PEESLETSELS
it’s all about loading

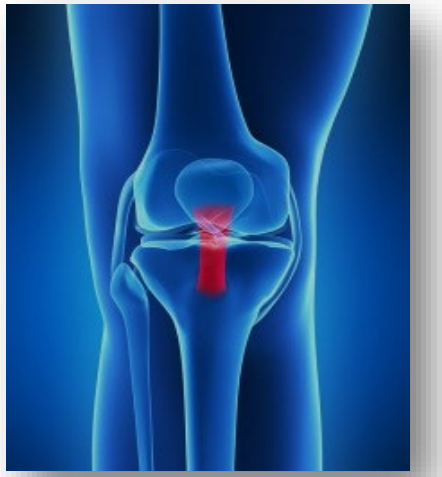


PROF DR K PEERS
SMAC – UZ KU LEUVEN

Tendinopathy

- epidemiology
- pathogenesis
- imaging
- treatment





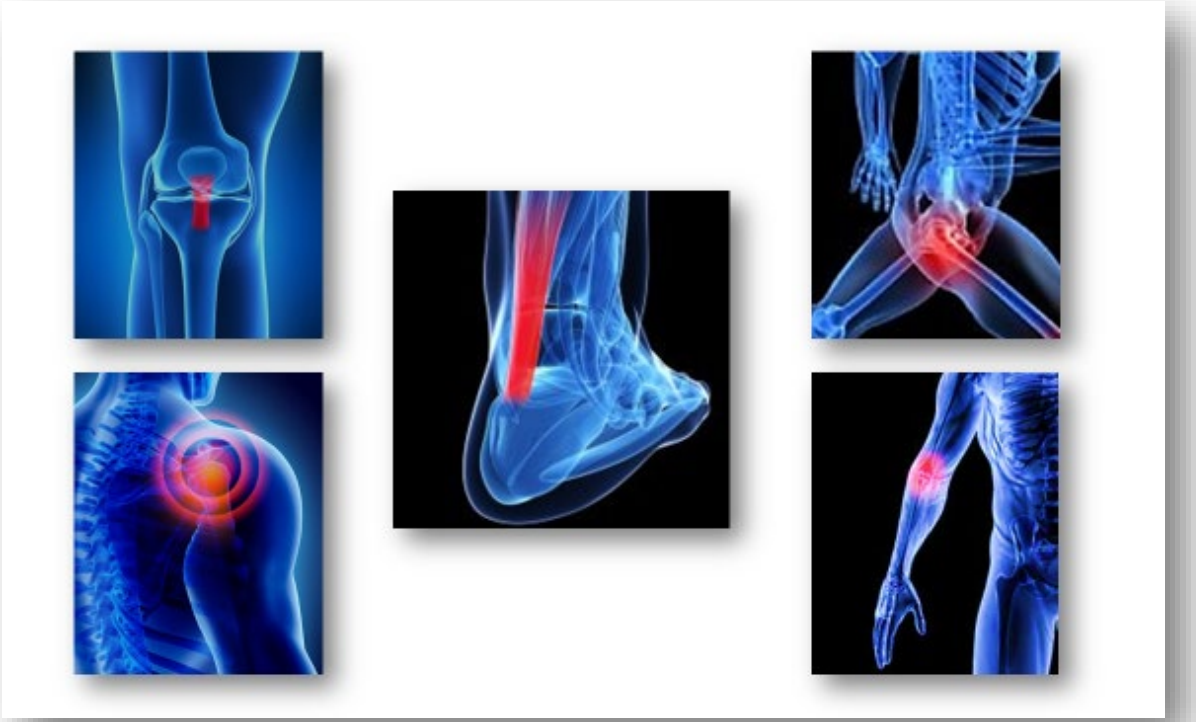








- Tendinopathie
- Bovenste Lidmaat:
  - ESWT
  - Rotator cuff tendinopathie
  - Elleboog tendinopathie
- Onderste lidmaat:
  - Peritendineuze letsels
  - ITB frictie syndroom
  - Achillespees ruptuur



Tendinopathy

pathogenesis:

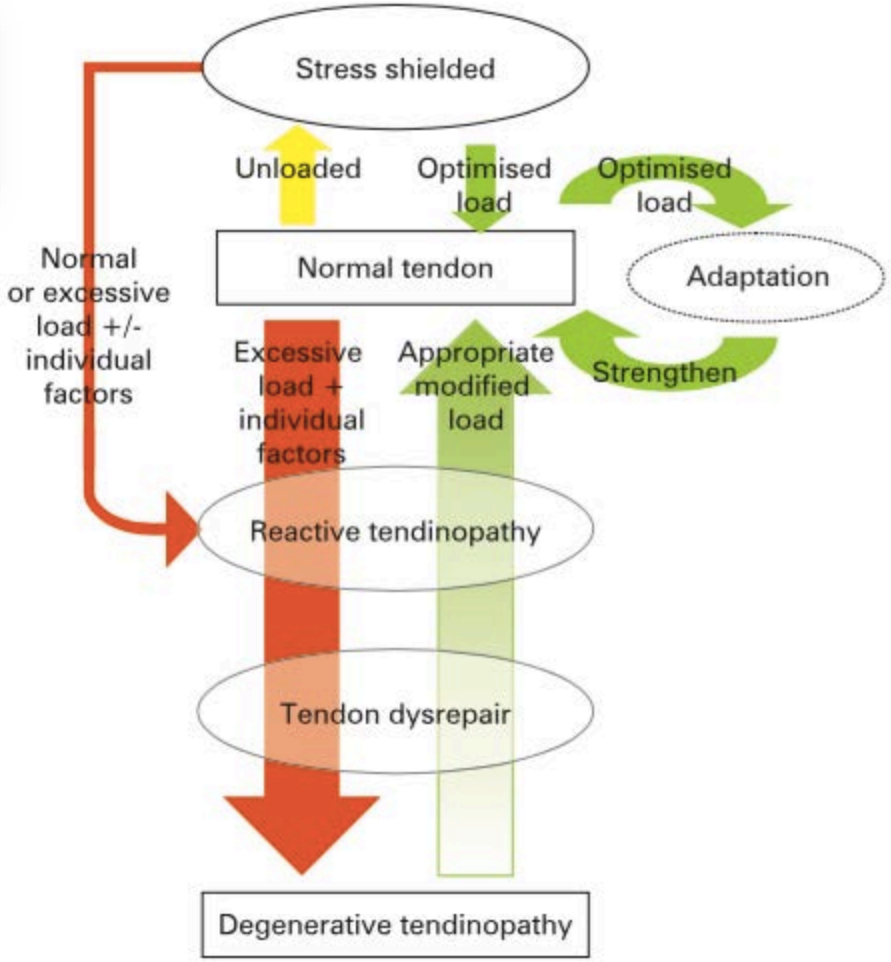
mechanotransduction



tendinopathie continuum model

Cook & Purdam BJSM 2009





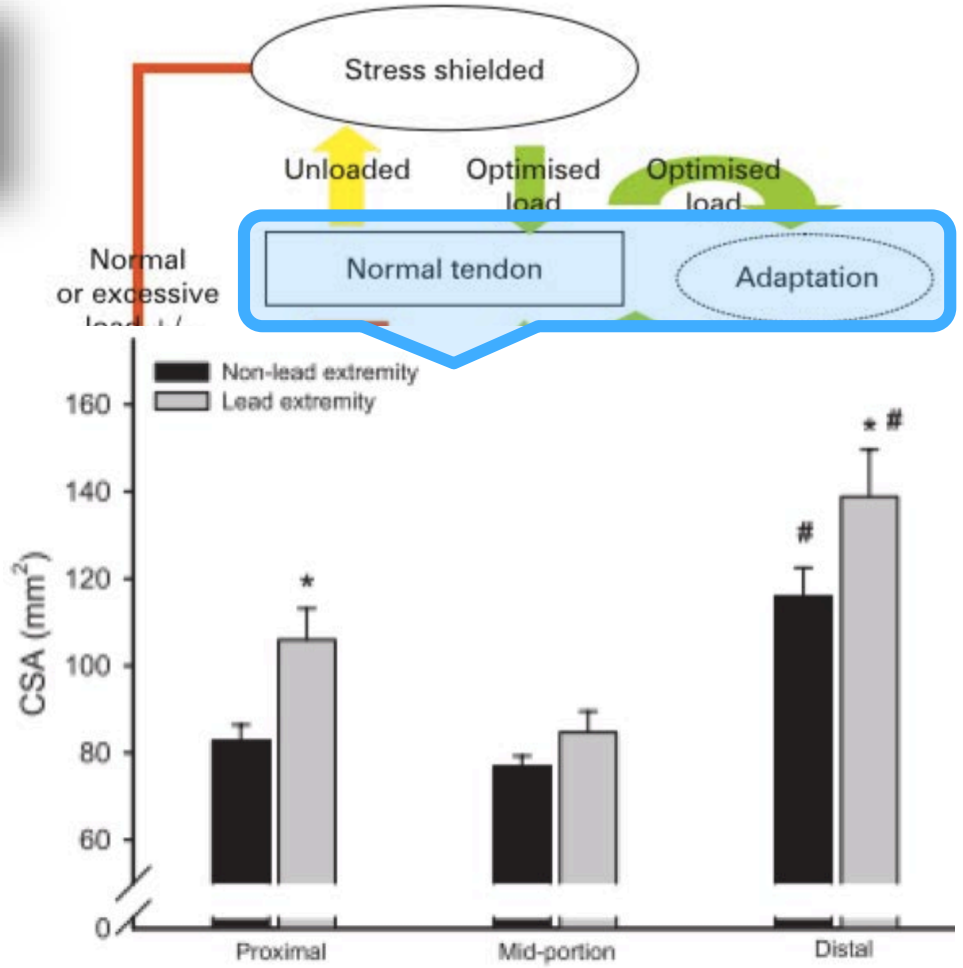
tendinopathie continuum model

Cook & Purdam BJSM 2009





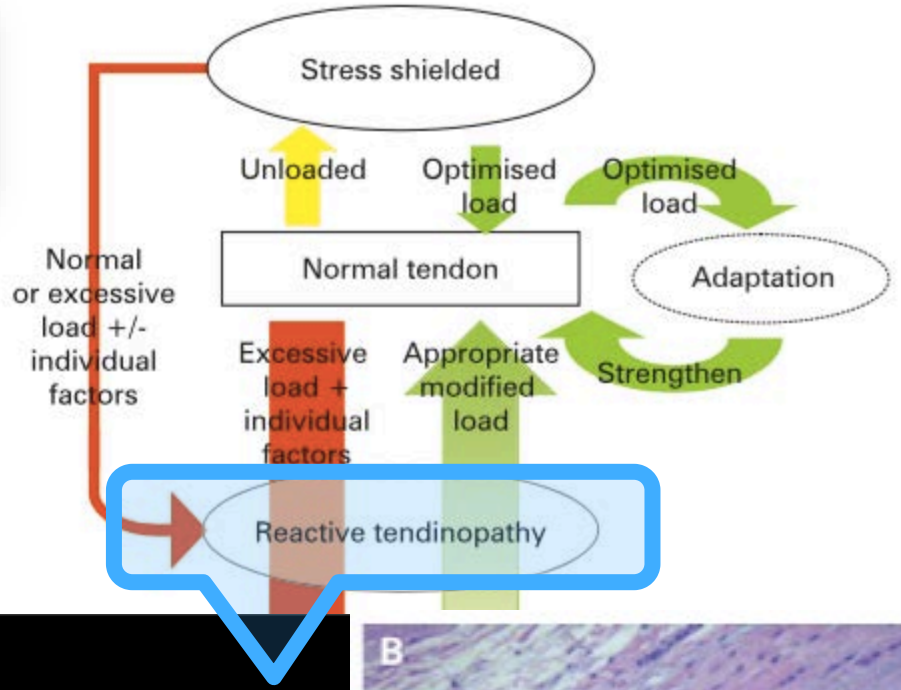


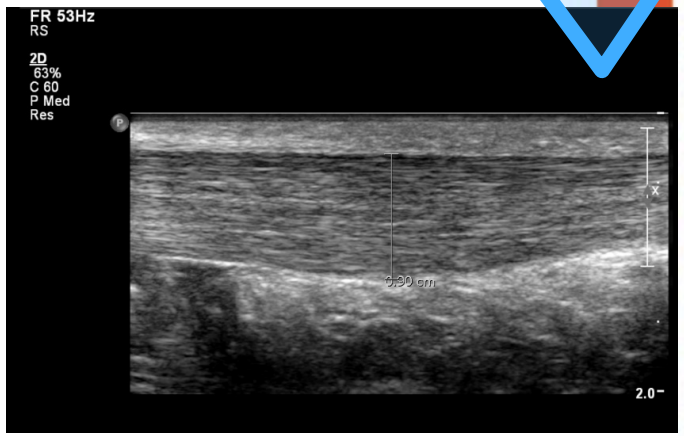


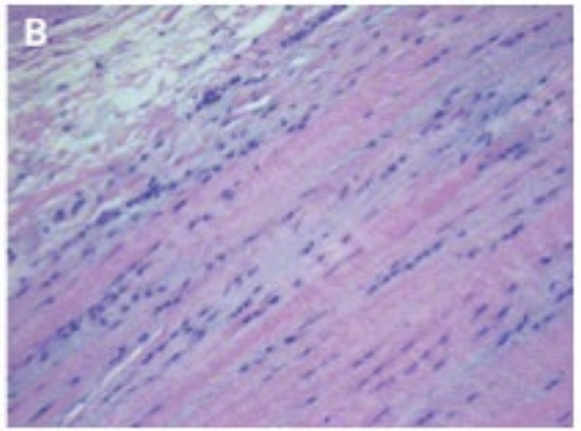
tendinopathie continuum model

Cook & Purdam BJSM 2009









tendinopathie continuum model

Cook & Purdam BJSM 2009



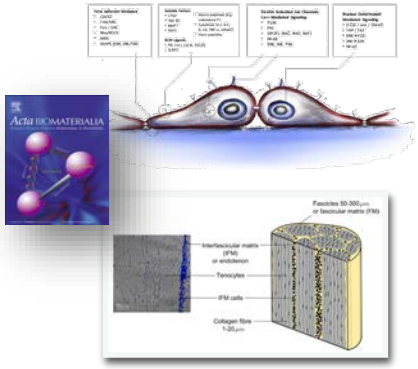
tendinopathie continuum model

Cook & Purdam BJSM 2009



- tendon is mechanosensing tissue

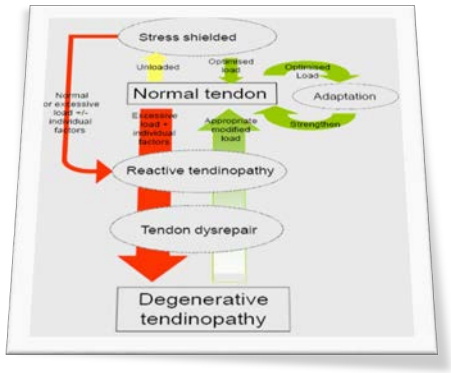
  - (un)loading of tendon



  - tension (strain) – shear - compression

  - cytoskeleton ----- cell-matrix

  - catabolic/anabolic reaction

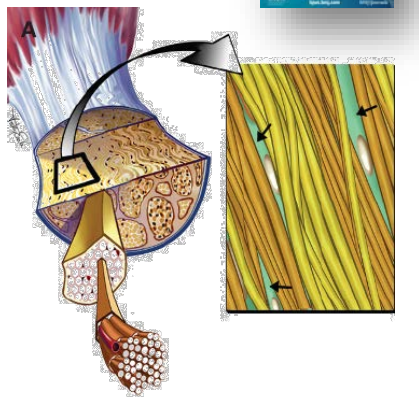


pathology based therapy

Mechanotherapy: how physical therapists' prescription of exercise promotes tissue repair

K M Khan, A Scott





Tendinopathy

imaging:

shift from morphological to biomechanical



Tendinopathy

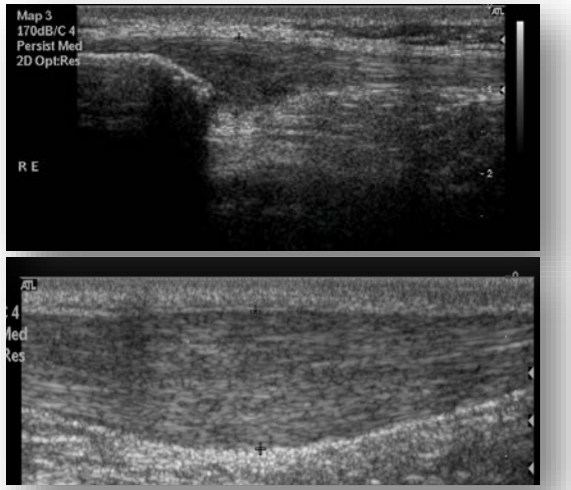
imaging:

shift from morphological to biomechanical

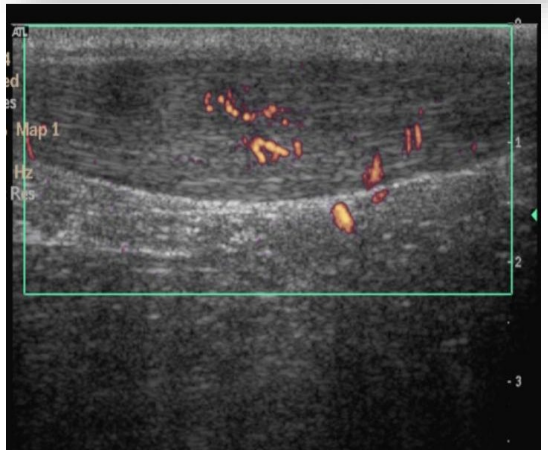


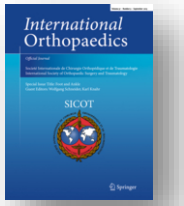
pathogenesis imaging → **shift from morphological to biomechanical**

- ultrasound
  - excellent histological correlation
  - unclear clinical correlation



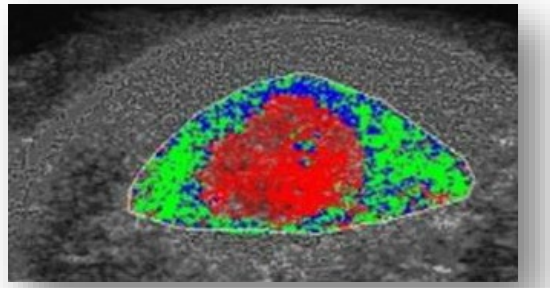
- color/power Doppler
  - power Doppler US in Achilles tendinopathy related to chronicity





Peers et al. Int Orthop 2003

Tendon imaging:
Ultrasound Tissue Characterisation (UTC)

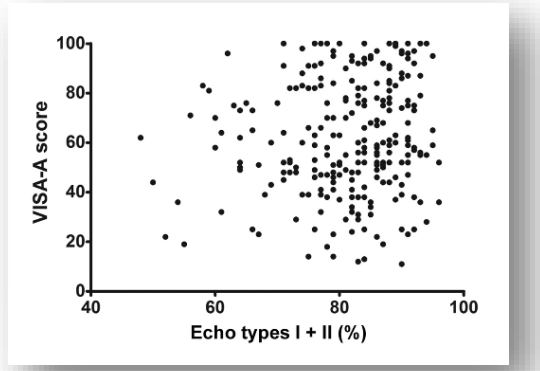


The Tendon Structure Returns to Asymptomatic Values in Nonoperatively Treated Achilles Tendinopathy but Is Not Associated With Symptoms

A Prospective Study

Suzan de Jonge,*†‡ MD, PhD, Johannes L. Tol,§||¶ MD, PhD, Adam Weir,|| MD, PhD, Jan H. Waarsing,† PhD, Jan A.N. Verhaar,‡ MD, PhD, and Robert-Jan de Vos,‡ MD, PhD
Investigation performed at Department of Sports Medicine, The Hague Medical Center Antoniushove, Leidschendam, the Netherlands





- Conservatively treated → asymptomatic
- No association at any time between UTC and symptoms
- No prediction in UTC evaluation

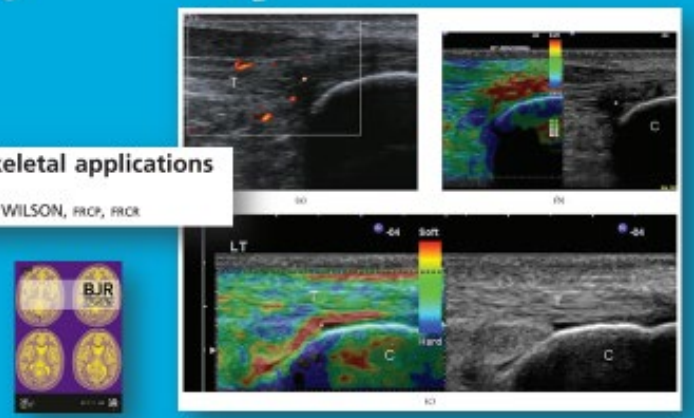
UZ LEUVEN

Shift from morphological → biomechanical tendon imaging

- **Biomechanical**
  - **Indirect: (shear wave) elastography**
  - **Direct: speckle tracking**

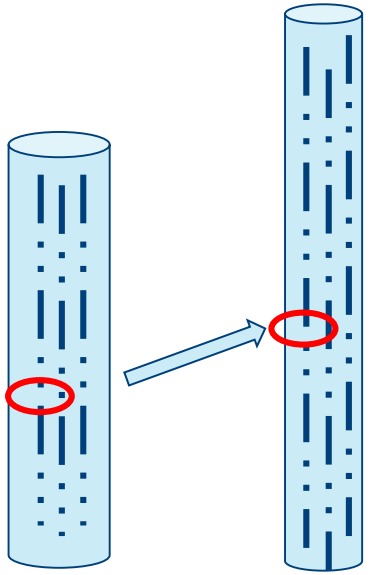
Ultrasound elastography for musculoskeletal applications

[1]E E DRAKONAKI, MD, PhD, [2]G M ALLEN, FRCR, MRCP and [2]D J WILSON, FRCP, FRCR



UZ Leuven

Principle of speckle tracking





US high spatial and temporal resolution

validated interactive application

Vevo 2100 Visualsonic	
Central Frequency	20MHZ
Transducer	MS250
Axial resolution*	75µm
Lateral resolution*	165µm
Frame rate	100fps
Voxel size	0.02x 0.09 mm
Image depth	27 mm
Image width	23.04 mm

PLoS One. 2017 Jul 20;12(7):e0181364. doi: 10.1371/journal.pone.0181364. eCollection 2017.

Evaluation of tissue displacement and regional strain in the Achilles tendon using quantitative high-frequency ultrasound.

Bogaerts S[1], De Brito Carvalho C[2], Scheys L[3], Desloovere K[4], D'hooge J[5], Maes F[2], Suetens P[2], Peers K[1].

Tendinopathy

therapy:

exercise & compliance



Tendinopathy

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Mechanotherapy: how physical therapists' prescription of exercise promotes tissue repair

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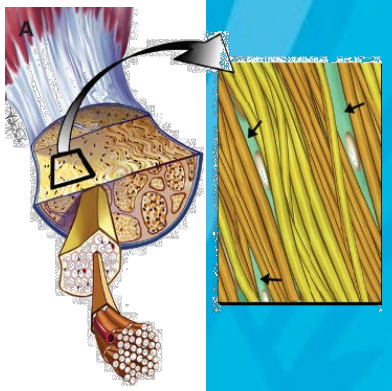
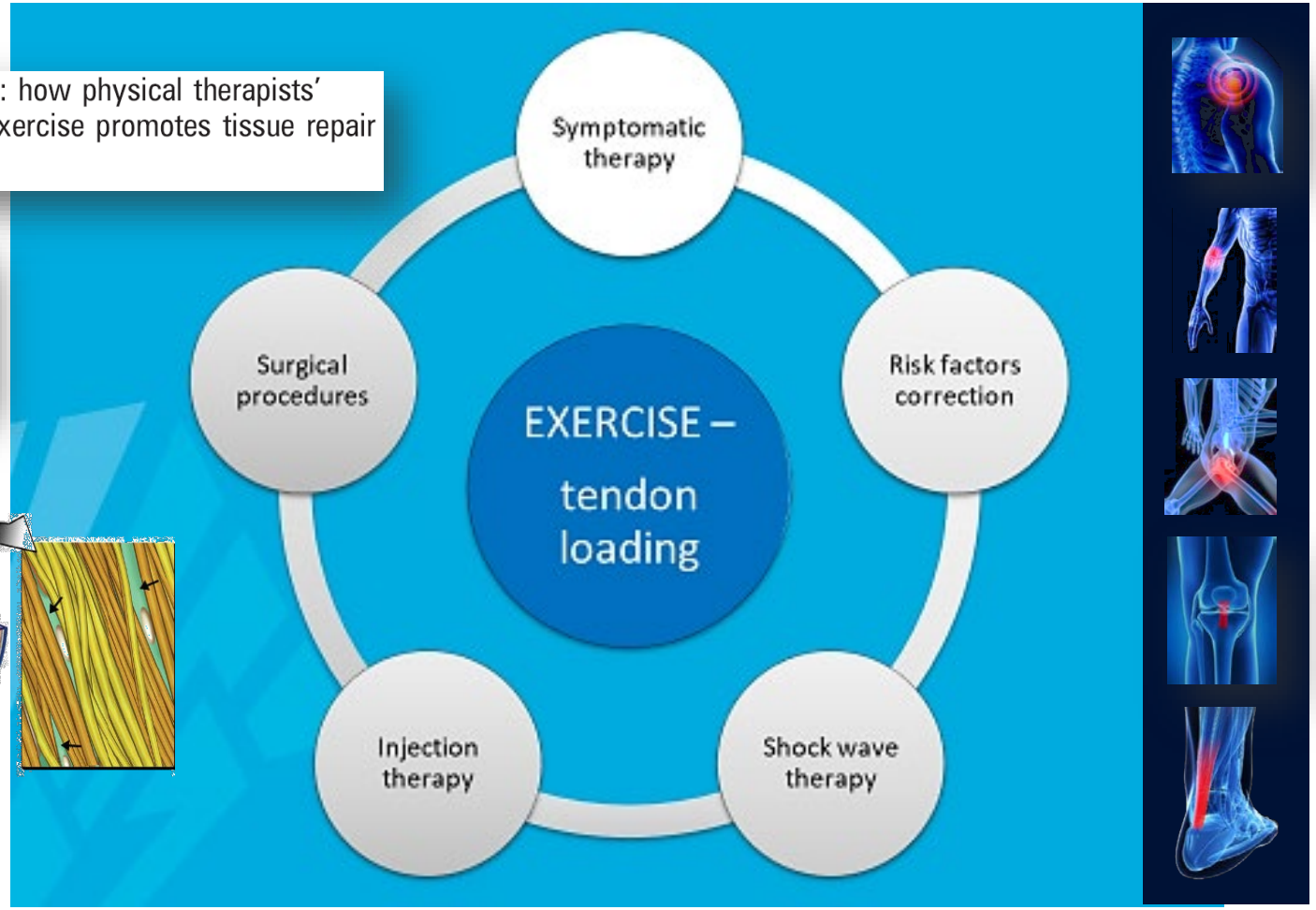




Isometrische oefeningen

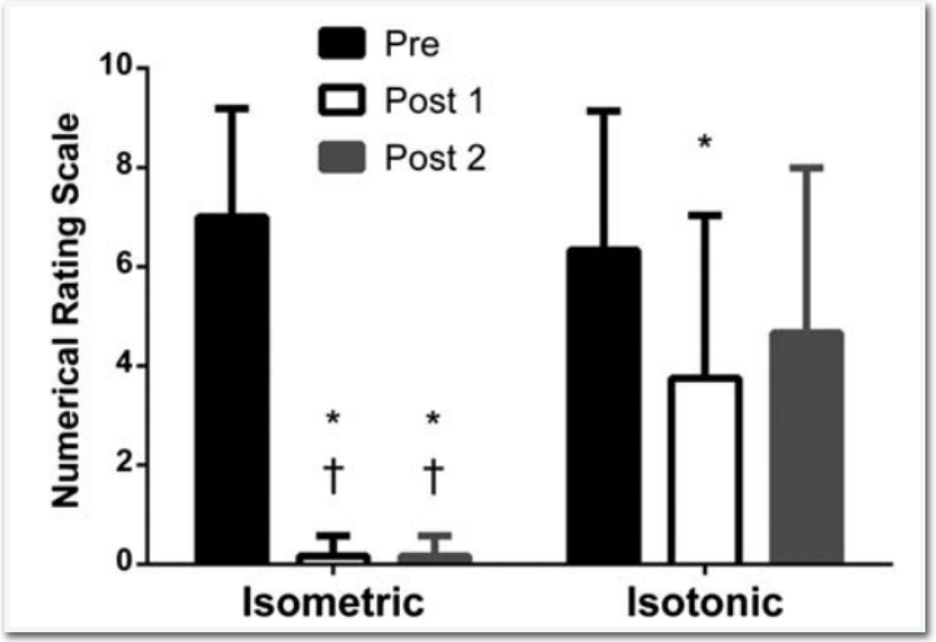
Isometric exercise induces analgesia and reduces inhibition in patellar tendinopathy

Ebonie Rio,[1] Dawson Kidgell,[2] Craig Purdam,[3] Jamie Gaida,[1,4] G Lorimer Moseley,[5] Alan J Pearce,[6] Jill Cook[1]

Table 2 Loading protocols in the study

	Apparatus	Prescription	Recovery (min)	Loading bolus
Isometric	Biodex Pro	5×45 s at 60°	2	70% MVC
Isotonic	Leg extension machine	4×8 repetitions *4 s eccentric phase* *3 s concentric phase*	2	100% 8RM

MVC, maximal voluntary contraction; RM, repetition maximum.



