Orthopaedic Associates OF MAINE

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ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION REHABILITATION PROTOCOL

PHASE I: 0-2 WEEKS

GOALS:

- Patient should have 0-90 degrees of knee ROM.
- Patient will ambulate without an AD by the end of this phase.
- Patient should be able to perform straight leg raise without lag
- Reduce pain and swelling; May use Electrical Stimulation Interferential and Pre-mod along with cryotherapy to assist with this.
- Manual Treatment for scar tissue reduction and patellar mobilization.
- Education of appropriate Home Exercise Program (HEP) so patient is competent when at home, proper use of crutches and knee immobilizer for gait during the first 1-2 weeks of post-op recovery.
- Avoid active hamstring contraction if hamstring graft.

GAIT:

- Assistive Device: weightbearing as tolerated with bilateral axillary crutches for 1-2 weeks or until patient demonstrates adequate quadriceps control and proper gait mechanics.
- Brace: Patient will use knee immobilizer for 1-2 weeks during gait until good LE control is demonstrated.

ROM/ STRENGTH:

- Early emphasis on full extension ROM.
- If pain free, flexion ROM may progress past 90 degrees.
- Quad and VMO contraction should be focused on early in rehab and may use Electrical Stimulation Russian Current and neuromuscular electrical stimulation to assist with good muscle contraction. Use of Biofeedback if available for quad contraction.
- Utilize Closed Chain Kinetic Control (CKC) exercises for functional recruitment of the quad.
- Begin proprioception and light balance perturbation training for patient to control their surgical LE in a safe and functional manner.
- Hamstring, glute and core muscle strengthening should be started as early as possible.

TREATMENT RECOMMENDATIONS:

- Assisted heel slides, wall slides.
- Heel prop, heel prop with calf stretch.
- Prone extension hangs, low-load, long duration stretching for extension.
- Manual ROM as needed.
- Utilize STM to patellar tendon, posterior musculature, incision sites and distal quad to reduce fibrosis and reduce swelling. Patellar mobilizations in clinic and at home for improved mobility.
- Weight shifting
- Calf raises
- Resisted Terminal knee extension (TKE)
- Single leg balance with upper extremity support as needed

- Mini-squat and hold, wall sits
- Hamstring sets, mini bridge
- Clamshells, band resistance hip extension
- Crunches, planks, core stability exercises
- Stationary bike at end of this phase, Upper extremity ergometer (UBE) for aerobic conditioning

PHASE II: 2-6 weeks
GOALS:

- Reduce pain and swelling continued from phase 1
- Patient will demonstrate non-antalgic gait with adequate quad control and ambulate with no AD and no brace for support on level surface. During this phase, patient will begin to ascend and descend stairs normally when approved by PT.
- ROM 0-120+ degrees
- ***Hamstring graft*** may begin low load, high repetition isolated contraction at 4 weeks post-operatively. No open chain resisted hamstring curls until at least 6 weeks post-operatively.
- ***NO resisted leg extension machine*** at any point during rehabilitation.

ROM/ STRENGTH:

- Continue Phase 1 manual mobilization and STM; include foam roller and more advanced self-mobilization.
- Flexion ROM should be advanced toward full ROM equivalent to the uninvolved LE.
- Once patient can achieve comfortable ROM of full extension and flexion past 90 degrees, may begin gentle quad and hamstring stretching.
- CKC exercises may advance to more dynamic variations being careful to avoid valgus/varus moment of the knee during the exercises.
- Incorporate co-contraction of hamstring and quadriceps muscles (Closed chain exercises at 30 degrees of flexion)
- Begin lateral training at week 4; side stepping with and without band, stepping up and down sideways.
- May introduce more upper extremity training, advance cardiovascular fitness at 4-6 weeks

TREATMENT RECOMMENDATIONS:

- Bicycle ergometer for ROM
- Foam roller/stick rolling
- Prone quad stretch, supine hamstring stretch, slant board stretching
- Wall slides with uninvolved LE overpressure and hold
- Begin to use more exercises that recruit multiple muscle groups
- Multi-plane lunges, leg press, ground clocks
- SL deadlift, stability ball hamstring curls
- Step up and eccentric step down exercises, band walks
- May Increase bike time. At the 6 week mark may begin elliptical, stair stepper and versa climber.
- Single leg balance on multi-surface, use unstable surface to advance proprioception.
- Pool workouts and upper body conditioning.

