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**KNOCK  
OUT  
KNEE  
PAIN  
FOR  
GOOD**

Protect your knees to  
ride strong forever

# A

**AT FIRST GLANCE**, the knee seems fairly simple: It's just a hinge joint that allows our legs to move in a circle as we pedal. But so many different forces act on it—the four muscles of the quadriceps, the three making up your hamstrings, one of the hip adductors, and the iliotibial band—that it's actually quite complicated. "All of those cross through the knee joint, and the different lengths and tensions aren't always in balance," says Frank Baptiste, a certified strength and conditioning coach in New York City.

And it plays a crucial role in your riding. "Power comes from the large muscles in our hips and thighs as we cycle," explains John Feldman, MD, an orthopedic specialist at the Orthopedic Institute at Jersey City Medical Center. "In order to transfer that power to the site of propulsion—our lower legs and feet—energy needs to be transferred through that knee joint."

Given that complexity, it makes sense that knee injuries are among the most common for cyclists—up to 33 percent of riders have suffered from knee pain, according to a 2018 study published in the *Open Access Journal of Sports Medicine*.

That's also due to how much we use our knees as we pedal. "If you're spinning at a hundred revolutions per minute for 100 minutes, you're looking at 10,000 repetitions," says Baptiste. If your body positioning is just a little bit off or you have a minor muscular imbalance somewhere, you're at risk for overuse injuries, which are caused by repetitive stress or trauma to a certain area. Luckily, most of these injuries tend to be pretty minor, says Feldman. But they can linger if you don't address them.

Don't let that happen to you. The advice on these pages is designed to help you kick knee pain to the curb, and prevent it from slowing you down again.



UP TO A THIRD OF RIDERS HAVE EXPERIENCED KNEE PAIN, MAKING IT ONE OF THE MOST COMMON INJURIES FOR CYCLISTS.

## WHERE DOES IT HURT?

**FRONT** / *Feels like:* A dull, aching pain around the kneecap

*The problem:* Patellofemoral pain syndrome  
*What it means:* Your quads do the hard job of pushing the pedal forward with every stroke. Each one is made up of four muscles—the vastus medialis is one of them, and works to extend your knee. If that muscle is relatively weak compared to the others in the quad, the stronger muscles can pull the kneecap to the side of the knee, says Feldman.

**FIX IT** Make sure your saddle isn't too low—that can put excess stress on the quadriceps, patella, and ligaments, says physical therapist

and bike fit specialist Kevin Schmidt, owner of Pedal PT in Portland, Oregon. Aim for a knee angle of 32 to 35 degrees at the straightest part of the pedal stroke. To find that sweet spot, have someone hold the bike steady for you while you pedal backward with your heels on the pedals; the knee should have just a very slight bend at the bottom of the stroke, he says.

**BACK** / *Feels like:* Pain or stiffness behind the knee, or at the top of the hamstrings near the glutes

*The problem:* Hamstring overextension  
*What it means:* A trio of muscles that run across the back of your thigh, your hamstrings are responsible for hip extension and knee flexion, helping you pull the pedal back up to the top of a stroke.

Each time the leg reaches too far to get to the bottom of a pedal stroke, it "places the hamstrings and posterior knee structure in a lengthened, stretched, and often inefficient position," explains

Schmidt. Add in countless repetitions over a long ride, and that's a recipe for pain.

**FIX IT** To avoid that overextension, try lowering the saddle slightly and moving it a little closer to the handlebar, a few millimeters each. But don't go too low—your knee angle should never be less than 30 degrees at the bottom of a pedal stroke, Schmidt says.

**OUTSIDE** / *Feels like:* Sharp pain on the outer side of the knee

*The problem:* Iliotibial (IT) Band Syndrome  
*What it means:* "The IT band is this long piece of fascia [a web of connective tissue underneath the skin] that extends from your hip all the way past your knee to the top of your tibia on the [outside] of your leg," Feldman explains.

It helps to move the hips and thighs toward the midline of your body, and stabilizes the knee—which involves it in every aspect of a pedal stroke. So with repetitive sports like cycling, "whenever you flex your knee, the IT band moves back and forth over the outside of the knee joint," he says. Over time, excessive friction can lead to inflammation in that connective tissue.

**FIX IT** Because the IT band is a connective tissue—not a muscle—you can't exactly stretch it, but foam rolling can help relax the surrounding muscles and ease tension on the IT band, says Feldman. Stretching and strengthening those surrounding muscles can also reduce pain. Learn how to do exercises that help at [bicycling.com/ITband](http://bicycling.com/ITband).

