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### Post-Operative Physical Therapy Protocol for Autograft ACL Reconstruction

#### **Post-Operative Weeks 0-2:**

##### *Goals:*

1. Obtain full knee extension and 90° of knee flexion

##### *Weight-bearing:*

1. Partial weight-bearing (unless otherwise instructed by MD) WITH BRACE LOCKED IN EXTENSION; use crutches

##### *Brace:*

1. Locked at 0° of extension while weight-bearing
2. 0-90° for knee flexion; gradually unlock further as flexion increases

##### *Ice:*

1. Ice 4-6 times per day for 15-30 minutes per session

##### *Exercises:*

1. Range of motion:
  - a. Flexion: Knee bends, wall slides, and heel slides to patient tolerance
  - b. Extension: Passive knee extension using prone hangs and towel roll

2. Strengthening:
  - a. Quad sets with knee support
  - b. Hamstring digs with knee support
  - c. Begin ankle strengthening exercises (plantarflexion/dorsiflexion, inversion/eversion)

### **Post-Operative Weeks 2-6:**

#### *Goals:*

1. Top priority - obtain full ( $0^{\circ}$ ) knee extension.
2. Increase knee flexion.
3. Increase quadriceps strength in preparation for progression to ambulation without use of crutches.
4. **No** progressive resisted exercises of the quadriceps, hamstrings, or hip musculature until full active range of motion is restored (week 6-8).

#### *Weight-bearing:*

1. Progress to full-weightbearing as tolerated. Continue to use crutches until:
  - a. Full active and passive extension is achieved.
  - b. Patient is able to perform a straight leg raise without a lag
  - c. Passive knee flexion is  $>90^{\circ}$
  - d. Patient can walk without a limp.

#### *Brace:*

1. Unlock brace when quad control is adequate for knee support (discontinue brace after 6 weeks)

#### *Exercise Program:*

1. Continue knee brace at full extension.
2. Flexion Exercises:
  - Active assisted knee flexion (goal is  $130^{\circ}$ ; try to increase  $10^{\circ}$ /week).
  - Heel slides
  - Wall slides
  - Biking as tolerated to 30 minutes (zero to low resistance; increase progressively).
  - First two weeks of exercise bike backwards (no resistance).

### 3. Extension Exercises:

- Prone hangs
- Passive terminal knee extension with overpressure to tolerance

### 4. Quadriceps activation exercises

### 5. Manual Interventions:

- Patellar mobilizations as needed
- Tibiofemoral mobilization into extension
- Soft-tissue as indicated

\* If any of these exercises seem to aggravate the knee (swelling, pain, or tenderness), then that specific exercise which causes the difficulty should be postponed until you have discussed the effects of the exercise with us (480-219-3342).

#### *Modalities:*

Modalities as needed for VMO re-education, pain modulation, control of inflammation, and edema control.

#### **Post-Operative Weeks 7-12:**

#### *Goals:*

1. Achieve full extension to near full flexion.
2. Improve quadriceps tone (return of VMO definition)

#### *Exercise Program:*

1. Quadriceps - straight leg raises (10 sets of 30 repetitions each), quads setting (10 sets of 30 repetitions each), and short arc quadriceps extension.
2. Hip muscle groups. May progress by adding weights above the knee. Hip abductors, flexors, abductors, adductors, and extensors (10 repetitions, 4 sets daily). An isometric variation can be performed by pushing down on the hip being worked on and sustaining a contraction for 10 seconds.
3. Hamstrings curls - may add weights around the ankle (10 repetitions, 4 times daily).
4. Calf raises. 3 sets, 10 repetitions - fast and slow sets (each).
5. Swimming. Flutter kick only - gentle. No whip kick.

