BEST PRACTICE
EVIDENCE-BASED
GUIDELINE

# ACUTE MANAGEMENT AND IMMEDIATE REHABILITATION AFTER HIP FRACTURE AMONGST PEOPLE AGED 65 YEARS AND OVER


JUNE 2003

## Endorsed by

The Royal New Zealand College of General Practitioners

NZ Geriatric Society

NZ Orthopaedic Association

Hospitals Association, Inc.

New Zealand Nurses Organisation

## Supported by

Royal Australasian College of Surgeons - New Zealand Branch

Australasian College for Emergency Medicine

Best Practice Evidence-based
Guideline

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***STATEMENT OF INTENT***

Clinical guidelines are produced to help health professionals and consumers make decisions about health care in specific clinical circumstances. Research has shown that if properly developed, communicated and implemented, guidelines can improve care. The advice on acute management and immediate rehabilitation after hip fracture amongst people aged 65 years and over given in this guideline is based on epidemiological and other research evidence, supplemented where necessary by the consensus opinion of the expert development team based on their own experience.

While the guidelines represent a statement of best practice based on the latest available evidence (at the time of publishing), they are not intended to replace the health professional's judgment in each individual case.



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# PURPOSE



The purpose of this guideline is to provide an evidence-based summary of the clinical aspects of hip fracture management and immediate rehabilitation amongst people aged 65 years and over. By following the evidence-based recommendations, most older people suffering hip fracture will be able to access the most effective treatment and return quickly to their previous residence and activities.

The guideline draws on the best evidence available from New Zealand and international sources, and is designed to inform decisions made by policy makers, funders, clinicians and consumers. It should not be construed as including all appropriate methods of care, or excluding other acceptable treatments.

Decisions taken in the management of any individual in any relevant age group must be determined by the health care team and the person with hip fracture in the light of the clinical problem, and the diagnostic and management options available.

# ABOUT THE GUIDELINE



## FOREWORD

The New Zealand Guidelines Group Incorporated (NZGG) is a not-for-profit organisation established to promote effective health and disability services. Guidelines make a contribution to this aim by sharing the latest international studies and interpreting these in a practical way for adoption in the New Zealand setting.

This guideline addresses the best practice for the following aspects of acute management and immediate rehabilitation after hip fracture:

- pre-hospital care, pre-operative preparation, and post-operative management
- surgical management
- immediate rehabilitation.

This guideline has been developed to inform decisions both about clinical aspects of hip fracture management, and about resource allocation. It should not be construed as including all appropriate methods of care, or excluding other acceptable treatments.

## GUIDELINE DEVELOPMENT PROCESS

In 2001 a multidisciplinary group of professionals and consumers was convened as the hip fracture guideline development team to develop two best practice evidence-based guidelines for people aged 65 years and over: one on the acute management and immediate rehabilitation after hip fracture; the other on the prevention of hip fracture. Both guidelines are available for download at www.nzgg.org.nz

A systematic search was made for published guidelines. Two previous guidelines were identified.[1,2] The guideline development team agreed to update and extend the scope of the earlier guidelines as well as adapt them to New Zealand requirements.

Methods used by the group in preparing the guideline for the acute management and immediate rehabilitation after hip fracture amongst people aged 65 years and over are available on the New Zealand Guidelines Group website at www.nzgg.org.nz – click on 'Supporting Materials' for this guideline.

# THE GUIDELINE DEVELOPMENT TEAM

The hip fracture guideline development team was commissioned by the New Zealand Guidelines Group and funded by the Ministry of Health to develop a best practice, evidence-based guideline on acute management and immediate rehabilitation after hip fracture amongst people aged 65 years and over. A multidisciplinary group was convened with members representing stakeholder professional groups and consumers. Contributors were:

## Research and Writing Group

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Orthopaedic Surgeon; Dean, Hull York Medical School; (formerly Dean, Dunedin School of Medicine, University of Otago); formerly NZGG Board Member; ChM, FRACS, FRCPEd

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### *Jan Jackson*

Fractured Neck of Femur Clinical Nurse Specialist, Auckland District Health Board; Diploma in Comprehensive Nursing, Post Graduate Certificate in Health Science

### *Clare Robertson*

Senior Research Fellow, Fall Prevention Research, Economic Evaluation, University of Otago Medical School; BSc (Hons), BCom, PhD

### *Jean-Claude Theis*

Associate Professor of Orthopaedic Surgery, Dunedin School of Medicine; MD, MChOrth, FRCS Ed, FRACS

### *Raymond Jones*

Project Co-ordinator, Otago District Health Board; Post Graduate Diploma in Health Informatics, Registered Nurse (UK and NZ), English Nursing Board Post Graduate Certificate in Orthopaedic Nursing

## Consultation Group

### *Marion Robinson (Dunedin)*

Personal experience of hip fracture

### *Heather Thomson (Opotiki)*

Māori, Consumer Advocate

### *Jim Reid (Dunedin)*

General medical practice

## Declaration of Competing Interests

John Campbell has received research funding from the Accident Compensation Corporation (ACC).

