

# SHEPshed CYCLING CLUB

## BASIC BIKE FITTING



As a new cyclist, the following guide on basic bike fitting is to help you get started and is particularly aimed at road bikes though many of the principles apply to other frame designs. Professional fitting should be considered, especially if you take cycling very seriously, or if you are going to do a lot of riding. A properly fitted bike will not only improve your speed and efficiency but will reduce the chance of injuring your body. Don't ignore pain, it is the sign that something on the bike may need altering.

**Caution :** Be careful when tightening any hexagonal cup socket bolts, not to exceed the specified torque which may be marked on the frame – this is especially important on carbon frame bikes.

If you are unsure of any of the information on bike fitting below, seek advice from a Club member or a bike mechanic.

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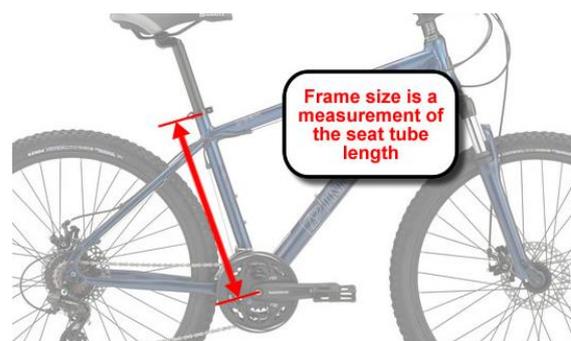


Bikes need to be properly fitted to the rider to allow for an efficient transfer of power from the rider's leg muscles to the pedals and to reduce or minimise the risk of acute sprains and pains or even long term injury. The bike frame is fixed in size so needs to be determined before purchase. Bike parts attached to the frame can be altered to accommodate the riders build eg saddle position, handlebar position and crank (attaches pedal to bottom bracket axle) length – think of it as a triangle.

#### 1. BIKE FRAME SIZE should be appropriate to the rider's build and determined before bike purchase.

The bike frame size, is the distance from the middle of the bottom bracket (centre of crank) to the top of the seat tube. The example below is for a man and shows the bike frame size in cm. Women's sizes are different. Online bike sellers have tables for men and women and for different types of bikes (road, sportive, tourer mountain, BMX).

BIKE SIZE	INSIDE LEG	HEIGHT
JUNIOR 43		
XXS 45	25" - 26.5"	4'8" - 4'10"
XS 48	26.5" - 28.5"	4'11" - 5'1"
S 51	28.5" - 30"	5'3" - 5'5"
M 54	30" - 32"	5'6" - 5'8"
L 57	32" - 34"	5'9" - 5'11"
XL 60	34" - 35.5"	6' - 6'2"
XXL 63	35.5" - 37.5"	6'4" - 6'6"



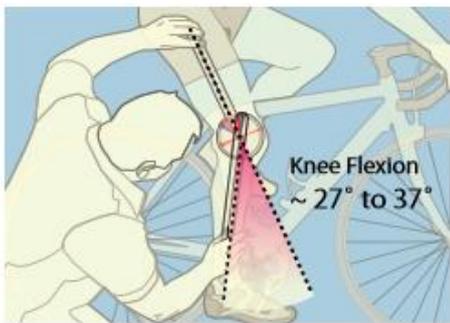
Measure the inside leg by standing shoeless, feet a couple of inches apart and next to a wall. Use a long spirit level or stick and keep it horizontal whilst pressing it snugly into the crotch. Get an assistant to mark the top of level against the wall and measure the height from the floor to this mark. Use the inside leg measurement to look up a frame size table which most online cycle sellers have.

# BASIC BIKE FITTING



This may also take account of your height as well. An easy way to tell if the road bike frame is right for you is to check stand-over height by standing astride the bike top tube, with shoes on. There should be a gap of at least 1 – 2 cm between your crotch and the top tube.

2. **SADDLE HEIGHT needs to be set to the correct value to suit the rider.** An easy way to set saddle height is to sit on the saddle, support against a person or wall and pedal backwards with your right shoe **heel** in the pedal. After a few rotations, maintain your posture and stop the right pedal at 6 o'clock. Your leg should be straight at the bottom stroke when the height of the saddle is correct. To alter the seat, either undo the quick release clamp or the hexagonal socket cup bolt at the top of the seat tube. Confirm that this is correct by pedalling so that the right foot when placed at the bottom stroke (6 o'clock), using the **ball** of your foot on the pedal. The leg should be slightly bent.



The precise knee extension angle is generally acknowledged to be between  $143^{\circ}$  and  $153^{\circ}$  (this is also referred to as the knee flexion angle range of  $27^{\circ}$  –  $37^{\circ}$ ). A goniometer is used to measure this as shown in the figure - I have a home-made one if you want to borrow it. You also want to make sure that whilst seated, you can rest the bike with your left shoe toe tip resting on the ground to steady you when you stop the bike.

3. **SADDLE FORE/AFT (front to back) position needs to be optimal.** Also known as “lay-back”, this is to ensure efficient leverage from your leg muscles to the pedals. If not set properly, knee pain may develop and ultimately will lead to knee damage. Pedalling should always be performed using the ball of the foot on the pedal, not the arch.

