

Patient Resource Guide



Anterior Cruciate Ligament Injury



To our patients:

Dr. Boyd wants to help you better understand your injury and the options you have to choose from regarding your care. This booklet provides important information about the following topics: the injury you have sustained to the anterior cruciate ligament in your knee, pain medication, rehabilitation, surgical options, post-surgical care, directions to the hospital and a listing of telephone numbers.

Please be sure to read this booklet carefully and keep it in a convenient place so that you may refer back to it. If you have further questions or concerns, write them down and bring them to your next appointment with Dr. Boyd so that these issues may be properly addressed. Our goal is to provide all of the necessary information you need to best prepare you for the decisions you will have to make.

Table of Contents

Section 1:	Anterior Cruciate Ligament Injuries
Section 2:	ACL Injury Acute Care Protocol
Section 3:	Surgery
Section 4:	Directions to the Hospital
Section 5:	Hospital Stay
Section 6:	Post Operative – At Home Exercises
Section 7:	Pain Medication
Section 8:	At Home after surgery
Section 9:	Post Operative Visit
Section 10:	Phone Numbers

Anterior Cruciate Ligament Injuries

Dale W. Boyd, Jr., M.D.

The anterior cruciate ligament serves a very important role in the normal function of the knee. It is called cruciate ligament because there are two ligaments in the knee, which cross: the anterior cruciate ligament (ACL) and the posterior cruciate ligament (PCL). The ACL is the ligament more frequently injured, especially in sporting or athletic type activities. Injury to the PCL occurs much less frequently than injury to the ACL and is most commonly associated with forceful injuries such as car accidents. Occasionally though, athletic activities can cause an injury to the PCL. The cruciate ligament is frequently injured by a load or stress applied to the outside portion of the leg with the leg in an extended position. Occasionally when the knee is hyperextended it can be injured, but most commonly it occurs when the leg is slowing down or decelerating with a rapid internal rotation of the lower leg on the upper portion of the leg at the level of the knee joint. The ACL serves a very important role in terms of normal mechanics of the knee, in other words, the stability and function of the knee are significantly affected when the ACL is torn. This relates especially to the other structures in the knee, specifically the cartilage.

There are two types of cartilage in the knee—one is the smooth gliding cartilage or articular cartilage and the other is the meniscal cartilage or fibrocartilage. The fibrocartilages are represented medially and laterally as c-shaped structures, which serve a role in protection of the articular cartilage and absorb the shock of the knee as well as provide a role in stabilizing the knee. When the ACL is torn there is increased anterior motion of the knee even with low energy activities such as walking but certainly with more high-energy activities such as running, stopping, starting, pivoting or sports-related activities. Which such activities there may be frank giving way episodes or increased motion in the knee which gives one the feeling that the knee is going to give out or buckle underneath them. The most important role of the ACL is protection of both the articular and fibrocartilage in the knee. Because the mechanics of the knee are altered when the ACL is injured it affects the cartilage and puts increased stresses across the cartilage surfaces. This may lead to further tearing or injury to the cartilage. In approximately 70% of injuries to the ACL, at the same time the ligament is injured, the cartilage is also torn or damaged. Frequently in young active patients following an injury to the ACL, it is recommended that the ligament be reconstructed. Although we cannot reproduce the absolute normal anatomy of the injured ACL, it is important to reconstruct the ligament to prevent and protect injury to the cartilage of the knee. This also provides increased support of the knee, prevents giving way episodes and usually will allow the athlete to return to their normal activity level. Frequently when there is an associated cartilage tear of the knee, in approximately half the cases, the cartilage is stable and once the knee is stabilized with a cruciate ligament reconstruction, the cartilage will heal on its own. In the other half of the cases, the cartilage tears are unstable and therefore will require repair of the tear. It is important to attempt to suture repair, or fix the cartilage, back to its normal position rather than remove cartilage because this preserves the integrity of the cartilage and helps to protect the knee, as the reason for reconstructing the ACL is primarily protection of this cartilage.

WHEN SHOULD SURGICAL RECONSTRUCTION BE PERFORMED:

After an acute injury to the knee, there is usually a significant amount of swelling which correlates with a large amount of fluid within the knee joint. This limits motion in the knee and does not allow for a normal range of motion. It is important to decrease the swelling in the knee to achieve a normal range of motion in the knee comparing to the opposite knee before any considerations for surgical intervention. This prevents any postoperative stiffness or loss of motion after knee reconstruction.

