**Bike Fit Curriculum**

**Goal**

Achieve a position on your bike(s) that is comfortable and efficient for the way you want to ride.

**Variations**

\* All our bodies are differently proportioned:

- Leg, torso and arm length

 Torso length shortens later in life

- Foot length

- Weight distribution

- Flexibility

 Changes with cycling experience and throughout life

- Personal preferences and individual conditions

- Preferred cadence - leg power versus spin

- Pedaling style - toes down, level or up

\* Our cycling styles are different:

- Commuting

- Touring

- Racing

- Triathlons (time trials)

- Mountain biking

- Long-distance rides

- Fast group rides

- Slow group rides

- Just plain old riding for fun

\* Types of bikes:

- "Road bikes" with drop bars

 Many sub-species

- Mountain bikes

- Hybrid bikes

- Cruisers

- Tandem (2 or more seats)

Beyond the scope of today's discussion:

- Children's bikes

- Recumbents

**Possible adjustments - Free (focus of this class)**

\* Seat height

\* Seat tilt

\* Seat fore-aft position (might require a different seat post)

\* Seat rotation

\* Handlebar height - small changes

\* Brake lever location on handlebar

\* Cleat position on sole, for those with clipless pedals

**Adjustments - Moderate expense**

\* Handlebar height - larger changes (different stem)

\* Reach to handlebar/brakes (new stem and/or bars)

\* Handlebar width and shape (different bars)

\* Saddle shape and type (new saddle)

\* Type of pedal (new pedals, for foot position and Q-Factor)

**Adjustments - More expensive**

\* Crank arm length (expensive)

\* Crank set type (expensive, for different Q-Factor)

\* Large change in handlebar reach and height (different frame or fork)

\* Bike too small, too big, or type inconsistent with your style of riding (different frame)

**There is no single "correct" bike fit!**

There are a few basic fit parameters, common across those variations.

Some parameters change with experience and age, some change with style of riding and type of bike.

\* Contact with the bike in three areas

- Seat, hands and feet

- Relative positions determine your comfort and efficiency

**Fit Parameters - Common across variations**

\* Make individual adjustments in small increments (1/8" or less), try it for a ride or too (unless it is uncomfortable) before making another change.

\* When you've found a position parameter that works well, measure it and write it down.

\* Each adjustment can affect other parameters.

\* Saddle height to the pedals

- Many formulas, but the simplest method is with heel or arch on the pedal at farthest position, leg should be completely extended, without requiring rocking hips to maintain pedal contact.

- Fine tune seat height height after working through other adjustments.

\* Saddle choice

* + Your saddle should be appropriate for you and how you ride. It will have shape that gives good support and doesn't chafe, is not overly padded (if at all), and have a good width across the back (typically wider for women)
		- * + Narrower saddles are typically better for faster riding and greater forward lean.

There are MANY good saddles. What works for someone else may not be right for you.

- What feels comfortable in the showroom or a quick ride around the block will not necessarily be comfortable on your typical ride.

- Some bike shops have a saddle trial program.

- For those that want to try a leather saddle (Brooks, Gilles Berthoud, Rivet, and others), several online vendors offer risk-free trial periods. Wallingford (http://www.wallbike.com/catalog/saddles) and Boulder Bicycles (http://boulderbicycle.bike/Berthoud-saddles-and-related-parts-and-treatment/) sell Brooks and GB saddles with a 6-month guarantee, and Rivet (http://rivetcycleworks.com) has a 12-month guarantee. All three websites have good information about how to choose between the many models offered.

\* Saddle tilt, so you're sitting ON the saddle.

- Goal is a "level" saddle - under your pelvis, not necessarily over the entire length *(bring photos of my two saddles)*

- Nose down tilt causes sore hands and wrists because you're always pushing yourself back

- Too much nose up tilt creates pressure on sensitive soft tissue

- Some like a saddle with a central cutout or relief to avoid that pressure, but others find that some cutouts can be painful.

