Athletic Injury Management

An Introduction to the Prevention & Treatment of Athletic Injuries



Chapter 1 Introduction to Athletic Injury Management (AIM)



Objectives of Athletic Injury Management

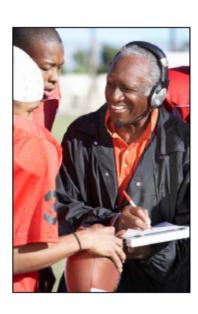
- An understanding of the roles and limitations of the AIM Specialist.
- A basic understanding of the care and prevention of athletic injuries.
- A process or mechanism for the delivery of adequate athletic injury care.

Athletic Injury Management Course Outline

- Role of the AIM Specialist,
- Planning and preparation,
- Game time guidelines,
- Common injuries and their care,
- Basic taping skills.

Additional Concerns

- Liability
 - Emergency Medical Aid Act
- Risk Management
 - Pro-active
- Code of Ethics
 - Maintain a professional manner
- Confidentiality
 - Freedom of Information and Protection of Privacy Act (FOIP)



The Sport Medicine Team

- AIM Specialist
- EMT/Paramedic
- Athletic Therapist
- Sport Nutrition Specialist



- Coach
- Physician
- Physical Therapist
- Sport Science Specialist



Chapter 2
Planning & Preparation



Pre-Season

- Athlete Medical Forms
- Medical History Forms
- Athlete Medical Information Card
- Parental Consent
- Insurance Coverage



Pre-Event/Ongoing: Environment

- Cool and wet weather conditions
 - Hypothermia (low core body temperature)
 - Frostbite
- Warm weather conditions
 - Hyperthermia (high core body temperature)
 - Sunburn
 - Lightening



Pre-Event/Ongoing: Facilities

 Athletes should be able to compete in a safe environment.

Assurance of a safe environment is the

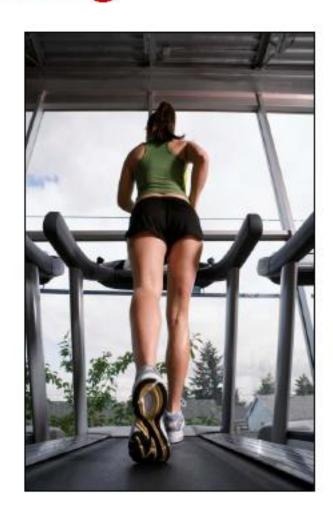
responsibility of

Facility Checklist



Pre-Event/Ongoing: Fitness & Conditioning

- Aerobic Power/Capacity
- Anaerobic Power
- Muscular Strength and Endurance
- Flexibility



Pre-Event/Ongoing: Protective Equipment

- Be properly fitted
- Be of good quality
 - Canadian Standards Association
- Be well maintained



Pre-Event/Ongoing: Skill Instruction

- Appropriate to age and ability,
- Proper progression,
- Avoid overuse.



Pre-Event/Ongoing: Warm Up

- Warm Up
 - How do you know when you are warm?
- 5-10 minutes of low intensity activity
- 2-5 different dynamic stretches





Pre-Event/Ongoing: Cool Down

- Cool Down
 - An element of injury prevention that is often forgotten.
- 5-10 minutes of light activity
- Static stretching



Chapter 3 Preparing for an Emergency



Emergency Action Plan

- Person in Charge (PIC)
- Call Person
- Control Person

When to Call EMS

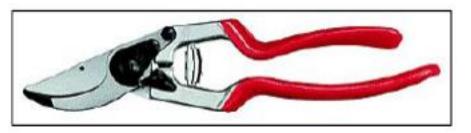
- Use your best judgment, err on the safe side!
 - Athlete is unresponsive.
 - Has trouble breathing.
 - Is bleeding severely.
 - Has a possible head or spinal injury.
 - Has suspected broken bones.



Emergency Equipment

- Maintain an airway.
 - Pocket Mask
- Cutting tools.
 - Utility Scissors
- Control bleeding.
 - Gloves and Gauze





Pre-Event Checklist

- Nearest hospital.
- Gates and doors open.
- Phone working.
- · Review with opposition.



Follow Up

- Injury Report Form.
- Inform parents.
- Refer to physician.



Chapter 4 Understanding Athletic Injuries



Injury Classification

Acute

Injuries that result from a sudden traumatic incident.

Chronic

 Injuries that develop or last over a long period of time.

