

Physical Therapist's Guide to Anterior Cruciate Ligament (ACL) Tear

An anterior cruciate ligament (ACL) tear is an injury to the knee commonly affecting soccer players, basketball players, skiers, gymnasts, and other athletes. About 70% of ACL tears are the result of non-contact injuries; 30% are the result of direct contact (player-to-player, player-to-object). Women are 4-6 times more likely than men to experience an ACL tear.

Usually, you will be examined by a physical therapist or an orthopedic surgeon immediately following injury. Most people who sustain an ACL tear will undergo surgery to repair the tear; however, some people may avoid surgery by modifying their physical activity so that they don't put a lot of stress on the knee. A select group can actually return to vigorous physical activity following rehabilitation without having surgery.

Your physical therapist, together with your surgeon, can help you determine if non-operative treatment (rehabilitation without surgery) is a reasonable option for you. If you elect to have surgery, your physical therapist will help you both prepare for surgery and recover your strength and movement following surgery.

What is an ACL Tear?

The ACL is one of the major ligaments (bands of tissue) connecting the thigh bone to the shin bone. It can tear if you:

- Twist your knee while keeping your foot planted on the ground
- Stop suddenly while running
- Suddenly shift your weight from one leg to the other
- Jump and land on an extended (straightened) knee
- Stretch the knee farther than you should
- Experience a direct hit to the knee



ACL Attachment:

How Does it Feel?

When you tear the ACL, you may feel a sharp, intense pain or hear a loud "pop" or snap. You might not be able to walk on the injured leg because you can't support your weight through your knee joint. Usually, the knee will swell immediately (within minutes to a few hours), and you might feel that your knee "gives way" when you walk or put weight on it.

How Is It Diagnosed?

If you see your physical therapist first, your therapist will conduct a thorough evaluation that includes reviewing your health history. Your therapist will ask you whether you:

- Felt pain or heard a pop when you jumped, stopped quickly when running, turned your leg with your foot on the ground, or stretched your knee farther than usual
- Had a direct hit to the leg while your foot was planted on the ground
- Saw severe swelling around the knee in the first 2-3 hours following the injury
- Felt your knee buckling or giving way when you tried to get up from a chair, walk up and down stairs, or turn while walking

Your physical therapist also will perform special tests to help determine the likelihood that you have an ACL tear. For instance, the therapist may bend your knee and gently pull on the lower leg (called the "anterior drawer" test or the "Lachman" test). The therapist also might use the "pivot shift" test, gently bending and twisting your knee at the same time. (You might feel some discomfort or instability during these tests, which is normal.) Your therapist may use additional tests to assess possible damage to other parts of your knee.

The orthopedic surgeon may order further tests, including magnetic resonance imaging (MRI), to confirm the diagnosis and also to rule out other possible damage to the knee.

How Can a Physical Therapist Help?

Once an ACL tear has been diagnosed, you will work with your surgeon and physical therapist to decide if you should have surgery or if you can try to manage your recovery without surgery. If you don't have surgery, your therapist will work with you to restore your muscle strength, endurance, and coordination so that you can return to your regular activities. In some cases, the therapist may help you to learn to modify your physical activity so that you put less stress on your knee. If you decide to have surgery, your therapist can help you both before and after the procedure.

Treatment Without Surgery

Current research evidence has identified a specific group of patients (called "copers") who have the potential for success without surgery. These patients have injury only to the ACL, and no episodes of "giving way" since the initial injury. There are specific functional tests—such as the Knee Outcomes Survey, the Global Rating of Knee Function, and the timed hop test—that can help the physical therapist identify this group of patients. If you fall into this category, your physical therapist will design a specific physical therapy treatment program for you, most likely including electrical stimulation to the quadriceps muscle, cardiovascular strengthening, traditional muscle strengthening, and balance training.

Treatment Before Surgery

Some orthopedic surgeons refer their patients to a physical therapist for a short course of rehabilitation before surgery. Your therapist will help you decrease your swelling, increase the range of movement of your knee, and strengthen your thigh muscles (quadriceps).

You might have what is known as a "quadriceps lag." This is when you try to raise your leg straight in the air, but you can't control the knee, and your leg bends slightly. Research shows that improving this condition before surgery leads to better outcomes after surgery. Your therapist might use electrical stimulation to help you straighten your leg.

