



Ohio High School Athletic Association
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HEAT STRESS AND ATHLETIC PARTICIPATION

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Early fall cross country, field hockey, football, golf, soccer, tennis and even indoor volleyball practices are conducted in very hot and humid weather or non-air cooled facilities in many parts of the United States. Due to the equipment and uniform needed in football most of the heat problems have been associated with football; however, athletes in other fall sports are also vulnerable to heat related illness.

Under such conditions the athlete is subject to the following:

- Heat Cramps- painful cramps involving abdominal muscles and extremities caused by intense, prolonged exercise in the heat and depletion of salt and water due to profuse sweating.
- Heat Syncope - weakness, fatigue and fainting due to loss of salt and water in sweat and exercise in the heat. Predisposes to heat stroke.
- Heat Exhaustion (Water Depletion) - excessive weight loss, reduced sweating, elevated skin and deep body temperature, excessive thirst, weakness, headache and sometimes unconsciousness.
- Heat Exhaustion (Salt Depletion) - exhaustion, nausea, vomiting, muscle cramps, and dizziness due to profuse sweating and inadequate replacement of body salts.
- Heat Stroke - an acute medical emergency related to thermoregulatory failure associated with nausea, seizures, disorientation, and possible unconsciousness or coma. It may occur suddenly without being preceded by any of the other clinical signs. The individual is usually unconscious with a high body temperature and hot, dry skin (heat stroke victims, contrary to popular belief, may sweat profusely).

It is believed that the above mentioned heat stress problems can be controlled provided certain precautions are taken. According to the American Academy of Pediatrics Committee on Sports Medicine, heat related illnesses are all preventable. (*Sports Medicine: Health Care for Young Athletes, American Academy of Pediatrics, 1991*). The following practices and precautions are recommended.

1. Each athlete should have a physical examination with a medical history when first entering a program and an annual health history update. History of previous heat illness and type of training activities before organized practice begins should be included. State High School Associations recommendations should be followed.
2. It is clear that top physical performance can only be achieved by an athlete who is in top physical condition. Lack of physical fitness impairs the performance of an athlete who participates in high temperatures. Coaches should know the Physical Condition of their athletes and set practice schedules accordingly.
3. Along with physical conditioning, the factor of acclimatization to heat is important. Acclimatization is the process of becoming adjusted to heat, and it is essential to provide for Gradual Acclimatization to Hot Weather Activities. It is necessary for an athlete to exercise in the heat if he/she is to become acclimatized to it. It is suggested that a graduated physical conditioning program be used and that 80% acclimatization can be expected to occur after the first 7-10 days. Final stages of acclimatization to heat are marked by increased sweating and reduced salt concentration in the sweat.

4. The old idea that water should be withheld from athletes during workouts has NO SCIENTIFIC FOUNDATION. The most important safeguard to the health of the athlete is the replacement of water. Water must be on the field/court/competition site and readily available to the athlete at all times. It is recommended that a minimum 10-minute water break be scheduled for every half-hour of heavy exercise in the heat. Athletes should rest in a shaded or cool area during the break. WATER SHOULD BE AVAILABLE IN UNLIMITED QUANTITIES. Check and be sure athletes are drinking the water. Cold water is preferable. Taking ample water before practice or competition has also been found to aid performance in the heat.
5. Salt should be replaced daily. Modest salting of foods after practice or games will accomplish this purpose. Salt tablets are not recommended. ATTENTION MUST BE DIRECTED TO REPLACING WATER -- FLUID REPLACEMENT IS ESSENTIAL.
6. Know both the Temperature and Humidity. The greater the humidity the more difficult it is for the body to cool itself. Test the air prior to practice or competition using a wet bulb, globe, temperature index (WBGT index) which is based on the combined effects of air temperature, relative humidity, radiant heat and air movement. The following precautions are recommended when using the WBGT Index: (ACSM's Guidelines for the Team Physician, 1991)

- Below 64 - Unlimited activity
- 65-72 - Moderate risk
- 74-82 - High Risk
- 82 plus - Very high risk

There is also a weather guide for activities that last 30 minutes or more (Fox and Mathews, 1981) which involves knowing the relative humidity and air temperature:

AIR TEMP	DANGER ZONE	CRITICAL ZONE
70 F	80% RH	100% RH
75 F	70% RH	100% RH
80 F	50% RH	80% RH
85 F	40% RH	68% RH
90 F	30% RH	55% RH
95 F	20% RH	40% RH
100 F	10% RH	30% RH

RH = RELATIVE HUMIDITY

One other method of measuring the relative humidity is the use of a sling psychrometer, which measures wet bulb temperature. The wet bulb temperature should be measured prior to practice and the intensity and duration of practice adjusted accordingly. Recommendations are as follows:

- Under 60 F Safe but always observe athletes
- 61-65 F Observe players carefully
- 66-70 F Caution
- 71-75 F Shorter practice sessions and more frequent water and rest breaks
- 75+ F Danger level and extreme caution

7. Cooling by evaporation is proportional to the area of skin exposed. In extremely hot and humid weather reduce the amount of clothing covering the body as much as possible. Never Use Rubberized Clothing.