

Bicycle Repair Troubleshooting Knowledge Base

A Comprehensive Diagnostic and Repair Guide for Common Bicycle Issues

Support Resource for Service Teams and Technical Staff

Version 1.0 | February 2026

Introduction

This knowledge base provides systematic troubleshooting procedures for the most frequently encountered bicycle repair issues. Organized by symptom, each section includes diagnostic steps, root cause identification, standard repair procedures, and preventive maintenance recommendations. Use this guide as a first-line reference for customer support, shop floor operations, and training new technical staff.

Document Structure:

- **Section 1–8:** Common repair issues with detailed troubleshooting
- **Section 9:** Quick reference diagnostic flowchart
- **Section 10:** Preventive maintenance checklist

Each issue follows a standardized format: Symptoms → Diagnostic Steps → Root Causes → Repair Procedure → Prevention.

1. Flat or Deflating Tires

Symptoms

- Tire completely flat or loses air pressure within hours/days
- Audible hissing sound from tire or valve
- Tire feels soft or squishy when pressed
- Visible bulge, cut, or embedded foreign object in tire^{[1][2]}

Diagnostic Steps

1. **Visual inspection:** Check tire tread and sidewalls for punctures, cuts, embedded glass/nails, cracks, or bulges
2. **Inflate and listen:** Pump tire to recommended pressure and listen for escaping air
3. **Water test:** Submerge inflated tube in water to locate small punctures (bubbles indicate leak)
4. **Valve check:** Apply soapy water to valve core; bubbles indicate valve leak
5. **Rim inspection:** Check for sharp edges, spoke protrusions, or rim tape damage that could cause internal puncture^{[1][3]}

Root Causes

Cause	Frequency	Identifying Features
Puncture from debris	60%	Single hole in tread area, foreign object may be embedded
Pinch flat (snake bite)	20%	Two parallel holes on inner tube from rim impact
Valve failure	10%	Leak at valve base or core, may have play/wobble
Perished tube	5%	Multiple small cracks, aged rubber, general deterioration
Improper installation	5%	Tube pinched between tire and rim during installation

Table 1: Common causes of tire deflation and identification

Repair Procedure

For punctures and pinch flats:

1. Remove wheel from bicycle (release brake caliper if needed)
2. Deflate tire completely and remove one bead from rim using tire levers
3. Extract inner tube carefully, noting valve position
4. Locate puncture using water test if not immediately visible
5. **Patch repair:** Clean area around puncture, apply rubber cement (if required by patch type), wait until tacky, apply patch firmly, allow to cure 5 minutes
6. **Tube replacement:** If multiple punctures, large tear, or valve damage, install new tube
7. Check inside of tire casing for embedded debris or damage; remove any sharp objects
8. Inspect rim tape covers all spoke holes; replace if damaged
9. Partially inflate tube to give it shape, insert valve through rim hole
10. Tuck tube into tire, ensuring no twists or folds
11. Work tire bead back onto rim, starting opposite valve and finishing at valve
12. Inflate to 50% pressure, check tube is not pinched between tire and rim
13. Inflate to recommended pressure (marked on tire sidewall)
14. Reinstall wheel, ensuring it sits properly in dropouts[1][3][4]

For valve issues:

- Removable core: Tighten or replace valve core using valve core tool
- Non-removable: Replace entire tube
- Presta valves: Ensure locknut is tight against rim

Prevention

- Maintain proper tire pressure (check weekly for high-pressure tires, monthly for others)
 - Inspect tires regularly for embedded debris, wear, and damage
 - Replace worn tires before casing threads show through
 - Use appropriate tire pressure for rider weight and terrain
 - Avoid riding through debris, glass, or rough surfaces when possible
 - Consider puncture-resistant tires or tire liners for high-debris environments[2][3]
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2. Brake Problems: Poor Performance, Noise, Rubbing

Symptoms

- Weak braking power or long stopping distances
- Brake lever pulls to handlebar with little resistance
- Constant rubbing or scraping sound when wheel rotates
- High-pitched squeal or squeak when braking
- Pulsating or grabbing sensation during braking
- One brake pad contacts rim/rotor before the other[1][4][5]

Diagnostic Steps

Rim brakes (V-brake, caliper, cantilever):

1. Squeeze brake lever: Check for weak return, excessive travel, or spongy feel
2. Inspect brake pads: Look for wear indicators, uneven wear, glazing, or contamination
3. Check pad alignment: Pads should contact rim squarely across entire surface, not touching tire or dropping below rim
4. Examine rims: Look for wear grooves, damage, or contamination (oil, wax)
5. Test cable tension: Pull cable housing; excessive movement indicates stretched cable or loose anchor
6. Check centering: Both pads should hit rim simultaneously; if one hits first, caliper/brake is misaligned[1][5]

Disc brakes (mechanical or hydraulic):

1. Spin wheel: Listen and watch for rotor rubbing on pads
2. Inspect pads through caliper: Check remaining material (replace if <1mm)
3. Examine rotor: Look for warping (use truing gauge or visual inspection), scoring, or contamination
4. Test lever feel: Hydraulic brakes should have firm lever with short travel; spongy feel indicates air in system
5. Check caliper alignment: Rotor should pass centrally through caliper with equal gap on both sides
6. For hydraulic systems: Inspect for fluid leaks at lever, hose connections, and caliper[1][4][5]

