

HYDRATION for SOCCER PLAYERS

Signs & Symptoms of dehydration:

Confusion, fatigue, increased heart rate, dizziness, headaches, nausea, chills, decreased sweating and higher rate of perceived rate of effort, decreased urination & dark yellow urine.

Signs & Symptoms of overhydration:

Confusion, fatigue, headaches, nausea, vomiting, weight gain, bloating, puffy or swelling of hands & feet, increased urination & totally clear urine color.

Let's first understand the importance & location of fluids inside the body. The human body is 40-70% water by weight. The lower range would relate to an obese person, as fat tissue is only 10% water weight, where the upper range could be a very muscular individual since muscle is 75% water weight. The body then divides total body water into two areas: 65% inside the cell & 35% outside the cell (between cells & blood plasma). When we sweat as a means to cool off, fluids are taken from blood volume & delivered to the skin to be evaporated.

Dehydration causes a reduction in blood volume & decreased blood flow to the muscles & skin, leading to fatigue & impairing the body's ability to release heat.

Why is this important? Well, muscles like to be wet & blood plasma is primarily water (94%), so as sweat exceeds fluid intake, fluids must shift from one area to another to compensate for the loss. Fluid balance is important for muscle contraction & relaxation, optimal delivery of oxygen & removal of lactic acid, reduced strain on the heart & regulation of core body temperature. We can monitor dehydration by measuring our body weight to see how much body fluid we have lost, > 2% loss is considered the dehydration zone.

Know when to say when – Overhydration Zone:

In general, the stomach has limits to how much fluid it can empty into the GI tract per hour, as well as the kidneys have limits on how much they can release fluids (urine) per hr. So keep in mind excessive fluid intake can be dangerous; as it rapidly dilutes the electrolytes & the kidneys cannot excrete urine fast enough. Weight gain during or post-exercise is a sign of being overhydrated & places you at risk of diluting your electrolytes.

Personal Hydration Zone:

Start by making sure your basic hydration needs are being met. Institute of Medicine recommends daily fluid intake for healthy adults at 15 cups for males & 11 cups for females. Approximately 80% of these levels are obtained from liquids (water, juice, milk, tea, FRS, soups, etc) & 20% from foods (fruits, vegetables). Sweating from exercise requires additional fluid beyond daily needs, thus ACSM & NATA recommend using individual sweat rates (body mass changes) as a guide for fluid intake during exercise. Conducting sweat rates in different environments, different intensities & with various sports, will help you dial in your hydration needs.

Sweat rate calculation:

Weigh with minimal clothing (pre & post exercise). Record fluids, environmental conditions, training type, intensity & duration.

Wt pre-ex – Wt post-ex = ? lbs → Wt difference (lbs) x 16 = Wt difference in oz
Fluids consumed during ex = ? oz → Total Fluids lost.

Duration of ex = ? hrs divided by time = oz per hr.

Example: sweat rate : 175 lb -172lb = 3 lb x 16 = 48ozs

Fluid Intake = 20oz + 48 = 68oz Ex for 2 hrs Sweat rate = 34oz/hr

Determine the number of times you will drink per hour to achieve at least 80% of your sweat rate. Example: drink 4-6 oz, every 10-15 min. (~1 swallow = 1 oz)

Below the zone – Dehydration

In the example above, the athlete is still in the zone: bodyweight loss of 3 lbs (2% of 175 lbs = 3.5 lbs), however at the same intensity & conditions, over time he/she would risk dehydration, especially in the heat. Cooler climates & lower intensity can allow an athlete to tolerate ~ 3-4 % below the zone. A ~3% loss of bodyweight heat can cause a 10% strength loss & 8% speed loss. Heat, intensity, duration & being a heavy sweater are the biggest dehydration risk factors.

Body weight lost as sweat	Physiological Effect
>2%	Impaired performance – endurance ↓ Mental performance
3%-5%	Capacity for muscular strength/power may decline in heat
4%	Impair performance – endurance, cold weather
5%	Heat exhaustion - endurance
7%	Hallucinations
10%	Circulatory collapse and heat stroke

Extra monitoring tools:

Along with body weight changes, your ideal hydration zone can be monitored by checking urine color (pale straw or lemonade color), urine volume & urine frequency (6-8x/day). Note: certain medicines & vitamins may cause the color of the urine to change. Stay tuned for more on optimal fluids, electrolytes & hydration strategies in upcoming articles.