**INSIDE** / *Feels like:* Sharp pain on the inner side of the knee

*The problem:* Foot misplacement  
*What it means:* "This is commonly related to 'too wide' of a stance, which occurs when the cleats are placed too far toward the inside of the foot on the shoe," says Schmidt. "It can also occur when the cleat is externally rotated on the shoe, causing your heel to rotate outward." That makes your knees more likely to collapse inward, putting more stress on it during each pedal stroke. Smaller riders, those who use a triple chainring in the front, and people who ride fat bikes may be more susceptible to this kind of pain, because their stance will naturally be wider.

**FIX IT** Get a bike fit. "Your goal should be to have your hip, knee, and foot in a nice vertical line when viewed from the front," says Schmidt. A professional bike fitter can offer gear and positioning solutions to better align your legs.

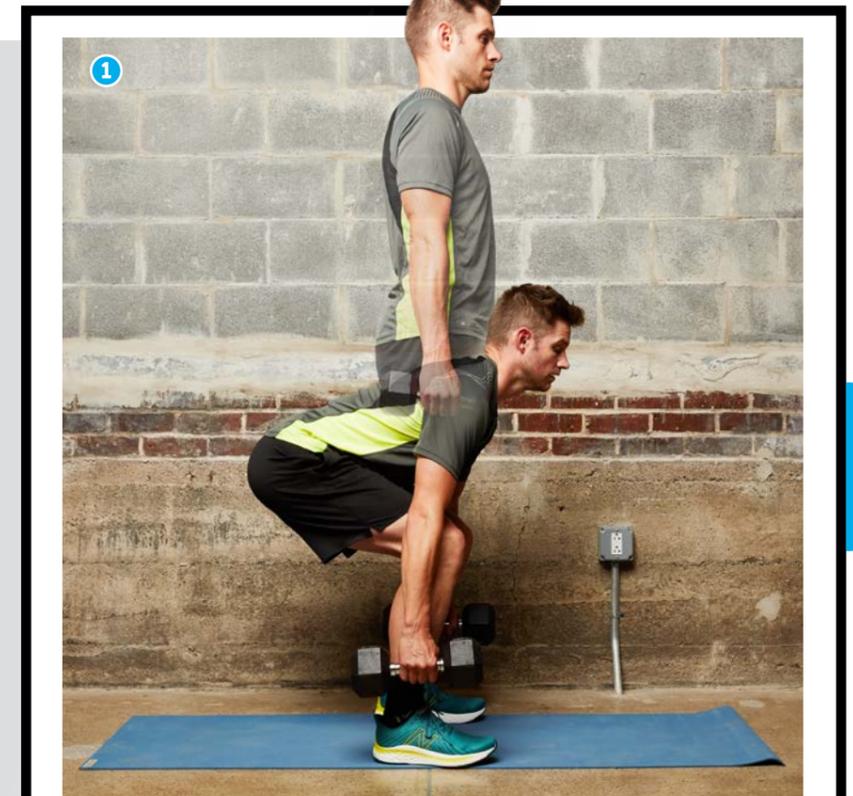
## 4 GO-TO MOVES THAT PREVENT KNEE PAIN

**TO KEEP YOUR** knees healthy, focus on the muscles surrounding the joint. "The knee doesn't work by itself—it's always going to be working with the hip and ankle," explains Baptiste. "Think about compound movements that involve triple extension, meaning you see the ankle, hip, and knee all opening at the same time." That targets all the muscles throughout the entire kinetic chain, strength-

ening any weak links along the way.

You also need to work in single-leg exercises. "That's the way you move on a bike," says Baptiste—only one leg is pushing forward at a time. "Not only are you going to balance out your strength side to side, you're also going to work on joint stability."

Do these moves twice a week. To build base strength, start with 3 reverse-pyramid sets: 15 reps on your first set, then 12 on the next, and 10 after that, says Baptiste. Use weights that make you work at an effort level of 6 or 7 out of 10, and increase the weight every set to keep the effort consistent as you lower the reps. "Your last set should be your heaviest, but 'leave two in the tank,' meaning you could complete 2 more reps if you had to. This will help ensure form doesn't break down at the end of your set," Baptiste says. After four to six weeks, once you've built up strength, you can start doing 4 sets of 6 reps each at heavier loads, he says.