Isometrische oefeningen

- Te beschouwen als pijndempend voor opstart zwaardere belasting
- Eerste fase aanpak reactieve tendinopathie

Lancet. 1999 Feb 6;353(9151):439-43.

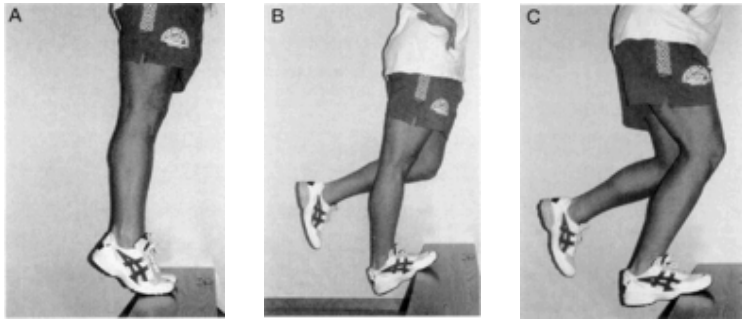
Effectiveness of active physical training as treatment for long-standing adductor-related groin pain in athletes: randomised trial.

Hölmich P[1], Uhrskou P, Ulnits L, Kanstrup IL, Nielsen MB, Bjerg AM, Krogsgaard K.



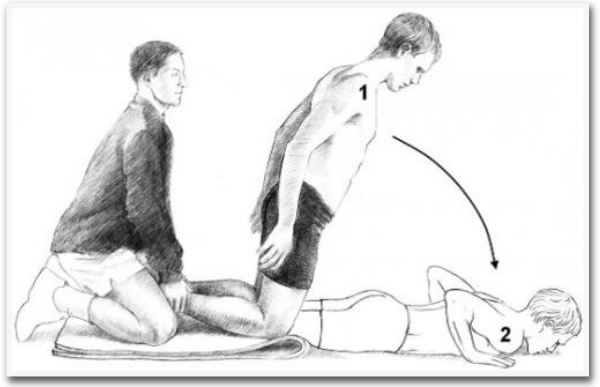
Excentrische oefeningen



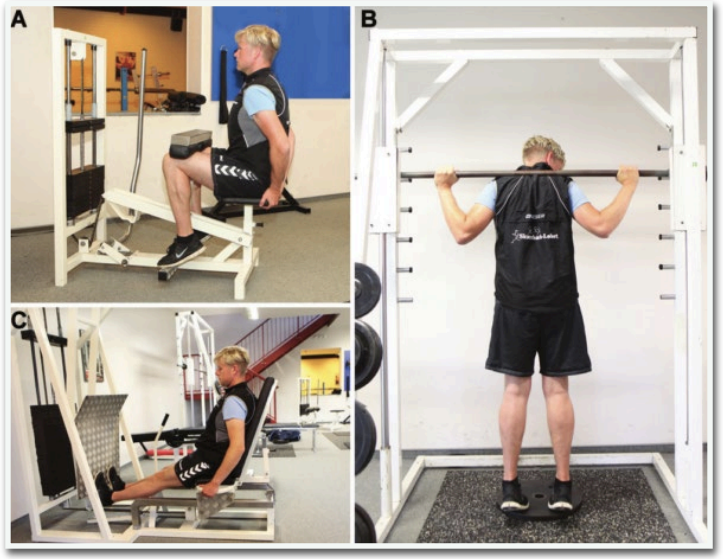


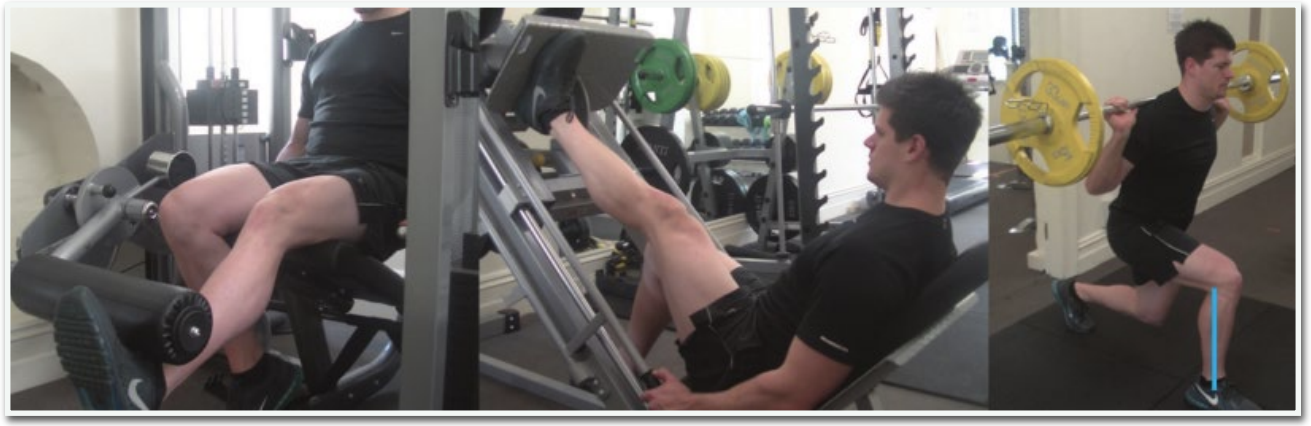






Heavy slow resistance







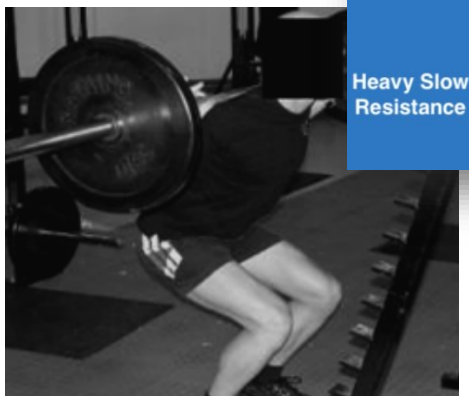




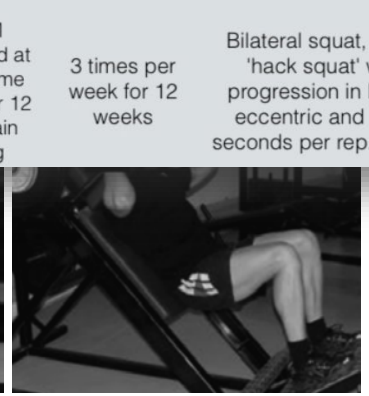


Type of exercise	Research	Sets, reps	Load	Frequency	Details
Eccentric	Alfredson et al. (1998) Achilles	3, 15	Body weight initially. Increased as pain allows	Twice daily for 12 weeks	'Heel drops' 1) with straight knee 2) with slightly knee flexed
Combined	Silbernagel et al. (2007) Achilles	Various	Body weight initially. Increased in phases based on patient status	Daily for 12 weeks to 6 months	Comprehensive programme including eccentric, concentric, balance, plyometric ex's and return to sport
Heavy Slow Resistance	Kongsgaard et al. (2009) & (2010)	4, 15-6	15-6RM Progressed at specific time points over 12 weeks pain allowing	3 times per week for 12 weeks	Bilateral squat, leg press and 'hack squat' with gradual progression in load. Includes eccentric and concentric. 6 seconds per rep. (3 ecc: 3 con.)



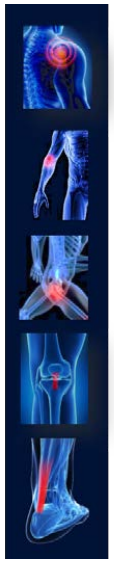






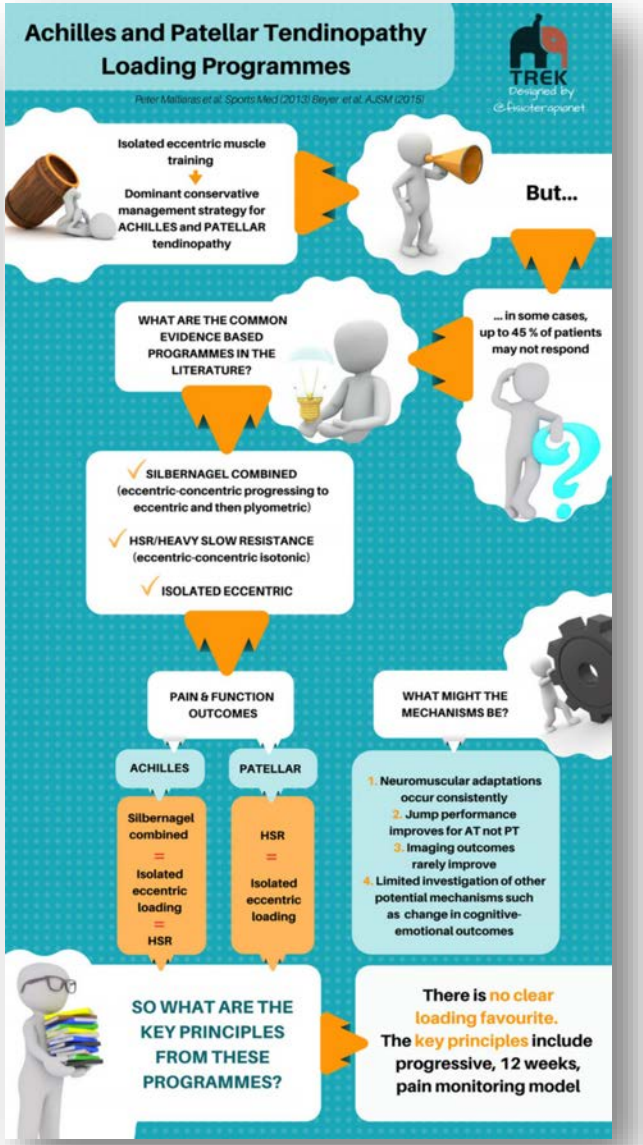
Infographic. Achilles and patellar tendinopathy rehabilitation: strive to implement loading principles not recipes

Peter Malliaras,[1] Jorge Rodriguez Palomino,[2] Christian J Barton[2,3]



Tendon exercise:

- progressive
- 12 weeks
- pain monitoring



PLoS One. 2017 Jul 20;12(7):e0181364. doi: 10.1371/journal.pone.0181364. eCollection 2017.

Evaluation of tissue displacement and regional strain in the Achilles tendon using quantitative high-frequency ultrasound.

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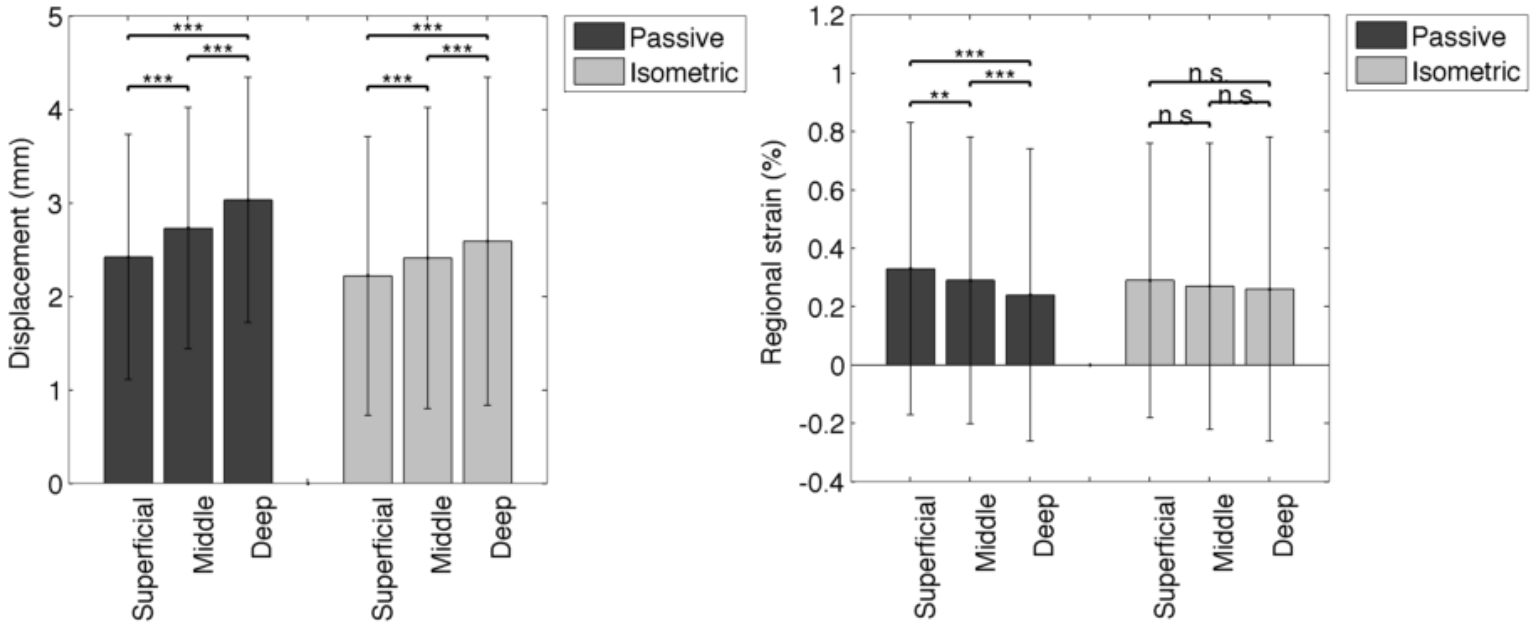


- highest *displacement* = deep layer
- highest *strain* = superficial layer

→ non-uniform behaviour

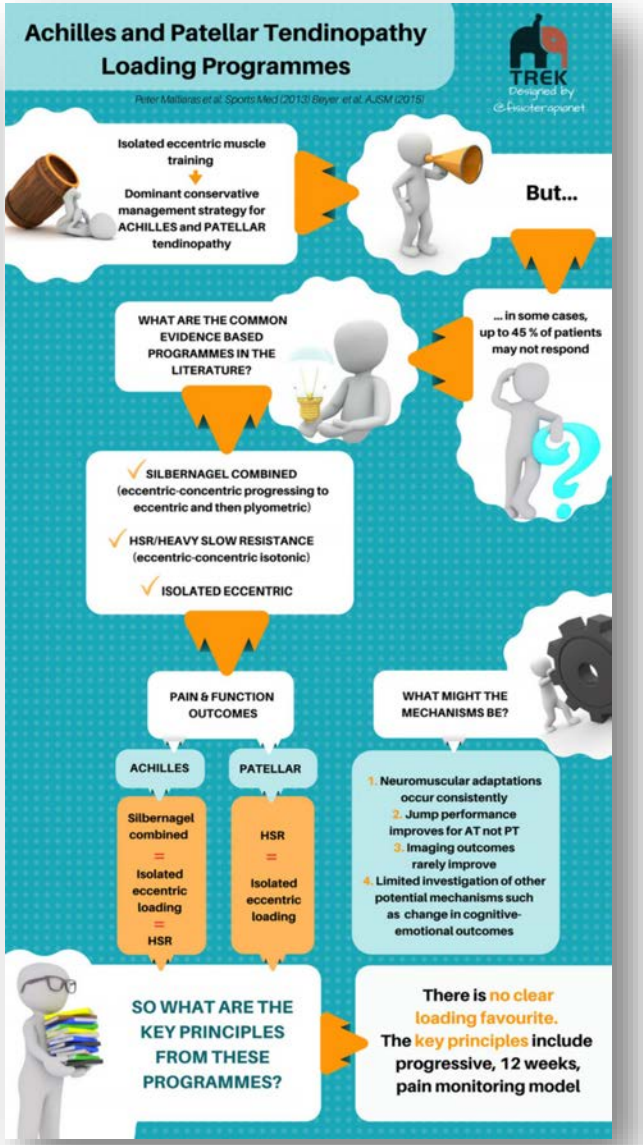
Infographic. Achilles and patellar tendinopathy rehabilitation: strive to implement loading principles not recipes

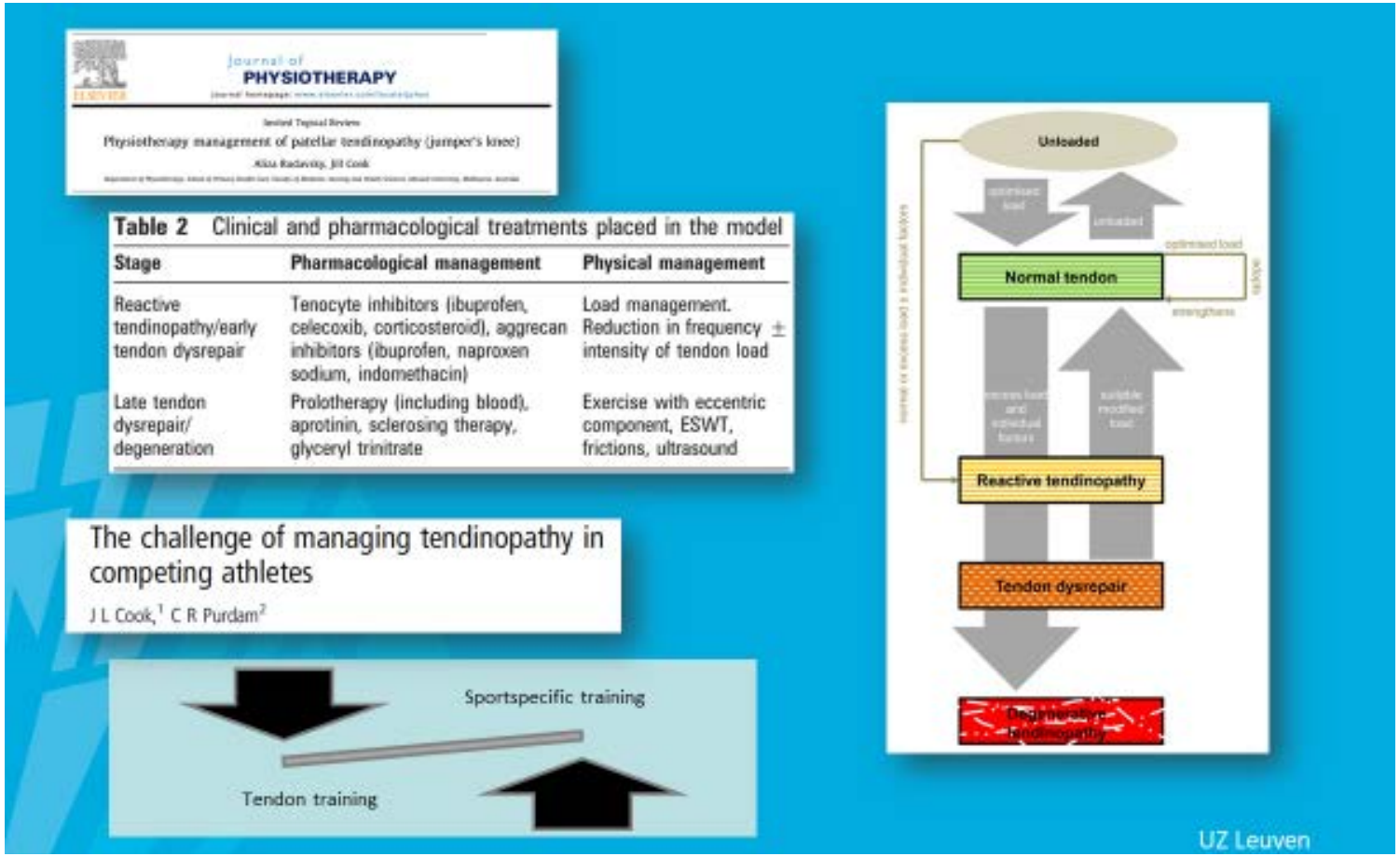
Peter Malliaras,[1] Jorge Rodriguez Palomino,[2] Christian J Barton[2,3]



Tendon exercise:

- progressive
- 12 weeks
- pain monitoring
- force
- joint angle
- phase tendinopathy




Journal of PHYSIOTHERAPY
Physiotherapy management of patellar tendinopathy (jumper's knee)
Table 2 Clinical and pharmacological treatments placed in the model
Stage | Pharmacological management | Physical management
Reactive tendinopathy/early tendon dysrepair | Tenocyte inhibitors (ibuprofen, celecoxib, corticosteroid), aggrecan inhibitors (ibuprofen, naproxen sodium, indomethacin) | Load management. Reduction in frequency ± intensity of tendon load
Late tendon dysrepair/ degeneration | Prolotherapy (including blood), aprotinin, sclerosing therapy, glyceryl trinitrate | Exercise with eccentric component, ESWT, frictions, ultrasound
The challenge of managing tendinopathy in competing athletes
J L Cook,[1] C R Purdam[2]
Sportspecific training
Tendon training
Unloaded
Normal tendon
Reactive tendinopathy
Tendon dysrepair
Degenerative tendinopathy
UZ Leuven

Pathology based therapy

Mechanotherapy: how physical therapists' prescription of exercise promotes tissue repair

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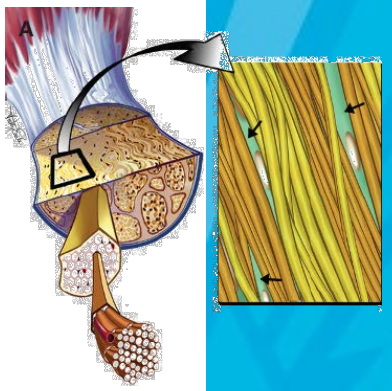
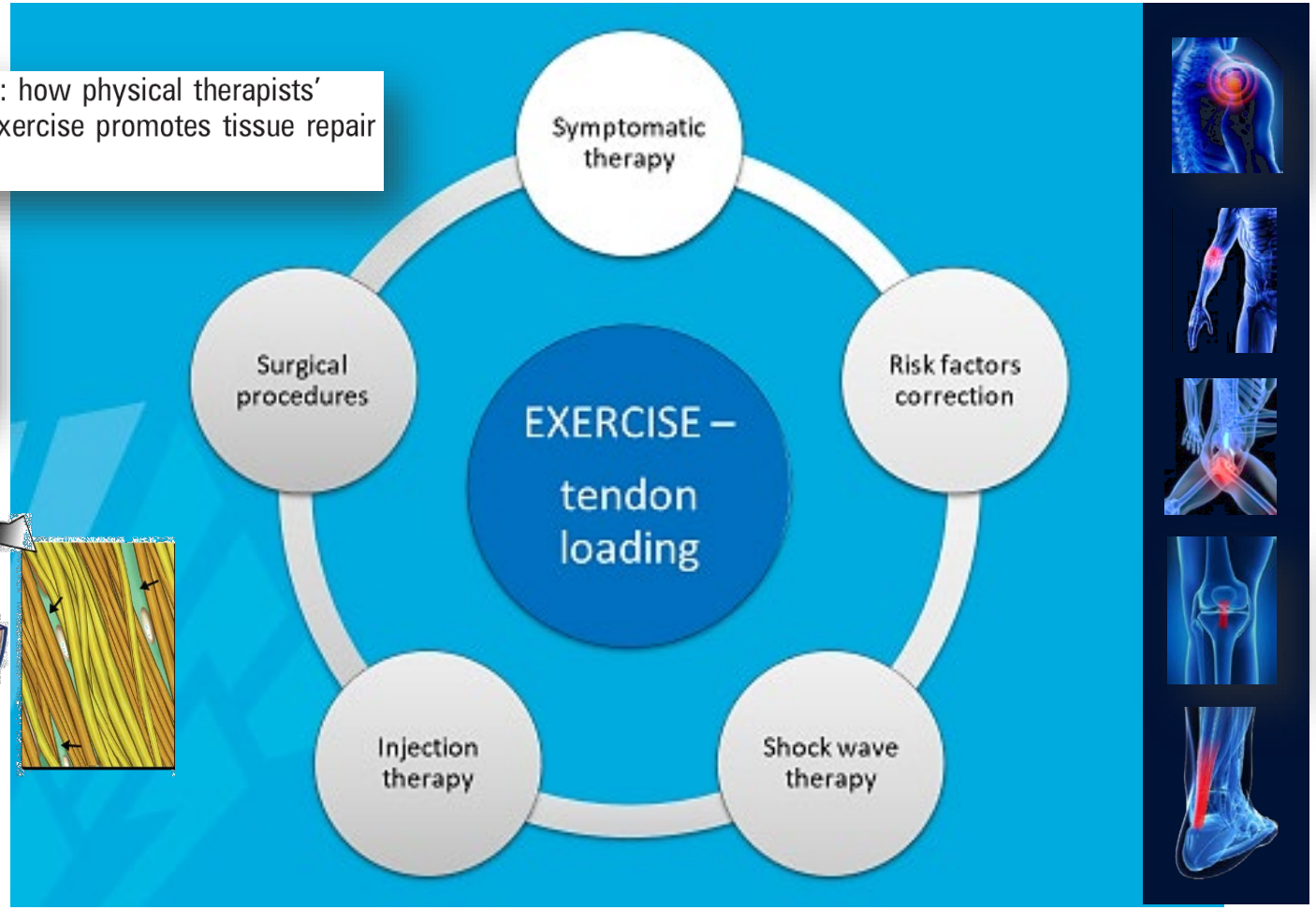
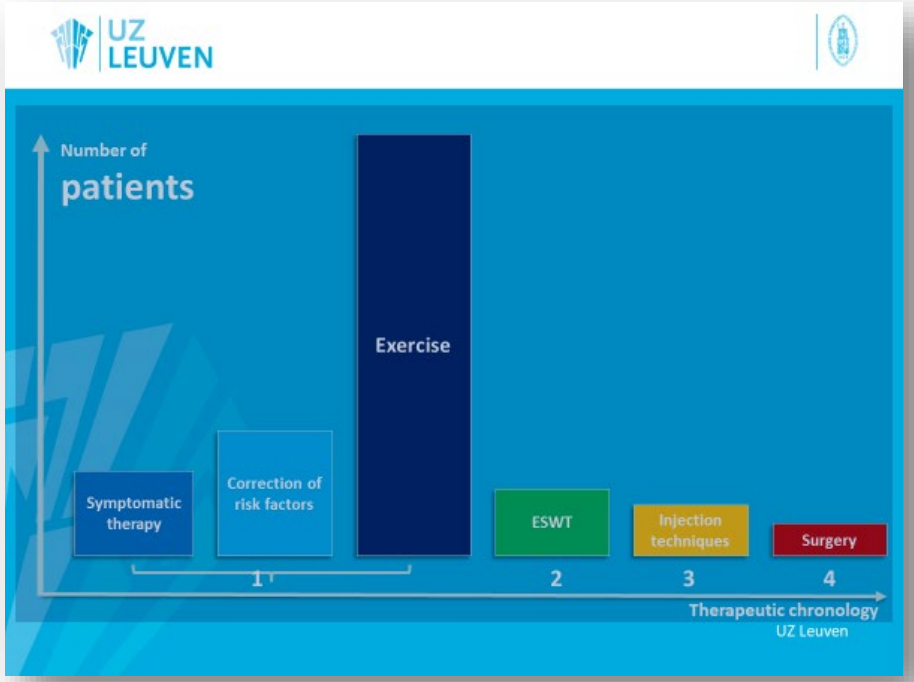
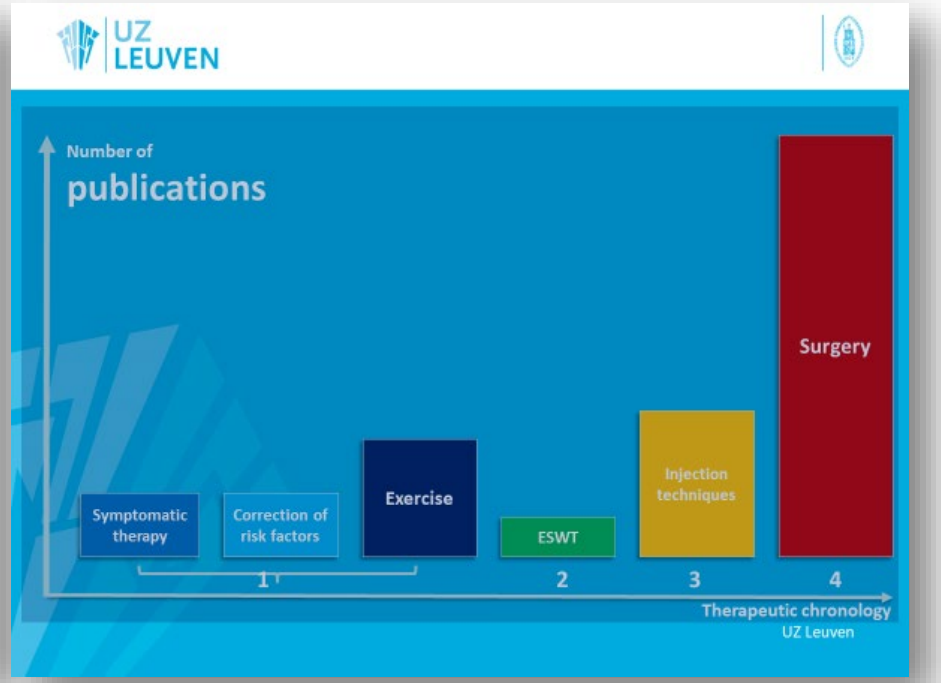