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PHASE III: 6-14 WEEKS
GOALS

- Demonstrate adequate stability with single leg activities on stable and unstable surfaces
- Tolerate light weight with CKC exercises
- Tolerate increase in intensity of cardiovascular training

ROM/STRENGTH

- Start isolated hamstring strengthening, if hamstring graft
- Progress single leg strengthening
- Demonstrate eccentric control with CKC activities (lower phase of single leg squat, step downs)

TREATMENT RECOMMENDATIONS

- Single leg squats
- Single leg press
- Mini to full lunges
- Single and double leg deadlifts
- Balance on unstable surfaces
- Elliptical/Stair stepper at 8 weeks
- IASTM/STM to maintain tissue length/integrity

14 WEEK FUNCTIONAL ASSESSMENT: This is completed at OA and entails objective assessments including ROM, strength, dynamic movement and proprioception to determine age appropriate progress for each patient. Criteria will be compared to contralateral lower extremity for percent efficiency and safety during activities. This information will be collected and passed on to the attending physician during their 12 week follow up. Patient must meet criteria to move on to the next phase of rehabilitation, if not adequate results, patient is required to repeat phase 3 for 2-4 weeks and repeat the functional assessment.

PHASE IV: 14-18 WEEKS
GOALS:

- Upon passing functional, begin walk/jog progression if gait looks good and proper mechanic changes are demonstrated.
- Introduce light jumping activity to prepare for eccentric loading
- Improve cardiovascular fitness

ROM/STRENGTH

- Quad strength 70% of unaffected side (if Isokinetic testing is available, utilize for measurement)
- Single leg control with dynamic loading (ex: skater hops, single leg squat)

TREATMENT RECOMMENDATIONS:

- Jogging in place
- Eccentric box jumps (jump downs)
- Side shuffle
- Ground attacks
- Agility ladder

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PHASE V: 18+ WEEKS
GOALS:

- Transition to sports specific activities
- Transition from walk/jog to running program
- If appropriate, begin Accel program:

  This program is done at OA. It includes an assessment and video analysis of drop down jump and single leg squats. The analysis includes a diagram of kinematics to determine valgus angle of the knee and overall movement mechanics. Following the analysis, the program consists of 2x/week for 6 weeks and focuses on training of dynamic movement, plyometric training, agility and high level strengthening. After the 6 week training, a second assessment and comparison of the initial video analysis is completed and progress is discussed.
- Higher level single leg strengthening exercises: deadlift, lunge and squat progression with increase weight and increased difficulty utilizing unstable surfaces.
- Increase difficulty of agility and lateral movements to improve confidence in changing direction
- Improve ability to work through fatigue and continue to have sound mechanics

ROM/STRENGTH:

- Demonstrate ability to perform dynamic activities with good knee mechanics, despite fatigue
- Demonstrate 80% or greater efficiency with single leg squat test
- Ability to complete running program
- Double leg plyometric exercises, transitioning to single leg when appropriate control is demonstrated

TREATMENT RECOMMENDATIONS:

- Running program to include speed transitions
- Broad jumps
- Side to side jumps
- Box Jumps
- 180 degree turns
- Bounding
- Squat jumps
- Agility with change of direction: ex: Figure 8, lateral cone touches

24 WEEK FUNCTIONAL ASSESSMENT: This is completed at OA much like the 12 week functional. This assessment will include more single leg hopping, change of direction, jumping and single leg strength assessment. Criterion will be compared to contralateral LE and age related norms. Following the assessment the information will be provided to the physician for the 24 week follow up. Clearance to full recreational activity return will be individual patient based per outcome