One widely used method to set the correct fore/aft of the saddle is the KOPS (Knee Over Pedal Spindle) method. With normal riding shorts and shoes, push the right pedal down and hold it at 3 o'clock. Get an assistant to drop a plumb line or hold a spirit level vertically from the bottom of your patella (knee cap). The plumb line should drop through the pedal spindle. To alter the saddle, undo the bolt under the seat to slide the saddle until the KOPS is correct and then lock the bolt. This bolt may also alter the seat tilt so be careful in not upsetting this. This is the starting position but you should experiment with the fore/aft position to get a comfortable position after a few rides – some rider prefer the KOPS point to be 1 or 2 cm in front of the pedal spindle.



# BASIC BIKE FITTING



4. **SADDLE TILT can be altered up or down slightly.** This is to find the most comfortable angle of the saddle which can be either side of horizontal. Play around with this and adjust to suit after riding to find the best setting for you but always tighten the saddle screw to the required torque before riding.



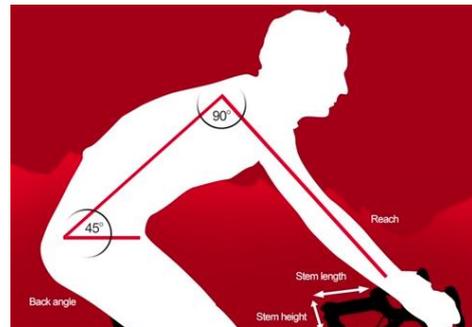
Too much tilt up can cause lower back, shoulder & neck pain



Too much tilt down can put too much pressure on your arms, wrists and hands

5. **REACH is the distance your arms travel to the handle bars.** The arms should not be straight but have a slight bend. If the handlebars are too low, a steering tube extender/raiser can be used to raise the handlebars. A simple way of raising the bars may also be to reverse the stem if it is initially sloping down. A shorter stem (attaches handle bars to upright steering tube) will bring the reach nearer.

Altering handlebar height and horizontal distance also affects the angle of the back. Fast agile backed racing riders will be hunched forward and low to reduce air resistance whilst more sedate tourers, sportive riders or people with "bad" backs may want a more comfortable angle closer to upright.



These values are for comfort (eg sportive or endurance) rather than aggressive road bike riding

The saddle fore/aft positioning should not be altered in an attempt to improve reach since it will adversely affect the position of the feet to the pedals!

6. **CRANK LENGTH should be suitable for the rider's leg length.** The crank is the section which holds the pedal to the bottom bracket axle. It cannot be adjusted but can either be fitted to suit the buyer at the point of purchase or if necessary, by purchasing a replacement pair of cranks after purchase (at extra cost). The standard crank is usually 170 mm long but pairs of shorter and longer can be purchased. Longer legs need longer cranks and *vice versa*. An easy way to test if crank length is optimal is to use the set-up as described above in 2). With the right leg on the pedal at 3 o'clock, the flexed knee angle should be about 70°. If the crank is too long, the knee flex angle will be too small and the knee will be raised too high (and *vice versa*).

Height	Crank Length(cm)
6'0" (1828mm)	177.5mm
5'11" (1803mm)	175mm
5'10" (1778mm)	172.5mm
5'9"(1753mm)	170mm
5'7" (1702mm)	165mm
5'5" (1651mm)	160mm



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A more detailed and accurate bike fitting can be accomplished by a professional bike fitter but the above will ensure you are close to a good fit. If you become more serious in your riding or ride regularly, you should seriously consider professional fitting.

In addition to saddle points 2, 3 & 4, in the future, you may wish to seek advice on the saddle best suited to you. This is a very personal consideration and depends on your gender, the type of cycling you do (eg. aggressive, sportive or touring), the distance between your sit bones and any problem you may be suffering from due to your current saddle. A good bike shop can advise.

The following are a list of useful videos which help illustrate many of the above points. You will find many more on the internet.

## VIDEO LINKS

### **Priorities of a Basic Bike Fit (British Cycling on BBS Sport)**

<http://www.bbc.co.uk/sport/get-inspired/36713628>

### **How to Perform a Basic Bike Fit (Global Cycling Network)**

<https://www.youtube.com/watch?v=1VYhyppWTDc>

### **How to Adjust a Saddle/Seatpost (Bike Radar)**

<http://www.bikeradar.com/gear/article/bike-fitting-find-your-correct-seating-position-video-42983/>

### **How to Set Up Your Bicycle Like a Pro (The Guardian)**

<https://www.theguardian.com/environment/bike-blog/video/2013/jul/10/how-to-set-up-bicycle-pro-video>

## FURTHER INFORMATION

### **Bike Fitting Tools – Goniometer (Bikefit)**

<https://www.bikefit.com/documents/GoniometerInstructions.pdf>

### **Beginners Guide to Buying a Road Bike (Wiggle)**

<http://guides.wiggle.co.uk/beginners-guide-buying-road-bike>

### **Beginners Guide to Buying a Road Bike (Bike Radar)**

<http://www.bikeradar.com/gear/article/beginners-guide-to-buying-a-bike-30635/>

**Disclaimer** The information contained here is offered in good faith and to be helpful. The Club and the author cannot be held responsible for any injury or damage incurred as a result of heeding the above advice.