

Minimum speed needed to improve the Maximum Aerobic Capacity.

When we run, the rate of oxygen consumption increases proportionally to the speed at what we are running: the most quickly we go, we need to ventilate more and more oxygen is consumed to cover great part of the energy demand of the muscles involved in the movement. But there is a point in which we cannot continue increasing the speed of running or a point where in spite of an increase of the speed not produces a concomitant increase of the oxygen consumption. This is known as the maximum capacity of consumption of oxygen VO_{2max} .

The VO_{2max} is specific for each sport, being observed in an individual different value for different disciplines; as the cycling, the swimming and the running. For a long of time it was believed that the VO_{2max} was the best parameter to predict the acting of a resistance athlete. A runner that had a VO_{2max} of 80 ml/Kg min should win one of 75 ml/Kg.min.

However, by the time, and the accumulation of experimental data it is known that a high VO_{2max} only explains part of the success and that it is not the best physiologic parameter to predict the result in long distances races.

Nowadays, other parameters, as the running economy and the speed at the VO_{2max} (vVO_{2max}), demonstrated to be much more necessary to predict the acting of a runner. In particular, the vVO_{2max} is of enormous importance for races as 3,000 and 5000 meters that are running very near at that speed. For coaches the vVO_{2max} is very useful and we will illustrate how. The vVO_{2max} is defined as the minimum running speed at what the maximum oxygen consumption is reached.

A female runner that moves effortlessly to a pace of 4.58 min/Km (3.35 m/s) uses 70% of her VO_{2max} . If the same athlete increases her pace progressively until 3.44 min/Km (4.45 m/s) will reach 100% of her aerobic capacity, in others words, that is to say, her VO_{2max} . Then her VO_{2max} is located at 4.45 m/s.

From the resting, for the athlete took about 2 min to reach their VO_{2max} running at pace of 3.44 min/Km (4.45 m/s). If a training program is designed to improve the one's VO_{2max} and the vVO_{2max} , the intervals should not demand vVO_{2max} and it duration it should be smaller than 2 min. Otherwise they won't fulfill the objective of the session.

It is recommended to try to take out the maximum profit of the minimum quantity of training. If, for example, the coach plans intervals of 3 to 5 min wit recovering time of 3 to 5 min, it is an mistake to demand higher speeds that the current vVO_{2max} of the of the runner, because the total time in the VO_{2max} will be the same one without additional benefits. Even more, when a superior speeds that the vVO_{2max} demanding, the runner possibly will get

tired and won't be able to complete the last intervals at the minimum speed ($vVO_2\max$) for an efficient training.

An efficient training would be as 5 x 3min at 4.45m/s, with 3 min of recovery. It is also possible to reach an efficient training of the one $VO_2\max$ and the $vVO_2\max$ with short intervals less than 2 minutes, but with recoveries equally short. For example, 10 x 400m to 4.45 m/space with 45 seconds of recovery between each one.

Maybe in the first 2 intervals the $VO_2\max$ is not reached, but by the rest it will be accumulated a good quantity of time in the $VO_2\max$. With this example we illustrate the importance of defining the objective of a session of training and that the design of the stimuli is adjusted to the objective in question.