





Centre for Sports and Exercise Medicine

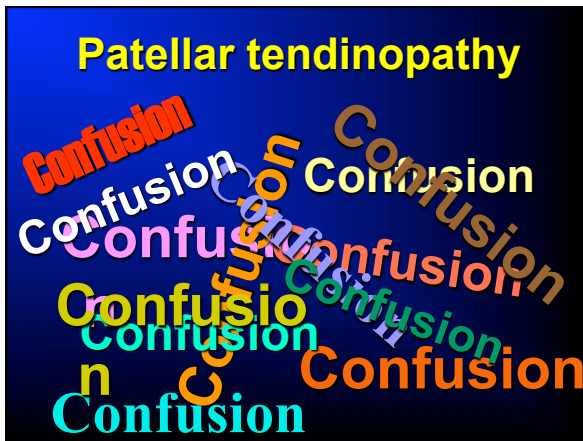


Patellar Tendinopathy
Conservative and surgical management




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- ### 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
 - ◆ Peri/para ... itis with tendi/tendo ... itis
 - ◆ Partial rupture

Traumatic patellar tendinopathy

GIORGIO GARAU¹, JOERN RITTWEGER², PETER MALLARIAS³, UMILE GIUSEPPE LONGO⁴ & NICOLA MAFFULLI⁵






The American Journal of Sports Medicine

Clinical Sports Medicine Update

Management of Tendinopathy

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- 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

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

Clin Orthop Relat Res (2008) 466:1625–1632
DOI 10.1007/s11999-008-0254-z

SYMPOSIUM: MOLECULAR AND CLINICAL DEVELOPMENTS IN TENDINOPATHY

Successful Management of Tendinopathy With Injections of the MMP-inhibitor Aprotinin

John Orchard MD, PhD, FACSP, FACSM, FFSEM (UK),
Andrew Massey MB BCh BAQ BSc(Hons),
Richard Brown MBBS Bsc(Med) (Hons) FRACGP FRCGP,
Adeline Cardon-Dunbar, Jamie Hofmann MD

Table 1. Characteristics of each subpopulation

Characteristic	All conditions	Achilles body	Achilles insertions	Patella tendon	Hamstring tendon
Number of cases	438	149	48	94	147
Number of aprotinin injections used	997	323	135	215	324
Average number of aprotinin injections used/case	2.3	2.2	2.8	2.3	2.2
Average age (years)	37.6	38.5	49.1	29.8	34.0
Average duration of symptoms (months)	20.1	21.6	18.4	14.9	27.3
Percentage male	74%	68%	70%	95%	57%
Percentage elite athlete	22%	22%	10%	29%	10%
Percentage followup	72%	72%	79%	62%	78%
Minimum followup (months)	3 (average, 12.2; range, 3–54)	3 (average, 11.6; range, 3–42)	3 (average, 11.5; range, 3–25)	3 (average, 11.7; range, 3–25)	3 (average, 14.4; range, 3–54)

Ultrasound-guided sclerosis of neovessels in painful chronic patellar tendinopathy

Håkan Alfredson, Umea, Sweden

Disability and Rehabilitation, 2008; 30(20–22): 1625–1634

informa
healthcare

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

TOM CRISP¹, FAISAL KHAN¹, NAT PADHIAR¹, DYLAN MORRISSEY¹, JOHN KING¹, ROSY JALAN¹, NICOLA MAFFULLI² & OTTO CHAN FRCP³

¹Centre for Sports and Exercise Medicine, Mile End Hospital, London, ²Department of Trauma and Orthopaedic Surgery, Keele University School of Medicine, Stoke-on-Trent, Staffordshire, and ³Department of Imaging, The London Independent Hospital, Beaumont Square, London, UK

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

Skin
Patellar tendon
Needle
Neovessels

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

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Disability Rehabilitation

Platelet-derived growth factor (PDGF)	Stimulates cell replication Promotes angiogenesis Promotes epithelialization
Transforming growth factor (TGF)	Promotes granulation tissue formation Promotes formation of extracellular matrix Regulates bone cell metabolism
Vascular endothelial growth factor (VEGF)	Promotes angiogenesis
Epidermal growth factor (EGF)	Promotes cell differentiation and stimulates re-epithelialisation, angiogenesis and collagenase activity
Fibroblast growth factor (FGF)	Promotes proliferation of endothelial cells and fibroblasts Stimulates angiogenesis

