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Post-operative Rehabilitation Protocol **ACL Reconstruction**

Phase I: Immediate post-operative (weeks 1- 4)

Goals:

- Protect graft and graft fixation
- Control inflammation/swelling
- 0-120 flexion AROM as tolerated first 4 weeks.
 - Caution: avoid hyperextension greater than 10 degrees.
- Educate patient on rehabilitation progression
- Restore normal gait on level surfaces

Weight bearing Status:

- Weight-bearing as tolerated immediately post-op with crutches
- Wean from crutches for ambulation by 2 weeks as patient demonstrates normal gait mechanics and good quad control.

Exercises:

- Patellar mobilization/scar mobilization
- Delay hamstring strengthening for 12 weeks. (for hamstring tendon autograft procedure only)
- Hamstring curls – add weight as tolerated (for patellar tendon autograft procedure only)
- Heel slides (to 90° only for hamstring tendon autograft procedure)
- Quad sets (consider NMES for poor quad sets)
- Gastroc/Soleus stretching
- Hamstring stretches (very gentle for hamstring tendon autograft procedures)
- Gastroc/Soleus strengthening (for patellar tendon autograft procedures)

- SLR, all planes. Add weight as tolerated to hip abduction, adduction and extension.
- If available, deep-water jogging for ROM and swelling.

For patellar tendon autograft procedures only:

- Closed Kinetic Chain Quadriceps strengthening activities as tolerated (wall sit, step ups, mini squats, leg press 90-30 degrees)
- Quadriceps isometrics at 60° and 90°
- If available, aquatics for normalizing gait, weight bearing and strengthening
- Balance/Proprioception
- Stationary Bike – initially for promotion of ROM – progress light resistance as tolerated

Criteria for advancement to Phase II:

- Full PROM flexion/extension
- Good quad set, SLR without extension lag
- Minimal swelling/inflammation
- Normal gait on level surfaces

PHASE II: Post-operative weeks 4 to 10

Goals:

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

Exercises:

- Continue with range of motion/flexibility exercises as appropriate for the patient
- Continue closed kinetic chain strengthening as above for patellar tendon autograft procedures, progressing as tolerated – can include one-leg squats, leg press, step ups at increased height, partial lunges, deeper wall sits, lunge walks.
- Initiate CKC quad strengthening and progress as tolerated for hamstring tendon autograft procedures (wall sits, step-ups, mini-squats, Leg Press 90o-30o, lunges)
- Stairmaster (begin with short steps, avoid hyperextension)
- Nordic Trac or elliptical machine for conditioning.
- Stationary bike- progress time and resistance as tolerated
- Continue to progress proprioceptive activities for patellar tendon autograft procedures, initiate for hamstring tendon autograft procedures – ball toss, balance beam, mini-tramp balance
- Continue hamstring, gastroc/soleus stretches
- Continue to progress hip, hamstring and calf strengthening as tolerated
- If available, begin running in the pool (waist deep) or on an unweighted treadmill at 8 weeks.

Criteria to advance to Phase III include:

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

PHASE III: Post-operative weeks 10 to 16

Goals:

- Full range of motion
- Improve strength, endurance and proprioception of the lower extremity to prepare for sport activities
- Avoid overstressing the graft, for hamstring tendon autograft progressively increase resistance of hamstring strengthening.
- Protect the patellofemoral joint
- Normal running mechanics
- Strength approximately 70% of the uninvolved lower extremity per isokinetic evaluation (if available)

Exercises:

- Continue flexibility and ROM exercises as appropriate for patient
- Initiate OKC Knee extensions 90°-30°, progress to eccentrics
- If available, isokinetics (with anti-shear device) – begin with mid-range speeds (120o/sec- 240o/sec)
- **Progress toward full weight bearing running at 12 weeks for BTB autograft (16 weeks for hamstring tendon autograft procedures).**
- Begin swimming if desired
- Recommend isokinetic test with anti-shear device at 12 weeks (14-16 weeks for hamstring tendon autograft procedures) to guide continued strengthening.
- Progressive hip, quadriceps, hamstring, calf strengthening
- Cardiovascular/endurance training via Stairmaster, elliptical, bike
- Advance proprioceptive activities

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

PHASE IV: Post-operative months 4 through 6

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
 - Assessment of running on treadmill

Criteria for advancement to Phase V:

- No patellofemoral or soft tissue complaint
- Necessary joint ROM, strength, endurance, and proprioception to safely return to work or athletics

PHASE V: Begins at 6 months post-op

Goals:

- Safe return to athletics/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