

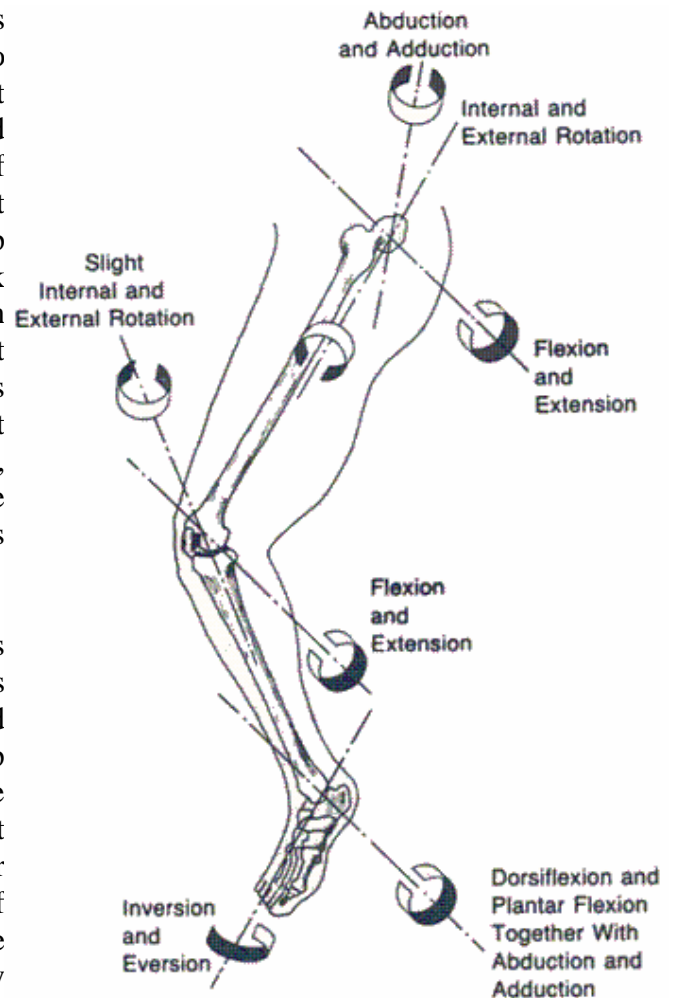
Is it the shoes? (Setting up your bike - Part 1)

Back in the days when Michael Jordan was sort of a 'new' big thing, he did a few commercials for Nike shoes. Spike Lee was the comic character interacting with Michael and he would keep asking "Is it the shoes?" He wanted to know - Did the shoes make all the difference in Jordan's playing basketball? Well Nike may have been able to make playing basketball more comfortable. Their shoes may have also provided the players with better traction and cushioning. However, if those players didn't have the skills to begin with, the shoes would not be the answer.

Using a bicycle for long distance riding or any form of competition requires wearing cycling specific shoes in order to perform well. The question is not so much, "Is it the shoes?", but rather "Are you wearing the right shoes and are your shoes adjusted right?" Racing or training on a bicycle in any scenario requires attaching a human being to a machine. The human being is the engine for that machine and the connections between the engine and the machine are through the shoes. If they are not set up correctly, the machine won't work to its full potential.

Actually, the only reason that the shoes are so important is because there is no other way to attach the feet directly to the bike. There have been goofy advertisements in the past where they showed a cyclist who has cleats attached directly to the bottoms of his feet. That looks absurd, but if there was such a way to attach your feet directly to a bike it would be better than any shoes. Having your feet snap directly onto the pedals would insure your legs track properly on every turn of the pedals. After all, the design behind all the best cycling shoes is to keep the athletes foot lined up correctly all the time. The cycling shoe companies are always looking for better ways to keep a riders foot from moving inside the shoe. They develop buckles, insoles, ratchets, snaps or some other mechanism to insure the athlete's heel stays in place in the shoe. But why is adjusting your foot so important?

Riding a bicycle requires a human body to drive the wheels in a manner similar to the way the connecting or drive rods used to work on old steam locomotives. The connecting rod moved back and forth like the way a cyclist's legs move up and down. The connecting rod on the steam locomotive was one long metal rod, moving back and forth in a straight line. The human leg consists of many pieces linked together with complex joints, uneven surfaces and a network of connective tissues. In order to work efficiently, all the pieces must be aligned just right. A good pair of properly set up cycling shoes helps to get all those leg pieces lined up and performing correctly.



If we take a look at the entire leg, from the top to the bottom we can see how complicated the motions can be. In his book *Science of Cycling*, Ed Burke has a nice diagram showing all the various segments of the leg and their directions of rotation. Because these segments are capable of moving in a variety of directions at the same time, it is important to keep them aligned properly in order to apply force to the pedals without their changing detrimentally.

Unlike the parts of an engine or other mass produced machine, human bones are never created exactly the same. The basic design of each joint is uniform, but the actual joint is different in every person. The length, density, diameter and strength of each bone is different with each person. The range of motion and strength of the connective tissues varies dramatically. That means that despite how well things are expected to work as a unit, they don't always meet those expectations. This is why steps must be taken to keep a person's leg moving in a way that provides both efficiency and stability.

The most important connection is the one between the feet and the pedals. There have been a whole host of connection methods developed over the years. The most basic was the cages and straps on pedals that held the cyclist's shoes in place. There was a slotted cleat mounted on the shoe to keep the foot aligned properly. The drawbacks to this system were many including no lateral movement and not being able to get your feet out quickly. As pedal development progressed, lots of methods were invented to provide the cyclist with a solid attachment and a controllable range of motion. The other area that also improved was the design of the shoe's ability to hold the cyclist's foot in place in relation to the pedal axle.

