

First thing is a quick bike anatomy lesson.

- **Frame**- This is the main part of the bike, made of steel, alloy or other space age materials. The frame is the most important aspect of each bike. The geometry and material determine how a bike will ride and handle. Sizing your bike frame is as important as keeping the parts in good working order.
- **Front Derailleur**- The front derailleur is the component that shifts your chain from chainring to chainring. It moves from side to side as you click your front shift lever, moving the chain along with it, and changing gears.
- **Rear Derailleur**- The rear derailleur is the component that shifts your chain from cog to cog on the rear wheel. moving from side to side as you click your rear shift lever, moving the chain into the correct rear gear (or cog. Rear derailleurs also act as a chain tensioner. Taking out additional chain slack that comes from shifting
- **Headset**- Your headset is a system made up of 2 sets of ball bearings (top and bottom). located just above and below your frame's head tube. These bearings allow you to freely turn the steering system. The headset also holds the steering system together.
- **Steering System**- The steering system is the group of components that allows you to control(steer) the bike. It is comprised of handlebars, stem, and fork. Handlebars are the straight or curved metal tube, which hand grips, brake levers and shifters are mounted to. The stem is the small angled, metal tube that connects the handlebars to the fork. The fork contacts the front wheel.
- **Quick-Releases**- Quick-releases (QR) are simple cam/lever devices that provide quick, easy-to-adjust attachments between your wheels and frame drop outs, and occasionally the seat tube. Quick-releases hold the wheels and seatpost securely to the bike. They also allow for quick adjustments and easy removal of the wheels. (*NOTE: Not all bicycles use quick-releases*).
- **Rims and Spokes**- Rims are the circular, metal frames on which your tires are mounted. Spokes are the thin metal supports that form each wheel's structure which allow you to adjust and maintain true wheels.

Best way to prevent some of these problems from happening in the first place is routine maintenance. Before or after each ride you should inspect the components and clean any affected areas. **DO NOT use WD-40** on your bike for any reason...this is a good lubricant for most items, but it attracts too much dirt and dust. Dirty parts wear faster than usual and function less efficiently. Purchase a chain cleaning system and a good lubricant such as "White Lightning" or "Pedro's". Get appropriate tools for home maintenance as well as trail side repairs.

PROBLEM: FLAT TIRE

Problem: The most under appreciated skill by cyclist...how to repair a flat tire while on the trail. This is the most common problem while riding yet the majority of rider do not have a clue how to repair a flat.

Preventive steps: not much you can really do about this, other than avoid riding over broken glass and sharp rocks. Best thing you can do is maintain proper air pressure.

Tools Needed: Tire levers, Spare Tube(s) (or repair kit), Air pump.

Solution one: These are easy to fix really, First you must remove the wheel assembly for the bike entirely. TO do this remember to un-do the brakes and wheel skewer. Then using the tire levers get under one side of the tire at the bead (where it meets the rim). Using several tire levers go in line and try flipping the bead off the wheel. This will take a little effort with some tires. Once you have one side of the tire off, pull the old tube out (fold and pack it out), check the inside and outside of the tire surface for thorns or foreign objects. Looking for the source of the flat. After the tire is clean of debris and sharp objects, blow a very small amount of air into the new tube. Place it into the tire and place the valve in the whole of the rim. Begin replacing the tire by rolling the bead back onto the tire, at the end you will need the tire levers again to flip it back on. Once the tire is on, add a little more air, and roll the bead forward across the tire, this will help set the bead and avoid "Pinch Flats". Continue filling the tire, replace the wheel, and re-do the skewer and brakes. I recommend not trying to patch the tube because it takes longer, and does not always work 100%. However; If you would prefer a patch kit the same procedure applies, but instead of re-placing the tube, remove the tube and repair it via instructions from the patch kit.

PROBLEM: TORN SIDEWALL

Notes:
Problem: A torn sidewall is typically caused by a mis-aligned brake pad that rubs through the side of the tire or a sharp object that the tire has hit. When the sidewall tears, the tube will bulge through leaving it exposed to punctures.

