



# HEAT ILLNESS

by *David A. McLain, MD., Chairman, USCTA Safety Committee*

With the world coming to Atlanta under the hot, summer, southeastern sun, the issues of heat exhaustion and heat stroke come to the forefront. People who exercise in hot weather need to be aware of overheating, especially those who have had one attack of heat illness who are more likely to have another one. You can't rely only on thirst to replenish liquids, you need to be aware of the effect clothing, medications, and illness have on the retention of body heat. The body tries to maintain a core temperature of 37 degrees (98.6F) and does this by evaporating sweat to dissipate heat. If the body runs low on body water, it cannot sweat effectively nor supply adequate blood to the brain, muscles, or internal organs. If clothing is too heavy or restrictive, heat cannot evaporate and then sweating cannot reduce the body temperature.

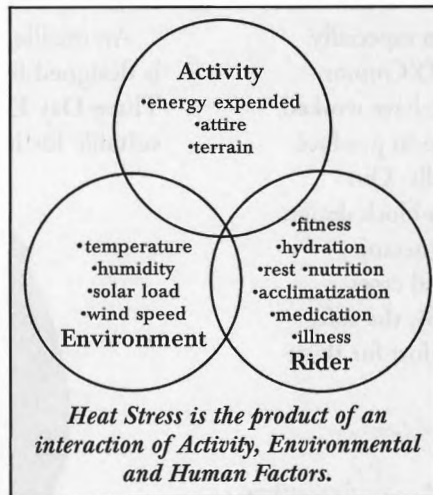
Heat illness is the product of an interaction of activity, environmental, and human factors. Environmental factors include temperature, humidity, solar load, and wind speed. Activity includes the energy expended, terrain and attire. Human factors of importance include fitness, hydration, rest, nutrition, acclimatization, medications, and illness. While we cannot control environmental factors except as they vary by the time of the day, we can control clothing, effort required and the human factors. Of the human factors, hydration is by far the most important.

Effective sweating causes the body to lose so much water that most of the problems that we ascribe to heat are really due to loss of water. Losing 5-6% of body water stops effective physical and mental function. Symptoms and signs of

core temperature.

Risk factors for heat illness include sleep deprivation, obesity, poor physical conditioning, lack of acclimatization, dehydration, febrile illness, medications that impair normal thermoregulatory response, and skin disorders that affect sweating. Heavy protective gear also confers a significant risk. A prior heat stroke is also regarded as a risk factor for repeated heat stroke. Diseases that predispose to heat stroke include heart disease, diabetes, atherosclerotic vascular disease, neurological diseases and extensive skin disease such as psoriasis, extensive scarring or burns, or even sunburn or heat rash.

Successful prevention of heat casualties is more important than their treatment. Prevention of heat illness depends on education. Participants need to drink at least four cups (a quart) of water an hour while outside when the temperature is above 80 degrees and should drink at least two cups an hour when temperatures are in the 70s. Spectators need to drink at least one large cup (8oz.) of water per hour. Thirst only begins when a good deal of the body's fluid has already been lost. If a person relies on the thirst mechanism, he or she will be behind in fluid losses and will not catch up for a day or two. He or she is already susceptible to "heat" illness. Remember that fruits also contain large amounts of water and chunks of oranges, watermelon and other juicy fruits can supplement



heat stress include such things as: muscle cramps, dizziness, chilling, goose bumps, extreme muscle fatigue, headache, clumsiness, unsteadiness, nausea, stumbling, rapid heart rate, and gradual impairment of consciousness. The victim becomes apathetic, confused, grouchy, groggy, sleepy, forgetful and slow to respond and to figure things out. Initially the victim may sweat profusely and later may stop sweating as they are volume depleted. At this point, body temperature mounts rapidly and collapse soon follows. Victims of exertional heatstroke, such as athletes and farmers, continue to sweat in about half the cases. In this case the skin may be deceptively cool despite a high

fluid intake along with water, soft drinks, or sports drinks. Alcoholic drinks (i.e. beer) and caffeinated drinks (i.e. iced tea, cola) cause us to waste water and are not recommended because they more than double the fluid intake requirement. One way to judge water loss is to weigh prior to beginning the activity and then during and afterwards. Athletic coaches (particularly football) are using this method to make sure that their players are staying well hydrated during late summer practices.

Salt is also lost in sweat. It is usually easy to ingest salts (mainly sodium and potassium) ahead of time and to replace them after exercise. Eating salty snacks such as peanuts, pretzels and potato chips is one way to replace salt. Sports drinks also contain salt and other electrolytes.

