ICSC04 – Emergency Procedures
Section 3
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Video Lesson: 1:01:57

This is Module 3 of three modules for Emergency Procedures for the Sports Chiropractor. In Module 1, we spoke about PPE, Personal Protective Equipment, when dealing with uncertain situations, scene safety, mechanism of injury and the golden hour. Then we went right into initial assessment, developing a general impression, assessing mental status, assessing airway, assessing breathing, the use of oxygen and assessing circulation. In Module 2 we dealt with the unresponsive athlete and how you identify the warning signs of stroke. Then we covered scene safety, spinal mobilization, using the backboard, and using cervical collars. We looked at focused history and physical exam, a detailed exam, reassessing vitals, transporting the injured athlete, ongoing assessment, helmet removal, and what goes in a sideline kit bag.

This Module 3, we are covering bleeding, the conditions with possible serious bleeding, about dealing with internal bleeding, external bleeding, using a tourniquet and then we are going to touch on bleeding from the nose, the ears, and the mouth. We will discuss penetrating neck injuries, lacerations of the great vessels, move into dealing with shock, the types of shock, the progression of shock, perfusion, splinting and some general principles, applying a rigid splint, some of the hazards of improper splinting. Then finally we will cover environmental emergencies, dealing with heat related illnesses and cold related illnesses before finishing with discussing some soft tissue injuries.

Let us look at bleeding and shock. These are things when you will address first when undertaking your sideline assessment. What conditions are you going to think of when assessing for serious bleeding? Is there significant mechanism injury? We spoke about that in the first module, taking into account the poor general appearance of the patient and assessing to reveal signs of shock. We are going to look to see if there is significant amount of blood loss noted and if the blood loss is rapid or whether we cannot control any external bleeding? These are all conditions which lead to serious bleeding.

Internal bleeding may not be readily apparent. When I was doing a rodeo event, a cowboy got thrown from the bull and was stepped on. After we made sure that the scene was safe in the arena, we evaluated the injured athlete. The first thing we noticed was his abdomen was distended and swollen. If you do not know what the warning signs are, you are not going to know that a swollen abdomen is one of the primary things that indicates there is some possibility of internal bleeding. That is why it is important to understand the mechanism of injury and when on the sideline as a doctor, you should be watching and paying attention to what is going on the field of play at all times.

What are some signs of internal bleeding? Is there ecchymosis or bruising around the abdomen or the chest region? Is there a hematoma bleeding beneath the skin? Is the athlete vomiting blood? We are not going to be too worried about black, tarry stools because that is not something we are going to see when we are dealing with the athlete on the field. Is the athlete coughing up blood? Is there pain, tenderness, bruising, and guarding or swelling over the abdomen? That is the number one sign to look for the possibility of internal bleeding. Are there broken ribs? Is there bruising of the lower part of the chest or is that rigid distended abdomen? That is a very big sign for the indication of internal bleeding.

What about external bleeding? Hemorrhage means bleeding and the body cannot tolerate greater than a 20% loss of blood. In children, it is a 25% loss of blood. We must remember that there are five liters of blood in an adult body, so the loss of one liter can be dangerous. In children, the loss can be between 100 and 200 milliliters. That indicates that there is a possible serious problem. Children degenerate rapidly as opposed to adults. An adult is via a slow, steady decrease in their condition. A child, they are going to be fine. Then all of a sudden, they fall off the table, and out of nowhere, we have the rapid change in a the patient's condition.

What are some of the characteristics of bleeding? We have arterial bleeding and that is blood that is bright red and spurts out. It is bright red because it is oxygenated. It spurts out because every time the heart contracts, it is pushing the blood through the arteries. That is where we are getting that blight, red blood that spurts. Venous blood is darker red and it does not spurt. It is dark red because there is not as much oxygen in it, and it does not spurt because it is going back to the heart through the venous system. The third thing is capillary bleeding, and that is when the blood just oozes out and it is controlled very easily. That is usually you see when somebody scrapes something, and it starts to bleed.

