

The Art of Drinking & Diving

The importance of being well-hydrated while diving

**By Mark Brill &
Laura Harris**

Diving while your body is dehydrated, it leads to aching muscles, fatigue and possibly even decompression sickness - it's that serious. Technical diver Mark Brill gets together with diver and sports physiologist Laura Harris to examine how dehydration affects divers and how you can avoid it

When you're preparing for a dive, you're probably more concerned about your equipment and your dive plan than making sure you've been drinking enough water. In fact, many drysuit divers and those who dive from small boats actively avoid drinking fluids before diving, for fear of needing a pee! Unfortunately, this is exactly the wrong thing to do.

Various diving accident reports have highlighted dehydration as a contributory factor in decompression incidents, even among the UK's drysuit divers. So this isn't just a warm water destination problem.

It's not only our planet that is made up of seven-tenths water. So are our bodies. Yet a relatively small loss of just 2% of your body mass in water will leave you seriously dehydrated and susceptible to a variety of injuries. Your muscles don't perform

well when dehydrated, and your ability to off-gas efficiently is impaired.

When your body loses water, your blood decreases in volume, becoming thicker and more viscous. It is less able to carry dissolved gases and its flow is slowed, so the speed at which you eliminate nitrogen and other gases is reduced.

Much of the water in our body is found in lean muscle mass. Getting rid of the excess nitrogen taken on during any dive requires the body's

Diving involves work, and your muscles are less effective and more prone to injury when you're dehydrated. Sports physiologists regard fluid loss as a major factor in sporting performance, so perhaps it's time for divers to take hydration more seriously.

Those who consider themselves "serious divers" are concerned about keeping themselves hydrated. Technical divers, who spend a long time in the water on decompression stops, will often avoid alcohol on their dive trips and take fluids to consume in-water. Nappies and pee-valves are the order of the day for dry-suited tekkies, because they must take on fluids and they don't have the option of ending their dive early!

That may seem a bit extreme for the average diver, but proper fluid regulation is a bit of an art. Taking on water needs to start the day before a dive, because losing fluids is all too easy, even in the chillier conditions in colder parts of the world.

How do divers lose fluid? There are four main ways: through sweating; respiration; urination, especially when exacerbated by diuretics; and stomach upsets, particularly those which involve diarrhoea and/or vomiting.

sweat!

As soon as you start exerting yourself or heaving yourself into your wetsuit or drysuit, you'll be losing



softer tissues to work well, yet it is these tissues that are adversely affected by dehydration.

Decompression is not the only stress on your system. Divers face the strain of lifting heavy equipment, climbing boat ladders and finning against currents.

fluids. Putting on a wetsuit or drysuit is like wearing a sweatsuit; your body starts losing moisture even if you're feeling quite cold, and you are unlikely to be aware of it.

Many divers with "wicking" undersuits will notice that they appear wet after a dive - but not because their drysuit has leaked. This is the result of sweat that has been wicked away from their body and condensed on the colder outer surface of the undersuit. Who said diving wasn't glamorous!

Any work done while suited up, such as lifting equipment, makes you sweat more. Pre-dive adrenaline and emotional stress contributes. So avoid putting your suit on too early, avoid working and - relax!

Wetsuits are equally problematic for hydration in both warm and cold climates, as tight-fitting neoprene will cause you to sweat. It is unpleasant climbing back into a damp suit for a second dive, but the loss of fluids caused by keeping it on can become dangerous.

FIVE KEY FACTS

- 1 A 2% loss of body mass through dehydration reduces your physical performance by 10%
- 2 A 5% loss of body mass through dehydration is the equivalent of heat stroke - you won't be able to stand.
- 3 You need to drink 2 litres of water every day to stay adequately hydrated
- 4 Diving provokes dehydration, so you need to drink before and after dives
- 5 Hydration is an important factor in off-gassing. Every dive involves decompression, and dehydration can provoke DCI.

Whichever type of suit you wear, take it off between dives.

breathe!

Breathing dry air causes dehydration. The compressed air in your cylinder removes moisture from your body as you breathe it. The longer your dive, the more moisture you'll have lost. The impact is greatest in cold water diving, where the lungs are warming the cold air, and moisture is lost as a

SPACEMAN SYNDROME

You've only been in the water for an hour, but now you're desperate! Why does diving makes you want to wee more frequently than you would on land?

Scientists call it "immersion diuresis" and it's a very serious problem for astronauts. Your body is designed for an environment with gravity, and weightless environments such as space or the underwater environment confuse the body's regulation mechanisms.

