Keep Your Derailleur Happy

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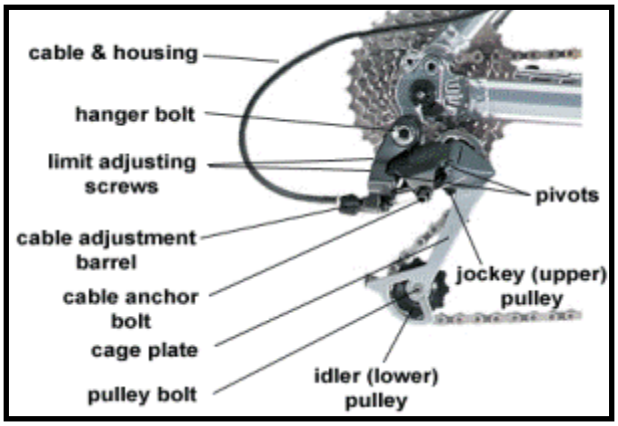
Everybody has derailleur problems. Unless your bike is just for show, you're going to have shifting problems. There's no way to stop them. But with some good maintenance techniques, you can really cut down the amount of rides that shifting problems spoil.



The trick is that there is no trick. There isn't one thing you have to do to keep your bike shifting well. There are a bunch of different things, any one of which can cause all sorts of problems.

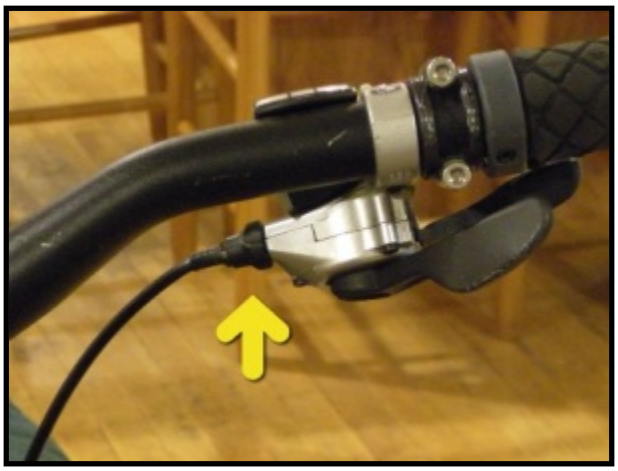
The first thing goes without saying, always lube your chain. It can make a huge difference in shifting performance.

The most common cause of poor shifting is probably the cables.

a. Old, worn, dirty cables can cause a lot of friction, which will make downshifting difficult. If the cables are really bad, the spring in the derailleur might not be strong enough to counter it, and up shifting might be impossible. Cables are pretty cheap and easy to do yourself, so if you ride in dirty conditions, you might want to just replace them every spring.

b. The most basic adjustment of your shifter cable is the bolt on the derailleur that pinches the cable. There are a few techniques to attaching this, but here's the way I do it: First tighten the barrel adjuster knob (more on that in a minute) on your shifter and derailleur if it has one. These are hand-turn knobs. Turn them to the right until the inner bolt is all the way 'in'. Now let the spring in your derailleur shift the chain all the way to the smallest gear in the rear. Adjust your shifter to match, so if the cable was working, it would shift into the smallest gear. Now full the cable firm with a pair of pliers and tighten the clamp bolt, with as little movement of the derailleur as possible. This can be tricky; it might take a few tries. Once you have it on, you're not done yet, you then have to move on to the next step...

c. Adjusting your barrel adjusters are probably the closet thing to a silver bullet there is. Look at your rear derailleur from straight behind or straight in front. Pedal with your hand and shift through your gears. You want your chain to be as straight as possible going from the derailer's hear, to your wheel's gear. If it’s off just a little bit, you can use your barrel adjusters. The (awesome) Shimano XT Shadow derailleur doesn't have a barrel adjuster, but most rear derailleurs do and all shifters I've seen do. A barrel adjuster is a bold that your shifter housing fit in. The bold has a big plastic knob around is so you can easily adjust it by hand, even with gloves on. Twisting the knob moves the bolt in and out.

