

Environmental Illness Management Millbury Memorial Jr/Sr High School

DEHYDRATION

Dehydration is an excessive loss of fluids in an athlete. Athletes should begin exercise sessions properly hydrated and should have convenient access to fluids throughout practice. They should be allowed to hydrate in addition to prescribed breaks. Dehydration is intensified with increase in humidity and/or ambient temperature. **DEHYDRATION CAN OCCUR IN BOTH HOT AND COLD ENVIRONMENTS!**

Signs and symptoms

Dry mouth, thirst, irritability, general discomfort, headache, apathy, weakness, dizziness, cramps, chills, vomiting, nausea, head or neck heat sensations, excessive fatigue and decreased performance.

Treatment

Dehydrated athletes should move to a cool environment and rehydrate.

Place a cold wet towel or ice pack on the back of the neck, head, wrists and/or groin area.

Return-to-Play Considerations

If the degree of dehydration is minor and the athlete is symptom free, continued participation is acceptable. The athlete must maintain hydration status and should receive periodic checks from onsite medical personnel.

HEAT EXHAUSTION

Heat exhaustion is the inability to effectively exercise in the heat, secondary to a combination of factors (cardiovascular insufficiency, hypotension, energy depletion and central fatigue). This condition is manifested by an elevated core body temperature and is often associated with heavy sweating and dehydration. Heat exhaustion most often affects heat-unacclimatized or dehydrated individuals.

Signs and symptoms

Heat exhaustion may be present if the athlete demonstrates excessive fatigue, faints, or collapses with minor cognitive changes (eg, headache, dizziness, confusion) while performing physical activity. Other signs and symptoms may include fatigue, weakness, dizziness, headache, vomiting, nausea, lightheadedness, low blood pressure, and impaired muscle coordination.

Treatment

Immediate removal of excess equipment and moved to a cool or shaded area. Use cool cloths or ice packs at pulse points to help cool the body. Monitor vital signs and place the athlete in a supine position with legs elevated to increase venous return.

If recovery is not rapid (within 30 minutes of treatment initiation) or condition worsens, EMS should be activated for proper fluid replacement and further treatment.

Return-to-Play Considerations

If the degree of heat exhaustion was minor and the athlete is symptom free, participation can resume the following day. The athlete must maintain hydration status and should receive periodic checks from onsite medical personnel. Physician clearance is necessary before returning to exercise if EMS was activated.

EXERTIONAL HEAT STROKE

Exertional heat stroke is a severe illness characterized by central nervous system (CNS) abnormalities and potentially tissue damage resulting from elevated body temperatures induced by strenuous physical exercise and increased environmental heat stress.

Signs and symptoms

CNS dysfunction (altered consciousness, coma, convulsions, disorientation, irrational behavior, decreased mental acuity, irritability, emotional instability, confusion, hysteria, apathy), hyperthermic immediately post-incident, nausea, vomiting, diarrhea, headache, dizziness, weakness, hot and wet or dry skin, increased heart rate, decreased blood pressure, increased respiratory rate, dehydration and combativeness.

Treatment

Aggressive and immediate whole-body cooling is the key to optimizing treatment. If untreated, hyperthermia-induced physiological changes resulting in fatal consequences may occur within vital organ systems. Provided that adequate emergency medical care is available onsite (i.e., ATC, EMT or physician), it is recommended to cool first via cold water immersion, then transport second. Cease aggressive cooling when core temperature reaches approximately 101°-102°F (38.3°-38.9°C).

Monitor airway, breathing, circulation, core temperature, and CNS status (cognitive, convulsions, orientation, consciousness, etc.) at all times. If complications develop that would be considered life threatening (i.e., airway, breathing, circulation), immediate transport to the nearest medical facility is essential.

Return-to-Play Considerations

Physician clearance is necessary before returning to exercise. The athlete should avoid all exercise until completely asymptomatic and all laboratory tests are normal. The athlete should avoid exercise for the minimum of 1 week after release from medical care. The athlete should cautiously begin a gradual return to physical activity to regain peak fitness and acclimatization under the supervision of an ATC or other qualified healthcare professional.

EXERTIONAL HYPONATREMIA

Factors contributing to onset of exertional hyponatremia are when an athlete consumes more fluids (especially water) than necessary, and/or when sodium lost in sweat is not adequately replaced. The risk of acquiring hyponatremia can be substantially reduced if fluid consumption during activity does not exceed fluid losses and sodium is adequately replaced. If the condition progresses, CNS changes (e.g., altered consciousness, confusion, coma, convulsions, altered cognitive functioning) and respiratory changes resulting from cerebral and/or pulmonary edema.

Signs and Symptoms

Low blood sodium levels, likelihood of excessive fluid consumption before, during and/or after exercise (weight gain during activity), low sodium intake, increasing headache, nausea, vomiting, swelling of extremities (hands and feet), irregular diet (e.g., inadequate sodium intake), during prolonged activity (often lasting >4 hours), mood changes, absence of severe hyperthermia (most commonly <104°F/40°C)

Treatment

If blood sodium levels cannot be determined onsite, hold off on rehydrating the athlete (may worsen condition) and transport immediately to a medical facility. The delivery of sodium, certain diuretics or intravenous solutions may be necessary. All will be monitored in the emergency department to ensure no complications develop.

