

Can exercising for just 60 seconds a week transform your health?

By DR MICHAEL MOSLEY

Dr Michael Mosley says his insulin sensitivity had improved with High Intensity Training (HIT)

The men in my family are not long-lived. My grandfather died in his early 60s (though the fact that he was a Japanese prisoner in Burma during World War II can't have helped), while my father passed away at the relatively early age of 74. When he died, he was on a dozen medicines and suffering from a range of diseases, including type 2 diabetes, heart failure, prostate cancer and what I suspect was early dementia.



At his funeral, a number of his friends commented on how similar I am to him. This was both flattering and disturbing, because I fear, along with his prominent nose, that I've inherited many of his more unhealthy tendencies.

But I also believe that although genes play a significant role in how well we age, lifestyle is just as important.

Down the centuries there have been lots of anti-ageing therapies, from injecting monkey glands to mega-doses of vitamins. But only a few things have consistently been shown to influence how well we age.

These include not smoking, moderate drinking, eating a diet rich in fruit and vegetables, doing exercise and keeping your weight down.

I've never been a smoker or a heavy drinker and I like fruit and vegetables, so that's not a challenge. But when it comes to doing more exercise and staying slim, well, that has been far trickier.

I found the standard advice - eat less and be more active - largely ineffectual. I kept trying and failing. Then, a couple of years ago, I began looking into a radically different approach to exercise called High Intensity Training (HIT). The idea is that instead of trying to shed weight and get healthier by jogging for hours, you can get many of the more important benefits of exercise from as little as three minutes of HIT a week.

Everyone agrees that getting more active will add years to your life (around 2.2 years, to be exact).

But, more importantly, it will significantly reduce your risk of developing a range of chronic diseases, from cancer to heart failure, dementia to diabetes.

Exercise will also help you sleep better, improve your mood and even perk up your sex life, according to the well-regarded Mayo clinic in the U.S.

But how much should you do? In 2008, a committee of U.S. scientists recommended 150 minutes of moderate exercise a week, while cautioning the necessary amounts 'cannot yet be identified with a high degree of precision'.

'In trials, most people say they prefer HIT to conventional exercise, not least because it is over so quickly'

This 150 minutes a week remains the recommended level despite the fact that less than 20 per cent of us do anything like that. The most common excuse is a lack of time. That has certainly been mine - which is why the idea of HIT appeals to me.

Roger Bannister was a 'fast' exerciser

The principles behind HIT are not new. In Fifties Britain, a young medical student called Roger Bannister was determined to become the first person in the world to run a sub-four-minute mile. He didn't have lots of spare time for training so he would go down to the track and do interval sprints. These consisted of running flat out for one minute, then jogging for two or three minutes before doing another one-minute sprint. He would repeat this cycle ten times, then head back to work. The whole thing normally took less than 35 minutes. In May 1954 he became the first person in the world to break the four-minute mile. Since then almost every middle-distance runner has done interval sprints as part of their training.

Jamie Timmons, professor of systems biology at Loughborough University, has spent many years researching the benefits of what has come to be known as HIT in normal people. He assured me that three minutes of HIT a week have been shown to improve the body's ability to cope with sugar surges (i.e., your metabolic fitness), and how good the heart and lungs are at getting oxygen into the body (your aerobic fitness).

Just three sessions of HIT a week for four weeks (12 minutes of intense exercise in total) made a difference. These two measures are great predictors of future health. Intrigued, I had blood tests taken and went through some baseline tests to assess my starting point fitness-wise. Then I began to do HIT.

I got on an exercise bike, warmed up by doing gentle cycling for a couple of minutes, then started to pick up the pace. At the same time, I increased the resistance on the bike by setting it to the hardest level and then went flat out for 20 seconds. I cycled gently for a couple more minutes to catch my breath, then did another 20 seconds at full throttle. Another couple of minutes' gentle cycling, then a final 20 seconds going hell for leather and that was it. In no more than seven minutes my exercise for the day was complete. I did three sessions of HIT a week for four weeks (12 minutes of intense exercise in total) and then went back to the lab to be retested.

The first surprise was the effect it had on my insulin sensitivity. This is a measure of the amount of insulin your body has to produce in response to a sugar surge to get that blood sugar back down to normal.

The less your body has to produce, the better. After 12 minutes of intense exercise, my insulin sensitivity had improved by a remarkable 24 per cent, something you would be unlikely to see after many hours of conventional exercise.

But although I was able to cycle longer and harder, I didn't see the 10 per cent improvement in aerobic fitness that typically happens when people do this regime. Why not? Well, it turns out that when it comes to aerobic fitness, I can blame my parents. I've had a genetic test which reveals that, like 20 per cent of the population, I am a so-called 'non-responder' when it comes to aerobic fitness. This means that however much exercise I do, in whatever form, I will never become incredibly fit.

