

TWO RELEVANT FACTS ABOUT BIKE POSITION

1. No Matter How Hard You Ride, There Should Be No Localised Quad Soreness.

Hands up anyone who experiences quad soreness post hard ride. By quad soreness I mean that sore, dead, no energy left feeling that many riders get when walking up stairs or exerting force with their legs after a tough ride. Many people think that this is normal; that the job of the quadriceps is to extend [straighten] the knee during the pedal stroke and that quad soreness is the price to be paid for this. Not so.

The quadriceps are the obvious extensors of the knee but there is another extensor mechanism that can be enlisted to help reduce the localisation of load to the quads, providing that the position of the cleats and seat are set to allow this to happen.

Most publications suggest cleat positioning that locates the ball of the foot over the pedal axle. If you push the cleats back further than this, in effect locating the ball of the foot further forward over the pedal, ankle movement is limited slightly to a range that can be well controlled with ease. With that pre condition and assuming that the seat position is somewhere near where it should be in its ideal fore and aft range for a particular rider, here is what happens.

The gastrocnemius, the bulk of what is known as the calf muscle, crosses the knee joint and attaches to the lower part of the femur [thigh bone]. The hamstrings, the large muscles at the back of the upper leg, also cross the knee joint and attach to the upper tibia and fibula [bones of the lower leg]. Both of these muscle groups working together contracting while the leg as a whole extends, has the effect of helping pull the knee joint backwards.

What this means is that when you have your foot in the right place over the pedal, and your seat in the right place for you fore and aft, the hamstrings and calves will assist the quadriceps in extending the knee. Done properly, you may ride so hard that you get off the bike jelly legged with muscle twitches going on for hours afterwards, but you will have no localised soreness. You will be able to walk upstairs without problem, or chase your children around or whatever. You will be tired, but tired everywhere.

If this sounds like something you need to be able to do then here is guide for the cleat position that will help in this regard for road riders. All distances relate to the centre of the ball of the foot being in front of the centre of the pedal axle with the shoe level and the crank arm horizontal and forward. Shoe sizes 36 – 38: 7mm; sizes 39 – 41: 8mm; sizes 42 and 43: 9mm; sizes 45 and 45: 10mm; sizes 46 – 47: 11mm; sizes 48 – 50 : 12mm.

These distances are approximate and sometimes need to be varied a mm or two either way depending on other factors [unusual pedaling technique,

high heel lift shoe lasts, injuries etc] but are unlikely to cause anyone any harm and help improve pedaling feel for the majority.

As to ideal seat position fore and aft, this is hugely variable from rider to rider and depends on differences in function and proportion. Simply, there is such variation in what is required by various people that all I can say is that the right place fore and aft for the seat is when you can support the majority of your weight, while riding with hands in the drops when the hands are removed from the bars.

2. *There Are 20 Odd Torso Muscles Used For Breathing, 18 Of Which Have Postural Implications. If Any Of These 18 Are Being Used To Bear Significant Weight Or Are Being Used To Stabilise With, Then They Are Not Fully Available To Breathe With.*

When a rider is riding really hard on a bike, the ability to breathe to the fullest capacity is fundamental. Under high heart rate, high load conditions; i.e. riding and breathing hard, if our ability to breathe is limited, the effects will be felt far more quickly than lack of food or lack of water. This should be self evident.

So how can we ensure that we breathe to the fullest capacity when riding a bike?

There are two major aspects to the answer to this question; posture and flexibility on one hand, and bike position on the other. With regard to posture and flexibility – to breathe to fullest capacity requires the largest possible vertical, transverse and fore and aft diameters of the thoracic cavity being maintained relative to what the body is forced to do. Simply, the more room the lungs have to expand, the greater the amount of air that can be taken in and the greatest amount of oxygen that can be transferred to the bloodstream. If the ability of the thoracic cavity to expand in any of the three directions in which it can is hindered by lack of flexibility or because of poor posture [or poor bike position], then the ability to breathe to greatest capacity is limited to whatever degree.

If the rib cage, spine or other thoracic structures are not sufficiently elastic; i.e flexible, then the ability to breathe fully is compromised at some level. I don't think this is appreciated by most bike riders. I was flipping through a well known cycling book the other day, one that is aimed at those who wish to coach themselves and to learn the principles involved and came to a chapter entitled "**Stretching For Cyclists**". There were stretches for glutes, hip flexors, quads, hamstrings, calves, etc, etc. Just about every muscle that is involved in the task of pedaling the bike was listed, but no mention of maintaining and improving the function of the musculature that allows us to "fuel the engine".

I think I have made my point. If you want to ride to potential, one of the boxes that needs to be ticked is do what is necessary to allow your self the best chance of being able to breathe fully while you are off the bike. Any

restriction of breathing ability because of less than ideal posture or flexibility off the bike will transfer onto the bike.

With regard to bike position – if you have a position on your bike that causes you to tighten the torso musculature noticeably to bear weight or to stabilize your self under load, you are restricting your breathing capacity and hence ability to perform optimally. There are many ways this can happen but here are a couple of examples.

Let's assume that where a rider has their bars positioned to ride in the drops causes them to have a sore upper back and neck on or after long or hard rides, a not uncommon circumstance. I am sure that they can cope with the discomfort, racing bikes is hard work, but they are restricting their breathing ability. A tight upper trapezius [the large kite shaped back muscle that extends from the base of the skull to the lowest thoracic vertebrae] usually causes or is associated with tight scalenes and intercostal muscles, which are respectively muscles that lift the rib cage and allow the rib cage to expand and hence play a part in allowing the lungs to fill to capacity.

As a second example let's assume a case where a rider is reaching a bit too far too the bars. Maybe the stem is too long or the seat is too far back, it doesn't really matter. Most riders shorten up their position somewhat under load because they are not as stable on a bike as they should be. For many people this will, while under severe load, cause them to arch their backs to stabilize themselves when riding really hard. Many of the people who do this will use their rectus abdominis [six pack] as it is flexor of the trunk as part of the process. Here is a test for you. While reading this, tense your six pack lightly or moderately. Now while holding that tension, try and take a deep breath. You have just found that you can't, yet that is what many do while they are going flat out on a bike.

There are a multitude of other examples that could be made but all have the effect of limiting respiratory efficiency at some level. This probably doesn't matter cruising in a bunch chatting to your mate at 30 km/h but it certainly does matter when you hit that steep hill or the speed ramps right up.

It is all about air. If you want to give your self the best chance of performing as well as you would like on a bike, do the miles, race the races but also make sure that you do what is necessary to allow you to breathe to the best of your ability on and off the bike.

This means improving posture and flexibility to allow best breathing efficiency and ensuring that the position that you have on the bike allows efficient breathing as well.

Postscript: I was reading a science article in a Sunday paper recently about aging. Amongst a lot of other stuff was a commentary about the reduction in height of old people due to shrinkage of intervertebral discs and increased stoop in posture that many elderly people adopt. The article made the point that the typical 80 year old is 100mm (4 inches) shorter than they were at 30 years of age and that for every 25mm (1 inch) of lost height there was a 10% decrease in lung capacity!