Recurrent

 These injuries heal but as a result leave body structures weakened or stretched.

Mechanism of Injury

- Direct Blow
- Torsion
- Shearing



Severity of Injury

- Physical, psychological and emotional state,
- Sensation,
- Ability to continue,
- Pain tolerance,
- Knowing the athlete.



When an Injury Occurs

- 1. Inflammatory Phase
- Swelling
- Heat
- Altered Function
- Redness
- Pain
 - 3-5 days



Swelling of right knee

When an Injury Occurs

- 2. Repair and Regeneration
- Elimination of damaged tissue,
- Regeneration of healthy tissue cells,
- Generation of scar tissue.



When an Injury Occurs

- 3. Remodeling Phase
- Crucial period often missed by athlete's who are anxious to return.
- New scar tissue needs time to gain strength.
- Rehabilitation!



Injury Treatment

- Rest/Restricted Activity
- Ice
- Compression
- Elevation



Rest/Restricted Activity

- Protection from inappropriate or painful movement
- Stabilizing, splinting, slings, crutches or bandages
- Not inactivity maintain fitness & conditioning

Ice



- Cold application reduces heat from inflammation, pain and muscle spasm.
- Apply ice or cold:
 - 15 to 20 minutes intervals
 - The temperature of the body part should return to normal before reapplication.
 - Apply in the first 72 hours
 - Can apply directly to skin when follow time parameters.

Ice or Cold Application

- Frozen Water
- Ice Cups
- Frozen Vegetables
- Reusable Gel Packs
- Instant Cold Packs
- Spray Coolants or Cold Rubs
- Cold Water Immersion

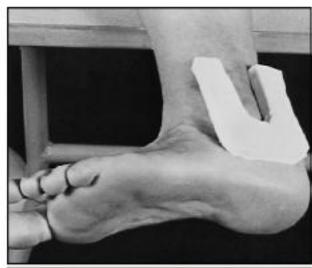






Compression

- Gentle compression can be very effective in minimizing swelling.
- Apply compression:
 - As soon as possible
 - Use a tensor bandage
 - Wrap towards the heart
 - Do not wear to bed





Elevation

- Elevation helps to return extra fluids from swelling back to the lymphatic system.
- · Elevate limb above heart.



Rehabilitation

- Ensure proper rehabilitation is followed:
 - Reduce likelihood of reinjury.
 - Reduce likelihood of injury becoming chronic.
- Very often over looked in amateur athletes!



Return to Play



- Written consent from a physician.
- Complete, uninhibited, pain free range of motion.
- Pre-injury strength, flexibility, endurance, speed and coordination without aggravating injury.
- Athlete is confident both physically and psychologically.

Chapter 5 Game Time



General Principles

- Be certified in a minimum of Standard First Aid and CPR/AED.
- Have a well stocked first aid kit accessible.
- Have an EAP in place.
- Know the athlete's needs.
- Practice scenarios.



Life-Threatening Situations

- Ensure scene safety.
- Assess consciousness.
- Assume a neck injury.
- Activate EAP.



Primary Survey

- Assess Airway (A)
 - Is the mouth open and unobstructed?
- Assess Breathing (B)
 - Look, Listen and feel!
- Assess Circulation (C)
 - Does the athlete have a pulse? Inititae CPR if no pulse is detected.

Secondary Survey

- While waiting for EMS to arrive:
 - 1. History
 - 2. Inspection
 - 3. Touch (palpation)



History

- Location of injury.
- Mechanism of injury.
- Symptoms of injury.



Inspection

- Bleeding
- Skin Changes
- Swelling
- Deformity
- Head/Neck/Chest Injuries

Touch (Palpation)

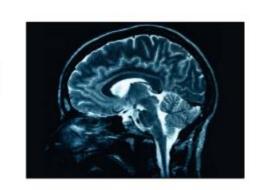
- Point Tenderness
- Skin Changes
- Range of Motion
- Crepitus
- Pulse



Chapter 6 Sport Related Injuries



Head Injuries



- Concussion
 - A brain injury that changes normal brain function.
- Contusion
 - Bruising and possible swelling of the brain.
- Hemorrhage
 - Bleeding around or within the brain.
- Fracture
 - A crack or break in the skull.

Concussion

 A concussion is caused by an impact to the head, face, neck or elsewhere on the body.

 Concussions occur when an athlete is moving at a high rate of speed and collides with another object.

 Concussions may or may not involve a loss of consciousness.

