

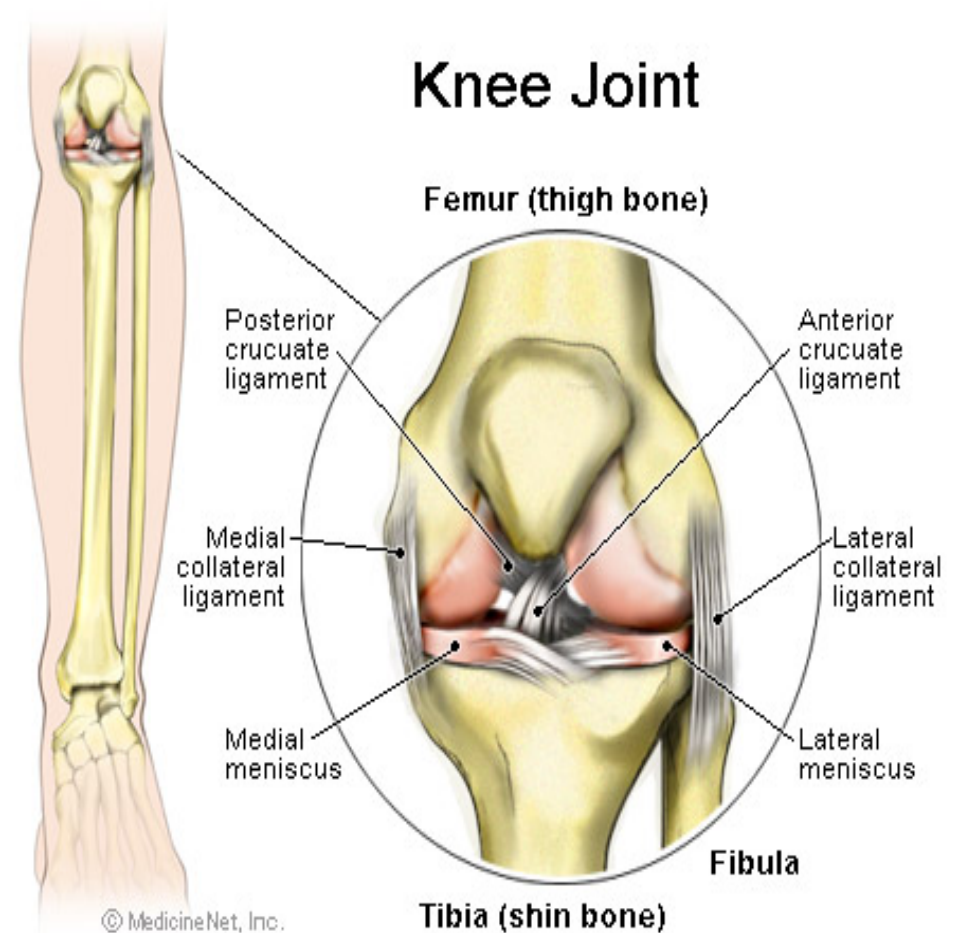
Anterior Knee Pain: Patellofemoral Pain—a review

Overview

- Anatomy review
- A brief understanding of biomechanics
- The differential for anterior knee pain
- Pertinent history and physical
- Imaging—which one and when
- Overview of treatment to include a systematic review from 2003
- Summary and Questions

The Knee

- The Joint Compartments
 - Medial tibiofemoral
 - Lateral tibiofemoral
 - Patellofemoral
- The Patella
- The Joint Line
- The Meniscus
- Anterior and Posterior Cruciate Ligaments
- Medial and Lateral Collateral Ligaments
- Iliotibial Band



Biomechanics

- Position of patella at rest
 - Superior and lateral at full extension
- Tracking of patella through its movement
 - S-shaped path during flexion
 - Can be a wobbly path that requires soft tissue and boney restraint
- During closed chained exercise the quad force is minimal as the knee is extended and increases as it is flexed
- During open chained exercise the quad force required to extend steadily increases as the knee moved from flex to extend

