# Understanding the physiological toll of running the London Marathon



Tens of thousands of participants are set to take part in the London Marathon this weekend, embarking on the challenging 26-mile run that places immense physical demands on the body. Experts have outlined the physiological effects experienced by runners before, during and after the race, highlighting some unexpected health consequences that may arise throughout the event.

In the moments leading up to the race, even before the starting gun sounds, runners' bodies undergo significant hormonal changes. Physiotherapist Sammy Margo, affiliated with the muscle and joint care brand Deep Heat and Deep Freeze, explained that anticipation triggers a surge in adrenaline and cortisol. She noted, "Adrenaline is part of the body's 'fight or flight' response prepping muscles for action," while cortisol, dubbed the 'stress hormone', helps unlock energy reserves. This hormonal activity causes an increase in heart rate, blood flow and breathing rate as the body prepares for exertion. "People have been building themselves up for this event which for some is a major life milestone for months if not years. It's a big deal," Ms Margo remarked.

Once the race begins, the body taps into its energy stores, primarily using glycogen stored in muscles to fuel the initial hour of running. According to Ms Margo, after an initial heart rate spike at the start, a runner's heart rate stabilises at about 60 to 80 per cent of their maximum. The increase in body temperature triggers sweating to regulate heat, with some runners experiencing rises of a couple of degrees depending on individual and environmental factors. Personal Trainer Elyn Marwick, also of Deep Heat and Deep Freeze, stated that muscle damage begins within the first hour through microscopic tears in muscle fibres. She clarified, "They're not going to impact you in that first hour, they'll just start accumulating."

The second hour often sees the onset of pain and soreness as by-products of muscle energy burning, such as lactic acid, accumulate. Ms Marwick explained that this buildup can cause cramps and discomfort, particularly in the legs which bear the brunt of the effort. Glycogen reserves begin to diminish roughly between 60 to 90 minutes into the run at moderate heart rates, making carbohydrate intake critical. "If you don't start to fuel up a little bit with carbs, from sweets, gels or energy drinks, you're going to run out of that glycogen and then out of energy," she said. Sweat losses can amount to two to four litres by the race's end. As glycogen depletes, the body increasingly burns fat for energy, which tends to be less efficient, and stress hormone levels rise further to sustain exertion.

By the third hour, many runners encounter "the wall," a phenomenon characterised by sudden energy collapse. Ms Margo elaborated, "Your fat becomes your main fuel source, which is less efficient." This period intensifies dehydration, electrolyte imbalance, and muscle damage. Joint pain in areas like the ankles and knees also becomes more pronounced due to prolonged stress. Additionally, the immune system weakens at this stage, increasing susceptibility to infections as the body grapples with stress and reduced energy.

As the marathon enters its fourth hour, muscle damage intensifies, increasing injury risks, and stress hormones continue to surge. Ms Margo cautioned about the dangers of hyponatremia—a condition resulting from consuming excessive fluids too rapidly, leading to dangerously low sodium levels and brain swelling with potentially fatal outcomes. This condition was responsible for the death of 22-year-old London Marathon runner David Rogers in 2007. In these final grueling moments, some runners may appear lethargic or "zombie-like," sometimes requiring assistance to finish the race. "People can look like zombies, and someone can come and pick them up to help them finish," Ms Margo noted.

After crossing the finish line, the marathon's effects on the body can persist for several days. Ms Margo highlighted that the immune system remains compromised for 24 to 72 hours post-race, increasing infection risk. Glycogen replenishment may take up to two days, and muscle soreness often peaks after the event as the body recovers from sustained physical stress. To aid recovery, Ms Marwick recommended that runners continue gentle movement rather than collapsing immediately after finishing.

An intriguing observation is that runners can experience a temporary reduction in height by approximately 1 centimetre due to the compression of vertebrae caused by hours of continuous running. This effect naturally reverses within around 24 hours following the marathon.

The various physiological challenges involved in running a marathon—from pre-race hormonal surges to post-race recovery—illustrate the extensive impact of this endurance event on the human body. With the London Marathon poised to take place this weekend, participants will once again navigate these demanding physical and metabolic processes over the course of the race.

Source: [Noah Wire Services](https://www.noahwire.com)

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