

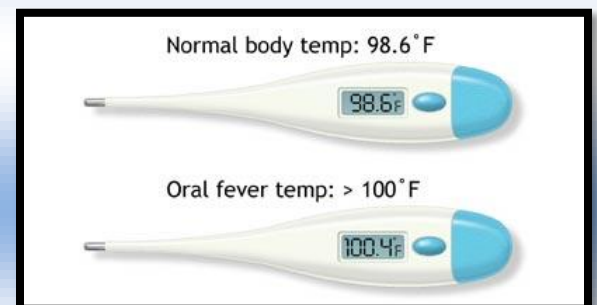
A Fluid Performance

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Nutrition affects performance. This is a universally accepted truth, no matter the sport. What may surprise you is that when it comes to nutrition and performance, adequate hydration is the most important nutrition component for optimizing sport performance. Even slight imbalances caused by dehydration, over-hydration, or electrolyte disturbance can have devastating effects on an athlete's performance. Staying hydrated not only aids in maximizing sport performance, it also allows for greater gains from training and injury prevention.

The body loses fluids many ways, but especially by sweating when it comes to exercise. When bodily fluid losses exceed stored levels or intake of fluid, dehydration occurs. Dehydration compromises cardiovascular function by decreasing blood flow to muscles, especially by lowering the amount of oxygenated blood the heart can put out. This decreased blood flow also slows delivery of other nutrients needed for continued performance or recovery from exercise.

Just a 1% deficit in fluid balance (a 1.5 lb. loss by 150 lb. athlete) can impair cognitive performance. For sports where tactical thinking and quick strategic moves are vital, such a small loss of sweat could mean the difference in making the losing or winning play. With each 1% loss of fluid during exercise, the body's core temperature increases by 0.27-0.36 degrees Fahrenheit. The higher the body's core temperature, the harder the athlete's heart must work to cool the body while continuing to try to support exercise endeavors. This is why a dehydrated athlete may notice an elevated heart rate while performing at their normal intensity, which makes their exercise seem harder than usual. If core temperature is allowed to continue to rise due to dehydration, physical exertion will eventually cease as heat illness/stroke will occur (usually around 5% and 10% dehydration, respectively).



Dehydration is the number one cause of fatigue. Physical sport performance is negatively affected with only a 2% fluid deficit. Work capacity is decreased as much as 48% between 2-4% dehydration. Because of this huge impact, hydration guidelines for optimal performance are to match fluid losses if possible, but at very least keep hydration deficits less than 2% while exercising. The body's thirst mechanism is

not even triggered until around a 2% loss of fluid. This means that sport performance may be impaired before your body even signals you that you need to drink. Many athletes don't recognize the signs of dehydration. Thirst is the most obvious sign, but here are many others: fatigue, dry mouth, thick saliva (i.e. difficulty spitting), feeling light headed, weak, or faint, rapid heart rate, dull headache, dizziness, nausea, irritability, muscle cramps, and abnormal chills. Fatigue and performance impairment caused by dehydration can cause athletes to compromise their physical mechanics. Therefore, not only does dehydration impair performance, it indirectly raises an athlete's risk of injury.

Everyone has a unique sweat rate, which means each athlete may need to hydrate differently. The

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amount of sweat you lose is affected by many things. Sweat rate is increased by: warm, humid conditions, male gender (men sweat 30% more than women of the same weight), fitness level (more fit=more sweat), acclimatization, insulating gear or clothing, and exercising more intensely (greater intensity=greater sweat rate). Athletes commonly lose 2-4 lbs. of sweat per hour (32- 64 oz. of fluid/hour). An average stomach volume is only 1.5 -3 oz., but can be

trained to expand up to 32 oz. with no increase in abdominal pressure. High volume sweat losses and limited stomach capacity make over-hydrating rarely a concern. However, if achieved, excessive hydration, especially without sodium, does not benefit performance and could be life threatening (hyponatremia). Knowing your individual sweat rate in various conditions allows for a customized hydration plan that should limit any risk of under or over-hydrating.

To optimize sport performance and minimize risk of injury, the hydration goal for every athlete should be to match their rate of losses, specifically fluid and electrolytes. The American Dietetic Association and the American College of Sports Medicine and Dietitians of Canada recommend the individualized approach of matching fluid intake with sweat losses, but also generally advise athletes to drink six to twelve ounces of fluid every fifteen to twenty minutes, as tolerated and to include sodium.

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