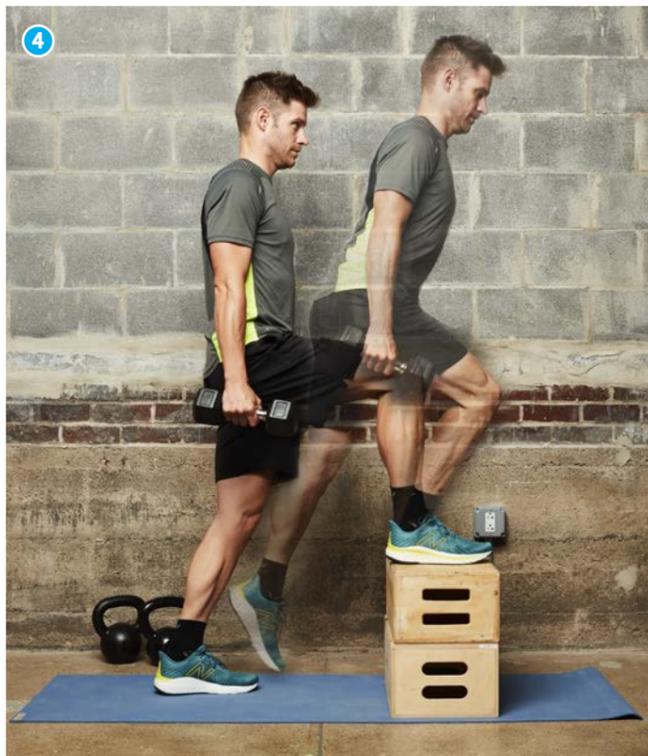
**DEADLIFT** / Stand with feet hip-width apart, a dumbbell in each hand. With your back flat and core engaged, hinge at the hips, sending your butt back and bending your knees. Drive your feet into the ground and contract your glutes to stand up.



**LUNGE** / Stand with your feet shoulder-width apart, hands on hips. Take a big step forward with your right leg. Keeping your back straight, bend your knees and lower your hips toward the floor until your right leg is bent about 90 degrees. Push back to start. Repeat on the other side.



**SQUAT** / Stand with your feet hip- to shoulder-width apart, toes slightly turned out. Hold a dumbbell in each hand at your shoulders. Push your hips back as if you were sitting in a chair and lower down as far as possible while keeping your weight in your heels and your chest tall; do not lean forward. Return to start.



**STEP-UP** / Grab a dumbbell in each hand and stand in front of a box that's a little shorter than knee height. Step onto the box with your right foot, pressing into the right heel as you straighten your right leg. Bring your left foot up to meet the right on top of the box. Slowly return to start, then repeat on the other side.

## CAN SUPPLEMENTS HELP?

**IT'S BEST TO** get nutrients from a well-balanced diet. But certain supplements that *complement* your diet can help prevent joint pain, especially for those who have nutrient deficiencies in their blood work or who follow more limited diets, like vegans, says Leslie Bonci, RD, owner of Active Eating Advice and co-author of *Bike Your Butt Off*. They're part of the long game—in fact, it can take two to three months to see results. “It’s not like taking Advil,” Bonci says. “It takes some time and consistent use to see a difference.”



**KLEAN ATHLETE COLLAGEN + C**  
\$38/12 oz

**COLLAGEN** / Collagen can help repair and grow cartilage, which helps joints move smoothly. In a 2021 study published in the journal *Nutrients*, researchers found that taking a supplement reduced the amount of activity-related knee joint pain. Go for one with vitamin C, says Bonci. “Taking at least 15 grams of collagen with about 50 milligrams of vitamin C daily seems to stimulate cartilage,” she says.