- "Two-bolt" seat posts are easier to make very fine and repeatable tilt adjustments

- A new saddle necessitates re-checking saddle height and tilt

**Fit parameters that change with Variations**

\* Saddle fore-aft position

- Probably most important adjustment, after seat height

- Varies with how you use your bike(s), and how you want to sit on it.

- Leaning far forward

- More aerodynamic

- Uses "the glutes" effectively

- Less comfortable over long distances for non-racers

- Can't see what's around you as easily

- More neck strain

- More flexibility needed since handlebars are lower and farther forward

- Greater hip rotation needed

- Requires the seat farther back

- Fully upright

- Less aerodynamic

- All power has to come from thighs

- More weight on sit bones

* + - * Harder to maintain a higher cadence
		- Different seat posts can have different setback
		- Some saddles (Brooks, GB) have shorter rails, so they can't be adjusted as far back

***Challenge is to find the compromise between extremes***

***Goal is balance so that arms aren't supporting your weight***

\* Handlebar height and reach

- These adjustments affect forward lean, and greatly influence comfort

- Different body types (torso and arm length), flexibility, and riding style are factors

- Quill stems (used in threaded headsets) can be adjusted up and down by loosening center bolt

- ***Do not raise above Minimum Insertion mark***

- Threadless headset stems can be flipped to change bar height, and headset spacers can be moved above or below the stem.

- Different stems (both types) allow change of reach as well as bar height (*photos of me on Marinoni with different stems*)

- There are many types of handlebars, including drop bars with different reach.

- Bars slightly (less than 1 inch) above or below saddle height tend to be comfortable and give a good balance of power for any distance.

- Younger, more flexible riders might prefer lower bars and greater reach.

- Those who prefer to climb standing ("out of the saddle") often like bars farther forward.

* + - A good guideline for many of us is a back angle of about 45 degrees
		- - On drop bars, reach and effective height can be tweaked by moving brakes up and down the curve

- Guideline for starting position is tips of brake levers even with straight edge under drops. I like mine about a finger's width higher.

- A bigger frame will allow higher bars relative to the saddle

- For modern bikes, models from the same manufacturer may have different bar heights and other changes for their perceived market.

\* Knee position relative to bottom bracket

- Common guideline is kneecap centered over pedal spindle on the forward pedal

- This is a controversial opinion, but can be a good check, or way to measure your position. It is **not a "rule"** like the seat height measurement.

- Upper body balance is a much better check.

**Other adjustments**

\* Cleat position - guideline is "under ball of the foot", slots allow easy adjustment

- Long distance riders often like cleats farther back

- Watch out for "toe clip overlap"

\* Q-Factor - lateral spread between feet

- Most affected by crankset design

- Small changes possible by moving cleats sideways

- Older cranks allowed lower Q-Factor, and new versions are available ($$$)

- Change in crankset often necessitates change in bottom bracket length to maintain chainring location on frame

- For those that want greater Q-Factor, pedal spacers are available

\* Crank arm length

- Crank arm length is related to leg length

- Shorter cranks allow easier spin (less hip rotation)

- Longer cranks provide slightly more torque

- Cranks are typically offered in 165, 170, and 175mm lengths. There are a few brands as low as 152mm and up to 180mm.

* + These days, better bike makers equip smaller bikes with shorter cranks and vice versa.

\* Remember that each adjustment can affect others, so finding **your** best fit is an iterative process. *(Examples of seat position versus height, bar height versus reach.)*

* Your bike does **not** have to be symmetrical. You probably aren't!
	+ Leather saddles break in to match your own anatomy (*show my saddles*)
	+ You might like your seat slightly rotated (*use my example*)
	+ One brake lever might be higher for arm length discrepancy
	+ Leg length discrepancies are common and you might benefit from a spacer under one cleat
* Make single small changes and try it for a ride or two before making another change. When I get a new saddle, I make small changes in saddle tilt in the middle of a ride for clear A-B comparisons.
* Measure and write down the results when you find something that works. (*show my own measurements*)

\* If you have different bikes with different purposes ("fast" road, touring, mountain, commuting) they could have different fit adjustments. But the fitting principles above still apply.