

ACL RECONSTRUCTION - HAMSTRING

Dr Elrashidy – Webster Orthopedics

OVERVIEW

- Focus on protection of graft and fixation in primary phases (Weeks 0 -12)
- For ACL reconstruction with meniscal repair, defer to precautions in meniscal repair protocol.
- The physician may alter time frames of brace-wear and use of crutches
- Supervised Physical Therapy for 4-6 months
- Use caution with hamstring stretching/strengthening based on donor site morbidity

GENERAL GUIDELINES

- Ok to shower on post-op day 3. **NO bathing/soaking knee** until cleared by physician
- Sleep with brace locked in extension x 1 week
- **Brace guidelines:** Locked in full extension for 1st week (when walking and during sleep). As quad function improves, begin unlocking brace gradually from Week 1 - Week 6 (15°-20° per week, fully unlocked at week 6). Discontinue brace after Week 6
- Weight-bearing as tolerated by end of Week 1/start of Week 2

PHASE 1: Post-Op Through Week 6

Goals:

- Protect graft and graft fixation with use of brace and specific exercises
- Minimize effects of immobilization
- Control inflammation and swelling (cryocuff/ice machine for first 2 weeks)
- Full active and passive extension/hyperextension range of motion. Caution: avoid hyperextension > 10°
- Restore normal gait on level surfaces
- No flexion past 90° until after Week 4 to protect graft fixation

Brace (Total Length = 6 weeks):

- **Week 1: Brace locked in full extension for ambulation and sleeping**
- **Weeks 2-4:** Unlock brace (goal of 90°) as quad function returns. Ok to d/c brace when sleeping after first post-op visit (Day 10-14)
- **Week 5-6:** Unlock brace completely from Week 5 to Week 6. Wean from brace after Week 6, as patient demonstrates good quad control + normal gait mechanics
- At Week 7-8: Brace on only in vulnerable situations (e.g. crowds, uneven terrain)

Weight-Bearing:

- Week 1: Partial weight-bearing with crutches to assist with balance
- Weeks 2 - 6: Progress to full weight-bearing with normal gait mechanics
- Wean from crutches by 2 weeks and brace by 6 weeks as patient demonstrates normal gait mechanics and good quad control (defined as lack of quadriceps lag)

ACL HAMSTRING PROTOCOL

Exercises:

- Week 1: Maintain extension and work on passive and active-assisted flexion and leg curls (progress to active leg curls as tolerated in Week 2)

A. Extension (straightening knee)



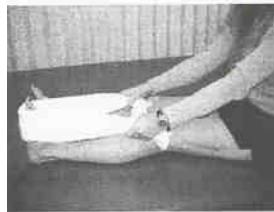
Lie on your stomach with your knee and lower leg hanging over the edge of the bed to stretch your knee straight. Hold 5-10 minutes, 4-5 times per day.

and



Lie on the bed with your ankle on a pillow. Let your knee relax down to stretch your knee straight. Avoid tightening your thigh muscle. Hold 5-10 minutes, 4-5 times per day.

B. Flexion (bending knee)



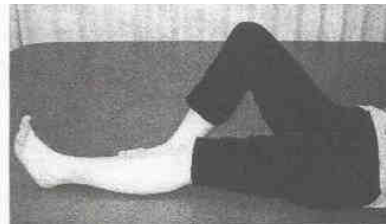
Lie on your bed with a loop of towel under your foot. Bend your knee **no more than 90 degrees** by sliding your heel toward your buttocks. Sustain the stretch for 3-5 seconds. Do 25 reps 4-5 times per day.



Flexion: Knee bending can also be accomplished by sitting in a chair. Slide your foot backwards with the help of your other foot. **Stretch no further than 90 degrees** Hold 10 seconds. Repeat 25 times 4-5 times daily

- Heel slides (limit to 90°)
- Quad sets

D. Quad Sets: When you are able to stretch your knee **completely straight** you can do this exercise. With your knee completely straight, tighten your front thigh muscle (quad). Hold for 3-5 seconds, repeat 10-20 times, 4-5 times per day.



