

Tips for working out when it's really hot

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HEALTH

Frozen towels, warm showers and calibrating your fluid intake will all help in the heat. Peta Bee on the science of exercising safely



Sip an ice-cold drink before you start your session

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Peta Bee

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If you're wilting at the thought of attempting a workout in the middle of a mini heatwave, spare a thought for Team GB at the Olympics in Tokyo, where temperatures are forecast to peak at 39C on August 3. Under the watchful eye of English Institute of Sport physiologists, some athletes have been training in outdoor heat tents to help them to prepare for conditions that sport scientists at the British Association for Sustainable Sport have warned are "too hostile" for the human body.

Mike Tipton, professor of human and applied physiology at the extreme environments laboratory in the University of Portsmouth's school of sport, health and exercise science, says: "Humans perform continuous exercise best in cool, dry environments of about 11C." When it's hot or humid the body is forced to deal with high internal and skin temperatures. In an attempt to release heat we sweat more and blood is shunted away

from our body's core towards the skin. These self-cooling processes are largely effective, but require extra energy and reduce the flow of blood and oxygen to working muscles. All of which explains why workouts can feel exhausting in the heat of summer.

“Both cognitive and physical performance deteriorate in the heat,” Tipton says.

“Everything from sunburn through to dehydration and cognitive impairment, to heat exhaustion or collapse from heatstroke can occur when intense or prolonged exercise is performed in hot weather.”

The good news is that exercise scientists have conducted extensive studies on how best to prepare for hot weather workouts. So what can we learn from the Olympians?

Wear as little as possible

Team GB athletes will be wearing regulation Adidas kit that features the brand's Heat.RDY technology made with lightweight fabric that draws sweat away from the skin to aid cooling. Any high-tech sweat-wicking fabric is better than heavy cotton, which hampers the body's ability to cool itself by reducing the evaporation of sweat. However, the golden rule is to wear as little as possible on hot days. “Sweat evaporates from human skin more efficiently than it does from any clothing, so the more skin that is exposed the better,” Tipton says. “Although you need to ensure you wear sunscreen to protect that exposed skin.”

Put a towel in the freezer and spritz your clothing

Precooling techniques that aim to lower skin temperature before exercise are popular among top athletes, some of whom go as far as wearing frozen underwear. In a [study](#) by Oliver Gibson, a senior lecturer in exercise physiology and a researcher in environmental extremes at Brunel University, runners were asked to lower their skin temperatures by draping cold, wet towels around their necks, plunging an arm into a bucket of icy water, wearing a frozen cooling vest and slipping on underwear inserted with ice packs before running hard for 30 minutes on a treadmill in a lab heated to almost 32C.

Thankfully you don't need to go to all of these extremes. Gibson says sticking a towel in the freezer then placing it around your neck and shoulders for a few minutes is a tried-and-tested method. Immersing your hands into a bucket of icy water is the quickest way to precool. “Our hands have a high surface area-to-volume ratio that predisposes them to rapid heat loss,” Tipton says.

You could also try spritzing your clothing with a fine spray of water and insect repellent. “This has a double-whammy effect of cooling the skin and accelerating the mechanism that triggers sweat to evaporate from the skin,” Taylor says. “It will generally take the body five to ten minutes to start cooling itself by evaporating sweat, but by spraying your clothing you will give it a head start.”

Sip an ice-cold drink before you start

Gibson’s research has shown that taking icy drinks before a run resulted in runners sustaining a faster pace — but only in the short term. “Adding ice cubes to a drink consumed about 15 to 20 minutes before you exercise in heat will make you feel cooler for a while and might help you run or cycle better because you feel more comfortable,” Gibson says, “but the effects won’t translate to big improvements in performance.” Cold drinks also encourage hydration, he says. “Research shows the temperature of a drink influences how palatable it is.”



