

## Sports Medicine Program

# Heat-related Illness in Young Athletes

Heat-related illness is responsible for thousands of Emergency Department visits annually by young athletes. The severity of heat injury ranges from mild heat cramps to heat stroke and death. In fact, heat stroke is the third most common cause of exercise-related death in U.S. high school athletes.

Because most of the contributing risk factors to heat-related illness are modifiable, heat-related illness is preventable. Some basic knowledge about thermoregulation, the human response to heat stress and how to recognize early signs of heat-related illness can significantly reduce the risk of an exercising youth suffering a heat-related illness.

### HEAT AFFECTS CHILDREN DIFFERENTLY

#### Are children and adolescents at an increased risk of heat-related illness?

In a recent policy statement about heat-related illness in exercising children and adolescents, the American Academy of Pediatrics (AAP) challenged the previous notion that young athletes are at an increased risk of suffering a heat-related illness due to differences in thermoregulation when compared to adults. According to the AAP, children and adolescents are not physiologically at a higher risk than similarly fit and acclimated adults with similar hydration status. In other words, children and adolescents are not at any higher risk of suffering a heat-related illness just because they are young.

However, the setting or circumstances in which children and adolescents exercise in hot environments may put them at an increased risk of suffering a heat-related illness compared to adults. Situations in which children and adolescents are at an increased risk include:

- School-age children and adolescents are often working out or exercising under the supervision of an adult, coach or official who determines when to take water breaks.
- Children and adolescents may be less willing to notify a coach when they are in the early stages of a heat-related illness for fear of appearing weak or out of shape.
- Adults or coaches may not recognize the early signs of a heat-related illness due to the large number of children or adolescents on the field at once (e.g., football, track, band).

- Children and adolescents tend to rely on thirst to determine when they should drink. The thirst mechanism kicks in when the body is 1 percent to 2 percent dehydrated.
- Children and adolescents may participate in all-day activities, such as tournaments involving repeated bouts of exercise, often with inadequate recovery time between bouts to rest and rehydrate.
- Because children are closer to the ground than adults, they more readily absorb radiant heat from the ground and pavement, thus raising their body temperature faster.
- Children and adolescents new to the South or out of shape should exercise for shortened, less-intense sessions three to four times a week for two weeks to allow their bodies to acclimate.

### Hydration tips for young athletes

Thirst is a poor indicator of hydration status. When children and adolescents begin to feel thirsty, they may already be 1 percent to 2 percent dehydrated.

- Prehydrate 30 minutes before activity. Children and adolescents should drink until they are no longer thirsty plus another 8 ounces.
- Hydrate during activity:
  - Drink 5 ounces every 20 minutes of activity for children and adolescents weighing less than 90 pounds.
  - Drink 8 ounces every 20 minutes of activity for children and adolescents weighing more than 90 pounds.
  - Encourage children and adolescents to drink water during activity instead of pouring it on their heads or faces.

Water is best if the activity lasts less than one hour. For activities lasting more than an hour, a fluid with carbohydrates (sugar) and electrolytes is best. Gatorade and Powerade were designed specifically for rehydration during exercise and contain the right amount of carbohydrates (about 6 percent to 8 percent).

Children younger than age 10 may dilute a sports drink—one part sports drink to one part water—for a better taste. Drinks, such as fruit juice and soda, contain too much sugar and can cause cramping. Avoid carbonated and caffeinated beverages because the carbonation can cause bloating and the caffeine can speed up metabolism, generating more heat.

## Tips for exercising in the heat

- Schedule workouts during the cooler times of the day.
- Allow children and adolescents who are overweight, out of shape or unacclimated time to adjust to the heat.
- Schedule water and rest breaks every 30 minutes during activities. During these breaks, do not just encourage, but require children and adolescents to drink. This also gives the coach or trainer a chance to monitor the athletes.
- Have shade, ice and a kiddie pool available for emergency treatment and rapid cooling.
- Have a cell phone (with a charged battery) available at all workouts for emergency contact.
- Wear sunscreen with a sun protection factor (SPF) of at least 15. Apply it 30 minutes before going out in the sun and every 20 to 30 minutes if sweating or swimming.
- Wear hats with brims and light-colored, breathable clothing.
- Youth sports rules can be modified to increase the safety of athletes. For example, soccer games can be divided into quarters rather than halves to allow for more rest breaks, hydration and monitoring. Referees can call an official time out for hydration periodically during the game.

