Bike Fit & Positioning - General

Incorrect frame size and poor bike fit will lead to inefficient energy use and can result in positioning problems and incorrect pedaling technique.

There are many techniques to achieve correct Bike Set Up. Below is our recommendation for an easy step by step process to help guide you along.

Remember that we are all different and some slight adjustments may be required to account for long back, short legs, lack of flexibility, personal preference etc.

1 Frame Size

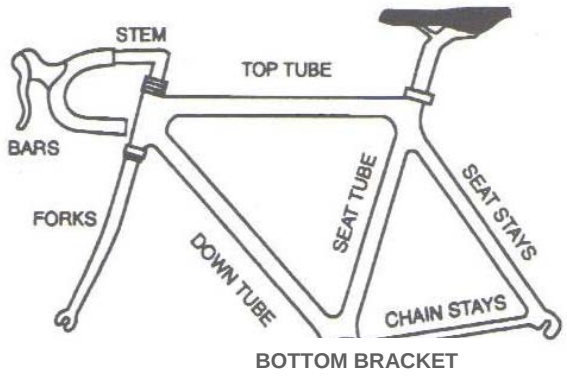
When buying a bike (frame) an experienced cycle dealer should be able to help you purchase a bike frame that is appropriate for your body shape and cycling needs.

1. Have the rider stand straight without shoes on and measure from the riders inside leg to the floor
2. Calculate the bike frame size by using the below formula

Road & Track Frame Size = inside leg measurement (cm) x 0.65

Mountainbike Frame Size = inside leg measurement (cm) x 0.56

Example: 80cm inside leg measurement x 0.65 = 52cm (for a road and track frame) or
80cm inside leg measurement x 0.56 = 45cm (for a hardtail mountainbike frame
You should look for a road and track frame that is 52cm from the seat post to the centre of the bottom bracket axle, or a hardtail mountainbike frame that is 45cm from the seat post to the centre of the bottom bracket axle.

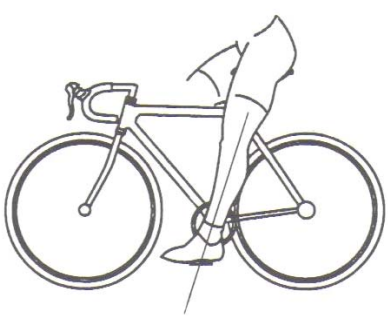


With some types of frame (some full suspension mountainbike, downhill mountainbike and BMX) frame size is often separated into small, medium and large categories. Personal preference and the type of riding being undertaken should be considered when settling on a suitable frame size for these riders.

2 Seat Height:

Having your seat too high or too low may result in a loss of power and energy by over stretching or restricting the leg muscles.

There are several methods you can use but below is an initial set up that is very easy and practical to follow.



1. Sit on the seat with your cycling shoes on.
2. Put you heel on the lower pedal
3. Line the crank arms up so they are parallel with the seat tube
4. With the seat horizontal, adjust the seat so that the leg is almost fully extended,

A second method is to take the riders' inside leg measurements and multiply it by 0.885. This method gives you the measurement (parallel to the seat tube) from the centre of the crank (bottom bracket axle) to the top of the surface of the seat.

For general mountainbike, optimum seat height is determined through the above steps. However, the type of riding is also a factor where lowering the seat height slightly can give improved control and allow greater movement on the bike, at the expense of a slight loss in pedaling efficiency.

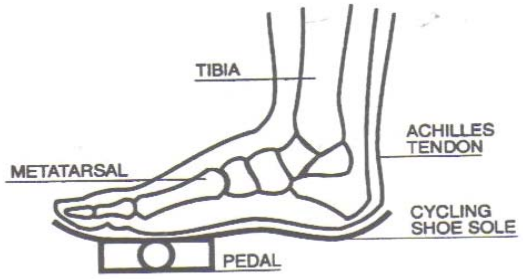
For BMX and downhill mountainbike, seat height is simply based on rider preference. The seat forms a very different function for this type of set-up, where rather than a traditional pedaling platform it becomes a reference point and balance/control platform. Seat height for this application should be low enough that the rider can easily move body position fore and aft (to full arm extension and low centre of gravity body position) without hindrance, but high enough that the seat forms an effective reference point.

3 Shoe and Cleat Position:

The purpose of cycling shoes is to maximise the drive through the pedal creating a stronger and smoother transfer of energy from foot to pedal.

However the natural style of the rider will also affect this.

