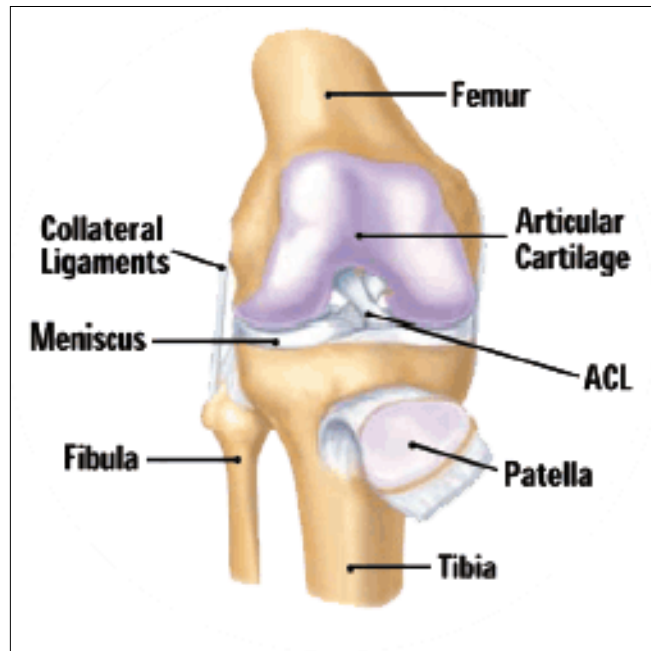




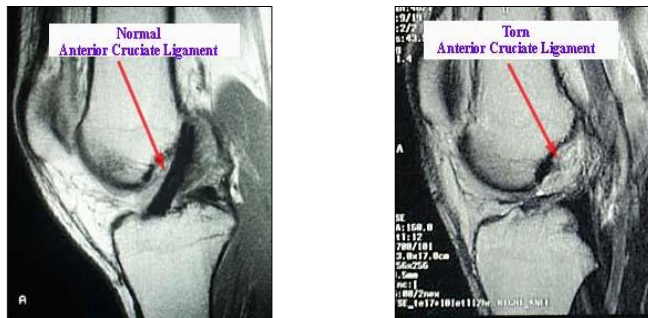
Suzanne L. Miller, MD



ANTERIOR CRUCIATE LIGAMENT INFORMATION PACKET

PATIENT INFORMATION SHEET: ACL INJURY

The anterior cruciate ligament or ACL is one of the major ligaments located in the knee joint. This ligament serves to stabilize the knee permitting us to run, jump and participate in sports. ACL injuries often occur during sports such as basketball or soccer which require cutting and pivoting movements. These actions could result in an ACL tear. Contact injuries such as a football player making contact with the knee of another football player during a tackle may also result in an ACL tear. The external force on the knee may be so overwhelming that other structures may be injured along with the ACL including the medial collateral ligament, or the medial or lateral meniscus



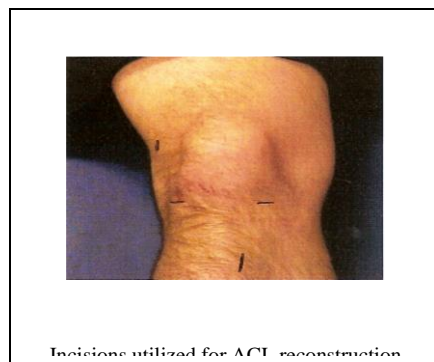
Magnetic Resonance Imaging (MRI) of a normal and torn ACL

Initial Injury:

During the initial injury, patients often report a sensation of leg buckling or giving way. You may even hear a “pop” from the knee joint. Patients are seldom able to continue with the activity or sport they were playing. Often the joint will swell within hours of the injury producing an enlarged and tender joint. Treatment at this time consists of rest, elevation, ice, compression and possibly crutches for ambulation. Your orthopedic surgeon will conduct a physical examination and utilize x-rays and MRI to confirm an ACL tear. The MRI is also useful to diagnose any associated injuries to the knee.

ACL Reconstruction Surgery:

Unfortunately, a completely torn ACL does not heal and must be either reconstructed or left deficient. The knee can function without an ACL. For the younger or active patient who seeks to return to an active lifestyle including playing sports, the ACL should be reconstructed to avoid further knee injury. Less active patients whose leg remains stable after injury may opt not to have their ACL reconstructed. These patients may however, be putting other stabilizers of the knee (meniscus) at risk due to the inherent instability of the ACL deficient knee. Once surgical reconstruction is selected, your surgeon will discuss what type of graft will be utilized to replace the ACL. In the United States, the most common grafts are; patella tendon, hamstring tendon and allograft (donated tissue). Each graft has specific benefits and drawbacks, which will be discussed in detail in the office with Dr. Miller.