Root Causes

- **Worn brake pads:** Friction material depleted to wear line or backing plate
- **Contaminated pads/rims/rotors:** Oil, grease, tire sealant, or cleaning products reduce friction
- **Cable stretch or poor adjustment:** Common in new bikes or after cable replacement
- **Glazed pads:** Overheating creates hard, shiny surface with poor friction
- **Misaligned pads or caliper:** Causes uneven wear and rubbing
- **Warped rotor or damaged rim:** Creates pulsing during braking and rubbing
- **Air in hydraulic system:** Results in spongy lever feel and reduced power
- **Loose headset or hub:** Can mimic brake issues with front-end shudder during braking[5][6]

Repair Procedure

Rim brake adjustment:

1. Release brake quick-release if present
2. Check pad wear; replace if beyond wear line
3. Clean rims with isopropyl alcohol or brake cleaner
4. If pads contaminated, sand surface with fine sandpaper or replace
5. Adjust pad position: Loosen pad mounting bolt, align pad to contact rim squarely (slight toe-in acceptable), tighten securely
6. Set pad height: Front edge should contact rim 1–2mm below rim edge, not touching tire
7. Adjust cable tension: Use barrel adjuster for fine tuning, or re-anchor cable at brake for major adjustments
8. Center brake: Adjust spring tension screws on caliper arms so pads hit simultaneously
9. Test brake: Lever should engage brake with 2–3cm of travel remaining before handlebar
10. Bed in new pads: Apply brakes moderately 20–30 times to transfer material to rim[1] [4][5]

Disc brake adjustment:

1. **For rubbing:** Loosen caliper mounting bolts slightly, squeeze brake lever to center caliper; tighten bolts while holding lever
2. **For weak braking:**
 - Mechanical: Adjust cable tension at lever or caliper
 - Hydraulic: If lever pulls to bar, bleed system to remove air
3. **For contaminated pads:** Remove pads, clean with isopropyl alcohol, sand surface if lightly contaminated, or replace if heavily contaminated
4. **For contaminated rotor:** Clean with isopropyl alcohol or disc brake cleaner; if severely contaminated, lightly sand with fine sandpaper
5. **For warped rotor:** Use rotor truing tool or adjustable wrench to carefully bend rotor true; check with truing gauge or by spinning wheel
6. **For glazed pads:** Replace pads; glazing difficult to fully remove
7. **Hydraulic brake bleeding:** Follow manufacturer-specific procedure (varies by brand); generally involves filling system with fresh fluid and purging air through bleed port

8. Test brake power and modulation after adjustment; bed in new pads/rotors properly[1][4][5]

Prevention

- Inspect brake pads monthly; replace before fully worn
- Keep braking surfaces clean; avoid touching rotors with bare hands (oil from skin contaminates)
- Use appropriate cleaners: isopropyl alcohol or specific brake cleaner only
- Avoid overheating brakes on long descents (use proper braking technique, allow cooling)
- Check cable condition and replace if frayed or corroded
- For hydraulic brakes, bleed annually or when lever feel becomes spongy
- Align pads/calipers properly during wheel installation to prevent rubbing[4][5][6]

3. Shifting Problems: Skipping, Poor Indexing, Chain Drop

Symptoms

- Chain jumps between gears or skips under pedaling load
- Difficulty shifting to certain gears or slow/incomplete shifts
- Chain overshifts and falls off cassette or chainring
- Loud clunking or grinding noises when shifting
- Ghost shifting (gears change without rider input)
- Chain drops between chainring and frame, or inside smallest cog[4][7][8]

Diagnostic Steps

1. **Test shifting on stand:** Shift through entire gear range with rear wheel off ground, observe derailleur movement and chain positioning
2. **Check cable tension:** Insufficient tension prevents upshifting; excessive tension prevents downshifting
3. **Inspect derailleur hanger alignment:** Sight from rear of bike; hanger should be perfectly vertical. Even slight bends cause shifting issues
4. **Examine chain wear:** Use chain wear gauge; replace if stretched beyond 0.5% (or 0.75% depending on cassette)
5. **Check cassette/chainring wear:** Look for hooked or sharp teeth, indicating wear
6. **Inspect limit screws:** High and low limits should prevent chain overshifting
7. **Look for cable/housing damage:** Frayed cables, kinked housing, or corroded cable creates friction and poor shifting[4][7][8]

Root Causes

1. **Cable stretch:** New cables stretch during first 50–100km, causing indexing drift
2. **Bent derailleur hanger:** Most common shifting issue; occurs from impact or laying bike down
3. **Worn drivetrain components:** Stretched chain, worn cassette teeth, or damaged chainrings
4. **Incorrect limit screw adjustment:** Allows chain to overshift or prevents full range access

