How to Fix a Flat Tyre and Other Adventures in Cycling

Most of your cycling will be trouble free, but from time to time issues arise. This document is intended to guide you through sorting out some problems that might occur on the road without the need to go to a bike shop for help. It covers changing an inner tube, fixing a flat, adjusting your seat height and fine tuning your gears and brakes.

Flat Tyres 1 - Change a Tube

Flat tyres don’t happen as often as you might think, but when they do, it doesn’t take long to fix them. The process is simple and logical and you’ll only need this guide the first time.

Explosive punctures are rare, it’s more likely that you’ll notice that the bike might be getting harder to pedal or wobble a bit because the tyre is getting soft. If your tyre is flat, STOP and move off the road before doing anything to the bike. Your control of the bike and braking power is much less with a soft tyre and riding with a flat could damage the wheel rim.

You need to carry some basic equipment with you:

- one or two spare inner tubes
- three tyre levers
- a pump or CO2 inflator
- a spanner if you don't have quick release hubs
- a puncture repair kit is optional

By replacing a tube you'll be back on the bike much quicker than if you tried to repair it on the footpath.

Once off the road have a good look around the outside of the tyre tread to see if there’s anything stuck in the tyre that may have caused the puncture. If you can’t see anything and it’s a slow leak, then pump the tyre up and continue riding carefully. That may be enough to get you home, even if you need to stop again and pump it again. Otherwise, here’s how to change the tube:

Step One: Take the Wheel Off

- If the flat is on the back, it’s easier to get the wheel on and off if you shift to the smallest gear on the rear cluster.
If you have rim brakes and your tyre is wider than the wheel rim, you need to release the brakes. With V-brakes, squeeze the two brake arms together and slip the “noodle” out of the keyhole slot in its cage (see photos). If the brake cable is too tight, you may need to wind out the lock nut and wind in the barrel adjuster on the brake lever to loosen it. A road bike might have side pull brakes with a quick release lever, but if the tyres are skinny enough, the wheel may slip between the brake blocks.

This procedure isn’t necessary with disk brakes, but if you have hydraulic disks, be careful not to squeeze the brake lever with the wheel off.

Open the quick-release lever on the hub; unwind the nut on the other end so that the wheel can come free from the fork or frame and remove the wheel. If your wheels are held on with nuts, you will need to undo them (anti-clockwise) with a spanner.

Step Two: take the tyre off

Some tyres are easy to take off the rim and others can be very tight. Release any remaining pressure in the tube. With a presta valve, unscrew the little nut and push down the stem; on a schrader valve press on the stem in the centre.

The tyre is held in the rim by the “bead”, a ridge around the inner edge. This picture is of a tubeless tyre, but shows how the beads fit into recesses in the rim (yellow) to hold the tyre in place. Staring opposite the valve and next to a spoke, hook a tyre lever under the bead repeat with the other tyre levers (see pictures below).

Swing each tyre lever down and hook it on the spoke, you should then be able to run a lever around the wheel to release it completely.

You don’t need to take the tyre off completely as you can often get the tube out through one side. You should be able to take the tube out of the tyre now, a small nut may hold the valve stem down, but you can unscrew it with your fingers.
Step Three: find the cause of the flat

- You need to check the tyre and remove any obvious nails or glass that caused the flat, so that the new tube you’re putting in isn’t going puncture straight away. If you find something in the tyre, take it out and dispose of it safely.

- Carefully run your fingers or a glove around the inside of the tyre to check if there is anything sticking through the tread. If there is, remove it from the outside, not the inside of the tyre. This is a good time to check the tyre’s general condition, if it’s worn replace it soon.

- Check the inside of the wheel rim, the rim tape may have shifted and exposed a sharp edge.

Step Four: put the tyre back on

- With the new or repaired tube, put the valve stem through its hole in the rim, but don’t seat it fully yet. Slip the tube back inside the tyre casing, a couple of strokes of the pump will take out the floppiness. Make sure the tube sits well and isn’t twisted or trapped.

- Put the tyre back on starting next to the valve, if necessary push the valve stem up a little to help the bead seat properly. Work around the tyre, slipping it into place with your thumbs. You may need to use a tyre lever to get the last bit of bead over the rim, at all times be careful not to pinch the tube.