How do we get to control external bleeding? The most important thing is following the PPE, personal protective equipment, using gloves and using a face shield if necessary. Responsive athlete is ABCs, airway, breathing, and then dealing with circulation. Make sure that the patient has an open airway and the patient is breathing adequately. If necessary, we might provide oxygen. We spoke about that in one of the earlier sessions, and there are several methods to control bleeding.

Direct pressure and elevation are the most common and effective way to control bleeding. Apply pressure with a gloved hand or finger over the site, as you see in the picture here to your right on this slide. Slightly elevate a bleeding extremity which will often stop venous bleeding. Use both direct pressure and elevation whenever possible and apply addressing. We spoke about that having four by fours or five by nines, when we looked at our first aid content and having the proper equipment on the sidelines. Wrap that dressing in a bandage as we see on the bottom picture here.

When things get serious or there is an amputation, we will look at applying a tourniquet. Fold the triangular bandage into four inches thick and wrap the bandage, using a stick as a handle to twist and secure the stick. Write TK and the time and place it was applied to the athlete. Why do you want to do that? There are different parts of the body that can go for different periods of time without a blood supply. If a limb is amputated, we have up to two hours to be able to replace that or reattach that limb and still have the possibility of that limb to function normally. That is why it is important to write TK and the time and place that you applied the tourniquet on the athlete.

Precautions when using a tourniquet. Place the tourniquet as close to the injury as possible, but never over the joint and never use narrow material. The wider and thicker the material, the better it is. Use wide padding underneath the tourniquet and never cover a tourniquet with a bandage. Once we put the tourniquet on, we do not want to take it off or loosen it. It must be done in a controlled environment and on the sidelines, it is not a controlled environment.

Let us talk about bleeding from the nose, the ears, and the mouth and some of the causes? The athlete could have a skull fracture, some sort of face injury, or some sort of sinusitis. Usually we see this early in the morning, when somebody first wakes up and the heat has been on overnight causing a mucus membranes and the nose to dry out. you get a lot of that time some sort of sinusitis, some sort of bleeding. Athlete may be bleeding from the nose due to high blood pressure or they might have some coagulation disorders or might suffer from some sort of digital trauma.

How about controlling a nose bleed? Follow the PPE precautions and in the 60’s when I was first learning, it was always have the person tilt their head backwards, however now with advancements in our methods, we know that tilting the head backwards, the blood is going to run down and into the stomach and the patient could possibly vomit. You want to help the **patient sit and lean forward** and apply direct pressure by pinching the patient's nostrils or you can put a piece of gauze underneath the patient's upper lip and gum, which will help slow down nose bleeds. You can consider putting ice over the nose, (but monitor any ice near the head) to assist to slow down the bleeding and if you can’t stop the bleeding in a relatively short period of time (up to 10 minutes) you will now consider transporting the athlete to a medical centre for assessment.

How about bleeding from the skull fractures? Do not attempt to stop the blood flow because if there is a fracture and if you put any pressure on it, you might be pushing some of the bone fragments into the grey matter of the brain, creating more issues. Instead, loosely cover the bleeding site with a sterile gauze, being careful of any cerebral spinal fluid present. In that case, we are not only going to see. what is called a battle sign, which is swelling behind the earlobe, or we might see raccoon sign which looks like person has black eyes.

How about dealing with penetrating injuries of the neck? These injuries can cause severe bleeding, the airway, the esophagus, and the spinal cord can be damaged from penetrating neck injuries. Direct pressure should control bleeding in most situations like this. Place a dressing on the neck using a roller gauze, wrap the bandage around and under the patient's opposite shoulder. Be careful not to wrap the bandage around the patient's neck and start preparing for prompt transport, as this is a situation where we might see the development of shock.

