

DR. SAFRAN'S THERAPY PROTOCOL
For
ARTHROSCOPIC ACL RECONSTRUCTION
WITH LARSON LCL-PLC RECONSTRUCTION

I. EARLY POST OPERATIVE (0 - 6 weeks)

A. Brace

- 1) Patients are locked at 0° for first week, except for ROM and/or CPM.
- 2) Open only for self administered PROM from 0° to 90° as tolerated.
- 3) After first week unlock brace for ROM activities
- 4) Full ROM allowed after Week 1
- 5) Keep brace locked for WB activities until good quadriceps control as assessed by PT.
- 6) If gait is normal, discontinue brace – usually at 3 (allograft) to 4 weeks (autograft)

B. Ambulation

- 1) Non weight bearing for 2weeks then
- 2) 50 lb WB with crutches and brace for 1 week then
- 3) 75 lb WB with crutches and brace for 1 week then
- 4) 100lb WB with crutches and brace for 1 week, then
- 5) Full WB with crutches and brace to wean off crutches
5a) Stop crutches as long as don't have a limp, no extensor lag, flexion contracture less than 5°, and good quad contraction
- 6) Long, hinged knee brace continues until 8 weeks post op

C. Electrical Stimulation is to be used until the patient can generate a quad set of good tone

D. Patellar mobilization is taught to the patient 1 - 3 days post-operatively including: inferior, superior, and medial glides, as well as patellar tilts. Emphasize grade 1 and 2 mobilization techniques to avoid further inflammation of the knee.

E. Cryocuff / Game Ready / or ice is applied immediately post-operatively over the sterile dressing. The brace is the applied over the cryocuff. the cryocuff should be drained and refilled with cold water every hour while in the hospital, then used for 20 -30 minutes every 2 -3 hours at home.

F. Exercises

1. All exercises during the first 3-4 weeks are done in the brace.
2. Exercises initiated during hospitalization include:
 - a. Ankle pumps
 - b. Self administered PROM as tolerated by the patient
 - c. Hamstring Sets
 - d. Quad sets in full extension
 - e. Straight leg raises with the brace locked in full extension.
 - i. If difficulty doing SLR, try side lying abduction, then rotating onto the back, keeping leg elevated
 - f. Heel slides
3. On POD # 7 begin:
 - a. Active prone leg curls
 - b. Prone hamstring sets
 - c. Active Hip Exercises:
 - i) Prone extension
 - ii) Sidelying Adduction
 - iii) It is IMPORTANT TO AVOID Sidelying ABduction
 - d. Passive knee extension to 0° in prone position. The quad should be silent.
 - e. Active knee extension 90° to 60° in seated position
 - i) Patient must be made aware of the proper angle locations. If not, must use Kin-Com with proximal pad placement to ensure safe angles are maintained.
 - f. Quad sets in full extension. Utilize electrical stimulation and/or biofeedback if the patient demonstrates difficulty in initiating quad set.
 - g. Stretch hamstrings and calves.
 - h. Straight leg raise without brace if less than 5 - 10° extensor lag.
 - i. May unlock brace at night at sleep.

4. On POD # 15 add:
 - a. Resisted leg curls in prone position protecting knee from hyperextension.
 - i) Angles should be between 0° and 60° with force curve near extension.
 - b. Quadriceps isometrics every 15° in the range of 90° to 60° .
 - c. Resisted gastroc/soleus exercise using rubber tubing.
 - d. Add resistance to hip exercise. Place weight proximal to knee for ADduction.
 - e. May stop using brace at night while sleep.
 - f. Stationary cycle - when inflammation low
 - i) Initially work partial cycle with seat set relatively low to increase motion.

5. On POD # 21 add:
 - a. Add light resistance to short arc quadriceps exercises in the range of 90° to 60° . Emphasis should be on low resistance/high repetition within the patient's tolerance.
 - b. Pool activities
 - i) AROM 0° to 90° with buoyancy assisting extension
 - ii) Flutter kicking performed with knee flexed and motion occurring at hips
 - iii) Hip exercises

II. INTERMEDIATE POST OPERATIVE PERIOD (7 - 14 Weeks)

- A. Post-operative rehabilitation brace should be discontinued at week 8
- B. Continue use of crutches WBAT if walk with a limp.
- C. Exercise:
 - 1. Weeks 7 - 10
 - a. AROM with goal to increase flexion and gain full extension
 - i) Stretch into flexion
 - ii) Hamstring / calf stretching
 - iii) Continue passive knee extension in prone position
 - b. Continue with straight leg raises in full extension if no lag. Slowly progress to weighted straight leg raises.
 - c. Active knee extension from 90° to 0°. Avoid pain and crepitation. No resistance applied in the range of 0° to 45°.
 - d. Progress exercise on leg press / hack squat machine as tolerated with emphasis on high repetition / low resistance in the range of 0° to 90°. Squats and Press should not be performed lower than 90° knee flexion.
 - e. Partial squats 0° to 30° of knee flexion. Joint must be painfree. Perform bilateral and progress to unilateral as tolerated.
 - Increase ROM for bilateral partial squats from 30° to 45° of knee flexion. Progress to unilateral squats / step-ups as tolerated.
 - f. Stationary cycle
 - i) Initially work partial cycle with seat set relatively low to increase motion.
 - ii) Once sufficient motion is present, increase seat height and work on low load/high speed for endurance. May pedal unilaterally to work hamstring using toe clips.
 - g. Continue with previous exercises progressing to weight machines as tolerated.
 - i) Resisted leg curl. Avoid knee hyperextension.
 - ii) Resisted hip extension.
 - iii) May start Hip Abduction and add resistance
 - iv) Resisted short arc quads in the range of 90° to 60°.
 - h. Begin Hip and Quadriceps stretching

