Patellofemoral Pain
ACPOMIT
Leeds 2013

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Finland
International Patellofemoral Research Retreats
- Ibeachu & Kshetri – epidemiology
- Erande – physiological profiling of ischaemia
- Lindley – EMG decomposition
- Theobald – taping techniques in cycling
- Burston – Orthotics
- Taylor – PFP & PFOA
- SNAPPS – epidemiological study
- Patellar Braces – study funded by DJO
- TIPPS – ARUK funded study of targeted intervention
Outcome Measures

- The static Q angle is of very limited value
- The MFIQ is recommended for use with a UK population
- Usual or average pain during last week
  11 point Numeric Pain Rating Scale (NPRS)
Epidemiology

- PFP is very common 1:4 in general population
Epidemiology

Prospective studies

- Witwrouw et al (2000) 282 PE students
- Coppack et al (2011) 1502 Military recruits

2591 subjects 160 (6%) developed PFP
Epidemiology (SNAPPS)

- Forty Three 9 to 17 year olds
- 19 Female
- 24 Male

- 7 had knee problems of some sort in the past year (3 female: 4 male)

- Prevalence 16.3%
Ischaemia Research

- Ischaemic pain may be present due to vascular torsion
Cold Questions

- Do you get night pain
- In winter do you use electric blankets/hot water bottles in bed
- Do your knees feel cold even on a warm day
- Does cold weather affect your knees
- Do you wear extra tights/long johns in winter
- Would you prefer a hot water bottle or ice pack on your knee
- Traumatic onset

Selfe et al The Knee (2010) 17; 319-323
Proposed treatment for ‘cold’ PFPS knees

- **Active exercise**
  Non Weight Bearing Range of Motion exercises
e.g. Cycle ergometer on low resistance
  Gentle hydrotherapy – not swimming
  Proprioceptive exercises, reductions in proprioceptive acuity have been demonstrated in both PFPS & NFCI

- **Passive modalities**
  Tubigrip / neoprene sleeves for warmth and proprioceptive effects rather than mechanical support
  Gentle heat, rapid re-warming of NFCI intensifies the injury
  Balmosa cream (used to treat chillblains)
  Acupuncture

Selfe J. Physiotherapy Ireland. 2010; 31(2)
Proposed treatment for ‘cold’ PFPS knees

- **Advice/counselling**
  Advice about fluid intake, mild dehydration can decrease peripheral blood flow
  Stress relief / counselling, NFCI is more prevalent in stressful environments

- **Pharmacology**
  Amitryptiline hydrochloride (50 or 100mg) at bed time is used for NFCI

*Selfe J. Physiotherapy Ireland. 2010; 31(2)*
• One 30 minute session a week for 6-weeks
• Heding (EX-LE2)
• Stomach (ST) 34, ST36
• Spleen (SP) 9 and SP10
• During treatment, the needles were energized for 10s every 5 min using a clockwise–counter-clockwise motion
Proprioception


Patellar Taping

- 52 Healthy volunteers
- 32 PFPS patients
- Neutral (placebo) tape applied in random order
- 50% circumference of the knee
Clinical Results

- 26 of the 52 normal healthy young adults were classified as having poor proprioceptive ability (50%)

- 22 of the 32 patients were classified as having poor proprioceptive ability (69%)

- Tape significantly improved proprioceptive acuity in both these groups
Weight bearing studies
The Conditions
Knee range of motion in the coronal plane

<table>
<thead>
<tr>
<th>Condition</th>
<th>Angle (degrees)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>9.4</td>
<td>0.001</td>
</tr>
<tr>
<td>Tape</td>
<td>8.3</td>
<td>0.005</td>
</tr>
<tr>
<td>Tubigrip</td>
<td>7.7</td>
<td>0.005</td>
</tr>
<tr>
<td>Brace</td>
<td>5.3</td>
<td>0.155</td>
</tr>
</tbody>
</table>

No versus Tape: 0.001
No versus Tubigrip: 0.005
No versus Brace: 0.005
Tape versus Tubigrip: 0.155
Tape versus Brace: 0.001
Does Tubigrip Really have an effect?

No Tubigrip

Tubigrip
In healthy subjects neutral patellar taping, produced a change in cerebellar activity (Callaghan 2009).

