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KNEE ACL SPRAIN NON-OPERATIVE GUIDELINES

Phase 1: Acute/High Irritability

PRECAUTIONS
• Modify activities and exercises that increase pain
• Minimize joint effusion and edema
• Monitor episodes of knee buckling/instability

CONSIDERATIONS
• Know the level of tear and other tissues involved

TREATMENT RECOMMENDATIONS
• Patient education
  - Activity modifications to decrease or eliminate pain and swelling
  - Understanding the importance of compliance with the home exercise program (HEP)
  - Management of pain and effusion
• Edema management
  - Protection, rest, ice, compression, elevation (PRICE)
  - Modalities
• Manual therapy
  - Joint mobilizations
    - Patella mobilizations in all planes
  - Soft tissue massage (STM)
    - Myofascial release
    - Edema control
• ROM/Flexibility
  - AROM, AAROM (active assisted range of motion)
  - Stretching
    - Low load prolonged stretching for knee extension
  - Aquatic therapy if available
  - Stationary bicycle
• Neuromuscular re-education
  - Neuromuscular electric stimulation (NMES) quadriceps
  - Biofeedback
• Strengthening
  - Progressive resistance exercises (PRE)
    - Consider blood flow restriction to low demand exercises with FDA approved device and qualified therapist if patient cleared by MD
    - Quadriceps
      - Quadriceps sets, SLR

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- Hamstrings
  - Standing curls
- Leg press bilaterally
- LE stabilizers proximal/distal to the knee
  - Hip abductors, adductors, extensors, and calves
- Upper extremity (UE) and core strengthening
  - No limits on UE or core workouts that do not affect the injured knee

• Functional training
- Gait
- Follow physician's prescribed weight bearing restrictions and brace guidelines
- Retrograde treadmill
- Aquatic therapy if available
- Stairs

• Squats bilaterally
- Body weight
  - Partial ROM (0°-45° in pain-free arc)

• Proprioception
- Weight shifting
  - Flat stable surface
  - Soft surface
  - Balance training devices

• Cardiovascular training
- Stationary bicycle

CRITERIA FOR ADVANCEMENT
• Minimal to no swelling present
• Restoration of knee ROM
- Knee extension 0-120º

• Normalize gait pattern without AD
- Restoration of full weight bearing status

• SLR without lag

EMPHASIZE
• Pain-free basic exercises
• Edema management
• Importance of hamstring as dynamic stabilizer
• Limit motions, activities and exercises which stress healing tissues
- Avoid tibial anterior translation, pivoting and activities that cause instability

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Phase 2: Sub-acute/Moderate Irritability

PRECAUTIONS
- Avoid premature return to activity
- Avoid stretching injured ligaments
- Avoid patellofemoral joint stress
- Minimize joint effusion and edema
- Monitor episodes of knee buckling/instability

TREATMENT RECOMMENDATIONS
- Patient education
  - Reinforced compliance with HEP
  - Movement strategies (importance of hip strategy versus knee strategy)
  - Edema management: PRICE, modalities
- Manual therapy
  - Joint mobility
    - Patella all planes
    - STM as needed
- Neuromuscular re-education
  - NMES quadriceps as needed
- ROM/flexibility
  - Achieve full and pain-free AROM
  - Stretching
  - Aquatic therapy if available
- Strengthening
  - Quadriceps progressive resistive exercise (PRE)
    - Open kinematic chain (OKC) knee extension
      - Partial tears: limited ROM of 90°-45° knee flexion
      - Complete tears: pain-free and crepitus-free ROM
    - Closed kinematic chain (CKC) knee extension
      - Standing TKE
- Hamstrings
  - Romanian Deadlift
- Strengthening (continued)
  - LE stabilizers proximal and distal to the knee
    - Hip abductors, adductors, extensors, and calves
  - Emphasize CKC exercises 0°-90° flexion
    - Leg press: double leg → eccentric → single leg. Avoid hyperextension
    - Monster walks

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- UE and core strengthening
    - No limits on UE or core workouts that do not affect the injured knee
- Aquatic therapy if available

