

## Hands Up!

### *Stem the tide toward “flat back”*

By Sheldon Brown

**M**uch of bicycle design is driven by the needs of racing cyclists — even though the vast majority of cyclists are not racers. Racing styles and positions are not necessarily suited to the needs of the touring cyclist.

Newer road bikes tend to have longer top tubes and to be sized smaller than was common a few years back. This is good for the racer, who is looking for the fastest, most aero-

upright riding position. Also, as cyclists age, they tend to prefer the more upright posture. Achieving this upright position often involves substituting a different handlebar stem on your bike, to move the handlebars higher up, or closer to the saddle, or both.

#### Adjusting Your Stem Height

Most road bikes use threaded forks, and take a stem that slips inside of the fork's steering column. The stem will have a long bolt running down through the vertical part, connecting to a wedge at the bottom. Tightening the bolt pulls up the wedge, and the wedge jams against the inside of the steerer, securing the stem to the steering column.

Loosening up the bolt, usually with a 6mm Allen wrench, may free up the wedge and allow you to move the stem in the steerer. Sometimes, loosening the bolt won't loosen the wedge, so you may need to unscrew the bolt a few turns, and then give it a tap on top with a block of wood or a soft mallet.

Once the stem is loose in the steerer, you can raise or lower it, and rotate it from side to side. If you decide to

raise it, it is important that you don't overdo it. If you raise the stem too high, so that there's not sufficient length remaining inside the steerer, you might find the whole handlebar assembly disconnecting from the bike while you're riding — your life will pass before your eyes and down you'll go!

Most stems have a "minimum insertion" mark that shows how high it may safely be set. If you can see this mark, the stem is too high. If your stem doesn't have such a mark, a good rule of thumb is that there should be at least 2 inches (50mm) of stem inside the fork.

If your stem is currently lower than you'd like it to be, don't get your hopes up too high that you can just raise it — most bikes already have the stem set to the max when they leave the shop. If your bars are too low, chances are you'll need to buy a new stem.

If your bike has a "threadless" fork/headset, options for stem adjustment are usually even more limited. There may be some spacer washers above or below the clamp-on "threadless" stem that could be re-arranged,

but, generally, again, the stem is probably already as high up as it will go, with the spacers underneath it.

#### Stem/Fork Compatibility

If you wish to change your stem, you need to consider compatibility with your bicycle's fork and handlebars. On bikes with traditional threaded fork/headsets, the stems will be sized to fit inside of the steerer. This sometimes causes confusion, because the nominal size is based on the outside diameter of the steerer, but the diameter of the stem is 1/8" smaller to fit inside the steerer. Thus, a normal 1-inch fork requires a stem of 7/8" (22.2 mm) diameter, while a 1 1/8-inch fork requires a stem that is 1 inch in diameter. Thus,



PHOTO BY GREG SIPPLE

**Your stem plays a big role in your riding position, so it's worthwhile to get it right.**

dynamic position, or for the weekend athlete out for a brisk high-intensity workout, but is not so good for the long-distance rider, who is likely to spend more time in the saddle.

Racers aim for the holy grail of the "flat back." The racers' high-intensity, high-gear pedaling style allows the reaction forces from their leg work to hold their upper body in position, even when leaning very far forward. Indeed, in a hard sprint, the rider is actually pulling upward on the bars. This intense riding style, however, is not sustainable for long hours in the saddle.

A touring cyclist rides longer, but with less intense pedaling effort. A long-distance rider is not seeking speed, but endurance. Thus, the touring cyclist is likely to seek a more

depending on how you look at it, either of these stem sizes might be referred to as "1 inch."

If your bike uses a threadless headset, there's less confusion, because the stem fits the outside of the steerer, just like the headset.

### **Stem/Handlebar Compatibility**

In the past, there was a wild proliferation of handlebar diameters and stems to match. Different countries and different companies would each have their own set of "standards." This anarchic situation is gradually being rationalized, to the point that there are now only two sizes left, the international ISO standard size (1 inch or 25.4mm) and the Italian national size, nominally 26mm. (Actually, many Italian bars are closer to 25.8mm than the nominal 26mm size.) Some people in the industry make a false distinction, referring to the ISO size as "mountain bike" size, and the Italian size as the "road" size.

