CHAPTER 1

HOW ARE SPORTS INJURIES CLASSIFIED AND MANAGED?

- ways to classify sports injuries
- identify specific examples of injuries that reflect each of the classifications
  - direct and indirect
  - soft and hard tissue
  - overuse

Sports injuries are not uncommon and can be either acute, such as sprains, fractures or tears, or chronic, such as tendonitis or overuse. An acute injury is one that occurs suddenly, like a jarred finger in basketball, and is very painful. A chronic injury is caused by overuse of the same muscle group or joint over time, or a re-injury of a previous acute injury. As an athlete, it is important to learn how to recognise and treat the most common sports injuries so that they can heal properly. Some of these injuries can be treated at home, while others require more specific and professional treatment.

The most common types of sports injuries are classified as direct, indirect or overuse injuries, which include damage to either soft tissue or hard tissue of the body. These classifications are outlined in Table 1.1.

Figure 1.1 Knee injuries are common in social and professional sport.
Soft tissue injuries

- **manage soft tissue injuries**
  - RICER (Rest, Ice, Compression, Elevation, Referral)
  - immediate treatment of skin injuries

Almost anyone who exercises or participates in sport on a regular basis will develop an ache, pain or sports injury at some time. The number and type of sports injuries are as varied as the individuals who play sports, but some injuries are likely to happen more often than others. The most common sports injuries are soft tissue injuries. Soft tissue injuries mostly occur to muscles, tendons and ligaments, but can also occur to blood vessels, cartilage, nerves, skin and internal organs.

- **tears, sprains, contusions**

A muscle tear is often referred to as a strain. This happens when some or all of the muscle fibres fail to cope with the demands placed upon them. These strains generally occur when there is a sudden acceleration of...
movement. There are three grades of muscle strains, from Grade I, which affects a small number of fibres causing localised pain but no loss of strength, escalating to a Grade III strain, which is a complete tear in the muscle. Symptoms of a strain are given in Table 1.1.

A sprain is damage or tear to a ligament that connects the bones in a joint. Like muscle strains, ligament sprains are also graded. A Grade I sprain is when there are some stretched fibres in the ligament, but generally the joint still has a normal range of motion, with some pain. A Grade II sprain has a considerable amount of damaged fibres to the joint that restricts its range of motion, revealing a firm end point to the movement. A Grade III sprain is a complete ligament tear with excessive laxity and no firm end point in the range of motion. Table 1.1 outlines the symptoms of a ligament strain.

A contusion is caused by a collision with another person or with an object; it generally occurs in the quadriceps (often referred to as ‘cork thigh’). The contact causes local muscle damage with bleeding. Although most contusion injuries are relatively minor and do not limit participation, occasionally it may result in severe bleeding. Treatment management of contusions is to minimise the bleeding and swelling, and then use carefully controlled soft tissue therapy to reabsorb the blood clot, and continue stretching and strengthening the muscle. Identification of contusions is outlined in Table 1.1.
The initial management of soft tissue damage after an injury is vital to the recovery process, in order to:

- minimise tissue damage
- minimise inflammation
- prevent further tissue damage
- remove blood clot and tissue swelling early and efficiently
- minimise scarring of damaged tissue
- regain full function before returning to sport activity
- enable the doctor or physiotherapist to make an early diagnosis because the swelling is reduced
- reduce rehabilitation time to allow early and complete return to sport.

Initial injury management and swelling control is critical, as swelling can result in increased pressure to the injured area, causing pain and altered neuromuscular function. Swelling slows the healing process and normal function is not regained until swelling is eliminated. The recommended management principle to control and reduce bleeding and swelling is called the RICER treatment regime (Table 1.2).

<table>
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<th>HOW</th>
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<td><strong>Rest</strong></td>
<td>• Control the mobility of the injury rather than completely immobilising it&lt;br&gt;• Rest the injured site for 24–48 hours before engaging in active rehabilitation, depending on the severity of injury</td>
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| **Ice** | • Apply ice over the injury and surrounding tissue for 10–20 minutes every 2 hours<br>• Conventional methods:  
  – crushed ice in a wet towel or plastic bag  
  – a frozen cup of water moving continuously over the area  
  – a commercial ice pack  
  – immersion in iced water<br>• Note:  
  – Do not apply ice directly to the skin. Wrap the ice in wet cloth or towel to avoid ice burns  
  – Ice should not be applied to an area if you are sensitive to cold or you have circulatory problems  
  – Children have a lower tolerance to ice treatment | • Ice decreases bleeding, swelling and localised pain<br>• Ice decreases muscle spasms and secondary damage to injured site |
| **Compression** | • Apply compression to the injured area. This is the single most important factor in swelling control, as it mechanically reduces the space available for swelling to spread and increase<br>• Apply an elastic wrap to achieve a firm and even pressure to the injury<br>• Maintain compression continuously for 72 hours, depending on the severity of the injury<br>• For chronic inflammatory conditions, compression should be applied until the swelling is almost entirely gone | • Reduces bleeding and swelling<br>• Provides support for injured area |
| **Elevation** | • Elevate the injured area as often as possible during the first 72 hours of the acute injury, depending on its severity<br>• Elevate the injured area above the level of the heart, where possible<br>• Elevating the injured site:  
  – eliminates the effects of gravity on blood pooling  
  – assists in venous and lymphatic drainage of blood and other fluids from the injured area | • Reduces bleeding, swelling and pain |
| **Referral** | • Refer to a doctor or physiotherapist | • Provides definitive diagnosis of injury and management process for rehabilitation |
Skin abrasions, lacerations, and blisters are very common basic, external soft tissue injuries. An abrasion occurs when the surface layers of the skin (epidermis) have been broken; while a laceration causes damage to the skin and underlying tissue.