Pre-surgery:

Before surgery, patients are instructed to continue to be as active as the knee permits, excluding participation in sports. It is essential to have full knee range of motion and good muscle strength prior to ACL surgery. Physical therapy may be required to achieve this goal.

- On the night before surgery, do not eat after midnight (no chewing gum or lozenges)
- On the morning of the surgery you may have your daily pills with a sip of water
- Your surgical time will be confirmed the day before the surgery by the surgery center or hospital. The original time may be adjusted based on patient needs and equipment availability
- Patients should bring their MRI and X-rays to the surgery
- If the surgery is done at our Waltham facility, the person who is accompanying you is welcome to a free one-day gym pass

Surgery:

The length of the procedure is approximately 90 minutes. This may be longer depending on type of graft used and whether there is other associated injuries such as a meniscal tear. Your nurse will bring you into the pre-op area where you will have an IV placed and meet with your anesthesiologist. General anesthesia is utilized to assure a comfortable surgery. This means that you will be “asleep” and completely unaware of the surgery until you wake up in the recovery area. Most patients will have a small tube placed in their windpipe, formal intubation may not be required. Local blocks are also available to supplement pain control. Your anesthesiologist will discuss this with you prior to surgery. The surgery is conducted with arthroscopic equipment. This means that we will use a small camera and small equipment through little incisions to reconstruct the ACL. **The procedure is also available to view online at www.bostonssc.com**

Post-surgery:

After the surgery is completed, you will awaken in the operating room and be moved to the recovery area. After surgery, most patients generally recover smoothly and have minimal pain due to local pain medication that is used at the completion of the surgery.

- **Bracing:** At the completion of surgery, you will have a brace placed on your leg. The brace should be locked in extension at all times except you can remove your brace while using your CPM machine, performing physical therapy, and for personal hygiene matters (showering and bathroom needs). You should sleep with the brace on until seen in your follow-up appointment.



POST-OPERATIVE INSTRUCTION SHEET

POST-OP MEDICATIONS:

- You were given a prescription for **pain medication**. Take this as directed until the pain is minimal at which time you may switch to over-the-counter medications, such as Tylenol
- You should take a **stool softener** while on pain medication, as these may cause constipation. Peri-Colace can be purchased over-the-counter and taken twice daily
- Anti-coagulation is critical to minimize the risk of a DVT (or blood clot). We recommend you take Aspirin 325mg twice daily as a precaution unless instructed otherwise.

ICE:

- An ice device or ice bag (not directly touching the skin) should be utilized to reduce swelling and pain. Please ice every 3-4 hours for about 15-20 minutes each time until swelling subsides

BRACE:

- You have been given a knee brace. This should remain on and **locked** until you are otherwise directed by the doctor at your post-op visit. It may be removed for dressing, bathing, and using your CPM machine. This brace is essential to protect your new ACL while your leg is weak

AMBULATION:

- You may weight bear as tolerated after surgery with two crutches unless otherwise instructed. Wean off your crutches as you feel comfortable with the brace on and locked. **EXCEPTION:** If you had a **meniscal repair** (as opposed to a meniscectomy) your weight bearing status may change. This will be discussed with you prior to discharge. Usually crutches are used for up to 3 week or until you are comfortable.

WOUND CARE:

- Leave your surgical dressing on for the first 2 days. After 2 days, you may remove your dressing and shower. Incisions may get wet but do not soak them and dry it off well after. You may put a sterile dry dressing/gauze back over the incisions or even a Band-Aid.

FOLLOW UP VISIT:

- If you do not already have a follow-up visit scheduled then please call 617-264-1100 to schedule one within 10-14 days. Your sutures will be removed at this visit.

PHYSICAL THERAPY:

- Please arrange to start PT the week following ACL surgery. You do not need to see the doctor prior to starting PT. A prescription and a PT protocol will be left for you prior to discharge.

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REHABILITATION

- You will need to plan on devoting time to physical therapy following your surgery. PT should start the week after surgery. You will schedule these appointments on your own. For the first 4-6 weeks, you will attend outpatient PT sessions once or twice a week. After that, you will attend two-three sessions a week for up to six months, depending on your progress and access to exercise equipment. Once PT has discharged you, you should continue with a home exercise program 2-3 times a week. Exercising will help maintain strength and flexibility.
- Limit your activities according to the advice of your physical therapist or doctor. Vigorous sporting activities and contact sports should be avoided for at least 4-6 months after surgery. Your doctor and physical therapist will give you balance and coordination exercises to see if you are ready to return to sports. This will be the final phase of your rehab program.

