



# Diagnosis and management options of ankle sprain injury

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**ABSTRACT** Elden-Lee, S. (2005) *Ankle sprain injury: diagnosis and management options. Nursing Times*; 101: 24, 38–40.

Ankle sprain is a common injury that accounts for a significant proportion of attendances at A&E. This article describes the anatomy and physiology of the ankle and discusses options for the diagnosis and management of ankle sprain injuries using a case study approach.

It has been suggested that ankle sprain injuries account for as many as 600,000 attendances at A&E every year in the UK (Wilson and Cook, 1998). It is a common injury affecting all age groups and can impact on activities of daily living, leading to loss of earnings and impaired social interaction (Smith, 2002). Ankle injuries in older people can have further complications due to multiple underlying pathologies. Children can be susceptible to complex injuries involving the growth plate, which may lead to permanent disability.

### Anatomy and physiology

The ankle is a complex joint consisting of the talus, the fibula and tibia, which terminate in the lateral and medial malleoli respectively. It is a hinged joint, where movement occurs in one direction only and is stabilised by ligaments that surround the joint. The distal articular surface, the malleoli and the lateral and medial ligaments combine to lock the talus into a mortice. The stability of the

### BOX 1. THE CLASSIFICATION AND GRADING OF ANKLE SPRAIN INJURIES

**Grade 1** – microscopic ligament tears. No laxity or instability

**Grade 2** – disruption of the ligament with some laxity on anterior drawer test. Joint remains functionally stable

**Grade 3** – complete disruption of the ligament. The joint then becomes unstable (Cross and Rimmer, 2002)

ankle depends greatly on the integrity of not only the bones but also the lateral and medial ligaments. Dorsiflexion and plantarflexion occur at the tibiotalar joint, and inversion and eversion occur at the subtalar joint (Dandy and Edwards, 1998).

The ligaments on the lateral aspect of the ankle are most susceptible to injury – during ‘heel strike’ up to five times the body’s weight can be placed against the joint (McDowell and Seymour, 1994). The anterior talofibular ligament is the most commonly injured ligament in the ankle (Safran et al, 1999), followed by the calcaneofibular ligament. Most sprains occur when the ankle is displaced or forced suddenly out of position. Inversion and eversion injuries most commonly occur during sports, on steps or rough ground and while jumping.

Ankle sprains are classified or graded according to severity (Box 1). The Ottawa ankle rules (Fig 1) were developed as a means of assessing ankle injuries and are commonly used in the UK, although their popularity rises and falls.

### Case study

A 22-year-old man presented at A&E with an injury to his left ankle. On arrival he was able to walk into the triage room with some difficulty. He had sustained an inversion injury to his ankle.

He was unable to weight bear immediately after the injury and stated he heard a loud ‘crack’ when he twisted his ankle. He noted that the injury started to swell soon after and that the coach had put an ice pack on his ankle. This had helped slightly. He stated that he had a large swelling over the lateral malleolus that had ‘gone down’ slightly with elevation overnight. He had not taken any analgesia and was concerned he ‘might have broken something’ due to the amount of swelling.

### REFERENCES

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McDowell, L., Seymour, S. (1994) Diagnosis and treatment of ankle sprains. *Nurse Practitioner*; 19: 3, 36–43.

### Learning objectives

Each week *Nursing Times* publishes a guided learning article with reflection points to help you with your CPD. After reading the article you should be able to:

- Know the incidence and possible complications of ankle sprains;
- Understand the anatomy and physiology of the ankle;
- Know how ankle injuries are assessed and classified;
- Be able to explain the rationale for the management of ankle injuries.

The patient was normally fit and well with no significant medical history. On examination it was noted that the left ankle was markedly swollen over the lateral malleolus in comparison with the side that was not injured. The foot was of normal colour with slight bruising appearing to the lateral aspect over the base of the fifth metatarsal. Good pedal pulse was noted and the limb felt warm to touch, with no reports of altered sensation.

An examination of the knee was first undertaken to rule out the possibility of any rotational injury to the proximal fibula and knee ligaments. On palpation the patient stated there was no pain over the bony landmarks of the knee and the ligaments appeared to be stable.

