

Perspectives in Nursing Management and Care for Older Adults
Series Editors: Julie Santy-Tomlinson · Paolo Falaschi · Karen Hertz

Karen Hertz

Julie Santy-Tomlinson *Editors*

Fragility Fracture and Orthogeriatric Nursing

Holistic Care and Management of the
Fragility Fracture and Orthogeriatric
Patient

Second Edition

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Perspectives in Nursing Management and Care for Older Adults

Series Editors

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The aim of this book series is to provide a comprehensive guide to nursing management and care for older adults, addressing specific problems in nursing and allied health professions. It provides a unique resource for nurses, enabling them to provide high-quality care for older adults in all care settings. The respective volumes are designed to provide practitioners with highly accessible information on evidence-based management and care for older adults, with a focus on practical guidance and advice.

Though demographic trends in developed countries are sometimes assumed to be limited to said countries, it is clear that similar issues are now affecting rapidly developing countries in Asia and South America. As such, the series will not only benefit nurses working in Europe, North America, Australasia and many developed countries, but also elsewhere. Offering seminal texts for nurses working with older adults in both inpatient and outpatient settings, it will especially support them during the first five years after nurse registration, as they move towards specialist and advanced practice.

The series will also be of value to student nurses, employing a highly accessible style suitable for a broader readership.

Karen Hertz • Julie Santy-Tomlinson
Editors

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Fragility Fracture Network

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Foreword

The first edition of this book [1] was a sister to another publication ‘Orthogeriatrics’ [2], which laid out the principles of management of older patients with fragility fractures, along so-called ‘orthogeriatric’ lines, and was aimed at all the relevant healthcare professionals who might be involved in orthogeriatric care and management. Although the latter publication included a chapter on the nursing role, it was clear that the centrality of nurses in optimising patient care in the orthogeriatric setting warranted a much more detailed exposition. This was produced by an enthusiastic team, in which the editors and all the authors were practising nurses. So far, that edition has had almost a quarter of a million chapter downloads from a wide range of countries, demonstrating the growing awareness of the challenge of fragility fractures and the key role of nurses in rising to it.

Both publications were driven and supported by the Fragility Fracture Network (in particular, its Education Committee), a global organisation that aims to ‘... *optimise globally the multidisciplinary management of the patient with a fragility fracture including secondary prevention*’ (www.fragilityfracturenetwork.org).

In the intervening years, the FFN has grown and matured, with a strong contribution from the global nursing community, who constitute a large proportion of its membership. There has been a substantial increase in the body of evidence supporting the efficacy and cost-effectiveness of orthogeriatric co-management in general, and orthogeriatric nursing in particular. Furthermore, dissemination of the messages in the first edition of the nursing book, in a rich international series of events organised by the FFN Education Committee, has deepened our appreciation of the nurses’ role and our knowledge in how to develop it. It was therefore timely for both books to be updated.

The second edition of the ‘Orthogeriatrics’ book [3] was laid out in conformity with the four ‘pillars’ of orthogeriatric co-management that had been defined in the intervening years:

1. Co-management of the acute fracture episode
2. Rehabilitation to regain function and independence
3. Secondary prevention (of further fractures)
4. Advocacy for policy change to enable the first three

In addition, the book contains a section on ‘cross-cutting’ issues that applied across all the pillars and, unsurprisingly, nursing was one of these.

This second edition of the Fragility Fracture Nursing book expands and enhances the description of nurses’ contribution to optimising care and management for those with fragility fractures. It now includes contributions from a global pool of experts in the field, as well as contributions from other members of the allied health team, reflecting the interdisciplinary nature of optimal fragility fracture care.

Orthogeriatric nursing and fragility fracture nursing are two facets of the same coin—one focused on co-managed acute care of significant fragility fractures such as hip fracture and the other on the pathway of care that leads to prevention of future fractures. The book is more comprehensive than its predecessor as it includes greater depth of discussion of aspects of orthogeriatric and fragility fracture nursing such as comprehensive geriatric assessment, fracture prevention, fall prevention, frailty management, nutrition, rehabilitation, remobilisation and exercise, carer involvement and hospital discharge.

Orthogeriatric nursing and fragility fracture nursing are still developing their theory, practice and evidence base. In some parts of the world, the nursing contribution has been enhanced by the development of advanced nurse practitioners in orthogeriatrics. This has happened in acknowledgement that there are too few geriatricians to provide optimum care from an orthogeriatric perspective, and in some parts of the world, there are no geriatricians at all. Recognising that nurses can develop advanced skills in this area that can enhance and optimise the management and care of older people with fragility fractures is an important first step in this journey for other countries where this model is championed by medical practitioners. Similarly, in some models of fracture prevention, nurses are leading the development of secondary prevention services.

Nurses are also beginning to develop their own theoretical perspective of what constitutes orthogeriatric and fragility fracture nursing and articulating the role of these in clinical practice. They are also increasingly engaged in and leading audit and research that demonstrates the immense value of nursing in optimising patient outcomes. This is enabling them to become empowered to develop their role, not only in expert and advanced care provision, but also in coordinating the orthogeriatric and fragility fracture care team in situations where nursing is central.

It is our great hope and belief that empowerment of nurses through the knowledge encapsulated in this book will play a major role in driving positive change in fragility fracture care in all countries of the world.

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Preface to the Second Edition

Since the first edition of this book was published in 2017, many things have changed while many others have stayed the same. Patients with fragility fractures remain the most common orthopaedic trauma inpatients in every acute hospital in almost every country. In many countries, the incidence has continued to increase, while in a few countries, the rise in incidence appears to be peaking but remains unacceptably high.

Patients who have sustained a fragility fracture are still usually elderly, although their average age may have increased alongside global population ageing. And they are also often frail—especially those who have suffered a significant fragility fracture requiring hospitalisation such as a hip fracture. These are injuries which nearly always require major orthopaedic surgery, engendering significant physiological and psychological stress and leading to significant reduction in individual function and mobility; loss of independence; physical, cognitive and psychological complications; and death. The need for a new edition of this book is, therefore, as acute as it ever was, if not more so.

This second edition has been written during the third year of the COVID-19 pandemic, which began in 2020, at a time during which there have been many unavoidable changes in numerous aspects of life. Many older people have had to change the way they live—spending more time at home, and more time alone as they have attempted to protect themselves from community spread of the virus. The impact of this on their health and well-being has not yet been extensively studied. It is very likely, however, that this has resulted in a cohort of older people whose musculoskeletal system has been deconditioned by periods of limited activity and who have become more reluctant to socialise within their communities. This places them at greater risk of both falls and osteoporosis—and, therefore, fragility fractures.

Many health services are beginning to recognise the unique needs of this group of often frail and vulnerable patients and are developing orthogeriatric services and ‘enhanced care’ units (often known as orthogeriatric units or hip fracture wards/units) where there is access to specialist medical, nursing and therapy care that includes geriatricians and other members of a multidisciplinary team with advanced skills in managing patients with highly complex needs following a fracture.

This edition has been written by a team of global expert practitioners in fragility fracture care, while the last edition was largely focused on the European experience. This reflects the increasing networking among fragility fracture practitioners facilitated by the Fragility Fracture Network (FFN) (www.fragilityfracturenetwork.org).

This has led to increased opportunities for knowledge and skill sharing internationally so that care at every stage of the pathway can be optimised. Patients whose care and management are not optimised have very poor outcomes in terms of regaining functional abilities, and they experience prolonged pain and complications that can, ultimately, lead to death.

Evidence-based, interdisciplinary care involves blending of the skills brought to the team by a diverse group of clinicians. This new edition reflects this through the involvement of many new authors from various professional backgrounds such as nursing, physiotherapy, nutrition, rehabilitation, medicine and surgery and crossing the speciality boundaries of orthopaedics, geriatrics, bone health and rehabilitation.

Patients with fragility fractures also need skilled and professional care in community and outpatient settings with a particular focus on bone health and fracture prevention. This reflects the ethos of the FFN, an organisation aimed at optimising globally ‘... *the multidisciplinary management of the patient with a fragility fracture, including secondary prevention*’.

The wealth of fragility fracture/orthogeriatric knowledge presented in this book is accessible to all practitioners who provide fragility fracture care in any setting and, it is hoped, will be available to the next generation of practitioners who want to practice in this challenging field and continue to improve and optimise care. This knowledge comes from the growing evidence base that informs best practice, as well as the diverse and extensive experience of the contributors.

The chapters provide a comprehensive exploration of the four ‘Fs’ of fragility fracture care:

- Fragility
- Fracture
- Falls
- Frailty

As well as an overview of three of the FFN’s pillars of fragility fracture care clinical intervention:

- Acute care
- Rehabilitation
- Fracture prevention

This is a complementary book to *Orthogeriatrics* edited by Falaschi and Marsh [1]. An unrestricted educational grant from the industry partner, UCB, has enabled the book to be published online as an open-access eBook so that the education it offers is freely available to all practitioners across the globe, no matter what their location or income. This support has been freely offered because education generates the power to make the care of patients with fragility fractures the very best it can be.

We hope that this new extended and updated edition will provide fragility fracture practitioners everywhere with the tools to optimise the care and management of patients in their local community and encourage them to engage with the global network of practitioners with the same goals in mind.

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Orthogeriatric and Fragility Fracture Nursing: An Introduction

1

Julie Santy-Tomlinson, Karen Hertz, Anita J. Meehan, Ami Hommel, Andréa Marques, Lingli Peng, and Robyn Speerin

1.1 Introduction

In many parts of the world, fragility fractures are the most common reason for admission to acute orthopaedic trauma units. The care of people following fragility fractures is provided in a variety of care settings including pre-hospital and

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emergency care, acute hospitals, outpatient/ambulatory clinics, rehabilitation, primary care and community/home care. Such care is often a complex, medium- to long-term undertaking with several phases from acute care through to rehabilitation and secondary fracture prevention. Often, a fragility fracture has a substantial impact on older peoples' longer term function, place of residence and quality of life. A hip fracture, for example, has been described as a 'life-breaking' event [1], reflecting its serious impact on the lives of individuals and their families. Sometimes, fragility fractures lead to the end of life. It is vital that care following a fragility fracture is swift and evidence informed. Nursing care has a huge impact on the outcomes for individuals whether it be their quality of life, where they live after the fracture or whether they survive.

Avoiding these devastating impacts drives the need to prevent fractures through secondary fracture prevention. This prevention care is lifelong and usually delivered and monitored by a primary care team including general practitioners, nurses, physiotherapists and other specialist practitioners. The pathway of care is, therefore, far from static and involves the collaboration of many individuals and agencies.

Although not all people who sustain fragility fractures are 'older' (some are fit and active, in their 60s, 50s or even 40s, and still in the workforce), most are elderly and often frail and/or living with sarcopenia. Many, especially those in younger age groups, have suffered a fracture that can be treated as an outpatient. However, such injuries are important warning signs that the underlying cause may be fragile bones caused by osteoporosis—often previously undiagnosed—that requires treatment to prevent further fractures.

If left untreated, osteoporosis and associated bone fragility can, ultimately, lead to significant injuries such as hip or femoral fractures, which will require hospital admission and surgery and severely threaten an individual's health and well-being, often becoming a precursor to declining function and even death from the complications of the injury and surgery. This can be illustrated by a patient story:

Sofia's story

I'm 78 now. Seven years ago, I was totally independent in my life, I fell and broke my left hip. They fixed it and I went home after 5 days. To be honest, I was never really the same after that. My walking seemed less steady, and I found it hard to walk far, or up the hill.

When I came out of hospital my general practitioner sent me for a bone scan. I was told I had osteoporosis. My Mum had it, so I suppose I wasn't surprised, but I didn't really understand the difference between osteoporosis and osteoarthritis. They put me on a drug for it. I've taken it every week since. After a year I had another bone scan. But I never got the results, and no one followed it up. I suppose I didn't take it seriously.

Over the last few years, I've noticed my spine has got quite curved. Sometimes my back aches. I think this has made my walking less steady. This has been worse since Covid—I stopped going out for quite a while and now it's hard to leave my home. I've been thinking I should talk to my doctor about seeing a specialist, but I haven't got around to it.

Recently, I fell again. I fractured my right femur, my right wrist, and the top of my right arm near the shoulder. The orthopaedic surgeon fixed my femur with a nail and my wrist with a plate. The fracture at the top of my arm has been left to heal on its own. It took me 4 weeks to get home as it's been so hard to get standing and walking again. I was so worried I might have to go into a home. It's been so much worse than last time.

The osteoporosis team came to see me in hospital. They said they thought I needed to start on some injections. I have a telephone appointment next week.

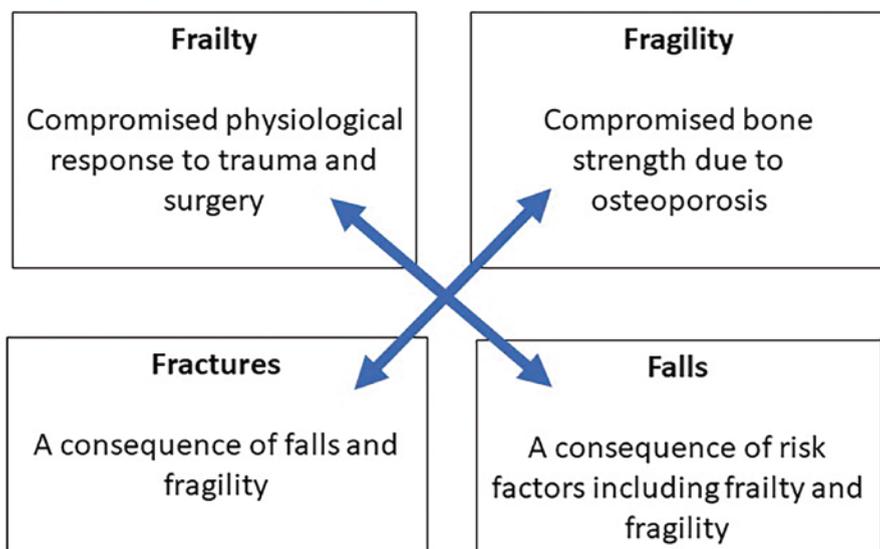


Fig. 1.1 The four 'Fs' of orthogeriatric/fragility fracture care

Loss of bone strength (bone fragility) due to osteoporosis, and consequent fragility fractures, often occurs in older people who are frail. They can then become frail or frailer following the fracture because of the physiological response to the tissue trauma, surgery and subsequent complications related to a sedentary lifestyle and the immobility that follows the fracture. Frailty is a complex geriatric syndrome linked with ageing, multiple health problems and physical and mental decline. It is recognised as a significant factor in adding complexity of needs to an already challenging clinical situation. This is reflected in the four Fs of orthogeriatric/fragility fracture care outlined in Fig. 1.1.

All these issues lead to significant challenges for clinical teams in every care setting. The main focus of this chapter is to introduce the reader to orthogeriatric and fragility fracture care. The aims are to both familiarise the reader with the multiple topics covered in this book and support the interdisciplinary care team in achieving optimal recovery of independent function and quality of life, with no further fractures for all people with fragility fractures.

1.2 Learning Outcomes

At the end of the chapter, and following further study, the practitioner will be able to

- Explore the causes and impacts of osteoporosis and fragility fractures.
- Outline the principles and challenges of fragility fracture and orthogeriatric care.
- Explain the elements of evidence-based pathways of care following fragility fracture.

- Outline the need for development of healthcare practitioner roles in fragility fracture care.
- Discuss the nature of fragility fracture care from an interdisciplinary perspective.

1.3 Fragility Fracture and Orthogeriatric Care

Fragility fractures are defined by the International Osteoporosis Foundation [2]:

Fragility fractures, which result from low energy trauma, such as a fall from standing height or less, are a sign of underlying osteoporosis. A patient who has sustained one fragility fracture is at high risk of experiencing secondary fractures, especially in the first 2 years following the initial fracture.

Although the care of patients with fragility fractures has taken place for centuries, as long as osteoporosis has existed, the concepts of orthogeriatric care and fragility fracture care have relatively recently been discussed. Consequently, we want to be clear about what we mean by these terms:

Orthogeriatric care is a specialised sector of healthcare that combines the skills of orthopaedic care as well as acute and rehabilitation care of older people who have suffered fragility fractures admitted to acute hospitals. This involves working as part of an interdisciplinary healthcare team who have expertise in geriatric medicine (although not specifically a geriatrician as they do not exist everywhere) and orthopaedic surgery as part of a team of allied health professionals with specialist expertise in aspects of the patient journey from injury to rehabilitation and fracture prevention.

Fragility fracture care is a specialised sector of healthcare that focuses on any person who has sustained a fragility fracture and has health and care needs that involve management of the fracture as well as prevention of future fractures. This care may take place in acute, rehabilitation and community settings and involves an interdisciplinary team approach, collaborating with other experts in fracture management, rehabilitation and secondary fracture prevention.

These two are not independent or exclusive of each other; practitioners in different parts of the fragility fracture journey may focus on one or the other or even both in their clinical practice, depending on their role and the setting in which they work. What is important is that these two facets of care of patients with fragility fracture require both fundamental and specialist skills and knowledge.

Osteoporosis and falls are more widely considered in Chaps. 2 and 4. The Fragility Fracture Network (FFN) has outlined four pillars of effective care and management of fragility fractures, listed in Box 1.1.

Box 1.1 The Fragility Fracture Network's (FFN) four pillars of fragility fracture care [3, 4]

- Pillar 1: Acute care
- Pillar 2: Rehabilitation
- Pillar 3: Secondary prevention
- Pillar 4: Policy

1.3.1 Pillar 1: Acute Care

Many fractures, including those sustained due to fragile or osteoporotic bones, require acute care from an orthopaedic trauma team to manage the fracture and monitor its repair/healing. If there is a relatively minor fracture (such as an uncomplicated fracture of the wrist) and the patient is otherwise fit and well, treatment can usually be provided without hospital admission, and in some areas across the world the treatment is managed in primary care. It is essential, however, that emergency care, fracture clinic and primary care teams recognise and act on the need to investigate the bone health of the patient. Secondary fracture prevention is the responsibility of all healthcare teams with the aim of minimising or deleting the treatment gap that is so prevalent in all parts of the globe. All teams are responsible for identifying whether osteoporosis is a cause of the fracture and ensuring that steps are taken to treat the cause according to contemporary evidence. Secondary fracture prevention is further discussed in relation to Pillar 3 below and in detail in Chaps. 2 and 5.

Vertebral fractures rarely lead to acute hospital admission but are worthy of mention here. They are common and have a significant impact, leading to further fractures, significant pain, loss of function and mobility, increased risk of falls, reduced quality of life and, even, death due to the impact of spinal curvature on the function of associated organs. However, the fracture usually occurs without symptoms, and most go undiagnosed.

The most severe injuries such as, but not exclusively, hip, femur and pelvis fractures require hospitalisation for assessment and management of the fracture. The most common of these is hip fracture (sometimes known as proximal femur fracture). In almost all cases, surgery is the most effective way to treat hip fractures as internal stabilisation of the fracture facilitates:

- (a) Managing the acute pain from the injury
- (b) Enabling the patient to mobilise early to avoid an extensive period of immobility

The management of these fractures, particularly hip fracture, is discussed in detail in Chaps. 7–12 where every aspect of the management of such injuries and care following surgery is considered.

It is increasingly common for patients admitted to hospital with a fragility fracture to have sustained a peri-prosthetic fracture (a fracture sustained around arthroplasty implants of the hip and knee), reflecting the more widespread use of hip and knee arthroplasty for the management of arthritis.

Any fracture that requires orthopaedic surgery places significant physiological and psychological stress on the patient, leading to significant anxiety, reduction in function and mobility, loss of independence and complications that can result in death.

Although this book is aimed at all health professionals providing care to patients with fragility fractures, nurses are the professional group who often provide care over the whole 24-h period, and the ones present in acute, primary and secondary care, making a significant contribution to positive outcomes. Consequently, nurses

are the largest group of health professionals in the orthogeriatric team. They are also likely to work across organisational boundaries, acting as links between the patient's family and local community, the hospital, the outpatient/ambulatory setting and other health and social care organisations. They are also instrumental in rehabilitation and fracture prevention pathways. It is important to acknowledge, however, that not all care is provided by nurses and that there are many other healthcare professionals and other workers who contribute to interdisciplinary patient care.

1.3.1.1 Acute Orthogeriatric Care

There are several different models of acute hospital care for patients with significant fragility fractures. Hospitalisation ideally involves admission to an orthopaedic trauma unit, but the unique needs of this group of largely frail and vulnerable patients are increasingly recognised and high standards of care are needed for all patients in every setting to ensure optimum outcomes. This is leading to the global development of 'enhanced care' units, often known as orthogeriatric units or hip fracture wards/units, where there is access to specialist medical, surgical, therapy and nursing care that includes geriatricians and other members of an interdisciplinary team with advanced skills in caring for patients with highly complex needs following a fracture. Depending on the local population size, these wards or units could be an entire ward dedicated to orthogeriatric care, or a section of an orthopaedic/surgical ward where dedicated beds are allocated to this group and the care staff have developed the special skills required to provide optimum care.

Orthogeriatrics is an established speciality in hip fracture care ... [in some countries ...], it involves the collaboration of orthopaedic surgeons working in partnership with geriatricians to provide medical care, which meets the best interests of the older person following hip fracture. But as the services have evolved the term 'orthogeriatrics' has come to describe an interdisciplinary team, caring, most often on an orthopaedic ward, for older people following hip fracture. They work collaboratively across the disciplines of surgery, medicine, anaesthesia, allied health professionals and nursing in providing specialist care [5].

It is widely accepted that hospitalised patients following a fragility fracture have highly complex care needs that require a team approach. No single healthcare profession can provide care in isolation, but patients' outcomes are improved if there is full collaboration across all disciplines making up the 'orthogeriatric' team [6] as well as involvement of patients and families in care and decision-making. Complexity of patient needs following hip fracture, high prevalence of such injuries, time spent in an acute hospital and healthcare costs mean that the focus of inpatient care tends to relate predominantly to this group. Around the world, how hospitalised patients are managed depends on local organisation of healthcare and the resources available. For example, in many countries, individuals are co-managed by orthopaedic surgeons and geriatricians, but the absence or limited numbers of geriatricians in some parts of the world means that other medical practitioners are more likely to be involved, including rehabilitation specialists and/or internal medicine physicians. In many higher income countries, where hip fracture and other fragility fracture management is audited against evidence-based standards,

outcomes following fragility fracture have significantly improved over the last few decades. In many other countries, however, these standards are yet to be incorporated into clinical practice. In some locations, for example, surgical fixation can be delayed for up to 2 weeks, despite best practice standards that recommend surgery within 1–2 days.

Many established orthogeriatric units use the interdisciplinary team approach. This model involves a lead clinician who is most often a physician, geriatrician or orthopaedic surgeon, collaborating with specialist nurses and allied health professional team members. There are highly developed local pathways and protocols of care to standardise and improve care and ensure effective communication between all team members and other specialists. This co-working has led to value-based care in action and improvement in patient outcomes, patient and family experiences and clinical team members' work experience. The concept of interprofessional care is essential for ensuring that individuals' needs drive clinical care, and the incorporation of evidence-based practice is central to assessment and intervention [7].

Most practitioners providing care for people with fragility fractures in the acute phase will have extensive orthopaedic knowledge and skills but may have limited knowledge and skills specifically relating to the specialist care of older people. Globally, there are too few geriatricians and physicians specialising in the health of older people to provide clinical leadership for all patients with significant fragility fractures—especially in Asia and Latin America where fracture cases are set to rise to epidemic levels. Because of this gap, orthogeriatric competencies based on comprehensive geriatric assessment (CGA) and management of frailty (Chaps. 3 and 6) must be developed in other practitioners. These practitioners may be from professions such as nursing, physiotherapy, occupational therapy and pharmacy, but who are led and educated by geriatricians wherever possible. In situations where geriatricians are not available, remote peer mentoring from advanced practitioners at a distance can be used to upskill local team members.

As the person travels through their journey towards rehabilitation, their care needs alter. As they move on from acute settings (for example, when they are assessed in secondary fragility fracture care services or bone health clinics), the team involved in their care need to be specialists in community rehabilitation, bone health, chronic health conditions, palliative care and self-management support models of care. It is the role of clinical leaders to ensure that there are sufficient educational opportunities to guarantee that the care patients receive is age sensitive and reflects their individual needs.

One of the key challenges in providing interdisciplinary orthogeriatric care is also the biggest opportunity for nurses. Interdisciplinary orthogeriatric care can be fragmented and less effective if it is not managed or coordinated effectively. Nurses' 24-h presence, detailed knowledge and involvement in care pathways make them ideal care coordinators. The complex care requirements of orthogeriatric patients mean that care should be led by those who are experts in the field, with an intuitive understanding of need. In some settings, care and its coordination are led by a specialist nurse or coordinator such as a hip fracture nurse specialist, elderly/elder care

nurse specialist, trauma nurse coordinator, nurse practitioner or advanced nurse practitioner.

This model of professional expertise is also critical to the development of secondary fragility fracture prevention teams such as fracture liaison services. These are commonly coordinated by nurses (although this role can also be done by other professional groups such as therapists and other allied health practitioners) to close the gap between the fracture and access to secondary fragility fracture prevention services. Expertise in fragility fracture prevention that includes medical and conservative care needs such as fall risk/prevention and nutrition is imperative for coordinators of secondary fracture prevention care. An understanding and knowledge of how to utilise behaviour change models of care are also needed so that the patient and family are not only core team members in their care planning and implementation, but also have a clear and heard voice in their health improvement journey. Employing behaviour change theoretical models of care aids in long-term positive outcomes as the person and their family will have had input into exploring what they are able to do to manage their bone health. These concepts are further discussed in Chap. 5.

In some countries, interdisciplinary collaborative working has supported the development of advanced nursing roles (often operationalised as clinical nurse specialists, nurse practitioners or physicians' assistants) who have a variety of skills that are complementary to the interdisciplinary team and which enhance patient care. Continuity of care should be provided so that communication between individual professional groups, patients and carers is central to care provision, providing high-quality care and excellent patient experience and ensuring that all care needs of individuals are addressed.

1.3.2 Pillar 2: Rehabilitation

Evidence-informed rehabilitation that considers local cultural needs is needed following many fragility fractures. Such rehabilitation will support people in recovering their function, independence and quality of life once the acute phase of care is subsiding. Rehabilitation starts immediately following the fracture, so this is not something that can be postponed until the person meets a specific rehabilitation professional or team. The individual's needs are assessed and planned for from admission to hospital with all team members responsible for working towards individual goals to achieve best possible long-term outcomes. Rehabilitation is considered in more detail in Chaps. 8 and 14.

1.3.3 Pillar 3: Secondary Prevention

People who sustain any fragility fracture underestimate their risk of osteoporosis, and they are usually unaware of the presence of this chronic disease until a fragility fracture occurs. Unless screening using bone densitometry becomes a normal part

of primary care in people at most risk (men and women aged 50 years or more), primary prevention (before a fracture occurs) is mostly infeasible. This has created a significant ‘treatment gap’ between those individuals who require medical and conservative management of osteoporosis and those individuals who actually receive treatment to prevent future fractures [8].

A fundamental pillar of effective fragility fracture care is comprehensive secondary prevention after every fracture, addressing falls risk as well as bone health. Secondary prevention involves identifying those who have osteoporosis immediately following presentation with a low trauma fracture (hopefully a less significant fracture such as a wrist fracture) so that osteoporosis can be treated and future fractures are prevented (see Chaps. 2 and 5).

Secondary fragility fracture prevention services (sometimes known as fracture liaison services (FLSs)) are interdisciplinary services that optimise the ‘case finding’ of those who have sustained a first, or ‘signal’, fragility fracture, as well as those who have had previous fractures but have not gained access to evidence-informed care to prevent further fractures. Such services are coordinated by a lead clinician, and the fracture prevention team work together to optimise the management of re-fracture prevention, including osteoporosis, over the short and long terms [9]. Such services and pathways are discussed in detail in Chap. 5.

This approach has been demonstrated to optimise osteoporosis treatment and thus reduce the incidence of re-fracture. Collaboration across the healthcare sector is imperative. However, this important aspect of care cannot simply be delegated to a fracture prevention service since such services are currently not commonplace across the world. The epidemic of fragility fractures worldwide means that a few expert teams cannot make enough difference globally, so there is a need to focus on global policy and change.

1.3.4 Pillar 4: Policy

The fact that fragility fracture care is not optimal or standardised either across the globe or even within many higher income countries led the Fragility Fracture Network (FFN) to instigate a global ‘Call to Action’ [3]. The Call to Action aims to improve the care of people presenting with fragility fractures through a systematic approach to fragility fracture care with the goal of restoring function and preventing subsequent fractures. There has been a repeated call on governments to urgently address the human and economic toll that fragility fractures are placing on societies through the formation of interdisciplinary national alliances to promote policy change. Quality of care is defined as: “... *the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with evidence-based professional knowledge, spanning health promotion, prevention, treatment, rehabilitation and palliation through the provision of evidence-based care that takes into consideration the needs and preferences of service users—patients, families and communities*” [10].

For meaningful policy change to take place, all stakeholders across fragility fracture care and linked sectors need to be involved in engaging with policymakers to seek improvements in care [11]. This includes the involvement of all health professionals in global, regional, national and local networks and all professional organisations. For nurses and other care providers, this also means speaking out about the needs for improvements in care through ensuring that there are adequate resources and education for clinicians. Further discussion of these issues is included in Chap. 18.

1.4 Interdisciplinary Care

There is strength in a team that is much more than the sum of its parts. The fundamental principle of orthogeriatric care and management of fragility fractures is the interdisciplinary approach. People presenting with fragility fractures need the simultaneous application of the skill sets of orthopaedic surgeons and geriatric physicians, but an effective interdisciplinary team is much broader. It includes other medical professionals such as emergency physicians, anaesthetists, endocrinologists, rheumatologists, rehabilitation specialists and primary care teams collaborating with other health professionals such as nurses, physiotherapists, occupational therapists, nutritionists and psychologists. Interdisciplinary care involves clinicians from different disciplines or professional groups sharing skills and working together, each drawing on their own disciplinary knowledge and working in the best interests of patients and their families.

In an interdisciplinary approach, nurses and other health professionals work collaboratively with medical and therapy colleagues, keeping people at the centre of the planning and provision of high-quality evidence-based care which not only reflects orthogeriatric knowledge and skills, but is also provided in a way that demonstrates that the care provided is integrated, compassionate, dignified, person-centred and holistic (see Chaps. 17 and 18).

Few orthogeriatric teams are yet working in a truly interdisciplinary manner. Table 1.1 provides an overview of the meaning of common terms relating to different styles of collaborative professional working.

For orthogeriatric care to be an effective model everywhere in the world, it is essential to move towards a more interdisciplinary approach with the aim of transdisciplinary collaboration (Table 1.1). Although interdisciplinary care is not yet common, it is achievable. Interprofessional collaboration as a basis for interdisciplinary care helps minimise undesirable events, improve teamwork and communication and improve patient outcomes. Major factors that affect collaboration include communication, respect and trust, unequal power among team members, understanding other team members' professional roles, and task prioritising. Despite many years of professional working relationships between nurses, therapists and doctors, for example, an understanding of each other's roles, values and beliefs could be improved in many teams.

Table 1.1 Common terms relating to team collaboration in healthcare [12]

Collaboration	Cooperatively working together, sharing responsibility for problem-solving, making decisions and providing patient care in a culture of mutual trust, respect and collaboration. Requires a clear recognition of boundaries, areas of overlap and thresholds for seamless referral and transfer of care
Multidisciplinary	Professionals from several different disciplines collaborating, with each drawing on their own professional knowledge and skills applied to a common focal point
Interdisciplinary	Professionals from several different disciplines collaborating by integrating and synthesising knowledge and skills from their different disciplines. Multiple angles on solving shared problems can offer innovative solutions that cannot be generated by a single discipline alone
Transdisciplinary	Professional collaboration through creating a new discipline that transcends the boundaries of disciplinary roles with a polymathic approach that does not sit neatly in any one discipline. Nutrition can be considered transdisciplinary in relation to the natural, biomedical and social sciences as well as the humanities

The FFN Call to Action (CtA) [3, 4] identified the core values of an interdisciplinary approach to fragility fracture management. The development of the CtA identified that patients with a fragility fracture can expect that they are cared for in an interprofessional manner across the continuum of care. Nurses, as well as other health professionals, are actively involved in the management of care in the first three clinical pillars and should be active in national alliances as well as Global FFN, promoting these values. However as identified by Marsh et al. [13]:

Despite the fact that nurses are actively involved globally in the multidisciplinary teams, for the management of fragility fractures. It depends on attitudes to nurses, and what they may be capable of, which varies widely across the globe. In some developed economies, nurses are significantly empowered, based on models of advanced training, protocol-driven care and supervision by appropriate medical specialists. This includes, in many locations, the ability to order investigations and treatments within protocols. By contrast, there are many countries where such autonomy would be anathema. What is very clear, and needs to be asserted as frequently as possible, is that the volume of fragility fracture-related work—already now but more so in the future—is such that it cannot realistically be delivered without enhanced nurse input. There is no prospect that there will be (1) enough geriatricians on the planet to deliver orthogeriatric surveillance of all older fracture inpatients on a daily basis or (2) enough endocrinologists for every fragility fracture patient to be assessed for secondary prevention by a doctor.

For nurses, there are three major questions regarding the interdisciplinary management of fragility fractures

1. What role do nurses play in the multidisciplinary team, and does this meet the criteria for an interdisciplinary team?
2. How do nurses identify and develop their orthogeriatric and fragility fracture professional knowledge and skills to demonstrate interdisciplinary nursing knowledge that relates to orthopaedic knowledge and skill, older persons' care, osteoporosis and management of fragility fracture care?
3. What does advanced professional nursing practice look like, and how should nurses act as coordinators of care in all parts of the 'acute care–rehabilitation–secondary prevention' pathway?

1.5 The Key Role of Nurses in Orthogeriatric and Fragility Fracture Care

The introductory chapter to the first edition of this book provided an overview of the nature of nursing. It identified that nursing is both a caring art and a science that encompasses a distinct body of knowledge, separate from that of medical or allied health professional colleagues. Knowledge is specific information about something, and caring is behaviour that demonstrates compassion and respect for another, but these simplified concepts do not truly reflect the synthesis of both knowledge and the art of caring that makes orthogeriatric nursing unique [14]. It is important, however, to acknowledge that not all ‘care’ is provided by those professionals who are identified as nurses and that, in the future, the boundaries of care giving roles are likely to be more flexible. For these reasons, this book, although focused on nursing (because a significant amount of fragility fracture/orthogeriatric care is provided by them), aims to broaden its relevance to all healthcare professionals who provide care in any part of the world.

Health professionals caring for those who have sustained a fragility fracture are required to provide evidence-based care and coordinate interdisciplinary care. Care also needs to be multi-specialist in the sense that it brings together the skills and knowledge of acute orthopaedic trauma care, acute geriatric care, rehabilitation and palliative care. This requires both advanced knowledge and enhanced skills. However, this is not the complete picture; those with fragility fractures also need skilled and professional care in community and outpatient settings with a focus on bone health and future fracture prevention. These practitioners need diverse skill sets, working at different levels from novice through to expert [15]. Nurses and other practitioners need to perceive and act on patients’ care needs holistically and use this to help them to provide high-quality care. This book has been written by a group of experts, predominantly nurses but also including other members of the team, each with skills and knowledge in specific aspects of fragility fracture care. It is the synthesis of this knowledge and the associated evidence that informs and leads the practice discussed within these chapters that epitomises this evolving care speciality.

Each contributor in this second edition has a different clinical background reflecting the interprofessional working required to care for orthogeriatric and fragility fracture patients across healthcare settings globally. This has offered the opportunity for the book to truly bring together a depth of experience of interdisciplinary practice and to acknowledge the need for practice development across a world where local practice varies according to social, cultural and political influences.

1.6 Safe and Effective Clinical Care

Nursing is broad and complex, and the nursing profession has traditionally had difficulty in articulating its unique benefits. Indicators of care quality include nurse-sensitive patient outcomes such as patient comfort and quality of life, risk, outcomes

and safety, patient empowerment and patient satisfaction [16]. Hip fracture is known to carry a high incidence of morbidity, mortality and long-term functional disability, challenging the interdisciplinary team to manage complex multi-factorial issues relating to, for example, advancing age, frailty, existing and evolving comorbidities, and cognitive dysfunction. These underlying issues are significantly impacted by nursing care interventions in the perioperative period and beyond [17].

More specific indicators of nursing quality of care include healthcare-associated infection, pressure ulcers, falls, drug administration errors and patient satisfaction [18, 19]. But an approach to quality that focuses on patient safety can neglect other aspects of clinical effectiveness and the impact on quality of care or patient experience.

In orthogeriatric care, a starting point might be to work on the development of nurse-sensitive indicators for pain, delirium, pressure ulcers/injuries, hydration and nutrition, constipation, prevention of secondary infections and venous thromboembolism (VTE) [20]. While many of these complications are discussed in more detail within other chapters, it is important to include evidence-based care and management strategies that coexist with medical models of care, reducing the risk of developing complications, morbidity and mortality while improving recovery, maintaining functional ability and improving patient outcomes and experiences. Pain management, nutrition and hydration, remobilisation, rehabilitation and motivation are all central to prevention of complications following hip fracture, and each of these are both interdisciplinary and nursing care priorities and considered in more detail in later chapters.

Comprehensive assessment of the older person with a fragility fracture, especially hip fracture, is central to effective, evidence-based care in the emergency, perioperative and recovery periods (Chap. 6), and an understanding of frailty and sarcopenia underpins all of this (Chap. 3). Many aspects of care are discussed, but pain management, complication prevention, remobilisation, nutrition, hydration, wound management and pressure ulcer prevention are singled out for specific attention in this book because they are so central to improving patient outcomes. Delirium (Chap. 12) and other cognitive impairments such as dementia are, like depression and other aspects of mental health, major barriers to recovery and rehabilitation following fragility fracture. In some instances, hip fracture may be the beginning of the final phase of a person's life and sensitive palliative care, with effective symptom control and emotional and psychological support for patients and their families being essential.

Quality indicators within the standards that underpin hip fracture audit have already had a significant impact on the quality of medical and surgical care. However, these currently only briefly consider nursing indicators. Specific indicators of the value of nursing care must be identified and ways to measure them developed. The overall contribution of healthcare delivery is often measured in terms of health status, outcomes, readmissions rates, length of stay, complication rates and mortality [15], but these do not necessarily help to capture the specific contribution of nursing and other members of the interdisciplinary team. Length of stay can be a misleading measure for success given concerns about early discharge when patients still need expert care.

1.7 Education for Orthogeriatric Care

Despite the high incidence of fragility fracture globally and their presence in a wide variety of healthcare settings, practitioners have rarely received formal education in the care and management of this group of patients with complex needs, and the centrality of the nursing role is not well recognised in the literature. Practitioners need multiple orthogeriatric specialist skills that combine orthopaedic care expertise with *age-sensitive* care of the older person in acute healthcare involving in-depth appreciation of the theory underpinning care. This includes a deep understanding of how both age and frailty, as well as skeletal fragility and injury, impact the planning and implementation of care. There is, consequently, an important education and skill gap, and at present there are limited education resources available to support professional development of specialist orthogeriatric nurses and other practitioners. Education needs to involve sharing of knowledge and skills nationally and internationally as an integral part of the development of orthogeriatric practice.

Summary of Key Points

- Fragility fractures are common globally, and their care, especially in older people, is often complex; involving three main clinical pillars: acute care, rehabilitation and secondary fracture prevention.
- The underlying causes of fragility fractures are osteoporosis and associated bone fragility with fractures often precipitated by a fall.
- Globally, not all who suffer a fragility fracture receive optimum care in some or all phases.
- People are usually unaware that they have osteoporosis until they have a first fracture—this fracture should lead to a referral to secondary prevention services often known as a fracture liaison service.
- Orthogeriatrics is a model of care that involves interdisciplinary collaboration in optimising care in the acute care of older people with significant fractures including specialist and advanced skills.
- Practitioners need to develop their practice through knowledge sharing and skill development through training.

1.8 Further Study

Returning to Sofia's story at the beginning of this chapter and reviewing what you have learned from this chapter, consider how her care might have been improved, based on the three clinical pillars, discussed above in relation to both her initial hip fracture and her more recent injuries from the perspectives of; (1) acute care, (2) rehabilitation and (3) secondary fracture prevention.

As you read some of the material in the following chapters, compare Sofia's experience to other cases presented in the subsequent chapters. Return to your reflections on Sofia's experiences, and consider how this relates to the care pathways in your own clinical setting.

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Osteoporosis and the Nature of Fragility Fracture: An Overview

2

Marsha van Oostwaard and Andréa Marques

2.1 Introduction

The main consequence of osteoporosis is that it is a condition in which bone mass is depleted and bone structure is destroyed to the degree that bone becomes fragile and prone to fractures. For affected patients, these ‘fragility fractures’ are associated with substantial pain and suffering, disability and even death, along with substantial costs to society [1]. The problems created by fragility fractures and osteoporosis are multifactorial in origin and are, therefore, an interdisciplinary problem. A first fragility fracture is often the first sign of osteoporosis, and ‘secondary’ prevention of fragility fractures is focused on the prevention of further fractures once an initial fracture has occurred.

The global prevalence of osteoporosis is estimated at 20% with variation between countries and continents [2]. The number of people suffering from osteoporosis (with high risk of fractures) is increasing significantly over time, probably because of global ageing and longer life expectancy, leading to a higher prevalence of osteoporosis and fractures in the general population.

Nurses, alongside other practitioners, play a key role in the education and guidance of patients with osteoporosis and prevention of fragility fractures. This chapter provides an overview of how osteoporosis and fragility fractures are linked, with a focus on fracture prevention.

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2.2 Learning Outcomes

At the end of the chapter, and following further study, the nurse will be able to

- Explain the fundamentals of bone biology and its relevance to osteoporosis and fragility fractures.
- Describe the most common fragility fractures, their epidemiology and impact on individuals.
- Undertake fracture risk assessment using different calculation tools (e.g. FRAX[®], Garvan) and recognise and modify the fixed and modifiable risk factors.
- Educate communities and individuals about osteoporosis diagnosis, treatment and advise on lifestyle changes.
- Outline the overall goal and benefits of osteoporosis treatment and support individuals during treatment.

2.3 Bone Biology

The human skeleton gives structure to the body, protects organs, makes motion and mobility possible by attachment to muscles via tendons and ligaments, stores and releases minerals and, in the bone marrow, manufactures blood cells. About 80% of the skeleton is cortical (or compact) bone, which forms the outer structure of the shafts of long bones. Trabecular bone (20%) is mainly present in the ends of long bones and in the centre of the vertebrae and ribs. Bone undergoes a lifelong process of replacement, with mature bone being replaced with new. This regulated process of ‘bone turnover’ maintains a balance between bone resorption and formation to maintain skeletal integrity [3]. This occurs throughout a person’s life, resulting in a replacement of 5–10% of the total skeleton each year and a total renewal of the skeleton every decade [4].

Remodelling involves three types of cells: osteoblasts (bone builders), osteoclasts (bone eaters) and osteocytes (‘directors’ of bone remodelling and repair). There is a continuously ongoing interaction between hormones, minerals and bone cells that is influenced by:

1. Changes in calcium levels in the blood
2. Pressure/strain on bones generated by gravity and the action of muscles
3. Hormones (oestrogen, testosterone and growth hormone)

In youth, bone formation exceeds resorption, so bone mass and strength increase. Peak bone mass is achieved at an age of 20–25 years [5]. At 30–40 years, bone mass gradually decreases as bone resorption exceeds bone formation. By the age of 80, it is estimated that total bone mass is \pm 50% of its peak [6]. When the balance tips towards excessive resorption, bones weaken (osteopenia) and, over time, can become brittle and at risk of fracture (osteoporosis) [7]. See Fig. 2.1.

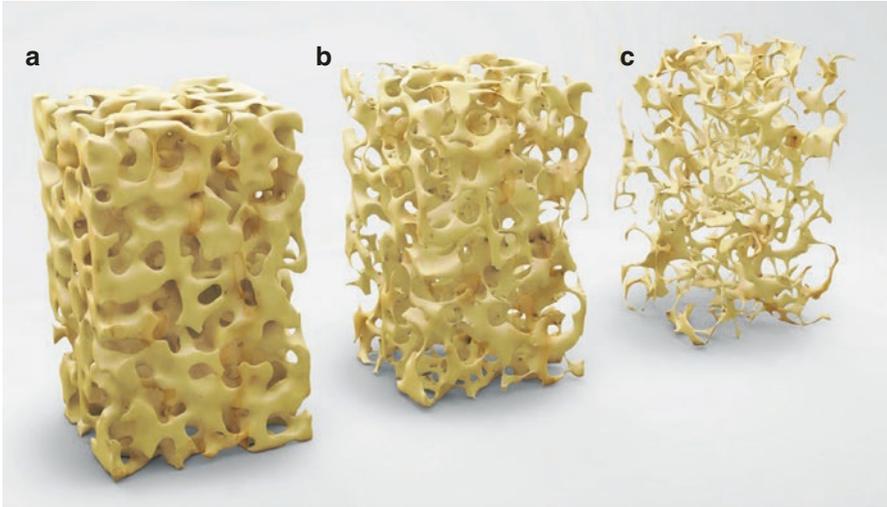


Fig. 2.1 The progression from healthy bone to severe osteoporosis: (a) healthy bone, (b) osteoporosis, (c) severe osteoporosis

2.4 Osteoporosis

Osteoporosis is a common, chronic, systemic skeletal disease that is ‘*characterised by low bone mass and microarchitecture deterioration of bone tissue, with a consequent increase in bone fragility and susceptibility to fracture*’ [8]. See Fig. 2.1. It is a devastating condition that can lead to pain, severe disability and premature death from fracture. As bones become more porous and fragile, the greater the increase in the risk of fracture. Patients are often unaware that they are at risk of or have osteoporosis as bone loss occurs silently and progressively without signs or symptoms until fractures occur.

2.4.1 Epidemiology

Osteoporosis is a global problem, but the size of the problem is unclear because of the variability in assessment and awareness, which probably leads to erroneously low reporting. However, epidemiological studies report extremely high estimated figures:

- Worldwide, it is estimated that 200 million women suffer from osteoporosis [9] and 1 in 3 women and 1 in 5 men will experience a fragility fracture resulting in a hospital visit every 3 s.

- In 2010, in the EU alone, 22 million women and 5.5 million men were estimated to have osteoporosis, resulting in 3.5 million new fragility fractures comprising:
 - 610,000 hip fractures
 - 520,000 vertebral fractures
 - 560,000 forearm fractures
 - 1.8 million other fractures [10]
- The economic burden of fractures was estimated at €37 billion and is still rising [10].
- After a fracture, the overall risk of a subsequent fracture is doubled, but this fluctuates over time and the risk is highest immediately after an initial fracture [11].
- Regarding the clinical consequences of fracture, for example after hip fracture:
 - 40% cannot walk independently.
 - 80% cannot perform basic activities such as shopping independently.
 - 10–20% require permanent residential care [12].
- By 2050, the worldwide incidence of hip fracture is believed to increase three-fold in men and double in women [13].
- The number of people living with osteoporosis in all regions of the world will increase dramatically in the coming decades due to ageing populations and lifestyle changes that are bone-unhealthy.

2.4.2 Fragility Fracture

‘Fragility fractures occur as a result of “low-energy” trauma, often from a fall from standing height or less, that would not normally result in a fracture’ [14] and are a major public health problem; one occurs globally every 3 s, with high human and socio-economic impact, morbidity, mortality and costs [15].

For individuals, fractures frequently result in loss of autonomy, deterioration in quality of life and need for care [8]. A fragility fracture may result from minimal trauma (e.g. a fall from a standing height) or no identifiable trauma at all [12]. The fracture is both a sign and a symptom of osteoporosis and a predictor for subsequent fractures [11].

Typically, fractures in patients with osteoporosis occur at the following locations [17]

- Vertebral (spine)
- Proximal femur (hip)
- Distal forearm (wrist)
- Proximal humerus

Wrist or distal forearm fractures are the third most common type of osteoporotic fractures [16], accounting for up to 18% of all fractures among older people [17], and their impact on quality of life due to complications and impaired function is often underestimated [18]. Distal forearm fractures are usually ‘the first’ fragility fracture, frequently followed by a subsequent hip or vertebral fracture [19].

Hip fractures are the most serious fractures in terms of cost and morbidity. Although a woman's risk of dying from a hip fracture is high (and exceeds the lifetime risk of death from breast cancer, uterine cancer and ovarian cancer combined), the mortality risk after a hip fracture is much higher for men. Hip fracture nearly always requires hospitalisation and is fatal in almost a quarter of all cases. For those who survive after a hip fracture, most do not regain their pre-injury level of function and 30% experience loss of independence. Dependency is greatly feared by patients and is costly to their family and to society [20]. If a first fragility fracture is recognised and osteoporosis treated, the risk of a future fracture can be reduced, preventing the continued downward spiral in health and quality of life, and even death, that often follows hip fracture [21].

Vertebral fractures are the most common manifestation of osteoporosis and are usually diagnosed when a patient presents with back pain, with a spinal X-ray showing vertebral body fracture. Vertebral fractures are 65–75% asymptomatic, or mildly symptomatic, and only 30–40% come to medical attention at the time that they occur [22]. Vertebral fractures in older adults are associated with increased mortality, often due to their association with frailty (see Chap. 3) [23]. A vertebral fracture increases the risk of sustaining more vertebral fractures, a phenomenon often referred to as 'vertebral fracture cascade'. Recognised vertebral fractures are usually treated non-surgically with a brief period of rest (bed), pain medication, bracing and physiotherapy. Approximately 40% of patients develop chronic disabling pain and/or spinal deformity (kyphosis) resulting in reduced pulmonary function that is associated with increased risk of mortality. Vertebral fractures increase the risk of sustaining future fractures fivefold, so it is important to identify them and immediately start preventive treatment. If a vertebral fracture occurs when patients are already being treated for osteoporosis, therapy will require evaluation and adjustment.

It is important to identify patients who are at increased risk of fracture. It has been estimated that only 20–30% of people sustaining a fragility fracture gain access to preventive care, despite international evidence that shows that a systematic approach to secondary prevention provided by 'fracture liaison services' results in fewer fractures and significant cost savings (see Chap. 5). Nurses and other practitioners can play a key role in identifying risk factors and providing education about the importance of a fracture risk assessment and fracture prevention. This can be done regardless of whether the practitioners work in hospital-based, homecare or residential care settings. Regarding fracture prevention, it is important to assess the patient's knowledge of osteoporosis and provide education regarding lifestyle factors such as calcium-rich diet and exercise. Practitioners should also assess any potential barriers such as limited access to healthy food, impaired mobility, impaired health literacy or language barriers.

Investing in fracture risk assessment and education about fracture risk reduction is an important area of potential interventions that are within the scope of daily clinical care. Nurses and other practitioners can play an important role in the management of patients with osteoporosis through supporting self-management in a way that is agreeable to patients and their family. Measures can be planned to impact modifiable risk factors and meet the individual's need for information and education. Secondary fracture prevention is discussed in significant detail in Chap. 5.

2.4.3 Risk Factors

Many risk factors for osteoporosis and fractures have been identified. They can be divided into two categories: fixed and modifiable. Fixed risk factors (listed in Box 2.1) cannot be modified but help to identify patients with high fracture risk [24].

Box 2.1 Fixed Risk Factors for Osteoporosis [24]

Age: Above 50 years of age contributes to risk of fracture independently of BMD (bone mineral density), with doubling of risk for every decade thereafter.

Female gender: Women are more at risk of developing osteoporosis due to menopausal decrease in oestrogen. Women have a lower peak bone mass than men.

Parents with a hip fracture: Having a parent with a hip fracture at any time in their lives is associated with an increased risk of fracture (independent of BMD).

Previous fracture: At least one earlier fracture that occurred in adult life—or a fracture arising from trauma which, in a healthy individual, would not have resulted in a fracture—doubles the risk of a second fracture in both men and women.

Ethnicity: Caucasian and Asian people have a higher incidence of osteoporosis and fractures of the hip and spine.

Menopause: Osteoclasts are more active, and bone loss increases due to decrease in oestrogen levels following menopause or oophorectomy.

Long-term glucocorticoid therapy: (>5 mg/day of prednisone or equivalent for >3 months) increases bone loss and impairs bone formation—calcium absorption is affected and muscle weakness can occur, increasing the risk of falling.

Rheumatoid arthritis (RA): Inflammatory cytokines and impaired mobility increase bone loss; people with RA have a twofold risk to have osteoporosis.

Primary/secondary hypogonadism in men: Due to hormone disorders, normal ageing or androgen deprivation therapy in prostate cancer—rapidly increases bone loss.

Secondary risk factors: Disorders and medications that make the bone more fragile and/or affect balance and risk of falling.

Most modifiable risk factors (listed in Box 2.2) directly impact bone biology and result in a decrease in bone mineral density but can also increase the risk of fracture independently of their effect on bone itself. Practitioners can educate and guide individuals towards healthier lifestyles to reduce these risk factors as much as possible (see Chap. 5).

Box 2.2 Modifiable Risk Factors for Osteoporosis [24]

Alcohol: Excessive alcohol consumption (>3 U daily) increases the risk of a fracture by 40% due to direct adverse effects on osteoblasts and parathyroid hormone levels (regulates calcium metabolism), associated with poor nutritional status (calcium, protein and vitamin D deficiency) [25].

Smoking: Current and/or past smoking; the exact mechanism is unknown, but increased fracture risk is reported when there is a history of cigarette smoking [26].

Low body mass index (BMI): Regardless of age, sex and weight loss, BMI <20 kg/m² is associated with a twofold increased risk of fracture.

Poor nutrition with low dietary calcium intake: Inadequate intake of calcium, vitamin D or both influences calcium-regulating hormones; deficiency of either calcium or vitamin D will result in impaired calcium absorption and lower concentration of circulating calcium; parathyroid hormone (PTH) secretion is stimulated, increasing PTH levels, leading to an increase in bone remodelling, significant loss of bone and increased risk of fracture (see Chap. 11).

Vitamin D deficiency: Vitamin D plays an essential role in calcium absorption; it is made in the skin when exposed to the sun's ultraviolet rays (10–15 min a day is usually sufficient); food sources (see Chap. 11) or supplemental sources of vitamin D are beneficial [27].

Eating disorders: Due to poor nutrition and vitamin D deficiency, there is a risk of obtaining a lower peak bone mass in early adulthood.

Oestrogen deficiency: Accelerates bone loss and reduces the build-up of bone mass; related to both hormone imbalance (e.g. early menopause) and nutritional factors.

Frequent falls: For factors that increase the risk of falling (see Chap. 4).

Sedentary lifestyle: Physical activity and fitness reduce the risk of osteoporosis and fracture as well as other fall-related injuries [28].

Low bone mineral density, one of the most important indicators of fracture risk, is both a fixed and modifiable risk factor. Many cross-sectional and prospective population studies indicate that the risk for fracture increases by a factor of 1.5–3.0 for each standard deviation decrease in bone mineral density [29]. Bone mineral density is determined by a wide range of factors including family history, age and lifestyle. Prevention of osteoporosis starts in youth by gaining sufficient peak bone mass; it is estimated that a 10% increase in the peak bone mass of children reduces the risk of an osteoporotic fracture during adulthood by 50% [30]. Lifestyle choices influence 20–40% of the reached peak bone mass [31], so lifestyle factors known to influence peak bone mass and strength are an important strategy to reduce the risk of developing osteoporosis or fractures later in life. Children should be encouraged to exercise and play outside and should be given vitamin D supplements (according to national guidelines) alongside a healthy diet with sufficient calcium intake. When

an individual is diagnosed with osteoporosis, prevention is no longer about gaining a higher bone mass, but preventing fractures. Treatment of osteoporosis consists of prescription of specific anti-osteoporosis medication and calcium and vitamin D supplements in combination with healthy lifestyles.

2.4.4 Diagnosis

Diagnosis and treatment of osteoporosis include a five-step approach: (1) case finding, (2) risk evaluation, (3) differential diagnosis of secondary osteoporosis, (4) therapy/treatment and (5) follow-up [32].

2.4.4.1 Case Finding

Case finding involves opportunistically identifying patients with osteoporosis when they present with a first fracture, using the fracture (a risk factor itself) as the starting point. This is the first step towards identifying those patients most urgently in need of fracture prevention through one of the two approaches:

- **Primary prevention:** Preventing the first fracture by identifying patient risk factors and starting treatment; often in primary healthcare settings where there may be a lack of structured or organised programmes. The presence of risk factors for osteoporosis, such as a family history of osteoporosis, fragility fracture, ethnicity, age, smoking history and alcohol consumption can be assessed by nurses and other practitioners, as well as a physical assessment identifying people with small body frame and/or low weight or BMI, loss of height and kyphosis.
- **Secondary prevention:** Preventing a second fracture after the first; assessment and treatment are performed in hospitals using structured programmes such as fracture liaison services (FLSs) (Chap. 5) and often initiated in the emergency department (ED).

2.4.4.2 Risk Evaluation and Diagnosis of Osteoporosis

The diagnosis of osteoporosis is made by measuring bone mineral density (BMD) using dual-energy X-ray absorptiometry (DXA). Low BMD is the strongest risk factor for fracture. Clinical diagnosis of osteoporosis is based on BMD measurements and presence of fractures [33]; BMD is described, for diagnosis and risk estimates, in terms of T-scores, i.e. the number of standard deviations that separate the BMD of the individual from the average BMD of healthy young adults of the same gender and race (peak bone mass). The WHO thresholds for each bone category are shown in Table 2.1.

Table 2.1 WHO criteria for clinical diagnosis of osteoporosis [33]

BMD T-score	Diagnosis
T-score ≥ -1 SD	Normal
$-1 > \text{T-score} > -2.5$ SD	Low bone mass/osteopenia
T-score ≤ -2.5 SD	Osteoporosis
T-score ≤ -2.5 SD with existing fracture	Severe osteoporosis

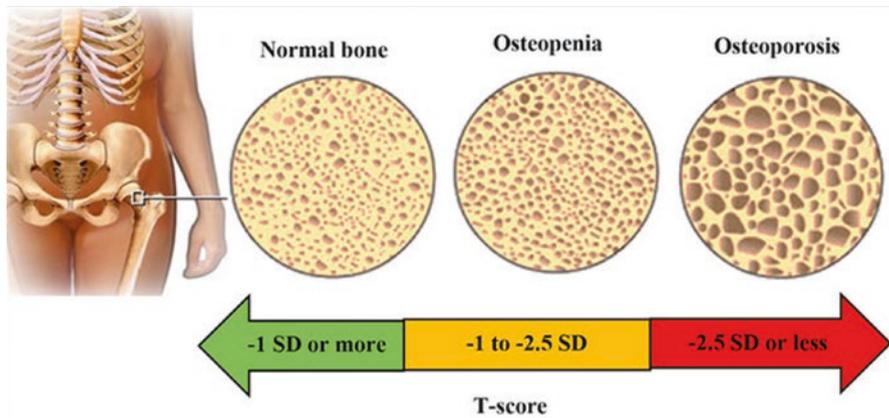


Fig. 2.2 Comparative view of normal bone, osteopenia and osteoporosis indicating links to T-score results. (Reproduced under the terms of the 'Creative Commons Attribution' for Open Access content [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/))

The DXA scan gives an *estimation* of bone strength by measuring the BMD in g/cm^2 in an area of the lumbar spine (L1–4), proximal femur and hip with little or no radiation exposure ($20 \mu Sv$). A pictorial example is provided in Fig. 2.2. DXA measurements can be negatively influenced by failing to position the patient properly, recent ingestion of barium for abdominal investigation, presence of vertebral fractures in the L1–4 region, hip prostheses, degenerative skeletal problems and severe arterial calcifications.

Most DXA scanners can also undertake an additional investigation of the spine at the same time, known as vertebral fracture assessment (VFA). The results are methodically assessed according to the Genant Classification [34]. The presence of a vertebral fracture is always a sign of impaired bone strength, a predictor of a next fracture and an indication for treatment. Vertebral fractures can also be identified by X-ray when VFA is inconclusive or not available.

2.4.4.3 Assessment Calculation Tools

Until recently, the strategy for preventing fractures was based on the performance of DXA and verification of the WHO densitometry criteria: those with normal or osteopenic values were given preventive measures, and those with osteoporosis were additionally eligible for pharmacological treatment [35]. The limitations of this approach were well recognised. In fact, most fractures occur among people with BMD values in the non-osteoporotic range, who would be excluded from treatment under this paradigm. Additionally, several risk factors for fracture were identified which were independent of BMD [36]. This led, though numerous and careful meta-analyses of data on risk factors, to the development of risk assessment tools, which can be used to estimate the future absolute fracture risk in the individual patient, based on clinical variables, with or without DXA. The most widely used of these is the FRAX[®], but others have been developed, including the QFracture[®] and the Garvan risk calculator [37].

The FRAX[®], launched in 2008, was developed by the WHO Collaborating Centre for Metabolic Bone Diseases at Sheffield, UK. It is an algorithm that estimates the probability of a fragility fracture occurring in a given individual over the subsequent 10 years, based on clinical risk factors (age, body mass index and dichotomised risk factors comprising prior fragility fracture, parental history of hip fracture, current tobacco smoking, long-term oral glucocorticoids, rheumatoid arthritis, causes of secondary osteoporosis and alcohol consumption) [38]. It may be performed with or without information on BMD and considers mortality in the same population as a competing risk. All these risk factors have been shown to be significant predictors of fracture in the presence or absence of BMD values, although their specific impact varies according to whether BMD is or is not considered. This algorithm is available online, in multiple languages with country-specific calibration to the national epidemiology of fracture and mortality of many countries worldwide.

2.4.4.4 Differential Diagnosis of Secondary Osteoporosis

Approximately 30% of women and 50% of men with osteoporosis have secondary osteoporosis that may be known or hidden and is caused by specific clinical conditions (Box 2.3). Treating the cause can decrease fracture risk and avoid unnecessary treatment [39], so every patient with a fragility fracture and a low BMD should have a baseline blood test for bone and mineral metabolism (calcium, phosphate, alkaline phosphatase, 25-hydroxyvitamin D, parathyroid hormone, kidney function, full blood count and thyroid-stimulating hormone).

When individuals are already living with a specific clinical condition (Box 2.3) that is associated with osteoporosis, it is important to promote evaluation by diagnostic tools and provide education on osteoporosis, fracture risk and lifestyle factors known to influence the risk of developing osteoporosis and fractures.

Box 2.3 Examples of Disorders Associated with Secondary Osteoporosis

- Diabetes mellitus
- Cushing's syndrome
- Hyperparathyroidism
- Hyperthyroidism
- Premature menopause
- Hypogonadism
- Celiac disease
- Inflammatory bowel disease
- Liver cirrhosis
- Rheumatoid arthritis
- Ankylosing spondylitis
- Systemic lupus erythematosus
- Anorexia nervosa

2.4.5 Treatment

Many patients are unaware that they have osteoporosis until after their first fracture, but even after a fracture, it often goes untreated. What is known as the international ‘treatment gap’ is that fewer than 20% of those who sustain a fragility fracture receive therapies to reduce the risk of fracture within the year following the fracture [40]. Preventive treatment has no effect on symptoms so may not be attractive to patients who may prioritise symptom control and a low treatment burden. Before treatment is even discussed, healthcare professionals must be aware of what the individual’s baseline understanding about osteoporosis is and what their preferences are regarding fracture-reducing treatment. Treatment of osteoporosis is always a combination of medication, lifestyle choices, adequate intake of calcium and vitamin D and prevention of falls.