There are instances where braces will help to stabilize the knee and prevent increased translation but the braces are not manufactured to prevent increased translation with high demand activities such as sports. Therefore, risk for giving way and further injury to the cartilage is high even in a brace. In certain circumstances, a brace may be recommended for the athlete initially prior to consideration of surgery. In some patients, surgery is not a consideration and therefore brace use may be a prudent alternative as well as a complete rehabilitation program.

OPTIONS REGARDING RECONSTRUCTION: Options basically include the use of tissue from the anterior portion of the knee using the central one-third of the patellar tendon, or tendon that connects the kneecap to the shinbone. This tendon is taken in approximately a 10 mm segment incorporating a small piece of bone from both the patella (kneecap) and tibia (shinbone). This does not significantly affect the mechanics of the knee and does not significantly increase risks for rupture of the patellar tendon. Although, approximately 40-50% of the time this does contribute to increased anterior knee discomfort or discomfort under the kneecap following reconstruction.

Another option for surgical reconstruction of the cruciate ligament is utilization of allograft tissue, which is essentially donated tissue from someone who has died and donated his or her body parts to science. The tissues as well as the blood of the individual are tested rigorously to avoid any bacterial type contamination, infection or viral contamination related to specifically the hepatitis virus and the AIDS virus. Although these tissues undergo scrutiny, there is still a risk of transmission of viral disease with the use of tissue. The risk has been estimated statistically to be approximately 1 to 1.6 million for transmission of the HIV virus. The tissue itself is similar to the central one-third of the patellar tendon and its use is identical. The benefits of the allograft tissue are: cosmetically it does not require a relatively large incision to harvest the tissue, it is felt to possibly obviate anterior knee discomfort following the surgery and it may allow earlier range of motion with earlier initiation of more aggressive rehabilitation due to the lesser amount of surgery involved. The negative sides are certainly the risks of transmission of viral disease as well as the possibility that the tissue may not be as strong as the autologous or central one-third of one's own patellar tendon. Clinical results to date have shown to demonstrate good result though with both type tissues although certainly there are some unknowns regarding allograft use.

Other surgical options include use of the hamstring tendons to reconstruct the ACL. There are reports of good strength and function using the hamstrings as a reconstructive

tool but certainly, fixation is not potentially as good. This is due to the lack of a bony plug to allow for immediate rigid fixation, which in turn allows for early range of motion of the knee. There also may be some side effects in harvesting the hamstring tendons due to change in normal gait patterns and strength of the hamstrings.

The entire reconstruction is basically done arthroscopically using an incision to either harvest the donor site or pass the allograft ligament. The meniscal repairs are also done arthroscopically although a secondary incision approximately 2-3 cm is required to protect the nerves and blood vessels about the knee from injury when passing the needles from inside to outside the knee or from outside to inside the knee. Incisions basically depend on type of tissue utilized. The central one third of one's own patellar tendon, if used, requires approximately a 5 cm incision based over the patellar tendon just to the inside portion. When utilization of an allograft is to be performed, the incision is only approximately 2-3 cm, just large enough to drill a bony tunnel to allow for passage of the graft into the knee joint. Small stab wounds are used at the level of the knee joint for arthroscopic visualization and instrumentation as well as a small stab incision just above the kneecap on the inside portion of the knee for inflow of fluid. The procedure that is utilized is technically described as an endoscopic anterior cruciate ligament reconstruction. Interference type screws or suture with a rotating internal button is utilized to affix the graft. These screws or button, never, necessarily, need to be removed. Occasionally on the shinbone side, or tibia, they provide for some mild irritation and can be removed at a time when the bone plug on the tibial side is incorporated with the tibial bone within the tunnel.

Length of time for this surgical procedure varies depending on associated injuries. If anterior cruciate ligament reconstruction is performed without a necessary meniscal repair, surgical time is approximately 1 ½ to 2 hours. With an associated meniscal repair, it can last for approximately 3 hours. A tourniquet is frequently utilized for a portion of the procedure to decrease any bleeding within the knee joint. Following the procedure, the hospitalization time is usually an overnight stay, or the patient may go home the same day if comfortable. This is important to allow early initiation of physical therapy and range of motion of the knee to prevent knee stiffness. It also allows for pain control.

