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The website for the answer to all your Orthopaedic Questions

- **Orthopaedic Opinion Online** is a website designed to provide information to patients who have orthopaedic and musculoskeletal problems and are undergoing treatment.
- **Patient information** is provided in the form of downloadable information sheets.
- **Orthopaedic advice** and second opinions can be provided by our expert internationally renowned Consultant Orthopaedic Surgeons.
- **Online review** of patients' X rays or MRI scans can also be provided and any proposed treatment plans reviewed.
- **Book a clinical consultation** with one of our internationally renowned consultant orthopaedic surgeons in Bristol or London.
- **Orthopaedic reports** can be provided for Injury or Accident Claims and Medical Negligence claims.

### This Patient Information Sheet is provided by Orthopaedic Opinion Online

## Ankle Sprain and Ankle Ligament injuries

### Introduction

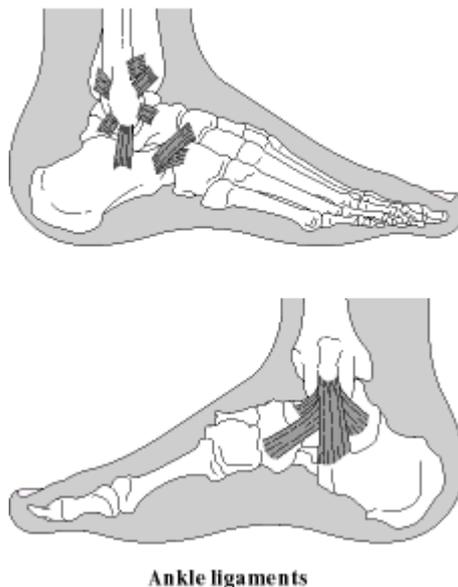
A sprain of a joint is where the joint is forced into a position in which the restraining structures are damaged. This results in pain, swelling and stiffness. If the joint is displaced to the degree that the surrounding stabilising structures are damaged then the degree of injury is more severe. If the surrounding joint capsule and ligaments are damaged to the degree that they are ruptured or torn apart then this is a more significant injury again. This is often referred to as a joint dislocation, disruption of ligament injury. As a consequence the degree of pain, swelling and stiffness is much greater and takes longer to settle.

In a more significant joint disruption type of injury there may be subsequent consequences or complications. Often the ligament injury may not completely heal and result in subsequent joint instability, laxity and a recurrent injury. Recurrent injuries may occur with minimal trauma due to the poor joint stability. There may also be an associated injury to the articular surface of the joint with a loose body within the joint itself.

### Anatomy

The ankle joint is composed of the lower articular surface of the tibia known as the tibial plafond. The lower end of the fibula or the lateral malleolus and the upper surface of the talus. The joint is free to move up and down in flexion and extension but restrained in rotation, twisting and forwards and backwards motion. The restriction to rotation and twisting is primarily provided by the shape of the bones supported by the capsule of the ankle and strong ligaments. The capsule of the ankle joint is weak but resists the excessive motion of up and down or flexion and extension. The principal ligaments are on the medial aspect of the ankle known as the medial or deltoid ligament. And the lateral ligaments composed of the anterior and posterior talo-fibular ligaments and the calcaneo-fibular ligament.

When displacement of the ankle occurs a specific pattern of injury results. The pattern is dependent upon the direction of displacement and the degree of that displacement. More significant forces resulting in greater displacement and greater injuries. Generally the capsule is initially damaged in the form of a sprain. In more significant injuries a single ligament may be torn commonly the anterior talo-fibular ligament. With even greater displacement leading to dislocation of the joint multiple ligament injuries or fracture of the bones around the ankle may occur.



### Causes

The ankle is the most frequently sprained joint. A minor sprain results when a ligament is stretched. In more serious sprains, the ligament may be partially or completely torn. A sprain can be very painful, with any movement of the joint increasing the pain. With a severe sprain, it is often too painful to bear weight on the affected leg. Inability to weight bear after the injury is an indication of a more significant type of injury with the possibility of ligament disruption, fracture or loose body within the joint. In these situations it is usually advisable to seek medical attention and X-ray or MRI scan.

The commonest type of ankle sprain is when the heel or foot turn inwards in relation to the lower leg, overstressing the ligaments on the outside of the ankle. This is called an inversion sprain. Less commonly the foot turns outwards, overstressing the ligaments on the inside of the ankle. This is called an eversion injury.

Ankle sprains are common sports injuries. They are especially common in sports that involve running and jumping, landing from a jump, fast changes in direction or lots of stop-starts, such as football, tennis, netball and basketball. Walking on an irregular surface, stepping off the edge of a kerb, or twisting the ankle while climbing stairs or steps are also common causes of a sprained ankle. Losing your balance on high-heeled or platform shoes is another frequent cause. People are at an increased risk of ankle sprain if they have weak muscles in the lower leg, loose ligaments in the ankle or an abnormal style of walking. Obviously sports people involved in high risk sports are at risk of injury. Some people especially in particular sports characteristically have loose or lax ligaments and are prone to such injuries. This is especially the case in Ballet or gymnastics. People who have had a previous ankle sprain are more likely to sprain the same ankle again, especially if they have not allowed the first injury enough recovery time or undertaken a proper program of rehabilitation.

### Symptoms

Symptoms of a sprain include:

- a sensation of the ankle "giving way" or coming out of joint at the time of injury
- pain at or near the ankle site
- difficulty in moving the joint
- swelling
- bruising

Sprains are classified into three types, based on how severe the injury is:

**Type 1** - the ligaments have been stretched but are still intact. There will be pain and a small degree of swelling but no difficulty moving the ankle.