The large vessels of the body, the superior vena cava, inferior vena cava, pulmonary artery and veins and aorta are all contained in the chest. Any kind of severe chest injury, whether it is blood trauma or if an open chest wound, be careful to make sure these vessels have not been lacerated because that is the possibility of there being fatal bleeding. We might have to start with CP and give some ventilatory response support. We have covered giving supplemental oxygen, types of devices to use and how to use an oxygen container in a prior module. Anytime we suspect that any of the great vessels of the body are lacerated, consider transporting the patient immediately.

What are some of the major arteries and veins? We have the aorta, pulmonary, carotid, femoral, brachial, the radial. Dealing with the upper extremity, lower extremity, chest, veins, superior vena cava, inferior vena cava and the pulmonary vein. We must be knowledgeable and understand how to find each of these along with the signs of any laceration of these large arteries or veins.

What is the emergency care? As always, follow PPE precautions. We want to maintain an airway and we want to give O2. We want to control external bleeding and care for any internal bleeding. We want to monitor and record vital signs. Remember, the first set are called baseline signs. In an unstable athlete, we want to reassess them every five minutes. If we suspect to be no possible fractures, we may elevate the legs and help maintain the body temperature by putting blankets over and under the athlete. Once again, when we suspect serious bleeding, we want to transport these athletes to the hospital immediately that goes with the golden hour that we spoke about in earlier modules. That is the time from then there is an injury to the injured athlete is in the hospital who might have a serious life-threatening condition which gives the best chance for the athlete to survive.

We are going to move into shock. Shock is when the circulatory system is unable to deliver significant amount of blood to the organs. There are many different causes and the athlete may have an increased hard rate, increased respiration or pale or blue skin. Remember, the skin is an organ, and we are dealing with circulation. Circulation has a lot to do with blood flow to the organs. That is why we might see some pale or blue skin. It is understanding when we are dealing with a different population that children do not show decreased blood flow and decreased blood pressure until shock is severe. Remember, the adult has a slow, steady decrease. The child looks fine and then like falls off the table. Degenerates very rapidly.

Shock is defined as a state of collapse and failure of the cardiovascular system that leads inadequate circulation. Without adequate circulation and blood flow, cells cannot get rid of metabolic waste and they die. Now, there are different types of shock. There is cardiogenic shock, there is neurogenic shock, there is hypervolemic shock, there is hemorrhagic shock, there is septic shock, psychogenic shock, anaphylactic shock, diabetic shock, respiratory shock, and metabolic shock. Let us talk about the each individual types, but first, we need to know the progression of shock.

The first is compensated shock. That is the body senses the decrease of perfusion. Perfusion is oxygenated blood going throughout the body and attempts to compensate for it. The body knows there is something wrong and tries to take care of it itself. How many times have you heard about that?

The next stage, which is the most important stage, is decompensated shock. This is the point when the body can no longer compensate for the lack of perfusion. This is when we see a range of conditions like the blood pressures, the pulse, the mental status changing. These are the things that we must be more aware of because if the conditions progress further, the person will go into irreversible shock. That is when the body has lost the battle to maintain perfusion to the organ system which is certain death, no matter what you do to assist the athlete, they are going to die. That is why we work fast to avoid the conditions progress to irreversible shock and important to understand the warning signs and symptoms for decompensated shock so you can act quickly.

When do we expect shock? Well, if there are multiple severe fractures. Any abdominal chest injuries, or spinal injuries, is why we are being careful and paying attention to what is happening on the field and the seeing the mechanism of injury. There are also times when shock can occur from severe infections from a major heart attack, Anaphylaxis, or a reaction to something that is happening around us, or some form of medical emergency. What are some of the signs and symptoms of compensated shock? The patient will become agitated, anxious, restless or a feeling of impending doom “as if they are going to die”. That is what they are talking about when someone is feeling of impending doom. When they feel like that the athletes mental status alters.