Return-to-Play Considerations

Physician clearance is strongly recommended in all cases. In mild cases, activity can resume a few days after completing an educational session on establishing an individual specific hydration protocol. This will ensure the proper amount and type of beverages and meals are consumed before, during and after physical activity.

HYPOTHERMIA

Hypothermia is defined as a decrease in core body temperature and is classified as mild (95-98.6°F), moderate (90-94°F), or severe (below 90°F), depending upon the measured core temperature. Each level of hypothermia has characteristic signs and symptoms. Hypothermia is most likely to occur with prolonged exposure to cold, wet, or windy conditions (or a combination of these).

Signs and symptoms

Mild: Vigorous shivering, cold extremities, fine motor skill impairment, lethargy, apathy, runny nose

Moderate: slow breathing and heart rates, bluish tint to skin (lips), cessation of shivering, impaired mental function, slurred speech, impaired gross motor control, decreased blood pressure, potential loss of consciousness, muscle rigidity

Severe: Rigidity, slow heart rate, slow breathing, comatose, risk of cardiac event

Treatment

Mild: Remove wet or damp clothing and remove from the cold conditions, if possible. Start rewarming the athlete with blankets and/or dry clothing. If heat is applied to the athlete, start by providing heat to the trunk and not the extremities. Provide warm fluids and foods containing 6-8% carbs. DO NOT apply friction massage to tissues in case frostbite is present.

Moderate/Severe: Same as above and activate EMS. Continually monitor vital signs and be prepared for emergency care.

Return-to-Play Considerations

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FROSTBITE AND FROSTNIP

Frostbite is freezing of body tissues. It is a localized response to a cold, dry environment, yet moisture from sweating may exacerbate frostbite due to increased tissue cooling. Similar to hypothermia, frostbite has stages, delineated by the depth of tissue freezing and resulting in frostnip, mild frostbite or severe frostbite. Frostbite develops as a function of the body's protective mechanisms to maintain core body temperature. Warm blood is shunted from cold peripheral tissues (extremities) to the core resulting in decreased temperature and subsequent freezing.

Frostnip, the mildest form of cold injury to the skin, is a precursor to frostbite. It can occur with exposure of the skin to very cold temperatures, often in combination with windy conditions. It can also occur from skin contact with cold surfaces. With frostnip, only the superficial skin is frozen, leaving the tissues not permanently damaged, but more sensitive and at risk for future damage.

Signs and symptoms

Located in extremities (fingers, toes, ears, nose), skin can look swollen, red or gray appearance, stiffness and transient tingling or burning. Deep frostbite will appear the same but the skin will feel hard and does not rebound. The affected area may also become numb.

Treatment

Begin by ruling out the presence of hypothermia by evaluating signs and symptoms and measuring core temperature. Rewarming should only occur if there is no likelihood of refreezing and should be performed slowly. Avoid hot water immersion and friction massage. Move the athlete to a warm area and rewarm with warm towels or blankets and place the affected tissue against another person's warm skin. The affected tissue can also be immersed in WARM water for 15-30 minutes. Remove when thawing is complete (tissue is pliable and color and sensation has returned). Activate EMS while continually monitoring vital signs and protecting the affected tissues from refreezing.

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CHILBLAIN AND TRENCH FOOT

Chilblain is an injury associated with extended exposure (1-5 hours) to cold, wet conditions. Chilblain is an exaggerated or uncharacteristic inflammatory response to cold exposure, resulting in hypoxemia and vessel wall inflammation. It can occur with or without freezing of the tissue, however. The hands and feet are most commonly affected, but has been reported to occur in the thighs as well. Chilblain severity is time and temperature related, so the higher the temperature of the water, the longer the duration of exposure required to develop chilblain.

Trench foot (or immersion foot) typically occurs with prolonged exposure (12 hours to 4 days) to cold, wet conditions, usually in temperatures ranging from 32-65°F. This condition affects primarily the soft tissues, including nerves and blood vessels, due to an inflammatory response that results in high levels of extracellular fluid. The most common mechanism for developing trench foot is the continued wearing of wet socks or footwear (or both).

Signs and symptoms

Exposure to cold, wet conditions for more than 60 minutes at temperatures less than 50°F.

Presence of small papules, with edema, tenderness, itching, and pain.

Exposure to cold, wet conditions for at least 12 hours with burning, tingling, or itching, loss of sensation, cyanotic or blotchy skin, swelling, pain or sensitivity, blisters and skin fissures or maceration.

Treatment

Remove wet or restrictive clothing or footwear, wash and dry the area, elevate the area, and cover with warm, loose, dry clothing or blankets. Do not disturb blisters, apply friction massage, apply creams or lotions, use high levels of heat, or allow weight bearing on affected areas. Continually monitor the affected area for return of circulation and sensation. Extremities can be placed in warm water.

Prevention can be done by encouraging athletes to maintain a dry environment within the footwear, which includes frequent changes of socks or footwear (or both), the use of moisture-wicking sock material, controlling excessive foot perspiration, and allowing the feet to dry if wearing footwear that does not allow moisture evaporation.

Return-to-Play Considerations

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