

Bike Fit

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We wrote this chapter about frame size and bike fit at the request of a number of cyclists and realizing that:

- (1) there are many unprofessional and/or unscrupulous people in bike shops and
- (2) bad articles are regularly written about bike size and fit in cycling magazines.

Therefore, there is a lot of misinformation and many myths in cycling concerning frame size and bike fit.

In understanding frame size and bike fit, the first thing you must always keep in mind is that the size of the frame and fit of the bike must deal with the three basic contact points of the human body on the bike. These are the pedals, saddle, and handle bars. Nothing else matters.

Myth One Destroyed

The first and one of the most common myths about frame size and bike fit has to do with looking for your hub in relation to your handlebars.

Since the head does not make contact with the bike (if yours does, you really got screwed), then the length of your neck, shape of your head, or position of your eyes in your head should in no way be a factor to determine frame size or bike fit.

Frame Size

The most important thing to consider in determining the size of the frame is the distance between your contact points with the pedal and the saddle. Therefore, the distance between the ball of your foot and groin is the distance that is most important for determining frame size.

The basic rule of thumb for determining the size of a road frame for an average built male is to measure your inseam from your groin to the floor in stocking feet. You subtract 10 inches (25.5 cm) from this measurement, convert it to metric, and it will be the correct frame size when measured from the center of the bottom bracket to the top of the seat tube.

It is that plain and simple except we aren't all average built males.

For people who's feet are large for their height, add one centimeter. For people who's feet are small for their height, subtract one centimeter. This is because your feet fit in the space between the saddle and the pedals and must, therefore, be considered in determining the frame size.

The legs of the average female are longer for the same height than are the legs of the average male. Therefore, the average built female should subtract one centimeter from this measurement to obtain the correct frame size or the frame will be too large from the seat tube to the head tube.

If a female has legs that are shorter than normal for a female's height, she should not subtract one centimeter. Use the same technique used by the average male.

If a male has legs that are longer than normal for his height, he also subtracts one centimeter. If a male has legs that are shorter than normal for his height, then he adds one centimeter.

Arms and hands which are out of the normal proportions are normally dealt with by stem length or a custom built frame. This is most commonly dealt with in bike fit.

The frame size for a track bike should be one centimeter smaller than for a road bike because the seat tube is more vertical pushing you about one centimeter higher.

We are not that familiar with the frame sizing on a mountain bike but we believe you do something like subtract about 4 centimeters from the frame size of a road bike and measure it the same way. This is because the top tube has to be much lower since you often have to dismount on irregular surfaces and want to decrease the potential of hard impacts by the groin against the top tube. The frame geometry is set up to compensate for the lower top tube.

Bike Setup : Saddle Position

When setting up the bike, you determine the height and forward-to-rear position of the saddle based on the position of the rear of the kneecap in relation to the axle of the pedal and the bend in the leg at what is called the "2 o'clock position".

To determine the height of the saddle, move either foot to what would be 2 o'clock on the face of the clock if your cranks were the arms of a clock and looking at the bike from the right side of the bike. When your foot is in this position, the inside angle between your leg BONES at the knee joint should be just a little less than 90 degrees.

DO NOT determine this bend based on the distance between the muscles because they vary too much in shape from one person to the next. This angle MUST be based on the estimated bend in the leg bones.

The reason for this is because of two things. First, we know that the power point of the bicycle crank arm (the point where you will generate the greatest downward thrust) is at the 2 o'clock position. Second, the position in joint angle at which your legs and arms are strongest is when the angle between the bones is 90 degrees. Therefore, you are matching the power point of the legs to the power point of the bicycle. In a manner of speaking, we are marrying the body to the machine so they can function as one unit.

To determine the forward to back position of the saddle, place either pedal in the 3 o'clock position. Then place a string with a weight on one end just behind the kneecap so that the weighted end of the string hangs down past the pedal of that leg.

For the average built male, the string should hang from behind the kneecap down through the center of the pedal axle with the ball of your foot over the axle. Here you are aligning the power point of the leg with the power point of the foot and the center of the axle.

For the average female or a male with long legs, the string should hang just in front of the pedal axle with the ball of your foot over the axle. For a male with short legs, the string should hang just behind the pedal axle with the ball of your foot over the axle.

The remaining saddle position has to do with the tilt of the saddle. It is simple for everyone.

Stand the bike upright, place a carpenter's level on the saddle with it touching the nose of the saddle and the back edge of the saddle. When the bubble in the level is centered, you have the correct tilt for your saddle. If not, you will either hurt your groin or hands on long rides.

If the nose of the saddle is tilted up too much, you will hurt your groin because too much weight is being placed on your groin (this is probably what is causing sterility in 1 out of 5 males.) If the saddle nose is tilted down too much, your hands will hurt because too much weight is being placed on your hands.

If you have very abnormal anatomic structures such as unusually long lower leg bones or unusually short upper leg bones, you really need to get a professional of the best quality at either a pro shop or a custom frame builder to set you up.

Bike Setup : Stem Length And Position

For this you really need a good sizing stem with the correct size handlebars. A sizing stem has an adjustable length for the top of the stem. You can usually get them from good pro shops. Every club and coach should have one and learn to use it.

You want to adjust the length of the stem until you are comfortable with about a 30-degree bend in your elbows with your hands on the brake hoods (again, with the bones.)

You must have this bend or the road vibrations will work directly up your arms to your shoulders and neck muscles causing severe neck muscle pain and head aches. You DO NOT want straight arms because the bend in the elbow permits the arms to act like a shock absorber.

For most people, the height of the stem should be such that it is just below the nose of the saddle when looking at the stem from the front. Most people can have their backs straight with a proper stem position but some of us will have a hump because of our anatomy. Therefore, get the back as straight as is comfortable and quit. Perfectly flat is not required.

Records

To make your next bike fit easier or to quickly set up your bike after an overhaul or traveling, keep records of some key measurements for setting up your bike.

Keep the following measurements in a pocket spiral notebook:

Frame size;

- From the center of your bottom bracket up your seat tube to the top center of your saddle;
- Handle bar type and size;
- From the tip of your saddle to the center of your handle bars at the stem;

Stem size;

- Stem height from the top of your head tube to the center of the horizontal part of the stem along the vertical part of the stem.

Keep one notebook in your toolbox for when you travel and one at home in a safe place. It will save you a lot of time and trouble. You can keep other important information such as shoe type and size.

Old Trick For Young Dogs

Have you ever hit your knee against the end of your handlebars while standing to climb or attack? Here's a suggestion. Before you tape your bars, place your hand on the flat of the bars behind the hooks. This is on the bottom flats just before the end of the bars. You want your hand to be all on the flat but just behind the first part of the bend for the hook.

Mark the bars just behind the back of your hand so that you have at least enough flat for your entire hand. Cut the rest of the bar off because you don't need it, it is dead weight, and you will hit it with your knee when standing. Be sure you get a good square cut or you will have trouble with your bar plugs.

If you have bar plug shifters, measure the fixed part of the shifter that extends out of the bars but not the moving lever arm. Cut that much more off the end of the bars so that you will have enough flat bar with the heel of your hand resting on the fixed part of the shifter.

This saves even more weight and moves your shifters farther forward so you won't be as likely to accidentally shift your gears while standing which adds all kinds of excitement to your riding.

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