

BLOCK 23

Core Strengthening and Injury Prevention

When I was about 22 or 23 years old, it seemed as though I could train 500 miles per week, do week-long stage races, and ride my bike every day year-round without injury—unless I got caught in a crash. Now, at twice that age, I no longer can.

However, since cycling involves no pounding of your joints, injuries are minimized with proper equipment and preparation. That fact, and that you do not need a partner or a team to ride, makes cycling a perfect sport for maintaining health late into life, although it has become clear to me that if I want to be riding my bike reasonable distances at age 80, I must incorporate into my regular routine some strengthening of areas of my body that cycling does not develop. Massage, stretching, chiropractic, etc., (see Blocks 20 through 22) and bike positioning (see Blocks 1 through 13) all are important components of preventing cycling overuse injuries, but strengthening of noncycling muscles, particularly those in the body's core, is critical as well.

There are a number of ways to strengthen noncycling muscles. The two that I have settled on in my own life are crosstraining (participating in other sports that complement cycling by using different muscles) and regularly following an established exercise routine at home or while traveling that requires minimal equipment. Other important ways of accomplishing similar results are with weight training, yoga, Pilates, The Feldenkrais Method, martial arts, and other disciplines. And doing these things can make a huge difference not only for bike riders, but also for anyone who works at a sedentary job.

Abdominal (Core) Strengthening

I think that perhaps the most important thing cyclists can do to prevent overuse injuries is core strengthening. Cyclists probably complain most about lower-back pain, even more than they do about the discomfort of pressure from the saddle. As I discussed in Block 20, if not managed properly lower-back pain can become chronic due to the lower-spine's position and lack of movement while riding. Cycling strengthens the lower-back muscles and does absolutely nothing for the abdominal muscles. When the strong lower-back muscles tighten up and shorten with no muscles opposing them in front, the pelvis is pulled up in back, tipping it forward and arching the lower back to create the “proud butt” posture common to many cyclists.

Maintaining the mobility of the lower spine and strengthening the abdominal muscles are important to keep the lower back healthy. One way to accomplish this is to follow a regular routine of abdominal exercises. If the routine is simple and not time-intensive, you will tend to do it regularly. The more hassle, time, and transportation the routine requires (for instance, if you have to get to a health club to do it), the less likely you will be to maintain it as a regular practice.

One of the best ways to do core strengthening, I am told, is to use a large fit ball that you sit on as well as roll around on with your chest and back. I know many people who swear by fit balls for their back health. On a several occasions, I bought a ball and received an

exercise program with it; but I could never stick to it, partly because I kept popping the balls by letting them get too close to a hot heater. Additionally, I travel so much that I need a routine I can do anywhere without bringing a ball along. I have a program that I do on a carpet or floor pad on evenings when I am too tired to think constructively any more. I combine it with my stretching routine and find it to be a relaxing thing to do before going to bed.

A physical therapist can provide you with core strengthening exercises. There are a few that I find to be particularly useful. One is to lie flat on your back and contract your abdominal muscles so that the lower spine is pressed down against the floor. Then “step up and down” with the knees sharply bent. You can also alternately extend one leg while pulling the other up, as if you were pedaling in a prone position. Key to these exercises is keeping the lower spine pressed against the floor throughout the entire movement of the feet.

Another one (the “sit back”) is to sit up with the knees bent and slowly lower your rounded torso until your shoulder blades touch the floor, rolling one vertebra into contact with the floor at a time, starting with the sacrum.

Finally, the “pelvic clock” is a great one. While lying flat on your back with the knees bent, start with the tailbone pressed to the floor as your 12 o'clock reference position. Roll the contact point of the back with the floor slowly around from that reference point to one o'clock, two o'clock, etc., all the way around the clock face. You are simply pressing a different portion of your lower back down into contact with the floor to each hour position around this imaginary clock face. Do it clockwise as well as counterclockwise. The Feldenkrais Method would have you do the pelvic clock very slowly, almost imperceptibly slowly, to isolate each tiny muscle movement. This is the way to get the most out of the pelvic clock, but just doing it at all, at any speed, is useful, particularly when your back is so stiff and sore that it is hard to get up in the morning. Doing the pelvic clock before getting out of bed makes all the difference for me. You can also do the pelvic clock sitting in a level chair, where the contact points touching the hour positions around the face of the clock are under your butt and thighs rather than your lower back. Try it while working at your desk; your lower back will feel more mobile within a minute or two.

