

Strength



← The back mechanic tinkers with Ken Whetham, an elite powerlifter.

FIX IT WITH THE BACK MECHANIC

To save his strength, our aching writer headed north of the border to see Stuart McGill, Ph.D., the master craftsman of healthy spines. By Lou Schuler

My exam began the moment I climbed out of my rented Chevy Cruze and walked up the driveway—I just didn't know it yet. Nor did I suspect that by the end of the day, I would learn that I'd been exercising wrong, that I had a semi-serious back injury, and that most one-size-fits-all fitness recommendations are basically bullshit.

All I knew was that after four decades of lifting, my workouts were no longer working. My squats were pathetic, my deadlift

was dying, and—worst of all—my back felt sore and unstable. If anybody in North America could help me recapture my weight-room mojo, it was Stuart McGill, Ph.D., who welcomed me into his home clinic in Gravenhurst, Ontario.

You may not recognize McGill's name, but if you've ever done a side plank, you've been influenced by his 30 years of innovative research as a professor of spine biomechanics at the University of Waterloo.

Strength

McGill has seen hundreds of elite athletes and worst-of-the-worst back-pain cases over the course of his career. He's published more than 250 studies that go way down the rabbit hole of investigating the causes of back pain and ways to prevent and treat it. His main takeaway: Don't worry about bodybuilding ab exercises like situps and crunches, and don't go looking for help from yoga, Pilates, your insurance company, or a surgeon.

You need to focus first on what triggers pain, and remove the cause. Then create a pain-free foundation by teaching your core muscles to stabilize your lower back—that is, to hold your spine in a safe position—and to develop endurance in those muscles.

Know Why Your Back Hurts

Your spine is a curved stack of vertebrae cushioned by gel-filled disks. If it bends out of that natural curve, that's not a big deal—unless it's bearing a load, whether that load is in the form of a barbell, a bag of mulch, or a screaming 3-year-old.

When that happens, the compression on the improperly stacked disks causes the fibers that make up the disk wall to loosen and divide. With enough stress, the disks become compacted and the gel interior squirts out between the fibers. That gel then hardens and

The conventional notion that everyone should squat “ass to grass” is basically bullshit, McGill says.

presses on nerves, creating a painful, bulging disk. This is also why any ab exercise that has you repeatedly bending your spine—like the situp—is less than ideal.

If your spine were a straight line, with the vertebrae stacked up like the floors of a skyscraper, it would easily bear heavy loads. But with its curved configuration, it has no inherent structural stability. “The spine bears load because it's stiffened by muscle,” McGill explains. Muscles and connective tissue act as a guy-wire system. Without muscle, your spine couldn't even support your upper-body weight, he says.

Spinal injuries due to instability tend to follow a U-shaped curve. We're most likely to mess up when the load is the lightest or the heaviest. When it's light, we may not bother bracing with enough muscle to provide tension. When it's heavy, those muscles can get overwhelmed. One of the most spine-bending positions is a move you probably do every time you sit down or hit the gym: the squat.



Fix Your Squat

It didn't take McGill long to find the locus of my discomfort. All he had to do was press down on my third and fourth lumbar vertebrae and there it was. He couldn't say exactly what type of injury I had, although it fit the pattern of a bulging disk that was probably pinching a nerve. Whatever it was, it was clear that the pain was brought on by the way I do the squat, one of the most basic movements. He said he'd noticed something about the way my body moved exiting my car.

So what was wrong with my squat? I was using standard form—feet shoulder-width apart, toes pointing straight ahead, thighs parallel to the floor at the bottom of the descent. The problem: I have a nonstandard body. Your body is likely nonstandard too.

McGill explained that a squat is safe only if you keep a neutral spine, with your lower back maintaining its natural arch. If you squat deeper than you should, your spine goes into “butt wink,” where your lower

spine curves inward. Doing that with heavy weights can damage one or more of your spinal disks. (Without weights, a daily deep squat is actually good for you.) I was shocked to learn that due to my hip structure, it's impossible for me to not shift into butt wink before my thighs are even parallel to the floor. That's why McGill recommended that I use a wider stance and squat to just above parallel. (To hone your own form, see “How Deep Should You Squat?” on the next page.)