5. **Contaminated or damaged cables:** Creates friction preventing smooth derailleur movement
6. **Misadjusted B-screw (B-tension):** Affects gap between upper pulley and cassette, impacting shift quality
7. **Damaged chain:** Stiff links, bent plates, or worn rollers cause poor engagement
8. **Loose derailleur mounting bolt:** Allows derailleur to move unpredictably[4][7][8]

Repair Procedure

Basic rear derailleur adjustment:

1. Shift to highest gear (smallest cog)
2. Check H-limit screw: Upper pulley should align with smallest cog; adjust if needed
3. Shift to lowest gear (largest cog)
4. Check L-limit screw: Upper pulley should align with largest cog without overshift
5. Shift to middle gear range
6. Adjust cable tension with barrel adjuster:
 - Chain slow to shift to larger cogs: Add tension (turn barrel adjuster counterclockwise)
 - Chain slow to shift to smaller cogs: Reduce tension (turn barrel adjuster clockwise)
 - Make $\frac{1}{4}$ -turn adjustments and test shift each time
7. Adjust B-screw: Gap between upper pulley and largest cog should be 5–6mm; adjust B-screw to set proper clearance
8. Test shifting through entire range, fine-tune as needed[4][7]

Front derailleur adjustment:

1. Set height: Outer cage plate should sit 1–3mm above tallest chainring tooth
2. Set rotation: Outer cage plate should be parallel to chainring
3. Adjust L-limit: Chain on smallest chainring and largest rear cog; inner cage plate should clear chain by 0.5–1mm
4. Adjust H-limit: Chain on largest chainring and smallest rear cog; outer cage plate should clear chain by 0.5–1mm
5. Set cable tension: With chain on smallest chainring, slight cable tension should be present but not causing derailleur movement
6. Test shifts, adjust cable tension as needed for crisp shifting[4][7]

For bent derailleur hanger:

- Use derailleur hanger alignment tool (recommended for precision)
- Or carefully straighten by hand (risk of breaking; aluminum hangers are designed to bend/break to protect frame)
- If significantly bent or cracked, replace hanger (hangers are frame-specific)[7][8]

For worn components:

- Replace chain if stretch exceeds 0.5% (0.75% maximum)
- If chain replaced after significant wear, cassette likely needs replacement (worn teeth won't engage new chain properly)
- Replace chainrings if teeth are hooked, sharp, or damaged
- Always replace chain and cassette together if both significantly worn[8]

Prevention

- Clean and lubricate chain regularly (every 100–200km or after wet rides)
 - Check and adjust cable tension monthly
 - Inspect derailleur hanger alignment if shifting degrades suddenly
 - Replace chain at 0.5% wear to prevent cassette/chainring damage
 - Avoid cross-chaining (big-big or small-small gear combinations)
 - Be cautious when laying bike down or transporting to prevent hanger damage
 - Use proper shifting technique: ease pedal pressure during shifts[7][8]
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4. Chain Issues: Noise, Dropping, Stiffness

Symptoms

- Chain makes excessive noise during pedaling (grinding, squeaking, or rattling)
- Chain drops off chainring or cassette during riding or shifting
- Chain feels stiff or resistant when backpedaling
- Visible rust, dry/crusty appearance, or heavy grease buildup
- Chain seizes or locks up suddenly
- Skipping or jumping under pedaling load[2][4][8]

Diagnostic Steps

1. **Visual inspection:** Look for rust, lack of lubrication, heavy dirt buildup, or sticky/gummy appearance
2. **Flex test:** Manually flex chain at each link; identify stiff or seized links
3. **Wear measurement:** Use chain wear gauge; replace if stretched beyond 0.5–0.75%
4. **Check chain line:** View from rear; chain should run relatively straight from chainring to cassette (avoid extreme cross-chain angles)
5. **Inspect for damage:** Look for bent or twisted links, mushroomed pins, or cracked plates
6. **Listen while riding:** Note if noise occurs in specific gears or throughout range
7. **Test derailleur limit screws:** Ensure chain cannot overshift and fall off[4][7][8]

Root Causes

Cause	Description
Lack of lubrication	Dry chain creates friction, noise, and accelerated wear
Over-lubrication	Excess oil attracts dirt, forming abrasive grinding paste
Contamination	Dirt, sand, or grit on chain acts like grinding compound
Stiff link	Tight or seized link from damage, corrosion, or improper assembly
Chain wear/stretch	Elongated chain no longer meshes properly with cog teeth
Improper chain length	Too long or short affects derailleur function and dropping
Bent derailleur/hanger	Causes poor chain positioning and potential dropping
Damaged chain	Bent plates, broken links, or twisted sections from impact

Table 2: Chain issue root causes and descriptions

Repair Procedure

Chain cleaning and lubrication:

1. **For light contamination:** Wipe chain with clean rag while backpedaling
2. **For moderate contamination:** Apply degreaser to chain, scrub with brush, rinse, dry thoroughly
3. **For heavy contamination:** Remove chain, soak in degreaser or solvent, scrub, rinse, dry
4. Apply bicycle-specific chain lubricant:
 - Drip lubricant onto inner plates while backpedaling slowly (1 drop per link)
 - Backpedal 20–30 rotations to work lube into rollers
 - Wait 5–10 minutes for penetration
 - Wipe excess lubricant from outside of chain with clean rag
5. **Lubricant selection:** Wet lube for wet conditions (longer-lasting, attracts more dirt); dry lube for dry conditions (cleaner, requires more frequent application)[2][4][8]

