

## Solent Pirates Ten Rules To Setting Up Your Road Bike

There are a series of basic rules to follow in order set up your road bike correctly. These rules vary a little and should be taken as the starting point. Many bike shops offer a detailed bike fitting service although you should always check this is undertaken using a recognised system and not some mad ideas unique to the bike shop owner!

### **Rule 1: Fit for Purpose**

It is very easy to be tempted to buy a big bike for young riders to grown into. Sure enough they will grown into the bike eventually, but in the meantime you risk their safety and comfort by not having the correct bike with the corresponding stand over height (can they stand with both feet on the ground and clear of the top tube) and top tube length (this impacts on the riders ability to reach the handlebars and therefore overate gears and brakes).

Beware that bike sizes for younger riders are often quoted by wheel size (normally in imperial measurements) while adult bikes are often quoted in frame sizes (normally quoted in metric and from centre of the crank to the centre of top tube / seat tube intersection).

Having looked at many sizing charts for kids they all seem to understate the size needed for youth road bikes. From our experience a 24" wheel road bike would suit most 8 year olds, while 26" wheel road bikes would suit most 9 – 11 year olds. Bigger 10 year olds will begin to be looking at small 700 road bikes (now talking metric wheel sizes). The Isla bike sizing chart looks pretty good and can be used to size many bikes.

Don't forget that a good youth bike will have carefully proportioned saddles, brake levels, crank lengths and gear ratio's all suited to their size and strength.

### **Rule 2: Knee Angle**

This guide it to set the optimal height for generating power and not necessarily suited to very young riders where safety and stand over heights are of more concern.

The ideal saddle height is best described by the angle of the knee at full extension.

Typically, men will be close to 145° and women 150°. The difference is due to flexibility, with looser female hamstrings allowing the knee to extend further. We would recommend close to 145° for both sexes.

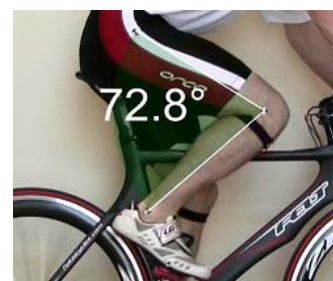
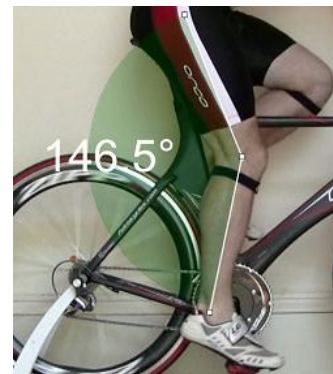
Tight hamstrings (not so much of an issue with young riders) will inhibit the extension of the knee, so many people find that being closer to 140° may suit them better.

The key to finding the ideal saddle height is to use knee angles and hamstring flexibility to get close, then fine tune (up or down 1-2mm at a time) until in the 'sweet spot'.

Please note that these are dynamic measurements, i.e. whilst pedalling and that static measurements may be slightly different. Without wishing to overcomplicate the issue, some literature recommends using 109% of inseam measurement (carefully measured), but these two methods will produce quite different saddle heights in around 65% of cases. Studies have shown that for riders setting a height using the 109% method which falls outside the recommended 145° are more prone to injury and produce less power. For this reason we have adopted the 145° method as a general guide.

Once the maximum knee angle has been established the minimum angle should be checked.

Avoid an angle less than 70° as this can put high shear forces into the knee joint, exaggerates the 'dead zone' at the top of the pedal stroke and can cause discomfort in the hip and lower back. If too tight, you will need shorter crank arms.



### Rule 3: Saddle set back

Due to the limited distances young riders undertake this is less important than ensuring they have a comfortable reach to the bars and controls.

The simplest method for establishing saddle fore aft position is to hang a plumb line from the tibial tuberosity (the bony bump below your kneecap).

This should pass straight through the pedal spindle when the crank arm is at three o'clock. This is called the Knee Over Pedal Spindle (KOPS) rule, but contrary to popular opinion there is absolutely no biomechanical justification for it. In fact, if the saddle height is incorrect the knee will be too far forwards or back and it will be wrong!