Tendinopathy therapeutic options in literature





Tendinopathy therapeutic options:

- injection (US-guided)
  - CS
  - PRP
  - high-volume
  - sclerosing
  - hyaluronic acid
  - aprotinin
  - botulinum toxin
  - nsaids
  - dextrose
  - …
- radiofrequent microdebridement
- glyceryl trinitrate patch
- electrolysis
- acupuncture
- soft tissue mobilisation (Astym)
- lasertherapy

- radial ESWT
- focussed ESWT
- iontophoresis
- TENS
- strap
- bandage
- kinesiotape
- splinting
- surgery (arthro/endoscopic – open)
  - debridement
  - scraping
  - excision
  - release
  - muscle graft
  - …

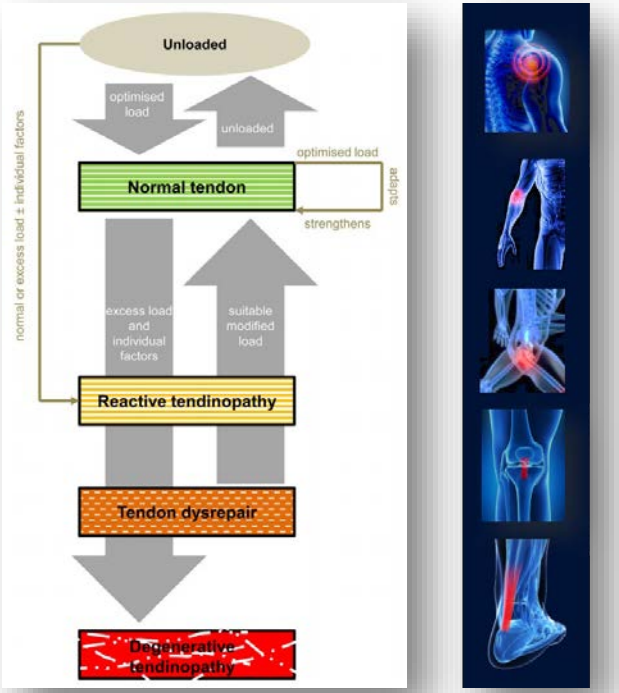
- Tendon additional therapy: extremely equivocal

  - Meta analysis: low quality

    Shock wave > injection > surgery

  - Selection of patient population (continuum)

  - No control for external loading (sport activity) or exercise therapy compliance



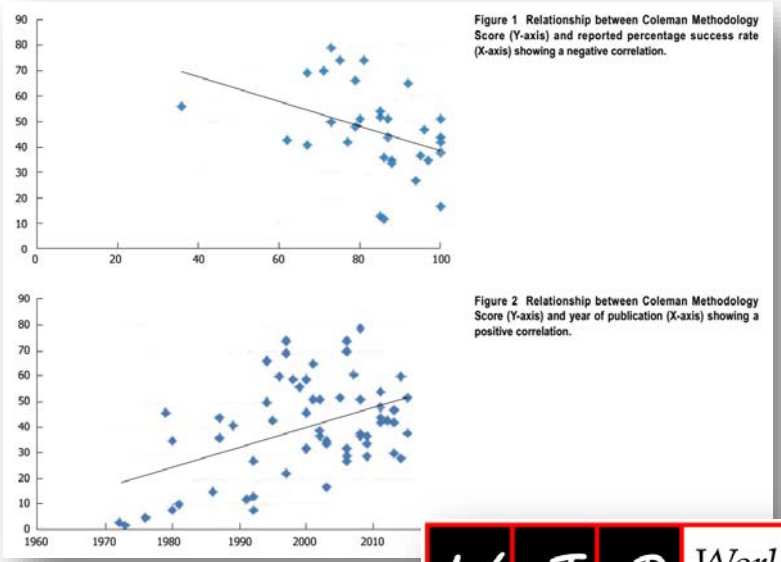
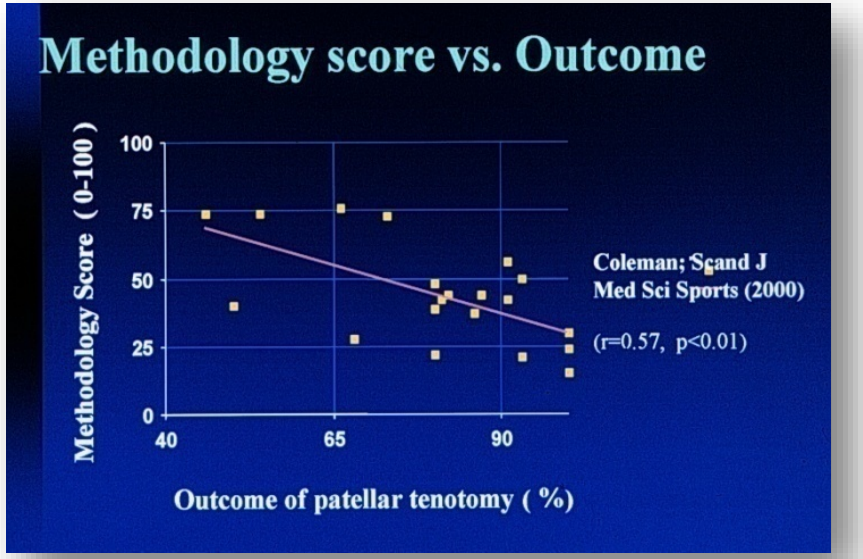
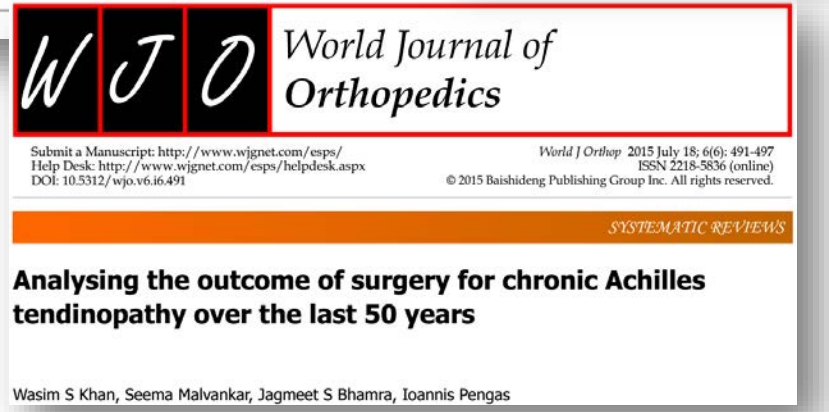


Figure 1 Relationship between Coleman Methodology Score (Y-axis) and reported percentage success rate (X-axis) showing a negative correlation.

Figure 2 Relationship between Coleman Methodology Score (Y-axis) and year of publication (X-axis) showing a positive correlation.





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World J Orthop 2015 July 18; 6(6): 491-497
ISSN 2218-5836 (online)
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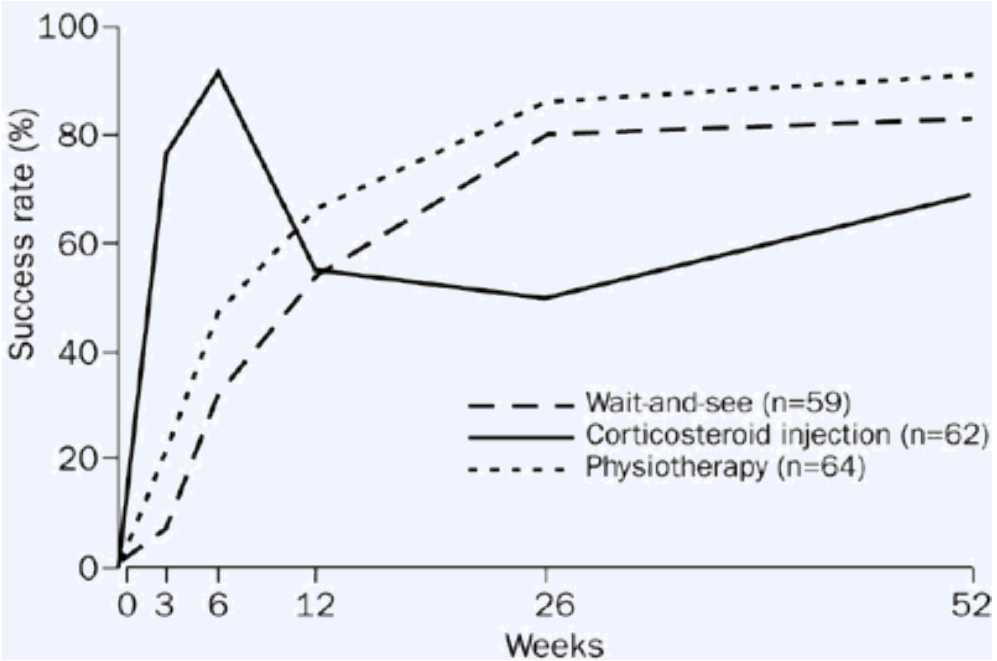
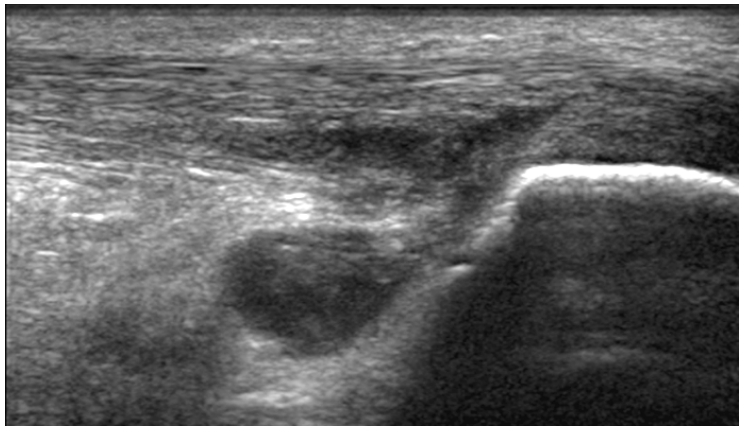
SYSTEMATIC REVIEWS

Analysing the outcome of surgery for chronic Achilles tendinopathy over the last 50 years

Wasim S Khan, Seema Malvankar, Jagmeet S Bhamra, Ioannis Pengas

Corticosteroid injections, physiotherapy, or a wait-and-see policy for lateral epicondylitis: a randomised controlled trial
Smidt et al Lancet 2002







EPIDEMIOLOGIE | PATHOGENESE | BEELDVORMING | BEHANDELING

Efficacy and safety of corticosteroid injections and other injections for management of tendinopathy: a systematic review of randomised controlled trials

Brooke K Coombes, Leanne Bisset, Bill Vicenzino

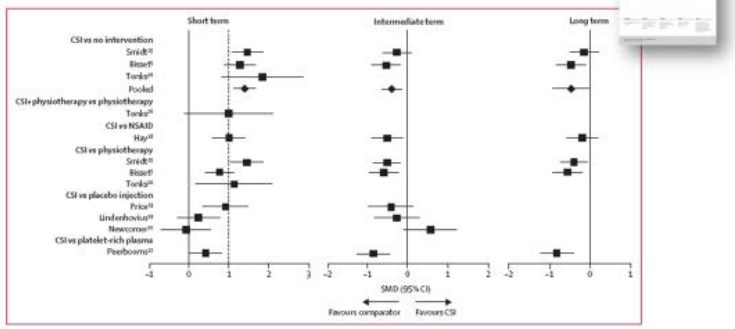
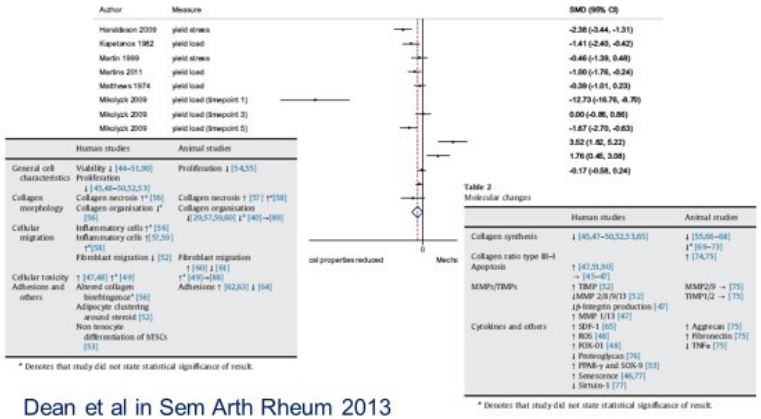


Figure 2: Standardised mean difference for improvement in pain after corticosteroid injection for lateral epicondylalgia

EPIDEMIOLOGIE | PATHOGENESE | BEELDVORMING | BEHANDELING

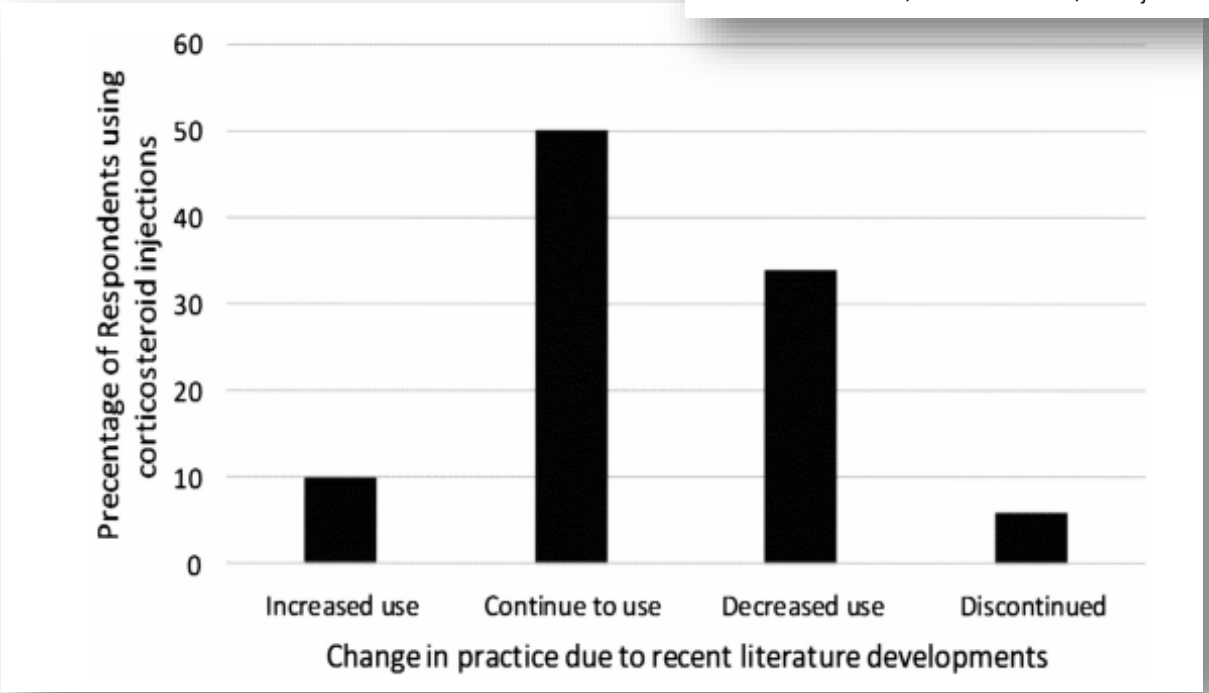
The risks and benefits of glucocorticoid treatment for tendinopathy



Dean et al in Sem Arth Rheum 2013

Corticosteroid and platelet-rich plasma injection therapy in tennis elbow (lateral epicondylalgia): a survey of current UK specialist practice and a call for clinical guidelines

Andrew G Titchener, Simon J Booker, Nivraj S Bhamber, Amol A Tambe, David I Clark






Wat kan IK voor u DOEN?
@SMACLeuven
tendinopathie
prof. dr. K. Peers


… patiënt …
… nodig …
@SMACLeuven
tendinopathie
prof. dr. K. Peers

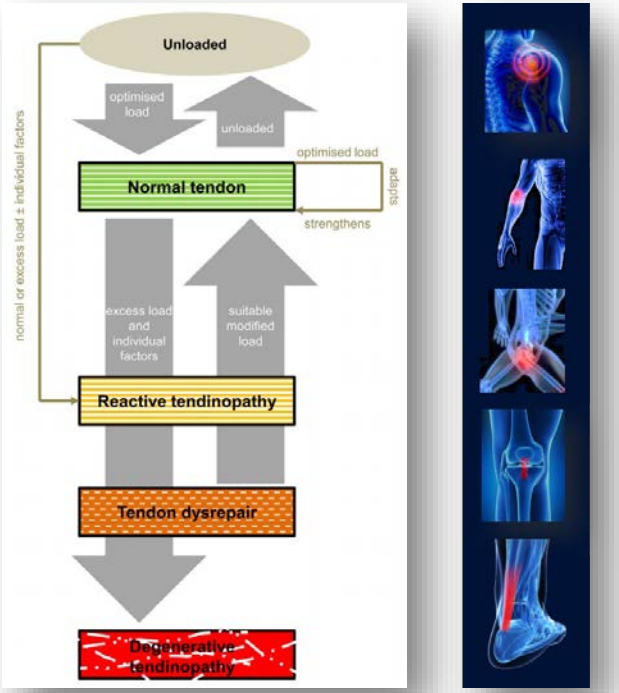
- Tendon additional therapy: extremely equivocal

  - Meta analysis: low quality

    Shock wave > injection > surgery

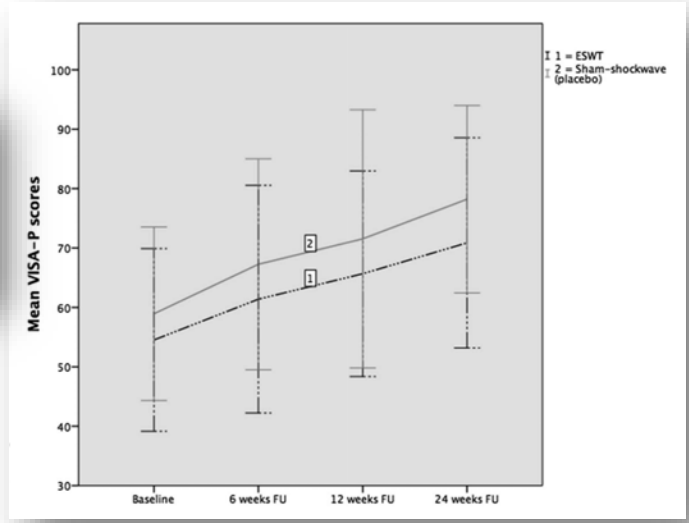
  - Selection of patient population (continuum)

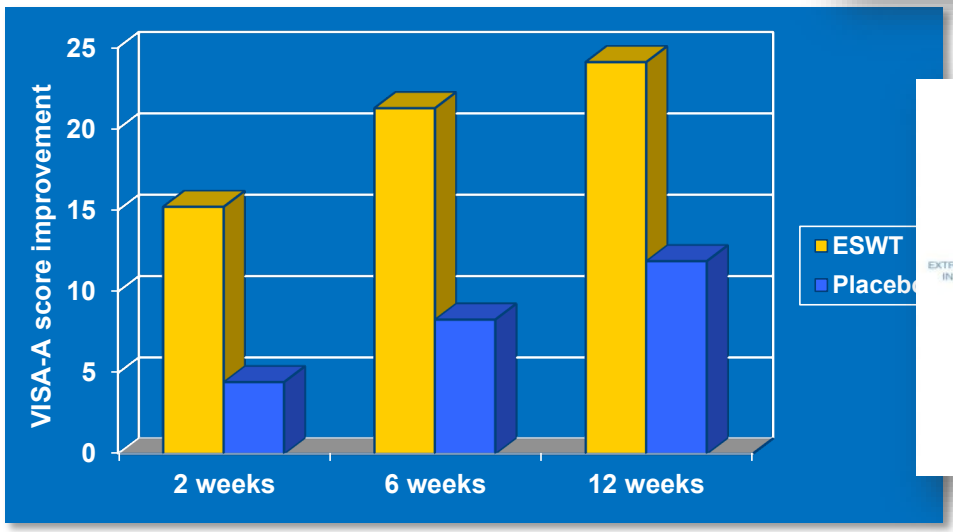
  - No control for external loading (sport activity) or exercise therapy compliance

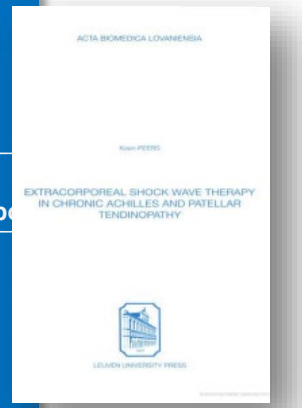


Effectiveness of Shockwave Treatment Combined With Eccentric Training for Patellar Tendinopathy: A Double-Blinded Randomized Study

Karin M. Thijs, MD, Johannes Zwerver, MD, PhD,† Frank J. G. Backx, MD, PhD,* Victor Steeneken, PT, MSc,‡ Stephan Rayer, PT,§ Petra Groenenboom, MD,¶ and Maarten H. Moen, MD PhD*‖***





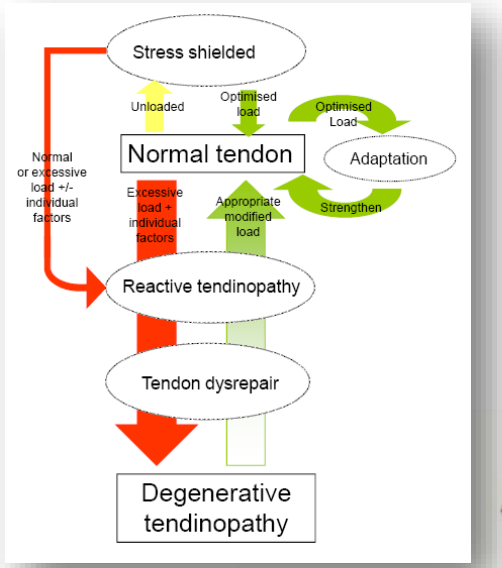


Sports Med
DOI 10.1007/s40279-013-0096-z

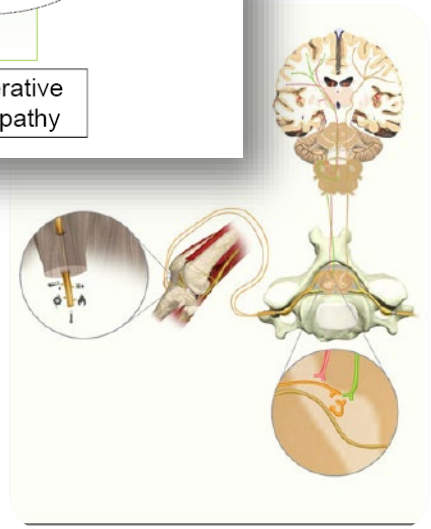
REVIEW ARTICLE

The Pain of Tendinopathy: Physiological or Pathophysiological?