# CONSULTATION

A draft of the guideline was widely circulated to over 30 individuals/organisations for peer review. Comments were received from the following:

- ACC Injury Prevention Division
- Allan Panting, Nelson Hospital
- Bruce Twaddle, Orthopaedics Department, Auckland District Health Board
- David Rankin, General Manager, ACC Healthwise
- Gail Leach, Executive Director, NZ Society of Physiotherapists
- Jan Nicholson, Canterbury District Health Board
- Keith McKea, General Manager Injury Prevention, ACC
- Lyn Muller, Taranaki Health
- Mark Flowers, Chief Executive Officer, Hawke's Bay District Health Board
- Orthopaedic Ward, Nelson Hospital
- Osteoporosis New Zealand Inc
- Raewyn Osbaldiston, Department of Orthopaedic Surgery, Auckland Hospital
- Richard Webb, Chief Executive, Canterbury District Health Board
- Roger Harris, Department of Orthopaedic Surgery, Auckland Hospital
- Sandy Dawson, Ministry of Health.

# EVIDENCE AND RECOMMENDATION GRADING SYSTEM

The grading system is a two-tier system where the INDIVIDUAL STUDIES are each given a level of evidence from 1 to 4 (refer Appendix for the details). Throughout the guideline, the level of evidence has been included alongside the references. This is formatted as reference[level of evidence].

The second step in grading is to consider the WHOLE BODY OF EVIDENCE ie, all the studies relevant to the issue, and decide on a recommendation and grade based on all of the individual studies.

| GRADES OF RECOMMENDATIONS | |
|---|---|
| At least one meta-analysis, systematic review, or RCT rated 1++, and directly applicable to the target population; or<br>A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results. | **A** |
| A body of evidence consisting principally of studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or<br>Extrapolated evidence from studies rated as 1++, or 1+. | **B** |
| A body of evidence consisting principally of studies rated as 2+, directly applicable to the target population, and demonstrating overall consistency of results; or<br>Extrapolated evidence from studies rated as 2++. | **C** |
| Evidence level 3 or 4; or<br>Extrapolated evidence from studies rated as 2+. | **D** |

The grades A to D are a measure of the strength of evidence underlying the recommendations and should not be construed as an indication of the relative importance of the recommendations.

# INTRODUCTION

The consequences of hip fractures in older people create a significant and increasing burden of illness in the community, and represent for many who suffer them 'a dramatic decline in physical function'.[3] Their anxiety is not without cause; 20% of older people who sustain a hip fracture die within a year. In New Zealand, the survivors, two years after the fracture, are more than four times more likely to have limited mobility than people of similar age without a fracture, and more than twice as likely to be functionally dependent.[4]

In New Zealanders of European origin, surveyed in the Auckland region in 1994,[5] age-adjusted annual incidence rates were comparable with other societies. Ninety-seven percent of hip fractures occurred in people identified as of European origin, compared with 0.9% for Māori and 0.6% for Pacific peoples. The crude incidence rate for the population as a whole was 632.3 women per 100,000 and 239.9 per 100,000 in men. The chance of sustaining a hip fracture increases with age. Amongst women of European origin, age-specific rates ranged from 47.1 per 100,000 in under 65 year olds to 5384.6 in women aged 95 years and over. Sixty-seven percent of the hip fractures were sustained by those aged 80 years or older. In Māori and Pacific Island populations, the difference in rates between men and women were not apparent. Overall crude rates in Māori were 151.6 per 100,000 for women, and 169.3 for men; in Pacific peoples, the rates were 154.5 per 100,000 for women, and 168.7 for men. The size of the difference between Māori and non-Māori is notable because the rate of reporting a fall in the previous 12 months does not show a significant difference (26% and 25%).[6]

Thus, hip fractures are common and have a large impact. Once an older person has suffered a hip fracture, she or he will require considerable attention from health services. This is not only from hospitals that provide secondary acute care or rehabilitation services, but also from the primary health care sector, from social services, and from informal carers.

## WHAT DO WE DO NOW?

The NZHIS hip fracture study[7] summarised the performance of 20 New Zealand Public Hospitals whose annual experience in 1998/99 of acute management of hip fracture was 30 or more people. Data from 2615 individuals aged 65 years and over were analysed. The authors of this report noted the limitations of using administrative data for purposes of clinical epidemiology, and the need for more detailed analysis at the level of individual hospitals to form any real conclusion about treatment practices. However, they were prepared to conclude that:

- hip fracture is a condition of high complexity, with multiple options available in clinical intervention
- there is a large variation in clinical practice due to lack of evidence-based guidelines

- an apparent disparity exists in quality of care across hospitals
- there is strong evidence of inconsistent outcomes in terms of complications, misadventures, re-admissions, and deaths.