All of the exercises below should be performed while wearing your knee brace, unless your doctor or physical therapist tells you otherwise

Early Post-operative Exercises

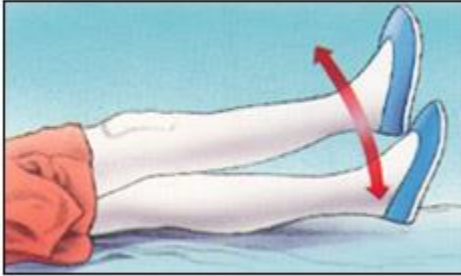
Start the following exercises as soon as you are able. You can begin these immediately after surgery. You may feel uncomfortable at first, but these exercises will speed your recovery and actually diminish your post-operative pain.

CONTINUOUS PASSIVE MOTION (CPM) MACHINE: You may have been prescribed a CPM machine for use at home to assist with bending of your knee. This is to promote early passive motion and to prevent stiffness. This can be started immediately after surgery and is typically used for the first week or two or until you have achieved 90 degrees of flexion or more. (Limit flexion to 90 degrees if you had a meniscal repair).

- When using the CPM machine, drain the ice device (or remove the bag of ice) and unlock the brace.
- The CPM machine should be used **three times a day, one to two hours at a time, for a total of up to six hours a day.**
- Begin at 30 degrees of flexion and continue to increase by 5-10 degrees each day up to 90 degrees of flexion, or as directed by your doctor.
- Re-apply the ice device or the bag of ice after each CPM session.

***Please do the following exercises three times a day.**

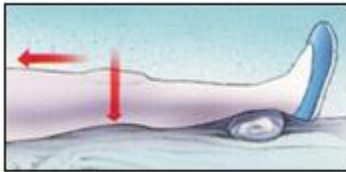
Quad Sets - Tighten your thigh muscle. Try to straighten your knee. Hold for 5 to 10 seconds. Repeat this exercise approximately 10 times during a two minute period, rest one minute and repeat.



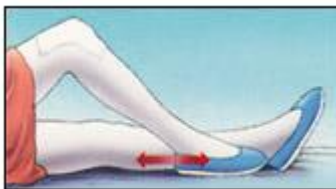
Straight Leg Raises - Tighten the thigh muscle with your knee fully (**with your knee brace locked**) straightened on the bed, as with the Quad set. Lift your leg several inches. Hold for five to 10 seconds. Slowly lower. Repeat until your thigh feels fatigued.



Ankle Pumps - Move your foot up and down rhythmically by contracting the calf and shin muscles. Perform this exercise periodically for two to three minutes, two or three times an hour in the recovery room. Continue this exercise until you are fully recovered and all ankle and lower-leg swelling has subsided.



Knee Straightening Exercises - Place a small rolled towel just above your heel so that it is not touching the bed. Tighten your thigh. Try to fully straighten your knee and to touch the back of your knee to the bed. Hold fully straightened for five to 10 seconds. Repeat until your thigh feels fatigued.



Bed-Supported Knee Bends - Bend your knee as much as possible while sliding (**with your knee brace unlocked**) your foot on the bed. Hold your knee in a maximally bent position for 5 to 10 seconds and then straighten. Repeat several times until your leg feels fatigued or until you can completely bend your knee.

THINGS TO REMEMBER:

- Do not forcibly bend your knee for the first six weeks from surgery.
- Do not hold your breath while doing any of these exercises
- Remove throw rugs and tack down loose carpeting in your home. Be careful of small children, pets, and any spills on the floor. All of these things may cause you to lose your balance and fall.
- When walking outdoors be careful of wet walkways, debris, and snow or ice adhering to the bottom of your crutches.

FREQUENTLY ASKED QUESTIONS:

When do I have to wear the brace and for how long?

The brace should be worn at all times except for bathing and dressing. You should wear it while sleeping and it should be locked when ambulating. The length of time you will need to be the brace depends on how fast you regain quadriceps strength and control. This will be decided at your first post-op visit.

How long will I need to be in Physical Therapy?

This is variable and depends on the patient. You should begin the week following surgery and in general, you should expect to be in PT for about 3-6 months. The specific PT program and goals will be per Dr. Miller's protocol. You will be provided with a prescription for PT and you can choose a facility that is a convenient location for you.

When can I drive?

If you had surgery on your left knee then you may return to driving once you are off the crutches and off the narcotic pain medication. If you had surgery on your right knee (or if you drive a standard transmission) then you should wait at least 4-6 weeks before you drive to fully regain control of your leg/foot.

When can I return to sports?

Return to competitive level sports is usually at 6 months, depending on rehab and recovery.

What signs should I look for which would be suspicious of a blood clot?