Pocket SCAT2

Pocket SCAT2



FIFA







Concussion should be suspected in the presence of any one or more of the following: symptoms (such as headache), or physical signs (such as unsteadiness), or impaired brain function (e.g. confusion) or abnormal behaviour.

1. Symptoms

Presence of any of the following signs & symptoms may suggest a concussion.

- Loss of consciousness
- Seizure or convulsion
- Amnesia
- Headache
- "Pressure in head"
- Neck Pain
- Nausea or vomiting
- Dizziness
- Blurred vision
- Balance problems
- Sensitivity to light
- · Sensitivity to noise

- Feeling slowed down
- Feeling like "in a fog"
- · "Don't feel right"
- Difficulty concentrating
- Difficulty remembering
- · Fatigue or low energy
- Confusion
- Drowsiness
- More emotional
- Irritability
- Sadness
- · Nervous or anxious

2. Memory function

Failure to answer all questions correctly may suggest a concussion.

"At what venue are we at today?"

"Which half is it now?"

"Who scored last in this game?"

"What team did you play last week/game?"

"Did your team win the last game?"

3. Balance testing

Instructions for tandem stance

"Now stand heel-to-toe with your non-dominant foot in back. Your weight should be evenly distributed across both feet. You should try to maintain stability for 20 seconds with your hands on your hips and your eyes closed. I will be counting the number of times you move out of this position. If you stumble out of this position, open your eyes and return to the start position and continue balancing. I will start timing when you are set and have closed your eyes."

Observe the athlete for 20 seconds. If they make more than 5 errors (such as lift their hands off their hips, open their eyes; lift their forefoot or heel; step, stumble, or fall; or remain out of the start position for more that 5 seconds) then this may suggest a concussion.

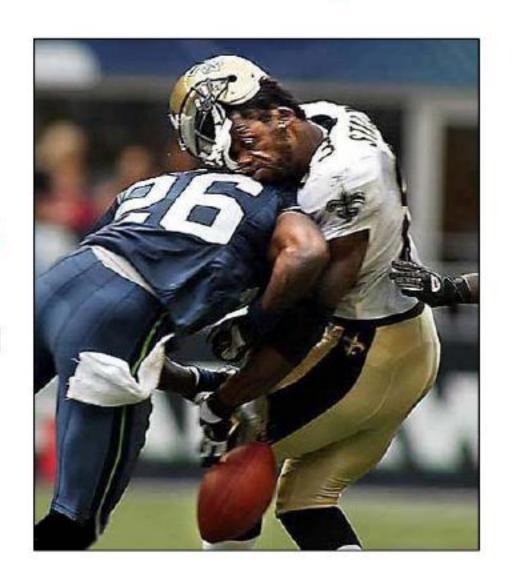
Any athlete with a suspected concussion should be IMMEDIATELY REMOVED FROM PLAY, urgently assessed medically, should not be left alone and should not drive a motor vehicle.

Return to Play Steps

Rehabilitation stage	Functional exercise at each stage of rehabilitation	Objective of each stage
I. No activity	Complete physical and cognitive rest.	Recovery
2.Light aerobic exercise	Walking, swimming or stationary cycling keeping intensity < 70% MPHR No resistance training.	Increase HR
3.Sport-specific exercise	Skating drills in ice hockey, running drills in soccer. No head impact activities.	Add movement
4.Non-contact training drills	Progression to more complex training drills e,g. passing drills in football and ice hockey. May start progressive resistance training)	Exercise, coordination, and cognitive load
5.Full contact practice	Following medical clearance participate in normal training activities	Restore confidence and assess functional skills by coaching staff
6.Return to play	Normal game play	

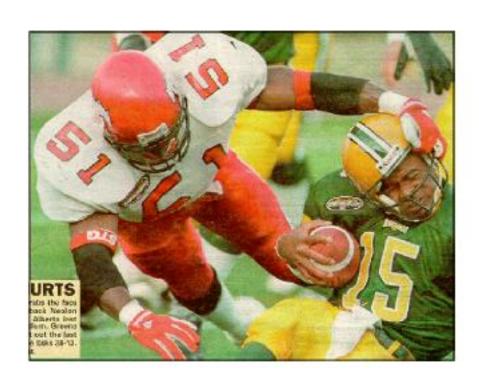
Management of Other Head Injuries

- Perform an injury assessment.
- Activate EMS.
- Assume a neck injury and do not move athlete.
- Monitor the athlete's vital signs and level of responsiveness.
- Revert to the primary assessment if necessary.