Stiff link repair:

1. Locate stiff link by backpedaling chain slowly and watching for link that doesn't flex smoothly
2. Work link back and forth laterally (side to side) while supporting adjacent links
3. If still stiff, apply lubricant directly to link, continue working
4. For severely seized link from rust or damage, replace chain section or entire chain
5. Test flex after repair; link should move as freely as surrounding links[4][8]

Chain replacement:

1. Determine correct chain length:
 - o New chain should match old chain length (if previous length was correct)
 - o Or, wrap chain around largest chainring and largest rear cog without going through derailleur; add 1 full link (1 inner + 1 outer = 1 inch)
2. Break old chain using chain tool at any rivet
3. Thread new chain through front derailleur cage and around cassette
4. Connect chain ends:
 - o For quick-link chains: Join quick-link by hand, pull chain firmly to seat
 - o For pin-type chains: Use chain tool to press in connecting pin, break off excess pin tail if applicable
5. Check connection security; quick-link should be fully seated, pin should be flush on both sides
6. Lubricate new chain before first ride[8]

Prevention

- Clean and lubricate chain every 100–200km, or after every wet/muddy ride
- Wipe excess lube after application to minimize dirt attraction
- Replace chain at 0.5% wear (before cassette damage occurs)
- Inspect chain regularly for stiff links, damage, or rust
- Avoid cross-chaining (extreme gear combinations)
- Store bike in dry location to prevent rust
- Use appropriate lubricant for riding conditions[2][4][8]

5. Wheel Issues: Wobble, Broken Spokes, Hub Problems

Symptoms

- Visible side-to-side wobble or "taco" shape when wheel spins
- Brake pads rub on rim at one point of rotation but not others
- Wheel makes creaking, clicking, or grinding noise
- Loose or floppy feeling when trying to move wheel side to side
- Broken spoke or loose spoke nipple
- Wheel doesn't spin freely; feels rough or catches[4][9]

Diagnostic Steps

1. **Spin test:** Elevate wheel and spin; observe lateral (side-to-side) and radial (up-down) movement
2. **Brake rub check:** Use brake pad as reference point to identify high and low spots
3. **Spoke tension check:** Pluck each spoke like a guitar string; listen for consistent tone (loose spokes sound lower-pitched)
4. **Visual inspection:** Look for broken spokes, loose nipples, cracked rim, or dents
5. **Hub bearing check:** Grasp rim and try to move wheel side to side perpendicular to axle; play indicates loose hub bearings
6. **Hub spin test:** Remove wheel, spin axle by hand; should rotate smoothly without grinding or catching
7. **Quick-release/thru-axle check:** Ensure wheel is properly secured in dropouts[4][9]

Root Causes

- **Impact damage:** Hitting pothole, curb, or rock causes immediate wheel deformation
- **Broken spoke:** From impact, fatigue, or corrosion; creates localized weak point
- **Loose spokes:** Result from insufficient tension or gradual loosening over time
- **Worn hub bearings:** Normal wear from use, water contamination, or lack of maintenance
- **Loose hub adjustment:** Cones not properly adjusted, allowing play
- **Rim damage:** Dent, crack, or flat spot from impact or brake wear
- **Improper wheel installation:** Not fully seated in dropouts or quick-release not tightened[4][9]

Repair Procedure

Minor wheel truing (lateral wobble <3mm):

1. Mount wheel in truing stand or flip bike upside down
2. Spin wheel slowly, identify high spots (where rim moves toward brake pad)
3. For high spot on left side: Tighten spokes on right side and/or loosen spokes on left side in that area
4. For high spot on right side: Tighten spokes on left side and/or loosen spokes on right side in that area
5. Make small adjustments ($\frac{1}{4}$ -turn or less) to 3–5 spokes in affected area
6. Recheck wobble, continue adjustments until wheel runs true within 1–2mm
7. **Important:** Never attempt major truing (>3mm wobble, multiple broken spokes, or taco wheels) without proper training; refer to experienced mechanic[4][9]

Spoke replacement:

1. Remove tire, tube, and rim tape to access spoke nipple
2. Thread new spoke through hub flange hole in correct direction (check spoke pattern)
3. Thread spoke into nipple, tighten until spoke reaches similar tension to neighbors
4. True wheel to eliminate wobble created by spoke replacement
5. Stress-relieve wheel: Grab pairs of parallel spokes and squeeze together firmly around entire wheel
6. Recheck tension and trueness, adjust as needed
7. Reinstall rim tape, tube, and tire[9]

Hub bearing adjustment (cup and cone type):

1. Remove wheel from bike, remove quick-release skewer
2. Loosen cone locknut on one side using cone wrenches
3. Adjust cone by turning inward (clockwise) to remove play or outward (counterclockwise) to reduce binding
4. Goal: No play when checking side-to-side, wheel spins freely without binding
5. While holding cone in position with one wrench, tighten locknut with second wrench
6. Recheck adjustment; tightening locknut often introduces slight play, may require readjustment
7. If adjustment doesn't eliminate play or rough feeling, bearings may be worn; refer to mechanic for bearing replacement[4][9]