- Pull the valve stem down as far as it will go and pump the tyre up a little further, but not so much that you can’t complete the next step. Go around the wheel and push the bead away from the rim on both sides of the wheel to check the tube isn’t trapped, then let the bead settle back into the ridge inside of the rim.

Valve types from left to right:
Long stem presta valve, closed (screwed down),
Medium presta valve, valve open (unscrewed),
Schrader valve (car type), the valve core can be seen in the centre. It needs to be pressed down to release air from the tube.

- Hold the axle in both hands and give the wheel a gentle spin and eyeball the tyre’s roundness to make sure the bead is seated correctly. If it isn’t, manipulate the tyre to get it right.

- Pump up the tyre. There are two types of valves used on bikes: schrader and presta. Schrader valves are fatter and have a flat top with a rod in the middle of the air hole. They are the same size as car valves and are common on mountain bikes. Presta valves are skinnier and have a nut on top that screws down onto the valve, or off for inflating. They are more common on road bikes and higher priced MTBs. Your pump may have two different sized holes for the two types of valves, or may need to have its inards reversed to fit the valve. Be careful not to force the pump on too far with a presta valve, or you may bend the core.

- It can take a lot of pumping with a mini-pump to get the tyre hard enough and you may only get enough pressure to ride on safely. Squeeze the sidewalls of the tyre to get an idea of how hard the tyre is, if your thumb goes in more than a couple of millimetres, keep pumping. You may need to pump it up a bit more with a floor pump when you get home. If you have a gauge in your pump, the recommended pressure for the tyre is usually moulded into the sidewall.

- Always check your tyre pressure as the right tyre pressure makes the bike easier to pedal. Too soft a tyre can cause a “snake bite” or “pinch flat”. Snake bites are caused by hitting a kerb or other hard object so it pinches the tube causing two puncture holes about 20 – 25 mm apart.
• **WARNING!** If you have car type schrader valves, **DO NOT** use an air pump at a gas station to inflate your bike tyre. They produce too much air and you could end up with an extravagantly exploded inner tube!

**Step Five put the wheel back on**

• Offer up the wheel with the chain on the smallest cog and fit the wheel back in the dropouts. You may need to push the upper derailleur jockey wheel backwards to get the wheel to slot into place. Make sure the wheel is sitting properly in the dropouts.

• With the quick-release lever at 90° to the wheel, wind in the nut on the other end of the axle until you start to feel resistance then close the lever, it should be stiff but not impossibly tight. Ensure that the lever is in a position where it won't get snagged or catch on anything, causing it to open unexpectedly.

• **IMPORTANT!** Re-connect the brakes. Re-adjust the cable at the brake lever to take up any slack you may have put in.

**Flat tyres 2 - fix a puncture**

• Find the puncture hole(s). At home, inflate the tube until it is fat and hold it under water in a bucket or sink so air bubbles out of the hole. On the street, inflate the tube and hold it close to your ear and cheek, run the tube past your ear until you hear/feel the air escaping, look closely and you should see the hole. In each case take note of where the hole is, you might put your thumb just by the hole, or some repair kits include chalk to mark the spot.

• The puncture repair kit will usually have pretty clear instructions on how to patch the tube. Scuff up an area larger than the patch around the hole and apply the rubber cement, again to an area larger than the patch. Wait until the cement is touch dry, peel the backing (often silver foil) off the patch and place it on the cement, holding it down firmly for a minute. If the puncture is near a seam moulded into the tube, it can be tricky to get a good seal, so a little time spent with the sandpaper can pay off.

• Because it has two layers of rubber, the repair will be stronger than the surrounding tube, so you don’t need to worry about using it again. Squeeze all the air out of the tube, roll it up, put a rubber band around it and put it in your backpack or saddlebag for next time.

**Adjust your seat height**

Seats can slip down in the frame over time or you may have taken the seat off to transport the bike, so you may find that you need to adjust your seat height while out riding. Many mountain bikes will have a quick release clamp for the seat post similar to the one on the wheel, other bikes may need an allen key or spanner.

Hold the seat with one hand and loosen the clamp with the other. Don’t release the clamp totally if you only need to shift the seat up or down by a couple of millimetres, or you may lose your position entirely. Change the height of the saddle, check that it is aligned with the top tube (not twisted) and re-tighten. Simple.

