

# **ACL Reconstruction and Rehabilitation Protocol**

**Michael J. Huang, MD**

**Sports Medicine**

**Colorado Springs Orthopaedic Group**

**4110 Briargate Parkway, Suite 300**

**Colorado Springs, CO 80920**

**(719) 632-7669**

**Fax: (719) 632-0088**

**[www.huangortho.com](http://www.huangortho.com)**



## ACL SURGERY

The recovery process after ACL surgery is straight-forward and this document is designed to help you and your physical therapist to get the best outcome!

Please visit Dr. Huang's website for post-operative care and early motion exercises. This page has many resources for you including training videos on dressing removal, crutch instruction, brace instruction, and even range of motion exercises!

The website is: <https://www.huangortho.com/knee-surgery-patients>

## AFTER SURGERY

1. Medications: we give you a variety of medications to try to make the recovery go smoothly. Remember that most of these medications are AS NEEDED. So, if you do not need them, do not use them.
  - a. Pain medication (usually oxycodone or hydrocodone). This is the narcotic. It is to take the edge off of surgical pain. It will not eliminate the pain. These are addictive so please use sparingly.
  - b. Stool softener (Colace). While taking the narcotic, please take a stool softener to counteract the constipation caused by the pain medication.
  - c. Anti-nausea (ondansetron or phenergan). This is provided if you have nausea after surgery.
  - d. Muscle relaxant (cyclobenzaprine or other). This is provided to help with muscle spasms that can occur after surgery. This can be taken with the pain medication or all by itself. Please be aware that it makes most patients sleepy.
  - e. Blood thinner (aspirin or other). All surgical patients are at risk for blood clots. Based on your personal risk, we will prescribe one. Duration is based on the complexity of the surgery and the duration of risk.
2. Knee Brace: Prior to leaving the operating room a hinged knee brace will be applied to your knee.
  - a. The postoperative knee brace helps to maintain extension and is to be worn at all times while walking, otherwise it can be removed.
  - b. For the first 24 hours, we recommend keeping it on at all times and it will be locked straight to protect you.
  - c. After removing the dressing on the first day, you may unlock the brace. See video on Dr. Huang's website ([www.huangortho.com](http://www.huangortho.com))

3. If you chose to have a N'Ice or GameReady machine, we will help you set this up ahead of time. Please give us advanced notice.
  - a. For either machine, you can leave the cold compression on for 30-45 minutes before giving it a break.
    - i. **Please note that the N'Ice or GameReady may not be reimbursed by your insurance company and that the patient may incur the cost of these devices.**
  - b. Ice packs or frozen bag of peas can be a great way to provide cold therapy to the knee. We recommend keeping these on for 20 minutes at a time and then allowing the knee to warm back up for another 20 minutes. Always keep a wash cloth or other layer between the skin and the ice pack.

### **RETURN TO WORK**

1. As far as returning to work, if you have a desk type job you can return to work when your pain medication requirements decrease, and you can safely walk with your crutches. Typically, this is between 5 - 10 days after surgery.
2. Patients who have jobs where light duty is not permitted will be out of work for a minimum of 6 - 12 weeks. Please discuss this with us as soon as possible so we can help you get all the details right!

### **WHEN CAN I DRIVE A CAR?**

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**REMEMBER, IT IS ILLEGAL TO TAKE PRESCRIPTION PAIN MEDICATIONS AND OPERATE A MOTOR VEHICLE!**

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1. First, you must not be taking any prescription pain medications.
2. Patients who have had surgery on the left knee, and who have an automatic transmission may drive when they can comfortably get the leg in and out of the car.
3. Patients who have had surgery on the left knee and have standard transmissions, should not drive until they have good muscular control of the leg. This usually takes 4-6 weeks.
4. Patients who had surgery on the right knee should not drive until they have good muscular control of the leg. This usually takes 4-6 weeks.

## **ACL RECONSTRUCTION PROTOCOL**

The intent of this protocol is to provide the therapist and patient with guidelines for the post-operative rehabilitation course after arthroscopic ACL reconstruction surgery. This protocol is based on a review of the best available scientific studies regarding ACL rehabilitation. It is by no means intended to serve as a substitute for one's clinical decision making regarding the progression of a patient's post-operative course. It should serve as a guideline based on the individual's physical exam/findings, progress to date, and the absence of post-operative complications. If the therapist requires assistance in the progression of a post-operative patient they should consult with Dr. Huang.

