VO_2 Max

What is a VO_2 max?

Your VO_2 max is basically a measure of how efficiently your body can use oxygen.

When you run your muscles are obviously using more oxygen than normal and so your heart and lungs have to work harder to supply this amount of oxygen to your muscles. However, there will reach a point when you are running so fast that you can't get enough oxygen and so your body starts to get enery anaerobically (without oxygen). At this point you have reached your VO_2 max. The higher your VO_2 max is, the faster you can run without experiencing fatigue.

Due to a variety of physiological reasons women tend to have a lower VO_2 max than men.

How is it measured?

Calculating your VO_2 max scientifically involves a complicated equation known as the Fick equation which takes into account your cardiac output, arterial oxygen content and venous oxygen content. Obviously this isn't possible to do without a specialist lab but you can calculate an estimate of your VO_2 max using the Cooper Test.

This basically involves you running as far as you can in 12 minutes and then putting the distance run into an equation (there are lots of websites which will do this quickly and easily) which will provide an estimate of your VO_2 max. Your running watch might also calculate it automatically after this test.

Can you improve your VO_2 max?

VO_2 max is largely determined by genetics but it is still possible to improve your VO_2 max with the right training.

There are lots of different ways you can improve your VO_2 max and there is quite a lot of debate on the best way to do this. But, you basically need to be running at, or close to your VO_2 max in order to improve it.

One study(1) found that running fast for four sets of four minutes (at 90-95% of your maximum heart rate) with three minutes of active recovery (at 70% of your maximum rate) in between each set was an effective way to increase your VO_2 max.

This type of training won't feel easy, but it will lead to improvements in your fitness and speed.

(1) Helgerud, J., Høydal, K., Wang, E., Karlsen, T., Berg, P., Bjerkaas, M., ... & Hoff, J. (2007). Aerobic high-intensity intervals improve V˙ O2max more than moderate training. *Medicine & Science in Sports & Exercise*, *39*(4), 665-671.