The goal of treatment, including osteoporosis medication, is to prevent fractures (not to increase the DXA numbers). Fracture risk can be reduced with optimal treatment of osteoporosis that consists of:

- Specific anti-osteoporosis medication (agreed on through shared decision-making)
- Adequate intake of calcium and vitamin D (dietary or supplements)
- Attention to lifestyle factors (must go hand in hand with any drug treatment prescribed)
- Fall prevention (when relevant)
- Follow-up (a plan that is known by the patient)

2.4.5.1 Medication to Reduce Fracture Risk

There are various medications to treat osteoporosis, all having different entry points, but they all have the same goal: preventing fractures. It should be noted that not all types of medication are available in all countries or regions worldwide. The most common approved treatments will be considered here including:

- Bisphosphonates (alendronate, ibandronate, risedronate and zoledronic acid) (oral or intravenous)
- ‘Selective oestrogen receptor modulators’ (SERMs) (raloxifene, bazedoxifene; oestrogen ‘agonist/antagonist’ drugs that act like oestrogen in bone, but in the uterus and breast tissue act like an oestrogen blocker)
- Monoclonal antibody (denosumab): reduces bone turnover by inhibiting the maturation of osteoclasts (subcutaneously every 6 months)

Bone-building therapies are

- Teriparatide: a synthetic form of parathyroid hormone (PTH) that stimulates (new) bone formation, resulting in increased BMD:
 - Daily subcutaneous injection for 24 months
- Abaloparatide: an analogue of human parathyroid hormone-related protein (PTHrP):
 - Daily subcutaneous injection for 24 months

- Romosozumab: a monoclonal antibody that promotes bone formation and inhibits bone resorption:
 - Two subcutaneous injections every month for 12 months

While the development of new treatments is ongoing, the most commonly prescribed are bisphosphonates which attach to bone tissue and reduce bone turnover by suppressing the activity of osteoclasts, often referred to as ‘anti-resorption’ therapy. The drug must be taken regularly for a minimum of 3–5 years initially and is combined with calcium and vitamin D supplements. Oral bisphosphonates are poorly absorbed (only approximately 1% of each dose), even with total compliance and proper administration. When administered orally, bisphosphonates must be taken according to the following instructions:

- In the morning on an empty stomach.
- At least 30 min before any food or drink.
- Swallowed whole with a large glass of tap water.
- The patient must remain upright for at least 30 min.
- Any calcium-containing supplements must be delayed for 3–4 h.

2.4.5.2 Follow-Up

Proper follow-up improves adherence and compliance with treatment and facilitates monitoring of the treatment goal: fracture prevention. At the start of the treatment, patients must be aware of the duration, the goal and benefits, for how long the medication must be taken and from whom to seek support when problems, such as side effects, occur. The occurrence of a fracture in patients on treatment is always a reason to re-evaluate treatment strategies, especially when this includes a vertebral fracture. Many patients fail to persist with their treatment, and many others experience a suboptimal response due to unintentional poor compliance or impaired absorption. Approximately 50% of all patients who start treatment stop within the first year [41].

It is important to check regularly that patients are following the instructions and are continuing to take their treatment properly. Despite the wishes of most patients to measure the effect of the treatment short-term, it is not recommended to make periodic measurements of BMD by DXA because BMD changes because of osteoporosis treatment occur slowly and the magnitude of measurement error with DXA is similar to the short-term change in response to treatment. An alternative approach is to measure biochemical markers of bone turnover in blood samples. These show large and rapid changes in response to osteoporosis treatment, allowing detection of a significant treatment response within a few months.

Another factor in poor compliance is fear of side effects. In oral treatments, gastrointestinal complaints are a common reason for patients to stop the treatment without talking to their health practitioner. It is important that patients report side effects so that further treatment options can be discussed. A rare, but feared, side effect is osteonecrosis of the jaw (ONJ); risk of this can be reduced by good oral hygiene and regular dental checks.

All patients will have an individual treatment plan throughout their life depending on the significance of their fracture risk, type of medication and intended lifestyle changes. The duration of the different therapies varies, and there is no uniform recommendation that applies to all patients. After a period of treatment, re-evaluation of the risk should be conducted, involving DXA, VFA (or X-ray of the spine) and fracture risk assessment.

Patients need to know from diagnosis that osteoporosis is a chronic condition, but that treatment duration is limited and periodical (the length of bisphosphonate treatment is 3–5 years). Good understanding of diagnosis and fracture risk is important because patients can then make informed choices regarding treatment and lifestyle changes. Low adherence and compliance are often low due to lack of knowledge, lack of guidance, invalid values and beliefs regarding therapies, side effects and the fact that patients do not directly ‘feel’ the benefits of the treatment, i.e. not having a fracture.

Nurses and other practitioners play a key role in improving compliance and adherence through specific nursing interventions including

- Education about the treatment goal and benefits (this takes time)
- Education about the prescribed drug regimen and recognising significant adverse reactions
- Instructing the patient to report side effects
- Advising patients on how to properly administer the medication
- Assessing (and supporting) compliance and adherence
- Informing and recording for how long patients must take their medication
- Scheduling fracture risk re-evaluation
- Advise on lifestyle modification regarding diet and exercise
- Advise on good oral hygiene and regular dental care
- Advise on prevention of falls (see Chap. 4)
- Referring patients to national osteoporosis associations for support

2.5 The Role of Practitioners in Osteoporosis and Fracture Prevention, Case Finding, Risk Assessment, and Management and Education After Diagnosis

Nurses and other practitioners have significant roles in the multidisciplinary approach to diagnosis of osteoporosis. All those who provide care to older people and those who have already sustained a fragility fracture should be aware of the possibility of their patients having osteoporosis and an increased risk of further fracture. They must know how to assess and modify the risk factors, why and how osteoporosis is diagnosed and how to ensure that proper referrals are made. Nursing and care diagnoses that are appropriate for patients with osteoporosis include impaired mobility, deficient knowledge, imbalanced nutrition, risk for falls, risk for injury (if substantial bone loss is presently increasing the risk of fractures), and acute pain (if fractures occur due to bone loss).

People diagnosed with this chronic condition need support in developing coping strategies. Most newly diagnosed patients are afraid of sustaining another fracture and feel vulnerable, sometimes leading to a paralysing fear of falling. Patients with advanced osteoporosis often experience decreased ability to perform activities of daily living and suffer from chronic back pain. Depression, loss of self-esteem, disability and increasing physical dependence can be significant. Nurses and other practitioners can guide, advocate and educate as part of caregiving by helping patients to maintain function and improve quality of life [42] and can refer patients to national osteoporosis associations for further information and support.

The role of nurses and other practitioners in osteoporosis can be envisaged in the following different stages: case finding, risk assessment, and management and education after diagnosis. This can include the following tasks:

- Incorporating simple questions on risk factors for osteoporosis into standard patient assessments and community questionnaires to improve early detection
- Promoting education regarding bone health to prevent osteoporosis in general population, including children, young adults and parents
- Providing education to other professional groups regarding bone health
- Implementing screening programs in at-risk populations
- Assessing the risk of falls in the elderly and promoting preventive strategies
- Supporting individuals in the treatment and management of this condition through ongoing assessment, teaching and counselling after diagnosis

Further discussion of secondary fracture prevention services is considered in Chap. 5.

- Promoting patients' commitment and compliance to lifestyle modifications and treatment over the course of their lives, and to cope with chronic illness through the development of coping strategies and, as required, pain management
- Providing ongoing remote telephone counselling and support
- Promoting compliance and persistence with osteoporosis pharmacologic treatment drugs

2.6 Suggested Further Study

To effectively provide care to patients with or at risk of fragility fractures, it is essential that the practitioners have extensive and up-to-date knowledge of osteoporosis and its prevention and management. Individual further study should be conducted using the strategies and resources to extend knowledge identified in Box 2.4.

Box 2.4 Strategies and Resources for Extending Knowledge About Osteoporosis and Fragility Fracture

- Talk to patients and their family about the impact of sustaining a fragility fracture due to osteoporosis. Reflect on these conversations, and search for evidence-based literature to improve care and outcomes.
- Expand knowledge by taking an online/e-learning course and use this to assess knowledge and performance yearly.

Online courses:

- <https://theros.org.uk/healthcare-professionals/courses-and-cpd/> Fracture Prevention Practitioner Training with the Royal Osteoporosis Society (UK): This is an interactive training course, which enables nurses with an interest in osteoporosis and fracture prevention to improve their knowledge and ability to deliver excellent health care to people with, or at risk of, osteoporosis and fragility fractures.
- <https://www.bonesource.org/> BoneSource™: This Professional Education Program from the Bone Health and Osteoporosis Foundation (USA) provides activities that are intended to improve the knowledge and competence for all healthcare professionals involved in the prevention, diagnosis and treatment of osteoporosis.
- Read and make notes from books, articles and national or international guidelines on Osteoporosis and fracture prevention. The following are examples, but many other options exist:

Example websites:

International Osteoporosis Foundation www.capturethefracture.org/ and www.iofbonehealth.org
 Fragility Fracture Network www.fragilityfracturenetwork.org/

Example books, articles and guidelines

Curtis, E.M. Moon, R.J. Harvey, N.C. Cooper, C. (2017) The impact of fragility fracture and approaches to osteoporosis risk assessment worldwide *Bone*. 104:29–38, 7–17 <https://doi.org/10.1016/j.bone.2017.01.024>

Falaschi, P. & Marsh, P. (Eds) (2021) *Orthogeriatrics. The management of older patients with Fragility Fractures*. Springer: Switzerland <https://link.springer.com/book/10.1007/978-3-030-48126-1>

Walsh J. S. (2017) Normal bone physiology, remodelling and its hormonal regulation, *Surgery* <https://doi.org/10.1016/j.mpsur.2017.10.006>

Guerado, E., Cano, J.R., Crespo, V., Campos, A. (2022). Bone Mineralization and Osteoporotic Changes. In: Pape, HC., Kates, S.L., Hierholzer, C., Bischoff-Ferrari, H.A. (eds) *Senior Trauma Patients*. Springer, Cham. https://doi.org/10.1007/978-3-030-91483-7_3

- Meet with osteoporosis specialists to keep up to date on new developments and disseminate this knowledge to colleagues

2.7 How to Self-Assess Learning

- Discuss within the local team if national guidelines for osteoporosis treatment and prevention and fragility fracture prevention are implemented correctly or need to be developed locally nationally.
- Conduct peer review sessions within the team identifying how team performance impacts patient outcomes and develop action plans for how practice can be improved.
- Undertake assessments contained within online courses listed above.

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Frailty and Sarcopenia

3

Andréa Marques, Carmen Queirós,
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3.1 Introduction

To provide optimum care following fragility fracture, all members of the disciplinary team need an awareness of frailty and its relationship with the outcomes of fractures.

Ageing, frailty, sarcopenia, falls, and fragility fractures are strongly linked [1]. They are all predictors of hospitalisation and negative health outcomes for older people, including functional decline, deteriorating physical and mental health, and death [2]. Falls and associated injuries in older people are connected with multi-component impairments, particularly of muscle function, balance, and cognition, so are best understood as resulting from complex system failure, as part of the frailty syndrome in the presence of sarcopenia [3]. Falls and fall prevention are considered

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in more detail in Chap. 4, but it is important to bear them in mind here as a significant feature of frailty.

All older people who have fallen and/or sustained an injury/fracture should receive an assessment for the existence of frailty and sarcopenia and an interdisciplinary plan of interventions devised to prevent, slow, or reverse frailty [4]. Such interventions have become a fundamental element of care for older people with fragility fractures [5] in all health, social care, and community settings.

This chapter aims to outline the role of health professionals in (a) identifying frailty and sarcopenia and (b) preventing decline and improving health in older people with fragility fractures who live with frailty. It will review the concepts of frailty and sarcopenia and their assessment. It will also outline the interventions that can be implemented by nurses and other healthcare professionals, which have the potential to positively affect health and functional status and may promote independent functioning of older people with frailty, sarcopenia, and fragility fractures.

3.2 Learning Outcomes

At the end of the chapter, and following further study, the practitioner will be able to

- Explain the causes and impact of frailty and sarcopenia on recovery and outcomes following fragility fractures.
- Identify individuals with frailty, sarcopenia, and associated reduced function.
- Promote health and well-being and prevent health deterioration in older people with frailty and sarcopenia.
- Educate older people about frailty and sarcopenia and their relationship with falls and fractures.
- Promote optimum nutrition and physical exercise in older people living with frailty and sarcopenia.

3.3 Frailty

Ageing is a universal experience with physical, sociocultural, and psychological implications. The physiological aspects of ageing can have a significant bearing on fragility fracture care. As Watson (2021 p. 23) [6] says:

... ageing itself is not a disease process, but for some people the combined effect of ageing on several systems can take a toll, and this can range from frailty—a general lowering of resilience to adversity and decreasing ability to carry out activities of daily living—to multipathology—where several pathological conditions co-exist in one individual

The importance of physical, functional, psychological, and social factors in realising a successful old age is recognised by older people and their families, healthcare professionals, policy advisors, and decision-makers [7]. Frailty is a complex

health issue that impacts the ageing global population and has significant implications for patients, their families, healthcare services, and society as a whole [8]. It is an important aspect of clinical assessment and intervention in patients with fragility fractures.

As the number of older people grows globally, their needs have become an increasingly important public health issue. Reduction in physical function can lead to loss of independence and need for hospital admission and long-term nursing home care as well as premature death. Frailty is a syndrome which has been of interest to geriatricians and physicians for some time and has more recently been drawn to the attention of other health professionals such as nurses and physiotherapists in fragility fracture care settings. Recognising its elements and effects and intervening appropriately have the potential to significantly improve fragility fracture care and outcomes, especially if the whole multidisciplinary team are involved.

There is no universally accepted definition of frailty, but it is widely considered to be:

... a progressive age-related decline in physiological systems that results in decreased reserves, which confers extreme vulnerability to stressors and increases the risk of a range of adverse health outcomes (Martin and Ranhoff 2021 p. 53) [4]

Such physiological vulnerability results in a recognisable and identifiable clinical syndrome that typically involves a depleted ability to resist physiological stress during health events, along with increased risk of further health deterioration, functional impairment, and poor outcomes of healthcare [9, 10]. It reflects the complexity of older individuals' responses to ill health and injury. An event such as an accidental fall, injury, or infection can lead to additional physiological stresses, which worsen a person's health status, increase functional decline, and can lead to death. Box 3.1 captures the main elements of frailty from commonly cited definitions. Frailty, however, is not simply a physical/physiological phenomenon, but also a psychological, cognitive, and social experience as each of these aspects of a person's well-being is both positively and negatively linked.

There are two common models used to explain frailty

1. As a syndrome where sarcopenia (loss of muscle with ageing) is the main underlying concept [11] and individuals experience at least three of a list of features including unintentional weight loss, exhaustion, weakness, slowness, and reduced physical activity
2. As the sum of an individual's deficits and non-specific disorders [12] that prevent them from launching an effective response to health stressors, leading to adverse health outcomes [9, 13]

Epidemiological studies indicate that frailty is common among older people [14] and have estimated the prevalence of frailty at between 4 and 59%, depending on the population being studied [15], gender (frailty is more common in women than men), and age (increasing age brings a higher prevalence of frailty) [16, 17].

Frailty is a term commonly used, although not necessarily based on a clear understanding of the concept, to describe an older person who lacks robustness; who is thin, weak, and unsteady; and who seems to be failing to function. It is also a state that may not be immediately apparent even though it is threatening the health and well-being of someone who is recovering from acute ill health, injury, surgery, and other physiological challenges. Healthcare professionals often develop their own ‘sense’ of what frailty looks like in an individual, but clinicians may not all be using the same parameters when they describe someone as frail. A nurse and a physiotherapist (or a nurse and a physician, for example) may see frailty differently through the lens of their different clinical experiences. Older people, their families and carers, society, and policymakers may also hold different views of what frailty is [18].

We must be careful not to view frailty as simply a medical diagnosis and something which labels older people as ‘failing’ or dying. McKay [19] describes a more positive way to view the needs of older people as ‘rest-of-life’ care, and this applies as much to frailty as any other health or social care issue. It is also important, therefore, to view frailty as a multiple, complex, health and well-being challenge with health and social care solutions.

Box 3.1 Elements of Frailty Definitions Discussed in the Literature

- A clinical syndrome
- A state of increased vulnerability
- Diminished resistance to stressors—both physical and psychological
- Can lead to functional impairment—with social impacts
- Increases risk of adverse health outcomes
- Physical and/or psychological

Although research exploring many aspects of frailty and its management has grown significantly and clinical knowledge of the syndrome is increasing all the time, the individual older person’s experience of being frail, and their own views of its impact and meaning, has not been studied in detail [18, 20]. As largely a condition of later life, frailty has traditionally been seen as central to geriatric medicine and care but has only more recently become an important topic in other areas of practice such as general surgery, orthopaedics, and trauma. It is also a relatively new concept for nurses working in these areas.

Box 3.2 Provides some examples of quotations from older people about their individual experience of being frail in their own words. These highlight for the practitioner that frailty is not simply a medical concept but a phenomenon which older people experience in different ways and that this personal experience must be considered when assessing individuals and providing individualised care.

Box 3.2 Examples of Individuals' Experiences of Frailty from Qualitative Research Studies

"... they get a bit old age in the joints maybe a knee gets a bit sore then that's I mean pain is a big, big a cause of frailty isn't it? You begin to wonder whether you can actually walk anymore ... and you think I can't do it and you get depressed and you become frail and it's a kind of on-going cycle of decline" [21].

"Well, I'll be sitting a lot inside. At home. I cannot even get around doing any work outside" [22].

"So I have, stopped the work outside. There is very little to do after I got problems with my hands and was no longer able to work. After that I got problems with my stomach and trouble with constipation. This caused some irregularities with sleep, and the medication was not so easy to dose. So I have to make sure I am near the toilet" [22].

"I do feel frail sometimes. There have been times when I have been walking with my stick and I've felt as though I'm going to trip you know. I'm frightened of tripping" [23].

"I try and make myself a cup of tea, if I can walk in the kitchen ... but this morning I couldn't manage to go in the kitchen as me feet were right swollen. And you know when I'm walking I count a lot, to keep me going, I thought if I count I might keep going me-self, but I couldn't this morning I was just too tired after getting downstairs" [23].

3.4 Assessment and Recognition of Frailty

Early recognition of those with fragility fractures who are frail and whose presentation is complex is the first step in planning effective interdisciplinary care. Undertaking an assessment of frailty will also identify those individuals who are at increased risk of adverse outcomes following their fragility fracture so that care can be optimised to meet their needs through 'frailty-aware' care [24] and help identify resource requirements and care priorities. Recognising frailty also plays an important role in preventing fractures in older adults [25] as it highlights factors that lead to fracture risk. While this assessment process is the responsibility of the entire healthcare team, much of the data is likely to be gathered and recorded by those who spend the most time with patients, usually the nursing team supported by other team members.

All people over 70 years of age and anyone with unintentional and significant weight loss should be assessed for frailty [9]. While this chapter focuses on frailty and its assessment, it is important to note that, in the orthogeriatric setting, frailty assessment and comprehensive geriatric assessment (CGA) form an integrated

ongoing assessment. A more detailed discussion of the principles and conduct of CGA in providing comprehensive information about an older individuals' health, cognitive, psychological, social, physical, and functional domains is provided in Chap. 6. It is essential that both CGA and frailty assessment data are shared and discussed within the interdisciplinary team so that the clinical lead (preferably a geriatrician where one is available) can make sense of the data and plan multidisciplinary interventions to combat frailty, facilitate recovery, and improve outcomes.

Assessing frailty and its elements is an integral aspect of the admission and ongoing assessment process with several tools available for this. The selection of an instrument to assess frailty in a specific clinical setting should be based on its purpose, theoretical approach, clinical validity of the items used, and its feasibility in the clinical context [26] as well as its sensitivity to local language and culture.

A 2021 review [27] identified 15 unique frailty instruments used in older hospitalised orthopaedic patients, all reported as having acceptable reliability and validity. It is not within the scope of this chapter to undertake a detailed review of all frailty scales appropriate for assessing patients with fragility fractures. There is such a review in the first edition of this chapter [28], and, as yet, there is no formal study that has identified the best instrument for use in either community-dwelling older people at risk of fracture or hospitalised older people with a fragility fracture. The choice of an instrument is, therefore, best made by individual teams working together to identify a tool that will best serve the fundamental purpose of identifying patient need. However, instruments which have not been specifically developed for this patient population and the relevant setting may require local modifications to meet specific needs [27].

For the purposes of this chapter, three examples of tools which might be considered for those with fragility fractures both in community/home and hospital settings will be discussed to provide illustrations so that practitioners can understand how a frailty instrument works and then investigate within their teams what local needs might be and how such tools might be implemented and used.

3.4.1 The Clinical Frailty Scale (Rockwood et al. 2005)

The Clinical Frailty Scale (CFS) was initially developed to enable clinicians to summarise the overall level of fitness or frailty of an older person [29]. It has since been widely used as a clinical tool and has been revised and assessed for reliability and validity. The CFS uses pictographs and descriptors to categorise individuals as (1) very fit, (2) fit, (3) managing well, (4) living with very mild frailty, (5) living with mild frailty, (6) living with moderate frailty, (7) living with severe frailty, (8) living with very severe frailty, and (9) terminally ill. The assessment involves assessing an individual's self-reported (with no need for face-to-face examination) comorbidities and needs for assistance with activities of daily living [29, 30]. This tool is widely used in a variety of clinical settings to make judgements about an individual's degree of fitness and frailty. For further information about CFS and its use, see Box 3.3.

The CFS has been studied in the orthogeriatric setting, particularly following fragility hip fracture. In one study [31], the validity of undertaking retrospective non-orthogeriatrician-assigned CFS scoring for hip fracture patients was assessed. CFS scores assigned by non-orthogeriatricians were shown to be a valid means of assessing frailty status in hip fracture patients.

Box 3.3 The Clinical Frailty Scale (CFS)

Full information about the CFS [32] can be found at a specific website devoted to the tool and other associated information. The scale is available in several languages. The authors of the tool make it freely available along with a variety of other resources but simply ask all potential users to complete a Permission for Use Agreement. Agreement requests for non-commercial educational, clinical, and research use, as well as for reprint, do not usually require a license agreement.

Clinical Frailty Scale <https://www.dal.ca/sites/gmr/our-tools/clinical-frailty-scale.html>

CFS guidance and training <https://www.dal.ca/sites/gmr/our-tools/clinical-frailty-scale/cfs-guidance.html>

Further Reading:

Rockwood K, Song X, MacKnight C, Bergman H, Hogan DB, McDowell I, Mitnitski A. A global clinical measure of fitness and frailty in elderly people. *CMAJ*. 2005;173(5):489–495.

Pulok MH, Theou O, van der Valk AM, Rockwood K. The role of illness acuity on the association between frailty and mortality in emergency department patients referred to internal medicine. *Age Ageing*. 2020;49(6):1071–1079.

Rockwood K, Theou O. Using the Clinical Frailty Scale in Allocating Scarce Health Care Resources. *Can Geriatr J*. 2020;23(3):210–215.

3.4.2 FRAIL Scale

The FRAIL scale is composed of five questions with ‘FRAIL’ as an acronym: F = fatigue, R = resistance, A = ambulation, I = illnesses, and L = loss of weight [33, 34]; three or more positive answerers indicate frailty, and one or two positive answers indicate pre-frailty.

3.4.3 The Study of Osteoporotic Fractures (SOF)

The Study of Osteoporotic Fractures (SOF) frailty tool assesses frailty according to three characteristics: (1) loss of 5% of body weight in the last year, (2) inability to stand up from a chair five times without the use of arms, and (3) replies ‘No’ to the question, ‘Do you feel full of energy?’. Two positive answers to the first and second items and/or a negative to the last one classifies the person as frail [35].

Box 3.4 Frailty Case Study

Mrs. Garcia is a former schoolteacher who lives alone in a small second-floor apartment in a suburb of a large city. Her three daughters and one son and their children live in the same locality. They provide most of her social support, and she receives visits from various members of her family daily, particularly to bring shopping and prepare meals.

Mrs. Garcia is 88 years old and was widowed 10 years previously. Prior to her husband's death, she was very active for her age but, since then, she has become more isolated and now rarely leaves her apartment. Like many older people, this situation has worsened since the Covid-19 pandemic. She can mobilise around her apartment but tends to use the furniture to help to steady herself.

Eight years ago, Mrs. Garcia had a myocardial infarction followed by coronary angioplasty. She takes medication for primary hypertension [angiotensin-converting enzyme (ACE) inhibitor: ramipril] as well as a beta blocker (atenolol) and a statin (atorvastatin) and aspirin. She has osteoarthritis in her hands and a very evident thoracic spine curve which has happened gradually over the last few years and seems to throw her body weight forwards meaning that she often feels like she might fall. She also reports that she has episodes of dizziness and breathlessness.

Mrs. Garcia has been admitted to the orthopaedic trauma unit via the emergency department following a fall at home. X-rays reveal an intertrochanteric fracture of her right hip—identified as a fragility fracture—as well as multiple previous vertebral fractures likely to be due to previously undiagnosed osteoporosis. On admission to the orthopaedic trauma ward, Mrs. Garcia is assessed by the nurse. This includes an assessment of frailty.

Some questions:

What more might you want to know about Mrs. Garcia to help you understand her degree of frailty and the factors that contribute to this?

How could you best assess her frailty given her current acute health state?

What impact might her degree of frailty have on her following surgery for her intertrochanteric fracture?

Box 3.4 provides a case study that offers an example of how frailty may present clinically in the fragility fracture setting.

3.5 Interventions for Frailty

Once frailty has been identified through assessment, there must be a focus on those interventions which are most likely to benefit patients. Although progress is likely to be slow, there are some healthcare interventions that can improve the degree of frailty over time [9]. Evidence identifies four easily accessible interventions most likely to

improve frailty status in those at risk of, or following, fragility fractures (Box 3.3): (1) exercise (aerobic and resistance), (2) calorie and protein supplementation, (3) vitamin D supplementation, and (4) reduction of polypharmacy [9, 17, 34] (Box 3.5).

- Planned exercise can develop muscle strength and improve physical performance and functionality [36] as well as decrease depression and fear of falling [9]. A mix of specifically prescribed aerobic and resistance exercises improves frailty and is effective in preventing its adverse outcomes [37, 38]. One systematic review found that an exercise programme, continued three times a week for 30–45 min per session for approximately 5 months, had positive impact [39].
- In frail older people with significant weight loss, it is essential to identify the cause (Chap. 8). Dietary calorific supplementation has been shown to be successful in achieving weight gain and reducing complications in malnourished individuals [40]. Protein supplementation of 15 g of protein twice a day over 24 weeks improves muscle strength and physical performance [41], while oral nutritional supplements provide additional protein and calories.
- Vitamin D supplementation can play a role in preventing or treating frailty by enhancing balance and maintaining muscle strength [42] but, while this is likely to be beneficial for frail older people, there have been no large-scale studies that have confirmed this to be the case on its own [9].
- Undertaking a medication review and considering side effects, interactions, and consequences for frailty are essential. Medication review and reduction of polypharmacy have also been advocated as an option for improving outcomes, especially in reducing mortality, hospital admissions, and falls [43].

These four interventions should be considered following frailty assessment so that they can be individually tailored to target specific identified problems and needs through an interdisciplinary approach [44].

As well as these interventions, it is essential that the clinical team work collaboratively with the patient and their family to understand their degree of frailty and how it has contributed to their current health status. It is equally important for the patient to understand that frailty is reversible and that working towards a greater degree of well-being is likely to both improve the outcomes from the current health event as well as help to prevent further fractures. Patients also need to be able to believe in their own influence over their future health, and the health-promoting role of the clinical team is essential in achieving this. It is vital that these messages are relayed to the patient and their family from the beginning of their hospital stay and throughout the pathway to rehabilitation and beyond.

Box 3.5 Interventions for frailty

- Exercise (aerobic and resistance)
- Caloric and protein supplementation
- Vitamin D supplementation
- Reduction of polypharmacy

3.6 Sarcopenia

Frailty and sarcopenia are linked, while frailty is a geriatric syndrome, sarcopenia is a disease. Sarcopenia contributes to the development of physical frailty and physical decline so is an important consideration in the care and management of patients with fragility fractures. Sarcopenia is a muscle disease rooted in adverse muscle changes that accrue across a lifetime, which can be viewed as ‘muscle failure’. With the continued increase in the older global population, sarcopenia has become a serious international public health problem. It can occur at any age but is most common among older adults.

Sarcopenia is characterised by low levels of muscle strength, muscle quantity/quality, and physical performance. It is a *‘progressive and generalised skeletal muscle disorder that is associated with increased likelihood of adverse outcomes including falls, fractures, physical disability and mortality’* ([45] p. 18).

The overall prevalence of sarcopenia is reported to be 10% [46], but it is more common in women than men [4] (Martin and Ranhoff 2021). Changes in body composition occur with normal physiological ageing [47]. Body weight usually increases during adulthood and peaks at the age of 65 years in women and 54 years in men [48]. In later life, muscle mass is lost at a rate of approximately 8% per decade between the ages of 50 and 70 years. After the age of 70 years, weight loss is coupled with an accelerated loss of muscle mass, reaching a rate of 15% in each decade [48]. In addition to this age-related decline in muscle mass, important factors in progression of loss include [4]:

1. Declining physical activity
2. Reduced food intake
3. Chronic health conditions and acute illness

The presence of these factors provides important indicators for the management and prevention of sarcopenia.

Sarcopenia is a powerful predictor of disability that is associated with age-related loss of muscle mass and strength which, in turn, affects balance, gait, and overall ability to perform tasks of daily living [49, 50]. The risk of disability is 1.5–4.6 times higher in older people with sarcopenia than in those with normal muscle. These common age-related changes in skeletal muscle are major causes of impaired physical function in older adults, contributing to impaired mobility, falls, and hospitalisation.

The causes of sarcopenia are multifactorial and can include muscle disuse, changing endocrine function, chronic diseases, inflammation, insulin resistance, and nutritional deficiencies [51]. Reductions in testosterone and oestrogen that accompany ageing appear to accelerate its development [52]. It has also become apparent that the Covid-19 pandemic has led to an increase in the incidence of sarcopenia because of both the physiological impact of the virus itself and the impact on social activity in older people whose physical and social activity, particularly

outside of the home, has been limited by lockdown restrictions and fear, leading to deconditioning [51, 52].

3.6.1 Screening and Assessment for Sarcopenia

Since sarcopenia, frailty, osteoporosis, and fragility fracture are linked [4], identifying sarcopenia in those with or at risk of fragility fracture is central in both fracture prevention and recovery/rehabilitation following fractures. An interdisciplinary approach to management of sarcopenia begins with diagnosis so that the team can plan care accordingly.

Sarcopenia, like many other health conditions, is asymptomatic in its initial stages, when interventions can best prevent the adverse health outcomes [53]. Screening tends not to be a routine aspect of clinical practice, partly because of the lack of appropriate screening strategies [54].

Several expert groups have convened with the goal of establishing a consensus about diagnostic criteria for sarcopenia [45, 55–58]. In 2010, the European Working Group on Sarcopenia in Older People (EWGSOP) published a sarcopenia definition [44, 56] that aimed to foster advances in identifying and caring for people with sarcopenia. The group met again (EWGSOP2) in 2019 to update the original definition to reflect progress over the previous decade [45], identifying three criteria for the diagnosis of sarcopenia. Common tests used in the diagnosis of sarcopenia are outlined in Box 3.6.

Box 3.6 Common tests for the diagnosis of sarcopenia [45, 56]

1. *Low muscle strength* is the primary parameter of sarcopenia and the most reliable measure of muscle function.

Measuring *grip strength* is simple and inexpensive using a calibrated handheld dynamometer.

The *chair stand test* (or *chair rise test*) can be used to assess the strength of leg muscles (quadriceps muscle group). This measures the amount of time needed for a person to rise five times from a seated position without using their arms.

2. *Low muscle quantity or quality* confirms the presence of sarcopenia.
3. *Low physical performance*

Physical performance can be measured by gait speed and the timed-up and go test (TUG), among other tests.

- Probable sarcopenia is identified by criterion 1
- Diagnosis is confirmed by criterion 2
- If all three criteria are met, sarcopenia is considered to be severe.

The screening tests outlined above are important aspects of fracture prevention and are central to CGA as well as frailty assessment. In orthogeriatric care settings, screening and assessment are best done through an interdisciplinary approach, with specific collaboration needed among physiotherapists, geriatricians/physicians, and the nursing team. An important consideration in assessing muscle strength, quality, quantity, and physical performance is that the person with a significant new fragility fracture affecting physical function will be unable to perform the test. Hence, taking a history of their functional abilities prior to the fracture will be important instead. Physical performance measures may also be affected by issues such as memory loss, or gait and/or balance problems.

3.6.2 The Clinical Consequences of Sarcopenia

Osteoporosis predicts the future risk of fracture, and sarcopenia is a powerful predictor of future disability [47] alongside frailty. Reduced muscle mass and strength are also associated with lower bone mineral density [59, 60], consistent with the ‘mechanostat’ theory of bone loss due to reduced forces of muscle on bone [61]. Sarcopenia also contributes to falls and, consequently, increases fracture risk [62, 63]. There is significant evidence that low muscle mass and strength are associated with fractures [63]. Several studies have confirmed associations between low muscle mass, future functional decline, and physical disability [2]. Physical inactivity or decreased physical activity is part of the underlying mechanisms of sarcopenia, so physical activity is important in reversing or modifying it, especially given the impact of the Covid-19 pandemic on outdoor activity in older people in many communities.

Several interventions have been proposed for the treatment of loss of muscle and strength, but exercise is central. Sarcopenia has also been linked to higher hospitalisation rates, increased morbidity, and mortality [64, 65]. Sarcopenia may also be associated with metabolic and cardiovascular diseases such as diabetes, dyslipidaemia, and hypertension.

3.6.3 Interventions to Prevent Sarcopenia

It is better to prevent progressive loss of skeletal muscle mass, strength, and function rather than try to restore it later, so preventive strategies should be initiated early, before loss of skeletal muscle mass and strength occurs. These are particularly important considerations in primary and secondary fragility fracture prevention services (see Chap. 5).

Since important causes of depleted muscle mass are declining activity, depleted nutrition, and acute and chronic health conditions, these are central factors in preventing and managing sarcopenia. These issues are frequently discussed throughout this book and are central to both frailty management and orthogeriatric care. Interventions for this are discussed earlier in this chapter in relation to frailty.

Exercise is considered in more detail in Chap. 8 and nutrition in Chap. 11. A brief overview of these main interventions for sarcopenia will be provided here, however, for the sake of completeness.

Exercise interventions have the most significant potential to improve sarcopenia. The benefits of physical activity in older people include lower mortality and better functional independence (Chap. 6). There are four specific categories of recommended exercise: (1) aerobic exercise, (2) progressive resistance exercise, (3) flexibility exercise, and (4) balance training [3]. See Chap. 8.

Nutrition is also important in preventing and reversing sarcopenia. Increasing age is associated with reduced appetite and early satiety, resulting in many older people failing to meet the recommended daily dietary allowance (RDA) for protein, which has important implications for skeletal muscles [66]. Older adults will require higher dietary protein (up to 1.2 g/kg/day) to counteract age-related changes in protein metabolism and higher catabolic state associated with chronic or acute diseases [67]. See Chap. 11.

It is the combination of exercise and nutrition interventions that are key to preventing, treating, and slowing down the progression of sarcopenia [66]. Pharmaceutical agents are under investigation but with no current proven benefit with inadequate evidence to support their use. Low serum vitamin D levels are associated with reduced muscle strength, and it has also been demonstrated that a dose-response relationship exists between serum levels and muscle health. If serum levels are low, vitamin D should be replaced with replenishment dosages ranging from 700 to 1000 IU/day [68].

Implementing interventions for frailty and sarcopenia has several challenges and barriers. One systematic review demonstrated that older people believe that exercise is unnecessary or, even, potentially harmful [69]. Others recognise the benefits of exercise but report a range of barriers to participation in exercise interventions. Raising awareness is important to enhance exercise participation among older people and to prevent sarcopenia.

Another barrier that needs to be considered in planning long-term strategies to prevent and treat sarcopenia in older people is the financial ability to attend exercise programmes [44]. Factors such as access to food, finances, and social isolation may all impact an older person's ability to obtain optimal food intake.

3.7 Conclusion

Both frailty and sarcopenia are linked with falls and fragility fractures, although they are concepts relatively new to nurses and other health professionals working in clinical settings outside of dedicated geriatric/elder care units. Being able to identify frailty and sarcopenia and plan and implement interventions for their modification are important skills for all members of the interdisciplinary team. Managing these conditions and their associated effects will be central to improving recovery and outcomes following fragility fracture.

3.8 Suggested Further Study

- Review reading materials, information, and online programmes relating to the impact of ageing on older people and consider how frailty and sarcopenia are part of this picture. See for example:

Websites:

Ageing in Motion <https://www.aginginmotion.org/>

Books:

Martin FC, Ranhoff AH. Frailty and Sarcopenia (2021) In: Falaschi P, Marsh D, editors. Orthogeriatrics: The Management of Older Patients with Fragility Fractures 2nd edition. Springer; Chapter 4. doi: 10.1007/978-3-030-48126-1_4 Available from: <https://www.ncbi.nlm.nih.gov/books/NBK565582/>

McSherry, W. Rykkje, L. Thornton, S. (Eds) (2021) Understanding Ageing for Nurses and Therapists. Springer Nature Switzerland AG. <https://doi.org/10.1007/978-3-030-40075-0>

Journal articles:

Cruz-Jentoft AJ, et al. Writing Group for the European Working Group on Sarcopenia in Older People 2 (EWGSOP2), and the Extended Group for EWGSOP2. (2019) Sarcopenia: revised European consensus on definition and diagnosis. Age Ageing. 48(1):16–31. doi: 10.1093/ageing/afy169. 06. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6322506/pdf/afy169.pdf>

- Talk with patients, carers, and other staff about the things they feel that lead to and prevent frailty and sarcopenia. Reflect on what these conversations suggest about how practice might be developed to improve mobility outcomes by involving patients.

3.9 How to Self-Assess Learning

- Discuss what you have learned about frailty and sarcopenia with other team members.
- Consider a patient you recently provided care for who you recognise as being frail or having sarcopenia or both. Make some notes about how your understanding of these issues has improved since reading this chapter. Discuss with your clinical colleagues how the care of the patient could have been improved in light of this learning.

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Preventing Falls

4

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4.1 Introduction

A fall is the usual mechanism of injury for fragility fractures. A fall is defined as ‘*an event which results in a person coming to rest inadvertently on the ground or floor or other lower level*’ [1]. Syncope, seizures or acute stroke are not considered falls, although they can also present as an episode of instability and a change of position to a lower level [2] and may be risk factors for falls. Common mechanisms of falls are slips, trips, and instability while walking or changing position. Falls can have diverse and complex causes and predisposing risk factors and are considered a geriatric syndrome since they are generally the result of the accumulated effect of impairments in multiple systems, particularly among those over 80 years old. They can also occur at any age and level of functioning when there is an inconsistency between physiological function, environmental demand and individual behaviour [3].

It is estimated that one-third of older people fall annually [4–6]. Fall-related injuries are a leading cause of hospitalisation of those aged 65 years and older [4, 6]. Falls

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are also a common cause of death in people over 60 years of age [4] and are among the ten health conditions that contribute to more years lived with disability [7].

Fractures occur in 5% of fall events, with 1% of these being a hip fracture [8]. Among musculoskeletal diseases, fractures are the third condition most responsible for years lived with disability demanding rehabilitation [9]. It is estimated that half of women and a quarter of men will suffer a fracture due to a fall during their lifetime [10]. Preventing falls and fall-related injuries in older adults is a global priority.

The mechanism of injury for most fragility fractures is a fall from standing height, usually by falling sideways [11]. Fragility fractures are defined as fractures that result from mechanical forces that would not lead to a fracture in a person with good bone density. Thus, a fracture after a fall from a standing height would be considered a fragility fracture, whereas a fracture after a fall from a high surface or a motor vehicle accident would generally not be considered a frailty fracture [12, 13]. Falls and fractures are closely linked in all age groups, but in older people, a combination of falls and fragile bone (osteoporosis) frequently leads to fragility fractures with frailty contributing further to the risk of falls and impeding recovery from injury (see Chaps. 2 and 3 for further information about osteoporosis and frailty).

Falls and fragility fractures can result in both short- and long-term disability and can have a significant impact on individuals, communities and health and social care services. For older people, the consequences of fragility fractures due to falls can be life-changing with considerable deterioration in health-related quality of life, increased dependency and social isolation [14]. As few as 40–60% of older people who sustain a hip fracture are likely to recover their pre-fracture level of mobility, and only half will regain their pre-fracture level of independence in instrumental activities of daily living, resulting in increased long-term care needs [15].

Falls are sometimes wrongly viewed as an inevitable consequence of the ageing process. They have, however, been shown to be avoidable with effective care and preventive measures [4]. Nurses and other health professionals working with patients following fragility fractures are in a unique position to integrate fall prevention into every aspect of the patient care pathway in the acute and rehabilitation phase of recovery as well as in secondary fracture prevention and community/home care settings.

The aim of this chapter is to explore the role of the practitioner working in acute hospital units, ambulatory care/outpatient clinics and community/home care settings and with people transitioning from hospital to home in preventing further falls in older people who have sustained a fragility fracture.

4.2 Learning Outcomes

At the end of this chapter and following further study, the practitioner will be able to

- Outline the impact of falls following fragility fracture on the older person.
- Explain the importance of preventing further falls.
- Identify their own and others' roles in fall prevention.

- Assess the causes of and risk factors for falls.
- Plan evidence-based care for the prevention of further falls in the acute hospital setting and/or the ambulatory care/outpatient clinic/community setting.
- Appropriately refer patients who have fallen to other services.

4.3 Understanding the Risk Factors for Falling from an Individual Perspective

As outlined above, the causes of falls are individual and multifactorial. Consequently, the risk factors for falls can interact dynamically [4, 16]. Over the years, more than a hundred risk factors have been identified in the literature, and these can be broadly classified into three main categories [17]:

1. **Demographic:** relating to issues such as age, gender, culture
2. **Intrinsic:** relating to individual biological and psychological factors, especially physical function, which are influenced by nutritional status, pre-existing medical conditions, medications, cognition, mood and sensory perception
3. **Extrinsic:** relating to the environment such as living conditions, home hazards and family/carer support

Table 4.1 provides examples of the most common risk factors for falls in older adults, based on the above classification.

Table 4.1 Categories of fall risk factors and examples

Main categories of risk factors	Category [5]	Example specific risk factors
Demographic	Sociodemographic	Advanced age, female gender, poverty, dependency, poor social support, isolation, cultural characteristics
Extrinsic	Environmental	Home hazards, uneven or cracked sidewalks, inappropriate footwear, risky behaviour
Intrinsic	Balance and mobility	Decreased walking speed, gait variability, decreased stepping response, foot pain and deformities (hallux valgus), muscle weakness
	Psychological	Delirium, dementia, depression and anxiety, fear of falling, loss of confidence, avoiding behaviours
	Medical	Frailty, sarcopenia, hypotension, malnutrition, diabetes, arthritis, respiratory and cardiovascular diseases, previous fractures, incontinence, neurological disease (e.g. stroke, Parkinson's disease, Alzheimer's disease)
	Medication	Polypharmacy and use of fall risk increasing drugs (FRIDs, such as psychotropics, antiepileptics, anticholinergics and some classes of cardiovascular drugs) [18]
	Sensory and neuromuscular	Age-related changes in sensorimotor function; visual impairments, dizziness, neuropathy and decreased plantar sensitivity

High risk of falling in older people is frequently associated with advanced age, multimorbidity and gait and balance problems. However, it is important to recognise that younger and more active older people, usually categorised as having a low-to-moderate risk, may also experience falls and should also be screened and assessed.

The prevalence/incidence of falls is different around the world, depending on culture, lifestyle and community practices. Availability of health and community services designed to prevent falls also varies significantly. Considering this, the strategy used in fall prevention will be influenced by region (location) and setting [19]. While the causes of falls, and therefore risk factors, are many, there are three main factors that strongly predict future falls [20]:

1. Falls and fall-related injuries in the last year
2. Fear of falling
3. Feeling unsteady when standing or walking

Box 4.1 provides an illustration of the risk factors for falls through a case study. The case study will continue later in the chapter.

Box 4.1 Case Study: The Fall Journey Part 1

Rosanna is 84 years old. She lives alone in a second-floor apartment (with a lift) in a city suburb. She is supported by two daughters and a son who live nearby. Since the COVID-19 pandemic, she has not been leaving her apartment as much as she used to and feels unsafe walking any distance. She now only goes out if her daughters or son take her.

About 8 months ago, Rosanna fell on the landing just outside her apartment while putting out the rubbish. She does not know why she fell. She sustained a fracture of her left wrist, which healed after several weeks in a lightweight plaster cast. Since then, she has been anxious about falling again, so she is very careful when she is walking around her apartment. She tends to hold onto her furniture to steady herself. Her children are concerned about her living alone and asked her to try not to go out for shopping without help.

Rosanna's husband died 5 years ago. She has become less socially active since then and feels that her life has contracted over those years. On many days now, she struggles to pay attention to the books and television she used to love, and she lacks the motivation to go out or join in social events. She does not like to admit that she has had a few falls since her wrist fracture but has, fortunately, been able to get up and has not been injured again at this stage. She has not told her family about these other falls.

Consider:

What else would you like to know about Rosanna?

What risk factors for further falls can you already see here?

What opportunities can you see for health professional intervention during this phase of Rosanna's care journey?

4.4 The Link Between Frailty, Sarcopenia, Falls and Fragility Fractures

Frailty, sarcopenia, falls and fragility fractures are highly correlated and often overlap. Sarcopenia is a major component for frailty [4], frailty can cause falls and falls can accelerate the frailty process as well as increase the risk of fragility fractures [21]. Falls are also considered a marker of sarcopenia and are one of the items of the SARC-F, an instrument designed to detect the risk of sarcopenia.

In older people, fractures are usually the consequence of two factors:

1. A fall
2. Bone fragility

Risk factors for falls significantly increase the risk of fracture and are linked to the risk factors for osteoporosis [22]. Another condition of great interest to clinicians is osteosarcopenia—the coexistence of osteopenia/osteoporosis and sarcopenia in the same patient—and it is associated with higher risk of falls, fractures, frailty and mortality [23]. Its prevalence ranges between 5 and 37% in community-dwelling older adults, with the highest rates observed in those with fractures [24]. Chapter 3 provides more information about sarcopenia and frailty.

The pathophysiology of osteosarcopenia is the consequence of multidirectional abnormalities in the bone-muscle crosstalk and local changes. Another important characteristic is that it can coexist with obesity, characterised by increasing levels of fat infiltration that are observed inside the bone marrow in osteoporotic bone and the dramatic levels of intramuscular fat infiltration observed in sarcopenic muscle.

Risk of falling has been shown to be more predictive of fractures than bone mineral density alone. Hence, fracture prevention should focus on identifying risk and preventing falls as much as on diagnosis and treatment of bone fragility (osteoporosis) and sarcopenia [25]. Optimum fracture prevention is, therefore, likely to require strategies to address falls as well as bone density.

4.5 Screening and Assessment

Screening is the process of identifying people at higher risk of falling (and stratifying their level of risk of falling) so that early preventive strategies can be personalised and implemented. This is an interdisciplinary activity that is the responsibility of all members of the team in all fragility fracture settings like acute/emergency care, rehabilitation, fracture prevention services and continuing care. Most patients with a fragility fracture will have fallen, so they can be automatically considered at risk of further falls. It is, however, still important to undertake assessment to enable the clinical team to do two important things:

1. Identify the level or risk of falling.
2. Understand the modifiable factors that can be altered with the aim of preventing future falls.

Nurses are particularly well placed to undertake screening and assessment because of their numbers and their 24-h contact with patients in some settings.

Various algorithms such as the CDC's STEADI [25], the American and British Geriatrics Societies' Clinical Practice Guideline for Fall Prevention [26] and the World Falls Guidelines (WFG) [19] recommend screening as an entry point for determining older people at risk of falling. All older adults should be considered a potential faller, even when they do not have any other risk factor.

Based on the complexity of identified problems, the input and support of other specialists (e.g. audiologists, ophthalmologist, podiatrists) and other members of the team with specific expertise or responsibilities may be needed to complete the assessment. This must take place as soon as possible, especially if there is a hospital admission and collaborative discharge planning needs to take place. In some countries and regions, there may not be any other specific services in place, and the nursing team and other health professionals will need to be trained and educated to undertake these assessments as part of the assessment/CGA process (see Chap. 5).

For example:

- **Home hazard assessment:** As early as possible, even immediately following hospital admission for hip fracture, so that measures can be in place well before discharge. In some countries, this is the role of a community/home care outreach team, social care specialist or occupational therapy service.
- **Vision assessment and referral:** Poor vision is a significant risk factor in falling and postural stability, assessment of visual acuity can be conducted early in the process of assessment and referral for a complete assessment should take place as soon as possible after the fracture [e.g. contrast sensitivity (CS), depth perception, binocular vision and binocular visual field]. Identifying those who wear multifocal/varifocal glasses is essential since they increase the risk of falling by impairing the distance contrast sensitivity and depth perception in the lower visual field of near-vision lenses, reducing the ability to detect environmental hazards.
- **Medication review:** Involving alteration of prescription and/or withdrawal of medications that increase the risk of falls. Some types of medication, and poly-pharmacy, are significant factors in falls. Medication should be reviewed either by the general practitioner or, during a hospital stay, by a geriatrician/physician/advanced practitioner and changes put in place and communicated to the patient's general practitioner/community team.
- **Malnutrition and sarcopenia:** Recognising undernutrition is essential in the management of frailty and sarcopenia (see Chap. 3), particularly in hospital where nearly 40% of older people are malnourished. Malnutrition is associated with poor health outcomes, hampering the management of other underlying conditions and diseases. The Mini-Nutritional Assessment (MNA[®]) was specifically developed and validated to identify older people who are malnourished or at risk of malnutrition, so intervention can be started early, and it has been translated into several languages (<https://www.mna-elderly.com/mna-forms>). The identification of possible cases of sarcopenia (risk of sarcopenia) can be conducted

using the SARC-F tool, and the European Working Group on Sarcopenia in Older People 2 (EWGSOP2) algorithm can be used to guide further steps into the assessment and confirmation of sarcopenia, including its severity [22]. Nutritional assessment and intervention are considered in more detail in Chap. 11.

Many assessment tools have been evaluated for their accuracy in identifying individuals' risk factors for consideration when planning preventive interventions that specifically address individual needs. A detailed fall assessment and prevention planning document is an important aspect of the patient record, and careful recording of information gained at each point is essential in ensuring that it can be shared among members of the team. Risk of falls is transitory and requires periodic assessment.

The NICE (2013) [21] guidelines recommended that:

... following treatment for an injurious fall, older people should be offered a multidisciplinary assessment to identify and address future risk and individualised intervention aimed at promoting independence and improving physical and psychological function.

Nurses and therapists are particularly well placed to understand fall history through casual conversations with patients during care episodes such as fundamental care and rehabilitation activities, for example, during personal hygiene interventions and when supporting mobilising.

It is essential that practitioners working in any setting where patients are admitted with fractures undertake a multidimensional fall risk assessment (MFRA). Identifying the individual causes of, and modifiable risk factors for falls that have led to injury is the first step in an effective care pathway. Such risk assessment can then inform planning of prevention measures most likely to meet individual needs in preventing further falls.

Nearly all fall risk assessment tools/scales have been developed in high-income countries and are usually written in the English language. Health professionals working in lower income countries and where English is not the first language (a) are less likely to use MFRA tool, and (b) available tools are inappropriate due to language and/or cultural differences. Tools, therefore, may need to be adapted and/or translated to reflect local conditions. A few tools have been translated into other languages.

The World Guidelines for Falls Prevention and Management for Older Adults [20] provide detailed advice about selecting an appropriate tool for local practice which the reader should access. These can be accessed in full at <https://doi.org/10.1093/ageing/afac205>. These guidelines focus on primary care settings, so those working in secondary care and acute hospital settings, for example (for which limited advice about fall prevention tools is available), will need to consider the needs of their local setting.

It is important that individual clinical settings work together as an interdisciplinary team to select a risk assessment tool that is

- (a) Meaningful to the care and management of their patient group, e.g. community-dwelling, hospitalised, post-fracture, ambulatory/outpatient care and peri-operative settings

- (b) Agreed by the interdisciplinary team as clinically appropriate following consideration and discussion
- (c) Uncomplicated to administer and record (simple to perform, require minimal space, equipment and time)
- (d) Easily included in care documentation, has a good predictive capacity to identify fall risk and is sensitive to change

Besides previously discussed usual gait speed test and TUG test, other fall risk assessment tools are the Berg Balance Scale, Performance-Oriented Mobility Assessment, Functional Reach test and fall history. Overall, these fall risk assessment tools have insufficient predictive performance when used alone, but they can be used in combination with the clinical judgement and expertise of healthcare professionals [27] while bearing in mind that they have been developed for primary care/community settings. The STEADI algorithm suggests assessing patients' modifiable risk factors and falls using the TUG, the 30-Second Chair Stand and the 4-Stage Balance Test [25].

A person-centred care plan based on the assessment of the older person's care needs, expectations and values can be built over the course of the interdisciplinary assessment/CGA process (see Chap. 6). Practitioners can build individualised fall prevention plans and tailor interventions with the participation of older people and their carers, improving short- and long-term concordance with prevention plans and interventions. An interdisciplinary assessment must then lead to early commencement of prevention strategies (including during any hospital stay), and the implementation of fall prevention measures should never be assumed the responsibility of another service or practitioner.

4.6 Evidence-Based Interventions for Fall Prevention

In all settings, fall prevention needs to be incorporated into the approach to fundamental daily care, be it in the hospital, secondary care or home care setting.

Many countries and localities now have evidence-based guidelines that identify those interventions most likely to prevent falls [28, 29] (see Box 4.2). It is widely accepted that preventing falls is an interdisciplinary undertaking as no one member of the team has all the skills required for successful outcomes in this complex activity. However, there is a danger with this approach that members of the team may perceive fall prevention interventions as the responsibility of someone else, making interdisciplinary collaboration ineffective—and resulting in worse outcomes for older people.

The focus, here, is on those interventions which might be considered specifically 'nurse-sensitive' or 'care-sensitive' measures. Nurses are the largest group of team members, and they are, therefore, well placed to co-ordinate the fall prevention care of those patients who have recently sustained a fragility fracture following a fall while working collaboratively with other team members, especially physiotherapists. Nurses are also the team members who spend the most time interacting with

patients over the 24-h period, particularly during a hospital stay. It is important to stress, however, that these interventions are not the sole responsibility of nurses and should be planned and delivered in collaboration with other members of the team while appreciating the individual skills and roles of each. For this reason, it is advisable that education and training of clinical interdisciplinary teams in the prevention of falls involve all members of the team being educated together through multiprojection education.

Box 4.2 Examples of Fall Prevention Guidelines International/Worldwide

Abraham I, Rimland JM, Trotta F, Pierini V, Cruz-Jentoft A, Soiza R, O'Mahony D, Cherubini A. Non-Pharmacological Interventions to Prevent or Treat Delirium in Older Patients: Clinical Practice Recommendations The SENATOR-ONTOP Series. *J Nutr Health Aging*. 2016;20(9):927–936. Doi: 10.1007/s12603-016-0719-9. <https://pubmed.ncbi.nlm.nih.gov/27791223/>

World guidelines for falls prevention and management for older adults: a global initiative. *Age and Ageing*, Volume 51, Issue 9, September 2022, afac205, <https://doi.org/10.1093/ageing/afac205>. <https://worldfallsguidelines.com/>

Step safely: strategies for preventing and managing falls across the life-course. Geneva: World Health Organization; 2021. <https://www.who.int/publications/i/item/978924002191-4>

Australia

Australian Commission on Safety and Quality in Health Care (ACSQHC) (2009) Preventing Falls and Harm from Falls in Older People: Best practice guidelines for Australian hospitals <https://www.safetyandquality.gov.au/sites/default/files/migrated/Guidelines-HOSP.pdf>

Royal Australian College of General Practitioners. Guidelines for Preventive Activities in General Practice, 9th ed. Published 2016. Accessed November 5, 2021. <https://www.racgp.org.au/download/Documents/Guidelines/Redbook9/17048-Red-Book-9th-Edition.pdf>

Canada

RNAO. Preventing Falls and Reducing Injury From Falls. 3rd ed. Registered Nurses' Association of Ontario; 2017. <https://rnao.ca/bpg/guidelines/prevention-falls-and-fall-injuries>

Korea

Kim KI, Jung HK, Kim CO, et al.; Korean Association of Internal Medicine, The Korean Geriatrics Society. Evidence-based guidelines for fall prevention in Korea. *Korean J Intern Med*. 2017;32(1):199–210. Doi: 10.3904/kjim.2016.218 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5214733/pdf/kjim-2016-218.pdf>

UK

British Geriatrics Society (BGS) (2017) Clinical Guidelines on Falls and Fractures <https://www.bgs.org.uk/resources/clinical-guidelines-on-falls-and-fractures>

NICE (National Institute for Health and Clinical Excellence) (2013) Falls in older people: Assessing risk and prevention. Clinical guideline [CG161] <https://www.nice.org.uk/guidance/cg161>

Public Health England (2020) Falls: Applying all our health <https://www.gov.uk/government/publications/falls-applying-all-our-health/falls-applying-all-our-health>

Scottish Government (2019) National falls and fracture prevention strategy 2019–2024 draft: consultation <https://www.gov.scot/publications/national-falls-fracture-prevention-strategy-scotland-2019-2024/pages/6/>

USA

American Family Physician/U.S. Preventive Services Task Force: Interventions to prevent falls in community dwelling older adults: Recommendation statement. Published August 15, 2018. Accessed November 1, 2021. <https://www.aafp.org/afp/2018/0815/od1.html>

Stevens JA, Phelan EA. Development of STEADI: a fall prevention resource for health care providers. *Health Promot Pract.* 2013;14(5):706–714. <https://doi.org/10.1136/injuryprev-2012-040580e.14>

Falls and their prevention are recognised as a fundamental aspect of maintaining and improving health and well-being in older people. The preventive measures for falls are also included in the interventions for the management of frailty, which are considered in Chap. 3. Prevention measures have been investigated in numerous research studies over several decades, so there is now significant understanding of which are most likely to be successful.

NICE (2013) Guidelines [21] recommended that:

...following treatment for an injurious fall, older people should be offered a multidisciplinary assessment to identify and address future risk and individualised intervention aimed at promoting independence and improving physical and psychological function

Fall prevention measures should be integrated into daily care activities and need to be implemented over time to enable older people to embed them into their everyday life. In inpatient units where older people are managed following a fall that has led to a fragility fracture, there are several evidence-based interventions that are most likely to contribute to fall prevention in older people following a fracture once an assessment for risk of falling and individual risk factors has been made:

1. Patient and carer education and collaboration
2. Improving muscle strength and balance
3. Improving mobility, increasing physical activity and avoiding sedentary behaviour

4. Supporting optimum nutrition
5. Monitoring cognitive fluctuations and medical conditions
6. Recommending assistive devices
7. Managing fear of falling
8. Managing polypharmacy and fall risk inducing drugs (FRIDs)
9. Collaborating with and referring to other members of the interdisciplinary team

4.6.1 Fall Prevention in Hospital

Even though there are many priorities in the care of the patient with an acute significant fragility fracture, it is essential that fall prevention measures are implemented throughout the hospital stay for two main reasons:

1. To ensure that fall prevention is an integral part of the patient's care to facilitate the prevention of future falls and associated fractures
2. To prevent further injuries and complications from in-hospital falls

The number of falls during hospital stay tends to be even higher than at home. It is common that falls occur when patients transfer themselves from the bed to the bathroom without caregiver supervision. During the hospital stay, it is important to embed some simple practices into care to prevent falls:

1. *Monitoring the environment*: Familiarise the patient with the environment to give them confidence - including aspects like lighting, bed height, furniture stability and patient call bells within reach.
2. *Monitoring nutrition*: Malnutrition can lead to muscle weakness, decrease the bone density and affect cognitive function. See Chap. 11 for further information.
3. *Improving mobilisation, functionality and physical activity*: Poor mobility and function and reduced activity are highly correlated with falls, fractures and risk of secondary falls. In hospital, individuals can undertake tailored exercise and can be encouraged to increase their level of physical activity by adopting an active attitude. Being active and mobile play an essential role in preventing the functional and cognitive decline associated with fractures and hospitalisation. Being active in the hospital, particularly after a hip fracture, is influenced by several factors such as the patient's age and surgical intervention, as well as the philosophy of care in acute care settings. Encouraging increased activity and mobility levels needs close collaboration with the therapy team. If no physiotherapist or other exercise/rehabilitation specialist is available, nurses can instruct simple exercises of mobilisation based on individuals' risk of falls: for example; sit and stand from a chair, knee flexion and extension, ankle plantar flexion and dorsiflexion, tandem position, and walking and turning around. Chapter 8 provides further information about mobility and exercise.
4. *Assessing patient's risk of falls*: As previously discussed in Sects. 4.5 and 4.6, nurses are well placed to assess the risk of falls. Following assessment, a team

discussion can identify the strategies that should be used and which may include referral to specialists or a targeted prevention programme.

5. *Managing fear of falling*: Fear of falling can have a significant impact on recovery, decreasing mobility, balance, social participation and motivation, for example. The dialogue of all health professionals, including nurses, with the patient is crucial in developing their confidence. Those health professionals who spend more time with the patient are ideally placed to help them develop increased confidence.
6. *Providing education*: This is an important action for both patient and family. Explaining the importance of and strategies that can help to reduce the risk of falls, for example, encourages patients to maintain physical activity aimed at fall prevention, encourages them to report falls and ask for help when they need and provides support in the period after discharge.
7. *Monitoring progress*: Clinicians such as nurses, who spend regular and extended time with patients, are well placed to observe patient progress and share findings with the interdisciplinary team. Patients and their families need to actively engage with fall prevention programmes. It is important that, at discharge or transfer, fall prevention programmes begun in the hospital continue. It is crucial to adjust the discharge plan, if necessary.