**Progression to the next phase based on Clinical Criteria and/or Time Frames as Appropriate.**

### **POSTOPERATIVE DAYS 0-14**

<b>Goals:</b>	<ul style="list-style-type: none"><li>* <b>Control pain and swelling</b></li><li>* <b>Care for the knee and dressing</b></li><li>* <b>Early range of motion exercises</b></li><li>* <b>Achieve and maintain full passive extension</b></li><li>* <b>Prevent shutdown of the quadriceps muscles</b></li><li>* <b>Gait training</b></li></ul>
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### **Control Pain and Swelling**

1. Control Swelling. Following discharge from the hospital you should go home, elevate your leg and keep the knee iced using ice, ice packs, the N'Ice or the GameReady. Remember that when using ice to keep a towel between the skin and ice itself to avoid frostbite burns.
2. Control Pain. You will be sent home with a prescription for a strong narcotic medication such as Oxycodone. You should take this for severe pain, as directed on the prescription bottle label.
3. Muscle spasm: A prescription for a muscle relaxant (see above) is often given to you as well to control muscle spasm. It can be used independently or with the oxycodone to help with pain.
4. As your pain and swelling decrease, you can start to move around more and spend more time up on your crutches.

### Caring for your knee

1. The first night and day after the surgery you can expect some drainage on the dressings (often blood tinged). This is normal!
2. Weight bearing: we recommend no weight bearing the first 24 hours. Once full sensation has returned, you will start at 30% partial weight-bearing for the first 2 weeks and increase to full weight-bearing with the help of your physical therapist after that.
3. You may shower, but you must keep your incisions dry for the first 10-14 days. This can be achieved by wrapping your knee in saran wrap or press and seal or use a waterproof plastic bag over your leg. See video on Dr. Huang's website.
4. The sutures are absorbable and do not need to be removed.
5. You may remove the knee brace while doing exercises or if you are in a safe, protected environment. However, the knee brace should be worn while sleeping for the first 4 weeks.

### Early Range of Motion and Extension

1. Passive extension of the knee by using a rolled towel. Note the towel must be high enough to raise the calf and thigh off the table.
2. Position the heel on a pillow or rolled blanket with the knee unsupported
3. Passively let the knee sag into full extension for 10 - 15 minutes. Relax your muscles, and gravity will cause the knee to sag into full extension.
4. This exercise can also be done by sitting in a chair and supporting the heel on the edge of a stool, table or another chair and letting the unsupported knee sag into full extension.
5. Active-assisted extension is performed by using the opposite leg and your quadriceps muscles to straighten the knee from the 90 degree bent position to 0 degrees (fully straight).



Use the non-injured leg to straighten the knee

6. Passive flexion (bending) of the knee to 90 degrees.

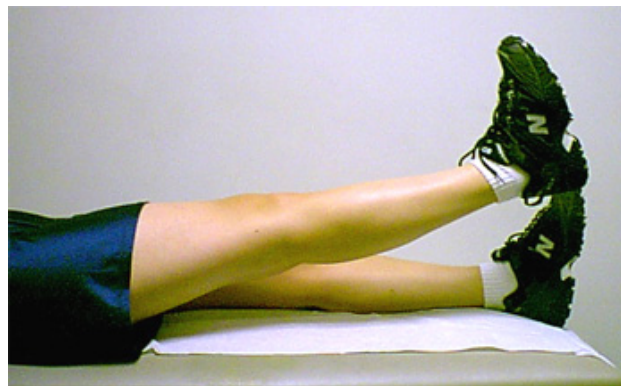
7. Sit on the edge of a bed or table and letting gravity gently bend the knee.
8. The opposite leg is used to support and control the amount of bending.



Passive Flexion allowing gravity to bend the knee to 90 degrees

### Exercising Quadriceps

1. You should start quadriceps isometric contractions with the knee in the fully extended position as soon as possible.
  - a. Do 3 sets of 10 repetitions 3 times a day.
  - b. Each contraction should be held for a count of 5-10.
2. Begin straight leg raises (SLR). Start by doing these exercises while lying down.
  - a. This exercise is performed by first performing a quadriceps contraction with the leg in full extension. The quadriceps contraction "locks" the knee straight and prevents excessive stress from being applied to the healing ACL graft.
  - b. The leg is then kept straight and lifted to about 45-60 degrees and held for a count of 5-10.
  - c. The leg is then slowly lowered back on the bed. Relax the muscles.