The quoted main results relevant to this guideline are:

| Parameter | Average | Range |
|---|---|---|
| Average length of hospital stay | 10.27 days | 6.78 days to 12.88 days |
| Prosthetic complications | | 0 to 11 % |
| Post-operative infection rates | | 0 to 4% |
| Bleeding complications | | 0 to 15 % |
| Thromboembolic complications | | 0 to 2.35% |
| In-hospital death rate | | 0 to 5.31% |
| Complexity/co-morbidity | | Victorian case weight average 3.39 to 3.90 |

NB Quoted percentages are ranges of point estimates of proportion for each hospital and do not include confidence intervals.



# OBJECTIVES

The objectives for developing this guideline were:

- to provide clinicians and people suffering hip fractures with evidence for current best practice in acute management and immediate rehabilitation after hip fracture, to support decision making
- to provide a basis for review of local practice, and implementation or updating of clinical pathways.

# TOPICS ADDRESSED BY THE GUIDELINE

The guideline covers the following aspects of acute management and immediate rehabilitation of hip fracture:

- pre-operative preparation, and post-operative management
- surgical management
- immediate rehabilitation.

For each section, the aims are specified followed by a summary of the evidence.

**KEY** - *Grades indicate the strength of the supporting evidence, rather than the importance of the recommendations - see page viii for details*

**A** Well designed meta-analysis (MA) or RCT, or a body of evidence which is consistently applicable
**B** Very well designed observational studies or extrapolated evidence from RCTs or MAs
**C** Lower quality observational studies or extrapolated evidence from B
**D** Non analytical studies or expert opinion

# NON-SURGICAL MANAGEMENT



## AIM

To provide evidence that supports clinical decision-making in pre- and post-operative management of older people with hip fracture.

## EVIDENCE SUMMARY

### Pre-hospital Care

No data from randomised trials on pre-hospital care after hip fracture were identified.

For older people living alone, or in isolated communities, long delays may occur between fracture and admission to hospital. In isolated areas, fluid replacement and catheterisation prior to transport to hospital may be indicated.

| RECOMMENDATION | |
|---|---|
| In isolated areas, fluid replacement and catheterisation prior to transport to hospital may be indicated. | D |

### Emergency Department

Use of a 'fast track' protocol for people suffering hip fracture in the emergency department, constructed in collaboration with the in-patient service, has proved effective in reducing admission delays.[8][2+]

| RECOMMENDATION | |
|---|---|
| Hospitals treating hip fracture should have formal 'fast track' protocols for assessment and admission of people aged 65 years and over. | C |

## Fluid Replacement

Older people after hip fracture are at risk of dehydration because of their inability to gain access to sufficient fluids. When fluid replacement is given intravenously, older people are also at risk of fluid overload and dilutional hyponatraemia because of increased antidiuretic hormone production due to trauma, medication, nausea and hypotension. Careful fluid management is required.

| RECOMMENDATION | |
|---|---|
| After hip fracture, there is a risk of dehydration because of inability to gain access to sufficient fluids. Careful fluid management is required, as there is also risk of fluid overload when fluid replacement is given intravenously. | D |



## Pre-operative Traction

There is no evidence that the routine application of pre-operative traction to the injured limb is associated with any significant reduction in the need for analgesia, or that fracture reduction at surgery is easier.[9][1+] Routine use of temporary leg traction may be unnecessary.

| RECOMMENDATION | |
|---|---|
| Routine use of temporary leg traction appears to be unnecessary. | A |

## Pain Relief

There is evidence[10] that older people with hip fracture frequently experience undertreated pain; this is particularly so in people with dementia.[11] Older people may attempt to 'tough it out', or, if confused, may not have usual external pain behaviours. Use of systematic clinical pain assessment tools can improve pain management.[12,13][2+]

As frail older people may tolerate narcotics poorly, multiple modalities should be considered for analgesia.[14][4]

In multi-modality treatment of post-operative pain, paracetamol should be preferred to aspirin as their effects are similar milligram for milligram, but paracetamol has fewer side effects.[15,16]

Ibuprofen is an NSAID effective in post-operative pain, and appears to have lower incidence of adverse effects than other NSAIDs.[17,18][1-]

Dextropropoxyphene has adverse central nervous system effects (sleepiness and dizziness)[19] and has been associated with an increased risk of hip fracture.[20][1-,2+] Propoxyphene-containing compounds are not recommended for people with hip fracture.