Anterior Knee Pain

- Second most common site of knee pain
- Result of:
 - Articular cartilage damage
 - Retinacular tightness
 - Patellofemoral malalignment
 - Localized trauma
 - Periarticular soft tissue inflammation
- Tends to be synonymous with patellofemoral pain syndrome

Differential Diagnosis

- Injury to quadriceps or patella
- Large joint effusions
- Patellofemoral syndrome (commonly b/l)
- Osteoarthritis (adv stage all compartments)
- Prepatellar bursitis (Housemaid's knee)
- Patellar tendonitis (Jumper's Knee)
- Osgood Schlatter Disease
- Inflammatory arthritis
- Septic Arthritis
- Osteochondritis dissecans

History

- Mechanism of injury
- What part of knee is causing pain
- Relationship to activity
 - “Movie theater” sign
 - Running, jumping, squatting, downstairs, hills
- Quality
 - Dull and achy
- Uni or Bilateral
 - 50% bilateral

Symptoms of Knee Pain

- Localized pain
- Focal swelling
- Inflammatory changes
- Noises
- Effusion
- Loss of support
- Loss of smooth movement

Physical

- Tests:
 - Patellar compression
 - Heel to buttocks
 - Palpation of bursae
 - Crepitus with ROM

Other tests

- General Observation
 - Bony malformation
 - Abnormal alignment
 - Quadriceps atrophy
 - Retinacular tightness
 - Elevated quadriceps angle
- Knee Exam
 - Effusion
 - Patellar tracking
 - Crepitus
 - Compression
 - “J” sign
 - Lateral pull test
 - Patellar glide test
 - Patellar tilt test
 - Q angle (QAF)
 - Tubercle sulcus angle
 - Palpation of the peripatellar soft tissues

Imaging

- Diagnosis is clinical, but if no improvement after 6 weeks of nonoperative treatment consider:
 - Weight bearing AP
 - Weight bearing AP view at 45 flex
 - Lateral view at 30 flex
 - Axial view with knee at 30 or 45 flex

Overview of Treatment

- Nonoperative treatment
 - Rest
 - Physical therapy
 - Patellar taping
 - Biofeedback
 - NSAIDs
 - Shoe orthoses
 - Knee sleeves
 - Resistive knee brace
 - Acupuncture
 - Injections of glycosaminoglycan polysulfate.

Systematic Review

by Bizzini et al., 2003

- Systemic Review of the Quality of Randomized Controlled Trials for Patellofemoral Pain Syndrome
- Conclusion: based on results of trials with sufficient level of quality recommended
 - Acupuncture
 - Quad strengthening
 - Use of resistive brace
 - Combination of exercises with patellar taping and biofeedback
 - Soft foot orthotics for excessive foot pronation

Acupuncture— appears to be effective

- Jensen et al (1999)
 - Mechanism for relief is unclear
 - Related to the gate and endorphin theories for pain reduction
 - 4 week intervention showed improvement of symptoms at 12 month follow up
 - Highest value for methodology
 - Weak study in terms of randomization
 - Can be difficult to create a blinded study

Injections and/or Exercises unclear

- Kannus, et al (1998)
 - Intra-articular and Intra-muscular injections of glycoaminoglycan polysulfate (GAGPS)
 - Inhibit degradative enzyme reactions, to inhibit the inflammatory cascade
 - Stimulate metabolism of chondrocytes and synovial cells
- 2 studies with follow up at 6 weeks, 6 months, and 7 years.
- Showed no significant difference in groups.
- Conflicting study done in 1990 claims positive relief. Therefore unclear role for injections.

