SPORTS SCIENCE

Exam Prep Session 2017

Exam Prep Session 1

<u>Hour 1</u>

- Extrinsic Factors
- Intrinsic Factors
- Warm Ups
- Cool Downs

<u>Hour 2</u>

- Exam questions under exam conditions

Risk Factors

- It is important that you can recognise factors that can influence the risk of injury. There are two types of factor:
- **Intrinsic** – Athlete related
- **Extrinsic** – Environment related

Intrinsic Factors

1. Physical preparation

– training

– warm up

– cool down

– fitness levels

– overuse

2. individual variables

– gender

– age

– flexibility

– nutrition

– sleep

– previous/recurring injuries

Intrinsic Factors

3. psychological factors

- motivation
- aggression
- arousal/anxiety levels

Intrinsic Factors

4. posture and causes of poor posture

– poor stance/gait (e.g. bending your knees or hunching your shoulders when standing)

– sitting positions (e.g. slumping/slouching)

– physical defects (e.g. muscles weaken around an injured area)

– lack of exercise (e.g. lack of core muscle strength means less support, being overweight puts strain on posture)

– fatigue (e.g. tired muscles will be unable to support the skeleton properly)

– emotional factors (e.g. having low self-esteem/lack of confidence can influence posture)

– clothing/footwear (e.g. wearing shoes with high heels can affect posture)

Intrinsic Factors

5. sports injuries related to poor posture

- pelvic tilt – This is the orientation of the pelvis which can be towards the front, back or either side of the body.
- lordosis – An inward curvature of the spine
- kyphosis – Curvature of the spine causing the top of the spine to be more rounded
- round shoulder – Caused by slouching
- scoliosis – Twisting and curvature of the spine towards the side

Extrinsic Factors

1. **type of activity** (e.g. contact sports present different injury risks from gymnastic activities)
2. **coaching/supervision**

- poor/incorrect coaching techniques
- ineffective communication skills
- importance of adhering to rules and regulations

3. **environmental factors**

- weather
- playing surface/performance area and surrounding area
- other participants

Extrinsic Factors

4. **Equipment**

– protective equipment (e.g. shin pads in football, gum shield in boxing, helmet in cycling, goggles in skiing)

– performance equipment (e.g. hockey stick, cricket ball, rock climbing harness)

– clothing/footwear suitable for playing surface/weather conditions/specific sport or activity

6. **safety hazards**

– risk assessments

– safety checks

– emergency action plans

Warm Up

- A warm up is done before taking part in any physical exercise. It provides physical and psychological benefits.

Physical Benefits

- A warm up has many benefits on the body

1. Warming up the muscles
2. Increase body temperature
3. Increase heart rate
4. Increase flexibility of muscles and joints
5. Increase blood flow and oxygen to muscles
6. Increase speed of muscle contraction

Psychological Benefits

- A warm up also helps us to mentally prepare

1. **Heighten or control arousal levels** (get into the zone or settle nerves)
2. **Improve concentration and focus**
3. **Increase motivation**
4. **Mental rehearsal**

Key components of a warm up

1. **Pulse Raiser** – jogging or skipping (increase HR)
2. **Mobility** – Arm swings or hip circles (move joints through full ROM)
3. **Dynamic Movements** – Change in speed and direction
4. **Stretching** – Dynamic Stretches such as open and close the gate
5. **Skill Rehearsal Phase** – rehearse movements used in the game such as passing drills in netball and football

Manchester United pre match warm up

Cool Down

- A cool down is done when exercise is complete to help the body gradually return to its resting state.

Physical Benefits

1. Helps the body's transition back to resting state
2. Gradually lowers heart rate
3. Gradually lowers temperature
4. Circulates blood and oxygen
5. Reduces breathing rate
6. Remove waste products such as lactic acid
7. Reduces the risk of muscle soreness and stiffness
8. Aids recovery by stretching muscles

Key Components of a cool down

1. **Pulse Lowering** – light jog or cycle (Gradually lower heart rate)
2. **Stretching** – static stretches (Reduces muscle stiffness and soreness)

Specific Needs a Warm up and Cool down must consider

1) Characteristics of an individual or group

- Size of group
- Age of participants
- Experience of participants
- Individual fitness levels
- Any medical conditions

2) Suitability as preparation for the activity/sport

3) Environmental factors (weather/facilities)

Exam Prep Session 2

<u>Hour 1</u>

- Types of injuries and treatment
- Responding to injuries
- Emergency Action Plans
- Medical conditions

<u>Hour 2</u>

- Exam questions under exam conditions

Types of Injury

<u>Acute injuries</u>

- caused as a result of a sudden trauma to the body (e.g. hard rugby tackle, being hit by a ball)
- result in immediate pain, and usually swelling with a loss of function

<u>Chronic injuries</u>

- also known as overuse injuries and are a result of continuous stress on an area (e.g. Achilles, tendonitis, shin splints or tennis elbow)
- These injuries tend to develop gradually over a period of time

Types of Injury

Soft Tissue Injuries

- **Sprains** caused when ligaments are overstretched or torn around a joint. For example a twisted or sprained ankle.
- **Strains** caused when a muscle or tendon is overstretched or torn. For example a pulled muscle

Treatment

- RICE (Rest, Ice, Compression, Elevation)

Types of Injury

Overuse Injuries

- **Tendonitis –** Inflamed and painful tendon caused by overuse
- **Shin Splints –** pain and tenderness in the shin caused by stress fractures

Treatment

- Rest and cold treatment with an ice pack

Types of Injury

Fractures

- **Open Fracture –** Open fractures are where the broken end of the bone comes through the skin.
- **Closed Fracture –** Closed fractures are where the skin is not broken.