The following treatment should be applied to abrasions and lacerations:
- Stop any associated bleeding by applying pressure to the injured part and elevate.
- Prevent infection by cleaning the wound thoroughly with a sterile irrigation.
- Apply a non-adherent dressing.
- Immobilise the wound if it is over a constantly moving part, like the knee or elbow.

A blister occurs when the outer layers of the skin separate due to excessive friction, and cause a pocket of fluid (sometimes blood, if the vessels is damaged) to form. Initial management requires rest for 24 hours when the symptoms may disappear. Using a ‘second skin’ dressing will aid the healing process. Do not attempt to burst a blister as this increases the chance of infection.

**Inflammatory response**

The inflammatory response is the body’s natural response immediately following tissue damage. Its main functions are to defend the body against harmful substances, dispose of dead or dying tissue and to promote the renewal of normal tissue. Several symptoms are immediate.

The tissues in the area are red, swollen and warm, as the large amount of blood and proteins required to repair the tissue are reaching the site. The area is painful because the tissues have expanded, causing pressure on nerve cells, and also pain mediators are doing their work.
There are three phases in the tissue healing process.

**Phase I: Acute inflammatory response**
- Begins immediately after injury and lasts for about 2–4 days until damaged tissue has been removed and new capillary network has been formed.

  - Vascular changes occur:
    - vasoconstriction—immediate decrease in blood flow to injured area for the first 5–10 minutes after injury
    - vasodilation—increased blood flow will start after about 10 minutes to begin cellular changes.

  - Cellular changes start the chemical reactions to neutralise or destroy offending agents, restricting tissue damage and preparing the area for healing.

  - This is a critical phase in the healing process. If this phase does not accomplish what it is supposed to or if it does not subside, normal healing cannot take place.

**Phase II: Proliferation or repair phase**
- This phase will extend from 48 hours to 3–6 weeks, as it removes debris and begins temporary repair with scar formation (fibroplasia).

  - Repair phase is undertaken through three stages:
    - resolution—dead cells and cellular debris are removed by phagocytosis
    - regeneration—damaged tissue is replaced by cells of the same type
    - repair—original tissue is replaced with scar tissue.

**Phase III: Maturing or remodelling phase**
- Usually begins around week 3, for the process of new cells to begin to mould or model into their surroundings to once again produce a functioning tissue.

  - For the first 3–6 weeks it involves laying down of collagen and strengthening of fibres to increase strength of repaired or replaced tissues.

  - Monitored rehabilitation is essential for the strength and development of the new tissue.

  - For enhanced scar tissue strength allow 3 months to 2 years.

- **hard tissue injuries**
- **manage hard tissue injuries**
  - assessment for medical attention
  - immobilisation

Hard tissue injuries apply to the bones and the teeth, the most common of which are fractures and dislocations. In the event of such an injury it is important to minimise the risk of further damage and to make the injured athlete as comfortable as possible. This is best done by immobilising and supporting the injury site, where possible, in order to:

  - reduce the pain
  - reduce serious bleeding and shock
  - prevent further internal or external damage, and
  - prevent a closed fracture becoming an open fracture.

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**Apply the ‘NO HARM’ policy in the first 72 hours immediately following injury.**

- NO HEAT, such as having a sauna, spa, hot shower or bath, or applying a hot water bottle or hot liniment, as this increases bleeding.
- NO ALCOHOL intake, as this increases swelling.
- NO RUNNING or exercising too soon can make the injury worse.
- NO MASSAGE or using heat rubs in the first 48–72 hours, as this increases bleeding and swelling.
A fracture is a crack, chip or break in the bone. Where bones are still growing in young children, the bone may crack, split or bend, like a tree branch, and this is usually referred to as a ‘greenstick fracture’. Symptoms and possible causes of bone injuries are given in Table 1.1.

There are four main categories of fractures: complete, incomplete, simple and compound. Complete and incomplete fractures refer to the way the bone breaks. In a complete fracture, the bone snaps into two or more parts; in an incomplete fracture, the bone cracks but does not break all the way through.