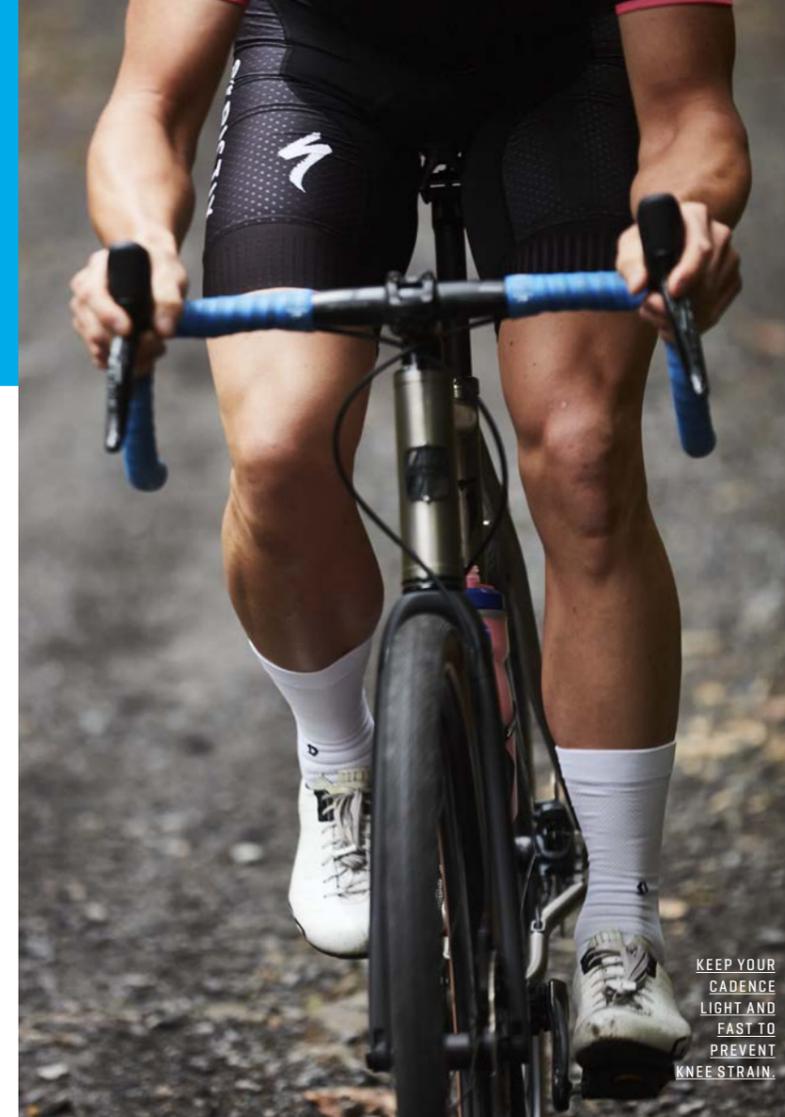
**LIVE CONSCIOUS CURCUWELL**  
\$30/60 capsules

**BOSWELLIA SERRATA AND CURCUMIN** / These two anti-inflammatory ingredients can be protective, says Bonci. One hundred to 250 daily milligrams of boswellia, a gum resin extract, was deemed to be an effective and safe treatment for people with inflammatory joint disease in a 2020 meta-analysis published in the journal *BMC Complementary Medicine and Therapies*. And 1.5 daily grams of curcumin, the active compound in turmeric, could help boost performance by reducing inflammation, pain, and muscle damage, according to a 2020 review in *Critical Reviews in Food Science and Nutrition*.



**TAMAFLEX COMPLETE**  
\$40/120 caplets

**TAMARIND AND CURCUMIN** / Tamarind is a tropical fruit with anti-inflammatory and antioxidant properties. “The combination of that with curcumin could be beneficial,” says Bonci. In fact, taking Tamaflex (which combines the two) daily for 90 days was shown to provide substantial relief from knee pain after physical activity and improved joint function in non-arthritic adults in a 2019 study published in *The International Journal of Medical Sciences*.



KEEP YOUR  
CADENCE  
LIGHT AND  
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## HOW TO PROTECT YOUR KNEES

### MOVE MORE

“You never want to stay in the same position for hours,” says Schmidt. Stand up on the pedals, slide back in the saddle, and shift around every 10 minutes or so, he adds, especially as terrain changes. Varying things refreshes the system and keeps pain from setting in.

### INCREASE CADENCE

“When you’re pedaling slow and hard, you’re only going to put more stress on the knee,” says Schmidt. So spin light and fast. Shift into an easier gear and increase your cadence to 90 to 100 rpm for relief.

### PAY ATTENTION TO PAIN

Most of the time, ignoring pain won’t cause irreparable damage, but it may prolong recovery time, says Feldman. And the more time you rehab, the less time you can spend on the road. If your knee hurts on the bike, cut your ride short, and assess what you can do to fix it.

### FOLLOW A MAINTENANCE PROGRAM

Use the moves on these pages twice a week to strengthen your hip flexors, glutes, and core. And warm up before every ride by pedaling easy for 10 to 20 minutes and activating those same areas, says Baptiste.