Ebonie Rio · Lorimer Moseley · Craig Purdam · Tom Samiric · Dawson Kidgell · Alan J. Pearce · Shapour Jaberzadeh · Jill Cook



- Reactive tendinopathy: increased expression of nociceptive substances but no change in innervation
- Painfull tendinosis: little expression of nociceptive substances but greater innervation
- (Central) sensitisation



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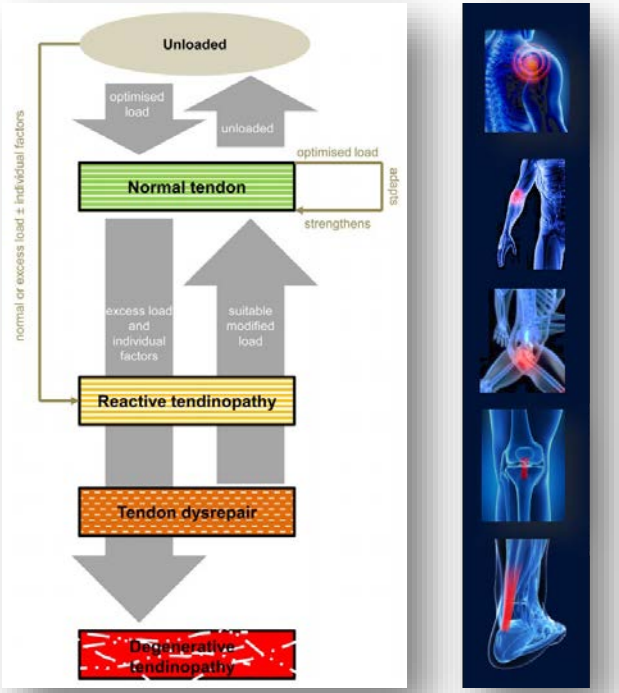
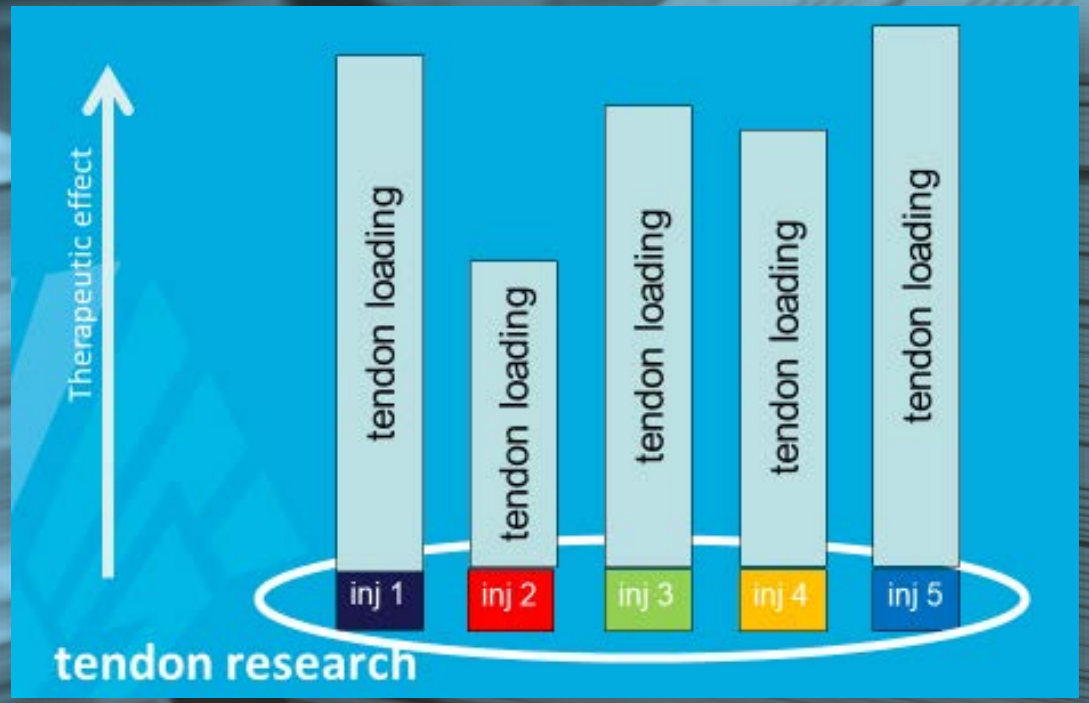


- **Tendinopathy outcome: no correction for tendon loading or exercise compliance**

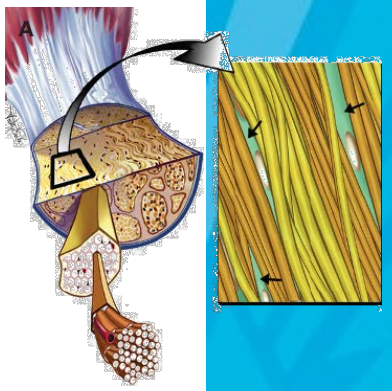


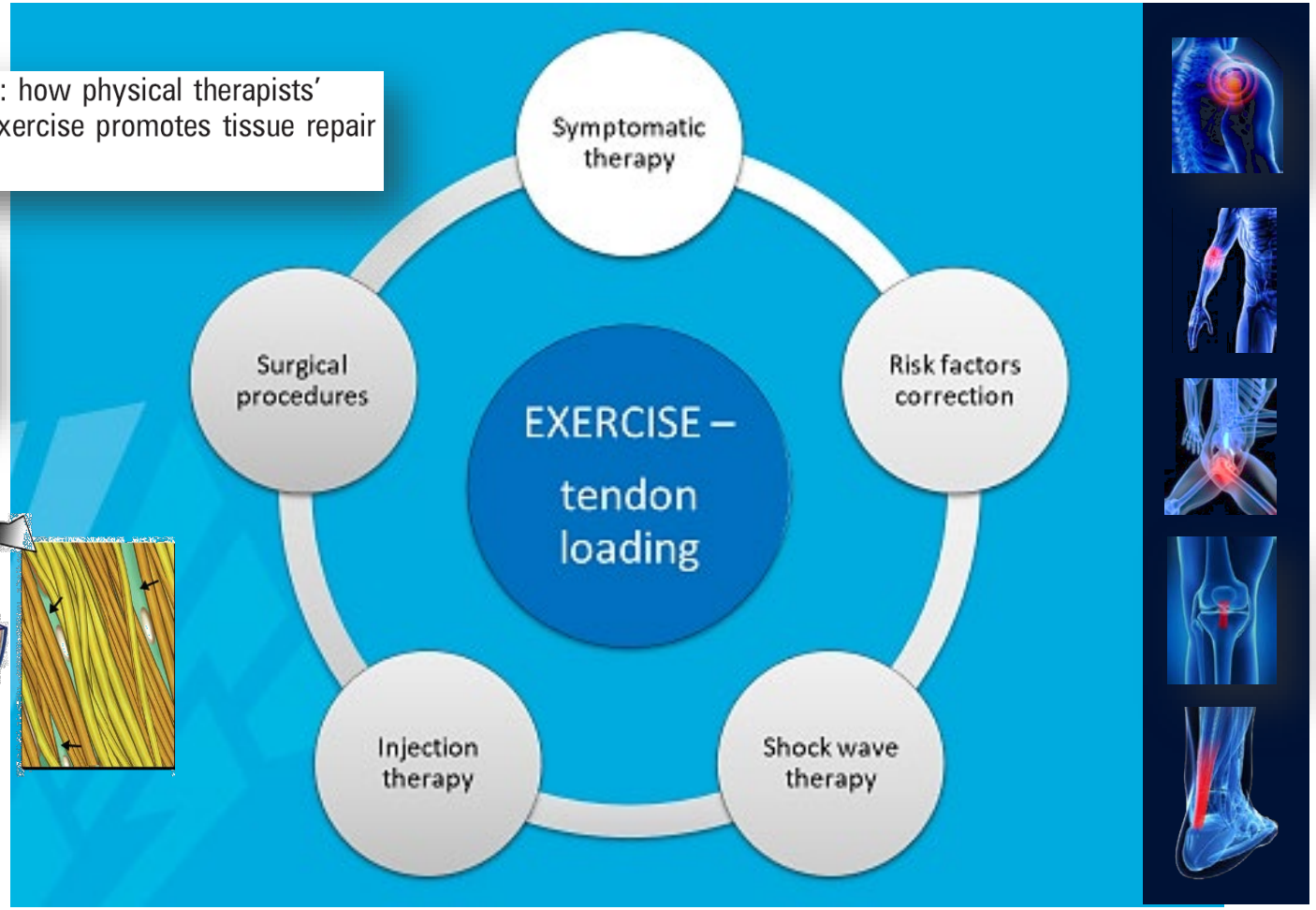
Pathology based therapy

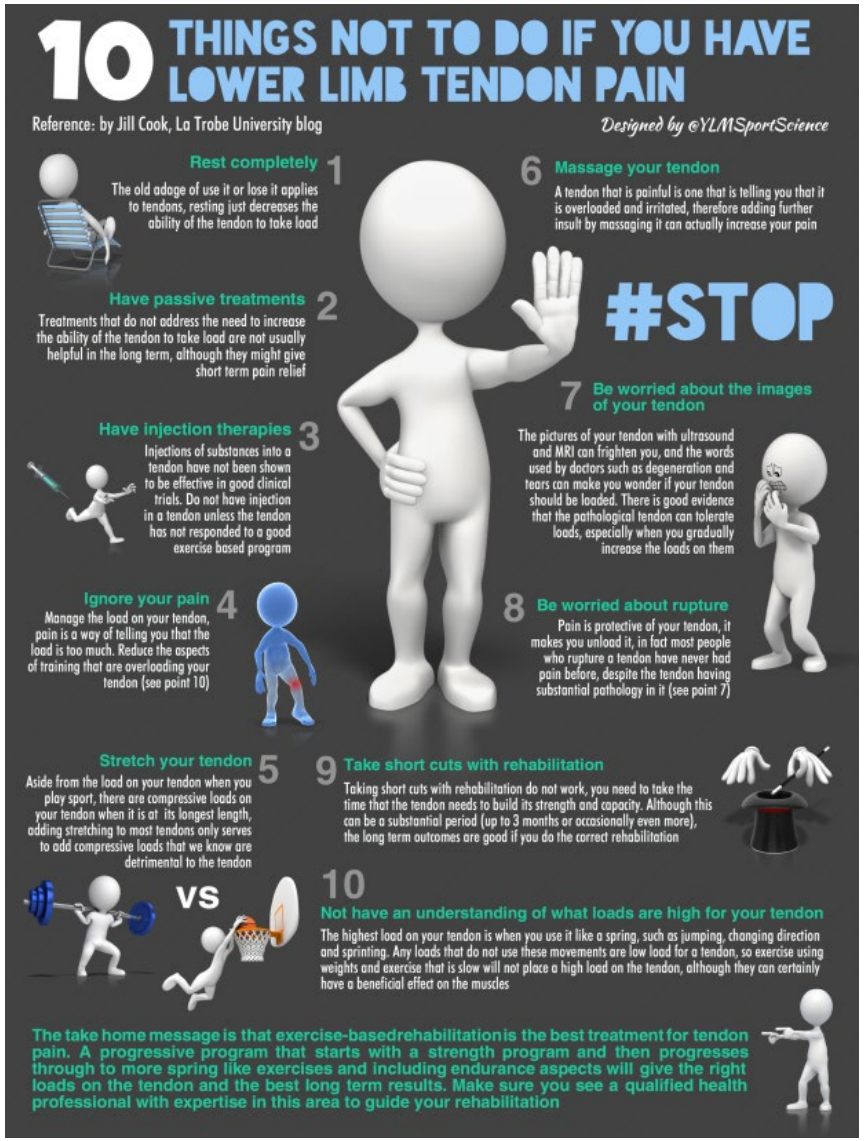
Mechanotherapy: how physical therapists' prescription of exercise promotes tissue repair

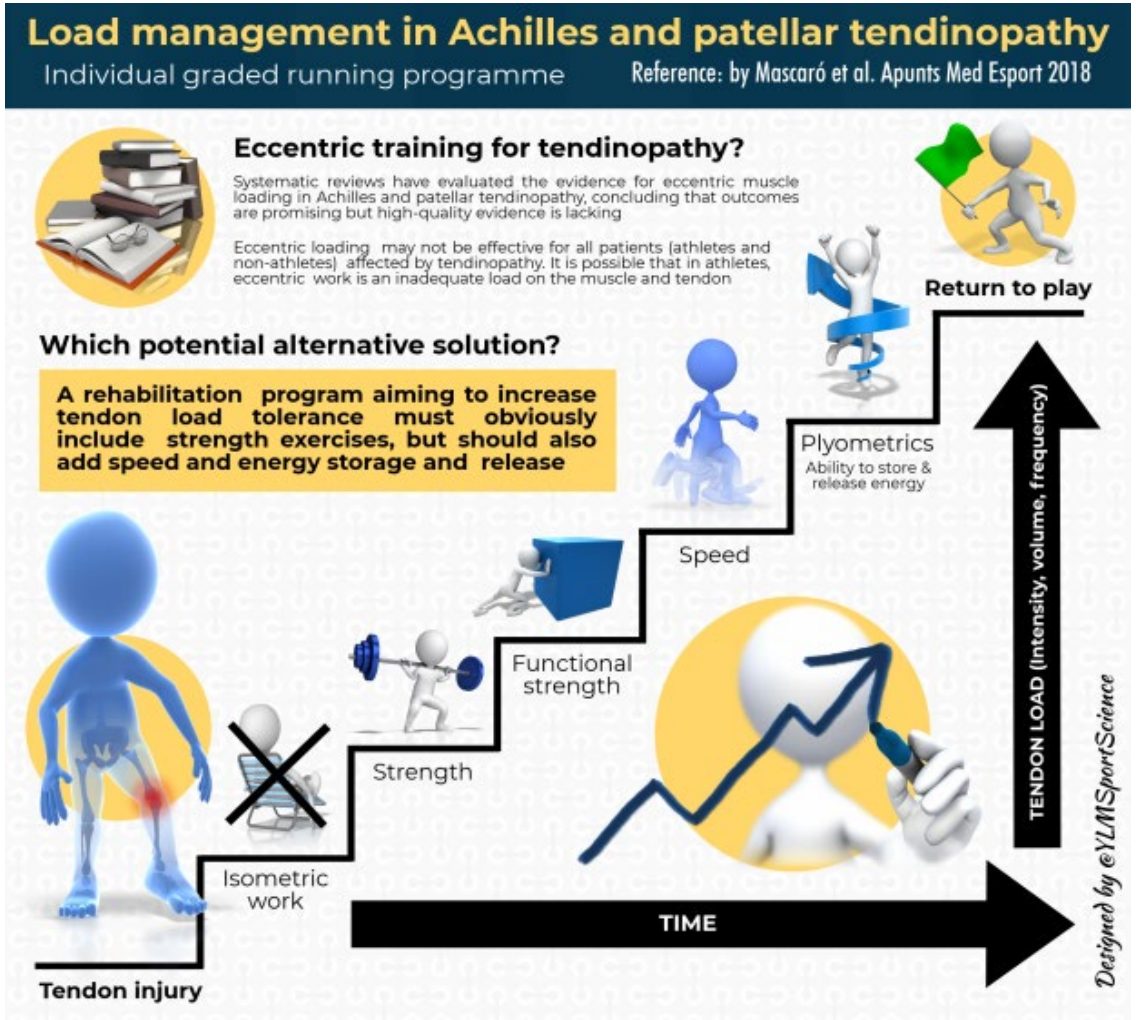
K M Khan, A Scott

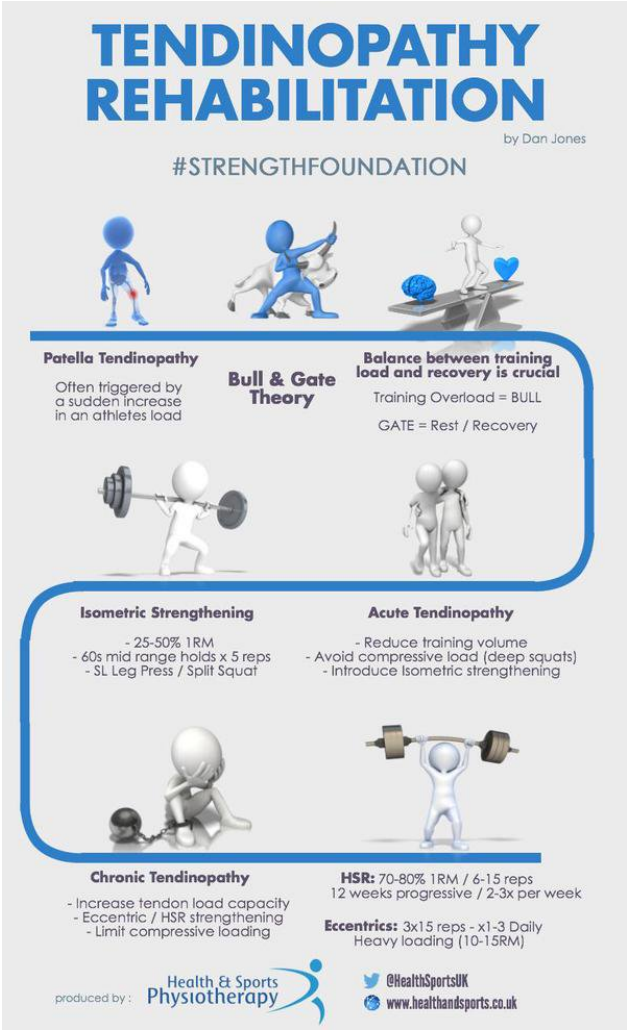


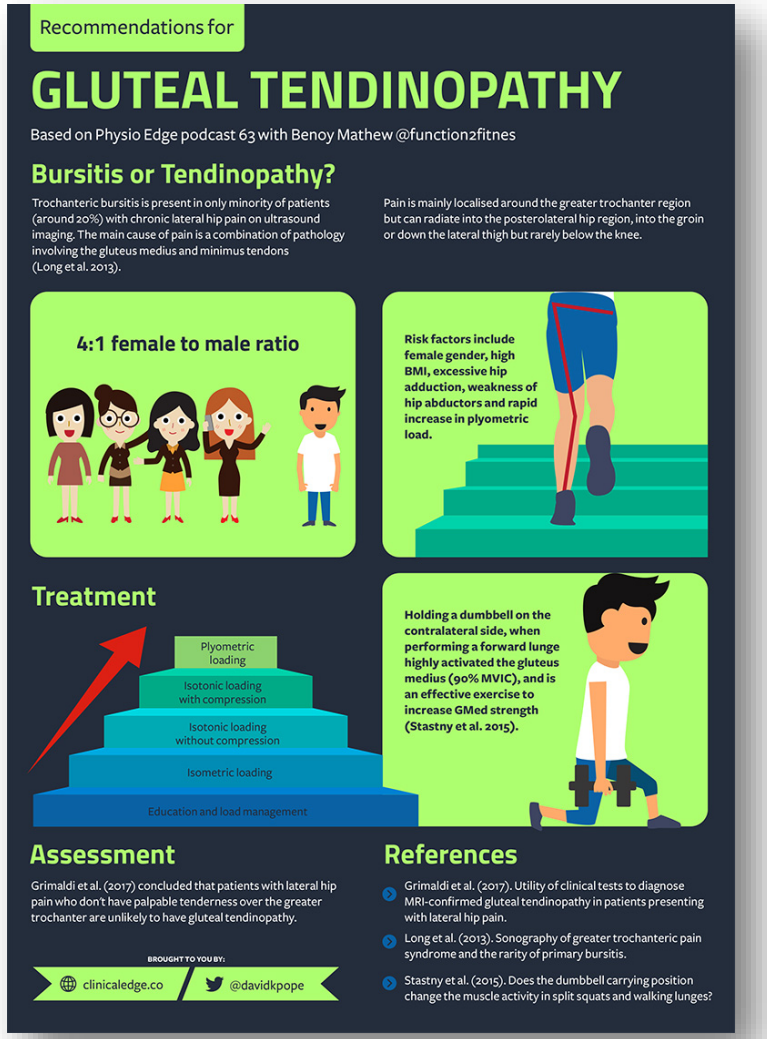


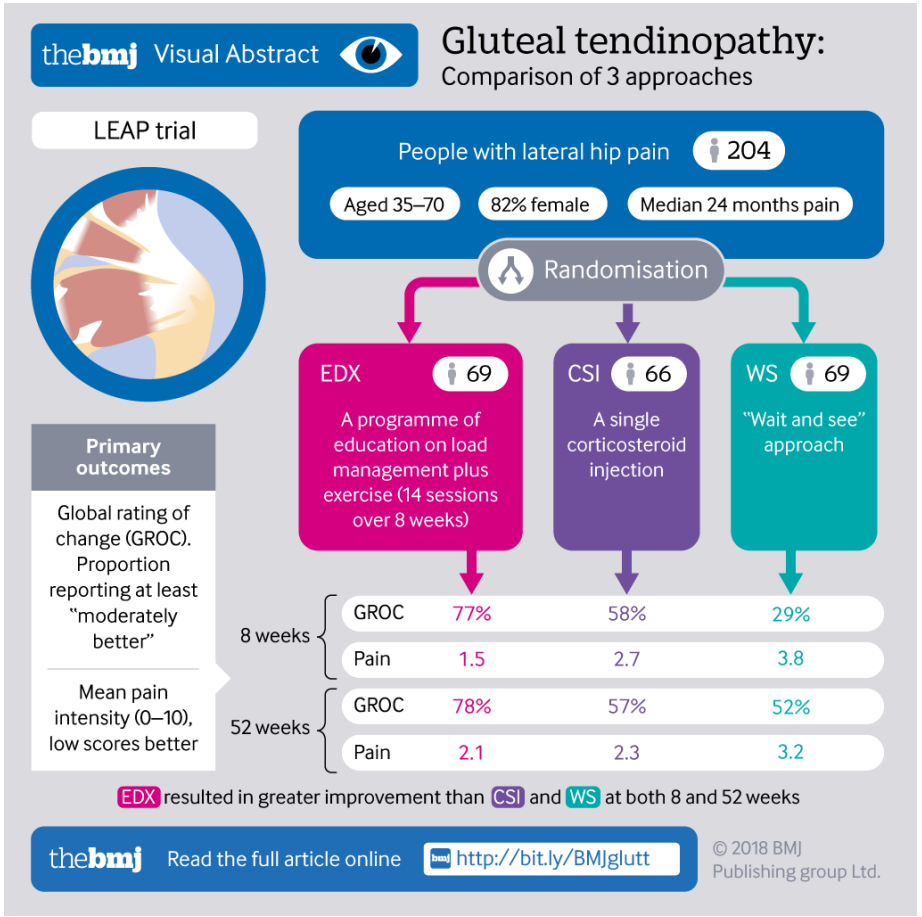



10 THINGS NOT TO DO IF YOU HAVE LOWER LIMB TENDON PAIN
Reference: by Jill Cook, La Trobe University blog
Designed by @YLMSportScience
1 Rest completely
The old adage of use it or lose it applies to tendons, resting just decreases the ability of the tendon to take load
2 Have passive treatments
Treatments that do not address the need to increase the ability of the tendon to take load are not usually helpful in the long term, although they might give short term pain relief
3 Have injection therapies
Injections of substances into a tendon have not been shown to be effective in good clinical trials. Do not have injection in a tendon unless the tendon has not responded to a good exercise based program
4 Ignore your pain
Manage the load on your tendon, pain is a way of telling you that the load is too much. Reduce the aspects of training that are overloading your tendon (see point 10)
5 Stretch your tendon
Aside from the load on your tendon when you play sport, there are compressive loads on your tendon when it is at its longest length, adding stretching to most tendons only serves to add compressive loads that we know are detrimental to the tendon
VS
6 Massage your tendon
A tendon that is painful is one that is telling you that it is overloaded and irritated, therefore adding further insult by massaging it can actually increase your pain
#STOP
7 Be worried about the images of your tendon
The pictures of your tendon with ultrasound and MRI can frighten you, and the words used by doctors such as degeneration and tears can make you wonder if your tendon should be loaded. There is good evidence that the pathological tendon can tolerate loads, especially when you gradually increase the loads on them
8 Be worried about rupture
Pain is protective of your tendon, it makes you unload it, in fact most people who rupture a tendon have never had pain before, despite the tendon having substantial pathology in it (see point 7)
9 Take short cuts with rehabilitation
Taking short cuts with rehabilitation do not work, you need to take the time that the tendon needs to build its strength and capacity. Although this can be a substantial period (up to 3 months or occasionally even more), the long term outcomes are good if you do the correct rehabilitation
10 Not have an understanding of what loads are high for your tendon
The highest load on your tendon is when you use it like a spring, such as jumping, changing direction and sprinting. Any loads that do not use these movements are low load for a tendon, so exercise using weights and exercise that is slow will not place a high load on the tendon, although they can certainly have a beneficial effect on the muscles
The take home message is that exercise-basedrehabilitationis the best treatment for tendon pain. A progressive program that starts with a strength program and then progresses through to more spring like exercises and including endurance aspects will give the right loads on the tendon and the best long term results. Make sure you see a qualified health professional with expertise in this area to guide your rehabilitation


Load management in Achilles and patellar tendinopathy
Individual graded running programme
Reference: by Mascaró et al. Apunts Med Esport 2018
Eccentric training for tendinopathy?
Systematic reviews have evaluated the evidence for eccentric muscle loading in Achilles and patellar tendinopathy, concluding that outcomes are promising but high-quality evidence is lacking
Eccentric loading may not be effective for all patients (athletes and non-athletes) affected by tendinopathy. It is possible that in athletes, eccentric work is an inadequate load on the muscle and tendon
Return to play
Which potential alternative solution?
A rehabilitation program aiming to increase tendon load tolerance must obviously include strength exercises, but should also add speed and energy storage and release
Plyometrics
Ability to store & release energy
Speed
Functional strength
Strength
Isometric work
Tendon injury
TIME
TENDON LOAD (Intensity, volume, frequency)
Designed by ©YLMSportScience


TENDINOPATHY REHABILITATION
by Dan Jones
#STRENGTHFOUNDATION
Patella Tendinopathy
Often triggered by a sudden increase in an athletes load
Bull & Gate Theory
Balance between training load and recovery is crucial
Training Overload = BULL
GATE = Rest / Recovery
Isometric Strengthening
- 25-50% 1RM
- 60s mid range holds x 5 reps
- SL Leg Press / Split Squat
Acute Tendinopathy
- Reduce training volume
- Avoid compressive load (deep squats)
- Introduce Isometric strengthening
Chronic Tendinopathy
- Increase tendon load capacity
- Eccentric / HSR strengthening
- Limit compressive loading
HSR: 70-80% 1RM / 6-15 reps
12 weeks progressive / 2-3x per week
Eccentrics: 3x15 reps - x1-3 Daily
Heavy loading (10-15RM)
produced by : Health & Sports Physiotherapy
@HealthSportsUK
www.healthandsports.co.uk


Recommendations for
GLUTEAL TENDINOPATHY
Based on Physio Edge podcast 63 with Benoy Mathew @function2fitnes
Bursitis or Tendinopathy?
Trochanteric bursitis is present in only minority of patients (around 20%) with chronic lateral hip pain on ultrasound imaging. The main cause of pain is a combination of pathology involving the gluteus medius and minimus tendons (Long et al. 2013).
Pain is mainly localised around the greater trochanter region but can radiate into the posterolateral hip region, into the groin or down the lateral thigh but rarely below the knee.
4:1 female to male ratio
Risk factors include female gender, high BMI, excessive hip adduction, weakness of hip abductors and rapid increase in plyometric load.
Treatment
Plyometric loading
Isotonic loading with compression
Isotonic loading without compression
Isometric loading
Education and load management
Holding a dumbbell on the contralateral side, when performing a forward lunge highly activated the gluteus medius (90% MVIC), and is an effective exercise to increase GMed strength (Stastny et al. 2015).
Assessment
Grimaldi et al. (2017) concluded that patients with lateral hip pain who don't have palpable tenderness over the greater trochanter are unlikely to have gluteal tendinopathy.
BROUGHT TO YOU BY:
clinicaledge.co
@davidkpope
References
Grimaldi et al. (2017). Utility of clinical tests to diagnose MRI-confirmed gluteal tendinopathy in patients presenting with lateral hip pain.
Long et al. (2013). Sonography of greater trochanteric pain syndrome and the rarity of primary bursitis.
Stastny et al. (2015). Does the dumbbell carrying position change the muscle activity in split squats and walking lunges?


thebmj Visual Abstract
Gluteal tendinopathy:
Comparison of 3 approaches
LEAP trial
People with lateral hip pain 204
Aged 35–70
82% female
Median 24 months pain
Randomisation
EDX 69
A programme of education on load management plus exercise (14 sessions over 8 weeks)
CSI 66
A single corticosteroid injection
WS 69
"Wait and see" approach
Primary outcomes
Global rating of change (GROC). Proportion reporting at least "moderately better"
Mean pain intensity (0–10), low scores better
8 weeks
GROC 77% 58% 29%
Pain 1.5 2.7 3.8
52 weeks
GROC 78% 57% 52%
Pain 2.1 2.3 3.2
EDX resulted in greater improvement than CSI and WS at both 8 and 52 weeks
thebmj Read the full article online
http://bit.ly/BMJglutt
© 2018 BMJ Publishing group Ltd.

