



AUCKLAND BONE AND JOINT SURGERY

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ACL PATELLAR TENDON AUTOGRAFT RECONSTRUCTION PROTOCOL

GENERAL GUIDELINES

- Focus on protection of graft during primary revascularization and incorporation.
- Dr. Boyle may alter time frames for use of crutches.
- Supervised physical therapy takes place for 5-8 months after surgery.

GENERAL PROGRESSION OF ACTIVITIES OF DAILY LIVING

- Remove outer dressing (soft-ban/crepe wrap) 4 days after surgery. Leave sticky op-site dressings on until suture removal.
- May shower with waterproof covers, otherwise no bathing/showering (sponge bath only) until after suture removal.
- Driving: 1 week for automatic transmission cars, left leg surgery
2-4 weeks for manual transmission cars or right leg surgery
- Weight-bearing as tolerated (as pain allows) immediately post-op.
- Wean from crutches for ambulation by 4 weeks as patient demonstrates normal gait mechanics and good quad control.
- Return to work as directed by physiotherapist or Dr. Boyle based on work demands.

REHABILITATION PROGRESSION:

Frequency of physiotherapy visits should be determined based on individual patient status and progression.

The following is a general guideline for progression of rehabilitation following ACL patellar tendon autograft reconstruction. Progression through each phase should take into account patient status (e.g. healing, function) and physician advisement. Please consult Dr. Boyle if there is any uncertainty concerning advancement of a patient to the next phase of rehabilitation.

PHASE I:

Begins immediately post-op through approximately 4 weeks

Goals:

- Protect graft and graft fixation
- Minimize effects of immobilization
- Control inflammation/swelling
- Full active and passive knee extension (caution: avoid knee hyperextension greater than 10°)
- Educate patient on rehabilitation progression
- Restore normal gait on level surfaces

Weightbearing Status:

- Weight-bearing as tolerated immediately post-op
- Wean from crutches for ambulation by 4 weeks as patient demonstrates normal gait mechanics and good quad control

Exercises:

- Patellar mobilization/scar mobilization (after suture removal).
- Heel slides.
- Quad sets (consider neuromuscular electrical stimulation for poor quad sets).
- Hamstring curls – add weight as tolerated.
- Gastrocnemius, soleus and hamstring stretches.
- Gastrocnemius and soleus strengthening.
- SLR in 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.
- Closed kinetic chain quadriceps strengthening activities as tolerated (wall sit, step ups, mini squats, leg press 90°-30°).
- Quadriceps isometrics at 60° and 90° of knee flexion.
- Aquatic/pool therapy (after suture removal) for normalizing gait, weightbearing strengthening, deep-water aqua-jogging for knee ROM and swelling control.
- Single leg balance, proprioception work.
- Stationary cycling – initially for promotion of knee ROM – progress light resistance as tolerated.

PHASE II:

Begins approximately 4 weeks post-op and extends to approximately 12 weeks. Criteria for advancement to Phase II:

- Full knee extension/hyperextension
- Good quad set, SLR without extension lag

- Minimum of 90° of knee flexion
- Minimal knee swelling/inflammation
- Normal gait on level surfaces

Goals:

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

Weightbearing Status:

If necessary, continue to wean from crutches.

Exercises:

- Continue with knee range of motion/flexibility exercises as appropriate for the patient.
- Continue closed kinetic chain strengthening as above, progressing as tolerated – can include one-leg squats, leg press, step ups at increased height, partial lunges, deeper wall sits.
- Stairmaster (begin with short steps, avoid knee hyperextension).
- Elliptical/cross trainer machine for conditioning.
- Stationary biking - progress time and resistance as tolerated; progress to single leg biking.
- Continue to progress proprioceptive activities – ball toss, balance beam, mini-tramp balance.
- Continue hamstring, gastrocnemius and soleus stretches.
- Continue to progress hip, hamstring and calf strengthening.
- Begin running in the pool (waist deep) at 8 weeks.

PHASE III:

Begins at approximately 12 weeks and extends through approximately 18 weeks. Criteria to advance to Phase III include:

- No patellofemoral pain
- Minimum of 120° of knee flexion
- Sufficient strength and proprioception to initiate running
- Minimal swelling/inflammation

Goals:

- Full knee range of motion
- Improve strength, endurance and proprioception of the lower extremity to prepare for sport activities
- Avoid overstressing the graft
- Protect the patellofemoral joint
- Normal running mechanics

- Strength approximately 70% of the uninvolved lower extremity per isokinetic evaluation

Exercises:

- Continue flexibility and knee ROM exercises as appropriate for patient.
- Knee extensions 90°-30°, progress to eccentrics.
- Progress toward full weightbearing straight-line running at 16 weeks.
- Begin swimming if desired at 14 weeks.
- Progressive hip, quadriceps, hamstring, calf strengthening.
- Cardiovascular/endurance training via stairmaster, elliptical, stationary bike.
- Advance proprioceptive activities.

PHASE IV:

Begins at approximately 5 months and extends through approximately 7-8 months post-op.
Criteria for advancement to Phase IV:

- No significant swelling/inflammation
- Full, pain-free knee 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 3 hop tests 85% of uninvolved lower extremity
- 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.

PHASE V:

Begins at approximately 8-9 months post-op. Criteria for advancement to Phase V:

- No patellofemoral or soft tissue complaint
- Necessary joint ROM, strength, endurance, and proprioception to safely return to sport or work
- Physician clearance to resume partial or full activity

Goals:

- Safe return to sport/work
- Maintenance of strength, endurance, proprioception
- Patient education with regards to any possible limitations

Exercises:

- Gradual return to sports participation
- Maintenance program for strength, endurance

Bracing:

- Functional brace generally not used, but may be recommended by Dr. Boyle on an individual basis to facilitate a return to dangerous or high risk activities.

ACL = anterior cruciate ligament SLR = straight leg raise ROM = range of motion