Knee Deep in Yoga

Yoga can be a source of knee pain or the ideal therapy. Here's a primer on keeping the joint healthy on and off the mat.

By Catherine Guthrie

The chorus of pops emanating from Kyle Ray's knee was his first clue that his body wasn't happy in Padmasana (Lotus Pose). It was the end of a relaxing yoga class in Louisville, Kentucky, and the teacher had instructed everyone to assume a seated position for some chanting. Sure, Ray's knees had acted up on occasion, but he'd gotten himself into Lotus before and was confident he could do it again. He slowly nestled his left ankle into the crook of his hip. Then, grabbing his right calf, he used his arm strength to muscle the top leg into position.

"The noise was awful," says Ray, 31. A second later, a quick, sharp pain shot through his knee. He gingerly unfolded his legs. After class, it was all he could do to hobble home and place an ice pack on the swelling joint. It took six months for him to be able to walk without pain. Although his knee pain did subside, Ray still frets about the stability of his knees and generally avoids knee-taxing postures like Virasana (Hero Pose).

There's no doubt that yoga asks much of the knees. Done properly, asana practice can shore them up to prevent injuries and slow the progression of some musculoskeletal diseases, but practiced without mindfulness, it spells disaster for these joints. Clearly, there are just as many people who credit yoga with rehabilitating weak knees as there are determined yogis like Ray, who will themselves into complex poses and pay a big price for overdoing it. But in poses like Supta Virasana (Reclining Hero Pose), in which the knees can feel pushed to the edge, it's sometimes hard to know if you're helping or hurting them. So what's a yoga practitioner who's concerned about protecting the knees to do? Nothing can replace the guidance of an experienced teacher, but certain principles can guide you into a safe, beneficial practice.

Weak in the Knees

The knee marks the meeting place of three bones: the shinbone (tibia), the thighbone (femur), and the kneecap (patella). Two crescent-shaped pads of cartilage, each called a meniscus, sit between the shinbone and the thighbone and act as cushions between the bones and shock absorbers during movement. Two sets of ligaments—the cruciates and the collaterals—strap all three bones in place. The cruciates crisscross below the kneecap; the collaterals run alongside the outside of the kneecap. The leg's substantial muscles help these ligaments keep the bones properly aligned.

Unfortunately, the knee's mechanics are better suited to chasing animals for dinner than to sliding into second base, says Stephen Messier, professor of health and exercise science at Wake Forest University in Winston-Salem, North Carolina. "We weren't designed to do the things we do with our bodies nowadays," he explains. "The knee's engineering isn't the greatest."

And it shows: Every year, nearly 11 million Americans complain to doctors about knee pain. Orthopedic surgeons operate more often on the knees than on any other body part; they performed more than 1.2 million such surgeries in 1996 alone (the latest year for which figures were kept).

Roughly 21 million Americans have osteoarthritis of the knee—a degenerative disease in which the cartilage gradually decays and fails to provide the shock-absorbent padding that cushions the bones. Many older people suffer from this painful arthritic condition; age is considered a risk factor, as are obesity and knee injuries.

For years, experts have touted leg strength as one of the best ways to ward off knee problems, including osteoarthritis. This is because the knee's key muscular supports are the hamstrings—which run from the base of the pelvis down the back of the leg to just below the knee—and the quadriceps, the four muscles on the front of the thigh that (among other things) extend a bent leg. At the first sign of the disease, doctors often instruct their patients to build muscle tone and develop flexibility in the legs so as to delay cartilage deterioration and subdue pain.

But the findings of a study published in the Annals of Internal Medicine in April 2003 indicate that in some cases, building leg strength doesn't slow the disease's progression—in fact, it hastens it. Researchers tested 230 volunteers with osteoarthritis of the knee for quadriceps strength and knee alignment, and then retested them 18 months later. The results surprised the medical community: Many volunteers with strong quads also showed rapid cartilage deterioration. But there was a catch—many of those who had strong quads and experienced a rapid progression of the disease also had misaligned kneecaps, a small but significant impairment that intensifies pressure on the cartilage.

You don't even have to suffer from osteoarthritis for misalignment to cause problems in your knees. In fact, Messier says, "misalignment can cause injury and osteoarthritis over long periods of time, especially if you have stronger muscles that are directing the forces improperly." If the muscular contraction between the two sides of the knee isn't balanced, the knee rotates as it bends, which makes the joint pull toward the stronger muscle. Over time, this wears down one meniscus faster than the other and eventually damages the bone the cartilage protects.