We spoke earlier about the Oedipus Scale and changing mental status? Is the athlete alert that he respond to verbal stimuli? Did they respond to painful stimuli or are they unresponsive? This is the changing or the altering of the mental status of the athlete and you most likely find a weak pulse because we are dealing with the circulatory system. The skin may be clammy or pale and there might be shallow or rapid breathing, shortness of breath, feeling of nauseous or vomiting, and/or delay in capillary refill. Capillary refill is by depressing the fingernail. It should go from pink blanche to a white. Once we take our finger off in less than two seconds, it should be pink again. If we are finding that it is not returning in less than two seconds, this is an indication of the possibility of shock. The athlete might complain of marked thirst, but there might be servel different reasons why the athlete may be thirsty.

What are the signs and symptoms of decompensated shock, falling blood pressure? Take those baseline vitals and if you have an unstable athlete, every five minutes recheck those basic vitals. One of the things you will notice is falling blood pressure. Is the patient having laboured or irregular breathing? Is the skin cyanotic? Remember, the skin is an organ, is there a thready or absent pulse? Do the eyes look dull, or the pupils dilated? We are probably not going to find much with poor urinary output because we are dealing with the athlete on the sidelines, because we want to make sure the athlete does not progress to irreversible shock. This is the terminal stage of shock. Even the transfusion of any type will not be enough to save the patient's life. We are trying to prevent the patient from getting into irreversible shock.

What is some of the emergency medical care? Make sure that there is an airway, it is open and keep the patient supine. Once the patient is in the supine position, that is when we can start all our interventions. Control external bleeding and splint any broken bones or joint injuries. We always want to provide oxygen, remembering that shock is dealing with the cardiovascular system. We are not getting enough oxygenated blood throughout the system so we can provide them with high flow O2. As you see in this patient to the right has a non-rebreather mask.

We are going to set the oxygen regulator at 10 to 15 liters when we are using a non-rebreather mask, remembering how important it is to understand what the numbers are and the different settings.

Place a blanket over and under the athlete to keep them warm. If there are no broken bones, we can elevate the legs six inches to 12 inches. This will assist to regulate the blood throughout the body within the internal organs to keep them nourished. Because remember, shock is when we are not getting enough blood to the internal organs. Do not give the patients anything by mouth because if there is a serious problem and surgical intervention in the hospital is required, we want to make sure that their stomach is empty.

One of the different types of shock include, cardiogenic shock. This is when the heart lacks the power to force the blood through the circulatory system. Onset may be immediately or not apparent for a period of time, but the heart lacks the power to force the blood through the circulatory system. How do we treat cardiogenic shock? The patient may breathe better in a sitting or semi sitting position. Administer high flow oxygen and assess the patient with ventilations. Give one rescue breath every five seconds in an adult. Have the suction nearby in the case the patient vomits. If we are bringing equipment on the sideline in our kit bag, we must be able to use all the equipment that we bring. If you have a suction device and you do not know how to use it and you brought it along, that is when you can get yourself into trouble. The suction devices are usually better suited for the ambulance where they have power driven suction devices. Anytime we are going to think of any cardiogenic shock, we want to transport the patient immediately.

How about cardiovascular causes of shock? Will you also have what is called pump failure? That is inadequate function of the heart. It is not that it is not strong enough to pump, it is just inadequate function. It is not operating the right way. This causes a backup of blood into the lungs resulting in pulmonary edema, which leads to impaired ventilation where the patient is not getting enough oxygenated blood throughout the body, which will create shock. We could have poor vessel function which happens when there is damage to the cervical spine that may affect and control the size and the muscular tone of the blood vessels. What happens? The vascular system increases and the blood in the body cannot fill the enlarged space, so we get neurogenic shock. A cervical spine injury causes damage to the nerves, which causes the bodies to vascular system to increase, again, neurogenic shock. We are chiropractors. We deal with the spine all the time. This should be something very easy for us to handle. We are used to having our hands on cervical spines on a regular basis.

