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# KNEE MULTILIGAMENT RECONSTRUCTION: ACL, PCL, MCL POST-OPERATIVE GUIDELINES

## Post-Operative Phase 1: Weeks 0-6

**PRECAUTIONS**

- Range of motion (ROM)
  - 0-90 degrees, as tolerated
  - Do not force ROM
- Adhere to weight bearing restrictions
  - 20% foot-flat weight bearing (FFWB) with bilateral axillary crutches
- Brace guidelines
  - Ambulation with brace locked and bilateral axillary crutches
  - Sleep with brace locked in extension for 6 weeks
- Avoid pillow under knee to prevent knee flexion contracture
- Avoid knee flexion active range of motion (AROM)

**TREATMENT RECOMMENDATIONS**

- Edema control (cryotherapy)
- Soft tissue mobilization, if indicated
  - Quadriceps, hamstring, gastrocnemius/soleus
- Immediate ROM after surgery
  - Do not force ROM
  - Passive ROM 0-40 degrees, progress as tolerated
  - Active-assisted ROM knee extension and PROM knee flexion pain-free (e.g., seated knee flexion off table)
  - Heel slides against wall (ROM >70 degrees)
- Emphasize full knee extension immediately
  - Calf prop with pillow multiple times per day (avoid hyperextension)
  - LE stretching, including hamstring, gastrocnemius, soleus
    - *Modification: avoid hamstring stretching if hamstring autograft is used*
- Patella mobilization as indicated (all planes)
- Strengthening
  - Quadriceps re-education with neuromuscular electrical stimulation (NMES)
  - Straight leg raise (SLR) flexion, extension, and adduction; avoid hip abduction open kinetic chain (OKC) and emphasize no extensor lag
    - Brace locked in extension if pain/lag
  - Ankle/hip/core progressive resistive exercises (PRE)
  - Short crank bicycle, once sufficient ROM of 85-90 degrees knee flexion is attained
- Consider Blood Flow Restriction (BFR) program with FDA approved device and qualified therapist with surgeon clearance
- Independent with home exercise program (HEP) that addresses primary impairments

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- Cardiovascular exercises (e.g., upper body ergometer), as tolerated

**CRITERIA FOR ADVANCEMENT**
- Adherence to post-operative restrictions
- Control post-operative pain/swelling
- Continued improvement in patella mobility and proximal strength
- Maintain knee ROM 0-90 degrees
- SLR flexion without extensor lag
- Independent with HEP

**EMPHASIZE**
- Ambulation with brace locked in extension and 20% FFWB
- Control pain/effusion
- Patella mobility
- Knee ROM 0-90 degrees
- Improve quadriceps activation

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## Post-Operative Phase 2: Weeks 7-12

**PRECAUTIONS**
- Progress knee ROM to 0-130 degrees, do not force motion
- Adhere to weight bearing restrictions
  - Progress to weight bearing as tolerated (WBAT) while demonstrating proper gait
- Brace guidelines: progress to functional brace, as per surgeon
- Avoid pillow under knee to prevent knee flexion contracture
- Avoid varus stress with supine positioning (avoid hip external rotation)
- Avoid resisted OKC knee flexion PRE

**TREATMENT RECOMMENDATIONS**
- Patient education on continued activity modification and cryotherapy
- Gait training: PWB to WBAT
  - Discontinue crutches when patient demonstrates normal gait pattern
  - Unlock brace when adequate quadriceps control
- Continue with LE stretching program from phase 1
- Gradual increase of knee ROM to full
  - Week 12: 0-130 degrees
  - Step knee flexion stretch
  - Maintain passive knee extension
  - Continue patella mobilizations as needed
- Strengthening
  - Continue with NMES as needed for quadriceps activation
  - Quadriceps isometrics at 60 degrees knee flexion
  - Closed kinetic chain (CKC) knee extension: resisted terminal knee extensions
  - Progress multiplanar core/hip strengthening: continue Phase 1 exercises, clamshells, bridges with resistance band, CKC hip strengthening – static to dynamic (e.g., contralateral hip abduction/extension)
  - Leg press: light weight bilateral, 60-0 degrees knee ROM arc
  - Squats: 60-0 degrees knee ROM)
  - Forward step up (FSU) 6” → 8”
  - Romanian dead lifts (RDLs)
  - Standing bilateral heel raises
  - Progress to upright stationary bicycle once sufficient ROM of 110-115 degrees knee flexion is obtained
  - Retro-ambulation with focus on quadriceps neuromuscular control
  - Hydrotherapy when incisions are healed – for gait, proximal strengthening, functional movements, balance, and edema control

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• Weight shift exercises with upper extremity (UE) support: bilateral leg balance/proprioceptive activities; progress to unilateral/uneven surfaces
• Consider BFR program with FDA approved device and qualified therapist with surgeon clearance

**CRITERIA FOR ADVANCEMENT**
• Normal gait pattern without assistive device
• Knee ROM: 0-130 degrees
• Isometric quadriceps contraction at 60 degrees knee flexion at 70% of contralateral LE
• Proximal MMT > 4/5
• Ascend 8” FSU

**EMPHASIZE**
• Compliance with brace
• Discontinue crutches only when normal gait demonstrated
• Modify load and activities of daily living (ADL)
• Patella mobility

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## Post-Operative Phase 3: Weeks 13-24

**PRECAUTIONS**
• Avoid pivoting or excessive varus force

**TREATMENT RECOMMENDATIONS**
• Range of motion
- Gradual increase of ROM to full
- Continue LE flexibility exercises
  - Prone quadriceps stretch
  - Supine or kneeling hip flexor stretch
- Continue patella mobilization as needed

• Brace
- Functional knee brace, per surgeon
- Discharge brace per surgeon direction

• Soft tissue mobilization as needed
• Strengthening
- Progress stationary bicycle time
- Progress to elliptical – when able to perform FSU 8”
- Leg press bilateral → eccentric → unilateral
- Retro-ambulation for neuromuscular quadriceps control
- Underwater treadmill/anti-gravity treadmill training if gait pattern continues to be abnormal
- Squats: progress squat depth over duration of phase no greater than 90 degrees knee flexion; progress to single leg squat
- Progress FSU program
- Initiate step-down program, emphasize proper movement pattern without deviations
- RDL: double leg → single leg
- Progress hip/core stabilization/kinetic linking program

• Progress balance/proprioception to include perturbation
• BFR program with FDA approved device and qualified therapist if patient cleared by surgeon
- Initiate bilateral plyometrics/running program after demonstrating the ability to descend 8” step without pain/deviation

**CRITERIA FOR ADVANCEMENT**
• Ability to descend 8” step
• Isokinetic testing – 85% limb symmetry (quadriceps/hamstrings)