Straight leg raises

## POST-OPERATIVE WEEK 2-6

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| <b>Goals:</b> | <ul style="list-style-type: none"><li>* <b>Maintain full extension</b></li><li>* <b>Achieve full flexion</b></li><li>* <b>Develop enough muscular control to wean off knee brace and crutches</b></li><li>* <b>Control swelling in the knee</b></li></ul> |
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**MAINTAINING FULL EXTENSION AND DEVELOPING MUSCULAR CONTROL ARE IMPORTANT!**

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### **Maintain Full Extension**

1. Continue with full passive extension (straightening), gravity assisted and active flexion, active-assisted extension, quadriceps isometrics, and straight leg raises.
2. Slowly work toward full flexion (bending)

### **Develop Muscular Control**

1. Start Partial Squats when instructed by PT (usually around 4-6 weeks after surgery)
  - a. Place feet at shoulder width in a slightly externally rotated position.
  - b. Use a table for stability, and gently lower the buttocks backward and downward.
  - c. Hold for 5-10 seconds and repeat.
  - d. Do 3 sets of 10 repetitions each day.



Partial squat using table for stabilization

2. Start Toe Raises.
  - a. Using a table for stabilization, gently raise the heel off the floor and balance on the ball of the feet.
  - b. Hold for 5-10 seconds and ease slowly back down.
  - c. Do 3 sets of 10 repetitions each day.



Toe Raise

3. Continue to use the knee brace for walking even if you have good muscle control of the leg. This will protect your graft. Around 4 weeks after surgery, begin to wean off the brace.
4. Wean from crutches when you can put full weight on the leg and walk with a normal heel-toe gait and no limp. Usually around 4 weeks after surgery.
5. You can continue using a stationary bike. Cycling is an excellent conditioning and building exercise for the quadriceps.
  - a. The seat position is set so when the pedal is at the bottom, the ball of the foot is in contact with the pedal and there is a slight bend at the knee.
  - b. No or low resistance used. Maintain good posture throughout the exercise.
  - c. As your ability to pedal the bike with the operative leg improves, you may start to increase the resistance (around 6 weeks).
  - d. Your objective is to slowly increase the time spent on the bike starting first at 5 minutes and eventually working up to 20 minutes a session.

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**THE BIKE IS ONE OF THE SAFEST MACHINES YOU CAN USE TO REHABILITATE YOUR KNEE, AND THERE IS NO LIMITATION ON HOW MUCH YOU USE IT.**

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## **POST-OPERATIVE WEEK 6 - 12**

By week 6, your range of motion should be full extension to at least 135 degrees of flexion.

**Goals:**

- \* **Full range of motion**
- \* **Continued strength**
- \* **Introduce treadmill**

1. Continue quad sets, straight leg raises, partial squats, toe raises, stationary bike, elliptical machine, leg presses, and leg curls.
2. Start tilt board and balance board for balance training.
3. Continue swimming program.
4. Start treadmill (flat only).
5. You may begin outdoor bike riding on flat roads.

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**NO MOUNTAIN BIKING OR HILL CLIMBING!**

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## **POST-OPERATIVE WEEK 12-20**

**Goals:**

- \* **Continued strength**
- \* **Introduce jogging and light running**
- \* **Introduce agility drills**
- \* **Determine need for ACL functional brace**

1. Continue all of week 6 -12 strengthening exercises.
2. Start straight, forward and straight, backward jogging and light running program.
3. Start functional running program after jogging program is completed.
4. Optional fitting for ACL functional brace.
5. Start agility drills, zig-zags and cross over drills.

**POST-OPERATIVE WEEK 24+**

This is the earliest you should plan on returning to full sports.

**Goals:           \* Return to sports**

To return to sports you should have:

- Quadriceps strength at least 80% of the normal leg
- Hamstring strength at least 80% of the normal leg
- Full motion
- No swelling
- Good stability
- Ability to complete a running program