Normally, much of your blood will pool in your extremities, slowed by gravity. Take away gravity, and more blood returns to your centre. Your heart responds to the extra volume by triggering a response in your kidneys to remove fluid. That means you need to pee more, and more often.

In a weightless environment your body is actively working against you to reduce your blood volume - and as blood is the primary site of gas exchange, this is not good news

result. Breathing is unavoidable, but rebreather divers who are inhaling warm, moist air have a definite advantage.

pee!

The process of being submerged seems to make people more inclined to urinate, but diuretics - substances that cause you to pee more - have a greater effect.

Alcohol is a well-known diuretic, and many of the symptoms of a hangover, such as headaches, loss of concentration and fatigue, are largely caused by dehydration.

Don't think that because beer contains 95% water it's any better than drinking spirits. The dehydrating effect of the alcohol far outweighs the intake of water in your pint.

Coffee, tea, cola and chocolate all contain caffeine, which acts as a diuretic. Tempting though it is to have a hot cup of tea on a cold day, in hydration terms it's inadvisable to drink caffeine-based drinks shortly before a dive.

Favoured alternatives are soup, hot Ribena, apple juice, fruit squashes and isotonic sports drinks - but be aware that some fruit juices and soups can work against your attempts to keep properly hydrated. Any food or drink that has 8 or more grams of carbohydrate per 100ml will make your body take water into the gut to dilute it. The simple solution: drink water at the same time.

better out than in!

An upset stomach will often mean that you are not effectively able to absorb fluid across your gut. You can also lose a considerable amount of fluid by vomiting or having diarrhoea. It's always best to avoid diving if you're not feeling 100%, and diving while dehydrated is likely to make you feel worse.

Many divers suffer from seasickness, but throwing up before a dive loses lots of fluids. If you'll feel better off the boat and diving, try to replace the lost fluid by drinking an electrolyte fluid. The best option is to use rehydration salts, which are available in sachets from chemists,

IN-WATER HYDRATION

Today's divers dive deeper and for longer than ever before - not because we're braver, but because we have better equipment, computers and thermal protection.

If you plan to do longer decompression stops, drinking under the water makes sense. Some divers take small foil packs of sports drinks that can be squeezed. Others attach a drinks container to the decompression station. It has a hose and a small tap that can be opened when the diver wants a drink.

There are also some commercial systems such as the SCUDA (Self Contained Underwater Drinking Apparatus) or the Weezle Rehydration System. Whichever type you choose, it's worth practising your underwater drinking technique. Here are some top tips:

- Use a strongly flavoured drink, such as apple juice or fruit squash, so that you can easily distinguish it from sea water.
- Remove the airspace from any container used.
- Hold your regulator between thumb and first finger and the drinking nozzle between the next two fingers of the same hand. That way you can switch easily between drinking and breathing, and your reg is on-hand.
- For rebreather divers, closing the loop, drinking, and reopening the loop requires long breath-holding. Many find it easiest to come off the loop and breathe open-circuit to drink.

but a good alternative consists of isotonic drinks such as Lucozade Sport.

Failing that, you can make your own rehydration fluid by dissolving six teaspoonfuls of sugar and half a teaspoonful of salt into 750ml of warm water.

the long-term view

It's not enough to take a few sips of water shortly before a dive and hope that you're properly hydrated. The best approach is a slow, gradual intake of fluid, up to two days before diving. Aim to drink at least 2 litres of water a day.

Avoid over-drinking and getting thirsty. In technical diving circles

there has been a move towards aggressive rehydration - taking on a lot of water shortly before a dive. In hydration terms this doesn't make much sense. If you drink too much water at one time, your body will simply flush it through your system, along with valuable minerals.

If you wait until you feel thirsty you're leaving it quite late - you're already dehydrated.

You will be most dehydrated in the morning, so on the day you dive, drink half a litre in the morning and a further 250ml - a normal-sized mugful - shortly before the dive to see you through your time under water. Immediately after a dive it's wise to drink between half a litre and a litre of water to replace the lost fluids.

Avoid too much alcohol, coffee, cola, tea, and chocolate - OK, so you're human and unlikely to change the habits of a lifetime for the sake of a dive, but keep a balance. Sports-style electrolyte drinks are designed to rehydrate you, providing a balance of water and nutrients; these drinks are especially useful if you suffer from seasickness, have a stomach upset or feel hung-over.

