

ACL Quadriceps Tendon Autograft Reconstruction Protocol –(Dr. Rolf)

GENERAL GUIDELINES

- Focus on protection of graft during primary re-vascularization (8 weeks) and graft fixation (8 –12 weeks)
- *For ACL reconstruction performed with meniscal repair or transplant*, defer to ROM and weightbearing precautions outlined in the meniscal repair/transplant protocol.
- The physician may alter time frames for use of brace and crutches
- Supervised physical therapy takes place for 4-7 months
- Use caution with quadriceps stretching/strengthening based on donor site morbidity

GENERAL PROGRESSION OF ACTIVITIES OF DAILY LIVING

- No bathing/showering (sponge bath only) until after dressing change. Wound must be dry. Please do not soak knee. Brace may be removed for bathing/showering.
- Sleep with brace locked in extension for 1 week or as directed by PT/MD for maintenance of full extension
- Driving: 1 week for automatic cars, left leg surgery
 - 3-4 weeks for standard cars, or right leg surgery
- Post-op brace locked in full extension (0-1 week) for ambulation & sleeping
 - 1-3 weeks- unlock brace ($<90^{\circ}$) as quad control allows
 - 3-4 weeks- wean from brace as patient demonstrates good quad control and normal gait mechanics
- Use of crutches/brace for ambulation for 6 weeks with adequate quad function
- Weight bearing (0-1 week)- PWB with crutches and brace
- Return to work as directed by PT/MD based on work demands

REHABILITATION PROGRESSION

PHASE I: Immediately post-operatively to week 4

Goals:

- Protect graft and graft fixation with use of brace and specific exercises
- Minimize effects of immobilization
- Control inflammation and swelling
- Full active and passive extension/hyperextension range of motion. Caution: avoid hyperextension greater than 10°
- Educate patient on rehabilitation progression
- Flexion to 90° only in order to protect graft fixation
- Restore normal gait on level surfaces

Brace:

- 0-1 week- post-op brace locked in full extension for ambulation and sleeping
- 1-3 weeks- unlock brace ($<90^{\circ}$) as quad control allows

- 3-4 weeks- wean from brace as patient demonstrates good quad control and normal gait mechanics
- 4-8 weeks- patient should only use brace in vulnerable situations (e.g. crowds, uneven terrain, etc)

Weightbearing Status:

- 0-3 week- partial weightbearing with two crutches to assist with balance
- 3-6 weeks- partial weightbearing progressing to full weight bearing with normal gait mechanics
- Wean from crutches/brace for ambulation by 6 weeks as patient demonstrates normal gait mechanics and good quad control as defined as lack of quadriceps lag

Exercises:

- Active-assisted leg curls 0-1 week. Progress to active as tolerated after 1 week. Delay strengthening for 12 weeks.
- Heel slides (limit to 90°)
- Quad sets (consider NMES for poor quad sets)
- Gastroc/Soleus stretching
- Hamstring stretching at 2-3 days post-op
- SLR, all planes, with brace in full extension until quadriceps strength is sufficient to prevent extension lag- add weight as tolerated to hip abduction, adduction and extension.
- Begin submaximal Quadriceps isometrics at 60° and 90° at 3 weeks
- Stationary Biking (progressive time and resistance) at 4 weeks
- If available, aquatic therapy (once sutures removed) for normalizing gait, weightbearing strengthening, deep-water aquajogging for ROM and swelling

PHASE II: Post-operative weeks 6 to 12

Criteria for advancement to Phase II:

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

Goals:

- Restore normal gait with stairclimbing
- Maintain full extension, progress toward full flexion range of motion
- Protect graft and graft fixation
- Increase hip, quadriceps, and calf strength
- Increase proprioception

Brace/Weightbearing Status:

- If necessary, continue to wean from crutches and brace.

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)
- Progressive hip, hamstring, calf strengthening (gradually add resistance to open chain hamstring exercises at week 12)
- Continue hamstring, Gastroc/Soleus stretches
- Begin gentle quadriceps stretching when patient has 115 degrees knee flexion generally around 6-8 weeks
- Stairmaster (begin with short steps, avoid hyperextension)
- Elliptical machine for conditioning
- Single leg balance/proprioception work (ball toss, balance beam, mini-tramp balance work)
- If available, begin running in the pool (waist deep) or on an unweighted treadmill at 10-12 weeks

Phase III: Post-operative weeks 12 to 18-20 (4 ½-5 months)

Criteria to advance to Phase III include:

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

Goals:

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

Exercises:

- Continue flexibility and ROM exercises as appropriate for patient
- Initiate open kinetic chain leg extension (90° - 30°), progress to eccentrics as tolerated
- Isokinetics (with anti-shear device)- begin with mid range speeds ($120^{\circ}/\text{sec}$ - $240^{\circ}/\text{sec}$)
- Progress toward full weightbearing 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 IV: Post-operative months 4 ½ or 5 through 6-7

Criteria for advancement to Phase IV:

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

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/sprints
 - Agility ladder drills
- Continue progression of running distance based on patient needs
- Initiate sport-specific drills as appropriate for patient

Please email Dr. Rolf with any questions!

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