



Orthopaedic Institute of Ohio
801 Medical Drive Suite A, Lima, Ohio 45804
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Post-Operative Rehabilitation Protocol

ACL Reconstruction via Patella Tendon Autograft

REHAB RED FLAGS - IF ANY OF THESE PROBLEMS OCCUR CALL DR. LEVINE'S OFFICE IMMEDIATELY

*CALF TENDERNESS

*FEVER

*GROSS SWELLING

*UNABLE TO ACHIEVE 0 DEGREES PASSIVE EXTENSION WITH EASE AT
POST-OP WEEK 2

*FLEXION LESS THAN 110-120 DEGREES AT POST-OP WEEK 3

KNEE FLEXION ROM GOALS

Post OP Week 1 90 degrees

Post OP Week 3 110-120 degrees

Post OP Week 4-6 Full

Phase I Protective Phase

Goals: 1. Prevent wound infection

2. Minimize post-op swelling

3. Achieve 0 degrees passive extension- NOT HYPEREXTENSION!

4. Achieve good quadriceps isolation (good quad set in extension)

5. Initiate knee flexion range of motion

6. Independent gait with crutches and knee immobilizer

Day of Surgery

1. Immobilization in extension, elevation on wedge, compressive dressing, ice

2. Ankle pumps 25 times per waking hour

3. Educate no pillow under the bend of the knee

4. Do not allow elevation of the foot of the bed by the controls on the bed (puts the knee in flexion)



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Post-op Day 1 to 7

1. Initial dressing change, wound inspection, instruct home dressing changes
2. Continue ankle pumps
3. Quad sets (if poor quad or VMO recruitment, try puffing the knee in slight flexion over a pillow and if necessary electrical stimulation for muscle re education- teaches the idea that when the quad contracts the patella slides up and when the quad relaxes the patella slides back down)
4. Active knee flexion ROM via sitting heel slides (teach to keep the quad relaxed, to stay down on the hip and to slide the heel back using the hamstring muscles; have the patient first try it on the contralateral leg)
5. Hamstring stretching
6. Teach leg control for transfers (i.e. tightening the quad while the leg is being moved with assistance)
7. Gait NV with assistive device
8. Ice with elevation and compression in extension
9. Issue home program

Post-op Week 1 to 2

1. Ankle pumps
2. Quad sets
3. Straight leg progression- standing to seated to supine
(if cannot perform the leg raise with 5 degree or less extensor lag then must have assistance, do not progress if extensor lag)
4. Active knee flexion ROM in sitting
5. Hamstring stretching
6. Heel cord stretching
7. Assess patella mobility; teach patella mobilizations if appropriate; have patient perform self-mobilizations before quad sets as part of home exercise program
8. Issue modified home exercise program as appropriate. Do not issue leg raises for home program if no family member for assistance. Recommend educating a family member on proper technique of each exercise.



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Phase 2: Controlled Stability Phase

Goals: 1. Continue to minimize swelling

2. Supine SLR with no extensor lag
3. Achieve full flexion ROM
4. Independent gait with good mechanics without assistive device
5. Begin to achieve single leg stability

Post-op Week 2-8

Before the start of every therapy session evaluate for swelling. If increased from previous session start with ice and elevation and compression. Modify exercise program including home program. Emphasize ice, elevation and compression. If mild swelling, perform only quad sets, SLR's, side lying hip abduction, knee flexion ROM, Hamstring stretching and heel cord stretching. If moderate swelling, perform quad sets, gentle knee flexion ROM, hamstring stretching and heel cord stretching. If significant swelling with no history of trauma perform only quad sets and hamstring and heel cord stretching and have patient go back on crutches.

Continue to begin and end rehabilitation program with the knee in extension.

1. If good wound healing at post-op week 3 instruct scar massage 2 minutes three times per day.
2. Progress weightbearing to weightbearing as tolerated by Week 2 and off crutches by week 4. Work on proper gait mechanics. Evaluate gait mechanics every session. May wean off crutches at Week 5 if consistent good mechanics.
3. Continue active knee flexion ROM in sitting. Can add assistance but do not be aggressive. When maxed out in sitting progress to supine heel slide. Continue hamstring stretching and heel cord stretching. If 0 degrees passive extension (not hyperextension) is not achieved with ease, have patient start using a towel under heel 10 minutes three times per day at home while lying supine.
4. Open kinetic chain strengthening

Quad sets- assess quality of contraction every session

Straight leg raises- assess extensor lag every session-progress as appropriate

Side lying hip abduction- begin when performing straight leg raises in supine

Sitting hip flexion

Standing hamstring curls - begin only when 90 flexion is achieved with ease



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Do not add weight until 4-6 weeks post-op and for supine leg raises only if no extensor lag!

If having problems eliminating extensor lag with a supine straight leg raise, try a mini heel lift- no more than a two inch towel roll under the knee.

5. Closed kinetic chain strengthening

Can begin at post-op week 3 and if supine SLR with <5 degree extensor lag and no swelling. Add one exercise at a time. Re-evaluate next exercise session. If swelling present discontinue exercise until resolved. If unable to determine which exercise is contributing to the swelling, discontinue all closed chain activities. Consider going back on crutches. Emphasize elevation, ice, compression.

Standing bilateral heel raises

¼ bilateral wall slides

Stationary bike (only when achieve 110-115 flexion ROM, keep seat high-ie only 10-15 degrees knee flexion at down pedal)

Stair stepper (4 inch step max)

Walking program when off crutches (start forward, add backward and sidestepping; progress to incline on treadmill forward and backward)

6. Balance/Proprioception

Begin at three weeks if good quad set and at least a seated straight leg raise with less than 5 degree extensor lag

Start with weight shifts with support, make sure patient is contracting quad. Progress to no support. If no problems progress to single leg stance.