When pedaling a bike, the leg's reach dimensions remain somewhat constant except within the shoe itself. If the heel of foot does not remain firmly placed at the back of the shoe, the dimension between the ankle bone and pedal axle is constantly changing. If this dimension is constantly changing, then the cyclist's bike fit is constantly changing with each pedal stroke. When the alignment of the cleats is also incorrect, this compounds misalignment throughout the entire leg. Sometime this results in nothing more than inefficient pedaling. Sometimes it results in injury. Unlike an uncomfortable pair of shorts or itchy jersey, no amount of fidgeting around can resolve bad shoe setup.

Going back to Spike Lee's question "Is it the shoes?", every cyclist should begin with this question when they are setting up their bicycle. The quality of a pair of shoes and their potential benefit should be as important as the brand and model of bicycle purchased. There are some very good bicycles that have geometry which simply will not fit every cyclist. There are also many brands of very good shoes that will never fit every cyclist. The challenge is to match the correct equipment with the cyclist and their needs. The shape of the shoes must match the shape of the cyclist's foot as closely as possible. There will always be small differences that can be rectified with things like insoles or shims, but these are minor problems. No amount of foam padding or variation in socks can compensate for a shoe that is too wide, too narrow, too short or too long.

Once the right shoe is found, the challenge is to have it properly adjusted and aligned to the pedals. This is the only real contact point with the bike. The pelvis rests on the saddle and the hands upon the handlebars, but these are not permanent positions like the shoe/pedal position. It is during this process that the real limitations of certain shoes or pedal systems become obvious. The need for a properly setup shoe/cleat system far outweighs the lightness, aerodynamics or popularity of any pedal design. If an athlete needs to be in a range of four and one half degrees of floatation to insure their knees move properly, then pedals with a range above or below that won't do the job. An athlete should not compromise on biomechanical efficiency. A good pedal design will allow the foot to be adjusted and stabilized on the X, Y and Z axis. This flexibility of adjustment is essential because the athlete's foot moves in these three planes.

Getting the right shoes, getting the right pedal system and getting these parts properly setup is the most important step in the process. There is a follow up process as well. Cleats wear out, shoes wear out, pedals wear out and a record needs to be kept in order to retain the same shoe fit positioning. Manufacturers often change

designs from year to year and even a seemingly minute change in sole design can drastically alter how a shoe fits. Having a written record will help guarantee that any changes or replacements don't change setup.

Smart Cycling Bike Shop

Name _____

ATHLETE DIMENSIONS

Right Foot Length: _____ cm.

Left Foot Length: _____ cm.

Right Foot Width: _____ cm.

Left Foot Width: _____ cm.

Right Phalanges: _____ cm.

Left Phalanges: _____ cm.

Right Arch Height: _____ cm.

Left Arch Height: _____ cm.

SHOE / CLEAT ADJUSTMENTS

Right - Front of sole to front of cleat: _____ cm.

Right - Inside of sole to side of cleat: _____ cm.

Right - Outside of sole to side of cleat: _____ cm.

Right - Rear of sole to rear of cleat: _____ cm.

Right - Cleat angle to inside line of sole _____ deg.

Right - Shim thickness _____ mm.

LOOK - Cleat Fit Form

Date _____

SHOE SPECIFICATIONS

Brand: _____

Model: _____

Size: _____

PEDAL SYSTEM

Brand: _____

Model: _____

Cleat Type: _____

Tension Setting: _____

Left - Front of sole to front of cleat: _____ cm.

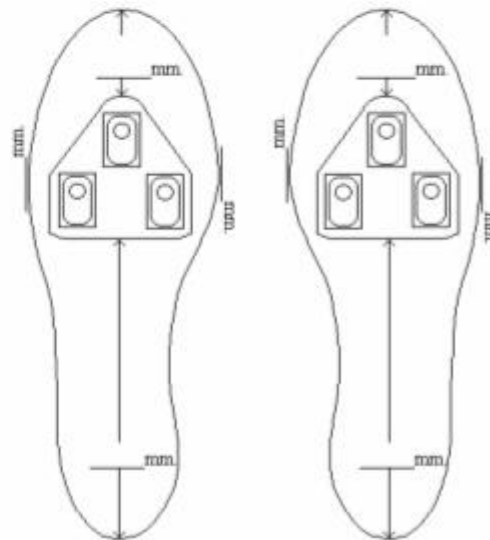
Left - Inside of sole to side of cleat: _____ cm.

Left - Outside of sole to side of cleat: _____ cm.

Left - Rear of sole to rear of cleat: _____ cm.

Left - Cleat angle to inside line of sole _____ deg.

Left - Shim thickness _____ mm.



Even if you lose your equipment, you can do a better job of replacing it if you have a detailed setup report of some kind. This is especially true if there are insoles, shims or orthopedic devices involved.

Spring time is when a lot of cyclists look to using new equipment. If you have the urge to change something in your bike setup, or are getting into the sport more seriously don't overlook the shoes. Take the time to find shoes that are right for your feet. Don't judge them the way you would a pair of walking or running shoes. Get the best pair you can afford. Most important of all - get them set up correctly by someone who knows how to fit a bike correctly. Be patient and get it done right. Then enjoy your bike to the maximum!