**CORE STRANDS and Standards**

**Strand 11 Students will be able to recognize common injuries and administer injury management.**

**Standard 1** Explain an injury assessment (HIPS)

* + - Identify proper PPE/BSI precautions.
		- Identify the components included in obtaining an accurate history.
		- Identify the components of an inspection.
		- Describe the process of palpation.
		- Describe the purposes of special tests.
			* Range of Motion
				+ Passive
				+ Active
				+ Resistive
			* Stress Tests (structural integrity
			* Neurological
			* Functional
		- Discuss the decisions that can be made from a HIPS evaluation.
		- Explain a HIPS assessment.

**Standard 2** Identify soft tissue injuries and skin conditions.

* + - Differentiate signs, symptoms, and treatment for:
			* Abrasions
			* Avulsions
			* Bites
			* Blisters
			* Contusions
			* Lacerations
			* Stings
		- Differentiate signs, symptoms, and treatment for:
			* Ring worm
			* Jock itch
			* Athlete’s foot
			* Impetigo
			* MRSA
			* Warts
			* Eczema

**Standard 3** Recognize abdominal injuries, bleeding, and shock.

* + - Discuss external bleeding.
		- Demonstrate proper procedures to control bleeding.
			* Apply direct pressure with sterile gauze pad
			* Apply a pressure dressing
			* Check circulation
		- Identify signs, symptoms, and treatment of internal bleeding.
		- Identify signs, symptoms, and treatment of abdominal injuries
			* Ruptured spleen
			* Appendicitis
			* Hernia
		- Describe the signs, symptoms, and treatment of shock.

**Standard 4** Discuss immobilization techniques.

* + - Identify fracture signs and symptoms.
		- Explain the steps to immobilization.
			* Splint in the position found
			* Immobilize the joint above and the joint below
			* Check circulation distal to the injury
		- Explain head/neck immobilization
			* Maintain in-line stabilization
			* Monitor ABC/s
		- **REQUIRED SKILL-**Demonstrate crutch fitting to any size individual

**Standard 5** Recognize and provide treatment for environmental conditions.

* + - Compare and contrast the causes, signs, symptoms, and treatment of heat illnesses.
			* Heat cramps
			* Heat exhaustion
			* Heat stroke
		- Compare and contrast the causes, signs, symptoms, and treatment of cold exposure.
			* Hypothermia
			* Frostbite

**Standard 6** Describe the treatment for the following medical conditions:

* + - Seizures
		- Fainting
		- Diabetes
		- Anaphylactic shock
		- Asthma
		- Exertional sickling
		- Sudden cardiac arrest

**Standard 7** Vocabulary:

* + - Cyanosis
		- Diagnosis
		- Incision
		- Palpation
		- Prognosis
		- Reduction
		- Shock

Injuries

* + - Bursitis
		- Dislocation
		- Fracture
		- Hematoma
		- Separation
		- Sprain
		- Strain
		- Subluxation