Tendinopathy:

- pathology: mechanotransduction
- imaging: from morphological to biomechanical
- therapy: exercise & compliance



Tendinopathy:

it's all about

loading



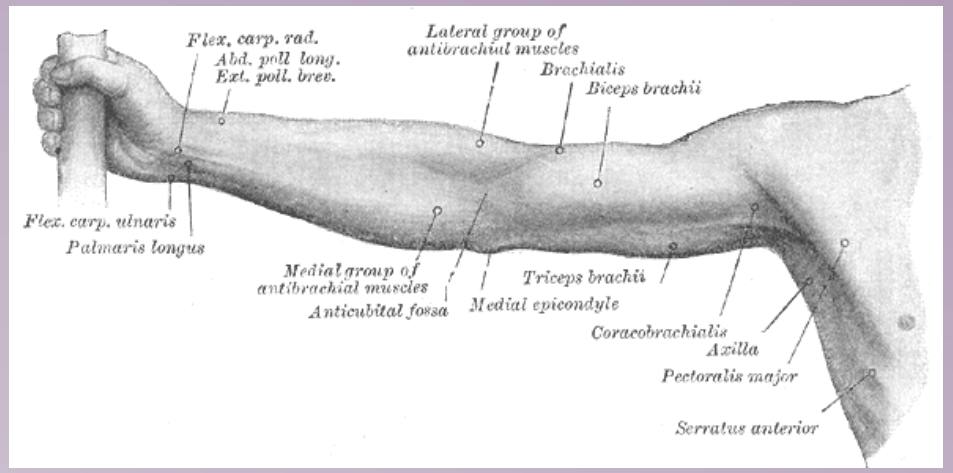
thanks for your attention



Tendinopathie – Bovenste lidmaat

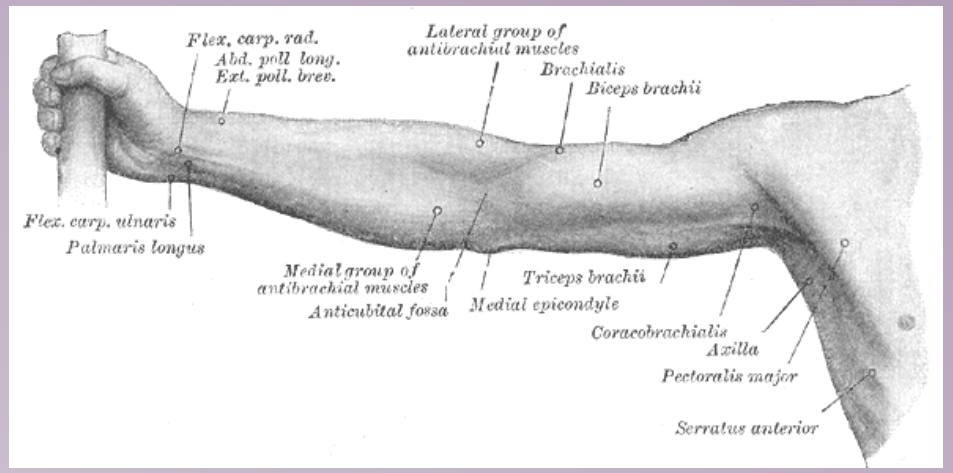
Pentalfa - Leuven
28 maart 2019

@stijnbog



Bovenste lidmaat

- ESWT
- Rotator cuff
- Laterale elleboog



Bovenste lidmaat

- ESWT
- Rotator cuff
- Laterale elleboog

Extracorporeal ShockWave Therapy

- Mechanisme
  - Electromagnetisch
    - Focused
  - Piezo-electrisch
    - Focused
  - Electro-hydraulisch
    - Focused
  - Pneumatisch
    - Radiair

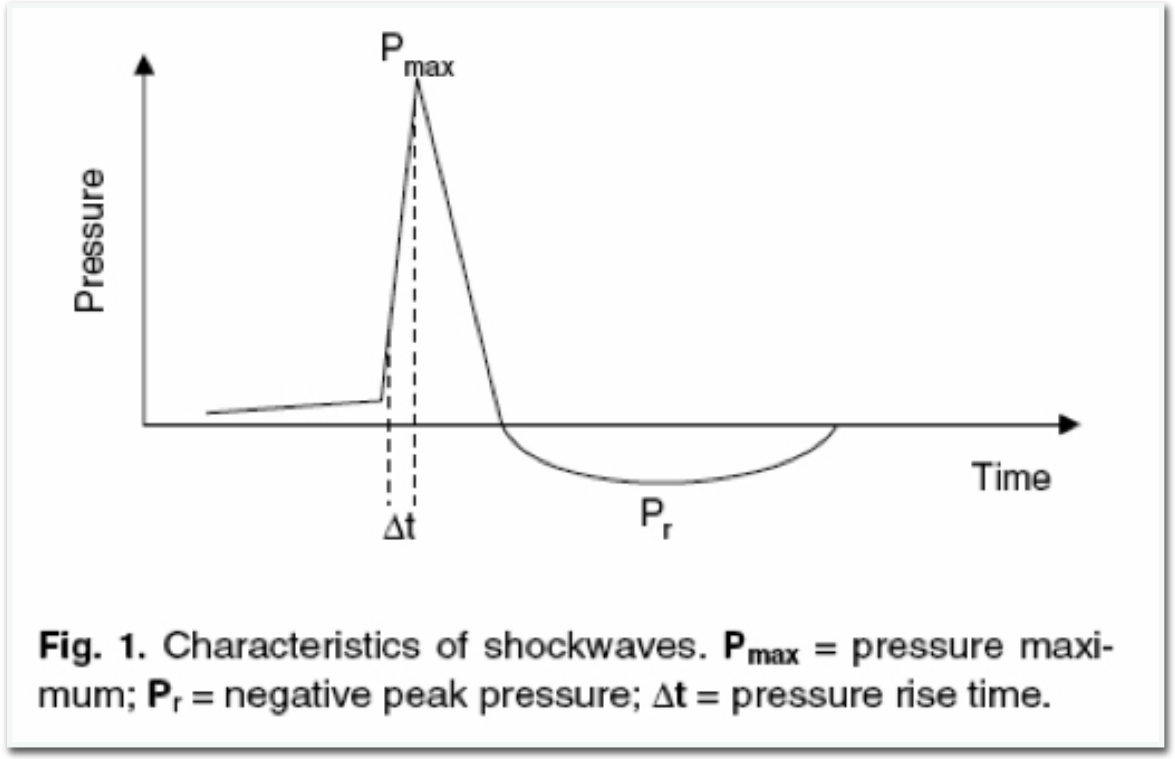


Fig. 1. Characteristics of shockwaves. P_{max} = pressure maximum; P_r = negative peak pressure; Δt = pressure rise time.

Extracorporeal ShockWave Therapy

- Belang van
  - Penetratie diepte
  - Energy Flux Density
    - < 0,2 mJ/mm^2 = lage intensiteit
    - > 0,2 mJ/mm^2 = hoge intensiteit

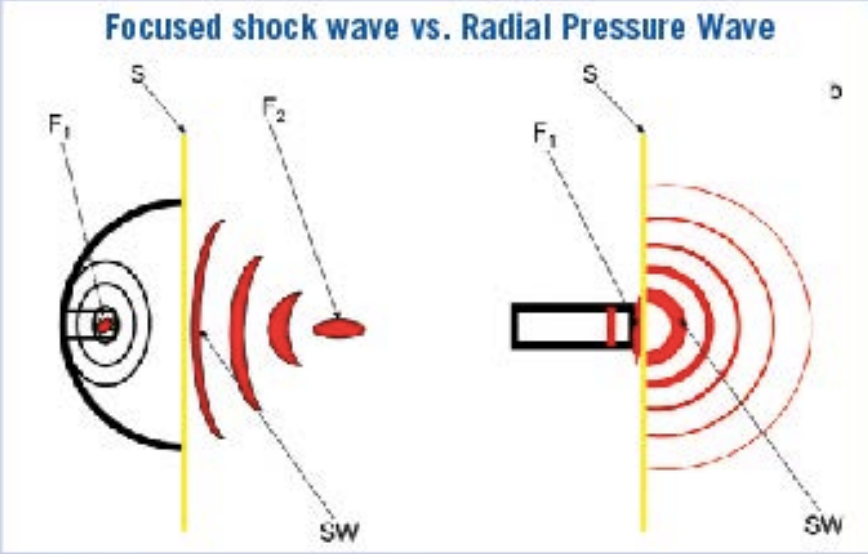


Figure 2b. Focused vs. defocused shock wave therapy. F1: Focal point in the generator. S: Skin surface. F2: Focal point (focus and depth of the energy transmitted via shockwaves in the tissue). SW: Shockwaves.

Extracorporeal ShockWave Therapy

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  - Energy Flux Density
    - < 0,2 mJ/mm^2 = lage intensiteit
    - > 0,2 mJ/mm^2 = hoge intensiteit

    - Indicatiegebied tendinopathie

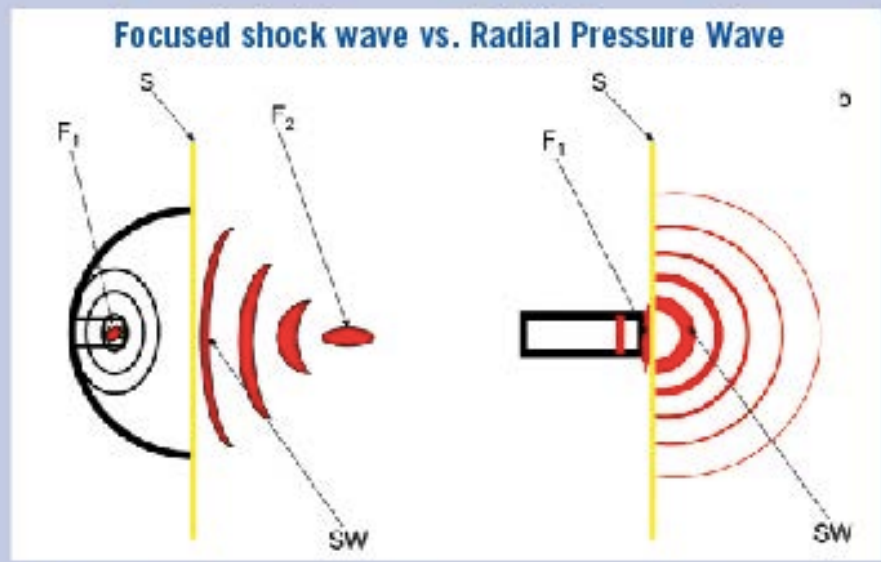


Figure 2b. Focused vs. defocused shock wave therapy. F1: Focal point in the generator. S: Skin surface. F2: Focal point (focus and depth of the energy transmitted via shockwaves in the tissue). SW: Shockwaves.

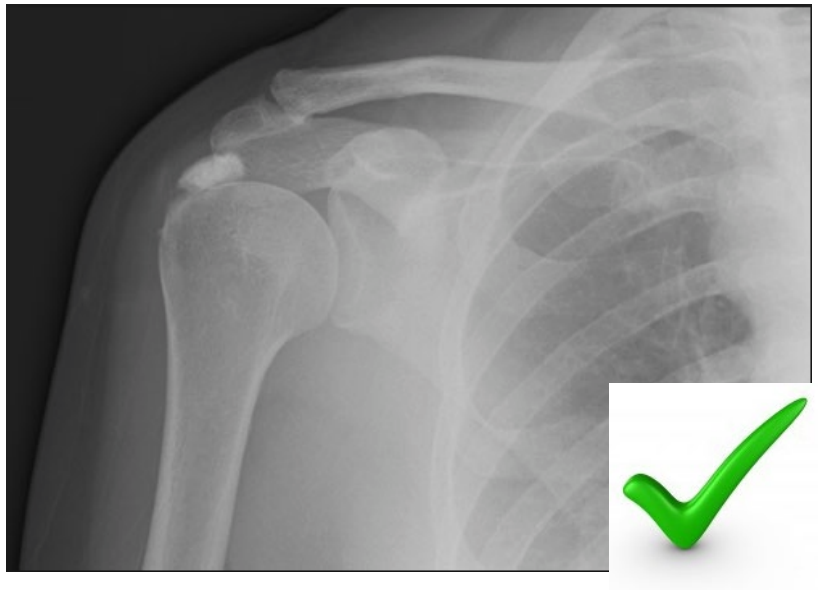
Extracorporeal ShockWave Therapy

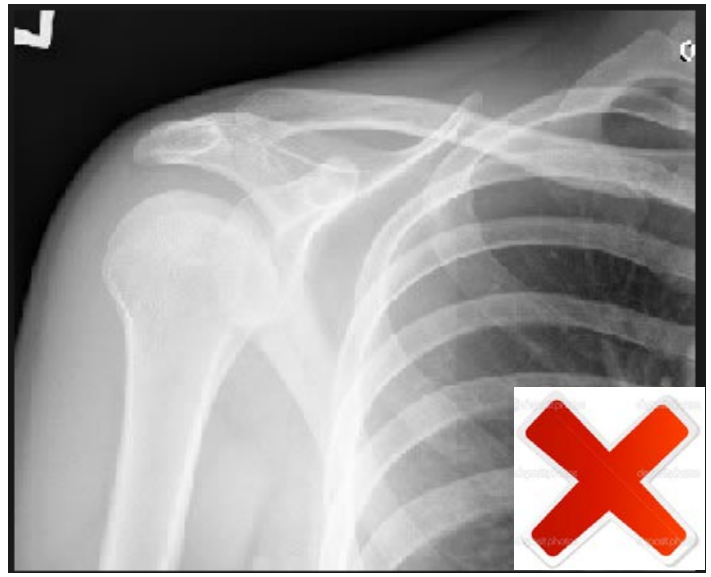
J Shoulder Elbow Surg. 2014 Aug;23(8):1240-9. doi: 10.1016/j.jse.2014.02.002. Epub 2014 Apr 26.

Evidence for minimally invasive therapies in the management of chronic calcific tendinopathy of the rotator cuff: a systematic review and meta-analysis.

Louwerens JK[1], Sierevelt IN[2], van Noort A[3], van den Bekerom MP[4].

RESULTS: Included were 20 studies (1544 participants). Common methodological flaws were related to randomization. In general, there is moderate-quality GRADE evidence that high-energy extracorporeal shockwave therapy has a significant effect on pain relief and functional status compared with other interventions. There is variable-quality GRADE evidence on the efficiency of other interventions.





Extracorporeal ShockWave Therapy

- Calcifiërende rotator cuff tendinopathie
  - 1 x 2000 shocks
  - MET lokaal anestheticum (intensiteit hoger tolereerbaar)
  - Klinische controle na 6 weken
  - Optie tot echografie bij klinische twijfel (fragmentatie, resorptie, bursale reactie)
  - Optie tot 2e sessie
  - Bij falen 2 sessies: overweeg arthroscopische needling

Extracorporeal ShockWave Therapy

- Calcifiërende rotator cuff tendinopathie
  - Echo-geleide needling
    - Effectiviteit in zelfde lijn als ESWT
    - Maar grotere kans op forse bursale reactie

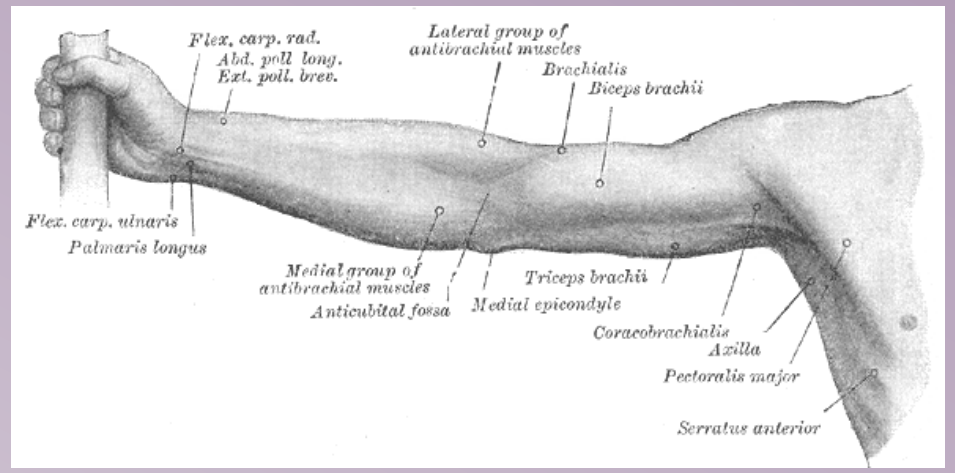






Extracorporeal ShockWave Therapy

- Tendinopathie (excl. rotator cuff)
  - 3 x 1000
  - GEEN lokaal anestheticum
  - Klinische controle na 6 weken
  - Enkel als adjuvans na > maanden oefentherapie
  - 2e sessie enkel na > maanden/jaren volledig effect



Bovenste lidmaat

- ESWT
- Rotator cuff
- Laterale elleboog

Rotator cuff

- Subacromiale schouderpijn (paraplu-term)
  - Calcifiërende rotator cuff tendinopathie
  - Rotator cuff tendinopathie
  - Chronische/acute rotator cuff ruptuur
  - Impingement
  - Bursitis
  - Peri-artritis scapulohumerale
  - Tendinitis calcarea
  - …



Rotator cuff

- Subacromiale schouderpijn (paraplu-term)
  - Calcifiërende rotator cuff tendinopathie
  - Rotator cuff tendinopathie
  - Chronische/acute rotator cuff ruptuur
  - Impingement
  - Bursitis
  - Peri-artritis scapulohumerale
  - Tendinitis calcarea
  - …



Rotator cuff tendinopathie



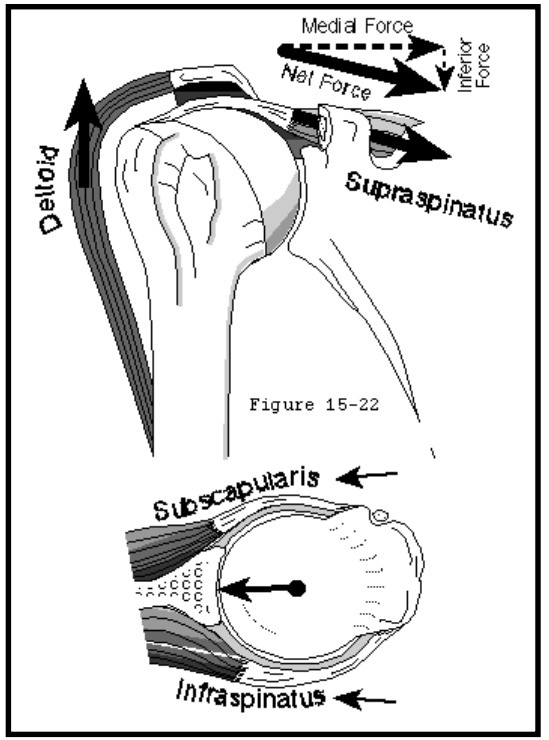
- Primaire oorzaken uitsluiten
  - Gevorderde AC artrose
  - Post-traumatische contusie
  - Humerusfractuur met verkorting
  - Bursitis bij inflammatoire pathologie

~~Acromion type I/II/III~~

Gevolg, geen oorzaak

Rotator cuff tendinopathie

- Secundaire oorzaken
  - Niet-sportieve populatie:
    - Rotator cuff kracht en evenwicht
  - Sportieve populatie: adaptaties
    - Mobiliteit glenohumeraal - scapulothoracaal
    - Krachtsverhouding endo/exorotatoren
    - Kinetische keten
    - …





Rotator cuff tendinopathie

- Therapie = Conservatief
  - Revalidatie!
  - ~~Heelkunde~~

Effect of specific exercise strategy on need for surgery in patients with subacromial impingement syndrome: randomised controlled study

OPEN ACCESS

Theresa Holmgren *PhD student*[1], Hanna Björnsson Hallgren *PhD student*[2], Birgitta Öberg *professor*[1], Lars Adolfsson *professor*[2], Kajsa Johansson *senior lecturer*[1]

Exercises may be as efficient as subacromial decompression in patients with subacromial stage II impingement: 4–8-years' follow-up in a prospective, randomized study

J. P. Haahr & J. H. Andersen

Exercises versus arthroscopic decompression in patients with subacromial impingement: a randomised, controlled study in 90 cases with a one year follow up

J P Haahr, S Østergaard, J Dalsgaard, K Norup, P Frost, S Lausen, E A Holm, J H Andersen

Ann Rheum Dis 2005;**64**:760–764. doi: 10.1136/ard.2004.021188

Does arthroscopic acromioplasty provide any additional value in the treatment of shoulder impingement syndrome?

A TWO-YEAR RANDOMISED CONTROLLED TRIAL

BJR

UPPER LIMB

No evidence of long-term benefits of arthroscopic acromioplasty in the treatment of shoulder impingement syndrome

FIVE-YEAR RESULTS OF A RANDOMISED CONTROLLED TRIAL

Rotator cuff tendinopathie

- RCT?
- Placebo gecontroleerd!
  - CSAW study
    - Andy Carr
  - FIMPACT trial
    - Mikka Paavola
    - Teppo Jarvinen



Rotator cuff tendinopathie

- RCT?
- Placebo gecontroleerd!
  - CSAW study
    - Andy Carr
  - FIMPACT trial
    - Mikka Paavola
    - Teppo Jarvinen



Lancet. 2018 Jan 27;391(10118):329-338. doi: 10.1016/S0140-6736(17)32457-1. Epub 2017 Nov 20.

Arthroscopic subacromial decompression for subacromial shoulder pain (CSAW): a multicentre, pragmatic, parallel group, placebo-controlled, three-group, randomised surgical trial.

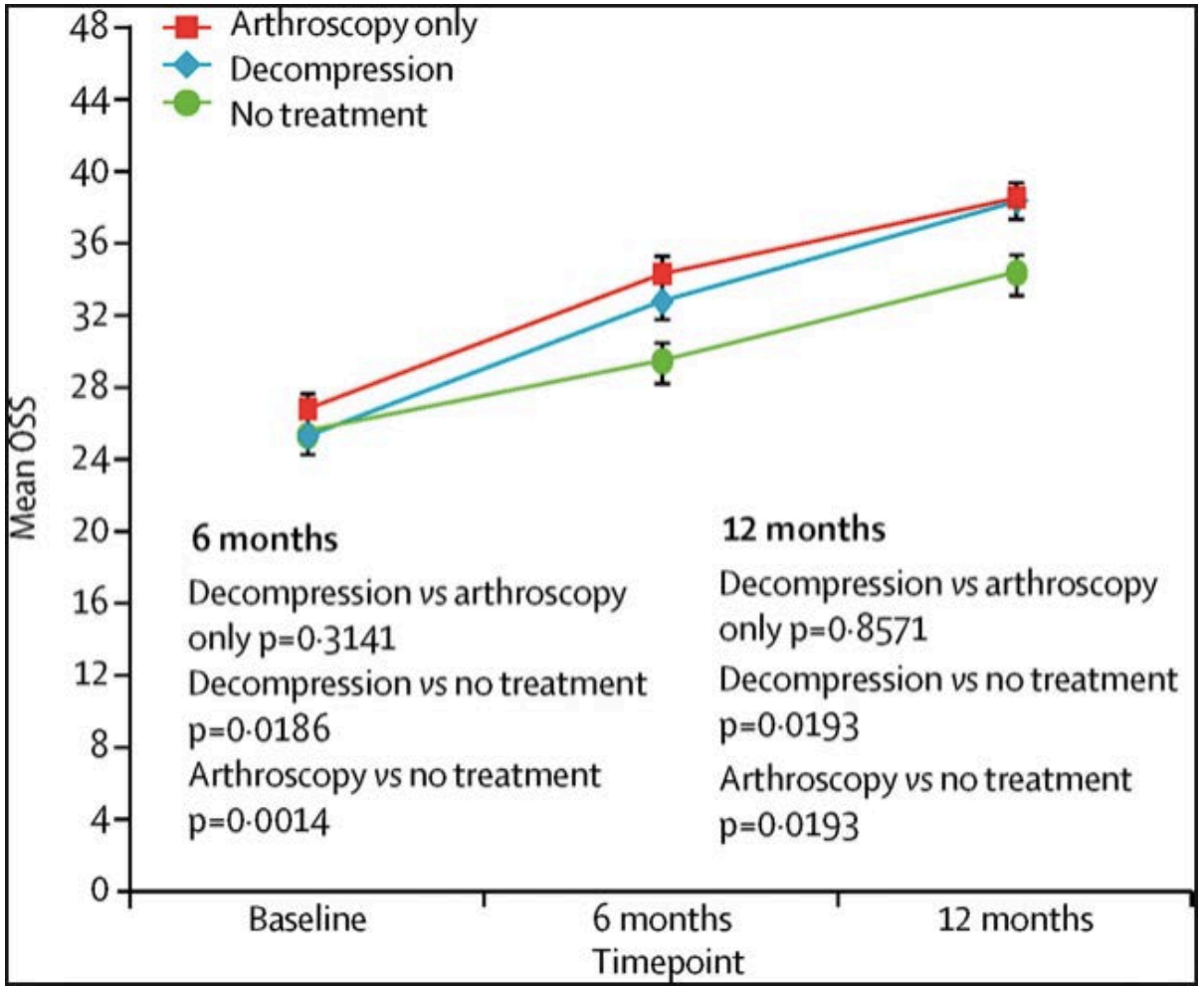
Beard DJ[1], Rees JL[2], Cook JA[3], Rombach I[3], Cooper C[3], Merritt N[3], Shirkey BA[2], Donovan JL[4], Gwilym S[2], Savulescu J[5], Moser J[2], Gray A[6], Jepson M[4], Tracey I[7], Judge A[2], Wartolowska K[2], Carr AJ[8]; CSAW Study Group.

CSAW
CAN SHOULDER ARTHROSCOPY WORK?

Summary

Background Arthroscopic sub-acromial decompression (decompressing the sub-acromial space by removing bone spurs and soft tissue arthroscopically) is a common surgery for subacromial shoulder pain, but its effectiveness is uncertain. We did a study to assess its effectiveness and to investigate the mechanism for surgical decompression.

Methods We did a multicentre, randomised, pragmatic, parallel group, placebo-controlled, three-group trial at 32 hospitals in the UK with 51 surgeons. Participants were patients who had subacromial pain for at least 3 months with intact rotator cuff tendons, were eligible for arthroscopic surgery, and had previously completed a non-operative management programme that included exercise therapy and at least one steroid injection. Exclusion criteria included a full-thickness torn rotator cuff. We randomly assigned participants (1:1:1) to arthroscopic subacromial decompression, investigational arthroscopy only, or no treatment (attendance of one reassessment appointment with a specialist shoulder clinician 3 months after study entry, but no intervention). Arthroscopy only was a placebo as the essential surgical element (bone and soft tissue removal) was omitted. We did the randomisation with a computer-generated minimisation system. In the surgical intervention groups, patients were not told which type of surgery they were receiving (to ensure masking). Patients were followed up at 6 months and 1 year after randomisation; surgeons coordinated their waiting lists to schedule surgeries as close as possible to randomisation. The primary outcome was the Oxford Shoulder Score (0 [worst] to 48 [best]) at 6 months, analysed by intention to treat. The sample size calculation was based upon a target difference of 4·5 points (SD 9·0). This trial has been registered at ClinicalTrials.gov, number NCT01623011.



CSAW
CAN SHOULDER ARTHROSCOPY WORK?

Interpretation Surgical groups had better outcomes for shoulder pain and function compared with no treatment but this difference was not clinically important. Additionally, surgical decompression appeared to offer no extra benefit over arthroscopy only. The difference between the surgical groups and no treatment might be the result of, for instance, a placebo effect or postoperative physiotherapy. The findings question the value of this operation for these indications, and this should be communicated to patients during the shared treatment decision-making process.