4.6.2 Fall Prevention at Home/Community and Secondary Care

Continuing with fall prevention strategies and programmes instigated during the hospital stay is essential. In the community or secondary care setting, the following strategies should be considered:

1. *Improving muscle strength, mobility and balance*: An international expert consensus guideline recommends resistance training aimed at improving muscle strength and power. This should involve balance and gait exercises, progressing in intensity and in complexity as well as dual-task exercises and Tai Chi exercises progressing in complexity [30]. Implement exercise for strength, and specific balance exercise is important to increase functional ability as well as recovery confidence and socialisation. A regular and progressive strength and balance training programme should be considered for all older adults. It is also important to encourage them to maintain the exercise routine continuously. The ideal would be referring the patient to a specific programme near where they live so that they can get there easily.
2. *Managing fear of falling*: It is important to maintain the previously discussed measures, especially the dialogue with the patient. Fear of falling often presents as anxiety and extreme reluctance to mobilise, which leads to avoidance of the activity perceived to have resulted in the fall (i.e. walking) as well as depleted motivation in the rehabilitation process, leading to a decline in function, loss of independence and reduced quality of life [31]. Older people fear falling partly

because they often perceive it as a catalyst for loss of independence and, even, moving to a care home, so they are reluctant to discuss their experiences and tend to underplay the number and significance of previous falls.

3. *Providing education:* To empower engagement and motivation, it is important to deliver positive messages and facilitate their understanding that future falls can be prevented by specific actions. It is important to stress to individuals that falls are not a normal part of ageing and can be prevented, but that effective prevention measures are based on an assessment of the factors and circumstances that led to falls for that person. Hence, providing details about the fall is particularly important in clarifying the mechanisms that caused a particular fall event. The process of interviewing and discussing the event contributes to active engagement in establishing a preventive and rehabilitative care plan. Education that reflects the preferred learning style of the individual needs to be delivered continuously so that important messages are integrated into their thinking. Educational interventions can take several forms, including verbal health improvement conversations during care episodes, multimedia options, paper-based materials and online options. Verbal conversations should be reinforced with written materials with simple messages that are easily remembered. See Fig. 4.1a–d for an example.

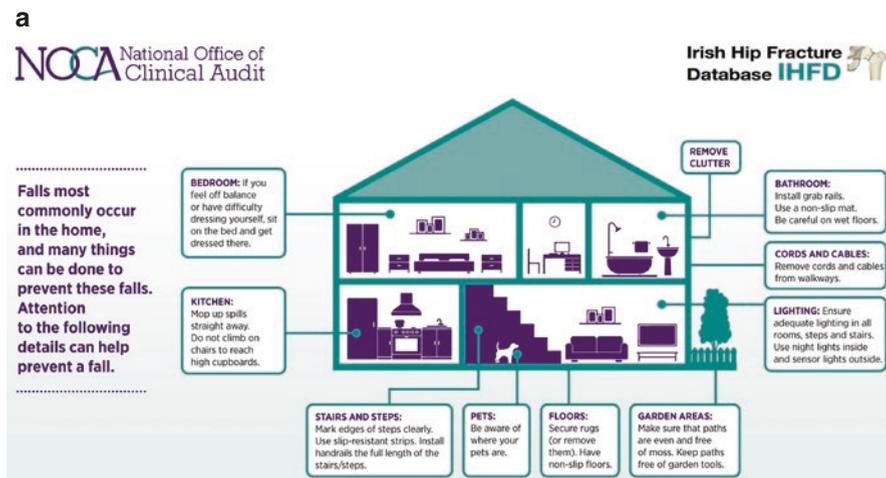


Fig. 4.1 (a) Fall prevention infographic (reproduced with permission from the National Office of Clinical Audit, Ireland [32]). (b) Staying safe at home to prevent fall infographic (reproduced with permission from the National Office of Clinical Audit, Ireland [32]). (c) Home safety checklist infographic (reproduced with permission from the National Office of Clinical Audit, Ireland [32]). (d) Active at home infographic (reproduced with permission from the National Office of Clinical Audit, Ireland [32])

b

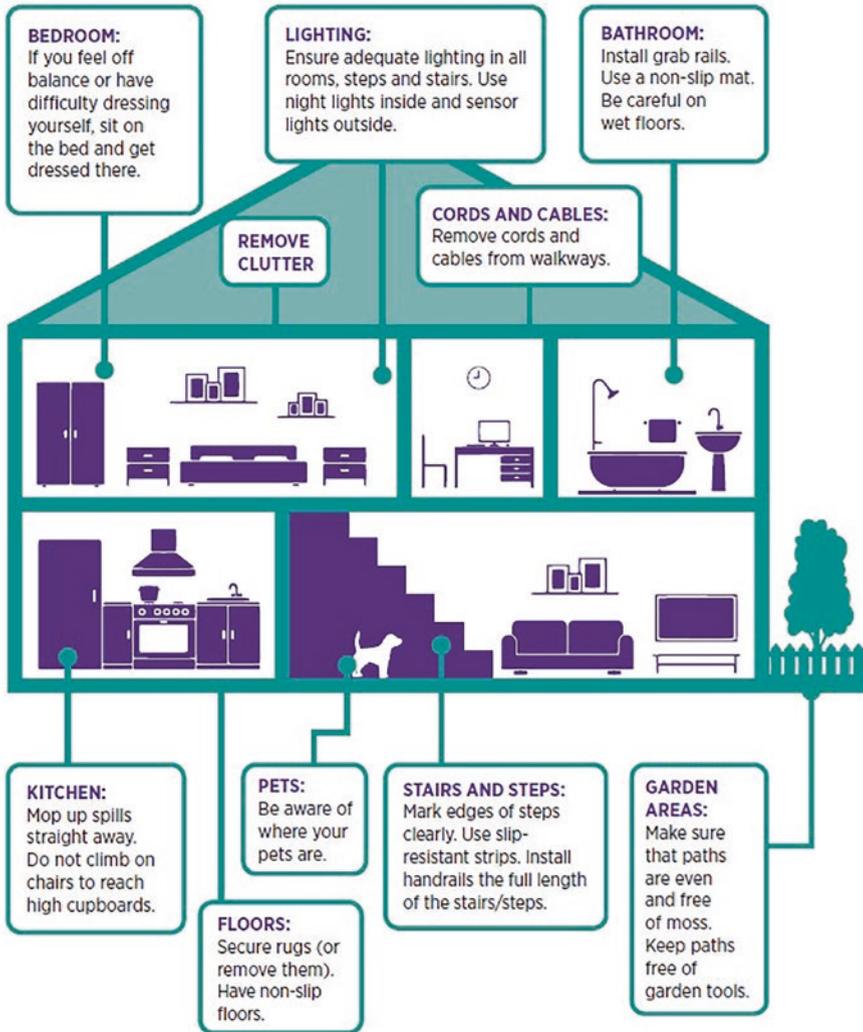


FIGURE 3: HOME SAFETY ADVICE

Fig. 4.1 (continued)

c HOME SAFETY CHECKLIST FOR FALLS PREVENTION

Falls in the home continue to be the leading cause of Major Trauma in Ireland. Attention to the following details in the home could reduce these accidents and prevent injuries.

 <p>IS THE ENTRANCE TO THE HOME SAFE? ✓ YES: NO ACTION. X NO: If the footpath is uneven or slippery, or has loose paving stones or trip hazards, it should be fixed or removed.</p>	 <p>CAN YOU WALK AROUND THE HOME EASILY? ✓ YES: NO ACTION. X NO: Ask someone to move furniture or clutter in order to make the rooms/walkways accessible and safe.</p>	 <p>ARE THERE RUGS OR TRIP HAZARDS? X NO: NO ACTION. ✓ YES: Remove rugs or use double-sided tape to make them safe; remove trip hazards.</p>
 <p>IS THERE ADEQUATE LIGHTING IN THE WALKWAYS AND ROOMS? ✓ YES: NO ACTION. X NO: Replace bulbs; suggest placing a lamp in darker areas in order to increase brightness.</p>	 <p>ARE THE STAIRS OR STEPS SAFE? ✓ YES: NO ACTION. X NO: Remove any items on stairs/steps; make sure handrails are safe; fix any loose steps or loose carpet; and make sure lighting is adequate on the stairs.</p>	 <p>IS THE KITCHEN SAFE? ✓ YES: NO ACTION. X NO: Make sure key items are within easy reach; if using a stool, make sure that it is in good working order.</p>
 <p>IS THE BATHROOM SAFE? ✓ YES: NO ACTION. X NO: Make sure non-slip mats are available in the bath or shower. If there is difficulty getting into the bath/shower, ensure that grab rails are placed where appropriate.</p>	 <p>IS THE BEDROOM SAFE? ✓ YES: NO ACTION. X NO: Ensure that a lamp or light is within easy reach of the bed. Ensure that the route to the bathroom is clear and easily visible. Remove clutter. Ensure that a walking aid is within easy reach if required.</p>	 <p>ARE THERE PETS IN THE HOUSE? X NO: NO ACTION. ✓ YES: Make sure the pet has a bell on its collar, so as to ensure that its whereabouts are known at all times.</p>

Fig. 4.1 (continued)

d

WHAT IS A HIP FRACTURE AND HOW CAN IT BE PREVENTED?

A hip fracture is any break in the upper portion of the thigh bone (femur) where the bone meets the pelvis. Falls are the main cause of hip fractures. As we age, our bones can become weaker (osteoporosis) and therefore a fall can result in the bone breaking easily. The majority of hip fractures were caused by falls at home. Across are some helpful tips to keep active at home.

SAFETY IS IMPORTANT

<https://bit.ly/38Klvcu>



Adapted from the work of Vanda Cummins, Primary Care Physiotherapist, HSE

Fig. 4.1 (continued)

4.7 Incorporating the Individual Experience of Falls into Care: The Person's Perspective

The consequences of falls are life-changing for older people, particularly after a fracture. For many individuals, falls and injuries such as fractures lead to fear of further falls (see Sect. 4.6), resulting in lack of confidence in mobilising and avoidance of physical activity. In turn, this leads to decreased physical activity and sedentary behaviour, decline in physical function, increased dependency, depression, anxiety and chronic pain. Some older adults might believe that being at rest and not moving is the best intervention for healing a fracture. These beliefs and experiences are inaccurate and negatively affect motivation to engage in both rehabilitation and fall prevention strategies. It is important, therefore, that practitioners understand the beliefs and experiences of older people following a fall so that they can ensure that the care process is focused on individual beliefs, needs and concerns.

These individual experiences are highlighted in qualitative research studies that have explored how it feels to be an older adult who has fallen. Gardiner et al. [34]

conducted a narrative review of qualitative research to examine studies that explored experiences of falling and the perceived risk of falling in the community. They reviewed 11 studies that revealed four themes: ‘falls as a threat to personal identity’, ‘falls as a threat to independence’, ‘falls as a threat to social interaction’ and ‘carefulness as a protective strategy’. These findings highlight that encouraging a proactive, constructive approach to managing the risk of falling and avoiding pervasive messages related to dependency and incompetence are practical implications for nurses and other professionals implementing fall prevention strategies.

Fall prevention programmes should be individualised, considering individual beliefs, attitudes and priorities [20]. The older adult’s perspective is essential for the success of the prevention programme, so they should be included in all stages of the process. Patient’s concordance with fall prevention programmes is often low. It is influenced by individual characteristics, environmental factors and perception of the benefits [33, 34], for example [33]:

I saw the others doing the exercises and I couldn’t do the same. I thought I was disturbing them.

I found myself walking better.

The problem was that I had to take the bus during rush hours, and it was overcrowded.

Clearly, understanding the older adult’s point of view is a good strategy to reduce lack of engagement and dropout from fall prevention programmes. Including them in group activities and near to where they live is a small action that can change their approach to involvement. It is also important that health professionals avoid using negative words and deliver positive messages to help the individuals to stay in the programme.

4.8 Working Collaboratively to Prevent Falls Within an Interdisciplinary Team

Every member of the interdisciplinary team is essential in delivering interventions for the prevention of falls. This team includes practitioners working in all the health and social care settings in which the patient will receive acute, rehabilitation, secondary and/or home care. Team members should be educated and led together so that a positive attitude to working collaboratively is developed to ensure that all members believe that they should be active in fall prevention and not think that they can simply delegate it to the therapist or for home care and community services. The prevention of future falls needs to begin immediately at the point of first fracture, be that in the emergency, hospital or community setting.

Each member of the team brings a specific set of skills, and these skills need to be made the most of by recognising every member’s potential contribution from the geriatrician/physician to the therapist and to the nurse. Fall prevention is most effective when the team works collaboratively towards the same goals. No single

member of the team can successfully support patients in preventing falls in isolation. The patient and their family are at the centre of this collaborative effort as patient and carer involvement in decision-making about interventions is fundamental to successful outcome.

Box 4.3 Case Study: The Fall Journey Part 2—An Example of Interdisciplinary Working for Fall Prevention in the Hospital Setting

Rosanna has, unfortunately, now suffered a serious fall at home. On this occasion, she has fractured her hip and has undergone orthopaedic surgery. She is now 3 days post-surgery and is beginning to mobilise.

The interdisciplinary team have collaborated to identify those factors which contribute to Rosanna's continuing risk of falls. The most important factor has been identified as her reduced mobility due to fear of falling and changed social circumstances. This has been discussed with both Rosanna and her family, and they are beginning to work on a plan to devise strategies for gradually increasing her engagement with her local community again.

The nurses and physiotherapists have discussed a plan of care for early rehabilitation that involves a gradual increase in activity with a focus on remobilisation. This starts with sitting on the edge of the bed, moving to a chair and gradually increasing the number of steps taken. The therapy team have provided a walking frame and have shown Rosanna how to use it. The plan involves using every opportunity during fundamental care to support her in standing, sitting and walking, gradually increasing the distance and time with a goal of her walking to the toilet*. The nurses and medical team have a plan in place to ensure that Rosanna's post-operative pain is well managed during this period with regular pain assessment and administration of analgesia.

The team have also begun to implement an education plan for Rosanna and her family, which focuses on them understanding why she fell, and the actions that can be taken to prevent future falls. This is also focused on increasing Rosanna's motivation, decreasing her fear of falling. The team are using Rosanna's fundamental activities such as mobilising and washing and dressing to engage her in conversation about how her risk of falling can be modified and her quality of life can be improved at the same time.

(*See Chap. 8 for further discussion relating to remobilisation plans and interventions, including exercise).

Summary of Main Points for Learning

- Falls are preventable and should not be viewed as an inevitable consequence of the ageing process.
- Falls and fragility fractures frequently result in both short- and long-term disability and can be life-changing with considerable deterioration in health-related quality of life, increased dependency and social isolation.
- Causes of falls are individual and multifactorial. Risk factors interact dynamically and can be broadly classified into three main categories: demographic, intrinsic and extrinsic.
- Frailty, sarcopenia, falls and fragility fractures are linked and should be identified and receive proper intervention.
- Evidence-based processes and tools for multidisciplinary screening, assessment and management of risk of falling are available and can guide healthcare professionals.
- Involving patients and their families is essential in developing and implementing a person-centred fall prevention care plan.

4.9 Suggested Further Study

World guidelines for falls prevention and management for older adults: a global initiative. *Age and Ageing*, Volume 51, Issue 9, September 2022, afac205, <https://doi.org/10.1093/ageing/afac205>. <https://worldfallsguidelines.com/> (See Box 4.3 for links to other falls prevention guidelines)

Blain, H., Miot, S., Bernard, P.L. (2021). How Can We Prevent Falls? In: Falaschi, P., Marsh, D. (eds) *Orthogeriatrics. Practical Issues in Geriatrics*. Springer, Cham. https://doi.org/10.1007/978-3-030-48126-1_16

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4.10 How to Self-Assess Learning

- Identify an older adult for whom you have recently provided care, and make some notes about your answer to the following questions:
 1. How do you feel about the care the person received? Was it satisfactory?
 2. Given what you have learned from this chapter and your further reading, what could you and your team have done to improve their care and, potentially, their outcomes?
 3. Discuss with your team what priorities are there for improving your service, and make a plan of action.

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Secondary Fracture Prevention

5

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5.1 Introduction

Fragility fractures are sentinel events, signalling that osteoporosis or osteopenia may be present [1] as discussed in Chap. 2. These fractures are sustained through minimal trauma which most commonly, although not limited to, occur due to a fall from standing height or less [2]. Low bone density due to osteoporosis or osteopenia means that such falls easily result in fractures, even when the fall dynamics are relatively mild, as discussed in Chap. 4 [3]. According to the Global Burden of Disease study in 2019, fragility fractures are common and the incidence is increasing [4] despite the increase in global efforts to improve access to secondary prevention. The most common age groups susceptible to fragility fractures are people aged 50 years and over [5].

Fragility fractures are the leading cause of hospitalisation due to accidental injury with significant risk of death in the year following the fracture [6]. The increased risk of death is due to complications arising from immobility, surgery, worsening of comorbidities, and increased frailty. Of all types of fragility fractures,

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hip and vertebral fractures have the greatest impact on the individual and are associated with the worst morbidity, mortality, and loss of functional ability as a direct result of the fracture [7].

Even relatively minor fractures, such as those of the wrist, can lead to significant impairment and early mortality, independent of any contributing comorbidities. Pain associated with fractures, both at the acute and chronic stages, and resultant disability contribute to impaired quality of life for the person sustaining the fracture [8]. In a study of over 800 people, it was found that the effects of fractures can impair quality of life at the same rate as complications of diabetes [9]—a key point for funders as well as health professionals in determining the service their community needs.

With this background in mind, all people aged 50 years and over who sustain fragility fractures should undergo investigation for osteoporosis and, if confirmed, be commenced on osteoporosis medication and be supported to participate in conservative behaviours that are known to improve bone health [10].

Global evidence confirms that organised and coordinated secondary fragility fracture prevention is the best option to prevent further fractures in all populations [6, 11]. The coordinated approach requires a multidisciplinary team working across care sectors in collaboration with the patient and family to ensure that care is consistent and person-centred and addresses individual needs. The multidisciplinary team and care providers in local communities must work within an agreed approach that includes patient identification, assessment (including bone health, comorbidities, social and psychological needs), diagnosis, treatment regimens, and follow-up over time, ensuring that everyone receives the healthcare they need. Local teams agree collectively on how care will be delivered, that is, the local ‘model of care’.

Internationally, secondary fragility fracture prevention models have been in place for over 20 years and are commonly known as ‘fracture liaison services’ (FLSs) [12, 13] or sometimes ‘orthogeriatric fracture liaison services’ [14] and ‘(re) fracture prevention services’ [15]. Most are coordinated by a nurse or physiotherapist in collaboration with the multidisciplinary team [15, 16].

Despite the evidence for successful outcomes and cost-effectiveness [1, 17, 18], many people across the globe who sustain fragility fractures do not have access to diagnosis and evidence-informed treatment to prevent the next fracture [2, 19] despite the presence of the hallmark of a first or subsequent fragility fracture. Those with vertebral fractures are of special note as they often present ‘silently’ (asymptomatically) other than with back pain, which is often attributed to non-specific back pain. This further restricts access to appropriate care for this patient group [20].

There is strong evidence that access to treatment and supportive follow-up prevent at least 70% of refractures of vertebral fractures, 50% of hip fractures, and all other fragility fractures by 20–30% [21]. While the fundamental management of bone health is considered in Chap. 2, to help practitioners understand how they can support their patients’ efforts to prevent the next fracture, this chapter aims to explore how secondary fractures can be prevented through evidence-based interventions and services. An example of an ideal care pathway is provided in Box 5.1.

5.2 Learning Outcomes

At the end of this chapter and following further study, the nurse will be able to

- Outline how secondary refracture prevention services can be developed, implemented, and evaluated.
- Describe how to coordinate a multidisciplinary secondary fragility fracture prevention service.
- Define the concepts included in an evidence-informed and effective secondary fracture prevention service including disease management, psychosocial needs, and self-management support strategies.
- Explain the need for coordinated secondary fracture prevention through pathways and models of care such as fracture liaison services.
- Discuss the role of practitioners in secondary fracture prevention and fracture liaison services.

Box 5.1 The Ideal Patient Journey Through Their Secondary Fragility Fracture Prevention Service

Mrs. Wang (aged 67 years) presented to her local hospital with her daughter, complaining of pain in her left wrist following a fall while working in her garden. She said that she was trying to get up from kneeling down and lost her balance. She had put her hand out to try and steady herself, which resulted in acute pain in her wrist.

Assessment in the emergency department (ED) confirmed a wrist fracture, which was immobilised with a back-slab. She was advised to attend the outpatient fracture clinic later that week. She was also advised to see her GP for further assessment of her antihypertensive medication as the ED doctor was concerned that she may have had a hypotensive episode precipitating her loss of balance.

The fracture liaison coordinator (FLC) visited Mrs. Wang in the ED. She introduced Mrs. Wang to the possibility that she may have osteoporosis, which predisposed her to fractures. She was told that if her bone had been healthy, she may not have had a fracture. Mrs. Wang agreed that she needed to know more so gave the FLC specialist nurse her contact details. They planned to discuss this further away from the ED when Mrs. Wang's mind would be more receptive to understanding what they would discuss.

Mrs. Wang attended the outpatient fracture clinic, and it was decided to proceed to surgery to stabilise her fracture. Surgery was performed without complication the following day.

Two weeks later, she attended her appointment with the FLC where the FLC discussed with her how she was progressing since her surgery, especially regarding pain management, and whether she had visited her general practitioner (GP) for an update on care needs. She had seen her GP and so the discussion turned to why fragility fractures can occur and what she could do to improve her chances of not having another fracture.

Mrs. Wang also completed the fracture liaison service (FLS) patient-reported measure questionnaire and had a bone density scan in the department on the same day. While awaiting the bone density scan report, Mrs. Wang and the FLC discussed her patient-reported measure scores as it revealed that she reported social isolation since moving in with her family, away from previous friendships. It was agreed that she would link in with the local fall prevention team and support group. While Mrs. Wang was discussing her medication needs with the FLS doctor, the FLC made an appointment for her to be assessed by the team physiotherapist for the fall team.

The FLC phoned Mrs. Wang and her daughter a week later to see how she was progressing. By this time, Mrs. Wang and her daughter had done some online investigation as her neighbour had spoken about something she heard on the radio about the dangers of the medicines for osteoporosis. The FLC listened to their concerns and shared with them the evidence regarding osteonecrosis, especially regarding risk versus benefits of using the prescribed medication. The FLC also suggested that they speak to their GP to alleviate their fears. In the meantime, Mrs. Wang agreed to continue her medication.

Mrs. Wang confirmed that she had an appointment with the fall prevention team for the next week and was feeling positive about meeting other people of her age group and with some of the same health issues. She also agreed to complete the patient-reported measure questionnaire in a month's time and post it back to the FLC. If no further issues were identified, they agreed that there was no need to contact each other again until this time next year when the FLS team would send her a questionnaire to address her current health status along with the patient-reported measure questionnaire. However, the FLC confirmed that Mrs. Wang and her daughter could contact the FLS team at any time if required.

5.3 Secondary Fracture Prevention

When a comprehensive FLS is in operation with participants being recruited from the age of 50 years and sustaining their first or subsequent fracture, the evidence is clear that FLSs can prevent many hip and other subsequent fractures.

This is the mantra of the FFN Secondary Fragility Fracture Prevention Special Interest Group. See <https://fragilityfracturenetwork.org/secondary-fragility-fracture-prevention/>.

Sustaining a fragility fracture is a signal that more fractures will occur, so healthcare that is known to prevent up to 70% of refractures must be instigated [21]. Unfortunately, healthcare systems across the globe often fail to provide this care because:

1. No one professional group takes responsibility for identifying and treating this patient group.
2. There are varying opinions by health professionals concerning who should be medically treated to prevent the next fracture.
3. People with fragility fractures are not advised of their potential for having osteoporosis, so they never report this condition in population surveys; hence, the reported statistics for osteoporosis are erroneously low.
4. Coding in health records is poor due to clinical teams not using terms in their medical records that inform the coder to report fragility fractures.
5. There is a lack of available international diagnostic codes, even when a fragility fracture is identified.

This results in health systems being unaware of the need for action and failing to implement secondary prevention services that reduce refracture rates, improve the quality of life of those who sustain fragility fractures, and reduce the complications and mortality that are directly attributable to any fragility fracture, not just hip fractures [2].

It has been estimated that about 70–80% of people sustaining a fragility fracture do not gain access to secondary prevention care despite international evidence that reveals that ‘fracture liaison services’, as a successful systematic approach to secondary prevention, result in fewer refractures and significant cost savings for both society and health systems [22].

5.4 Development of Fracture Prevention Services and Best Practice

5.4.1 Models of Care

Several models of secondary fracture prevention services exist and are outlined in Table 5.1. Outcomes from different models of care vary. The more intensive the model of care, the better the bone health outcomes, along with improved quality of life, better use of resources, and cost-effectiveness [23]. Table 5.1 outlines what a meta-analysis revealed with varying intensities of intervention. Many services have reported their outcomes when using the type A model of care including Nakayama et al. [24], who reported on fragility fractures at their hospital, where an FLS had been in operation for over 10 years, compared to a hospital where there was no FLS. The study revealed that there were 40% less hip fracture presentations at their hospital compared to the site without FLS. This is just one example of findings much the same from FLS teams across the globe.

Table 5.1 Common models of fracture liaison service (FLS)

FLS model type	Interventions provided within the model of care	Outcomes
A	Intensive service with all interventions, the responsibility of the team	Most effective across all care needs for people who sustain a fragility fracture and is cost-effective with the most refractures prevented
B	All interventions except treatment initiation—the responsibility of the patient’s general practitioner	Not as effective as type A but more effective than health education alone
C	Health education only provided with handover to the general practitioner from a physician through either written or phone call communication	Little or no effect on initiation of effective treatment known to reduce the incidence of refracture
D	Health education provided. There is no physician contact with the person’s general practitioner	No effect on the initiation of effective treatment known to reduce the incidence of refracture

5.4.2 Value-Based Care

Value-based care (VBC) is a concept that is gaining momentum globally as a core way of revealing if a health intervention is worthwhile in terms of patient outcomes and value for investment [25, 26]. Incorporating patient-centred care in secondary fragility fracture prevention services will lead to outcomes that reflect VBC. While planning a service, or revising how an existing service is delivered, the elements of VBC should be at the front and centre of planning. The team decide which elements of the model of care are central including:

- Deliver outcomes for patients that matter to them
- Improve their healthcare experience
- Improve health professional experience in their work
- Make optimum use of the resources available to the team.

5.4.3 Patient-Centred Care

To achieve the elements of VBC, a service will need to include strategies that improve patient and family involvement in decisions. This will help their adherence to medical and conservative treatment and interventions. The decisions the patient and family make in collaboration with their service team will ensure that they are more likely to be receptive to their healthcare, resulting in better adherence to their agreed care plan.

Patient-centred care in a secondary fragility fracture service equates to being more attentive to what will

- Enhance patient and family involvement (attendance)
- Gain their full involvement in what needs to be done to reduce the risk of fracture and improve bone health (commence treatment)

- Support the patient in working towards adherence to their mutually agreed treatment over time (care plan)
- Help the patient and family understand the need for regular review of their treatment regimen to ensure that the strategy for improving and maintaining best possible bone health is appropriate for their needs over the long term.

5.4.4 Behaviour Change Strategies

Long-term and chronic healthcare teams have always realised the benefits of using behaviour change methods in achieving patient-centred needs [27–29]. This requires a change in mind-set from traditional care delivery. Teams need education and training and supportive managers to facilitate the incorporation of shared decision-making and listening more, both elements of behaviour change methodology. Patient-reported measures (PRMs) are also central as they elucidate many issues which concern individuals. Traditionally, services use PRM questionnaires for auditing quality improvement, but in behaviour change methods, they are also used in clinical assessment, care planning, and follow-up assessments [30].

Using behaviour change methods will help the care team to achieve patient engagement in their journey towards better bone health, which involves introducing the patient to their care plan. The journey to better bone health, in conjunction with other health issues the patient may have, can be onerous for the patient and family. Commencing too many health goals at one time can set them up to fail, so they need to understand the value of working on a small number of goals at one time. Helping them understand the need for medication to improve bone health is a priority; then one conservative goal of their choice can be added, later helping them determine further goals.

Working with the patient and family in this manner takes time, more than that required when the clinical team makes decisions for the patient which can overwhelm them and not give them time to determine the value of interventions. However, the positive and collaborative engagement of people who seek the care of a secondary fragility fracture prevention service will lead to enhancements of patient outcomes (less refractures due to adherence to evidence-informed therapies) [11] and improved use of health service resources (less presentations for further fractures) [17].

5.4.5 Fracture Liaison Services

As the fracture liaison service (FLS) model of care is the most widely implemented globally, the following descriptors of successful secondary fragility fracture prevention will refer to the FLS type of services, although local services may be called something different. Models of care need to be developed with consideration of local culture, circumstances, population structure, and resource allocation.

The FLS model of care was developed and evaluated by a team in Glasgow, Scotland, over 20 years ago [12]. Their model of care described the organised and



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Fig. 5.1 The NSW model of care for osteoporotic refracture prevention [15] (Reproduced with permission)

coordinated team of health professionals who collaborate to ensure that people who sustain fragility fractures have access to diagnosis, treatment, and follow-up [10]. Over time, the Glasgow model evolved in the UK to include coordinated care across primary and secondary care environments [31].

Over the past 20 years, many services have added elements to meet their local requirements. Figure 5.1 outlines one way a local service has adapted the Glasgow model of care in New South Wales (NSW), Australia.

5.4.6 Location of Service

The location of a service will be a local decision based on local needs. While services have traditionally been hosted in a hospital setting, others have opted for community-based settings and telehealth options. Considerations to support the decision on location will include patient access, where the multidisciplinary team can be located, and where a suitable venue is available.

The COVID-19 pandemic has encouraged an emphasis on telehealth models of care. Despite previous concerns about these modes of delivery not being acceptable to many patients, necessity has now shown that they are both acceptable and effective [32]. The pandemic has also led to rethinking of how services, such as some elements of assessment, can be provided concurrently with other services such as fracture clinics [33]. As with all decisions regarding a service, it will be a team decision in consideration of all the identified local issues.

5.4.7 The Multidisciplinary Team

For optimal outcomes, secondary fragility fracture prevention services must be delivered within a multidisciplinary approach with all team members employing behaviour change methods to support patient-centred care [34, 35]. As described in Sect. 5.4.4, behaviour change approaches, no matter the theory applied, have been shown to facilitate improved uptake of self-management [36–38]. The multidisciplinary team commonly includes the following:

5.4.7.1 Fracture Liaison Coordinator

Whether based in primary or secondary care settings, for best outcomes, the service should be led by what is internationally referred to as the fracture liaison coordinator (FLC) [39]. This role is commonly fulfilled by a senior nurse or physiotherapist. Patient care is, however, a shared responsibility with the FLC acting as a leader, but not the sole provider of care.

Responsibilities of the FLC, in collaboration with other team members, include the following

- Coordinating a steering group to guide the service initiation and development. Steering group membership will comprise representatives of the clinical team—medical, nursing, allied health, a patient (or family member) with experience of fragility fracture, and management and funding allocation representatives.
- Facilitating the development and maintenance of clinical records for assessment, treatment, and outcomes.
- Being the link between people who access the service, the multidisciplinary team, and the wider health service, especially community services. Facilitating and agreeing to formal communication processes and vital liaison with primary care physicians.

- Leading the development, implementation, and evaluation of quality improvement initiatives to ensure ongoing service improvements.
- Ensuring that PRMs considering experience and outcomes are included and reviewed regularly as a part of quality improvement activities.
- Ensuring that key performance indicators (KPIs) are collaboratively developed by the team as a joint effort and regularly collating and reporting these to the manager, funder, and others.
- Supporting team members in extending their knowledge in contemporary fracture prevention through self-study and education initiatives.

5.4.7.2 Clinical Lead

The FLC works closely with a medical practitioner who provides medical governance, undertakes medical assessment, and prescribes treatment. The medical practitioner will have a keen interest in secondary fragility fracture prevention and act as the champion of the service. They will champion the value of the service to encourage administrators to provide sufficient resources to conduct the service. The clinical lead will be trained in any of the following medical specialties, but not limited to orthopaedic surgery, primary care, or as a specialist physician in rheumatology, endocrinology, geriatrics, rehabilitation, or pain medicine. In some areas, nurse practitioners are increasingly being authorised to work within a designated scope of practice in tandem with medical officers to undertake some of the medical assessment and prescribing.

5.4.7.3 Allied Health Professionals

People who attend an FLS have a variety of clinical needs that are best addressed by allied health professionals (AHPs). These may include their fragility fracture prevention plan or comorbidities that can impact their health and well-being and impede their ability to work effectively on their bone health. Access to and ensuring that there is a close partnership with local fall prevention teams are essential (see Chap. 4). While not all AHPs will be available in all areas, the service plan will include how to access practitioners such as physiotherapists, dietitians, social workers, psychologists, and others. Being inventive may include linking with AHPs outside the local area, sometimes even in another country, and learning from each other to gain access to aspects of their expertise. This is one of the benefits of networking through organisations such as the Fragility Fracture Network (FFN) (www.fragilityfracturenetwork.org), which has a Special Interest Group (SIG) for secondary fragility fracture prevention whose prime aim is to link health professionals globally to learn from each other and hear how others implement the requirements of successful fracture prevention in their local settings. Membership of FFN is free at the above web address.

5.4.7.4 Administrative Support

Administrative officers, sometimes called clerical officers or clinical support officers, are ideally placed to undertake the non-clinical activities of the FLS. This enables clinical staff to be free of conducting clerical activities to create more time

to undertake clinical work. Activities include formatting and sharing documents outlining service activities to others involved in patient care outside of the service such as the patient's family doctor, fall prevention teams, and other allied health professionals. Administrative officers will also undertake duties such as supporting the clinical team in collating data, formatting data for submission, and ordering resources.

5.4.7.5 Team Members External to the FLS

The team approach will include other professionals external to the FLS. For example, collaboration between hospital staff and care providers such as physicians and fall prevention and radiology services is vital and the opposite when the FLS is set in primary care. Collaboration across care settings facilitates seamless care and continuity of education about bone health and comorbidities.

5.5 Resources to Guide Best Practice Service Provision

To support the implementation of services, the International Osteoporosis Foundation (IOF) has developed 'Capture the Fracture', a best practice framework that defines essential elements of service delivery and evaluation [39]. This includes the following:

- Processes are in place so that each person requiring secondary fragility fracture prevention is identified and recruited to the service.
- The patient and family are provided with information so that they understand the need to improve their bone health and how this is achieved through their efforts in tandem with their healthcare team.
- There is access to investigation of their bone health such as bone densitometry, serum blood testing, and any others required for individuals.
- The person and their family understand precipitating factors that may make them susceptible to osteoporosis and further fractures.
- There is local access to medical and other care such as fall prevention and exercise programmes.
- Primary and secondary care teams collaborate to ensure person and family-centred care.
- Each person is followed up regularly long-term to support adherence to treatment with periodical medical review to ensure that their treatment remains appropriate for them.

To complement this framework, in 2020, the IOF Capture the Fracture initiative and the Global Fragility Fracture Network (FFN) developed patient-level key performance indicators (KPIs) [40]. These are designed to follow the patient journey through their FLS experience and to be used to determine what strategies need to be instigated to improve patient outcomes and experiences. They are also designed to

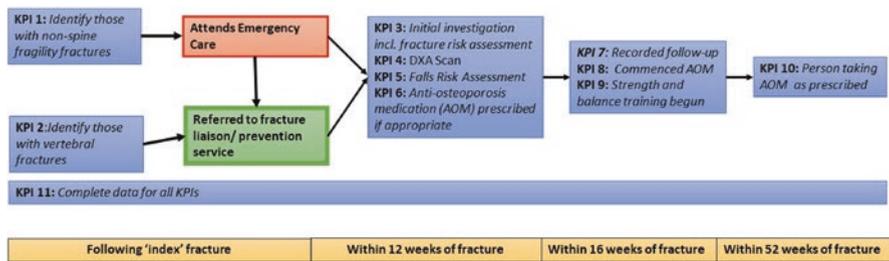


Fig. 5.2 IOF/NOF/FFN [40] patient focused key performance indicators for fracture liaison/prevention services

be used in reporting the progress of an FLS to managers and funders of the service. See Fig. 5.2.

Other resources developed for global use are the FFN Clinical [41] and Policy [42] Toolkits where there is extensive guidance concerning the patient and health service needs across acute care, rehabilitation, and secondary fragility fracture prevention. They are available in several languages.

5.6 The Patient and Family Journey

5.6.1 Identifying the Patient Cohort

Identifying people who require the FLS is critical and can be the most time-consuming element. This patient group is often not recorded in medical records as having sustained a 'fragility fracture' but simply a 'fracture'. Early in the development of a service, the local steering group will need to guide and support the FLC in setting up a system that aims to identify everyone requiring the service, not just those formally referred to it. An agreed hospital/health service policy will also be needed that states that all potential patients needing secondary fragility fracture prevention interventions will be automatically enrolled in the local service. Globally, some services have set up electronic identification systems that capture all those aged 50 years and over who present with a fragility fracture with some generating lists of eligible patients but also their complete health data. This will help determine where a person's care should be provided; for example, a frail older person may be cared for in an orthogeriatric FLS, compared to the less complex patient in an FLS that caters for all other patients, and some may be best managed in their primary care setting. These 'whole of health' identification systems can also help provide information about patients before meeting them, including other chronic conditions or disabilities, and those who are already receiving fracture prevention medications, who may not need medical review but may still require self-management support with medication adherence and conservative care requirements.

International guidelines suggest that all people aged over 50 years who have sustained a fragility fracture, however they are identified, should be assessed [43].

For hospital-based services, therefore, the identification process needs to include the following settings:

- Emergency departments (ED): whether admitted to a ward or discharged directly from the ED
- Inpatients in all wards/units, including those who sustain a fracture while an inpatient
- Radiology reporting, especially in the identification of vertebral fractures, whether incidental or anticipated
- Outpatient clinics of any specialty
- Those referred from primary care settings who had not attended ED or been admitted to a ward

5.6.2 First Contact with the Service

The first meeting may be within a hospital ward or department, or by telephone/online. An explanation of the reasons for referral is required, along with a discussion about the nature of fragility fracture and osteoporosis, investigations that are required, and potential results. These initial discussions should be brief and aim to help the person and/or their family know why the service is required for them. Further discussions can follow later after time to absorb initial information.

A further comprehensive meeting can be scheduled within 2 weeks when data from investigations may be available. At this appointment, the patient will complete the PRM form so that a baseline assessment can be discussed, with plans to revisit this at the next meeting.

5.6.3 Patient Assessment

There are several elements to patient assessment including the following

1. *Timing of assessment.* After the initial assessment when the discussion centres on basic information about bone health and the opportunities to manage the risk of refracture, the next will include a more collaborative discussion as the person will have had time to consider and seek information. Myths can be dispelled with evidence to the contrary, and, using behaviour change methods, a plan of the next steps will be made.
2. *Incorporation of patient-reported outcome measures (PROMs).* To engage the patient and their family, it is important to listen carefully to incorporate what they have to say and how they score themselves on a ‘whole of person’ PROM. This will include activities of daily living along with issues that align with having had a fracture, the potential for a chronic condition diagnosis, and for psychological effects of this diagnosis [44]. Psychological discomfort can impede engagement in the treatment and positive attitudes. The PROM and Quality of Life Instrument Database offer tools that consider generic items and

those that consider diagnosis-specific items including those for people with osteoporosis under the Rheumatology table [45] (see https://www.qolid.org/proqolid/search__1/pathology_disease_pty_1925/).

3. Risk of further fractures can be estimated using tools such as the WHO Fracture Risk Assessment Tool (FRAX[®]) (<https://www.sheffield.ac.uk/FRAX/tool.jsp>) or the Garvan fracture risk calculator (<https://www.garvan.org.au/promotions/bone-fracture-risk/calculator/>). These can be an opportunity to help people to engage with assessment and treatment but should be used as a guide only, and clinical expertise should be applied relating to the variables that could affect scores.
4. *Consideration of risk factors.* Risk factors for fragility fracture can be primary (those that are non-modifiable) or secondary (can be modified). Most are listed in Box 5.2.

Box 5.2 Risk Factors for Osteoporosis and Fragility Fractures: Non-Modifiable and Modifiable

Non-modifiable risk factors	Modifiable risk factors
Age	Alcohol use
Female gender	Smoking
Parents with a hip fracture	Low body mass index
Previous fracture	Poor nutrition with low calcium intake
Ethnicity	Vitamin D deficiency
Post-menopause	Eating disorders
Long-term glucocorticoid therapy	Oestrogen deficiency
Rheumatoid arthritis	Falls
Primary/secondary hypogonadism in men	Sedentary lifestyle

5. *Assessment of bone and general health status.* Assessment (Chaps. 2 and 6) is essential and involves discussion about the mechanism of the fragility fracture, comorbidities, and investigations needed. Routine investigations will include:
 - Bone densitometry to assess bone health
 - Serum blood tests to assess calcium, vitamin D, and function of organs such as the thyroid gland, and others that may add to the risk of osteoporosis and contraindicate some bone-sparing medications that may be used in the treatment of osteoporosis

5.6.4 Health Education

Health education is essential during all patient interactions with the aim of supporting the person and their family/carers, at a pace that suits their ability to understand and respond positively. The goal is to support self-management of all aspects of preventing the next fracture in a person-centred manner so that they can develop the understanding and skills needed. They need to take responsibility for conservative

interventions and work effectively with their healthcare team to be proactive with prescribed medical therapies and attend periodical check-ups to ensure that their treatment remains contemporary and appropriate. All health education sessions are an opportunity to dispel myths about osteoporosis treatments with positive, accurate explanations.

These conversations, along with formal group education, support the person to live well with a chronic condition and require significant skill in positively engaging them while recognising that they may not be able to assimilate all information in one consultation. Health professionals engaged in this work should seek training in behaviour change strategies as described earlier in this chapter.

5.6.5 Establishing a Personal Plan

Following diagnosis, a personalised care plan needs to be agreed to, listing treatment elements and including how the person and the healthcare team will work together to achieve the care plan elements, including access to services. The person will set goals for their self-management plan, which will be reviewed at agreed time frames to ensure that they and their healthcare team are on track for success in preventing the next fracture.

A few small goals set at any one given time will be more achievable and set the person and their family up for success. Using behaviour change strategies will reinforce the need for reviews of progress and resetting of goals [46]. To achieve the elements of their individualised care plan, the healthcare team must include primary care providers. The general practitioner/family doctor/primary care physician will know the person and their family better due to a longer term relationship with them, so are able to advise on long-term planning and follow-up.

5.6.6 Assessments Over Time

While reassessments can be a time-consuming aspect of the patient journey, especially with many patients waiting to be seen in an FLS, it is an important aspect of the service from three perspectives:

1. Supporting the individual in their efforts to maintain their treatment regimens and to review their agreed goals, to understand why and discuss if any of their goals have been abandoned, and to help the person reset and add goals
2. To ensure that they are seeking regular (e.g. 6 monthly) reviews with their health team to ensure that their bone health regimen remains contemporary and appropriate for their needs
3. To provide evidence of their health outcomes along with the opportunity to gain the information required to report the KPIs as displayed in Fig. 5.2

5.7 Evaluation of the FLS

Evaluation of the outcomes of an FLS has two key purposes from determining the FLS outcomes

1. The data can be used to decide what quality improvement activities are required and to inform any changes to the agreed model of care.
2. To inform managers and funders with data that will provide evidence for resourcing improvements and future developments.

All team members are responsible for ensuring that patient and service records are maintained in the agreed format and are complete. This is a key aspect of the service planning by the team. Leaving this to the FLC places undue workload on them as well as leads to increased work for team members, so it is essential to agree on how this will be done and make it part of the routine workflow.

Summary of Main Points for Learning

- A range of system failings make it difficult to identify people with a fragility fracture, so there is a ‘care gap’ that results in many people being undiagnosed and not treated to support secondary fragility fracture prevention.
- Secondary fracture prevention services, often known as fracture liaison services, aim to narrow this gap by assessing all those who present to health services with a fragility fracture, prescribing medical and conservative treatment that aims to improve bone density and prevent refracture in collaboration with the patient’s primary care team.
- It is essential to provide secondary fracture prevention in a coordinated and multidisciplinary manner, with agreements between service settings in primary care and secondary care.
- Multidisciplinary care teams require training in behaviour change methods to ensure that patients are included in all decisions concerning their within a ‘whole of person’ approach. This training seeks to move away from previous attitudes and actions of clinical teams of disease-specific and didactic interactions. With whole of person and inclusion of patient and family in partnership with the clinical team, every effort is made to achieve better health outcomes.
- It is important to determine the multidisciplinary model of care to be applied locally with representation of those who have the lived experience of a fragility fracture and understand the local culture.
- This chapter is written as a guide for local teams in their development, implementation, and evaluation of the model of care chosen by local team members.
- Secondary fragility fracture prevention services can remain operational despite the COVID-19 pandemic. A good outcome of our efforts to deter being infected with the virus is our learnings on the acceptability of providing services via telecommunications and over the internet. While the evidence concerning efficacy is not in as yet, these options add to the opportunities for patient and family preferences that are congruent with behaviour change theoretical models [47].

5.8 Further Study

- Identify the education needs of your team in relation to secondary fragility fracture prevention, and consider how these needs might be fulfilled.
- Examples of education resources include:
 - (a) FFN Toolkits that are available in a variety of languages:

The Clinical Toolkit is available at https://fragilityfracturenetwork.org/wp-content/uploads/2023/01/ffnclinicaltoolkit_english_v1_web.pdf. The Policy Toolkit is available at https://fragilityfracturenetwork.org/wp-content/uploads/2023/01/ffnpolicytoolkit_english_v1_web.pdf.
 - (b) IOF Capture the Fracture best practice framework is available at <https://www.capture-the-fracture.org/node/20> and associated tools.
 - (c) UK NOS Fracture Prevention Practitioner e-learning is available at [uk/for--health-professionals/professional-development/e-learning-and-training/fracture-prevention-practitioner-training/](https://uk-for-health-professionals/professional-development/e-learning-and-training/fracture-prevention-practitioner-training/).
 - (d) Local and national training programmes, especially those offered in behaviour change methodologies. These may be referred to as ‘health coaching’, ‘shared decision making’, ‘self-management support’, or other terminologies that may be used locally.

Assessing your own learning and performance needs regarding secondary fragility fracture prevention

- Having read this chapter and undertaken further study, discuss the learning you have gained from this chapter and the book so far with your colleagues: identify and discuss how you, as a team, might improve local practice in secondary prevention of fragility fractures.

Finally ... a challenge from the authors

The challenge now is for teams internationally to conduct innovative quality improvement projects on how they can build on the methods of providing secondary fragility fracture prevention as described in this chapter. What can be done better in terms of value-based care to:

- *Keep patients safe*
- *Be effective in clinical outcomes*
- *Enhance patient and health professional experiences*

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The Nursing Role in Orthogeriatric Comprehensive Geriatric Assessment (CGA)

6

Louise Brent, Lina Spirigienė, Niamh O'Regan,
and Brid Diggins

6.1 Introduction

In 2023, the population of the world exceeded eight billion for the first time, and as it continues to grow, so does the proportion of older adults. This can be seen as a positive result of the advancement of modern medicine and the evolution of specialties and interventions specific to the care of older people. However, as people age, they develop more chronic conditions, requiring more medications and needing more healthcare resources to support them. Globally, there is a need to focus on how to support the health and well-being of older people without risking overburdening stretched and/or resource-limited health services. It is widely accepted that, in many countries, fragility fractures will continue to rise in accordance with an increasing older population.

Healthcare professionals will encounter patients with fractures in a variety of clinical settings such as general practice, emergency departments, fall clinics, intermediate care services, acute medical wards, rehabilitation, convalescence services,

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their own homes, and long-term residential care homes. Older people with fragility fractures are a diverse group, and their care needs are complex. Although some have comparatively few underlying health problems, many have a series of interconnected illnesses and psychological and social problems requiring a range of health and social care interventions. Following a fragility fracture, it is often social and functional decline relating to frailty and vulnerability that has the biggest impact on an older person's ability to maintain independence (Chap. 3).

Throughout this book, there is reference to orthopaedic and geriatric co-management of patients with or at risk of a fragility fracture, known as orthogeriatric care. Although the orthogeriatric speciality is well established in some countries, it is not common in many others. The primary focus of orthogeriatric care is to ensure that those older adults admitted with a fragility fracture receive as high a standard of care in an orthopaedic unit as they would in a setting specialising in the care of the older adult. The care should provide excellent orthopaedic surgical management as well as excellent geriatric care, in a way that is collaborative, interdisciplinary and person-centred.

Evidence about how best to care for fragility fracture patients has been garnered from the ever-growing number of national clinical audits around the globe [1]. The objectives of these are usually to collect data about the care, standards and outcomes of those with a hip fracture. In some countries, this has recently evolved to capture evidence about other non-hip fragility fractures. This data has become a powerful driver for the development of orthogeriatric services in many countries including England, Ireland, Scotland, Wales, Northern Ireland, Australia, Denmark, Sweden, Norway, Spain and Canada. The audits gather and analyse information about all aspects of care including, as a core data set, geriatric review, bone health and specialist fall assessment. Some audits have been evolving to capture nutritional screening and delirium assessment, alongside functional and quality-of-life measures.

The term 'geriatric syndrome' encompasses older adults' common health problems that do not fit into distinct organ-specific disease categories and that have multifactorial causes including frailty (Chap. 3), cognitive impairment (Chap. 12), delirium, incontinence, malnutrition (Chap. 11), falls (Chap. 4), gait disorders, pressure ulcers/injuries (Chap. 9), sleep disorders, sensory deficits, fatigue and dizziness. These can all lead to lowered quality of life (QoL) and increased disability [2].

To diagnose these geriatric syndromes, a comprehensive, interdisciplinary geriatric assessment should be performed, undertaken as part of the orthogeriatric assessment as an essential aspect of orthogeriatric care. There is compelling evidence that improves outcomes for older adults. Early orthogeriatrician review helps avoid delay to surgery, improves perioperative care and expedites rehabilitation and discharge planning [3]. Problems that relate to ageing such as functional impairment and dementia are common and often unrecognised or adequately addressed by other healthcare professionals. Identifying problems specific to ageing so that interventions can be tailored to meet the individual's needs when they also have a fragility fracture requires a detailed and comprehensive assessment. This helps clinicians manage these conditions and prevent or delay their progression, deterioration and

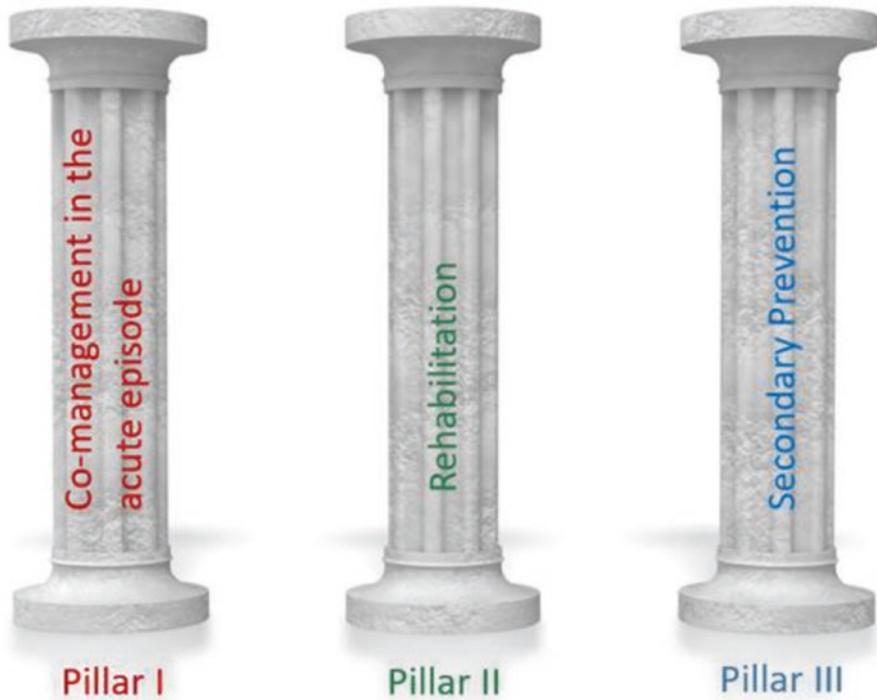


Fig. 6.1 The three pillars of the fragility fracture care continuum (Adapted from Fragility Fracture Network <https://fragilityfracturenetwork.org/>)

complications. This must be conducted collaboratively by the whole interdisciplinary team so that the skills of each team member can contribute to building a picture of the patient's needs through the entire care continuum (Fig. 6.1). Nursing and other practitioners' assessment are a significant part of this process.

The aim of this chapter is to outline the nursing role in supporting the care of older adults who have sustained a fragility fracture. This will focus on how the nurse's role is integrated into the interdisciplinary team, who have a combined goal to ensure that the patient receives a comprehensive (ortho)geriatric assessment (CGA).

6.2 Learning Outcomes

At the end of this chapter, and following further study, the practitioner will be able to

- Explain the principles of comprehensive (ortho)geriatric assessment (CGA) from a nursing perspective.
- Identify how the CGA process applies to the whole interdisciplinary team.
- Discuss the nursing contribution to comprehensive assessment of the older person with fragility fracture.

6.3 The Purpose of CGA

A 2017 Cochrane systematic review found that those patients who were cared for based on CGA while they are inpatients were more likely to be discharged home as well as more likely to survive admission to hospital, have good outcomes and return home [4]. The better an older person's health and well-being are understood, the more effective interventions are likely to be. This enables the orthogeriatric team to manage other health issues and threats at the same time as the fracture. The British Geriatric Society (2021) defined CGA as '*a multidimensional, interdisciplinary diagnostic process to determine medical, physiological and functional capabilities of a frail older person in order to develop a coordinated and integrated care plan for treatment and long term follow-up*'. The process of CGA is coordinated, communicated and person-centred and involves five central assessment themes [5]:

- Environmental
- Functional
- Social networks
- Medical
- Psychological/cognitive

Assessment involves collecting information about a person's circumstances and needs and making sense of that information to help in decision-making about what support, treatment and care are needed; it should be timely and comprehensive.

The assessment of older adults differs from standard medical/health review in three ways

1. It focuses on older adults with complex problems.
2. It emphasises functional status and quality of life.
3. It takes advantage of an interdisciplinary team.

The gathering of information as part of CGA is not the responsibility of the geriatrician/physician in isolation. Their skill is in interpreting the data and recommending a course of action to resolve the challenges identified. An ongoing and interdisciplinary approach to assessment is essential to obtain the broadest understanding of the person's well-being prior to their admission or fall. A multidimensional assessment considers medical comorbidities, physical and baseline functional ability, and environmental and social factors affecting the person with a fracture. From this assessment, an integrated personalised plan of care can be developed, applying not only to the peri-operative period but also in the rehabilitation and transitional care to home and community services.

Nurses and other allied health professionals take an active part in the CGA process, with getting to know the person, their strengths and needs being an important first step in effective care [6]. This reflects the APIE (assessment, planning, implementation and evaluation) approach familiar to nurses. Comprehensive assessment can also facilitate the identification of individual needs and identification of risks that might impact care outcomes and inform effective discharge planning [7].

The first step in CGA is to identify those individuals who are likely to benefit from this process alongside the orthogeriatric team approach. According to NICE (2016) [8], older people who present because of a fall, immobility, dementia or delirium; have polypharmacy or incontinence; or are approaching the end of life should receive CGA.

Following a fragility fracture, the most common vehicle for CGA is that of orthogeriatric assessment. The Scottish, UK, Irish and Australian guidelines on hip fracture care all recommend that CGA-orthogeriatric assessment should take place within 3 days of admission. Both the Scottish and Irish standards state that this assessment could be undertaken by either a geriatrician/physician or a specialist nurse with experience in the management of older people; the geriatrician or specialist nurse is not responsible for obtaining all of the information required, but synthesise the information, identify interventions and formulate a plan of care. The Scottish guidelines [9] recommend that the following should be considered part of CGA for orthogeriatric patients:

- Assessment of comorbidities
- Assessment of functional abilities
- Medication review
- Cognitive assessment
- Nutritional assessment
- Assessment for sensory impairment
- Specialist fall assessment
- ECG
- Lying and standing blood pressures
- Continence review
- Assessment of bone health
- Discharge planning

The skill, at the heart of orthogeriatric care, is developing a comprehensive picture of the potential impact of comorbidities and functional capacity to try to predict their potential impact on the patient's recovery and rehabilitation following the fracture [9], and for this knowledge to direct care provision.

There is limited but evolving discussion about the role of nurses in the process of CGA. Nurses are integral to the interdisciplinary team, are often care coordinators and contribute to the assessment through their expertise in domains such as nutrition, pressure ulcers/injuries, cognition and continence. As demonstrated in both the Irish hip fracture and Scottish hip fracture guidelines, specialist nurses can undertake the key role of coordinator in CGA.

The key features of CGA [3] are that it involves

- Coordinated interdisciplinary assessment, so that each member of the team can contribute expertise; the team is commonly made up of a geriatrician/physician, nurse and therapists, but can involve other health professionals depending on clinical needs.
- One team member leads the process as the coordinator or 'case manager'.

- Geriatric medicine expertise, so that the medical management of the patient's health problems can lead to interdisciplinary interventions.
- Identification of medical, physical, social and psychological problems so that a comprehensive picture can be obtained and the impact of each of these understood.
- Formation of a plan of care that includes appropriate rehabilitation.

CGA should be initiated as soon as possible after admission by a skilled, senior member of the interdisciplinary team and used to identify reversible medical problems, target rehabilitation goals and plan all the components of discharge and post-discharge support needs [10]. But it is not a one-off process, so should continue throughout the care process with constant review and evaluation.

To facilitate recording and sharing of assessment findings, the interdisciplinary team should use and share documentation specifically developed for the purpose to help clinicians to follow the process comprehensively and logically and in a way that is easily communicated within the team. The same process and documentation should follow the older person after discharge to home care and other community-based care facilities.

Performing a comprehensive assessment is an ambitious undertaking that can be more complex than it may initially seem (Box 6.1). Older people can struggle to recall their past medical history, and temporary or long-standing cognitive impairment can make it difficult for them to reliably answer questions. Resolving this involves skilled communication with the patient and collaboration with family and other people who know the individual well. Maximising communication by resolving problems with hearing and sight beforehand is also central to successful assessment.

Box 6.1 Areas of Assessment that Team Members May Choose to Assess Depending on Patient Needs

- Current symptoms and illnesses and their functional impact
- Current medications, their indications and effects
- Relevant past illnesses
- Recent and impending life changes
- Objective measure of overall personal and social functionality
- Current and future living environment and its appropriateness to function and prognosis
- Family situation and availability
- Current caregiver network including its deficiencies and potential
- Objective measure of cognitive status
- Objective assessment of mobility and balance
- Rehabilitative status and prognosis if ill or disabled
- Current emotional health and substance abuse
- Nutritional status and needs
- Disease risk factors, screening status and health promotion activities
- Services required and received
- Spiritual needs

6.4 Dimensions of Comprehensive Geriatric Assessment

Comprehensive assessment involves looking not only at disease states as a standard medical assessment would do, or at functional ability as a standard rehabilitation assessment might do, but at a range of domains. By assessing each of these domains of health, a comprehensive assessment can be made, and the full nature of the individual's problems identified. This process can be supported by using standardised scales and tools, or full formal assessment schemes such as the 'interRAI' assessment tools (www.interrai.org). Using standardised scales encourages consistent practice, helps to ensure safety (e.g. pressure ulcer/injury risk screening) and enables detection of serial changes. However, scales can also be time-consuming and clinically constraining. Clinicians undertaking CGA should consider the extent to which standardised approaches are helpful in their own setting [11]. Core components of CGA that should be considered during the assessment process are outlined in Table 6.1, and the following sections consider some of these in more detail.

Table 6.1 Domains and suggested items for comprehensive geriatric assessment [10]

Domain	Suggested items for assessment
Physical health and medical conditions	Comorbid conditions and disease severity Medical review Nutritional status Polypharmacy Urinary continence Sexual function Vision/hearing Dentition
Mental health and psychological status	Cognition Mood and anxiety Fears Goals of care Advance care preferences Spirituality
Functioning	Functional capacity: core functions such as mobility and balance, fall risk Activities of daily living Life roles that are important to the patient
Social circumstances	Social support and networks Informal support available from family, wider network of friends and contacts, statutory care Financial concerns and poverty
Environment	Living situation: housing, comfort, facilities and safety, use or potential use of 'telehealth' technology, transport facilities Accessibility to local resources

6.4.1 Functional Status

Functional status refers to the ability to perform activities necessary or desirable in daily life. It is directly influenced by health conditions, particularly in the context of an older person's environment and social support network. Changes in functional status (e.g. not being able to bathe independently) should prompt further diagnostic evaluation and intervention. Measurement of functional status can be valuable in monitoring response to treatment and can provide prognostic information that assists in long-term care planning. With respect to the impact of functional status on activities of daily living (ADLs), an older person's functional status can be assessed at three levels:

1. Basic activities of daily living (BADLs)
2. Instrumental or intermediate activities of daily living (IADLs)
3. Advanced activities of daily living (AADLs)

BADLs consider self-care tasks including bathing, dressing, toileting and maintaining continence, grooming, feeding and transferring. IADLs consider the ability to maintain an independent household including shopping for groceries, driving or using public transportation, using the telephone, performing housework, home maintenance, preparing meals, doing laundry, taking medication and handling finances.

Such is the importance of information about mobility and functional status that several national hip fracture audits have incorporated standardised assessment: for example, the New Mobility Score [12] to assess pre-fracture mobility and the Cumulative Ambulatory Score [13] to capture functional progress (Chap. 8). Some audits have created a national clinical standard for mobilisation. Early mobilisation for hip fracture patients has been shown to increase the number of patients going home and reduce the number going into long-term care and dying as an inpatient [14].

In addition to considering ADLs, gait speed alone predicts functional decline and early mortality in older adults. Assessment of gait speed is usually the domain of the physiotherapist within the team (Chaps. 8 and 14) and may identify patients who need further evaluation, such as those at increased risk of falls (Chap. 4). Assessing gait speed may also help identify frail patients who might not benefit from treatment of chronic asymptomatic diseases such as hypertension. For example, elevated blood pressure in individuals aged 65 and older is associated with increased mortality only in individuals with a walking speed ≥ 0.8 m/s (measured over 6 m or 20 feet) [15].

6.4.2 Falls

Most falls occur in the home or where the person is residing (e.g. residential home) [16, 17]. Approximately one-third of community-dwelling people over 65 years and half of those over 80 years of age fall each year [18]. Older people are much more

likely to suffer harm from a fall. Those who have fallen or have a gait or balance problem are at higher risk of having a subsequent fall and losing independence. An assessment of fall risk should be integrated into the history and physical examination of all older patients. A home safety assessment or advice about how to keep safe in the home and make the home safe to prevent falls should be shared with patients. Chapter 4 considers fall assessment and prevention in more detail.

6.4.3 Cognition

The incidence of dementia and delirium increases with age, particularly among those over 85 years; yet, many older people with cognitive impairment remain undiagnosed. Delirium is very common in orthopaedic patients and should be proactively screened for initially and then regularly throughout admission (Chap. 12). The value of making an early diagnosis includes the possibility of uncovering treatable causes. The evaluation of cognitive function can include a thorough history, brief cognition screening, a detailed mental status examination, neuropsychological testing and other tests to evaluate medical conditions that may contribute to cognitive impairment. The introduction of the 4AT assessment tool (Chap. 9) has been adopted and reported in several hip fracture audits. This is a very short but sensitive test (takes less than 2 min) for delirium and, crucially, can be carried out by any member of the healthcare team <https://www.the4at.com/> [19].

