



ACL RECONSTRUCTION RECOVERY & REHABILITATION PROTOCOL

- **PREOPERATIVE:**

If you have suffered an acute ACL injury and surgery is planned, the time between injury and surgery should be used to regain knee motion, decrease swelling, and maintain muscle tone. Physical Therapy may be necessary *prior* to surgery.

- **POSTOPERATIVE:**

Pain Medicine:

You will be sent home with a prescription for narcotic pain medicine (Oxycodone, Hydrocodone, or Propoxyphene), and anti-inflammatories (Ibuprofen, and Toradol, or Ketorolac). Narcotic pain medication is usually helpful for the first 1-2 weeks, then often is not required. Toradol, an anti-inflammatory, can be helpful for the first few days after surgery to help with pain control. Ibuprofen, another anti-inflammatory, should be used regularly for the first 2-3 weeks after the Toradol prescription is finished. Please do not take the Ibuprofen and Toradol at the same time.

Ice:

Ice is essential for pain relief and to reduce swelling for the first several weeks after surgery, and can be helpful for several months (particularly after physical therapy sessions). Ice should be used at least 3-4 times a day for 20 minutes.

Activity:

You may fully weight-bear on your surgical leg with crutches.

Dressings:

You may remove your dressings 48-72 hours after surgery and cover your incisions with band-aids or gauze. **Steristrips should be left in place** (strips of white tape covering each incision). You may shower once your incisions are completely dry, without any drainage (usually 5-7 days after surgery).

Braces:

A post-operative brace ***may*** be fitted to your leg on the day of surgery. If a brace is prescribed, it should be worn for walking for the first 3 weeks after surgery (with crutches) to prevent your knee from giving way or buckling. The brace should be locked in full extension while you are walking. Otherwise, it may be unlocked to allow knee motion. The brace may be unlocked for walking within the first 3 weeks if your quadriceps strength is adequate, upon recommendation from your physical therapist. However, you should continue to use the brace for dangerous activities such as walking on uneven ground, sand, snow, ice, etc. Later, you will be fitted for a functional ACL knee brace, which you will use for jogging, agility training, and return to any athletic or pivoting activities.

Home Exercises:

On the day after surgery you should start performing knee motion exercises as detailed in this protocol. Within 2-3 weeks you should achieve full knee extension and 90 degrees knee flexion.

Goals of the first 2-3 weeks:

1. Knee Motion: full extension to 90 degrees flexion (exercises)
2. Decrease swelling (ice, ibuprofen, elevation)
3. Maintain Quadriceps muscle tone (exercises)
4. Straight Leg Raises **without** extensor lag
5. Good Patella mobility

Physical Therapy:

You should start Physical Therapy within 1-2 weeks after surgery. **Several months of formal Physical Therapy and a devoted home exercise program are essential in order to achieve a good outcome for your knee.** Please give a copy of this ACL Rehabilitation Protocol to your therapist.

Follow Up:

You will return to see your surgeon at the following intervals after surgery:

1. 7-10 days
2. 6 weeks
3. 3 months
4. 6 months
5. 1 year

• **EXERCISES**

You should perform your exercises 3-4 TIMES DAILY, starting the day after surgery.

Week 1:

1. Ankle Pumps (see diagram 1)
2. Quad Sets (2)
3. Hamstring Sets (3)
4. Hip Abduction (4 - perform in brace locked in extension)
5. Hip Adduction (5 - perform in brace locked in extension)
6. Hamstring Stretching (6)
7. Sitting Range of Motion – Flexion (7)

Weeks 2-4:

Add the following exercises:

1. Straight Leg Raises (8 - perform in brace locked in extension)
2. Prone Hip Extension (9)



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3. Prone Leg Curls (10)
4. Passive Knee Extension Stretches (11, 12)

Optional Exercises (if you have access to a pool):

1. Active ROM from 0-90 degrees with buoyancy assisted extension
2. Flutter kicking performed with knee fully extended and motion occurring at the hips
3. Walking in chest deep water forward and backwards
4. Hip Exercises

Weeks 4-8:

1. Active and active-assisted range of motion: 0-130 degrees
2. Leg press
 - a. Begin with 45-60 degrees flexion
 - b. Calf raises
3. Proprioception board
 - a. Balancing exercises
4. Multi-Angle quadriceps isometrics between 90 and 60 degrees, every 15 degrees (6-8 weeks).
5. Add the following under Physical Therapy supervision and guidance:
 - a. Straight Leg Raises with ankle weights (NO EXTENSOR LAG). Progress 1-2 pounds/week, 20 repetitions 3 times daily.
 - b. Hip Abduction with ankle weights. Progress 1-2 pounds/week, 20 repetitions 3 times daily.
 - c. Standing Knee Curls with ankle weights. Progress 1-2 pounds/week, 20 repetitions 3 times daily.
 - d. Wall slides without weights. 10 repetitions, 3 times daily.
 - e. Hip Adduction without weights. 20 repetitions 3 times daily

At 6 weeks, add the following:

1. Stationary Bicycling:
 - a. Adjust seat such that the down leg is in slight flexion
 - b. Low load & high speed for endurance
2. One-legged cycling for hamstring activity

At 8 weeks, add the following:

1. Stairmaster using shallow steps. Start at 5 minutes, adding 2 minutes per session progressing to 15 minutes.
2. Nautilus-type leg extensions using both legs to lift, and surgical leg to lower (eccentric quadriceps strength).
3. Concentric quadriceps 90-45 degrees on leg extension machine with low weight on the surgical leg.



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At 3 months:

1. Light Jogging: 10 minutes every 2nd or 3rd day, increasing 2 minutes per week. Monitor knee for signs of swelling. If swelling occurs, jogging should be delayed.

At 4 months:

1. Agility Training

At 5-6 months:

1. Limited non-contact sport-specific activities with permission from your physician.
2. More aggressive strengthening:
 - a. Leg Press: progress with weights (do not exceed 90 degrees flexion)
 - b. Leg Curls: progress with weights
 - c. Leg Extensions: concentric and eccentric (90-30 degrees)
3. Stationary Bicycle: increase resistance and duration
4. Step-up's: progress from 2 to 6 inch step. Lower with the heel of the uninvolved leg first. Progress rapidly toward lowering with the involved leg.
5. Jump Rope: two feet progressing to one foot
6. Agility Training in functional knee brace:
 - a. Side to side steps: controlled lateral agility, emphasize eccentric phase
 - b. Running forward/backward
 - c. Side to side hops
 - d. Carioca crossover steps alternating front to back

At 6-8 months:

You may return to competitive athletics under the following conditions:

1. No knee swelling
2. Full range of motion
3. Adequate strength: at least 90% strength & endurance
4. Adequate knee stability
5. You must use your functional knee brace. Continue to use your functional knee brace during athletic activity for at least 12 months after surgery. You may discontinue the brace under instruction from your surgeon.



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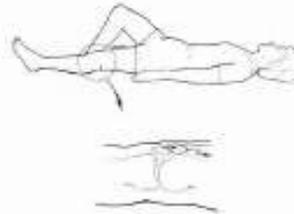
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Exercise 1 of 12

DORSI/PLANTAR FLEXION - ACTIVE

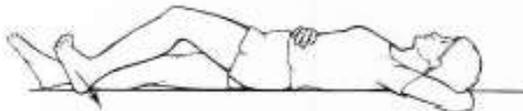
1. Bend ankle up toward your body as far as possible
2. Hold 3 seconds
3. Now point toes away from your body
4. Hold 3 seconds
5. 10 repetitions, 5 times per day



Exercise 2 of 12

QUAD SETS/EXTENSION

1. Sit or lie on your back with leg straight
2. Tighten the muscle on top of your thigh. This will press the back of your knee downward
4. Hold 3 seconds
5. 10 repetitions, 5 times per day



Exercise 3 of 12

HAMSTRING SETS

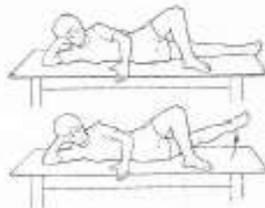
1. Sit or lie with knee bent partially as shown
2. Press heel to floor (Or hook heel on edge of bed for stability and try to pull foot toward buttock)
3. Hold 3 seconds
4. 10 repetitions, 5 times per day