Despite this, I have continued doing HIT because of the other benefits, which include improvements in my mood, metabolic fitness (sugar surges) and appetite control. I've found (and numerous studies support this) that doing HIT has a significant effect on the number of calories you eat over the following 24 hours following the session.

An Australian study involving overweight men in their 20s and early 30s found that the men ate fewer calories after doing very high-intensity workouts (594 calories) than after moderate exercise (710).

Furthermore, they reported eating fewer calories on the day following the high-intensity workout (2,000 calories) than after a moderate session (2,300).

This helps explain why, although HIT is so short, it seems to be more effective at helping people cut their weight than conventional exercise. Just three 20-second 'workouts' a week is not the least amount of exercise you can do that has been shown to be effective.

In 2011, Dr Niels Vollaard and colleagues at Bath University did a study in which they asked 15 healthy but sedentary young men and women to try something they called REHIT (reduced exertion high-intensity training) for six weeks. He started them off in the first week with a couple of minutes of gentle cycling, then one ten-second burst of intense cycling followed by a couple of minutes of cool-down.

In weeks two and three each exercise session consisted of a warm-up, 15 seconds of all-out sprinting, a couple of minutes of recovery, another 15 seconds of all-out sprinting, then the gentle cool-down. For the final three weeks they cranked it up so each exercise session consisted of two 20-second flat-out sprints separated by a couple of minutes of recovery.

Despite the fact that over the six weeks the volunteers had done less than ten minutes of hard exercise, both the men and the women showed significant improvements in their aerobic fitness. When it came to insulin sensitivity, there was a gender difference: the men's improved by 28 per cent while the women's did not improve.

Niels is keen, at some point, to see if a single burst of 20 seconds done three times a week makes a measurable difference.

So how can you get so much change in such little time?

Part of the explanation is that HIT makes your muscles produce new and more efficient mitochondria, the tiny powerplants in your cells that convert glucose into useable energy.

The more mitochondria you have, the more power they produce and the more fat and sugar they consume.

The stress caused by HIT also leads to the release of large amounts of catecholamines - which are hormones such as adrenaline and noradrenaline - that target fat cells, particularly those in the abdomen.

A day's exercise could simply be a couple of minutes' gentle cycling, then 20 seconds going hell for leather. No more than seven minutes

In trials, most people say they prefer HIT to conventional exercise, not least because it is over so quickly. And the good news is that scientists like Jamie Timmons have developed a gentler version: the 60-second workout.

The basic principle is to alternate 60-second bursts of activity with 90-second recovery periods - i.e. one minute on, 1½ minutes off.

It can be done cycling or running, though it helps if you are able to adjust resistance. In the case of running or cycling outdoors, this means finding a hill to run up. You might think that 60 seconds of HIT has to be tougher than the 20-second bursts of standard HIT, but this version is not.

The key difference is that you don't push yourself quite as hard. Instead of going flat out, you exercise for a minute at about 90 per cent of your best effort, aiming to push your heart rate up to around 150 beats per minute. Beginners should start with two bursts of one minute (three times a week, that's just 24 minutes of exercise a month if you stick to the very basic rate), going up to ten bursts of one minute if you are really fit.

I now combine one-minute HIT (going at 100 per cent) with a very simple strength and flexibility regimen which, though it takes less than ten minutes, three times a week, has led to some impressive biceps and the beginnings of a six-pack.

Could it be dangerous?

Many people will wonder, however, if HIT is safe unless you are really fit. A year ago, the popular BBC broadcaster, Andrew Marr, had a debilitating stroke some hours after doing an intense workout on a rowing machine. So did the exercise cause the stroke?

'If you are frail or extremely unfit it would be wise to have a medical check-up before starting any form of exercise, but don't use that as an excuse not to start'

It is certainly possible that the prolonged and vigorous movement involved in working out on a rowing machine could have torn previously weakened blood vessels in his neck.

But it is also possible that his stroke had nothing to do with the workout.

Studies on people with blood vessels weakened by a previous condition, such as stroke, or who were born that way, show that something as innocuous as sneezing or a turn of the head can trigger a stroke. Andrew had had at least one silent stroke (with no obvious symptoms) before and was under a lot of stress; stress is a significant cause of stroke. The forms of HIT that I've tried do not involve prolonged exertion and have been extensively studied to ensure they are safe.

These studies include trials done with nearly 5,000 patients who have a previous history of heart attacks and strokes.

If you are frail or extremely unfit it would be wise to have a medical check-up before starting any form of exercise, but don't use that as an excuse not to start.

You can get a dose of HIT while walking or even from climbing the stairs. The benefits greatly outweigh the risks.