

BIKE FIT & HOW TO AVOID KNEE PAIN

By Kenneth Lundgren

You can ride a \$10,000 Trek, but if your position on that machine isn't comfortable or efficient, then that's ten grand straight into the toilet.

No matter what: the bike fits *you* – you don't fit the bike.

Let's start with the cleats. Basically, you want to put them under the balls of your feet. Some riders like to put them a little more forward to get more power. Some riders who pedal heel-down like to position them further back, so they can generate more force with the upstroke.

For saddle height, I like to keep it simple: if the saddle's too low, your knees are considerably bent. If the saddle's too high, your hips will rock. So, in a proper position, your knees are slightly bent. Raise the seat until the hips rock, then lower until you feel almost a full flex of the knee. Greg LeMond created the method where you take your inseam in centimeters, then multiply that number by .883. That product is the overall distance from the center of the bottom bracket to the top of the saddle.

Next up is the saddle position. Nose up, nose down? A generic saddle position: take a ruler, lay it across the length of the saddle. Then put a level on it and make sure it's completely flat. Some riders like to tilt the saddle down a smidge (I see most time-trialists also turn their road saddles down slightly). Personally, I tilt mine up a little, trying not to affect my hip angle. I find tilting my saddle up helps me sit more securely on the saddle while avoiding saddle sores. Expert fitters say a tilted up saddle means inappropriate fit (like too far of a reach for the bars), but I hate scooting forward on the saddle, and tilting it back slightly keeps me in one place. Everyone has different riding styles and must experiment to find what works for them.

Finding the proper saddle fore/aft position is critical, however. Too far forward: you'll generate more power over a short distance but will have trouble keeping up on long endurance rides, also running the risk of damaging your knees. Too far back and you'll have the opposite: you'll be better able to use all of the muscles in your leg, therefore increasing endurance, but you won't be able to accelerate or lay the hammer down with the same severity as you would in a further forward position.

So a position in the middle is common. Set your bike up on a trainer and make sure the front and rear wheels are at the same height. Get on the bike and start pedaling. Then stop, keeping the cranks parallel with the ground, your right foot forward. Try to stay in the same position as you would when pedaling. Then drop a plumb from the front of your kneecap. The line should touch the tip of the crank arm. If the plumb falls in front of the tip of the crank, move the saddle back. If it falls behind, move the saddle forward.

Then begin pedaling again. Stop and re-check the measurement, dropping the plumb from the front of the kneecap. The plumb should hit the end of the crank arm. Also remember that sliding the saddle forwards or backwards changes the height. If you go forward, you'll have to raise the saddle. In the end, make sure the saddle is at the proper height while also in the proper fore/aft position. Riders with longer legs may need a setback seatpost to get the appropriate position.

Greg LeMond's method for proper fore/aft position puts the rider slightly further back, with the plumb bisecting the axle of the pedal. Greg personally had his seat even further back, as he thought he could generate more power from this position. However, LeMond has incredibly long femurs. Most riders are not built like that. Dr. Andy Pruitt noted that former pro Ron Kiefel, a seven-time Tour de France competitor, once moved his saddle back in accordance with Greg's method, but Ron did not go any faster. Instead, he developed a sore back and missed several weeks of racing... What works for Greg does not work for everyone. The way I "fit" a cyclist is one of the top modern-day methods.

To find proper stem length, there is a very simple way: climb a hill out of saddle with your hands on the hoods. Your knees should come within 1-2 inches of the handlebar. If the stem is longer, you may feel super stretched out while climbing or riding in the drops, and you won't climb standing at 100% because your upper body will always be more forward and not upright enough to support your weight. If the stem is too short, you will bump your knees into the handlebars when out of the saddle and will feel too bunched up when seated. Following my recommendation, most riders will find that they should go with a slightly shorter stem.

For handlebar height, looking at the saddle is a good place to start! You do not want your handlebars more than 2-3 inches lower than the saddle. Most riders want to look like a professional, but when they twist themselves into a position that emulates their favorite pro rider, more often than not they can't ride at effort in the drops, a critical position to be in while competing. Or they feel too stretched out while climbing, vastly diminishing performance.

Always remember this: it's easy to get aero on a non-aero bike, but it's impossible to get comfortable on an aggressively-positioned bike.

The days of hammering away with a flat back are almost gone. With the widespread use of power meters, we're learning that keeping the hips more open allows us to produce more watts. On a road bike, I'd keep the power and forfeit some aerodynamics. Unless you're Dave Zabriskie with a Jell-O upper body and spend 35 hours a week on the bike, being more upright is the way to go. Keeping the handlebars higher might not be the most aero option, but you'll generate more power climbing, you'll be vastly more comfortable during the second half of the race or ride, and you'll be able to control the bike better while sprinting.

