

## CHAPTER 3: Injury prevention and the rehabilitation of injury

### Practice questions - text book pages 77 to 78

- 1) Injury to the medial meniscus of the knee joint is common amongst:
- hockey players.
  - boxers.
  - footballers.
  - track and field athletes.

**Answer:** c.

**Explanation:**

*Medial meniscus tears are common in footballers where change of direction and impact are characteristics of the game.*

- 2) Elevation of an injured body part helps reduce injury by:
- helping support the weight of the limb.
  - allowing white blood cells to be released to fight infection.
  - reducing blood flow to the area.
  - increasing blood flow to the area.

**Answer:** c.

**Explanation:**

*Elevation uses the fact that if the injured part is raised above the heart, gravity can send fluid within the swelling, back towards the body core, thus reducing damage caused by the swelling itself.*

- 3) Overuse of tendons in physical activity can cause problems. Which one of the following is associated with tendon overuse?
- inflammation.
  - arthritis.
  - hypertrophy.
  - bruising.

**Answer:** a.

**Explanation:**

*Arthritis is inflammation of a joint. Hypertrophy is the enlargement of an organ or tissue from the increase in size of its cell. Bruising is damage to underlying tissues or bone in which the skin is not broken, often characterized by ruptured blood vessels and discolorations. Inflammation is a localised physical condition in which part of the body becomes reddened, swollen, hot, and often painful, associated with overuse injuries such as tendonitis.*

- 4) Which one of the following is not a method of reducing risks of injury when participating in physical activities?
- wearing shin pads when playing hockey or football.
  - making sure you warm up before participating in an exercise class.
  - playing with others of similar ability in a rugby match.
  - wearing fashionable sports equipment when going to the gym.

**Answer:** d.

**Explanation:**

*Choices a.b.and c. are all ways of reducing injury risk, whereas wearing fashionable sports equipment is not.*

- 5) A sprain during a sport activity is to be immediately attended to by:
- application of ointment.
  - elevation of affected body part.
  - cold compression.
  - massage.

**Answer:** c.

**Explanation:**

*The key word in the question is immediately and applying cold compression will reduce internal bleeding and swelling.*

- 6) Which of the following would you recommend to prevent inflammation of the joints during or after physical activity?
- rub massage oil into your joints before and after exercise.
  - use carbo-loading to increase energy levels.
  - stretch your muscles thoroughly before exercising.
  - do not do too much activity at any one time.

**Answer:** d.

**Explanation:**

*Stretching prepares joints for physical activity, thus reducing injury potential associated with inflammation.*

- 7) Why are joint sprains a particular problem? 2 marks

**Answer:**

*2 marks for two of:*

- Most common sprains are in the **ankle and wrist joints** where several ligaments are involved depending on the severity of the sprain.
- There is an **immediate loss of functional range** of motion.
- Prolonged immobilization **delays the healing** of a sprain.
- And this usually leads to **muscle atrophy** and a **stiff joint**, particularly in weight bearing ankle joints.

- 8) Sports injuries can be broadly classified as either acute or chronic injuries. Explain what is meant by these two classifications, using examples where appropriate. 4 marks

**Answer:**

- **Acute** injuries refer to sports injuries that happen in a moment.
- For example, a hamstring pull during a sprint race.
- **Chronic** injuries develop over time and so are characterised by a slow, sustained development of symptoms.
- That culminates in painful inflammatory conditions.
- For example, patellar tendinosis or jumper's knee, which is caused by inflammation of the bottom of the patella.

- 9) Playing kit and equipment are major factors that an athlete needs to consider in injury prevention. Identify the key factors that affect the selection of their use. 4 marks

**Answer:**

- Equipment needs to be appropriate to the **playing surface**. For example, selection of appropriate hockey sticks to playing surfaces.
- **Shoes** or boots are the most important item of clothing. They should be selected to meet the demands made on the foot.
- For example, running shoes provide both support and shock absorption for hard running surfaces, squash shoes provide closer contact with the court therefore have less support.
- Ski boots are extremely robust, supporting high above the ankle joints.
- Equipment needs to be checked for possible **defects** prior to use. For example, safety check for fibreglass poles.
- Choosing **protective clothing** is important for potentially dangerous sports such as cricket, boxing and fencing.
- Kit needs to **fit** well.

- 10) Discuss the principles and guidelines for injury prevention. 5 marks

**Answer:**

*2 marks for:*

- Well-planned fitness programmes to include **FITT** principles of training.
- **Frequency** or the number of sessions.
- **Intensity** of the session.
- **Type** of training.
- **Time** taken to train.