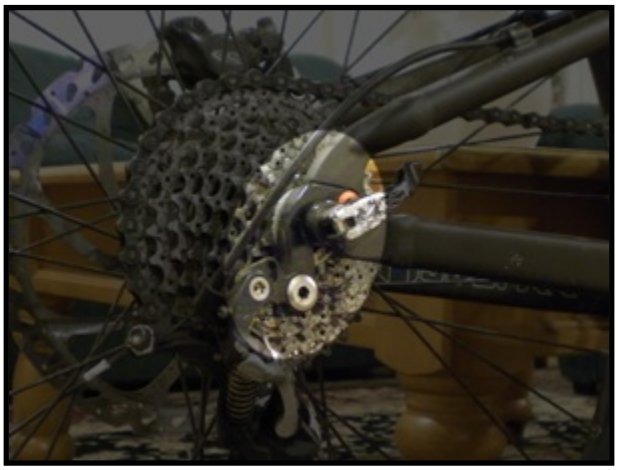


This brings the housing with it, and lets you essentially make your cable housing longer or shorter. A shorter housing will release tension on the cable and your derailleur will move slightly in one direction. A longer housing will increase tension and move the derailleur your other way. Keep pedaling by hand as you make these adjustments to keep everything flowing nice and smooth. You can only make minor adjustments with the barrel adjusters, if the derailleur cable is WAY off, you'll need to re-do the previous step.

d. If you're derailleur is new, you'll have to adjust your limit screws too. You rarely have to readjust these screws, but it can happen. These screws simply but a hard limit on how high or low your derailleur can go. They physically stop the derailers pivots from bending past a certain point. There are two screws, one for the top and one for the bottom. You want to adjust them both so that you can easily get in to both your largest and smallest gears, but you also don't want the shifter to ever go PAST each gear, then you'll shift the chain right off the gear and into your spokes, or frame. Limit screws only effect the outer limits of your derailleur. If you are having issues with poor shifting in middle gears, limit screws will do NOTHING for you.

The second most common source for poor shifting is likely the bent derailleur hanger.

a. A derailleur hanger is the piece of metal that hangs down from your frame. It's the piece that your derailleur actually bolts on to. On most steel and titanium frames, the hanger is part of the frame. On most aluminum bikes, the hanger is a separate bolt on piece made of super soft aluminum. This is done so that if you catch your derailleur on something, it will tear the hanger off without damaging your expensive frame. The downside is that you really can't bend aluminum back into place. So if your hanger is bent, the official repair is to replace it with a new one. At ~$25 a pop, that can get expensive, so I usually bend mine back into place anyway.



b. So how do you know if your derailleur is bent? Well, unless it’s VERY bad, you really can't eyeball it. There are very few straight pieces of metal in a derailleur, so it's very hard to judge by eye. So what you really need is the Park Tools DAG Derailleur Hanger Adjustment Gauge!

c. This little guy isn’t very little. And it’s a bit pricey too. But if you want consistent shifting, you need this tool. If you ride hard, you will probably use this tool weekly at least. Yes, that’s how easy it is to knock a flimsy little aluminum derailleur hanger out of alignment.

d. So step one to using this tool is to true your back wheel. Yup. It uses the plane of your wheel to gauge the alignment of your hanger, so if you have any wobbles in your wheel, take care of those first. I've heard some people say that your rear wheel has to be "perfectly" true to use this DAG too. It doesn't. Just make sure it's "pretty true". No wobbles etc.

e. Now remove your rear derailleur. Just one bolt. You don't have to undo the cables (since we just got the cable aligned perfectly). Just undo the one bolt that holds the derailleur on and gently let it hang as you work around it.

f. So screw the DAG tool into the derailleur hanger, all the way. The other end of the tool is adjustable and what you do is rotate the tool around your wheel sliding the end up and down, to keep the thin bar lined up with your rim. If your hanger is out of alignment, the space between the thin bar and the rim will not be consistent.

g. So if your hanger as aluminum, the official next step is to replace it. But if you're not made of money, it can't hurt (actually it could - disclaimer-) to try the next step.

h. If your hanger is steel or titanium, it's time to bend it back into shape. This is easy to do; you just have to be patient. The DAG tool is very solid, so after using it and figuring out which way the hanger need to go, apply gentile but firm pressure on the tool to bend the derailleur. Do a very little bit at a time, and then re-gauge against the wheel. Especially if you are doing aluminum, the least amount of bending, the better. So you don't want to over bend. Just keep doing a little bit at a time until the gauge maintains the proper spacing all the way around the wheel.

i. Also, don't be afraid to hit up your frame manufacturer once in a while and see if you can't get some free derailleur hangers. For the $2000 you probably paid for your aluminum frame, the least they can do is send you a few free hangers since they get bent practically every other ride if you ride hard.

