

# Activities and Exercise After Injury to the Anterior Cruciate Ligament (ACL) of the Knee

Quincy Medical Center

Massachusetts General Hospital

## Eric Berkson, MD

Orthopaedic Surgery of Quincy  
909 Hancock Street  
Quincy MA  
(617) 773-7457

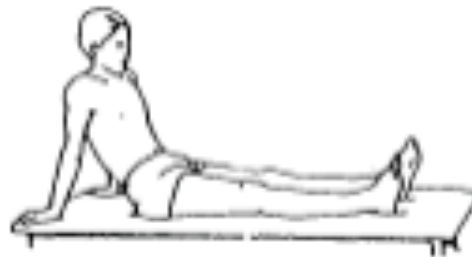
### PHASE 1: THE FIRST SIX WEEKS AFTER INJURY

Initially, the knee needs to be protected-use the knee immobilizer and/or crutches and avoid full weight bearing. Apply ice and an elastic wrap to control swelling. Elevate the leg and use elastic stockings if the leg is swollen. As the pain lessens and the swelling decreases, try to gradually regain knee motion. Avoid pivoting or twisting the knee because it might be unstable and give out.

When walking, bear weight according to the doctor's instructions. Use crutches to assist when walking. You may gradually wean from 2 crutches to 1 crutch, held on the side opposite the injured knee. Progress to no crutch(es) or brace when you can walk without a limp and there is no pain. Ice the knee if there is pain and swelling. Place a towel or cloth between the skin and the ice to prevent skin injury. Ice for 20 minutes, three times a day. At about three weeks following injury, the pain is usually subsiding and the swelling is lessened. You can now try to stretch the knee to regain motion. Stationary cycle, swimming (flutter kick only) and the following exercise program are recommended.

**QUADRICEPS SETTING** - to maintain muscle tone in the thigh (quadriceps) muscles and straighten the knee.

Lie on your back with the knee extended fully straight as in the figure. Contract and hold the front thigh muscles (quadriceps) making the knee flat and straight. If done correctly, the kneecap will slide slightly upward toward the thigh muscles. The tightening action of the quadriceps muscles should make your knee straighten and be pushed flat against the bed or floor. Hold five seconds for each contraction. Do at least 20 repetitions three or four times a day until you can fully straighten your knee equal to the unoperated side.



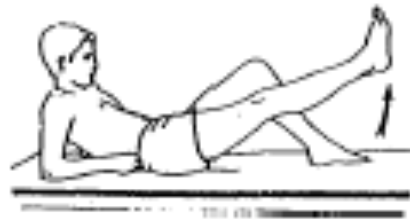
## **HEEL SLIDES** - to regain the bend (flexion) of the knee.

While lying on your back (figure), actively slide your heel backward to bend the knee. Keep bending the knee until you feel a stretch in the front of the knee. Hold this bent position for five seconds and then slowly relieve the stretch and straighten the knee. While the knee is straight, you may repeat the quadriceps setting exercise. Continue this exercise until you can fully bend your knee equal to the unoperated side. Also, as you start to gain flexion, you can assist your efforts to gain flexion by assisting the heel slide with a towel. See illustration. Repeat 20 times, three times a day.



## **STRAIGHT LEG LIFT**

Tighten the quadriceps muscles so that the knee is flat, straight and fully extended. Try to raise the entire operated limb up off of the floor or bed. If you are able to keep the knee straight raise the limb to about 45 degrees, pause one second and then lower slowly to the bed. Relax and repeat. If the knee bends when you attempt to lift the limb off of the bed, do not do this exercise. Keep trying to do the quadriceps setting exercise until you can lift the limb without letting the knee bend. Repeat 20 times.



You can advance to the following exercise program to help you regain knee motion and strength. If the exercises can be performed easily after the first week, then an ankle weight may be used to increase the resistance of the exercise and to build strength. Start with one pound and add one pound per week until you reach five pounds.