Strand 11 – INJURY MANAGEMENT

Lecture Notes

**Standard 11: Students will be able to recognize common injuries and administer injury management.**

**Objective 1: Explain an injury assessment**

I. **Injury Assessment**

* 1. Steps to prevent disease transmission must be taken when an injury or medical condition occur
		1. Personal protective equipment (PPE) or body substance isolation (BSI) protocols need to be followed
			1. Avoid contact with body fluids
			2. Wear gloves
			3. Cover cuts
			4. Wear protective coverings; such as masks, eyewear or gown when appropriate
			5. Use breathing barriers when delivering rescue breaths
			6. Remove gloves without contacting soiled part of glove
			7. Wash hands after giving care
			8. Dispose contaminated material in a biohazard container
			9. If athlete is bleeding during activity they must be taken out of activity and blood needs to be removed from uniform. A solution of bleach and water or hydrogen peroxide can be used
	2. When an injury occurs that is not life threatening, a specific sport related assessment can be used
	3. The **HIPS format is used to perform a thorough assessment** of the major complaint areas. This evaluation can be divided into four basic steps
		1. **HISTORY**
		2. **INSPECTION**
		3. **PALPATION**
		4. **SPECIAL TESTS**
	4. An ordered sequence of procedures is used to assess the nature, site, and severity of an athletic injury.
	5. The importance of using a detailed and properly sequenced checklist in the assessment procedure cannot be overemphasized.
	6. By following a consistent pattern in your evaluation procedures, you are less likely to forget a procedure or miss an important detail.
	7. Each step is important and should be carried out thoroughly and efficiently to accurately assess an athletic injury. Not all of the procedures discussed under each step of the HIPS evaluation will be carried out with each athletic injury. The nature, type, and severity of the injury will determine the evaluation techniques to be used.
	8. **HISTORY**
		1. Most important step in the survey
		2. Find out as much information as possible about an injury and the circumstances surrounding its occurrence.
		3. Ask the athlete questions
		4. Ask bystanders questions
		5. Be VERY Thorough!!!
		6. Think of **MAPPS**
			1. **Mechanism of injury**
				1. What happened?
				2. How did it happen?
				3. Ask them to be specific

Were you cutting?

Did you step on someone’s foot?

Were you coming down from a jump?

Did someone hit you

Etc…

* + - 1. **Acute or chronic**
				1. How long has it hurt?

Did this just happen?

Has this been bothering you for a while?

Try to identify what type of injury

* + - * 1. **Acute injures** are usually traumatic

Fractures

Dislocations

Subluxations

Contusions

Sprains/ strains

Nerve injuries

* + - * 1. **Chronic injuries** are usually due to over use activites or repetitive micro-trauma

Bursitis

Tendonitis /- osis

Tenosynovitis

Stressfracture

Osteoarthritis

* + - 1. **Pain**
				1. Duration

Does it hurt during activity?

How long does the pain last

Is it during the warm up, during the game, after the game?

How intense is the pain?

How would you rate your pain at rest?

How would you rate your pain during activity?

Does anything make your pain go away?

Does anything make your pain worsen?

Location

Where does it hurt?

Do you have any radiating pain up or down from the injury?

* + - 1. **Prior history**
				1. Have you ever hurt this area before?
			2. **Sounds/ symptoms**
				1. Did you hear or feel any snapping, popping, clicking or tearing?
	1. **INSPECTION**
		1. This step is purely observational, look for clues that tell you about the injury.
		2. Always compare bilaterally
		3. Look for:
			1. Swelling
			2. Discoloration
			3. Deformity
			4. Prior injuries
			5. Bleeding
			6. Posture and functional abilities
				1. Holding or grasping body area
				2. Limping, protecting or guarding body area
			7. Facial expressions
	2. **PALPATION**
		1. Palpation means to touch and feel the injured area.
		2. Areas to be palpated
			1. Bones
			2. Muscles
			3. Soft tissue (tendons and ligaments)
		3. Increase palpation pressure as tolerated
		4. Begin away from site of injury
		5. Visualize structures as you examine
		6. Palpate bilaterally
	3. **SPECIAL TEST**
		1. 5 special tests will be performed during the HIPS survey
			1. Range of Motion
			2. Stress Tests
			3. Neurological exam
			4. Circulatory exam
			5. Functional Tests
		2. **Range of Motion**
			1. Perform all motions bilaterally to compare motion and strength
			2. Active – performed by athlete
			3. Passive – performed by examiner with athlete relaxed
			4. Resistive – athlete contracts the body part while examiner provides resistance
		3. Note any restriction or limitation
		4. These findings are used to determine status of a muscle/ or muscle group
	4. **Findings**
		1. Weak and Painless
			1. Possible 3rd degree strain or sprain
		2. Weak and Painful
			1. Possible fracture at joint site
		3. Strong and Painful
			1. Possible tear of muscle / tendon
		4. Strong and Pain Free
			1. No muscle injury
		5. **Stress Tests**
			1. Use to assess joint function and integrity of structures
				1. Ligament stability
				2. Muscle imbalances or tightness
				3. Joint function
			2. Each body area has specific stress tests to determine specific injuries
			3. Used to determine:
				1. Muscle tightness
				2. Joint function
				3. Integrity of structures
		6. **Neurological**
			1. Sensory function- sharp, dull, numbness, tingling
				1. Run fingers over area of skin on affected and unaffected area
				2. Apply sharp and dull points to affected and unaffected area