Neck and Spine Injuries

- They can be caused by:
 - A blow to the head, neck or back.
 - Hyperextension or hyperflexion.
 - Compression.
 - Torsion or twisting.

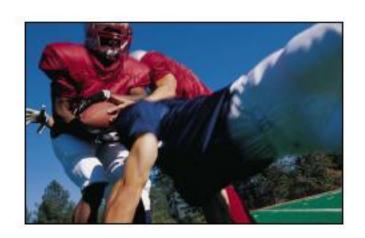


Neck and Spine Injury Management

- Perform injury assessment.
- Activate EMS.
- Stabilize head and neck in position found.
- Do not move patient.
- Do not remove helmet.
- Monitor the athlete's vital signs and level of responsiveness.
- Revert to the primary assessment if necessary.

Internal Injuries

- Ruptured Spleen
 - Located on the left side of the body, underneath the ribs.
- Bruised Kidney
 - Located on either side of the spinal cord.
- Testicular Trauma
 - Have athlete perform self-exam.



Internal Injury Management

- Perform injury assessment.
- Activate EMS.
- Do not give athlete any food or water.
- Monitor the athlete's vital signs and level of responsiveness.
- Revert to the primary assessment if necessary.

Respiratory Illness

- Asthma
 - Air passages in the lungs constrict.
 - Exercise-induced, exposure to cold, allergic.
- Hyperventilation
 - Athlete breathes too rapidly.
 - Deficit in carbon dioxide.



Asthma Management

- Perform illness assessment.
- Assist the athlete with medication.
- Have the athlete rest in a comfortable position.
- Contact EMS if no history of asthma or if athlete's condition does not improve.
- Monitor the athlete's vital signs and level of responsiveness.
- Revert to the primary assessment if necessary.

Hyperventilation Management

- Perform illness assessment.
- Have the athlete rest in the most comfortable position.
- Reassure the athlete.
- Encourage them to slow down their breathing.
- Revert to primary assessment if necessary.



Circulatory Illness

Angina

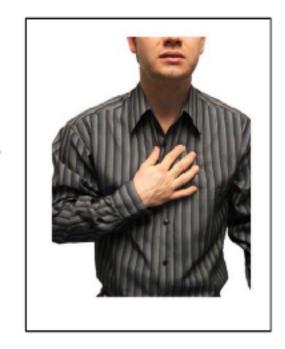
Chest pain due to diseased or narrowed coronary arteries.

Heart Attack

Blockage in a coronary artery.

Stroke

- Blockage in an artery serving the brain.
- Weakness, trouble speaking, vision problems, dizziness, severe headache



Angina and Heart Attack Management

- Perform illness assessment.
- Have the athlete rest in the most comfortable position.
- Reassure the athlete and act calmly.
- Assist a known heart patient with nitroglycerin if it has been prescribed by a doctor.
- If signs and symptoms continue, activate EMS.
- Monitor the athlete's vital signs and level of responsiveness.
- Revert to the primary assessment if necessary.

Stroke Management

- Perform illness assessment.
- Have the athlete rest in the most comfortable position.
- Reassure the athlete and act calmly.
- Activate EMS and monitor athlete's vital signs until EMS arrives.
- If athlete is unresponsive, place in recovery position.
- Revert to primary assessment if necessary.

Hyperthermia

Heat Cramps

Leg or abdominal. Fatigue and dizziness.

2. Heat Exhaustion

 Body loses excessive fluid due to a hot environment.

3. Heat Stroke

- Body's heat regulating mechanism fails.
- Life threatening condition.



Hyperthermia Management

- Remove the athlete from the heat.
- Perform illness assessment.
- Give the athlete water or dilute electrolyte solution if the athlete is responsive.
- Cool the athlete immediately using a cool bath, fan, ice packs or wet towels on their head, neck, armpits, limbs and trunk.
- Activate EMS if suspect heat stroke. Heat exhaustion may turn to heat stroke if not managed.

Hypothermia and Frost Bite

- Hypothermia
 - Lowered body temperature.
 - Cold, wet and windy weather.
- Frostbite
 - Cooling of localized areas of tissue.



Hypothermia Management

- Perform illness assessment.
- Prevent further heat loss, carefully move the athlete to a warm environment, replace wet or cold clothing.
- Add heat at major arteries using heat pads.
- Provide fluid if athlete is responsive.
- Activate EMS if signs and symptoms are severe.
- Revert to the primary assessment if necessary.