6.4.4 Mood

Depressive illness in older people is a serious health concern leading to unnecessary suffering, impaired functional status, increased mortality and excessive use of healthcare resources (Chap. 13). It can also have a negative impact on recovery from fragility fracture. Depression in later life remains underdiagnosed and inadequately treated. It may present atypically and may be masked in those with cognitive impairment. Screening is easily administered and can identify patients at risk if both of the following questions are answered affirmatively:

1. 'During the past month, have you been bothered by feeling down, depressed or hopeless?'
2. 'During the past month, have you been bothered by little interest or pleasure in doing things?'

6.4.5 Polypharmacy

There are different definitions of what constitutes polypharmacy; some say that it is taking four or more medications. It is linked to an increased risk of falls. Older people are often prescribed multiple medications by different healthcare providers,

placing them at increased risk of drug interactions and adverse medication events. A medical practitioner would usually review medications at each visit, but nursing roles such as advanced nurse practitioners (ANPs) now carry out some of these tasks and are often best placed to do this as they are most familiar with the patient. The best method of detecting potential problems with polypharmacy is to have patients provide all medications (prescription and non-prescription) in their packaging. Otherwise, practitioners should contact the patient's primary care practice, particularly if the patient cannot remember their medications. As some health systems have moved towards electronic health records and electronic prescribing, the possibility of detecting potential medication errors and interactions has increased. Older people should also be asked about alternative medical therapies such as herbal medicine use with the question: What prescription medications, over-the-counter medicines, vitamins, herbs or supplements do you use?

6.4.6 Social and Financial Support

The existence of a strong social support network in an older person's life can be the determining factor in whether they can remain at home or need to be in a residential care setting. A brief screen of social support includes taking a social history and determining who is available to help them. Early identification of problems with social support can help planning and timely development of resource referrals. For patients with functional impairment, the practitioner should ascertain who the person has available to help with ADLs. It is also important to assess the financial situation of a functionally impaired older adult; some may qualify for state or local financial benefits, and there may be other sources such as long-term care insurance or veteran's benefits that can help in paying for caregivers and avoid the need for residential care.

Gathering information can be complex [20], particularly collecting accurate baseline information from patients who may have cognitive difficulties, especially if the environment is noisy such as in the ED or busy trauma unit, or in the presence of pain, opioid analgesia or anaesthesia. In the first few hours following admission, the patient is more likely to recall the history of the injury due to more recent recall, but this period is also very stressful. Collecting detailed and accurate information needs specialised skills in communication and an expert understanding of the process of assessment.

6.4.7 Spiritual Needs

Spirituality is an important source of inner strength and is fundamental to giving meaning to life, dealing with adversity and experience of ageing, ill health and injury. For older people, it is equally as important as physical considerations [21].

Developing familiarity with a person's spiritual needs during the comprehensive assessment assists health professionals to identify their specific needs, and spiritual coping strategies can be applied by individuals to deal with the challenges related to hip fractures. Once older adults' spiritual needs are recognised, a collaborative team approach typically provides the best method to address these needs. Interprofessional collaboration often plays an indispensable role in addressing the spiritual needs and concerns of older adults.

Poor quality of life and health status experienced by persons following a hip fracture have been identified, which persists for a long period of time following this life-changing event. The use of spiritual coping strategies has been shown to be an effective coping mechanism by which older adults adapt to the stressors imposed by hip fractures [22].

6.5 Assessment Tools

Although the amount of potentially important information may seem overwhelming, formal assessment tools and shortcuts can reduce this burden on the clinician performing the initial CGA. An advance questionnaire given to the patient or caregiver prior to the initial assessment can be time-saving when there is a need to gather a large amount of information and timing allows, although this is rarely an option when there is an acute admission and urgent surgery. Questionnaires can be used to gather information about general history (e.g. past medical history, medications, social history, review of systems) as well as gather information specific to CGA. These frequently form part of an integrated care pathway and can be completed by nurses or other professionals during their initial assessments and should include information such as:

- Ability to perform functional tasks and need for assistance
- Fall history and previous fractures
- Urinary and/or faecal incontinence
- Pain
- Sources of social support, particularly family or friends
- Depressive symptoms
- Vision or hearing difficulties
- Whether the patient has specified a 'lasting power of attorney' for healthcare

Support staff and assistants can be trained to administer screening instruments to both save time and help the clinician to focus on specific disabilities that need more detailed evaluation. If there is an advanced nurse practitioner (ANP) in place, they would be ideally placed to carry out and act on the findings of these assessments and, in doing so, provide a more seamless service. Within their scope of practice, ANPs with advanced competencies in their area of expertise provide holistic care to patients [23].

6.6 Post-hospital Discharge CGA

Key elements of post-hospital discharge CGA include targeting criteria to identify vulnerable patients, a programme of multidimensional assessment, comprehensive discharge planning and home follow-up. This can be conducted by nurses with specialised geriatric practitioner skills or ANPs who visit patients during hospitalisation and can provide follow-up after discharge by either home visit, review at a clinic or more recently, due to the COVID-19 pandemic, remotely. Ideally, there should be contact within the first few days after discharge and ongoing support or review planned with the patient and/or family as required. Patients often cannot absorb information during the hospital admission due to illness, so these subsequent reviews provide an opportunity to reiterate information that will support their recovery, e.g. bone health medication compliance, fall prevention strategies and any unresolved or ongoing issues. This process should integrate with physical therapy, occupational therapy, social work and/or home nursing services when indicated in the community (Chap. 16).

6.7 Secondary Prevention

Secondary fracture prevention is an important aspect of orthogeriatric assessment and is discussed in Chap. 2.

6.8 The Nursing and Interdisciplinary Team Role

Traditionally, the various components of the CGA process are completed by different members of the team, with considerable variability in the way assessments are conducted and recorded. However, recently, there have been more conscious efforts to reduce the fragmented approach to trauma care for older people and create a more seamless approach [18]. The medical assessment of older people may be conducted by a physician (usually a geriatrician), nurse practitioner, physiotherapist or physician assistant. The core team (geriatrician/physician, nurse, therapist and social worker) may conduct only brief initial assessments or screening for some dimensions. These may be subsequently augmented with more in-depth assessments by additional professionals such as a dietitian/nutritionist who may be needed to assess dietary intake and make recommendations for optimising nutrition, or an audiologist who may need to conduct a more extensive assessment of hearing loss and evaluate an older person for a hearing aid.

Because of the 24-h nature of their practice and the wide range of care, nurses are often expected to take a leading role in the care of older people and to coordinate the assessment process. Despite this, the role of the nurse in CGA is ill defined and is not considered in detail in the literature, particularly in the orthogeriatric setting. The potential for nurses, particularly those with advanced assessment skills, to act as a fulcrum for the CGA process is largely untapped. The nursing role in managing

and caring for these patients is an integral one, acting like a hub-and-spoke model of care—with the nurse being in the centre as the key professional working with the patient, who then interacts with the other specialities and implements recommendations, prescriptions and interventions and liaises continuously with all specialities, the patient and their family.

Nursing is already directed by the nursing process: incorporating APIE. Clarke [23] suggested that this traditional view of the nursing process focuses on identifying need deficit and that a more effective philosophy is to assess the resources of older people themselves and jointly plan care alongside the MDT, patients and carers so that as much self-management is retained as possible. Nurses place importance on coming to know a person as an individual through a continuous and ongoing assessment process that will support the rest of the nursing process (planning, implementation and evaluation) and help them to provide effective care. This knowledge can only be achieved by a comprehensive assessment process that incorporates the biological, psychological, social and spiritual dimensions of the person [10].

While the CGA process has not been specifically developed to capture patients' nursing needs, it is becoming more common for it to be a holistic interdisciplinary assessment for the whole team and to ensure that the complex needs of patients with fragility fractures are fully met through a continuous process while looking for changes in the patient's condition. The whole team need to work together to further develop this process from a collaborative perspective so that the many different forms of mono-disciplinary assessment processes and associated documentation can be brought together as a single, effective process [20]. New or adapted assessment tools may be required for use by all professionals in the team that can be used to facilitate interdisciplinary and interagency working [17] but also with a view for seamless transfers between primary and secondary care settings. All practitioners should be able to use the information generated during CGA to develop treatment and long-term follow-up plans, arrange for primary care and rehabilitative services, organise and facilitate the intricate process of case management, determine long-term care requirements and optimal placement and make the best use of healthcare resources.

The assessment process in most units is not perfect, and there is a need to identify ways to both improve the assessment process and demonstrate the value of nursing in this central aspect of care.

Summary of Key Points

- Timely and comprehensive assessment is essential in understanding the needs of older people and ensuring that their needs are met through care and treatment.
- CGA is a person-centred, holistic, interdisciplinary process that helps to assess the frail older person so that their medical conditions, mental health,

functional capacity and social circumstances can be considered in detail and from which patients with fragility fractures can benefit significantly.

- The process should begin on admission and be followed through to post-discharge care in primary and residential care settings: it is not a one-off process but should be subjected to constant review and evaluation.
- The CGA process should, as a minimum, consider the domains of physical health and medical conditions, mental health and psychological status, functioning, social circumstances and environment so that MDT care and treatment can be based on the needs generated by these.
- Assessment tools need to be developed, or adapted, to meet the needs of this interdisciplinary process and can include existing assessment and screening tools. Interdisciplinary team collaboration will be needed in making this process work in the best interests of patients with fragility fractures.

6.9 Suggested Further Study

Think about how you currently conduct assessment in your place of work:

- Does it fit in with the CGA approach discussed here?
- Do you have shared documentation?
- Are all assessments available to the interdisciplinary team, avoiding repetition?
- What skills do you/your team need for you to improve how you make assessments using the CGA approach?
- How might you learn these skills, and how would you use and assess what you have learned?

Discuss with other members of the interdisciplinary team within which you work how you might move towards a full-team approach to the CGA process and what changes might be needed for this to happen.

6.10 Self-Assessment

- Examine the current assessment documentation used in your unit and consider:

Whether it reflects

- Comprehensiveness
- Patient-centredness
- Interdisciplinary team working

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Orthogeriatric Care in the Emergency and Perioperative Setting

7

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7.1 Introduction

As the global population ages, musculoskeletal trauma in older people has become a growing challenge everywhere. Although management of older adults following trauma has some similarities to that for all trauma, there are also differences and specific considerations relating to ageing. The most common cause of injury in older people is a fall, so fall-related trauma will be the focus of this chapter while acknowledging that the care of trauma in older people, whatever the cause, is based on the same principles.

The aim of this chapter is to outline the care of older people following hip fracture, the most common significant injury requiring orthogeriatric care. Although the nursing interventions discussed here apply to orthogeriatric care generally, hip fracture is the most common reason for admission to an orthopaedic unit, so this is the focus. The complexity of needs, prevalence, number of bed days and cost means that the focus of care tends to be predominantly on this category of injury. The principal skills and knowledge needed to look after patients with hip fractures apply to

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the management of all older people with fractures. This care includes all the fundamental aspects of nursing care for the adult as well as specialised interventions for older people [1, 2].

7.2 Learning Outcomes

At the end of the chapter, and following further study and reflection, the reader will be able to:

- Identify crucial factors that impact patient outcomes following hip fracture.
- Describe hip fracture types and their surgical management.
- Deliver evidence-based acute and perioperative care to patients with hip fracture.
- Prepare and support the patient during the perioperative and rehabilitation phases.
- Maintain safety and prevent and recognise complications.
- Acknowledge the impact of a hip fracture on individuals' lives and the challenges this creates.
- Comprehensively prepare the patient for hospital discharge.

7.3 Perioperative Care

Assessment and subsequent care of the patient with a hip fracture are best provided by effective interdisciplinary team working based on sound orthogeriatric principles [3]; it is essential that the causes and effects of the fall, unstable comorbidities and early effective rehabilitation are considered alongside fracture treatment [4].

Physical care attracts the most attention, and caring for patients following hip fracture is an everyday experience for care providers. For the patient, however, it is a life-changing event with severe and frightening consequences [5, 6]. Patients have existential concerns that a hip fracture is a serious injury with complications that can be life-threatening and that it can reduce their future independence and quality of life. These preconceived notions can place patients in a crisis-like situation during hospitalisation and in the days after discharge and can interfere with their ability to retain information and participate in their own recovery.

It is, therefore, essential to consider both physical and psychological impacts of the experience of having a hip fracture [6–8].

Surgery is the preferred treatment for hip fracture because it provides stable fixation, facilitates full weight bearing and decreases the risk of complications [9]. Non-operative management carries additional risks of immobility, thromboembolism, pressure ulcers/injuries, other complications and loss of function and independence. Nevertheless, non-operative treatment may sometimes be chosen for very frail patients if pain can be controlled by other means. Some impacted and/or stable fractures may also be treated non-operatively.

There are three phases to perioperative care:

1. The *preoperative* phase is the period prior to arrival in the operating department for surgery. The goals are to optimise the general health of the patient, stabilise the injury, manage pain, prevent delirium and restore function. Standardised pre-operative assessments and patient-centred management protocols are needed. The aim is to facilitate preparation for surgery through coordinated orthogeriatric and anaesthetic care. Surgery within 24 h after admission to hospital has been shown to lower mortality rates [10].
2. *Intraoperative* care aims to mitigate the pathophysiological effects of surgery without destabilising the patient's physiology. Patients are at substantial risk of perioperative morbidity and mortality due to age and frailty in combination with a major surgical event. They have decreased physiological reserve, and one or more comorbidities, polypharmacy, frailty and cognitive dysfunction are common with a potential negative impact on physiology (see Chap. 3 for further information about frailty).
3. *Post-operative* orthogeriatric care aims to mitigate the effects of surgery, facilitate remobilisation, and re-enable and re-motivate patients in preparation for discharge, ideally back to their place of residence before the fracture. The early post-operative phase is crucial as delayed remobilisation is associated with prolonged hospital stay and has a negative impact on 30-day mortality rates [10, 11]. Post-operative care includes, therefore, early mobilisation, pain management, post-operative hypotension and fluid management, postsurgical anaemia management, delirium assessment and nutritional optimisation.

7.3.1 Hip Fracture Diagnosis and Surgery

A hip fracture is diagnosed by the symptoms and verified with X-rays [4, 11], sometimes supplemented with MRI or CT, to establish the diagnosis. Most hip fractures occur in one of the two broad locations: at the femoral neck or in the trochanteric region.

The location of the fracture and the degree of displacement or impaction help determine the best treatment. In nearly all cases, surgery is the treatment of choice as this is the most effective way to manage pain and stabilise the fracture so that the patient can remobilise as soon as possible [9].

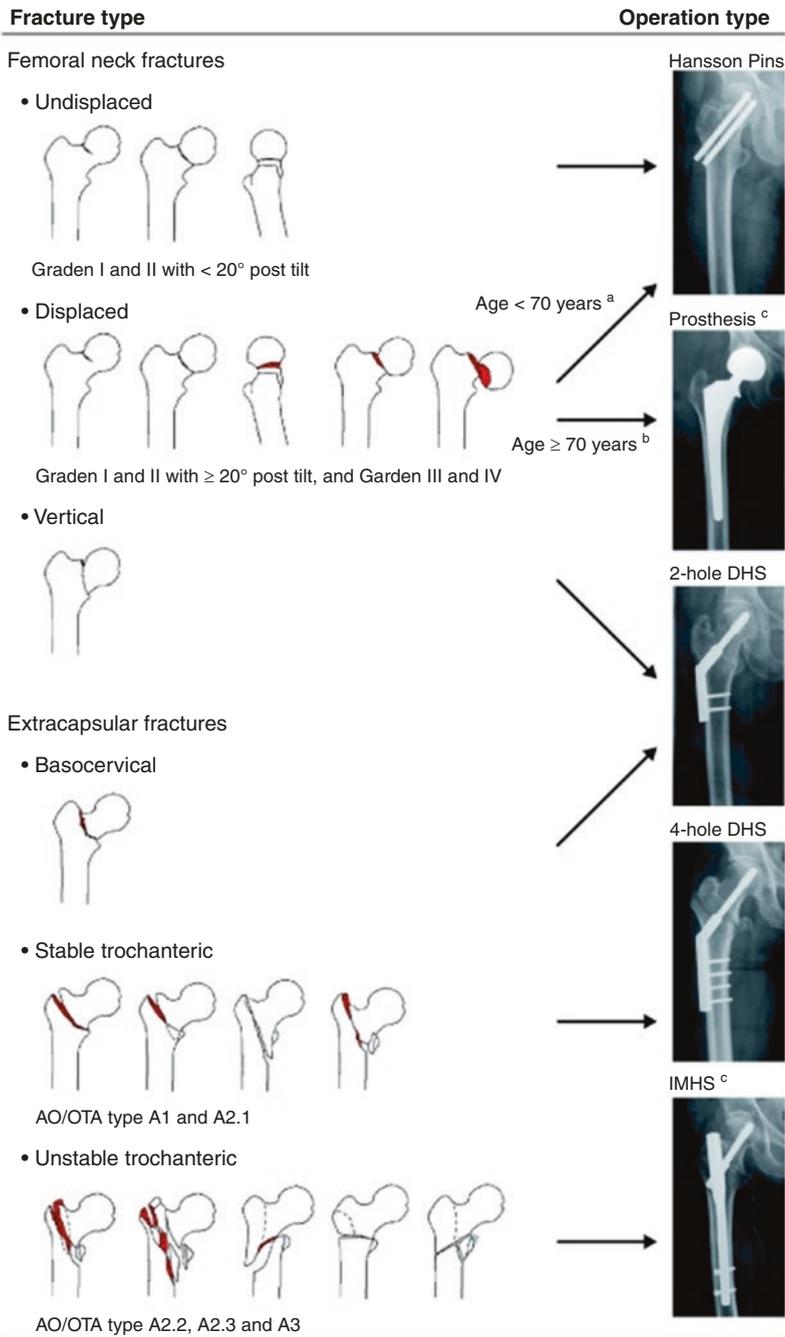
- *Femoral neck fracture*: This fracture occurs in the neck region of the femur in the intracapsular region (within the hip joint capsule). The configuration of the blood supply to this area means that any type of femoral neck fracture may disrupt the blood supply to the femoral head, causing it to collapse due to avascular necrosis. As this risk is higher after a displaced fracture, these are usually managed with hemi- or total hip arthroplasty. Un-displaced fractures are usually stabilised with parallel implants (see Table 7.1).
- *Trochanteric (or intertrochanteric) hip fracture*: This fracture occurs in the upper 8–12 cm of the femoral shaft in the region between the lesser and greater

Table 7.1 Decision-making criteria for the type of surgery for hip fractures [11, 12]

Fracture type	Considerations	Example type of surgery
<i>Femoral neck (intracapsular) fractures</i>		
Nondisplaced	<i>Garden classification I</i> (nondisplaced impacted or incomplete fracture) or <i>Garden classification II</i> (nondisplaced complete fracture) <i>(These classifications imply minimal disruption of the blood supply to the head of the femur and low risk of avascular necrosis)</i>	Internal fixation with femoral head retained, e.g. cancellous hip screws
Displaced	<i>Garden classification I or II</i> with more than 20° tilt <i>Garden classification III (complete fracture partially displaced/angulated)</i> or <i>Garden classification IV (complete fracture completely displaced)</i>	Age <70 years: As for nondisplaced (see above) Age >70 years: Hemiarthroplasty or total hip arthroplasty depending on local guidelines
Vertical	Vertical orientation of the fracture is associated with increased risk for failure of fixation because of greater instability	Sliding hip screw
<i>Extracapsular fractures</i>		
Basocervical	At the boundary between the neck of the femur and the trochanteric region, so can be both unstable and prone to blood supply problems	Sliding hip screw
Stable trochanteric fractures	In the trochanteric region to just below the lesser trochanter, so outside the joint capsule	Sliding hip screw
Unstable trochanteric fractures/ subtrochanteric fractures	Fractures with the greatest degree of instability	Intermedullary nail

trochanters. As the fracture is extracapsular (outside the joint capsule), the blood supply is less likely to be disrupted, so internal fixation with intramedullary nail or sliding hip screw is preferred (see Fig. 7.1).

Subtrochanteric hip fracture: This fracture occurs in the upper part of the femoral shaft with its major extension just below the lesser trochanter. An intramedullary nail is recommended to internally fix a subtrochanteric fracture (see Fig. 7.1). It is also increasingly common for patients admitted to hospital with a fragility fracture to have sustained a peri-prosthetic fracture (a fracture around an orthopaedic implant/prosthesis) around previous arthroplasty implants of the hip and knee, reflecting the more widespread conduct of hip and knee arthroplasty for the management of arthritis. Patients who have previously fractured a hip may also sustain a fracture around the previous fixation implant/hemi-arthroplasty. These fractures are more complex to manage surgically.



^a Prosthesis is dictated if not fully reducible on the traction table.

^b Femoral Head Removal is dictated if bedridden.

^c Mandatory supervision of junior registrars.

Fig. 7.1 How hip fracture surgery decisions are made: an algorithm for hip fracture surgery (Reproduced with permission from Acta Orthop [12])

7.4 Emergency and Preoperative Care

Sustaining a hip fracture is a sudden traumatic event, threatening many aspects of patients' lives and a forceful reminder of their mortality [6, 13]. Restoring function is one of the crucial factors affecting the overall outcome after a hip fracture, so physical care attracts the most attention [4]. The primary goals of care for the older adult with hip fracture are to maximise mobility and preserve optimal function [1, 2]. Psychosocial factors, however, must be incorporated into a holistic approach to care, helping patients to find motivation to rehabilitate [1, 13].

Emergency departments (EDs) are often noisy, busy, overstimulating care settings, with inappropriate care environments for vulnerable older people in a state of personal and physical crisis. These conditions can expose patients to a risk of acute delirium (Chap. 12). Reducing the impact of this requires consideration of the following three principles [14]:

- *Timeliness*—avoid unnecessary and unwanted delay in the ED with rapid transfer to a definitive care environment.
- *Effectiveness*—aim for optimal outcomes using the best available evidence.
- *Patient-centredness*—provide care that is respectful of and responsive to individual needs.

Patients should fast for up to 6 h before the operation and must not drink for up to 2 h before the operation (both depending on local guidance). It is important that patients do not fast for an unnecessarily long time and are offered clear liquids (preferably containing sugar and protein) up to 2 h before the operation [15, 16]. Some patients will have been lying on the floor at home for a long time after their fall. Consequently, they are at risk of dehydration and other complications of a 'long lie' after the fall including pressure ulcers/injuries, incontinence, compartment syndrome and rhabdomyolysis (release of toxins from muscle damage into the bloodstream). In accordance with local guidelines, intravenous fluid therapy should be commenced soon after admission to the ED [17]. EKG/ECG and initial blood tests should include, as a minimum, BAC test (blood typing, antibody screen and computer control test), fluid and electrolyte balance and haemoglobin. Identification of signs of a urine infection such as pyrexia, frequency, cloudy/foul-smelling urine and incontinence may instigate a urine sample being sent for microbiology.

Providing emergency care to older people following trauma must follow the same principles as for all age groups, using the ABCDE approach. The normal and abnormal changes of ageing, compounded by active comorbidities, mean that morbidity and mortality are increased concerns. Examples of physiological considerations relating to ageing include the following [18]:

Airway—ageing causes degeneration of the physiological airway, and musculoskeletal pathology, such as osteoarthritis, can reduce neck and spine flexibility, making airway management difficult. Any pre-existing dysphagia increases the risk of aspiration and pneumonia. Hypostatic pneumonia is an increased risk due to immobility and limited coughing reflexes.

Breathing—depleted respiratory resilience leads to loss of hypoxic reserve and potential hypoventilation with oxygen administration; oxygen therapy is still needed but requires closer monitoring in recognition of this. Older people are more at risk of respiratory failure because of the increased work of breathing.

Circulation—reduction in cardiopulmonary reserve means that there is increased risk of fluid overload when administering intravenous fluids (particularly colloids), requiring closer monitoring. Normal heart rate and blood pressure are not a guarantee of normal cardiac output and use of beta-blockers, and antihypertensive agents can mask the signs of deterioration. Blood loss from the fracture site can vary from a few millilitres for an un-displaced intracapsular fracture to over a litre for a multi-fragment or subtrochanteric fracture. All patients should have intravenous saline from the time of presentation, with the rate of infusion adjusted according to the estimated blood loss and degree of dehydration. Older people have an increased risk of heart failure, so infusion needs to be carefully prescribed and monitored.

Disability—prolonged inactivity and disuse limit final functional outcome and impact survival.

Exposure—skin and connective tissue undergo extensive changes with ageing, resulting in diminished thermoregulation, increased risk of infection, poor wound healing and increased susceptibility to hypothermia. Prevention of these risks should begin from arrival in the ED. The patient's skin should be examined from head to toe to identify any skin damage or redness and recorded in the patient record (see Chap. 9 for further information about pressure ulcer/injury prevention). A pressure-redistributing mattress should be in place on the trolley/bed; older people who are suspected to have hip fracture should preferably be immediately admitted to a hospital bed (rather than ED trolley) with a pressure-relieving/redistributing mattress. Clothing should be replaced with a gown as soon as possible so that zippers or buttons do not create pressure, leading to skin injuries [15, 19]. Adequate pain assessment and management should be in place to enable position changes. The admission to the ED is the point at which comprehensive geriatric assessment (CGA) should begin (see Chap. 6). A full and comprehensive history should be taken that includes relevant comorbidities, medication history and previous functional ability as well as personal and social history. This will form the initial CGA assessment to be built on in the following hours and days. Further detailed assessment can then take place following hospital admission and surgery. It is important to get an overview of the patient's overall history from various sources on arrival at the ED. Many older people, with and without cognitive impairment, are unable to provide an accurate history in this stressful situation so the history should also be sought from a relative, caregiver or general practitioner [20, 21].

7.4.1 Pain Management

A hip fracture is very painful, but good pain management is a frequently neglected aspect of care. Unresolved pain contributes to worse outcomes for the patient. Good collaboration among the orthogeriatric team is essential for achieving good pain management, particularly so that mobilisation can take place soon after surgery.

One significant reason for inadequate analgesia is poor assessment, particularly in those who have difficulty in or are unable to communicate [22]. Acute pain should be continuously assessed by the clinical care team at the time of presentation and then regularly throughout the care pathway so that effective pain management can be implemented. Every patient should receive frequent, accurate pain assessment using an evidence-based tool, beginning at the admission interview [23]. A review of health records should be conducted to detect pre-existing painful conditions and prescribed analgesia, noting its impact and any side effects and reporting these to the clinical team.

Common instruments used for pain assessment are the verbal rating scale (VRS) and the visual analogue scale (VAS) (particularly useful for patients with cognitive decline) [24]. Older people are often reluctant to acknowledge and report pain, so practitioners should be alert to signs of pain in older people including behavioural and autonomic signs of pain, e.g. facial grimaces/frowns; writhing or constantly shifting while in bed, moaning, whimpering or groaning; restlessness; or agitation.

Administration of nerve blocks preoperatively (including in pre-hospital care by paramedics in some countries) for patients with hip fracture is increasingly common as they have been shown to have a significant positive effect on the pain experience and minimise the need for opioid analgesics, which have multiple risk factors in older frail patients [25, 26]. Advanced and specialist nurses increasingly have a role in the administration of nerve blocks both in the ED and inpatient units [26].

Immediate analgesia should be offered to all patients presenting with suspected hip fracture, including those with cognitive impairment. The choice and dose of analgesia should be age-appropriate, with close monitoring for associated side effects. Analgesia should be sufficient to allow movements necessary for investigations (indicated by the ability to tolerate passive external rotation of the leg) and for nursing care. Multimodal analgesia can be used to maximise the positive effect of the selected medications while limiting the associated adverse effects [27]. Older people are more susceptible to adverse medication reactions. However, analgesics can be used safely and effectively when age-related differences in absorption and distributions of these medications are considered alongside individual risk factors [22]. Comorbidities, especially kidney disease, and polypharmacy must be considered, and pain management in those with cognitive difficulties is challenging because of communication problems. Attention to patient comfort using support and positioning is an additional element of pain management. Turning the patient with a hip fracture onto the affected side should be avoided until it has been surgically fixed; gently 'tipping' the patient may be unavoidable when performing care and checking the skin on the patient's back. Pillows should be used between the thighs and knees to help manage pain. Adduction or rotation of the affected leg should be avoided. Changing the patient's position should always be performed by two experienced nurses using good manual handling practice.

7.5 Post-operative Care

Post-operatively, orthogeriatric care aims to mitigate the effects of the fracture and surgery and remobilise, re-enable and re-motivate patients in preparation for discharge, ideally back to their place of residence before the fracture (Chaps. 8, 14 and 16). The fundamental principles of post-operative care include:

- Early mobilisation
- Management of pain
- Post-operative hypotension management
- Optimisation of hydration
- Management of anaemia
- Assessment for delirium
- Nutritional optimisation

Mobilising the patient soon after surgery has proven to be beneficial in prevention of the complications of mobility and in assisting recovery (see Chap. 8 for more information about mobility, remobilisation and exercise following fragility fractures). The early post-operative phase is crucial, as delayed remobilisation is associated with prolonged hospital stay [11]. Following surgery, it should be standard practice to sit the patient out of bed for them to begin to stand on the day after surgery, providing that this is not medically contraindicated. Attention should be paid to the potential for the patient's blood pressure to drop (orthostatic hypotension) on standing in the first few days. Progress thereafter varies considerably depending on the individual patient and the type of fracture or surgery. Patients with extracapsular fractures tend to take longer to remobilise than those with intracapsular fractures [4]. Initially, they may be afraid of weight bearing on the operated leg and should be motivated by the care team while ensuring effective pain management.

Creating good outcomes in rehabilitation after a hip fracture requires motivation, so understanding a patient's anxiety, feelings of vulnerability and concerns for the future should be considered as barriers for recovery [28].

7.5.1 Pain Management

Pain assessment, evaluation, reassessment and appropriate administration of analgesia should be central to routine care and to promote rehabilitation. Most patients have constant pain in the days following surgery, which worsens when they move, so they want to lie still to avoid pain, increasing the impact of immobility. The same principles of pain assessment and pain management discussed earlier apply in the post-operative period. If pain is poorly controlled, mobilisation will be delayed, increasing the risk of the complications of prolonged immobility and leading to increased dependency and associated rise in the risk of delirium [29, 30]. Pain also inhibits the ability to receive and understand given information.

The highly variable nature of pain and an individual's response to it make accurate assessment a central element in facilitating individualised pain management and monitoring. Many studies have shown that cognitively impaired and acutely confused patients receive less analgesia than their unimpaired counterparts. To help staff understand the individual needs of a person with dementia, the use of an assessment tool such as the 'this is me' tool [31] encourages relatives and carers to share individual information, characteristics and behaviour.

Paracetamol can be offered every 6 h unless contraindicated with additional opioids if paracetamol alone does not provide sufficient pain relief. Nonsteroidal anti-inflammatory drugs are often contraindicated in older adults and should only be considered in selected cases. Opioid analgesia is a key component in managing hip fracture pain, but there remains wide variability in individual need; opioid requirements decrease with ageing, and side effects can impede mobility, impair cognition and interfere with recovery. Other medications such as sedatives, anti-emetics and neuroleptics may increase opioid sedation, and adverse effects need to be considered when dosing and titrating opioids. It is essential to anticipate and monitor common side effects such as sedation, constipation, nausea and vomiting and instigate preventive treatment as appropriate [32]. Older people have increased risk of respiratory depression with opioids, so regularly monitoring sedation levels is recommended.

Non-pharmacological therapies are also an integral part of the treatment plan. A variety of options have been shown to be effective individually or in combination with appropriate medications [1]. Selecting strategies that the patient believes to enhance the effectiveness is helpful. Recommended therapies include, but are not limited to:

- Ensuring that the patient feels warm using blankets
- Cognitive-behavioural strategies: breathing exercises, relaxation therapy, humour, music therapy and socialisation/distraction
- Repositioning regularly with supportive pillows, engaging the patient in decision-making about comfortable positions
- Using an interdisciplinary approach: occupational therapists may provide custom seating, splints or adaptive devices; physiotherapists will assist in individual mobility, exercise and strengthening programmes
- Physical activity to improve range of motion, mobility and strength (Chap. 8)

7.5.2 Preparation for Discharge

Discharge planning should be a coordinated effort between the patient, the patient's family, the interdisciplinary team and staff in the destination setting, if the patient is to be discharged to another care facility (discharge and post-hospital care are considered in more detail in Chap. 16). This process should begin as soon as possible following admission.

Education of the patient and family or other carers is an important aspect of preparing for discharge both in terms of their continued recovery and rehabilitation and in relation to prevention for future falls (Chap. 4) and secondary fracture prevention (Chap. 5). This can be a challenge for healthcare providers because of decreasing lengths of stay and the need to deliver increasingly complex information. So, providing patients with alternative ways of receiving information is valuable. This may include printed written information and various forms of electronic information and education using mobile phone apps, for example. Providing patients with an information booklet or automated pictographic illustration of discharge instructions has been proven valuable [33–35]. Healthcare professionals can also support information and education for patients with a hip fracture using an app that accommodates different learning styles. This way of dissemination of health knowledge can be used by elderly hip fracture patients even if they are not used to technology [36].

There are numerous factors to consider when preparing the patient for discharge. The responsibility for the patient's care after discharge from the hospital is often delegated to the patient and their family (Chap. 15) along with the general practitioner and, sometimes, community care staff. Therefore, the patient and their caregivers must be able to understand the discharge advice so that they can recall aftercare instructions and recognise that the information they require for their post-discharge care can be found in these (written or other) instructions. There are several reasons for supporting oral information or education with written or virtual illustrations: with ageing visual clarity and auditory acuity decreases, making it difficult for older people to assimilate information, and poor lighting, noise levels and room temperatures can inhibit the learning process. Managing multiple messages can be difficult for older people, and their personal perception of the severity of their injury and subsequent surgery will limit their ability to receive and understand information. Anticipation, anxiety and fear all contribute to diminished reception of knowledge. Fear and preconceived notions of the consequences of acquiring a hip fracture also block patients' ability to take in information [6].

7.6 Fundamentals of Perioperative Care

Maintaining mobility, energy and participation in self-care during an older person's hospital stay can help to maintain their independence, reduce the likelihood of falls and fall-related injuries and minimise loss of confidence due to fear of falling (Chap. 4). The underlying principle of high-quality care is empathy; this is a complex multidimensional aspect of the therapeutic relationship that involves understanding the needs, meanings, fears, priorities and perspectives of patients [37, 38] (Chap. 12).

Attending to comfort and hygiene is a fundamental care activity. This includes, for example, acknowledging that the patient often does not feel hunger or thirst and therefore may have a dry mouth, needing effective and frequent mouth care. Many other aspects of fundamental nursing care during the perioperative period are covered in other chapters including the following:

Cognitive impairment and acute delirium—The nursing team is most likely to recognise and act on the signs of altered cognitive function and/or signs of delirium. Interaction between care providers and a patient with cognitive impairment can be a source of stress, particularly if the individual with cognitive impairment resists the efforts of the care provider (Chap. 12).

Pressure ulcer/injury prevention—Pressure injuries are serious complications of immobility, hospitalisation and surgery and can affect up to one-third of hip fracture patients (Chap. 9).

Hydration and nutrition—Fluid management in older people can be difficult as they may reduce/self-regulate fluid intake to control incontinence or urinary frequency and to manage difficulties in accessing toilet facilities. Close monitoring of fluid balance is essential to prevent or identify renal injury. Often patients do not like or want to drink fluids or nutritional supplements. Nutrition is closely linked to all recovery outcomes. Although it is the responsibility of the whole team, the 24-h presence of the nursing team makes them central to adequate fluid and dietary intake (Chap. 11).

Constipation—Either acute or chronic constipation is a significant and common complication for patients following fracture and during periods of ill health and immobility. Prevention should be considered early in the care pathway; this should involve:

- Regular assessment of bowel function including frequency and consistency of defecation
- Titration of opioids as pain diminishes—opioid analgesia is a significant cause of constipation
- Providing and encouraging a fibre-rich but palatable diet and sufficient oral fluid intake
- Careful but early use of prescribed aperients

Nurses should also educate patients about how to diminish aperients after discharge according to their changed mobility, regained privacy and, eventually, regained appetite.

Healthcare-associated infection—Prevention, recognition and management of infection are the responsibility of the whole orthogeriatric team but are central to 24-h nursing care, which includes coordination of care provided by the other team members. Nurses in leadership roles can be instrumental in ensuring adherence of staff to infection prevention guidelines and monitoring rates of infection. Prevention of surgical site (Chap. 10), pulmonary and urinary tract infections and thromboembolism are also important in perioperative care.

Secondary fracture prevention—When preparing the patient for discharge, it is important to consider secondary prevention of the fracture. This is described in detail in Chaps. 2 and 5 and should be a focus during the entire patient's stay in hospital. This includes referral for investigation and—when needed—treatment of osteoporosis together with assessment and prevention of fall risk (Chap. 4).

Summary of Key Points

- The care of the orthogeriatric patient following hip fracture and subsequent surgery presents significant challenges for the healthcare team.
- Effective evidence-based nursing care is crucial in optimising patient outcomes following hip fracture.
- Nurses need to understand different types of hip fracture and their management so that they can deliver evidence-based acute and perioperative care to patients with hip fracture based on each person's specific needs.
- Much of the pre-, peri- and post-operative care of the patient in need of hip fracture surgery is aimed at maintaining safety and preventing and recognising the complications of the fracture and surgery.
- Patients have existential concerns and worries about the future as they know that a hip fracture is a serious injury with complications that can be life-threatening or threaten their mobility.
- Even once the patient has recovered from surgery, there remains the need to comprehensively prepare them for discharge.

7.7 Suggested Further Study and Ideas for Reflections

After reading this chapter, consider the following case example:

Mrs. Ito has been admitted to the ED in her local city hospital following an intertrochanteric hip fracture. You are the practitioner who receives her on arrival at the orthopaedic unit. Her daughter is with her.

Mrs. Ito is transferred from the ED trolley to a bed. She is clearly in pain, so you administer the pain medication she is due immediately. While you are making her comfortable, you chat with her about how she is feeling. At first, she seems a little uncertain in her answers, and you notice that she seems anxious.

- What do you think may be going on in her mind? What might be her worries?
- How might you find out more about what her experiences and worries are? And how can you comfort her?

The following day, after Mrs. Ito's surgery for internal fixation of her fracture, you are responsible for her personal care.

- Write a reflection about what you think is important for patients in their post-operative care.

7.7.1 General Suggestions for Further Reflection

- Talk with your colleagues about what you have learned and the ways you could use this to address the problems identified. Have you noted any areas of good practice in this chapter that do not currently happen in your own area that you might consider implementing?

- Reflect on your practice concerning pain management; which tools do you use? Do you reassess patients' pain? And how do you react if the patient is still in pain?
- Talk with patients and relatives and other health professionals about topics concerning the patient pathway such as preoperative care and pain management. Reflect on what you learn from these discussions, and make suggestions about how practice might be developed to improve satisfaction and encourage patient empowerment by involvement of patients and relatives in care.

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7.8 How to Self-Assess Learning

To identify learning achieved and the need for further study, the following strategies may be helpful:

- Examine local documentation of nursing care regarding hip fracture care and other outcomes, and use this to assess your own knowledge and performance. Fundamentally, nursing is a team effort, so consider this from your own individual perspective as well as that of the team.
- Seek advice and mentorship from other expert clinicians regarding the issues raised in this chapter, e.g. pain specialists, anaesthetists, orthopaedic surgeons, geriatricians and physiotherapists. Have 'learning conversations' with specialists and other members of the team to keep up to date on new evidence and disseminate it to colleagues. These conversations can include any recent new knowledge or evidence.

- Review indicators of good practice (e.g. incidence of complications, early mobilisation, regular pain assessment and evaluation), and regularly assess patient and carer views and satisfaction; satisfaction has been recognised as an independent indicator of nursing care quality.
- Peer review by colleagues can be used to assess individual progress and practice but should not be too formal. There should be open discussion within the team. Weekly case conferences can identify nurse-focused issues and enable the exchange of expertise.
- Collaborate with health professionals from other departments covering the patient pathway to undertake case evaluation.

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Early Mobilisation and Exercise After Fragility Fracture

8

Morten Tange Kristensen , David J. Keene ,
and Carmen Queirós 

8.1 Introduction

Mobilisation is a critical component of supporting recovery and rehabilitation after fragility fracture. ‘Mobilisation’ usually refers to moving the injured limb or the act of mobility practice. Mobility practice includes moving from lying to sitting, sitting to standing and walking, with or without the aid of others or devices. Mobilisation and exercise after fragility fracture tend to denote structured activities that are practised and progressed to enable the body to regain movement to enable a return to function and prevent post-fracture complications.

The aim of this chapter is to promote the role of the nurse and other practitioners in patients’ early mobilisation and exercise after fragility fractures. The importance

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of early mobilisation and exercise is highlighted, along with practical information on easily applicable assessments, pain and weight bearing and tips on how to facilitate early mobilisation. There is a focus on early mobilisation after hip fracture as this is the most common significant fragility fracture requiring hospitalisation and surgery. However, many of the issues covered are in common with other types of fragility fracture.

In many healthcare settings, there may be specialist healthcare professionals in physical rehabilitation such as physiotherapists, occupational therapists or rehabilitation nurses. While these professionals can provide expertise in assessment and management of post-fragility fracture mobilisation and exercise, the whole care team have a role in supporting these activities to enable patients to reach independent mobility in the first place and their recovery goals in the longer term.

8.2 Learning Outcomes

At the end of the chapter, the reader will be able to:

- Appreciate the problems of inactivity after fragility fracture.
- Describe the rationale and evidence regarding the importance of early mobilisation after hip fracture surgery.
- Discuss the trajectory, importance of monitoring and influence of fracture-related pain on mobility outcomes.
- Rationalise and question commonly used restrictions after surgery for a fragility fracture.
- Use easily applicable and valid outcome measures for evaluation of patients with a fragility fracture.
- Employ strategies to facilitate early mobilisation and exercise after fragility fracture.

8.3 Immobilisation in Fracture Management

The earliest recorded use of immobilisation and rest for injured limbs was by the ancient Egyptians approximately 3000 years B.C. [1]. Ever since, there has been ongoing refinement and use of external splinting and movement restrictions to manage fractures [2, 3]. A wide range of effects of immobilisation have been studied in animal and human models (Table 8.1). What is evident is that the musculoskeletal system is responsive to mechanical loading, or stress [4] and absence or diminished mechanical loading below usual levels is detrimental to tissues as they enter a catabolic state or degradation. Mechanical loading is required for musculoskeletal tissue homeostasis and, if increased within physiological limits, is an anabolic, or biosynthesis, stimulus for bone healing [5, 6]. After a fracture, periods of immobilisation are clinically associated with joint stiffness and muscle weakness. As a result, there have been efforts to reduce periods of immobilisation

Table 8.1 Summary of the effects of immobilisation on bones and muscles from basic research [5, 9–11]

Structure	Effect of immobilisation
Bone	Increased reabsorption and decreased depositing of bone tissue Decreased bone stiffness and strength
Muscle	Sarcomeres at the myotendinous junction increase in number if immobilised in a lengthened position and reduce if in a shortened position (starts within 12–24 h of immobilisation) Atrophy of contractile and non-contractile components Reduced muscle fibre size Reduced number of collagen fibres in tendon Diminished neural recruitment of motor units Decrease in motor cortex map area of immobilised muscles Decreased excitability of corticospinal pathway for immobilised muscles Deficits in muscle strength and endurance

and non-weight bearing after fracture as much as possible. For example, there have been several clinical trials assessing early weight bearing and movement after ankle fracture surgery [7, 8].

8.4 Early Mobilisation After Fragility Fracture

In the context of fragility fracture management, it is vital to consider the impacts of immobility on wider body systems, not just the musculoskeletal issues after injury. After a hip fracture, longer periods of immobility are associated with serious complications, including respiratory infection, delirium, pressure injuries, thromboembolic events, worse recovery of function and increased risk of mortality [12–14].

The importance of early surgical treatment for hip fracture has been shown in a systematic review [15]. The rationale for early surgery is, in part, to enable early weight-bearing mobilisation to reduce the detrimental impacts of immobility. Contemporary surgery for hip fracture using internal fixation or arthroplasty should aim to enable early weight-bearing mobilisation. In fact, early mobilisation is now increasingly monitored in national hip fracture databases and is core to many clinical guidelines. For example, the United Kingdom's National Institute for Health and Care Excellence clinical guidelines for hip fracture recommend 'mobilisation on the day after surgery' [16]. Early mobilisation is also a key recommendation in the Academy of Orthopaedic Physical Therapy Clinical Practice Guidelines [17].

Studies have used different time cut-offs for defining early mobilisation after hip fracture surgery, e.g. 24 or 36–48 h post-operatively. In practice, this means getting patients up and mobilising on the day of or day after surgery. In a recent large-scale observational research in the United Kingdom, early mobilisation after hip fracture has been found to be associated with increased probability of discharge from hospital [18] and increased survival and ambulatory recovery for patients (with and without dementia) at 30 days after surgery [13]. Correspondingly, in Danish and Irish hip fracture registry studies, early mobilisation has been associated with increased survival [19, 20]. Focusing on post-surgery ambulatory status as well as the status

after day one also seem important and are associated with mortality, medical complications and discharge destination for patients admitted from their own home [21]. Two further studies from the Danish hip fracture registry have shown increased mortality, readmission and risk of infection in patients where the pre-fracture ambulatory status, evaluated with the Cumulated Ambulation Score (CAS) [22], did not recover at the time of acute hospital discharge [23, 24]. Thus, recovering baseline mobility as soon as possible has been highlighted as an important first-step recovery goal [25].

The CAS is an easily applicable score that was designed for patients with hip fracture (feasible for all fragility fractures) for the monitoring of basic mobility until independence has been reached. It evaluates three activities: getting in and out of bed, 'sit to stand to sit' from a chair with armrests and indoor walking with or without an assistive device. A 1-day CAS of 0–6 points is based on a score from 0 to 2 for each activity, where a score of 0 = not able to, 1 = able to with assistance/guiding and 2 = independent of human assistance [26]. The CAS is currently available in more than 15 languages and proven feasible in several patient groups, and further information is available [here](#) [27]. Using such a score to monitor mobility following fragility fracture is not only the domain of the physiotherapist but also a useful way to evaluate care for nurses and other health professionals.

Although early mobilisation is clearly a critical goal, and something that the whole care team is responsible for achieving, there are many complex challenges in achieving this. Common barriers to early mobilisation after hip fracture include hypotension, pain control issues, agitation or refusal [14], and cardiovascular instability [28]. These barriers are important to assess and actively attempt to prevent and manage (see Chaps. 7, 12, 13 and 14).

8.5 Fragility Fracture-Related Pain and Other Factors Influencing Mobilisation

Having a hip fracture is extremely painful for those who experience this injury. The initial management often involves complete immobilisation until post-surgery. However, patients with other fragility fractures also experience fracture-related pain that can compromise their ambulatory status. For example, people who usually use walking aids can struggle to walk after sustaining a wrist or proximal humerus fracture. Still, patients with a hip fracture are probably the fragility fracture group that most often experience pain influencing their ability to mobilise (get up from a chair and walk) [29].

Effective pain management is crucial following a fragility fracture, enabling patients to ambulate and participate in the physical training and exercise programmes essential for their recovery (see also Chap. 7). An individualised approach to pain management is important. People have different experiences of pain and use of pain medication before their fracture, and varying pain trajectories are seen for different fracture types. A standard pain management program, where all patients are given the same pain medication, will be sufficient for some but overtreat some,

Table 8.2 Overview of common pain assessment scales

Pain score	Scale	Assessed by
Visual Analogue Scale (VAS) [30]	0–10 or 0–100	Asking patients to mark their experienced pain level on a ruler where no pain is at the far left and 10 is the far right of the ruler (numbers are on the rear of the ruler and not visible for the patient)
Numeric Rating Scale (NRS) [31]	0–10	Asking patients to report their experienced pain level with a number for severity, where 0 is no pain and 10 is worst imaginable pain
Verbal Rating Scale (VRS) [32]	0–4	Asking patients that report pain, using categories, if they experience pain as follows: 0 = no pain, 1 = slight pain, 2 = moderate pain, 3 = severe pain, 4 = unbearable pain. Points are not presented for patients but used for the recording in medical charts

and not be sufficient for others. Pain management needs to be guided by ongoing (several times daily) pain assessments by nurses, physiotherapists and other healthcare professions. A validated pain score is needed. All healthcare professions are familiar with the Visual Analogue Scale (VAS, 0–10 or 0–100 points) [30] and the Numeric Rating Scale (NRS, 0–10 points) [31] where patients are asked to, respectively, mark their pain on a ruler or report as a number (Table 8.2).

The VAS and NRS pain scores are commonly used for many patient groups. Following hip fracture, and especially for those with dementia or other cognitive disorders, the VRS (0–4 points) is valid and superior to the VAS [32, 33]. The VRS 0–4-point scale evaluates pain in categories where:

- 0 = no pain
- 1 = slight pain
- 2 = moderate pain
- 3 = severe pain
- 4 = unbearable pain

Numbers are not presented to the patient; they are only used to record the result in care records. The VRS manual [34] states: ‘*When using the VRS, it is important to ask about the degree of pain when using the categories and without using numbers*’. Many patients find it difficult to express the degree of pain, so when using the VRS scale, a dialogue with the patient can be conducted. If the patient indicates unbearable pain, the practitioner can, for example, ask: ‘*Is it as bad as when you just broke your hip?*’

While pain can be assessed at rest, more importantly, it should be assessed during activity such as walking or sit to stand from a chair, to get a ‘true picture’ of how pain treatment is working. This is referred to as ‘dynamic pain’. Using the VRS for evaluating whether pain management is sufficient—none to mild pain (VRS 0–1) at rest and mild to moderate pain (VRS 1–2) during activity—is useful, especially in the early post-operative stage. At later time points, adjustment of pain management should be considered for moderate to unbearable pain (VRS 3–4) during activity. Correspondingly, for patients with acute vertebral fragility fractures, systematic monitoring of dynamic pain is also recommended, using a scale specifically for patients with dementia who are unable to verbalise their pain [35].

Fracture-related pain is not the same for different fracture types (Chap. 7). Patients with an intracapsular femoral fracture (surgical procedure; osteosynthesis or arthroplasty), for example, can experience less pain than those with extracapsular inter- and subtrochanteric fractures (surgical procedure; dynamic hip screw or intramedullary hip screw). This is the case both during the first post-operative days [36] and on discharge from hospital [37]. Intracapsular femoral fractures are also associated with better ambulatory status [38].

Patients often compare their progress with those around them, leading to disappointment if their recovery progress is not the same. They should be informed that this can be ‘normal’ and experiencing more pain does not mean that something is wrong but may simply be due to different fracture types. Other factors that can contribute to a slower recovery for patients with an extracapsular trochanteric fracture can be the larger blood loss/anaemia [39–41] and the markedly greater quadriceps strength loss compared to patients with an intracapsular femoral fracture [42]. Hip fracture-related pain can also influence the walking distance for the 6-min walking test [43].

Other factors that influence the acute care ambulatory status are the age and pre-fracture functional level of the patient. Pre-fracture functional level evaluated with the modified [44] New Mobility Score (NMS) [45] is a strong predictor of the basic mobility CAS level in the acute setting [46–48] and for mortality in the long term [45, 49]. The NMS, 0–9 points, evaluates three activities: indoor walking, outdoor walking and walking during shopping. Each activity is scored by asking patients or relatives/carers how well these activities are managed, with a score of 0 = not at all, 1 = with help from another person, 2 = with a walking aid and 3 = no difficulty and no aid (the instrument is available [here](#)) [44, 50].

This is important information to give to patients and their relatives worrying about a slower than expected recovery. Practitioners should also consider these factors in their practice, enabling them to identify when ongoing pain assessment and management are most needed, as well as the interference of pain (among other variables) in patient mobility. Close collaboration within the rehab team regarding pain assessments and management is also important [25]. It is vital to coordinate periods of more intense mobility and physical training with pain medication doses and to liaise with the prescribing practitioner if medication seems insufficient during mobility or is a barrier to movement. Fracture-related pain and fatigue are the most restricting factors for patients with hip fracture being able to ambulate independently and participate in the planned physiotherapy, during the early post-operative period [29].

8.6 Surgical Procedure and Mobilisation After Lower Limb Fragility Fracture

Different countries have different approaches to movement and weight-bearing restrictions following fragility fracture surgery. The tendency is that restrictions have been reduced over the years and are now rare in some parts of the world. Still,

for patients having a hemi- or total hip arthroplasty after a cervical femoral fracture, some hip precautions may be stipulated in post-surgical protocols to reduce the risk of luxation (dislocation of the joint). If the conventional posterior surgical approach to the hip is used for the procedure, then common restrictions are:

1. No hip flexion $>90^\circ$
2. No hip adduction over the midline
3. No internal rotation of the hip (no crossing of legs) during the first few months post-surgery

However, the ‘muscle-sparing’ approach (SPAIRE) for hemiarthroplasty is more commonly used. This seems to reduce luxation when compared to the conventional posterior approach, and improved function and reduced mortality have been reported [51, 52]. The SPAIRE technique is considered safe and may facilitate return to pre-injury level of mobility [53]. If the anterior or lateral approach is used for surgery, then fewer restrictions are typically applied [54].

It is essential that patients are informed that hip precautions do not mean that they are not allowed to walk, exercise and perform daily life activities, just that these precautions need to be considered while doing this. Aids and adaptations may be needed to achieve hip precautions (e.g. seat risers, sock aids) to support independence. Depending on the country, an occupational therapist or a nurse may be involved in selecting aids and managing restrictions.

Weight-bearing protocols after lower limb fragility fractures also differ globally, from no restrictions (weight bearing as tolerated on the fractured leg) to partial or no weight bearing at all for different time periods. In some countries, almost 100% of older patients with hip fracture are allowed weight bearing as tolerated immediately, as prescribed by the surgeon (no waiting for post-surgery X-rays). This is in line with findings of a large UK and Ireland audit including about 20,000 patients with a hip fracture [55]; 96% were allowed unrestricted weight bearing immediately after surgery. However, for non-hip fragility fractures, only 32% were allowed unrestricted weight bearing, illustrating that this may be handled differently for different fragility fracture groups [55].

Although nurses and physiotherapists do not usually make decisions or changes regarding movement and weight-bearing restrictions, they might discuss the necessity of reviewing such restrictions with the lead clinician if practice is based on tradition rather than evidence. The importance of reviewing routine weight-bearing restrictions for people with hip fracture was highlighted in a Spanish cohort study—a few weeks of non-weight bearing was associated with reduced function [56] and increased mortality [57] at 1 year.

Patients with acetabular fractures [58] and hip fractures [59] may be unable to follow weight-bearing restrictions. Kammerlander et al. [59] concluded:

‘Elderly patients seem to be unable to maintain weight-bearing restrictions. As early mobilization of geriatric trauma patients is an important element for a successful rehabilitation, the directive of postoperative partial weight-bearing for these patients should be abandoned’.

8.7 Practical Suggestions for Facilitating Early Mobilisation

After a fragility fracture, encouraging mobility is critical for a sustained recovery and bone healing, keeping joints mobile, maintaining and strengthening muscles, optimising motor control and returning to functional activities. The following offer suggestions for facilitating this.

- *Patient handling*: Safe patient handling, correct body mechanics, familiarity with organisation/facility policy, and equipment and training requirements regarding the mobility of patients are just a few of the many important safety considerations for all team members at all times.
- *Assessment*: A patient assessment is required to determine how many staff members are needed and what manual handling equipment will be needed for mobilisation. This should include their history, physical function and laboratory/diagnostic study findings for abnormalities (such as signs of infection and cardiovascular status) and the patient's weight, current and pre-fracture mobility, cognitive function and medical treatments.
- *Coordination*: Coordination is needed with other team members if assistance is anticipated and to acquire assistive transfer devices if necessary.
- *Falls*: A patient with a lower extremity fracture is at higher risk of falling again (Chap. 4), so additional support on the affected side may be necessary when mobilising.
- *Independence*: The most important aspect of mobilisation is for patients to accomplish as much as they can on their own and for staff to provide as little support as possible to improve independence as quickly as is feasible. Evaluation and analysis of the functional ability and level of dependence of older individuals in self-care found that staff frequently did tasks that older people were capable of performing, increasing their levels of dependence. Developing practices that support and sustain autonomy is recommended [60]. When dealing with a patient who lacks the ability to care for themselves, practitioners should guide, assist physically, foster an atmosphere conducive to improvement and promote learning [61].
- *Orthostatic hypotension*: If the patient moves from lying or sitting to standing too quickly, a significant drop in blood pressure can occur. Before helping a patient stand or walk, check their vital signs, blood pressure, mental status and any other symptoms they may be experiencing, such as dizziness and pain. Raising the head of the bed to a high-fowler's position, helping the patient rise from the bed by slowly sitting them up, moving to the side of the bed and bringing their legs over the edge can help to prevent this.
- *Transfers*: Once the patient's respiratory rate, heart rate and blood pressure have stabilised, equipment for manually transferring patients can be used [62] such as transfer belts, transfer boards, standing hoists and pivot discs. Some healthcare organisations only permit manual transfer when the patient's life is in danger or when the assisting personnel do not need to carry most or all of the patient's weight [63].

- *Injury prevention:* Knowing the local policy regulating patient mobility and remembering that practitioners are at a higher risk for work-related neck, shoulder and back injuries, while performing manual patient transfers [64].

There are numerous ways in which practitioners can enhance patient mobility.

- *Sit to stand:* Practitioners can facilitate patients' access to mobility practice opportunities as part of their care. One example is helping/encouraging patients to eat while sitting in a chair rather than staying in bed during mealtimes, so they will frequently practise the sit-to-stand movement. The ability to rise from a seated to a standing position is necessary for the initiation of walking and other functional activities. Given the significance of being able to stand up from a seated posture, the sit-to-stand activity is as a pertinent, inexpensive and usually successful intervention to enhance or preserve mobility in older adults. While there is some evidence that sit-to-stand activity improves the outcomes of older people, additional research is required [65]. Given the low cost of such sit-to-stand interventions, research of its implementation in low- and middle-income nations might be especially beneficial.
- *Walking:* While adhering to any weight-bearing or other restrictions, patients should be encouraged to use walking aids (see below) at appropriate times throughout the day, such as when they need to use the bathroom. When discussing the post-operative care plan with patients, practitioners can also support achieving recovery through increasing/improving their daily walking distance (using visual landmarks that the patient could relate to or a specific mobility goal such as 900 steps/day).

8.7.1 Selecting Walking Aids

Practitioners supporting patients in using walking aids need to ensure that guidelines for effective and safe practice are considered, for example, ensuring that medical issues in the post-operative period such as acute cardiovascular instability do not contraindicate mobilisation.

The appropriate walking aid for a patient depends on a variety of factors, including the patient's specific needs, physical capabilities and weight-bearing indication. The patient's strength, endurance, balance, cognitive function and needs of the environment should all be taken into account when deciding the walking aid. To prescribe and train patients in walking aids, health professionals need appropriate training to achieve local competencies or standards.

The following provides guidance to support patients with walking aid, and links to videos are offered with each section to provide the reader with a more visual overview. If you are uncertain or have any doubts regarding the safety of patients' mobility capacity and the appropriate assistive device, please confer with specialist healthcare professionals in physical rehabilitation such as physiotherapists,

occupational therapists or rehabilitation nurses before encouraging and assisting patients on using walking aids.

The basic principles in walking aid selection are that walking sticks and crutches are less supportive and require more balance and coordination than, e.g., a standard four-legged walker. Therefore, in the early post-operative phase, it is common for people with hip fracture to start mobilising by using walking frames of various types. If they are unable to stand up, specialist manual handling equipment is often used to help the patient transfer from bed to chair. Walking frames, crutches and canes are examples of walking aids that can be used to help patients to gain stability, mobility and independence. Those with lower limb weakness or poor balance can benefit from walking frames to provide additional stability and mobility as this enables some weight to be supported through the upper limbs, as well as provides a wider base of support (see Table 8.3).

Crutches can help patients who need to use their upper limbs to support weight bearing and propulsion but require greater coordination and balance (see Table 8.4). The three major purposes of a cane/walking stick are to shift body weight away

Table 8.3 How to support use of a walker/walking frames on a flat surface

1. Ensure that the patient is wearing slip-resistant footwear or slippers with rubber soles. The patient should push themselves up from the chair to stand using armrests. They should not pull themselves up using walker. Observe closely for signs of orthostatic hypotension discussed earlier.
 2. Once standing, the patient should place the frame in front of them and ensure that there is enough space between the body and the frame for stability. Hands should be placed on the hand grips.
 3. The patient should lift or move the walker forward, depending on the type of frame, while supporting it with their hands. They should not advance the walker too far in front. They should not begin walking until they feel prepared and the walker is stable. Early after surgery, people can experience anxiety and/or dizziness when standing.
 4. The injured leg (for lower extremity fractures) should step forward towards the walker first, and then the other leg should step up to the same level, keeping the feet approximately shoulder width apart. The patient should use their arms for support and take short and consistent step lengths. The same principles apply for other walking devices (i.e. crutches), where extra support is needed for the fractured leg.
 5. The patient should continue with this walking pattern until their walking improves. Later, as weight bearing and balance improve, they may progress onto a walking aid that uses less support, start practising more normal walking patterns and start to look straight ahead rather than focusing on the immediate environment.
- A link to a video showing how to use a walking frame is available at the end of this chapter.

Table 8.4 How to use crutches for climbing stairs

1. When climbing stairs, if having a lower extremity fracture, take one step at a time
 2. When walking up the stairs, move the non-fractured (or uninjured) leg first followed by the fractured and the crutch
 3. When walking downstairs, move the crutch and the fracture leg first, followed by the non-fractured.
- A link to a video showing how to use crutches is available at the end of this chapter.

from a painful or weakened lower limb, to raise the centre of gravity and to increase sensory information about the surroundings, all of which contribute to greater balance [66].

Nursing care programmes emphasising basic self-care can be helpful in improving functional outcomes among older patients hospitalised [67].

A crucial measure involves engaging and motivating the family/caregivers (Chap. 15) to involve patients in mobility practice. A useful resource to support family and caregivers is available [here](#) [68]. There are interprofessional standards regarding the safe patient handling and mobility [69], but family carers should also be taught how to assist patients in moving from lying to sitting, sitting to standing and using walking aids* (based on any weight-bearing restrictions) according to the equipment and the environment they will have available at home. As patient-handling equipment and devices become more widely available for use in the home, carers must be provided with opportunity to learn how to utilise them safely [70].

When designing a care plan for a patient, it is important to take into account the patient's knowledge, cultural values and ethnic beliefs accompanying the loss of independence, evaluate their knowledge and provide information about the consequences of immobility. This may be enough for the patient to cooperate with mobilisation practices following surgery [62].

