

## CARDIO TRAINING

# The truth about Tabata

Intervals have become popular once again, with many health and fitness professionals claiming to incorporate a form of interval training known as the Tabata protocol in their programming. [Christian Finn](#) takes a look.

### What is VO<sub>2</sub>max?

VO<sub>2</sub>max is a way of measuring aerobic power. It tells you how much oxygen your body can use at a maximal level of effort and is usually expressed in millilitres of oxygen per kilogram of bodyweight per minute.

**W**hen Roger Bannister became the first man in history to run a mile in fewer than four minutes one blustery afternoon in May 1954, a large part of his speed and stamina was developed using interval training.

Now interval training is on the rise, with many health and fitness professionals claiming to incorporate the Tabata protocol into their programming. Unfortunately, the vast majority of them are doing nothing of the sort. In fact, many of the purported benefits of Tabata intervals extend far beyond those shown in the original study back in 1996.

### What are Tabata intervals?

Tabata intervals are named after a Japanese scientist called Dr Izumi Tabata. Tabata published a study in 1996

comparing conventional aerobic exercise with high-intensity interval training (HIIT).<sup>1</sup>

In his study, Tabata took two groups of male students with an average age of 23. Most were physically active and had a VO<sub>2</sub>max in the 'excellent' category. Group one did 60 minutes of moderate-intensity exercise five days a week. Group two (the interval group) also trained five days a week but performed up to eight 20-second sprints of high-intensity cycling with a 10-second rest (pedalling at a slower rate) in between. This was sandwiched between a 10-minute warm-up and cool-down.

On the fifth day, the interval group also did 30 minutes of steady-state exercise at 70% of their VO<sub>2</sub>max. This was followed by four intervals, also of the Tabata protocol.

Tabata found that athletes using HIIT increased their VO<sub>2</sub>max and anaerobic capacity to a greater extent than athletes on a typical endurance training regime, despite big differences in the amount of time each group spent working out.

The figure below shows the average change as a whole in VO<sub>2</sub>max in both the HIIT group (black line, filled circles) and the steady-state group (dashed line, white circles).

In the steady-state group, VO<sub>2</sub>max increased from 53ml/kg/min to 58ml/kg/min, which represents a 10% improvement. VO<sub>2</sub>max in the HIIT group went from 48ml/kg/min to 55ml/kg/min, an increase of approximately 15%. It is worth noting that, as the interval group started out with a lower VO<sub>2</sub>max value, there may have been a greater potential for improvement.

These results demonstrate why the Tabata protocol generated so much interest. The HIIT group was able to increase its VO<sub>2</sub>max to a greater extent than the steady-state group, despite exercising for only a fraction of the time.

### Is Tabata used today?

Some of the ways in which Tabata's research has been applied, as well as claims about the fat-burning potential of Tabata intervals, extend way beyond what was shown in the research.

For example, some trainers like to use kettlebell swings, front squats or bodyweight exercises with a 20-second work interval and 10 seconds of rest, and call it a Tabata interval.

Although this might replicate the time sequence of the Tabata protocol, it's not going to produce the same kind of gains in VO<sub>2</sub>max simply because of the big difference in intensity.

The Tabata protocol involves 'all out' sprinting on a stationary bike. This is not a level of intensity that gets you a little out of breath. It's a type of training that will leave you feeling like throwing up. If your first set is performed at a submaximal effort level that becomes maximal on the last few sets, it's still not the same. It might feel hard but it isn't a Tabata interval.

What's more, if you're using a movement like kettlebell swings that requires a certain amount of skill, fatigue can cause your form to break down, potentially exposing you to a higher risk of injury. When fatigue starts to kick in on a stationary bike, the worst thing that happens is that you stop pedalling.

### Fat loss

Tabata's research looked at the effect of HIIT on VO<sub>2</sub>max and anaerobic capacity. He did not look at fat loss, post-exercise calorie expenditure (EPOC) or any of the other things that some people are claiming. No matter how hard you push yourself, there's a limit to the number of calories you can burn in such a short workout.

It's true that intense exercise boosts oxygen consumption (EPOC) and calorie expenditure after exercise to a greater extent than moderate-intensity activity. However, the effect of EPOC isn't as great as some people seem to think. A research review on the subject of EPOC and weight loss<sup>2</sup> concludes the following:

Tabata involves 'all out' sprinting on a stationary bike – it's a type of training that will leave you feeling like throwing up.



"[T]he earlier research optimism regarding an important role for the EPOC in weight loss is generally unfounded. This is further reinforced by acknowledging that the exercise stimuli required to promote a prolonged EPOC are unlikely to be tolerated by non-athletic individuals. The role of exercise in the maintenance of body mass is therefore predominantly mediated via the cumulative effect of the energy expenditure during the actual exercise."

The researchers are making two main points. Firstly, that "the exercise stimuli required to promote a prolonged EPOC are unlikely to be tolerated by non-athletic individuals."

What they're saying is that the type of workout needed to generate a large post-exercise calorie burn, both in terms of time and intensity, simply isn't a realistic goal for many.

Even for athletic individuals, problems with recovery can be a real issue. HIIT is an extremely demanding form of exercise, especially if you're combining it with two or three sessions of resistance exercise and a restricted calorie diet.

Pushing your body so hard on a regular basis, week in and week out, can leave you feeling burned out and, if not overtrained, certainly overreached.

The second point made by the researchers is that "the role of exercise in the maintenance of body mass is therefore predominantly mediated via the cumulative effect of the energy expenditure during the actual exercise."

This means that the calories burned during exercise will make the biggest contribution to calorie expenditure and increasing that number is going to have a much larger impact on fat loss than EPOC.

In summary, HIIT is both an effective and time-efficient way to boost your VO<sub>2</sub>max. But it's not a magic bullet. There are many different ways to do cardio and all of them have their place at different times and for different people. Reports of the "death" of steady-state cardio have been highly exaggerated.

For the references mentioned, visit [www.fitpro.com/references](http://www.fitpro.com/references) a sprawl technique. **fp**