Preventive steps: Take a look at the sidewall looking for any fabric material that has shown fatigue or fraying. Pay attention to the brake pad locations. If the pads are lightly rubbing against the sidewall, there is trouble ahead. Look for slices or objects that are puncturing sidewalls. If the sidewall shows a black rubber bubble protruding through, it's time for a new tire.

Tools: Air Pump, Tire levers, Duck Tape (or use a dollar bill or Powerbar wrapper).

Solution one: **The standard way of fixing a slashed or torn sidewall would be to place something inside the tire in between the tube and the sidewall to keep the tube in and the elements out. Place the material inside the tire carefully so that it will stay in place while you inflate the tire. Some examples that have worked in the past are folded over dollar, power bar wrapper, sandpaper from your patch kit. Gray duct tape is the best solution. Place a small section of tape over the hole in the side wall (covering about 1/2 inch around).**

PROBLEM: BROKEN CHAIN

Problem: Your chain breaks on you while your ten miles from the car or the nearest bike shop.....

Preventive steps: Check your chain periodically for tight links, twisted links, and most important of them all keep your chain oiled. Do this by rotating your cranks backward, if the chain has bad or stiff links they will catch and show up. Chains should be replaced after around forty to fifty hours of off road riding (depending on conditions). If you have a Shimano chain you will require a special "Shimano chain pin". It is the only pin that will work with a Shimano chain.

Tools: a chain breaker tool.

Solution one: Using your chain breaker tool push the damaged pin out and re-connect your chain at the next sound link. Shortening the chain might make it difficult to use all the gears. Ideally carry a small section of chain for longer events or rides.

- **Shimano Chains:** Locate the bad link on the chain or section where the chain is broken. Remove bad links by using your chain breaker tool to push the pin out completely. Replace the links with additional section you have brought with you (in bag). Add the same number of links as you removed...no more no less! Place the special Shimano pin in from the outside of the chain, it will slide in halfway. Use your chain breaker tool to push it in the rest of the way until you see the notch come out the other side. Make sure not to push too far either, because this pin will not go in reverse. Once the pin is set, use pliers or other tool to snap off the excess pin. Once the chain is back together give a gentle but firm twist of the chain (side to side) at the new pin(s). Make sure section of link where the pin was fixed bends fully up and down.
- **Other Chains:** Locate the bad link on the chain or section where the chain is broken. Using the chain breaker tool push the pin out till it almost comes loose. When the pin is almost out twist the chain sideways to separate and remove the bad links (pin remains attached to good portion of chain). Get the replacement links from your and replace the section of lost links. Put the joining links together in the chain tool and push the pin back into the chain. Once the chain is back together give a gentle but firm twist of the chain (side to side) at the pins(s) you moved. Make sure section of link where the pin was fixed bends fully up and down.
- **Solution two(temp):** If you don't have a chain tool, you will have to be creative and primitive. Look for a fist-sized rock. Using the rock and a small tool (pliers) try to place the back side of the loose link onto a similar sized rock then pound the pin in with the rock in your hand, if this works be very gentle riding back to your car. Replace the chain before riding again.! If the rock is not working for you all is not lost, a very temporary relief is to use some wire and thread the 2 links back together.

PROBLEM: BROKEN REAR DERAILLEUR

Problem: This can be a very unexpected event. With one blow, from a rock or stick, it can cause your derailleur to be snapped off. A broken rear derailleur causes your shifting to be nonexistent!

Preventive steps: Ride with caution when going through rough terrain and refrain from laying the bike on the drive side.

Tools Needed: Chain Tool, Set of allen wrenches.

Solution one: You will have to remove it from the bike and shorten the chain, you will be forced to use a fixed gear to get home 1.) Break the chain and thread it out of the derailleur . 2.) Remove the derailleur from the frame. 3.) Remove additional links from the chain so it works in the *middle* chainring in the front and the *middle* cog in the rear. Using your chain tool, remove as many links until the chain is as snug as it can get around the drive train. If the chain is too tight it will automatically drop the next lower gear (rear).