## Be aware of the heat index

Humidity plays a major role in athletes' heat response. Know the heat index, which is a measure of the environmental temperature and humidity. This can be measured at the field or obtained from your local weather service or the Internet. When the temperature is 90°F and the humidity is 80 percent, the heat index is 115°F, which places athletes at risk of suffering a heat-related injury.

## ACTIVITY GUIDELINES (see chart to the right)

Add 5°F to the temperature between 10 a.m. and 4 p.m. from mid-May to mid-September during sunny days.

- Children and adolescents should receive a five- to 10-minute rest and fluid break every 25 to 30 minutes of activity.
- Children and adolescents should receive a five- to 10-minute rest and fluid break every 20 to 25 minutes of activity. Children should be in shorts and T-shirts (with helmet and shoulder pads only, not full equipment, if worn for activity).
- Children and adolescents should receive a five- to 10-minute rest and fluid break every 15 to 20 minutes of activity. Children should be in shorts and T-shirts only (with all protective equipment removed, if worn for activity).
- Cancel or postpone all outdoor practices and games. Practice may be held in an air-conditioned space.

## EARLY SIGNS OF HEAT-RELATED ILLNESS

### Dehydration and heat cramp

Thirst, fatigue, dizziness, light-headedness, muscle cramps and loss of energy may be signs of dehydration. Athletes should stop and drink water or a sports drink. Muscle cramps can be stretched and lightly massaged. Resume activity with caution only when all symptoms have cleared.

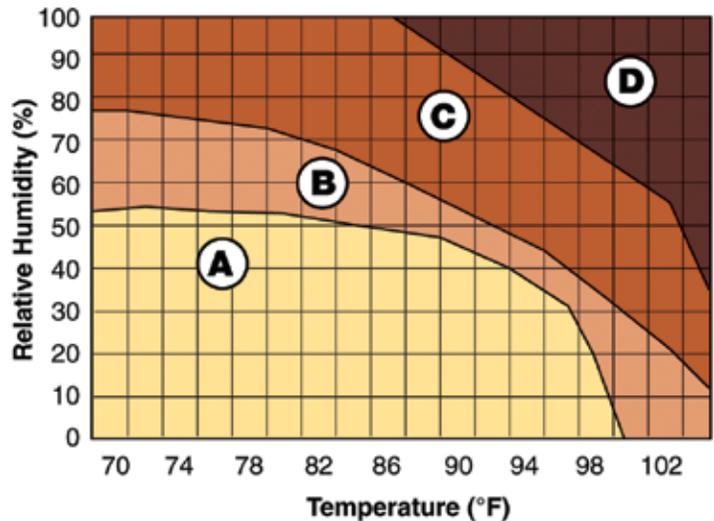
## Heat exhaustion

Dizziness, rapid pulse, headaches, nausea, vomiting, chills and loss of coordination may be signs of heat exhaustion. The athlete may be sweating profusely or the skin may be dry. Activity should be discontinued and the athlete should be rehydrated. If his level of consciousness does not allow oral hydration, transport him to a medical facility for intravenous hydration. Core body temperature should be measured. If this is not available, transport him to a medical facility for hydration and monitoring.

## Heat stroke

Call 911 immediately. Confusion, irrational behavior, drowsiness, nausea, vomiting and a dangerously high temperature (104°F and above) may be signs of heat stroke. This is a life-threatening medical emergency that requires rapid cooling by immersion in an ice bath. Ice bags on the neck and groin may help if a bath is unavailable.

Physicians and parents with knowledge about heat-related illness should take on a role of educating administrators, coaches and officials and encouraging proper training in the recognition and treatment of heat-related illness.



Certain children and adolescents are at an increased risk of suffering a heat-related illness and must be identified so extra precautions can be taken, if needed. At-risk children and adolescents include those who:

- Are overweight and/or unacclimated to exercising in a hot environment.
- Have or are recovering from a recent illness, especially involving vomiting, diarrhea and/or fever.
- Are taking certain medications (diuretics, attention-deficit/hyperactivity disorder (ADHD) medications, anticholinergics and caffeine).
- Have chronic medical conditions (asthma, sickle cell trait, hyperthyroidism or cystic fibrosis).
- Have a history of suffering a heat-related illness.

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