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**A** Well designed meta-analysis (MA) or RCT, or a body of evidence which is consistently applicable
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The use of local analgesic nerve blocks reduces the need for parenteral or oral analgesia while awaiting surgery, during surgery, and in the post-operative period.[21][1+]

Use of local analgesic blocks may also be associated with a reduction in post-operative respiratory infection.[21][1-]

| RECOMMENDATIONS | |
|---|---|
| Use of systematic pain assessment tools helps to avoid undertreatment or overtreatment of pain. | C |
| As frail older people tolerate narcotics poorly, multiple modalities should be considered for analgesia. | D |
| Narcotic use must be carefully titrated and supervised. | D |
| Paracetamol should be preferred to aspirin as their effects are similar milligram for milligram, but paracetamol has fewer side effects. | B |
| Ibuprofen is an NSAID effective in post-operative pain, and appears to have lower incidence of adverse effects than other NSAIDs. | B |
| Propoxyphene-containing compounds are not recommended in people aged 65 years and over with hip fracture. | B |
| The use of local analgesic nerve blocks reduces the need for parenteral or oral analgesia. | A |



## Oxygen Therapy

After hip fracture, oxygen should be administered to maintain adequate tissue oxygenation, as indicated by bedside oximetry and clinical status.[6,22,23][2++]

The detailed indications for titration, monitoring, and discontinuation of oxygen therapy after hip fracture in older people have received little research attention. The most cost-effective approach is unclear even using extrapolation from other patient groups.[22,23] Oxygen therapy in the bed precludes mobilisation. Its use for strictly defined periods of time post-operatively is sometimes inappropriate.

| RECOMMENDATION | |
|---|---|
| Oxygen should be administered to maintain adequate tissue oxygenation, as indicated by oximetry and clinical status. | C |

## Prophylaxis Against Venous Thromboembolism

General measures, including adequate fluid balance and early post-operative mobilisation appear to be associated with lowering of the risk of post-operative venous thromboembolism (VTE).

Prophylaxis with aspirin significantly reduces the incidence of symptomatic deep venous thrombosis, and of definite or probable pulmonary embolism when administered pre-operatively and continued for 35 days.[24][1++]

Prophylaxis with unfractionated heparin or low-molecular weight heparin significantly reduces the incidence of venographically confirmed deep venous thrombosis after hip fracture. There is insufficient RCT evidence in this group to confirm the effect on pulmonary embolism.[25][1+]

Striking a balance between the benefits and adverse effects of pharmacological prevention of venous thromboembolism after hip fracture has been controversial in the past, and remains an important consideration for each individual with hip fracture. However, the reported incidence of venous thromboembolism after hip fracture appears higher than the incidence of adverse events (mainly bleeding complications) from prophylactic administration of heparin or aspirin. In clinical trials this is so, both where ascertainment has been achieved by routine venographic monitoring,[25] and where diagnosis has been made during the routine management of symptomatic events.[24] No direct comparisons presently exist with sufficient power to confirm whether any significant difference is present between these modalities in respect of effectiveness or impact of adverse effects.

Cyclical compression devices (foot or calf pumps) are effective in reducing the incidence of deep venous thrombosis in people with hip fracture.[25][1+] Problems with skin abrasion and compliance have been reported.

There is insufficient evidence to confirm the effectiveness of thromboembolism stockings in the context of hip fracture. Available evidence is extrapolated from studies in joint replacement and abdominal surgery.[26][1+] The manufacturers warn against the use of these stockings in people suffering hip fracture with ankle:brachial pressure ratios of less than 0.7. People suffering hip fracture with peripheral arterial disease and diabetics with neuropathy are said to be particularly at risk.

| RECOMMENDATIONS | |
|---|---|
| Adequate fluid balance and early post-operative mobilisation lower the risk of post-operative venous thromboembolism (VTE). | D |
| Administration of either aspirin or low molecular weight heparin is associated with reduced risk of VTE, but some increase in adverse bleeding events. | A |
| Foot or calf pumps reduce the incidence of VTE, but have some adverse skin effects and compliance problems. | A |
| There is insufficient evidence to confirm the effectiveness of thromboembolism stockings after hip fracture. | B |

## Prophylaxis Against Wound and Other Infections

Antibiotic prophylaxis using a dosage regimen which gives adequate blood levels for a minimum of 12 hours is effective in reducing wound infections associated with hip fracture surgery. This may be achieved either by repeated doses of short-acting agents, or a single administration of a longer acting agent. Depending on the spectrum of the agent used, urinary tract and respiratory infections may also be reduced in the post-operative period.[27][1+]

| RECOMMENDATION | |
|---|---|
| Antibiotic prophylaxis is effective in reducing wound infection after hip fracture surgery. | A |

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## Use of Beds, Mattresses and Cushions to Prevent Pressure Sores

The use of high specification foam bed mattresses, and pressure relieving mattresses on operating tables are effective in reducing the incidence of pressure sores.[28][1+]

| RECOMMENDATION | |
|---|---|
| The use of high specification foam bed mattresses and pressure relieving mattresses on operating tables reduces the incidence of pressure sores. | A |



