Patellofemoral Pain Syndrome

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Clinical Diagnosis

• ‘Patellofemoral Pain Syndrome’
• Peri-patellar pain
• Aggravated/elicited: kneeling, stairs walking, prolonged knee flexion
• Excluding other pathology
• Minimum 2-3 months duration?

(anterior knee pain, chondromalacia patellae, retropatellar chondropathy)

(2005)

Epidemiology

• 26.3% AKP female basketball
• 12.7% PFPS ‘knee pain’ in GP
• 13.5% PFPS freshmen USNA
• 10% PF pain PE teachers
• 27.5% knee/PF pain sports medicine

(Foss, 2012; vanMiddelkoop, 2008; Boiling, 2009; Witvrouw, 2000; Baquie, 1997)

Diagnosis

• History
  insidious [overload/direct trauma?], kneeling, bending, peri-patellar pain

• Physical Examination
  FROM, no effusion, tenderness patellar facets, painful grinding

• Additional examinations
  X-ray, MRI, CT, arthroscopy?

Validity of clinical tests

<table>
<thead>
<tr>
<th>Test</th>
<th>+ LR^a</th>
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<tbody>
<tr>
<td>Vastus medialis coordination test</td>
<td>2.26</td>
</tr>
<tr>
<td>Patellar apprehension test</td>
<td>2.26</td>
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<tr>
<td>Waldron’s test phase I</td>
<td>1.41</td>
</tr>
<tr>
<td>Waldron’s test phase II</td>
<td>1.05</td>
</tr>
<tr>
<td>Chirke’s test</td>
<td>1.94</td>
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<tr>
<td>Eccentric step test</td>
<td>2.34</td>
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*These data question the validity of clinical tests for the diagnosis of PFPS*

(2006)
Additional examinations?

- Excluding other pathology – X-ray
  PF OA, PF instability/dislocation, femoral OCD, apophysitis

- Excluding other pathology - MRI/US (CT)
  PF chondral lesion, meniscal lesion, tendinopathy

- Pre-surgical – MRI/CT
  Instability, PF chondral lesion

Pathophysiology

- Mechanical model
- Neuro-muscular model
- Biological model

Mechanical model

1. objective patellar instability; history of at least one patellar dislocation and objective radiological abnormalities
2. potential patellar instability; no patellar dislocation but have objective radiological abnormalities
3. patellofemoral pain without dislocation and without objective radiological abnormality
4. patellofemoral arthrosis

Insall, 1976; Dejour 1994

Neuro-muscular model

- Neuromuscular insufficiency
- altered quadriceps contraction patterns
- altered patellar gliding
- excessive compression forces
- peri-patellar pain

Biological model ('envelope of function')

- Disruption of tissue homeostasis
- overload of the patellofemoral joint
- different pathophysiological processes
- loss of tissue homeostasis
- subsequent peripatellar pain

Dye, 2005
What are the most important risk-factors for the onset of PFPS?

Etiology
- Multifactorial
- Proximal factors
  - Hip kinematics, strength abductors/external rotators
- Local factors
  - Patellar kinematics/tracking, pain, PF contact-stress, VMO function
- Distal factors
  - Foot kinematics

Risk factors – prospective studies
Systematic review
- 7 studies included (1991-2010), prospective
- 135 variables - 235 patients!
  - 10 anthropometric variables
  - 7 psychological parameters
  - 18 variables for physical fitness
  - 7 posture variables
  - 37 variables for plantar pressure
  - 5 variables for EMG onset timing of VMO

‘Patellofemoral Retreat’
Darius, 2010; Powers, 2012

Bodyweight
Q-angle

Knee extensors – peak torque

‘Lower knee extension strength is a risk factor for PFPS based on the findings of several studies included in this systematic review’
Conservative Therapy

- 'Wait and See' / Rest?
- Exercise Therapy?
- Taping/bracing?
- Insoles?
- Medication?

‘Wait and see’

- 87% still complaints after 1 year
- 50% recovered in the ‘wait and see’ group after 1 year

Clark, 2000; vanLinschoten, 2009

Exercise Therapy

- Systematic review

- Exercise therapy versus placebo
  8 trials (total 23)

- Short/long term—significant less pain
- Short term – significant better function
- No difference in recovery

vanLinschoten, 2012 (Thesis)

Differences in pain scores
Exercise Therapy vs. No treatment

Bracing / taping

- Systematic review

  Tape/brace/exercise vs. Exercise/placebo
  8 studies

- no additional effect on pain reduction
- conflicting evidence on functional improvement

Swart, 2011

Insoles

- Insoles vs PT ‘wait & see’ vs standard inlay
  ‘significant less pain after 6 weeks’

- Systematic Review
  7 studies included
  ‘limited evidence for short term effects of orthotics’

Collins, 2008; Barton, 2010
Other Conservative Options

- NSAID’s
  Effective short term

- Neuromodulators?
  No data

- Intra articular Visco Supplementation
  ‘weak recommendation for use in PF-OA’

Heintjes, 2004; van Jonbergen, 2010

Prognostic Factors

- Insoles vs PT vs ‘wait&see’ vs standard insole
  1 year follow up
  ‘… long duration of complaints is consistent predictor of poor outcome’

- Exercise/PT/insoles/‘wait&see’
  Multi-center analysis – 1 year follow up
  ‘…Knee pain duration >2 months is the most consistent prognostic indicator, followed by AKP Scale score <70.’


‘It ain’t over ‘till it’s over’

- PFPS has a tendency to a moderate recovery after 1 year (50-60%)

- Exercise therapy is effective on pain/function

- Long duration – leads to worse prognosis