Treatment

- Immediate treatment involves supporting and stopping movement in the affected area. If it is an open fracture it is important to cover the wound with a clean dressing.
- Depending on severity and location of the fracture it may require a plaster cast or surgery. This will involve a period of rest from activity.

Types of Injury

Concussion

- Concussion occurs after a blow or injury to the head.
- Symptoms include:

-Brief loss of consciousness

-Confusion

-Disturbance of vision (seeing stars)

Treatment

- Ice pack to reduce swelling
- Paracetamol for pain
- If symptoms persist or become worse it is important to seek medical advice.

Types of injury

Abrasions

- Grazes and cuts can be caused in a range of situations such as falls, tackles and collisions.

Treatment

- If there is a large amount of blood loss apply pressure to reduce the bleed
- Clean and dress the wound
- Larger or deeper cuts may need hospital treatment

Types of injury

Contusions

- Contusions are bruises where blood vessels under the skin have burst following an impact.

Treatment

- Cold treatment using ice packs to reduce the swelling

Types of injury

Blisters

- Blisters are pockets of fluid on the skin caused by friction, caused often from poor fitting footwear.

Treatment

- Do not burst the blister
- Cover with a specialist plaster until the blister falls of naturally

Types of injury

Cramp

- Cramp is an involuntary contraction of the muscle caused by a lack of blood flow in the muscle.

Treatment

- Stretching and massaging the muscle will help to relieve the cramp

Types of injury

Injuries related to children

- **Osgood Schlatter's Disease –** A condition that affects young athletes. Caused by the quadriceps muscles (at the front of the thigh) pulling on their attachment point at the top of the shin bone, just below the knee.

Treatment

- Rest.
- Apply cold therapy treatment such as an ice pack, especially after exercise.
- Gently stretch the quadriceps muscles.
- Use a knee support or strap to reduce the pull on the bone and keep the tendon warm and flexible, as well as encouraging blood flow to the area

Types of injury

Injuries relating to children

- Severs Disease - Severs disease is pain in one or both heels when walking. The tendon at the back of the heel (Achilles tendon)pulls at the heel bone. The reason the tendon is tight is because your bones grow faster than your muscles.

Treatment

The following will help to relieve the symptoms of severs disease

- Rest
- Ice
- Elevation
- Pain relief
- Always wear shoes

Responding to injuries in a sporting context

<u>SALTAPS on field assessment routine</u>

- **SEE-** watch the injury happen and evaluate
- **ASK-** Ask the performer what hurts etc
- **LOOK –** Look for swelling/bleeding
- **TOUCH –** Assess pain, swelling, reduced or altered skin sensation.
- **ACTIVE –** Performer moves injured part, full movement will enable the performer to continue. Limited movement would mean the performer needs to stop participation
- **PASSIVE –** Movement done by the medic
- **STRENGTH –** Performing movement of the injured site whilst medic provides resistance

R.I.C.E Treatment

- **Rest** – avoid exercise and reduce your daily physical activity. Using crutches or a walking stick may help if you cannot put weight on your ankle or knee.
- **Ice** – apply an ice pack to the affected area for 10–30 minutes. A bag of frozen peas, or similar, will work well. Wrap the ice pack in a towel to avoid it directly touching your skin and causing ice burn.
- **Compression** – use elastic compression bandages to limit swelling.
- **Elevation** – keep the injured leg, knee, arm, elbow or wrist raised above the level of the heart. This may also help to reduce swelling.

Responding to injuries in a sporting context

- **Stretching and Massage** – Used to aid recovery from muscle, tendon and ligament injuries
- **Taping, bandaging, splints, slings** – Used to apply pressure, support or restrict movement of injured limbs to allow recovery
- **Hot and cold treatments** – heat packs used to relieve muscle pain and ice packs used to reduce swelling
- **Action plans to respond –** Emergency procedures in place to handle injuries in the sporting environment

Emergency Action Plans in a Sporting Context

- **emergency personnel**, i.e. first responder, first aider, coach
- **emergency communication**, i.e. telephone, emergency numbers, emergency services
- **emergency equipment**, i.e. first aid kits, evacuation chair.

Responding to Common Medical Conditions

- Ensure awareness of any participants' medical conditions prior to commencing physical activity

- Know when to refer the performer on to a professional and how to do so.

Responding to Common Medical Conditions

Asthma Symptoms

- Coughing
- Wheezing
- Shortness of breath
- Tightness in the chest.

Asthma Video

Responding to Common Medical Conditions

Responding to Asthma Attacks

- Re-assurance
- Inhaler
- Emergency services (if needed)

Asthma Attack Response Video

Responding to Common Medical Conditions

Diabetes Symptoms

- increased thirst
- going to the toilet lots
- extreme tiredness
- weight loss

Diabetes video

- **Type 1** (insulin-dependent) the pancreas does not produce any insulin. If you have type 1 diabetes, you will need to take insulin injections for life. You must also make sure that your blood glucose levels stay balanced by eating a healthy diet, taking regular exercise and having regular blood tests.

- **Type 2** (non-insulin dependent) the body does not produce enough insulin, or the body's cells do not react to it. This is known as insulin resistance.

Responding to Common Medical Conditions

Responding to Diabetes

- Give insulin
- Give the individual sugar (e.g. fruit juice, sugary sweets)

Diabetes response

Responding to Common Medical Conditions

Epilepsy Symptoms

- Seizures (Absence or fitting)
- Stiffness or twitching of body parts
- Pins an needles
- Smacking lips
- Experience of unusual smell or taste
- Sudden intense feeling of fear or joy

Responding to Common Medical Conditions

Responding to Epilepsy

- Make safe and protect from further injury
- Contact emergency services if seizure is prolonged
- Emergency care plans in place for the individual

Epilepsy response