*3 marks for three of:*

- **Overload** and **progression** result from training activities getting harder.
- In order to stress physiological adaptations required.
- **Moderation** implies that note is taken of the sportperson's state of physical health.
- And when signs of deteriorating performance are detected training loads must be reduced.
- And **recovery** time increased.
- Rest or recovery between sets and training sessions must be adequate.
- **Warm-up** prepares the musculo-skeletal systems for exercise by raising muscle temperature, oxygenating active muscle tissue, stretching muscle tissue, mobilising joints and meeting the demands of sport-specific drills.
- **Cool-down** is a way of reducing **DOMS** by flushing out lactic acid and increasing flexibility of joints.
- **Diet** is aimed at refuelling depleted energy reserves.

11) Why should stretching be part of an injury preventative training programme?

2 marks

**Answer:**

- The **stretch reflex** limits flexibility.
- Stretching over an extended period of time **inhibits** the activation of the stretch reflex.
- Causing an increase in the resting length of soft tissues such as ligaments, tendons and muscles.

12) Hyperbaric oxygen chambers and ice baths are aids to rehabilitation for elite performers. Briefly describe how each of these therapies assist in this process.

6 marks

**Answer:**

- A **hyperbaric oxygen chamber** is pressurised with increased amounts of oxygen.
- Aims to reduce the injury recovery time.
- By **stimulating** the growth of new blood vessels.
- By **increasing** the oxygen concentration to damaged tissues such as in pulled muscles or stress fractures.
- Aids the **treatment of infection** by boosting white blood cell activity around the damaged tissues, thereby controlling infection.
- **Ice baths** use the fact that local tissue inflammation can be reduced by **chilling** the affected area.
- The athlete remains in the ice bath for 5-10 minutes.
- During this time the cold water causes the blood vessels to **vasoconstrict**.
- Thereby draining blood and any lactic acid away from the immersed body parts.
- On leaving the ice bath, the immersed body parts fill up with freshly oxygenated blood as blood vessels **vasodilate**, thus aiding recovery.

13) Describe the use of the PRICE protocol for the immediate treatment of acute injuries.

5 marks

**Answer:**

- The **PRICE** protocol is a five-step process for treating a muscle or joint injury such as an ankle sprain is short for Protection, Rest, Ice, Compression, and Elevation.
- **Protection** ensures that the injured person is safe from further damage. For example, if the injury was sustained on the sports field, stop the game and protect the injured part with a bandage, padding or splint.
- **Rest** is needed as soon as the injury occurs to prevent making it any worse and allow adequate rehabilitation time for the injury to heal.
- **Ice** applied to the injured area for 10-15 minutes, then removed for 20 minutes (and repeat) will reduce internal bleeding, inflammation.
- **Compression** using a stretchy bandage such as cohesive bandage will reduce swelling and support the soft tissue, thus minimising further damage.
- **Elevation**, created by raising the injured area above the heart, aids the drainage of any liquid/leakage caused by the injury, thereby reducing swelling and inflammation.

14) What are the signs and symptoms of concussion and how is this condition treated?

4 marks

**Answer:**

2 marks for:

- Concussion (or minor brain injury) is a temporary disturbance in the brain's functioning as a result of a blow to the head.
- The effects of concussion can leave people with symptoms including dizziness, nausea, confusion or an inability to process or retain information, sensitivity to light, and vision distortion.

**Treatment**

2 marks for two of:

- Be checked by a health professional trained in assessing head injuries. This may include a brain scan for a serious brain injury.
- Getting plenty of rest and avoiding stressful situations.
- Have someone to stay with patient for the first 48 hours so they can look out for problems such as changes in behaviour or difficulty concentrating or understanding.
- If patient has a headache, take paracetamol.
- Don't return to normal lifestyle until recovered.

15) Warm-up and cool-down are useful in preventing injury and in aiding the recovery process after intense exercise.

a) What activities would you include in the warm-up and why?

3 marks

**Answer:**

- 5-10 min **light cardiovascular activity** to raise body temperature and enhance elasticity of muscles, tendons, ligaments and joint structures.
- Range of **dynamic exercises** to addressing key major muscle groups.
- Ensure that exercises are **sports specific**.
- Gradual **increasing of intensity, priming** exercise.

b) What would you include in the cool-down and why?

3 marks

**Answer:**

- **Light cardiovascular activity** to prevent blood pooling and to deal with excess muscle lactic acid.
- **Static stretching** to help muscles and tendons relax, stopping them becoming tight.
- Cool-down helps **prevent delayed onset muscle soreness (DOMS)**.

16) During a match a player received a severe tackle to the lower leg.  
How can a first aider assess the nature and severity of the injury?

8 marks

**Answer:**

- To make an assessment of the type, location and severity of an injury the first aider can assess the sporting injury by using **SALTPAS**.
- **Stop** the activity when an athlete gets injured and observe the injury.
- **Ask** questions about the injury such as where does it hurt and pain intensity.
- **Look** for specific signs and indicators of injury, such as bleeding, swelling, distorted joints and bones.
- **Touch** the injury site and decide the extent of the injury. This requires gentle palpations around the injured area to identify discomfort, pain, swelling and loss of skin sensation.
- **Active** movement of the injured area assesses if the athlete is able to move the injured part independently.
- **Passive** movement of the injured area assesses which movements the athlete can't make.
- **Strength** testing assesses if the athlete is stand up and walk and whether he or she can resume physical activity.