Does it feel the same on both sides

* + - 1. Compare bilaterally
			2. When necessary reflex testing can be done to area effected:
				1. Patella
				2. Achilles
				3. Biceps
				4. Triceps
				5. Brachioradialis
		1. **Circulatory**
			1. Check pulse distal to the injury
				1. No pulse indicates a medical emergency
			2. When needed, such as if injury includes external or internal bleeding, abdominal injury or shock- assess vital signs
				1. Pulse

60-100 normal

* + - * 1. Blood pressure

120/80 normal

* + - * 1. Nail perfusion

Rapid return of color normal

* + 1. **Functional Tests**
			1. Sport specific skills need to be performed before an individual can return to sport participation
			2. Motor coordination and proprioception need to be evaluated
				1. Perform skills which challenge balance
				2. Walk, jog and run in straight line, figure 8 and zigzag
				3. Squat, throw, stand on one leg
	1. **Decisions Made from a HIPS evaluation**
		1. The examiner can make any of the following decisions after completing a thorough musculoskeletal examination:
			1. The seriousness of the injury.
			2. The type of first aid and immobilization.
			3. Whether or not the injury warrants referral to a physician for further assessment.
			4. The appropriate follow-through and treatment for this injury.
	2. **Plan of action**
		1. Return to play?
			1. **YES**
				1. With / without restrictions

No restrictions

Practice as tolerated

No contact

Conditioning only

Concussion protocol; 1-14 days

* + 1. Return to play?
			1. **NO**
				1. Remove from competition

RICE/ Splint/ Crutches/ Parent contacted?

Call 911?

Physician Referral?

Re-evaluate?

Enter Concussion protocol?

Start therapy/ treatment

**Objective 2: Identify soft tissue injuries and skin conditions**

1. **Management of soft tissue injuries and skin conditions**

**Soft Tissue Injures**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Injury | Signs and Symptoms | Treatment | Prevention  | Complications |
| **Abrasion** | Minimal bleeding | Wash w/soap and water, apply antibiotic cream, cover with sterile dressing | Cover during activity to prevent re-opening of skin | Watch for infection |
| **Avulsion**Completely Severed or Amputated | Bleeding, Tearing or pulling away a part of a structure  | Wash w/soap and water, apply antibiotic cream, cover with sterile dressing |  | Completely severed:1. Wrap in sterile gauze
2. Put in plastic bag
3. Put plastic bag on ice
4. Take to the hospital with victim
 |
| **Bites**  | Bite: Break or tear the skin using teeth/puncture wounds, bleeding | Wash w/soap and water, apply antibiotic cream, cover with sterile dressing, apply ice | Wear repellant | Do not apply ice to a snake bite- ice stimulates the venom to circulate faster through blood stream. Minimize movement watch for infection and seek medical attention |
| **Blister** | Feel “hot spot” can be filled with fluid | Donut padding, moleskin or second skin covering | Proper shoe selection, wear socks | Watch for infectionDo Not PopWhen needed- medical professional can drain blister and inject anti-biotic into blister |
| **Contusion** | Discoloration and tenderness | Apply ice | Wear protective padding to vulnerable areas | Internal bleedingIF severe contusions occurs and not treated properly myositis ossificans can occur- where bone grows within the muscle |
| **Lacerations** | Jagged or irregular cut or tear in soft tissue, bleeding | Wash w/soap and water, clean with antiseptic, Pull edges of wound together and use steri-strips or butterfly bandage to enclose them. Cover with sterile dressing.  | Wear protective clothing  | Recommendation for Sutures Wounds that are longer 1 inch and/or deep, edges that do not close with butterfly or steri-stripsTiming: best to get within first 6-8 hours to minimize contamination, with clean wounds sutures can be applied within the first 18-24 hours.To minimize scaring sutures should be applied within the first 4 hours with facial lacerations and within 24 for rest of body. |
| **Stings** | Stinging sensation, swelling, itchy feeling | Remove stinger if present by scraping it away with fingernail or plastic card, wash w/soap and water and apply ice, watch for allergic reaction |  | Stings can cause a life threatening allergic reaction called Anaphylactic Shock* Air passages swell and restrict breathing
* s/s=Rash, tight chest, swelling of face &tongue, dizzy and confusion

