Note: The following document was created by Jeff Archbold, who developed it to compliment his custom frame building hobby. Jeff currently works as a bike fit specialist at La Bicicletta in Toronto. Jeff can be reached through La Bicycletta at 416.762.2679

BICYCLE FITTING: TAILORED BIKES

A proper fitting for a bicycle should take into account not only your height/inseam/arm length, but also the following conditions:

- type of riding
- amount of riding
- terrain to be ridden
- foot length
- cleat position
- upper leg-to-lower leg length ratio
- relative strengths of muscles
- total back and hamstring flexibility
- 'location' of flexibility in back
- arm length

Only when these parameters are considered, and weighted appropriately, can a proper fitting for a bicycle be performed.

Type of Riding/Amount of Riding/Riding Terrain

An elite level racer requires a different set-up than a recreational rider. For the racer looking for that extra last bit of speed, aerodynamics are more important, comparatively, than for the person wanting to enjoy nice, quick ride in the countryside. While the recreational rider wants to be aerodynamic, sacrificing too much comfort for the sake of a slight increase in top speed when sprinting for the town sign once a week is not usually worth the compromise.

Also, climbers require a slightly different position than a racer specializing in criterium racing. A proper fit will be adjusted to enhance the specified riding.

Foot Length/Cleat Position

The length of a riders foot, if relatively long or short compared to the leg length, will affect how the cleats should be positioned fore-aft.

In addition, depending on whether the rider has strong lower leg muscles, compared to upper leg muscles, and the type of riding to be done will affect how the cleats should be positioned to maximize the performance and efficiency of the rider on a properly-fitted bike.

Leg Lengths and Leg Muscle Strengths

Many bike fit programs can calculate a saddle height based on inseam length. This saddle height is usually quite close to ideal. Different riders however, pedal at different cadences, and ride on different terrains. The saddle height can be fine-tuned for an individual, however, based on the above-described variables.

Determining the proper 'set-back' of the saddle (related to 'seat tube angle') is more difficult because of the variables in rider physiology described above.

Different bike frames have different seat angles. Seatposts and saddles can be installed to also vary the effective 'seat tube angle' of a bicycle. By varying the seat tube angle, the amount of set-back in the seatpost, and where the saddle is clamped into the seatpost, the distance between the front/tip of the saddle relative to the vertical line passing through the bottom bracket axle can be varied. This measurement is typically called 'saddle set back'.

Depending on the ratio of upper leg to lower leg to foot length, a rider will be more comfortable, more efficient, and produce more power with a certain saddle set back compared to other saddle set back positions. In addition, the relative strength of muscles in not only the upper leg versus lower leg, but also quadriceps strength versus hamstring strength influences the saddle position best suited to an individual rider.

By placing a rider on an adjustable bike and altering the saddle set back while the rider pedals against a variable resistance, and while comparing power output and heart rate to different saddle positions, it is possible to compare determine the saddle set back position at which the rider is most efficient.

If a bike fitting attempts to determine saddle set back without using this dynamic test while the rider is pedalling, the rider is only being offered the 50th percentile solution. By doing the comparative measurements as the rider pedals, the saddle set back is tailored to the individuals body type, producing a better fit.

Back Flexibility/Arm Length

Riders have varying amounts of flexibility, and arms come in all different lengths. These variables, along with the type of riding to be done affect how an optimal handlebar position is achieved.

Some riders have a lot of flexibility close to their hips, while others have minimal flexibility until at least the mid-back region. Thus, riders with identical biometric measurements can require vastly different handlebar positions.

By varying the handlebar height, and the distance from the saddle to the handlebar, an optimal position can be obtained. For the elite-level racer, this handlebar position will typically be lower than for the recreational rider.

In addition, compromise between comfort and aerodynamics while riding on the brake hoods must be compared to riding on the drops of the handlebars. Some riders are fortunate to achieve optimal positions in both of these hand positions, while for others, a compromise must be made, weighted based on the type of riding they will be doing.

LA BICICLETTA BICYCLE TAILORING

The bicycle tailoring system at *la bicicletta* evolved over many years. It started as a way to provide the best fit for custom-built frames, albeit with a more static-fitting method. As the fitting process was examined, ways to improve it were continually suggested and implemented.

The bike tailoring begins with questions about the past riding history of the rider, and what type of riding will be done in the future. The rider's strengths and weaknesses are noted, along with their typical cadence, and once this has been determined, the cleats are checked, and adjusted if necessary. Next, the crankarm length for the dynamic measuring is suggested/chosen.

The handlebars and saddle height are ‘roughed in’ to produce an acceptable starting position.

The saddle height is adjusted and ‘tweaked’ based on the individual rider and their style of riding.

Proper pedalling motions are described and explained to improve the efficiency of the rider.

The optimum saddle set back is determined dynamically using a heart rate monitor and a variable resistance power meter adjusted to maintain a typical cadence.

The position of the handlebar is varied to obtain the best compromise between comfort and speed, depending on the riding style or objectives.

The fit dimensions of the riding position are then recorded. This allows the rider/mechanic to reproduce the optimum position determined on the adjustable bike on any other bicycle, within reason.

(Since saddles are not all the same, different saddles were measured relative to the saddle used on the adjustable bike. The distances between the front/tip of the saddles and the most likely position of the sit bones on the saddles was measured. These measurements produced a ‘conversion factor’ distance that must be added or subtracted from the measurements provided in order to replicate the fit using saddles other than the one used on the adjustable bike.)

This system is tailored to the individual rider based on the multitude of variables inherent in riding styles and morphology. The rider experiences the differences while pedalling on the adjustable bike.

Just as a tailored suit looks and feels better than something off the rack, this bike tailoring is completely individual, custom measured, and based on the person who will end up riding the bike. We believe you will agree.

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