
Rehabilitation Following ACL with Semitendinosus Reconstruction

I. IMMEDIATE POSTOPERATIVE PHASE :

Goals:

- 1) Protect ACL reconstruction
- 2) Reduce swelling & inflammation
- 3) Restore & maintain full extension
- 4) Gradually restore knee flexion
- 5) Activate quadriceps muscle
- 6) Independent ambulation
- 7) Patient education & protect graft harvest site

POD 1

Brace Brace locked at zero degrees extension for ambulation

Weight Bearing Two crutches as tolerated (at least 50 % WB)

Range of Motion - Full passive extension (0-90 degrees) – obtain hyperextension if present on Opposite side....goal is symmetrical motion

Exercises

- * Ankle pumps
- * Passive knee extension to zero or equal to opposite side (hyperextension)
- * Straight leg raise (flexion)
- * Hip Abd/Adduction
- * Knee Extension 90-40 degrees
- * Quad sets
- * No Hamstring stretching **

Muscle Stimulation Muscle stimulation to quads (4-6 hours per day) during active exercises

CPM Zero to 90 degrees

Ice and Evaluation Ice 20 minutes out of every hour and elevate with knee in extension

POD 2 to 7

Brace Brace locked at zero degrees extension for ambulation

Weight Bearing Two crutches as tolerated

Range of Motion Patient out of brace 45 times daily to perform self ROM 0-90/100 degrees

Exercises

- * Intermittent ROM exercises (0-90 degrees)
- * Patellar mobilization
- * Ankle pumps
- * Straight leg raises (4 directions)
- * Standing weight shifts and mini squats [(030) ROM]

- * Knee extension 90-40 degrees
- * Continue quad sets

Muscle Stimulation Electrical muscle stimulation to quads (6 hours per day)

CPM Zero to 90 degrees

Ice and Elevation Ice 20 minutes out of every hour and elevate with knee in extension

II. **MAXIMUM PROTECTION PHASE (Week 28)**

- Goals:**
- 1) Absolute control of external forces and protect graft
 - 2) Nourish articular cartilage
 - 3) Decrease swelling
 - 4) Prevent quad atrophy

A: Week Two

Brace Brace locked at zero degrees for ambulation only, unlocked for self ROM (4-5 times daily)

Weight Bearing As tolerated (goal to discontinue crutches 710 days post op)

Range of Motion - Self ROM (4-5 times daily), emphasis on maintaining zero degrees passive extension

KT 2000 Test (15 lb. anterior-posterior test only)

Exercises

- * Multiangle isometrics at 90, 60, 30 degrees
- * Leg raises (4 planes)
- * No Hamstring curls
- * Knee extension 90-40 degrees
- * Mini squats (0-40) and weight shifts
- * Lateral Lunges
- * Leg Press (0-60)
- * PROM/AAROM 0-105 degrees
- * Patellar mobilization
- * No Hamstring and calf stretching
- * Proprioception training
- * Well leg exercises
- * PRE Program start with 1 lb., progress 1 lb. per week

Swelling control Ice, compression, elevation

B: Week Four

Brace - Brace locked at zero degrees for ambulation only, unlocked for self ROM (4-5 times daily)

Range of Motion Self ROM (4-5 times daily), emphasis on maintaining zero degrees passive extension

Exercises

- * Same as week two
- * PROM 0-125 degrees
- * Bicycle for ROM stimulus and endurance

- * Pool walking program, swimming
- * Initiate eccentric quads 40100 (isotonic only)
- * Leg press (060)
- * Emphasize CKC exercise
- * Emphasize hip strengthening (Hip ER, Abduction, Extension)
- * Elliptical

KT 2000 Test (Week 4, 20 lb. anterior and posterior test)

Phase Two: Continued

C: Week Six

Brace - Discontinue use of drop locked brace

Exercises

- * Same as week four
- * Hamstring Curls (light resistance)
Hip Drills (RDLs, Clams, Lateral slides) etc
- * Pool Program
- * AROM 0-115 degrees
- * PROM 0-125 degrees
- * Emphasize closed chain exercises
- * Bicycle

KT 2000 Test (Week 6, 20 lb. and 30 lb. anterior and posterior test)

D: Week Eight

Brace - Consider use of functional brace

Exercises - Continue PRE program
Initiate light hamstring PREs

KT 2000 Test (Week 8, 20 lb. and 30 lb. anterior and posterior test)

III. **MODERATE PROTECTION PHASE (Week 10-16)**

Goals: Maximal strengthening for quads/lower extremity
Protect patellofemoral joint

A: Week 10

Exercises

- * Knee extension (90-40 degrees)
- * Leg press (0-60)
- * Mini squats (0-45)
- * Lateral step ups
- * Hamstring curls
- * Hip Abd/Add
- * Toe/calf raises
- * Bicycle
- * Stairmaster
- * Wall Squats
- * Lunges

- * Pool running
- * Proprioceptive training
- * Continue PRE progression (no weight restriction)

B: Week 12-14

Exercise - Continue all above exercises

Testing - Isokinetic Test (180/300 degrees/sec, Full ROM, 10/15 reps)

KT 2000 Test Total Displacement at 15 lb., 20 lb. and 30 lb., Manual Maximal Test

Maintain/Begin running (if patient fulfills criteria)

IV. LIGHT ACTIVITY PHASE (Month 4-5)**Criteria to Enter Phase IV**

- * AROM 0-125 degrees >
- * Quad strength 70% of contralateral side, knee flexor/extensor rated 70-79%
- * No change in KT scores (+2 or less)
- * Minimal/no effusion
- * Satisfactory clinical exam

Goals: Development of strength, power, endurance
Begin gradual return to functional activities

Exercises: Initiate light straight line running (Physician decision)

A: Week 20-21**Exercises**

- * Emphasize eccentric quad work
- * Continue closed chain exercises, stepups, minisquats, leg press
- * Continue knee extension 90-140 degrees
- * Hip abduction/adduction
- * Initiate plyometric program
- * Initiate running program
- * Initiate agility program
- * Sport specific training and drills
- * Hamstring curls and stretches
- * Calf raises
- * Bicycle for endurance
- * Pool running (forward/backward)
- * Walking program
- * Stairmaster
- * High speed isokinetics

Testing - Isokinetic Test (180/300 degrees/sec, Full ROM, 10/15 reps)

KT 2000 Test Total Displacement at 15 lb., 20 lb. and 30 lb., Manual Maximal Test
Criteria for Running

Isokinetic Test - 85% > of opposite leg (quads), 90% > of opposite leg (hamstring)

Isokinetic Test - Quad torque/body weight (180 degrees/sec) (60-65% males)(50-55% females)

KT 2000 Test – Unchanged

No Pain/Swelling

Satisfactory clinical exam

Functional Drills

- * Straight line running
- * Jog to run
- * Walk to run

V. RETURN TO ACTIVITY PHASE (Month 6 - 7)

Goals: Achieve maximal strength & endurance

Return to sport activities

* Continue strengthening program for one year from surgery

4 Quads

Knee Extensions
Wall Squats
Leg Press (40-100)
Step downs

4 Strength

Hamstrings
Calf Raises
Hip Abduction
Hip Adduction

4 Endurance

Bicycle
Stairmaster
Elliptical
Swimming

4 Stability

High Speed Hamstrings
High Speed Hip Flexion/Extension
Balance Drills
Backward running
Hip ER/IR strengthening
Lateral Slides

*Pick One