The degree to which the brain is activated can be influenced by varying the somatosensory inflow from the skin around the knee (Thijs 2009).
Effect of tape as rehab programme
FIQ after 4 weeks taping programme

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Tape Mean</th>
<th>SD Total</th>
<th>No tape Mean</th>
<th>SD Total</th>
<th>Weight</th>
<th>Std. Mean Difference IV, Fixed, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harrison 1999</td>
<td>1.51</td>
<td>0.2</td>
<td>36</td>
<td>0.79</td>
<td>46</td>
<td>3.57 [2.86, 4.28]</td>
</tr>
<tr>
<td>Whittingham 2004</td>
<td>8.4</td>
<td>0.5</td>
<td>10</td>
<td>5.5</td>
<td>10</td>
<td>3.82 [2.23, 5.40]</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td></td>
<td></td>
<td>46</td>
<td></td>
<td>56</td>
<td>3.61 [2.96, 4.26]</td>
</tr>
</tbody>
</table>

Heterogeneity: Chi² = 0.08, df = 1 (P = 0.78); I² = 0%
Test for overall effect: Z = 10.92 (P < 0.00001)

Cochrane Review: Patellar taping for patellofemoral pain syndrome in adults (Callaghan & Selfe 2012)
K tape and cycling
Surface decomposition EMG (dEMG)

- Provides detailed behavioural characteristics of individual motor unit action potentials (MUAPs)

- The mean firing rate of Vastus Medialis exhibited an increase with the application of tape compared to the no tape condition

- These neuromuscular changes were coupled with a significant improvement in knee control
Targeted Intervention for Patellofemoral Pain (TIPPs)

- **Study design:** Observational study

- **Setting:** Four NHS physiotherapy departments in England;
  Central Manchester University Hospitals NHS Foundation Trust
  Harrogate and District NHS Foundation Trust
  Lancashire Care NHS Foundation Trust
  NHS Solent

- **Patient recruitment to date:** 92/150
TIPPs - Grouping

- PFP
  - Baltimore grouping
    - Proximal
      - hip abduction
    - Local
      - quadriiceps weakness
      - patellar hypomobility
    - Distal
      - patellar hypermobility
    - Regional
      - pronated foot
      - lower limb biarticular muscle tightness
  - TIPPS literature review
<table>
<thead>
<tr>
<th>Domain</th>
<th>Questionnaire / items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical characteristics</td>
<td>time since onset&lt;br&gt;previous treatment&lt;br&gt;history of trauma&lt;br&gt;physical activity (International Physical Activity Questionnaire (IPAQ)&lt;br&gt;physical functioning (Modified Functional Index Questionnaire (MFIQ)</td>
</tr>
<tr>
<td>Socio-demographic characteristics</td>
<td>age&lt;br&gt;gender</td>
</tr>
<tr>
<td>Anthropometry</td>
<td>height&lt;br&gt;weight&lt;br&gt;body mass&lt;br&gt;leg length&lt;br&gt;skin fold over the patellae</td>
</tr>
<tr>
<td>Psychosocial</td>
<td></td>
</tr>
<tr>
<td>Pain measures</td>
<td>Nociceptive Pain&lt;br&gt;Short Form McGill Pain Questionnaire (SF-MPQ-2)&lt;br&gt; Numeric Pain Rating Scale (NPRS) for average pain during the past week&lt;br&gt;Neuropathic Pain&lt;br&gt;Leeds Assessment of Neuropathic Symptoms and Signs (S-LANSS)</td>
</tr>
<tr>
<td>Quality of life</td>
<td>WHO Disability Assessment Scale 2 (WHODAS 2.0)&lt;br&gt;EQ-5D-5L&lt;br&gt;Hopkins Symptom Checklist 25 (HSCL-25)</td>
</tr>
<tr>
<td>Psycho-motor movement awareness</td>
<td>Movement Specific Reinvestment Questionnaire</td>
</tr>
<tr>
<td>Physiological parameters</td>
<td>Self-reported indicators of cold knees&lt;br&gt;skin temperature measurement (centre of patella &amp; muscle belly of tibialis anterior)</td>
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## Clinical Assessment Tests

<table>
<thead>
<tr>
<th>Proposed Clinical Group</th>
<th>Test</th>
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<tbody>
<tr>
<td>Hip Abductor weakness</td>
<td>Hand Held Dynamometry</td>
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<tr>
<td>Quadriceps weakness</td>
<td>Hand Held Dynamometry</td>
</tr>
<tr>
<td>Patellar Hypomobility</td>
<td>Patellar Glide Test</td>
</tr>
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<td>Patellar Hypermobility</td>
<td>Patellar Glide Test</td>
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<tr>
<td>Pronated Foot Posture</td>
<td>Foot Posture Index</td>
</tr>
<tr>
<td>Lower Limb Biarticular muscle tightness</td>
<td>Rectus femoris length test</td>
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<tr>
<td></td>
<td>Hamstrings length test</td>
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<tr>
<td></td>
<td>Gastrocnemius length test</td>
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THANK YOU FOR LISTENING

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