

## THE ENDURANCE COACH.COM

### Elite Performance Mountain Bike Racing

Whether you are racing mountain bikes or riding hilly road races, time trials and sportives, there are some key factors which determine your performance. Here are the 5 critical factors according to The Endurance Coach:

#### 1. Aerobic Capacity

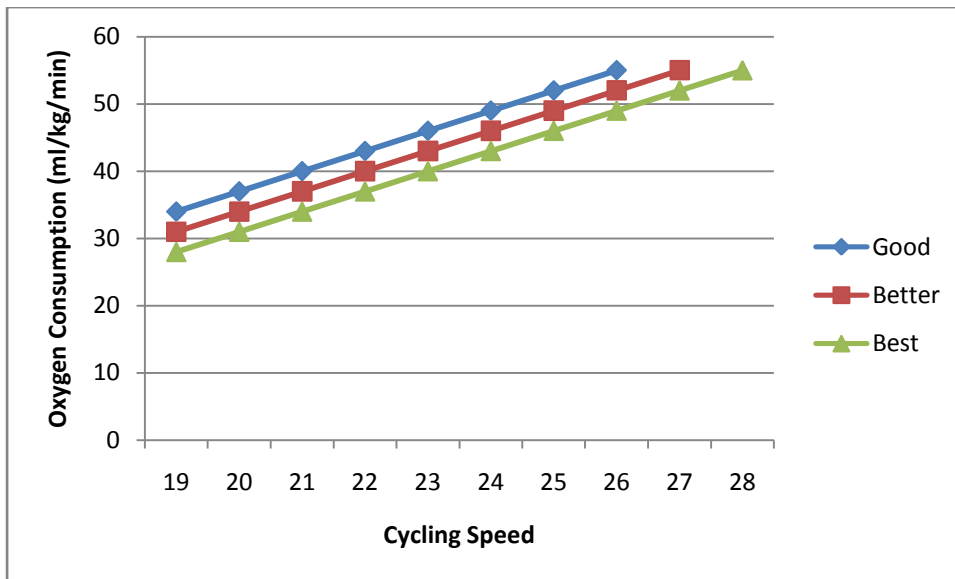
Aerobic capacity refers to the amount of oxygen your body can absorb and use to create energy, Your VO<sub>2</sub> maximum is the common measurement for aerobic capacity and is measured as ml/kg/min. This refers to the maximum amount of oxygen in millilitres, which can be absorbed by each kilogram of body weight per minute. Aerobic capacity quite simply is the size of your aerobic engine.

Your aerobic capacity will be influenced by your heart, blood vessels and blood composition as this provides working muscles with the oxygen they need. Oxygen supply is useless unless the muscles can do something with it so muscle fibres also have a role to play. There are 2 types of muscle fibres, slow twitch and fast twitch, it's the slow twitch fibres which are most adept at utilising oxygen and you're either born with them or you're not.

#### 2. Aerobic Economy

Aerobic economy relates to 'miles to the gallon' and this has a huge impact upon your performance. The size of the engine (VO<sub>2</sub> maximum) may not be the critical part of a long race, it's the fuel consumption at any given time, races are often won not because someone has a bigger engine but because they burn less fuel and hold pace better in the final third of the race.

Consider the 3 riders below, all of them have the same VO<sub>2</sub> maximum of 55 ml/kg/min but they are very different with regards to economy. The 'best' rider consistently uses less oxygen at all cycling speeds and as a consequence is able to ride at 28 mph before finally reaching their maximal capacity, the other 2 riders reach their maximal capacity at 26 & 27 miles per hour. This clearly shows that VO<sub>2</sub> maximum is not the only predictor of performance, it's how much of your engine you use for any given cycling speed.



- Anaerobic power is the ability to produce short and powerful bursts such as those required on short sharp climbs. In longer races you should always try to ride with a consistent power output and avoid big spikes as these burn lots of fuel. However, in shorter races where fuel usage is less of an issue, the ability to maintain speed and 'drive hard' up short climbs without automatically reaching for the gear shifter is a big advantage, especially when coupled with the ability to recover quickly on the downhill and repeat the process.

Although mountain bike racing is an endurance event which places greatest demands on the aerobic system, constantly rolling courses often demand repeated short bursts of power followed by recoveries on downhill sections. In longer events this would have the same impact as constantly changing into 2nd gear and hitting the accelerator whilst driving on the motorway, it guzzles fuel as your rev counter repeatedly dips into the red. However, in shorter races where fuel consumption is not so critical, it may well be the fastest way to ride the course.

- Power to weight ratio is relevant to all of the above. Whilst maximal aerobic capacity and anaerobic power are important, they become a far better predictor of performance when body weight is taken into account, especially when you are climbing hills!

Power output measured in watts is the recognised predictor of cycling performance and riders are often discussed in terms of how many watts they can produce for a given period of time. More critical than the number of watts you can produce is the power to weight ratio which is generally measured as watts/kg.

Calculating the power to weight ratio is simple, first you calculate how many watts you can produce in a maximal test or the number of watts you can hold for a set period of time such as 1 hour. The next step is to divide this figure by body weight to give you perhaps the best indicator of your potential performances.

Rider 'A' can hold 320 watts for 1 hour over a hilly course and weighs 80kg, their power to weight ratio for 1 hour = 4.

Rider 'B' can hold only 300 watts for 1 hour over the same course but they weigh only 60kg. Their power to weight ratio for 1 hour = 5.

Rider 'B' wins.. every time.

5. Our final requirement for elite performance relates to the technical demands of mountain bike racing. There is little point being first to the top if you then lose several minutes by the time you arrive at the bottom. When 'training' it's easy to become focused on 'fitness' only and forget technical requirements. If you know that cornering and descending are a weakness then you should spend some time developing this area to ensure that you are a 'balanced' rider.

Technique stretches further than just cornering and descending. Being able to sit still on the bike, pedal smooth, select the best gear and correct pace judgement are vital skills which are not simply learned by experience alone. As with any other skill, they will only improve over time if you dedicate time and attention to perfecting these aspects of your riding.

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