HEAT ILLNESS

(Information provided by Tom Steltenkamp)

I. Heat Cramps

II. Heat Exhaustion

III. Heatstroke

IV. Prevention

Heat cramps, heat exhaustion, and heat stroke are conditions caused by overexposure to heat. Heat cramps are the least severe but, if not cared for, may lead to heat exhaustion and heat stroke.

I. HEAT CRAMPS

Heat cramps are extremely painful muscle spasms that occur most commonly in the calf and abdomen, although any muscle can be involved. The occurrence of heat cramps is related to some imbalance between water and several electrolytes or ions (sodium, potassium, magnesium and calcium), which are essential elements in muscle contraction.

Profuse sweating involves losses of large amounts of water and small quantities of electrolytes, thus destroying the balance in concentration of these elements within the body. This imbalance will ultimately result in painful muscle contraction and cramps, which may indicate that a person is in the early stages of a more severe heat-related illness.

The person most likely to get heat cramps is one who is in fairly good condition but who simply overexerts in the heat.

The immediate treatment for heat cramps is ingestion of large quantities of water or a commercial sports drink, and mild stretching with ice massage of the muscle in spasm. An athlete who experiences heat cramps will generally not be able to return to practice or competition for the remainder of the day because cramping is likely to reoccur.

TABLE 18.1 Heat Index

	Air Temperature										
	70	**75**	**80**	**85**	**90**	**95**	**100**	**105**	**110**	**115**	
Relative Humidity	**Apparent Temperature°**										
0%	64	69	73	76	83	87	91	95	99	103	107
10%	65	70	75	80	85	90	95	100	105	111	116
20%	66	72	77	82	87	93	99	105	112	120	130
30%	67	73	78	84	90	96	104	113	123	135	148
40%	68	74	79	86	93	101	110	123	137	151	
50%	69	75	81	88	96	107	120	135	150		
60%	70	76	82	90	100	114	132	149			
70%	70	77	85	93	106	124	144				
80%	71	78	86	97	113	136					
90%	71	79	88	102	122						
100%	72	80	91	108							

°Degrees Fahrenheit.
Above 130°F = heat stroke imminent
105°-130°F = heat exhaustion and heat cramps likely and heat stroke with long exposure and activity
90° -105°F = heat exhaustion and heat cramps with long exposure and activity
80° - 90°F = fatigue during exposure and activity
Source: National Safety Council, 1991. *First Aid and CPR.* Boston: Jones and Bartlett. 160. Reprinted with permission

II. HEAT EXHAUSTION

Heat exhaustion results from inadequate replacement of fluids through sweating. Clinically, the victim of heat exhaustion will collapse and manifest profuse sweating, flushed skin, mildly elevated temperature, dizziness, hyperventilation, and rapid pulse.

It is sometimes possible to spot athletes who are having problems with heat exhaustion. They may begin to develop heat cramps. They may become disoriented and light headed, and their physical performance will not be up to their usual standards when fluid replacement has not been adequate. In general, persons in poor physical condition are most likely to get heat exhaustion.

Immediate treatment requires ingestion of large quantities of water. If possible, the athlete should be moved to a cool environment, but it is more critical to replace fluids.

III. HEATSTROKE

Unlike heat cramps and heat exhaustion, heatstroke is a serious, life-threatening emergency. The specific cause of heatstroke is unknown; however, it is clinically characterized by sudden collapse with loss of consciousness; pale skin, the athlete will have relatively dry skin. Basically there is a breakdown of the thermoregulatory mechanism, caused by excessively high body temperature; the body loses the ability to dissipate heat through sweating.

Heatstroke can occur suddenly and without warning. The athlete will not usually experience signs of heat cramps or heat exhaustion. The possibility of death from heatstroke can be significantly reduced if body temperature is lowered to normal within 45 minutes. The longer that body temperature is elevated to 106°F or higher, the higher the mortality rate.

Every first-aid effort should be directed to lowering body temperature. Get the athlete into a cool environment. Strip all clothing of the athlete, sponge him/her down with cool water, and fan with a towel. Place ice bags in cold sensitive parts of the body, such as on the wrists, ankles, under each armpit, behind the neck, and in the groin area. Only immerse the athlete in cold water as a last resort. It is imperative that the victim be transported to a hospital as quickly as possible. The replacement of fluid is not critical in initial first aid.

WHEN TO CALL EMS

Refusing water, vomiting, and changes in the victim's level of consciousness are signals that the victim's condition is worsening. Call EMS personnel

immediately if you have not already done so. If the person vomits, stop giving fluids and position the athlete on his side. Continue to cool the body.

IV. PREVENTION OF HEAT DISORDERS

Ironically, heat-related illness causing death among athletes is a totally preventable problem. Application of a few simple guidelines and a dose of common sense are all that is needed to avoid possible tragedy.
In order to prevent heat disorders, athletes should comply with the following guidelines:

1. Consume fluids and avoid **dehydration** when participating in activities in warm and humid environments. Experts recommend the consumption of 10 ounces of water every 30 minutes of activity (AAOS, 1991).
2. Avoid heavy exertion during times of extreme environmental conditions, especially when the temperature is above 95°F and there is high humidity.
3. Remember that restrictive garments can impair circulation of air, thus reducing the evaporation of sweat. Be aware that dark colors on uniforms and helmets may facilitate heat buildup.
4. Be reminded that fitness has a positive effect on the ability to function in extreme conditions. The process of developing a tolerance to extremes of climate, or acclimatization, normally requires a period of weeks.

PLEASE VISIT THE NATIONAL FEDERATION OF STATE HIGH SCHOOLS ASSOCIATION WEBSITE FOR MORE INFORMATION ON HEAT STRESS AND RECOMMENDATIONS FOR HYDRATION TO PREVENT HEAT ILLNESS.

THE WEBSITE IS: www.nfhs.org
Link to "Sports Medicine" then scroll down to "Heat Stress and Athletic Participation" and "Heat & Hydration"