## Nutritional Supplementation after Hip Fracture

Oral multinutrient feeds appear to reduce unfavourable outcomes (death or post-operative complication) after hip fracture.[29][1+] There is no evidence of benefit from a policy of naso-gastric multinutrient feeding.

| RECOMMENDATION | |
|---|---|
| Oral multinutrient feeds reduce unfavourable outcome (death or post-operative complication) after hip fracture. | A |

## Management of Urinary Retention

Routine catheterisation after hip fracture is not recommended. Urinary retention occurs in around 40% of people after operation for hip fracture.[30][2-] There are various catheter regimens to manage retention. It is unclear which regimen is best; there are few relevant clinical trials. Where routine post-operative indwelling catheterisation is employed, it may be associated with a delay in return to normal voiding. The use of portable ultrasound scanning allows non-invasive monitoring of residual urine. Residual volumes greater than 300ml are associated with an increase in mortality.[30][2-]

In people admitted to hospital for acute treatment of a hip fracture who develop acute retention of urine, successful voiding resumes more quickly following regular intermittent catheterisation (8 hourly) than indwelling catheterisation for 48 hours.[31][1+]

Intermittent catheterisation regimens are associated with significant costs in nursing time and equipment. In Skelly, Guyatt, Kalbfleisch, Singer and Winter,[31] people with severe dementia or a history of long standing urinary incontinence were excluded; the results may not be generalisable to these groups. Other RCTs,[32,33] which have supported the use of indwelling catheters, have been in different population groups and have employed less rigorous intermittent catheterisation regimens.

| RECOMMENDATIONS | |
|---|---|
| Routine catheterisation after hip fracture is not recommended. | D |
| When urinary retention occurs, intermittent catheterisation results in quicker restoration of normal voiding than indwelling catheterisation. | A |

## Management of Dementia/Delirium

Both dementia and delirium in people with hip fracture are associated with poor long-term outcomes and increased length of hospital stay.[34,35] Either may be present on admission to hospital. Initial admission data should include a formal measure of cognitive function.[2+]

Early involvement of a geriatric medical team in hip fracture care has been associated with a significant reduction in the incidence of post-operative delirium.[36][1-] This effect is likely to be mediated by optimisation of medications and fluid replacement.

Active re-orientation by provision of clock, calendar, radio, television and telephone does not appear to reduce post-operative cognitive deterioration.[37][1-]

The provision of continuity in nursing care may reduce post-operative cognitive deterioration.[38][3]

| RECOMMENDATIONS | |
|---|---|
| Initial admission data should include a formal measure of cognitive function. | C |
| Early involvement of a geriatric medical team in hip fracture care has been associated with a significant reduction in the incidence of post-operative delirium. | B |
| Active re-orientation by provision of clock, calendar, radio, television and telephone does not appear to reduce post-operative cognitive deterioration. | A |
| Continuity in nursing care may reduce post-operative cognitive deterioration. | D |

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**C** Lower quality observational studies or extrapolated evidence from B
**D** Non analytical studies or expert opinion

# SURGICAL MANAGEMENT



## AIM

To provide evidence that supports clinical decision-making in surgical management of older people with hip fracture.

## EVIDENCE SUMMARY

### Delay Before Surgery

Delay between admission and surgery, whether for medical stabilisation of the person's co-morbidities, or for administrative/logistical reasons, may increase length of hospital stay, and may also be associated with increased morbidity and mortality. Early operation (within 24 hours) is recommended for most people.[39-41][2+] It is likely that many interacting factors impact on morbidity, mortality and length of stay. Many published studies have claimed an association between delay to surgery and outcome, but few have adjusted for potential confounding in the analyses.

| RECOMMENDATION | |
|---|---|
| Early operation (within 24 hours) for people aged 65 years and over with hip fracture is associated with shorter hospital stay and decreased mortality/morbidity. | C |

### Anaesthesia

Differences in regional anaesthesia for hip fracture surgery is associated with a lower rate of deep venous thrombosis.