Exercise, Education, Taping— positive for combo tx with exercise

- Clark DI (2000) Annals of Rheumatic Disease
- 4 groups, looking at combined treatment
 - Exercise, taping and education
 - Exercise and education
 - Taping and education
 - Education alone.
- Patients who received the exercise program were more likely to be discharged after 3 months
- Patient satisfaction was used as the criterion for discharge.
- No significant differences in pain, anxiety and depression, quad strength, and function at 3 mo and 1 year follow up

Kinetic Chain Exercises— positive results with any program

- Witvrouw et al (2000)
 - Evaluated the efficacy of non-weight bearing exercises vs weight-bearing exercises
 - Increased function and decreased pain in both groups
 - No difference in pain, muscle performance, and functional outcomes between groups.

Exercise with Knee Brace

some positive evidence

- Timm et al (1998)
 - Compared a group using Protonics brace during daily activities against a control group of no treatment.
 - Brace provided progressive resistance to knee motion in sagittal plan
 - Showed improved function and reduced pain

Options for braces



Sacroiliac Joint Manipulation

some positive evidence

- Suter et al (1998)
 - Documented presence of quadriceps activation failure (QAF) in patients with anterior knee pain
 - Speculated that SI joint dysfunction may adversely affect patellofemoral biomechanics
 - Reports that patients who received SI joint manipulation had short-term results decreasing QAF.

PT Program, Foot Orthotics some positive evidence

- Eng et al (1993)
 - Looked at soft foot orthotics in a group of adolescent females with excessive foot pronation.
 - 16 weeks of a physical therapy program consisting of exercises and wearing of soft foot orthotics were shown to have significant reduction in pain as compared to physical therapy alone.

Low-level Laser unclear

- Rogvi-Hansen et al (1991)
 - Looked at difference in symptoms between patients with arthroscopically diagnosed chondromalacia patellae who received real versus sham low-level laser.
 - Results showed that low-level laser treatment was not effective in the management of pain

Patella Mobilization unclear

- Rowland et al (1999)
 - Comparison of those who received detuned ultrasound versus patellar mobilization.
 - Reported no difference in functional outcome, but mobilization group showed significantly lower levels of pain at one month

PT and Patellar Taping unclear

- Kowall et al (1996)
 - Physical therapy for 8 weeks incorporating stretching and isometric, isotonic, and isokinetic quad strengthening versus the same exercises with patellar taping.

Patellar Brace— no adequate evidence

- Miller et al (1997)
 - Compared 3 groups
 - “dynamic patellar brace”
 - knee strap
 - no-brace
 - No difference in pain reduction
- Finestone et al (1993)
 - Compared 3 groups
 - Elastic knee sleeve with patellar ring
 - Simple elastic sleeve
 - No treatment
 - No difference in pain reduction
 - Wearing the sleeve with ring resulted in skin abrasions.

Medications— no adequate evidence

- Fulkerson et al (1986)
 - Compared diflunisal and naproxen in patients with anterior knee pain.
 - Reported significant levels of pain relief for both.
 - Patients had a variety of conditions that were primarily inflammatory

Modalities— no adequate evidence

- Antich et al (1986)
 - First RCT to evaluate effect of different modalities on strength and improvement for chondromalacia patella, infrapatellar tendonitis, peripatellar pain.
 - Ice, phonophoresis, iontophoresis, and ultrasound-ice contrast were compared
 - Results suggested ultrasound-ice was most effective for treatment of pain

Case Study

Mascal et al 2003

- 2 Cases on evaluating management of anterior knee pain targeting hip, pelvis, and trunk muscle function
- Conclude that you should consider treatment of hip, pelvis, and trunk if a patient has abnormal lower body kinetics
- Looked at active, passive, and accessory mobility of the rearfoot, tibiofemoral joint, hip joint, and lumbar spine

Summary

- There are a lot of options for outpatient management
- But, there is no clear guidelines as to what works
- Important to start out with a clear diagnosis
- Evaluate the joints above and below to look for comorbid conditions
- Treatment should focus on patient education, flexibility, quad strengthening, short term use of braces if needed, orthotics for foot pronation, and close follow up.

Questions