

# Fractures (non-complex): assessment and management

NICE guideline

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## Your responsibility

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

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## Overview

This guideline covers assessing and managing non-complex fractures that can be treated in the emergency department or orthopaedic clinic. It aims to improve practice so that people with fractures receive the care that they need without unnecessary tests and treatments.

The guideline should be read alongside the NICE guidelines on [major trauma](#), [major trauma: service delivery](#), [spinal injury](#) and [fractures \(complex\)](#).

## *Who is it for?*

- Healthcare professionals and practitioners who provide care for people with fractures
- People with fractures, their families and carers

## Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in [your care](#).

[Making decisions using NICE guidelines](#) explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

Recommendations apply to both children (under 16s) and adults (16 or over) unless otherwise specified. Some recommendations on management depend on whether the growth plate of the injured bone has closed (skeletal maturity). The age at which this happens varies. In practice, healthcare professionals use clinical judgement to determine whether a bone is skeletally mature. When a recommendation depends on skeletal maturity this is clearly indicated.

### 1.1 *Initial pain management and immobilisation*

#### Pain assessment

- 1.1.1 See the NICE guideline on [patient experience in adult NHS services](#) for advice on assessing pain in adults.
- 1.1.2 Assess pain regularly in people with fractures using a pain assessment scale suitable for the person's age, developmental stage and cognitive function.
- 1.1.3 Continue to assess pain in hospital using the same pain assessment scale that was used in the pre-hospital setting.

#### Initial pharmacological management of pain in adults (16 or over)

- 1.1.4 For the initial management of pain in adults (16 or over) with suspected long bone fractures of the legs (tibia, fibula) or arms (humerus, radius, ulna), offer:
  - oral paracetamol for mild pain
  - oral paracetamol and codeine for moderate pain
  - intravenous paracetamol supplemented with intravenous morphine titrated to effect for severe pain.

- 1.1.5 Use intravenous opioids with caution in frail or older adults.
- 1.1.6 Do not offer non-steroidal anti-inflammatory drugs (NSAIDs) to frail or older adults with fractures.
- 1.1.7 Consider NSAIDs to supplement the pain relief in recommendation 1.1.4 except for frail or older adults.

### **Initial pharmacological management of pain in children (under 16s)**

- 1.1.8 For the initial management of pain in children (under 16s) with suspected long bone fractures of the legs (femur, tibia, fibula) or arms (humerus, radius, ulna), offer:
- oral ibuprofen, or oral paracetamol, or both for mild to moderate pain
  - intranasal or intravenous opioids for moderate to severe pain (use intravenous opioids if intravenous access has been established).

### **Hot reporting**

- 1.1.9 A radiologist, radiographer or other trained reporter should deliver the definitive written report of emergency department X-rays of suspected fractures before the patient is discharged from the emergency department.

### **Splinting long bone fractures of the leg in the pre-hospital setting**

- 1.1.10 In the pre-hospital setting, consider the following for people with suspected long bone fractures of the legs:
- a traction splint or adjacent leg as a splint if the suspected fracture is above the knee
  - a vacuum splint for all other suspected long bone fractures.

### **Femoral nerve blocks in children (under 16s)**

- 1.1.11 Consider a femoral nerve block or fascia iliaca block in the emergency department for children (under 16s) with suspected displaced femoral fractures.

## 1.2 *Acute stage assessment and diagnostic imaging*

### Use of clinical prediction rules for suspected knee fractures

- 1.2.1 Use the Ottawa knee rules to determine whether an X-ray is needed in people over 2 years with suspected knee fractures.

### Use of clinical prediction rules for suspected ankle fractures

- 1.2.2 Use the Ottawa ankle and foot rules to determine whether an X-ray is needed in people over 5 years with suspected ankle fractures.

### Imaging of scaphoid fractures

- 1.2.3 Consider MRI for first-line imaging in people with suspected scaphoid fractures following a thorough clinical examination.

## 1.3 *Management in the emergency department*

### Reduction of distal radius fractures

- 1.3.1 Consider intravenous regional anaesthesia (Bier's block) when reducing dorsally displaced distal radius fractures in adults (16 or over) in the emergency department. This should be performed by healthcare professionals trained in the technique, not necessarily anaesthetists.
- 1.3.2 Do not use gas and air (nitrous oxide and oxygen) on its own when reducing dorsally displaced distal radius fractures in the emergency department.