PROBLEM: BROKEN DERAILLEUR CABLE (also brake cable application)

Problem: Cables grow old pretty fast, from clamping and re-clamping, and can snap without much warning.

Preventive steps: Check front and rear derailleur cables for frayed ends, rusted sections, and worn spots in the housing or crimping at the derailleurs. Replace worn out cables before your next ride or event.

Tools: Set of allen wrenches, Screwdriver (small for derailleur adjustment).

Solution one: If your derailleur cable breaks while you are on the trail, you have 2 options for repair. The first is simply replace the cable with a spare from your pack. To do shift the derailleur to it's lowest possible position (make sure the shifter is in this position as well). Remove the old cable completely (keep track of cable housing locations), thread the new cable into the shifter (remember the shifter should be in the derailleurs lowest possible location). Feed the cable through the housing all the way to the derailleur (adjust the barrel adjusters back to original position if needed). Give a slight tug to make sure all the slack is out of the cable. Attach the cable to the derailleur via the clamping bolt. Now that is attached try out to... most likely it will not be working perfect, you will need to finesse the barrel adjuster a little to align the chain better.

Solution two: The fixed gear method. Start by putting your chain in a desired gear that fits the terrain you are riding and screw the high/low adjustment screws until the chain and derailleur are lined up with that particular cog. You are essentially locking your bike into a single gear.

PROBLEM: SEVERELY BENT WHEEL (TaCo)

Problem: This usually happens when a lot of force or weight is directed to the wheel or is hit hard on a foreign object, like a big rock.

Preventive steps: Check spokes for even tension by grabbing and pinching two together at a time, doing this throughout the wheel on both sides.

Tools Needed: Spoke wrench, spare spokes, Tree or Post.

Solution one: A bent wheel will rub on your brake pads, your frame, your chainstays. If your wheel goes out of round you should be able to get home by releasing the straddle cable on the brakes. Carry a spoke wrench and use your brake pads to help you true the wheel enough get home.

Solution Two: If your wheel is bent side to side, first you are going to have to release the brake and remove the wheel from the frame. Check for broken spokes, twist them around the next good spoke. Next, place your bent wheel against a tree holding the bent sides, then with a few quick jolts try to bend the wheel back to "RIDABLE" shape. This process may have to be repeated a few times depending on the condition of the wheel. You want to use the tree as your pressure point and your arms and legs to put the wheel back to somewhat of a normal state. If you have a spoke wrench with you may be able to true some of the bad spots out of the rim. Remount the wheel on to your bike, you will probably still have to release the brakes or adjust them so the pads do not rub on the rim or tire.

PROBLEM: LOOSE HEADSET

Problem: The headset of your bike holds the forks firmly in the frame. It also houses the bearings which allow for smooth and effortless steering. If the headset comes loose, the first thing you should notice is a rocking sensation in the bar and stem sometimes with a slight clicking sound.

Preventive steps: Check your headset before every ride. First straddle the bike and then grab a handful of the front brake and rock the bike back and forth; if the headset is loose, you will have a light knocking feeling in the front end. Tighten the headset to end the rocking motion, but allow smooth turning.

Tools: Special Headset wrenches (for standard headset), or allen wrench set (for A-Head style headset).

Solution one: Using the special headset wrenches (2 -either 32, 36, or 40mm), adjust the headset till tight again.

Solution two: If you do not have 2 headset wrenches with you on the trail your hands will work temporarily. Use your hand to cinch down your headset. Grab the top of the headset and twist the locknut clockwise. Wiggle the front end while doing this may help get it tighter.

PROBLEM: CHAIN SUCK

Problem: Chain suck usually occurs when trying to shift your gearing in extreme conditions, ie., quick transitions from a descent to a climb and trying to shift in the process, muddy wet conditions, dry chain, shifting is out of adjustment, worn chain, or improper sized chain.

Preventive steps: Keep your drive train well maintained and lubed, and clean or replacing parts when necessary. Chains can usually last about forty to fifty hours of off road riding. Muddy and winter conditions may wear a chain faster.

Tools Needed: Crank-O-Matics installed on your cranks (replaces existing crank bolt), Set of allen wrenches, Chain Tool.