Frostbite Management

- Perform illness assessment.
- Protect frozen areas from further damage.
- Avoid thawing if refreezing cannot be avoided.
- Seek medical help immediately.
- Revert to the primary assessment if necessary.



Diabetic Coma and Insulin Shock

- Diabetic Coma
 - Excessively high blood sugar.
- Insulin Shock
 - Excessively low blood sugar.



dangerously high blood sugar (hyperglycemia) or dangerously low blood sugar (hypoglycemia) can lead to a diabetic coma

Diabetic Coma and Insulin Shock Management

- Perform illness assessment.
- If unsure about athlete's condition, give sugar.
- If the athlete does not respond, activate EMS.
- Do not give insulin.
- Revert to the primary assessment if necessary.

Seizures

- Normal electrical activity in the brain is interrupted.
- Chronic condition: epilepsy.
- May occur after hard hit.



Seizures Management

- Perform illness assessment.
- Allow the athlete to in rest in most comfortable position.
- Move objects that may cause injury.
- Place athlete in recovery position.
- Call EMS: athlete has not history of seizures, lasts more than 10 minutes or keep coming back.
- Revert to primary assessment.

Chapter 7 Managing Specific Athletic Injuries



Bone Injuries

- Open Fracture
 - Protrudes through the skin.
- Closed Fracture
 - Does not protrude through the skin.
- Stress Fracture
 - Repetitive stress or shock.







Bone Injury Management

- Perform injury assessment.
- Activate EMS.
- Loosely cover open fractures.
- Use ice.
- Stabilize or splint.
- DO NOT reduce or attempt to straighten.
- Check circulation after splinting.
- Monitor athlete's vital signs and level of responsiveness.
- Revert to the primary assessment if necessary.



Muscle and Tendon Injuries

Strains

- Muscle fibers are stretched or torn.
- Vary in severity: first, second or third degree.



Muscle and Tendon Injuries

- Contusions
 - Bleeding and muscle spasm.

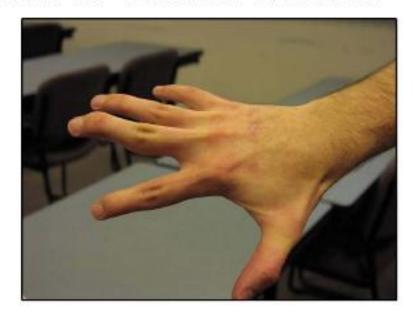




Muscle and Tendon Injuries

- Tendon Rupture
 - Where tendon and muscle join.
- Tendonitis
 - Inflammation of the tendon or tendon sheath.





Muscle and Tendon Injury Management

- Perform injury assessment.
- Use R.I.C.E.
- Monitor athlete's vitals signs and level of responsiveness.
- Revert to primary assessment if necessary.
- Send the athlete to a medical facility.
- If there is a tendon rupture, activate EMS.

Tendonitis Management

- Perform injury assessment.
- Use R.I.C.E.
- Gentle stretching.
- Send the athlete to a medical facility.



Ligament Injuries

- Sprains
 - Ligaments are stretched or torn.
 - Vary in severity: first, second or third degree.





Ligament Injury Management

(thigh bone)

- Perform injury assessment.
- Use R.I.C.E.
- Stabilize the joint.
- Monitor the athlete's vital signs and level of responsiveness.
- Revert to the primary assessment if necessary.
- Send the athlete to a medical facility.

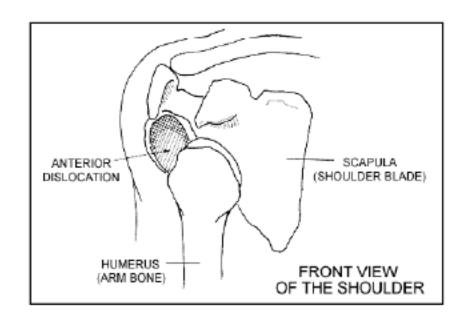
Joint Injuries

Dislocation

- Complete disruption of a joint.
- Damage to ligaments, nerves and bones.

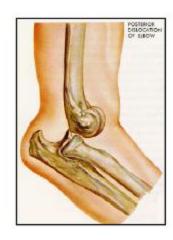
Subluxation

The bones immediately move back into place.



