



# RECOMMENDATIONS FOR HYDRATION TO PREVENT HEAT ILLNESS



## TYPES OF SPORTS DRINKS

### ◆ Fluid Replacers

- Examples: Water, Gatorade, 10K, Quickkick, Max
- These drinks are absorbed as quickly as water and typically are used for activities lasting less than 2 hours.

### ◆ Carbohydrate loaders

- Examples: Gatorlode, Exceed High, Carboplex
- These drinks replace more muscle glycogen to enhance greater endurance.
- They should be used after ultra-endurance events to increase muscle glycogen resynthesis after exercise.

### ◆ Nutrition Supplements

- Examples: Gatorpro, Exceed Sports, Ultra Energy
- These supplements are fortified with vitamins and minerals and they help athletes maintain a balanced diet.
- They can be used as a meal replacement supplement for athletes who wish to skip a high fat meal, or as extra calories for athletes who wish to gain weight.

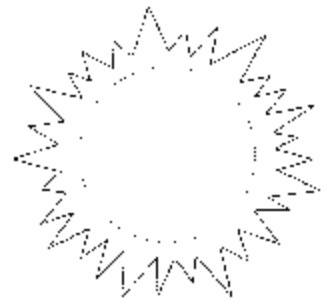


## WHAT NOT TO DRINK

- ◆ Drinks with Carbohydrate (CHO) concentrations of greater than eight percent should be avoided.
- ◆ Fruit juices, CHO gels, sodas, and sports drinks that have a CHO greater than six to eight percent are not recommended during exercise as sole beverages.
- ◆ Beverages containing caffeine, alcohol, and carbonation are not to be used because of the high risk of dehydration associated with excess urine production, or decreased voluntary fluid intake.

# HYDRATION TIPS AND FLUID GUIDELINES

- ◆ Drink according to a schedule based on individual fluid needs.
- ◆ Drink before, during and after practices and games.
- ◆ Drink 17-20 ounces of water or sports drinks with six to eight percent CHO, two to three hours before exercise.
- ◆ Drink another 7-10 ounces of water or sport drink 10 to 20 minutes before exercise.
- ◆ Drink early — By the time you're thirsty, you're already dehydrated.
- ◆ In general, every 10-20 minutes drink at least 7-10 ounces of water or sports drink to maintain hydration, and remember to drink beyond your thirst.
- ◆ Drink fluids based on the amount of sweat and urine loss.
- ◆ Within two hours, drink enough to replace any weight loss from exercise.
- ◆ Drink approximately 20-24 ounces of sports drink per pound of weight loss.
- ◆ Dehydration usually occurs with a weight loss of two percent of body weight or more.

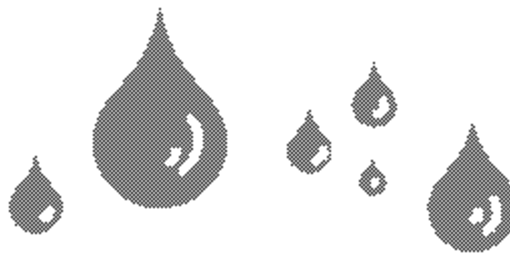


# WHAT TO DRINK DURING EXERCISE

- ◆ If exercise lasts more than 45-50 minutes or is intense, a sports drink should be provided during the session.
- ◆ The carbohydrate concentration in the ideal fluid replacement solution should be in the range of six to eight percent CHO.
- ◆ During events when a high rate of fluid intake is necessary to sustain hydration, sports drinks with less than seven percent CHO should be used to optimize fluid delivery. These sports drinks have a faster gastric emptying rate and thus aid in hydration.
- ◆ Sports drinks with a CHO content of 10 percent have a slow gastric emptying rate and contribute to dehydration and should be avoided during exercise.
- ◆ Fluids with salt (sodium chloride) are beneficial to increasing thirst and voluntary fluid intake as well as offsetting the amount of fluid lost with sweat.
- ◆ Salt should never be added to drinks, and salt tablets should be avoided.
- ◆ Cool beverages at temperatures between 50 to 59 degrees Fahrenheit are recommended for best results with fluid replacement.

# DEHYDRATION, ITS EFFECTS ON PERFORMANCE, AND ITS RELATIONSHIP TO HEAT ILLNESS

- ◆ Dehydration can affect an athlete's performance in less than an hour of exercise — sooner if the athlete begins the session dehydrated.
- ◆ Dehydration of just one to two percent of body weight (only 1.5-3 lb.. for a 150-pound athlete) can negatively influence performance.
- ◆ Dehydration of greater than three percent of body weight increases an athlete's risk of heat illness (heat cramps, heat exhaustion, heat stroke).
- ◆ High-body-fat athletes can have a harder time with exercise and can become dehydrated faster than lower-body-fat athletes working out under the same environmental conditions.
- ◆ Poor acclimatization/fitness levels can greatly contribute to an athlete's dehydration problems.
- ◆ Medications/fevers greatly affect an athlete's dehydration problems.
- ◆ Environmental temperature and humidity both contribute to dehydration and heat illnesses.
- ◆ Clothing, such as dark, bulky, or rubber protective equipment can drastically increase the chance of heat illness and dehydration.
- ◆ Wet bulb temperature measurements should be taken 10-15 minutes before practice, and the results should be used with a heat index to determine if practices or contests should be started, modified or stopped.
- ◆ Even dry climates can have high humidity if sprinkler systems are scheduled to run before early morning practices start. This collection of water does not evaporate until environmental temperatures increase and dew points lower. Dry climate areas should take wet bulb and temperature readings 10 to 15 minutes before practice or contests.
- ◆ A Heat Index chart should be followed to determine if practice/contests should be held.
- ◆ A Heat Index chart should come from a reputable source like the National Oceanic and Atmospheric Association.
- ◆ A relative humidity of 35 percent and a temperature of 95 degrees Fahrenheit are likely to cause heat illness, with heat stroke likely.
- ◆ A relative humidity of 70 percent and a temperature of 95 degrees Fahrenheit are very likely to cause heat illness, with heat stroke very likely.



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.

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

**THE WEBSITE IS: [www.nfhs.org](http://www.nfhs.org)  
Link to "Sports Medicine" then scroll down to "Heat & Hydration"**