Rotator cuff tendinopathie

- RCT?
- Placebo gecontroleerd!
  - CSAW study
    - Andy Carr
  - FIMPACT trial
    - Mikka Paavola
    - Teppo Jarvinen

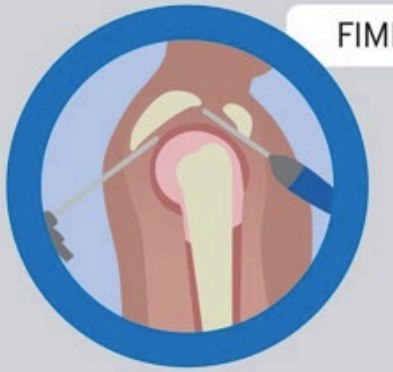


thebmj Visual Abstract

Shoulder impingement

Subacromial decompression versus diagnostic arthroscopy

FIMPACT trial



139 Patients with subacromial pain and unresponsive to conventional treatment

Aged 35 to 65

Pain for 3 or more months

Randomisation
After exclusions

Primary outcome

Shoulder pain at rest and with arm activity at 24 months

Visual analogue scale (VAS) 0–100: 0 denotes no pain

Threshold for minimal clinically important difference = 15

59 ASD
Arthroscopic subacromial decompression

63 DA
Diagnostic arthroscopy, a placebo surgical intervention

		Difference between arms 95% CI	
Mean change in pain at rest	-36.0	4.6 lower -11.3 to 2.1	-31.4
Mean change in pain with activity	-55.4	9.0 lower -18.1 to 0.2	-47.5

Arthroscopic subacromial decompression provides no clinically relevant benefit over diagnostic arthroscopy.

thebmj Read the full article online http://bit.ly/BMJshoimp

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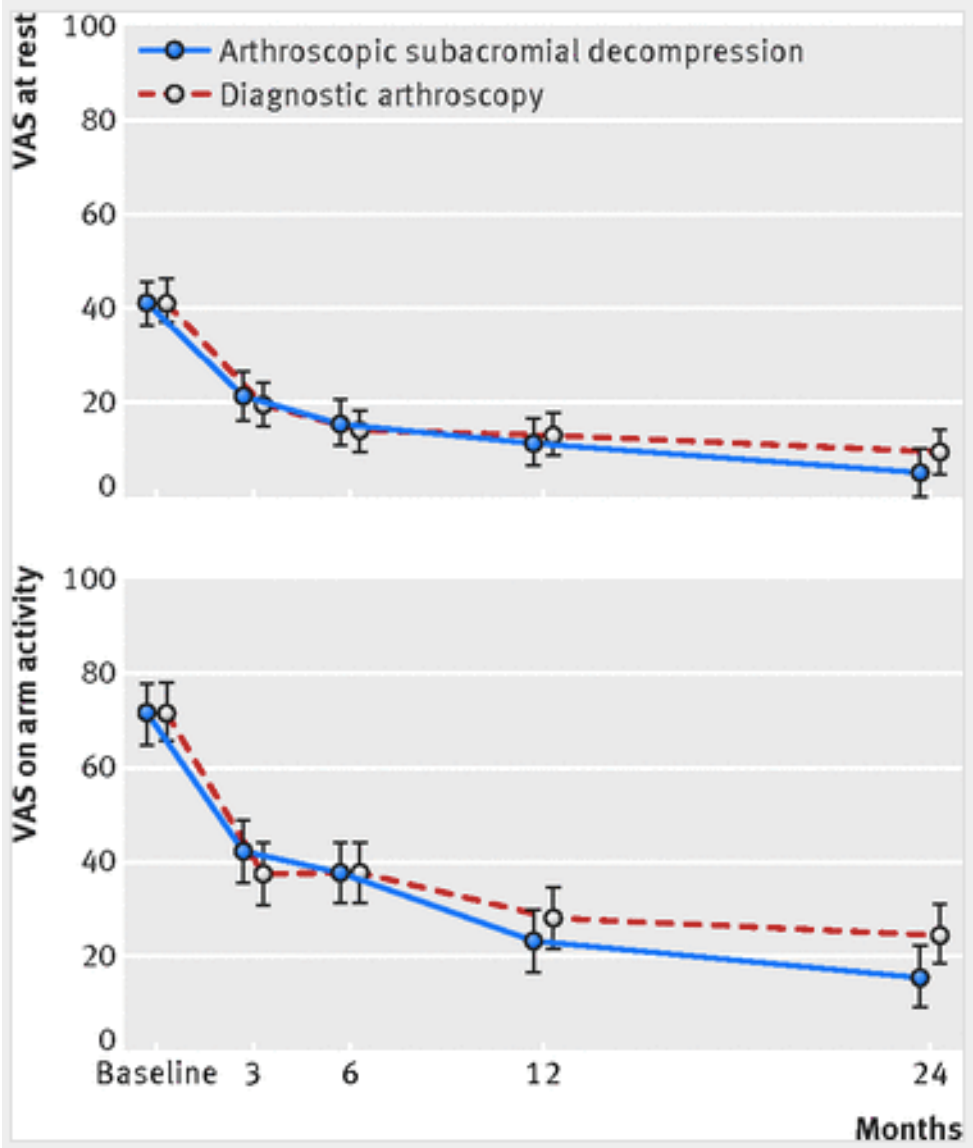


Rotator cuff tendinopathie

- Inhoud revalidatie ?
  - Principes van tendinopathie
  - Progressief
  - Weerstandstraining
  - Minimum 12 weken
  - Pijn monitoring
    - Tijdens oefeningen
    - 24u nadien



Rotator cuff

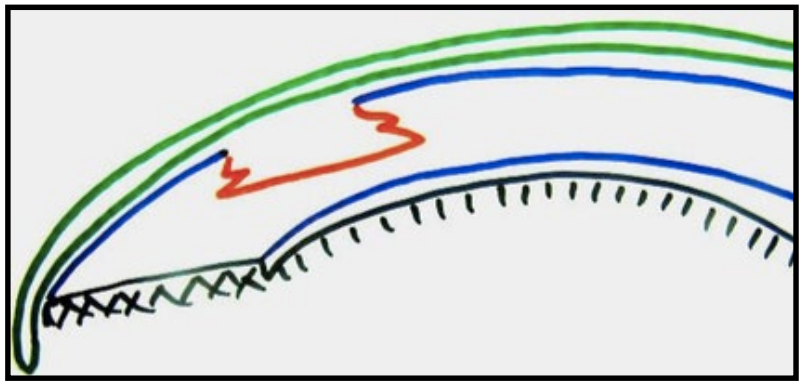
- Subacromiale schouderpijn (paraplu-term)
  - Calcifiërende rotator cuff tendinopathie
  - Rotator cuff tendinopathie
  - Chronische/acute rotator cuff ruptuur
  - Impingement
  - Bursitis
  - Peri-artritis scapulohumerale
  - Tendinitis calcarea
  - …

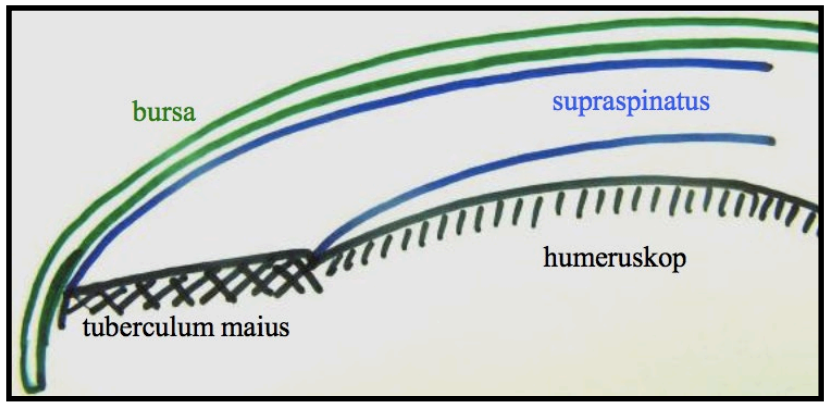


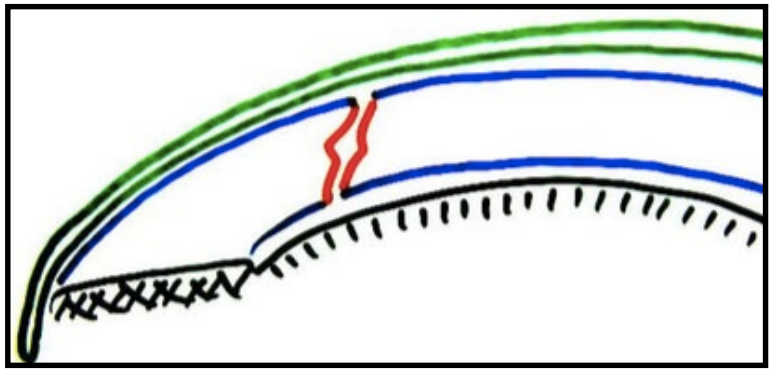
Rotator cuff ruptuur

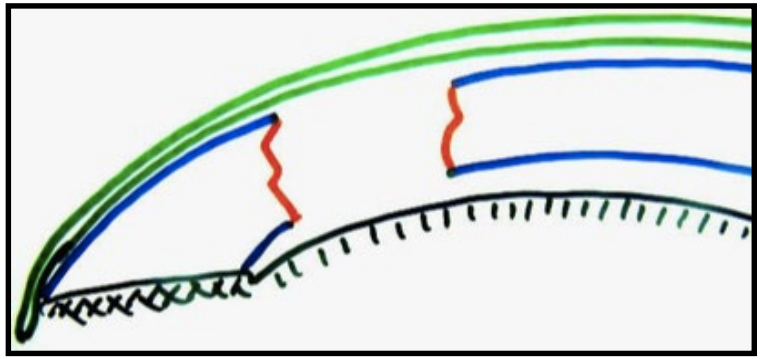
- Nomenclatuur

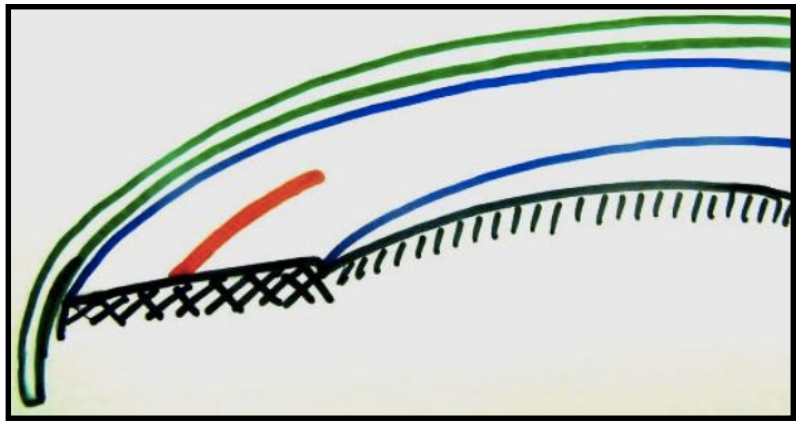


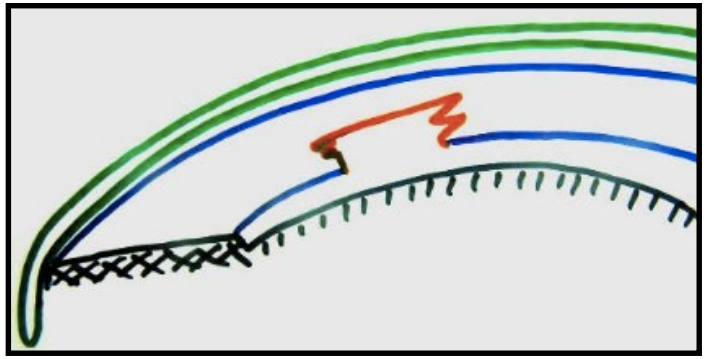






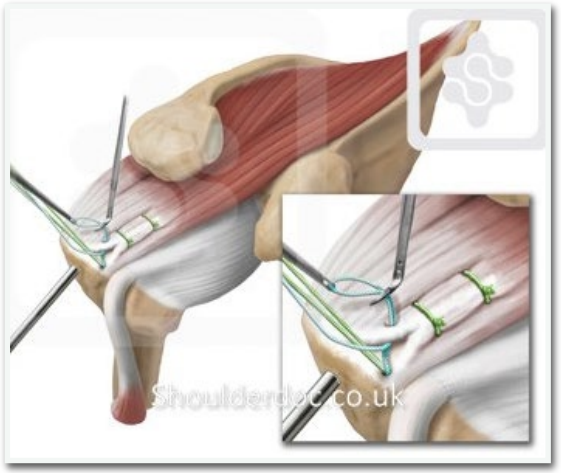


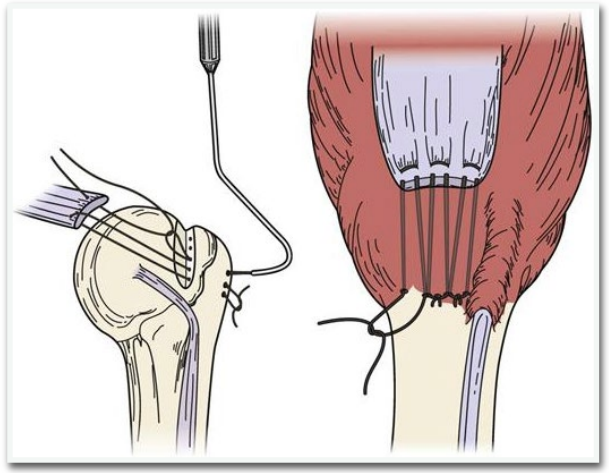




Rotator cuff ruptuur

- Heelkunde ?



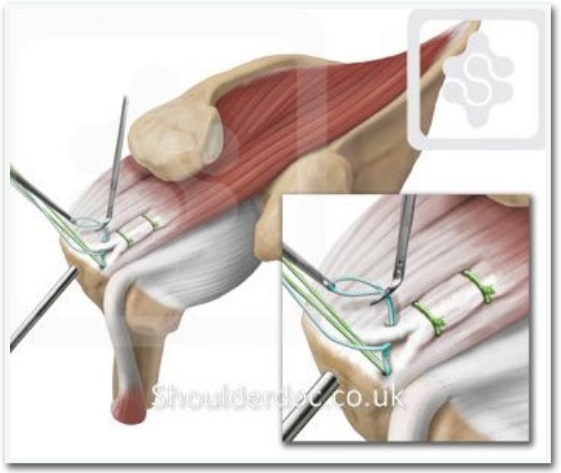


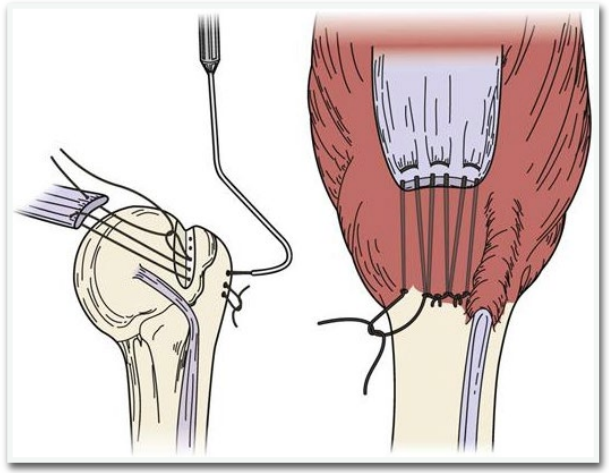




Rotator cuff ruptuur

- Heelkunde ?







Rotator cuff ruptuur

- Revalidatie “versus” chirurgie: predictoren?
  - Ernst van de scheur
  - Leeftijd
  - Activiteiten-niveau
  - BMI
  - Geslacht
  - Pijn-niveau
  - Educatie-niveau
  - Voorkeursarm
  - Co-morbiditeit
  - Duur van symptomen
  - Kracht
  - Tewerkstelling
  - Rookstatus
  - Verwachting van patiënt ten opzichte van revalidatie

Rotator cuff ruptuur

J Shoulder Elbow Surg. 2016 Aug;25(8):1303-11. doi: 10.1016/j.jse.2016.04.030.

2013 Neer Award: predictors of failure of nonoperative treatment of chronic, symptomatic, full-thickness rotator cuff tears.

Dunn WR[1], Kuhn JE[2], Sanders R[3], An Q[4], Baumgarten KM[5], Bishop JY[6], Brophy RH[7], Carey JL[8], Harrell F[4], Holloway BG[9], Jones GL[6], Ma CB[10], Marx RG[11], McCarty EC[12], Poddar SK[12], Smith MV[7], Spencer EE[9], Vidal AF[12], Wolf BR[13], Wright RW[14]; MOON Shoulder Group.

- Revalidatie “versus” chirurgie: predictoren?
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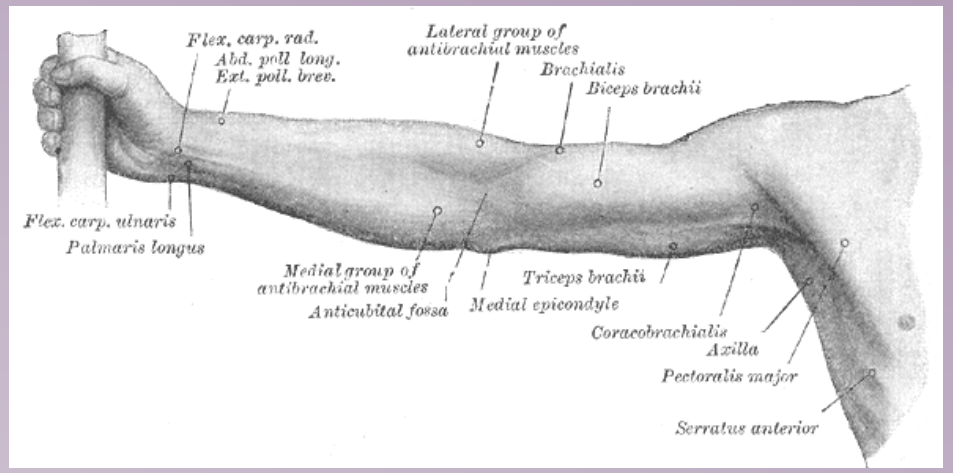
  - **Verwachting van patiënt ten opzichte van revalidatie**



Bovenste lidmaat

- ESWT
- Rotator cuff
- Laterale elleboog

Laterale elleboog

- Nomenclatuur
  - Common extensor tendinopathie, tennisselleboog, epicondylitis lateralis, …
  - Laterale elleboog tendinopathie







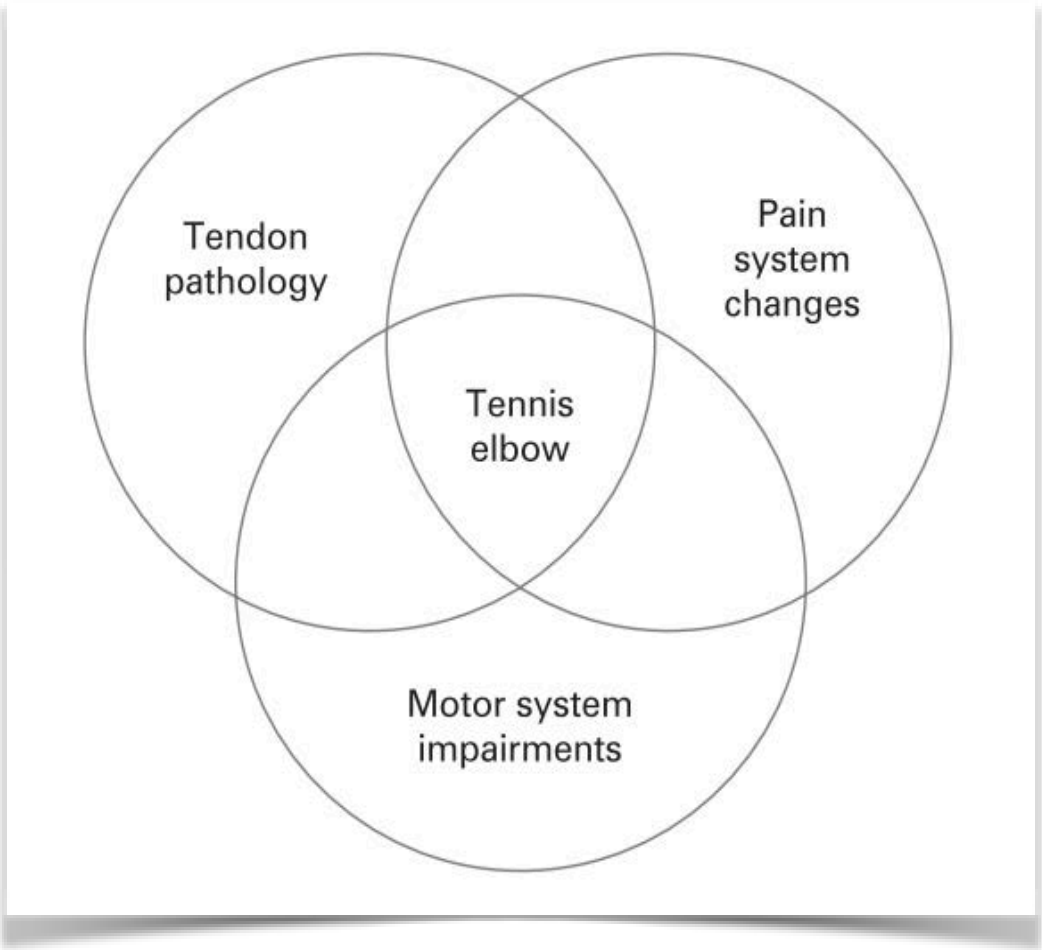




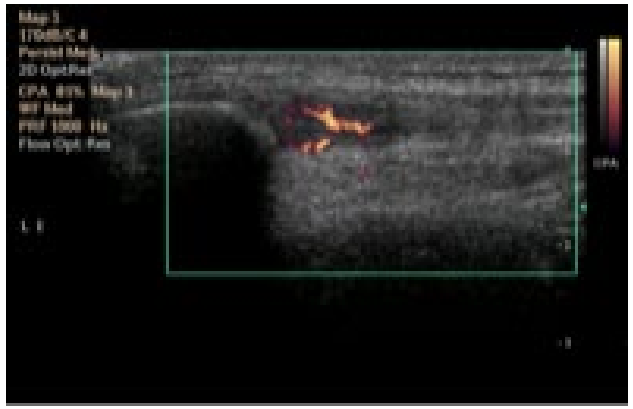


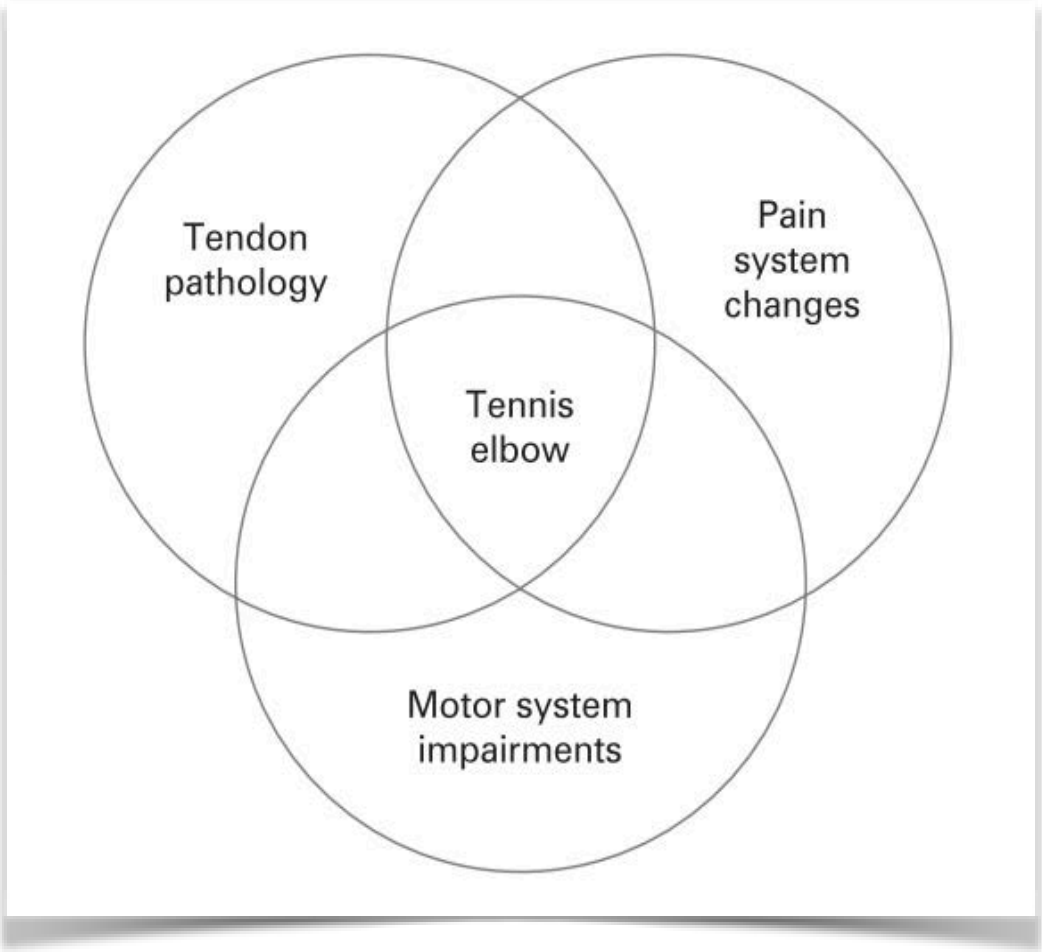


Laterale elleboog



Laterale elleboog





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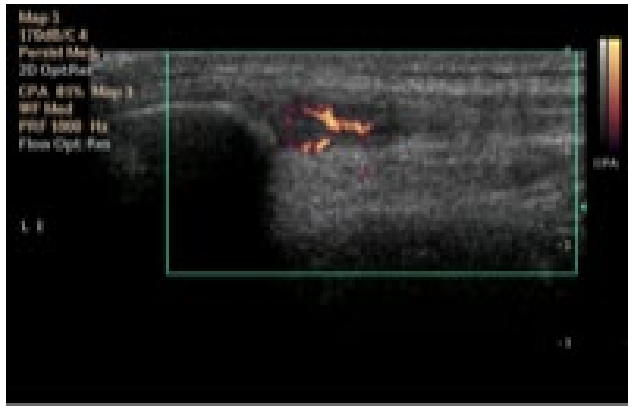