A CPM, or continuous passive motion machine, is utilized postoperatively to put the knee through a gentle slow range of motion and is also frequently taken home with the patient to continue range of motion for approximately 1-2 weeks at home following surgery. This is utilized for 6 to 8 hours a day, when at home.

Ice is utilized to decrease the amount of swelling in the knee, thus this also decreases the amount of discomfort, decreases swelling and improves range of motion and pain. This also tends to decrease the amount of pain medication required postoperatively. It is recommended the ice be utilized 6 to 8 hours per day at increments of 20-30 minutes every hour following surgery for approximately one week, but this may be used when on returns to more rigorous activities if swelling occurs.

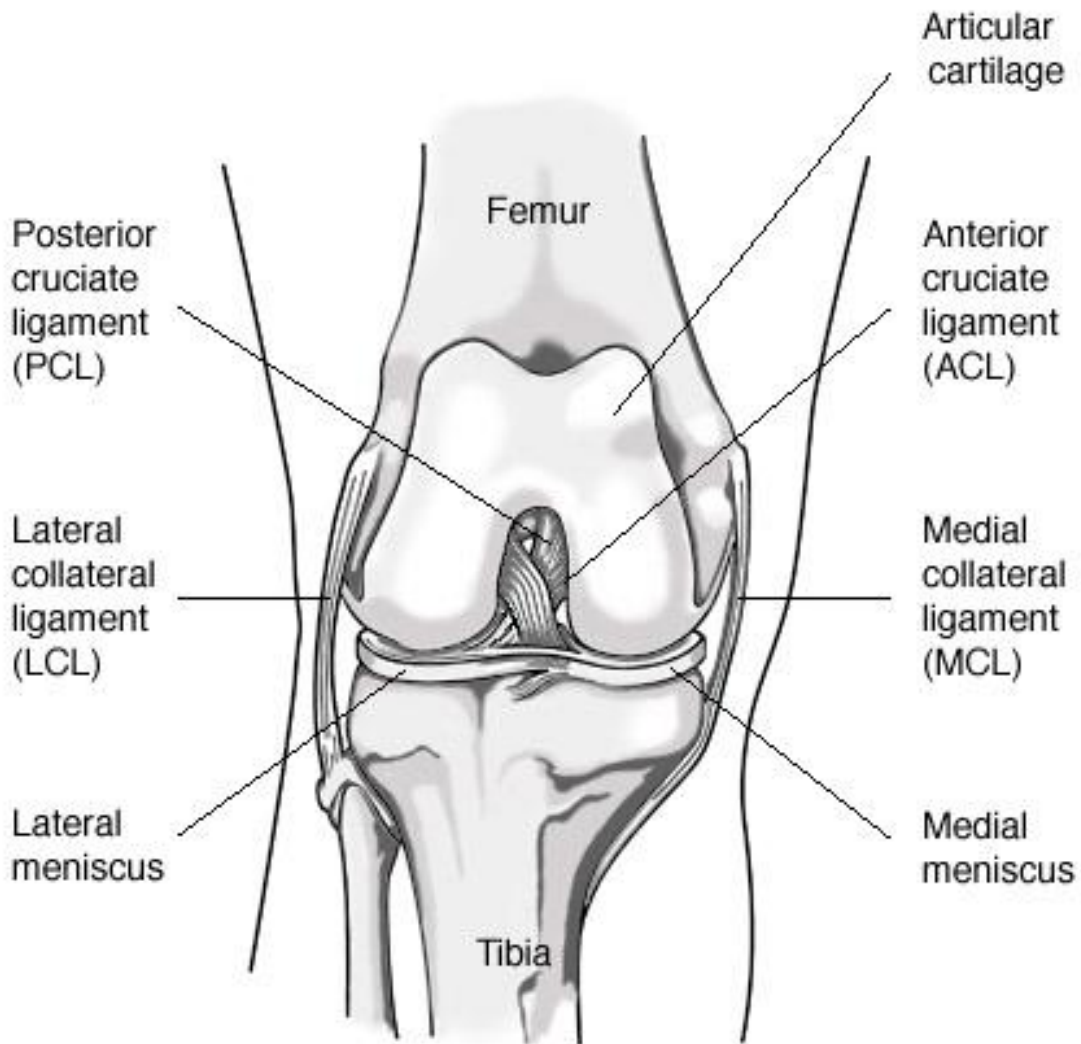
A metal hinged brace is utilized postoperatively for approximately 1 to 3 weeks depending on return of function of the quadriceps muscle. The brace is just a stabilizer until the quadriceps muscle responds normally. Once this response occurs and walking can be resumed in a safe manner, the brace can be discontinued. No specific postoperative brace is used following this nor is needed upon return to work.