Treat by Activating EMS and administrating an auto-injector of Epinephrine  |

**Skin conditions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Condition | Etiology (cause) | Signs and Symptoms | Treatment | Prevention |
| **Tinea corporis*** **Ringworm**
 | Fungus | Lesions with defined ring-like eruption with red, scaly raised border- found on body or face | Anti-fungal creamAvoid skin to skin contact- very contagious | Fungi grow in dark, damp warm environments, so shower right after activity and wash close after practice |
| **Tinea cruris*** **Jock itch**
 | Fungus | Red, scaly, itchy rash on groin or medial thigh | Anti-fungal cream or powder | **Shower**  right after activity and wash close after practice |
| **Tinea pedis*** **Athletes foot**
 | Fungus | Red, scaly, itchy inflamed vesicles between toes or along lateral aspect of sole | Anti-fungal cream or powder or spay. Oral anti-fungal can be prescribed if needed | Shower with protective wearKeep feet dry after exercise- air out, powders, dry socks |
| **Impetigo** | Bacteria | Pustules that become crusted and rupture | Oral- antibiotic and creams | Highly contagious- avoid skin to skin contact, practice good hygiene |
| **MRSA** - Methicillin-Resistant Staphylococcus Aureus | Bacteria - Staphylococcus aureus bacteria “Staph” | Start as small red bumps, turn into deep painful abscesses | Antibiotic, Draining Abscesses | Resistant to broad spectrum antibiotics, can be fatal if penetrates into bloodstream. Watch minor skin irritations for infection |
| **Verruca vulgaris*** **Warts**
 |  Virus | Small, fleshy, rough bumps, contain pinpoint black dots, or wart "seeds**”** | Salicylic acid treatments or cryotherapy | Can re-occur. Protect areas that experience frequent trauma. |
| **Verruca Plantaris** **-Plantar Warts** |  Virus | Same as above, but on bottom of foot | Same as above | Shower with foot protection |
| **Eczema** | Allergies, chemicals, drugs, scratching, sun exposure, stress, temperature  | Itchy red rash, may weep or ooze and become crusted, thickened or scaly | Lotion, ointment creams which contain corticosteroids, antihistamines or that hydrate skin | Keep skin from becoming dry |