8.8 Early Exercise After Hip Fracture

In addition to mobility training and weight-bearing activity, a wide range of exercises are used to support recovery after hip fracture. A systematic review and meta-analysis of exercise interventions targeting physical function that were commenced in the first 3 months after hip fracture [71] found nine randomised controlled trials, recruiting 669 participants. There was high to moderate quality evidence that exercise interventions improve physical function, but the evidence for the optimal mode of exercise was uncertain. Hulsbæk et al. [72] examined the evidence regarding the effects of exercise for people following hip fracture in their systematic review and meta-analysis. Although the evidence had some uncertainties, across 49 studies involving 3905 participants, they found that exercise had:

- Small-to-moderate positive effects in the short term (end of intervention) on mobility, activities of daily living, lower limb muscle strength and balance
- Small-to-moderate positive effects at long term (closest outcome data to 1 year post-fracture) on mobility, balance and health-related quality of life

The 2022 Cochrane review [73] of interventions for improving mobility after hip fracture surgery in adults highlighted the complexity in assessing the evidence for exercise after hip fracture. There are multiple types of exercise that can be used, including but not limited to:

- Gait training
- Balance and functional training
- Resistance/strength training
- Endurance exercises
- Flexibility exercises

Exercise programmes also have different doses, levels of health professional supervision and variable settings (e.g. in-hospital, clinics, home-based). Although there are some uncertainties in the evidence to date, the available evidence demonstrates that exercise is a critical component of rehabilitation across the recovery journey, from very early in-hospital rehabilitation through to later community-based rehabilitation. Indeed, structured exercises including progressive high-intensity resistance strength, balance, weight bearing and functional mobility training have been recommended in national clinical guidelines from the Academy of Orthopaedic Physical Therapy and the Academy of Geriatric Physical Therapy of the American Physical Therapy Association [17].

A major challenge in rehabilitation is ensuring that exercise programmes are performed accurately and at a frequency that will achieve their desired affect (e.g. improved muscle strength) [74]. While exercise programmes are commonly prescribed by physiotherapists for individual patients, the whole care team has a key role in supporting patients with regular training. Strategies to facilitate exercise programme adherence may include reminders and prompts to perform prescribed exercises, assessing and addressing barriers to exercise such as pain, and providing feedback on performance.

8.9 Nutrition, Mobilisation and Exercise After Hip Fracture

While there has been a focus on mobilisation and exercise for people after hip fracture in this chapter, it is important to highlight that, for the benefits of exercise to be realised, a focus on optimising nutrition is required. It is common for older adults to be malnourished at the time of injury and to experience reduced food intake [75]. Again, highlighting the multi-disciplinarity of hip fracture rehabilitation, nutritional status and needs are often assessed and managed by nursing staff and specialist dietitians (Chap. 11). Whether facilitating food intake or through use of nutritional supplements, supporting sufficient calorie intake is important for exercise and mobilisation practice, and to ensure enough protein to build muscle bulk. There is also a role for carers in this aspect of recovery (see Chap. 15), and a useful guide has been produced by the Royal College of Physicians in the United Kingdom accessible [here](#) [76].

Summary of the Main Points

- After a hip fracture, short and longer periods of immobility are associated with serious complications, including respiratory infection, delirium, pressure sores, thromboembolic events, worse recovery of function and increased risk of mortality.

- Early mobilisation and continued after day one should be a key focus after a fragility fracture and now increasingly monitored in national hip fracture databases, which is a core part of many clinical guidelines.
- Nurses should recognise the factors that impact patient's early mobility, such as the pre-fracture function and the type of hip fracture and pain, and identify the main scales used to assess patients and how to manage these issues.
- Although movement and weight-bearing restrictions are not something that nurses or physiotherapists decide on or change, they might discuss the necessity of reviewing such restrictions with the responsible lead clinical staff/surgeons, if based on tradition rather than evidence.
- Safe patient handling, correct body mechanics and familiarity with facility policy regarding the mobility of patients are just a few of the many important safety considerations that all healthcare team members must consider at all times.
- Assess patient history and laboratory/diagnostic study findings for abnormalities and the patient's weight, mobility, cognitive function and medical treatments to determine how many staff members will be needed for mobilisation.
- Before helping a patient stand or walk, check their vital signs, blood pressure, cognitive status and any other symptoms they may be experiencing, such as dizziness and pain.
- The everyday duties of nurses can be modified so that patients can engage in mobility-enhancing practice: for instance, assisting/encouraging patients to eat out of bed during mealtimes, instructing them on the use of walking aids at various times of the day and negotiating an increase/improvement in the daily ward walking distance.

8.10 Suggested Further Study

Use this chapter to help you determine your team's educational needs in terms of early mobilisation and exercise after fragility fracture and consider how these needs might be addressed. Examples of educational resources include:

Health Safe Executive. Moving and handling in health and social care. <https://www.hse.gov.uk/healthservices/moving-handling.htm>

NHS inform. Using crutches. <https://www.nhsinform.scot/tests-and-treatments/medicines-and-medical-aids/walking-aids/using-crutches>

NHS inform. Using a walking frame <https://www.nhsinform.scot/tests-and-treatments/medicines-and-medical-aids/walking-aids/using-a-walking-frame>

Royal College of Nursing. Moving and handling. <https://www.rcn.org.uk/Get-Help/RCN-advice/moving-and-handling>

The National Institute for Occupational Safety and Health. Safe Patient Handling and Mobility. <https://www.cdc.gov/niosh/topics/safepatient/default.html>

8.11 How to Self-Assess Learning

After reading this chapter and undertaking additional study, you can evaluate the following choices for deciding what you have learned and how it applies to your practice and team:

- Share what you have learned from this chapter with your colleagues, and discuss ways your team could improve early mobilisation practice and exercise for fragility fracture patients.
- Perform regular searches to explore the most recent recommendations about early mobilisation practices and exercise for fragility fracture patients.
- Meet with specialists and other team members to discuss and disseminate the most recent findings.
- Obtain guidance from skilled clinicians, and gain knowledge from experts in the field.

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Pressure Ulcer Prevention

9

Carina Bååth, Louise Brent, Julie Santy-Tomlinson,
and Ami Hommel

9.1 Introduction

The prevention of pressure ulcers (also categorised as ‘skin injury’, pressure injuries or pressure sores) is a fundamental aspect of managing the patient following a fragility fracture, especially following hip fracture and associated surgery. The term ‘pressure ulcer’ will be used here as it is used by the WHO and has an ICD-11 code, EH90 [1]. Pressure ulcer prevention has traditionally been associated with nursing aspects of care, but it is now recognised that the causes of skin injury are complex and that prevention is the responsibility of the wider disciplinary team.

Ageing skin and multiple comorbidities are significant factors in skin injury. This chapter aims to explore the causes of pressure ulcers and provide the reader with an overview of evidence-based approaches to preventing pressure ulcers following fragility fractures.

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9.2 Learning Outcomes

At the end of the chapter, and following further study, the practitioner will be able to:

- Explain the causes and pathophysiology of pressure ulcers.
- Recognise risk factors for pressure ulcers in patients following significant fragility fractures/hip fracture.
- Provide evidence-based care to patients at risk of pressure ulcers.

9.3 Introduction

Pressure ulcers (sometimes known as pressure injuries) are a significant risk to patient safety and recovery following fragility fracture, especially significant fractures requiring hospitalisation and surgery such as femoral, pelvic, and hip fractures. Pressure ulcers result in short- and long-term pain and delayed or limited rehabilitation and are associated with other complications that can lead to increased mortality. Due to the avoidable nature of most pressure ulcers, since 2001 they have been considered indicators of the standard of care provided [2]. For that reason, many of the established national clinical audits for hip fractures now audit pressure ulcer care as a key standard [3].

Local and national clinical audits of pressure ulcer incidence and prevalence are central to good prevention policy and practice. Johansen et al. [4] reported that the incidence of pressure ulcers recorded across multiple national hip fracture audits ranged from 2 to 4%. Evidence from existing hip fracture audits has demonstrated that measuring and feeding back to units can help to achieve a reduction in pressure ulcers. It is sometimes argued that pressure ulcers resulting from a long lie on the floor following a fall at the time of fracture may be considered unavoidable. However, hospital-acquired pressure ulcers are avoidable with appropriate interventions [5].

The Fragility Fracture Network's Hip Fracture Audit Special Interest Group reviewed the key variables captured in all existing hip fracture audits. Of all hip fracture audits, 70% were capturing data on pressure ulcers, but the review recommended that any new or existing audits should also measure pressure ulcers as a key metric as part of their minimum common data set [3].

To reduce pressure ulcer incidence, an essential part of patient safety and service improvement is ensuring that practitioners are well educated and possess the skills and knowledge of evidence-based practice in pressure ulcer prevention. For example, the implementation of a national patient safety program has had a positive impact on the nationwide pressure ulcer prevalence and occurrence of prevention strategies. Such programmes can successfully engage leadership and healthcare staff to work systematically with prevention, evaluation and audit [5].

9.4 Pathophysiology and Causes of Pressure Ulcers

Pressure ulcers are defined as localised areas of tissue damage, usually over a bony prominence, resulting from direct pressure and/or shearing forces. Both pressure and shear deform soft tissue and can result in cell death due to the deformation itself or ischemia that the deformation creates in the long term. Current aetiological knowledge confirms that pressure ulcers develop due to sustained mechanical loading leading to soft tissue deformation [6, 7].

Pressure ulcers occur in older people, those who have limited mobility, and/or those who are confined to a bed or chair by an acute or chronic health problem, injury, or surgery and who have impaired nutrition. These factors are common for patients who are frail and have fragility fractures. Such circumstances reduce the tolerance of the individual's skin and underlying tissues to forces that damage the skin and circulation. Patients with fragility fractures who are also frail (see Chap. 3) are at high risk of skin damage because of the physiological vulnerability that accompanies frailty and its impact on skin health [8].

Susceptibility to damage because of underlying factors is sometimes referred to as 'skin vulnerability'—these underlying factors are threats to 'skin integrity', meaning that an individual is susceptible to damage as a result of a health threat or injury that would not normally damage the skin of a healthy individual.

As well as the extrinsic factors discussed above, patients are also vulnerable to tissue injury because of a complex interplay between various intrinsic factors that affect the skin's innate ability to resist external forces—tissue tolerance (Fig. 9.1)

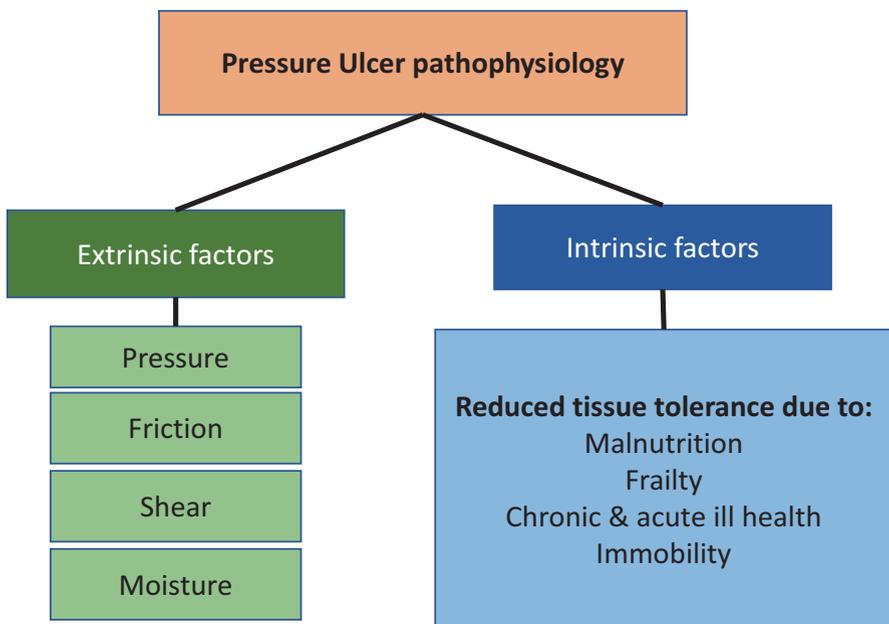


Fig. 9.1 Major factors in the pathophysiology of pressure ulcers in patients with fragility fractures

[9]. These factors include coexisting health conditions such as those affecting the respiratory and circulatory system, which result in diminished blood, oxygen, and nutrition supply to the tissues and often lead to frailty. Pulmonary disease, cardiovascular disease, and diabetes are common examples of such conditions. Frailty (see Chap. 3) significantly predicts pressure ulcers [10]. Health conditions that affect mobility, such as osteoarthritis and neurological conditions, also increase the risk of pressure ulcers because they restrict the person's ability to move, mobilise, and change their position in bed or chair. Due to the acute nature of major fragility fractures such as hip fractures, patients become instantly at risk of pressure ulcers, and timely action is vital (Fig. 9.1).

9.5 Classification of Pressure Ulcers

Understanding the development, progression, and classification of pressure ulcers and recognising the early signs are essential in helping healthcare personnel to recognise the early development of pressure ulcers so that deterioration can be prevented. The classification of a pressure ulcer is also essential in decision-making about actions for healing; not all pressure ulcers are open wounds.

Pressure ulcers are classified according to the NPIAP/EPUAP/PPPIA guidelines, updated in 2019 [9]. The initial stage of a pressure ulcer is usually skin redness (erythema), particularly over bony prominences. In the first instance, this redness indicates an area of skin subjected to pressure and other forces, resulting in an inflammatory reaction that causes local dilation of blood vessels. This is called 'blanching' erythema if all redness disappears when light finger pressure is applied, indicating that the local capillaries are undamaged. The patient may state that there is localised pain over a bony prominence even before erythema begins [11]. Blanching erythema is a sign of risk of tissue injury, and the patient's position needs to be changed as there is potential for capillary damage if pressure is not relieved. Blanchable erythema is not considered a pressure ulcer but a critical warning sign that preventive actions are needed. If the forces are not removed, blanching erythema can quickly develop into a pressure ulcer, as indicated by category 1 non-blanchable erythema of intact skin. (For further information, please see page 38 of Prevention and Treatment of Pressure Ulcers/Injuries: Quick Reference Guide [9] https://www.internationalguideline.com/static/pdfs/Quick_Reference_Guide-10Mar2019.pdf.)

One example of an online education programme called 'React to Red' [12] focuses specifically on recognising and acting on red skin because of the importance of early intervention, <https://www.reactto.co.uk/resources/react-to-red/>.

9.6 Pressure Ulcer Prevention

A pressure ulcer is classified as patient harm, and most are preventable. Preventive interventions must be led by the latest evidence-based guidance and coordinated by the interdisciplinary team. The NPIAP/EPUAP/PPPIA guidelines [9] provide direction for practice worldwide, and the following advice is based on this guidance. A quick reference guide to the guidelines can be downloaded [here](#):

The implementation of guidance, education, evaluation of practice, and regular audit and monitoring of pressure ulcer prevalence or incidence should be led by local experts/leaders responsible for service improvement [13]. This should include reporting, investigation, and root-cause analysis of hospital- and care facility-acquired pressure ulcers. It is crucial to raise awareness to prevent the formation of pressure ulcers. The European Pressure Ulcer Advisory Panel (EPUAP) have published two algorithms (patient algorithm and algorithm for professionals) that can act as guidelines to follow when preventing/treating pressure ulcers. They can be handed out in hospitals and other healthcare institutions not only to healthcare workers but also to patients themselves. The algorithm can be downloaded [here](#).

9.6.1 Risk Factors and Risk Assessment

The NPIAP/EPUAP/PPPIA guidelines [8] state that individuals with limited mobility, limited activity, and a high potential for friction and shear should be considered at risk of pressure ulcers. This includes all patients admitted to the hospital with a hip fracture, for example. Pressure ulcers are a common complication of hip fractures and hip fracture surgery [14, 15]. The risk increases significantly when the patient undergoes surgery and in the early post-operative period because of the additional impact of both intrinsic and extrinsic factors.

Assessment is central to planning effective preventive interventions as it provides an understanding of those risk factors, which can be mitigated by effective evidence-based care.

9.6.1.1 Skin Assessment

- Full skin assessment should be done as soon as possible after admission as part of every risk assessment, or more frequently if the patient's health deteriorates or healthcare interventions such as procedures or surgery increase the risk.
- Skin assessment should focus on common pressure points over bony prominences such as the sacrum, buttocks, heels, back of the head, elbows, shoulders, hips (over the greater trochanter), ischial tuberosities, sides of knees, and ankles/malleoli. Any red or discoloured skin over bony prominences indicates possible tissue damage and must be acted upon immediately to prevent deterioration.
- Any existing or new pressure ulcer should be recorded and classified according to the NPIAP/EPUAP/PPPIA classification system [9].
- It is essential to recognise early signs of damage to skin colour, especially in persons with darkly pigmented skin since those with dark skin tones are more

likely to develop pressure ulcers than those with lighter skin tones [16]. However, it is important to address the knowledge gap that exists for many practitioners relating to assessing and identifying pressure ulcers across the tone diversity and how this affects the risk for individuals [17].

9.6.1.2 Moisture-Associated Skin Damage

Moisture-associated skin damage (MASD) is an umbrella definition of irritant-contact dermatitis; common irritants include urine, faeces, intestinal liquids from stomas, and exudate from a wound. There are four different types of MAS: intertriginous dermatitis, peri-wound skin damage, peri-stomal moisture, and incontinence-associated dermatitis (IAD) [18, 19].

9.6.1.3 Incontinence-Associated Dermatitis

Incontinence-associated dermatitis (IAD) presents as an inflammation and/or disruption of skin integrity. It is one form of irritant-contact dermatitis, WHO ICD11 EK02.22 [1]. IAD, caused by prolonged exposure of skin to urine or faeces, alters the skin pH level to become more alkaline, reducing barrier function and defence against infection. Often, IAD is mistaken for a category 2 pressure ulcer. However, prevention and treatment are different. Therefore, it is important that it is diagnosed correctly to reduce the potential for skin damage and to manage the condition with appropriate treatment.

9.6.1.4 Risk Assessment

A structured risk assessment for pressure ulcers must be carried out as soon as possible after admission to identify any risk of pressure ulcer development and the individual factors that require intervention. Patient characteristics that indicate the potential risk of pressure ulcers should be documented in the risk assessment, including patient age, medical conditions impacting tissue health, and drug or other therapy impacting tissue health. Subsequently, a risk assessment should be conducted again after any change in health status.

Risk assessment tools offer a structured approach to assessment but do not replace a comprehensive assessment conducted by practitioners. Assessment should also include taking note of any medical devices (e.g. casts, urinary catheters, intravenous lines, oxygen masks, straps, and ties) that can lead to additional injury (medical device-associated pressure ulcers).

It must be stressed that assessment alone is not sufficient to reduce the incidence of pressure ulcers [10] and that it is the preventive interventions that follow which are the most important factors.

9.6.2 Evidence-Based Preventive Interventions

Pressure ulcers are important indicators of the quality of care, and the development of an avoidable injury is a breach in patient safety. It is essential that prevention of pressure ulcers begins in pre-hospital care (e.g. at the scene of the fall, and in the ambulance) continuing through hospitalisation to discharge. Heel pressure ulcers

are a particular concern throughout the care process in those who have sustained a lower limb injury such as hip fracture [20].

Assessment and interventions for prevention and treatment of pressure ulcers need to be patient centred. Although much research has been conducted into the causes of and most effective prevention methods, and there is much evidence-based guidance readily available, pressure ulcers are still a significant problem for hospitalised patients [21]. Failures in prevention that lead to hospital-acquired pressure ulcers can be viewed as healthcare-associated complications and are sometimes considered an indicator of the quality of interdisciplinary care. The results of a European prevalence study in 2002 suggested that as few as 10% of patients at risk of pressure ulcers were receiving enough preventive care at that time [22]. In a 10-year survey, pressure ulcer prevalence in hospitalised patients decreased from 17.0% to 11.4%, while preventive measures such as pressure-reducing mattresses, sliding sheets, heel protection, and repositioning plans increased [5]. In 2018, a systematic review [23] reported that the overall global prevalence of pressure ulcers using point prevalence and period prevalence was 14.8% and 11.6%, respectively, and the overall mean incidence of pressure ulcers was 6.3%. It is difficult to draw conclusions from these data since pressure ulcer incidence and prevalence are measured differently in various studies, but these findings highlight the continuing problem of pressure ulcers.

One example of a national approach to pressure ulcer prevention is the UK National Health Service, which has developed an approach to pressure ulcer prevention known by the acronym SSKIN (Skin, Surface, Keep moving, Incontinence, and Nutrition), which is part of the 'React to Red' programme mentioned earlier in this chapter. This provides one approach to identifying evidence-based interventions for the prevention of pressure ulcers as follows:

Skin: Fundamental care that helps to maintain the skin's protective purpose includes keeping the skin clean and dry using unscented skin cleansers that do not irritate. This is particularly important for patients with older, dry skin and for those with skin allergies and other skin conditions. It is also helpful to protect the skin's moisture barrier by regularly applying a light layer of simple, unscented moisturisers or emollients while avoiding the overuse of creams and lotions. In addition, positioning the patient on areas of erythematous (red) skin and massaging the skin should be avoided. Massage causes friction and shear that can damage the delicate microcirculation and lead to inflammation and tissue damage.

Surface: Support surfaces on both beds and chairs, as well as operating tables during surgery, should meet individual patient needs. Support surface choice is based on the patient's level of mobility; those who are mainly bedbound (e.g. while awaiting surgery or immediately afterwards) may benefit from the use of an alternating pressure mattress from admission, but this should never replace frequent repositioning (see *keep moving* below). The relative merits of these higher specification support surfaces in preventing pressure ulcers are unclear [24]. Once the patient can sit out of bed, the risk of pressure ulcers must be acknowledged, and a redistributing pressure cushion should be used until the patient is fully mobile.

Keep moving: Care should support remobilisation as early as possible while recognising the effects of reduced mobility during the rehabilitation phase (see Chap.

8). Prolonged pressure to bony prominences and other vulnerable areas, along with friction and shear, must be avoided by regular repositioning of the patient, especially if they cannot do this for themselves or mobility is restricted.

Good manual handling practice is essential in avoiding friction and shear, and heels should be lifted free of the bed surface using pillows. The frequency of repositioning should be based on individual patient need relating to their skin tolerance to pressure (e.g. development of areas of blanching hyperaemia) and their general condition and comfort. Pressure should be relieved or redistributed, and repositioning onto bony prominences should be avoided using the 30° tilt options and profiling bed functions. (A short guide to using the 30° tilt can be found here: https://www.inva-care.co.uk/sites/gb/files/csv_migration/product_docs/sales_docs/DSAL010236_the_30_degree_tilt_final.pdf. Some patients may be unable to move to certain positions, such as onto the operated hip, so this needs to be considered as part of the repositioning plan. Once patients can sit in a chair, repositioning should be carried out regularly by encouraging patients to stand, mobilise (see Chap. 8), and return to lying positions depending on frequent skin reassessment. Many hip fracture audits also now include early mobilisation as a key standard, as this is associated with many benefits to the patient, including better functional recovery, increased survival, increased likelihood of being discharged home, and reduced pressure ulcers [25].

Incontinence: Incontinence of urine and/or faeces exposes the skin to excessive moisture, damaging the dermal and epidermal cells. Urine, faeces, sweat, and exudate contain chemical substances toxic to skin cells and can lead to incontinence-associated dermatitis [26]. Patients with incontinence should have an individual continence management plan that includes immediate skin cleansing following incontinence and the light use of barrier creams to protect the skin. The absorbency of continence products such as pads can be affected by barrier creams transferred from the skin to the pad.

Nutrition: Nutritional assessment and screening should be conducted to identify malnourished patients or those who are at risk of malnourishment [27]. It is essential to ensure an adequate supply of nutrients—particularly protein, energy, water, and vitamins. An individualised nutrition plan is needed for anyone with or at risk of malnutrition. Nutritional risk assessment is now more commonplace in orthopaedic wards and is also featured in several hip fracture audits.

Nutrition should be a priority in pressure ulcer prevention and all other aspects of care following fragility fracture, not an afterthought, so it is specifically highlighted here and considered in more detail in Chap. 11. The proper amounts of macronutrients and micronutrients are essential in maintaining all body tissues, so nutrition is vital in preventing and treating pressure ulcers [28].

Summary of Key Points for Learning

- Understanding the pathophysiology of pressure ulcers is a fundamental aspect of pressure ulcer prevention.
- Practitioners must recognise the risk factors for pressure ulcers, including red skin, particularly in patients at elevated risk, such as those with hip fractures.

- Evidence-based care should focus on optimal nutrition care, hydration, skin assessment, and support surfaces, keeping the patient moving by ensuring mobility and/or frequent changes of position, and effectively managing skin moisture, especially concerning incontinence.
- Pressure ulcer prevention should be started already during ambulance care.

9.7 Suggested Further Study

- Download the National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance (EPUAP/ NPIAP/ PPPIA) (2019) Prevention and Treatment of Pressure Ulcers: Quick Reference Guide. From: https://www.internationalguideline.com/static/pdfs/Quick_Reference_Guide-10Mar2019.pdf.
- Identify someone in your team who might be a good person to act as a pressure ulcer champion to ensure that the evidence-based guidelines are implemented in your workplace. Furthermore, the pressure ulcer champion can serve as an educator for personnel and students.
- To focus on nutrition in the care provided by your team, access the following e-book, which provides a detailed exploration of improving nutrition for older people. Identify ways in which nutritional care can be improved to help prevent pressure ulcers. Download the Interdisciplinary Nutritional Management and Care for Older Adults: An Evidence-Based Practical Guide for Nurses, 2021 Springer <https://doi.org/10.1007/978-3-030-63892-4>.

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Wound Management

10

Carina Bååth and Ami Hommel

10.1 Introduction

Wounds have a significant effect on patient experiences and their care. The management of wounds is a fundamental aspect of the management of the patient following a fragility fracture, especially following a hip fracture and associated surgery. Patients with a fragility fracture might not only have a surgical wound after the surgical procedure but may also have other wounds such as a leg ulcer, skin tears, diabetic foot ulcer, pressure ulcer or eczema as well as be at risk of incontinence-associated dermatitis. Nurses and other practitioners must check patients' skin from head to toe at admission. Ageing skin and multiple comorbidities are significant factors in skin injury and wound healing problems. All wounds require evidence-based intervention.

This chapter aims to provide an overview of skin and wound assessment and evidence-based nursing interventions that can optimise wound healing in older people with fragility fractures.

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10.2 Learning Outcomes

At the end of the chapter, and following further study, the nurse will be able to:

- Discuss the factors that inhibit and enhance wound healing.
- Assess older persons' risk for skin tears.
- Provide evidence-based care to fragility fracture patients with wounds.

10.3 Wound Healing Physiology

Wound healing is the process by which the function of damaged tissue is restored following surgery, trauma or other sources of tissue damage. It is a dynamic, complex process that is significantly affected by the nature of the wound, pre- and post-operative management, the patient's health status, the care environment and the care that is given. To understand what wound care is needed, what wound dressing should be used or why a wound is not healing, practitioners must understand the wound healing process.

Regardless of the aetiology of the wound or whether it is acute or chronic, the repair processes are similar. The wound healing process is a normal biological cascade. Although it is a complex biological process, it is classically divided into four phases: rapid haemostasis, appropriate inflammation, proliferation and remodelling [1, 2]:

Haemostasis: Haemostasis starts within the first 15 min after the injury/surgery. At this stage, bleeding is controlled with vascular constriction, forming a platelet thrombus, propagation of the coagulation cascade, termination of clotting and removal of the clot by fibrinolysis. This process prepares the wound for future stages of healing.

Inflammation: The inflammation phase begins immediately after the injury when the injured blood vessels leak transudate (consisting of water, salt and protein), causing localised swelling. Inflammation both controls bleeding and prevents infection so is an essential part of the initial healing process providing that it lasts for the right amount of time and does not become chronic. Following platelet activation, inflammatory cells migrate to the wound site during the first few days following the injury/surgery. Mast cells release vasoactive cytokines such as prostaglandins and histamine, which increase capillary permeability and promote local dilation to aid the migratory process; damaged cells, pathogens and bacteria are removed from the wound area. This process enables the cells and chemicals needed for wound healing to reach the wound site. White blood cells, growth factors, nutrients and enzymes create the classic signs of inflammation; swelling, heat, pain and redness are commonly observed during this phase.

Proliferation: The proliferative phase occurs 3–21 days after injury/surgery. The wound is rebuilt with new collagen and extracellular matrix tissue. This phase involves angiogenesis (growth of new capillary vessels), granulation tissue production, collagen deposition and epithelialisation. The primary outcome of this phase is the filling of the wound defect. Hypoxic conditions in the wound bed lead to nitric

oxide synthesis by endothelial cells, stimulating vascular endothelial growth factor to release and promote angiogenesis.

Remodelling: The remodelling phase is also called the maturation phase and includes collagen cross-linking, remodelling and wound contraction. The cells used to repair the wound but no longer needed are removed by apoptosis or programmed cell death. This process can continue for 1 year. A wound will regain 80% of its original strength 3 months after injury [1, 2].

There are many factors that can influence these processes, so individual patients' wound healing can progress or be delayed differently. The role of the practitioner in wound care is to optimise the factors, which support healing so that wounds can heal in a timely way, without complications.

10.4 Surgical Wounds

The definitive management of hip fracture and other significant fragility fractures almost always requires surgical fixation (see Chap. 7). Consequently, most patients require surgical site wound care during the hospital stay and following discharge. Surgical wounds occur under controlled circumstances, and surgeons try to ensure minimal tissue loss and a good approximation of the wound edges during wound closure. However surgical wounds are also an important source of potential complications due to the risk of infection, haematoma and wound healing problems such as dehiscence (wound breakdown).

Nurses and other practitioners have many clinical decisions to make about the management of surgical wounds. There is a lack of scientific evidence considering issues such as how long the dressing that is applied under sterile conditions after the operation should remain in place, although knowledge based on clinical experiences suggests that it should remain for at least the first 48 h, as most surgical wounds are then sealed.

The main aim of care of the wound is for it to heal rapidly without complications such as infection or dehiscence. However, for many patients who have surgery following a fragility fracture, their general health may be poor, they may have multiple pre-existing health problems and medications, they may be malnourished (see Chap. 11) and they may be frail (see Chap. 3), all of which can significantly affect healing.

10.4.1 Recognising and Preventing Surgical Site Wound Healing Problems

The complex wound healing process can be interrupted, delayed or halted due to extrinsic and intrinsic factors:

- *Extrinsic factors* may include smoking, medication, pain, illicit drug use and alcohol consumption, mechanical stress, moisture, infection and chemical stress.
- *Intrinsic factors* are multiple comorbidities, increased age, obesity, nutritional status and health status.

These factors affect the health of the cells involved in wound healing by disrupting blood supply to the tissues and can lead to disordered immune and inflammatory processes. To prevent delayed wound healing, practitioners must be able to apply a knowledge of the skin structure, phases of wound healing and wound types to be able to identify risk factors in healing and decide on the most appropriate evidence-based treatment and care to support the healing process. The prevalence of wound healing problems has not been extensively studied in older adults with hip fractures, even though age has been identified as a potential risk factor for delayed wound healing.

Some surgical wounds may be considered a short interruption in the continuity of protective properties of the skin resulting from surgery and can be expected to make rapid and predictable progress towards healing [3]. For the older person who has undergone surgery, however, numerous factors place them at greater risk of wound healing problems such as infection, haematoma, dehiscence, sepsis and death. To facilitate optimal wound healing, the general health and well-being of the patient must be optimised both pre- and post-operatively while considering the patient's past medical/surgical history, medications/polypharmacy and current health history, as discussed in Chap. 7. The following section provides an overview of the care priorities for supporting wound healing.

10.4.1.1 Optimum Nutrition

The patient's nutritional status can significantly influence wound healing. Poor nutrition is the most common reason for wound healing problems, and optimum nutritional intake is central to ensuring wound healing without complications. This is especially important given the prevalence of malnutrition in older hospitalised patients who may also have undergone prolonged fasting preoperatively. The best way to improve nutritional status is for the patient to consume a varied diet rich in necessary nutrients. If food or nutrient intake is inadequate, nutritional supplementation may be warranted [4]. Food contains calories, protein, fluid, vitamins, minerals, dietary fibre and a wide variety of potentially anti-inflammatory substances that could benefit wound healing [5]. Chap. 11 considers nutritional assessment and nutritional support in detail.

10.4.1.2 Stop Smoking

Smoking impairs wound healing through its effects on chemotaxis, migratory function and oxidative bactericidal mechanisms in the inflammatory phase as well as causing vascular diseases that affect blood supply to the tissues. It also reduces fibroblast migration and proliferation [6]. Smokers have been shown to have significantly worse outcomes than non-smokers following surgery, with a higher incidence of delirium and analgesia complications and greater consumption of post-operative opioids [7]. Supporting patients who smoke in smoking cessation is an important aspect of wound care.

10.4.1.3 Chronic Health Conditions

Chronic diseases that affect vascular flow and oxygen delivery to the tissues have a detrimental impact on healing. Many older people with a fragility fracture have diabetes, a common underlying cause of wound healing problems. Impaired wound healing for patients with diabetes is due to a constellation of structural, biochemical, cellular and microbial factors. Hyperglycaemia and its associated inflammation contribute to immune dysfunction, vascular damage, neuropathy, cellular senescence, impaired transition beyond the inflammatory stage, microbiome disruptions, failed extracellular matrix formation, growth factor and cytokine imbalance, limited re-epithelialisation, alterations in fibroblast migration and proliferation [8]. Optimising glycaemic control for patients with diabetes is a primary intervention for preventing comorbidities associated with poorly controlled diabetes and supporting wound healing.

10.4.1.4 Medication and Polypharmacy

Many older people are prescribed multiple medications which require review as part of the Comprehensive Geriatric Assessment (CGA) process (Chap. 6). Drugs that promote healing include insulin, vitamins, thyroid hormone and iron. Medications that can adversely affect healing include anticonvulsants, steroids, antibiotics, angiogenesis inhibitors and non-steroidal anti-inflammatory drugs (NSAIDs) [9]. Patients with rheumatoid arthritis (RA) who are treated with disease-modifying anti-rheumatic drugs (DMARDs) will have delayed wound healing when undergoing orthopaedic procedures. Additional risk factors have been shown to be advanced age, prolonged surgery and low preoperative white blood cell count [10], common factors for many older patients with a fragility fracture. In addition, DMARDs may increase skin-tear risk [11].

Effective pain management is essential following fracture, and NSAIDs are widely used. Because of their impact on wound healing, however, NSAIDs should be prescribed judiciously in post-operative care. There is an ongoing discussion of their possible role in decreasing both bone and wound healing, so it is recommended they are not used for more than a few days. However, NSAID use does not appear to decrease the wound healing rates of soft tissue wounds [12].

Anticoagulant medication is frequently needed following orthopaedic surgery in at-risk individuals (especially following hip fracture) to prevent thromboembolism. Around 30% of patients presenting with fragility fracture are already receiving anticoagulant treatment for various other reasons. Anticoagulant medications can present additional bleeding risks in the immediate post-operative period, so medical guidance needs to be considered. Platelet inhibitors need not be discontinued for acute hip fracture surgery. Vitamin K antagonist, e.g. warfarin, should, however, be reversed. Direct oral anticoagulants (DOACs) must be discontinued prior to surgery to prevent excessive perioperative bleeding [13]. However, patients with a hip fracture using DOAC have not been shown to have increased surgical delay, length of stay or risk of reported bleeding compared with patients without DOAC prior to surgery ([14]. None of these studies reported delayed wound healing.

10.4.2 Preventing Surgical Site Wound Infections

Understanding the factors that can lead to poor healing and, particularly, surgical site infection, as well as the best methods to facilitate healing and prevent infection, is an essential nursing activity both in the pre- and post-operative period. Even pre-operatively, a well-prepared patient can make a significant difference to avoid surgical complications and their consequences. It has been reported that the occurrence of deep infection following surgery for hip fracture is between 1.5% and 7.3% depending on comorbidities [15]. *Staphylococcus aureus* has been shown as the most common causative pathogen, either alone or as a mixed infection [16].

Orthopaedic surgery results in a wound that penetrates through all layers of soft tissue to bones and joints, and, often, a metal implant is involved. This makes infection a significant worry as deep surgical site infection can lead to implant site infection (where there has been surgical fracture fixation or hemi- or total arthroplasty), osteomyelitis and wound dehiscence, resulting in pain and discomfort, poor outcomes from surgery and delayed discharge. Using the most recent evidence-based guideline [17] for preventing hospital-acquired infections is central to preventing surgical site infection for all patients following fractures and surgery. Such guidelines tend to focus on careful attention to hand hygiene and hospital environmental hygiene.

According to the US Centers for Disease Control and Prevention and the Healthcare Infection Control Practices Advisory Committee Guideline for the Prevention of Surgical Site Infection published in 2017 and updated in 2018 [18], measures to prevent wound infection should include:

- *Parenteral antimicrobial prophylaxis*: Administer antimicrobial agents only when indicated based on published guidelines. Time administration so that bactericidal concentration is established in serum and tissues at the initial incision. Multiple guidelines exist globally for antimicrobial/antibiotic prophylaxis for hip fracture surgery, so local practice will be guided by this.
- *Glycaemic control*: Implement perioperative glycaemic control using blood glucose target levels <200 mg/dL in patients with and without diabetes.
- *Normothermia*: Maintain perioperative normothermia. The temperature of the patient's tissues can drop significantly during the perioperative phase, leading to poor perfusion. A central activity for perioperative care is to ensure that the patient is kept warm with the use of warming devices and blankets as needed.
- *Oxygenation*: To maximise tissue perfusion, administer an increased fraction of inspired oxygen intraoperatively and in the immediate post-operative period following extubating for all patients with normal pulmonary function undergoing general anaesthesia with endotracheal intubation.
- *Antiseptic prophylaxis*: If possible, patients should have a full-body shower or bath the night before surgery (with either soap or an antiseptic agent) to reduce the number of skin commensal organisms. This may not be possible in the case of many fragility fracture patients. Intraoperative skin preparation should be performed with an antiseptic agent containing alcohol unless contraindicated.

Consider intraoperative irrigation of deep or subcutaneous tissues with an aqueous iodophor solution.

Paying attention to the above guidance is more vital than consideration of wound dressing and cleansing. Surgical drains are now rarely used as they increase the risk of infection, and wound closure practices have altered to incorporate dissolvable suture materials, which decrease the risk of infection compared to, for example, removable staples. Wound cleansing has been shown to be unnecessary in clean wounds such as surgical sites.

Following surgery, patients and their wounds should be closely monitored for signs of surgical site/deep wound infections. Identifying and treating infections early are central to preventing superficial infections deteriorating and affecting the deep implant site. Orthopaedic surgery site infections can become evident up to 1 year after surgery. On wound observation, the main signs that an infection may be present are:

- Pain at the wound/deep surgical site that appears not to be improving or worsening
- Slow wound healing and dehiscence of the wound
- Wounds showing signs of an intense inflammatory response such as redness, heat, swelling and discharge: not all wounds that are infected produce purulent discharge
- Pyrexia

Many surgical site infections do not become evident until after discharge from hospital; patients and their caregivers should be educated about the signs of surgical site infections and advised how to contact the team, while impressing on them the importance of seeking treatment if an infection is suspected.

10.5 Assessing and Managing Skin Tears

Skin tears are one of the most common types of skin breakdown in older people. According to the International Skin Tear Advisory Panel (ISTAP), a skin tear is a traumatic wound caused by mechanical forces, including the removal of adhesives (e.g. from wound dressings and other devices). Severity may vary by depth, not extending through the subcutaneous layers [19, 20]. Many skin tears involve a flap of skin defined as a portion of the skin (epidermis/dermis) that is unintentionally separated (partially or fully) from its original place due to shear, friction and/or blunt force [21].

Skin tears have been sparsely studied following hip fracture, but elective orthopaedic surgical patients have been shown to be at high risk of skin tears due to their age, mobility issues, mechanical and assistive devices, surgery and pharmacological interventions. Many patients who are admitted to hospital with a significant fragility fracture have fallen and they may have an associated skin tear on admission, often on the legs and arms—the pre-tibial area (on the front of the shin) and forearms are

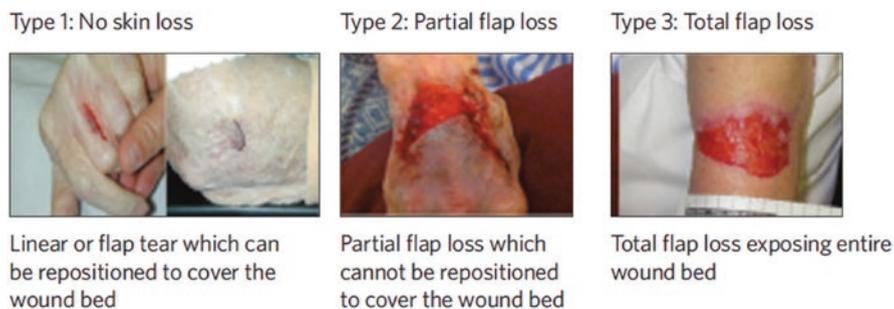


Fig. 10.1 The ISTAP classification tool, reproduced with permission [21]

particularly vulnerable. Subsequently, patients also remain at risk of new skin tears during the recovery and rehabilitation process. Guidance recommends identifying patients at risk of skin tears on admission to hospital [22].

Skin tears are classified according to ISTAP:

- *Type 1*: No tissue loss (linear or flap tear which can be repositioned to cover the wound bed): skin tears
- *Type 2*: Partial flap loss (partial flap loss which cannot be repositioned to cover the wound bed): skin tears
- *Type 3*: Total flap loss (total flap loss exposing the entire wound bed; see Fig. 10.1).

Early assessment of the patient's skin to identify the risk of skin tears or any existing tears is essential. A comprehensive skin assessment should also be conducted on admission to healthcare settings, or when visiting healthcare facilities [23] (also see Chap. 9). When patients are identified to be at risk, it is crucial to implement interventions concerning their skin condition, especially if they have a previous history of skin tears and/or have dry, fragile skin. For patients with limited mobility, such as those with a hip fracture, friction and shear on the skin should be avoided. General health status should be optimised including a focus on nutrition and hydration [21]. If a skin tear has been identified, it is important to classify it correctly and use generic language for describing and documenting its state and progress. The [ISTAP Skin Tears Classification Instrument](#) (Fig. 10.1) has been translated into six different languages and is a useful way to describe the wound [22, 24, 25].

The most common risk factors for skin tears are age-related skin changes, dehydration, malnutrition, sensory changes, mobility limitations, pharmacologic therapies and mechanical factors related to skin care practices [23]. Skin tears occur anywhere on the body but are most often found on the arms, legs and back of the hands of older people following trauma, for example, when bumping into an object or sustaining a fall.

Because of the fragility of the skin in those with and at risk of skin tears, the choice of dressing is paramount. This should also be considered for surgical wounds

in at-risk patients as the peri-wound skin is liable to damage if an inappropriate dressing is chosen. Careful consideration should, therefore, be given to wound dressing selection in skin tear management. The ISTAP panel [21] recommended choosing dressings that will promote the maintenance of moisture balance, suit the local wound environment, protect peri-wound skin, control or manage exudate and infection and optimise caregiver time [26]. It has been shown that silicone dressings are the best option for the treatment of skin tears, facilitating faster complete wound closure times compared with non-silicone dressing. The findings support expert opinion [21] that silicone-based dressings should be used in managing skin tears in place of traditional dressings. However, further research is required [27]. A recent systematic review [28] highlights the relationship between skin care bundles (a set of evidence-based interventions) and decreasing skin tears among the older population. In the same review, the authors care staff education, as this appears to be successful in enhancing competence in assessing and categorising skin tears. Healthcare staff could prioritise using skin care bundles by focusing on preventing skin tears in the ageing population.

A recent study [29] concluded that the skin is an important indicator of overall health and well-being. Therefore, improving skin integrity in individuals with skin frailty is a fundamental and holistic, person-centred approach to skin healthcare and improved skin integrity outcomes and quality of life in ageing populations [29, 30].

Summary of Key Points for Learning

- The effective evidence-based management of surgical wounds following surgery after a fragility fracture can be challenging as ageing and comorbidities affect wound healing.
- Skin and wound care involves careful skin and wound assessment and attention to infection prevention measures while managing the factors affecting wound healing.
- Clinical considerations in wound management also include maintaining adequate moisture, treating oedema and preventing further injury.

10.6 Suggested Further Study

Further study needs to address older persons' skin health as an opportunity to prevent several complications that may otherwise go unaddressed during hospital care. Here are some options:

- Find out where you can access data about wound infection rates nationally and in your unit. How does your unit compare to the national rates?
- Think about how wound care is practised in your unit compared to the recommendations presented in this chapter, national and local guidelines.

- Find out whether skin tears' knowledge translates into improved practice and patient outcomes.
- Write a reflection that includes recommendations for at least one improvement in practice, and develop an action plan.

10.7 Suggested Further Reading

- <https://www.skintears.org/resources>
- <https://ewma.org/>
- https://www.rch.org.au/rchcpg/hospital_clinical_guideline_index/Wound_assessment_and_management/
- https://www.woundsinternational.com/resources/all/0/date/desc/cont_type/45

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Nutrition and Hydration

11

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and Jack Bell

11.1 Introduction

At the ESPEN congress in Vienna 2022, an international declaration to recognise nutritional care as a human right was agreed [1, 2]. Especially in the care of older people, particularly those in hospitals or in long-term care facilities, nutrition and hydration are a fundamental aspect of care. Many older people do not eat and drink adequately during hospital stays and, following hip fracture, many patients achieve only a half of their recommended daily energy, protein, and other nutritional requirements [3, 4]. This leads to poor recovery, diminished health status and physical and functional ability, mortality, and a higher risk of other complications. Optimal nutrition and hydration are central to preventing and managing falls, osteoporosis, fragility fractures, chronic and acute health conditions, and frailty as well as recovery and rehabilitation following injury, fractures, and surgery. If nutritional care is optimised, all other aspects of care are likely to result in better outcomes.

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Across global settings, nurses are ‘best-placed’ coordinators of interdisciplinary nutritional management and care. It is essential, however, that nurses bring other healthcare specialists together as a team to collaboratively provide high-quality care that reflects patients’ needs for assessment, intervention, and health promotion. When an interdisciplinary team (orthogeriatric collaboration) work together care is more successful, improves patient outcomes, and reduces the risk of in-hospital and long-term mortality.

The aim of this chapter is to increase awareness of nurses’ responsibilities, within a multidisciplinary team, for assessment and intervention for nutrition and hydration, examine the issues pertaining to nutrition and fluid balance in older people and outline the nature, assessment, and interventions relating to malnutrition and dehydration.

11.2 Learning Outcomes

At the end of the chapter, and following further study, the practitioner will be able to:

- Identify those at risk of malnutrition and dehydration.
- Prevent complications of poor nutrition and dehydration through effective intervention and health promotion.
- Identify the nurse’s role in coordination of the interdisciplinary team to best meet patients’ needs.

Box 11.1: Malnutrition in Older People: A Case Example

Michael is a 78 year-old wine maker living at home with his wife. Fit and healthy in his younger years, Michael gained a lot of weight after he handed over the vineyard to his son. This was most likely from a combination of reduced physical activity, more regular visits to the local marketplace to purchase baked goods as a substitute for smoking, and his longstanding love of beer as well as wine. Michael now tends to avoid eating meat and his favourite fresh fruits due to poor dentition. In his early 70s, he was diagnosed with chronic obstructive pulmonary disease and Type II diabetes. He is weight stable with a BMI of 37. More recently, his wife had been making some jokes about his very thin ‘chicken’ legs and expanding waistline. It was these same thin legs that could not balance his weight when he slipped on a wet pavement on his way to the market and fell, breaking his hip.

Consider:

Michael is a typical example of people with health problems in middle- and high-income countries. Patients in low-income countries may have nutritional issues depending on local culture and social conditions. Therefore, caregivers must be aware that health problems are often influenced by social and financial factors, but that having a higher income does not necessarily mean that malnutrition is less likely.

11.3 A Healthy Diet for Older Adults

As individuals and populations age, what people eat changes in response to lifestyle, appetite, and health-related factors. Regardless of age, in developed countries, people are now consuming more food high in energy, fats, sugars, and salt than in previous decades. While undernutrition leads to a higher risk for health-related problems, obesity also contributes to increased morbidity and mortality from diabetes, hypertension, and cardiovascular diseases.

A key factor for healthy aging is the selection and preparation of healthy food. This can support the prevention of malnutrition in every form. When considering what is 'healthy', it is important to consider an individual's intake, uptake, and requirements for nutrients. For the case example in Box 11.1 above, an age-related change in appetite combined with dentition problems negatively influenced the intake of protein, essential vitamins, minerals, and fibre. This was further compounded by malabsorption associated with poorly controlled diabetes, and the increased requirements of chronic lung disease, resulting a dual diagnosis of undernutrition and obesity. A careful assessment would identify that Michael has a dual diagnosis of undernutrition and obesity, resulting from high fat and sugar intake, inadequate protein intake, increased nutritional requirements of disease, and reduced uptake of nutrients associated with poorly controlled diabetes [5].

It is essential that healthcare professionals identify the determinants of malnutrition, whether related to deficiencies or excesses in nutrient intake, imbalance of essential nutrients, or impaired nutrient utilisation [6]. Campaigns have been launched in previous years in Europe, the USA, and other countries [7–10], for example, the World Health Organization (WHO) global initiative on the Implementation of Nutrition Action [11]. All these campaigns have had the goal to increase the awareness that nutritional care as a human right is fundamental to improving the quality of care for patients across different settings and stages of life [1, 2].

It is important to focus on the different levels of action that may be taken:

11.3.1 Actioning a 'Healthy' Diet that Is Relevant to Age and Stage

Increasing age, physiological, psychological, and lifestyle changes increase the incidence of chronic diseases, fractures, and disabilities. This is not only a result of changing metabolism or physical circumstances, but also due to lack of knowledge regarding appropriate strategies to prevent and manage malnutrition. This may require a shift in approach regarding what is 'healthy' over time. For example, a low saturated fat, high fibre, energy-deficient diet may have been helpful to promote healthy weight loss for Michael in his 60s; however, optimising nutrition intake towards a nutrition-rich diet should be considered a higher priority with his inadequate protein and micronutrient intake, malnutrition, and recent hip fracture [12].

While the requirement for some nutrients (e.g. carbohydrates and fats) decreases with older age, the requirement for protein, vitamins, and minerals remains stable or increases for protein and vitamin D [13, 14]. Most fragility fracture patients, like Michael, are over the age of 60 years when admitted to hospital where it is essential that patients receive a diet with an appropriate amount of energy, and which is rich in protein, vitamins, and minerals. In the case of suspected weight loss, acute disease or increased requirements to support recovery from fractures and surgery, a diet higher in energy is also often necessary. Moving into rehabilitation and recovery phases, dietary changes should be adapted to the needs of the patient, for example, to decrease the risk of falls, fractures, and osteoporosis, support recovery and healing, and manage comorbidities.

11.3.2 Healthy Nutritional Guidelines for Healthy Older Adults

At the individual level, practitioners should have knowledge about healthy diets for every age group. A rudimentary approach to intake and distribution of macronutrients (carbohydrates, fat, and proteins) considers the following recommendation as an orientation for healthy adults [15]:

Carbohydrates	Fats	Proteins
45–65%	20–35%	10–35%

However, the requirement for macronutrients and micronutrients should be adjusted depending on the individual condition of the patient. According to the WHO recommendations, a healthy diet for healthy adults contains the following key aspects [16]:

- Eat at least 400 g (5 portions) of fruits and vegetables per day.
- Eat less than 10% of total energy intake from free sugars (equivalent to 50 g for a person of healthy body weight consuming approximately 2000 calories per day).
- Eat less than 5 g of salt per day, and preferably iodised salt.
- Eating unsaturated fats (e.g. from fish, avocado, nuts, olive oil) is preferable to saturated fats (e.g. in fatty meat, butter, palm, and coconut oil).

11.3.3 Energy, Protein, and Fluid Requirements

Although the calculation of energy intake for older people varies between countries, it often includes two steps:

- (a) Calculation of baseline energy needs, which depends on age, gender, and general health aspects.
- (b) The physical activity level (PAL) of the person. The PAL in older adults in hospitals is estimated to be between 1.2 and 1.4.

An estimate of recommended baseline energy intake for older people is 30 kcal/kg/bodyweight per day. These minimum requirements are increased for those who are malnourished or with raised requirements associated with increased metabolic requirements or malabsorption. The minimum recommended intake of protein per day is at least 1g/kg/ bodyweight [17]. So, an older person with a bodyweight of 70 kg needs an energy intake of about 2100 kcal and 70 g protein per day. Older people, especially those recovering from fracture and surgery, have fluctuating metabolic needs and practitioners must ensure that sufficient energy and other nutrients are available for recovery and wound healing. Where differences in individual requirements are likely, or if patients need more detail nutritional support, other members of the interdisciplinary team should be involved, such as dieticians. Nurses are often responsible for coordinating the multidisciplinary team in deciding the appropriate amount of energy and protein intake based on the specific condition of each patient. Complex patients like Michael (see Box 11.1) will need additional professional support from a dietician or dietetics expert.

The recommended daily fluid intake for people over the age of 65 years is 2250 mL. This consists of approximately 60% direct fluid (from drinking) and 40% indirect fluid (from food and oxidation) [18]. In the case of kidney or heart disease or other health problems that necessitate restriction of fluid intake, a physician should be involved in estimation of the appropriate amount of daily fluid required. Practitioners must use this baseline information to educate patients and carers about healthy eating and fluid intake.

11.4 Calcium and Vitamin D

Two crucial factors in bone health are calcium and vitamin D; vitamin D is essential for the uptake and absorption of calcium. The daily amount of calcium intake required for people over 65 years depends on country-specific recommendations but should be a minimum 1000 mg [20, 21]. Table 11.1 shows the main sources of calcium with minimum amounts of 250 mg and 100 mg calcium. Other good sources of calcium are milk, salmon, and tofu [21]. If a patient is not able to meet the needs for calcium from their food, they should be prescribed calcium supplements.

Vitamin D is a fat-soluble vitamin that is vital for calcium uptake to bone, especially important in later life. Food contains only a small amount of vitamin D; the main source is sunlight. The production of vitamin D (specifically vitamin D3) takes place in the skin under the influence of ultraviolet (UV-B) light. The

Table 11.1 Dietary sources of calcium [19]

Main sources of calcium (250 g)	Additional Sources of calcium (100 mg)
200 mL milk	100 g broccoli
180 g yoghurt	100 g leguminous plants (dry weight)
30 g hard cheese	300 g granary bread
60 g soft cheese	40 g almonds
200-250 g curd	25 mL calcium-rich mineral water

production of vitamin D is limited where sunshine is depleted, such as in northern Europe and northern North America, particularly during wintertime. The capacity to produce vitamin D decreases in older age by four times, resulting in lower levels [22]. To achieve the recommended amount of Vitamin D it is advised that the hands, arms, and face should be exposed to sunlight for approximately 5–25 min per day [23]. At the same time, age, geographic latitude, air pollution, and other factors influence the appropriate production of Vitamin D in the skin. The blood level of Vitamin D should be checked regularly and, if necessary, supplemented as part of a comprehensive therapy plan. The recommendation for adequate supplementation of vitamin D intake for older people is 800–1000 IU per day [24]. With the reduction of the risk of hip fracture and other fractures in mind, older patients benefit from a combination of Vitamin D and calcium if the level of Vitamin D is low and the intake of calcium is poor [25, 26].

Although nutrition is important in preventing fragility fractures, it is also essential for maintaining the positive effects of weight-bearing activity and exercise training on bone density [27]. Regular physical activity of 30 min per day promotes calcium resorption and supports muscle growth and bone density [28]. Following hip fracture, patients should be encouraged to participate in daily activity as part of their discharge plan, supported by inpatient or outpatient rehabilitation programmes. If patients are independent in activities of daily living and do not suffer from other health problems or disabilities which limit physical activity, additional information about specific exercises and activities should also be provided (see Chap. 8).

11.5 Definitions of Malnutrition and Dehydration

To identify and treat patients with malnutrition or dehydration, practitioners need to know how malnutrition and dehydration are defined. According to NANDA [29], malnutrition is: ‘Intake of nutrients insufficient to meet metabolic needs’. A recent consensus-based definition for the diagnosis of malnutrition (GLIM) comes from the global initiative of clinical nutrition societies [30]. The group defined weight loss, low BMI, and reduced muscle mass as phenotypic criteria and reduced food intake or problems with assimilation and disease burden/inflammation as etiologic criteria. The definition of malnutrition contains at least one phenotypic and one etiologic criterion to be positive (see Fig. 11.1). In the final step, the severity must be measured based on phenotype criterion. The group recommended within a diagnostic process the following procedure for clinical settings:

The definition of dehydration is more complex as it can refer to both loss of body water and volume depletion following the loss of body water; it is suggested [31] that it is defined as a complex condition resulting a reduction in total body water. This can be related to both total water deficit (‘water loss dehydration’) and combined water and salt deficit (‘salt loss dehydration’) due to both too low intake and excessive/unbalanced excretion.

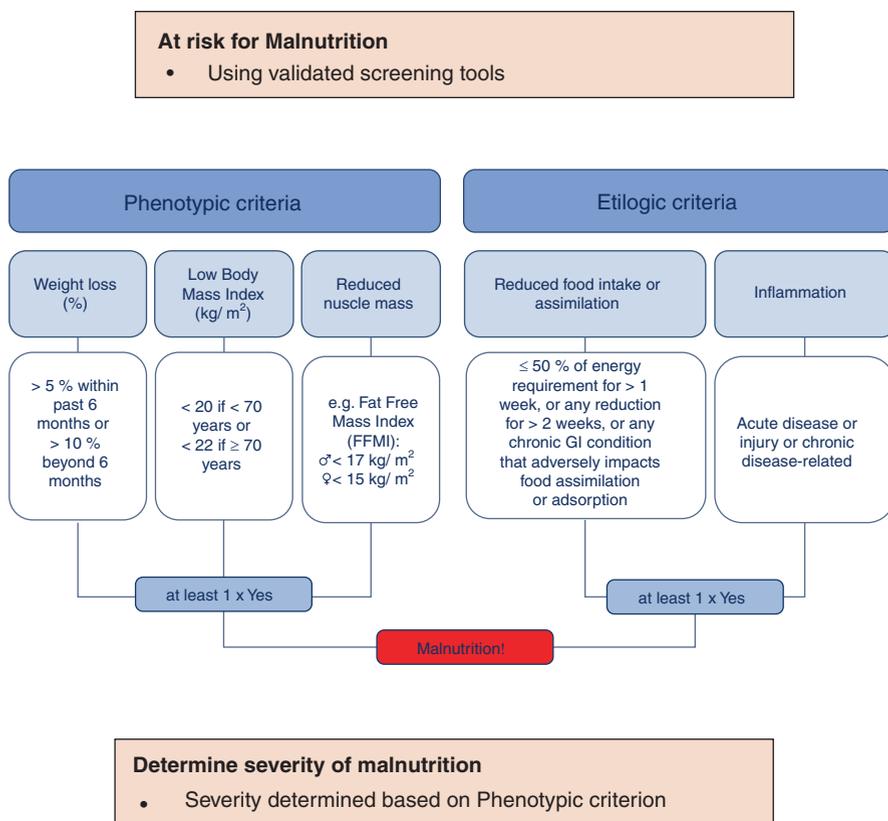


Fig. 11.1 The GLIM criteria for the diagnosis of malnutrition [30]

11.6 Prevalence, Determinants, and Symptoms of Malnutrition and Dehydration

The prevalence of malnutrition in care facilities differs widely depending on location, for example, in geriatric wards the prevalence is higher than on coronary wards [32]. The estimated number of patients admitted to acute hospitals being at risk of malnutrition is approximately 35% with 20–50% [33].

The reported prevalence of dehydration also varies and depends on which definition of dehydration and which research methods are used. It is estimated that 40% of people newly admitted to hospital are dehydrated and 42% of patients who were not dehydrated at admission were dehydrated 48 h later. Because people who live in residential institutions are often very frail, dehydration is estimated to be 46% in these settings [31].

The risk factors for malnutrition vary between clinical settings and patient groups. A theoretical framework for the aetiology of malnutrition does not exist.

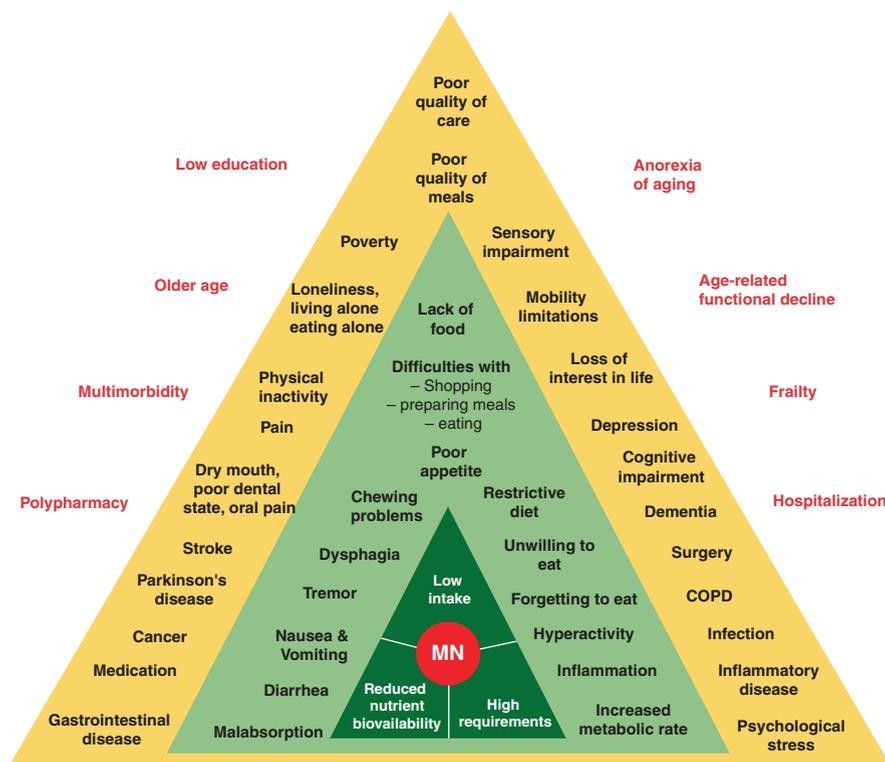


Fig. 11.2 Determinants of Malnutrition in Aged Persons (DoMAP) [34] (reproduced with permission)

The European Knowledge Hub ‘Malnutrition in the Elderly (MaNuEL)’, developed a model for ‘Determinants of Malnutrition in Aged Persons’ (DoMAP) in a multi-stage consensus process with multiprofessional experts in geriatric nutrition (see Fig. 11.2) [34].

- The main etiologic mechanisms are placed in the middle of the model (level one, dark green).
- The factors in the light green triangle (level two) are the determinants which directly lead to one of the main factors, for example, as hyperactivity leads directly to high requirements.
- The third level (yellow) contains determinants which indirectly lead to one or more central mechanisms through factors in level two. For example, a side effect of medication may lead to poor appetite and to a lower intake.
- Around the pyramid are typical age-related factors, which additionally influence the process of malnutrition. Some factors, such as hospitalisation or polypharmacy, might be starting points for developing malnutrition.

Other factors like frailty or multimorbidity may progressively worsen the nutritional status of older adults. The symptoms of malnutrition vary and may manifest as weight loss, low energy levels, lethargy, low mood, depression, cognitive decline [35], delayed wound healing, diarrhoea, limited/reduced muscle tone (sarcopenia), and/or lack of interest in, or aversion to, eating/drinking [36].

