

# HYPONATREMIA

Hyponatremia is the technical term used to describe low sodium levels in the blood. Although rare, this condition can occur in healthy, active individuals. Left untreated hyponatremia can result in severe nausea, vomiting, disorientation, and possibly even death.



Although very rare, hyponatremia can also occur if a 'salty sweater' (a person who, for a variety of reasons, loses high-sodium in sweat) consumes too little sodium during their sustained physical activity, regardless of the amount of fluid they drink. Typical sport foods such as gels, bananas, fruit bars, and diluted sport drinks don't contain enough sodium to replace the levels lost by these individuals, in particular when physical activities exceed four hours duration.

## Symptoms of Hyponatremia (from Mild to Severe):

Bloating (puffiness), swollen hands and feet, nausea, vomiting, undue fatigue, restlessness, headache, confusion, disorientation, wheezy breathing, seizures, respiratory distress, coma, and death.

## Sodium and Sweat Losses – A Few Facts First

Sodium is one of the most important electrolytes in the body. Its main functions are to maintain the correct amount of fluid inside and around body cells, as well as to assist in nerve signaling.

During physical activity an athlete's internal body temperature rises tremendously. Sweating is the body's way of preventing overheating. As sweat evaporates it cools the skin, which in turn cools the blood circulating throughout the body. Sweat contains mostly water and sodium.

The amount of sweat lost by athletes is highly variable, ranging from one-third of a litre to 2 ½ litres or more lost for every hour of activity. In addition, the amount of sodium in sweat varies dramatically from one person to another and can range from 115 mg to 5000 mg per litre of sweat. Exercise intensity and duration, plus the environmental conditions (hot, humid, windy) and individual differences, are all factors that will affect sweat and sodium losses during physical activity.

## So What Causes Hyponatremia?

Hyponatremia is **most likely** to occur if, during sustained exercise (greater than 60 minutes duration), an athlete drinks **excessive** water, that is, a greater volume of water is consumed than sweat is lost. This scenario essentially dilutes the sodium remaining in the blood. It is most commonly experienced by modestly fit female runners who, by exercising at a very slow pace, lose relatively small amounts of sweat, yet they consume copious amounts of sport drink and/or water. Sport drinks should contain at least 500 mg of sodium per litre, indicating most commercial sport drinks should not be diluted. But when any athlete drinks to excess, even electrolyte-containing sport drinks may not contain enough sodium to prevent hyponatremia.

## Factors that May Increase the Risk of Hyponatremia:

- excessive drinking (before, during and/or after exercise)
- high availability of drinking fluids (e.g. too many "fluid" stations)
- weight gain during exercise (caused by fluid consumption exceeding sweat and urine losses)
- low body weight
- high body fatness
- being female
- slow running or performance pace
- endurance event inexperience (i.e., novice endurance athletes)
- greater than 4 hours sustained exercise duration
- unusually hot and/or humid environmental conditions
- 'salty sweat'

## Preventing Hyponatremia

Individuals susceptible to becoming hyponatremic can easily prevent low sodium levels in their blood throughout endurance activities by taking a few precautions. Since exercise-related hyponatremia is primarily caused by consumption of fluids in excess of sweat and urinary losses, the most important strategy would be to avoid over consumption of fluids (especially plain water) before, during and/or after exercise. For more information, please refer to the [Fluids for Athletes](#) tip sheet.



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## Drink According to Thirst During Exercise

To reduce the risk of excess fluid retention during exercise, athletes should drink the amount of fluid needed only to quench their thirst. They should therefore expect to lose up to a maximum 2% of their body weight through sweat during physical activity. Some experts advise fluid intake should range between 400–800 ml for every hour of activity and discourage excessive fluid consumption at fluid stations placed too frequently throughout endurance events.

## Avoid Weight Gain During Exercise

Endurance athletes should carefully monitor their weight immediately before and after their physical activity to determine their weight difference as a result of sweat loss during exercise. Weight loss greater than 2% of body weight indicates excessive dehydration; weight gain during exercise is associated with excessive fluid intake and increased risk of hyponatremia.

After exercise, athletes should drink approximately 450–675 ml of fluid for 0.5 kg of body weight lost from exercising; rehydrating until the point when urine is pale in colour intensity (i.e., pale like lemon juice).

## Encourage Sodium Rich Foods

Individuals at risk of hyponatremia and those who typically lose large amounts of sweat should be encouraged to consume sodium-rich foods before, during, and after their sustained activities. Examples include sport drinks, soups, dairy products, pretzels, vegetable and tomato juices, soy sauce, pickles, other condiments, and adding salt to food during cooking or at the table.

If an athlete has suspected symptoms of hyponatremia they should seek immediate medical attention to manage this condition.

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