### Management of torus fractures

- 1.3.3 Do not use a rigid cast for torus fractures of the distal radius.
- 1.3.4 Discharge children with torus fractures after first assessment and advise parents and carers that further review is not usually needed.

## 1.4 Ongoing orthopaedic management

### Non-surgical orthopaedic management of unimalleolar ankle fractures

1.4.1 In the non-surgical orthopaedic management of unimalleolar ankle fractures:

- advise immediate unrestricted weight-bearing as tolerated
- arrange for orthopaedic follow-up within 2 weeks if there is uncertainty about stability
- advise all patients to return for review if symptoms are not improving 6 weeks after injury.

### Timing of surgery for ankle fractures

1.4.2 If treating an ankle fracture with surgery, consider operating on the day of injury or the next day.

### Timing of surgery for distal radius fractures

1.4.3 When needed for distal radius fractures, perform surgery:

- within 72 hours of injury for intra-articular fractures
- within 7 days of injury for extra-articular fractures.

1.4.4 When needed for re-displacement of distal radius fractures, perform surgery within 72 hours of the decision to operate.

### Definitive treatment of distal radius fractures in adults (skeletally mature)

1.4.5 Consider manipulation and a plaster cast in adults (skeletally mature) with dorsally displaced distal radius fractures.

1.4.6 When surgical fixation is needed for dorsally displaced distal radius fractures in adults (skeletally mature):

- offer K-wire fixation if:
  - no fracture of the articular surface of the radial carpal joint is detected, or



- displacement of the radial carpal joint can be reduced by closed manipulation
- consider open reduction and internal fixation if closed reduction of the radial carpal joint surface is not possible.

### **Definitive treatment of distal radius fractures in children (skeletally immature)**

1.4.7 In children (skeletally immature) with dorsally displaced distal radius fractures (including fractures involving a growth plate) who have undergone manipulation, consider:

- a below-elbow plaster cast, or
- K-wire fixation if the fracture is completely displaced (off-ended).

### **Definitive treatment of proximal humerus fractures in adults (skeletally mature)**

1.4.8 For adults (skeletally mature) with displaced low energy proximal humerus fractures:

- offer non-surgical management for definitive treatment of uncomplicated injuries
- consider surgery for injuries complicated by an open wound, tenting of the skin, vascular injury, fracture dislocation or a split of the humeral head.

### **Definitive treatment of femoral shaft fractures in children (skeletally immature)**

1.4.9 Admit all children (skeletally immature) with femoral shaft fractures and consider 1 of the following according to age and weight:

- prematurity and birth injuries: simple padded splint
- 0 to 6 months: Pavlik's harness or Gallows traction
- 3 to 18 months (but not in children over 15 kg): Gallows traction
- 1 to 6 years: straight leg skin traction (becomes impractical in children over 25 kg) with possible conversion to hip spica cast to enable early discharge
- 4 to 12 years (but not in children over 50 kg): elastic intramedullary nail

- 11 years to skeletal maturity (weight more than 50 kg): elastic intramedullary nails supplemented by end-caps, lateral-entry antegrade rigid intramedullary nail, or submuscular plating.

## Mobilisation after surgery in people with distal femoral fractures

- 1.4.10 Consider advising immediate unrestricted weight-bearing as tolerated for people who have had surgery for distal femoral fractures.

## 1.5 Documentation

The NICE guideline on [major trauma: service delivery](#) contains recommendations for ambulance and hospital trust boards, senior managers and commissioners on documentation within a trauma network.

- 1.5.1 Consider developing and using standard documentation to prompt the assessment of the following from first presentation in people with fractures:
- safeguarding
  - comorbidities
  - falls risk
  - nature of fracture, including classification where possible.
- 1.5.2 Follow a structured process when handing over care within the emergency department (including shift changes) and to other departments. Ensure that the handover is documented.
- 1.5.3 Ensure that all patient documentation, including images and reports, goes with patients when they are transferred to other departments or centres.
- 1.5.4 Produce a written summary, which gives the diagnosis, management plan and expected outcome, and:
- is aimed at and sent to the patient's GP within 24 hours of admission
  - includes a summary written in plain English that is understandable by patients, family members and carers

- is readily available in the patient's records.