The ankle was examined in accordance with the Ottawa ankle rules. There was no obvious bony tenderness over the posterior tip of the lateral or medial malleoli, nor over the navicular. However, the patient did report tenderness over the base of the fifth metatarsal. On active and passive movement (plantar and dorsiflexion) the patient noted pain in this region as well as over the lateral ankle ligaments.

## Diagnosis

In view of these findings the following conclusions were reached:

- Inversion injury less than 24 hours old and mechanism of injury;
- Bony tenderness at base of fifth metatarsal;

- Swelling to lateral malleolus with tenderness over the anterior talofibular ligament;

- Unable to weight bear immediately after event.

These conclusions suggested an avulsion fracture at the base of the fifth metatarsal and therefore an X-ray of the left ankle and foot, anterior posterior (AP) and lateral views was requested to be carried out.

The patient had not taken any analgesia and was therefore offered paracetamol. He was also advised to elevate the limb while he was waiting for the procedure.

The X-ray revealed that there were no significant radiological abnormalities and a grade 1 ligament sprain was diagnosed based on the findings of the clinical examination.

The following management plan was devised:

- Simple analgesia consisting of paracetamol for the next 24 hours, after which ibuprofen may be included;

- Firm, supportive footwear;
- Rest, ice, compression, elevation (RICE);
- Gentle mobilisation on the injured limb, trying to maintain normal posture;
- Exercises involving rotation and plantar/dorsiflexion of the injured limb.

## Management

The management of this relatively common injury tends to vary depending on where the patient is seen and by whom. This is supported by Smith

## REFERENCES

Neal, M.J. (2003) *Medical Pharmacology at a Glance (4th ed)*. Oxford: Blackwell Science.

Reynolds, W. (1999) *Sprained Ankle Injury Avoidance and Recovery Exercises*. Available at: <http://sportsinjurybulletin.com/archive/sprained-ankle.html>

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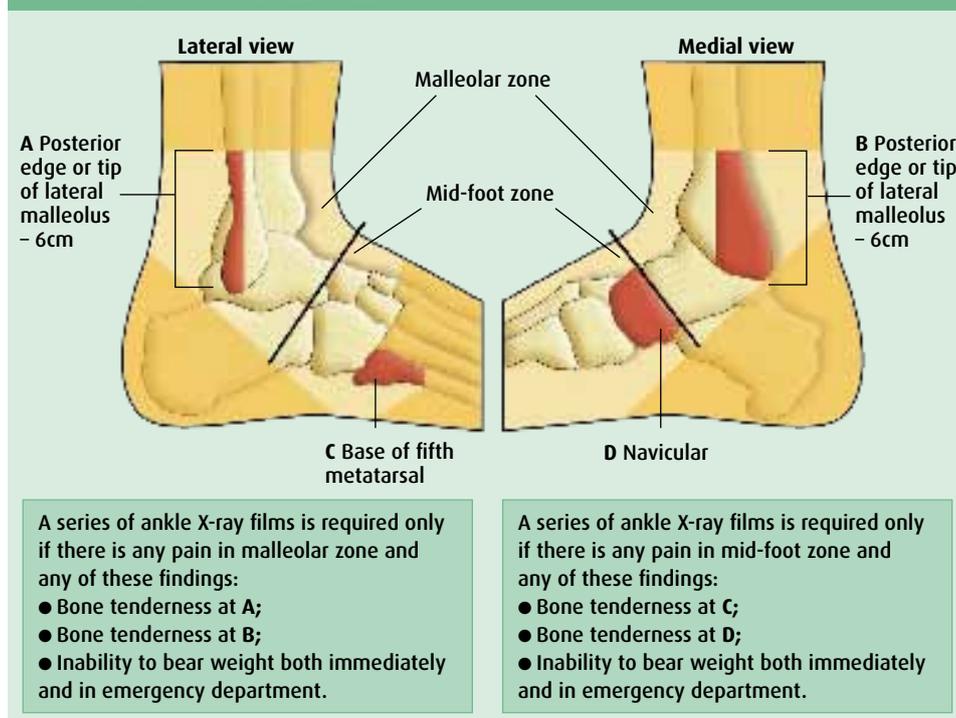
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Wilson, S., Cook, M. (1998) Double bandaging of sprained ankles. *British Medical Journal*; 317: 1722-1723.

