

ACL Reconstruction Protocol
Jeffrey J. Albert, MD

Phase 1 (0-2 weeks after surgery)

- 1. Do all exercises daily. Use ice after exercises.
- 2. Attend physical therapy two times per week
- 3. Walking: Partial weight-bearing with both crutches, advance to weight-bearing as tolerated (strict non-weight bearing for 4 weeks if meniscus repaired).
- 4. Immobilization: Knee immobilizer **brace to be worn for all ambulation for the first ten to fourteen days** until satisfactory limb control has been attained. The splint is removed for exercises and all rest activities as tolerated. It is not necessary to sleep in the brace unless otherwise instructed by the surgeon.
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Exercises Immediately Post-op

- 1. **Quad Sets/Ham sets** - periodically tighten front and back of thigh. This basis exercise should be done as frequently as possible.
- 2. **Straight leg raise (SLR)** - Tighten thigh muscles, lift leg approximately 45 degrees, hold for count of five. Lower slowly. Repeat, working up to 10 sets of 10 reps - 3 times per day.
- 3. **Heel slides** - Lying on back; sock on foot; slide heel towards body, bending the operative knee. Bend until a stretch is felt, but **Do Not** push to extreme discomfort. Repeat 20 - 30 times.
- 4. **Isometrics** - Multi-angle quadriceps isometrics (45 - 90 degrees) hamstring isometrics (any position)
- 5. **Static extension stretching** - Elevate the foot on a bolster 8-12 inches above the bed or exercise table and allow the knee to fully extend with the aid of gravity to achieve full extension. The exercise should be done several times a day as tolerated.
- 6. **Prone hangs** - Lying face down on a bed or table with the knee hanging out over the edge, allow the foot to hang with the assistance of gravity to achieve full extension. May utilize a 1-2 lb. ankle weight to advance the stretching program as tolerated. This should be done at least twice a day for 5-10 minutes as tolerated.

Ice after exercising to minimize pain and swelling

Week 1:

- 1. Continue quad/ham sets, SLRs, and heel slides.
- 2. **BEGIN**
 - 1. **Prone hamstring curls** - lying flat on stomach, bend knee as far as possible. 5 sets of 10 reps.
 - 2. **Side leg raises** - lying on non-operative side, raise operative leg out to side, keeping foot pointed straight ahead. Repeat 5 sets of 10 reps.
 - 3. **(optional)** - underwater walking 2 times per week.

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Week 2:

- Continue all above exercises and **Add**:
- 1. Weight (cuff weight or similar) **Above Knee** for SLRs and side leg raises
- Approximately 2 lbs. to start.
- 2. Hamstring curls - **Prone** - add cuff weight at the ankle.
- 3. Hamstring stretch - sitting (**no** hyperextension of the knee allowed)
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Phase 2: (3-10 weeks after surgery)

Week 3

- 1. Continue all Phase 1 exercises and progress amount of resistance
- (cuff weights only); do all exercises **out of brace**.
- 2. Stationary bicycle if knee flexion is at least 90 degrees. May cycle without a brace
- minimal resistance for 2 km. Or approximately 5-10 minutes.
- 3. (optional) - continue walking backwards.
- 4. **GAIT** - Off crutches if limp is minimal.
- 5. **BEGIN** closed kinetic chain quadriceps exercises
- a. Leg press
- b. 1/4 squats with Sport-cord or Theraband
- c. Stairmaster

- (**Advance program as tolerated and continue throughout complete rehab**)

Weeks 3 - 4:

- Begin Progressive Resistance Exercises (PRE) as follows:
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- 1. Stationary cycle (warm up of 2 km's)
- 2. Hamstring curls (knee curl machine) with 3 hole space weights
- 3. Duosquat machine (alternating leg press)

- New exercise **added** each day to include:
- 1. Hip adduction / adduction machine
- 2. Hip and back machine
- 3. Toe raise machine

- Note:** This program continues 3-5 days per week for the next six weeks. Increase
- weight resistance as tolerated.