Mineral-rich foods such as bananas, watercress and mushrooms also help your body maintain proper hydration. If only Pot Noodles came with watercress and mushroom!

unwell after a dive?

If any other diver ever feels unwell after a dive, don't ignore the signs or assume that it's trivial - make sure he or she gets water and oxygen, and contact a DAN hotline immediately. Let the doctor on call make the diagnosis and advise you what to do.

If you take it on yourself to make a diagnosis, for example by deciding that the condition isn't serious, you could be liable if the condition turns out to require urgent treatment. Apparently trivial symptoms can be the first signs of decompression illness (DCI).

Many divers with DCI will not think straight and will not want to make a fuss, but it is far better for all concerned to react defensively. Rehydration plays a vital role in the treatment of DCI, and nobody comes to harm if made to drink some water and breathe oxygen.

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If a person has been scuba diving and has symptoms such as:

- altered responsiveness • paraesthesia
- weakness / paralysis • pain (often around joints)
- breathing difficulty • vision or speech difficulty
- other neurological symptoms

- Lay the diver down flat
- Provide Basic Life Support as necessary
- Provide as near to 100% Oxygen as possible
 - Give IV fluids (normal saline)
- Perform Physical and Neurological Examination
 - Record details of:

- dive(s) • signs and symptoms • first aid & treatment given

Contact the appropriate DAN-supported Diving Emergency Hotline for advice from a diving medical specialist



www.danseap.org

***Diving Emergency Service: 1800 088 200 (in Aust.)**

For an Emergency outside Australia call: +61-8-8212-9242

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CHECK YOUR HYDRATION LEVEL

Check the colour of your urine. Generally speaking, the more dehydrated you are, the stronger the yellow and the more potent the smell. Ideally, your urine should be plentiful, very pale yellow or almost colourless, and odourless. Just bear in mind that first thing in the morning your urine will be a stronger yellow colour regardless of your level of hydration. And if you have been drinking a lot of diuretic fluids (alcohol, tea or coffee) be aware that it will tend to be paler, even though you are not properly hydrated.

DRUGS AND DIVING

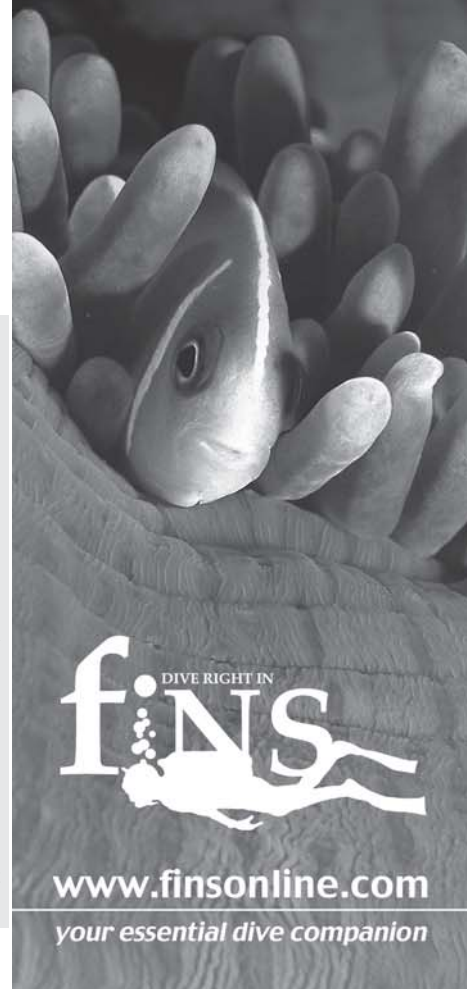
Diving puts extra and unavoidable stress on your body. If you are taking prescription drugs, check with a doctor about how advisable it is to dive.

If you are taking drugs to control blood pressure or blood volume, drugs which impact on the functioning of your heart and kidneys - even drugs to cope with water-retention and bloating - then it's probably best not to dive, (Ed: or at least to ensure that you have been assessed by a diving physician).

If your usual doctor knows nothing about diving, you can find a specialist diving doctor by looking at the South Pacific Underwater Medical Society (SPUMS) Website at www.spums.org.au.

Look Deeper.

Where dive education is concerned, it's easy to stick familiar and shy from pushing the limits. But the mark of a good diver, a thinking diver, is a willingness to be drawn out, to keep on learning and discovering. With **FiNS Magazine's** emphasis on diver training and safety issues, you can count on us to be your companion in becoming a safer, more able diver.



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