Do the exercises daily for the first week, then decrease to every other day when using ankle weights. You may ride the stationary bicycle daily for 10 to 20 minutes. Avoid using stair-stepper machines, doing deep knee bends and squats or any exercise that causes crunching, clicking or pain at the kneecap.

## **STATIONARY BICYCLE**

Utilize a stationary bicycle to move the knee joint and increase knee flexion. If you cannot pedal all the way around, then keep the foot of your operated leg on the pedal, and pedal back and forth until your knee will bend far enough to allow a full cycle. Most people are able to achieve a full cycle revolution backwards first, followed by forward. You may ride the cycle with no resistance for 10 to 20 minutes a day. Set the seat height so that when you are sitting on the bicycle seat, your knee is fully extended with the- resting on the pedal in the fully bottom position. You should then ride the bicycle with your forefoot resting on the pedal.



### STANDING HAMSTRING CURL

Stand facing a table, using the table for balance and support. While standing on the unoperated limb bend the knee of the operated side and raise the heel toward the buttock. Hold this flexed position for one second. Slowly lower the foot back to the floor. Keep the thighs aligned as illustrated. Repeat 20 times.



### STANDING TOE RAISE

Stand facing a table, hands on the table for support and balance. Keep the knees extended fully. Tighten the quadriceps to hold the knee fully straight. Raise up on 'tip-toes' while maintaining the knees in full extension. Hold for one second, then lower slowly to the starting position. Repeat 20 times.



### HIP ABDUCTION

Lie on your unoperated side. Keep the knees fully extended. Raise the operated limb upward to a **45** degree angle as illustrated. Hold one second, then lower slowly. Repeat 20 times.

### WALL SLIDES

Stand upright with your back and buttocks touching a wall. Place the feet about 12 inches apart and about 6 inches from the wall. Slowly lower your hips by bending the knees and slide down the wall until the knees are flexed about 45 degrees (illustration). Pause five seconds and then slowly slide back up to the upright starting position. Do 3 sets of 10 to 15 repetitions.



### STRAIGHT LEG LIFT

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### OFFICE VISIT

Continue with this exercise program until you are re-examined by the doctor at your next appointment.

## PHASE 2: SIX WEEKS AFTER INJURY ONWARD

At about six weeks after injury, you should have regained almost full motion of the knee. However, you might now have a "trick knee" that could be unstable and give out when you pivot quickly. The doctor will advise you whether you should now have surgery to replace the torn ACL with a graft or continue with exercises and maybe use a knee brace.

### ACTIVITIES

If the doctor believes that your knee is unstable and likely to give out when you pivot. He will recommend surgery. While awaiting surgery to be done, avoid jumping and pivoting activities. Do the enclosed exercises to regain knee strength and motion.

If the doctor believes there is a good chance that your knee will be stable without surgery, He will advise you to continue the exercises use an elastic knee support and try increasing your activities. If the knee has no problem, then you can progress your activities as tolerated. If your knee gives out or feels unstable, you will have the choice to a) stabilize the knee surgically or b) to cut back on activities and avoid pivoting.

Continue to use ice for 20 minutes after each workout.

You can buy an elastic knee sleeve (made of neoprene rubber) at a sporting goods store. It should have an opening for the kneecap and velcro straps but does not need hinges on the sides. Use this support if you are on your feet for a prolonged period of time.

You can utilize a stationary bicycle to both strengthen the thigh muscles and increase knee flexion. If you cannot yet pedal all the way around, then keep the foot of your injured leg on the pedal, and pedal back and forth until your knee will bend far enough to allow a full cycle. You may ride the cycle with mild resistance for up to 10 minutes a day. Set the seat height so that when you are sitting on the bicycle seat, your knee is fully extended with the heel resting on the pedal in the fully bottom position. You should then actually ride the bicycle with your forefoot resting on the pedal.

You should add the following exercises, every other day, as instructed by the physical therapist:

### CHAIR SQUAT

In the chair squat exercise, you lower your buttocks toward the chair until your buttocks touch the chair. Do not sit or rest on the chair, but instead immediately and slowly return to the standing and starting position.