Platelet-rich plasma: New clinical application
A pilot study for treatment of jumper's knee

Iliriana Kozic¹, Giuseppe Filardo², Marco Deogrande³, Marco Lo Presti⁴, Alessandro Basso⁵, Mike Reed⁶, Alessandro Di Martino⁷, Annalisa Crivelli⁸, Pier Maria Forzan⁹, Maurizio Marnett¹⁰

- ✦ 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

Injury

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



British Journal of
sports
medicine

www.bjsportmed.com

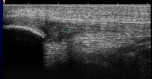
BJSM, 2001

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



Chronic patellar tendinopathy

Melbourne/Umeå Study


† Non surgical management
Eccentric quadriceps training

3 x 15 reps, 2 times/day, 12 weeks

Group A: Flat Group B: 25° decline board

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

Rheumatology Advance Access published February 15, 2008
 Rheumatology 2008; 1 of 2 doi:10.1093/rheumatology/ken011

Editorial
Conservative management for tendinopathy: is there enough scientific evidence?

✦ *Maffulli, Longo 2008*

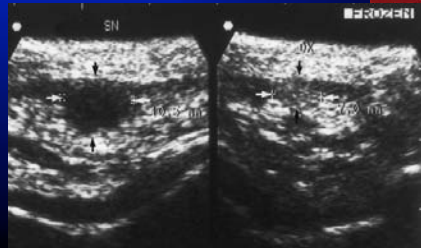
Rheumatology Advance Access published August 12, 2008
 Rheumatology 2008; 1 of 2 doi:10.1093/rheumatology/ken337

Editorial
How do eccentric exercises work in tendinopathy?

The American Orthopaedic Society for Sports Medicine
The American Journal of Sports Medicine

Patellar Tendinopathy in Athletes
 Outcome of Nonoperative and Operative Management

Alfredo Schiavone Panni,* MD, Mario Tartarone,* MD, and Nicola Maffulli,†‡ MD, MS, PhD, FRCS(Orth)



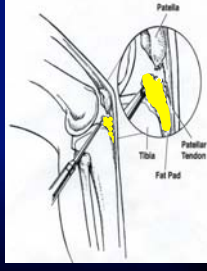
Surgical management of tendinopathies

✦ No validated surgical protocols

- needling
- coblation
- percutaneous (ultrasound guided) tenotomy
- arthroscopic management
- **open longitudinal tenotomy**

Open and arthroscopic patellar tenotomy

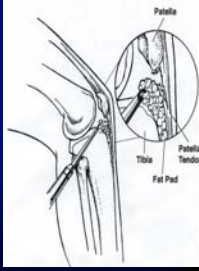
- ✦ Four year follow up
- ✦ Retrospective study
- ✦ Open procedure: 25 patients (29 tendons)
- ✦ Arthroscopic procedure: 23 patients (25 tendons)
- ✦ Two surgeons
- ✦ One performed open surgery
- ✦ One performed arthroscopic surgery



Coleman et al AJSM, 2000

Open and arthroscopic patellar tenotomy

- ✦ Symptomatic benefit: 81% (O) and 96% (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

Arthroscopic Management of Chronic Patellar Tendinopathy

Antonio Pascarella,* MD, Mahbub Alam,† MRCS, MS, Fabio Pascarella,* MD, Carmine Latte,* MD, Mariano Giuseppe Di Salvatore,* MD, and Nicola Maffulli,‡ MD, MS, PhD, FRCS(Orth)

Investigation performed at the *Laboratorio di Chirurgia Artroscopica, Isernia, Italy, and the Centre for Sports and Exercise Medicine, Queen Mary University of London, Bart's, and The London School of Medicine and Dentistry, Mile End Hospital, London, United Kingdom*