2. 11 - 14 weeks

- a. Should have achieved full extension by the end of the 8th week. Dr. Safran should be notified if the patient presents with loss of knee extension, decreased patellar mobility, and a quadriceps lag. Passive stretching should be considered at this time.
- b. Crutches and other assistive devices should be discontinued by now if the noted criteria are met. Utilize treadmill for gait training as needed. May use mirror for visual feedback.
- c. Continue with exercises as above progressing as tolerated emphasizing high repetition / low resistance weights
- d. Increase seat height to protect patello-femoral joint while pedaling the bike. Increase intensity and duration of pedalling as tolerated.
- e. Progress multiple angle quadriceps isometrics up to 45°.
- f. Step-ups. Begin with a 2" block and progress as tolerated.
- g. Balance activities. Initiate with unilateral standing on flexed knee with eyes open. Progress to foam mat, BAPS board and/or decrease visual input (close eyes). Use of K.A.T. may be helpful.
- h. Isometric and Isotonic training for hamstrings.

III. LATE POST OPERATIVE PHASE (4 - 7 Month)

A. Full knee flexion should be achieved by the 13th week. Use passive stretching techniques to gain flexion if needed.

B. Exercises:

1. 16 - 18th weeks (4th month)

a. Progress above exercises as tolerated including:

i) Stationary cycle

a) Pedal 15 - 30 minutes to develop local muscular and cardiovascular endurance.

b) Unilateral pedalling to emphasize hamstrings

ii) Exercises on weight machines

a) Emphasis still on high repetition / low weight. Perform sets of up to 100 repetitions to fatigue muscle.

b) Machines may include:

(i) Leg press / hack squat 0° to 90°

(ii) Leg curl

(iii) Hip ABduction

(iv) Hip ADduction

(v) Hip flexion

(vi) Hip extension

iii) Progressively increase walking to tolerance on treadmill or level ground

iv) Begin Jogging

a) Weeks 16 and 17:

i) Up and Down straightaway, no curves

ii) Stop at end and turn around

iii) Gentle and easy at first

iv) Increase speed and reps gradually

v) Take day off between each workout to see how knee responds

vi) If pain or swelling develops - back off!!

vii) Ice after jogging

b) Weeks 18 and 19

i) Begin running around track, including gentle curves, in both directions

ii) Progress speed, intensity and duration

- v) Add:
 - a) Short arc quads 30° to 0° with light weight/high repetitions to eliminate lag. Ensure that this does not irritate patello-femoral joint.
 - b) Flexibility exercises for lower extremity prn
 - c) Multiple angle isometrics approaching full extension starting submaximal progressing to maximal effort
 - d) Weighted step-ups in the range of 0° to 30°.
 - e) Stairmaster as tolerated. Begin with able to walk on level and stairs normally. Short steps and avoid hyperextension.

2. 20th to 24th week (5th month)

- a. Continue exercises as described above.
- b. Progress Running Program
 - i) Weeks 20 and 21
 - a) Begin figure of 8's on straightaway, using entire length, with slow gentle turns
 - b) Progressively shorten length of figure of 8 to half the length of the track, then to quarter length
 - ii) Weeks 22 and 23 start
 - a) Carioca's
 - b) Shuttle runs
 - c) More aggressive running and cutting drills
- c. ADD:
 - i) Full strengthening exercises if tolerated by patello-femoral joint
 - ii) 1/4 squats with weights. Keep tibia perpendicular to floor.
 - iii) Isometric and Isotonic training for quadriceps
 - iv) Progress proprioceptive activities to include balance activities on foam mat, mini tramp, and other uneven terrain or fitter.

IV. RECONDITIONING AND RETURN TO SPORTS

A. Exercise

1. Continue to progress above exercises as tolerated.
2. Functional strengthening exercises
 - a. Progress from slow speed to fast speed concentric / eccentric activities including:
 - i) Mini-tramp
 - ii) Jumping rope
 - iii) Jumping
3. Progress proprioceptive activities and progress to foam and other uneven terrain and/or fitter.
4. **Gradual return to sport – this is set for 11 months for Andy**
 - a. Begin progression when torque, work and endurance testing is less than 20% deficit.
 - b. Progression must be gradual, progressive and sport specific.
5. Will try custom Bracing for Andy – needs to get fit about 5 – 6 months post op as his strength / bulk progresses.