According to Toni Geer, a cycling physical therapist at the Boulder Center for Sports Medicine, “riders with poor core strength generally have more back problems. The abdominal muscles are hooked to the pelvis, and if the abs are well toned, you have better control over the angle of the pelvis. If you control the position of the pelvis, you control the vertebrae.”

Shoulder Exercises

As I mentioned in Block 20, the shoulders can hurt when cycling as they roll forward and pinch the shoulder tendons and ligaments between the acromion (the bony bump that is the end of the shoulder blade) and the top of the humerus. The key to counteracting this tendency, as Geer says, is to “put the scapula (shoulder blade) in your back pocket.”

Cycling strengthens and tightens the muscles at the front of the shoulders that hold you up, but it does nothing for the muscles of the mid-back. The trapezius muscles are responsible for pulling down on the shoulder blades, and if they are weak, the shoulder blades will slide upward and impinge on nerves, tendons, and ligaments as the shoulders roll forward to reach the handlebar. The same thing also occurs when sitting at a desk typing or clicking a mouse.

An effective and time-efficient method of getting your shoulder blades to pull back and down is to shrug your shoulders up, back, and down periodically while you sit at your desk. Stretching the shoulder muscles by grabbing the elbow with the opposite hand and pulling it across the chest at shoulder height helps relax the muscles that keep the shoulder blades pulled up tight. I also sit up periodically on the bike while I'm out riding and do both of these exercises (with the hands off the bars). Stretch the pectoral muscles by placing your hands on either side of a door frame and leaning forward; this relieves some pull on the shoulders.

At my desk, I keep a 10-foot piece of the wide rubber-band material called Thera-Band that physical therapists chop off of a big roll. It can be hooked on a doorknob, around a desk corner, or through a drawer handle on a file cabinet to do rowing exercises (see Photo 23.1) and lat (lateralis muscle) pull-downs while standing. To do pull-downs, extend the arms straight out in front of you (like Frankenstein) and hold the Thera-Band taut. Then pull your arms down to your sides. While sitting or standing, I do internal rotation (see Photo 23.2) and external rotation (see Photo 23.3) of the shoulders by pulling the band across my abdomen. These exercises encourage me to periodically move and stand up from my desk, which improves my productivity as well as my feeling of well-being.

If you are experiencing pain in the shoulders at the top of the humerus, you really need to focus on strengthening the lower- and mid-trapezius muscles; the exercises described above will bring the scapulas down and back and create space between the acromion and the head of the humerus, alleviating pressure on the tendon and ligament attachments. Raising your stem or riding a mountain bike, at least temporarily, will help as well, by allowing your shoulders to roll back a bit.

Geer says that the second most common cycling injury she sees and works to rehabilitate is patello-femoral pain—irritation between the patella (kneecap) and the femur, usually caused by poor tracking of the kneecap in its groove on the end of the femur. This is often called by the general term “chondromalacia,” referring to the irritation and deterioration of articular cartilage, in this case on the back of the kneecap.

Cycling tends to overdevelop the large outer thigh muscle of the quadriceps group (the vastus lateralis) relative to the smaller quadriceps muscle to the inside of the knee (the vastus medialis), resulting in the kneecap being pulled to the outside so it does not ride in its smooth groove on the end of the femur. It can get rubbed raw riding against the outer protruding knob on the end of the femur. This hurts—a lot.

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Part of the cure is to develop the vastus medialis to counterbalance the vastus lateralis and pull the kneecap back toward the inside. Leg extensions are a great way to do this.

You can do leg extensions on a leg extension machine at a gym with your foot pointed outward (so that if both legs were straight, heels together, your feet would make a V) to focus the work more on the vastus medialis. Cyclists should just do the last 15 degrees of extension. Geer, an avid cyclist herself, says, "A full extension tends to cause anterior knee pain (patello-femoral pain). Cyclists, being boneheads, will figure more is better and try to do the whole 90-degree extension. I do these very regularly and credit them with fixing my debilitating anterior knee pain. Technique is very important. It is a slow exercise with a *stop* at each end—hold two seconds when extended and then release all tension for two seconds when flexed."