While the study points to the problems created by building uneven leg strength, Messier is concerned that its findings will be misinterpreted. "The last thing we want to do is discourage people from getting stronger," he says. What the study actually highlights is the importance of evenly building the leg muscles to keep the joint properly aligned—a task for which yoga is perfect.

One of the Best Antidotes

Whether you're out to guard against injury and disease or regain strength and flexibility after an injury, yoga can be a superb antidote to knee trouble. "Yoga is fantastic for the knees, especially for people recovering from damaged ligaments," says Michael Salveson, who has worked on dozens of yoga students during his 33-year tenure as a Rolfer in Berkeley, California. "Yoga increases the stabilizing action of the leg's big muscles." When the inner and outer quadriceps are equally strong, he adds, they exert an equal pull on the ligaments, which keeps the kneecap in alignment.

Sandy Blaine is a good example. As a teenager, she enjoyed dance and gymnastics. By her early 20s, she'd dislocated both knees on several occasions. Searching for a low-impact way to stabilize her joints, Blaine tried Iyengar Yoga when she was 26. She was initially surprised by the discipline's difficulty, yet what impressed her more was how remarkably good she felt afterward. Within six months of attending two to three Iyengar classes a week, Blaine found that her knee pain had vanished. Today, at 42, she still sounds as if she can't believe her knees are pain-free, calling the result "an absolute miracle."

"I was looking at a lifetime of being very constrained," says Blaine, who is now an instructor at the Yoga Room in Berkeley and regularly conducts workshops on yoga and knee health. Regaining healthy knees "was an incredible relief," she adds.

To evenly engage the leg muscles, Blaine does Utkatasana (Chair Pose) with her back against a wall. She focuses on lifting her toes and pressing down evenly through all four corners of her feet. Otherwise, the outer quadriceps do all the work and old patterns are reinforced, she explains. Another way Blaine works on equalizing muscle use is by balancing on one foot with her eyes closed. "Without the orientation of the eyes, your feet and ankles have to find a true alignment to come into balance," she says.

Robust ligaments are also essential for healthy knees. Less elastic than muscles and tendons, ligaments can give a little and bounce back to their original shape. But trouble brews when they stretch too far: Like a rubber band that's lost its snap, they lose their shape, leaving the joint loose. Salveson, who is also an instructor at the Rolf Institute in Boulder, Colorado, compares the microtears a ligament sustains in an injury to frays in a rope; when a few strands snap, the rope lengthens. After a torn ligament heals, one side may always be a little longer and, therefore, more susceptible to reinjury. "You can make it stronger," he says, "but you can't make it shorter."

Knee experts are actually divided about whether ligaments can be strengthened. "We know that you can increase muscle and bone strength," says Angela Smith, M.D., a clinical associate professor of orthopedic surgery at the University of Pennsylvania School of Medicine. "Intuitively, we think that the other structures of the knee—ligaments and tendons—get stronger as well."

Blane, for one, is convinced that years of Iyengar Yoga have toned her knee ligaments. "At first, my feet, ankles, and knees were so weak that the standing poses were sheer torture," she says. "My ligaments and muscles were strong on the outer leg and weak on the inner leg, which pulled the knee joint to the side. Yoga helped me strengthen those weak areas. It taught me how not to go with the path of least resistance." Her ligaments used to be so weak that she once dislocated her kneecap tripping on a curb. But since committing herself to a regular yoga practice, she hasn't suffered a knee injury in years.

You also can't overlook the role of the joint's supple cartilage in supporting the knee. Without regular use, the cartilage protecting the knee joint becomes dry and brittle, making it vulnerable to decay. "Cartilage is like a sponge," says William Roberts, M.D., president-elect of the American College of Sports Medicine and associate professor of family medicine at the University of Minnesota. "When you exercise, you squeeze the sponge, which allows it to soak up nutrients."

If you've ever struggled to sit between your heels in Virasana or cross your legs into Padmasana, you've probably felt a twinge in your knee joint. While most yoga instructors agree that sharp pain is a one-way ticket out of any pose, the answer to the bigger question of how much (if any) sensation is OK is less obvious. Roberts recommends stretching muscles, not ligaments. "Tension in the muscle is fine. Sensation directly above the kneecap is not a problem," he says. "But if the tension is on the sides of the knees, I'd back off."