For hip fracture surgery, regional anaesthesia when compared with general anaesthesia, appears to be associated with a lower rate of deep venous thrombosis.[42][1+] Mortality rate at one month and incidence of post-operative delirium may be lower, but the differences are not statistically significant.

| RECOMMENDATION | |
|---|---|
| Regional anaesthesia for hip fracture surgery is associated with a lower rate of deep venous thrombosis than general anaesthesia, but no significant differences in mortality or other measures of morbidity. | A |

## Undisplaced Intracapsular Fractures

Screws appear to provide better fixation and fracture healing than unthreaded pins. The use of a side plate on a fixation device does not appear to confer any additional benefit.[43][1-]

| RECOMMENDATION | |
|---|---|
| Screws appear to provide better fixation and fracture healing than unthreaded pins. | B |

## Displaced Intracapsular Fractures

There is no evidence to confirm any benefit of open reduction over closed reduction of a femoral neck fracture prior to internal fixation.[44][1+]

There is limited evidence for the superiority of arthroplasty compared with internal fixation for displaced intracapsular fractures of the hip, reflected by lower re-operation rate.[45][1+]

In arthroplasty after hip fracture, the use of bone cement may be associated with less late pain in the limb. It is unclear whether this benefit is offset by adverse events associated with the use of intramedullary bone cement.[46][1+]

When hemi-arthroplasty is chosen for people aged 75 years and over, a unipolar hemi-arthroplasty appears as effective as a bipolar arthroplasty (which is more expensive).[46][1+]

There is inadequate evidence to identify whether the use of total hip replacement is superior to the use of hemi-arthroplasty in displaced fracture of the femoral neck.[46][1+]

| RECOMMENDATIONS | |
|---|---|
| Any benefit of open reduction over closed reduction of a femoral neck fracture prior to internal fixation is unproven. | A |
| Evidence for the superiority of arthroplasty compared with internal fixation for displaced intracapsular fractures of the hip, reflected by lower re-operation, is limited. | A |
| Arthroplasty is associated with a lower re-operation rate than internal fixation. | A |
| In arthroplasty after hip fracture, the use of bone cement may be associated with less late pain in the limb. | A |
| Unipolar hemi-arthroplasty appears as effective as bipolar hemi-arthroplasty, and is less expensive. | A |
| There is insufficient evidence to identify whether the use of total hip replacement is superior to the use of hemi-arthroplasty in displaced fracture of the femoral neck. | A |

**KEY** - *Grades indicate the strength of the supporting evidence, rather than the importance of the recommendations - see page viii for details*

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## Extracapsular (trochanteric) Fractures

Sliding hip screws have been shown to give superior results when compared with fixed nail plate devices, with cephalocondylic intramedullary devices, and with condylocephalic intramedullary devices.[47-49][1+]

| RECOMMENDATION | |
|---|---|
| Fixation with a sliding hip screw gives superior results to fixed nail plate devices, or intramedullary devices. | A |



## Surgical Suction Wound Drains

There is inadequate evidence to confirm whether the use of closed suction wound drainage after hip fracture surgery reduces clinically significant wound complications or changes the requirement for blood transfusion.[50-52][1+]

| RECOMMENDATION | |
|---|---|
| The usefulness of surgical suction wound drains after hip fracture surgery is unproven. | A |

## Post-operative Mobilisation

People with hip fracture should be mobilised, weight bearing with support as tolerated, as soon as possible after surgery, on the first or second day.[6][4]

| RECOMMENDATION | |
|---|---|
| People with hip fracture should be mobilised, weight bearing with support as tolerated, as soon as possible after surgery. | D |

A single RCT[53] conducted in 1968 compared weight bearing at two weeks with weight bearing at 12 weeks after fixation of displaced intracapsular fractures. There were no significant differences between the two regimens; neither is employed in current practice.

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# IMMEDIATE REHABILITATION



## AIM

To provide evidence that supports clinical decision-making in immediate rehabilitation of older people with hip fracture.

## EVIDENCE SUMMARY

Early supported discharge involves multidisciplinary assessment of the person suffering hip fracture and her/his social circumstances with a view to allowing return home with all necessary support as soon as is practicable after the fracture has been treated. The introduction of a multidisciplinary Early Supported Discharge Programme as part of a formal Geriatric Hip Fracture Programme (GHFP) in acute orthopaedic units appears effective in achieving a reduction in mean hospital stay, and a higher rate of effective return to previous residential status.[54,55] Complications and re-admission rates are not significantly increased.[56][1+] There is insufficient evidence at present to confirm whether these strategies have impact on subsequent physical function, quality of life, or carer burden.

GHFPs are multidisciplinary clinical pathways for people suffering hip fracture in the acute treatment area; as well as specifying a target length of stay and best practice for each stage of the person's management. Typically these cover clinical interventions, clinical observations, tests/investigations, and rehabilitation/discharge planning. Early multidisciplinary assessment by a geriatric team is an essential component,[36] as is access to a rehabilitation facility for people after hip fracture whose circumstances and medical condition do not allow early discharge to the community. Clinical pathways are also associated with increased compliance with recommended practices.[57]

Supporting older people once they return to the community requires active participation from primary care services including general practitioners. Good communication between hospital-based services and primary care is essential.

| RECOMMENDATIONS | |
|---|---|
| Hospitals providing treatment for people aged 65 years and over with hip fracture should provide formal hip fracture programmes which include early multidisciplinary assessment by a geriatric team. | A |
| Early Supported Discharge Programmes reduce mean hospital stay, and are associated with a higher rate of effective return to previous residential status. | A |

# IMPLEMENTATION



The recommendations of this guideline are intended to assist decision-making, and are based on current best evidence. The guideline is not intended to serve as, or be construed as, a standard of health care. Adoption and implementation of the recommendations will be a matter for Accident Compensation Corporation (ACC), District Health Boards (DHBs), Independent Practitioners' Associations (IPAs), Primary Healthcare Organisations (PHOs) and local provider units to consider. The guideline should provide a basis at local level for protocols, continuing health professional education, audit, and quality assurance activities. Suggestions for audit are described in Chapter 5.