Physical therapy is initiated in the hospital. Normal walking on flat, level surfaces is begun as well as emphasis on obtaining full extension of the knee postoperatively while in the hospital. Ascending and descending stairs instructions will also be given with regard to use of crutches and brace. The drain is removed on second postoperative day and the patient is usually discharged on this day following physical therapy. The patient is discharged to home with a CPM machine and instructions to continue use of crutches and brace.

Upon follow up in the physician's office at approximately 3-4 days postoperative, out patient physical therapy is initiated. Physical therapy lasts approximately 6-8 weeks under the guidance of the physical therapist. Following this, most exercises can be performed at home with physical therapy supervision approximately one time per week. Initially it is recommended that the patient go approximately three times per week, at least for the first 6 weeks of therapy. Following achieving full range of motion of the knee and a normal gait, the patient can begin to progress, do more proprioceptive or joint sensibility exercises, as well as agility and sports specific exercises. In general, follow up with the physician proceeds at approximately weekly intervals for the first 2 to 3 weeks postop and then approximately every 2 weeks until 6 to 8 weeks postop and then follow up intervals are quite a bit longer. It is important initially postoperatively that full extension be achieved. This is the most important initial goal following surgery. It frequently takes approximately one week for all the wounds to completely heal over to allow for showering. At that time showering may proceed and the steri-strips or surgical tapes over the wound can be removed or washed off with the shower. Soaking should be avoided-this includes the bathtub, ocean or pool. Frequently, prolonged standing is avoided for the first 6 weeks postoperatively, as this tends to lead to swelling of the knee and fatigue of the quadriceps musculature. Most patients have enough control of the quadriceps to start driving a car at 2 to 3 weeks postop and can basically get around on their own at this point and perform almost all activities of daily living. Return to sports activities basically requires 4 to 6 months of rehabilitation and successful completion of physical therapy as well as sports-specific functional testing that demonstrates adequate joint sensibility, strength, function, range of motion and integrity of the ligament to allow safe return to sports.

Outer side of knee

Inner side of knee



ACL INJURY ACUTE CARE PROTOCOL

Goals:

- Reduce swelling
- Gain full range of motion
- Initiate muscle reconditioning

Phase 1:

- Ice 4-5 times per day for 20 minutes each time.
- Weight bearing as tolerated with assistance from crutches, trying to maintain a normal heel-toe gait.
- Stay off of feet as much as possible except for necessary daily activities.
- Place heel on bump for 10-20 minutes twice daily allowing knee to fully extend.
- Quad sets throughout the day, 100 times by the end of the day.
- Straight leg raises, 100 per day.
- Wall slides: slide sock feet down wall and back up 10 times, twice daily.

Phase 2:

- Straight leg raises, 4 directions, 25 times each.
- Wall sits: maintain knee position over heel and not toes. 25 per day.
- ¼ squats: 25 per day.
- Standing terminal knee extensions with Theraband: 25 per day.
- Gait training: may discontinue crutches when walking with normal heel-toe gait.

Phase 3: (when swelling has subsided)

- May ride a stationary bike (start with 5 minutes and gradually advance time)
- Continue phase 2 exercises
- Ball circles: 5 times each direction.
- Leg press (if available)
- Lunges (maintain knees over ankles position)

After initial swelling starts to subside continue to ice twice daily or more if necessary for swelling and/or pain control.

If you were given an anti-inflammatory, medication make sure you take it as prescribed and with food.

Be very cautious about walking on uneven surfaces, twisting or turning quickly, stepping in or out of vans and trucks as these may lead to giving way episodes.

