Bike Set Up For Optimal Cycling Biomechanics

Article by Megan Dunphy.

For every cyclist, correct bike set up is essential in enhancing performance, preventing injury, and ensuring comfort.

Cyclists are pre-disposed to overuse injuries due to the amount of time spent in the saddle. Knee pain is the most commonly reported overuse injury related to cycling, followed closely by back and neck complaints. Many of these injuries can be prevented or cured if the bike is correctly set-up for the individual athlete.

Cycling performance is affected by the interaction of the environment, bike, and athlete. Altering the relationship between any of these variables can impact performance, comfort, and injury. Although we may not be able to control the environment, we can change the relationship between the bike and the athlete. Changes in how your bike is set-up can alter joint angles, muscle lengths, and muscle moment arm lengths, thus affecting the tension-length, force-velocity-power relationships of multi-joint muscles and the effectiveness of force production. In other words, changing your position on the bike can improve your cycling efficiency and performance.

In general, there are three factors to consider when setting up your bike: seat height, seat fore/aft position, and reach.

Seat Height

If the seat is too high, lower limb muscles are forced to work beyond their optimal length-tension relationship and therefore power output will decrease. If the seat is too low, there is a resultant increase in knee flexion which increases the load put through the knee, potentially leading to knee pain/injury.
An ideal seat height can be found when seated on the bike, drop one foot down to the lowest position- at this point, there should be a slight (approximately 10 degree) bend in the knee while maintaining a level pelvis.

Seat Fore/Aft Position

The fore/aft position of the seat has a big impact on knee loading. A seat too far forward can lead to increased compression forces on the knee. Conversely, a seat too far back results in over lengthening of the glutes and hamstrings which inhibits force production.
To find a good starting point, drop a plumb line down from the bottom of your knee cap while the pedals are at a 3- and 6 o'clock position. The line should fall through the pedal axis.

Reach

Reach is largely dependent on the type of cycling, how much priority is on performance versus comfort, and athlete specific

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variables such as flexibility. Therefore, there is more variability in finding the correct reach position. In general, with good positioning, the athlete should be able to maintain a flat neutral spine, shoulder blades back, a slight bend in the elbows, and relaxed upper limbs.

Although the importance of correct bike set-up has been widely acknowledged, the real challenge is in finding the correct cycling position considering all factors whilst allowing for the individual differences of each cyclist. The physiotherapists at In Balance Physio & Pilates are now offering bike fits. This will involve specific measurements to ensure your bike is set-up correctly for you. It is also possible to have a physical assessment to determine areas to work on, either for injury prevention, or performance enhancement. So whether you are concerned about pain which is aggravated by riding, or if you want to improve your performance we can help.

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