**Type 2** - a more severe injury, involving a partial tear of a ligament. Pain will be moderate to severe, the ankle will be swollen and difficult to move and there will be some bruising. Weight bearing will be painful.

**Type 3** - a complete tear of a ligament. There is usually severe pain, swelling, loss of joint motion, bruising in the ankle and foot and inability to weight bear and walk on the ankle. The ankle often takes some weeks to settle, the bruising may be pronounced and the joint may be subsequently weak, unstable and recurrent injuries may occur with minimal trauma.

### Diagnosis

A doctor will examine the ankle to assess how bad the sprain is. He or she will ask about exactly the mechanism and how the injury happened. This may help identify the nature and degree of the displacement give a clue as to the type and degree of injury and of the particular ligaments involved. Palpation and examination of the ankle also provides significant information of the nature, type and degree of injury.

An X-ray may be recommended if the doctor suspects that any bone has been damaged. However an x-ray does not provide information about the nature of the soft tissue or non bony injury. It also cannot identify damage to the articular surface of the bones. For this investigation an MRI is necessary. If the patient is unable to weight bear or the history, examination or degree of pain suggest a more significant type of injury the treating specialist may well suggest that an MRI scan be undertaken. However, with most ankle sprains, an X-ray is not required.

### Treatment

Unless the joint is extremely painful, it is not possible to weight bear or move the joint, is obviously deformed or particularly tender over the bones then a simple sprained ankle can often safely be treated by self-care. The initial treatment is commonly referred to by the acronym R.I.C.E.

### RICE

**R**est  
**I**ce  
**C**ompression  
**E**levation

Treatment with "RICE" aims to reduce swelling, and can be continued for as long as swelling is present, and at least for the first 48 hours after the injury.

- **Rest** the injury by avoiding movement of the affected joint and keeping weight off it for the first 24-48 hours, to prevent further injury. If you need to move around, a crutch may help.
- **Ice** packs, a bag of frozen peas or a cold compress will cool the injured area to ease the swelling, bruising and pain. Ice should not be applied directly to skin because it can cause frostbite - place a cloth between the ice and skin. Ice can be applied for up to 20 minutes in every hour, every couple of hours.
- **Compress** the joint by bandaging it with an elasticated support bandage. The bandage should be firm but not so tight that circulation is cut off (if the toes go blue, for example, the bandage is too tight).
- **Elevate** the joint by raising and supporting it above the level of the heart, especially at night while sleeping.

Over-the-counter painkillers of Paracetamol or Aspirin may be helpful. However anti-inflammatory medicine known as NSAID's such as Ibuprofen and Diclofenac can significantly help reduce the pain as well as reduce the inflammation and swelling following injury. Over the counter Ibuprofen is one variety of NSAID. Alternately others are available on prescription from your doctor. As well as the use of ice initially to reduce the acute pain and swelling. Once this is achieved, often on the second day, it may help to bathe the ankle in cold water for one minute, followed by hot water for three minutes. Repeat this cycle for about 15 minutes two or three times a day.

If you have the following symptoms after the first 24 hours you should see a doctor or visit a hospital. This is appropriate also if the ankle remains extremely painful, the swelling and discolouration does not begin to subside, it is impossible to walk or to bear any weight on the affected leg. Obviously early medical attention must be sought if there is any obvious deformity. If there is no improvement after two or three days, seek medical advice.

### Rehabilitation

The swelling and discomfort should begin to subside after about two days. At this point, you can begin to move the ankle. The aim of this stage of recovery is to regain the range of movement, muscle strength and balance. This stage involves moving the joint more freely, so compression bandages should normally be removed because they limit movement. Initial exercises can include rotating the foot and moving it up and down. After exercise application of an ICE pack for a time is helpful in avoiding reactionary swelling.

Applying heat - e.g. warm baths or a hot water bottle - will encourage blood flow, which may help with healing. Massage also increases blood flow to the area. These treatments should not be used during the first two days while swelling is developing.

Physiotherapy should be helpful for more severe sprains, or if symptoms are not improving. A physiotherapist can advise on exercises and may use heat, ultrasound, or other treatments.

### **Preventing recurrence**

For more severe sprains, a plaster cast has traditionally been used. However using a cast, brace or taping to support the ankle will support the ankle and optimise the prospect of healing of the capsule and ligaments in a functional and effective way. In the more significant types of injuries it is important to optimise the conditions for functional healing and avoid if possible the subsequent chance of ligament laxity and recurrent injury. This is particularly relevant for people who are aiming to return to sporting activities.

The risk of problems following ankle sprains and ligament injuries can be reduced by a careful and well planned and supervised program of rehabilitation. The physiotherapist is the most appropriate therapist for this. A steady increase in exercises, motion, static strengthening and then sports specific exercise is appropriate. The program will incorporate at the appropriate stage a re-education program for the ankle muscular control. This includes balance, proprioception and strength training.

### **Surgery**

Surgery is not usually required in the treatment of an acute sprain of the ankle joint. However in the more significant type of injuries an orthopaedic opinion should be sought. In cases of suspected fractured bones around the ankle joints X-rays will be required. If a fracture exists then immobilisation in a plaster cast or even surgical reconstruction may be appropriate. In cases where it is suspected that an intra-articular chondral fracture or damage to the surface of the joint has occurred further investigation of a MRI and subsequent arthroscopy and minimally invasive surgery may be appropriate. In the case of a significant ligament injury or a combined injury, immobilisation in a cast or splint may be able to reduce the risk of subsequent problems. If after rehabilitation the ankle remain lax to examination, symptomatic or unstable then reconstruction of the ligaments around the ankle may be necessary at a later stage. Fortunately surgery is only occasionally recommended for people who have an injury and torn ankle ligaments and it would be most unusual after a simple ligament sprain..

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