Once you have decided on a surgery date, you may have some more questions:

Who will schedule my surgery?

Your surgery will be scheduled with the hospital through our office.

Do I have other appointments before my surgery?

Yes, you will have a preoperative visit in our office with Dr. Boyd. At this appointment he will check your heart and lungs and make sure you are otherwise well. He will go over the procedure with you and tell you the risks of the surgery. You may also have an appointment with the anesthesiologist at the hospital. Dr. Boyd will decide if you need to go over to the hospital after your preoperative visit. If you do not have to go to the hospital, you will meet with the anesthesiologist on the morning of your surgery.

What time will I need to be at the hospital?

If your surgery is scheduled at 7:30 a.m., you must be at the hospital at 6:00 a.m. If your surgery is scheduled at a later time, you will need to be at the hospital 2 hours prior to the time. Remember to have nothing to eat or drink after midnight on the night before your surgery.

Where do I need to go once I get to the hospital?

You will be given instructions in our office at your preoperative visit.

****IT IS VERY IMPORTANT THAT YOU REMEMBER NOT TO EAT OR DRINK ANYTHING AFTER MIDNIGHT BEFORE YOUR SURGERY** EVEN WATER**

After your surgery:

Many people experience varying degrees of nausea, swelling and low grade fevers following surgery. These are a typical reaction and should not be cause for alarm.

CAPE FEAR HOSPITAL
5301 Wrightsville Avenue
Wilmington, NC 28403
910-452-8100



HOSPITAL STAY

*You will stay overnight at the hospital. There is the possibility for same day discharge depending on how well you are doing.

*You will begin your **physical therapy** in the hospital. A therapist will visit you in your room and instruct you on the exercises you should be doing. This part of your therapy will be geared to obtaining full extension of your knee and normal walking on flat surfaces. You will be doing some of the same exercises you were performing after your injury first occurred. You will be instructed on the use of crutches and brace as well as the CPM machine.

*While in the hospital, you will be using a **continuous passive machine or CPM machine**. This machine will slowly move your knee for you through range of motion that will be set for you. This machine may be taken home to use as well.

*To help you work on getting full extension back in your leg, you will be keeping your heel on an 8-10 inch **bump** every 10-15 minutes. The “bump” is usually a couple of rolled up blankets placed under your heel. Make sure you relax your leg as much as possible so that it will be as straight as possible.

*After surgery you will be fitted with a **hinged knee brace** for approximately 1-3 weeks. You will wear the brace until you have regained proper function of the quadriceps muscle and you can walk with a normal gait. You may remove your brace to perform your exercises.

POSTOPERATIVE EXERCISES: At Home Exercises

- Quad Sets: Sitting on a flat surface with leg straight, tighten quadriceps muscle and hold for 10-12 seconds. (You want to feel as if you are pushing the back of your knee to the floor.)
- Hamstring Sets: Sitting on a flat surface with leg straight, tighten hamstring muscle and hold for 10-12 seconds. (You want to feel as if you are pushing your heel into the floor.)
- Pillow squeezes: Place pillow between knees and squeeze it. Hold this for 10-12 seconds.
- Straight leg raises: Lying on your back with leg straight, flex your foot and raise your leg up off the surface about 2-3 feet. Hold for 1-2 seconds then bring back down (only touch the surface with your heel) and repeat the exercise. **NOTE:** If you are unable to do a straight leg raise on your own, have someone help you raise your leg up by placing their hand under your heel for support while you bring your leg back down on your own.
- Heel on Bump: While lying down, prop your heel up on the arm of the couch, so that the back of your lower leg and knee are not touching the cushions. Relax your leg so that it will be as straight as possible. Keep leg on bump for 10-15 minutes every hour. *Another option for a “bump” is to roll up a large blanket or a couple of thick bath towels, enough so that it is about 8-10 inches high.
- Ankle pumps: Pump your foot up and down as if you were pressing on the gas pedal of a car. Repeat this about 50 times once a day.

****Stay off of your feet as much as possible except for necessary daily activities.**

****Ice as often as possible for 20 minutes at a time, using a bag of ice (you can put gauze or a clean cloth over your stitches.**

PAIN MEDICATION

You should receive your prescription for pain medication at your preoperative appointment with Dr. Boyd. You should have had it filled at the pharmacy before your surgery.