1. Put your shoe on and mark the ball of your foot on the side of the shoe with a pen.
2. Put the pedal in the 3 o'clock position and put your foot on the pedal.
3. Check that the pedal is level, then adjust the cleat so that the ball of your foot is over the pedal axle. The cleat (shoe plate that attaches to the pedal) should be placed over the ball of the foot (see diagram)



FOOT POSITION ON PEDAL

4. Looking down, feet should be parallel to the cranks, however some people have feet that turn naturally in or out so adjustments should be made to the cleats to accommodate the natural foot positioning eg: rotating the cleat left or right to allow each foot to sit in its natural position. An indication of where this position might be relative to the neutral position (parallel to the cranks) can be gained by observing where your feet naturally fall while walking.
5. Check that the inner sole arch support fitted in the shoes is also sufficient for the physiology of the rider's feet.

Knee, hip pains and muscle injuries are often caused by shoes and cleats being incorrectly set up. The exact position of shoes and cleats will be determined by your individual pedaling style, but this is a good start.

Note: For mountainbike and BMX use the position of the cleat relative to the ball of the foot can be altered to give different characteristics of power and control. When the cleat is lined up with the ball of the foot pedaling cadence and efficiency is maximized. Sliding the cleat rearwards and behind the ball of the foot can improve control and power, but usually at the expense of efficient pedaling speed.

Cleat float should also be taken into account, with cleat positioning on the shoe performed at the neutral float setting.

4 Stem Height and Reach

Your handlebar stem should be as low as possible, this is normally around 5-8 cm below the height of the seat (riders flexibility in the lower back, hips and hamstrings will limit how low you can comfortably set your handlebar stem). Quill type stems should never be adjusted higher than the maximum height line marked on the stem.

Stem forward extension or reach should be sufficient that when handlebars and seat are in the correct position, the rider is neither ‘reaching forward’ nor ‘cramped’ in body position.

Personal preference is more important with mountainbike and BMX stem positioning and handlebar height. Some mountainbike riders prefer a more upright stance on the bike delivered through the use of high stem positioning or riser bars, or a combination of both. The low, aerodynamic stance of a stem and handlebar set-up being as low as possible is not all that applicable to general mountainbike rider positioning, however should still be encouraged for true racing set-up. In all cases, the stem should not be spaced too high off the steerer tube headset – the more spacing used in this area, the more flex will be generated at this interface. A variety of riser type handlebars and stem (upward) angles are available to provide the right combination to suit all individual preferences.

5 Handle Bars

Drop style handlebars should be positioned so the bottom (drop) part of the bar is angled slightly at about 5 -10 degrees from the horizontal (with the plug end of the bar lower than the front of the drop section). This places the wrists in a more natural position when holding the drops.

Flat style handlebars should be positioned according to rider preference. If there is a rearward sweep angle built in to the handlebars, this angle should be positioned so that the handlebar sweep is horizontal or rotated slightly upwards.

Riser style handlebars typically have both an upward ‘rise’ and a rearward ‘sweep’. A good starting point for positioning these types of handlebar is to view the rise portion of the handlebar from the side, and set it as close to the vertical plane as possible. Handlebar position can then be fine tuned (if necessary) to suit rider preference by rotating the handlebars back slightly from this starting point. If rider positioning is cramped with the rise portion of the handlebars in the vertical plane, a stem with greater forward extension or handlebars with less sweep should be fitted rather than rotating the handlebars forward from this position.

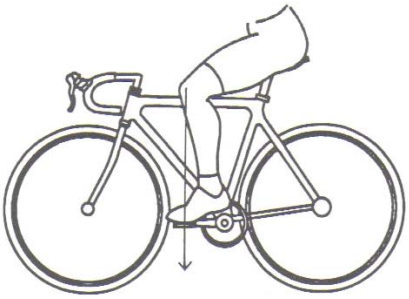
BMX style handlebars should conform with regulation limits (UCI/BMXNZ) on width and height and be positioned so that power can be maximized, as well as providing an efficient base body position. Rise and sweep are components also associated with BMX style handlebars, and setting these to the guidelines for riser style handlebars explained above will be a good starting point. Rotating BMX style handlebars too far forward will have a large influence on rider balance.

Make sure that the brake levers can be reached easily without undue hand movement. For road, low enough on the handlebars that moving the hand upwards out of the drops is not

necessary – a simple one or two finger extension should locate the right point on the brake lever, giving maximum braking leverage.

For mountainbike and BMX, the same reasoning applies. Brake levers should be angled at approximately 45°, and positioned on the handlebars so that extending one or two fingers forward from the natural hand position on the grips locates the right point on the lever, giving maximum braking leverage.

6 Seat Position (Fore/Aft)



1. Have the rider on the bike either with the bike on a wind trainer or near a wall (to lean against). Make sure the ground is level
2. Slowly pedal until the cranks are horizontal to the ground (one foot at 3 o'clock and the other at 9 o'clock) Feet should be parallel to the ground
3. The rider should be holding onto the drops of the handle bars or the grips, and 'sit bones' should be positioned at the correct part of the seat
4. Drop a plumb bob (a piece of string with a heavy object on the bottom) from the tibial tuberosity on the knee down between the crank and frame (see diagram)
5. Adjust the seat forwards or backwards so the plumb line falls directly through or just behind the centre of the pedal axis

Downhill mountainbike and BMX fore/aft seat positioning will be a matter of preference, but a middle rail position will be a good starting point.