The signs of dehydration are seen earlier than malnutrition; common symptoms include increasing heart rate, diminished urine output, nausea, dry lips, spasm, unexplained mental confusion [37] and, sometimes, pale mucosa [38].

11.7 Screening and Assessing for Malnutrition

Screening and assessment for malnutrition should be conducted with a validated instrument. Examples of validated instruments are [39, 40]:

- 3-min nutrition screening (3MinNS).
- Nutritional Risk Screening 2002 (NRS-2002).
- Mini Nutritional Assessment (MNA).
- Malnutrition Universal Screening Tool (MUST).
- Malnutrition Screening Tool (MST—cut off >2).
- Unwanted weight loss (more than 5% in the last 3 months).

The selection of an appropriate and validated screening instrument should be made according to the clinical setting and with common underlying health issues in mind. Multidisciplinary teams should also be collaboratively involved in the decision and implementation process to increase the rate of acceptance and use of the selected instruments.

The implementation of screening and assessment should lead to a structured process of identification of those at risk of malnutrition. The process should follow two steps:

1. Screen everyone within 24 h of admission to identify those at risk or with the diagnosis of malnutrition.
2. Assess all those identified as at risk to provide a comprehensive understanding of the problem to enable planning of appropriate interventions.

If a patient is at risk of malnutrition, or already malnourished, the information obtained from screening and assessment should be used to achieve a comprehensive understanding of the individual issues as part of the Comprehensive Geriatric Assessment (CGA) process (see Chap. 6) to facilitate an individualised plan for avoiding or treating malnutrition.

Regarding Michael's situation, the following steps should be undertaken (see case study Box 11.1):

- Involvement of his wife and other carers to understand and assess his nutritional status and needs.

- Collaboration with members of the interdisciplinary team such as dieticians, physicians, dentists, or physiotherapist.
- Discuss with Michael, his wife and other carers about nutritional-related goals and development of an individualised intervention plan.
- Set a follow-up appointment to evaluate the effectiveness of the intervention plan
- Other general actions may include:
- In case of end-of-life care, the application of artificial nutrition should be discussed in respect to the principles of bioethics including beneficence, non-maleficence, and justice with full consultation the patient, his relatives, and the interdisciplinary team (Chap. 17)
- Ensure continuity of nutritional care throughout hospital, rehabilitation, and home care.

11.8 Evidence-Based Interventions to Prevent and to Treat Malnutrition

Malnutrition, or risk of malnutrition, should be approached as a multifactorial problem. It is important that interventions to prevent malnutrition begins with recording a nutrition history and monitoring the patient's food intake during the first days after admission. The ESPEN guideline for clinical nutrition and hydration in older persons provides evidence-based recommendations for preventing and/or treating malnutrition and dehydration [17]. The treatment of malnutrition involves several specific aspects:

11.8.1 Arrangements for Food and Meals

- Meals in hospitals and, particularly, in long-term care facilities, are often tasteless. To improve the taste, practitioners should liaise with those responsible for the cooking of meals.
- Changes in the nature and variety of food or the use of flavoursome sauces are simple and cheap ways to improve taste.
- As well as the usual timed meals, snacks should be offered by staff or, as self-service, made easily accessible for patients over 24 h. Food should reflect the patient's preferences.
- For those with physical or psychological difficulties with eating, assistance should be provided with the use of appropriate aids (e.g. large handles on cutlery, coloured glasses for visually impaired patients) to help increase independence.
- Where there are specific problems such as difficulty swallowing or poor dentition, other professionals should be involved as physicians, speech therapists, and dentists to address the problem [41].

11.8.2 Dietary Supplementation

- Patients with difficulties eating adequate amounts of food should be offered multi-nutrition supplements with at least 400 kcal/day including 30 g or more of protein/day [17].
- Dietary supplements (enteral nutrition) are liquid foods that are used to improve nutritional intake [42]. This is particularly important in frail older people in the perioperative period as there is evidence that dietary supplements, especially for older patients with hip fractures, have a positive effect on quality of life and help to reduce complications [17, 43, 44].
- To support muscle strength gain during recovery and rehabilitation, high-protein supplements should be combined with muscle resistance training exercise with the physiotherapy team (Chap. 8).
- Patients should be informed about the reason for supplementation and be asked about their preferences in the taste or temperature of the supplement.
- If patients have intolerances or problems eating and drinking because of the taste, a dietician should be involved.
- Physicians should be reminded of the need for vitamin D supplementation.
- Providing information material about healthy diet and fluid intake in older age, particularly about the requirement for minerals and vitamin D, is essential during discharge management.

11.8.3 Interaction during Mealtimes

- Patients are often highly dependent on the help of nurses and other care givers, especially those with cognitive or functional decline who are already at risk of malnutrition. Practitioners must, therefore, consider individual needs for support with eating.
- Creating a culture in which mealtimes are periods of calm with as few interruptions as possible can increase the likelihood of adequate intake [45]. It is also important that enough help is available at mealtimes to support eating and that families are encouraged to be involved.

11.8.4 Environmental and Personal Requirements

- The environment in hospitals and residential facilities can be unfamiliar and impersonal. Mealtimes are important human interaction opportunities normally conducted in pleasant, comfortable surroundings conducive to appetite.
- Nurses and other practitioners should involve support workers, volunteers, and families in creating a pleasant environment for eating, considering issues such as adequate table decoration adapted to the seasons to help patients to be more orientated, feel more comfortable, and increase the likelihood of them eating adequately [46].

11.8.5 Education, Support, and Guidance

- Patients and families can be unaware of the risk of malnutrition, malnutritional diagnosis, and the consequences of malnutrition.
- Education, information, support, and guidance are important in engaging patients and carers in eating well. Information needs to be individualised and can be provided in a variety of ways. Some people prefer written information (e.g. leaflets, visual aids, or posters), while others prefer technological approaches such as apps on smartphones and/or Internet-based information.
- A good source for evidence-based information are the websites of the country-specific nutritional societies (e.g. nutrition care in accreditation or clinical care standards/comprehensive care standards) [47].

11.8.6 Medication Review

- The medical doctor should regularly check the medical management of conditions adversely influence nutrition, for example, nausea, vomiting (see Chap. 6, CGA).

11.8.7 Quality Management

- Hospitals, and specific units where care is provided to older people, should review their structures and processes of nutrition management in order to identify neglected aspects.
- The implementation of high-quality nutritional management in a hospital should be based on well-evaluated nutritional programs [48].
- The process of implementation and evaluation of the nutritional program can be supported by a hospital wide quality improvement system along the PDCA process ('Plan, Do, Check, Act').

11.9 Hydration and Dehydration

Dehydration is common among hospitalised older adults with significant adverse consequences. The screening of those at risk of dehydration is challenging because of the unspecific symptoms and how rapidly it develops. Box 11.2 lists the main risk factors for dehydration.

11.9.1 Screening and Assessing Patients with Dehydration

To identify people at risk of dehydration, practitioners should follow the same procedure as for the risk of malnutrition. However, unlike malnutrition, there are no

validated screening tools, so nurses need to use their knowledge and skills to make individualised assessments by:

1. Screening all patients within 24 h of admission to identify risk factors for dehydration.
2. Assessing all patients at risk to enable a comprehensive understanding of the problem and plan appropriate measures.

Box 11.2: Risk Factors for Dehydration

- Low BMI
- Depleted thirst
- Dependent on care
- Cognitive impairment
- Frailty and comorbidities
- Neurological deficits such as hemi- and paraplegia
- Dysphagia
- Constipation, diarrhoea, vomiting, and incontinence
- Fear of incontinence and reluctance to drink
- Taking potassium-sparing diuretics

As well as considering the risk factors identified in Box 11.2, criteria for positive risk screening of people for dehydration may include [40]:

- Fatigue and lethargy
- Not drinking between meals
- BIA (bioelectrical impedance analysis) resistance at 50 kHz (BIA assesses electrical impedance through the body commonly from the fingers to the toes and is often used to estimate body fat)

Additional screening tests with limited diagnostic accuracy include:

- Decreasing drink intake
- Diminished urine output
- High urine osmolality
- Low axilla moisture (dry armpits)

11.9.2 Assessment and Further Action

If the patient is dehydrated, or at risk of dehydration, screening should achieve a comprehensive understanding of the underlying issues and generate a care plan of appropriate measures to treat or prevent dehydration. This should include:

- Close monitoring and recording of both fluid intake and urinary and other fluid output such as vomiting or wound drainage.
- Ensure toileting facilities are easily accessible, and if not, or patient's physical activity is limited, use aids such as urine bottles or commodes. Patients who have difficulty reaching the toilet are more likely to restrict their fluid intake.

- Involvement of the patient and family/carers in the assessment and plan of care, including encouraging fluid intake of approximately 2.0 L/day for women and 2.5 L/day for men of all ages (from a combination of drinking water, beverages, and food) if not contraindicated.
- Involvement of other members of the team such as physicians and ensuring that the whole of the nursing team, including support workers/carers, are aware of the risks and the need to closely monitor fluid intake and supplement as required.
- Discuss with patients and their family/caregivers the risks, plan of care and aims of care in terms of volume of fluid required and engage family in supporting the aims.
- Ensure the problem is included within the discharge plan.

11.9.3 Evidence-Based Interventions to Prevent and Treat Dehydration

Patients' oral fluid intake is often inadequate, especially early in the patient pathway while fasting and undergoing perioperative preparation. It is essential to closely monitor and document fluid intake and output and to supplement intake, where necessary, with intravenous fluids.

Prevention aims to ensure the availability of drinks that are pleasant to drink and that patients and families understand the necessity to drink. Support and help are needed to facilitate adequate intake of oral fluids with the following advice in mind [49]:

11.9.3.1 Availability of Drinks

Drinks should be constantly and easily available. Frequent regular drinks 'rounds' should take place; to support nurses and other care givers, volunteers, or assistants may be given responsibility for this activity. Care giving activities can act as prompts to support patients with drinking oral fluids such as during medication rounds.

11.9.3.2 Drinking Pleasure

Taking pleasure in drinking depends on individual preferences including types of fluid, temperature, and flavour. Asking patients/families about preferences and considering factors that can support fluid intake such as reminders to drink and social interaction can be useful.

11.9.3.3 Support and Help to Drink

Offering individualised support to patients to help them to drink can encourage adequate fluid intake. This should be done in a friendly, unhurried, and calm manner using appropriate drinking aids such as straws and special cups or with bottle-clipped systems. Families often feel helpless but may be able to help with drinking so that they feel involved and useful. Family members can be offered information including how to recognise dehydration and how to help with drinking.

11.9.3.4 Monitoring and Understanding of the Necessity to Drink

Nurses and other care givers should provide appropriate information so that patients understand the benefit of adequate fluid intake. Accurately monitoring and recording intake and asking patients/families about the baseline daily fluid intake are essential. All involved the need to be aware of the outward signs of dehydration such as:

Diminished urine output and concentrated urine.

Dry lips, mucous membranes, diminished skin turgor.

Muscle weakness, dizziness, restlessness, headache.

Summary of Main Points for Learning

- The care process begins with screening and monitoring of the nutritional status and fluid intake of all older people within 24 h of admission.
- In the case of a positive screening, a comprehensive assessment and involvement of other team members should undertake to understand the underlying problem.
- Appropriate food and appealing meals, snacks and drinks for older people should be available and offered with recommended amounts of energy, protein, vitamins, minerals (particularly calcium), and water; this should be complemented with supplementary drinks if intake is not adequate.
- The prescription of vitamin D and calcium should be discussed with the patient's physician.
- Patient-centred and evidence-based information should provide and interventions in the case of end-of-life care should be appropriate discussed.
- Educating, informing, and involving patients and families increases their level of health literacy.
- Malnutrition and/or dehydration management should be included in the discharge plan.

11.10 Suggested Further Study

Access and read the following review paper. Make some notes about ways in which the paper's conclusions could impact on your practice and that of your team:

- Sauer A et al. (2016) Nurses needed: Identifying malnutrition in hospitalized older adult. *Nursing Plus Open* <https://doi.org/10.1016/j.npls.2016.05.001>

Use the following open access book as a reference guide for your further study of this topic:

- Geirsdóttir, Ó.G., Bell, J.J. (eds) *Interdisciplinary Nutritional Management and Care for Older Adults. Perspectives in Nursing Management and Care for Older Adults*. Springer, Cham. https://doi.org/10.1007/978-3-030-63892-4_1

Find out what nutritional guidelines are available in your own region. Read them carefully and think about how these could be used to develop simple strategies for improving diet and fluid intake in your patients and discuss this in your team.

Undertake an audit of nutrition and fluid charts of patients who are at risk of malnutrition or dehydration. Discuss with the team, including a dietician, whether you are adequately recording intake and output. Reflect on its implications, and what you could do to improve this practice.

Develop an information leaflet for patients/families about why and how patients can make sure they get enough to eat and drink. Discuss this within the team.

Talk with patients/carers/staff about the things they feel that prevent good diet and fluid intake for patients. Reflect on what these conversations suggest about how practice might be developed to improve patient's nutrition and hydration status.

11.11 How to Self-Assess Learning

To identify learning achieved and the need for further study, the following strategies may be helpful:

- Examine local documentation of nursing care regarding nutrition and hydration and use this to assess your knowledge and performance.
- Seek advice and mentorship from other expert clinicians such as dietician and seek their help to keep up to date on new evidence and disseminate to your team.
- Peer review with colleagues can be used to assess individual progress and practice but should not be too formal.
- Therefore, modern methods of education like training on the job or training near the job should be used. Staff are able to learn more easily within this non-formal environment new expertise in certain topics. Furthermore, these training methods support an environment in which an open discussion is possible.
- Weekly case conferences regarding patients like Michael with nutrition or hydration problems are also good options to identify nurse-focused issues and enable the exchange of expertise. Expertise is conveyed to the various members of the multidisciplinary team by educational initiatives and by fostering a culture where all the patients' problems are considered.
- The implementation of a quality improvement system helps to identify neglected areas of action. The systems support the work along patient-related processes.

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Delirium and Other Altered Cognitive States

12

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12.1 Introduction

Delirium is a common complication following surgery, particularly for older adults. Often described as an ‘acute confusional state’ it can be hard to detect, treat, and manage. Healthcare practitioners’ knowledge around delirium care can often be limited. This chapter aims to provide an overview of delirium, its assessment, and its management and how it can impact patient recovery following fragility fracture.

12.2 Learning Objectives

At the end of this chapter, and following further study, the practitioner will be able to:

- Describe what delirium is and the subtypes of hyperactive, hypoactive, and mixed delirium.

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- Gain insight into the experience of delirium for the patient, loved ones, and practitioners.
- Identify patients at increased risk of developing delirium and have an awareness of preventative strategies.
- Apply evidence-based tools to assist in diagnosis and assessment of delirium.
- Instigate an interprofessional investigation to highlight the triggers of delirium and necessary treatments/actions.
- Identify management strategies and care priorities for the patient with delirium.
- Discuss the medication possibilities within delirium management.
- Articulate the similarities and differences between delirium, dementia, and depression.
- Identify the impact of an acute confusional state (delirium) on the ability to provide informed consent and maintain self-advocacy.

12.3 Delirium

Delirium is a neuropsychiatric syndrome that manifests as an acute decline of attention and cognition when a person is medically unwell. Despite advances in the understanding of delirium physiology, its mechanisms, pharmacology, and assessment, there has not been a significant improvement in delirium management globally, so it still remains a challenging worldwide problem [1]. Delirium often highlights the existence of medical issues within the patient, making its investigation imperative. There are also many undesirable consequences associated with delirium as shown in Box 12.1.

Seen in both the medical and surgical hospital settings, studies have shown a prevalence of delirium in hospital patients of 32% in Europe (increasing to 68% in intensive care units), 40% in the USA, 17% in Asia, and 12.3% in Africa [2–6]. There is limited data on the prevalence and outcomes of delirium in low- and middle-income countries, despite their medically and socioeconomically vulnerable patient populations; so it is assumed that the prevalence may be higher than the numbers available from research reports.

Rates of delirium are very high among surgical patients. A meta-analysis revealed the global prevalence of postoperative delirium to be 20% [7, 8] reaching as high as 60–65% in patients undergoing surgery for fragility hip fracture [9, 10].

It is estimated that approximately 20–80% of cases of delirium go undiagnosed or unassessed [11–13]. Detection is particularly low if patients present with hypoactive delirium or also have pre-existing dementia. This is especially relevant because the inability to detect delirium implies an increased risk of negative patient and institutional outcomes (See Box 12.1). If practitioners are not assessing for delirium, they are likely also to be missing the opportunity to prevent its occurrence.

Box 12.1: Consequences of Delirium

- More hospital-associated complications (such as pressure injuries and falls) [14].
- Increased stay in hospital or need for high dependency/critical care in hospital [14].
- Restrictions in motor functionality [6].
- Increased mortality rate [1].
- Increased incidence of cognitive decline or impaired cognitive functions [15].
- More likely that the patient will not return to their premorbid baseline function and will require long-term care/support on discharge (increased chance of discharge to an institution rather than return home) [2].
- More likely to die in the short and long term [14].

Globally, healthcare costs associated with delirium are considerable: €182 billion per year in Europe, \$164 billion in the USA [16], \$8.8 billion AU in 2016–2017 in Australia [17] and \$961,131 CAD in 2012 in Canada [18]. Better prevention and management of delirium would not only improve patient and institutional outcomes but could also relieve some healthcare financial burden.

12.4 The Experience of Delirium

Caring for someone who has delirium can be challenging. Caregivers cannot fully understand what the person suffering from delirium is experiencing. As patients with delirium can often be resistant to treatment, having some insight into their direct experience can help in understanding how best to manage those suffering from delirium, how best to help their loved ones feel less anxious, and how to empower practitioners to feel confident in their caregiving.

12.4.1 Patient Experience

Often the experience of delirium is described as a waking dream, or nightmare, where the world around the patient is confusing, odd, and unexplained but feels very real. There is a lot of fear as many experience the feeling of threat, persecution, and conspiracy. This knowledge helps in understanding why a patient may behave in certain ways and gives insight into what behavioural approaches may be the most appropriate. It may also help us spot delirium earlier, thus prompting medical management sooner. It can be appropriate to ask the patient what they are experiencing to gain a better understanding of their experience and how best to provide care. Patients may not disclose what they are experiencing unless asked. It is imperative that practitioners provide reassurance to the patient that they are going to keep them safe.

'I believed everything that I now know I was imagining but at the time, I believed it 110%.... But up until that moment it was fact and although they told me it wasn't happening I thought they are in with everybody else' [19]

'...my experiences [of delirium] changed and developed. The episodes of delirium I experienced ranged from absolute terror and fear; through anger, the unnerving and bizarre; to paranoia, the annoying, interesting and, with hindsight, the vaguely funny'. [20]

12.4.2 Loved Ones Experience

It is also vital to acknowledge the experience of the loved ones of the patient with delirium. Often naïve to what delirium is and how it may present, witnessing a delirious episode can be very alarming for the patient's family members, partners, and friends. Acknowledging this allows practitioners to empathise with the loved one and consider how to best support them.

'I suppose I just learnt with my Dad that it comes in all shapes or forms; it was very, very confusing. He did not recognise me which I would say even against the episodes where he was seeing rats and spiders crawling over people and up walls, I think probably the most distressing thing was not being recognised by my dad, that was the first time I ever experienced anything like that' [19].

Loved ones can be vital in helping healthcare professionals spot delirium and monitor its progress. It is important to heed comments by family members about any changes in behaviour.

'I'm not an expert in this area, but I could see he was not himself' [21].

12.4.3 Healthcare Professionals Experience

The act of caring for someone who is delirious should be valued as an experience worthy of understanding. Caring for someone who is delirious can be unpredictable. Practitioners can feel uncertain and unprepared to take on this aspect of care, especially when it comes in addition to an already busy workload.

'When we actually have a delirious patient, and nothing seems to be working. I don't know what would be better, I guess, and that's what makes it very frustrating because you feel very helpless'. [22].

12.5 Delirium Screening and Assessment

Delirium is a common complication in patients who have a fragility hip fracture and following surgery. As in other populations, patients who develop delirium have poorer outcomes when compared to those who do not [2, 3]. The good news is that the factors that increase a person's risk for developing delirium are well known and

nurses and other caregivers are ideally positioned to mitigate risk of delirium by screening for risk factors on admission and beyond. Factors that contribute to the development of delirium are commonly divided into two categories: predisposing and precipitating.

Predisposing risk factors are those that are present on admission and tend to be non-modifiable. The most significant predisposing risk factor for delirium is dementia, considered an independent predictor for delirium. Other examples of predisposing factors include advanced age, sensory impairment, and functional dependence.

Precipitating factors often occur as a consequence of hospitalisation and illness and tend to be modifiable. Examples of precipitating factors include sleep deprivation, medications, immobility, and severity of illness. The greater the number of predisposing factors, the fewer precipitating factors needed to create a delirious episode. Table 12.1 provides a list of common predisposing and precipitating risk factors [23].

Several studies have demonstrated that, with early identification of risk and prompt initiation of prevention strategies, as many as 30% of cases of delirium can be avoided or the severity ameliorated [22, 24, 25]. In the acute care setting, prompt identification of baseline mental status and predisposing risk factors for delirium should be part of the nursing admission process.

While often not possible in the case of hip fracture; for older adults undergoing elective surgery, it is advisable to complete a robust geriatric assessment to identify and optimise baseline vulnerabilities prior to surgery. Often known as a Comprehensive Geriatric Assessment (CGA) (See Chap. 6 for more information about CGA), when used preoperatively this assessment has shown to improve patient and clinic outcomes [9].

Table 12.1 Common predisposing and precipitating factors for delirium

Predisposing risk factors	Precipitating risk factors
<ul style="list-style-type: none"> • Age and frailty 	<ul style="list-style-type: none"> • Unfamiliar environment
<ul style="list-style-type: none"> • Dementia or cognitive impairment 	<ul style="list-style-type: none"> • Sleep deprivation or day/night disorientation
<ul style="list-style-type: none"> • Depression 	<ul style="list-style-type: none"> • Loss of sensory aids/clues
<ul style="list-style-type: none"> • History of delirium 	<ul style="list-style-type: none"> • Physical restraints
<ul style="list-style-type: none"> • Severe illness or injury (especially hip fracture) 	<ul style="list-style-type: none"> • Constipation
<ul style="list-style-type: none"> • Polypharmacy 	<ul style="list-style-type: none"> • Urinary retention
<ul style="list-style-type: none"> • Malnutrition or dehydration 	<ul style="list-style-type: none"> • Immobility
<ul style="list-style-type: none"> • Functional dependency 	<ul style="list-style-type: none"> • Acute illness (e.g. infection, AKI, or MI)
<ul style="list-style-type: none"> • Sensory impairment 	<ul style="list-style-type: none"> • Untreated pain
<ul style="list-style-type: none"> • History of excess alcohol intake 	<ul style="list-style-type: none"> • Use of analgesics and other medications
<ul style="list-style-type: none"> • History of chronic benzodiazepine, opioids, or illicit drug use 	<ul style="list-style-type: none"> • Alcohol/nicotine/benzodiazepine withdrawal
	<ul style="list-style-type: none"> • Limited or lacking communication with family

12.5.1 Screening for Risk Factors Predictive of Delirium

Cognitive screening can be problematic in emergency/urgent care where time is limited, especially where best practice relies on patients proceeding to surgery as soon as possible. There are several ‘rapid’ tools and questions that can assist in identifying those with cognitive impairment and increased risk for delirium. Asking the patient (or family) if they ‘have any memory problems’ is important. Listening to how questions are answered can also provide clues to baseline mental status. The Single Question in Delirium (SQID) is a rapid screening for delirium. It involves asking the patient and or family: ‘...have you felt more confused lately?’

The Delirium Elderly at Risk screening tool (DEAR) is an easy-to-use admission risk screen that has been validated in both elective and emergent orthopaedic populations [26, 27]. The DEAR consists of five predisposing risk factors: advanced age (≥ 80), history of cognitive impairment, use of sensory aids, functional impairment, and chronic benzodiazepine or alcohol use. Including a risk screen in nursing admission assessment provides an opportunity to initiate strategies to prevent or ameliorate the severity of delirium. Those identified with cognitive impairment and high risk for developing delirium should then be supported with prevention interventions specific to their risk. A more detailed assessment and ongoing monitoring for signs and symptoms of delirium will then assist in developing an optimal plan of care.

12.5.2 Assessment for the Presence of Delirium

The Confusion Assessment Method (CAM or ICU CAM) is considered the ‘gold standard’ for assessment and diagnosis of delirium. An abbreviated version, the bCAM consists of four questions that identify behaviours associated with delirium shown in Fig. 12.1. According to the bCAM training manual, for a patient to meet criteria for delirium, they must positively display features 1 AND 2 and EITHER feature 3 AND/OR 4. This tool requires staff to be educated on its use and studies have shown that it is poorly utilised by nurses [27].

The ‘4AT’ is a brief, easy-to-use, validated tool used to assess for moderate to severe cognitive impairment and the presence of delirium with little training needed [28]. It is sometimes preferred to the ‘abbreviated mental test score’ (AMTS) and is free to use and download (www.the4at.com). It can be used for both initial screening and as a daily assessment tool to monitor delirium. It allows assessment of patients with severe drowsiness or agitation. The four questions contained in the 4AT are as follows:

1	2	3	4
Altered mental status or fluctuating course	Inattention	Altered level of consciousness	Disorganised thinking

Fig. 12.1 bCAM abbreviated confusion assessment method questions [27]

1. Alertness: How awake is the patient? Are they easily awoken?
2. AMT4 (an abbreviated version of the AMT). Ask patient to recall:
 - (a) Where are you now?
 - (b) What is your birthday? (day, month, year).
 - (c) How old are you?
 - (d) What is the current year?
3. Attention: List months of year backwards starting with December.
4. Acute Change or Fluctuating Course: Has the patient experienced any hallucinations, paranoia, exhibiting strange behaviours, or acting ‘not quite right’?

The nursing delirium screening scale (NuDESC) [29] is also an easy-to-use tool to identify delirium based on observation of five features: inappropriate behaviour, inappropriate communication, illusions/hallucinations, and psychomotor retardation. Each item is scored based on its severity (0 = absence, 1 = mild, and 2 = severe), and a score equal to or greater than two indicates delirium.

Table 12.2 provides a sample of the variety of screening and assessment tools available. When selecting a tool, it is important to review the complexity, time, and training required to complete as well as the setting and population of patients where will be used.

In the fast-paced acute care setting, it is especially challenging to tease apart normal vs abnormal behaviour in patients admitted with pre-existing cognitive impairment. Often, abnormal behaviour is attributed to pre-existing dementia which contributes to the large number of missed cases. In addition, delirium presents in a variety of ways (See Table 12.3). The hyperactive subtype is the most easily recognisable but sometimes misdiagnosed as agitated dementia or a psychotic disorder. The hypoactive subtype is easily overlooked as the patient is not demanding of nursing time or attention. This subtype is most often misdiagnosed as lethargy or slow recovery from anaesthesia. There are times when the patient may exhibit behaviours that fluctuate between the two, referred to as the mixed subtype.

In cases where the patient may be suffering from subsyndromal delirium—a milder state characterised by the presence of certain delirium symptoms but without meeting full diagnostic criteria thresholds—the most valuable assessment comes from the family who are best positioned to pick up on subtle changes. Comments from the family such as: ‘My Mother is normally confused, but this is different’,

Table 12.2 Overview of common delirium assessment tools

Select delirium risk screening and assessment tools					
Name	# of questions	Time to complete	Population tested	Risk for delirium	Presence of delirium
SQID	1	<1	Mixed	X	
DEAR	5	2–3	Surgical	X	
bCAM	4	5–7	Surgical		X
4AT	4	2–3	Mixed	X	X
NuDESC	5	1–3	Surgical		X

Table 12.3 The subtypes of delirium

Hyperactive	Hypoactive	Mixed
Agitation	Lethargic	Fluctuates between
Disorientation	Quiet	Both hyper and hypo
Hallucinations	Drowsy/unusually sleepy	
Delusions	Delusions and hallucinations but presented much more subtly	
Hypervigilant	Withdrawn	
Restlessness wandering/pacing	Not interested in eating, moving, talking	
Combative	Appears calm	

‘My Father is not acting like himself’, and/or comments from the patient themselves suggesting confusion or disorientation should trigger further investigation.

For those hospitalised patients who are at increased risk, as well as those who may develop delirium during hospitalisation, medical management by a geriatrician/physician is recommended. Oversight by a clinician with geriatric expertise will help guide the team on ways to ameliorate delirium severity and aid in the referral for a more comprehensive geriatric assessment after discharge.

Growing sophistication of electronic medical record programmes provide an opportunity for consistent electronic monitoring of risk factors from information entered on the patient’s condition during hospitalisation. Moon et al. [29] reported the sustained high predictive ability of their automated process to identify delirium in hospitalised older adults, the Auto-DELRAS.

Not to be overlooked is the practitioner’s clinical judgement as a valuable ‘tool’ in identifying those who may be developing or suffering from delirium. When in doubt, since delirium is a geriatric emergency, it is best to err on the side of delirium rather than ignoring subtle changes. Nurses and other caregivers should be encouraged to trust their instincts /clinical judgement even if all the criteria for delirium on an assessment tool are not present. Care management strategies for those at risk or those suffering from delirium are not harmful and potentially improve care even in the absence of delirium. Interventions may include involvement of family, reorientation/reassurance, sensory aids in place, mobility, assessing and addressing pain, monitoring for constipation/urinary retention, and others.

12.6 Managing the Delirious Patient

Using a tool to identify delirium is only helpful if repeated and supported with a detailed assessment of the patient’s condition. The 4AT, for example, can provide a diagnosis but it does not provide details about the severity or duration of the delirium and, importantly, its causes. Once diagnosed, the patient requires rapid intervention to identify the cause (or causes), initiation of treatment, and close monitoring.

In addition, the patient will need ongoing supportive care. In all the aspects of delirium detection and management, it should be stressed that a multidisciplinary approach is vital.

12.6.1 Initial Actions and Investigations

Once delirium has been diagnosed actions should be taken immediately to discover the causes of the delirium. This will allow treatment and interventions to take place as soon as possible with the aim of preventing the delirium escalating and to aid in its resolution. Some institutions have suggested a time window in which these initial actions should take place (e.g. 4 h from time of diagnosis).

12.6.1.1 Review of Medical Causes

A review of the medical causes of delirium should always be seen as a multidisciplinary review where investigations are taken on by the relevant healthcare professional or team. While there may be some more obvious medical causes for delirium, it is suggested that a full medical review is completed to ensure no potential triggers are missed. This should take place alongside ongoing Comprehensive Geriatric Assessment (Chap. 6). There are several mnemonics used as aide-memoires for delirium, one of which is DELIRIUM. There are many other mnemonics for delirium (such as 'PINCH ME'—Pain, Infection, Nutrition, Constipation, Hydration, Medication, Environment [30]), and there will be relevant alternatives for different languages. While not exhaustive of all the potential causes, it is a good starting off point to run through.

D—Drugs? Dehydration?

E—Electrolytes disturbances?

L—Lots of pain?

I—Inflammation? Infection?

R—Respiratory failure (hypoxia/hypercapnia)?

I—Impaction of stool (constipation)?

U—Urinary retention?

M—Metabolic disorder (liver/renal failure, hypoglycaemia)/MI?

It is worth also considering alcohol withdrawal, nicotine withdrawal, psychiatric or psychological issues and whether the patient's basic physical needs are addressed: are they hungry, thirsty, need to use the toilet, do they have their glasses/hearing aids? While usually not the causal factors of delirium, these may add to the experience and severity of a delirium.

By going through this review, the delirium trigger (or often triggers) can be identified which then leads on the informed medical treatment plan. Delirium triggers should be constantly reviewed however as a patient may develop additional triggers over time (e.g. a post-op infection which takes 48 h to present, constipation following several days of morphine or urinary retention following urinary catheter removal).

12.6.1.2 Falls Assessment

Delirious patients are more likely to fall; patients over the age of 65 years with delirium have a 30% risk of falling compared to 10% of their non-delirious counterparts [31]. A prompt falls risk assessment should be completed with the emphasis on reducing risk. A low bed, bed alarms, or enhanced observation should be employed to help maintain a safe environment. In the patient who is agitated and wandering, physical restraint is never appropriate; a patient is more likely to settle if allowed to mobilise with support and supervision to maintain safety. The use of bed rails is always discouraged as they act as a barrier that can frighten or agitate the patient further, increasing the risk of them climbing over the rails and falling from a greater height; close monitoring is more effective. The prevention and management of falls are considered in detail in Chap. 4.

12.6.1.3 Inform Family

Early contact with the patient's family can be the single most effective intervention to assist the healthcare team in the management of the delirious patient. It allows families to feel involved in care, helps reduce stress, and provides an opportunity to seek help in managing the delirium. The presence of a relative, friend, or carer can be calming, facilitating interventions, and relieving the need for close observation by a healthcare team member. This must, though, be done with caution; the presence of a relative with the patient does not reduce the overall risk from delirium, so regular observation and detailed instruction is needed to ensure any change in condition is acted on promptly and appropriately.

12.7 Non-pharmacological Care Interventions

Informed and sympathetic patient care is paramount within delirium management in addition to daily medical and nursing duties (i.e. medication rounds, checking observations). There are several non-pharmacological interventions which practitioners can adopt which can not only improve the patients experience but also improve the experience of the healthcare professional caring for that patient. As stressed before, while delirium care is largely undertaken by nurses, the multidisciplinary team should be aware of how best to support a patient with delirium. The 'Hospital Elder Life Program' (HELP) is an example of a system of patient support that aims to maintain cognitive and physical function during hospitalisation and maximise mobility on discharge, helping with discharge and avoiding hospital re-admission [32]. There are also other, more general geriatric models which could be considered when looking at delirium care in hospitals include the 4Ms Model of Care and NICHE (Nurses Improving Care to Health System Elders). All focus on regular monitoring and intervention. A summary of suggested delirium care interventions can be seen in Box 12.2. These interventions should be regularly completed in addition to daily reviews of delirium triggers and treatment plans.

Box 12.2: Suggested Interventions for Delirium Care

- Regular reassurance and compassion. If appropriate, explain delirium to the patient to help them understand their experience.
- Daily orientation to time, date, place (verbally by staff and visible clock, orientation board, etc.).
- Adapt communication (consider simple, clear instructions, or information) and consider methods such as the VERA framework [33].
- Regular updates on surgical/medical plans (when this does not cause distress).
- Early mobilisation (maintaining function/normal routine as much as possible).
- Hearing /vision adaptations (ensuring hearing aids, glasses, etc.).
- Sleep hygiene (promoting day/night routine to promote usual routine, reduce noise and patient contact at night where possible).
- Regular visits from friends and family and availability of familiar objects such as photographs (to promote orientation and enable meaningful engagement between patient and staff).
- Reduce unnecessary moves within the hospital where possible.
- Ensure adequate nutritional and fluid intake (offering drinks regularly/ assisting with meals).
- Consider need for a non-verbal pain assessment tool such as the Abbey Pain Tool, FPD-R, PAINAD, or MOBID-2 [34].
- Careful monitoring for the presence of hypoactive delirium which can often be missed as believed to be a tired or sedated patient.

As with patients with dementia, adaptive communication is vital with patients experiencing delirium. At all times, it is best to validate the patients experience (e.g. ‘I understand you are feeling very frightened at the moment’) rather than ignore it, and then work with the patient to find what can make them feel more relaxed. Trial and error is sometimes needed to find out what works for the patient. For example, patients can respond well to being informed they are in hospital at some times but at others this might fuel their anxiety and paranoia so more of a ‘distraction’ technique is needed.

12.8 Medication

Medication management related to delirium involves being aware of what medications the patient is currently on (long term and short term) and what medications may be required to assist in the treatment and management of delirium. A comprehensive review of the patient’s current medications is essential to identify and modify/remove any medications which may be causing or adding to delirium. Tools

such as the Anticholinergic Burden Calculator (<http://www.acbcalc.com>) [35] or the 'Beers' List ([Beers Criteria Medication List - DCRI](#)) [36] can be useful to practitioners when reviewing the medication of a patient with delirium. Additionally, consideration of pharmacological treatments for patients who are experiencing alcohol/substance/nicotine withdrawal may be required.

A common error in treating delirium involves the use of antipsychotic medications in excessive doses, the overuse of benzodiazepines or giving either of these drug types too late. If it is necessary to medicate the patient, the goal should be reduction of symptoms, not sedation. Sedation should be avoided and only considered as a last resort if the delirium is posing a significant risk to the patient or others. With proactive early assessment and intervention, patients should not need medication, but if they do, the following could be considered (for guidance only; drug, doses, and administration should be based on local evidence-based policy and prescriber decision-making):

- An antipsychotic (such as Haloperidol, a first generation antipsychotic) is often the treatment in delirium (unless the patient has Parkinsons/Lewy Body Dementia, seizures, or an ECG shows changes such as a raised QTc).
- A benzodiazepine (such as Lorazepam, a benzodiazepine) is often a first-line treatment in patients with delirium who do not meet the criteria for haloperidol, or where only a short duration of action is needed (e.g. for essential investigations).
- If delirium medication is needed, the following are important considerations:
- *Dose:* Give a low dose in a timely manner rather than planning to 'wait and see' which often then results in an excessive escalation of delirium symptoms and the need for higher doses. Consider the age (and size) of your patient. It is often advised to give lower doses in elderly patients.
- *Timeline:* How long does the patient need the medication? Daily reviews of delirium medication are advised and a weaning plan prescribed, if necessary, when it is time to stop the medication.
- *Discharge planning:* In most cases, it is advised that patients are not discharged on delirium medication, but this must be discussed on an individual basis.

12.9 Dementia and Depression

It is worth noting the importance of dementia and depression when considering delirium, as well as orthogeriatric care in general. Dementia and depression can be important predictive factors of delirium, impact the way management and care for a delirious patient are implemented, and they may affect the final patient outcome. With all delirious patients, but particularly with patients who have dementia or

depression, it is important to understand their pre-delirium cognitive/psychological baseline status and regularly discuss the situation with their loved ones to help understand what is their normal or expected cognitive presentation, and what might be a manifestation of acute delirium.

It is important to understand the similarities and differences between dementia, depression, and delirium (the ‘3 Ds’). One particularly important factor is the pattern of onset when diagnosing delirium. Delirium symptoms tend to present within hours to days, depression in weeks to months and dementia over several months to years. Often delirium can be misdiagnosed as dementia or depression and vice versa. Frustratingly, delirium, dementia, and depression can have similar symptoms so care should be taken when making a diagnosis. Table 12.4 outlines some of the key presentations and how they overlap for ‘The 3 Ds’ [37, 38].

Table 12.4 Key features of delirium, dementia, and depression

Delirium	Dementia	Depression
<ul style="list-style-type: none"> • Sudden onset • Lasts hours to months, dependent on speed of diagnosis • Usually resolves with treatment 	<ul style="list-style-type: none"> • Lasts for years • Most types are progressive and irreversible until death 	<ul style="list-style-type: none"> • Can last several months to years, especially if not treated • Progression can be gradual or rapid • Can often resolve with treatment
<ul style="list-style-type: none"> • Often disorientated to time and place 	<ul style="list-style-type: none"> • Disorientation increases as the disease progresses • Loss of ability to identify day-to-day objects 	<ul style="list-style-type: none"> • Selective disorientation
<ul style="list-style-type: none"> • Thinking fluctuates between lucid and disorganised • Impaired consciousness and attention • Recent and immediate memory often impaired 	<ul style="list-style-type: none"> • Gradual loss of a range of cognitive abilities; including memory, thinking, and reasoning 	<ul style="list-style-type: none"> • Low mood • May make no attempt to use abilities • Some memory impairment
<ul style="list-style-type: none"> • Likely to experience frightening or paranoid hallucinations and delusions 	<ul style="list-style-type: none"> • Hallucinations and delusions can be present, particularly in Lewy-body dementia • Misperceptions are common 	<ul style="list-style-type: none"> • Hallucinations or delusions can be present in severe depression
<ul style="list-style-type: none"> • Disturbed sleep, often involving reversal of sleep-wake cycle 	<ul style="list-style-type: none"> • Sleep can be normal, but sleep-wake cycle can become confused 	<ul style="list-style-type: none"> • Disturbed sleep. Often hypersomnia during the day and/or early morning waking

12.10 COVID-19 and Delirium

Little is yet known about the association between acute mental changes and adverse outcomes in hospitalised adults with COVID-19. However, studies so far have suggested that delirium is a significant issue, particularly within the older population, being cited as one of the top six most common presenting symptoms of Covid infection [39, 40]. The ability of healthcare providers to assess and manage delirium was, especially initially, influenced by whether a patient has a diagnosis of Covid. The fear of the unknown and the fear of transmitting infections to others made healthcare teams change the way that they behaved and worked with patients [41]. By wearing protective equipment and limiting visits to patients' rooms to minimise the exposure to the virus, delirium care could have been jeopardised because the patient could not communicate adequately and recognise familiar faces and voices [42]. During times of visiting restrictions where it was prohibited for loved ones to visit patients and to provide care patient social isolation was increased [42]. Patients with Covid infections requiring intensive care stays, often with prolonged mechanical ventilation time, high use of sedatives and extensive immobilisation, were also at increased risk of delirium [43]. For those in ICU, the ABCDEF approach to care appears to have been effective in shortening the duration of delirium [44]. Hospital-wide adaptations can be made to maximise delirium prevention, or management, even with restrictions in place due to infection prevention. This includes ways of improving communication with patients when visiting is restricted such as enabling video or phone communication with loved ones or authorising visiting rights to the most relevant loved on of a patient [45].

12.11 Advocacy and Consent

12.11.1 Consent

Many ethical issues including capacity and consent are considered in detail in Chap. 17. However, some of these are considered here because of the additional vulnerability created by cognitive impairment. A central aspect of care for all patients with cognitive difficulties is decision-making; be it long term, acute, or temporary. Having the capacity to consent to decisions and treatments in delirium can be confusing as a patient's lucidity can fluctuate. If a patient is deemed to lack capacity (following a formal assessment following local guidelines), best interest decisions should be made. Practitioners must consider what is

- (a) In the patient's best interest
- (b) The least restrictive option

Practitioners must first ask: 'Can the decision or treatment be delayed to allow time for mental capacity to return?' If not, such as in a time-pressured situation such as surgical fixation following fracture, the best interest decision to ascertain the

onward course of care is needed. Any best interest ‘meeting’ or discussion must involve as many team members as possible to ensure the decision reached involves aspects that might not be considered by individuals. If all team members cannot be gathered, other forms of communication must be used to ensure all involved are consulted (e.g. via telephone or email) and to ensure all decisions and rationale are documented to provide clarity. The patient may also be able to put forward opinions even if not able to fully make the decision. Family members, or those with power of attorney should also be included in this decision process.

Each country, state, or institution will have guidelines regarding capacity, competence, and consent such as the UK’s Mental Capacity Act 2005 [46]. The terminology around capacity may vary between countries. For example, the USA refers to capacity as the inability to make decisions regarding medical treatment and care and refers to competency as a legal term related to ability (or inability) in decision-making. Overall, however, capacity has shared factors across the globe. It is time- and decision-specific: a patient should not be deemed as lacking capacity for all decisions but should be assessed for each important decision that needs to be made at the time it needs to be made. Capacity is assessed by looking at the patients’ ability to understand the information given to them, retain this information, weigh up the pros and cons, and replay their thoughts and reasonings to the assessor [23, 46].

Many countries have human rights legislation that states that all individuals have the right to their liberty being maintained. This can put practitioners in a difficult ethical situation, especially if the patient who lacks capacity resists the treatment being attempted in their best interests, for example, the ‘wandering’ patient who may try to leave during treatment or the acutely delirious postoperative patient who declines medication. Examples from other countries including the Mental Capacity Act [46] and the Human Rights Act [47] provide guidance on how this can be addressed, providing a frame-work to legally ‘deny’ the patient without capacity their usual rights to liberty and enforce treatment that is in their best interest.

12.11.2 Advocacy

An advocate can only provide opinion and information; the medical or surgical team can note personal preferences and previous decisions made, but this does not give the advocate rights to demand or decline treatments that may be in the best interest of the patient. In the UK, for example, anyone can advocate for someone as long as they can confidently:

1. State they know the wants and beliefs of the person who they are advocating for
2. Are not in receipt of financial benefit from their relationship (e.g. a paid carer)

There are cases where a patient has no available family or friends to advocate for them. In the UK, in this situation, the surgical or medical team can proceed using the information they have at hand to make the ‘best interest’ decision. In non-emergency situations, where capacity is questioned and unlikely to improve,

practitioners can seek the help of an independent mental capacity advocate (IMCA); usually appointed by local authorities and who are charged with the gathering and evaluation of information regarding the views of the individual without capacity and making representations on their behalf.

A more formal position of advocacy in many countries is referred to as ‘Durable Power of Attorney’ (DPA) or ‘Lasting Power of Attorney’ (LPA). An LPA/DPA is appointed legally with consent from the patient (this consent being given at a time when the patient is confirmed to have capacity to make this decision). LPA/DPAs are usually appointed for specific areas such as health or finance and are there to make decisions on behalf of patients only when the patient lacks the capacity speak for themselves.

Summary of Main Points for Learning

- Delirium is a neuropsychiatric syndrome that manifests as an acute decline of attention and cognition when a person is medically unwell. It is a medical emergency which prompts investigation into its causes.
- Delirium is related to increased in-hospital and post-discharge morbidity (complications) and mortality (death).
- Delirium can present as hyperactive, hypoactive, or mixed in presentation. It can be a distressing experience for the patient, their loved ones, and the healthcare professionals caring for them.
- In some cases, delirium can be prevented. Early assessment is vital to help highlight those at risk.
- Delirium is underdiagnosed across the globe due to poor understanding of delirium and the, often, ‘quiet’ nature of hypoactive delirium.
- There are many tools available to assess for the presence of delirium, most of which also rely on a degree of professional judgement.
- Delirium requires an interdisciplinary approach to investigation, treatment, and presentation management.
- Liaison with loved ones is crucial for delirium management as it can help understanding of whether a patient is outside of their cognitive baseline (therefore potentially delirious) and if the delirium is improving/resolving.
- Medications can be used within the care for a delirium patient, but these should be reviewed on a regular basis and ceased when delirium improves or resolves.
- Delirium can be hard to spot in someone who already has a cognitive impairment such as dementia. Delirium, dementia, and depression have several similarities which can make diagnosis complicated.
- Delirium often affects a patient’s decision-making ability, however due to the fluctuant nature of delirium this may vary.

12.12 Translating Knowledge into Action

- Think about how well delirium is understood in your institution. How could delirium knowledge be improved among staff? Could patients and families be offered a delirium information leaflet to improve their understanding of delirium?
- Is delirium included in annual competencies for staff and as part of staff orientation to your institution?
- Do you currently use a delirium screening or assessment tool? Consider reviewing the assessment tools mentioned in this chapter and which may work best for you and your institution.
- What delirium tools and processes does your institution currently use? Should these be reviewed? Are they used well among staff?
- Consider how you currently go about a delirium investigation: Is the multidisciplinary team involved? Would staff benefit from a structured system to work from when investigating delirium triggers (such as the DELIRIUM mnemonic).
- Does your organisation have a delirium policy covering assessment, prevention, and management? Are medications underused or overused with the management of ‘challenging’ patients with delirium?
- Do staff in your institution have good understanding of your local policies on capacity, competency, and consent? Are practitioners confident to assess capacity and apply the correct measures for patients with delirium where confusion can fluctuate greatly.

12.13 Useful Resources for Further Study

Videos

What is delirium?

<https://www.youtube.com/watch?v=qmMYsVaZ0zo>

<https://www.youtube.com/BPfZgBmcQB8>

VERA—Communication method

<https://www.youtube.com/craoo582xm0>

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13.1 Introduction

The psychological status and wellbeing of those who suffer a hip fracture has an important impact on physical health status, recovery, motivation, and rehabilitation. An appreciation of how psychological wellbeing affects care and progress is important in providing high-quality care that optimises outcomes. The aim of this chapter is to provide an overview of the causes of negative psychological status, provide advice on strategies for identifying those at risk, and give examples of assessments and interventions to aid diagnosis and treatment.

Following a significant fragility fracture, many patients are unable to regain the same functional abilities they had previously. This can lead to a loss of independence in performing daily activities, as well as a significant increase in the risk of suffering further fractures. Most significant fragility fractures are hip fractures, consequently most research relating to fragility fractures has examined outcomes and interventions relating to hip fractures. For this reason, this chapter will focus on hip fracture, but the reader should bear in mind that the same principles apply to other significant fractures.

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13.1.1 Why Is Psychological Status Important in the Management of Hip Fracture?

Hip fractures are associated with reduced health-related quality of life (QoL). Buckling and colleagues [1] found that pre-existing need of care, limited function, and depression are independent factors associated with lower QoL during the post-operative period. To appreciate the impact of osteoporosis and osteoporotic fracture treatment, it is important to understand the full impact that osteoporotic fractures have on QoL as this can predict mortality, as well as physical and psychological functioning [2].

13.1.2 Why Is Psychological Status Important in the Outcome of Hip Fracture?

Depression at the time of hip fracture has been estimated at between 9% and 47% (mean 29%) [3]. Following hip fracture, the psychological fallout can be considerable for the patient in terms of negative emotional experiences, reduced level of self-esteem, and tendency to depression.

The presence of negative emotional experiences in older adults who have suffered hip fractures is linked to low psychological tolerance, anxiety, perioperative pain, limited lower limb movements, and high prognostic expectation.

Mental health status at the time of surgery has been reported as being an important determinant of outcome and is associated with poorer functional recovery and higher mortality rates [4]. Conversely, it has been suggested that participants with high psychological resilience were able to achieve a greater gain in recovery compared with participants with low psychological resilience [5]. It has also been suggested that pre-fracture dependence in ADL is a stronger predictor of further functional decline—resulting in institutionalisation or death—than pre-fracture dementia [6]. That the increased occurrence of negative psychological emotions and states, such as anxiety and depression, are likely to be due to several factors such as insufficient knowledge about fractures, psychological preparation for surgery, sequelae of surgery, and concern about the cost of medical services [7]. Negative psychological experiences and states are further aggravated by long recovery times after surgery, reduced mobility, and postoperative pain [8, 9].

13.1.3 Why Is Psychological Status Important in the Rehabilitation from Hip Fracture?

Anxiety associated with fear of falling can have a negative influence on psychological wellbeing as well as on balance. Fear of falling affects walking speed so can negatively impact recovery [10].

Approximately one in five people who are not depressed at the time of their fracture become so after 8 weeks [11]. Depression has been reported to affect long-term

functional recovery following hip fracture [12]. The negative effect of depression on daily living activities can even emerge 6 months from the time of injury.

A patient's active participation in the rehabilitation process can have a positive effect on recovery, but the presence of depression disrupts this process because of reluctance, negative thoughts, slowed speech, decreased movement, and impaired cognitive function common with major depressive disorder. Depression in older adults with hip fracture negatively affects daily function. Psychological status influences recovery [13]. The emotional responses to a hip fracture predict both psychological and physical functioning over time offering an opportunity to enhance recovery through appropriate support [14].

Rehabilitation after hip fracture is negatively affected if function is restricted due to fear of falling (FOF) (Chap. 4) [15]. Anxiety about the possibility that a fall may occur again is associated with a low level of self-efficacy and results in the onset of an anxiety state [16]. In turn, anxiety can cause insecurity and lack of confidence in the individual's own abilities, so they choose not to risk falling and therefore not to move [17–19]. The psychological consequences of falling might be even more disabling than the fall itself [20]. The negative impact of falling on quality of life has been reported to be higher than the impact of stroke or cancer [21]. FOF is both a risk factor for falls and a consequence of a fall. It has been associated with subsequent poorer quality of life, functional decline, depression, and frailty [22, 23]. This may initiate a vicious cycle that reduces participation in activities, impairs rehabilitation outcomes, increases social isolation, provokes new trauma, exacerbates developing deficits, and impairs overall recovery [23–26].

It is essential to consider psychological status and support as part of the interdisciplinary care approach and to develop clinical practice in this area.

13.2 Learning Outcomes

At the end of the chapter, and following further study, the practitioner will be able to:

- Identify patients at risk of low psychological health
- Apply evidence-based tools to assist in the diagnosis and assessment of psychological health
- Discuss management strategies and priorities in the patient from the psychological perspective
- Use positive aspects of psychology to increase the possibilities of recovery in the patients

13.3 How Should the Psychological Status Be Assessed?

Table 13.1 illustrates the variety of aspects that it is important to evaluate to obtain a complete assessment of patients' wellbeing during the different stages of the illness and recovery.

Table 13.1 Areas to be evaluated in an integrative assessment at different stages (1 = admission; 2 = discharge; 3 = 90 days follow-up; 4 = 1 year follow-up; 5 = 2 years follow-up)

Areas	Stage				
	1	2	3	4	5
Patient					
Quality of life	X		X	X	
Fear of falling			X		
Pain			X	X	
Activities of daily living	X		X	X	
Depression	X		X	X	X
Stress		X	X		
Anxiety		X	X		
Psychological wellbeing	X		X	X	

13.3.1 Psychological Evaluation

The recovery process that follows surgery can vary depending on the patients' comorbidities, cognitive and functional status, and their psychosocial state. Wellbeing means much more than physical health so psychological assessment is an essential aspect of comprehensive assessment (CGA) for all orthogeriatric patients (see Chap. 6) in evaluating different negative and positive dimensions to assess patients' psychological status when following a bio-psycho-social approach.

13.3.1.1 Quality of Life

Health-related Quality of Life (QoL) is recognised as an important measure of health status [27]. It is a broad, multidimensional construct that includes domains such as physical, psychological, and social function [28], which facilitates identification of specific aspects of QoL and targeting of associated interventions. Some people suffer from loss of QoL [29] and wellbeing [30] while others move to nursing home facilities [31]. Wellbeing and self-efficacy are important resources for both health and illness and should be considered when exploring ways of promoting recovery [32]. The importance of patients' perception of the care they receive has been highlighted [33] and, without QoL data, the burden of osteoporotic fractures is likely to be underestimated [34].

The EQ-5D has been recommended for the assessment of QoL in older adults [35]. Although this instrument shows good psychometric properties in older patients, assessing the QoL of cognitively impaired patients is difficult. In people with mild and moderate dementia, these tests yield good validity and good-to-average test-retest reliability for the descriptive system, but not for the Visual Analogue Scale (VAS) which is part of the questionnaire. Proxy assessment is sometimes the only way to gather information regarding QoL when patients are unable to respond because of cognitive difficulties. Family caregivers, however, tend to overestimate health limitations concerning less visible items (such as pain and anxiety/depression). Healthcare professionals often rate patients at the same level for all five domains (some problems with everything). No consensus has been reached as to the most appropriate proxy to apply, but proxy assessment of EQ-5D seems to be the best option when assessing QoL in patients with advanced dementia. QoL should be

assessed using the EQ-5D method on admission to determine pre-fracture QoL and in post-admission 90-day and 1-year follow-up. In patients affected by severe dementia, EQ-5D should be completed by a proxy, if one is available [36].

13.3.1.2 Fear of Falling

Fear of falling is linked to self-efficacy—the belief people have about their capability to perform certain tasks [37]. After hip fracture, older people have reported that their lives have changed physically, personally, and socially [38]. During hip fracture rehabilitation, older people have been shown to struggle to take control of their future lives by trying to balance risk-taking and help-seeking [39]. They are aware that, on the one hand, it might prove risky to move around and that they were afraid of falling but, on the other, they wanted to be active and were trying to do things. They were determined to regain independence. Giving information to patients and including them in discussions regarding their progress is essential.

13.3.1.3 Pain

Assessment of pain is considered in Chaps. 7 and 8. Pain can also initially be assessed using the EQ-5D test; however, as previously discussed, the VAS used in the EQ-5D is not reliable in cognitively impaired patients [35]. The VAS within EQ-5D rates overall body pain, while practitioners are also interested in pain at the site of the fracture. The Verbal Rating Scale (VRS) performs well with patients with dementia, and it provides more information about fracture-site pain [40]. Liem et al. [36] agree that this test should be used on the second day after surgery or, in cases of conservative treatment, the second day after admission, and at 90 days and 1 year after admission.

13.3.1.4 Activities of Daily Living

Activities of daily living (ADLs) are an important health outcome for orthogeriatric patients. Recovery of pre-fracture health and functional levels is one of the main goals of care. It is important to assess deterioration in functional level over time. A vast selection of ADL measurement tools is available, but the Katz Activities of Daily Living Scale [41], is the most widely used. In many cases, it can prove difficult to assess pre-injury ADLs accurately at the time of admission. In such cases, consulting a proxy can be useful, who will typically be a family member, friend, or caregiver. ADLs should be assessed on admission to evaluate pre-fracture status. During patient follow-up, ADLs should then be assessed after 90 days and 1 year following admission.

13.3.1.5 Depression

Depression is the most common psychological disorder following hip fracture although it is difficult to assess [42]. An independent relationship exists between low functional capacity and depression symptoms in older people [43]. Social isolation often occurs in older adults who cannot walk well enough to perform daily living activities, and social isolation is an independent risk factor for depression [44]. A vicious cycle of low ADL function is, therefore, created between

pre-existing depression and an increase in depression from feelings of inadequacy when performing daily activities. The Geriatric Depression Scale (GDS) may be a valuable instrument with which to assess depression [45]. Depression has been observed more often in women and those whose spouses have died [11]. Depression should be assessed on admission to evaluate its pre-fracture status. During patient follow-up, it should be assessed after 90 days, 1 and 2 years from the date of admission.

13.3.1.6 Stress

There is a link between osteoporosis, fragility fractures, and psychological stress [46]. Relaxation strategies can be used to decrease stress and are described in the last section of this chapter. The Perceived Stress Scale [47] can be useful when assessing stress which should be appraised at discharge and 90 days after admission.

13.3.1.7 Anxiety

Anxiety has emerged as one of the most important aspects of patient assessment on admission [26]. The Short Anxiety Screening Test [48] has been shown to be an easy and valuable tool for the assessment of anxiety in this group of patients. Anxiety should also be assessed upon discharge and 90 days after admission.

13.3.1.8 Psychological Wellbeing

The concept of subjective well-being (SWB) has multiple components. It is affected by positive (e.g. happiness), negative (e.g. depressive symptoms), and cognitive components (e.g. life satisfaction). These multiple components are affected by different social determinants and develop differently at various life stages [49]. The Psychological General Well-Being Index (PGWBI) [50] is a useful test for the investigation of patients' and caregivers' psychological wellbeing which should be assessed after admission and at 90 days and 1 year after admission. Reinforcing and increasing positive psychological components, such as resilience, motivation, and internal locus of control, can facilitate recovery.

13.4 How Can Psychological Status Be Influenced Positively by the Orthogeriatric Team?

It is clear that social and psychological elements (both negative and positive) can influence the outcomes of recovery and rehabilitation [51, 52]. The psychological state of the patient plays a key role in rehabilitation [53] so it is crucial that they receive adequate psychological care.

Shi et al. [54] highlighted the importance of systematic and standardised psychological care following hip fracture. Specifically, they compared the outcomes of psychological care devoted to older adults who had suffered a hip fracture with the outcomes of routine psychological care alone provided for a control group. Systematic and standardised psychological care, carried out during the

perioperative period, positively benefited the psychological state of patients, relieving symptoms of anxiety and depression significantly.

The main aspects of the psychological care were:

1. *A good practitioner–patient relationship*: nurses and other practitioners talked with patients while maintaining a caring, kind, and sincere attitude. Through encouragement and suggestions, practitioners kept both patients and their families informed about the importance of the perioperative period and guided them in precautions to be taken. Nurses also explained the anaesthetic program, surgical procedures, and potential risks of surgery and the importance of subjective factors was emphasised.
2. *In-depth interview between patients and nurses*: through dialogue, patients expressed their psychological difficulties and negative emotions. This enabled nurses and other practitioners to have greater awareness of their state of mind. It was also explained to patients that negative thoughts and emotions can have a negative influence on treatment and prognosis and nurses tried to clarify patients' doubts and uncertainties.
3. *Relaxation and concentration*: patients were asked to relax, assuming a comfortable position, while maintaining focused attention. When they experienced negative emotions, anxieties, or fears, nurses helped them by identifying their causes, so that they could intervene with strategies aimed at limiting their onset as much as possible.
4. *Listening to music*: the benefits, goals, and directions related to listening to music were explained. Playing music occurred only if patients were willing to listen. Three main genres of music were used: classical, soft, and stimulating. The volume of music was adjusted according to the patients' perceived level of wellbeing and relaxation. Music was played twice a day, in the morning and evening.
5. *Limiting the influence of negative emotions of family members*: negative emotions expressed by family members can have an influence on patients, especially on the process of rehabilitation and functional recovery. It is, therefore, important for family members to provide psychological and emotional support as well as material support throughout the treatment period to help strengthen patients' self-confidence in themselves and their ability to recover.

Although the study discussed was a short-term follow-up conducted with a limited sample of patients, the results indicated the benefits of offering individualised psychological care. Healthcare practitioners should listen to patients' thoughts and opinions and learn about their feelings and emotions. Emotional and psychological support, health education and the use of music can be effective tools in caring for older adults with hip fractures. Through increased communication between practitioners and patients, support from family members and the promotion of positive emotions and confidence in treatment, patients can increase their ability to cope with problems.

Dedicated psychological care for patients who have suffered hip fractures should be structured to focus on patients' wellbeing and quality of life following surgery. Attention should also be paid to the physical pain that each patient may experience differently, physical, and psychological rehabilitation, and emotional support. Psychological adjustment to one's physical condition, emotional awareness, and maintaining a state of calm and wellbeing are factors that contribute to improving postoperative quality of life.

The different negative and positive dimensions that are important to evaluate and the instruments most likely to be appropriate at each stage discussed should be addressed by the orthogeriatric team following a bio-psycho-social approach. The inclusion of a psychologist in the team can help in the assessment of the patients' psychological wellbeing, using the tools we have detailed above, but can also enable psychological counselling. During counselling, the psychologist can obtain more qualitative data to help tailor interventions based on emerging needs and the resources available as well as give feedback to patients and their caregivers on the problems and the strengths that emerged in the assessment. It has been demonstrated that twice-weekly counselling for about 45 min had a positive influence on hip fracture patients' depressive and anxiety symptoms [55].

Similar results were shown for 'psychological support therapy' (PST). This had a significant impact on patients who had sustained a femur fracture, contributing to pain reduction and improvement in psychological status, as well as patients' quality of life and nurses' job satisfaction [56]. The outcomes of PST, which was applied in addition to routine care for 41 adults following femur fracture, were compared with the outcomes of routine psychological care alone for a control group.

The PST intervention involved:

1. A psychological support group, consisting of nurses with solid nursing skills and physicians with extensive clinical experience. Psychologists created the group by choosing members with psychological intervention skills, especially the ability to recognise and understand patients' emotions, reduce negative emotions, and promote positive ones, while being able to communicate effectively with patients.
2. Older adults who with fractures often do not fully understand the details of surgical procedures leading to misunderstandings and facing the surgery with a negative state of mind. Team members informed patients and answered all their questions clearly and patiently. Practitioners were also required to understand the needs of patients and deliver individualised interventions. The team assessed the psychological status of patients, interviewed them, observed changes in their behaviours, understood the emotions felt by patients after sustaining a fracture, and offered targeted psychological support according to their needs.
3. The team provided fracture-related information through communication modes adapted to the patient's level of education and the ability to understand. The impact of functional exercise on rehabilitation was explained, including both patients and their family so that worries and doubts were relieved, resulting in reduction in anxiety. These patients risk much longer and more frequent hospital stays than other adults. Comprehensive discharge-planning programmes (Chap.