Next is hypovolemic shock or content failure that results from rapid blood loss. The blood loss could be external or internal. That is why we must be aware of what the signs are of internal bleeding. The number one sign is that hard, distended, bruised abdomen. Severe thermal burns can cause plasma loss. Plasma loss is the loss of fluid. It is not necessarily something we are going to see unless you are dealing with sports like motocross or NASCAR. When there is some sort of crash and there is a fire, you might be concerned about there being some sort of type of burns, fluid loss, and some form of hypovolemic shock. Remember that dehydration aggravates shock. Please make sure that the athletes are hydrated, especially in the hot humid weather.

We could also have combined vessel and content failure, multiple types of things causing shock. Some patients with severe bacterial infections or toxins or infected tissue can contract septic shock, which will not be something you would usually see on the sidelines. Toxins may also damage the blood vessel walls, causing leaking and imperative ability for them to contract, resulting in some form of shock. Shock leads to dilation of the vessels and loss of plasma, causing hypovolemic shock.

How do we treat hypovolemic shock? Start with controling the obvious bleeding, and splint any bones or joint injuries. If we see no fractures, raise the legs six to 12 inches, keeping all the blood nourishing, the vital organs. Secure the airway and maintain the airway as that is when we might have to use a nasopharyngeal or oropharyngeal airway.R emember we would want to give oxygen as soon as we suspect any form of shock, to get oxygenated blood or perfusion throughout the body as quickly as possible. Anytime we suspect shock, we want to transport the athlete quickly.

What are some instances of non-cardiovascular shock? Respiratory insufficiency. The patient may have a severe chest injury or airway obstruction and may be unable to breathe adequate amounts of oxygen. Insufficient oxygen in the body is going to produce shock. It is the failure of the cardiovascular or the inability for oxygenated blood throughout the body. We also may have anaphylactic shock. This occurs when a person reacts violently to a substance. There are normally four categories, injections, stings, ingestion, inhalation. More so than not, we will find this on the sidelines if an athlete gets stung by a bee or some type of insect, which is normally the type of anaphylactic shock you will see on a sideline.

This is part of your first aid training, however anytime an athlete has a server reaction causing anaphylactic shock, they usually carry an EpiPen with them. Help the athlete administer EpiPen, epinephrine immediately. Call emergency services immediately, to organise prompt transport and give them oxygen and be ready to assist their ventilations whilst you wait for assistance to arrive. Remember, anytime an EpiPen is used, the athlete must be transported to the hospital.

We might have psychogenic shock that is caused by a sudden reaction of the nervous system that produces a temporary generalised vascular dilation. This is commonly referred to as fainting or syncope, and it can be brought on by several causes from fear or bad news to unpleasant sites. You have a young baseball athlete, has not really played much. A ball is hit to them in the outfield and they have a feeling of fear, "I am going to drop the ball." They have this vasodilation and pass out, psychogenic shock. We are treating psychogenic shock. It is usually self-resolving. Once you have assessed the patient from injuries which may have been caused by passing out and falling, if the patient has difficulties after regaining consciousness, we must assess for other conditions.

We are going to hit neurogenic shock, which is damaged to the cervical spine, which causes widespread blood vessel dilation. Circulatory failure is caused by paralysis of nerves that control the size of the blood vessels. These are one of the things that they did not think sports chiropractors are capable of handling, a cervical spine injury, however we touch more spines in a day than most physicians touch probably a month or a year.

Let’s explore how do we treat neurogenic shock? Maintain the airway, assess breathing, assist ventilations which we talked about artificial ventilations. We want to maintain body temperature, keeping them warm, and getting them ready to transport promptly. In this image we see there is damage to cervical spine and the vessels are dilated, the normal vessel versus the dilated vessel at a circumference of the dilated vessel is so much larger. Same amount of blood flow just in a larger space which is a concern.