Off-Topic: Why don't they make aluminum frames with soft steel derailleur hangers? You'd still be protecting the frame from damage if the hanger was softer than the frame, but if it was steel, you'd be able to bend it back many many times before replacing it. Since steel is no where near as brittle as aluminum is. Derailleur hangers are like monthly payments you pay on a bike that you already own outright

Another cause of poor shifting is chain & gear wear.
As your chain gets old, it stretches out. As a chain stretches, its force is no longer shared among all the teeth of your gear, all the pressure gets put on the first tooth. This stretching happens in unison, so for a while you won't have any problems from this. But if you replace just one gear, or just the chain, without replacing everything else, you'll get components that aren't matched and you'll get some phantom chain skipping. Another common problem I have is on my middle rings. I'm not sure why it's the case, but even on drive trains that aren't that old, my middle ring apparently wears much quicker than all the rest. Keep in mind I use all three of my front gears often, and probably use the middle one the least. But if you have a problem where only one of your front gears is causing skipping, you'll probably be ok if you just replace that one gear. If you are getting lots of chain skipping from all over your drive-train, even after you check all your other adjustments - and if your drive train is a year or two old, or more… then you may have to replace the whole thing. Whole thing meaning a new cassette, new chain, and three new chain rings. Might be a good time to get a whole new crankset, if you can find a nice deal.

The last thing that can cause shifting problems is a bad derailleur itself. There are two primary ways a derailleur can go bad. The pivots can wear out, causing lots of flop. Or the derailleur can get physically mangled or bent. You usually know when you've mangled a derailleur. You can check for bad pivots easy enough too. Just grab the very bottom of your derailleur (where the bottom gear is) and gently wiggle it

towards and away from the wheel. There should be no or very little play in the derailleur. If it’s flopping back and forth, it's time for a replacement.

If you need a new rear derailleur, I do have a recommendation for you. I avoid XTR components because they are just too expensive, and everything on a bike wears out or breaks quick if you ride a lot. I usually stick to XT class parts, but I still used to go through 4 rear derailleurs every riding season, then I switched to Shimano's XT Shadow rear derailleur. Get this derailleur! It's really a great design. It has much less movement (meaning it doesn't flop around as much). It’s much stiffer so it shifts better. It doesn't stick out nearly as far, so it doesn't get caught on sticks and rocks as much. Now I only go through 1 rear derailleur a year. That’s huge!

Long Cage or Short Cage?
Wondering which you should chose? There actually isn't a choice. The cage portion of the derailleur is just to tension the chain. If you have a big ring up front, you need a longer chain, so you need the long cage derailleur to tension all that chain. If you only have a middle ring in the front (or a granny and middle) then you want a short cage, since you have less chain that needs to be tensioned.

What about front derailleur?
Front derailleurs are fundamentally different (and simpler) than rear derailleurs. A rear derailleur does two things. It feeds the slacked chain into the gear you want to be in, AND it acts as a tensioner and keeps your chain tight. A front derailleur only works with the top of the chain that is in use. It pushes the active top of the chain that is providing all of the drive power, from gear to gear. There are only three gears in the front, so this is a huge gap compared to a shift in the back.

So adjusting a front derailleur has some similarities. Good cables are a must. Laying the cable and adjusting the barrel adjusters and the limit screws are the same. None of the rest really applies. The front derailleur doesn't feed the chain directly; it just pushes the chain side to side as you shift. The only real guides are: does it shift into all the gears, and does the chain rub against the front derailleur when you're not shifting. Otherwise you're good. The simplicity of the front derailleur explains why they usually cost 1/3 to 1/4 as much as a comparable rear derailleur.

And the final bit of knowledge is, don't shift under load. You can't shift if you're not pedaling (and if you do, you can mess up your perfect cable alignment). So you have to be pedaling when you shift. But you have to be pedaling very lightly. If you try to shift while you're pedaling up a hill, you'll do lots of grinding, and you'll probably make your chain skip anyway, which will kill all that momentum you were trying to save by pedaling hard while shifting. It's also very easy to snap your chain if you are pedaling while shifting. It's an art, but you need to very quickly go from hard pedal strokes, to very light ones while you shift, then right back to hard strokes.