PHYSICAL THERAPY
and the PATELLOFEMORAL JOINT

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OBJECTIVES:
1. Understand what a physical therapy evaluation for patellofemoral non-surgical and surgical patient consists of
2. Protocols followed for both non-surgical and surgical patellofemoral patients
3. Common exercises for patellofemoral patients
4. Modifications/taping and bracing for patellofemoral patients

Demographics
- Female > Male
- 50-59 age group > 10-19 age group
- Athletes ages 16-25
- Prevalence
  - 21-40% in active adolescents
  - 15-33% in adults
- Adolescents and Young Adults
  - Higher in Adolescents
  - A quarter of all knee problems in athletes
- Cyclists, Young Athletes of both genders
- Not influenced by height, weight, body fat %, military vs civilian or leg length discrepancy
- Low performance on vertical jump was associated with development of PFPS

Related articles:
  Ther. 2015 Jun; 10(3): 281–290
- Problems with PFP research is it is not looked at across the general population. Research is mainly done in sports medicine centers, military facilities and smaller orthopedic facilities
- Looked at Data from 2007-2011 using Pearl Diver Patient Record Database
- Looked at Patellofemoral Pain using
  - Chondromalacia of patella
  - Pain in joint, lower leg
  - Found that Patellofemoral Pain is more common:
    - In the South (42%)
    - In Females (60%)
    - Increased with age and peaked at 50-59 years old (over 25%)
    - Only 13.5% in 10-19 year olds compared to 70% of age 16-25 found in other research
  - Incident rate was approximately 7.3% of all orthopedic visits
  - No real PFP code with ICD-10

Common activities that cause pain
- Running
- Squatting
- Ascending/Descending Stairs
- Prolonged sitting with knee in flexed position

http://www.patellofemoral.org/pfoe/pfpain.html
PATELLOFEMORAL PHYSICAL THERAPY EVALUATION

PT Evaluation
- Gait pattern: Possibly a Trendelenburg pattern or just antalgic
- VMO atrophy/control
- Effusion
- Patellar mobility: Limited or painful
- Point tenderness: Not always found
- Flexibility: Typically tight in IT Band, hamstrings and quad
- Knee and Hip strength
- ROM
- Functional Tests
  - Squat ability
  - Stair climbing
- Special tests
  - Ober Test: Tight IT Band commonly found
  - Patellar Grind Test: May be positive
  - Patellar Apprehension Test: Positive if previous dislocation/subluxation
  - Medial and Lateral Patellar Glide Tests: Often limited medially due to tight lateral structures
  - Patellar tilt: Sometimes present
- Subjectively patient will complain of pain with running, jumping, stairs climbing and squatting

PATELLOFEMORAL PHYSICAL THERAPY PROTOCOLS

PATELLOFEMORAL PROTECTION PROGRAM

This four-phased program approach can be utilized for both conservative and surgical patellofemoral clients.

Ultimate Goal of Program:
1. Improve Functional Status
2. Normalize biomechanical Forces
3. Improve Strength/Power/Endurance
4. Decrease Pain/Inflammatory Status

Acute Phase - Maximum Protection
- Weight bearing as tolerated - crutches as needed
- Ice, Compression, Elevation, Anti-inflammatory as indicated by physician
- Electric Stimulation to Quadriceps
- Strengthening Exercises (isometric)
  - Quadriceps setting
  - Multi-angle isometrics (non-painful) 90, 75, 60, 45, 30
  - Straight leg raises (four planes of motion)
  - Hip adduction, hip flexion strengthened
  - Hip abduction not done with lateral compression syndrome
- LE Stretching (especially gastrocnemius and hamstrings, checking iliotibial band and quadriceps)
- Avoid squatting, kneeling, excessive knee flexion, stairs, repetitive activities
- Brace as needed for patellar stability

2016 Patellofemoral Pain Research Retreat

- 35 of 50 attendees to the retreat were part of the expert panel
- 8 out of the top 10 patellofemoral researchers where present
- Produce a consensus-based recommendation regarding treatment of patellofemoral pain
- Evidence published between Jan 2010 and June 2015.
- Used a 10 point scale similar to that used at the Osteoarthritis Research Society International

• 22 systematic reviews and 7 randomized-controlled trials to look at the following interventions:
  • Exercise Therapy
  • Combined Interventions
  • Foot orthotics
  • Patellar taping/bracing
  • Other adjunctive interventions

Recommendations
1. Exercise is recommended to reduce pain in the short, medium and long term, and improve function in the medium and long term.
2. Combining hip and knee exercises is recommended to reduce pain and improve function in the short, medium and long term, and this combination should be used in preference to knee exercises alone.
3. Combined interventions are recommended to reduce pain in adults with patellofemoral pain in the short and medium term.
4. Foot orthoses are recommended to reduce pain in the short term.
5. Patellofemoral, knee and lumbar mobilizations may not improve outcomes.
6. Electrophysical agents may not improve outcomes.

Future Considerations
1. Minimum reporting standards for clinical research to allow clinicians to be able to apply the interventions to clinical practice.
2. More research into what specific pain pathways (central vs local pain mechanisms) are primarily involved to determine in non-mechanical interventions can be used to address factors in some individuals.
3. Future trials investigating interventions across the life span.
4. Future high quality studies looking at other potentially valuable interventions, such as gait retraining.