Remember to apply sun cream regularly

ALAMY

Always apply (and reapply) SPF

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Outdoor exercisers — from golfers and tennis players to cyclists and runners — are notoriously bad at applying sunscreen. Surveys by the Sun Safety Code, a campaign backed by more than 80 sports governing bodies including the British Association of Sports and Exercise Medicine, reveal that 40 per cent of young people who play sport apply no SPF. Consequently rates of skin cancer are much higher among people who exercise under the sun’s harsh rays than the rest of the population.

A study by dermatologists at the Medical University of Graz in Austria looked at 210 runners in training for a marathon and a control group of 210 non-runners who were matched for age and sex. The results, published in the *Archives of Dermatology*, revealed

that only half of the runners used sunscreen regularly and had more skin lesions suggestive of basal cell and squamous cell carcinomas, skin cancers that are malignant and can spread but are less aggressive than the more deadly melanoma.

It's not just the sun that poses a risk. It's possible, suggested the researchers, that the training regimen of the marathon runners may have left them even more vulnerable to skin damage by lowering their immunity. "It is absolutely essential to apply SPF to exposed skin when you exercise outdoors," Tipton says. "Apply factor 50 half an hour before you head out and wear sunglasses and a peaked hat for extra protection."

Sunscreen starts to lose effectiveness at about the two-hour mark, or even sooner if you are sweating heavily, so you will need to reapply every hour that you are outside. Look for brands that have both UVA and UVB protection and are sweat or water-resistant.

How much water do you need to drink?

Dehydration and overhydration are a risk in hot weather, so how do you know if you are taking in the right amount of fluids when you work out? In general, says Anita Bean, a registered sports nutritionist and author of *The Complete Guide to Sports Nutrition*, an intake of 400 to 700ml an hour when exercising in very hot weather will prevent dehydration as well as overhydration, but it helps if you can establish how much fluid your body typically loses through sweat.

"You can get a good idea of your individual sweat rate by weighing yourself before and after your workout, then subtracting your post-workout weight from your pre-workout weight," Bean says. "The amount you have lost in kilograms is equal to litres of fluid lost, so if you lose 1kg in weight you have lost 1 litre of fluid and will need to replace that during and after exercise."

Drinking too much raises the risk of hyponatraemia, or water toxicity, when body salts can become dangerously diluted. "Our stomachs empty fluids at a rate of about three quarters of a litre per hour," Tipton says. "If you drink a litre an hour you risk overfilling your stomach and will feel nauseous. Drink if thirsty is the rule when exercising."

Do you need to replace electrolytes?

Sports drink manufacturers promote the idea that replacing electrolytes — the body salts such as potassium and magnesium excreted in sweat — is essential when exercising. That is certainly true if you work out intensely for longer than an hour in high temperatures, a recent [study](#) by physiologists at Edith Cowan University in Australia found that electrolyte-enhanced water made runners less susceptible to muscle cramps than drinking pure water. However, Bean says you can make your own drink by mixing 200ml regular squash with 800ml water and 1.25-2.5g salt.

He adds that immediate electrolyte replacement is not necessary if you are just doing a 5km run or 45-minute cycle. "Replacing of electrolytes during exercise is unnecessary for most people and you only really need to think about it if you're exercising for longer than

two hours or sweating heavily for more than an hour in hot, humid conditions,” Bean says. “Drinking plain water and eating plenty of fruit and vegetables during the day will replace any electrolyte losses.”

Take a hot shower or warm bath when you finish

It sounds counterintuitive, but either will help your body to acclimatise to hot conditions. In a comprehensive [review](#) of evidence about exercising in the heat, Gibson reported that standing under a warm shower or soaking in a bathtub for ten minutes after a warm-weather workout prompts our bodies to adapt their tolerance of heat. “Lying in a hot bath can amplify your body’s adaptations to heat without you needing to spend more time outside,” Gibson says. “It is an easy and beneficial way to acclimatise to warmer conditions.”

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