



Graham Watson

# Medical Assistance

## The Five Most Common Cycling Injuries

Many of us experience pain while riding, but do we have to? **Steve Hogg** explains how you can enjoy a pain free and therefore faster ride.

**C**rashes aside, cycling injuries tend to be overuse injuries. If some aspect of interaction between rider and bike isn't quite right, then repeating the pedalling action tens of thousands of

times stresses the body's ability to cope with that suboptimal relationship until pain or injury occurs. Two key points that are wise to remember are:

In a positional sense, a bicycle is a symmetrical apparatus while the body atop of it is not. The bike is symmetrical because the seat is over the centre line and the handlebars and pedals are equidistant from the centre line. The rider appears symmetrical at first glance, but look more closely and you will see differences in posture, alignment, development and facility between left and right sides. All of which contribute to the rider being functionally asymmetrical to varying degrees. Different size feet, greater muscular development on one side than the other and the effects of handedness

and footedness are examples. There is no getting away from the fact that the more symmetrically the rider can function, the lower their chances of developing overuse injuries while cycling.

All challenges to a rider's position in space over their bike will increase their tendency to left or right asymmetry. A challenge to position is any factor that tends to destabilise the rider. A challenge can have a morphological, positional, functional or neurological cause. Simple examples of each are:

### Morphological - A Marked Disparity in Foot Size or Leg Length

A longer foot means that the leg it is attached to is functionally lengthened. Any difference in leg length, whether





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functional or measurable, needs to be compensated for. If it is not, then the most common consequence is that the rider will sit with the pelvis tilted towards the side of the functionally shorter leg, which in turn creates a left or right difference in the function of ankles, knees, hips, pelvis, torso and extension of the arms.

#### Positional

There are many, but a common example is too high a seat height. If the seat is too high, it is a rare rider who sits squarely on the seat and equally overextends each leg. Much more commonly they will hang towards the side of the leg that they favour creating a morphological situation similar to that mentioned above.

#### Functional

One of the more common examples of a functional difference is where there is a significant change in flexibility between left and right sides. The tighter side will create a functionally shorter leg in that there is a less range of motion on that side at the hip and knee. Again, a morphological situation is created.

#### Neurological

This is a lesser known but far from rare occurrence. Some people have an overt tendency to favour one side when cycling and this tendency increases as they fatigue or are put under high load. The favoured side may or may not be the side of their 'handedness' or 'footedness'.

The examples above are common but there are many more. With that

background, let us look at the most common problems experienced by cyclists.

#### Knee Pain

Ironically, cycling is the most commonly prescribed activity for the rehabilitation of knee injuries, yet knee pain is the most common injury resulting from cycling. Only rarely is knee pain caused by cycling intrinsic to the knee. Much more commonly, other factors combine to load the knee in a way that it is not designed to cope with.

Cycling related knee pain is almost always a result of issues with the foot and/or the ankle at one end of the kinetic chain, or the hips and lower back at the other. Often the cause is not on the same side as the painful knee. It is for this reason that pain in the left knee caused by cycling is more common than pain in the right knee. More people have a functionally short right leg than have a functionally short left leg. A functionally shorter right leg will often cause the right hip to drop. When this happens the left leg has to extend further than the right leg. Additionally the plane of movement of the left hip, left knee and left ankle is challenged. Of those three joints, the hip and ankle tolerate multi-plane loads much better than does the knee, which is more or less a single plane, hinge type joint. Ideally the knee should descend vertically over the pedal during the pedal downstroke. If this doesn't happen, knee pain usually occurs:

#### Behind the Knee

In most cases this is caused either by the seat being too high or too far back, or even both.

#### On the Outside of the Knee

This pain commonly occurs at the insertion point of the iliotibial band (ITB). Almost invariably, this is result of the hip on the other side dropping under load and consequently challenging the plane of movement of the hip of the leg experiencing knee pain.

#### Front of the Knee

This type of pain is often behind or just adjacent to the patella. Here the seat may be too low, too far forward and/or the cleat position may be too far forward. Equally, foot, ankle or hip issues may challenge the plane of the knee, causing the patella to incorrectly track. Many who are overly tight in the hips pedal with their knees outboard of their feet, though this is far from the only reason for front of knee pain. For those who do, the long-term solution is to improve hip and lower back function. The short-term solution is to move the feet further apart so that they are under the vertical path of the knee. This can be accomplished with pedal spacers, or longer than standard pedal axles.