In a simple fracture, also called a closed fracture, the bone breaks but there is no open wound in the skin. Whereas in a compound fracture, also called an open fracture, the bone breaks through the skin and may sometimes recede back into the wound and not be visible through the skin. It is important to prevent any infection entering into the injury site, as this will complicate the healing process.

Managing and immobilising a compound fracture to the tibia

1. Follow DRABCD.
2. Control any bleeding.
3. Check for fractures (open or closed).
4. Immobilise fracture by applying a splint to prevent movement in the following way:
   - gently bring uninjured leg to injured leg, padding in between them
   - bandage around the ankles and feet in figure of eight
   - bandage the legs together above the knees, tying on the uninjured side
   - check every 15 minutes that the bandages are not too tight or loose.
   Note: support is above and below the injury site, where possible.
5. Watch for signs of loss of circulation in the feet.
6. Monitor the injured person carefully until help arrives.

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In a tooth injury, appropriate treatment is vital to the survival of the tooth. It is important to locate the tooth and rinse it in milk, or the injured person’s own saliva. (Use water as a last resort to rinse tooth, as chlorine will damage the tooth.)

Holding the crown (the white part), reinsert the tooth into its socket. If the tooth cannot be reinserted, place it in milk, and then take it with the injured person to the dentist.
A dislocation is where the bone has been removed from its joint structure. This can happen spontaneously or as a result of trauma, and may have associated fractures. Many people have joints that can dislocate easily due to a congenital condition, or weak ligaments, stretched by previous repeated dislocations. A severe dislocation can cause tearing of the muscles, ligaments and tendons that support the joint.

The human body is quite susceptible to dislocation. The joints most frequently affected are the shoulders, elbows, fingers, hips, kneecaps and ankles.

The following treatment should be applied to a dislocation:

• Try to support the dislocation in a comfortable position.
• Do not attempt to put the dislocation back into place.
• If possible, try to splint the dislocation.
• To reduce the swelling apply the RICER regime, if possible.
• Seek medical advice immediately.
assessment of injuries

perform assessment procedures to determine the nature and extent of injury in simulated scenarios

- TOTAPS (Talk, Observe, Touch, Active and Passive movement, Skills test)

When an injury occurs it is important to assess the incident or injury before taking any action. The initial response of DRABCD should be applied; however, in most sports injury cases the athlete is conscious. The trainer can then continue an assessment of the injury.

TOTAPS is the accepted assessment process for an injury to see if medical attention is required or if activity can resume. It involves the following to assess the extent of the injury:

**Talk**

Talk to the injured athlete to determine what has happened and what they may have heard. Is there any pain? Where is the location of the pain? Is the pain getting worse? Was there a crack or snap heard?

**Observe**

Look at the injured site and compare it to the other side to see if there is any swelling, deformity, discolouration or bleeding.

**Touch**

Gently feel the area for anything that feels out of place or unusual. Begin away from the injured site and work towards the site, to gauge increase in pain.

**Active movement**

Ask the athlete to move the injured body part. If they are unable to continue, seek further medical attention.

**Passive movement**

Move the athlete’s limb gently and slowly, stop at the point of pain or movement restriction. Do not allow a return to play unless there is a range of pain–free movement.

**Skills test**

Ask the athlete to stand up, walk and jog slowly. Ask them to perform a few basic skills of the sport they were playing. Only allow a return to play if pain free.

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**Activity 1** *(Page 227)*

Review the document *Hospitalised sports injury, Australia 2002–2003*, from the website below. Select TWO sports from the document and **analyse** the hard tissue injuries and the body regions they affect. Why are these body regions likely to be injured?


**Activity 2** *(Page 227)*

**Analyse** the information in Figure 1.7 on the following page. Choose TWO body regions and **identify** the types of injuries that could occur to these body regions and why. Consider age, gender and participation levels.
**Activities cont.**

![Figure 1.7](image-url)

**Note:** Excludes 1 case with missing age data. Excludes 2578 sport and recreation cases that had ICD-10-AM codes for injury (U50-U72) but did not have a diagnosis in the injury range (S or T).

**Activity 3 (Page 230)**

Apply TOTAPS and outline the appropriate treatment for the following incidents:

- Tennis player has rolled their ankle on the court.
- Football player has been kneed in the thigh.
- Rugby player has cut his forehead.
- Mountain bike rider has a compound fracture to their lower leg.
- Basketball player has dislocated a finger.

**Review Questions**

1. **Describe** the differences between direct and indirect injuries.
2. **Define** soft tissue and hard tissue injuries.
3. **Explain** the difference between a strain and a sprain.
4. **Outline** the advantages of the RICER regime in management of a soft tissue injury.
5. **Describe** the significance of the inflammatory response in relation to the rehabilitation of a soft tissue injury.
6. **Outline** the TOTAPS procedure in relation to a sports injury.