Treatment After Surgery

Your orthopedic surgeon will provide post surgery instructions. Physical therapists have developed and published guidelines on knee stability and movement problems, which recommend the following actions.

Bearing weight. Immediately after surgery, you will use crutches to walk. The amount of weight you are allowed to put on your leg and how long you use the crutches will depend on the type of reconstructive surgery you had. Your physical therapist will guide you through this part of your rehabilitation.

Icing and compression. Immediately after your surgery, your physical therapist will control your swelling with a cold application, such as an ice sleeve that fits around your knee and compresses it.

Bracing. Almost all surgeons will give you a brace to limit your knee movement (range of motion) after your surgery. Some will give you a brace to use during sports a little further along during your recovery. Your physical therapist will fit you with the brace and teach you how to use it safely.

Exercises to increase your ability to move. You will begin some exercises almost immediately following surgery. In the first week, your physical therapist will help you with your range of motion and teach you gentle exercises that you can do at home. The focus will be on regaining full movement of your knee. If you're like most people, this will take some time.

You will do exercises without pressure on your leg (called "non-weight-bearing exercises") and ones that have you placing weight on your leg ("weight-bearing exercises"). These exercises might be limited to a specific range of motion to protect your newly healing ACL graft. Your therapist might use electrical stimulation to help restore your quadriceps (thigh) muscle strength and help you achieve those last few degrees of straightening the knee.

Exercises to increase your strength. In the first 4 weeks after surgery, your physical therapist will help you increase your ability to put weight on your knee, using a combination of weight-bearing and non-weight-bearing exercises. The exercises will focus on your quadriceps and hamstrings (thigh muscles) and might be limited to a specific range of motion to protect the new ACL. Your therapist might use electrical stimulation to help restore your quadriceps strength.

During weeks 5 through 12, you can expect to begin to walk without crutches and regain a normal walking pattern. Your therapist will increase the intensity of your exercises and add balance exercises to your program. After 3-4 months, your thigh muscles should have about 75% of the strength of the muscles on your uninjured side. During this time, you and your therapist will be planning your return to higher-level activity.

Return to your sport or physical activity. You may begin balance exercises, running, jumping, hopping, and other exercises specific to your sport. This phase varies greatly from person to person. One study found that the return to moderate and strenuous sports varied between 6 and 12 months after surgery. You might be ready to return to your sport if:

- You no longer have pain and swelling
- You have no feelings of instability during sport-specific activities, such as cutting, jumping, and landing
- Your quadriceps strength is 90% of that on your uninjured side
- Your performance of the 1-legged hop test is at 90% of that on the uninjured side

Remember, each surgeon might have a specific plan for you; these are only broad guidelines describing what you might expect for your recovery.

Can this Injury or Condition be Prevented?

Current research shows that the percentage of ACL tears has been reduced in certain populations. Much of the research on ACL tears has been conducted with female collegiate athletes, because women are 4-6 times more likely to have this injury. Researchers have made the following recommendations for a preventive exercise program:

- The program should be designed to improve balance, strength, and sports performance. Strengthening your core (abdominal) muscles is key to preventing injury, in addition to strengthening your thigh and leg muscles.
- Exercises should be done 2 or 3 times per week and should include sport-specific exercises.
- The program should last no fewer than 6 weeks.

Although most exercise studies have been conducted with female athletes, the findings may benefit male athletes as well.

Real Life Experiences

Anita is a star college basketball player—until she comes down from a rebound and feels a pop in her knee and can no longer stand on it. She's taken to the training room, where the physical therapist conducts an evaluation, including the Lachman and anterior drawer tests. The results of both tests are positive, and the therapist notices an increase in her swelling just in the 30 minutes that she spends in the training room. He suspects an ACL tear and refers her to an orthopedic surgeon. As the physical therapist suspected, Anita is diagnosed with an ACL tear.

After a short course of treatment by a physical therapist, Anita has surgery the following month. After surgery, she returns to her physical therapist and begins her rehabilitation. After 5 weeks, she is able to walk normally, fully extending her knee with no pain or feelings of instability. During the next 2 months, she visits her physical therapist 2 times a week and works on her strength and balance. She finds that the hardest exercises are the balance exercises, which require her to balance on a piece of foam or a rocker board while throwing a ball.

