



FACT SHEET

Fluids in Sport

Why fluid is important

Water is essential to maintain blood volume, regulate body temperature and allow muscle contractions to take place. During exercise, the main way the body maintains optimal body temperature is by sweating. Heat is removed from the body when beads of sweat on the skin evaporate, resulting in a loss of body fluid. Sweat production, and therefore fluid loss, increases with a rise in ambient temperature and humidity, as well as with an increase in exercise intensity.

Drinking fluid during exercise is necessary to replace fluids lost in sweat. This action will reduce the risk of heat stress, maintain normal muscle function, and prevent performance decreases due to dehydration. In most cases during exercise, the rates of sweat loss are higher than the rate you can drink, so most athletes get into fluid deficit. Therefore, fluid guidelines promote drinking more fluid to reduce the deficit and potential performance detriments associated with dehydration. However, it is also important to acknowledge that it is possible to over-drink during exercise. This highlights the importance of getting to know your sweat rate and knowing how much you should be drinking. See your sports dietitian for an individual fluid plan.

Dehydration and Performance

As dehydration increases, there is a gradual reduction in physical and mental performance. There is an increase in heart rate and body temperature, and an increased perception of how hard the exercise feels, especially when exercising in the heat. Studies show that loss of fluid equal to 2% of body mass is sufficient to cause a detectable decrease in performance (that's a 1.4 kg loss in a 70 kg athlete). Dehydration of greater than 2% loss of body weight increases the risk of nausea, vomiting, diarrhoea, and other gastro-intestinal problems during exercise.

Dehydration reduces the rate of fluid absorption from the intestines, making it more difficult to reverse the fluid deficit. You may end up feeling bloated and sick if you delay fluid replacement. It is impossible to 'train' or 'toughen' your body to handle dehydration.

Can you drink too much?

Drinking more fluid than is comfortable, in any conditions, has the potential to interfere with your performance. In cool weather or when the exercise pace is gentle, the rate of sweat loss may be quite low. It is unnecessary and potentially dangerous to drink at rates that are far greater than sweat losses. Such over-hydration during exercise can cause a dilution of blood sodium levels (hyponatraemia). Symptoms include headaches, disorientation, coma, and in severe cases, death. It is important to note though that this is relatively rare and dehydration is a much more common issue.

Estimating your fluid losses

Knowing your sweat rate can give you an indication of how much you should be drinking during exercise. Sports dietitians routinely measure an athlete's sweat rate during training and competition in a range of environmental conditions, to provide them with the information required to design an individual fluid plan. Follow these easy steps to measure your fluid losses:

- Weigh yourself in minimal clothing, as close to the start of exercise as possible. Ideally you should empty your bladder before weighing.
- Commence exercise session
- Weigh yourself at the end of your session, in minimal clothing again, ensuring you towel off any excess sweat from your body.
- Your weight change during exercise reflects your total fluid loss; i.e. the difference between your sweat losses and fluid intake.
- Remember that weight loss during exercise is primarily water loss (not fat loss), and needs to be replaced soon after finishing exercise.
- Other minor losses come from breathing, spitting, vomiting and other insignificant sources. Sweat losses can be monitored to give you an idea of how much fluid to replace during training sessions and competition.

How Much Fluid & When?

Drinking fluid during exercise helps to prevent a drop in performance caused by dehydration, and fluid after exercise will re-hydrate you. The amount of fluid and the timing of drinks depend on the individual and the sport. Here are some tips:

- Always start exercise well hydrated; this will lower the risk of becoming dehydrated during sport. There is minimal performance benefit to being over-hydrated as drinking excessive amounts of fluid before exercise causes increased urination and feeling bloated.
- Develop a plan for drinking during exercise based on your own sweat rates.
- Immediately after exercise, monitor your weight change to estimate your final fluid deficit. During recovery, you will continue to lose fluids through sweating and urine losses, so plan to replace 125-150% of this fluid deficit over the next 2-6 hours. For example, if you lost 1 kg (1000mL), you will need to drink 1250-1500mL to fully re-hydrate. Drink fluids with your recovery snacks and the following meal to achieve this goal.
- Different sports pose different challenges and opportunities for optimal hydration. For team and racquet sports there are formal breaks between play, with substitutions and time-outs, all offering an opportunity to drink. Some individual sports require you to drink on the move. Be smart and practice strategies to get maximum benefit from fluid intake with minimal fuss and discomfort. Try special squeeze bottles, or hands free drink pouches if practical.
- Thirst is not an effective indicator of hydration status while exercising. There is usually a significant fluid loss before you feel thirsty. When drinking, your thirst will be satisfied well before these losses have been fully replaced.

What is the best fluid to drink?

As there are many drink options available, you now need to think about which is best for you.

Plain water alone is an effective drink for fluid replacement, especially in low intensity and short duration sports. However, if carbohydrate and electrolytes are added to water, as in a sports drink, performance can be enhanced, especially in high intensity and endurance sports.

If a drink tastes good, athletes will consume more of it, which may assist in meeting fluid targets during competition or rehydrating more effectively. Carbohydrate in fluid provides a muscle energy source as well as enhancing flavour. This can be one advantage of a **sports drink** over plain water. Electrolytes such as sodium are lost in sweat

and need to be replaced during and after prolonged exercise. Sodium in fluid improves fluid intake as it stimulates the thirst mechanism, promotes both carbohydrate and water uptake in the intestines, and reduces the volume of urine produced post-exercise. Of course, salt can be consumed in foods that are eaten at the same time as post-exercise fluids. For more information see the SDA fact sheet on [Sports Drinks](#) and for information on the effects of sports drinks on dental health, see our fact sheet: [Dental Health for Athletes](#).

Caffeine

There are a growing number of drinks on the market that contain a number of ingredients including caffeine. Caffeine is no longer banned by the World Anti Doping Agency. The consumption of small to moderate doses of caffeine (75 - 200 mg) can help to sustain exercise performance, reduce the perception of effort, and is unlikely to alter hydration status during exercise. However, the use of caffeine amongst athletes is often ad hoc and they may be unaware of the potential detrimental side effects associated with its use. Ensure that you discuss the use of caffeine with your sports dietitian or sports scientist and consider individual responses to caffeine.

Alcohol

Alcohol is not a suitable fluid to choose immediately after exercise, as it will impair vital recovery processes, and may also impair the athlete's ability to rehydrate effectively. If you choose to drink alcohol after exercise, look after your recovery needs first (i.e. replacing fluids, carbohydrate stores and consuming some protein to assist with muscle repair) and then enjoy an alcoholic beverage in sensible amounts.

Fluid Guidelines Summary

- The detrimental effects of dehydration on performance may include: loss of coordination, impaired ability to make a decision, increased rate of perceived exertion and increased risk of heat stress.
- Aim to match your sweat rate with fluid intake as closely as possible.
- Ensure that you drink at a rate that is comfortable.
- Practice your competition fluid intake plan in training sessions.
- Get to know your sweat rate by weighing yourself before and after training sessions and competition.
- Water is an excellent fluid for low intensity and short duration sports.
- Sports drinks are ideally suited to high intensity 'stop-go' and endurance sports.
- Drink alcohol sensibly and assess the detrimental effects on your recovery.