

The Orthopedic Clinic, Association
Anterior Cruciate Ligament (ACL) Reconstruction Rehabilitation Protocol

General Guidelines

- Supervised Physical Therapy and home rehabilitation exercises require up to 6 months of work by the patient for recovery
- Rehabilitation following ACL reconstruction is progressive. Goals of each phase must be met prior to the next phase. The physician provides final determination regarding progression of exercises with advisement from the Physical Therapist and patient discussion.
- Continuous Passive Motion (CPM) machines are not typically used.
- Driving is allowed when cleared by the physician, but general guidelines include:
 After discontinuation of narcotic medication and able to straight leg raise
- Custom Bracing for sport activity and daily use is rarely utilized at the completion of the course of treatment. With discussion and approval of the physician, a functional brace may be recommended upon returning to sports.

Prior to Surgery

Goals:

- Control swelling
- Regain motion
 - ✓ Heel slides
 - ✓ Achilles tendon stretching
 - ✓ Seated hamstring stretching
 - ✓ Passive extension (towel under heel while sitting)
- Review home exercise program to avoid confusion

Phase I 0 – 3 weeks post surgical

The purpose of this phase is to initially regain range of motion and to control swelling. It is also important to return one's walking, i.e. gait pattern normal. By doing so the risk of any postoperative complications, such as scar tissue, is minimized.

Goals:

- Protect graft fixation
- Full knee ROM
- Pain/edema reduction
- Normalize balance for daily activity
- Begin and enhance quadriceps recruitment

Home exercise program: (handout will be provided)

- Heel slides, no limitations to knee flexion first 4 weeks
 - ✓ Flexion is limited to 90° if meniscal repair is completed
- Achilles tendon stretching
- Seated hamstring stretching
- Passive extension (towel under heel while sitting)

- Ankle pumps
- Quadriceps sets
- Hamstring sets
- Straight leg raises
- Patellar mobilizations

Bracing:

- Initially locked at -10° hyperextension
- When straight leg raise is completed, brace can be opened to full flexion
- Wear at night until after you see the physician for your first post operative visit.
- Wear until 1 month post op visit

Crutches

- Weight bearing as tolerated (WBAT) for standard ACL surgeries
- Toe touch weight bearing with surgeries involving meniscus repairs and revisions
- Cartilage restoration procedure – Non weight bearing

Objectives to meet prior to progression to Phase II:

- Quadriceps contraction without extension lag
- Quadriceps control
- 90° flexion of knee
- Full extension
- No signs of active inflammation
- Normal gait

Phase II 3 – 8 weeks (2 months)

The purpose of this phase is to further regain function and gradual strength of the knee and involved extremity. The graft strength at this time is very weak, and even if one feels the leg to be normal, excessive activity should not be undertaken otherwise they may compromise the graft's integrity.

Goals:

- Restore normal gait
- Maintain full extension/flexion
- Protect graft fixation

Formal Physical Therapy:

- Begins at 3 weeks post op
- Three times weekly
- Utilize same Physical Therapist at each visit so that continuity of care is provided
- Suggested exercises: Low weight/high reps

Passive extension, Quad Sets, Hamstring sets, straight leg raises, open chain hamstring exercises, four way hip exercises, bridges, gait training, proprioception training on stable ground, bike, heel raises, wall slides 0°-45°, retro treadmill walking, lateral stepping with band resistance, pool – waist deep (no whip kicks).

✓ 4 weeks - Step downs

✓ 6 weeks - Initiate open chain with restricted motion – (90° – 30°)

- Suggested modalities:

Edema reduction, muscle stimulation if no quad contraction

Objectives to meet prior to progression to Phase III:

- Community distance walking with normal gait
- Normal stair ascent/descent
- Control step downs
- Single leg squat to 60°, held for 5 seconds
- Overhead squat test

Phase III

2 – 5 months

The goal of this phase is to further increase strength, endurance and regain confidence in the knee.

Goals:

- Improved strength, endurance and proprioception
- Side to side symmetry
- Return to functional activities

Formal Physical Therapy: 2 – 3 times weekly. Suggested exercises:

- Versa Climber, Fitter, Nordic Track
- Single leg squats, resisted lateral shuffles, supine Therapy ball hamstring curl, Control single leg lunge to 60°, unilateral step ups, proprioception – single leg on uneven surface (Bosu ball, soft side. Single leg Air-ex step), Static lunges, not past 90° knee flexion
- Allowed exercises: (with physician approval)
 - ✓ 10 weeks - Walking lunges, Elliptical, Stair climber
 - ✓ 12 weeks - Treadmill running
 - ✓ 14 weeks – Slide board
 - ✓ 16 weeks - Single leg hops, proprioception – Bosu ball, platform side
 - ✓ 18 weeks – Plyometrics

Objectives to meet prior to progression to Phase IV:

- Max strength of lower extremity
- Open chain strength – restricted motion from 90 – 45°, knee extension, high reps with low/medium weight
- Strength and proprioception approximately 85% of uninjured leg
- Side to side symmetry in knee flexion and extension within 15%
- Single limb peak landing force symmetry on an 18 inch hop
- Audibly rhythmic foot strike patterns on treadmill running

Phase IV 5 -- 6 months

The goal in this phase is full, unrestricted return to sports and activities.

Goals:

- Improvement of single-limb power production
- Improvement of lower extremity fatigue resistance
- Progress proprioception during functional activities
- Return to functional activities
- Increase strength of surgical limb to within 10% of strength of uninvolved limb.

Formal Physical Therapy:

- Wall jumps, line jumps (front to back/side to side), 180° jumps, tuck jumps, cross over hops, band good mornings, Swiss ball trunk extensions, bounding, single leg squats on Bosu ball, retrograde treadmill training with incline.
- Sport activities
- Maintenance program for strength and endurance

Objectives to meet prior to progression to Phase V:

- Maximum graded strength
- Proprioception -- 100% of uninvolved limb during activity
- Vertical jump test
- Shuttle run
- Lateral jump test

Phase V Post 6 months

Goals

- Return to full activities

Objectives to meet prior to full discharge:

- Drop vertical landing symmetry
- Tuck jump with 80 point score
- Modified Agility T-test time within 10%
- Single leg, 10 second power test

Suggested readings:

- Myer GD, Paterno MV, et al. Neuromuscular training techniques to target deficits before return to sport after anterior cruciate ligament reconstruction. *Journal of Strength and Conditioning Research*, May 2008.
- Grodski M. Exercises following anterior cruciate ligament reconstructive surgery: biomechanical considerations and efficacy of current approaches. *Research in Sports Medicine*, 16:75-96, 2008.
- Wright RW, Preston E, Braden C, et al. A systemic review of anterior cruciate ligament reconstruction rehabilitation – part I: Continuous passive motion, early weight bearing, postoperative bracing, and home based rehabilitation. *Journal of Knee Surgery*, July 2008.
- Wright RW, Preston E, Braden C, et al. A systemic review of anterior cruciate ligament reconstruction rehabilitation – part II: Open versus closed kinetic chain exercises, neuromuscular electrical stimulation, accelerated rehabilitation, and miscellaneous topics. *Journal of Knee Surgery*, July 2008.