For handlebar position, rotate them down until your wrists don't hit the tops while sprinting in the drops. This usually means that while sprinting, your wrists are perfectly

straight, the strongest position. Once the handlebar position is set, move the hoods up as high as they can go, but not so high that you can't brake or shift from the drops.

Sometimes there is very little difference between first and second place, and an improper fit may very well lead to losing that extra burst of power needed to succeed and ride to your max...

TIME TRIALING

For time trial bikes, the position is more forward. A forward position is not only more aerodynamic, but you can also generate more power over short periods. When you find the proper saddle height and drop the plumb, it should fall 2-3 cm in front of the crank arm. Remember that the further forward you go, the more you have to raise the saddle. Most time-trialists like to keep the front portion of the saddle flat or angled slightly down, as they can get even more forward. Again, I tip the saddle ever so slightly up as I don't want to creep even more forward than I already am...

After the saddle height is set, adjust the aero bars. Most riders like to get super low and stretch the arms out, but I can tell you from absolute experience that during the second half of a time trial, if you're in an incredibly uncomfortable position, you just cannot generate the power necessary to be competitive. Time trialing success is a mix of aerodynamics and power, but if being aero really begins to compromise your power, look to change your position.

For time-trialing, being narrow is more important than getting super-low. Set the bars as close as possible. In a proper position with narrow arms, your breathing should not be affected. If you feel constricted in the chest, experiment by moving the bars further apart a little at a time. When in the TT tuck, your forearms should be parallel with the ground. While pedaling, your knees should almost hit your. In the aero bars, your arms are almost at 90°, perhaps open slightly more. With your arms bent like this, you can put all your weight on your elbows and produce maximum power with your lower body. Following these simple tips will put you in both an aero and powerful time trial position.

Experiment with stem heights, but remember that riding the TT bike easy or during tempo rides is exponentially different than when going full-metal at 100% effort. Make sure to test the position before you put the skinsuit on! If you're too low, your hip angle is closed, robbing you of power. You also may have trouble breathing, and you'll have trouble keeping your head and eyes up! No joke: my biggest complaint from riding in too low of a position was that I'd struggle to keep my eyes up, creating a terrible bloodshot feeling and near-nauseau sensation. Not good when you're trying to hold 30 mph!

I've also learned that riding with your saddle slightly lower than your road position may be beneficial. For TTs, with the saddle 2-3 cm lower, you open your hip angle, allowing for max power output. Also, your lower leg (the tibia) becomes angled in a more forward position, ideal for generating extra power for timed events. And lowering the saddle also lowers your back, making your slightly more aerodynamic.

KNEE PAIN

I would also like to point out that during this time of the season, as we begin to go heavy in the gym and do on-the-bike force drills, our knees will be under an extreme amount of stress. Here are some remedies for how to avoid and treat knee pain...

Start with light weights in the gym, gradually building up to heavier weights. Strengthening the knee, quads, and tendons is a great way to avoid pain or injury. Squats and leg presses are the primary exercises, plus Lunges and Leg Extensions. Spending time in the gym does not just mean pumping iron: when you warm up on the stationary, you're opening the capillaries that distribute blood through the muscles and better lubricate the knee joint.

Cover up your knees in the cold. Always. If it's below 60, wear knee warmers. Below 55, leg warmers. Your knees ache in the cold because the blood vessels constrict, keeping the knee undernourished. You only get one set of knees, and once they're wrecked, it's practically a one-way street. Eddy Merckx was notorious for wearing knee warmers until late-spring...

While cycling, the lateral quads develop more the inner quads, possibly causing an imbalance with the kneecap pulling to the outside. To compensate for this, loosen the vastus lateralis and IT band with a Hip Twist stretch. And stretch those hamstrings! If they're tight, your quads work harder to straighten the leg on the downstroke. And unnecessary stress to the knee, as we know, can lead to bad things...

Riding on a saddle that's too low causes you to flex the knee more and push the pedal at a less efficient angle, generating more stress and rubbing of the patellar tendon against the thighbone. Your leg should be almost fully flexed at the bottom of the stroke. If the saddle is too high, your hips will rock. I cannot stress how important it is to find the appropriate saddle height. Many cyclists ride with too low of a saddle. Some riders have it jacked up too high, their toes pointed way down at the bottom of the stroke.

Don't ride bowlegged or with your knees in, as both stress the knee unnaturally. Riding with the knees close to the top tube is common, like when time-trialing or breaking away, but it's wreaking havoc with your knees.

Regarding supplements, Glucosamine can help rebuild an injured joint by speeding the formation of new cartilage building blocks. Taking Glucosamine is especially beneficial for cyclists over 35.

Feel free to contact me at Coach@EliteEndurance.com if you have any fitting questions or knee pain issues.

www.EliteEndurance.com