**Objective 3: Recognize abdominal injuries, bleeding and shock.**

1. **Control of Bleeding, abdominal injuries and shock**
	1. **External Bleeding**
		1. Bleeding or hemorrhage refers to the loss of blood from arteries, capillaries or veins. Loss of blood may initially cause weakness and progress to shock and death if the bleeding is not controlled.
		2. There are three types of bleeding:
			1. **Arterial**
				1. Arteries carry oxygenated blood from the heart through the body.
				2. The blood spurts with each heartbeat and is bright red.
				3. Arterial bleeding is usually severe and hard to control and needs immediate attention.
				4. Life- threatening 10% loss of blood volume
			2. **Venous –**
				1. Veins carry deoxygenated blood from the body back to the heart.
				2. It has a steady flow which can be heavy and the color is dark red.
				3. Venous bleeding is easier to control than arterial bleeding.
			3. **Capillary –**
				1. Capillaries are the smallest blood vessels.
				2. The blood flow is usually slow and steady.
				3. The threat of infection is greater than with arterial or venous bleeding.
		3. The average adult has 6 liters of blood circulating through their body at any one time.
		4. The acute loss of 10% of the circulatory blood volume (600 ml) may be critical.
		5. There are several methods for controlling bleeding. In most cases bleeding stops naturally after 6-10 minutes because of the body’s clotting mechanism. However, sometimes the damaged vessels may be too large that clots cannot block them.
	2. **To control bleeding:**
		1. PPE/BSI
		2. **Apply direct, local pressure** on the wound with a dressing. Pressure stops the physical flow of blood and permits normal blood clotting to occur.
			1. A dressing is a clean covering placed over the wound that protects it and helps control the bleeding by absorbing the blood and allowing it to clot.
			2. Once you put a dressing on a wound, do not remove it. If bleeding continues, add new dressings on top of the old ones. The less a bleeding wound is disturbed, the better the chances of stopping the bleeding.
		3. Apply a pressure bandage. This is used to hold a dressing in place, restrain movement, and help stop bleeding.
		4. Check the circulation distal to injury. A pressure bandage that is too tight can impede circulation.
	3. **Internal bleeding**
		1. Although, not usually visible, internal bleeding can be very serious. The athlete with severe internal bleeding may go into shock before the loss of blood is realized.
		2. Internal bleeding can result from crushing injuries, punctures, injuries from blunt objects, tears in internal organs and blood vessels, bruised tissues, and fractured bones. If the victim is not properly checked, internal bleeding may go unnoticed.
		3. Signs and symptoms of internal bleeding include:
			1. Bruised, swollen, or rigid abdomen.
			2. Bruises on chest or signs of fractured ribs.
			3. Blood in vomit.
			4. Wounds that have penetrated the chest or abdomen.
			5. Fractures of the pelvis.
			6. Abnormal pulse and difficult breathing.
			7. Cool, moist skin.
		4. There is little someone can do in the field to control internal bleeding. If the sports medicine professional suspects internal bleeding based on the mechanism of injury or the athlete’s signs and symptoms:
			1. **Activate EMS**
			2. **Treat for Shock**
			3. **Do not give them anything to eat or drink**
			4. **Monitor airway and breathing**
			5. **Can be life threatening**
	4. **Abdominal injuries**
		1. Abdominal injuries have a lower incidence of occurrence than the extremities, yet they can be serious
		2. **Anatomy**
			1. Abdominal cavity lies between the diaphragm and the pelvis
				1. Organs in the abdominal cavity include:

Stomach, intestinal tracts, the liver, the kidneys and the spleen

* + - * 1. Abdominal injuries are not common but are serious.
				2. The abdominal cavity is vulnerable to injury during all contact sports
		1. **Specific injuries**
			1. Ruptured spleen
				1. The spleen is located above the pancreas in the upper left quadrant
				2. Main function is to serve as a reservoir of red blood cells
				3. Injuries result from fall or direct blow to the upper left quadrant of the abdomen.
				4. Signs and symptoms include rigid abdomen, nausea, vomiting and possible signs of shock. **Kehr’s sign** can be present
				5. **Kehr’s sign** is referred pain occurring to the left shoulder and one third of the way down the left arm
				6. A ruptured spleen can cause profuse hemorrhaging into the abdominal cavity and cause death. A ruptured spleen must be surgically removed.
				7. Athletes with splenomegaly, such as athletes with mononucleosis, must not engage in jarring activities.
			2. **Appendicitis**
				1. The appendix is located in the lower right quadrant
				2. The appendix is generally not injured during athletic play, but it is important to know how to detect the early signs of appendicitis.
				3. Appendicitis is caused by a bacterial infection from fecal obstruction, parasites, lymph swelling or even a tumor.
				4. In its early stages the appendix becomes red and swollen, and then turns gangrenous and ruptures into the abdominal cavity.
				5. Signs and symptoms include

Mild to severe cramping in lower abdomen which progresses into localized right lower quadrant pain