## DISSEMINATION

The guideline will be sent to:

- ACC
- colleges and associations representing relevant health professional vocational groups
- members of IPAs
- PHOs
- chief executives and chief medical officers of DHBs
- tertiary education institutions offering health professional programmes
- providers of Aged Care services in the community
- selected others.

Summary guidelines will also be prepared. The guidelines and summaries will be posted on the NZGG website www.nzgg.org.nz and on the ACC website www.acc.govt.nz

# AUDIT AND PERFORMANCE INDICATORS



## QUALITY

People aged 65 years and over suffering with hip fracture, service providers, and funders of services to people with hip fracture all have an interest in the quality of the care and management of people with hip fractures. This places a responsibility on service providers to collect information relevant to different perspectives. This chapter suggests:

- a minimum data set for collection relating to each individual with hip fracture aged 65 years and over
- additional data for periodic audit (by an internal or external agency).

### Suggested data for routine collection

- Basic demographics of people at risk for hip fracture (age and gender)
- Current living status (own home – alone, residential, family support)
- Maternal history of hip fracture
- Smoker status. Number of attempts at quitting
- Diabetes diagnosed. Using insulin?
- Number of strokes
- Number of falls in the previous 12 months
- Previous fractures (hip, wrist, humerus, spine)
- Current medications and dose levels (anticonvulsants, bisposphonates, corticosteroids, opioids, HRT, psychotrophic drugs, and type Ia antiarrhythmic)
- Use of vitamin D supplements and calcium
- Side effects of medication.

## AUDIT

Audit is a systematic, independent and documented process for obtaining evidence and evaluating it objectively to determine the extent to which a service, such as

a primary health care practice, is meeting best practice standards. In order to assess whether acute management and immediate rehabilitation after hip fracture is being provided effectively, performance indicators should be assessed.

## Suggested performance indicators

### *Process Indicators:*

- Average length of time in the emergency treatment
- % assessed systematically for pain and provided with appropriate analgesia
- % receiving operation in 12 hrs or less; 12 – 24 hrs; 24 – 36 hrs; more
- % receiving prophylaxis for venous thromboembolism
- % receiving antibiotic prophylaxis
- proportion of people with hip fracture requiring catheterisation who receive intermittent catheterisation
- % receiving early multidisciplinary geriatric assessment before discharge
- % referred to an early supported discharge programme
- average length of hospital stay.

### *Outcome indicators:*

- % who develop thromboembolic complications
- % who develop post-operative wound infection
- % requiring re-operation during primary admission
- % requiring re-admission after discharge
- % receiving osteoporotic medications on discharge (with details of the medications prescribed).

# EVIDENCE AND RECOMMENDATION GRADING SYSTEM USED FOR THIS GUIDELINE



The guideline development team ranked the evidence according to the revised system of the Scottish Intercollegiate Guidelines Network (SIGN).[58] The SIGN Grading System for Recommendations in Evidence-based Clinical Guidelines is a revised version of the system developed by the US Agency for Health Care Policy and Research (AHCPR).[59] Evidence statements relating to interventions have been assigned a grading according to the 'strength' of the supporting evidence where 1 is the best quality evidence and 4 is expert opinion.

Qualitative material was systematically appraised for quality, but was not ascribed a level of evidence.

| LEVELS OF EVIDENCE | |
|---|---|
| **1++** | High quality meta-analyses/systematic reviews of randomised controlled clinical trials (RCTs), or RCTs with a very low risk of bias |
| **1+** | Well-conducted meta-analyses/systematic reviews, or RCTs with a low risk of bias |
| **1-** | Meta-analyses/systematic reviews, or RCTs with a high risk of bias |
| **2++** | High quality systematic reviews of case-control or cohort studies<br>High quality case-control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal |
| **2+** | Well-conducted case-control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal |
| **2-** | Case-control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal |
| **3** | Non-analytic studies eg, case reports. Case series |
| **4** | Expert opinion<br>Qualitative material was systematically appraised for quality, but was not ascribed a level of evidence. |

# GLOSSARY



## MEDICAL TERMS

**Analgesia:** The relief of pain without loss of consciousness.

**Antidiuretic:** An agent that suppresses urine formation.

**Arthroplasty:** Plastic surgery of a joint or of joints; the formation of movable joints.

**Catheter:** Tubular, flexible, surgical instrument inserted into a cavity of the body to withdraw or introduce fluid, especially a tube for introduction into the bladder through the urethra for the withdrawal of urine.