7. Seat Position (Angle)

1. For road, track and rigid mountainbike, make sure the seat is close to level (usually best with the nose 3 to 4mm lower than the back) If the seat is sloping down (nose down) the rider will always be sliding forward. If it is sloping up (i.e. nose high) the rider may end up with discomfort or numbness in the crotch). A nose high position can also rotate the pelvis too far rearward, increasing lower back load and stress.
2. For front and full suspension mountainbike, it is important to set the seat angle with the rider in the most natural position possible, to simulate actual suspension 'sag" (both front and rear). This may mean that the seat appears to be nose down with the bike in the static or unloaded position, depending on preference for suspension sag. Ideally, front and rear suspension sag will be set at about the same rate for a well balanced bike set-up, meaning seat angle should be horizontal when in the unloaded position.
3. For downhill mountainbike and BMX seat angle will be a matter of personal preference, but a too-high nose angle should be avoided to lessen the chances of body hindrance when moving fore/aft at this point.

Gearing Restrictions for U17's & 19's

Why do Juniors Race with Gearing Restrictions?

The UCI and BikeNZ place gearing restrictions on juniors to protect young riders against the physiological damage that can result from riding in gearing too big at an early age.

Riding in restricted gears help assist young riders develop a high cadence (pedaling speed) technique that will be beneficial for their long term development and assist them in reaching the elite ranks.

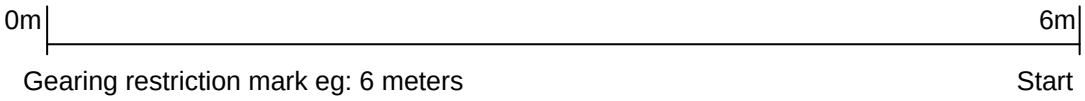
How do you work out the Gearing Restrictions?

Gearing restrictions are based on a roll out distance. This is the distance the bike travels in a straight line with one full revolution of the cranks (pedal arm) in the bikes biggest gear.

PERFORMING THE ROLL-OUT TEST:

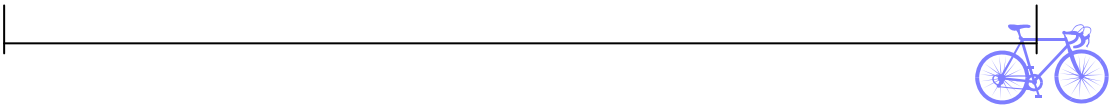
Below is an easy process for determining if your bike is set on the correct gearing restrictions for your age category.

1. Using a tape measure, mark out the meter restrictions required for your age category eg: 6.00 meters.



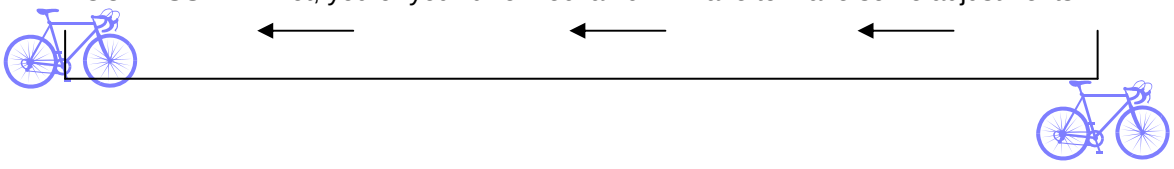
2. Place your bike in its highest gear. The chain must be on the largest front chainring and the smallest rear sprocket.

3. Place your bike on the start mark with your rear wheel closest to the roll out mark.



4. Put the cranks in an absolutely vertical position and line up the lower pedal axle with the start mark.

5. Roll the bike backwards in a straight line towards the other mark. The cranks will turn as you roll the bike. If the crank you lined up with the first mark makes one complete revolution and ends up back at its lowest position before you reach the other mark, then YOU PASSED! If not, you or your bike mechanic will have to make some adjustments.



GEARING RESTRICTIONS FOR JUNIOR RIDERS

CyclingNZ Gearing Restrictions – Club, Center and National Events

Under 15	max of 6.00 meter roll out
Under 17	max of 6.61 meters roll out
Under 19	max of 7.93 meters roll out

New Zealand Schools Cycling Association Gearing Restrictions - relates to all schools cycling events

Individual / Team Time Trial

All junior age groups	max of 6.61 meters roll out

Road Races

Year 7 & 8	max of 6.00 meters
Under 14,15,16,17	max of 6.61 meters roll out
Under 20	max of 7.93 meters roll out