Nausea and or vomiting

Low grade fever

* + - 1. **Hernia**
				1. Hernia refers to the protrusion of abdominal viscera through a portion of the abdominal wall.
				2. Hernias can be congenital or acquired.
				3. Acquired hernias occur when a natural weakness is further aggravated by either a strain or a direct blow.
				4. Hernias resulting from sports often occur in the groin area in males and are known as inguinal hernias and femoral hernias in women
				5. Superficial protrusion in the groin area possibly can be observed. Pain is increased by sudden movements and exacerbated by coughing or sneezing.
				6. Treatment is surgery
	1. **Shock**

|  |  |
| --- | --- |
| Definition | The failure of the cardiovascular system to keep adequate blood circulating to the vital organs of the body (such as the brain, heart, and lungs).  |
| Mechanism of Injury | Bleeding, poisoning, insect bites and stings, snakebites, electrical shock, burns, severe injuries, psychological trauma, heart attack, and other medical conditions. |
| Signs and symptoms | Nausea and vomiting.Restlessness and anxietyWeak, rapid pulseLow blood pressure (systolic pressure is usually below 90 mm Hg.)Cold, wet, clammy skinProfuse sweatingPaleness that changes to cyanosisShallow, labored, rapid, or irregular gasping respirationsDull, lusterless eyes with dilated pupilDrowsiness and sluggishnessLoss of consciousness  |
| Treatment | Activate EMS- Call 911Elevate legs 8-12 inchesMonitor temperatureDo not give anything to eat or drinkMonitor Vitals |

**Objective 4: Discuss immobilization techniques**.

1. **Splinting**
	1. Sometimes it is difficult to tell whether an injury is a fracture, dislocation, sprain, or strain. Since you cannot always be sure which of these an injured athlete may have, always care for it as a fracture. ***When in doubt, splint.***
	2. The basic principles of splinting are:
		* 1. Splint only if you can do it without causing more pain and discomfort to the victim.
			2. Splint an injury in the position you find it.
			3. Apply the splint so that it immobilizes the fractured bone as well as the joints above and below the fracture.
			4. Check the circulation distal to injury before and after splinting.
			5. If at all possible, do not move the athlete until they have been splinted.
		1. Shoulder injuries should be immobilized with a sling and swathe bandage, with the upper limb bound to the body securely.
		2. **Head, neck or back injury care**
			1. Activate EMS
			2. Do not move athlete
				1. If athlete is wearing a helmet, do not remove it
				2. Instruct athlete to stay as still as possible and instruct not to move
				3. When EMS arrives they will apply a cervical collar and transport athlete on backboard
			3. Maintain in line stabilization
				1. Place hands on both sides of victims head
				2. Hold the athletes head in –line with the spine, if severely angled hold and maintain in the position you found it
				3. Support this position until EMS personnel arrive
				4. Maintain airway and breathing

**Objective 5: Describe the treatment for medical conditions**

1. Medical Conditions

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Condition | Etiology | Signs and Symptoms | Treatment | Precautions  |
| **Seizure** | Epilepsy, head trauma, tumor, infection, fever, diabetes, poisoning | Uncontrollable convulsions, and loss of consciousness which last for variable periods of timeMay experience “aura” before occur | Protect athlete by removing any objects that could cause injuryDo hold them downDo not put anything in mouthMonitor ABC  | Activate EMS ifLonger than 5 minOccur repeatedlyAthlete is injuredUnknown causePregnancyDiabetic |
| **Fainting**  | Temporary reduction of blood flow to the brain | Partial or complete loss of consciousnessCan be preceded by:Sweating, distortion of vision, vomiting, head or abdominal pain  | Elevate legsLoosen restrictive clothing, check for injuriesDo not give anything to eat or drink | If identify signs and symptoms try to catch and lower carefully to ground. |
| **Allelrgic Reaction- anaphylactic shock** | Caused by insect stings, food other allergens | Air passages swell and restrict breathing. Rash, tightness in chest, swelling of face and tongue, dizzy, confused | Use of Epi-pen is necessary treatment | Activate EMS. Clam down and lie them down |
| **Diabetic Emergency** | Imbalance of sugar and insulin in the bloodstream | Changes of LOC Dizziness, confusion, irregular breathing, rapid weak pulse, feel/look ill | If conscious administer sugar- candy, fruit juice or soda5+ min does not get better call 911 | If unconscious do not give sugar in any form in mouth- call 911  |
| **Asthma** | Allergic reaction to food, pollen, drugs, insects or emotional stress.Exposure to cold airExercise |  Constricting of air passages caused by spasm of muscles lining the bronchiWheezing  | Medication administered via an inhaler. Medication opens airway to make breathing easier  |  |
| **Exertional Sickling** | Medical emergency occurs in athletes who carry the sickle cell trait. Red blood cells change shape or “sickle” Causes a buildup of RBC’s in small blood vessels, leading to decreased blood flow. | Cramping, muscle weakness that exceeds pain, athlete slumps to ground rather than a sudden collapse, rapid breathing | Stop activity, Check vital signs, Call 911, prepare for CPR, Administer oxygen, cool athlete down, |  |
| **Sudden Cardiac arrest** | Heart suddenly stops | Chest pain, crushing pain, pressure in the chest | Cardiac chain of survival. Early recognition, early cpr, early defibrillation, early advance medical care |  |