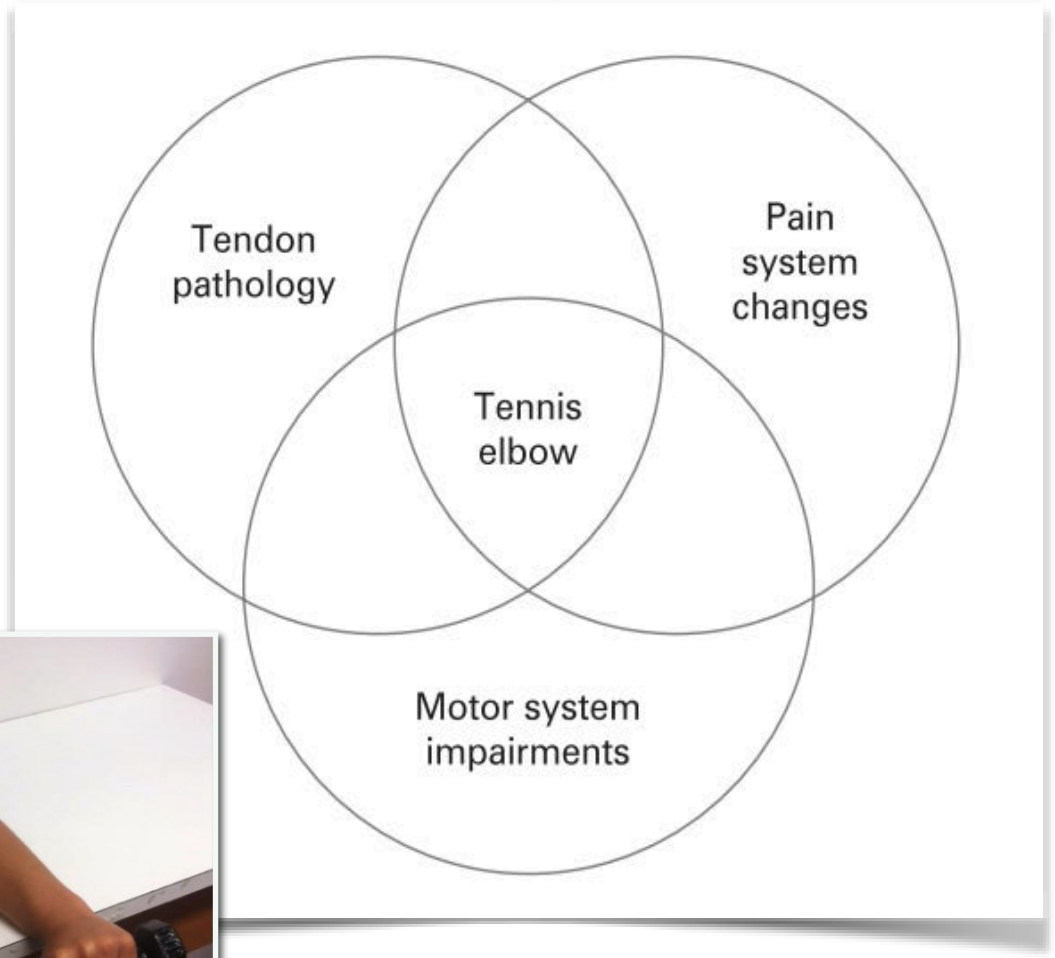



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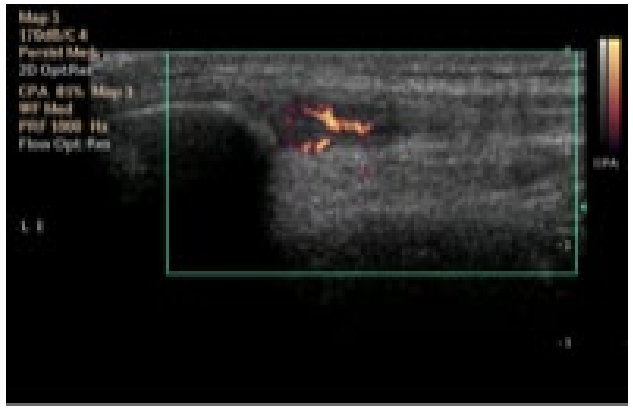

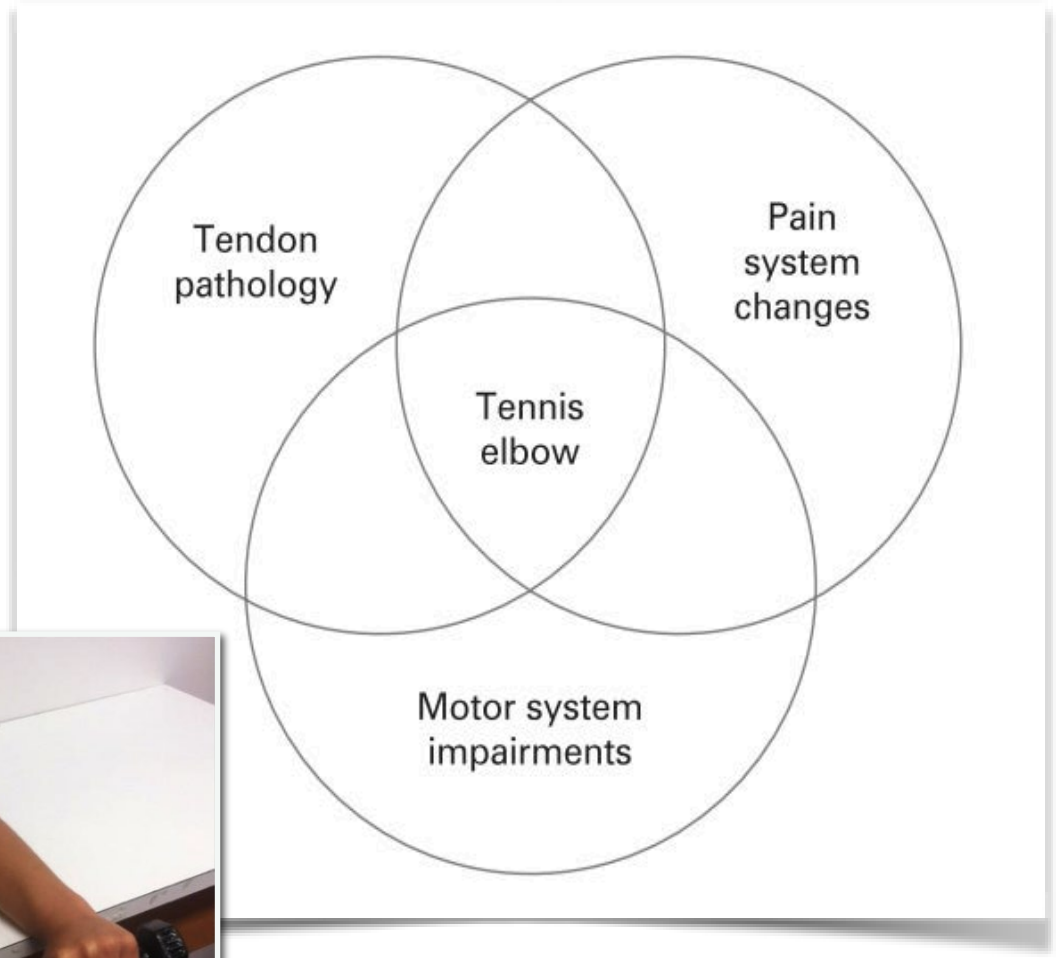





Laterale elleboog

Clin J Pain. 2015 Jan;31(1):30-5. doi: 10.1097/AJP.0000000000000078.

Cold hyperalgesia associated with poorer prognosis in lateral epicondylalgia: a 1-year prognostic study of physical and psychological factors.

Br J Sports Med. 2016 Nov;50(22):1400-1405. doi: 10.1136/bjsports-2015-094729. Epub 2015 Jun 2.

Economic evaluation favours physiotherapy but not corticosteroid injection as a first-line intervention for chronic lateral epicondylalgia: evidence from a randomised clinical trial.

Br J Sports Med. 2014 Oct;48(19):1400-6. doi: 10.1136/bjsports-2013-092535. Epub 2013 Oct 21.

Sensory and motor deficits exist on the non-injured side of patients with unilateral tendon pain and disability--implications for central nervous system involvement: a systematic review with meta-analysis.

Med Sci Sports Exerc. 2015 Apr;47(4):681-90. doi: 10.1249/MSS.0000000000000469.

Novel adaptations in motor cortical maps: the relation to persistent elbow pain.

Clin J Pain. 2012 Sep;28(7):595-601. doi: 10.1097/AJP.0b013e31823dd333.

Thermal hyperalgesia distinguishes those with severe pain and disability in unilateral lateral epicondylalgia.

Eur J Pain. 2018 Jul;22(6):1124-1133. doi: 10.1002/ejp.1199. Epub 2018 Feb 23.

Psychological factors not strength deficits are associated with severity of gluteal tendinopathy: A cross-sectional study.



Laterale elleboog

Clin J Pain. 2015 Jan;31(1):30-5. doi: 10.1097/AJP.0000000000000078.

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Br J Sports M

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Sensory and motor defic **ndon pain and disability--implicatio** **iew with meta-analysis.**

Med Sci Spo

Novel a **sistent elbow pain.**

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Thermal hyperalgesia di **al lateral epicondylalgia.**

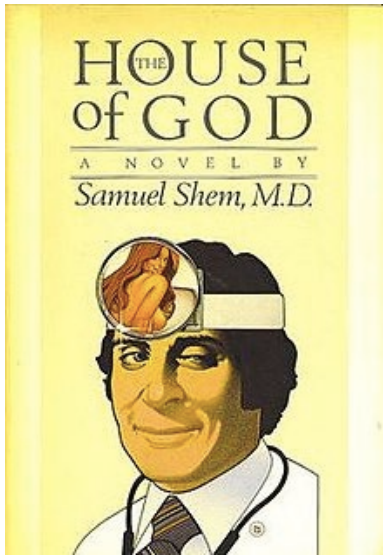
Eur J Pain. 20

Psychological factors not strength deficits are associated with severity of gluteal tendinopathy: A cross-sectional study.



Laterale elleboog

- Aanpak
  - (H)erkennen
  - Blijf rustig
  - Realistische planning
  - Educatie
    - Pijn
    - Load
  - Graded activity/exposure
  - Medicatie







Tendinopathie – Bovenste lidmaat

Pentalfa - Leuven
28 maart 2019

@stijnbog

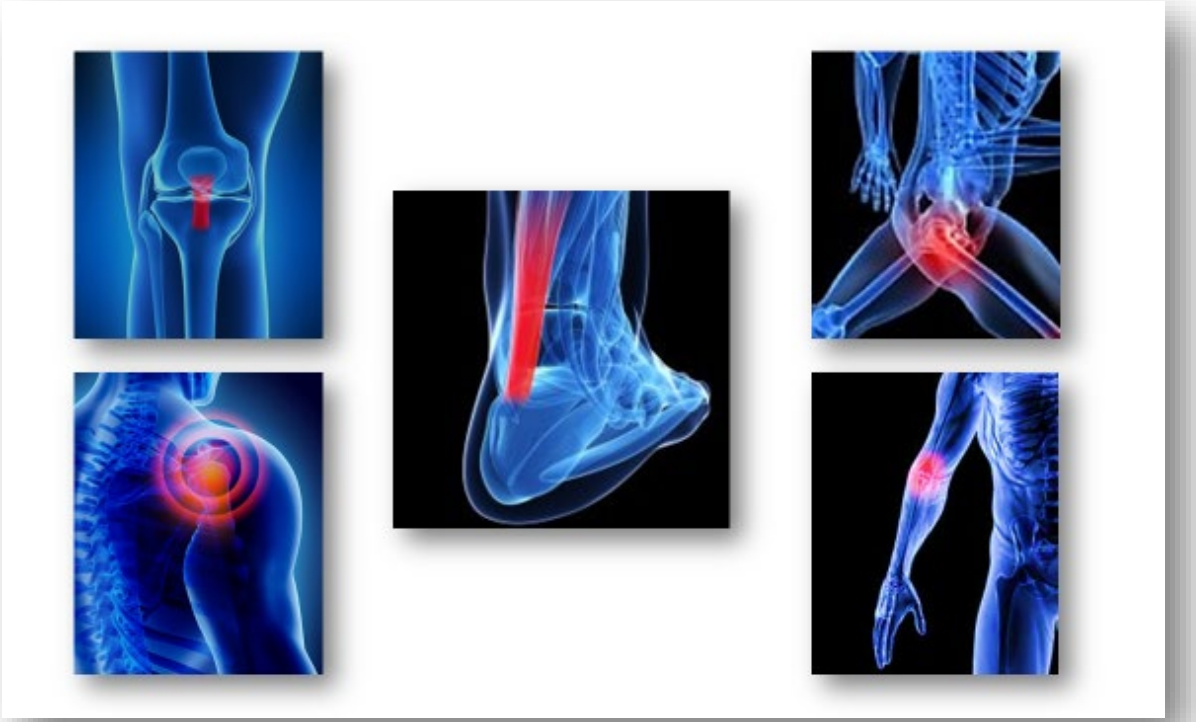
ONDERSTE LIDMAAT:

WAT ALS HET GEEN TENDINOPATHIE IS?

UZ LEUVEN

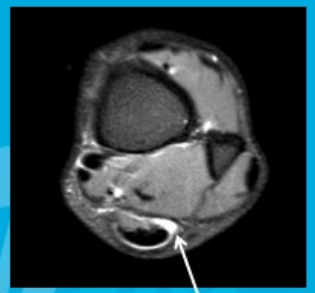
SMAC
SPORTMEDISCH ADVIESCENTRUM
UZ LEUVEN

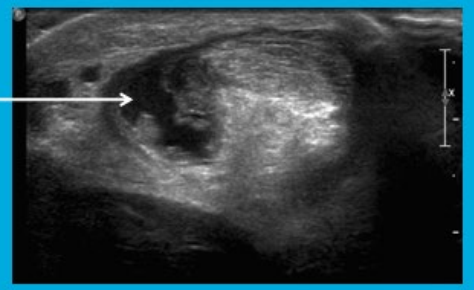
- Tendinopathie
- Bovenste Lidmaat:
  - ESWT
  - Rotator cuff tendinopathie
  - Elleboog tendinopathie
- Onderste lidmaat:
  - Peritendineuze letsels
  - ITB frictie syndroom
  - Achillespees ruptuur

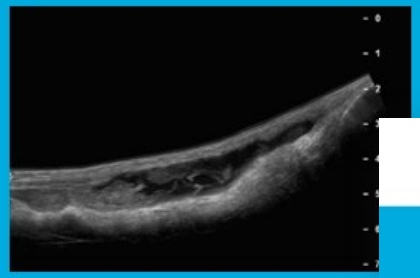


UZ LEUVEN

- Peritendinopathy

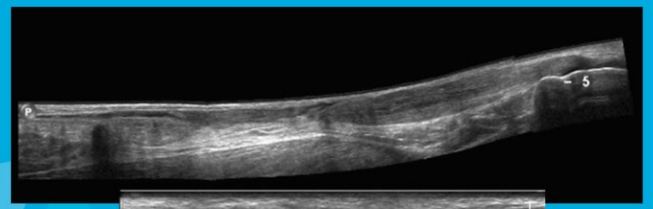


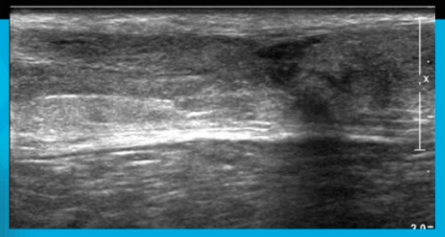




UZ LEUVEN

- rupture achilles tendon

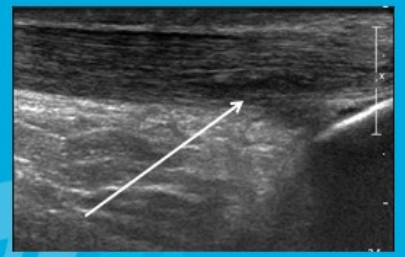


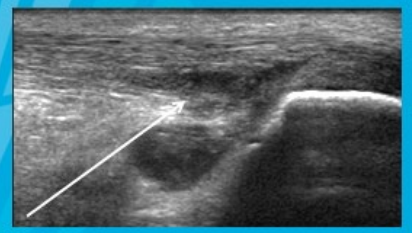


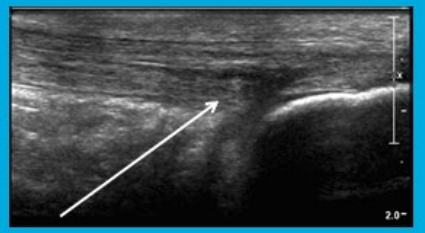
UZ Leuven

UZ LEUVEN

- Intratendinous cleft vs partial tear achilles tendon

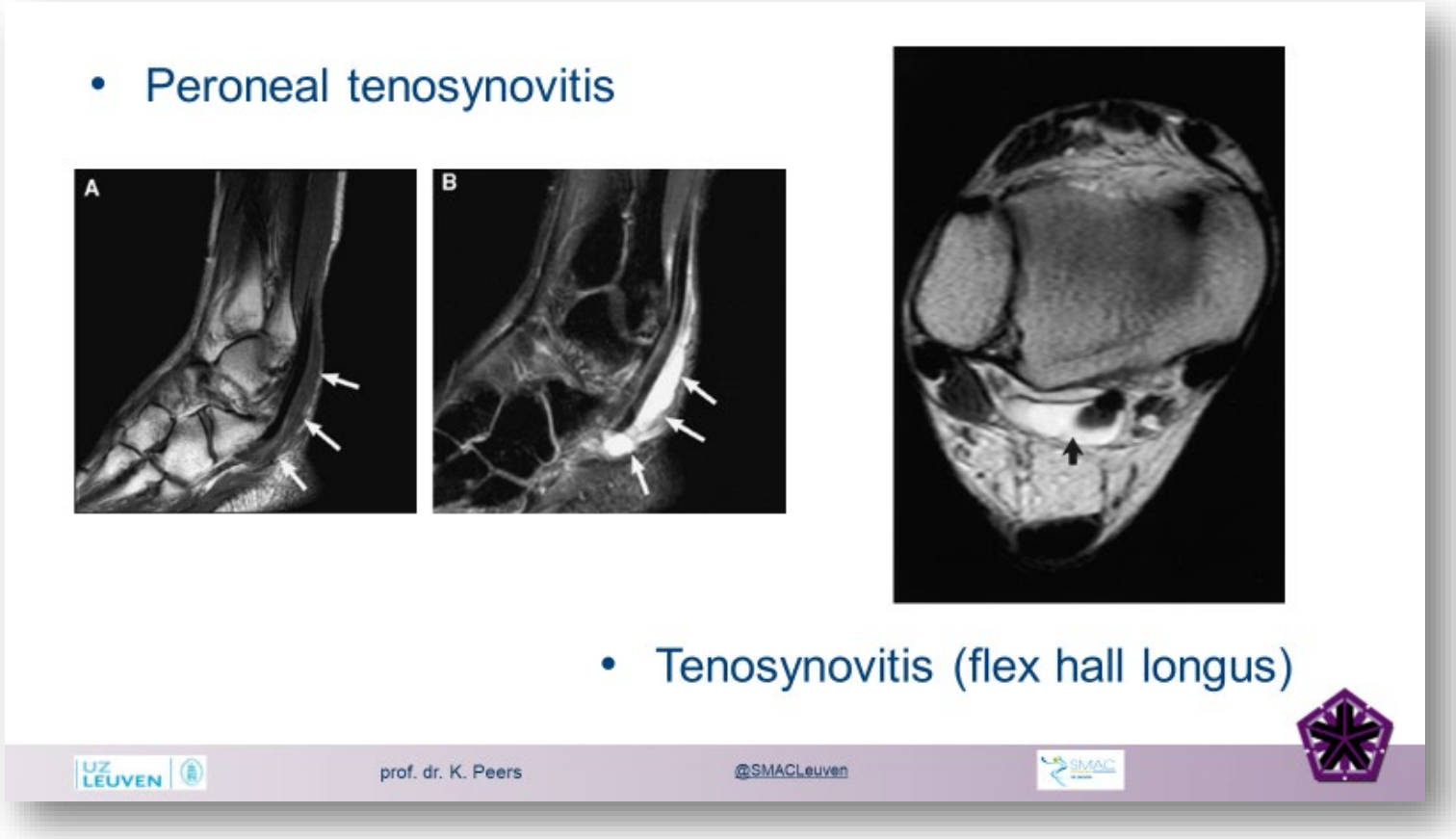






UZ Leuven

- Peritendineuse reactie
  - acuut/subacuut
  - secundair (stabilisatie)
    - trauma
    - deconditionering posttraumatisch



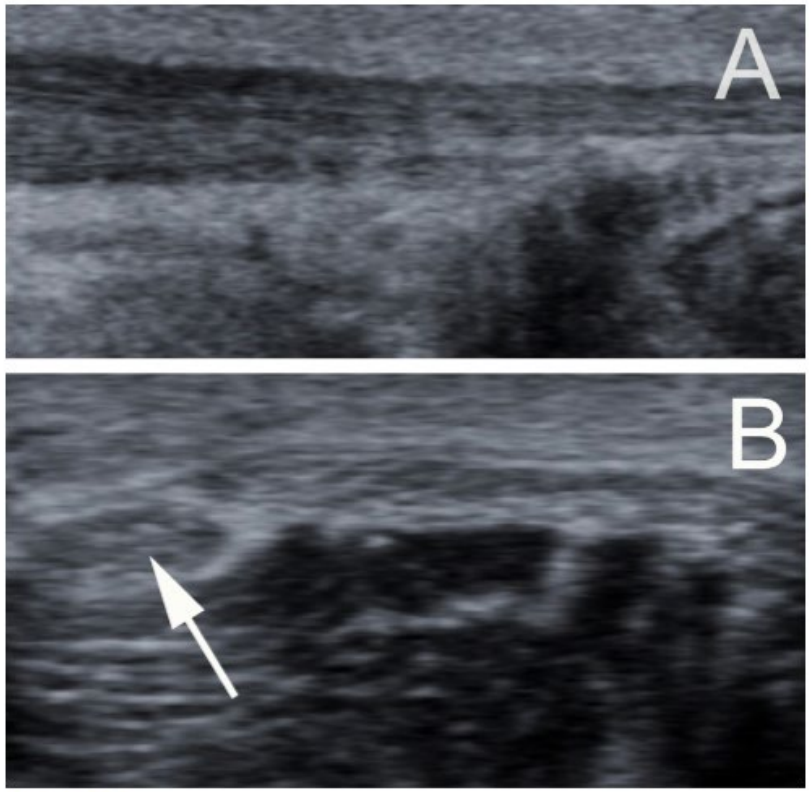


Figure 1 Ultrasound examination of a patient with a normal Achilles tendon (longitudinal view) (A). Cross view showing a thickened plantaris tendon (arrow) on the medial/ventral side of the Achilles (B).

Surgical plantaris tendon removal for patients with plantaris tendon-related pain only and a normal Achilles tendon: a case series

Håkan Alfredson,[1,2,3] Lorenzo Masci,[3] Christoph Spang[4]

What are the new findings?

- Plantaris tendinopathy can occur without Achilles tendinopathy.
- Plantaris tendinopathy may be misdiagnosed because ultrasound and MRI examination show a normal Achilles tendon.
- Excision of the plantaris tendon in patients with plantaris tendon-related pain (plantaris tendinopathy) results in pain relief and fast return to full sports activity.

Results of minimally invasive Achilles tendon scraping and plantaris tendon removal in patients with chronic midportion Achilles tendinopathy: A longer-term follow-up study

Anna Ruergård[1], Christoph Spang[2,3] and Håkan Alfredson[1,4,5]



Postoperative rehabilitation

- Day 1 (surgery day): rest, elevated foot.
- Day 2: ROM (range of movement) exercises, short walks.
- Day 3–7: gradually increased walking, slow tempo.
- Day 8–14: increased walking distances and tempo, start bicycling.
- From 2 weeks and forward: sutures out, gradually increased Achilles tendon loading up to free activity.

Verwijdering van de plantarispees bij chronische midportion Achilles tendinopathie: een systematisch literatuurnazicht

De Burghgraeve Sara[1], Brouwers Dennis[2], Bogaerts Stijn[1,3] , Peers Koen[1,3]



Tabel 1: Weergave van de uitkomstparameter van elke studie

Auteur	VAS		VISA-A		Postoperatief tijdstip waarop de parameter werd opgemeten	Effect	
	Preoperatief	Postoperatief	Preoperatief	Postoperatief		VAS	VISA-A
Bedi et al.[18]	-	-	51 (39-63)	95 (90-100)	>6 m	-	+44
Masci et al.[19]	-	-	56.8 (34-73)	93.3 (87-100)	6 m	-	+36.5
Calder et al.[20]	5.8 (5.4-6.3)	0.8 (0.3-1.3)	-	-	-	-5	-
van Sterkenburg et al.[a 21]	6.9	1.3 0.3	19	64 97	6 w 1 j	-5.6 -6.6	+45 +78
	5.8	1.7 0.4	25	55 55	6 w 1 j	-4.1 -5.4	+30 +30
	5.9	0.0 0.0	45	77 91	6 w 1 j	-5.9 -5.9	+32 +46
Ruergard et al.[22]	6.2 (4.2-8.2)	1.5 (0.0-3.0)	-	-	1 j	-4.7	-

[a] aantal patiënten = 3 waarbij scores voor elke patiënt afzonderlijk worden gegeven

Tabel 3: Risico op bias volgens NOS

	Bedi et al.[18]	Masci et al.[19]	Calder et al.[20]	van Sterkenburg et al.[21]	Ruergard et al.[22]
Selectie	-	+	-	+	++
Variabele	+	+	+	++	+
Uitkomst	+	+	+	+	+

Score per onderdeel: - laag, + matig, ++ hoog

Tabel 2: Methodologische kwaliteit

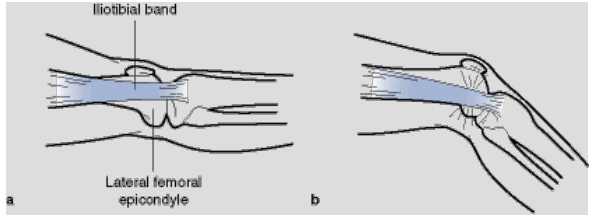
	Bedi et al.[18]	Masci et al.[19]	Calder et al.[20]	van Sterkenburg et al.[21]	Ruergard et al.[22]
Aantal patiënten	-	-	-	-	+
Follow-up	-	-	-	-	-
% follow-up	-	++	++	-	-
Interventies/groep	++	++	++	+	+
Studie type	-	-	-	-	-
Diagnose	++	++	++	++	++
Ingreep	++	++	++	++	++
Revalidatie	+	-	++	+	+
Uitkomst criteria	++	++	++	++	++
Uitkomt opmeten	+	+	+	+	+
Selectie criteria	+	+	+	+	+
Totaal op 100	**55**	**52**	**62**	**43**	**57**

Score per onderdeel: - laag, + matig, ++ hoog

CONCLUSIE

- gunstig effect heeft op zowel pijn als functie
- lage methodologische kwaliteit en selectiebias

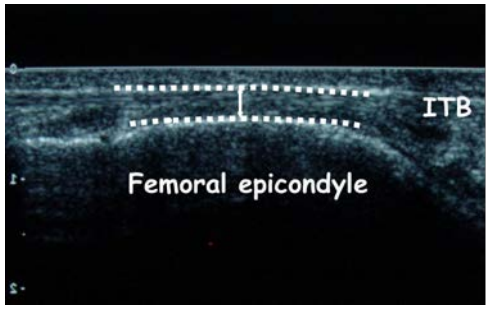
ITBFS



- Diagnose:
  - Anamnese – klinisch onderzoek
  - Echografie







- Behandeling
  - Niet (traag) afstandlopen
  - Stretching
  - Krachttraining
    - Glutei, core stability
    - Qceps, hamstrings
  - loophervatting: intervaltraining





Local corticosteroid injection in iliotibial band friction syndrome in runners: a randomised controlled trial

P Gunter, M P Schwellnus

Br J Sports Med 2004;**38**:269–272. doi: 10.1136/bjsm.2003.000283

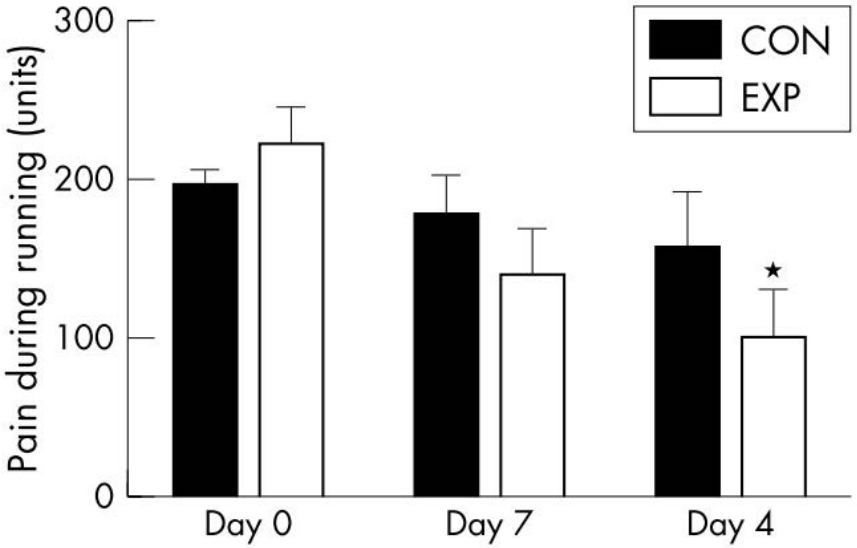


Figure 2 Total pain experienced during running in the control (CON) and experimental (EXP) groups at day 0, 7, and 14. Values are mean and SE. *Significant difference from the value at day 7 (p = 0.01).

