

Right hydration integral to a successful race



Mok Ying Ren



Ivan Low

The human body is made up of 70 per cent water and it is essential for a wide range of physiological functions in the body, such as sweating. Sweating is a mechanism to cool down our body during physical activity or when the body is overheated.

While it is an effective means by which the body counters heat stress, excessive sweating without proper replenishment can lead to repercussions.

Ninety per cent of our blood plasma consists of water. Excessive sweating will therefore reduce the blood volume we have in our bodies. Our blood flows in vessels, very much like the pipes that deliver water to our homes.

When a water shortage occurs, water has to be rationed and each household will receive less water. Similarly, when there is reduced blood volume, less blood is available to flow through the vessels and to supply the muscles.

Blood carries red blood cells which in turn carries oxygen to our muscles. A reduction in blood volume requires the heart to work harder to supply oxygen and nutrients to the exercising muscles.

This scenario is further complicated when there is also competition for blood supply to the skin to promote convective heat loss.

While severe clinical dehydration rarely occurs during exercise, a less hydrated body is nonetheless more susceptible to thermal strain during exercise. In other words, our bodies overheat faster when we are dehydrated.

Moreover, research has also shown that endurance performance is affected when athletes' fluid loss exceeds two per cent of



Endurance runner Benjamin Quek quenching his thirst after a long-distance evening. Having a hydration strategy can reduce the risk of overheating during long-distance marathons.
PHOTO: ONEATHLETE

their body weight.

Clearly, a good hydration strategy is critical for safe and successful endurance running.

Endurance runner and ONEathlete Benjamin Quek shared those sentiments. He said: "Our body loses water up to two per cent of our weight when we work out. Therefore, we need to hydrate in order to run over a long distance."

More is not always better when it comes to drinking. One of the important salts in our blood is sodium. Excessive water consumption may overly dilute the sodium concentration, a condition known as hyponatremia.

Hyponatremia can pose a serious threat with symptoms such as nausea, vomiting, headaches, confusion, muscle cramps, seizures and even the onset of coma.

It has been recommended by the American College of Sports Medicine that event organisers provide sodium-laden sports drinks as a strategy to reduce participants' risk of dilutional hyponatremia during long-distance endurance races such as marathons.

Sports drinks in the form of ice

slushies can be a good alternative to boost heat tolerance during endurance races.

Research evidence from the Department of Physiology, National University of Singapore, has shown that ingesting ice slushies before exercise can lower pre-exercise core temperature and increase heat tolerance in hot and humid conditions.

Runners should never toe the starting line in an under-hydrated state.

Always ensure that the body is well (but not overly) hydrated before a race and avoid alcoholic beverages before training and races.

A well-crafted hydration plan is the first step towards a successful race. While we should always race hard, never forget to race smart too. It is always better to race smart than to race hard.

stsports@sph.com.sg

• Dr Ivan Low is a research fellow in the Department of Physiology, National University of Singapore. The exercise physiologist ran the Boston Marathon in 2015.

Drink more if you perspire more

It is important to note that different individuals will have different perspiration rates, depending on fitness and heat acclimatisation status.

A runner who is more heat-acclimatised may need a more aggressive hydration plan, as he is likely to sweat more readily than fellow runners who are less heat adapted.

As such, there is hardly a one-size-fits-all hydration strategy for the replenishment of fluid loss during endurance events.

Follow these steps to implement your personal hydration strategy:

- Weigh yourself without any clothes before your run (for example 60kg)
- Head out for your run. Take note of the weather conditions, exercise duration, intensity and exact volume of water drunk (e.g. one hour easy run, drank 500ml)
- After towelling yourself dry, weigh yourself again without any clothes (e.g. 59.5kg)
- Calculate the difference. In the above example:

Amount of weight difference: $60 - 59.5 = 0.5\text{kg}$
Amount of sweat loss: $\text{body weight loss} + \text{water ingested} = 0.5\text{kg} + 0.5\text{kg} = 1\text{kg}$ or 1 litre

In the above example, the runner has lost one litre of fluid in an hour of easy running, assuming there was no other form of fluid loss (e.g. urination) during the run.

Note that sweat rates may differ according to exercise intensity, duration and weather conditions. So, you should repeat this test under conditions that best mimic your race setting, to estimate your sweat rate and devise a personal hydration plan for your upcoming race accordingly.

You do not need to replace the entire volume of sweat loss during the run or race, as it can be difficult to drink so much when running.

Our body can handle up to 1 to 2 per cent of dehydration and perform just as well, if not better (you carry less weight for your run). However, do remember to replace all the fluid loss after your run or race.