SPORTS NUTRITION GAME PLAN

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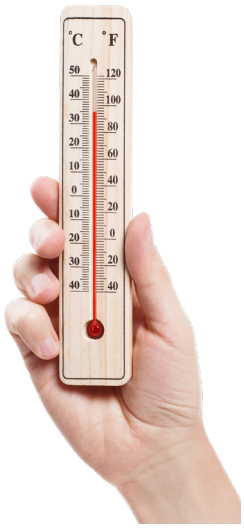
ENVIRONMENTAL HYDRATION CONSIDERATIONS

Extreme environmental challenges (heat, cold, humidity, and altitude) require physiological, behavioral, and technological adaptations to ensure athletes are capable of performing at their best. Various environments can affect hydration status and the body's ability to dissipate heat and/or induce heat illness. It is of utmost importance that athletes take precautionary measures when training or competing in environments different from what they are used to.



Fluid Considerations in Hot Environments

Training in hot and humid conditions can:

- Increase sweat rates by 10–20% per hour
- Increase the use of glycogen as fuel
- Hasten the onset of fatigue and rating of perceived exertion
- Impair mental performance

Hydration Recommendations in the heat:

- Start exercise and competitions in a state of euhydration (optimal hydration)
- Increase fluid intake to match or exceed sweat rates
- Consume cold beverages to help reduce core temperature
- Monitor urine color with a goal of it being pale yellow
- Increase sodium intake from food and likely electrolyte-rich beverages

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ENVIRONMENTAL HYDRATION CONSIDERATIONS

Fluid Considerations in Cold Environments

The primary concerns of exercising in cold environments are the maintenance of euhydration and body temperature. While exercise-induced heat production and appropriate clothing are generally sufficient to minimize heat loss, smaller, leaner athletes are at greater risk of hypothermia. This is due to increased heat production required to maintain core temperature and decreased insulation from lower amounts of body fat.

Several factors can increase the risk of hypohydration when exercising in the cold, such as:

- Cold-induced diuresis
- Impaired thirst sensation
- Reduced desire to drink
- Limited access to fluids
- Self-restricted fluid intake to minimize urination
- Sweat losses from over-dressing
- Increased respiration with high altitude exposure

Hydration Recommendations in the Cold:

- Start exercise and competitions in a state of euhydration (optimal hydration)
- Continue to drink fluid at regular intervals, following during-exercise hydration recommendations
- Remove wet clothing from the body
- Wear clothing that helps muscles stay warm
- Rehydrate back to euhydration, even if using warm fluids like soup, hot chocolate, and hot teas

Fluid Considerations at Altitude

Hydration at altitude is associated with:

- Low humidity
- Initial diuresis
- Increased ventilation
- Exercise sweat losses

Some experts suggest daily fluid needs are as high as 4–5 L with altitude training and competition, while others encourage individual monitoring of hydration status to determine fluid requirements. It is fair to say that hydration should likely be increased by at least 1–1.5 liters of fluid per day.

Hydration Recommendations at Altitude:

- Start exercise and competitions in a state of euhydration (optimal hydration)
- Increase fluid intake to match or exceed sweat rates
- Add electrolytes as needed
- Monitor urine color with a goal of it being pale yellow to clear
- If flying in an airplane for training or competition, it is important to monitor urine color and add an approximate 8 ounces of fluid for every hour in the air

Journal of Athletic Training 2017;52(9): 877–895 National Athletic Trainers' Association Position Statement: Fluid Replacement for the Physically Active

Journal of Athletic Training 2002;37(3): 329–343 National Athletic Trainers' Association Position Statement: Exertional Heat Illnesses

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