• Balance and proprioception
- Single leg balance
    - Progress to unstable surfaces with eyes closed
- Perturbation training

• Functional training
- Gait
    - Aquatic therapy if available
- Squat
    - Bilateral to chair, progress depth as tolerated to <90°
- Forward step ups (FSU)
- Forward step downs (FSD)
- Lateral step up/down (watch volume)

• Cardiovascular
- Stationary bicycle – progressively increase resistance

CRITERIA FOR ADVANCEMENT
• Full knee ROM
• Pain and edema managed as activity increases
• 5/5 strength gross lower quarter
• Able to perform symmetrical squat with proper alignment and control
• Able to perform single leg balance without compensation
• Demonstrates frontal plane knee stability during functional tasks

EMPHASIZE
• Importance of adherence to HEP and activity modification
• Pain-free exercise
• Edema management

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Phase 3: Chronic/Low Irritability

PRECAUTIONS
- Avoid premature return to activity
- Avoid compensatory movement strategies
- Minimize joint effusion and edema with plyometrics
- Monitor episodes of knee buckling/instability

TREATMENT RECOMMENDATIONS
- Patient education
  - Functional progress
  - Importance of adequate rest and recovery
- Manual therapy
  - STM to musculature as needed
- Flexibility
- Strengthening
  - Progression of isotonic exercises
    - Double leg → single leg exercises
    - Body weight → external resistance
- Isokinetic exercises if available (high → moderate velocities)
  - Full kinetic chain exercises
  - Aquatic (sports specific, higher level resistance)
- Balance and proprioception
  - Dynamic proprioceptive exercises and perturbation training
  - PNF exercises
    - Slow speed, low force, controlled movements
- Functional training
  - FSD 8”
  - Lateral step up/down 8” (watch volume)
  - Squat: single leg
- Plyometrics
  - Jumping
    - Bilateral vertical → forward → lateral
  - Hopping
    - Single alternating → single unilateral → Single vertical → forward → lateral
  - Progressive running program
- Cardiovascular
  - Elliptical
  - Swimming
  - Stationary bicycle – progressively increase resistance

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CRITERIA FOR DISCHARGE OR ADVANCEMENT TO PHASE 4 (IF RETURNING TO SPORT)

- Demonstrate FSD 8” with proper form and control
- Demonstrate unilateral squat with proper alignment and control
- Proper utilization of full kinetic chain during exercise
- Lack of pain and apprehension with running and plyometric activities

EMPHASIZE

- Pain-free exercise
- Proper knee alignment with functional strengthening
- Landing with good eccentric control in frontal/sagittal planes

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Phase 4: Return to Play

PRECAUTIONS
• Avoid premature return to play
• Minimize joint effusion and edema with plyometrics and sport specific training
• Monitor episodes of knee buckling/instability

CONSIDERATIONS
• Sport, position
• Need for functional athletic brace
• Physician clearance for return to sport

TREATMENT RECOMMENDATIONS
• Running
  - Progress to shuttle runs, sprinting with distances required by sport
• Balance and proprioception
  - Dynamic proprioceptive exercises and perturbation training
  - PNF exercises
    - High speed, high force, uncontrolled movements
• Plyometrics
  - Progress resistance and endurance
• Agility
  - Ladder, hurdles, cutting drills
• Sport specific training
• Utilization of functional brace for sports participation per physician's recommendation

CRITERIA FOR DISCHARGE
• Isokinetic testing (quadriceps, hamstrings) if available: > 90% limb symmetry (average peak torque, total work)
• > 90% limb symmetry of contralateral limb on hop tests
• > 90% of contralateral limb on star excursion test
• No symptoms with sprinting, sport-specific multidirectional movements, and plyometrics
• Movement patterns, functional strength, flexibility, motion, endurance, power, deceleration and accuracy to meet the demands of the individual sport and position

EMPHASIZE
• Importance of recognizing fatigue
• Sports specific drills with eccentric control, avoiding increased trunk flexion, dynamic genu valgum and femoral internal rotation