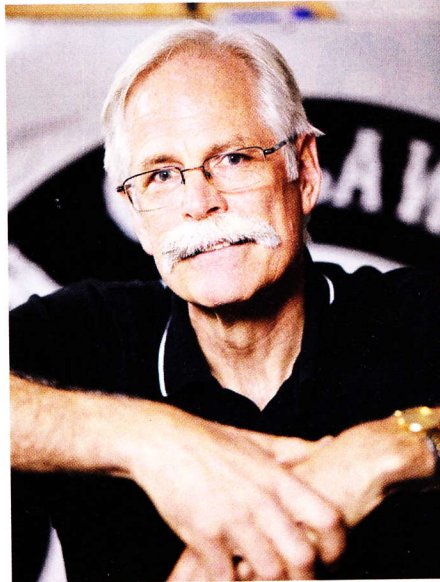
Indeed, the conventional notion that everyone should squat “ass to grass” is basically bullshit, says McGill. “Life isn't fair. Your anatomy is what determines your safe squat depth and risk of injury.” But my squat wasn't my only problem.

Keep an Eye on Your Form

McGill quickly noticed something embarrassing about my form. When I picked up a weight, I braced my core to protect my back—a good practice. But when I finished with the weight, I simply bent over and set it down, losing all my protective muscle tension. I've actually warned others, based on what I learned from McGill, to treat every weight as if it's heavy. A principle I'd apparently failed to assimilate is that a weight that's heavy on the way up is still heavy on the way down. That led to another important lesson.



HIPS DON'T LIE
Your hip anatomy determines whether certain moves may hurt your back.



create or exacerbate an injury. It's better to stand tall, lift your head, and sneeze upward.
▶ When you go from sitting to moving. You see this a lot the gym: A guy sits on a bench between sets, hunching over his phone; this cues an unnatural spinal curve. Then he goes right into a heavy lift. Allow a little transition time to stand; then activate your core muscles to protect your back as you begin to lift.

Save Your Spine with Four Moves

McGill's research has busted key myths about what alleviates back pain. For example, he's discovered that yoga and Pilates are not suited to some backs; too much lying in bed tends to worsen back pain rather than fix it; and back surgery often isn't necessary to relieve pain. Another big finding is that your back can take 10 years to truly heal from an injury, not the six to 12 weeks your insurance company might claim.

So what works? The best way to protect your spine is to do four exercises every day.

The first one is a body-weight squat, which is all you need to preserve your hip mobility without putting your back at risk.

Next, do exercises that improve your core strength and endurance and stiffen your guy-wire system. McGill's favorites are the bird dog, side bridge, and curlup. (For descriptions of all three, plus the squat, turn to "Your Back Pain Prescription" on page 137.)

On workout days, use these as part of your warmup, he suggests. The stiffness those exercises generate will remain for up to two hours and will make your lifts safer, more efficient, and more powerful.

Don't Force It

When I first walked into McGill's clinic, my goals were pretty straightforward: to learn why I'd lost so much strength on my squat and deadlift, and to get rid of my pain. But now I'm realizing that I might need to rethink my entire routine—including the loaded squat, one of my favorite moves.

What's the purpose of a loaded squat? "Why is it the best tool? Why not do a lunge, or push a sled, or climb steps?" McGill asked me.

I didn't have a good answer. It just seems strange to give up on what everyone says is such a great muscle-building exercise. But McGill has talked to countless dinged-up athletes and lifters in his many years as a scientist and clinician, and he knows that we all have the same fear: If we can't do the stuff we see other people doing, we feel diminished by comparison.

And that's absurd, he says, when you consider the alternatives. A deadlift off blocks using a trap bar hits all the muscles in my hips and thighs, and I can do it without any risk of butt wink. Stepups, lunges, and sled pushes work those same muscles.

Whatever I choose, I'll incorporate his core routine and remember that no lift is safe unless I pick up and put down every object as if it's heavy enough to break my back. Because believe me, it is.

Never Let Your Guard Down

Risk can also be situational, and injury can happen when you least expect it. McGill says you're especially vulnerable at these times:

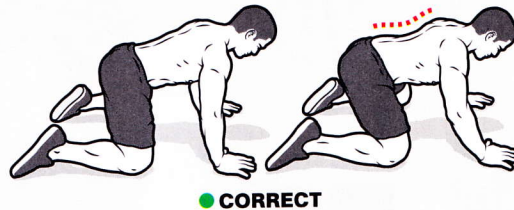
▶ First thing in the morning. After eight hours in bed, your disks will hold more water than usual. That means there's more pressure within the disks, making them ripe to bulge. Wait at least an hour before you do anything that requires lifting or bending.