Hub bearing service (cartridge bearing type):

- Cartridge bearings are sealed units; adjustment not possible
- If worn, bearings must be pressed out and new bearings pressed in
- Requires special tools; refer to mechanic for service[9]

Prevention

- Avoid riding through large potholes or off curbs at speed
 - Check spoke tension monthly; address loose spokes promptly before breaking
 - Maintain even spoke tension to prevent stress concentration
 - Have wheels professionally trued and stress-relieved when new
 - Lubricate cup-and-cone hub bearings annually
 - Replace worn bearings before damage extends to hub races
 - Ensure wheels are properly installed in dropouts and secured[9]
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6. Creaks, Clicks, and Mystery Noises

Symptoms

- Creaking noise when pedaling, especially under load
- Clicking sound that corresponds with pedal rotation
- Squeaking from saddle, seatpost, or stem area
- Rattling or buzzing from bottle cages, racks, or accessories
- Mysterious noise that's difficult to locate
- Noise occurs only when standing and pedaling, or only when seated[4][9][10]

Diagnostic Steps

- 1. Isolate the noise:** Determine when it occurs (pedaling, braking, coasting, bumps)
- 2. Test pedaling seated vs standing:** Helps identify bottom bracket vs saddle/seatpost
- 3. Test hands on/off handlebars:** Helps identify stem, headset, or front hub
- 4. Bounce test:** Lift front wheel and drop; listen for loose parts
- 5. Wiggle test:** Check for play in:
 - Crank arms (side-to-side)
 - Pedals (side-to-side and rotation)
 - Headset (front brake on, rock bike fore-aft)
 - Seatpost (try to rotate and move side to side)
 - Stem and handlebars (try to twist)
- 6. Remove accessories temporarily:** Take off bottle cages, bags, lights, etc. to rule them out
- 7. Check torque on all bolts:** Loose bolts are very common noise source[4][9][10]

Root Causes and Solutions

Source	Common Causes	Solution
Bottom bracket	Loose crank bolts, worn bearings, insufficient grease	Tighten, service, or replace BB
Pedals	Loose pedal threads, worn bearings	Tighten or rebuild pedals
Saddle/seatpost	Dry clamp, movement between parts	Remove, grease, reinstall
Stem/handlebars	Loose bolts, dry interfaces	Tighten to spec, light grease
Headset	Loose or too-tight adjustment, dry bearings	Adjust preload, grease bearings
Chainring bolts	Loose mounting bolts	Tighten with proper tool
Accessories	Loose bottle cage, rack, fenders, lights	Tighten or add rubber shims
Spokes	Loose or crossing spokes rubbing	Tension and true wheel
Seat tube rattle	Cable housing inside frame hitting walls	Add foam pipe insulation

Table 3: Common noise sources and solutions

Repair Procedure

Bottom bracket area creaking:

1. Remove crank arms using appropriate tool (depends on crank type)
2. Check for damage or wear on bottom bracket spindle and crank interfaces
3. Clean all surfaces thoroughly with degreaser
4. Apply thin layer of grease to spindle, crank interfaces, and threads
5. Reinstall crank arms, tighten crank bolts to manufacturer torque spec (typically 30–40 Nm)
6. For external bearing type: Remove, clean, grease threads, and reinstall bearing cups to proper torque
7. Test ride to verify noise is eliminated[4][9]

Pedal creaking/clicking:

1. Remove pedals (remember: left pedal has reverse threads)
2. Clean pedal threads on crank arm
3. Apply anti-seize compound or grease to pedal threads
4. Reinstall pedals, tighten firmly (15–20 Nm, or very tight by hand if no torque wrench)
5. If noise persists, pedal bearings may need service or replacement[9]

Saddle/seatpost creaking:

1. Loosen seatpost collar, remove seatpost and saddle assembly
2. Clean inside of seat tube and outside of seatpost
3. Apply appropriate lubricant:
 - Carbon seatpost/frame: Use carbon assembly paste (provides friction and prevents slipping)
 - Aluminum/steel: Use grease
4. Reinstall seatpost to proper height, align saddle
5. Tighten seatpost collar to specification (typically 5–7 Nm)
6. Loosen and retighten saddle rail clamps: Clean clamp surfaces, apply small amount of grease, tighten evenly to spec
7. Test by attempting to twist saddle and seatpost; should be secure[4][9]

Headset creaking:

1. Loosen stem clamp bolts
2. Adjust headset preload:
 - Tighten top cap bolt (clockwise) to remove play
 - Test: Front brake on, rock bike fore-aft; no clicking or knocking should be felt
 - Ensure fork still turns smoothly without binding (too tight if notchy)
3. While holding handlebars straight, tighten stem clamp bolts to specification (typically 5–6 Nm)
4. Recheck adjustment and alignment
5. If noise persists after proper adjustment, headset bearings may need cleaning and greasing or replacement[4][9]

Accessory noise:

1. Check all bottle cage, rack, fender, and light mounting bolts; tighten as needed
2. For persistent rattles, add thin rubber shims between accessory and frame
3. Remove items one at a time to identify specific noise source
4. Secure loose cables with zip ties or cable clips
5. Add foam insulation inside frame to prevent internal cable rattle[10]

Prevention

- Regularly check torque on all bolted connections (monthly inspection)
- Apply appropriate lubricants during assembly (grease, anti-seize, carbon paste)
- Service bottom bracket and headset bearings annually or when developing play/roughness
- Remove seatpost periodically (every 6 months) to prevent seizing and refresh grease
- Use proper torque wrench for carbon components to avoid over-tightening damage
- Address noises promptly before they indicate serious wear or damage[4][9][10]

7. Loose Components: Handlebars, Stem, Saddle

Symptoms

- Handlebars twist forward or rotate in stem during braking or climbing
- Stem rotates on fork steerer when pulling on handlebars
- Saddle tilts up or down during riding
- Seatpost rotates or slides down while riding
- Unsafe handling or unpredictable bike control[1][2][4]

Diagnostic Steps

1. **Handlebar-stem interface:** Stand over bike, hold front wheel between legs, attempt to twist handlebars; should be completely solid
2. **Stem-steerer interface:** Apply front brake, rock bike fore-aft; stem should not move relative to fork
3. **Saddle-seatpost interface:** Sit on bike, try to rotate saddle; push/pull saddle nose up and down
4. **Seatpost-frame interface:** Try to rotate seatpost in frame; check if seatpost has slipped from set height
5. **Check torque markings:** Look for witness marks or tape indicating if component has moved from original position[1][4]

Root Causes

- **Insufficient bolt torque:** Most common cause; bolts not tightened to specification
- **Wrong diameter components:** Handlebar too small for stem clamp, seatpost too small for seat tube
- **Damaged or worn clamp surfaces:** Rounded edges, burrs, or damage preventing secure clamping
- **Missing or incorrect shims:** Needed when component diameters don't match perfectly
- **Over-greased carbon interfaces:** Too much lubrication prevents friction needed to hold carbon parts
- **Damaged component:** Cracked stem, bent clamp, stripped threads prevent proper tightening[1][2][4]

Repair Procedure

Handlebar and stem tightening:

1. **Handlebar in stem:**
 - Loosen faceplate bolts completely, remove faceplate
 - Position handlebars at desired rotation angle (typically brake levers at comfortable angle)
 - Replace faceplate, insert bolts finger-tight
 - Tighten bolts evenly in cross pattern to manufacturer specification (typically 4–6 Nm)
 - Recheck alignment and torque
2. **Stem on steerer:**
 - Loosen stem clamp bolts (side bolts, not top cap)
 - Adjust headset preload with top cap bolt (removes play but doesn't over-tighten bearings)
 - While holding handlebars straight and aligned with front wheel, tighten stem clamp bolts evenly to spec (typically 5–6 Nm)
 - Verify stem cannot rotate on steerer[1][4]

Saddle and seatpost adjustment:

1. **Saddle on seatpost:**
 - Loosen saddle rail clamp bolts

- Position saddle at desired fore-aft position and tilt angle (typically level or slightly nose-down for road, slightly nose-up for mountain)
- Clean clamp surfaces if dirty or greasy
- Tighten clamp bolts evenly to specification (typically 8–10 Nm for single-bolt, 4–6 Nm each for two-bolt)
- Verify saddle cannot be moved by hand

2. Seatpost in frame:

- Loosen seatpost collar or binder bolt
- Set seatpost to proper height, align with top tube or parallel to ground
- Clean inside of seat tube and outside of seatpost if excessively dirty
- Apply appropriate lubricant (grease for metal, carbon paste for carbon)
- Tighten collar to specification (typically 5–7 Nm)
- Mark seatpost height with tape or note measurement for future reference[1][2] [4]

Important torque specifications:

- Stem faceplate (aluminum): 4–6 Nm
- Stem steerer clamp: 5–6 Nm
- Saddle clamp (single bolt): 8–10 Nm
- Saddle clamp (two bolt): 4–6 Nm each
- Seatpost collar: 5–7 Nm
- **Carbon components:** Never exceed manufacturer specifications; over-tightening causes damage

For carbon components:

- Always use torque wrench to prevent over-tightening damage
- Apply carbon assembly paste (friction compound) instead of grease
- Clean surfaces thoroughly before assembly
- Follow manufacturer torque specs exactly (typically lower than aluminum)
- Inspect regularly for cracks; carbon damage can be invisible internally[4]

Prevention

- Use proper torque wrench for all critical bolted connections
 - Check torque on handlebars, stem, and seatpost monthly
 - After first 50–100km on new bike, recheck all torque values (components settle and may loosen slightly)
 - Use correct diameter components; never force oversized parts into undersized clamps
 - Apply appropriate assembly compound for material type
 - Mark component positions with tape or measurement so you can detect movement
 - Never over-tighten to compensate for wrong-size component; replace with correct size[1][2][4]
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8. Pedal and Crank Problems