Important Information About the Use of Your Medicine

1. Call your pharmacist if the directions on the label are not clear.
2. Tell all people who treat or take care of you the name and dose of all medicines you are taking, any ALLERGIES or side effects to medicines or foods, if you have a special diet or have recently changed your diet and if you are pregnant or breast feeding your child.
3. Ask the pharmacist if there is a lower price medication with the same effects if you are having trouble paying for your medicine.
4. Keep all medicines in the bottles they came in.
5. Check with your doctor or pharmacist before taking any over the counter medicine. Some of these medicines may interact with prescription medication.
6. Keep all medicines out of the reach of children.
7. Look at the bottle **each time** to make sure you are taking the **right** medicine at the **right** time.
8. Do not wait until you have run out of medicine before calling for a refill. Get your refill a few days before the medicine runs out.
9. Do not take another person's medicine or give the medicine to someone else even if they have the same problem.
10. Do not drink alcohol while taking pain medication.
11. Do not operate a motorized vehicle while taking pain medication.

About Your Medications

The following are questions you may ask your pharmacist:

- *What is the name of the medicine?
- *What does it do?
- *How and when do I take it and for how long?
- *What foods, drinks, other medicines or activities should I avoid while taking this medicine?
- *Are there any side effects and what should I do if they occur?
- *Is there any written information available about the medicine?

Side Effects

When taken as prescribed by your doctor, medicines are generally safe. The benefits far outweigh the small risks of side effects you may experience; however, some side effects are more bothersome or severe.

Side effects caused by medicines are sometimes hard to tell apart from the usual aches, pain and other symptoms we have in everyday life. If you believe that a medicine may be bothersome to you, call your physician or pharmacist for advice and instructions.

One of the most common side effects with the use of narcotic pain medication is constipation. If you experience constipation that is uncomfortable and you do not have a bowel movement in 2 to 3 days, contact your pharmacist to inquire about the use of a stool softener.

Signals For Action

For some symptoms, you should call Dr. Boyd or your pharmacist right away. These symptoms include, **but are not limited to:**

- *fevers or chills
- *skin rash, hives or itching
- *swelling around the face or throat
- *fainting spells / dizziness

If you notice any unusual reactions or symptoms that you were not told about, check with Dr. Boyd or your pharmacist.

ONCE YOU ARE HOME

1. Remember you are not to take a shower. When your wounds have healed, Dr. Boyd will instruct you that you may take a shower. It usually takes 7-10 days for all wounds to completely heal over. However, once this has occurred, soaking your knee in hot water, a bathtub, the ocean or a pool should still be avoided.
2. Do not drive.
3. Avoid standing for prolonged periods of time.
4. Work on your “At Home Exercise” program on a daily basis. These exercises are an essential part of your recovery.
5. Take your pain medication as prescribed and take it with food.

Call our office, 910-790-9714, immediately if any of the following symptoms occur:

**Increased wound drainage

**Increased pain

**Increased numbness / tingling in your foot and/or lower leg

**Fever greater than 101.5 degrees

Return to work / school

Return to daily activities varies among patients. Dr Boyd will address your status to return to work or school at your first postoperative visit.

YOUR FIRST POSTOPERATIVE VISIT

You will see Dr. Boyd in our office approximately 2-3 days after your surgery. Your bandages will be removed and you will be shown your intraoperative pictures from surgery. You will also have an x-ray taken. This visit will include a trip to Cape Fear Rehabilitation Services so that you may get started on your rehabilitation. You will need to make sure to bring your insurance card and, if applicable, authorization for the physical therapy clinic.

Cape Fear Rehabilitation Services

6019 Oleander Drive, Suite 101

Wilmington, NC 28403

910-791-0001

Cape Fear Rehabilitation Services is located directly below Cape Fear Sports Medicine.

PHONE NUMBERS

The following is a list of telephone numbers you may need. Keep these for future reference.

- | | |
|------------------------------------|--------------|
| *Cape Fear Sports Medicine | 910-790-9714 |
| *Cape Fear Hospital | 910-452-8100 |
| *Cape Fear Rehabilitation Services | 910-791-0001 |