



THE RIGHT WAY TO HYDRATE FOR MARATHONS

(Q&A SHEET)



1. How important is hydration to a marathon safety and performance?

Hydration status in marathon runners is dependent on the balance between sweat losses and fluid replacement and dehydration occurs when fluid losses are not adequately replaced. Sweat rates are influenced by weather conditions and running pace (i.e., pace per mile). Warm humid weather increases sweat rates and may accelerate the onset of dehydration and heat-related illnesses in runners. Keeping the body properly hydrated with the right amount of fluids improves safety and performance in a marathon by maintaining blood and cell fluid volume for cardiovascular transport and sweating. Dehydration causes marathon runners to run slower as the drop in body water decreases vascular volume with lower cardiac output and decreased muscle cell function. It is possible to ingest too much fluid, which can result in a potentially fatal condition called hyponatremia. Balancing fluid intake with sweat losses to avoid *dehydration and hyponatremia* is the goal. Find out what keeps you in balance; there is no standard intake rate for everyone.

2. What are the signs of dehydration?

Thirst is an indicator that you should start replacing your sweat losses. Signs and symptoms of worsening dehydration include headache, fatigue, dizziness, nausea, muscle cramps, weakness, abnormal chills, thick saliva (i.e., difficult to spit), and irritability.

3. What is the best way to avoid dehydration?

The best way to avoid dehydration is to calculate your sweat rate and replace your anticipated losses throughout the run. A few (10-20) ounces of fluid about an hour before the race will help you start with adequate water in your system.

4. How do I calculate my sweat rate?

The easiest method to estimate your sweat rate is to weigh yourself nude and run for either ½ or 1 hour in the conditions and at the pace you expect to race. At the end of the run, strip down, towel off, and reweigh yourself nude. The difference in weight (ounces) is either half (if you ran for ½ hour) or equal (if you ran for an hour) to your sweat rate. No more than that amount should be replaced in each hour of your race. If you have determined that you need to drink 6 oz every 20 minutes, then you stick with that plan for longer runs. Drinking too much water or sports drink (overhydrating) can lead to hyponatremia.

5. What is hyponatremia?

Hyponatremia is defined as a serum sodium level (concentration of sodium in the blood) less than 135 mmol/L. Exercise-associated hyponatremia (EAH) refers to hyponatremia that is induced by excessive fluid intake during prolonged physical activity such as a slow marathon (> 4 hours).

6. What are signs or symptoms of exercise-associated hyponatremia?

Symptoms become pronounced when serum sodium levels fall below 135 mmol/L and water begins to flow into the body cells. Early symptoms include puffiness (e.g., swollen fingers, tight fitting watch), nausea, vomiting, progressively worsening headache, and a sense of "just not feeling right." More serious symptoms will show when worsening brain swelling leads to confusion, irritability, agitation, and

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seizures. Left untreated, hyponatremia can progress to serious brain and lung swelling, coma and death.

It can take time for hyponatremia symptoms to appear and progress to a dangerous level, so keep an eye out for the symptoms even a few hours after the race, especially if you or a friend fit a high risk profile. If you do not feel thirsty, it is important not to drink large amounts of fluids until you are urinating normally.

7. What causes exercise-associated hyponatremia (EAH)?

Exercise-associated hyponatremia (EAH) has been shown to occur in marathon runners who maintain or gain weight during a marathon caused by overdrinking and possible abnormal fluid retention triggered by hormones that affect kidney function.

8. How can I avoid exercise-associated hyponatremia (EAH)?

The only way to avoid EAH is prudent fluid replacement during the marathon. Slow runners should drink when thirsty to avoid overdrinking during marathons or other long runs. Use training runs to determine how much and how often you should drink in different weather. Know your sweat rate. Weigh yourself before and after runs, and if you do not lose a little weight during a long run, you are most likely drinking too much. Reduce your intake rate for future runs in the same conditions.

9. Who is at risk for exercise-associated hyponatremia (EAH)?

Anyone who drinks too much water or sports drink before, during, or after the race is at risk for developing EAH, but other factors are associated with EAH, including:

- ◆ Marathon runners with finish times >4 hours
- ◆ Runners with low body weight or low body mass index
- ◆ Female runners

10. How can I balance my hydration to avoid both dehydration and hyponatremia (EAH)?

Develop your own balanced hydration program using these tips:

- ◆ Do not overdrink.
- ◆ Drink when you are thirsty or determine your fluid intake that keeps your weight balanced with a slight 1-2% loss during a long run. The rate of sweat and weight loss for the same distance varies according to time of the year and weather conditions.
- ◆ Keep your urine a pale yellow color like lemonade, neither dark like apple juice (dehydration) nor clear like water (overhydration)
- ◆ Try to match fluid intake to weight loss. For example, if you lost 2 lbs (32 oz), you should try to drink close to 32 oz but not more during that long run.
- ◆ Recognize the warning signs like water sloshing in your stomach or feeling puffy. Stop drinking and seek medical attention.

11. What should I do if I have symptoms?

Seek medical attention at a medical aid station or hospital during a marathon. Request a sodium serum concentration test immediately. Do not drink until cleared to do so by medical personnel.

REFERENCES

1. Hew-Butler T, et al. Consensus Statement of the 1st International Exercise-Associated Hyponatremia Consensus Development Conference, Cape Town, South Africa. *Clinical Journal of Sports Medicine*. 2005;15(4):208-213.
2. Almond CSD, et al. Hyponatremia among Runners in the Boston Marathon. *The New England Journal of Medicine*. 2005;352(15):1550-1556.