## 1.6 *Information and support for patients, family members and carers*

The NICE guideline on [major trauma: service delivery](#) contains a recommendation for ambulance and hospital trust boards, senior managers and commissioners on providing information and support to patients, family members and carers.

### Providing support

#### 1.6.1 When communicating with patients, family members and carers:

- manage expectations and avoid misinformation
- answer questions and provide information honestly, within the limits of your knowledge
- do not speculate and avoid being overly optimistic or pessimistic when discussing information on further investigations, diagnosis or prognosis
- ask if there are any other questions.

1.6.2 If possible, ask the patient if they want someone (family member, carer or friend) with them.

1.6.3 Reassure people while they are having procedures for fractures under local and regional anaesthesia.

### *Support for children and vulnerable adults*

1.6.4 Allocate a dedicated member of staff to contact the next of kin and provide support for unaccompanied children and vulnerable adults.

1.6.5 For a child or vulnerable adult with a fracture, enable their family members or carers to remain within eyesight if appropriate.

1.6.6 Work with family members and carers of children and vulnerable adults to provide information and support. Take into account the age, developmental stage and cognitive function of the child or vulnerable adult.

- 1.6.7 Include siblings of an injured child when offering support to family members and carers.

## Providing information

- 1.6.8 Explain to patients, family members and carers, what is happening and why it is happening. Provide:
- information on known injuries
  - details of immediate investigations and treatment, and if possible include time schedules.
- 1.6.9 Offer people with fractures the opportunity to see images of their injury taken before and after treatment.
- 1.6.10 Provide people with fractures with both verbal and written information on the following when the management plan is agreed or changed:
- expected outcomes of treatment, including time to returning to usual activities and the likelihood of any permanent effects on quality of life (such as pain, loss of function or psychological effects)
  - activities they can do to help themselves
  - home care options, if needed
  - rehabilitation, including whom to contact and how (this should include information on the importance of active patient participation for achieving goals and the expectations of rehabilitation)
  - mobilisation and weight-bearing, including upper limb load-bearing for arm fractures.
- 1.6.11 Document all key communications with patients, family members and carers about the management plan.
- 1.6.12 Ensure that all health and social care practitioners have access to information previously given to people with fractures to enable consistent information to be provided.

## ***Providing information about transfer from the emergency department***

1.6.13 For patients who are being transferred from an emergency department to another centre, provide verbal and written information that includes:

- the reason for the transfer
- the location of the receiving centre and the patient's destination within the receiving centre
- the name and contact details of the person responsible for the patient's care at the receiving centre
- the name and contact details of the person who was responsible for the patient's care at the initial hospital.

## ***1.7 Non-accidental injury***

1.7.1 Address issues of non-accidental injury before discharge in all children with femoral fractures. This is particularly important for children who are not walking or talking. For more information, see the NICE guideline on [when to suspect child maltreatment](#).

## ***1.8 Training and skills***

**These recommendations are for ambulance and hospital trust boards, medical directors and senior managers within trauma networks.**

1.8.1 Ensure that each healthcare professional within the trauma service has the training and skills to deliver, safely and effectively, the interventions they are required to give, in line with the NICE guidelines on [non-complex fractures](#), [complex fractures](#), [major trauma](#) and [spinal injury assessment](#).

1.8.2 Enable each healthcare professional who delivers care to people with fractures to have up-to-date training in the interventions they are required to give.

You can also see this guideline in the NICE pathway on [trauma](#).

To find out what NICE has said on topics related to this guideline, see our web page on [injuries, accidents and wounds](#).

See also the guideline committee's discussion and the evidence reviews (in the [full guideline](#)), and information about [how the guideline was developed](#), including details of the committee.

## Context

The annual incidence of fractures in Britain is about 3.6% and the lifetime prevalence nearly 40%. Most of the 1.8 million fractures that occur in England each year are non-complex, and include a wide range of injuries over the complete age range from infancy to old age. Many different bones can be involved and the mechanisms of injury are many and varied. The range of treatment options is also wide. Because of this, non-complex fractures present an enormous challenge to the NHS.