17) Screening is a key part of the professional sportspersons daily life.  
How can it be used in injury prevention?

4 marks

**Answer:**

- Screening is a **search for a specific condition** that can help to detect health risk factors, for example, undetected cardiac abnormality.
- Standard screening tests are used to assess **strengths** and **weaknesses** in key areas, such as strength, flexibility, core control and balance.
- This information can be used for **exercise prescription** for musculoskeletal conditioning thereby decreasing the risk of getting injured.
- Regular screening provides information about **physical changes over time**, which is particularly important in the **growing athlete** and for an athlete following long hours of training/competition.

18) Rapid recovery from injury is vital for elite performers and they now use a wide range of injury recovery techniques. For each of the following methods describe the treatment and its purpose.

a) Cryotherapy.

3 marks

**Answer:**

- **Cryotherapy** is the general or local use of **cold temperatures** in the treatment of injury.
- Ice baths and cryogenic chambers are often used as part of post-match recovery.
- **Stops internal bleeding** to reduce swelling and aid recovery.

b) Proprioceptive retraining.

3 marks

**Answer:**

*3 marks for three of:*

- **Proprioception** is the body's awareness of position, movement and changes in state of balance.
- Proprioception capabilities are impaired when joints are injured, such as with ligament sprains.
- Resulting in poor **balance**.
- Balancing exercises teach the body to **control** the position of a deficient or an injured joint.
- Proprioceptive retraining is aimed at **rebuilding** the performer's **proprioceptive sense**.
- For example, low level single leg balance work on unstable surfaces, such as a wobble board, provides an unstable surface that develops knee/ankle stability.

c) Therapeutic massage.

3 marks

**Answer:**

- **Therapeutic massage** is the application of **massage** techniques to the muscle and connective tissues to enhance sports performance.
- Used to increase range of movement/**flexibility** and to relieve **muscle soreness**.
- May help injury prevention and promote **faster recovery**.

19) Explain how the use of an ice bath can help to reduce the 'delayed onset of muscle soreness' (DOMS).

4 marks

**Answer:**

- Involves sitting in **ice cold water** for between 5-20 minutes.
- Causes blood vessels to tighten/decreases metabolic activity/**vasoconstriction**.
- **Restricting blood flow** to the area.
- **Reduces swelling**/tissue breakdown/aids muscle repair.
- **After leaving the ice bath**, area is flooded with new blood/**vasodilation**.
- Fresh **re-circulating oxygen** removes **lactic acid** (when out of the ice bath).

20) Surgery is used in the treatments of sports injuries. Using examples of sporting injuries, discuss the advantages and disadvantages of keyhole surgery against open, invasive surgical techniques.

10 marks

**Answer:**

- Both key hole and open surgery are performed under a **general anaesthetic**.
- **Arthroscopy** (keyhole surgery) is used to **tidy up** injuries such as torn menisci.
- Cartilage, within the knee joint, can become damaged as a result of a sudden injury to the menisci caused by a sudden twisting movement or slowing down too quickly from a flat-out sprint.
- For knee arthroscopy only **two small incisions** are made, one for the arthroscope and one for the surgical instruments to be used in the knee cavity.
- Trimming the jagged/torn edges and cleaning out floating debris from inside the joint is sufficient to clear up a minor tears and recovery is anywhere between 3 to 6 weeks.

**Advantages:**

- Increase the rate of success due to **less trauma** to the connective tissue.
- Has **shorter healing time**.
- Operations are often performed as **day-case** procedures allowing the patient to go home the same day.
- This **releases ward beds** for more serious injuries.
- **Smaller operation wounds** results in less pain, less wound complications such as infection.
- **Scarring** is less, so a better cosmetic result.

**Disadvantages:**

- Not suitable for more **complex injuries** such as fractures.
- More **expensive equipment** is needed to perform arthroscopies and therefore the provision of such operations in some hospitals has been prohibited by these cost implications.

**Open surgery** is performed through a large incision.

- For example, an injured athlete sustains a heavy tackle on the lower limb during a football match, resulting in a fractured femur.
- During the surgical repair of this fractured long bone, bone fragments are first repositioned into their normal alignment.
- They are then held together with special screws and metal plates attached to the outer surface of the fractured bone.

**Advantages:**

- Allows the surgeon to have **hands on control** and access the injured body part, for a stronger repair or reconstruction.

**Disadvantages:**

- The patient will **remain in hospital longer**.
- Carries an increased **risk of infection** and scarring.
- Repair needs a **longer rehabilitation** period.