#### On the Inside of the Knee

This is caused by any factor that forces the inside edge of the knee joint to open. Common causes may be the knee rolling in on the pedal down-stroke because



the feet are not placed on the pedal far enough from the centre line for the hip function of the rider. It can also be because compromised hip function pulls one (sometimes both) knees in towards the centre line.

### Poor Cleat Angle

This can potentially cause knee pain in almost any location. Cleat angle needs to be chosen so that there is at least a small amount of potential free movement either side of the angle that the foot naturally sits on the pedal under reasonable load.

### Lower Back Pain

Lower back pain is the next most common complaint caused by cycling. The major causes are poor seat position, overly long reach out to, or down to the bars and generally poor stability, or any combination of those. The background to this is that if the lower back is caused to flex (forward bend in the lumbar spine) beyond an individually variable degree, pain will occur. Even for those who are asymptomatic, it is better to bend forward at the hip rather than in the lumbar spine. To do this requires better than average flexibility in the hips and hamstrings. For the motivated, it is not hard to acquire better than average flexibility because the 'average' in the cycling population is poor. Flexing the lumbar spine over time, even if no pain is felt, causes the posterior support elements of the spine, the ligaments and tendons, to lengthen and weaken, setting up that person for a longer-term problem.

### Common Causes

#### Seat Height

If your saddle is too high, the muscles of the lower back are forced to carry an unreasonable load in attempt to brace against pedalling forces.

#### Seat Setback

If the setback on your seat is too great, then often lumbar flexion is used to reach forward. Set your seat setback at the minimum distance behind the bottom bracket that allows you a largely unweighted upper body. You should need your arms to support the weight of your torso, but only just need them.

#### Bars Too Far Away or Too Low

If your stem length is too long or the bars are too low, many riders cannot reach them without too great a degree of lumbar flexion. Often, this isn't obvious until the rider is under load and so they may be able to ride a flat or low to moderate intensity ride without problems, with issues only becoming apparent on hilly terrain or during higher intensity efforts.

### Generally Poor Stability

Poor stability occurs when the rider's ability to apply force to the pedals is better than their ability to resist the application of that force. Pedalling loads work both ways; action and reaction. The muscles of the hip and lower back are the base from which leverage is applied to the pedals. Each pedal stroke is potentially a challenge to on-seat pelvic

stability. Developing that overused term, core strength, is the answer. The best core exercise that can be performed for long periods during waking hours is to stand and sit tall. Lift your sternal notch (wishbone). By doing so your rib cage is elevated and your lumbar and thoracic spines extend. This hollows the abdomen and switches on the deep muscles that indirectly support (and indirect support is the majority of available support) the lumbar spine. Good posture is uncommon. Good posture and 'core strength' are largely synonymous. Good posture improves cycling comfort and performance.

### Upper Back, Neck and Hand Pain

I have grouped these issues together because they are usually linked. A given individual may only feel discomfort in one of these areas but that doesn't mean that the others aren't potentially an issue. If pain is felt only on one side, look to the alignment of the pelvis for the cause. If a rider sits with one hip forward, or has it move forward on the down stroke, one of two things are likely to result:

The shoulder, arm, hand and upper back of the forward side of the pelvis will be used to brace against that motion. Pain or discomfort is usually felt in the most susceptible or most highly loaded part of the body. That means the best solution is to resolve the asymmetrical way of sitting on the bike. This may be easy, it may be hard, but nothing will change unless the

process is started. The reason may be a poor bike position, it may be less than ideal and asymmetric mechanical function of the rider or it may be a combination of both.

If pain or discomfort is felt more or less equally on each side, then bar position, seat position or both is the issue. The answer to 'my hands get sore' is not gel gloves. You need to ask yourself, 'What factors are combining to load my hands?'