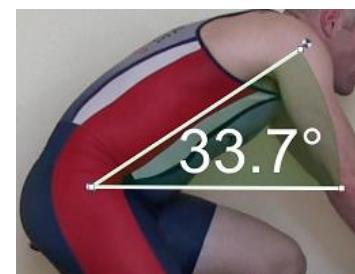
It can work very well though because it is a good predictor of the hip position relative to the seat tube axis. If the hip joint is along this axis, the rider will tend to be well balanced without too much weight on their hands and as the bike designer intended.

Finding the precise point on the Greater Trochanter to signify the hip centre of rotation can be tricky though, which is why the KOPS technique is more popular.

### Rule 4: Torso Angle

Torso angle is very dependent upon the cyclist's choice of performance and comfort. A lower position is more aerodynamic as frontal surface area is reduced.

30° to 40° is a good compromise of performance and comfort but does rely on reasonably good flexibility to lower back and hamstrings.



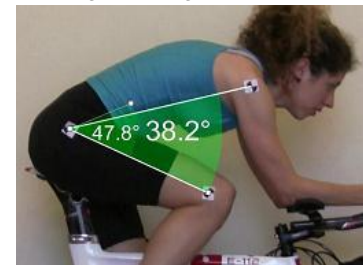
### Rule 5: Minimum Hip Angle

Torso angles significantly less than 30° can only be achieved using specific Time Trial or Triathlon bikes.

Although being much lower at the front will reduce aerodynamic drag, the minimum hip angle can tighten to a point where both comfort and power are compromised. Note how there is a difference between the 'actual' hip angle measured between the body reference points and the 'real' hip angle due to the curvature of the spine.

The ideal 'real' hip angle will vary between individuals and is dependent upon their flexibility and duration of events.

The 'actual' hip angle is easier to measure and men of average flexibility should be able to sustain 45° to 50° for some time. Whereas very flexible women can hold angles less than 40°.



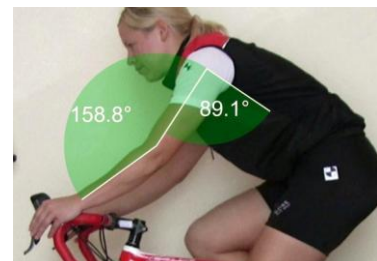
The minimum hip angle can be affected by saddle height and fore-aft position, crank length and the position of the bar extensions and elbow pads. Moving forwards onto the tip of the saddle will open up the hip.

### Rule 6: Upper arm and elbow

On a road bike, the upper arm should always be between 80° and 90° to the upper body.

This puts the shoulder in a relatively stable position and distributes loads directly into your skeleton. If ever fitting a shorter stem, care should be taken to check that knees do not hit the bars when riding out of the saddle.

A small bend in the elbows will help dissipate road induced shock load into your upper body. If you feel you need to ride with locked elbows, you are probably too far away from the bars. This is a common error when setting up youth bikes.

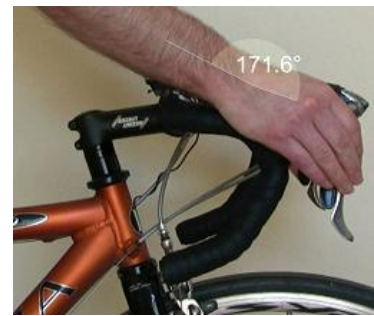


### Rule 7: Hand Position

Dropped handlebars are designed to offer a number of holds to facilitate both alternative torso angles and a variety of hand positions. This is to suit different road conditions and prevent discomfort due to staying in one position for too long.

Once saddle height and set back has been established, stem length should be set such that the hands fall naturally to the hoods.

This offers the alternatives of a more relaxed position up on the bars and a more aerodynamic position on the drops. If riders spend nearly all their time up on the bar tops, either their top tube or their stem is too long for them. The hoods should be adjusted such that the wrists are straight (as when shaking hands). Again, this is another common problem when setting up youth bikes.



### Rule 8: Cleat Position

This applies to either riders with cleats or when just positioning a foot on a normal pedal.

The cleats should be positioned such that the ball of the foot is over the pedal spindle and to accommodate the natural toe in or out of the foot.

The ball of the foot can be defined as the end of the first three metatarsals bones which can be found with a bit of light prodding. Alternatively just use the bony lump on the inside of the foot at the base of the big toe.