Exercise 4 of 12

HIP ABDUCTION

1. Lie on side with affected leg on top
2. Bend lower leg slightly
3. Tighten top thigh and raise leg straight up, without letting it come forward
4. Hold 2 seconds, slowly relax
5. 10 repetitions, 5 times per day



Exercise 5 of 12

HIP ADDUCTION

1. Lie on side as shown, with affected leg on the bottom
2. Bend opposite knee and bring foot in front of bottom leg. Be sure not to roll backward - stay on your side
3. Raise bottom leg up toward ceiling
4. Hold 2 seconds, slowly relax
5. 10 repetitions, 5 times per day



Exercise 6 of 12

HIP FLEXION (HAMSTRING)

1. Sit with leg straight on bench as shown
2. Lean forward, keeping the back straight, so that a stretch is felt
3. Hold 10 seconds
4. 5 repetitions, 5 times per day



PERFORMANCE

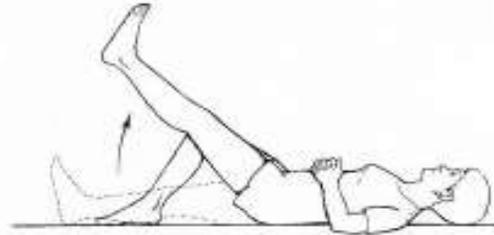
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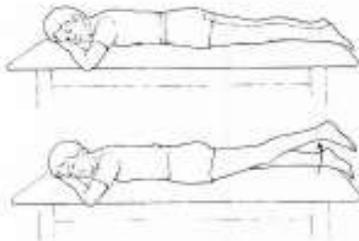
Exercise 7 of 12
KNEE FLEXION

1. Sit in a chair with your feet on a smooth surface
2. With opposite foot, gently push affected knee into flexion by sliding ankle backwards
3. Hold 10 seconds
4. Then gently slide ankle forward so knee straightens with your opposite foot and relax
5. 10 repetitions, 5 times per day



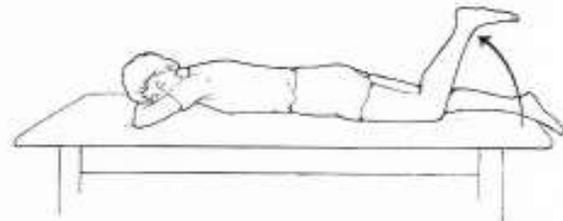
Exercise 8 of 12
STRAIGHT LEG RAISE

1. Lie on back with knee straight and the other knee bent as shown
2. Keeping the leg completely straight, raise it until at the same height as bent knee
3. Hold 2 seconds and slowly lower
4. 10 repetitions, 5 times per day



Exercise 9 of 12
HIP EXTENSION

1. Lie on belly
2. Keeping hips down, raise affected leg straight off floor as shown
3. Hold 2 seconds, slowly lower leg
4. 10 repetitions, 5 times per day



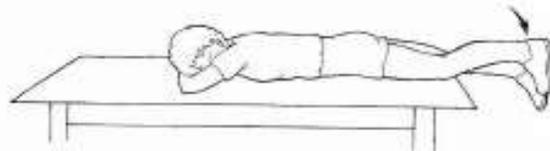
Exercise 10 of 12
HAMSTRING/FLEXION

1. Lie as shown
2. Slowly bend affected knee as far as possible
3. Hold 10 seconds, slowly lower
4. 10 repetitions, 5 times per day



Exercise 11 of 12
KNEE EXTENSION

1. Sit with affected leg propped as shown
2. Relax, letting the knee straighten
3. Hold 30 seconds. Try to work up to 5 minutes
4. 3-5 repetitions, 3 times per day



Exercise 12 of 12
KNEE EXTENSION

1. Lie on a table or bed with feet hanging over end as shown
2. Slowly allow gravity to extend the affected knee
3. Hold 30 seconds. Try to work up to 5 minutes
4. 3-5 repetitions, 3 times per day