Let us move on to splinting and types of splints? There are flexible or rigid device used to protect the extremity. Unless the patient has injuries which are critical, injuries should be splinted prior to moving the patient as it helps prevent further injury. When we have the possibility of needing a splint, improvised splinting materials whenever needed. Take a branch off a tree, a piece of wood from the bench, anything you can find to make a rigid device to support a fractured limb. The principles are remove the clothing from the affected area so you can expose the injured limb. Note and record the patient's neurovascular status. The importance of neurovascular status lets us know whether or not there is a proper blood and nerve supply below the site of the injury.

In case there is an open wound, say an example of a compound fracture, we want to cover all wounds with a dry sterile dressing. This way it is going to prevent the possibility of infection. Do not move the patient before splinting unless we think the situation is critical. Immobilise a joint above and below the injured joint and pad all rigid splints. Maintain manual immobilisation by using a constant general manual traction if needed. Find resistance to the limb alignment when you are trying to manually immobilise it, splint the limb as is in the deform position.

Immobilise all suspected spinal injuries in the inline neutral position. If the patient has signs of shock, align the limb in the normal anatomical position, and transport them. At any time we have any signs of shock, we always transport the patient and when in doubt splint.

What do we see here? They are using gloves on their hands, we see one of the medical personnel providing gentle support inline traction of the limb. The other EMT places a rigid split alongside or underneath the injured limb. The padded side goes against the body, place the padding between the limb and the splint as needed. Secure the splint to the limb with bindings. All those are cravats or strips of cloth. Never put the binding directly over the injury site. As we secure the splint, recess and assess and record the distal neurovascular function which will tell us about the blood and nerve supply below the site of the injury.

Here we see them working on an upper extremity as we see on the top picture manual inline support. A lot of times, in the upper extremity, when the forearm is fractured, it is usually both the radius and the ulna. You notice in the middle picture we are seeing that they are placing a roller bandage in the hand. That is called position of function. This way, if the hand is cupped like that, if for some reason there is a permanent damage and the patient loses use of their hand, if the hand is cupped like that, they could still use a fork or hold some sort of drinking cup in their hand. If the hand was left flat and they cannot use the hand anymore, they would not be able to use a fork or a spoon or a cup.

What are some of the hazards of improper splinting? It could be compression of the nerves and tissues and blood vessels. Correct or check for neurovascular function. Improper splinting can cause a delay in transport of a patient with a potential life-threatening condition. Improper splinting can reduce distal circulation which support the rationale for checking neurovascular function. It could also aggravate the injury, or it can cause further injury to the tissues, the nerves, the blood vessels, or the muscles.

Let us move on to environmental emergencies and this is mostly heat related illnesses. Heat illnesses is a common problem in the hot human weather. It is poor adjustment to hot weather and dehydration. All heat-related illnesses are preventable, however we need adequate time to adjust to the heat. Athletes need to have adequate liquid intake, stay hydrated, have a normal dietary intake, and eating a normal diet. The first cause of a heat-related illness is referred to as heat cramps. This is an inadequate adjustment to the hot weather and generally not life-threatening. This is when you are going from a cold environment into a hot human environment and you are not giving the body enough time to adjust to the weather condition. We are normally going to find that muscles in the arms and the legs go into spasm. The athlete has a lot of heavy sweating. What is the treatment? In this case, it is increasing our fluids. We can massage or stretch the cramped muscles and rest the athlete in a cool environment and apply ice to the injured area.

How do we prevent heat cramps? Maintain adequate fluid intake. That means 30 minutes before the exercise, consuming at least 16 ounces of fluid, drinking four ounces of fluid every 15 minutes during exercise. After exercise, all weight is usually water weight. After we exercise, we should be drinking 16 ounces of fluid for every pound of body weight that is lost. 16 ounces of water weighs about a pound. Increased fitness will help people prevent heat-related illnesses or heat cramps. The wearing of light color or lightweight clothing. For the young athletes, avoid alcohol, caffeine, coffees, high energy drinks, and sodas. A lot of athletes are drinking energy drinks that are filled with caffeine.so be sure to keep the athletes hydrated with a balance of water.