About 4 months after surgery, Anita is allowed to begin jogging, then running; at 5 months, she starts exercises that involve jumping up and down or that mimic basketball activities such as rebounding. During these activities, the therapist has Anita concentrate on proper landing techniques so that she lessens the chance of reinjuring her knee when she returns to play.

After 8 months, Anita is allowed to practice with her team. She has no problems with her knee following surgery and returns to competition 11 months after her surgery.

What Kind of Physical Therapist Do I Need?

Although all physical therapists are prepared through education and experience to treat a variety of conditions or injuries, you may want to consider:

- A physical therapist who is experienced in treating people with orthopedic, or musculoskeletal, problems.
- A physical therapist who is a board-certified clinical specialist or who has completed a residency or fellowship in orthopedic physical therapy has advanced knowledge, experience, and skills that may apply to your condition.

You can find physical therapists with these and other credentials by using [Find a PT](#), the online tool built by the American Physical Therapy Association [www.APTA.org] to help you search for physical therapists with specific clinical expertise in your geographic area.

General tips when you're looking for a physical therapist:

- Get recommendations from family and friends or from other health care providers.
- When you contact a physical therapy clinic for an appointment, ask about the physical therapist's experience in helping people with ACL tears.

During your first visit with the physical therapist, be prepared to describe your symptoms in as much detail as possible, and say what makes your symptoms worse.

Further Reading

The American Physical Therapy Association (APTA) believes that consumers should have access to information that could help them make health care decisions and also prepare them for their visit with their health care provider.

The following articles provide some of the best scientific evidence related to physical therapy treatment of ACL tears. The articles report recent research and give an overview of the standards of practice for treatment both in the United States and internationally. The article titles are listed by year and are linked either to a PubMed* abstract of the article or to free access of the full article, so that you can read it or print out a copy to bring with you to your health care provider.

Ritter RC, Axe MJ, Godges JJ, Logerstedt DS, Snyder-Mackler L. Knee stability and movement coordination impairments: knee ligament sprain. *J Orthop Sports Phys Ther.* 2010;40:A1-A37. [Free Article.](#)

Eitzen I, Moksnes H, Snyder-Mackler L, Risberg MA. A progressive 5-week exercise therapy program leads to significant improvement in knee function early after anterior cruciate ligament injury. *J Orthop Sports Phys Ther.* 2010;40:705-721. [Free Article.](#)

Risberg MA, Holm I. The long-term effect of 2 postoperative rehabilitation programs after anterior cruciate ligament reconstruction: a randomized controlled clinical trial with 2 years of follow-up. *Am J Sports Med.* 2009;37:1958-1966. Epub 2009 Jun 25. [Free Article.](#)

Hurd WJ, Axe MJ, Snyder-Mackler L. A 10-year prospective trial of a patient management algorithm and screening examination for highly active individuals with anterior cruciate ligament injury: Part 1, outcomes. *Am J Sports Med.* 2008;36:40-47. Epub 2007 Oct 16. [Free Article.](#)

Benjaminse A, Gokeler A, van der Schans CP. Clinical diagnosis of an anterior cruciate ligament rupture: a meta-analysis. *J Orthop Sports Phys Ther.* 2006;36:267-288. [Article Summary on PubMed.](#)

Hewett TE, Ford KR, Myer GD. Anterior cruciate ligament injuries in female athletes: part 2, a meta-analysis of neuromuscular interventions aimed at injury prevention. *Am J Sports Med.* 2006;34:490-498. [Article Summary on PubMed.](#)

Beynon BD, Johnson RJ, Abate JA, Fleming BC, Nichol CE. Treatment of anterior cruciate ligament injuries, part 2. *Am J Sports Med.* 2005;33:1751-1767. Article [Summary on PubMed.](#)

Fitzgerald GK, Piva SR, Irrgang JJ. A modified neuromuscular electrical stimulation protocol for quadriceps strength training following anterior cruciate ligament reconstruction. *J Orthop Sports Phys Ther.* 2003;33:492-501. [Article Summary on PubMed.](#)

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