Some yoga teachers, however, consider Robert's warning too conservative. "It's a controversial issue," Blaine admits. "At some point, you're going to have some sensation." She advises her students to breathe through the mild sensation of stretching but to immediately come out of any posture that becomes painful.

Joni Yecalsik, a yoga practitioner since 1970, discovered Iyengar Yoga in 1988 while recovering from a torn meniscus. She now teaches Iyengar classes in Hoboken, New Jersey, and encourages her students to tune in to the subtle differences between a sensation in the joint itself and one in the muscle and to avoid anything that irritates the knee joint. "You should feel an opening sensation in the belly of the muscle," she says, "but you don't want to strain the tendons or ligaments."

A focus on body awareness and allowing slow, deep openings make certain forms of yoga ideal for students recovering from knee injuries. These include Iyengar and Anusara (which focus on attention to detail) and Kripalu and Viniyoga (which focus on gentle compassion and healing). If you're recovering from a knee injury or surgery, you might want to steer clear of practices that involve a lot of athleticism and quick transitions between asanas until your recovery is complete.

Regardless of the style you choose, make sure the teacher is knowledgeable about knees and willing to see you through the recovery process. Try to move toward a tough pose with patience and compassion for yourself and with the attitude that getting into the final pose is only the icing on the cake. Then, when you get there, your knees will be as happy as you are.

7 Ways to Protect Your Knees in Yoga

1. Avoid hyperextending. When joints are overly mobile and flex too far back, they're hyperextended. In the knees, hyperextension often occurs in poses in which the legs are straightened, such as Trikonasana (Triangle Pose) and Paschimottanasana (Seated Forward Bend), putting an unhealthy tension on the ligaments. If you're prone to hyperextension, keep a slight bend in the knees during standing poses and keep your weight evenly distributed among the four corners of your feet. In seated forward bends, place a rolled-up sticky mat or towel under the knee of the extended leg or legs.
2. Start with your feet. Proper alignment through the feet is the key to building strength evenly in the ligaments on both sides of the knee; when all the ligaments are equally strong, the kneecap glides effortlessly up and down and the cartilage doesn't get worn down. Separate your toes and press actively through the four corners of your feet in every pose, even inversions. If your feet are out of alignment, your knees are going to suffer.

3. Keep your knees in line. When moving into deep knee bends, such as Virabhadrasana II (Warrior Pose II) and Parsvakonasana (Side Angle Pose), first align your bent knee over your ankle, then draw your kneecap in line with your second toe. Maintain awareness in your back foot, pressing down evenly, while lifting up from the arch of your front foot. "If you let the arch drop, the knee falls inside the big toe, and you're set up to suffer a number of different kinds of overuse and acute knee injuries," says Angela Smith, a professor of orthopedic surgery.
4. Tune in to subtle signals. "Oftentimes, the knees don't give immediate feedback," explains Iyengar teacher Joni Yecalsik. "Only later do you realize you've gone too far. When it comes to the knees, the sensation that would normally proceed the red flag is the red flag." If you feel achiness when you come out of a bent-knee pose, you may have worked too hard.
5. Build strength by balancing. Balancing poses, especially those that require moving through a bent standing leg, such as Garudasana (Eagle Pose), are especially beneficial. "Very dynamic balancing protects the knee against future injury by training the functional alignment, not just working the muscle," Smith says.
6. Be prop-friendly. When it comes to seated asanas, nothing makes a tight knee happier than a bounty of props. In Virasana (Hero Pose), try raising your seat with blankets or a block. Anytime the knees are deeply bent, such as in Balasana (Child's Pose) or Marichyasana III (Pose Dedicated to the Sage Marichi III), pressure can be relieved by placing a rolled-up washcloth as far into the knee pit as possible before bending the joint.
7. Warm up with hip openers. "If your big joints aren't open, your small joints will always take the stress," yoga instructor Sandy Blaine says. "Many people hurt their knees doing Lotus when their hips aren't ready." She recommends warming up with hip stretches like Baddha Konasana (Bound Angle Pose) and Gomukhasana (Cow Face Pose).