Symptoms

- Pedal feels loose or has side-to-side play
- Creaking noise from pedal area when pedaling
- Pedal doesn't spin freely or feels rough/gritty
- Crank arm wobbles side to side on bottom bracket spindle
- Pedal fell off during riding
- Difficulty threading pedal into crank arm[1][4][9]

Diagnostic Steps

1. **Pedal play check:** Hold crank arm steady, try to move pedal side to side; should have no play
2. **Pedal spin test:** Spin pedal on spindle; should rotate smoothly without roughness or catching
3. **Thread inspection:** Check pedal threads on spindle and inside crank arm for damage, cross-threading, or stripped threads
4. **Crank arm play check:** Grab crank arms and try to move side to side perpendicular to bottom bracket spindle
5. **Bottom bracket check:** Remove crank arms, spin bottom bracket spindle by hand to assess bearing condition
6. **Crank bolt check:** Verify crank bolts are tight (may require removal of dust cap to access)[1][4][9]

Root Causes

- **Loose pedal threads:** Pedals not tightened sufficiently, gradually loosen from pedaling forces
- **Wrong threading direction:** Left pedal has reverse (left-hand) threads; installing incorrectly causes loosening
- **Worn pedal bearings:** Normal wear, contamination, or lack of maintenance causes rough rotation or play
- **Cross-threaded installation:** Forced pedal installation damages threads in crank arm
- **Loose crank bolts:** Allows crank arm to wobble on spindle, eventually damages spindle or crank taper/splines
- **Worn bottom bracket bearings:** Causes crank arm play and rough rotation
- **Damaged bottom bracket spindle or crank interface:** Wear on splines, tapers, or threads[1][4][9]

Repair Procedure

Pedal removal and installation:

1. **Removal:**
 - Right pedal: Turn pedal spindle counterclockwise (toward rear of bike) to loosen
 - Left pedal: Turn pedal spindle clockwise (toward front of bike) to loosen—REVERSE THREADS

- Use pedal wrench or hex key (typically 6mm or 8mm) on wrench flats at crank arm
 - Position crank arm forward (3 o'clock) for leverage
 - If seized, apply penetrating oil, wait 10 minutes, try again; tap wrench handle with mallet if needed
- 2. Thread cleaning:** Clean threads on pedal spindle and inside crank arm using wire brush or thread chaser
- 3. Installation:**
- Apply grease or anti-seize compound to pedal threads
 - **Critical:** Verify correct pedal for side (pedals marked "L" and "R")
 - Start threading by hand to prevent cross-threading
 - Right pedal: Tighten clockwise (normal threads)
 - Left pedal: Tighten counterclockwise (reverse threads)
 - Tighten firmly: 35–40 Nm torque, or very tight by hand if no torque wrench
- 4. Verification:** Pedals should have no play and spin smoothly[1][4][9]

Pedal bearing service:

- Platform pedals: Often have serviceable cartridge bearings; disassemble, clean, regrease, and reassemble
- Clipless pedals: Some models have serviceable bearings; refer to manufacturer service instructions
- If bearings are worn (pitted, corroded, or loose), replace with new bearings
- If pedal body is damaged or worn beyond service, replace entire pedal[9]

Crank arm and bottom bracket tightening:

- 1. Remove dust caps** from crank arms if present
- 2. Check crank bolt torque:**
- Square taper: 30–40 Nm
 - Splined (ISIS, Octalink): 35–50 Nm
 - External bearing (Shimano Hollowtech II, SRAM GXP): 12–14 Nm on pinch bolts after preloading with cap
- 3. If crank arms are loose:**
- Remove crank arms using appropriate tool (crank puller for square taper, cap and pinch bolts for external bearing)
 - Clean interfaces thoroughly
 - Apply thin layer of grease to spindle and crank interfaces
 - Reinstall crank arms, tighten to proper torque in correct sequence
 - For external bearing cranks: Install non-drive side first, install drive side and preload with cap to eliminate play, then tighten pinch bolts
- 4. If bottom bracket has play or roughness:**
- Remove crank arms and bottom bracket
 - Inspect bearings and races for wear, pitting, or damage
 - Clean and regrease if serviceable (cup and cone type)
 - Replace bearings or entire bottom bracket if worn beyond service
 - Reinstall bottom bracket to proper torque (varies by type, typically 35–50 Nm)
- [4][9]

Prevention

- Check pedal tightness monthly; tighten if any play detected
 - Remember threading direction: Right pedal normal, left pedal reverse
 - Use pedal wrench for installation to ensure adequate torque
 - Service or replace pedal bearings when they develop play or roughness
 - Check crank bolt torque every 3–6 months
 - Address crank arm looseness immediately to prevent damage to spindle/crank interface
 - Use appropriate lubricant during installation (grease or anti-seize, not threadlocker)
 - Replace worn bottom bracket bearings before damage extends to cups or spindle[4] [9]
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9. Quick Reference Diagnostic Flowchart

Problem: Wheel doesn't spin freely

- Brake pads rubbing → Adjust or center brake caliper (Section 2)
- Hub feels rough/grinding → Service or replace hub bearings (Section 5)
- Chain dragging → Clean and lubricate chain (Section 4)
- Wheel not seated properly → Reinstall wheel correctly in dropouts