16) can improve these outcomes. On admission to care facilities, early multidimensional assessment (Chap. 6) can provide indications of how to address patient needs more effectively. Greater psycho-educational support can be provided during the rehabilitation phase during which there is more time to focus on this.

4. The importance of nurses strengthening communication with patients and the need to provide psychological care for them according to their individual needs was stressed. Nurses also explained to patients the relationship between their emotional state and maintaining a positive attitude and confidence in their care.
5. Patients were encouraged to maintain communication with the world outside the hospital and to access support from family members. At the same time, family members were encouraged to spend more time with them, talking to them and listening to them to help them adapt to their condition and reduce any negative emotional states.
6. Patients' favourite genres of music, such as light or relaxing music, and TV series were played to divert patients' attention from their condition, entertain them, reduce their pain, and reduce their anxiety and negative thoughts.
7. Patients who had successfully recovered after a fracture were invited to share their experiences to encourage other patients to have a positive approach toward rehabilitation.

The PST programme made it possible to assess patients' psychological state, analyse the factors that contributed to the development of negative thoughts and emotions, conduct psychological counselling, and help nurses and patients communicate effectively. This strengthened patients' trust in healthcare personnel, who played an active role in accelerating the rehabilitation process following a fracture. In this type of therapy, healthcare practitioners can [57]:

- encourage patients to create a healthy psychological state
- explain to patients the impact that a negative state of mind can have on the rehabilitation process
- encourage patients to take the initiative in expressing themselves
- respond to their questions and concerns
- help patients take a positive view toward their health problems and reduce their negative thoughts and attitudes
- alleviate worries and anxieties
- encourage patients to develop the habit of self-regulating their emotions

Psychological support therapy can also contribute to:

- improving patients' ability to cope with pain
- reducing psychological pressure
- increasing confidence in the process of recovery and rehabilitation
- strengthening psychological and physiological adaptation by increasing tolerance to stimuli

Nurses can also encourage patients to maintain active communication with family members so that they have a social support network [58].

The results of the studies discussed here lead to an appreciation of the importance of psychological evaluation and support in care for older adults affected by fragility fractures. As part of the integrated and multidisciplinary approaches to care, practitioners who can demonstrate the appropriate psychological skills to assess the psychological wellbeing of patients and their caregivers are essential.

Summary and Main Points for Learning

- Negative emotional experiences in older adults who have suffered hip fractures are associated with low psychological tolerance, anxiety, perioperative pain, limited lower limb movements, and high prognostic expectation.
- Mental health status at the time of surgery has been reported as an important determinant of outcome, with mental health disorders associated with poorer functional recovery and higher mortality rates.
- The recovery process that follows surgery varies depending on the patients' comorbidities, cognitive and functional status, and their psychosocial state. Wellbeing in this sense means more than health as such. It is important to evaluate different negative and positive dimensions to assess patients' psychological status when following a bio-psycho-social approach.
- Nurses encourage patients to maintain active communication with family members so that they have a social support network.
- Psychological support therapy for older fracture patients has been used to assess their psychological state, analyse the factors that contribute to the development of negative thoughts and emotions, provide psychological counselling for patients, and help nurses and patients communicate effectively to increase patients' trust in health professionals, who play an active role in accelerating the post-fracture rehabilitation process.

13.5 Suggested Further Study

Being able to empathise with patients, especially from an emotional perspective, is vital in providing excellent care that includes psychosocial aspects.

Access the following open access (free to download) article: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7925874/>.

Tutton E, Saletti-Cuesta L, Langstaff D, Wright J, Grant R, Willett K (2021) Patient and informal carer experience of hip fracture: a qualitative study using interviews and observation in acute orthopaedic trauma. *BMJ Open*. 11(2):e042040. <https://doi.org/10.1136/bmjopen-2020-042040>.

Read the article, but particularly focus on the quotations that highlight patient and family emotional experiences of hip fracture. Ask yourself the following questions:

- What can I see in the patient and family words (the quotations) in this chapter that suggests that having a hip fracture is an exceptionally difficult emotional experience?
- In what way does my team take this emotional experience into account during care providing?
- Having read the article and this chapter, what I can I now see is important in the way we provide care that would better support psychological wellbeing in our patients and their families?

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Lauren Beaupre, Kathleen Mangione, and Carmen Queirós

14.1 Introduction

Following a fragility fracture, especially a hip fracture, patients face a long journey to recovery [1]. Older people with fragility fracture are often medically complex, presenting with concomitant conditions including frailty that require extended care from multiple carers/providers in both hospital and community settings. Beyond the physical challenges to recovery, social and psychological factors, including fear of falling, can also affect the rehabilitation and recovery process. Although hip fracture is one of the most common and devastating fragility fracture, the rehabilitation concepts discussed in this chapter are also applicable to patients experiencing other fragility fractures. Previous chapters discussed frailty, early mobility, remobilization and exercise, and falls prevention. This chapter will focus on rehabilitation across the care continuum, including interprofessional care, for patients following a

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fragility fracture. The aim of the chapter is to promote the role of nurses and other practitioners in progressing mobility through the rehabilitation process in patients with fragility fractures.

14.2 Learning Outcomes

At the end of the chapter, and following further study, the practitioner will be able to:

- Define the goals of rehabilitation for patients with fragility fractures transitioning back to their community settings
- Describe the role of the nurse and other practitioners in empowering the family to participate in and enhance rehabilitation processes.
- Outline the evidence and make pragmatic suggestions for including older adults with dementia and fragility fractures in all rehabilitation processes
- Apply strategies to encourage full return to function and participation in the community.

14.3 Long-Term Outcomes Following Significant Fragility Fracture

Many older adults who experience a low trauma fall and fragility fracture will experience a decline in physical mobility, basic and instrumental activities of daily living, and quality of life in the year following fracture. The risk of institutionalization is increased, but this is not significantly different after fragility fractures of the hip, pelvis, and spine—suggesting increasing disability among all those with fragility fractures [2].

Older adults who sustain a fragility fracture after a fall are likely to fall again. In an Australian study of 336 older adults who sustained a lower extremity fragility fracture, 43% of the participants fell again during the following year and approximately 10% sustained a second fracture [3]. In 161,000 older USA residents who had sustained a hip fracture, the risk of subsequent fracture was approximately 5.5% and most likely to be another hip fracture. The risk of further fractures increased with age, being female, and having comorbid conditions [4]. A critical review of disability outcomes following hip fracture found that older adults in New Zealand were four times more likely to be unable to mobilize in the community 2 years after fracture [5]. By 6 months post fracture, 42–71% of surviving patients recovered basic ADLs. In instrumental ADLs, of the 34% who were independent prior to the fracture, only 14% were independent after a year. Across the globe, decline in quality of life (QoL) measures (EQ. 5D) was in the region of 10–20% at both 4- and 12-months post fracture. The review also reported studies which noted the need for increased domestic services in the home and reported decline in both cognitive and

physical health the year post fracture [5]. The studies in the critical review could only include the survivors under usual care conditions. The review did not address potential for recovery for a given patient or for those who receive optimal care.

14.4 Post-acute Rehabilitation

Most older adults who sustain a significant fragility fracture (e.g., hip or pelvis) will receive post-acute rehabilitation. This rehabilitation may occur in multiple settings, making care complex [6, 7]. In-patient acute rehabilitation centers provide patients with daily physical and occupational therapy. Nursing homes can also provide daily rehabilitation services, but usually at less intensity than acute rehabilitation centers. Rehabilitation can occur in patients' homes (including assisted living facilities or group homes) and at out-patient centers, but the frequency of visits is usually two to three times per week at best [7]. While the ultimate goal of rehabilitation services is to restore patients to the highest level of function and/or return patients to their level of function prior to the fracture, the care is often fragmented by the transition in settings and by the multiple professionals communicating with patients.

14.5 Rehabilitation and Exercise

Rehabilitation combines the key features of exercise science with functional training for basic and instrumental activities of daily living. Although exercise and remobilization are considered in detail in Chap. 8, it is important to consider these as part of the rehabilitation process. For rehabilitation to be successful, gradually rebuilding strength and endurance in activity is important. Supporting patients in exercise for rehabilitation is an interdisciplinary team's responsibility. In particular, the nursing and therapy teams need to work closely together to support patients in undertaking exercise and other rehabilitation activities. Rehabilitation needs to be incorporated into care activities so that it is performed several times a day, rather than only when a physiotherapy, an occupational therapist or a rehabilitation nurse is present.

In terms of exercise science, "progressive overload," "specificity," and "reversibility" are key principles that are applied to all types of exercise affecting muscle, bone, and function which will impact on rehabilitation:

- Progressive overload is that an individual needs to provide a load to the tissue (muscle or bone) that is "more than the customary load" for there to be an increase in muscle strength or bone formation. Lifting the leg or extending the knee may be an appropriate exercise day 1 after hip surgery but, for the muscle to get stronger as the exercise becomes easier, a greater load (weight) is needed to continue to increase muscle strength.

- Specificity is defined as adaptations made by muscle that are specific to the type of stimulus applied. For example, performing a holding contraction of the thigh muscles (quadriceps set) will not increase the ability to rise from a chair. The muscle needs to be stronger while moving through either “cuff weights” or practicing the specific activity. The location and type of stimulus are important. The third principle of exercise science is reversibility of training.
- Reversibility suggests that when the stimulus/load is discontinued, the gains are diminished.

In practical terms, the discontinuation of rehabilitation must be associated with a plan to continue exercise and movement so that gains made are not lost. Exercise, like medication, is prescribed at a specific dose. “Dosing” of exercise is done by identifying the frequency (how often an individual should do the exercise), intensity (at what level of exertion or effort the exercise should be performed), and duration (how many repetitions, or for how many minutes, the exercise should be done). By manipulating these dosing characteristics, rehabilitation providers create individualized and progressive programs for their patients.

These principles are supported by recommendations in clinical practice guidelines for hip fracture and other fragility fractures [7, 8]. Multimodal exercises are recommended for older adults post fracture. Multimodal exercises include progressive resistive exercises for gaining strength, weight-bearing exercises, balance exercises, and functional mobility training. These recommendations are consistent with the WHO’s guidelines for older adults:

“... as part of their weekly physical activity, older adults should do varied multicomponent physical activity that emphasizes functional balance and strength training at moderate or greater intensity, on 3 or more days a week, to enhance functional capacity and to prevent falls” [9].

Examples of potential exercises, dosing and rationales are provided in Table 14.1.

In the acute hospital setting, an assessment will be needed of whether patients are physically fit to conduct prescribed exercise, even with support. Frailer patients, for example, may take longer to be able to undertake exercises and other physical activity.

Table 14.1 Training type, possible exercises, dosing, and rationale

Training type	Exercise and dose	Overload	Specificity and rationale
Progressive resistive exercise	Knee extension with a weight that allows the patient to be very tired at the last repetition. Perform the 8–10 repetitions three times each day for 3 days per week	Increase the weight when the patient can easily complete 10 repetitions for 3 sets a day OR increase the number of days per week, the person does the exercise to 5x/week	This exercise helps build quadriceps (thigh muscle strength) but other exercises are needed to help with functional activities

Table 14.1 (continued)

Training type	Exercise and dose	Overload	Specificity and rationale
Weight-bearing exercises	Step up and down from a short step or heavy book. Lead with the weaker leg and do this until the leg feels tired at the last repetition. Start with 5 times for up to 3 sets per day and do this 5 times per week	Increase the number of repetitions when five becomes easy OR increase the height of the step or do two steps	This exercise uses many muscle groups and challenges balance. It is specific to using the leg to climb a curb or step and for getting up from a chair. This exercise is less intense for any specific muscle, and therefore with lower repetitions, can be performed daily
Balance exercises	Static: Standing with the feet close together (ankles touching) or dynamic: moving one leg out to the side (like a sidestep) back and forth while maintaining balance on the stance leg. Perform repetitions that include a combination of static and dynamic exercises every day for 5 min a day	Balance exercises are progressed by increasing the challenge of the specific task (stand with feet together and eyes closed) or decreasing the amount of upper extremity support or increasing the amount and number of exercises performed	Static balance exercises help to train the neuromuscular system to respond to a decreasing base of support and to balance without vision. Static exercises are precursors to more challenging exercise. Dynamic balance exercises train the neuromuscular system to anticipate movements that could be destabilizing when the center of mass moves over the base of support. This exercise prepares the patient for walking in narrow pathways or getting over obstacles, etc.
Functional mobility training	Practicing the specific task that the patient is unable to perform independently. The task can be broken down into smaller steps and cues can be provided to make the task more or less challenging. Functional training can occur 5 days per week and repetitions are performed until the patient fatigues or learns how to complete the task	Overload is not typically associated with functional task performance with the exception of walking duration. Patients need to be able to walk for minutes over various terrains to be independent in the community. Overload, for walking endurance, can be achieved by increasing the daily duration of a single walking episode or increasing the number of shorter walks the patient performs each day	There is obvious specificity of the functional activity and the task chosen to practice. However, patients need to have the building blocks of strength, balance, and endurance to be able to be truly independent

14.5.1 Functional Rehabilitation

In the early weeks post fracture (regardless of setting), the rehabilitation provided by an interdisciplinary team made up of physiotherapists, occupational therapist, and/or rehabilitation nurses/practitioners (“The rehabilitation team”) will focus on getting the patient to be able to safely, and independently walk using an assistive device (such as a walking frame or stick/s). They will also focus on patient ability to get in and out of bed, how to rise from a chair and toilet, and how to balance for short periods of time without holding on to the assistive device. Practitioners can achieve these functional goals by educating patients, and instructing them in proper techniques, while working on increasing muscle strength, range of motion, and standing balance.

As recovery progresses in the next several weeks, the rehabilitation team will encourage the patient to walk and move frequently for an increasing amount of time each day. Frequent and sustained movement helps to prevent muscle atrophy and decreases fall risk while enhancing wound healing, bowel function, and bone healing.

Rehabilitation will become more intensive as progressive resistive exercises will be part of the routine to increase muscle strength. Balance exercises will also become more challenging, and functional training will include walking on various indoor and outdoor terrains, getting on and off the floor, and up and down steps. Ultimately, as the patient becomes more independent with household activities and community engagement, the rehabilitation team will recommend a life-long physical activity plan for the patient.

14.6 Interprofessional Rehabilitation Following Fragility Fracture

For patients to achieve maximum recovery and return to pre-fracture function and living arrangements, the support of multiple healthcare providers and disciplines is required. Where human health resources might be limited, all available healthcare providers, including nurses, may offer a broad spectrum of care to meet the patients’ needs across the care continuum, including the community and home. Evidence suggests that patients should be offered a coordinated interdisciplinary care approach to care and rehabilitation from the time of admission to improve their recovery [10].

Nurses play a pivotal role in engaging with patients and their families as they are the primary provider in many locations in terms of time spent with patients involving multiple interactions with patients (and their families) throughout each day [11]. Providing positive, consistent messages around recovery, rehabilitation, and promoting the importance of early mobility is a role for all team members, with nurses playing a leading role. Early goal setting with patients and their family and/or support system can help patients anticipate their recovery, but also allows acute care providers to identify gaps in care that need to be addressed before or during

discharge transitions. Communication within and across team members and care settings is critical to successful recovery [12].

Not only can nurses and other practitioners assist with goal setting, they can also help coordinate healthcare team communication across disciplines so that the care provided addresses individual patient needs in a coordinated manner. Advanced practice nursing roles are emerging to ensure a patient-centered coordinated approach to care [13].

Having the healthcare team provide consistent messaging to patients and their families about the importance of movement and mobilization early after surgery and continuing to progress their mobility increases the likelihood of patients becoming partners in their own healthcare. Patients and their families may have difficulty perceiving the benefits of early mobility and movement as fear of falling is highly prevalent following a fragility fracture; >90% of fragility fractures occur with a simple fall from a standing height [14] (see Chap. 4). Providing information about how to safely mobilize and emphasizing how early mobility will help patients recover and return to their pre-fracture home is an important role for all healthcare providers.

Nurses and other practitioners frequently assist patients to transfer out of bed and should encourage them to be out of bed as much as possible. Positive feedback about daily progress as patients regain the ability to perform daily tasks with decreasing assistance can facilitate patient motivation, an important contributor to full recovery [15]. A recent UK study using the UK “Physiotherapy Hip Fracture Sprint Audit” reported that patients who received more frequent and intensive physiotherapy in the first week after surgery had shorter acute care length of stays [16], so early mobility support from all team members may have benefits for both patients and healthcare system.

Appropriate pain management is also an important part of early acute care, as it is associated with delirium, sleep disturbances, and reduced mobility [17–19]. Patients with altered cognition may have difficulty communicating about their pain and are often under-treated for pain [20]. Using non-verbal cues/assessments of pain [21, 22] are important to improve their pain control and remove barriers to patients’ participation in mobility activities. Nurses play a central role in managing pain, particularly in acute settings [12]. But pain management remains an important consideration throughout the recovery process and during rehabilitation as patients are much more likely to engage in mobility and rehabilitation activities when their pain is well-controlled. Nurses (and all members of the care team) who work outside of acute care settings, including the community, should continue to monitor pain to ensure it is not a barrier to rehabilitation progression.

Special consideration must also be given to those patients who present with cognitive impairment. The 3Ds that can affect patient rehabilitation and recovery are Dementia, Delirium, and Depression [23]. In particular, patients with pre-existing dementia or who present with delirium during their hospital stay represent up to 40% of patients who experience a hip fracture [24], but are often considered poor candidates for rehabilitation. They are less likely to be mobilized early after surgery, typically receive fewer rehabilitation services in hospital and are less frequently

discharged to rehabilitation facilities [24]. Research evidence is limited in these patient sub-groups, as they are often excluded from clinical research studies and trials [25].

However, limited evidence supports that patients with cognitive impairment experience similar relative gains in function as those without cognitive impairment. An Advanced Nurse Practitioner-led interprofessional rehabilitation approach for patients with cognitive impairment recovering from hip fracture surgery demonstrated that patients who received the program were significantly more likely to return home than those who received usual care in a risk-adjusted model ($p < 0.02$) [26]. Adaptations to programs to engage patients with cognitive impairment in mobility include performing functional tasks of interest to the patient, such as ambulating or getting out of a chair rather than structured exercises [27]. Increasing the distance walked and the number of sit to stand activities performed over the day can help achieve progression in function and independence.

Patients who live in residential care settings at the time of the fracture represent the frailest sub-set of those experiencing fragility fracture and frequently present with concomitant cognitive impairment [28]. Even in this group, limited research suggests that patients experience at least short-term benefits from rehabilitation. An Australian randomized trial of 240 nursing home residents who received a 4-week rehabilitation program reported improved mobility at 4 months and better quality of life at 12 months [29]. A controlled trial in Canada reported sustained functional gains in mobility and ambulation at 12 months after a 10-week rehabilitation program delivered in the nursing home [30]. Further research is underway, but principles of mobility and rehabilitation should be applied to allow these fragile patients to try to regain their pre-fracture functional levels. (See Box 14.1 for issues to consider optimizing recovery).

Box 14.1 Issues Requiring Management to Optimize Rehabilitation and Recovery

- Early engagement of patient and family to set goals for recovery and facilitate discharge planning
- Nutrition (both in-hospital and at home) (Chap. 11)
- Management and prevention of delirium (Chap. 12)
- Pain management
- Management of dementia and adaptation to include patients with altered cognition in rehabilitation
- Progressive exercise and mobility, including physical activity (Chap. 8)
- Falls prevention and appropriate use of assistive devices (Chap. 4)
- Social support including community re-engagement where possible (Chap. 13)
- Caregiver support (Chap. 16)

14.7 Case Application

Encouraging movement and physical activity after a fragility fracture is essential for continued recovery in terms of bone growth around the fracture, for keeping joints lubricated (decreasing stiffness), for maintaining and improving muscle strength, and for maintaining motor control and functional activities. In the home environment, there are several cues and tasks that can be easily added to a day to increase the total amount of physical activity. The following cases illustrate how this can be done.

Case 1: Mrs. Herrera

Mrs. Herrera is an 84-year-old woman who fell and fractured her hip and after her in-patient rehabilitation, now lives with her daughter. She is functionally independent in that she can get up from the chair or bed or toilet alone and walk within the home with a rollator, but she spends most of her day sitting in the living room. Both mother and daughter are fearful that she will fall and fracture again. The Rehab Team left exercises for her to perform but is not visiting the patient on a regular basis.

Consider:

How can the nurse help educate the patient and daughter and encourage a message of movement and activity?

Think of the normal full body activities that an older adult performs each day: rising from a bed/chair/toilet, walking from room to room, perhaps ascending and descending stairs, or walking outdoors. To encourage enough physical activity to achieve the physiologic goals mentioned above, one needs to build the physical activity around normal routine. Mrs. Herrera may get up in the morning, walk to the toilet, walk to the kitchen for breakfast, and then settle in a living room chair until lunch. To increase the number of times, she needs to move from the living room chair, the practitioner could try the techniques listed below. The key for all the suggestions is to make the initial opportunities successful, not associated with “exercise” or anything medical, and enjoyable.

- Educate the daughter to encourage greater intake of liquids at meals (for increased trips to the toilet).
- Designate a chair that is for “exercise”—firm seat and back and have Mrs. Herrera do some of the exercises.
- Take her blood pressure in a different room than where she currently sits.
- Educate the daughter to have Mrs. Herrera come to the kitchen table for tea or mid-morning snack or even medications if they don’t all have to be given at specific time.
- Cue Mrs. Herrera and her daughter to stand up during commercials on TV or when a clock chimes.
- Consider a *short* afternoon nap in the bedroom so that Mrs. Herrera has to get into and out of bed again, go to a different room, and stretch out. While in bed,

she may be able to do a few bridging exercises or other exercises the Rehabilitation Team recommended.

- Walking outdoors, initially accompanied by the daughter, should be promoted daily. Initially getting fresh air and sunlight can help motivate patients and continued performance can help it become a routine like it may have been prior to the fracture. Time or distance doesn't need to be addressed initially, but if Mrs. Herrera had a neighbor to chat with or an animal to pet, it may help in the initial stages.
- Music is a powerful motivator for movement. Playing Mrs. Herrera's favorite music will likely get her moving in her chair and the ultimate goal would be for her to get out of the chair and begin dancing or moving. This activity may be a great precursor for walking outdoor.

Case 2: Miss Loke

Miss Loke is an 87-year-old woman who lived alone prior to falling and fracturing her hip. She has had rehabilitation and will remain in the residential facility since she has no one to help her at home. She can ambulate independently with a rollator, but the institution is very fearful of residents falling.

Consider:

The approach to promoting movement and physical activity with Miss Loke will vary slightly due to the environment. Many of the suggestions listed above for Mrs. Herrera could apply, in addition, consider:

- Have her assist in the transport of a wheelchair bound resident to meals or activities.
- Allow her to be a peer leader in activities that involve dance or movement or exercise.
- Provide adequate seating in hallways, etc. so that if she will be encouraged to walk to all meals and activities. If she becomes tired, she could rest without worrying about finding a place to sit.
- Encourage the development of a walking club for staff and residents.

Case 3: Mr. Sale

Mr. Sale is an 85-year-old man who lived in a care home prior to falling and fracturing his hip. He has pre-existing dementia requiring full time residential care but ambulated independently without aids before his fracture and required only stand by assistance to get out of bed. He is now 2-days postoperative but has not been mobilized as he has been very sleepy and non-communicative. His family thinks he just needs to rest and rehabilitation can start later.

Consider:

What should the care team do to increase the likelihood of Mr. Sale returning to independent ambulation?

- It is not uncommon for people with dementia to also experience delirium postoperatively, which can present with hypo-activity. Assess his cognitive status for delirium (including asking family members about his pre-fracture cognitive status). If delirium seems present, assess for other reasons for delirium (dehydration, urinary retention/UTI, etc.) and treat as necessary.
- Explain to the family how important it is for him to be awake during the day, and in upright positions to encourage alertness. Educate the family about the importance of early mobility, including walking, to enhance the likelihood of returning to independent ambulation. Discuss the harms of prolonged bed rest.
- Turn the lights on in his room, sit him up in bed and when more alert, move Mr. B into a chair. Rather than explaining the whole process of the transfer for Mr. B, which is common practice for those without dementia to reduce their anxiety, use short 1-step instructions for Mr. B. Short-term memory loss is common with dementia, so although patients will not remember a 3-step command, they can follow a 1-step command. Tell Mr. B each step that is going to happen and then immediately perform that action.
- If possible, try ambulating a short distance. Frequently, people with dementia will ambulate more readily post fracture than those without dementia as walking is a familiar activity and they may not remember that they have sustained a fracture.
- Ensure that Mr. Sale sits in a chair for brief periods throughout the day, including for meals and continue daily ambulation, increasing the distance and reducing the assistance as able.
- On discharge back to his nursing home, provide detailed instructions as to his current level of mobility and the need for this to continue so that Mr. B can return to independent ambulation.

Summary of Main Points for Learning

- Decline in mobility after a fragility fracture is common and should be directly addressed by the Rehabilitation Team (rehabilitation nurse, physiotherapist, and/or occupational therapist).
- Intentionally making exercises more difficult (progressive overload), choosing exercises and activities specific to the patient's goals and functional level (specificity), and a targeted and concrete plan for continued activity and movement after discharge are all essential to return the patient to their pre-fracture functional level.
- Patients with cognitive impairment should also receive rehabilitation postoperatively to increase their likelihood of returning to their pre-fracture functional status.

14.8 Suggested Further Study

Determine your team's educational needs in terms of patient rehabilitation and consider how these needs might be addressed. Examples of educational resources include:

Cadel L, Kuluski K, Wodchis WP, Thavorn K, Guilcher SJT (2022) Rehabilitation interventions for persons with hip fracture and cognitive impairment: A scoping review. *PLoS One*. 17(8):e0273038.

Handoll HHG, Cameron ID, Mak JCS, Panagoda CE, Finnegan TP (2021) Multidisciplinary rehabilitation for older people with hip fractures. *Cochrane Database Syst Rev*. 11.

FFN Resources—<https://fragilityfracturenetwork.org/ffn-resources/>

Discuss with patients, caregivers, and other staff members the factors they believe can delay or enhance rehabilitation. Consider the implications of these ideas for patient-centered care aimed to rehabilitation and family participation.

14.9 How to Self-Assess Learning

Following reading this chapter and additional study, consider the following options for determining how what you have learned pertains to your individual practice and that of your team:

Discuss the knowledge you gained from this chapter with your colleagues and determine and discuss how your team could improve local patient rehabilitation practice.

Search regularly about recent new practices, guidance, knowledge, or evidence related to rehabilitation.

Meet with specialists and other team members to keep current on new evidence and disseminate it to colleagues.

Consult and be mentored by other expert clinicians.

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Family Partnerships, Patient and Carer Education and Support

15

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15.1 Introduction

The concept of patient-centred care has gained increasing prominence as a key goal of healthcare systems. However, despite growing recognition of the importance of patient-centred care and evidence of its effectiveness in contributing to other system goals such as efficiency and effectiveness, many national health systems are falling short in this area. Data from international studies show that patients often rate hospitals and healthcare providers highly, but report significant problems in accessing important information, understanding treatment options, getting explanations about medications, and receiving responsive, compassionate service from their care providers [1, 2].

The literature identifies the following as some of the key factors in achieving patient-centred care at the organisational level [3]:

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- Involvement of patients and families at multiple levels, not only in the care process, but as full participants in key committees of the organisation that cares for them.
- A supportive work environment that involves staff in all aspects of process design and treats them with the same dignity and respect that is expected of patients and families.
- Supportive technology that involves patients and families directly in the care process and facilitates access to information and communication with their carers.

A hip fracture is a sudden event that often requires immediate and increased support from carers (family, friends, neighbours). People with a hip fracture may need ongoing support due to deconditioning or reduced physical function. While people with a hip fracture are in hospital, carers continue to play an active role in helping the person to maintain their Activities of Daily Living (ADL), such as hygiene, dressing, and eating hygiene, as well as providing social interaction and emotional support. In particular, carers of people with hip fractures have expressed difficulties in adapting to their new role, managing stress and strain, navigating the unknown, accessing appropriate information, and understanding the discharge planning process [4].

In addition to patient and carer challenges, some studies identified a number of current gaps in the literature that need to be addressed to improve the care experience. The authors identified the importance of further understanding and unpacking the tensions associated with caregiving, as well as issues around changing identity and family dynamics. Further exploration of these areas from the perspectives of patients, carers and healthcare providers is essential to inform care planning and discharge processes. Therefore, studies are exploring how carers of older adults with hip fracture navigate their roles and responsibilities in a complex healthcare system [5, 6].

In this context, knowing how to support patients and carers, not only educationally but also emotionally, is crucial. First and foremost, health professionals need to be trained and empowered to empower others.

15.2 Learning Outcomes

At the end of this chapter, the practitioner will be able to:

- Discuss the role of family and friends as carers and how healthcare professionals should facilitate family involvement in care
- Describe how to empower patients and carers
- Discuss the importance of education programmes for patients with hip fractures
- Describe how caregiver support programmes can affect care-related burden
- Define the term eHealth technology

15.3 The Value of Partnership Work and Empowerment

There has been a significant shift in the way healthcare professionals view care, from a medical-centred model to a patient-centred approach. It is now recognised that a key priority for patients is how their wishes and those of their families and carers are integrated into the care process. Healthcare professionals are expected to focus on working with patients and families of all ages, at all levels of care and in all healthcare settings [7].

The aim of patient-centred healthcare is to empower patients to become active participants in their own care, while also ensuring the empowerment of the family when they play an important role in patient care [6]. The philosophical concept of empowerment can be traced from Latin America and Paulo Freire and his 'Pedagogy of the Oppressed' [8] to other philosophers such as Sartre [9]. Although Freire's theory of consciousness-raising among underprivileged groups was not related to illness, the idea is that encouraging people to reflect on their situation is a way of allowing power to come from the person and for change to happen, that empowerment highlights the person's competencies and that there are many different solutions to a problem. The idea behind the concept of empowerment is that it is possible to help people cope and feel better through dialogue and reflection between the professional and the person in need, or between the family carer and the care provider. According to Freire, as part of an empowerment strategy, the professional should encourage the person to reveal their own vulnerability and resources in the face of illness and other limitations, in order to reflect together on the meaning of the illness and to promote the person's choice to act and cope.

Research shows [10] that to empower a person, it is necessary to take a holistic approach, considering all aspects of the person's needs, such as social, spiritual, emotional, and physical. Simply inviting a person to participate in their own care process will not lead to empowerment, so it is important that the person's private experiences and thoughts are in harmony with what they are doing. The empowerment process is a continuous interaction of empowering practice and critical reflection. However, practitioners must first become empowered themselves before empowering others, as a person needs competence and motivation to empower others.

According to Adams [11], empowerment is the ability of individuals or groups to take control of the situation and achieve their own goals. It is the process by which individuals or groups can improve their quality of life and help themselves. The literature shows [12, 13] that educational support for patients and carers, and the provision of resources and methods that increase self-awareness, ensure an empowerment process, which is important during patients' recovery, especially after traumatic events such as a fragility fracture.

Health professionals are vital in the empowerment process of family carers and patients. Only by considering the situations and experiences of family members will it be possible to define their needs [14].

Empowerment of family carers and patients can be achieved in several ways, such as providing comprehensive information about health conditions; involving

them in care decisions; helping them to recognise their own needs; encouraging them to keep in touch with friends and others with similar experiences. Providing financial support, in countries where the social/health system allows, is also considered an important resource in the empowerment process. Feeling supported educationally and emotionally also prevents exhaustion and stress. In orthopaedic wards, patient and caregiver empowerment, managed by specially trained nurses and a specialised, tailor-made rehabilitation programme, can be instrumental in helping patients reduce their hospital stay and return to their previous life [15].

Carr [16] states that the levels of participation in decisions about one's own health and the empowerment of people who use social/health services continue to be low, highlighting the fact that the lives of family carers and people who use services are often so pressurised that they are reluctant and/or unable to make decisions. This shows that the creation of health and emotional support and education programmes led by health professionals needs to become routine in all health services so that 'making decisions about one's health' can become the norm for patients and carers.

15.4 Educational Support to the Patient

Patient education can be defined as 'the process by which the patient comes to understand his or her physical condition and self-care through the use of various media and experiences' [17]. The main aim of patient education is to enable patients to make appropriate decisions to improve their health. Therefore, patient education is much more than just understanding the health problem or disease [17]. Sometimes it requires changes in values, attitudes, and beliefs, which are not easy to achieve. Healthcare providers must create a friendly environment in which patients can share their perceptions and discuss the changes needed, which may include help from others and/or changes in habits and customs. The use of adapted (simple) language by health professionals to facilitate the understanding of health problems and to ensure the right shared decision-making [18] is also essential. Some of the theoretical models used by healthcare providers to design patient education programmes are:

- cognitive dissonance theory [19]
- self-efficacy theory [20]
- health belief model [21]
- adult learning theory [22]

All these models describe different concepts and offer tools for providing appropriate patient education. Some of the benefits of patient education described in the literature include [23]:

- improved continuity of care
- reduced complications
- increased adherence to treatment

- improved satisfaction
- anxiety, empowerment of patients
- improvement in their independence and quality of life

It has also been shown to reduce costs by reducing hospital stays and health centre visits [24].

Educating older adults with hip fracture about their injury and the best treatments is essential. However, age should be considered when designing specific patient education programmes to ensure an appropriate decision-making process, which should include family/carers. Some specific postoperative educational programmes conducted with older adults with hip fracture have been shown to be effective in:

- improving chances of discharge to home [25]
- health-related quality of life [26]
- functional status [27–29]
- satisfaction [30]
- reducing functional urinary incontinence [31]

These educational programmes have been delivered face to face, but there are other blended programmes using written information and online resources, such as the FReSH Start toolkit (manual and online resources) [32, 33] and the ActiveHip+ educational programme for older adults with hip fracture and their carers [34]. Although each patient education programme must be designed considering the context and specific characteristics of each population, the FReSH Start toolkit [32, 33] and the ActiveHip+ programme [33, 34] can be used as examples of education programmes for older adults with hip fracture.

The basic content that should be included in this type of health education programme for patients includes:

- An overview of the process from hospital admission to discharge to reduce anxiety for older adults and their carers. This overview could be provided using a friendly infographic with information about medical tests (e.g. X-rays, blood tests), healthcare providers who will see the patient (e.g. doctors, nurses, physiotherapists, occupational therapists, social workers), schedules of activities in the hospital (e.g. meals, Activities of Daily Living (ADL) training, medication intake, exercise training), and any other information of interest from each health centre.
- Knowledge of hip anatomy and biomechanics, types of surgery and postoperative mobility prescription, including an overview of activities to avoid early after hemiarthroplasty (the main movements to avoid are hip flexion above 90° and hip adduction) as discussed in Chap. 7.
- Common misconceptions about hip fracture. Sometimes older adults have misconceptions based on the experiences of other relatives, friends, or neighbours who have had a hip fracture. Healthcare professionals need to provide information about best practice based on the latest evidence. For example, explaining

- why early mobility (within 24 h after surgery) is important (see Chap. 8), or performing ADLs as soon as possible, including self-care and locomotion.
- Pain management. Explanation of ‘typical’ pain patterns after hip fracture, and basic analgesic medication and its use specifically before ambulation (see Chap. 8). A clear message encouraging older adults to ask doctors and nurses if pain persists needs to be included, as does an emphasis on controlling pain while remaining active.
 - Post-surgery mobilisation. Healthcare professionals should provide a detailed description of exercises to be performed in the first days after surgery, the correct way to walk (using different walking aids), the safest way to perform transfers (e.g. bed-to-chair, chair-to-toilet), and other ADLs (24 h after surgery if indicated) [34]. The focus needs to be on supporting older adults to do as much as possible, even though tasks may take longer in the early days. Chapter 8 provides more detail about remobilisation and exercise.
 - Assistive devices for ADLs and mobility. Healthcare professionals can demonstrate and explain the use of some ADL aids (e.g. raised toilet seat, bath transfer bench, long shoe horn) and mobility aids (e.g. walker, crutch, cane, and crutches).
 - An overview of the recovery process after discharge from hospital. An infographic with information on the different care pathways available in each context, health and social resources, key contact details for social and health services, reminders for medical appointments, and home recommendations would help older adults cope with the new situation. Chapter 16 considers discharge and post hospital care in more detail.
 - Hydration and nutrition. It is essential to provide information on the importance of maintaining adequate hydration and optimal nutrition with a protein-rich, nutrient-dense diet, and dairy products to support the recovery process so that patients and their carers can engage actively in this aspect of their care (see Chap. 11).
 - Home environment recommendations. Healthcare providers need to emphasise the importance of a safe home environment that supports older adults to move around and reduces fall risk factors, such as adequate handrails, supportive lighting, and clear paths between rooms.
 - Post-discharge mobilisation. Examples of balance and strength exercises of varying levels of difficulty to be performed at home and outdoors, and suggestions for adapted ADLs to be performed at home to improve physical function and independence need to be provided (see Chap. 14). Healthcare providers need to encourage older adults to go out for shopping or leisure activities to increase social participation.
 - Routines and wellbeing. It is important to prevent older adults from taking on a passive role. Therefore, the moment of returning home will be very important for regaining roles, routines, and social interactions to avoid depression and isolation. Family carers and friends can support older adults to engage in some leisure activities, make phone calls, and meet other relatives and friends to improve their wellbeing.

- Preventing falls and secondary fractures. Information about osteoporosis, medications to stimulate bone regeneration, dietary and physical activity recommendations should be discussed with patients to ensure proper understanding and to motivate them to adopt new habits. See Chaps. 1 and 5 for more information about osteoporosis treatment and Chap. 4 for falls prevention.

15.5 Family Involvement in the Care Process

The concept of family care has also evolved significantly and now reflects the changing nature of ‘family’ in society. Much informal care is provided by individuals who would not traditionally be considered family members, and such ‘informal care’ is recognised as an important facet of care provision. Informal caregivers are defined as ‘persons without formal health care training who are caring for or assisting a person with functional disabilities, prolonged psychiatric or physical illness, or age-related problems’ [35].

Families (defined in this chapter as anyone who has an important relationship with the patient, such as relatives, partners, friends, and neighbours) are an essential component of care, health, and wellbeing; quality and safety initiatives recognise their role in ensuring high standards of care [36]. Families often act as primary carers and advocates for patients who are unable to make decisions for themselves (see Chap. 17). They are an essential part of the patient care continuum, and a key feature of holistic care is that nurses need to collaborate with others to achieve best practice [36].

There are four key factors to consider in relation to patient and family involvement:

- dignity and respect
- information sharing
- participation
- collaboration

Communication is also a key factor in ensuring timely and appropriate information sharing between healthcare professionals and the patient and family. Any information shared should be unbiased and relevant; asking the patient or family what they need to know or understand better can help avoid frustration, miscommunication, upset, and anxiety. Practitioners also need to communicate the same message to the patient and family to avoid misunderstandings and ensure they can make the most appropriate decision about their care [37].

During the process of family involvement, it is important to gain and document a full holistic understanding of the family’s role in the patient’s care; without ever assuming that the family is willing or able to provide care, nor judging whether they would prefer not to be involved in direct care. It is important to establish how much support has been, and can be, provided by non-family members, the costs involved and its effectiveness. The family should be asked if they know of any voluntary or

community support that can provide resources. Grants and financial support may be available to patients and family members from social work/care agencies or voluntary organisations [36].

Family involvement in post-discharge care requires careful planning and organisation during the discharge planning process, starting with an open discussion with the patient and family to ensure that everyone understands the implications of decisions. Arrangements need to be made for equipment and services at home. Family members may need to develop specific caring skills and arrangements need to be made to ensure that they understand issues such as the patient's limitations and potential progress towards recovery. If the decision is made to discharge the patient to a residential facility, either permanently or temporarily, the implications for the family, such as social and financial aspects, need to be carefully considered with the help of social workers [38].

15.6 Caregiver Burden and Supporting Caregivers

Depending on the carer's circumstances, caring can be a joy or a source of anxiety. A person who needs a lot of help and care can have a negative impact on the caregiver's quality of life, which can also affect the relationship between caregiver and care recipient [39].

The rehabilitation task of caregiving in the context of hip fracture most often falls to a family member. Several studies have focused on the concept of burden, defined as 'caregiving burden', losing sight of the importance of assessing the positive aspects that characterise an individual's health status. Informal carers are an important resource for older hip fracture patients, as they play a key role in their recovery. One important role is to motivate patients to adhere to their treatment programmes. Informal caregivers have to cope with physical, psychological, and social stressors that negatively affect their health status and quality of life [13, 40].

Many carers take on the role of carer with little or no preparation and have to learn to manage several aspects of care in a very short time. In most cases, they do not have any professional skills in caregiving. In fact, carers often do not know what to expect during hip fracture recovery. They are faced with situations where they must deal with various care-related tasks, such as arranging rehabilitation services and assistive devices. These situations become more stressful when caregivers have to balance their own work and family life with their caregiving activities. Informal caregivers have been repeatedly recognised as a model of chronic stress due to the high levels of daily stress they experience. The main stressors experienced by informal caregivers are related to the severity of the illness and the amount of time spent providing assistance [41, 42].

When caregivers are observed over a considerable period of time, it becomes clear that family caregiving responsibilities do not end when a disabled relative moves to institutional care. Instead, this important transition seems to influence the

type and intensity of help provided. Some studies treat institutionalisation as an 'endpoint' in family caring, but recent research has highlighted the continuing involvement of relatives in care and the impact of institutionalisation on family members' stress and mental health [43].

High levels of depressive symptoms and low levels of life satisfaction among caregivers may also be associated with poor quality of care provided to their frail care recipients and even with mistreatment of the older adult (see Chap. 17). Caregiver burden and related stress negatively affect caregivers' perceived overall physical and mental health and have been negatively correlated with the functional status of older family members 1 month after discharge following hip fracture surgery [44].

Research shows that what family carers need most is support and information. The most frequently mentioned issues by family caregivers were the need for advice in complicated situations and the need for information about medication and onset of disorientation and mood changes. Carers also need both skills and knowledge to provide care and to reduce their own distress [45].

A literature review has shown that there are several ways to empower family carers through educational courses and information services. However, these initiatives should offer family carers the opportunity to express their needs and should include ways to help family carers better manage their emotions and increase coping/problem-solving skills. Knowledge about the rights of the family carer and the different support services available to them should be provided. It is essential that training courses and information services are well planned to increase family carers' self-esteem by providing the right kind of skills and knowledge, for example, on medication management and depression. Family carers will be empowered through the improvement of their competence and self-esteem through meeting the psychological needs of their carers [46].

The needs of carers must be considered when designing educational content for them. Educational needs change according to the socio-economic and anthropological conditions in which the patients find themselves, and according to the characteristics of the carers themselves. It is common to find informal carers who are of a different nationality from the patient and who provide different types of care according to their own culture [47].

As the literature shows, the needs of caregivers range from the more technical to the more relational. Multidisciplinary educational initiatives that include this content have been shown to be effective in reducing stress and inappropriate hospitalisation. Carers participating in these support programmes have also reported feeling valued and empowered. In addition to the topics usually included patient education following fractures, the caregiver of a post-fracture patient needs appropriate attention to effective communication with the patient, support for the cognitively impaired patient, the role of the caregiver, consideration of anthropological differences, and stress management through the development of appropriate coping strategies [48].

15.7 Family Cares and Patient Education Using Technology

The COVID-19 pandemic has given digital educational pathways enormous visibility, as it was impossible to organise face-to-face support groups for patients and carers worldwide. The term ‘eHealth technology’ is used to refer to digital support (mobile applications, web-based platforms, virtual reality, etc.) that delivers digital interventions or relevant educational content. Studies have found many positive aspects of this approach and suggest that digital health tools can be an inexpensive, easily accessible and time-saving option for addressing caregiver burden and mental health. Further improvement and the development of commercialised digital health tools that are scientifically based but tailored to carers is needed [49].

Evidence suggests [50] that digital tools for caregivers (including web-based solutions, mobile applications, or virtual reality; through video, audio, text, and interactive content) that help to develop coping skills, emotional self-regulation, caregiver education, skill building, and training using a well-structured approach can be very effective in managing caregiver stress and burden. Due to their accessibility, adaptability, and the ability to provide structured and therapeutic interventions, digital health tools are an important means of support for informal carers.

Regarding the use of digital content among patients, it is important to consider that the digital format is not an option for all patient profiles (if they have cognitive deficits or are unfamiliar with devices such as smartphones, PCs, tablets) and health-care providers need to explore the preferences and digital skills of each older adult before offering this type of educational programme [49].

Summary and Main Points for Learning

- The aim of patient-centred healthcare is to empower patients to become active participants in their own care, while also ensuring the empowerment of the family when they play an important role in patient care. A key priority for patients is how their wishes and those of their families and carers are integrated into the care process. Healthcare professionals are expected to focus on working with patients and families of all ages, at all levels of care and in all healthcare settings.
- Educating older adults with hip fracture about their injury and the best treatments is an essential aspect of healthcare. However, the age of this patient profile should be considered when designing specific patient education programmes to ensure an appropriate decision-making process, which should include their carers.
- The needs of carers must be considered when designing educational content for them. Educational needs change according to the socio-economic and anthropological conditions in which the patients find themselves, and according to the characteristics of the carers themselves. It is common to find informal carers who are of a different nationality from the patient and who provide different types of care according to their own culture.

15.8 Suggested Further Study

Ariza-Vega P, Ortiz-Piña M, Kristensen MT, Castellote-Caballero Y, Jiménez-Moleón JJ (2019) High perceived caregiver burden for relatives of patients following hip fracture surgery. *Disabil Rehabil.* 41(3):311–318. <https://doi.org/10.1080/09638288.2017.1390612>.

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Discharge and Post-hospital Care

16

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16.1 Introduction

Fragility fracture is the result of a combination of bone fragility and a fall. Hip fracture and other significant fractures are devastating injuries for both the patient and their family, especially if the patient is older which nearly always requires admission to an acute hospital. The impact of such injuries and subsequent surgery on mobility, function, and independence is immense and the recovery process requires both physical and psychosocial care [1] which usually aims to return the person to their place of residence before the injury. A well-planned discharge can reduce the risk of adverse outcomes and readmissions. A multidisciplinary approach and good communication both with the patient and family/informal caregivers as well as primary care throughout the process is essential for a safe discharge.

Patients' and their families' feelings of not being seen, heard, or given opportunity to take part in planning discharge and post-hospital care can negatively influence their experience of transition to another level of care. Studies show that actively [2]. Families and caregivers can play an important role in post-hospital care so should be deeply involved in discharge planning. Studies show that patients have lower readmission rates when caregivers are involved.

Case management models can be used to integrate services to meet the needs of people with complex care needs. Such approaches can help in planning and preparing patients with hip fracture or other significant fragility fractures for discharge.

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One model that has demonstrated effectiveness in addressing the needs of patients with fragility fractures is the Transitional Care Model (TCM).

This chapter aims to give an overview of best practice in discharge planning, discharge, and post-hospital care following fragility fracture and describe different case management models.

16.2 Learning Outcomes

At the end of this chapter, the practitioner will be able to:

- Describe patient's, families', and caregivers' involvement in planning discharge
- Describe different elements of a discharge plan
- Effectively plan discharge with the involvement of the patient, family, and caregivers
- Describe different case management models
- Describe elements of post-hospital care

16.3 Patient and Carer Involvement in Discharge from Hospital

Communication is a significant factor in patient satisfaction and complaints about care. Research shows that older people often feel anxiety, stress, and uncertainty about the future after a hospital stay [3]. Lack of communication and involvement when planning discharge and post-hospital care can increase these feelings, so involving the patient in discussions and decision-making about the plan for post-hospital care may decrease stress and increase their satisfaction. When planning discharge, it is essential that practitioners assess what patients' needs will be after discharge is essential. One part of this assessment is asking patients about what help they think they will need [4]. Patients who are given information about how to evaluate symptoms, manage medication, and undertake activities feel better prepared for discharge.

The capacity to understand and execute discharge instructions is important for patients for effective self-care [3]. They may have problems understanding the information that is given and be reluctant to ask questions because they do not want to bother the healthcare workers. Studies show that many patients forget information they are given and that the information they do remember may be inaccurate. Informal caregivers, who are often family members, frequently participate in caring for the older people following discharge. They are, therefore, an important resource when helping the patient to understand information and asking questions on their behalf; being in a closer relationship to the patient enables them to capture vital information that the patient may miss. Family caregivers who receive adequate information and feel involved in hospital-to-home transitions are likely to be more satisfied, accepting of their caregiving role and experience less anxiety. For patients

with cognitive impairment involving family from day one is essential. Supporting patients and caregivers to take a more active role during care transitions may also reduce rates of readmission.

The patient and family have a right to be involved at every stage of the process, so collaboration and continuity of care are central. To prepare the person and their family for discharge a structured conversation with them is vital to allow exchange of vital information and clarify any elements of uncertainty. Written information should support oral information and should be brief, relevant, and easy to read [5]. The conversation/meeting should consider the patient's needs and abilities. Family members should be given the opportunity to participate with patient permission, especially if the patient has any cognitive impairment. The meeting should be scheduled to give the patient and relatives time to prepare.

Communication failures between clinicians are the most common primary cause of errors and adverse events in health care [8]. Communication between hospital caregivers and caregivers in primary care or institutions is essential to clarify what kind of care the patient needs post-discharge and what kind of care the place of discharge can offer. This helps to avoid unrealistic expectations about the level of care the patient can expect. Patients and their caregivers want to know how long they are staying in hospital, and when they can expect discharge so beginning this conversation early in the admission is essential even though firm plans for discharge may be uncertain. Although a discharge date will not be definite, patients and caregivers should be given a tentative date for discharge early on so they know what to plan for. All relevant information, including what is important for the patient, should be given as early as possible so that the next level of care knows the discharge plan and can put in place the resources need to follow it. Reassuring the patient about their care after discharge may ease the transition.

Box 16.1 Case Study: Discharge from Hospital Following Fragility Hip Fracture

Mrs. da Silva fractured her left hip a week ago. The fracture was surgically fixed the day after admission. She is an 82-year-old widow who lives alone in a one bedroomed apartment in a high rise building with a lift. Her son and his family, who provide support, lives nearby.

You have ascertained that, prior to the fracture, Mrs. da Silva was fairly fit and well for her age. She attended a social group for older people once a week as well as a weekly chair exercise class for elders at a local community centre. She did most of her own cooking and housework although her family have shopped for her and provided additional support with household activities since her husband died 4 years ago. However, she reports that she has had a couple of falls at home recently and that she has been suffering from low mood.

At present Mrs. da Silva is slowly remobilising. She is finding this process difficult as she says she seems to have lost her confidence and she is struggling to get her appetite back.

On admission, the plan for discharge was that Mrs. da Silva would be discharged approximately 10 days after her surgery. At this point, you are starting to focus on a more concrete plan for her discharge.

Consider:

- What else do you need to know that will help you to plan Mrs. da Silva's discharge? How might you access this information?
- What options might there be for Mrs. da Silva when she leaves hospital, given what you know about what is available in your own locality?
- With whom do you think you should discuss these options?
- Who, in your locality, can help you to make a discharge plan for Mrs. da Silva?

16.4 Preparing for Discharge

Discharge from hospital of an older person after hip fracture or other significant fragility fracture to the most appropriate setting is complex and requires careful planning. The combination of higher clinical acuity and shorter lengths of stay, places demand on the health services to plan discharge carefully to avoid unnecessary readmissions. Disorganised discharge can result from too much focus on rapid discharge, not involving patients and other caregivers, and not having a standardised patient assessment during care transitions [8].

Older people often experience lack of continuity of care after a hospital stay [9]. The aim is to secure a safe transition from the hospital to the next level of care and make sure that the carers at next level have enough information to continue the recovery and rehabilitation process. A rushed or poorly planned discharge may result in a new fall, health deterioration, and/or hospital readmission. Increasing evidence indicates that patients are particularly vulnerable and more likely to experience negative outcomes during these readmissions [10, 11].

Many factors can increase the risk of readmission including poorly planned discharge, inadequate post-discharge care or follow-up, therapeutic errors such as adverse drug events and other medication-related issues, inadequate transfer handovers, and complications such as infections, pressure ulcers, and new falls. Depending on the length of the hospital stay some of these factors can be modified while the patient is in hospital and some need follow-up after discharge in the primary/home care setting. Investing in a well-planned discharge and making sure that the next level of care receives the information about the patient's needs is essential in preventing adverse events and readmissions.

The whole interdisciplinary team including patients and their families should be involved in the discharge process to ensure a safe discharge. Frail older adults commonly experience a combination of mobility problems, complications, cognitive decline, and psychological problems which require a carefully thought-through individual discharge plan [12].

Table 16.1 Elements of Comprehensive Geriatric Assessment (CGA) to be considered in discharge planning

Cause of fall and status on admission	<ul style="list-style-type: none"> • Did the fracture happen due to an accident caused by dizziness, illness, medication, or alcohol? • Time from fall to hospital admission? • Did patient need medical attention before the fracture could be addressed? • Skin and nutrition/hydration status on admission can be indicators of how the patients are managing in daily life.
Comorbidities	<ul style="list-style-type: none"> • Any known or new health conditions that will impact discharge and post-hospital care? • Have there been any changes in medication that need further attention after the hospital stay?
Pre-morbid ADL-status	<ul style="list-style-type: none"> • Information about how the patient is able to function in daily activities
Cognitive status	<ul style="list-style-type: none"> • Known dementia or cognitive impairment? • Suspicion of cognitive impairment that needs following up after hospital stay? • Delirium during hospital stay?
Social network and living conditions	<ul style="list-style-type: none"> • Living alone or with someone? • Family or friends nearby who can help? • Was there any help from primary care in place before the fall? • Previously living at home or in an institution? • Home: is everything on one floor or steps/stairs?

Planning discharge should begin at hospital admission, by initiating a comprehensive geriatric assessment (CGA). A person's pre-fracture status will be an indicator for what kind of care the patient will need after the hospital stay. Frail patients leaving hospital following hip fracture and surgery will always need further care. The aim of this assessment is to identify the patient's physical, cognitive, and social resources and define what kind of help will be needed after the hospital stay to ensure continuity of care. Continuity of care and the degree to which all involved feel prepared to manage care following hospitalisation are the best predictors of a person's and caregivers' satisfaction with discharge planning [13].

Table 16.1 identifies the main elements of CGA to be considered and addressed when planning discharge as these are most likely to impact the level of care the patient will need after discharge. More detail relating to the elements of a full Comprehensive Geriatric Assessment (CGA) can be found in Chap. 6.

16.5 Discharge Readiness

The length of stay in hospital following hip fracture, other significant fragility fractures, and after surgery varies from hospital to hospital, and the health and social care services offered to the patients after discharge will also differ locally depending on the country and region. Whether the patient is ready for discharge will depend on their discharge destination: to home, subacute care, post-acute care, or a long-term care facility.

Higher acuity and pressure on hospital beds have led to shorter lengths of stay in many localities. The impact of this is less time for the interdisciplinary team to assess and prepare patients, families, and caregivers for discharge. Assessment of length of hospital stay must be considered individually and identifying when the patient is ready for discharge will vary. Being medically ready for discharge may not mean the patient is ready in other aspects such as physical, psychological, and social readiness. The focus on shorter hospital stays has meant that some guidelines recommend that the medical well-being and functional capacity of the patient should be assessed before the patient can be considered ready for discharge as identified in the discharge checklist in Box 16.2 [14].

Box 16.2 Medical Discharge Readiness Checklist [14]

Hemodynamically stable?

No fever?

Is haemoglobin level stable and not decreasing?

Is kidney and cardiovascular function acceptable, with no major electrolyte disturbances?

Is there a normal level of consciousness (Glasgow Coma Scale)?

Is pain management adequate?

Are delirium and other complications under control?

Is there an acceptable fluid and nutritional intake?

Medical conditions and symptoms under control?

Is mobility adequate for discharge location and support available?

Although clinicians may clear the patient medically for discharge, the patient may not feel ready for discharge physically nor psychologically. Box 16.3 provides a case example of the impact of this. Preparing them for discharge, giving an estimate of length of stay on admission, and actively involving the patient and family/caregivers in decisions can be instrumental in the formulation and execution of a transitional care plan in which the patient is fully engaged. Preparing patients and their caregivers for what to expect after discharge involves giving them the opportunity to provide input into the plan of care regarding their values and preferences.

An important component of this preparation is to ensure that the person and their caregivers are given clear advice on how to manage their conditions, how to recognise warning signs that something has worsened needs attention (e.g. delayed wound problems, infections) and who to contact [15].

Studies have demonstrated the effectiveness of case management in hip fracture patients. Through patient assessment, effective communication, coordination, and careful allocation of resources, integrated and personalised social and health services can improve the quality of patient care [6]. Case management accompanies patients from admission to discharge, from the ward to home, and provides them with assistance and help in every detail. This approach can ensure that patients receive high-quality personalised nursing and other services, but also provide

psychological support, which facilitates patients' rapid return to society after their injury/surgery [7, 8]. Evidence has shown that a case manager for patients with hip fractures can also increase the rates of appropriate treatment of osteoporosis with a subsequent reduction in future fractures, an increase in life expectancy, and a substantial reduction in costs [9, 10].

Box 16.3 Case Study: Discharge Readiness

Ms. Hansen, an 84-year-old with dementia and paroxysmal atrial fibrillation, has been living in a nursing home for the last year. She was admitted to the orthopaedic unit after a fall but had to wait 48 h for the operation because she is anticoagulated with direct oral anticoagulants (DOAC). She had a hemiarthroplasty for her sub-capital hip fracture 2 days after she was admitted to hospital. She was very confused, anxious, and agitated preoperatively. Post-operatively, she has been mobilised, but she seems lethargic and very reluctant to move. Her haemoglobin dropped from 10.1 to 7.5 mg/dL, and she was transfused with 2 units of blood the same day she was discharged.

It is the usual routine for nursing homes to be informed on admission that the patient will be discharged a day or two after surgery. Ms. Hansen was discharged back to the nursing home 2 days after the operation, the nursing home staff were given notice the same day.

Three days later, she was readmitted with deterioration in her general condition, low haemoglobin, and fever.

Consider:

1. What can we learn from this patient's story?
2. What do you suggest might be the reasons for readmission?
3. Could the readmission have been prevented, and how?

16.6 Case Management Models: A Resource in the Discharge Process

In some countries, case management is a model of care that supports individuals and families facing numerous health and well-being challenges, including fragility fractures. As case management practices have evolved, the definition of the term has become increasingly complex, with different organisations offering a myriad of case management interventions. Case managers come from diverse professional backgrounds in health and social care services, including nursing, medicine, social work, rehabilitation counselling, workers' compensation schemes, and psychological and social healthcare providers. The main role of case managers is to support clients and support systems in managing complex care needs [16].

The term ‘case management models’ encompasses a range of approaches and services that have evolved over the years. Case management was originally conceived as a service for persons with severe and persistent mental illness [17, 18] but has expanded to include other groups such as older people being discharged from hospital.

There are several case management models; the four most critical ones that can be modified and adapted to ensure effective results in a variety of case management contexts, including discharge planning, are [19]:

- The Brokerage Model Case Management
- The Clinical Case Management Model
- The Strengths-Based Clinical Case Management Model
- The Intensive Case Management (ICM) Model

16.6.1 The Brokerage Case Management Model

This model focuses on needs assessment, referral to services, and synchronisation and supervision of ongoing treatment. The services are mainly office-based, and the case manager coordinates the services offered by a range of agencies and professionals. The model aspires to the individual being given responsibility for deciding the approach and timing for using the resources available to them once they have been informed about the options. In this model, case managers are not as involved with the client as in other models, and most of their time is spent organising patient care and ensuring a smooth flow of services. Like all case management models, the Brokerage Model has its merits and disadvantages. While the model offers clients higher levels of freedom, it also allows case managers to serve more clients, as there is less interaction. The model is not considered ideal for some complex cases where case managers need to spend more time with clients. Since they cannot have a closer relationship with case managers, many clients do not opt for this model [20].

16.6.2 The Clinical Case Management Model

This model grew out of the need for case managers to provide therapeutic services. Although the clinical model is similar to the brokerage model (in the prominence of commitment assessment, assessment and planning, and community liaison), it has the added component of therapeutic interventions, including psychotherapy, psychoeducation, and crisis intervention. Considering hospital discharge as an event that can cause despondency, anxiety, and worry, the therapeutic interventions offered by this model is useful for both patients and their families.

Studies [19, 20] show that this case management model can be very effective when performed by nurses. Because the nurse case manager is aware of the person’s needs, their level of understanding enhances their ability to identify needed services and connect the person with formal resources in the form of community service

providers. Clinical care providers can also encourage the patient and their family to connect with family, friends, and peers, helping them to address social, emotional, and psychological barriers to services. This association can increase the client's willingness and ability to engage with services.

Being clinicians, case managers in the Clinical Case Management (CCM) model have more responsibility than in the Brokerage model, as they provide a wider variety of services. They focus more on executing the entire care plan for the patient, rather than simply referring them to other professionals as in the Brokerage model. As they are more involved with clients/patients, they can assess gaps and identify areas for improvement in their care plans. Clients feel more motivated and supported, which makes care more efficient.

The CCM model is built around the client's personal strengths, goals and needs, valuable information that is carefully incorporated into each step of the rehabilitation process, helping the patient to feel more enthusiastic, increasing its effectiveness.

16.6.3 The Strengths-Based Clinical Case Management Model

As the name suggests, the model is based on a person's strengths. The case manager in the strengths-based model has the responsibility and skills to identify and analyse a client's particular strengths. The analysis of these strengths then forms the basis of a tailored care plan for the client [16, 18].

The reason why strength-based clinical case management models are successful is that they are built around the person's goals and personal needs, valuable information that is carefully incorporated into every step of the recovery/rehabilitation process. Through such personalised care, the model dispels the notion of 'one size fits all' and instead creates care plans that are perfectly tailored to each client's needs.

This model of case management recognises that the critical goal of a case manager goes beyond simply accessing services, while caseworkers focus on empowering clients and their families. This approach is highly effective, for example, with hip fracture patients and their careers, where empowerment is the basis of all education and support interventions. This topic is discussed in more detail in Chap. 15.

This model also recognises the value of community services and working with families; it encourages the client to develop and maintain informal support networks as well as recognising and accessing formal community services and established resources.

16.6.4 The Intensive Case Management (ICM) Model

The objective of the ICM model is to provide high-quality services in a short period of time. One of the ways in which the model differs from the brokerage model is that patients receive much more individual attention from case managers, as the goal is to do more in less time. The case manager can meet regularly with the patient

and follow their progress, determine the duration of rehabilitation or discharge date according to their individual needs, and share information with other clinicians and case managers to ensure comprehensive individual care.

With a greater degree of involvement, recovery/rehabilitation/discharge is achieved earlier than with other case management models. Moreover, the relationship between the client and the case manager is stronger than any other model, promising better and faster results. The downside is that some clients may find the ICM care plan intense, potentially causing stress about their progress in the rehabilitation process [20].