The vast majority of bikes made in the last 10 to 15 years use the ISO 1 inch size, whatever sort of handlebars they use. High-end aftermarket drop bars are commonly Italian (26mm) size, but most drop bars supplied on built-up bikes are ISO (1 inch). Up until a couple of years ago, Cinelli used a proprietary 26.4mm size.

If you're shopping for a stem, and are not sure of the handlebar size you need, don't guess; measure it, or get somebody to measure it for you with a proper caliper. If the bars are too skinny for the stem, it is possible, but inelegant, to shim the bar with thin metal stock. If in doubt, however, don't take chances, especially with aluminum stems. If you force an aluminum stem to bend to a shape it wasn't made to fit, it may fatigue and crack. If it is going to break, it will break when you are pulling or pushing extra hard on it, and down you'll go. Stem failures are among the most dangerous parts failures there are, and almost always lead to nasty crashes.

### **"Pop-Top" Stems**

Many of the newer bikes are coming with "pop-top" stems. This type of stem has a removable front section held on by two bolts, rather than the usual single bolt. In addition to being light and strong, this type of stem can be interchanged much more easily than traditional one-bolt stems, because you don't need to remove handlebar tape/grips nor brake/shift levers to change the stem.

### **Stem Dimensions: Reach, Rise and Height**

Stems are measured in ways that are often confusing, and measurement systems

will sometimes vary from one manufacturer to another.

"Rise" refers to the angle of the "extension" part of the stem. This may be referenced either to the steering axis, or to an imaginary line perpendicular to the steering axis. Thus, a stem with the extension perpendicular to the quill might be referred to either as a 90-degree stem, or as a 0-degree stem! A traditional "7" shaped road stem might be referred to as a 73-degree stem, or as having a 17-degree negative rise! Caveat emptor!

Many of the newer "comfort bikes" come with pivoting stems with adjustable rise. These are good for the casual pootler who just wants to sit up as straight as possible, but are not always the best choice for a more committed cyclist. As these stems go up, the bars also move back, and this may move the bars back so far as to disturb the weight distribution and steering geometry. That doesn't matter to the occasional bike-path cruiser, but may be a significant issue to the touring cyclist, especially with a loaded bike.

The "reach" is the distance from the centerline of the steering axis to the center of the handlebar clamp area — what you have to watch is the angle this measurement is taken from.

Traditional "road" stems shaped like the number "7" have a reach measured along the horizontal axis. Newer type stems that have different "rise" angles most often measure the reach along the axis of the rise, which leads to confusion. A 120mm "7"-shaped stem, raised to place the handlebars at the same height as a nominal 120mm stem with a 135-degree (or 45 degree — depending on how you measure it!) rise, will actually place the handlebars substantially farther forward.

The height of a stem is an important variable, not usually specified in any clear way. In the case of "7" shaped stems, if height is specified, it is usually the overall length of the vertical part of the stem, from top to bottom.

### **Stem Extenders**

If you want to raise your bars, and your stem is already at the maximum, one option is to replace the stem. Another is to use a "stem extender," a stepped tubular device that mounts between the stem and the steerer. These are readily available for both threaded and threadless headsets, 1-inch and 1 1/8-inch sizes.

An extender for use with expander/wedge type stems is narrow at the bottom to fit into the steerer, and has its own wedge to secure it. The wedge bolt is deeply recessed, so you'll need either a long Allen

wrench or, sometimes, a socket wrench with an extension to reach it. The original stem fits into the wider top half of the extender.

Thus, the bottom of the stem winds up about 1/2 inch (1cm) above the top of the steerer, so an extender of this type will raise the stem about 2 1/2 inches (6cm) above the normal "max" level. This may be overkill for you.

Extenders for use with a clamp-on stem and threadless headset are similar, only they have the wide part at the bottom, and are narrow at the top. The bottom section will have a binder bolt to clamp it onto the threadless steerer, and there will be a deeply recessed bolt in the middle, to connect to the star nut. The original stem clamps on to the narrower upper section of this type of steerer.

Note that the installation of a stem extender (or tall stem) may be complicated by the need to replace some or all of the brake and shift cables, if the original ones are not long enough to reach the bars in their new, higher position. ●

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