ELITE SPORTS MEDICINE
Connecticut Children's Medical Center
399 Farmington Avenue, Farmington, CT 06032 • 860.284.0220 • WWW.ELITESPORTSMEDICINE.ORG

PATELLOFEMORAL (KNEE CAP) PAIN
NON-OPERATIVE REHABILITATION GUIDELINES

General notes:

Patellofemoral problems generally fall into two general categories – **Malalignment & Instability.**

The care and management related to mechanical or structural malalignment are discussed here. Those due to traumatic (secondary to patellar dislocations) and atraumatic (specific or generalized hyperlaxity) patellar instability are discussed in the **Patellar Instability Guidelines**.

Malalignment problems are common and can be caused by any or all of the following:

- Increased hip rotation (anteversion)
- Tibial rotation (torsion)
- Flat-footedness (pes planus)
- "Knock-knee" alignment (knee valgus)

When these issues are present, the patella (kneecap) which lies within a groove known as the trochlea does not track normally, hence the name malalignment. Care is directed at improving the tracking and involves treatment around the hip, knee, and ankle.

All phases and exercises are to serve as guidelines. Progression through these guidelines should be based upon criteria and will vary depending on each individual patient. Exercise suggestions are merely suggestions, and are not appropriate for every patient.

Return to sport is based on input from team of providers (physician, physician assistant, athletic trainer and/or physical therapist) & appropriate testing.

The following factors should provoke communication with or referral back to the treating physician:

- **Visible swelling longer than 2 weeks or new swelling lasting more than 48-72 hours**
- **Further loss of range of motion (ROM)**
- **Increased pain**
- **Patellar subluxation and/or dislocation**
- **Inability to progress if pain exists**

Phase I: Initial Phase

Taping / Orthotics:

- McConnell / Kinesiotaping – as needed or indicated by provider for symptom management
- Orthotics when appropriate to address foot and/or ankle abnormalities

ROM (Range of motion):

- Progress with physical therapist & with a home exercise program (HEP) until functional ROM is achieved

Therapeutic Exercises:

- Emphasis on neuromuscular re-education to improve faulty or dysfunctional movement patterns
  - Core strengthening
    - Planks, quadruped activities
  - Open chain hip strengthening as tolerated
    - Sidelying hip alphabets, sidelying hip abduction, clamshells, fire hydrants
  - Closed chain hip & knee strengthening as tolerated
    - Lateral band walks, posterior band walks
  - Stretching of shortened muscle groups (hip flexors, quadriceps, hamstrings, gastrocnemius / soleus complex)

Manual therapy:

- Appropriate joint & soft tissue mobilizations as needed to hip / knee / ankle to address restrictions and create smooth and symmetric motion

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Cardio:
- Swimming & stationary bike as tolerated

Modalities:
- Cryotherapy (ice pack or ice massage) as needed

Progression to Phase II:
- *Reduction or improvement in pain levels with daily activities*
- *Reduction in swelling*
- *Improving functional ROM of knee and hip*

Phase II: Intermediate Phase

Taping / Orthotics:
- Continue with McConnell / Kinesiotaping if helping to reduce symptoms
- Continue with orthotic use if helping to reduce symptoms

ROM:
- Progress to full ROM

Therapeutic Exercises:
- Progress core exercises with emphasis on hip strength (hip external rotation, hip abduction and hip extension)
  - Prone & sidelying planks in conjunction with lower extremity movements
- Progress both open & closed chain hip and knee strengthening exercises both concentrically & eccentrically
  - Squats, box step ups, wall sits, medial step downs
- Continue to stretch / lengthen shortened muscle groups
- Initiate single leg balance exercises with emphasis on neuromuscular control
  - Anterior / Lateral / Posterior reaching, steamboats, 3 way cone reach

Manual Therapy:
- Continue with appropriate joint & soft tissue mobilizations as needed to hip / knee / ankle to address restrictions and create smooth and symmetric motion

Cardio:
- Continue with swimming & stationary bike
- Initiate elliptical if tolerated
- Initiate light straight-plane jogging if tolerated

Plyometrics:
- Simple double-leg plyometric exercises with a focus on maintaining good form & mechanics
  - Ladder Drills, drop vertical jump, line hops

Modalities
- Cryotherapy (ice pack or ice massage) as needed

Progression to Phase III:
- *Good neuromuscular control with all closed chain hip & knee exercises*
- *Good tolerance to initiation of jogging in Phase II*
- *Good tolerance to initiation of light plyometrics / agilities in Phase II*

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Phase III: Advanced Phase

Taping / Orthotics :
- Begin to wean self from all taping, using only as needed
- Continue with orthotic use if helping to reduce symptoms

Therapeutic Exercises:

- Patient to continue all core / hip / knee strengthening exercises with HEP (home exercise program)
- Continue all stretching
- Continue to progress dynamic balance / proprioception exercises
    - Challenge patient with perturbations and standing on various surfaces ie. Foam, BOSU

Cardio:
- Progress from jogging to running and sprinting when tolerated

Plyometrics:
- Advance plyometric exercises with a focus on maintaining good form and mechanics
- Progress double leg → single leg
    - Split lunge jumps, lateral bosu push offs, double leg & single leg broad jumps, lateral bounding

Modalities
- Cryotherapy (ice pack or ice massage) as needed

Progression to Phase IV:
- *Symmetric strength of hip and knee bilaterally*
- *Symetric neuromuscular control with advanced plyometrics initiated in Phase III*
- *Demonstration of understanding of HEP*

Phase IV: Return to Sport Phase

Taping / Orthotics:
- Used only for comfort
- Continue with orthotic use if helping to reduce symptoms

Therapeutic Exercises:

- All core, hip and knee exercises should be continued with an HEP

Cardio:
- Running
- Sprinting
- Sport – specific conditioning

Plyometrics:
- Sport-specific activities
    - Change of direction, cutting, pivoting (with a soccer ball, for example)

Modalities:
- Cryotherapy (ice pack or ice massage) as needed