If the position a rider holds destabilises them generally, they will use the only available mechanism available to attempt to regain stability, and that is upper body effort. This is accomplished by muscular tension in the arms, shoulders and often, upper and middle back. It is holding this tension that is the cause of discomfort in the upper back, neck and hands. One simple example, and there are many, is that the bars are too low and that the rider needs to extend their neck more than they comfortably can to see forward with hands placed on the drop bars or the brake hoods, because of overly low bar height. Or possibly the bars are too far away and the rider is thrusting their shoulders too far forward in an effort to allow their arms to reach the brake hoods. Or the seat is too far back... or the brake hoods are too low... and so on. As a guide, no more than 90% of the range of motion of the neck should be used to see forward comfortably with hands in the drops. The shoulders should sit naturally and not be thrust forward with



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hands on the brake hoods. If they are, ask why, and act on the answer.

### Sore or Numb Feet

At some stage in their cycling experience, many people encounter foot pain or numbness. The two most common reasons are poorly fitting shoes or a cleat position that is too far forward. Less common reasons are the morphology of an individual's feet combined with a lack of foot correction inside and outside the shoe.

### Shoe Fit

A cycling shoe should fit more snugly than a walking or athletic shoe but there should be no sense of lateral compression across the metatarsophalangeal joints (MTP joints; base knuckles of the toes). If there is, compression of the nerves situated between each pair of MTP joints can result. The answer is wider or better-fitting shoes.

### Cleat Position

If your cleat position is too far forward, the plantar fascia, the tendon-like layer that extends from the heel to the MTP joints is constantly being pressured. If this pressure is too great, that constant pull compresses the MTP joint spaces, creating a different situation to the shoe fit problem mentioned above, but a similar end result. As a guide, position your cleats so that the first MTP joint (ball of the foot) is in front of the pedal axle, as measured with the shoe levelled between where the sole joins the upper under mid heel, and where the sole joins upper under the middle of the forefoot.

This is done with the crank arm forward and horizontal to the ground.

Don't, as many do, buy a shoe that is a size larger than ideal in an effort to gain extra width. All this does is solve one problem, that of width, by creating another – that of potentially poor cleat position – because your foot doesn't totally fill the shoe. A number of brands, chiefly Shimano and Sidi, make extra-wide shoes in EE and EEE fittings.

### Pedalling Load

Many people have feet that cope okay with a walking or running load, something we have evolved to do, but don't cope that well with a cycling load. If your shoes fit well, if you have a moderately rearward cleat position as per and are still experiencing hot spots or localised loading of the areas of the foot, then lack of foot correction is the likely reason. If in doubt, seek out a specialist in these matters. The likely solution will involve any, or any combination of:

- arch support insole
- orthotics
- heel, cleat or internal wedges for your shoes.

Of the various methods of foot correction that can be employed, almost all cyclists would experience a comfort benefit if their cycling shoes were fitted with quality arch-support insoles. There has been a move in this direction by some cycling shoe manufacturers in recent years but it is a tentative one. By that I mean that generally speaking, the heights of arch support available suit low to moderate-height arches only. For average to high arches, it is best to look at the aftermarket, with G8s and E-soles being the pick.

### Seat Discomfort

This is a curly one because it can involve a less than ideal position on the bike or a poor choice of seat for a given individual, as not all seats suit all riders. As a general guide, if you have experienced repeated seat comfort issues and have tried a number of seats, then the likelihood is increasing that it is not the seat that is the problem, but rather the way that the position that you hold on your bike is forcing you to bear your weight on it.

- If bike position is the reason, likely culprits can be:
- Too high, too far forward or too far rearward a seat position
- Handlebars that are too far away or too low
- In extreme cases, too far forward a cleat position

If it is the seat that is the problem, possibilities include:

- Too great a seat width forcing the rider forward onto the narrower section of the seat
- Too narrow a width of seat
- A seat profile that tapers down too quickly from the centre to the sides
- The lack of strategic perineal cut-out
- An angle of seat that is too nose-down or too nose-up. Many seats can go from being instruments of torture to comfortable with a slight change in angle.



*End note: In a brief article like this, there is not the available space to go into the ideal level of detail. I hope this has given you something to think about. For those interested, much more information is available at [www.stevehogbikefitting.com](http://www.stevehogbikefitting.com)*