Dislocation

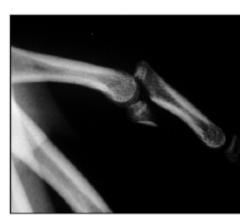






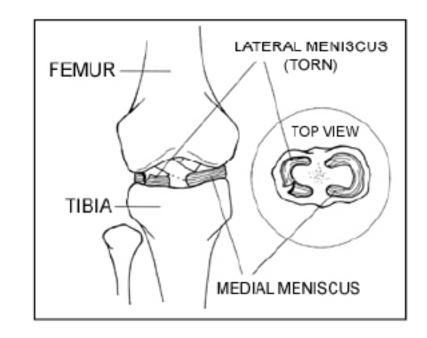
Joint Injury Management

- Perform injury assessment.
- Do not try to relocate.
- Stabilize the joint.
- Use R.I.C.E.
- Monitor the athlete's vital signs and level of responsiveness.
- Revert to primary assessment if necessary.
- Send the athlete to a medical facility.



Cartilage Injuries

- Hyaline Cartilage
 - Covers the ends of bones where they articulate.
 - Smooth gliding service.
- Fibrocartilage
 - Found between joint structures.
 - Meniscus in knee.



Cartilage Injury Management

- Perform injury assessment.
- Use R.I.C.E.
- Send the athlete to a medical facility.

Bursae Injuries

- Bursae
 - Small fluid-filled sacs.
 - Reduce friction between: skin, tendons and muscle over rough bones.
 - Excessive frictional rubbing or direct trauma.



Bursae Injury Management

- Perform injury assessment.
- Use R.I.C.E.
- Send the athlete to a medical facility.

Skin Wounds

- General Wound Care:
 - Wear gloves.
 - Clean the wound with saline.
 - Use sterile gauze.
 - Monitor for signs of infection.

Signs of Infection

- Swelling
- Heat
- Altered Function
- Redness
- Pain



Blisters

- Excessive friction causes the layers of skin to separate and fill with fluid.
- Poorly fitted equipment.
- Repetitive motion.



Management of Blisters

- Closed Blister:
 - Clean the area
 - Pad around the blister
 - Do not pop
- Open Blister:
 - Keep area clean and dry
 - Check for infection



Blister Prevention

- Keep feet and hands clean and dry.
- Wear properly fitted shoes and socks.
- Treat "hot spots".
- Keep callused areas filed down.

Abrasions

- Scraping injuries to skin.
- Very susceptible to infection.
- Can affect only top layers of tissue or can be very deep.



Abrasion Management

- Minor Abrasion:
 - Clean the area with saline.
 - Cover with a non-adherent dressing.
 - Ensure no debris is left in wound.
 - Check for signs of infection.
- Deep/Large Abrasion:
 - Refer to a medical facility.

Lacerations

- Cuts that affect deep layers of skin.
- Risk of infection.
- Do not heal if edges of wound are not brought together.
- Scalp and face bleed profusely.

Severe Laceration Management

- Activate EMS.
- Cover the wound with sterile gauze.
- Apply direct pressure.
- Elevate the injured part above the heart.
- Monitor the athlete closely and revert to primary assessment if necessary.

Minor Laceration Management

- Apply direct pressure.
- Clean the area with saline.
- Bring the edges of the wound together.
 - Steri-Strips
 - Tuf-Skin
- Refer to a physician if suturing required.



Nose Injuries

- Nosebleed
 - Dry nasal passages, direct blow or head injury.
- Broken Nose
 - Excessive bleeding, pain, deformity.



Nosebleed Management

- Have athlete sit with head slightly forward.
- Pinch bridge of nose.
- Apply ice.
- Avoid blowing and sniffing.
- Refer to physician if bleeding persists or athlete has recurring nosebleeds.

Broken Nose Management

- Assess the athlete for a head injury.
- Have the athlete sit up to keep their airway clear.
- Apply ice gently.
- Refer to physician.

Eye Injuries

- Eye Contusion
 - Black eye.
- Foreign Body in Eye
 - Dirt, grass, bugs.
- Eye Laceration
 - Scratches or cuts on cornea.



Eye Contusion Management

- Perform injury assessment.
 - Head injury
- If blurred or double vision persists refer to hospital.
- Apply ice.
- Have the athlete rest.

Foreign Body in Eye Management

- Avoid rubbing the eye.
- Close the eye until pain subsides.
- Protect from bright light.
- Pull upper lid of lower and release.
- Flush with saline.