Alternatively, when you are sitting or lying down, you can do leg extensions isometrically. With your leg supported behind the knee on a pillow or the edge of a chair, periodically straighten your leg (foot pointed out) and hold it straight for a number of seconds, contracting the vastus medialis muscle on inner side of the knee as hard as you can. Try to make that muscle rock hard, and then relax it.

Perineal Muscle Toning

As Dr. Robert West, designer of Selle San Marco's Aero line of saddles (the ones with an arrowhead-shaped cutout in the middle), says, "The human anatomy is not designed to straddle a bicycle saddle. A problem develops when the rider's weight compresses the erectile tissues against the top surface of the saddle. While seated on a conventional saddle, the rider incurs a compression injury with each turn of the crank, which is cumulative over time."

By now, most every male cyclist has heard of the possibility of impotency associated with sitting on a bike seat, and women do not need to be told how painful the soft tissue of the perineum (the soft tissue under the crotch) can become when compressed on the nose of a saddle either. However, this conversation always tends to start and end with a discussion of what saddle to buy. At least as important is the rider's fitness and overall position on the bike. The stronger the rider, the harder they pedal and the less weight is carried on the saddle.

But there is an exercise for cyclists, which I have never heard anyone (other than me) talk about, that makes sense as another exercise to balance cycling's compressive effects. That is exercising the muscles of the perineum. Everybody knows that as we age, our tissues become less elastic, and that also applies to the arteries under the crotch. It seems to me that if the muscles surrounding these arteries are flaccid, the artery walls will collapse more easily.

When my wife was pregnant, her midwives had her do Kegel exercises to tone her perineal muscles. To do this exercise, you repeatedly contract the same muscles that you use to shut off your flow of urine. No matter what saddle you use, doing a lot of Kegels on a regular basis has to be good for your circulation, muscle tone, and nerve function. I just do them whenever I think about it—while sitting at my desk, driving, stretching, or reading.

Crosstraining

It is possible to have too much of a good thing. Doing any athletic activity to the exclusion of all others tends to create muscle imbalances as well as a feeling of staleness. To balance muscle tone and keep the body healthy, as well as to stay mentally fresh, do other sports.

To get the most benefit from your overall physical health, select activities that strengthen body parts that cycling does not.

There are myriad sports that complement cycling well. Weight training, yoga, Pilates, The Feldenkrais Method, and other practices can be designed specifically to balance cycling muscles. Rock climbing and swimming build the upper body well. And any movement off a bike saddle that gets your blood pumping helps regenerate tissues damaged by compression from the saddle.

I recommend looking for sports that you love and that work your upper body and core muscles. I break up my cycling with cross-country skiing in the winter and early spring and with white-water kayaking in the late spring, summer, and fall. The poling action of Nordic skiing, particularly the powerful double-poling you constantly use when racing, demands abdominal strength and builds the mid- and lower-trapezius muscles. And after months of skiing, I am really eager to get back on my bike, rather than being burned out from having bundled up daily through the winter and faced the cold on my bike, or, heaven forbid, having ridden on an indoor trainer!

White-water kayaking also obviously works the upper body, but the abdominal workout that comes with it may not be as evident. Proper paddling technique involves using your core strength more than your arms to power the boat forward or backward. But even more important is the abdominal muscle control required to present the proper angulation of the boat to the current to avoid getting flipped over. When you are spinning around in a “hole” (a recirculating hydraulic feature), your abdominal muscles are working hard and fast to tip the boat first onto one edge and then the other. A couple hours of that and you will feel like you have been doing sit-ups all day!

I grew up alpine (downhill) skiing and hiking and still love doing both. Even though, like cycling, they tend to primarily work the quads and lower back, they do offer crosstraining benefits as well as a break from sitting on a bike seat and a healthy change of scenery. Says Geer, “In keeping a training log, I ‘discount’ the hours and count a full day of alpine skiing or hiking as two hours of training. Depending on how you ski, alpine skiing can be a fantastic core strength exercise. Carving on modern shaped skis requires strong back and abdominal muscles. Furthermore, during a carved turn the quads and hamstrings contract simultaneously and extremely forcefully. The hamstring force actually equals the quad contraction—this provides stability.”

To enjoy cycling more and to enjoy the rest of your life, I can’t emphasize enough the importance of crosstraining and strengthening of core muscles and other noncycling muscles. 

The Boulder Center for Sports Medicine is online at www.bch.org/sportsmedicine.