6. May begin outdoor biking program - avoid hills. A good rule of thumb for those interested in returning to athletics is that you need three minutes of biking to substitute for one minute of running.
7. Accelerated program - start with sand bags on tibial tubercle. Perform straight leg raises (10 sets, 10 repetitions each) and progress fulcrum distally one inch per week).
8. Walking (level ground). Build up pace gradually. Feel big toe of affected foot push off as you walk to ensure normal gait pattern. Start off at one mile at brisk pace, increase to three miles. No limping allowed.
9. Sissy squats. Stand facing the edge of a door and place hands on the door knobs on each side of the door. Feet should be shoulder width apart. Perform a half-squat (never past 90 degrees) and slowly raise to a starting position. Build up to 100 repetitions per day.

### **Post-Operative Weeks 12-16:**

#### *Goals:*

1. Full knee range of motion. Refer back to surgeon for extension restriction of 5° or if less than 110° flexion.
2. Normal gait pattern.
3. Progressively increasing functional strengthening program.

#### *Exercises:*

1. Continue with exercise program from week 7-12.
2. Weight room activities:
  - Leg press - press body weight as many times as possible on nonsurgical side (to fatigue). Follow same sequence on surgical side.
  - Squat rack - half squats (not past 70 degrees) at one-half body weight, 10 repetitions; progress to full body weight as tolerated.
3. Continue biking and/or swimming on a daily basis. No whip kicks.
4. Agility workouts:
  - Balancing on a teeter-totter board or disc on a half-croquet ball
  - Figure of 8's (20 to 30 yard diameter circles)

## **Post-Operative Months 4-6:**

### *Goals:*

1. Improve quadriceps strength/function
2. Improve endurance
3. Improve coordination/proprioception

### *Exercises:*

1. Backward jog
2. Jogging - (level surfaces only) - 15 minutes at 8-10 minutes/mile pace. Add 5 minutes per week. Perform daily.
3. Biking - by now the amount of set resistance should be increasing. Perform daily at 20 minutes/day. Legs should feel drained once off the bike.
4. Step-ups - face the step. Put foot of operative knee on step and step up on the step. Repeat with gradual build up in repetitions until doing 100 step-ups/day. Try to lower from the step twice as long as it takes to raise up on the step.
5. Agility Drills:
  - Figure 8's - daily - 5 minutes half-speed - tighten circle size down
  - Shuttle runs daily - 5 minutes - half-speed - repeat 10-12 repetitions
  - Zig-zag running - angle across a distance of 10-15 yards, then angle back across field to another boundary 10-15 yards apart. Continue for 100 yards. Tighten up as strength/endurance permits.
6. Educate patient as to use of functional brace.
7. Sports on Own:
  - Basketball - shooting baskets only
  - Rollerblades - level surfaces - no hills- no quick stops, cutting, or operative leg cross-overs (parking lots)
  - Golf (9-holes, avoid fatigue)

## **Post-Operative Full Rehabilitation:**

1. No competitive or pivot sports until cleared by surgeon. When cleared, patient is to use functional brace for 6 months. Return to sports is typically allowed no sooner than 9 months post-operatively.

2. Therapists criteria for return to sports:

- Full and painless A-ROM
- No patellofemoral joint pain
- Gross manual muscle testing strength 90-100% of contra-lateral side
- Patient can pass single leg hop test for distance, single leg squat test, and figure of eight hop test

3. Quadriceps/thigh circumference should be within 1 cm of nonoperative (if normal) side.

4. Weekly strengthening program - independently (2-3 times/week):

- Full speed jog/run - 20-30 minutes - 6-7 minutes/mile or best pace.
- Exercise stationary bike - increasing resistance, set bike so low leg is flexed no more than 10-15 degrees, 20 minutes.
- Agility drills (figure 8's, shuttle runs, turns), teeter-totter balancing
- Continue quad sets, SLR's (300 repetitions/day)
- Hills/stairs - running up hills and up stairs can be utilized to help build muscle mass and strength. Care should be taken running downhill and down steps. This can irritate the knee and should be one of the last exercises added to the workout program.