Solution one: First stop to prevent the chain getting any more stuck or damaged. In most cases you should be able to grab the chain and pull it back the same way it sucked up...with a little force. If it is still stuck you can either remove the crank arm (a good reason to have Crank-O-Matics), or use your chain tool to separate the chain and thread it out. Once the chain is free replace the crank arm, or re-connect the chain (depending on which method you chose)...Check for any kinks or twists in the chain, which can cause problems in shifting.

Solution two: If you do not have a chain breaker tool or Crank-O-Matics try removing the chainring bolts to give the chain some room to possibly wiggle its way out of its bind. Retighten bolts firmly.

PROBLEM: BENT CHAIN RINGS

Problem: Chain rings will bend. The soft aluminum teeth can't hold up to rocks and logs. A bent chainring can throw the chain, cause chain suck, or the loss of the bolts holding it on. If your chainring is bent, it will grind on the inside of your front derailleur on every pedal stroke.

Preventive steps: Before each event check the bolts which hold the chainrings on (small and large), also check to make sure the chain itself is in good working condition. Avoid using your chainring as a bash guard.

Tools Needed: Crescent wrench or pliers.

Solution one: Your crescent wrench out of your tool kit is going to be the best tool for the job in this case. Place the tool over the part of the ring that is bent, making sure it clears the chainring teeth. Once you have the wrench in the proper position, push or pull the bent part very gently to try and realign the ring back to its normal position. If it is un-repairable fix the chain to in one of the operating chainrings (adj. Screws on the frt. Der.) Check the bottom bracket before you come to the conclusion that your chainring is bent as well. If the spindle is bent or broken...Start walking.

PROBLEM: LOOSE CRANK ARM

Problem: A loose crank can cause permanent damage by rounding off the taper inside the aluminum crank arm. If the taper gets rounded out, you will never get your crank arm to stay tight again. You can also lose the retaining nut or bolt that secures the crank arm if you are not careful.

Preventive steps: Check your bike's crank arms before every ride. It should be either a 14mm or 15mm wrench that you should have. This requires a wrench that fits into the crank arm around the nut or bolt (a socket works well). Better yet get a set of Crank-O-Matics for your bike (\$15-\$25)

Tools: 14/15 mm box end wrench, or allen wrench set (depending on the type of bolt).

Solution one: A one-key crank bolt (Crank-O-Matic) is nothing more than an allen bolt that threads through a special cap and on into the end of the spindle. With a one key crank bolt, you can tighten and remove your cranks with a 5mm allen wrench. Remember, keep the threads (only) well greased for ease of tightening and loosening. (The newer high end Shimano cranks come equipped with one-key crank bolts). When using Ti Spindle, bolts, or Aluminum bolts use anti-seize to lubricate the threads, tighten with a steel bolt first and then the alloy bolt.)

Solution two: For standard crank bolts without the appropriate wrench, improvise...use a crescent wrench or your hands. To facilitate getting the bolt tight, you might want to pound on the crank arm with a rock. The further you can get the crank arm onto the spindle the longer it will stay in place. If the arm falls off and you lose the bolt you will have to tap it back on with a rock, again, this can damage the cranks in the long run though.

PROBLEM: BROKEN HANDLEBAR

Problem: The mother of all problems...Not only will you have to fix yourself, but make your bike rideable again. Handle bars are typically made from high grade aluminum. This aluminum will eventually stress under repeated usage like bumps, and rocky terrain.

Preventive steps: Replace your handle bars every year or 2

Tools Needed: Knife, saw, or strong friend, Small tree or limb.

Solution one: Once you have brushed yourself off and made sure there are no broken bones turn your attention to making your bike rideable. This will take a little creativity, and will yield a means to get home. First is to look for a small tree (green) which will be about same diameter as the opening in your handle bars. Cut a section of the tree about 9-12 inches long. Remove all bark for this piece and then shove it into the broken section of handle bar. Then shove the broken section of bar onto the tree splint. This will allow you to steer and brake, but beware the bars will now feel like a noodle.