**Objective 6: Recognize and provide treatment for environmental conditions**

1. **Environmental Conditions**
	1. Maintaining body temperature is affected by three factors
		1. Air temperature
		2. Humidity
		3. Wind
	2. High temperatures and elevated humidity can negatively impact athletic performance, adversely affect health, and even threaten life. While environmental heat problems most often strike football players, all athletes are susceptible.
		* 1. This cooling process can be interrupted in two ways:
				1. The humidity can be so high that sweat does not evaporate
				2. The thermoregulatory system of the athlete can be disrupted, causing sweating to cease.
				3. Heat illnesses normally progress in severity, starting with heat cramps or heat exhaustion and leading to life-threatening heat stroke.
	3. Low temperatures and wind can cause cold injuries occurs in two ways.
		* 1. The core temperature is maintained, but the temperature decreases in the skin, muscles, and extremities resulting in local injuries that include frostbite.
			2. The core temperature and the temperature in the skin, muscles, and extremities both decrease and all of the body processes slow down. This condition is known as hypothermia and may be fatal if not treated

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Environmental Condition  | Etiology (Cause) | Signs and Symptoms | Treatment | Prevention |
| **Heat Cramps** | Strenuous activity in a combination of hot and humid weatherFluid imbalance | Painful spasms of skeletal musclesCalf and abdominal muscles most often effected | Slowly stretch the contracted muscle Encourage to drink liquids | Drink plenty of fluids before and during activityConditioning and acclimatizationCan lead to heat exhaustion and heat stroke |
| **Heat Exhaustion** | Strenuous activity in a combination of hot and humid weather | Profuse sweating wet, cool, and clammy skin that may appear pale or gray headache, weakness, dizziness, fatigue, nausea, alteration of consciousness | Remove from hot environmentRemove equipment and clothing as appropriateCool body with cold water Give cool fluids | If symptoms persist or worsen seek medical attention immediatelyCan lead to heat stroke |
| **Heat Stroke** | Strenuous activity in a combination of hot and humid weather | Hot, dry skin that is reddened or flushed.Headache, dizziness weakness convulsions unconsciousness The athlete will not be sweating | Place ice or cold towels around the bodySponging the body with cool waterCan immerge in cool waterDrink cool fluidsTreat for shockSeek medical Tx | Life threatening- Body’s sweating mechanism is shut off to conserve depleted fluid levels. Temperature then rises rapidly to dangerous and possibly fatal levels |
| **Frostbite** | Exposure to coldFreezing of body tissuesIce crystals and swelling damage and destroy cells | Lack of feeling in areaSkin appears white and waxy and is cold and firm to the touch | Remove from coldHandle gentlySoak in warm waterLoosely bandage areaSeek medical attention | Dress properlyCover vulnerable areasDo not Rub the affected area can damage underlying tissue |
| **Hypothermia**  | Continued exposure to cold | ShiveringNumbnessGlassy stareApathyDecrease LOCWeaknessImpaired judgment | Remove from coldMonitor and treat ABCWarm slowly using blankets, hot water bottlesWarming too quickly can cause heart arrhythmias Activate EMS | Life-threatening- Body’s warming mechanism fail to maintain normal body temperature and the entire body cools |