Effectiveness of Exercise Therapy in Treatment of Patients with Patellofemoral Pain Syndrome: A Systematic Review and Meta-Analysis
Ron Clijsen, Janine Fuchs, Jan Taeymans in Physical Therapy July 2014
- Used PEDro and ended up with 15 studies out of 285 that were included in the Meta-Analysis
  - Exercise Therapy vs No-Exercise Therapy
  - Exercise vs Exercise with Additive Therapy
  - Knee Extension Exercises vs Other Forms of Exercise
- Exercise prescription varied widely across the trials
- 3 to 5 times a week vs 2 or less a week vs home-based exercise only
- Exercise showed improvements in surveys (PRMALP) but not in VAS pain scale in both the short and long-term.
- Exercise vs Exercises with Additive Therapy (Electrical Stimulation, splinting) showed that exercise was more favorable in the long-term than adding additional therapy
- Closed-Chain vs Open-Chain exercises showed no significant difference between the groups.
- Overall, determined that exercise was important in achieving pain relief with PFPS but the type of exercise can not be determined at this time
- Closed-chain exercises do show a slight advantage over open-chain exercises, just not a statistically significant one.

Hip Posterolateral Musculature Strengthening in Sedentary Women With Patellofemoral Pain Syndrome: A Randomized Controlled Clinical Trial With 1-Year Follow-up, THIAGO YUKIO FUKUDA , et al, JOSPT, vol 42, 10, Oct 2012
Knee exercise (KE) group
- Stretching (hamstrings, planter flexors, quadriceps, and iliotibial band), 3 repetitions of 30 seconds
- Seated knee extension from 90° to 45°, 3 sets of 10 repetitions
- Leg press from 0° to 45°, 3 sets of 10 repetitions
- Single-leg calf raises, 3 sets of 10 repetitions
- Prone knee flexion, 3 sets of 10 repetitions

Knee and Hip exercises (KHE) group
- Same protocol as the KE group with the addition of
  - Hip abduction with weights (sideslying), 3 sets of 10 repetitions
  - Hip abduction against elastic band (standing), 3 sets of 10 repetitions
  - Hip lateral rotation against elastic band (sitting), 3 sets of 10 repetitions
  - Hip extension (machine), 3 sets of 10 repetitions

Result showed that the KHE group has better pain control and functional outcomes compared to the KE group at the 3, 6 and 12 month follow ups
• Most significant difference was found in the single-leg hop test of the KHE group at 12 months compared to that of the KE group
General Rehab Considerations

- Encouraged patients to switch from running to swimming, pool running or cycling
- Avoidance of squats, stairs and uphill running
- An elliptical should be used with caution as it may cause increase patellofemoral contact forces
- Address poor patellofemoral tracking
- Increase patellar mobility and LE flexibility
- Strengthen VMO and Posterolateral hip joint musculature
- Eccentric exercises more than concentric exercises and closed chain more than open chain

Important Exercises to Complete for Patellofemoral Problems

- Side-lying hip abduction
- Side-lying clamshells with theraband
- Prone hip extension
- Prone hip extension with knee flexion

Close Chain Exercise

- Lateral Step Downs
- Forward Step Downs
- Squats

Core Stability

- Forward Planks
- Side Planks
- Bridges
- Single-leg Bridges

Graston

- Use of Graston or other manual therapy treatment to the IT Band and around patella can help decrease tightness that is inhibiting correct patellar alignment

McConnell Taping

- Taping begins with an assessment of the patellofemoral joint’s lateral hypermobility.
- Hypafix (Cover Roll) is applied to the skin covering the knee to protect the skin from the tape.
- Next, a medial glide of the patella is obtained by manually pushing the patella medially to its end range of motion.
- Rigid strapping tape is then used to maintain the medial glide of the patella by pulling the skin and patella medially.

http://lermagazine.com/article/patellofemoral-taping-pain-relief-mechanisms
Mulligan Taping

Using Mulligan Taping is another option and does not require taping over the patellofemoral joint.

This is a rigid tape that is applied under tension in a spiral around the knee. The goal is alter tibiofemoral rotation.


Significantly less knee pain when performing single leg squat with Mulligan tape applied.

Kinesio-taping

BRACES

Over the Counter Braces

A variety of different braces can be found at Target, Wal-Mart, CVS, Walgreens or even Academy. The best over the counter brace is going to have straps to help adjust the brace for comfort, and a pad around the patella to provide extra support/stability.

In Conclusion...

- Research shows that combining exercise interventions work better than knee specific interventions alone.
- More specific details are needed in what research exercise interventions are to be translated to clinical practice.
- Bracing/Taping maybe beneficial for some patient’s but exact type will depending on the individual.
- Physical therapy is usually the first step in treatment of PFPS and only after 6-8 weeks of treatment should surgery be considered.
- Patient compliance with exercise goes a long way towards determining long term outcomes or the need for future surgery.
Patellofemoral Education from the International Patellofemoral Study Group


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Any Questions?