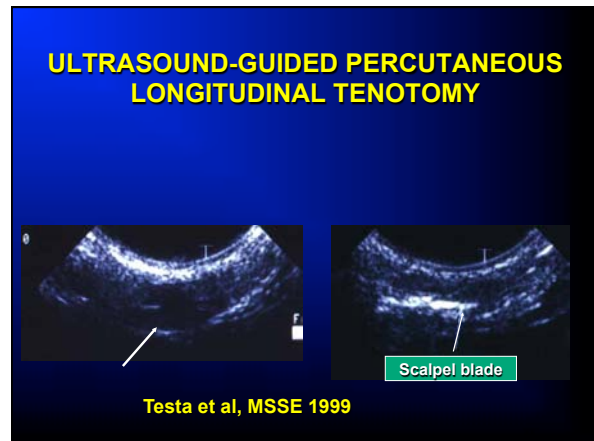
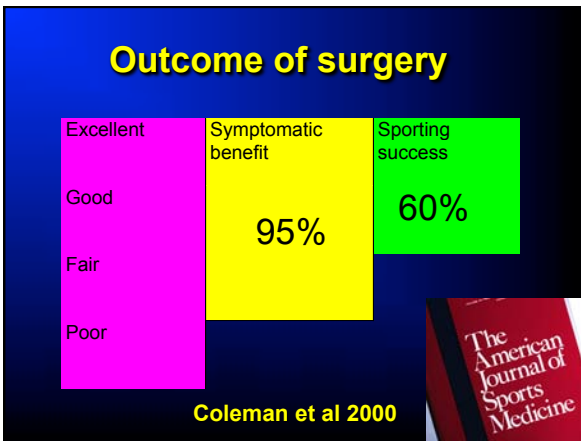
Methods: A total of 64 patients (73 knees), 27 of whom were professional athletes, with patellar tendinopathy refractory to nonoperative management underwent arthroscopic debridement of the adipose tissue of the Hoffa's body posterior to the patellar tendon, debridement of abnormal patellar tendon, and excision of the lower pole of the patella. Preoperative and postoperative evaluation was undertaken using the International Knee Documentation Committee (IKDC), Lysholm knee scale, and Victorian Institute of Sport Assessment-Patella (VISA-P) scores for all patients at 1 and 3 years. No patients were lost to follow-up. Forty-three and 29 patients were similarly assessed at 5 and 10 years, respectively, after surgery. Return to sports and rehabilitation was also assessed.

and 10 years' follow-up. There were no postoperative complications. Nineteen of the 27 professional athletes returned to sports at the same level. Seven patients developed pain after sports within 3 years after the operation, a failure rate of 7 of 73 knees (9.6%). All patients were able to return to sports by 3 months.



TABLE 2
Average Outcome Scores Before Surgery and at Follow-up at 1, 3, 5, and 10 Years*

Time From Surgery, y	No. of Knees	Average IKDC Score	Average Lysholm Score	Average VISA-P Score	Average VISA-P Score for Professional Athletes
Preoperation	73	51.6	52.3	35.3	32.4
1	73	86.4	94.7	69.8	71.3
3	73	86.4	95.5	70.7	70.5
5	42	85.7	92.9	70.1	
10	29	84.2	92.3	69.4	



Patellar tendinopathy surgery

Engerbrechtsen, RCT, JBJS Am

- ✦ 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

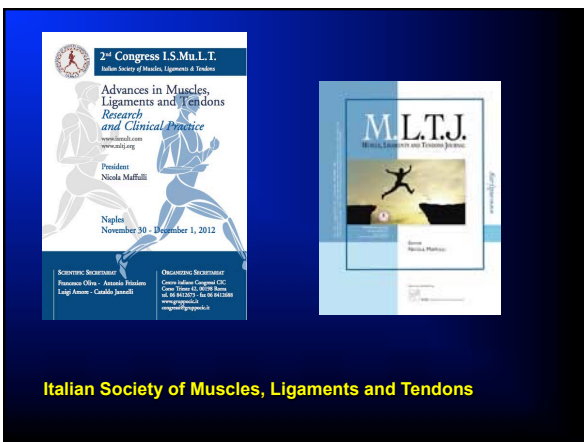
Difficult to compare surgeries

- ✦ 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



Thank you
Thank you