- Gastroc/Soleus stretching
- Very gentle hamstring stretching at 1 week
- Quad isometrics as 60° and 90°

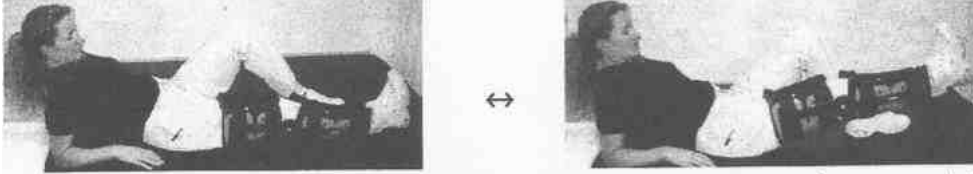
VMO Isometrics: Sit with your knee with at least 70 degrees of bend in it. Squeeze a small ball or rolled towel between your knees while pushing your feet into the floor. Hold 5-10 seconds and repeat 10 times, 1-2 times daily.



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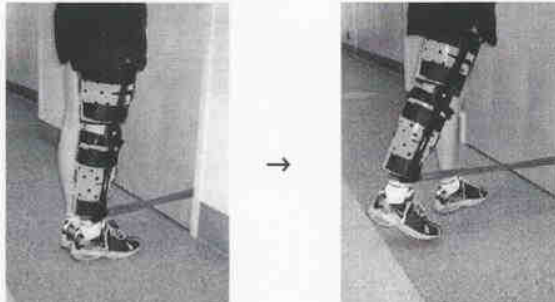
- SLR all planes: Brace on in full extension until quad strength sufficient to prevent extension lag. Add weight as tolerated to hip abduction, adduction and extension.



Straight Leg Raise – Brace On When you are able to stretch your knee completely straight you can do this exercise: With your knee completely straight and the brace on and with your other knee bent, lift the operated leg up as high as your other knee. Hold for 2-3 seconds, repeat 10-20 times, 4-5 times per day.

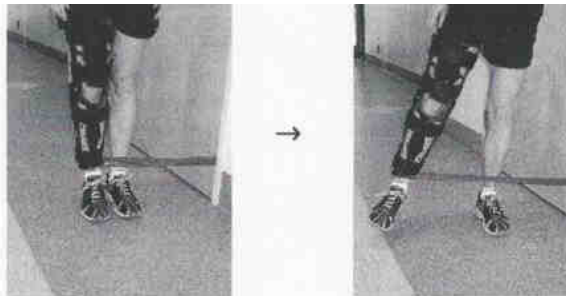
Hip Workout:

Extension Secure a loop of theraband in a door. Stand in the brace with the band around your ankle. Extend your leg backwards. Follow strength progression as above. Repeat with opposite leg.



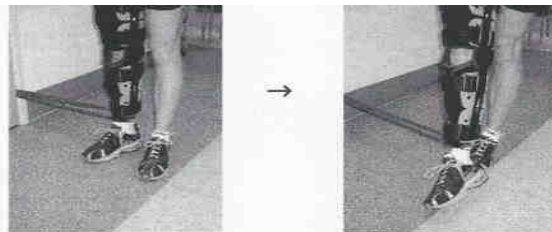
Hip Workout: Abduction:

Secure a loop of theraband in a door. Stand in the brace with the band around your ankle. Lift your leg out to the side. Follow strength progression as above. Repeat with opposite leg.



Hip Workout: Adduction:

Secure a loop of theraband in a door. Stand in the brace with the band around your ankle. Pull band across your body by crossing your leg. Follow strength progression as above. Repeat with opposite leg.



- If available, aquatic therapy (once sutures removed) to normalize gait, WB, and strength. Deep-water aqua-jogging for ROM and swelling

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PHASE 2: Weeks 7-12

Criteria for advancing to Phase 2:

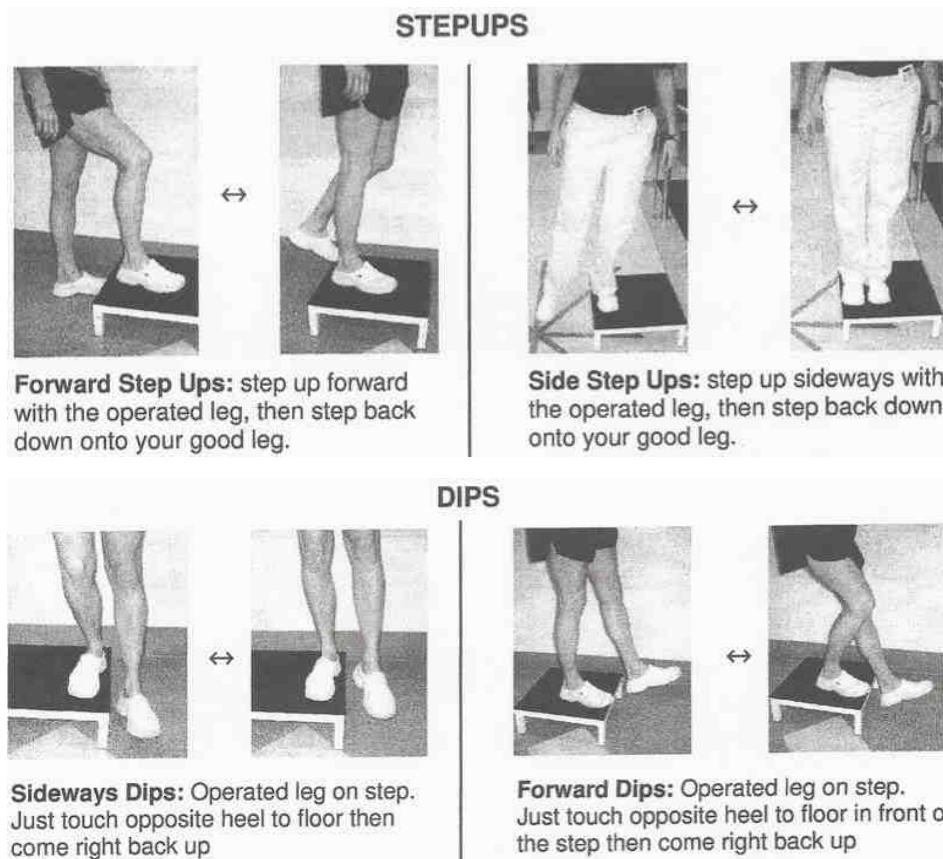
- Full Extension and Flexion to 90°
- Good quad set, SLR without extension lag
- Minimal swelling/inflammation
- Normal gait on level surfaces

Goals:

- Restore normal gait with stair climbing
- Maintain full extension, progress towards full flexion
- Increase hip, quadriceps, and calf strength
- Increase proprioception

Exercises:

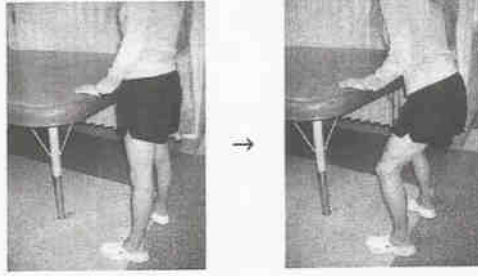
- Continue with range of motion/flexibility exercises as appropriate for the patient
- Initiate CKC quad strengthening and progress as tolerated (Wall sits, Step-ups, Mini-squats, Leg press 90° – 30°, Lunges)



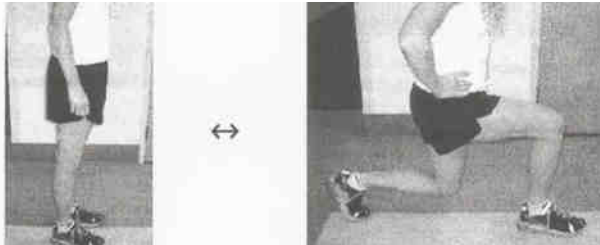
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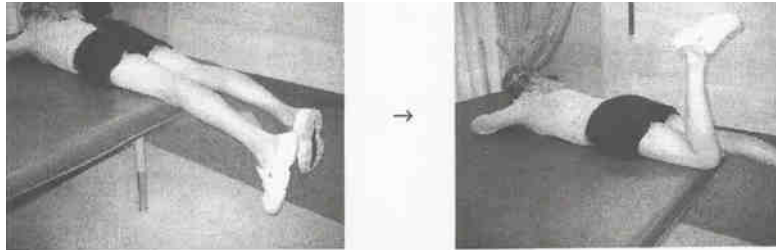
Mini Squats: Stand with your feet shoulder width apart while holding onto a table or countertop. Bend your knees until your knees are directly over your toes. Hold 5 seconds then return to the starting position. Follow strength progression as above. **Optional:** Can also squeeze a ball between your knees while squatting. Make sure knees are kept over toes.