Although a blood clot is unlikely if you are taking the blood thinner as recommended, it is not impossible. If you develop ANY calf pain/swelling or shortness of breath please contact our office immediately.

What signs should I look for that is suggestive of an infection?

Infection is not a common complication after this surgery but if you develop a fever of >102 degrees or if there are signs of spreading redness or increased tenderness around the incision or any drainage (other than blood) through the bandages then please contact our office immediately at 617-264-1100.

REHABILITATION GUIDELINES AFTER ACL RECONSTRUCTION

Suzanne Miller, MD
Boston Sports & Shoulder Center
617-264-1100

The intent of this protocol is to provide the therapist with guidelines of the post-operative rehabilitation course after an ACL reconstruction. It should not be a substitute for one's clinical decision making regarding the progression of a patient's post-operative course based on their physical exam findings, individual progress, and/or the presence of post-operative complications. The therapist should consult the referring physician with any questions or concerns.

INDIVIDUAL CONSIDERATIONS:

PHASE I (0-2 weeks)

Goals

- Control inflammation and pain
- CPM increase to 90 degrees as tolerated
- Full active extension and 90 degrees of flexion
- Achieve quadriceps control

Brace

- Locked in extension for 1 week for ambulation
- Unlocked after post op visit for ambulation
- Sleep with brace locked in extension until first postoperative visit
- May remove for CPM and exercises except straight leg raises

Weight-Bearing Status

- WBAT with crutches
- Crutches can be discontinued when good quadriceps control and a normal gait is achieved (usually 2-4 weeks)

Therapeutic Exercises

- SLR in all planes (use brace locked in extension initially until quad strength is good enough to prevent an extension lag)
- Heel slides, calf pumps, quadriceps sets
- Electrical stimulation as needed
- Wall slides to 45 degrees
- Patellar mobilization
- Prone leg hangs

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- Proprioception with active and passive joint positioning
- Balancing activities on a stable platform with eyes open and closed

PHASE II (2- 6 weeks)

Criteria

- Good quad set, SLR without extension lag
- 90 degrees of knee flexion
- Full extension

Goals

- Restore normal gait
- Restore full range of motion
- Protect graft fixation

***Limit knee flexion to <90 degrees for 4 weeks in combined meniscal repairs*

Brace/Weight-bearing status

- Continue with full weight bearing
- May discontinue brace when normal gait pattern and quad control is achieved

***For patellar tendon autograft, use brace for 4 weeks*

Therapeutic Exercises

- Mini-squats (0-45 degrees)
- Stationary Bike (high seat, low tension)
- Prone leg hangs with ankle weights until extension is achieved
- Closed chain extension (leg press:0-45 degrees)
- Pool walking/jogging
- Stair climbing (up/down, forward, backwards), StairMaster
- Toe raises
- Hamstring and gastroc/soleus stretches
- Proprioception
 - Mini-tramp standing
 - Unstable platform (BAPS) with eyes open and closed
 - Standing ball throwing and catching

PHASE III (6 weeks-5 months)

Criteria

- Normal gait
- Full range of motion
- Sufficient strength and proprioception to initiate functional activities

Goals

- Improve confidence in the knee
- Avoid overstressing the graft
- Protect the patellofemoral joint
- Progress with strength, power, and proprioception

Therapeutic Exercise

- Continue with flexibility exercises
- Advance closed chain kinetic strengthening (one-leg squats, leg press 0-60 degrees)
- StairMaster, elliptical trainer, cross-country ski machine

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- *Functional Training (start at 8-12 weeks)*
 - Straight ahead jogging, progress to running
- *Plyometrics*
 - Stair jogging
 - Box jumps (6 to 12-inch heights)

- *Proprioception*
 - Mini-tramp bouncing
 - Lateral slide board
 - Ball throwing and catching on unstable surface
- *Functional Training (12+ weeks)*
 - Running
 - Figure-of-eight pattern
- *Agility (12+ weeks)*
 - Start at slow speed
 - Shuttle run, lateral slides, Carioca cross-overs
 - Plyometrics
 - Stair running
 - Box jumps (1-2 foot heights)

PHASE IV (5 months+)

Criteria

- Full, pain-free range of motion
- No patellofemoral irritation
- Sufficient strength and proprioception to progress to functional activities

Goals

- Return to unrestricted activity by 6 months

Therapeutic Exercises

- Progress with flexibility and strengthening program
- Continue running
- Incorporate cutting drills into agility training
- Advance heights with plyometric conditioning
- Sports specific drills (start a 25% on speed and advance as tolerated)

Criteria for Return to Sports

- Full, painless range of motion
- No effusion
- Quadriceps strength 85% of contralateral side
- Hamstring strength 100% of contralateral side
- Side-side difference <3mm translation

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