**Catheterise:** To introduce a catheter within a body cavity; usually used to designate the passage of a catheter into the bladder for the drainage of urine.

**Cephalocondylic intramedullary devices:** Refers to either extramedullary implants such as fixed nail plates and sliding hip screws, applied from the top down or other intramedullary nails which are inserted into the femoral canal from above the fracture. These devices are for the treatment of extra-capsular femoral fractures.

**Condylocephalic intramedullary devices:** Refers to nails which are inserted up through the femoral canal from above the knee, for example Ender and Harris nails.

**Hyponatraemia:** Deficiency of sodium in the blood; salt depletion.

**NSAID:** Nonsteroidal anti-inflammatory drug.

**Osteoporosis:** Low bone density.

**Oximetry:** Determination of the oxygen saturation of the arterial blood using an oximeter.

**Prophylaxis:** Preventive treatment.

**Venography:** Radiography of the veins after injection of the contrast medium into bone marrow at an appropriate site, such as the iliac crest, ischium, pubic bones, greater trochanter, spinous processes of the vertebrae, or sternum.

**Venous Thromboembolism:** A term that includes both deep venous thrombosis (DVT) and pulmonary embolus.

# METHODOLOGICAL TERMS

**Bias:** Bias is a systematic deviation of a measurement from the 'true' value leading to either an over- or underestimation of the treatment effect. Bias can originate from many different sources, such as allocation of participants, measurement, interpretation, publication and review of data.

**Case-control study:** Participants with a certain outcome or disease and an appropriate group of controls without the outcome or disease are selected (usually with careful consideration of appropriate choice of controls, matching, etc) and then information is obtained on whether the subjects have been exposed to the factor under investigation.



**Case series:** The intervention has been used in a series of patients (may or may not be consecutive series) and the results reported. There is no separate control group for comparison.

**Causality:** The relating of causes to the effects they produce. The Bradford-Hill criteria for causal association are: consistency, strength, specificity, dose – response relationship, temporal relationship (exposure always precedes the outcome – it is the only essential criterion), biological plausibility, coherence and experiment.

**Cochrane Collaboration:** The Cochrane Collaboration is an international network that aims to prepare, maintain and disseminate high quality systematic reviews based on RCTs and when RCTs are not available, the best available evidence from other sources. It promotes the use of explicit methods to minimise bias, and rigorous peer review.

**Cohort study:** A study in which data are obtained from groups who have been exposed, or not exposed, to the new technology or factor of interest (eg, from databases). Careful consideration is usually given to participant selection, choice of outcome, appropriate controls, matching, etc. However, data on outcomes may be limited.

**Confidence interval (CI):** An interval within which the population parameter (the 'true' value) is expected to lie with a given degree of certainty (eg, 95%).

**Confounding:** The measure of an association or treatment effect is distorted because of difference in variables between the treatment and control groups that are also related to the outcome. For example, if the treatment (or new intervention) is trialed in younger participants then it may appear to be more effective than the comparator, not because it is better, but because the younger participants had better outcomes.

**Effectiveness:** The extent to which an intervention produces favourable outcomes under usual or everyday conditions.

**Efficacy:** The extent to which an intervention produces favourable outcomes under ideally controlled conditions such as in a randomised controlled trial.

**Evidence:** Data about the efficacy or effectiveness of a new treatment or intervention derived from studies comparing it with an appropriate alternative. Preferably the evidence is derived from a good quality randomised controlled trial, but it may not be.

**Extrapolation:** Refers to the application of results to a wider or different population and means to infer, predict, extend, or project the results beyond that which was recorded, observed or experienced.

**Incidence:** The number of new events (new cases of a disease) in a defined population, within a specified period of time.

**Level of evidence:** A hierarchy of study evidence that indicates the degree to which bias has been eliminated in the study design.

**Meta-analysis:** Results from several studies, identified in a systematic review, are combined and summarised quantitatively.

**Randomised controlled trial (RCT):** An experimental comparison study in which participants are allocated to treatment/intervention or control/placebo groups using a random mechanism, such as coin toss, random number table, or computer-generated random numbers. Participants have an equal chance of being allocated to an intervention or control group and therefore allocation bias is eliminated.



**Relative risk or risk ratio (RR):** Ratio of the proportions in the treatment and control groups with the outcome. This expresses the risk of the outcome in the treatment group relative to that in the control group.

**Systematic review:** The process of systematically locating, appraising and synthesising evidence from scientific studies in order to obtain a reliable overview.

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