Foreign Body in Eye Management

- If cannot remove object cover the eye and transport to hospital.
- If blurred vision or continued pain refer to physician.
- Flush with saline for caustic substances before transport to hospital.

Eye Laceration Management

- · Remove small particles.
- Cover both eyes.
- Have athlete rest in semi-reclined position.
- Consult a physician or activate EMS.

Dental Injuries

- Sensitivity to thermal changes may indicate a dental injury.
- Immediate care increase chances of healing.
- Manipulate as little as possible following injury.

Loose or Chipped Tooth Management

- Perform injury assessment.
- Sit with head slightly forward.
- Apply pressure in mouth.
- Protect exposed nerve.
- Refer to dentist.



Avulsed or Knocked Out Tooth Management

- Perform injury assessment.
- Rinse tooth with saline.
- Place tooth in saline.
- Cover socket with sterile gauze.
- Have athlete sit forward.
- Refer to dentist or hospital.



Dental Injury Prevention

- Mouthguards
 - Stock mouthguards: bite and hold in place.
 - Formed mouthguards: boil and bite.
 - Custom mouthguards: made by dentist.
- Facemasks



Chapter 8 Special Topics



Drug Use in Sport

- Therapeutic Drugs
 - Treat a disease or infection, relieve swelling or pain.
- Recreational Drugs
 - Legal and illegal with negative side effects.
- Performance Enhancing Drugs
 - Improve athletic abilities.

Therapeutic Drugs

- Analgesics
 - Minor pain relief.
- Local steroids
 - Applied to skin for allergies or skin disorders.
- Antibiotics
 - Fight infection.
- Beta-Agonsists
 - Maintain airway during asthma attack.

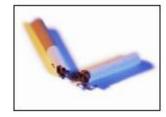


Recreational Drugs



- Alcohol
 - Slow reaction time, decreases circulation and respiration.
- Caffeine
 - Diuretic.
- Tobacco
 - Decreased stamina.
- Cannibinoids
 - Slows perception and coordination.
- Cocaine
 - Suppressed immune system and hallucination.





Performance Enhancing Drugs

- Anabolic Steroids:
 - Hormone similar to testosterone
 - Illegal in sport competition
 - Health risks = heart problems; cancer; addiction; mental illness; weakened ligaments; vascular problems; violent behaviour; acne and liver

problems.

Ethics

Canadian Centre for Ethics in Sport (CCES)

www.cces.ca

Infectious Diseases

- Infectious diseases are viral infections that can be passed from one person to another.
 - Hepatitis B (HBV)
 - Hepatitis C (HBC)
 - Human Immunodeficiency Virus (HIV)
 - Acquired Immune Deficiency Syndrome (AIDS)

Universal Precautions

- Disposable gloves (latex or vinyl).
- Pocket mask.
- Cover open wounds.
- Stop play when an athlete is bleeding.
- Clean playing surfaces.



Chapter 9 Taping Techniques



When To Tape

- Prevention
 - High risk of a particular injury or recurrence of an injury.
- First Aid
 - Acute injury.
- Return to Play
 - Support and stabilize an injury for rehabilitation.

When Not To Tape

- Unsure
 - Do not know condition of the athlete.
- Abnormal Injury Assessment
 - Signs and symptoms are not normal.
- Night
 - Do not impair circulation to extremities.
- Pre-puberty
 - May inhibit bone development.
- Return to play
 - Not to facilitate return to play until athlete is ready.

Before Taping

- If taping is practical in this situation?
- What structures need supporting?
- What movements take place at this joint?
- What are the demands of the sport?
- What areas are likely to be irritated by tape?
- What areas are sensitive to tape?

Skin Preparation

- Clean and dry.
- No ice, heat or ointment.
- Shaving.
- Check skin for areas of irritation.
- Spray with tape adherent.
- Use lubricant with foam pads.
- Use underwrap.
- Use caution with taping/adhesive allergy.





Position of Athlete

- Minimum stress on the affected structure.
- Instruct athlete to maintain this position.
- AIM Specialist position of comfort.

Applying Tape

 Particular to the taping technique and structure injured.

Check the Completed Tape Job

- Is it functional?
- Is it too tight or is circulation impaired?
- Are there any gaps or wrinkles?
- Warn the athlete about tape loosening and becoming less supportive.

Created by SMCA – Sport Medicine Council of Alberta