Weeks 4 - 6:

- Begin walking forward in the pool or Aquatrex (optional)

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Weeks 6 - 8:

- Begin high speed hamstring isokinetic exercise (0-90 degrees allowed as tolerated)

Weeks 8 - 10:

- 1. Exercise program decreased to 3 times per week
- 2. May swim - gentle scissor kick - no breaststroke or butterfly
- 3. Continue to increase resistance on weight machine
- 4. Continue to ice after exercise

Phase 3: (10 - 16 weeks after surgery)

Exercises:

- 1. Begin eccentric quad PRE program 3 times per week. Utilize anti-shear device or proximal one-third tibial pad. Range of motion initially limited to 45-90 degrees only. May add concentric quad exercises at 12-14 weeks as tolerated. Note: This initiates the use of open kinetic chain exercise for the quadriceps in this protocol.
- 2. Continue to increase resistance as tolerated (with the slowest rate of increase on knee extensions).
- 3. Increase resistance and / or distance on stationary cycle.
- 4. May use rowing machine - **no full** leg extension.
- 5. May ride outdoor bicycle **with the brace**.
- 6. May begin jogging in Aquatrex (optional), if strength and flexibility are acceptable.
- 7. One-legged 1/4 squats: May do 1/2 squats with minimal resistance (free weight).
- 8. Swimming - may scissor kick with more effort.
- 9. Flexibility - continue hamstring and quadriceps stretch.
- 10. May begin high-speed quadriceps isokinetic exercises at 12 weeks (45-90 degrees only). - **Anti-shear device or proximal 1/3 tibial pad**
- a. Continue to ice after every exercise session to reduce swelling and prevent any soreness from developing.
- b. If soreness persists after approximately 24-36 hours, decrease intensity of workout.
- c. Persistent swelling or pain must be reported to the therapist or doctor.

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Phase 4: (4-5 months after surgery)

Exercises:

- 1. Continue to increase resistance on PRE workouts three times per week.
- 2. Continue high-speed quad isokinetics (full-range allowed).
- 3. Progress proprioceptive training:
 - A. Step-ups (sideways and fronts)
 - B. BAPS board training
- 4. **Brace:** Patient may now be fitted with a functional ACL brace (CTI-II preferred).
- 5. **Jogging:**
 - A. Week 16 post-op: May jog with **Brace ON** at 1/2 speed, no corners, no inclines, declines, or sudden starting or stopping.
 - B. Begin with 1/4 mile walk/jog alternates (not to exceed 3/4 mile initially).
 - C. Gradually increase **distance and speed** over the next 2-3 months.
- 6. **Swimming:** No breaststroke kick or butterfly kick
- 7. **Outdoor cycling:** Avoid extreme inclines or declines
- 8. **Golf:** May begin swinging the club initially with short irons and without spikes, advance gradually over 4-6 weeks as tolerated until Phase V.
 - *Continue ice after exercise for any swelling/pain*
 - *May not initiate any sports activity*

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Phase 5: (5-6 months after surgery)

Exercise:

- 1. Continue PRE's 3 times per week. Increase resistance as tolerated. Avoid any irritation of the knee cap (see PT if knee cap or surrounding tissues becomes irritated).
- 2. Continue flexibility program
 - Hamstrings
 - Quadriceps
 - Achilles (calf muscle)
 - Low Back

Sports:

May begin sport specific activity depending upon individual situation

- 1. Hit tennis balls - No Games
- 2. Unrestricted golf activities
- 3. Aerobic exercise - begin low impact
- 4. Continue swimming, jogging, and rowing
- 5. May jog out of brace if strength and flexibility adequate (PT's discretion)
- 6. Increase to full-speed running with brace as tolerated
- 7. Advance cardiovascular training programs at physician's discretion
- Note:** Continue to use ice for any pain or possible swelling
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Phase 6: (Beyond 6 months or when Phase 5 has been completed with all goals met)

Exercise:

- 1. Maintenance strength program is suggested on a 3 times per week basis
- 2. Strength evaluation: isotonic and isokinetic quadriceps and hamstrings
- 3. Thigh girth should be approaching 1/2 inch deficit or less
- 4. Continue flexibility program

Sports:

- 1. Increase sports-specific activity
- 2. Increase full-speed running if desired
- 3. Perform agility drills if:
 - A. Strength is equal or within 15% of Kincom/Cybex
 - B. Range of motion = extension deficit of 5 degrees or less
 - = flexion deficit of 15 degrees or less
- 4. Return to play **in brace** if above criteria is acceptable
- 5. Continue regular cardiovascular training programs
- 6. Wear brace for first full season for competitive or at-risk sports
 - (brace not necessary for jogging or golf, etc.)
 - May discontinue use of brace earlier at physician's discretion.
- Ice for any soreness or swelling**
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