



Go with the flow the facts about fluids

Fluid is a vital part of exercise. In fact, fluid is vital for life and makes up about 60% of body weight. Good hydration helps to maintain an efficient cooling system and keeps the kidneys, respiratory system and cardiovascular system working. However when exercise is added into the equation, fluid becomes more important and more complicated to calculate.

During exercise, muscles only use about 25% of the energy for work, with the rest released as heat – which is why exercise makes you hot! Heat from the working muscles is transferred to the blood. The blood flow to the skin is increased and heat is lost by evaporation – sweating. Sweat comes from water in the blood, so you need to replace this vital fluid to prevent dehydration.

How much do you need?

You can work out your basic daily fluid needs by multiplying your body weight in kilos by 35mls, for example, an athlete who weighs 75kg will need just over 2 ½ litres of fluid a day to stay well hydrated ($75 \times 35 = 2635\text{mls}$). On top of this, you will need to take more in to deal with the amount of sweat you lose during an exercise session – and this varies a lot between athletes.

The fluid needed for a specific training session will depend on sweat rate, session length, surrounding temperature and humidity and intensity. Everyone sweats but some sweat more than others. The easiest way to get an estimate of how much sweat you lose is to weigh yourself before and after exercise. Each kilo of weight loss is equal to a litre of fluid lost. However, you will also lose fluid as urine, so you should drink at 1 ½ litres of fluid for every kilo of weight lost. So, to work your sweat losses and your fluid requirements for exercise, follow these guidelines:



- Weigh yourself just before the start of exercise and just after going to the toilet
- Weigh yourself in a minimum of clothing – remove socks and trainers
- After the exercise session, weigh yourself before going to the toilet
- Run down the body with a towel to remove sweat
- Keep a record of how much fluid you drank during the session

To calculate fluid loss, take the final weight from the initial weight.

Here's an example to show you how it works:

These are the figures from an athlete who worked hard for 1 hour in the gym.

Initial weight = 85kg

Final weight = 84.5kg

Weight loss = 0.5kg

Fluids drunk = 500mls (= 0.5kg)

Sweat rate = weight loss (0.5kg) + fluids drunk (0.5kg) = 1kg = 1litre fluid

So this athlete's sweat loss is about 1 litre an hour. He drank 500mls of fluid during the session which means he needs to aim to drink another 500mls during similar sessions to match his sweat losses.

What to drink?

Which fluid you opt for depends on how hard you exercise, and for how long. It is important that you choose a flavour that you like to encourage you to drink more. If you're exercising at low-to-moderate intensity for less than an hour, then water is fine. If you are working out for more than an hour, then a fluid with some carbohydrate for fuel, and sodium (salt) for improved absorption is recommended. There are a whole range of sports drinks available that are generally divided into 3 types:



- *Hypotonic* – these contain very small amounts of carbohydrate – about 2 to 5g per 100mls – and electrolytes such as sodium and potassium. They are useful for athletes who need to watch their weight. An example available in the UK is Lucozade hydro active; other countries may have other products that fall into this category.
- *Isotonic* – these contain around 5 to 8g of carbohydrate per 100mls and sodium and potassium. They provide fuel and can be used before, during and after exercise. Examples are Powerade, Lucozade Sport and Isostar.
- *Hypertonic* – these drinks have a high carbohydrate content – above 8g carbohydrate per 100mls – and are designed as a refuelling drink rather than for hydration.

Drinking commercial sports drinks can work out to be expensive, so another option is to make your own home-made drink – the following recipes should help.

Hypotonic drinks

100mls fruit squash
900mls water
pinch of salt

250mls fruit juice
750mls water
pinch of salt

Isotonic drinks

200mls fruit squash
800mls water
pinch of salt

500mls fruit juice
500mls water
pinch of salt

Hypertonic drinks

400mls fruit squash
1 litre water
pinch of salt

Is it possible to drink too much?

Technically, yes it is. There is a problem called hyponatraemia which occurs when the concentration of sodium in the blood falls to an abnormally low level. This can be caused by drinking excessive amounts of fluid that contain no sodium. This is only likely to be a potential problem in endurance events of longer than 4 hours, particularly when undertaken in hot conditions where sweat rates are very high, and water is taken in large volumes.

However it is good practice to use a drink that contains some sodium (either home made or commercial) when exercising for long periods, especially in the heat.

A useful way to check your hydration quickly is the PEE test. Quite simply looking at the colour of urine shows how well or poorly hydrated an athlete is. To show good hydration, the urine should be a pale straw colour; the darker the colour, the more dehydrated you are.

Dehydration – the ugly facts

- Any degree of dehydration will impair your performance. With every level of dehydration, there is an increase in your heart rate and body temperature. This also makes the exercise session feel much harder.
- The effects of dehydration are most noticeable when exercise is done in a hot and humid environment
- Dehydration reduces mental functioning and skill co-ordination, so dehydration will have an extra impact on sports involving skill and decision making
- High levels of dehydration increase the risk of nausea, vomiting and diarrhoea during exercise and slows down the rate you can absorb fluids
- It is **impossible** to 'train' or 'toughen up' your body to handle dehydration so don't bother trying.

A drop of drink

Post competition celebrations often include alcohol ... be sensible and look after fluid needs first as alcohol not only affects co-ordination and decision making, but can also encourage dehydration and slow down recovery. Remember that alcohol is also high in calories and cannot be used as a fuel source for the working muscle. The result is that the calories are stored as fat.



Calling all coaches

Drinking during exercise does not come naturally to athletes. You can help athletes by:

- Recognising the importance of fluid replacement during exercise
- Arranging for athletes to be well educated regarding hydration
- Helping athletes prepare a fluid replacement plan for training and competition
- Including drink opportunities during training
- Monitoring fluid balance from time to time to create awareness of whether your athletes are meeting their fluid intake goals.

Practice makes perfect

Follow these guidelines to develop a fluid plan that suits you.

- Always take a full drinks bottle to training and competitions
- Choose a drink that you like. Cool drinks are more refreshing and palatable
- Practice your drinking routines in training
- Always start an exercise session well hydrated. Drink 300 – 500mls of fluid before your session.
- Aim to drink regularly to offset fluid losses – this will be governed by the rules of your sport, but make the most of all opportunities such as injury time, half time and natural breaks. Remember the more you sweat, the more you need to drink.
- Start rehydrating after exercise – how much fluid you need will depend on how much you have lost in sweat.
- When travelling, take extra drinks with you. Air travel, air conditioning and altitude will all increase your fluid requirements.

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