When exercising under conditions of high heat and humidity, clothing should be lightweight and light colored. As much skin as possible should be exposed to facilitate sweat evaporation. Periodically, sweat-saturated garments should be replaced by dry ones. Riding attire impedes heat loss. Coats should not be mandatory when heat and humidity are high. Protective vests pose a potential problem of their own as they trap heat. The British team at the World Equestrian Games in the Hague put on vests from the freezer before cross-country. The problem with this is that the protective qualities of the foam in the vests had not been tested while frozen and a frozen vest might be too firm to prevent injury. Helmets pose another problem. Adequate head protection is absolutely necessary to prevent brain damage in a fall. On the other hand, we lose about 70% of excess body heat out the top of our heads. To help with this, some helmet manufacturers have developed ASTM certified helmets with vent holes. Another novel idea is an ice cap that has been developed by Polar Ice Products (Biglerville, PA). An equestrian, Cookie Driscoll, has developed an ice cap that is designed to be worn in the

helmet and act as a heat sink.

Acclimatization is very important for athletes traveling into a warm climate, like Atlanta. It is recommended that after traveling to a warmer climate, initial workouts should be moderate in intensity and duration. A gradual increase in the time and intensity of physical exertion over 8 to 10 days permits optimal acclimatization. Non-acclimatized individuals are subject to salt depletion heat exhaustion and should make sure they get salt along with water.

While prevention of heat stroke is more important than treatment, critical steps in the management of heat stroke are recognition of the possibility of temperature elevation and immediate, on-site initiation of rapid cooling. Immersion in cool water with skin massage is the classic technique for cooling heat stroke patients. Immersion in ice water can cause shivering and convulsions and generally should be avoided. Rubbing the body with ice bags while keeping the skin wet and moving the air over the skin is an alternate method. Paramedics should be called as the victim may need intravenous fluids for hypotension. However, one should not wait for the paramedics to start the cool-

ing process. Hypotension often responds to cooling alone. Vomiting is common and one must be aware of this to prevent aspiration. A person skilled in CPR should be present to monitor the airway until the paramedics arrive.

Riders who are taking medications or legal or illegal drugs such as thyroid, antihistamines (allergy and sinus medications), anticholinergics (i.e. stomach medications such as Bentyl), phenothiazines, tricyclic antidepressants, diuretics, alcohol, beta blockers, calcium channel blockers, amphetamines, cocaine and pheylephrine (over the counter diet pills and decongestants) are at increased risk for heat stroke. Riders suffering from colds, intestinal or respiratory flu, or other illness are also at increased risk.

Prevention of heat stroke in Atlanta and at all our other competitions during the summer heat should be our goal and involves: **Education, Hydration, Appropriate Clothing and Acclimatization.** Awareness of the effect of medications and illness also should be kept in mind. The bottom line is **water, water, water!**

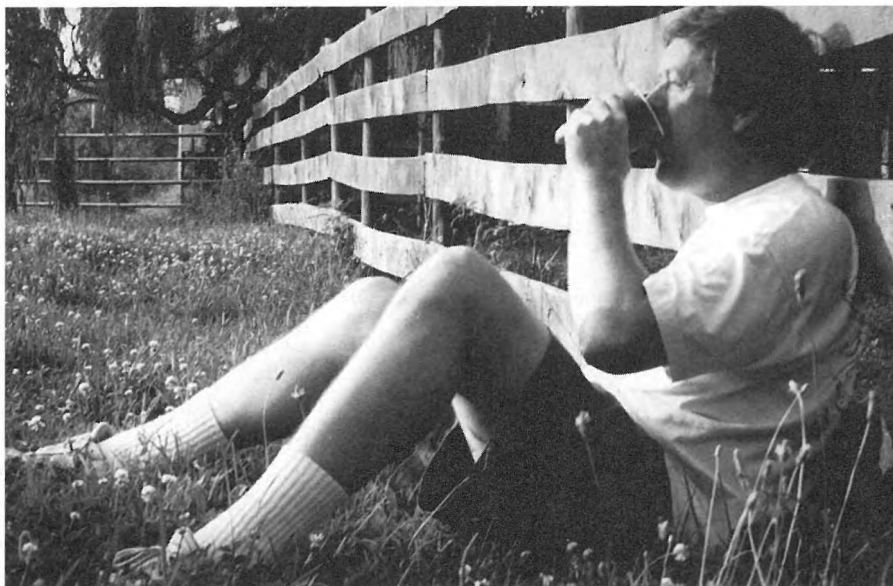


Photo by Dara Dickey

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