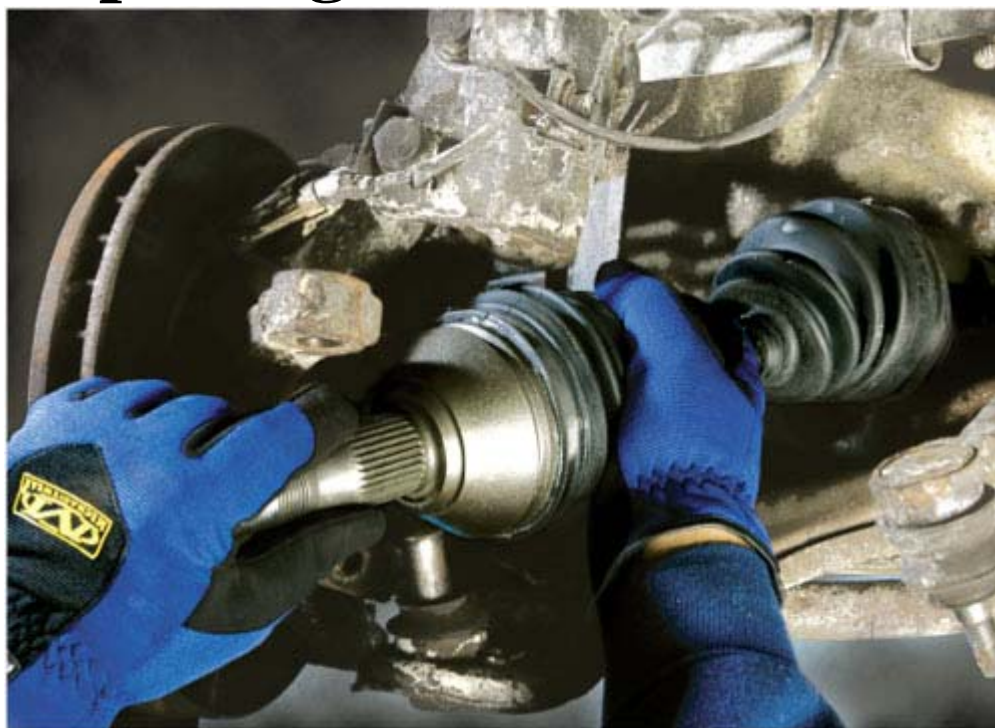


# Replacing Front-Drive Axles



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**Photography by Monte Isom**

**Shop facilities courtesy of Bargain Auto Service, Linden, N.J.**

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**That clicking noise** that your front-wheel-drive car makes as you accelerate around low-speed righthand corners has been getting a little louder for weeks. One afternoon, just as you pull out of the parking lot, there's a loud banging noise and a series of crunches. Then all forward thrust drops off, punctuated by vibration and the occasional ping of tortured metal. Your CV joint has failed.

## **THEY DON'T MAKE THEM LIKE THAT ANYMORE**

The wheels of your front-drive vehicle are connected to the transaxle via axles that have constant-velocity-type universal joints at each end. There is an inner and outer joint on the left and right

### DEGREE OF DIFFICULTY



**DIFFICULT**

axles. All else being equal, the outer joints fail first because they run with the highest angularity--when the wheel is turned, the joint has to redirect the torque from the engine around a corner. The more angle, the more strain. And it's usually the right side that goes first because here in the lefthand-drive US of A, we turn sharper around righthand corners than lefthand ones. Sometimes the rubber boots covering the joints fail from age or are torn by road debris, letting the grease out and dirt and water in. As recently as 10 years ago, the repair meant removing the pertinent axle and taking out the failed CV. You'd then replace it and the boot, lubricate the new and old joint with fresh grease, reinstall and go.

Nowadays it's difficult to find a CV joint for sale at a parts store. The industry has made it standard procedure to swap in a complete new or remanufactured axle, with the boots installed and prelubricated. No mess, no fuss--which is good because the molysulfide-doped grease specified for CV joints is the blackest, nastiest, most thixotropic (you know, sticky) goop you can imagine, and it will stain your cuticles, your tools and your work clothes worse than printer's ink. You'd never get the stuff out of the washing machine.

You can save some money by buying a remanufactured axle, which will be virtually as good as new. The refurbishing process involves regrinding all the grooves in the inner and outer halves of the joint to a standard oversize, and replacing the cage and ball bearings with new oversize ones.

## GET DOWN

Replacing a front-wheel-drive axle is straightforward, although physically demanding. Get the replacement axle before you start, as well as a new spindle nut and a cotter pin or two. The counterman at the auto parts store will be able to tell you what you need and if the spindle nut needs to be replaced every time it's removed. There may be a new spindle nut in the box with the axle assembly.

Start by loosening all the lug nuts on the wheel that you'll be working on with the car on the ground. Jack up the car and set the whole front end on proper safety stands, as high as you can. You'll need both wheels off the ground to allow enough suspension droop.

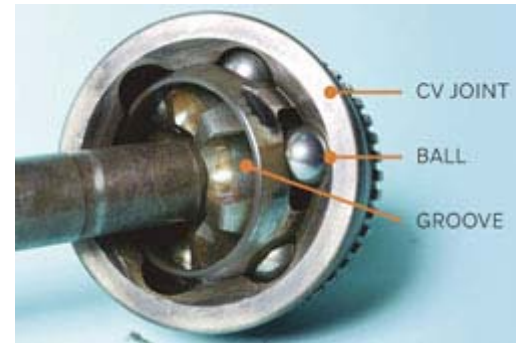
You'll need a big socket to remove the spindle nut. A large crescent wrench or pipe wrench is not an acceptable substitute. Borrow, rent or buy the right socket and a flex handle with at least an 18-in. handle, because that nut may be torqued to as much as 300 lb.-ft. You can use an air wrench to loosen it if you have compressed air available.