Progression:

Eyes open level surface

Eyes open uneven surface (standing on a pillow)

Eyes closed level surface

Eyes closed uneven surface

7. Continue ice, elevation and compression after exercises.

8. Continue to issue modified home exercise program as instructed.

Phase 3: Functional Strengthening

Criteria for progressing to Phase 3:

1. Satisfactory clinical examination per MD
2. Full active flexion ROM and 0 degrees passive extension
3. No extensor lag with supine SLR
4. Unassisted ambulation with proper mechanics



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- Goals:
1. Increase strength
 2. Improve cardiovascular and muscular endurance
 3. Improve cardiovascular and muscular endurance
 4. Achieve good single leg stability

Post-op 2-4 months

Continue to monitor the knee's reaction to new activities and modify the rehab program as necessary

Do not sacrifice quality for quantity

Continue progression of closed chain strengthening with progression to single leg activities as appropriate

Stationary bike warm-up

Stretching

Hamstring curls (progress to machine in prone or sitting if appropriate)

Single leg wall slides (use physioball to also work balance)

Leg press (start double leg then up with both legs and down with involved leg then up and down with involved leg only)

Single leg heel raises (progress to calf machine if appropriate)

Step ups (start with front and progress to side; start with 2 inch step and progress to 6-8 inch as appropriate; watch for proper hip/trunk control)

Lunges (front, back, diagonal; add weight if and when appropriate)

Resisted walking with sport cord (forward, backward, side-stepping)

Continue single leg balancing activities(ex-add ball toss, up on toes)

Stationary Bike

Elliptical Machine

Stair stepper

Straight ahead jogging at 3 months post-op

Jogging up steps and walking down at 3 months post-op

Hamstring and heel cord stretching

Ice with elevation and compression

Continue to issue modified home exercise program as appropriate



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Phase 4: Return to function

Criteria for entering Phase 4: 1. Satisfactory clinical examination per MD

2. Involved leg= uninvolved single leg stance

3. Thigh girth difference 1 inch or less involved to noninvolved

Post-op 4-12 months

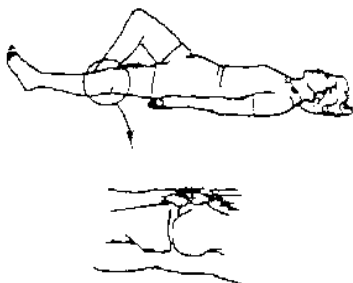
Begin sport specific functional progression-know the demands of the sport

Continue cardiovascular training

Begin plyometric training

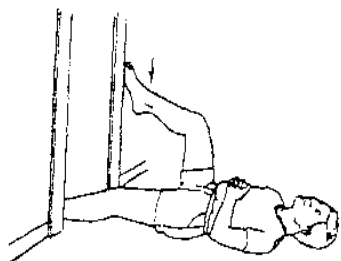
Issue home maintenance strengthening and flexibility program

Functional testing (one legged hop tests) at 6 months post-op



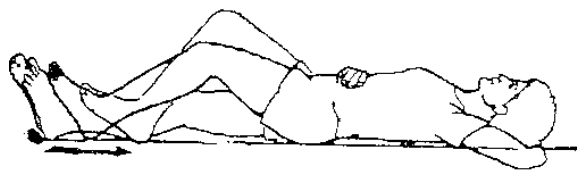
Exercise 1 of 6
Quad Sets/Extension

1. Sit or lie on your back with operated leg straight
2. Press the back of your operated knee downward
3. This will tighten the muscle on top of your thigh and move your kneecap as shown
4. Hold 5 seconds
5. 50 Repetitions, 3 times a day



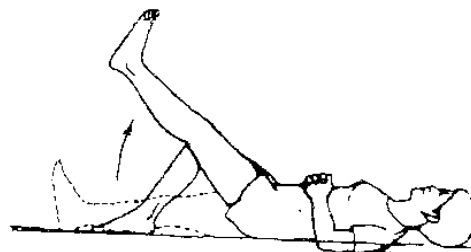
Exercise 3 of 6
Knee Flexion

1. Lie on floor as shown with toes lightly touching wall
2. Let the weight of gravity bend your knee, as you let your toes slide down the wall
3. Hold 3 seconds
4. 30 repetitions, 2 times per day



Exercise 5 of 8
Hamstring/Flexion

1. Lie flat on back
2. Slide heel toward your buttocks, bending the knee
3. Hold 3 seconds and slowly lower
4. 30 repetitions, 2 times per day



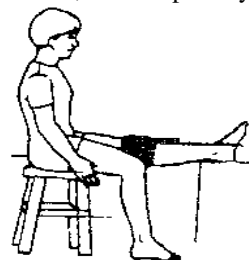
Exercise 2 of 6
Straight Leg Raise

1. Lie on back with operated knee straight and the other knee bent as shown
2. Keep the leg completely straight, then raise it to match the height of the bent knee
3. Hold 3 seconds and slowly lower
4. 30 repetitions, 2 times per day



Exercise 4 of 8
Hip Adduction

1. Lie on side as shown, with operated leg on the bottom
2. Raise leg up toward ceiling
3. Hold 3 seconds, slowly relax
4. 30 repetitions, 2 times per day



Exercise 6 of 6
Knee Extension

Lying or sitting: Place foot on a rail or table. Make sure there is nothing supporting the leg under the thigh or calf. Point toes toward the ceiling; do not let your foot roll to the side. Perform 5-10 min EVERY WAKING HOUR. May use a weight on top of the leg to increase the amount of extension.