

The Importance of High Cadence In Cycling

Have you noticed other riders in the club, legs whirling at dizzying speeds no matter what terrain that they're on? It looks tiring, but they seem to be able to ride that way for hours on end. High cadence is all about efficiency and has close links to our body's energy systems, musculature and our nervous system. So why is high cadence practiced by so many advanced riders?

Maintaining a high pedaling cadence is an advanced technique for dividing up the workload in cycling into smaller more manageable intervals. Think of it this way, say you have a pallet of 5 kilogram bags of flour that need to be moved onto shelving. Two methods could be used:

1. You move 4 bags (20 kilograms) at a time and move them all in this way. The weight seems manageable at first, but as time goes on your muscles fatigue and you're forced to slow down or stop.
2. You grab just one bag at a time, but you move them much faster. The weight is manageable, and it feels like you could do this all day.

In the end all of the bags get moved, but in the first scenario your muscles are fatigued to the point that you would need to rest before performing any more work. In the second scenario you were breathing heavier while you were working, but your breathing returns to normal very quickly after the flour is moved. You can go back to work almost immediately.

So how fast should your cadence be and how is it done? It has been found that it is biomechanically best to keep cadence in the range of 80 – 90 revolutions per minute (see diagram 1 – next page). Smaller lightly muscled riders will generally spin faster, while larger heavily muscled riders will generally spin slower within that range. To accomplish this, several changes to the way you pedal will need to happen:

1. Be sure to have your bike fit assessed and adjusted by a qualified bike fitter.
2. Become attached (besides emotionally) to your bike with a step-in pedal/shoe system.
3. Concentrate on making your pedaling motion more rounded. At the bottom of the power phase pull the crank arm back and up as though you're scraping mud from the sole of your shoe.
4. As each foot comes to the top on each revolution start your power phase sooner driving the pedal forward.

It takes time to train your nervous system to become "hard-wired" to fire your muscles for this new smooth spinning style – so keep working on it. A cycling computer with cadence function can be of benefit, at least in the early stages of your transformation. If you have a spin bike or can put your bike on a mag trainer do one leg drills until you can smoothly spin 90 rpm with each individual leg.

Most new riders also find this higher rpm pedaling more aerobically taxing at first, but that's okay as the aerobic energy pathway can be maintained indefinitely with proper hydration and fueling. Aerobic capacity improvement also occurs relatively quickly. The alternative of pushing a higher gear only in the short downward power phase taps into another energy pathway and muscle fibres that are limited to about 2 hours in a trained athlete. Once that energy pathway and those muscle fibres are exhausted it takes 24 to 48 hours to recover.

Another benefit of a higher cadence is that the load placed on the muscles, connective tissue and joints is substantially reduced. As a result, injuries are less likely to happen.

You may find that in order to keep a high cadence your selection of gears is reduced. This indicates that your bike is over-gearred for you. The solution is to either improve leg strength or switch out the cassette and/or chainrings to give an overall lower (easier) range of gears. Ideally you should have a wide range of gears that will keep you at 80-90 rpm regardless of the hill or wind conditions.

So, get out there and spin-spin-spin!

Diagram 1

The illustration above shows (starting at the top) the 3 energy pathways, the muscle fibres involved, types of fuel used and finally the consequences of pedaling for extended periods at either extreme.