Lunges – body erect, knees over toes



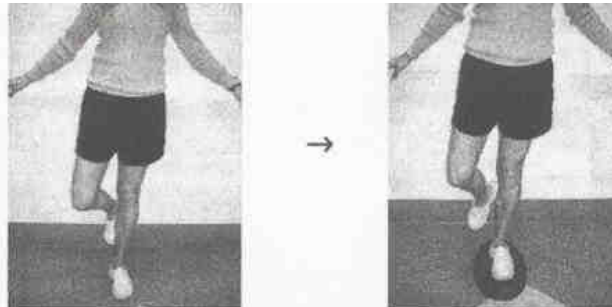
- Progressive hip, hamstring, calf strengthening (gradually add resistance to open chain hamstring exercises at week 12)



Hamstring Curls: Lie on your stomach with your knees hanging off the end of the bed. Curl your lower leg up. You can use your other leg to help the operated leg back to the starting position. Hold 5 seconds and repeat 10 times, 1-2 times daily.

- Continue Hamstring, Gastroc/Soleus stretches
- Stairmaster (begin with short steps, avoid hyperextension)
- Nordic Trac, Elliptical for conditioning
- Stationary Bike (progressive time and resistance)
- Single leg balance/proprioception (ball toss, balance beam, mini-tramp)

Single Leg Balance – Brace Off: Start on level floor then progress to standing on a pillow. Progress from using your arms for support to no arm use. Try with eyes open then progress to eyes closed if you have good control and are safe.



ACL HAMSTRING PROTOCOL

- If available, pool-running (waist deep) or on unweighted treadmill @10-12 weeks

PHASE 3: Weeks 13 Through 18-20

Criteria for advancing to Phase 3:

- No patellofemoral pain
- Minimum of 120° of flexion
- Sufficient strength + proprioception to initiate running (unweighted in pool)
- Minimal swelling/inflammation

Goals:

- Full range of motion
- Improve strength, endurance + proprioception of extremity to prepare for sports
- Avoid overstressing graft. Progressively increase resistance and hamstring strengthening
- Protect the patellofemoral joint
- Normalize running mechanics
- Strength 70% of uninvolved lower extremity per isokinetic evaluation

Exercises:

- Continue flexibility and ROM exercises as appropriate for patient
- Isokinetics (with anti-shear device). Begin with mid range speeds (120/sec-240/sec)
- Progress toward full weight-bearing running at about 16 weeks
- Begin swimming if desired
- Recommend isokinetic test with anti-shear device at 14-16 weeks to guide continued strengthening
- Progressive hip, quad, hamstring, calf strengthening
- Cardiovascular/endurance training via stairmaster, elliptical, bike
- Advance proprioceptive activities

PHASE 4: Month 5 Through Month 6

Criteria for advancing to Phase 4:

- No significant swelling or inflammation
- Full, pain-free ROM
- No evidence of patellofemoral joint irritation
- Strength 70% of uninvolved lower extremity per isokinetic evaluation
- Sufficient strength and proprioception to initiate agility activities
- Normal running gait

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Goals:

- Symmetric performance of basic and sport specific agility drills
- Single hop and three hop tests 85% of uninvolved leg
- Quadriceps and hamstring strength at least 85% of uninvolved lower extremity per isokinetic strength test

Exercises:

- Continue and progress flexibility and strengthening program based on individual needs and deficits
- Initiate plyometric program as appropriate for patient's athletic goals
- **Agility** progression including, but not limited to:
 - Side steps
 - Crossovers
 - Figure 8 running
 - Shuttle running
 - One leg and two leg jumping Cutting Acceleration/deceleration/springs Agility ladder drills
- Continue progression of running distance based on patient needs
- Initiate sport-specific drills as appropriate for patient

Phase 5: Post-op Months 6-7 = RETURN TO SPORT

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