Problem: Bike doesn't shift properly

- Slow or incomplete shifts → Adjust cable tension with barrel adjuster (Section 3)
- Chain overshifts off cassette → Adjust limit screws (Section 3)
- Shifting suddenly became poor → Check for bent derailleur hanger (Section 3)
- Chain skips under load → Check chain and cassette wear; likely needs replacement (Section 3)

Problem: Noise when pedaling

- Clicking with every pedal revolution → Check bottom bracket, pedals, or chainring bolts (Section 6)
- Creaking when standing → Likely bottom bracket or seatpost (Section 6)
- Squeaking from saddle area → Remove, clean, grease, and reinstall seatpost (Section 6)
- Chain grinding/squealing → Clean and lubricate chain (Section 4)
- Rubbing sound → Check brakes, chain alignment, or fender clearance (Section 2)

Problem: Bike handling feels unsafe

- Front end wobbles → Check headset adjustment and stem bolts (Section 6, 7)
- Handlebars twist → Tighten stem faceplate bolts (Section 7)
- Brakes don't stop bike → Adjust brakes or replace pads (Section 2)
- Wheel wobbles side to side → True wheel or check hub (Section 5)

Problem: Component keeps coming loose

- Saddle tilts or rotates → Tighten saddle clamp bolts with proper torque (Section 7)
 - Seatpost slides down → Tighten seatpost collar; check for correct diameter (Section 7)
 - Pedals loosen → Ensure correct pedal for side; tighten firmly (Section 8)
 - Accessories rattle → Tighten mounting bolts or add rubber shims (Section 6)
-

10. Preventive Maintenance Checklist

Before Every Ride (Quick Visual Check)

- [] Tires inflated to proper pressure, no visible damage
- [] Brakes engage properly and pads not worn to limit
- [] Chain appears lubricated, not excessively dirty or rusty
- [] No obviously loose or missing bolts
- [] Wheels spin freely without rubbing
- [] Quick-releases or thru-axles properly tightened

Weekly Maintenance (for regular riders)

- [] Check tire pressure and adjust as needed
- [] Wipe down chain, inspect for wear; re-lubricate if dry
- [] Check brake pad wear and alignment
- [] Test all gears shift smoothly
- [] Clean frame and components if dirty
- [] Check for any new noises or handling issues

Monthly Maintenance

- [] Thoroughly clean and lubricate chain
- [] Inspect tires for wear, cuts, embedded debris; replace if needed
- [] Check brake cable and housing condition
- [] Test for play in headset, hubs, and bottom bracket
- [] Check torque on critical bolts (stem, seatpost, crank arms)
- [] Inspect spokes for tension and breakage
- [] Clean and lubricate pivot points on derailleurs and brakes

Every 6 Months (or 1000km)

- [] Full drivetrain cleaning and inspection
- [] Measure chain wear; replace if beyond 0.5% stretch
- [] Inspect cassette and chainring teeth for wear
- [] Check cable and housing; replace if frayed or corroded
- [] True wheels if wobble has developed
- [] Remove seatpost, clean, and re-grease to prevent seizing
- [] Service or replace brake pads
- [] Full bike inspection for cracks, damage, or wear

Annually (or 2000–3000km)

- [] Replace chain regardless of apparent condition (preventive)
- [] Service bottom bracket bearings (clean, regrease, or replace)
- [] Service headset bearings
- [] Service hub bearings
- [] Replace cables and housing
- [] Replace handlebar tape or grips
- [] Full brake system service or bleed (hydraulic)
- [] Inspect frame thoroughly for cracks or damage
- [] Consider professional tune-up and safety inspection

Maintenance by Riding Conditions

Wet/muddy conditions: Clean and re-lubricate chain after every ride; inspect brakes and bearings more frequently

Dry/dusty conditions: Clean chain more frequently; check tire condition regularly

High mileage: Follow upper end of maintenance intervals; consider more frequent chain replacement

Stored long-term: Clean thoroughly before storage; inflate tires to max, store in dry location; service all bearings before returning to use

Appendix: Tool Requirements

Essential Tools (minimum for basic repairs)

- Tire levers (2–3)
- Portable pump or CO₂ inflator
- Patch kit or spare tube
- Multi-tool with hex keys (2.5, 3, 4, 5, 6, 8mm)
- Chain tool
- Spoke wrench (correct size for spoke nipples)

Recommended Tools (for home workshop)

- Floor pump with pressure gauge
- Pedal wrench (15mm)
- Adjustable wrench or cone wrenches
- Cable cutters
- Chain wear indicator tool
- Torque wrench (2–20 Nm range)
- Cassette lockring tool and chain whip
- Crank puller (for square taper cranks)
- Bottom bracket tools (varies by type)

Consumables to Stock

- Chain lubricant (wet and/or dry)
 - Degreaser
 - Multi-purpose grease
 - Anti-seize compound
 - Rags and brushes
 - Spare tubes (correct size)
 - Spare brake pads
 - Spare chain quick-links
-

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