16.7 The Transition to Post-hospital Care

Although some re-hospitalisations are appropriate and unavoidable, it is estimated that between 13 and 20% of those experienced by chronically ill older adults are preventable [19–21]. Patients with hip fracture are often older adults with multiple chronic conditions complicated by other risk factors, such as deficits in activities of daily living or social barriers. They experience multiple challenges in managing their healthcare needs, especially during episodes of acute illness. Identifying effective strategies to improve transitions and outcomes of care is essential. One rigorously tested model that has consistently demonstrated effectiveness in addressing these complex needs while reducing healthcare costs is the Transitional Care Model (TCM). The TCM is a nurse-led intervention targeting older adults at risk for poor outcomes as they move across healthcare settings and between clinicians.

The TCM focuses on improving care, improving patient and family caregiver outcomes, and reducing costs among vulnerable and chronically ill older adults identified in health systems and community-based settings such as patient-centred care/nursing homes. The model emphasises the identification of patient health goals, the design and implementation of a streamlined care plan, and continuity of care across settings and across providers during and following acute illness episodes (e.g. from hospital to home) [22–24]. Care is delivered and coordinated by the same advanced practice registered nurse, in collaboration with patients, their families, physicians, and other members of the multidisciplinary healthcare team [24].

We can illustrate this pathway as if it were the guarded passage of a precious stone (the patient) between the hands of the different hospital actors (such as the nurse case managers) until it arrives in the hands of the territorial actors of post-hospital care (such as the family nurse, a figure present in European and South American healthcare settings) [25].

The rigorous evaluation of TCM-based interventions and review of detailed case summaries developed by the participating expert nurses led to the development and continuous refinement of the nine core components of the model. Each of the core elements of TCM are identified and defined in Table 16.2 [26, 27]. Although each element is defined separately, it is important to note that all are interconnected and part of a holistic care process.

Table 16.2 Transitional Care Model (TCM) components and definitions

Component	Definition
Screening	Targets adults transitioning from hospital to home who are at high risk for poor outcomes
Staffing	Uses expert nurses who assume primary responsibility for case management throughout episodes of acute illness
Maintaining relationships	Establishes and maintains a trusting relationship with the patient and family caregivers involved in the patients' care
Engaging patients and caregivers	Engages older adults in design and implementation of the plan of care aligned with their preferences, values, and goals
Assessing/managing risks and symptoms	Identifies and addresses the patient's priority risk factors and symptoms
Educating/promoting self-management	Prepares older adults and family caregivers to identify and respond quickly to worsening symptoms
Collaborating	Promotes consensus on plan of care between older adults and members of the care team

Following hip fracture and other significant fragility fractures, patients require care from a wide range of providers in different settings, including hospitals, inpatient rehabilitation units, outpatient clinics, home care, assisted living facilities, and long-term care homes [28, 29]. It is estimated that they undergo an average of 3.5 moves or relocations within 6 months of the injury [30]. Care transitions are a vulnerable time for patients, as poorly managed transitions can lead to medication errors, hospital readmissions, negative patient outcomes, and compromised patient satisfaction.

As discussed in Chap. 15, during and after the discharge process of fragility fracture patients, it is crucial to give attention to their caregivers. During care transitions, caregivers are often the only constant factor in the patient's life [30]. Caregivers and patients can provide insight into the quality-of-care transitions and their involvement in care planning can improve patient outcomes [8]. A randomised controlled trial found that older patients had lower hospital readmission rates when caregivers and patients received tools to communicate with providers, were encouraged to take an active role in care planning and received guidance from a transition coach. Unfortunately, despite the importance of caregivers in care planning, caregiver involvement during care transitions is often lacking [30]. Jeffs et al. [31] found that caregivers of orthopaedic patients were not actively involved during care planning and did not receive adequate support from the care team after discharge.

16.8 Post-hospital Care

Leaving the hospital setting, often perceived as a protected environment, and returning home can be traumatic for patients and their families. Following hip fracture and other significant fragility fractures, patients are at risk of functional decline, multimorbidity, and institutionalisation [32]. Approximately 13.5% of patients die within 6 months after hip fracture and, of those who survive, only 50% regain their

pre-fracture mobility [33]. This generates worry, anxiety, and stress within the family unit [34].

In a reality where the World Health Organization identifies the home as the ideal place of care, health systems are called upon to make this type of care feasible and to support the family unit by providing adequate territorial social and health services [35]. The care pathway of older adults following significantly fragility fractures such as hip fracture has been the subject of several studies [28, 29, 36] in which patients, their relatives, and caregivers were interviewed at each point of transition in order to understand their experiences during the entire care pathway, including the return home [36]. In transitions to and from formal care settings, patients and caregivers were particularly troubled by confusion about the roles of the multiple providers involved in their care, and often described difficulty in distinguishing between different types of staff or providers in acute care and hospital rehabilitation settings.

In all transitions, information about the patient's condition, care and transition trajectory was not readily available or provided to patients or caregivers. This lack of information was particularly relevant for patients and caregivers transitioning from acute care to home, or from hospital rehabilitation to home. Caregivers who experienced the transition from acute care explained that they often did not receive any information. The patient, however, was often overloaded with information while sedated, tired, or anxious. Sometimes, patients were given brochures or information sheets containing general information about the hip fracture and the surgery but were left free to interpret this information independently. In some cases, the written information was even passed on to them by patients who had received other operations, such as hip replacements. Many of the patients' questions, however, concerned their care needs and recovery process so the standard written information provided by the brochures was not helpful in answering their questions or preparing them for their return home.

The difficulty patients and caregivers experienced in obtaining information from providers contributed to the feeling of being instructed during care, rather than being actively involved in their care decisions. Patients and caregivers in transitions from acute care or hospital rehabilitation to home did not feel involved in decisions made about their care.

Toscan and colleagues [28] explained that, in the transition to home, the greatest challenge is isolation and self-doubt, suggesting that this uncertainty can be a significant obstacle for patients and caregivers transitioning to a home environment. The transition home was particularly stressful for family caregivers, who were suddenly responsible for most of the patient's care. Caregivers were expected to manage the transition, which involved a several care tasks [37]. These expectations often came without any flexibility or consideration of the caregiver's availability and without direct instructions on how best to provide the patient with the care they needed at home. This dependence on family caregivers causes discomfort and stress, especially because most caregivers lack the skills and knowledge to adequately care for the patient at home. In the transition to home care, patients and caregivers felt very unprepared and uncertain about patient care in the future. This feeling of

unpreparedness was particularly hard on caregivers, who felt very unsure of how to care for the patient at home. Brooks and colleagues [38] concluded that, in the transition to home care, caregiver stress is associated with a lack of information. Supporting caregivers is considered in more detail in Chap. 15.

Staying in the home setting is not always possible. Worsening health status, the patient's level of dependency, changes in family structure and economic conditions are among the reasons why the demand for residential care facilities (RCF) has increased rapidly. The transition to an RCF is a critical period for older adults as a significant life event that requires them to adapt to a new environment, facing substantial challenges. Studies have reported that individuals experienced substantial emotional responses, limited communication opportunities, isolation, and changes in social support and living patterns. Newly admitted residents to care homes experienced loss of autonomy, stress, and uncertainty at the beginning of the move. Older people are more vulnerable to stress and anxiety in these new locations because they usually depend heavily on familiar people and their usual environment to maintain their independence. Maladaptation to the new situation can damage the quality of life and health status of older people [37].

The process of moving to an RCF requires residents to make complex and important decisions [38]. The decision-making process is the first phase of the transition when the degree of preparedness for the transfer is very important because it determines the outcome of the overall transition. Adaptation was poor for residents whose admission to a nursing home was unplanned. Some older people who felt excluded from the process reported a decrease in psychological well-being [30]. The decision-making process consisted mainly of two elements: the reasons for the move and the behaviour of the placement decision-maker. Similar results were found in a study that revealed four phases: initiation of the placement decision (mainly the reasons), evaluation and weighting of the decision, finalisation of the decision, and evaluation of the decision [39].

Culture is also an important factor influencing how older people respond to care home life [39]. The RCF is often a place of residence for older people of different socio-economic statuses, education levels, and career and cultural backgrounds. Older people from different countries and cultures respond differently to relocation.

Despite common levels of stress and burden, most caregivers reported wanting to care for their chronically ill family members at home and consider RCFs as a last resort [37].

Nurses play a central role in educating, advocating, and supporting the transition of residents into RCFs. However, they need to understand that the adaptation process is dynamic and that tailor-made interventions should be considered to meet the needs of residents in their own time. There are four key points to promote adaptation [39]:

- Encouraging residents to express their feelings
- Establishing trust and conveying respect towards residents
- Interacting with residents as much as possible
- Increasing family involvement

Patients, carers, and caregivers experience transitions between care settings differently, generating the need for personalised approaches and systems integration to improve care transitions. Older adults with complex conditions, including hip fractures and other significant fragility fractures, receive care from multiple providers and experience multiple care transitions. Future research should further explore ways in which other transition contexts can impact the patient, caregiver, and health-care provider experience, and quality of care for a range of complex health conditions. Such evidence would provide important directions for practice change, including improving discharge planning practices, enhancing information sharing between healthcare organisations, clarifying roles between healthcare providers and providing appropriate education and involvement of patients and their caregivers.

Summary and Main Points for Learning

- Older people often feel anxiety, stress, and uncertainty about the future after a hospital stay and involving the patient in discussions and decision-making about the plan for post-hospital care can decrease stress and increase their satisfaction.
- Family caregivers who feel involved in hospital-to-home transitions are likely to be more satisfied, accepting of their caregiving role and experience less anxiety, take a more active role during care transitions.
- The aim of discharge planning is to secure a safe transition from the hospital to the next level of care. The patient and family have a right to be involved at every stage of the process, so collaboration and continuity of care are central.
- To prepare the person and their family for discharge a structured conversation is vital to allow exchange of vital information and clarify any elements of uncertainty.
- Being medically ready for discharge may not mean the patient is ready in other aspects such as physical, psychological, and social readiness.
- Case management is a model of care that supports individuals and families facing numerous health and well-being challenges, including fragility fractures, managing complex care needs and discharge planning.
- Leaving the hospital setting and returning home or moving to a residential care facility can be traumatic for patients and their families.

16.9 Suggested Further Study

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17.1 Introduction

Health and social care professionals meet ethical dilemmas constantly. Being able to make clinical decisions based on sound ethical principles is central to compassionate care and should underpin all the topics covered in this book.

The range of consequences of fragility fractures include acute and chronic pain, loss of mobility, loss of independence, increased frailty and, for some, it may be the event that precipitates death. The decline in health, and wellbeing that often follows a fragility fracture threatens wellbeing, especially when we have limited capacity and/or diminished power over their own lives and decisions. These challenges make a person vulnerable because they may be unable to take care of themselves and/or to protect themselves from harm or exploitation. Needing to obtain assistance from family, friends, or other carers, places them at increased risk of various types of abuse.

Providing compassionate care to older people involves maintaining their dignity and autonomy. The ethical principle of autonomy supports the right of older adults to be empowered in their decision-making and to determine their own plan of care. This also extends to decision-making about end-of-life plans and care.

The aim of this chapter is to provide practitioners with information about ethical principles and dilemmas in caring for patients with fragility fractures so that they can provide ethically sensitive care, including at the end of life.

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17.2 Learning Outcomes

At the end of the chapter, and following further study, the practitioner will be able to:

- Explain the causes and consequences of vulnerability of individuals following fragility fracture.
- Describe practitioners' responsibilities in safeguarding vulnerable older adults from abuse.
- Place dignity at the centre of care.
- Identify threats to dignity in healthcare.
- Explore ethical challenges at the end of life.
- Engage in ethical decision-making.

17.3 Ethics in Providing Care for All Adults Following Fragility Fracture

The range of individual consequences of fragility fractures include chronic pain, loss of mobility, loss of independence, increased frailty and, for some, it may be the event that precipitates death. Such decline in health threatens a person's wellbeing, especially in the absence of the capacity or resources to resist such a threat. Hip fracture, for example, is often cited as an injury that leads to poor health outcomes; about half of patients lose their prior level of physical function, and many lose their independence. Only around half those who have recovered from a hip fracture regain mobility, and often not to the same level as prior to the fracture. Many also report chronic pain 1 year after the fracture. However, hip fractures are not the only injuries that have a negative impact on individuals' future lives: vertebral fractures are also associated with higher disability and mortality rates, even when they are asymptomatic [1].

Practitioners working with individuals following fragility fracture must frequently make decisions on behalf of their patients and balance different ethical perspectives. These decisions are guided by the principles of healthcare ethics: beneficence, non-maleficence, autonomy, and justice. These principles are defined in Table 17.1.

Healthcare workers are often faced with complex medical and moral situations. Many patients with fragility fractures are older adults, but it is essential not to assume that age is an indicator of function, capacity, or health status. Older people are, however, more likely to be vulnerable when they need health and social care; requiring specialised care which takes their age and function into account and ensures that principles of healthcare ethics are applied appropriately.

Clinical guidelines can be of limited use in these instances, so several ethical frameworks have been proposed to assist in decision-making processes. Ethical frameworks are analytical tools designed to assist healthcare workers in complex moral decision-making situations. Models and frameworks tend to share basic

Table 17.1 The principal components of healthcare ethics (from Varkey 2021 [2])

Beneficence	Practitioners must act for the benefit of the patient—defending their rights, preventing harm, provide help when needed, and promote their welfare
Non-maleficence	Practitioners are also obliged not to harm the patient—not causing death, pain or suffering, incapacity, or deprivation. Benefits of healthcare interventions must often be weighed against their choosing the best course of action for the patient. This is particularly important in making decisions about end-of-life care, withholding and withdrawing life-sustaining treatment, the administration nutrition and hydration, and in pain and other symptom control
Autonomy	The ethical principle of autonomy is that everyone has an intrinsic and unconditional worth and should be enabled to exercise their capacity for self-determination. This includes the power to make their own decisions and moral choices. Autonomy may need to be weighed against competing moral principles and does not apply when a person lacks the capacity to make rational decisions. Informed consent and truth-telling are important aspects of autonomous decision-making
Justice	People are entitled to fair, equitable, and appropriate treatment and distribution of healthcare services. This includes the allotment of healthcare resources, including treatments, care, investigations, and healthcare professional time

components. An example of some common fundamental questions a practitioner could ask when making ethical decisions is provided in Box 17.1.

Box 17.1 C.A.R.E. Questions for Ethical Dilemmas (Schneider and Snell 2000 [3])

1. What are my core beliefs, and how do they relate to this situation?
2. How have I acted in the past when faced with similar situations? What do I like about what I have done? What do I not like?
3. What are the reasoned opinions of others about similar situations? What does our culture seem to say about this situation?
4. What has been the experience of others in the past when faced with similar situations? What do I like about what they have done? What do I not like?

The questions in Box 17.1 can be applied, for example, to the case study in Box 17.2.

Box 17.2 Case Study Part 1: Ethical Principles

Mr. Kaur has just been admitted to hospital with a fragility hip fracture. It is immediately apparent to the nurse that he is thin and frail. The handover from the Emergency Department (ED) informed that he arrived by ambulance alone, his clothing and body smelled of urine, he seemed confused and disoriented, that he has a stage 3 pressure injury on his sacrum and the heel of his injured leg has a black/purple area under the skin (see Chap. 9). Mr. Kaur is 86 years old. The ambulance crew told the ED staff that he lives in the home

of his son and his family. Mr. Kaur's daughter-in-law called the ambulance but could not accompany him to the hospital. She told them that he is diabetic, has been "unwell" for a few weeks, and recently fell at home.

Consider:

- Given the four principles of healthcare ethics described in Table 17.1—what concerns do you have about Mr. Kaur and his current state of health and wellbeing?
- How can you begin to answer the questions in Box 17.1?
- What further information do you need about Mr. Kaur's social circumstances?
- What are your priorities on his admission to hospital?
- How might you act in Mr. Kaur's best interests?

17.4 Dignity

Respecting dignity is a fundamental aspect of quality of life and a central principle in compassionate healthcare delivery. It involves respecting the uniqueness of each person by taking care of the whole person including social, psychological, and spiritual aspects of life as well as the physical ones [4]. Understanding the importance of dignity is crucial in influencing the caregiver's view of humanity and quality of life and in providing compassionate care [5].

Preserving dignity involves respecting the uniqueness of each person and acknowledging that the world- or life view of health professionals and other caregivers can be very different from that of individuals in their care [4]. Human dignity is a moral code, a duty and a human right and, for care providers, a moral obligation to enable people to feel valued, grow, and develop. The International Council of Nursing Code [6] states that:

"Inherent in nursing is respect for human rights, including cultural rights, the right to life and choice, to dignity and to be treated with respect".

The presence of chronic and acute health problems, injury, and reduction in self-care ability mean that there is often focus on medical needs, which can result in dehumanising of care, threatening an individual's dignity. This places the protection of dignity at the centre of holistic individualised care.

All users of healthcare services have the right to be treated with dignity and respect. However, some older people can be particularly vulnerable to loss of dignity, so it is essential that extra attention is paid to making sure that care is provided with dignity at its centre. This involves care teams having a shared view of what dignity is and what it means to be treated as an individual. Dignity is a foundation on which many of the topics in this chapter should be considered, and it should be applied to all the chapters in this book.

Many older adults perceive dignity as central to the meaning of a good life in old age. Failure to maintain their dignity in both acute and long-term care facilities can lead to depression and even accelerate death [7]. Care with dignity supports the self-respect of the person, recognising their capacities and ambitions, and does nothing to undermine it [8] Dignified care assists individuals to maintain their individuality and to have it respected by others. While dignity itself can be a complex concept, it is often a collection of fundamental caregiving actions that can help to maintain it. For example:

- Maintaining an individual's privacy and confidentiality during caregiving
- Offering information, choice, and respecting decisions
- Assistance in fundamental aspects of care such as eating meals and access to lavatory/bathroom facilities
- Addressing individuals appropriately
- Enabling them to maintain their own personal standards such as a respectable appearance
- Stimulation and a sense of purpose by supporting activities that are fulfilling.

17.5 Vulnerability

Vulnerability is a concept applied to individuals (or communities) who have impairments (social, psychological, and/or physical/physiological) that result in [9]:

- (a) compromised capacity to make decisions and/or are
- (b) at risk of incurring harm and/or being wronged

“Vulnerable adults” are often defined as those who have a restricted ability to give their consent (such as people with cognitive difficulties) or those who are biologically/physically vulnerable because of their health needs. This potentially decreases a person's control over their own actions and decision-making [10]. In the context of fragility fracture care and prevention, vulnerability can be seen not only as a characteristic of an individual, but also a relationship between individuals and others. Vulnerability is often created by relationships where there is unequal power such as that which exists between a patient and those who provide their care. The presence of health and social care needs increases vulnerability. Ill health, frailty, and/or injury, for example, can lead to a greater reliance on others, increasing the demand for health and social care and additional responsibilities for families and informal caregivers [11, 12].

Vulnerability is a complex multidimensional construct involving behavioural, socio-cultural, economic, and political elements which interact with biological processes throughout life. In the presence of chronic and acute health conditions, vulnerability can be linked to factors such as negative self-perception, health deterioration, biological ageing, unhealthy lifestyle, frequent and prolonged hospitalisation, inability to access health services, poor knowledge of health threats,

scarce financial resources, and inadequate social networks [13]. A vulnerable adult has limited self-care abilities and may be unable to protect themselves from harm or exploitation. There is significant risk to their health and wellbeing if assistance is not provided or the person is unable to access assistance and care from individuals or organisations. There is an association between vulnerability and factors which are common in patients with fragility fractures: age, female gender, low physical activity, presence of comorbidities, (such as hypertension, diabetes, osteoarthritis, osteoporosis) polypharmacy, and frailty [14]. A vulnerable individual can have four times the risk of death or functional decline when compared to older people not assessed as vulnerable.

The Vulnerable Elders Survey-13 (VES-13) is one of several validated tools available to screen patients for frailty and vulnerability. The components of the 13-item questionnaire include age, self-rated health, limitations in physical function, and disability. The VES-13 [15] provides a simple, function-based assessment that can help healthcare professionals to identify older people with increased vulnerability.

17.6 Decision-Making Capacity

As an element of the principle of autonomy, *Capacity*, or Decision-Making Capacity (DMC), refers to a person's ability to assimilate and use information relevant to making a specific decision and use this information to make and communicate a choice. It is generally assumed that adults have the capacity to make decisions affecting their own lives. However, vulnerability through acute and chronic ill health, injury, and surgery can affect a person's ability to make decisions and healthcare practitioners frequently need to make an assessment of that capacity so that they can judge if decisions need to be made on behalf of the person [16]. Capacity is required for a person to give consent to all healthcare interventions.

Various legal and ethical frameworks have been devised globally to assist in assessing capacity as well as making decisions on behalf of another person. These frameworks tend to involve the following or similar principles:

1. Decision-making capacity should always be assumed to be present unless there is a reason for concern. Concerns should lead to assessment of capacity.
2. Capacity is context-specific in that it relates to a specific decision being made at a specific time under specific circumstances.
3. A person should only be assessed as without capacity to make a decision once all possible actions to help them make decisions have been employed: this includes all aids to communication such as speech, sight and hearing, and translation if the person does not speak the same language as those providing care.
4. Capacity is fluctuating and can change from one decision-making even to the next—if a person lacks capacity and a decision is not essential, it should be delayed until they have capacity.

5. Decision-making must be based on accurate and timely information presented to the person in a manner that is easy for them to understand.
6. If someone has capacity, their decisions must be respected, no matter how unwise any decision is considered by others.
7. Knowing if and how a person has appointed someone to make decisions on their behalf (e.g. through “power of attorney”) is essential in supporting decision-making. Liaison with families and carers/caring organisations is central.

If an individual does not have capacity to make a decision, the decision should be delayed whenever possible unless they are unlikely to return to a state where they have capacity. If the person does not have capacity (either temporarily or permanently) or there is no legal power of attorney, healthcare staff may intervene on their behalf based on the principles of “best interests” decision-making using an interdisciplinary team approach. This may involve liaison with family and carers, but they should not be decision-makers unless they have legal written power of attorney to do so. Box 17.3 provides an opportunity to consider this in more detail in relation to the case study introduced in Box 17.2.

Box 17.3 Case Study Part 2: Capacity

It is now the day after his admission and Mr. Kaur’s hip fracture surgery has been delayed because he is receiving treatment for dehydration. He remains confused and disorientated and seems unable to communicate his wishes to the hospital staff. Once his dehydration has been resolved he will be scheduled for urgent surgery to manage his fracture and pain—this is planned for tomorrow. The nursing team have tried to contact his family to discuss Mr. Kaur’s care but have been unable to reach them. One of the issues with this is consent for the surgery.

Consider:

- How could you ascertain Mr. Kaur’s capacity to make decisions and give consent for his surgery?
- If assessment identifies Mr. Kaur lacks capacity now, what should the next steps be?

17.7 Safeguarding

Older adults with fragility fractures can be vulnerable to abuse. Health professionals’ recognition of and response to concerns about abuse play an important role in protecting people from further harm [17].

There are several different types of abuse which may be apparent to practitioners working with patients following fragility fractures. Abuse may have been part of the

mechanism of injury for the fracture; for example, if an older person has fallen because of weakness due to neglect, lack of appropriate care and supervision, or violence against them.

The World Health Organization [18] defines abuse of older people as:

“... a single or repeated act, or lack of appropriate action, occurring within any relationship where there is an expectation of trust, which causes harm or distress to an older person”.

Such abuse constitutes a violation of human rights and respect and leads to loss of dignity for an older person. Abuse includes physical, sexual, psychological and emotional abuse, financial and material abuse, abandonment, and neglect. Abuse can lead to serious harm and even death. Older people suffering a fragility fracture may have experienced any and more than one of these types of abuse, but physical abuse and neglect are most likely to come to light following their injury.

Physical abuse includes pushing, hitting, slapping, kicking, misuse of medication, restraint, and withdrawal of freedom.

Neglect involves acts of omission which include omission or lack of care provision and failure to meet care needs or provide access to appropriate health and social care service, as well as not providing necessities such as adequate nutrition, fluids, and/or heating.

The perpetrators of any form of abuse can be anyone with power over the life of an older person, especially those who are in a position of trust or tasked with providing care such as family members' caregivers.

Safeguarding vulnerable adults involves protecting an individual's right to live in safety, free from abuse and neglect [19] and involves collaborative working to recognise risks and prevent abuse, while at the same time making sure that their safety and wellbeing are promoted. This includes ensuring individual wishes, views, feelings, and beliefs are incorporated into their care. Box 17.4 provides a case example.

Safeguarding duties seek to protect all adults who [20]:

- Have needs for care and support (whether or not the local authority meets any of those needs)
- Are experiencing, or at risk of, abuse or neglect
- As a result of those care and support needs are unable to protect themselves from the risk of, or the experience of, abuse or neglect.

Box 17.4 Case Study Part 3: Vulnerability

Referring back to what you already know about Mr. Kaur from Boxes 17.2 and 17.3: it is now a few hours since he has been admitted to the hospital ward and you have been providing his care during this time. You have had an opportunity to make an assessment of his health and wellbeing. You have not yet heard anything from his family and have been unable to contact them so far.

Consider:

- In what ways would you suggest Mr. Kaur might be perceived as being vulnerable?
- What further information do you now wish to access about Mr. Kaur and where might you be able to access this information?
- Do you have any safeguarding concerns? Are there any signs of intent to harm? Are there any signs of neglect?
- With whom might you discuss your concerns given the information you have so far?
- How will you approach a conversation with Mr. Kaur?

When there are safeguarding concerns, nurses and other health professionals have specific responsibilities. Their role usually has several elements:

1. Ensuring that patients are safe and that their immediate and future care needs are being met
2. Recognising the signs of abuse through assessment and preserving any evidence
3. Respecting the person's views and wishes relating to the situation and those involved
4. Reporting suspected abuse through referral to appropriate professionals and agencies.

Holistic and thorough assessment as part of the comprehensive geriatric assessment (CGA) process (Chap. 6) is central to recognising risk or signs of abuse. Where there are concerns practitioners have a duty to share information [21].

Older adults sometimes have complex interpersonal relationships and may be ambivalent, unclear, or unrealistic in their views of their personal circumstances. They may be aware of their own vulnerability but also recognise their right to autonomy. Their right to make their own decisions takes precedence, therefore, over the duties of protection perceived by a practitioner [22].

Acting on concerns about elder abuse is complex. Policy and guidance vary around the world depending on local laws, guidelines, and culture. What is important is that practitioners are well educated about the guidance, able to take appropriate action, and communicate with appropriate agencies to ensure the safety of older people.

17.8 Decision-Making, Capacity, and Consent

Decision-making becomes more complex for those with multiple health and care needs as the capacity to self-manage is affected by the cumulative effects of these needs, sometimes leading to decisions being made on their behalf. However, health-care providers must actively involve individuals in decision-making processes about

their care. People vary in their degree of involvement as they take on various roles in the decision-making process. Some prefer to make their own decisions, some prefer others to make decisions for them, and some want to share the responsibility with others (e.g. the care provider). Older people emphasise the importance of participation and involvement in decisions about their care, highlighting negative consequences of the current emphasis on autonomy, personal choice, and freedom in both healthcare ethics and policy development.

The skills for sharing and discussing decisions with vulnerable patients, and their families, can be challenging to embed in services so there is a need to establish mechanisms that preserve and foster shared decision-making between professionals, patients, and carers and how they achieve improvements in patient outcomes.

17.8.1 Decision-Making Capacity

Decision-making capacity is a clinical assessment of a person's ability to make specific healthcare decisions, whereas competency is a legal determination of the patient's ability to make his or her own decisions in general. Decision-making is an important aspect of dignity.

The ethical principle of autonomy supports the right of patients with the decision-making capacity to determine their plan of care. Autonomy is a fundamental ethical principle in healthcare and includes respect for person and a person's ability to make decisions relating to their wishes.

Adults are presumed to have decision-making capacity but may lack the ability to do so temporarily or permanently due to acute or chronic illness or injury. Assessment of capacity is critical to understanding whether and to what extent the patient can participate in clinical decision-making. The concept of decision-making capacity is complex and multidimensional, and there are no gold-standard instruments assuring its valid measurement.

A person with decision-making capacity is able to:

- Understand the relevant information presented about the diagnosis, prognosis, treatment options, risks, and benefits of each option and alternative
- Appreciate the consequences of the choice
- Reason about the options in the context of personal values
- Make and communicate a choice.

Informed consent is a legal process, grounded in the principle of autonomy, which ensures patients are adequately informed to make healthcare choices and give authorisation for procedures and other interventions. Informed consent is more than a document indicating the patient's authorisation. The main elements of informed consent are:

- Disclosure—the person must be given adequate information regarding the nature and purpose of proposed treatments, as well as the risks, benefits, and alternatives to the proposed therapy, including no treatment

- Decision-making capacity—that the individual has capacity to make the specific decision
- Voluntariness—the decision is being made without pressure or duress and free from coercion.

17.9 End-of-Life Decisions

For some patients, their fragility fracture, especially a hip fracture, may be an event that will hasten the end of their life—and it may occur because they are frail and already approaching the end of their life. Death, dying, and end-of-life are profoundly personal issues embedded within societal and cultural contexts. Understanding of the importance of individual preferences at the end of life is constantly shifting. In some communities, this is a facet of human existence that is increasingly seen as essential to facilitating a dignified death [23], while in others it is a private and personal topic that is rarely discussed openly. For those who live within cultures where death and dying are part of healthcare conversations, there are three main principles that relate to end-of-life situations and decisions following significant fragility fracture and surgery:

1. Do not attempt resuscitation decisions
2. Palliative care
3. End-of-life care

17.9.1 Do Not Attempt Resuscitation Decisions

Fractures and subsequent orthopaedic surgery can lead to significant deterioration in a patient's health which can lead to cardiac arrest. Cardiopulmonary resuscitation is an invasive procedure that in some cases can lead to restoration of circulation and breathing. In most cases, however, resuscitation is unsuccessful, especially in patients who have multiple health conditions and/or are frail. This procedure was never meant to be applied to people who are suffering from irreversible conditions from which they are likely to die.

In many countries, “Do Not Attempt Resuscitation” (DNAR) decisions are recorded and applied when a person does not wish to be resuscitated or when resuscitation attempts are likely to be futile. Such decisions can be made and recorded by individuals in advance or made by clinicians at the time of cardiac arrest, but these decisions are a source of ethical concerns [24]. This may be a process that is, in fact, not openly discussed or considered, even in healthcare settings, in some countries or communities.

Most people who have suffered a serious fragility fracture will never have actively thought about what their wishes might be in this situation, so it is important that practitioners discuss this with patients and/or their loved ones whenever possible and in a way that respects their values.

Many countries have policies and guidelines in place which govern DNAR decisions, aiming to protect individuals from poor care, inconsistency in decision-making, communication, and documentation. Around the world, there are examples of significant progress in the development of clinical practice in this area. In some countries, there are formalised processes for emergency care and treatment planning (ECTP) which facilitate patient-centred discussions about CPR decisions [25]. In the UK, for example, the “Recommended Summary Plan for Emergency Care and Treatment” (ReSPECT) is supported by a document that prompts the inclusion of patients’ preferences in conversations and is held by the patient. These conversations support patients and clinicians to develop shared understandings of the patient’s condition and preferences, agree on a direction of care, and make shared recommendations about treatment options, including CPR [26].

17.9.2 Palliative Care

While surgery for major fragility fractures such as hip fractures is recommended for most patients; a few, especially those who are already frail, are unlikely to survive the physiological stress of the fracture and subsequent surgery. In this situation, the clinical team, led by the surgeon, may decide that surgery should not be conducted. Other patients may suffer significant and unresolvable health deterioration following surgery. In these situations, the principles of palliative care should be applied.

The World Health Organization [27] defines palliative care as:

“An approach that improves the quality of life of patients and their families facing the problems associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual”.

The fundamental aims of palliative care include [27]:

- Provide adequate pain relief and minimise discomfort by providing symptom relief
- Affirm life and regarding dying as a normal process
- Intend neither to hasten nor postpone death but to
- Integrate the psychological and spiritual aspects of patient care
- Offer a support system to help patients live as actively as possible until death
- Offer to provide a system of support to help the family cope during the patient’s illness and death and in their own bereavement
- Work collaboratively as a team to address the needs of patients and their families, including bereavement counselling, if indicated
- Enhance quality of life and positively influence the course of illness
- Effectively and comprehensively manage distressing physical symptom and psycho-social problems pay attention to spiritual needs. Clinical and psychological complications at a location that meets the needs and wishes of the patient and family.

Surgery for hip fracture is still the most effective way to manage pain for patients who are reaching the end of life, so the reasons for the decision not to perform surgery must be clearly explained to the patient and/or family and ethical decision-making employed.

Palliative care is not limited by time and care should be delivered based on needs as they arise. It can take place in primary care, in acute hospitals and in long-term and hospice care facilities. Many patients who survive a hip fracture do not regain their pre-fracture functional level, and almost one third lose their independence [28]. Practitioners must be equipped for, and expect to deliver, end of life and palliative care in the orthopaedic and ortho-geriatric setting routinely rather than as an exception.

17.9.3 End of Life

End-of-life care focuses on a short period of time before death and includes a discussion of medical practices and decision-making. More people are living longer with more comorbidities and, unfortunately, the insult of a major fracture such as a hip fracture can see the patient's health decline and ultimately result in end of life. It is estimated that there were approximately 54.6 million deaths worldwide in 2011 and that 9% of those were due to injuries [29]. Men have a higher risk of mortality after a hip fracture, but women are also at substantial risk of death; this risk exceeds the lifetime risk of death from breast cancer, uterine cancer, and ovarian cancer combined.

When considering the philosophy of "end of life care" [30], Dame Cicely Saunders said:

"You matter because you are you, and you matter to the end of your life. We will do all we can not only to help you die peacefully, but also to live until you die".

Her words reflect the human responsibility to care for others in a humanistic and compassionate way until the end of their life.

There are many responsibilities in end-of-life care, ranging from communicating with individuals and families about their care and preferences; to observing, discussing, and recording any changes in condition and offering compassion and support. A broad range of care skills are needed along with awareness of the values which underpin this philosophy of care. When providing end-of-life care, practitioners should [31]:

- Treat people compassionately
- Listen to people
- Communicate clearly and sensitively
- Identify and meet the communication needs of each individual
- Acknowledge pain and distress and take action
- Recognise when someone may be entering the last few days and hours of life
- Involve people in decisions about their care and respect their wishes
- Keep the person who is reaching the end of their life and those important to them up to date with any changes in condition

- Document a summary of conversations and decisions
- Seek further advice if needed
- Look after yourself and your colleagues and seek support if you need.

End-of-life care can be provided in a range of settings including the community, care homes, and hospices. Practitioners need to be attuned to noticing when a person is nearing the end of life or actively dying. How the patient and family communicate with/during this phase of life will depend on the individual patient. As much as possible, this should be patient-led and the nurse should proceed with gentle, honest answers, using a language the person understands. If the patient is uncomfortable or does not wish to talk about their dying or death, it is important to respect their wishes. It is crucial, however, to have sensitive conversations with families and carers to prepare them for impending death.

Good nursing care for those at the end of their life should include physical, emotional, and psychological aspects of care along with spiritual support. The process of dying creates multiple emotions and feelings for all involved: the patient, family, carers, and the care providers. It can be very stressful and complex. It is helpful to use tools to assist in identifying indicators that someone is approaching their end of life such as the Gold Standards Framework (GSF) [32] and the Palliative Performance Scale 2 (PPS). Nurses play a key role in helping the patient throughout this natural process. The gentle “winding down” at the very end of life can be very peaceful as the body starts to let go, so if the patient is distressed or restless, this can be disrupted.

Summary of Main Points for Learning

- Vulnerability is a multidimensional construct, in which behavioural, socio-cultural, economic, and political conditions interact with biological processes throughout life.
- Safeguarding involves protecting an adult’s right to live in safety, free from abuse and neglect.
- Nurses’ assessment should be holistic and thorough considering the patient’s emotional, social, spiritual, psychological, and physical presentation as well as the identified older adult clinical needs. One of the most important points that need to be observed in taking care of the elderly is maintaining their dignity.
- Decision-making becomes more complex for older people with multiple health and care needs as the capacity to self-manage is affected by the cumulative effects of long-term conditions.
- The goal of end-of-life care is to prevent or alleviate suffering as much as possible while respecting the wishes of dying patients.
- Fragility fracture, particularly hip fracture, may be a signal of, or hasten, the end of life. Palliative and end-of-life care is, therefore, an important aspect of the care process in both hospital and community settings. Physical, psychological, emotional, and spiritual care need to be provided in a sensitive and compassionate manner.

17.10 Suggested Further Study

Select some of the following sources of information to help you further explore your own thoughts about the topics discussed in this chapter:

- Boltz M, Capezuti E, Zwicker D, Fulmer TT (eds) (2020) Evidence-based geriatric nursing protocols for best practice. Springer
- <https://nicheprogram.org/>
- Nurses Improving Care for Healthsystem Elders (NICHE) imparts principles and tools to stimulate changes in clinical practice to achieve patient-centred nursing care for older adults in healthcare facilities. The vision of NICHE is that all older adults, age 65 and over, receive age-friendly, exemplary nursing care.
- McSherry W, Rykkje L, Thornton S (eds) (2021) Understanding ageing for nurses and therapists. Springer, Cham, Switzerland
- <https://www.who.int/health-topics/ageing>
- Marks J, Predescu I, Dunn LB (2021) Ethical issues in caring for older adults. Focus (American Psychiatric Publishing) 19(3):325–329. <https://doi.org/10.1176/appi.focus.20210011>

Find local and national guidance for consent and capacity, safeguarding, palliative and end-of-life care, and use these to identify ways in which care might be improved with respect to these aspects of care.

17.11 How to Self-Assess Learning

- Think about how you currently identify vulnerability of patients in your care?
- Talk with your colleagues about how you currently maintain older adults' dignity and personal values and identify an area in which you would like to make improvements. Write an action plan for this improvement, involving the whole team.
- Using the case study in this chapter, or an example of your own, consider what skills do you/your team need to identify and act on patient abuse and neglect and how could you improve these skills?
- Identify a person you have recently provided care for who was approaching the end of their life. Write a reflective account of the care you gave and analyse whether you feel it could have been improved.

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Orthogeriatric and Fragility Fracture Care in the Future

18

Karen Hertz and Julie Santy-Tomlinson

18.1 Introduction

This book has explored the central concepts of orthogeriatric and fragility fracture care. It has taken a lead from the first edition but explored some aspects in more detail and updated the background and literature. While the focus has been on nursing care, the clinical role of other allied health professionals who collaborate with nurses as part of the interdisciplinary approach has also been outlined in recognition of the developing interdisciplinary approach so important to effective management and care—even though much clinical practice globally is not yet as collaborative as it ought to be. Some new topics have been incorporated along with updated ideas, theory, and evidence. The authors include clinical nurses, educators, and researchers from the complete patient journey with collaboration and additional input from colleagues who are physiotherapists, dietetic practitioners, psychologists, physicians, and surgeons, reflecting the acute, surgical, rehabilitation, and secondary prevention aspects of the care pathway.

Although this book is aimed at nurses working in any setting around the globe where people with fragility fractures receive care, we have tried to broaden the audience for the book to other health professionals who are part of the orthogeriatric/fragility fracture interdisciplinary team. Throughout ‘practitioners’ are referred to, capturing the diversity of roles in orthogeriatric and fragility fracture teams. However, because nurses make up such a large proportion of the workforce working

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with patients with fragility fractures, specific nursing aspects are discussed throughout the book. Nurses are active across the complete pathway with potential to significantly and positively influence care outcomes.

Practice, resources, attitudes, and culture vary around the world and practitioners in different localities face different challenges. For nurses and their interdisciplinary team colleagues to provide evidenced-based, high-quality care they need to not only have an understanding of their own roles but also the roles and value of their team colleagues and how each impact on patient outcomes throughout the pathway.

The role of nurses and other practitioners in orthogeriatric care and fragility fracture management and care (definitions are provided in Chap. 1) is as broad and complex as are the characteristics of the older people with whom they work, in the community and hospital, in times of acute need and throughout their lifespan following a first fragility fracture.

This final chapter aims to outline some of the future goals for fragility fracture care and to offer some thoughts on how some of the more significant challenges need to be approached.

18.2 The Future Impact of the Fragility Fracture Epidemic

The rising incidence of fractures, particularly fragility fractures, is a global public health issue [1]. As the global population continues to age, it is anticipated that the world will see an increase, not only in the number of people presenting with a fragility fracture, but also in the complexity and frailty of those with the fracture. It has been estimated that there is one fragility fracture worldwide every 3 s, equating to 25,000 per day [2] almost always resulting in attendance at an emergency department and either admission to hospital or a general practitioner or clinic visit. This places unprecedented and constant pressure on every aspect of health and social care services in every country.

Veronese et al. [3] explored the epidemiology of fragility fractures and their social impact, outlining both the costs of healthcare and the devastating social costs of fractures, particularly those of the hip and vertebrae. They illustrated how hospital costs for hip fracture are similar to other diseases requiring high hospitalisation rates (e.g. cardiovascular disease, stroke) but are dwarfed by social costs and impacts because of the onset of new comorbidities, sarcopenia, frailty, loss of function and independence, poor quality of life, disability and mortality following fractures.

The ageing of the population and the associated increase in the prevalence of fragility fractures is a growing challenge for healthcare services, placing pressure on resources and ongoing social care demands because of the negative impact on quality of life, functional ability, and independence. While all fragility fractures have a varied impact, the significant impact on those falling and fracturing their hip has been explored by Dyer et al. [4] who identified that, in resource-rich nations, approximately 10–20% of patients move to residential care after a hip fracture, with accompanying financial and socioeconomic costs. Although in middle- and low-income countries, these issues have yet to be explored as data is more difficult to

collect, it can be hypothesised that where healthcare services are less well resourced, most fragility fracture care takes place in the patient's place of residence or that of their family; placing significant stress on their ability to cope in a setting where surgery might not be available and creating a situation in which outcomes for the person suffering the fracture are very poor.

For all members of the orthogeriatric/fragility fracture interdisciplinary team, it is essential to embrace the values (vision and mission) of the Fragility Fracture Network (<https://fragilityfracturenetwork.org/>) (see Box 18.1) so that prevention and management of fragility fractures everywhere in the world can move in a positive direction. The following sections illuminate some of the considerations in achieving these bold plans.

Box 18.1 The Fragility Fracture Network Values [5]

Vision

A world where anybody who sustains a fragility fracture achieves the optimal recovery of independent function and quality of life, with no further fractures.

Mission

To optimise globally the multidisciplinary management of the patient with a fragility fracture, including secondary prevention.

18.3 Workforce and Resource Challenges

There is a chronic worldwide shortage of nurses: the World Health Organization [6] has estimated that the global shortage of nurses is in the region of 5.9 million; with the greatest gaps being in the poorest parts of the world, including countries in Africa, Southeast Asia, and South America. There is a strong interdisciplinary relationship between nurses, doctors, and allied health professionals and, although the nursing shortage is undoubtedly a crisis, it is not in isolation. The World Health Organization has also identified a projected global shortage of ten million health workers by 2030, mostly in low- and low-middle income countries [7]. In specialties such as orthogeriatrics and fragility fracture management, however, where there is high patient acuity and high demand for expert care, this shortage of nurses and other team members results in failure to meet patient and community needs, making this a critical crisis.

The nursing shortage is due to a variety of factors including an ageing population, political ideologies for healthcare, education and resourcing problems, a decrease in the numbers entering the nursing profession, and a high nurse turnover rate. This has a direct impact on the quality of patient care; when there are insufficient nurses and other practitioners to care for patients, there is a longer wait for

care and patients receive less care that is more likely to be of poor quality with a resultant effect on care outcomes. ‘Missed care’ or ‘care rationing’ occurs when nurses are unable to complete all care activities for patients because of scarcity of time and resources. Rationing of care or missed care negatively correlates with patient safety incidents and higher risk of complications and death for patients [8]. It has been shown that an increase in a nurses’ workload by one patient, from eight to nine patients per qualified nurse, increases the likelihood of an inpatient dying within 30 days of admission by 7% [9].

Given the nature of hip fractures, for example, and associated complexity of needs, care can be time and staff intensive, demanding staffing flexibility. A literature review [8] has highlighted that nursing care is more likely to be missed when staffing ratios are low and when staffing flexibility is lacking. Staffing flexibility involves the ability to provide additional staff with the right skills when needed, based on patient care needs.

The full impact of the COVID-19 pandemic on nursing work and recruitment and retention is currently unknown. During the pandemic, many services have had to adapt to meet the demands of the service; many elective services were halted; and nurses and other healthcare professional have worked in new ways including moving to unfamiliar areas of clinical practice. This has demonstrated the best of nurses and nursing, showing their resilience and desire to fulfil the fundamentals of nursing even when working under extreme conditions. Virginia Henderson [10] recognised that:

‘... the unique function of nurses in caring for individuals, sick or well, is to assess their responses to their health status and to assist them in the performance of those activities contributing to health or recovery or to dignified death that they would perform unaided if they had the necessary strength, will, or knowledge and to do this in such a way as to help them gain full of partial independence as rapidly as possible’.

For nurses, moving to an unfamiliar clinical area challenges them to perform tasks and activities for which they feel ill prepared, and it is important to recognise how these new and extremely challenging situations will have affected the nurses as individuals and professionals. Studies have shown that there have been significant levels of burn out for nurses working through the pandemic [11]; the impact this will have on ongoing recruitment and retention is likely to have a detrimental effect on health services’ ability to provide care long into the future. Orthogeriatric and fragility fracture services will need to develop approaches to this problem that will ensure quality of care is maintained and that outcomes continue to improve.

On a positive note, since the pandemic there have been reports of increased interest in pre-graduate applications for nursing courses and an increase in applications for entry to nursing. This is thought to be due to the positive portrayal of nurses and nursing during the pandemic. Although this will not resolve the nursing shortage, made worse by the pandemic, it means that recruitment of staff to orthogeriatric and fragility fracture services could improve in the future providing these services adapt to the needs of the new generation of nurses and ensure they are attractive places to work from the perspective of working conditions and education.

Nurses working in high acuity areas such as orthogeriatrics and fragility fracture care find themselves in a challenging situation. They must expend inordinate energy to provide care that meets patient needs and constantly have to adapt to the changing needs of patients, their families and communities. At the same time, they must also engage with governments, policy makers, leaders, employers, and communities to present evidence, lobby, and negotiate for their own working conditions and the care priorities of those for whom they provide care.

18.4 New Ways of Working and Nursing Role Development

The fundamental roles of nurses in the care of patients following fragility fractures are threefold:

- Clinical care in the acute clinical episode.
- Specialist advanced care throughout the patient pathway of care, from the first fragility fracture to, potentially, end of life care.
- Care coordinators of orthogeriatric/fragility fracture interdisciplinary care.

For those working in orthogeriatric/hip fracture units, orthopaedic wards, inpatient rehabilitation units, or at home while restoring health and function, this book has tried to provide a comprehensive review of the fundamental knowledge and skills required to look after patients well in any of these settings. Nursing care of patients with fragility fractures is best provided by nurses who not only understand the injury and the acute care needs related to the fracture, but also recognise the specific and complex needs relating to the frail older person with multiple comorbidities.

The focus of interventions is to reduce the impact of the fracture and optimise recovery and subsequent outcomes. Demonstrating the positive impact of nursing care involves identifying those actions that are specifically related to nursing and finding ways to identify measurable nurse-sensitive indicators of care quality [12]. This will enable nurses and nursing to demonstrate its value despite the complexity of nursing activity.

The nursing role in fragility fracture care has been discussed throughout this book. It focuses on:

- Pain management, by assessment and interventions such as administering medication, positioning/repositioning and comfort measures.
- Optimising nutrition and hydration.
- Identifying and treating delirium.
- Prevention strategies for:
 - Venous thromboembolism.
 - Healthcare-associated infections.
 - Subsequent falls and injuries.

- Skin damage and promoting wound healing.
- Postoperative and opioid induced.
- Assisting in early remobilisation and rehabilitation.
- Integrating rehabilitation goals into all care activity.
- Planning coordinating and implementing optimum discharge from hospital.

In the clinic/community/primary care setting, and after patients' discharge from the hospital, the role of the nurse encompasses:

- Continuing rehabilitation and optimisation of function.
- Optimising adherence to osteoporosis treatment and other activities to prevent secondary fractures.
- Falls prevention.

In some localities, care is enhanced by nurses working in advanced practice roles. These roles vary depending on the location, the local health system, local and national policy and guidance, and the culture, education, and empowerment of nurses in individual countries. Such roles often encompass advanced/specialist clinical practice, leadership, and education and can carry various titles that may include the following:

- Nurse practitioners and Advanced Practice Nurses.
- Hip fracture nurse specialists/advanced practitioners.
- Fracture liaison nurse specialists or coordinators.
- Osteoporosis nurse specialists.
- Elderly/elder/older person care and frailty nurse specialists.
- Trauma nurse coordinators.

These roles are usually undertaken by nurses, but not exclusively and may be performed by other allied health practitioners. The role of the advanced practitioner is to lead, participate in, and monitor the provision of high-quality care to optimise patient outcomes. Each advanced practitioner will deliver additional/enhanced interventions depending on their expertise and scope of practice and reflecting the needs of the service/patients. This may include, for example, carrying out diagnosis through advanced patient assessment, initiation of treatment plans, initiation of tests and investigations, and prescribing treatment including medication.

The fundamental role of advanced practitioners, however, is coordination. The sharing of care between orthopaedic, geriatric, and other medical specialties, such as anaesthetists, endocrinology, and rehabilitation physicians, can become fragmented and less effective if the care pathway is not coordinated effectively. Nurses in advanced practice roles are well placed to facilitate liaison between medical specialties as well as patients, their families or carers, and other services. Their focus needs to be on monitoring care, ensuring high standards of evidence-based care, while facilitating interdisciplinary team working throughout the continuum of care

from fracture to rehabilitation to discharge and successful secondary fracture prevention.

The centrality of communication and coordination is also reflected in secondary fracture prevention roles such as Fracture Liaison Coordinators where the clinical coordinator case-finds patients who have had a fragility fracture, initiates treatment plans (either independently or through the family physician/GP/osteoporosis specialist) and, crucially, communicates with patients and their families and carers, monitoring treatment outcomes and concordance. The value of this role in fracture prevention has been frequently discussed in this book and we hope that this may inspire more practitioners to instigate and engage in local discussions about the development of new services across the globe as encouraged by the IOF 'Capture the Fracture' programme (<https://www.capturethefracture.org/>).

The true value of advanced practice roles in orthogeriatric and fragility fracture care is starting to be evaluated and the results so far demonstrate positive outcomes in terms of cost, length of hospital stay, and functional outcomes [13]. Optimal management and prevention of fragility fractures for a global population that will continue to age dramatically is essential. It is not an option to accept provision of sub-optimal care even when resources are limited. Because nurses are the largest and most adaptable workforce, their role needs to develop to support the ever-increasing demand for care. In countries where advanced practice roles are established, this is a valuable career progression option that keeps the best nurses clinically focused on direct patient care while taking advantage of the skills of advanced practitioners. In many countries, however, nurses are not currently empowered to develop and extend their roles so they need to be supported by other members of the interdisciplinary team in positions of greater power, such as surgeons and physicians, in developing opportunities to extend their clinical skills and education.

18.5 Chronic Condition Management

As the earlier chapters of this book have demonstrated, fragility fractures are linked with chronic health problems; not just osteoporosis, but the many comorbidities that affect older adults including frailty and sarcopenia, and concomitant chronic diseases such as diabetes, cardiovascular and respiratory diseases. Consequently, all members of the interdisciplinary team need skills in chronic disease management.

Most fragility fractures occur as a result of low energy trauma in the presence of osteoporosis, and it is the occurrence of the first fragility fracture that leads to a diagnosis of osteoporosis. Unfortunately, there are still far too few people around the world who are screened for fracture risk, investigated for osteoporosis, and started on appropriate treatment. This is known as the 'treatment gap', and this is a global problem that is as much the responsibility of the nursing community as it is the rest of the interdisciplinary team. The treatment gap (percentage of eligible individuals not receiving treatment with osteoporosis drugs) in a group of European

countries is estimated to be 73% for women and 63% for men; an increase of 17% since 2010 [14].

Initial treatment and investigation to prevent further fracture most often occurs in secondary care, through coordinated structured programmes such as fracture liaison services. In these services, nurses take an active role that includes coordinating the service, making sure that vigorous and proactive case finding is implemented, and treatment and education are provided. A cost analysis showed that, when case finding and treatment are initiated and monitored as part of an FLS, the impact is not only fracture reduction, but cost saving [15].

Osteoporosis is a chronic disease that involves treatment over the remainder of the individual's life. Understanding and adjusting to this knowledge can be difficult for individuals and their families, especially as the problem is not visible externally until a fracture happens. A diagnosis of osteoporosis and adherence with treatment needs continuing support. Nurses are experts in supporting patients, so it makes sense that they are best placed to do this, proving they have the knowledge and skills needed to do this effectively. Nurses working within FLS teams have a unique opportunity, as they are likely to be involved with the patient following a fragility fracture over a long period of time, often several years. Their role as health educators is critical to the success of medicines management and concordance alongside health promotion and health improvement. The success of nurses in these roles relates to their ability to educate the patient and their families and to promote behavioural change that improves bone health and prevents fractures. These skills are also relevant to supporting patients in managing other chronic conditions that relate to their overall health and well-being, reducing the risk of falls and associated injuries as well as improving outcomes following fractures.

18.6 Dignity and Compassion in Care

Much of this book has been focused on providing nurses and allied health professionals with the knowledge and skills to provide evidence-based physical and psychological care. But providing compassionate care is about much more than simply doing what the evidence says is best. Very few people following fragility fracture are cared for in specialist orthogeriatric units by an interdisciplinary team with expertise in both orthopaedic and older adult care. As leaders in providing compassionate, dignified care, nurses must foster an environment and culture that reflects the needs of older adults with acute care needs, ensuring that the core values of compassion, empathy, dignity, and respect are an integral part of the care provided and are not an afterthought. Providing compassionate, respectful care is a whole-system attitude and, although much has been achieved over the last few decades, there are still ageist attitudes prevalent in many healthcare systems. This has been widely demonstrated in the Covid pandemic, when many countries had policies in relation to hospital admission or treatment plans for people based upon their age, not their individual health status, most often as a means to ration access to care [16, 17].

The care provided for patients with fragility fractures in every setting needs to represent best practice, but also needs to be patient centred. Kindness, respect, and dignity mean different things to different people. Among other factors, patient-centred care requires practise to be collaborative, coordinated, and accessible. The right care being provided at the right time and the right place as well as focused on physical comfort and emotional well-being [18]. Patient and family preferences, values, cultural traditions, and socioeconomic conditions need to be considered and involvement of patients and their carers in care planning and decision-making is integral.

18.7 Evidence-Based Orthogeriatric and Fragility Fracture Nursing

There is a vast and continuously expanding body of research and evidence that directs orthogeriatric and fragility fracture care. A search of the literature will reveal that many aspects of fragility fracture care have been researched from the perspectives of acute care and rehabilitation, secondary fracture prevention, and policy [19]. Most of this research has been led by clinical researchers who are surgeons, physicians, rehabilitation specialists, and other allied health professionals. However, even though the largest proportion of fragility fracture practitioners are nurses, only a fraction of this research has been conducted or led by nurses. This is problematic; nursing care has significant potential to optimise patient outcomes following fragility fracture, as has been repeatedly identified in this book. But, unless nursing care has a specific and broad body of evidence that identifies exactly what its actions are and what its value is, its influence will be limited. This, unfortunately, restricts the ability of nursing members of the interdisciplinary team to influence the resources allocated to nursing and, consequently, prevents them from providing optimum care.

A global strategy is, therefore, needed that drives the development, conduct, translation, and application of nursing research for the care of patients with fragility fractures so that the benefits of nursing approaches can be explored and promoted alongside those of the rest of the interdisciplinary team.

In many countries, it is now unmistakable that evidence is being applied to clinical care, as shown by audit, especially for patients with hip fractures for whom some aspects of care have improved over the last few decades [20]. Even so, much of the data collected in hip fracture audits is focused on aspects of clinical management and care that do not specifically identify the impact of effective, evidence-based nursing care on outcomes.

This is not to say that nurses should conduct research in isolation. It is important that the agenda for future research is led by priorities that reflect the needs of patients with fragility fractures as well as all members of the interdisciplinary team who provide their care. The research priorities for orthogeriatrics and fragility fracture practice need to be based on an understanding of the shared interests and concerns of patients, their families, communities, and healthcare professionals [21]. Fernandez et al. [21] conducted a study in the UK to identify key research priorities

by involving multiple stakeholders including patients, family and friends, carers, and healthcare professionals. A summary of the key priorities is listed in Box 18.2:

Box 18.2 A Summary of UK Research Priorities in Fragility Fractures of the Lower Limb and Pelvis [21]

1. Physiotherapy/occupational therapy in hospital and following discharge.
2. Thromboembolism prevention.
3. Information for patients and carers.
4. Mobilisation and weight-bearing following fractures.
5. Priorities for patients.
6. Prevention and management of delirium.
7. Pain management.
8. Rehabilitation pathway for adults with dementia/cognitive impairment.
9. Preventing surgical site infection.

Although the priorities summarised in Box 18.1 are specific to the country in which the research was conducted, the research questions identified are likely to be relevant in many other places and the study provides an example of good practice in relation to interdisciplinary collaboration in the research agenda. Even so, there is limited focus on nursing-specific priorities. If care is interdisciplinary, then research also be interdisciplinary. Interdisciplinary research in orthogeriatrics and fragility fracture care must involve all members of the team at the outset, including patient and care involvement. Nurse leaders may need to support nurses who possess research skills to seek to be more involved in this agenda so that they can be more certain that their role is represented.

Mixed methods studies are increasingly common and are an ideal opportunity for nurses to influence research since mixed methods approaches are more flexible in answering multifaceted questions about clinical care, and this provides an opportunity for nurses to ensure studies involve nursing care issues, especially of care activities that are nursing specific and can impact significantly on outcomes. Mixed methods studies also have the potential to foster interdisciplinary collaboration in the clinical research agenda as well as in practice.

18.8 Orthogeriatric and Fragility Fracture Nursing Education

The purpose of health professional education is to foster excellence in practice through supporting practitioners in developing the knowledge, skills, and attitudes needed to make clinical decisions based on the best available evidence [22]. Education is the foundation of transforming care and services so that patient outcomes following fragility fracture can be optimised and future fractures prevented. The success of the Fragility Fracture Network (FFN) Call to Action (CtA) [23] is partially, but significantly, dependent on educating all health professionals involved

in the management, care, and prevention of fragility fractures. Any approach to education will also need to accommodate geographical, political, and cultural differences to facilitate successful learning. The need for education is universal, crossing geographical, cultural, and professional boundaries. Global organisations such as the Fragility Fracture Network (<https://fragilityfracturenetwork.org/>), and International Osteoporosis Foundation (<https://www.osteoporosis.foundation/>) as well as regional networks such as the Asia Pacific Fragility Fracture Alliance (<https://apfracturealliance.org/>) are bringing together face-to-face and virtual networks of practitioners, experts, leaders, and researchers from all parts of the globe. These networks, and the existence of many options for communication and sharing of knowledge and best practice examples, offer significant potential for interprofessional, professional community-led education.

The education needs of nurses and other health professionals vary depending on their existing knowledge and skills, the level of their practice, and their global location. Health professional education varies significantly from one country to another—often in tandem with how empowered nurses, for example, are to develop their practice and take control over their own professional education. Even in higher income countries, nurses do not usually receive pre-qualifying or post-qualifying education to prepare them to provide care to patients with fragility fractures—creating a gap between their knowledge and skills and patient needs. Just as the need for improvements in the care of patients with fragility fractures is global, so the need for nursing education to facilitate such improvements is an international challenge. The nursing community needs to develop a strategic plan for the leadership, planning, and delivery of education for optimum nursing and interdisciplinary care of patients with fragility fractures. This book, perhaps, can be viewed as a blueprint for a global plan for orthogeriatric and fragility fracture nursing education. Even so, education is much more than dissemination of the written words in a book, and it will take planning and effort to integrate knowledge into practice across the globe.

Even though nursing education is paramount in achieving optimum patient care, acknowledging that orthogeriatric and fragility fracture care is, by necessity, interdisciplinary is essential. The benefits of multidisciplinary approaches to care, supported by interdisciplinary education are well documented [24].

The task of facilitating learning of individuals and teams of fragility fracture practitioners at a global level requires careful consideration of how learning might be delivered in a manner that accommodates different cultures, learning needs and styles, and available resources. The mode of delivery is an important consideration. Face-to-face delivery of education is now a luxury in a world where online education is increasingly valued. It is wise, therefore, for global, regional, country, and local fragility fracture education strategies to be based on the online approach where and when possible. Ultimately, a blended approach (where online and face-to-face delivery are mixed) would be preferable, but the costs and logistic issues need to be carefully considered.

Any education programme must have a clear and workable strategy for evaluation. This needs to be much more than simply focused on learner written feedback but needs to focus on the impact of the learning on each clinician's skills as well as

the ultimate purpose of delivering optimum care as well as consideration of how this reflects the patient/carer/family perspective and how it can include the patients' experience of their condition. Such a strategy would need consideration of different cultural aspects globally.

18.9 Conclusion

This concluding chapter has explored some of the considerations for the future of orthogeriatric and fragility fracture care from the perspective of nurses and other practitioners. The demand for care in some parts of the world will continue to escalate in the coming decades. This means that the right resources and skills need to be in place for fracture prevention to ameliorate as much of the rise in incidence as possible, and for post-fracture care to be optimised. Without such a focus, services will be overwhelmed. Orthogeriatric and Fragility Fracture Care teams need to work collaboratively with leaders and policy makers to ensure the best evidence-based care can be implemented.

The agenda that supports this important goal includes attention to workforce resources as well as the development of the roles of practitioners with particular attention to the skills needed to care for older people following acute injury as well as in health improvement and prevention of future fractures. Significant effort is also needed in the research agenda that can support future optimum practice and education of the workforce to provide this optimised care that is compassionate and person centred.

Summary of Main Points for Learning

- The role of nurses and other practitioners in orthogeriatric care and fragility fracture management and care (definitions are provided in Chap. 1) is broad and complex.
- The rising incidence of fractures, particularly fragility fractures, is a global public health issue placing unprecedented pressure on service.
- Care of patients with fragility fractures is best provided practitioners who recognise the specific and complex needs of frail older people with multiple comorbidities.
- In some places care is enhanced by nurses working in advanced practice roles that encompass advanced/specialist clinical practice, leadership, and education.
- All members of the interdisciplinary team need skills in chronic disease management.
- Care provided for patients with fragility fractures needs to be compassionate and patient centred.

- Interdisciplinary research in orthogeriatrics and fragility fracture care must involve all members of the team with nurses more involved in the conduct of research.
- The task of facilitating learning of individuals and teams of fragility fracture practitioners at a global level requires careful consideration of how learning might be delivered in a manner that accommodates different cultures, learning needs and styles, and available resources.

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