Remember to keep your head over your feet and bend at the waist as you descend. After the first week, you may hold dumbbells while performing this exercise. Start with 3 to 5 pounds in each hand. You may add 2 to 3 pounds per week until you reach 10 pounds in each hand. Do 3 sets of 10 to 15 repetitions.





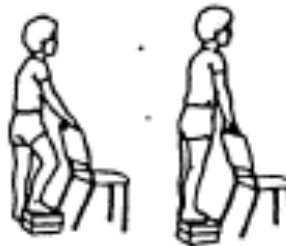
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### **STEP-UPS**

For this exercise, place a small stool or a book or a block of wood on the floor, about 2 feet from a wall chair. Place the foot of the operated limb on the stool. Maintain balance by holding onto the wall or chair (illustration).

Slowly step up onto the stool and slowly let the knee straighten. Slowly lower the opposite foot to the floor, trying not to rest but instead slowly returning to the 'stepped-up' position. Start this exercise for 3 sets of 5 repetitions for the first week. You may add 1 repetition per session, until you reach 3 set of 15 repetitions, if there is no kneecap pain or pain at the patellar tendon site.



### **ONE-LEGGED TOE RAISES**

Continue the toe-raises from phase 2, but now try to raise up and down slowly on just the operated side. Hold the unoperated foot off the floor and hold the wall or a chair or table for balance and support. Build to 3 sets of 15 repetitions.

### **HAMSTRING STRETCH**

Perform this stretch in the position illustrated. Bend slowly forward at the hips, keeping the knee fully extended until you feel gentle stretch in the back of your thigh and knee. Hold the stretch for 15 to 20 seconds and repeat 3 to 5 times.



## CALF STRETCH

In the position illustrated, keep the heel flat on the floor and the knee fully extended. Lean forward at the hips with the arms supporting your weight. When you feel a gentle stretch in the back of your calf and knee, hold for 15 to 20 seconds for 3 to 5 repetitions.



## QUADRICEPS STRETCH

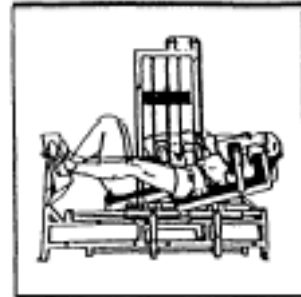
This stretch is performed in the position illustrated. Lean gently backward as if bringing your heel toward the buttock. When a stretch is felt in the front of the thigh and knee, hold 15 to 20 seconds for 3 to 5 repetitions.

## OPTIONAL ADDITIONAL EXERCISES

The following exercises may be added to your exercise program at 8 weeks after injury:

### LEG PRESS

As the starting weight for this exercise, use an amount of that feels easy enough to perform 20 repetitions. Use this the first week before raising the weight. The weight may be by about 5 pounds every 7 to 10 days thereafter, as long as you perform 20 repetitions per set for 3 sets. In this exercise, avoid knees snap or extend suddenly when reaching the fully straightened position. Avoid starting the exercise with the knees excessively bent. Do not knee so far that your calves and back of thighs touch. Adjust position to limit the excursion of the machine.

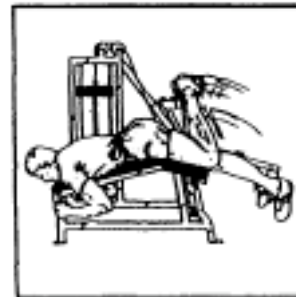


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### RESISTED HAMSTRING CURLS

If you have access to a hamstring curl machine (illustration), you may start using it. As with the leg press, start with a reasonable weight and use that weight for the first week. You may increase the weight by 3 to 5 pounds every 10 days as long as you can perform 3 sets of 20 repetitions slowly, with good form. If you do not have access to a hamstring machine, continue doing the standing hamstring curl adding an ankle weight for resistance. Start with 3 to 5 pounds and add 1 pound per week until you build to 10 pounds for 3 sets of 15 repetitions.



## OFFICE VISIT

The doctor will discuss with you whether you should have surgery or continue the exercise program and gradually resume normal activities.