At this point procedures may vary slightly, depending on your vehicle's



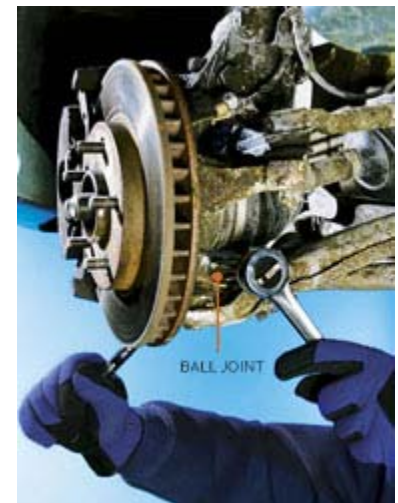
**CLICK TO ENLARGE**

A failed boot requires immediate disassembly and cleaning, fresh lube and a new boot.



**CLICK TO ENLARGE**

This joint shows minor wear. Balls and grooves will show wear before the joint fails completely.



**CLICK TO ENLARGE**

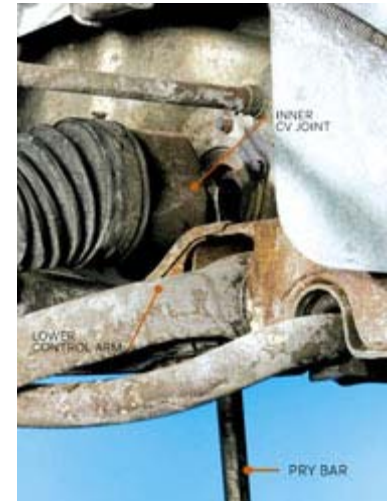
Start by removing the ball joint's pinch clamp bolt and tie rod end from the suspension upright.

suspension. Consult your shop manual for specifics, but for the most part you'll need to do the following.

Remove the cotter pin from the tie rod end, and pop the tie rod end out of the steering arm. If it's frozen, don't whack the end of the threaded shank with a hammer; you'll probably just ding the threads. Leave the castellated nut a few threads on, and use a big screwdriver or pry bar to lift the steering arm up. Then, smack the rod end a good shot with a hammer and it should pop right out. An alternative is to use two ball-peen hammers and hit both sides of the steering arm simultaneously. There are also threaded pullers for really stubborn cases. If you don't mind destroying the rubber boot on the rod end, you can use a crowbar or a "pickle fork" puller.

Disconnect the ball joint from the suspension upright. You probably can do this by loosening and then removing the pinch bolt at the bottom of the shock. Pull the lower control arm down until the ball joint separates from the steering upright.

This is where it gets tricky. On some vehicles you're in a position to pull the suspension upright and outward enough to let the spindle shaft fall free of its bearing. On many vehicles the suspension arm won't droop far enough. You'll need to disconnect the sway bar and perhaps another suspension piece. Try disconnecting the sway bar, and using a big pry bar and a helper to get the ball joint to clear.



**CLICK TO ENLARGE**

Pry the inner joint free of the transmission. Check a manual for specifics for your vehicle.

## POPPING THE AXLE OUT

Methods of attaching the axle at the transmission end vary. Our example vehicle uses a spring ring that snaps into a groove. We simply used a big pry bar to pop it out. On other vehicles, there's a snap ring that needs to be removed with snap ring pliers to allow the axle to clear the transmission. Check beforehand because using a pry bar until one of these came loose probably would be a bad idea.

**Warning:** Some vehicles will spill transmission fluid as soon as the inner axle stub clears the seal. Be ready with a drain pan.

Some European vehicles use a ring of bolts to hold the inner CV to the inner stub axle, and the stub axle stays in the transmission case. These bolts probably use a 12-point Allen-type wrench. They are notorious for stripping. Be sure to clean any road grime out of the Allen bolt heads, and seat the Allen wrench into the bolt head with a light hammer tap to prevent this.

## POPPING THE AXLE IN

Give the pair of axles, new and old, a critical look to be sure they are identical. For instance, ABS- and non-ABS-equipped cars may use axles that look almost exactly the same, but have differing



**CLICK TO ENLARGE**

Use a big pry bar to drop the ball joint far enough to allow the suspension to clear the spindle shaft.



numbers of splines.

Clean the inner end splines of the new axle to keep from introducing any dirt into your transmission. Slide the new axle home until it's seated, being sure the snap or spring rings are seated in their grooves. Now it's simply a matter of reassembling the ball joint--which will probably require a helper to lean on the pry bar while you stuff the ball joint stud back into its hole in the bottom of the upright.

Reinstall the tie rod end with a fresh cotter pin, button up the sway bar and any other parts you've removed or loosened, and you're ready to torque the spindle nut, reattach the wheel and take the car off the safety stands.



**CLICK TO ENLARGE**

Use pliers to install the tie rod end with a fresh cotter pin. Don't reuse the old pin.



**CLICK TO ENLARGE**


## He Ain't Heavy, He's My ...

That spindle nut needs to be torqued properly, but few shade-tree mechanics have a torque wrench capable of the 200 to 300 lb.-ft. required. Put Archimedes to work. Say the nut is supposed to be tightened to 225 lb.-ft. (Check the shop manual.) If the flex handle you have is 18 in. long, simply put 150 pounds of weight on the end of the handle: 150 pounds x 1.5 ft. = 225 lb.-ft. You may need to find someone who weighs the right amount, or measure out a slightly different place to stand on the wrench. Do the math. And don't bounce up and down--just let your weight do the work.

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