

Did you Know that Sweating is Cooling?

Madelyn Noe, RD, CSSD

*Chief Clinical Dietician at Bayshore Health Care & Rehabilitation Center
Certified Specialist in Sports Dietetics*

Did you know that the process of sweating is cooling our bodies during high endurance exercise in the heat? It is the evaporation of this sweat that is our best defense against overheating.

So let's look at this wonderful mechanism of sweating.

Our bodies contain 2-4 million sweat glands which secrete a slightly salty film onto our skin. Sodium is an essential mineral to life – we cannot survive without it. When we sweat, up to 12 ounces (350 milliliters) seeps through the skin as perspiration during exercise, and another 10 ounces (300 ml) of water vaporizes daily from moisture lost through our mouth and nose during breathing. In cold weather, this vaporization is seen as “foggy breath.” In total we can safely lose about 20 ounces (650 ml) of fluids during the day with exercise.

Sweat itself does not cool the skin; skin cooling occurs only when sweat evaporates off our skin. Therefore, during high humidity, the ability of the body to cool itself off is thwarted.

Some Facts About Sweating:

- A 2% decrease in body weight loss due to dehydration can jeopardize exercise performance and cause heat injury. For example, if you weigh 200 pounds, a 4 pound weight lost during exercise as sweat will hamper your exercise performance if not replaced quickly.
- Several hours of intense sweating can cause “sweat gland” fatigue.
- Sweat loss dehydration causes your heart rate to increase. One liter (32 ounces) of sweat loss stresses your heart to beat 8 beats per minute faster.
- Restricting fluids during training does not prepare you to perform better in the heat.
- Taking your oral temperature is not an accurate measure of your core body temperature after exercise.

Pre Exercise Hydration

It's a good idea to increase fluid intake 24 hours before strenuous exercise in the heat to enhance exercise performance. Also, drinking 400-600ml (13-20 ounces) of cool water 20 minutes before you exercise is recommended. Having a full belly of fluids helps promote gastric emptying - water is absorbed more quickly into your circulatory system. You can also hyper-hydrate one week prior to your scheduled intense endurance activity in hot conditions. Up to 4.5 liters per day for a larger male is suggested.

Are You Going Into Your Event Well Hydrated?

Most individuals replace only 50% of the water lost (less than 500ml) during exercise. Fluid replacement is easier said than done. If you are well hydrated, you will produce large volumes of urine, light in color, and without a strong smell.

Hyponatremia - Dangerously Low Serum (Blood) Sodium Levels

Sweating for a prolonged period of time in high heat and humid conditions can deplete your blood of sodium, known as hyponatremia or "water intoxication." Normal levels of serum sodium are 136 - 142 mEq/liter. A serum sodium level of 130 mEq will trigger symptoms:

- Visual disturbances
- Heat cramps, muscle twitching
- Headache
- Confusion
- Fatigue
- Nausea and/or vomiting
- Heat exhaustion

Sodium Intake Helps Rehydration and Prevent Dehydration

Both carbohydrates and sodium improve hydration status. A beverage with 6% carbohydrates (14 grams CHO per 8 ounces) and 110 milligrams of sodium per 8 ounces will improve hydration and may reduce your risk of dehydration by enhancing water retention within your circulatory system and muscles. Potassium also enhances water retention. Well hydrated muscles and circulatory system are needed to improve your chances of better exercise performance.

Some sports beverages do not contain adequate amounts of sodium nor potassium, read the label carefully. The American College of Sports Medicine (ACSM) recommends .5 to .7 grams sodium per liter of fluids

consumed during exercise lasting more than 1 hour. Eating solid foods containing salt is also necessary after you exercise. By simply drinking plain water after endurance activities in the heat you will merely be increasing urine output with limited benefit to rehydration.

Who's At Risk for Hyponatremia

Hyponatremia is caused by extreme sodium loss through prolonged sweating coupled with consuming large amounts of fluids containing low or no sodium. Increasing your risk for dehydration and hyponatremia are lack of time for heat acclimation, being out of shape, genetics and high levels of sodium in your sweat. Remember this Spring weather where we've been exercising in cooler temperatures, then all of the sudden one day it's over 80 degrees. This is a perfect set-up for dehydration due to lack of acclimatization.

Staying Well-Hydrated Takes More Than Simply Drinking Water

1. Two to three hours before exercise drink 14 to 22 ounces of fluids
2. Drink 5 to 10 ounces about 30 minutes before exercise.
3. Do not drink more than 32 ounces of plain water over 15 minute intervals during exercise.
4. Add small amounts of salt: ¼ tsp. to ½ tsp. per 32 ounces plain water.
5. Do not restrict dietary salt.

Foods containing sodium to eat after you exercise:

Pretzels	cheese & crackers
Salted nuts	pizza
Soups	Celery or any vegetable sprinkled with salt
Smoked ham	peanut butter
Vegetable juices	salted bagel
Smoked salmon	onion soup dip mix
Canned vegetables	Baked Beans
Processed meats	Frozen and canned pasta entrees
TV dinners	Canned vegetables
Jarred Spaghetti Sauce	Olives, pickles, ketchup

Remember - getting used to heat stress known as heat conditioning, takes 7 to 10 days for acclimatization to occur. Heat acclimatization teaches your sweat to be more dilute allowing you to hold onto your precious minerals!