The next stage is heat exhaustion. This is long exposure to the hot, humid weather, caused by been in the hot environment for long periods of time. Generally not life-threatening, however symptoms we are going to find here ate the skin is going to be cool, pale, and moist. The athlete might complain of headache, dizziness, or poor coordination. The athlete will be sweating profusely. What do we do for this? In this case, we are going to stop the activity and get the athlete to rest in a cool place. If the

patient is conscious, give them some water and put cool compresses in the groin under the armpits and at the base of the neck.

The athlete must be referred to the medical doctor if they do not recover quickly. How do we prevent heat exhaustion? Just like anything else for heat-related illnesses, maintain adequate fluid intake, 30, 40 exercise, drink 16 ounces of fluid, four ounces of fluid every 15 minutes during the exercise or the competition, replacing lost fluids from the last time they exercise. Make sure they have appropriate fitness, allow time for rest and cool down, wear light clothing and avoid the alcohol, the caffeine, the coffees, and the soda.

Heat stroke is when the body's temperature control system shuts down. This is a true medical emergency so you need to act quickly. What are the symptoms? Hot, dry, red skin, a rapid pulse. The major sign, no heavy sweating. You notice in the other two, heat stroke, no heat cramps. In heat exhaustion, there is heavy sweating. In heat stroke, there is no sweating at all. That is the big red flag. The athlete might be confused, or dizzy. There might be some chains in the athlete's altered mental status. A treatment for this is immediately cooling the athlete. Put them in a tub of ice in a cool room. Ice packs underneath the armpits in the groin at the base of the neck. This is a true medical emergency. The athlete must be transported to the hospital immediately. Be alert and monitor for the athlete breathing, and be ready to assist with artificial ventilations, or other hard compromise, or CPR.

How do we prevent this? The same as we did for the other injuries. Adequate fluid intake, drinking fluids 30 minutes before the exercise, four ounces of fluid every 15 minutes during the exercise, restoring of loss fluids from the last time they exercised, making sure they have the appropriate fitness. Make sure we allow them time to rest and cool down in between sporting events, the wearing of light, color, and lightweight clothing. Remember, avoid the alcohol, the caffeins, the sodas, the coffees. Now, we dealt with heat related injuries.

Cold-related injuries and trying to prevent hypothermia. Normal body temperature is around 98.6 F (37 C). Hypothermia is when the internal body temperature falls below 95 F (35 C).

This is usually because of prolonged exposure to cold and freezing temperatures. The temperature does not need to be below zero. There are different ways of losing body heat because heat is going to travel from the warm body to the cold air.

What are some of the ways we are going to lose heat? We can lose it by conduction. That is the direct transfer of heat from the body to a cold object, like when the warm hand touches the cold metal bench or convection when heat is transferred to the circulating air. Standing outside in the windy weather in lightweight clothing. Evaporation, it is the conversion of a liquid to a gas that requires heat, like when you sweat. It is like when you come out of a swimming pool, and you have that sensation of cold as the water evaporates from you. Radiation, loss of body heat directly to a cold environment, just standing in a cold room or standing outside in the cold weather. Respiration, remember, the body loses heat as the warm air and the lungs has exhaled. Remember when we were kids, we act like we were smoking cigarettes, but blowing out the smoke when we breathe in the cold weather? That is an example of how we are going to lose heat from the body.

Some of the signs and symptoms of hypothermia are when the body internal core temperature is dropping. We are going to look for blue lips and fingernails, as the athlete is shivering because the active movement of muscle is going to create heat to help compensate for the hypothermia. The body functions begin to slow down, poor coordination might have some memory loss, loss of sensation to touch. How do we prevent hypothermia? We want to prevent further heat loss by removing the athlete from the cold environment, remove the wet clothing and wrap them in a dry blanket.