▶ When you sneeze. Most of us instinctively bend over to sneeze, which puts the lower back into a compromised position. The propulsive force of the sneeze can then

How Deep Should You Squat? Use the hip rock-back test to find out.

Start on all fours with your knees a few inches apart and lower back naturally arched. Slowly push your hips back until you feel movement in your lower back, a sign that you're losing that arch. Return to the start. Spread your knees

wider and repeat. Keep going until you find the position that allows the deepest range of motion without any change in your lower back. Try it again with your feet angled out to see if you can go even deeper. Apply that position to your squat.

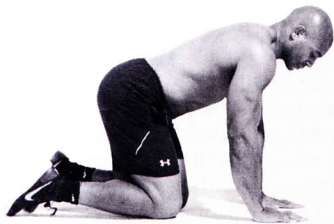


Your Back Pain Prescription



If you don't have back pain now, just wait—chances are you will. Unless, of course, you learn to love these four moves. Stuart McGill, Ph.D., the author of *Back Mechanic*, says they can boost core strength and endurance, reduce pain, and prevent injury.

DIRECTIONS Perform the four moves daily. For the bird dog, curlup, and side plank: Do 6 reps (per side, if applicable), rest 30 seconds, then 4 reps, rest 30 seconds, then 2 reps. Then move on to the next exercise. End by doing 1 squat with good form.



Bird Dog

Get on your hands and knees with your hips and knees bent 90 degrees. Lift your right leg and left hand; keep your raised foot and heel pointing back and away directly behind you, and your raised hand directly in front of you. Both limbs should be perfectly parallel and aligned with your torso. Hold the position for 10 seconds; then return to the starting position. Do all your reps and repeat with your left leg and right hand.



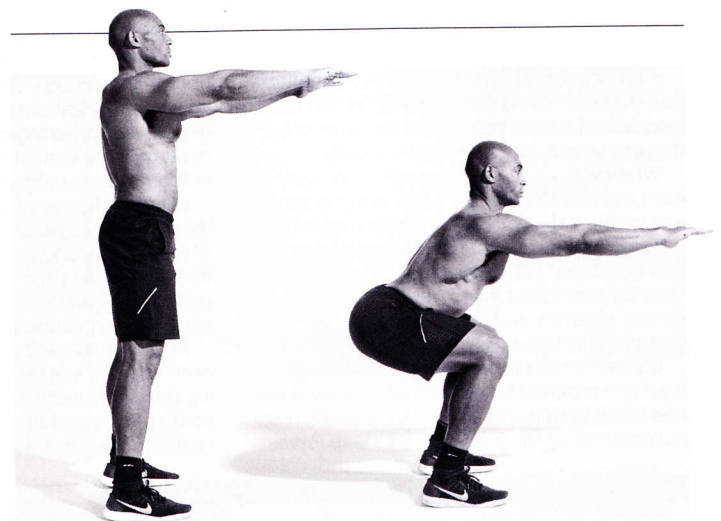
The Curlup

Lie on your back. Bend one knee so your foot is flat on the floor, and place your hands (palms down) beneath your lower back. Raise your elbows slightly and brace your core. Lift your head, neck, and shoulders simultaneously an inch or two off the floor. Hold the position for 10 seconds; then lower. That's 1 rep. Do half your reps, switch legs, and do the rest.



Side Plank

Lie on the floor on your left side. Prop yourself up on your left elbow and feet. Your top foot should be on the floor directly forward of your bottom foot. Place your right hand on your left shoulder and make sure your hips are pushed forward throughout. Hold the position for 10 seconds; then lower your hips. That's 1 rep. Do all your reps and repeat on your other side.



Squat

Stand tall with your arms outstretched. Push your hips back, bend your knees, and lower your torso. Keep your back straight throughout the descent. Now relax and sink into the bottom of the squat for a few seconds. Begin building tension in your back to straighten it, and then push back up.

Trainer: Stuart McGill, Ph.D.
Time: 15 minutes
Do It: Daily

Grooming: Nicole Wooler/True Beauty Marks (workouts); FINN O'HARA (inset)
MATTI MARTEL (DVD cover)