The seat post will have a maximum extension point marked on it. If you need to have the saddle so that this mark is showing above the frame, you need a longer seat post. When you have found the most comfortable height, lightly mark the seat post so that you can find that place again.
Adjusting brakes

This section deals with cable adjustment and centring for V-brakes. V-brakes are common on mountain bikes and popular on hybrids, as they are simple and powerful. For other brake types and other adjustments or brake pad replacement, see the resources section for help.

As the brake blocks wear and the brake cable stretches the brake lever needs to be pulled closer to the handlebar to get the brakes working. Too much brake lever travel is dangerous as if the lever can touch the handlebar you can’t apply enough force to stop the bike. If this is the case take the bike to a bike shop urgently, or consult the guides below to find out how to replace your brake blocks and/or shorten the brake cable.

The best place to make fine adjustments is the barrel adjuster where the cable comes into the brake lever (see “take the wheel off”). Unwind the locknut a couple of turns, then turn the adjuster anticlockwise to tighten the cable or clockwise to loosen it. Give the brake lever a couple of firm squeezes to check the brake travel and when you’re happy with it, retighten the lock nut.

Adjusting the brakes may mean that a brake pad now rubs on the rim, but you want the wheel to turn freely. The arrow on the photo points to the centring screw, there is one of these on each brake arm. The screw will either take an allen key or small phillips (cross) head screwdriver.

Tighten the screw on the side that is rubbing and slacken the screw on the other side until there is an equal gap between each brake block and the rim. Squeeze the brake lever and check again. If the brake arms aren’t returning equally the brake pivots may need lubrication. Again, see the resources section.

Adjust your gears

New gear cables can stretch over time making shifting gears awkward, but fine-tuning them is not difficult. Derailleurs guide the chain from cog to cog; they look complex but are basically simple. Pulling the gear cable lifts the chain shifting to a bigger cog and releasing it allows a spring to push it across to a smaller one. The rear derailleur is more likely to be affected by cable stretch than the front as you use it more often and there is less movement between each gear.

Make adjustments to the rear by turning an adjusting knob on the derailleur itself (left photo, adjuster has the cable running through it) or on the gear shifter (right photo between the handlebar and the brake cylinder). The front adjuster is also likely to be on the front shifter. These adjusters are spring loaded with detents at a quarter of a turn, two clicks at a time is enough to make a difference. Fine tuning is achieved according to the following principles:

- Shifting to larger sprockets is accomplished by pulling on the cable; if such shifts are slow, the cable is not tight enough, turn the barrel anticlockwise a couple of clicks at a time to tighten it.
- Shifting to smaller sprockets is accomplished by releasing the cable; if such shifts are too slow, the cable is not loose enough; turn the barrel clockwise a couple of clicks at a time to loosen it.
Generally, the gears are well adjusted if the derailleur cage is centred on the cog and the chain is straight. Eyeball it from the back of the bike to check.

The front derailleur can be adjusted at the gear shifter where the cable attaches; the same principles described for the rear derailleur apply. The advantage of adjusters on the shifter (for the back derailleur as well on some systems) is that you can change them a couple of clicks at a time while riding and get immediate feedback on your changes, whether the change is better or worse.

Resources

Some resources to help you keep your bike in top shape and running well are available from your local library or bookshop, look for books like:

- Leonard Zinn's “Zinn and the art of road bike maintenance” and “Zinn and the art of mountain bike maintenance”
- Richard Ballantine's “Richard's new bicycle book”.
- Todd Downs' “Bicycle maintenance & repair”
- C Calvin Jones’ “Big blue book of bicycle repair”

There are a number of excellent bike maintenance websites:

http://www.sheldonbrown.com/articles.html a delightfully quirky and comprehensive site covering cycling issues from the basic (flats) to the esoteric (wheel building) very highly recommended

http://www.utahmountainbiking.com/fix/index.htm another comprehensive US site

http://www.krankdirtwear.com/fix-your-bike/ closer to home, several useful articles here, including a good one on bike fit.

http://www.mikebentley.com/bike/maint.htm a page of links including repair and maintenance