

Progressive Dehydration

During double days student-athletes may not rehydrate and replenish lost electrolytes effectively. Progressive dehydration results when the body is dehydrated at the start of each exercise session, leading to greater dehydration. This increases the likelihood of heat illness. There are several ways to assess hydration and maintain adequate body fluid balance.

Weigh-Ins

An easy way to assess hydration status is to record body weight before and after exercise. When weighing in, it is important to wear as little clothing as possible. Sweat soaked clothing will be counted as body weight. Any loss in body weight after practice means a loss of body fluid.

Urine Color

A second way to assess hydration is to check the color of urine. A properly hydrated body will eliminate clear or pale yellow urine. Yellow or dark urine is a sign of dehydration. It is important to drink enough water to make the urine color clear or pale yellow before exercising.



Hydrated ————— Dehydrated ————— Severely Dehydrated

Fluid Equivalentents

Most people need at least 64 ounces of water a day. Student-athletes should try to drink 100 ounces a day.
8 ounces (oz) = 1 cup
16 oz = 2 cups = 1 pint
32 oz = 4 cups = 2 pint = 1 quart ≈ 1 liter
64 oz = 8 cups = 2 quart/liter = 1/2 gallon

Before Exercise

2 hours before exercise drink at least 16 to 20 oz. This will allow enough time to eliminate fluids prior to exercise. Drink 10 oz. of water or sport drink 10 to 20 minutes prior to exercise.

During Exercise

During exercise drink at least 10 oz. of fluid every 15 minutes.

After Exercise

Drink at least 20 oz. of fluid for each pound of body weight lost from exercise. Rehydration should take place within 2 hours after exercise. Fluid should contain carbohydrates and electrolytes.

Sport Drinks

There are many sport and energy drinks being sold with the promise of better performance. Some of these drinks can be very harmful and lead to dehydration, upset stomach, racing heart beat, or death. These drinks include Red Bull, Rockstar, Shark, Monster, Energy, XS, Crunk, NOS, etc.

Sport drinks that are beneficial contain the following:

- 6% carbohydrate (Gatorade, Powerade)
- 4% sodium
- Glucose, sucrose, or glucose polymers
- Coolness in temperature

Sport drinks that are harmful contain:

- Greater than 8% carbohydrate
- Fructose (energy drinks, fruit juices)
- Caffeine (soda, energy drinks, ice tea)
- Carbonation (soda, energy drinks)
- Ephedra/Ma Huang
- Creatine
- Alcohol

Phone Numbers

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Casa, D.J., Armstrong, L.E., Hillman, S.K., Montain, S.J., Reiff, R.V., Rich, B.S.E., Roberts, W.O., Stone, J.A. (2000). National Athletic Trainer's Association position statement: Fluid replacement for athletes. *Journal of Athletic Training*, 35, 212-224.

Preventing Dehydration and Exertional Heat Illness

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The Athletic Training staff are members in good standing of the National Athletic Trainer's Association (NATA) and certified through the Board of Certification, Inc. Additional information about the athletic training profession can be found at: www.nata.org.

Introduction

This pamphlet was developed to increase awareness of exertional heat illness and proper fluid intake during sport participation. We, the Santa Margarita Catholic High School Athletic Training staff, hope this information assists parents in helping maintain a student-athlete's health before and after sport participation.

The Importance of Water

During sport participation the body sweats, which is evaporated from the skin, to regulate body temperature. Sweating decreases body fluid balance of electrolytes (sodium and potassium). Dehydration results when the amount of sweat lost is greater than the amount of water/fluid intake. This appears as a decrease in body weight after sport participation. For example a student-athlete weighing 130 pounds before practice and 127 pounds after practice has lost 2% of body weight. A loss of 2% can negatively affect performance.

Dehydration can also result from a variety of internal and environmental factors. Internal factors are personal characteristics and body chemistry. Environmental factors are external influences that may not be controllable.

Dehydration will lead to heat illness if the body is not properly rehydrated. Heat illness is more likely in hot and humid weather but can also result in any type of condition. Heat related illnesses are classified as heat cramps, heat syncope, heat exhaustion, heat stroke, and exertional hyponatremia.

Intrinsic Factors

These factors may increase the risk of dehydration and heat illness:

- History of exertional heat illness
- Inadequate heat acclimatization over 10 to 14 days (the body adapting to exercising in the heat)
- Lower level of fitness status
- Higher percentage of body fat
- Dehydration or overhydration
- Presence of a fever
- Presence of gastrointestinal illness
- Salt deficiency/electrolyte imbalance
- Skin condition (sunburn, skin rash, etc)
- Medication (antihistamine, diuretics, etc)
- Dietary supplements (ephedra, creatine, alcohol, caffeine)
- Motivation to push oneself
- Reluctance to report problem, issues, illness
- Pre-pubescence
- Lack of sleep

Environmental Factors

These factors may increase the risk of dehydration and heat illness:

- Intense or prolonged exercise with minimal breaks
- High temperature/humidity/sun exposure
- No access to shade during exercise or during rest breaks
- Minimal access to fluids before and during exercise
- Delay in recognition of early warning signs
- Lack of education and awareness of heat illness
- Wearing dark clothing or athletic equipment, rubber or plastic suits, or helmets that prohibit heat loss

Signs of Dehydration

Dehydration results when fluids are not replenished to the body before, during, and after exercise. Signs of dehydration include:

- Dry mouth
- Thirst
- Irritability
- General discomfort
- Headache
- Apathy
- Weakness
- Dizziness
- Cramps
- Chills
- Vomiting
- Nausea, head or neck sensations
- Excessive fatigue
- Decreased performance

Muscle Cramps

Muscle cramps may be the first sign of dehydration, electrolyte imbalance, and muscle fatigue. Muscle cramps happen after intense exercise and results in painful and involuntary muscle contraction. To relieve muscle cramps, stop activity, drink fluid containing sodium (Gatorade), and stretch the muscle.

Heat Syncope

Heat syncope results when there is not enough blood volume to support the entire body due to dehydration, blood pooling in the lower extremity, or blood close to the surface of the skin for cooling. Heat syncope can result from high environmental temperatures and the first 5 days of acclimatization. During heat syncope move the student-athlete to a shaded area, elevate legs above the head, rehydrate, and monitor vital signs.

Heat Exhaustion

Heat exhaustion is the inability to continue exercising while experiencing heavy sweating, dehydration, electrolyte loss, and fatigue. During heat exhaustion the body core temperature rises up to 104°F. Other symptoms include persistent muscle cramps, weakness, fainting, dizziness, headache, diarrhea, low urine output, and hyperventilation. To treat heat exhaustion, give shade, remove excess clothing, cool the athlete with fans, ice towels, or ice bags, start fluid replacement, and seek emergency help if recovery is not rapid.

Heat Stroke

Heat stroke results when the body core temperature rises above 104°F. Internal organs start to fail due to excessive heat production and low heat loss. Symptoms include rapid heart beat, sweating, hyperventilation, vomiting, diarrhea, seizures, coma, and altered mental state. Heat stroke is life threatening and requires immediate help from emergency personnel. To treat heat stroke, remove excess clothing and immerse the body into a pool of cold water, monitor vital signs, transport to the hospital, and monitor for at least 24 hours.

Exertional Hyponatremia

Exertional hyponatremia is a rare condition that results when sodium is not adequately replaced during exercise lasting longer than 4 hours. Symptoms include increasing headache, disorientation, vomiting, fatigue, seizures, and swelling in the hands and feet. If hyponatremia is suspected no fluids should be administered unless advised by a physician.