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FIG 1. THE OTTAWA ANKLE RULES



This article has been double-blind peer-reviewed.

For related articles on this subject and links to relevant websites see [www.nursingtimes.net](http://www.nursingtimes.net)

(2003), who carried out a study in an A&E department that examined how nurses treat ankle sprains and what advice is given. It was found that treatment was not always evidence-based and tended to vary greatly.

### Treatment options

Many departments still recommend the application of an elasticated tubular bandage for ankle injuries. However, it is suggested that this is more of a psychological rather than a physical support and research has shown this treatment method to be ineffective.

Kennet (1996) showed that insufficient compression is obtained with the use of elasticated tubular bandages. This view is supported by Watts and Armstrong (2001) who demonstrated that treatment of grade 1 and grade 2 ankle sprains with double elasticated tubular bandages did not seem to reduce time to functional recovery and indeed could lead to an increase in the need for analgesia.

It is also noted that ibuprofen is commonly recommended for people with ankle sprains. Ibuprofen is a non-steroidal anti-inflammatory drug (NSAID) that is relatively inexpensive and easily obtainable. It does, however, promote an anti-inflammatory response at the site of injury and it has been suggested that this can delay healing if used in the first 48 hours. Inflammation is attenuated rather than abolished by NSAIDs due to inhibition of prostaglandin synthesis.

In the inflammatory process prostaglandins are responsible for vasodilation and increased vascular permeability (Neal, 2003). Therefore, introducing this analgesic early in the course of the healing process may well cause delay.

In comparison paracetamol has no significant anti-inflammatory action and is generally well tolerated as it does not cause gastric irritation. However, considerations have to be made when recommending paracetamol due to the possibility of hepatotoxicity in overdose.

When slightly stronger analgesia is required

preparations such as co-codamol and co-dydramol may be of benefit as the addition of codeine to paracetamol enhances the analgesic effect. Codeine or methylmorphine is well absorbed orally but has a low affinity for opioid receptors. Approximately 10 per cent of the drug is demethylated to morphine in the liver although it can cause side-effects such as nausea, sedation and constipation (Neal, 2003). This must be taken into account when recommending or dispensing analgesics.

The use of ice can be beneficial in soft tissue injuries as protective vasodilation occurs after 10 minutes at the site of application. This in turn protects tissues from damage due to prolonged cooling and relative ischaemia and is known as a Lewis Hunting reaction.

The application of ice is commonly recommended for a maximum of 10 minutes every three hours following injury during the inflammatory phase. It was felt that the patient described in the case study would benefit from advice regarding rehabilitation as he wished to return to playing football as soon as possible.

### Rehabilitation

As previously mentioned early mobilisation of the injured joint is recommended. However, in addition to the exercises already detailed, physiotherapists recommend proprioceptive exercises in order to strengthen and increase flexibility at the site of the injury.

A good example is the use of a 'wobble' or balance board. Exercises with a balance board are especially effective at improving the strength, mobility, flexibility and elasticity of the muscles, tendons and ligaments that run between the knees and toes. These structures include the intrinsic muscles of the feet, the plantar fasciae, the plantar and dorsiflexors of the ankle and the Achilles tendons.

All of these anatomical components help to stabilise and control the foot and lower part of the leg during the footstrike portion of the gait cycle and in particular govern and coordinate pronation – the natural inward movement and rotation that occurs at the ankle immediately after the foot hits the ground. Balance-board exercises mimic what happens to the muscles, tendons and ligaments of the feet, ankles and lower legs during running – and thus fortify them for the stresses they must endure (Reynolds, 1999).

### Conclusion

It is suggested that a return to sport may be possible within seven to 21 days of sustaining a grade 1 ankle sprain (Brind, 2004). However, in practice the patient is usually the best judge of when she or he feels able to return to regular sport. ■

## Guided reflection



Use the following points to write a reflection for your PREP portfolio:

- Describe your place of work and why this article is relevant to you;
- Think about the last patient you saw with an ankle injury and compare her or his management to that of the case study in this article;
- List any new knowledge you have learnt from the article;
- Describe how will you apply this knowledge to your future practice.