Traditional perspective

1. Patellar tendinopathy is self-limiting
2. It is inflammatory (‘tendinitis’) 
3. Imaging can be used to guide management 
4. Conservative Rx can be effective 
5. A shot of corticosteroids does no harm 
5. Surgical Rx ⇒ return to competition in 3/12

Patellar tendon

- Tenalgia 
- Tendinitis 
- Tendinosis 
- Paratendinitis 
- Peritendinitis 
- Tendonitis 
- Paratendonitis 
- Peritendonitis 
- Partial rupture

Trammatic patellar tendinopathy

- often anecdotal 
- rarely evidence-based 
- often emotional 
- dubiously effective
What can we offer?

- Exercise?
- Physical modalities?
  - US, ESWT, PEMF
- Lotions and potions?
  - GTN, NSAID
- Injection?
  - CSI, blood, aprotinin

Referral?
- Surgery
  - Open
  - Arthroscopic
  - Percutaneous

What can we offer?

Hurdles to optimal management of tendinopathies

- No validated conservative management protocols
  - relative rest
  - physical therapy
  - NSAIDs
  - deep frictions
  - hyperthermia
  - HOT
  - fibrolysis
  - eccentric loading
  - ultrasound
  - laser treatment
  - ozone
  - injections
  - steroid
  - heparin
  - aprotinin
  - polydocanol & others
  - ESWT
  - topical glyceryl trinitrate

Aprotinin

- Protease inhibitor
- Peritendinous injection
- Does not inhibit chemotactic response
- Avoids potential steroid problems
- 80% Good/excellent (vs 30% placebo)

Capasso G, Testa V, Maffulli N, Bifulco G.
Aprotinin, corticosteroids and normosaline in the management of patellar tendinopathy in athletes: a prospective randomized study.
Sports Exerc Injury 1997; 3: 111-115

Table 1. Characteristics of each subpopulation

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Aprotinin (n=20)</th>
<th>Corticosteroids (n=20)</th>
<th>Normosaline (n=20)</th>
<th>Placebo (n=20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of cases</td>
<td>20</td>
<td>20</td>
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<tr>
<td>Number of active injections</td>
<td>10</td>
<td>10</td>
<td>10</td>
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<tr>
<td>Average number of injections</td>
<td>2.5</td>
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<td>Average age (years)</td>
<td>32.6</td>
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<tr>
<td>Average duration of symptoms (months)</td>
<td>5.2</td>
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<tr>
<td>Percentage male</td>
<td>76%</td>
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<tr>
<td>Percentage active</td>
<td>40%</td>
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<tr>
<td>Percentage placebo</td>
<td>25%</td>
<td>25%</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>Percentage steroids</td>
<td>25%</td>
<td>25%</td>
<td>25%</td>
<td>25%</td>
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<tr>
<td>Percentage heparin</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Percentage polydocanol &amp; others</td>
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<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Percentage ESWT</td>
<td>10%</td>
<td>10%</td>
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</tr>
</tbody>
</table>

Ultrasound-guided sclerosis of neovessels in painful chronic patellar tendinopathy

Håkan Alfredson, Umeå, Sweden

High volume ultrasound guided injections at the interface between the patellar tendon and Hoffa's body are effective in chronic patellar tendinopathy: A pilot study

Capasso G, Testa V, Maffulli N, Bifulco G.
Aprotinin, corticosteroids and normosaline in the management of patellar tendinopathy in athletes: a prospective randomized study.
Sports Exerc Injury 1997; 3: 111-115
Purpose

- To determine the effectiveness of high volume image guided injections (HVIGI) for chronic patellar tendinopathy
- Concoction: 40 mg hydrocortisone (62,500 IU aprotinin), 10 ml 0.5% marcain/chirocain, 40 ml 0.9% NaCl

High volume injections at interface between Hoffa’s body and patellar tendon

20 male athletes with a mean history of 20.7 months of pain
Prospectively evaluated at 6 months follow-up
No severe adverse events were observed, and statistically significant improvements in all scores were recorded

Eccentric exercises
The best evidence

Curwin & Stanish, 1985
**Jumper’s knee RCT, 2001**
- Randomized controlled trial (pilot, n=19)
- No confounding treatments permitted
- Eccentric drop vs concentric knee extension / hamstring curl

BJSM, 2001

**Chronic patellar tendinopathy**
Melbourne/Umeå Study
- **Non surgical management**
- Eccentric quadriceps training

Group A: 9 patients-10 tendons (26 years)
Group B: 8 patients-12 tendons (24 years)

**The exercise protocol was...**
- 3 x 20 reps; 5 days/week, 12 weeks
- Warm-up, stretch, exercise, stretch, ice
- Outcomes (0,6,12 weeks): torque on Cybex, pain scale, functional scale

Cannell et al, BJSM, 2001

**Using the ‘decline board’**
- Focussing the load on the patellar tendon
- Use for assessment and treatment
- Progressively more difficult

**Progression**
- Squat
- Lunge
- Squat on decline board
- Single leg decline squat
- Decline hop
Surgical management of tendinopathies

- No validated surgical protocols
  - needling
  - coblation
  - percutaneous (ultrasound guided) tenotomy
  - arthroscopic management
  - open longitudinal tenotomy

Open and arthroscopic patellar tenotomy

- Four year follow up
- Retrospective study
- Open procedure: 25 patients (29 tendons)
- Arthroscopic procedure: 23 patients (25 tendons)
- Two surgeons
- One performed open surgery
- One performed arthroscopic surgery

Coleman et al AJSM, 2000

Open and arthroscopic patellar tenotomy

- Symptomatic benefit: 81% (O) and 49% (A)
- Sporting success: 54% (O) and 46% (A)
- Median time to return to preinjury level of activity: 10/12 (O) and 6/12 (A)
- Median VISA: 88 (O) and 77 (A)
- No difference in outcome between types of surgery

Coleman et al AJSM, 2000
Outcome of surgery

Excellent: Symptomatic benefit
Good: 95%
Fair: 60%
Poor: Sporting success

Coleman et al 2000

ULTRASOUND-GUIDED PERCUTANEOUS LONGITUDINAL TENOTOMY

Testa et al, MSSE 1999

Patellar tendinopathy surgery

- Eccentric exercise vs surgery
  - RCT
    - 40 knees
    - No difference between groups
    - VISA 30-50 (3 months), 58 (6 months), 70 (12 months)
    - Surgery 5-12-2-1 (no symp, improved, no change, worse)
    - Eccentric 7-8-5
  - Bahr et al JBJS Am 2006

Difficult to compare surgeries

- Subtle technical aspects of surgery, or of rehabilitation protocol may significantly change outcome
- Opening, closing of patellar defect
- Excision, retention of paratenon
- Time reduced activities after surgery
- Strengthening protocol
- Andrea Ferretti; Jon Karlsson; John King; Nicola Maffulli: good stable results
Average true recovery time after patellar tendinopathy surgery:

- 9-12 months

Most common cause of failure following surgery

- (Attempt at) Too early return to offending sports

Limited indication to refer patellar tendinopathy patients for early surgery

Italian Society of Muscles, Ligaments and Tendons