Many non-complex fractures get better with minimal clinical intervention. But healthcare can overcomplicate matters, with unnecessary time and effort being expended on fractures that are likely to get better without treatment. However, some non-complex fractures can appear minor and be easily missed, but have the potential for a poor long-term outcome; scaphoid fracture is an example. So there is a need to achieve a balance between making sure that injuries needing treatment are not missed and treatment is avoided for injuries that are likely to get better on their own.

This guideline covers the diagnosis, management and follow-up of non-complex fractures in children (under 16s) and adults (16 or over). It includes recommendations in the following key clinical areas:

- initial pain management and immobilisation
- acute stage assessment and diagnostic imaging
- management in the emergency department
- ongoing orthopaedic management
- documentation
- information and support for people with fractures and their families and carers
- non-accidental injury.

The guideline does not cover all potential situations for every individual fracture. It is based around a group of topics that should be considered as representative of an evidence-based guide to the general management of non-complex fractures and it provides recommendations for areas in which there is variation in practice. It does not cover skull fractures, hip fractures, spinal injuries, pelvic fractures, open fractures and the management of conditions such as osteoporosis and osteoarthritis. These are covered by other NICE guidelines.

## Recommendations for research

The guideline committee has made the following recommendations for research.

### *1 Imaging of ankle fractures*

Is CT scanning in addition to initial plain film X-ray clinically effective and cost effective for planning surgical treatment of unstable/displaced ankle fractures compared with plain film X-ray alone?

#### **Why this is important**

Ankle fractures are common and affect a significant number of people every year. Outcomes following surgery are important for patients' long-term function and quality of life, and may also be associated with additional cost if another operation is needed. It is important to know whether adding CT scanning to plain film X-ray improves outcomes following surgery and is cost effective.

### *2 Virtual compared with face-to-face clinics*

What is the clinical and cost effectiveness of virtual new patient fracture clinics compared with next-day consultant-led face-to-face clinics in people presenting with non-complex fractures in the emergency department and thought to need an orthopaedic opinion?

#### **Why this is important**

Currently many people with fractures are asked to attend a next-day clinic led by a consultant, although it is believed that a virtual clinic may be at least as effective. If this is the case, face-to-face clinics may be an unnecessary use of time and resources for both patients and the NHS. Firm evidence of clinical and cost effectiveness is needed before virtual clinics can be introduced as part of a change in service structure.

### *3 Image guidance in the reduction of displaced distal radius fractures*

For patients with displaced fractures of the distal radius, is manipulation with real-time image guidance more clinically and cost effective than manipulation without real-time image guidance?

#### **Why this is important**

In a large minority of patients with a distal radius fracture, the bone fragments are displaced and need manipulation and reduction into an anatomical position. Currently in the NHS, most



manipulations for distal radius fractures are performed in the emergency department without real-time image guidance. It is believed that image guidance may be important, but despite hundreds of people having manipulation for these fractures in the emergency department each day, there are no high-quality studies in this area.

#### *4 Post-operative weight-bearing in people with ankle fractures*

What is the most clinically effective and cost-effective strategy for weight-bearing in people who have had surgery for internal fixation of an ankle fracture?

##### **Why this is important**

In the NHS, open reduction and internal fixation of the ankle is often performed. Currently there is variation in the advice about mobilisation and weight-bearing given to people who have had this done. There is uncertainty as to whether people should be advised to immediately start unrestricted weight-bearing as tolerated or to wait a number of weeks.

#### *5 Treatment of torus fractures*

What is the clinical effectiveness and cost effectiveness of no treatment for torus fractures of the distal radius in children compared with soft splints, removable splints or bandages?

##### **Why this is important**

Torus fractures of the distal radius are among the most common fractures in children but management varies widely between immediate discharge from the emergency department to repeated outpatient reviews with casting and imaging. These fractures result from trauma to growing bones and account for an estimated 500,000 emergency department attendances a year in the UK. Current treatment often involves application of a bandage, or a removable cast or a soft cast, with review in outpatient clinics and repeated X-ray imaging. This is despite anecdotal evidence that treatment with simple analgesia and immediate discharge from the emergency department is safe and effective. There have been no studies comparing current treatments with no intervention in children with torus fractures. A randomised controlled trial is needed to evaluate the clinical and cost effectiveness of no treatment compared with soft splints, removable splints or bandages.

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## Accreditation