Put heat packs in the groin, the base of the neck, and the armpits. Do not massage the arms and the legs, which is different. When we had a heat cramp, we talked about massaging the muscle that was in spasm. When there is a cold related illness, we do not want to massage the arms or the legs, but give them some food or warm drink.

Frostnip is the long exposure to cold and in this instances, we might have some freezing of the skin. The deep tissue is unaffected, and this is usually not painful. The next involved is what they refer to as trench foot which is prolonged exposure to cold water. This can occur when the athlete sitting on the sidelines, during an event where it is raining, waiting to talk the field. Their feet are in the puddles on the sidelines underneath the bench causing prolonged exposure to the cold water. They refer to it as trench foot because during World War I, when there was a lot of trench fighting. It was so cold, and the soldiers were in the trenches for prolonged periods of time, they were getting cold-related illnesses, especially to their lower extremities. That is why it is referred to as trench foot.

Frostbite is the most serious of the cold injuries because the tissues are frozen. Emergency care for frostbite, remove the athlete from the cold environment, handle the injured part gently. Preventing further injury, we want to remove wet clothing. We rub the injured extremity or break blisters or rewarm frost biting areas. All of that must be done under a controlled environment as most cold injuries are confined. The exposed parts, the feet, ears, nose, and/or face. Most heat loss comes from the head and the neck, which is why it is important for them to wear a hat. Once they are off the field in the cold weather, make sure they keep their warmup team clothing on, to keep the body core temperature warm.

Soft tissue injuries, looking at closed injuries, soft tissue damage beneath the skin. Open injuries are breaks in the surface of the skin and burns our soft tissues receive more energy than they can absorb. All instances when we find soft tissue injuries. One of the ones is called the contusion. That results from a blunt force striking the body. Here is an example of a contusion. A hematoma, which we spoke about is a pooling of blood that collects in the body. We want to be careful to watch for compartment syndrome. The fascia is very avascular, not a lot of blood supplying in there. When there is a lot of bleeding underneath the skin, it could very well cause a lot of compression to the fascia, which can affect the muscles and the veins and the arteries inside the skin and the body. An abrasion that is caused by friction. Good example of that is road rash. Somebody falls off the bicycle, you are doing a triathlon event, or you are doing a bicycle race.

Next, a laceration. Here is an example of an athlete who was riding on a bicycle and the chain broke. We are seeing either smooth or jagged cuts to the extremity. An avulsion is a separation of various layers of the skin. Penetrating wounds results from a sharp pointed object. Just like a track and field event where an athlete gets stepped on by a cleat or in football or soccer where you will have some form of penetrating injury. Ice, compression and elevation ahead the heart will assist in slowing down the bleeding and reduce the swelling. Splinting decreases bleeding and reduces pain. RICER, rest, ice, compression, elevation, referral. There are some concerns about whether this technique is outdated, however it is still used in emergency situation. This is sideline management, so we want to have the ice, compression, and evaluation, then splinting where required.

Impaled objects do not attempt to remove or move an impaled object. Control the bleeding and stabilise the object in place. Transfer the patient to the hospital carefully. How about amputations? Mobilise a partial amputation with a bulky dressing and a splint, being careful to wrap a complete amputation using a dry sterile dressing and place the amputation limb in a plastic bag, and send with the athlete to the hospital. Place the bag in a container filled with room-temperature water. We want to transport the severed part with the patient to the hospital. The function of bandaging and dressing and remember, to control bleeding. It protects the wound, and it prevents contamination. We want to use sterile dressings to cover the wounds and use a bandage to keep the dressing in place next.

At times we are in situations on the field when emergency procedures are needed. It is important to be familiar with how to handle these situations and be able to assist in a multi-disciplinary setting if there is more than one healthcare provider there.

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