Therefore the practical recommendation for treating runners is that local corticosteroid infiltration is effective and safe in the early (first 14 days) treatment of recent onset ITBFS. However, it must be emphasised that identification and correction of the underlying causes must form part of the management.

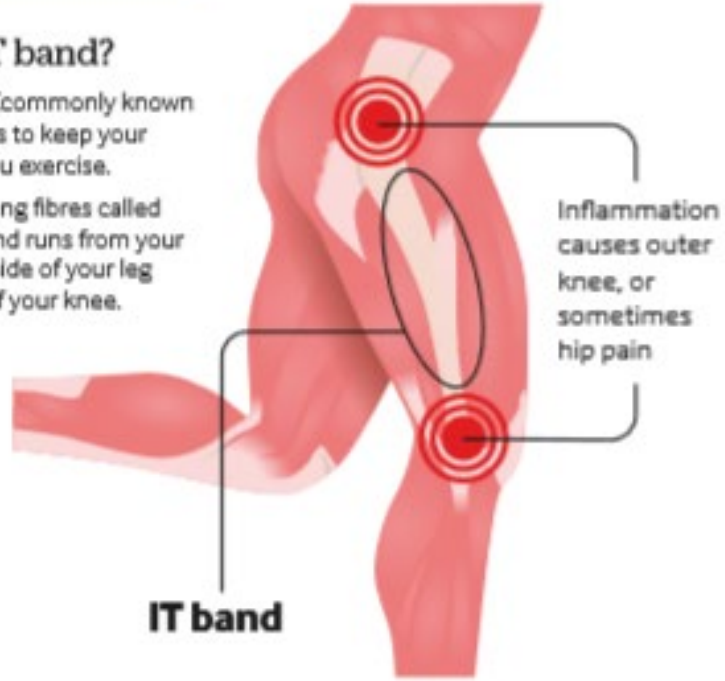
thebmj Visual summary

IT band syndrome: Information for patients

What is the IT band?

The **Iliotibial band** (commonly known as the **IT band**) helps to keep your knee stable when you exercise.

It is made out of strong fibres called connective tissue, and runs from your pelvis down the outside of your leg into the outer part of your knee.



Why does IT band syndrome happen?

The **IT band** moves as you bend your knee during exercise. It can start to rub on the outer part of the knee causing pain if:

- your **IT band** is tight
- your hip muscles are weak
- you have an uneven running style
- you participate in particular activities, such as long distance running

IT band syndrome is common for people who do sports including:

- Running
- Cycling
- Jumping activities
- Field sports
- Hockey
- Rowing
- Breast stroke
- Hiking
- Basketball

Around 7-14% of runners get **IT band syndrome**

What symptoms does it cause?

IT band syndrome causes pain around the outside of the knee when running or doing exercise. The pain often:

- starts when you begin to exercise more, or are training for an event like a marathon
- occurs at the same distance each time
- gets worse if you continue to exercise, particularly if you are running downhill

Do I need any tests?

Your GP or physiotherapist can usually diagnose **IT band syndrome** based on your symptoms, pattern of exercise and an examination.

If the cause of the pain isn't clear, or if it doesn't improve with simple treatments, your GP may refer you to a specialist physiotherapist, sports medicine specialist or orthopaedic surgeon.

What is the treatment for IT band syndrome?

Rest

6 weeks

Start by reducing or changing activities to avoid aggravation of the pain for about 6 weeks to allow the inflammation to settle

You might need more or less than 6 weeks rest, depending on how bad your symptoms are

Some people with severe pain may need to avoid all activities whilst resting. Others may be able to change their activities to swimming, yoga, walking, or similar to avoid pain

Light exercise

After about 6 weeks, restart activities with reduced frequency and distance

- Try short sprints, which may avoid the repetitive irritation that occurs on longer runs
- Applying ice after a run, and simple painkillers such as paracetamol and ibuprofen can be helpful
- Avoid running on angled circuits, hard surfaces, and downhill
- Poorly fitting or inadequately padded shoes can make the condition worse so changing them could be helpful
- Different shoes can be bought to correct foot posture and running style. Specialist assessment on a treadmill may help choose a better fitting shoe. This can also be assessed in some running shops

Make sure to stretch



Improving strength around the hip is important to reduce the forces on the **IT band**. A physiotherapist may recommend using an elasticated band placed around the ankles and then performing leg movements. Lifting the leg sideways as shown 10 times, repeated 3-4 times a day, can improve pelvic muscle strength.



Start doing regular **IT band** stretches:

- Stand upright and cross your affected leg behind your unaffected leg
- Lean away from the painful side until you feel a stretch and hold this position for 30 seconds
- Repeat this 4 more times
- Do these 3 times a day and continue until symptoms resolve

What happens if it doesn't get better or recurs?

50% About half of people can return to sport by 8 weeks

90% This rises to 9 out of 10 at 6 months

If the advice in this leaflet doesn't help, consider seeing a physiotherapist. There may be an underlying problem, such as a muscle imbalance, running technique or biomechanical issue.

Specially made insoles, called orthotics, may be helpful for some people. A podiatrist can assess you for this.

Sources: Produced to assess pony Gabbi's band syndrome (ITBS) by James Pegrum, Alex Self, and Nish Hall. Published in The BNJ, Issue [illegible]. https://doi.org/10.1136/bmj.[illegible]

Thanks: To our patient reviewers who helped us test this information sheets Elaine Stiles and Lucy Fry

Disclaimer: This infographic is not a validated clinical decision aid. This information is provided without any representations, conditions, or warranties that it is accurate or up to date. BNJ and its licensors assume no responsibility for any aspect of treatment administered with the aid of this information. Any reliance placed on this information is strictly at the user's own risk. For the full disclaimer wording see BNJ's terms and conditions: http://www.bmj.com/bmj-pony/legal-information/

Achilles tendon rupture

Achillespees ruptuur

- 18 /100 000/jaar (Finland)
- Diagnose
  - Klinisch
  - Echografisch
- Behandeling
  - Conservatief
  - Operatief





TABLE 6
General Group Outcomes (Pooled or Not Pooled) That Were Assessed for and Reported by Each of the Included Studies[a]

	Meta-analysis								
	Lo[10]	Bhandari[2]	Khan (2005)[9]	Khan (2010)[8]	Zhao[21]	Jiang[6]	Wilkins[20]	Soroceanu[17]	van der Eng[18]
Functional outcome measures									
Ankle range of motion	−	−	−	−	+	−	−	+	+
Ankle strength (ie, of plantar flexion, by different means, including dynamometry)	+	−	−	−	+	−	+	+	+
Return to previous level of sporting	+	−	−	−	+	+	−	−	−
Return to work time	+	−	−	−	+	−	+	+	−
Mean time for sick leave	−	−	−	−	−	+	−	−	−
Reduction of calf circumference/calf circumference	−	−	−	−	+	−	−	+	−
Period of hospitalization	−	−	−	−	+	−	−	−	−
Tendon width	−	−	−	−	+	−	−	−	−
Return to normal function	−	+	−	−	−	−	−	−	−
Spontaneous complaints	−	+	−	−	−	−	−	−	−
Functional outcomes/functional recovery (by different scales)	−	−	−	−	−	+	−	+	−
Functional scoring scales									
Visual analog scale	−	−	−	−	+	−	−	−	−
Musculoskeletal functional assessment index	−	−	−	−	+	−	−	−	−
Leppilahti ankle score	−	−	−	−	+	−	−	−	−
Achilles tendon total rupture score	−	−	−	−	+	−	−	−	−
Physical activity scale	−	−	−	−	+	−	−	−	−
Validated functional tests	−	−	−	−	+	−	−	−	−
Functional index for the lower leg and ankle	−	−	−	−	+	−	−	−	−
Complications									
Rerupture rate	+	+	−	−	+	+	+	+	+
"Major" complications	+	−	−	−	+	−	−	−	+
"Moderate" complications	+	−	−	−	+	−	−	−	−
"Minor" complications	+	−	−	−	+	−	−	−	+
Total complications (rerupture + other)	+	−	−	−	+	+	−	−	+
Total complications (excluding rerupture)	−	−	−	−	−	−	−	+	−
Total infection rate	−	+	−	−	−	−	−	−	−
Superficial infection rate	−	−	+	−	−	+	−	−	−
Deep infection rate	−	−	+	−	−	+	+	−	−
Incidence of sensibility disturbance/sural nerve sensory disturbance	+	−	+	−	−	+	+	−	−
Rate of scar adhesions	+	−	+	−	−	+	+	−	−
Rate of DVT	+	−	−	−	−	+	+	−	−
Rate of extreme tendon lengthening	+	−	−	−	−	+	−	−	−

[a]"+" indicates that reference to the outcome variable was made and "−" indicates that reference to the outcome variable was not made.
DVT, deep vein thrombosis.

Is Operative Treatment of Achilles Tendon Ruptures Superior to Nonoperative Treatment?

A Systematic Review of Overlapping Meta-analyses

Brandon J. Erickson,*† MD, Randy Mascarenhas,† MD, FRCSC, Bryan M. Saltzman,† MD, David Walton,† MD, Simon Lee,† MD, Brian J. Cole,† MD, and Bernard R. Bach Jr,† MD
Investigation performed at Rush University Medical Center, Chicago, Illinois, USA

CONCLUSION

Operative treatment of Achilles tendon ruptures decreases rerupture rates but increases minor complications compared with nonoperative treatment. Surgery may allow earlier return to work.

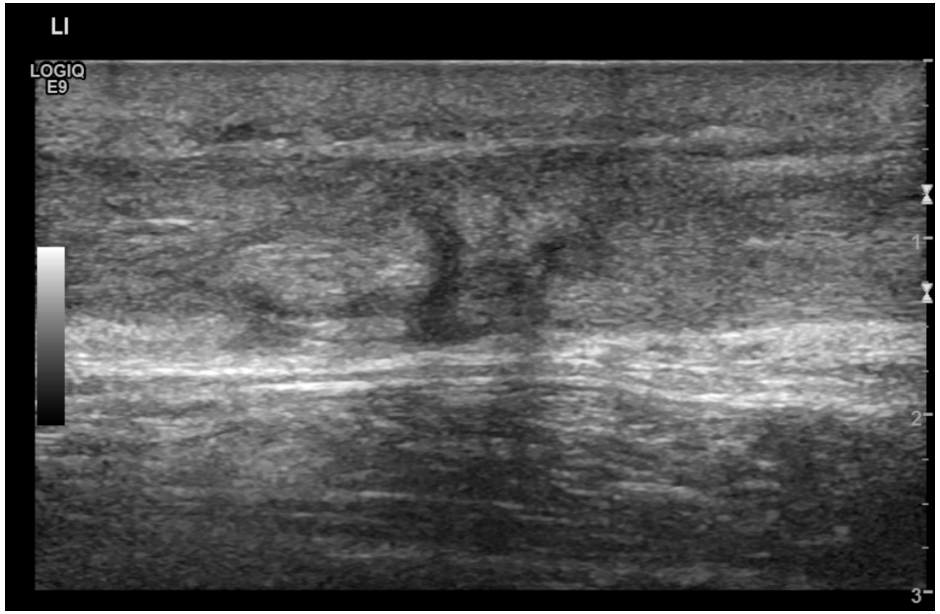
Achillespees

Besluit 14 mei:
Walking boot met wig verhoging van 3 cm.

28 mei:
Beterschap, nu 2 weken walking boot met 2 wigjes van 1.5cm
Beleid: afbouwen krukken, van 2 naar 1 wigje over 2 weken - opstarten van kinesitherapie

11 juni:
Beterschap, marche zonder krukken lukt. Gebruikt nog 1 wig van 1.5 cm.
Gestart met kinesitherapie, voorzichtige mobilisaties en isometrische oefeningen

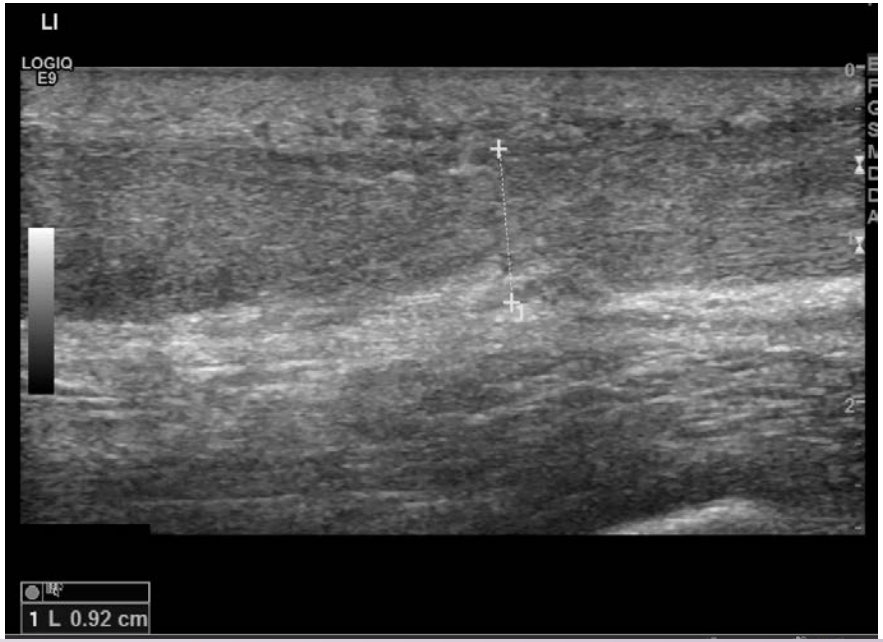


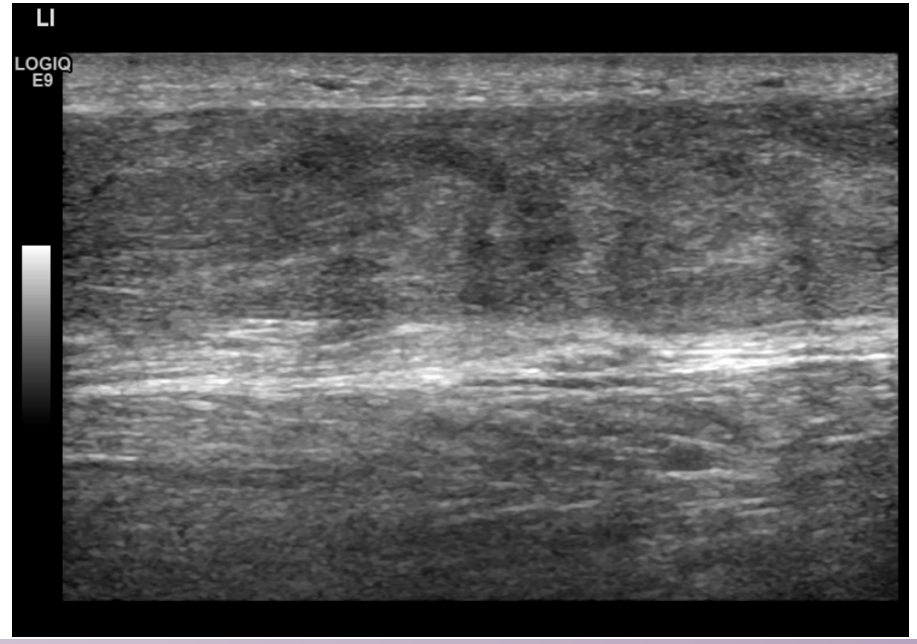


Achillespees

6 juli:
Stapt zonder krukken, sinds 1 week zonder wig in walking boot.
Goede progressie bij de kine, meer functionele kracht, geen pijn. Thompson geeft plantairflexie.
Beleid: nog 1 week met walking boot, daarna langzaam afbouwen, bij lange afstanden nog te dragen, nog geen explosieve bewegingen.

31 juli:
Stapt sinds 2 weken zonder walking boot. Geen pijnklachten. Kan 2u rechtstaan/rondstappen zonder belangrijke last.
Beleid: Verder zetten opbouwschema oefeningen onder begeleiding van kine met aandacht voor soeplesse tijdens march
Werk hervatten na einde verlof mid augustus





Operative treatment versus nonoperative treatment of Achilles tendon ruptures: systematic review and meta-analysis

Yassine Ochen,[1 2] Reinier B Beks,[1 3] Mark van Heijl,[3 4] Falco Hietbrink,[1] Luke P H Leenen,[1] Detlef van der Velde,[5] Marilyn Heng,[2] Olivier van der Meijden,[6] Rolf H H Groenwold,[7] R Marijn Houwert[1]

BMJ

Study or subgroup	No of events/total: Operative	No of events/total: Nonoperative	Risk ratio, M-H, random (95% CI)	Weight (%)	Risk ratio, M-H, random (95% CI)
Randomised controlled trials					
Nilsson-Helander et al 2010	2/49	6/48		28.5	0.33 (0.07 to 1.54)
Twaddle et al 2007	2/25	1/25		12.5	2.00 (0.19 to 20.67)
Willits et al 2010	2/72	3/72		22.1	0.67 (0.11 to 3.87)
Subtotal (95% CI)	6/146	10/145		63.1	0.60 (0.21 to 1.70)
Test for heterogeneity: τ^2=0.00; χ^2=1.63, df=2, P=0.44; I^2=0%					
Test for overall effect: Z=0.96, P=0.34					
Observational studies					
Jackson et al 2013	1/29	2/51		12.3	0.88 (0.08 to 9.28)
Kotnis et al 2006	1/67	2/58		12.1	0.43 (0.04 to 4.65)
Renninger et al 2016	1/27	2/30		12.5	0.56 (0.05 to 5.79)
Subtotal (95% CI)	3/123	6/139		36.9	0.60 (0.15 to 2.33)
Test for heterogeneity: τ^2=0.00; χ^2=0.18, df=2, P=0.91; I^2=0%					
Test for overall effect: Z=0.74, P0.46					
Total (95% CI)	9/269	16/284		100.0	0.60 (0.26 to 1.37)
Test for heterogeneity: τ^2=0.00; χ^2=1.80, df=5, P=0.88; I^2=0%					
Test for overall effect: Z=1.21, P=0.23					
Test for subgroup differences: χ^2=0.00, df=1, P=0.99; I^2=0%					

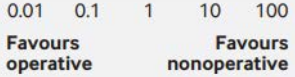


Fig 4 | Forest plot of re-rupture rate in studies that included accelerated functional rehabilitation in meta-analysis of Achilles tendon ruptures. M-H=Mantel-Haenszel





Surgical Versus Conservative Intervention for Acute Achilles Tendon Rupture

A PRISMA-Compliant Systematic Review of Overlapping Meta-Analyses

Hao Zhang, MD, Hao Tang, MD, Qianyun He, MD, Qiang Wei, MD, Dake Tong, MD, Chuangfeng Wang, MD, Dajiang Wu, MD, Guangchao Wang, MD, Xin Zhang, MD, Wenbin Ding, MD, Di Li, MD, Chen Ding, MD, Kang Liu, MD, and Fang Ji, MD

CONCLUSION

Based on the present systematic review of overlapping meta-analyses that compared surgical with conservative intervention for acute Achilles tendon rupture, the best available evidence indicated that conservative intervention for acute Achilles tendon rupture may be preferred at centers offering functional rehabilitation, because it shows similar rerupture rate when comparing with surgical treatment while low risk of other complications. However, surgical treatment should be considered at centers without functional rehabilitation because it could reduce the incidence of rerupture.

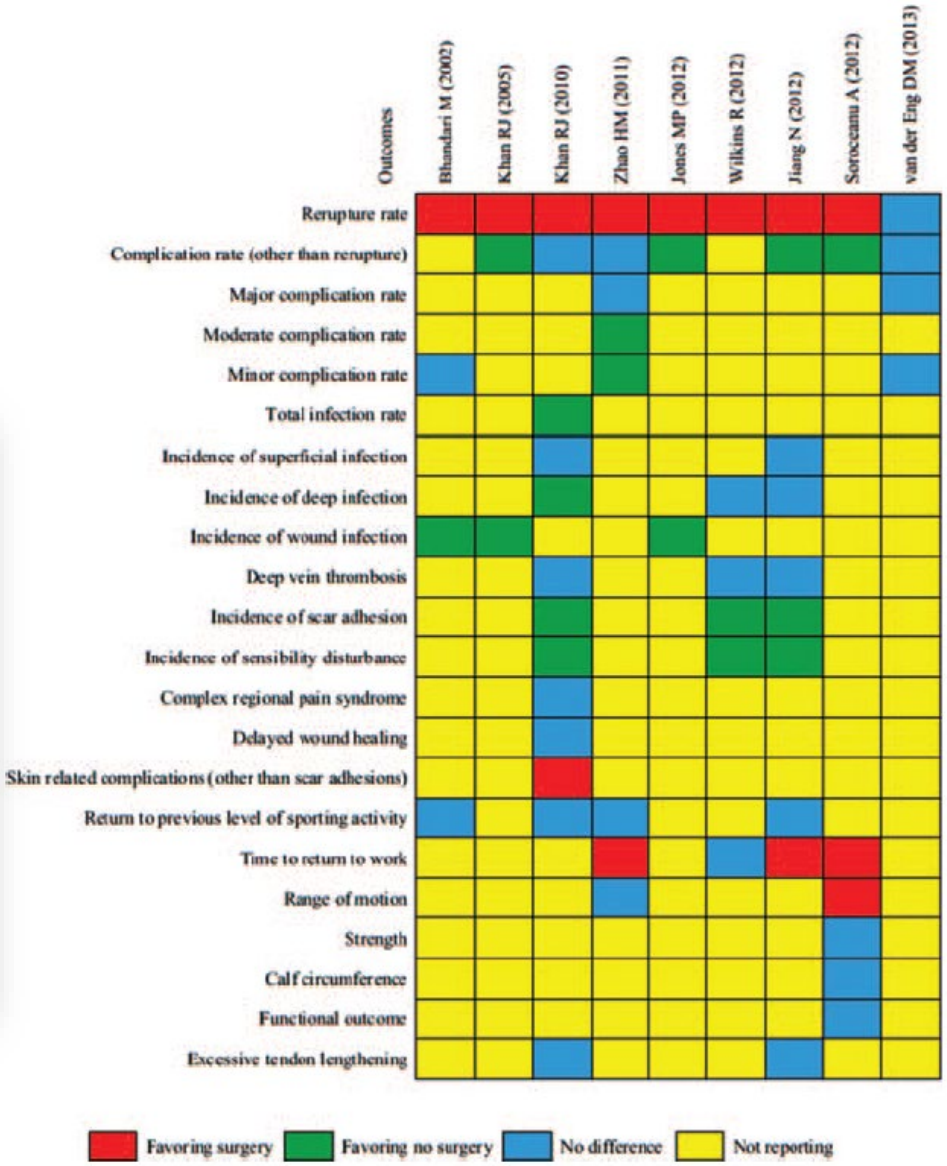
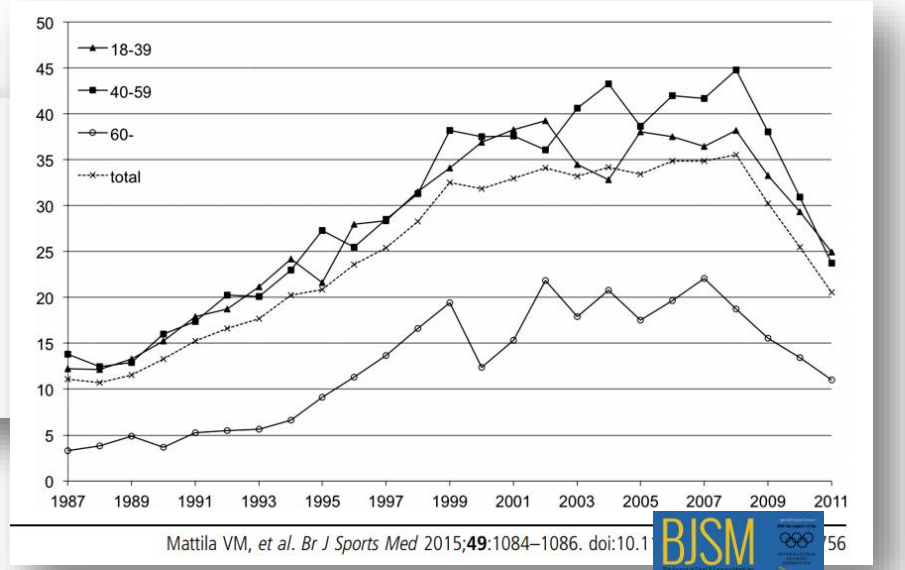


FIGURE 2. Results of the included meta-analyses.

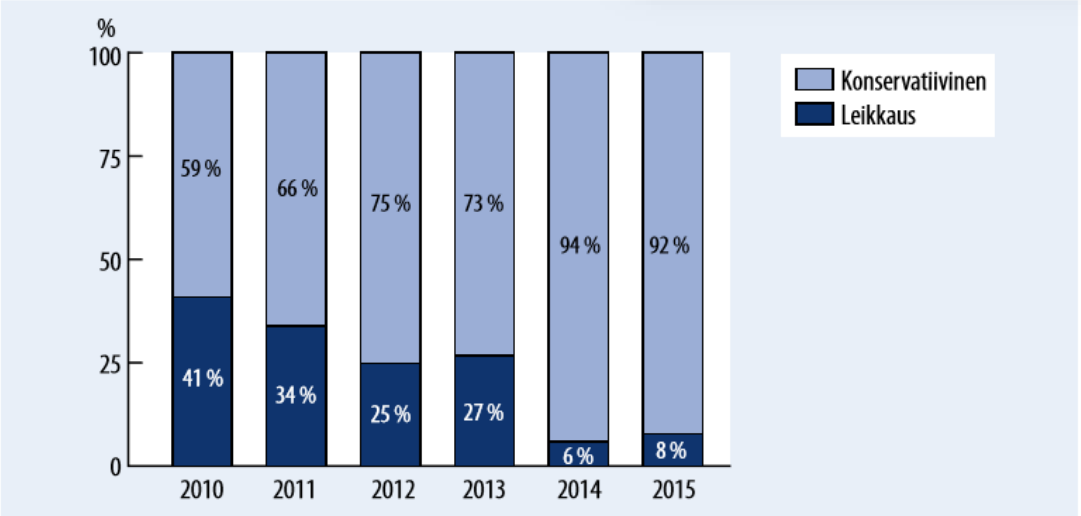
Declining incidence of surgery for Achilles tendon rupture follows publication of major RCTs: evidence-influenced change evident using the Finnish registry study

Ville M Mattila,[1,2,3,4] Tuomas T Huttunen,[1,5] Heidi Haapasalo,[1] Petri Sillanpää,[1] Antti Malmivaara,[6] Harri Pihlajamäki[7,8]



Mattila VM, *et al. Br J Sports Med* 2015;**49**:1084–1086. doi:10.1





KUVA 4. Akuutista akillesjännerepeämästä kärsivien potilaiden konservatiivisen ja leikkaushoidon osuus Keski-Suomen keskussairaalassa vuosittain.

THE BONE & JOINT JOURNAL

■ FOOT AND ANKLE

The treatment of a rupture of the Achilles tendon using a dedicated management programme

A. M. Hutchison,
C. Topliss,
D. Beard,
R. M. Evans,
P. Williams

From Morriston Hospital, ABMU University Health Board, Swansea, United Kingdom

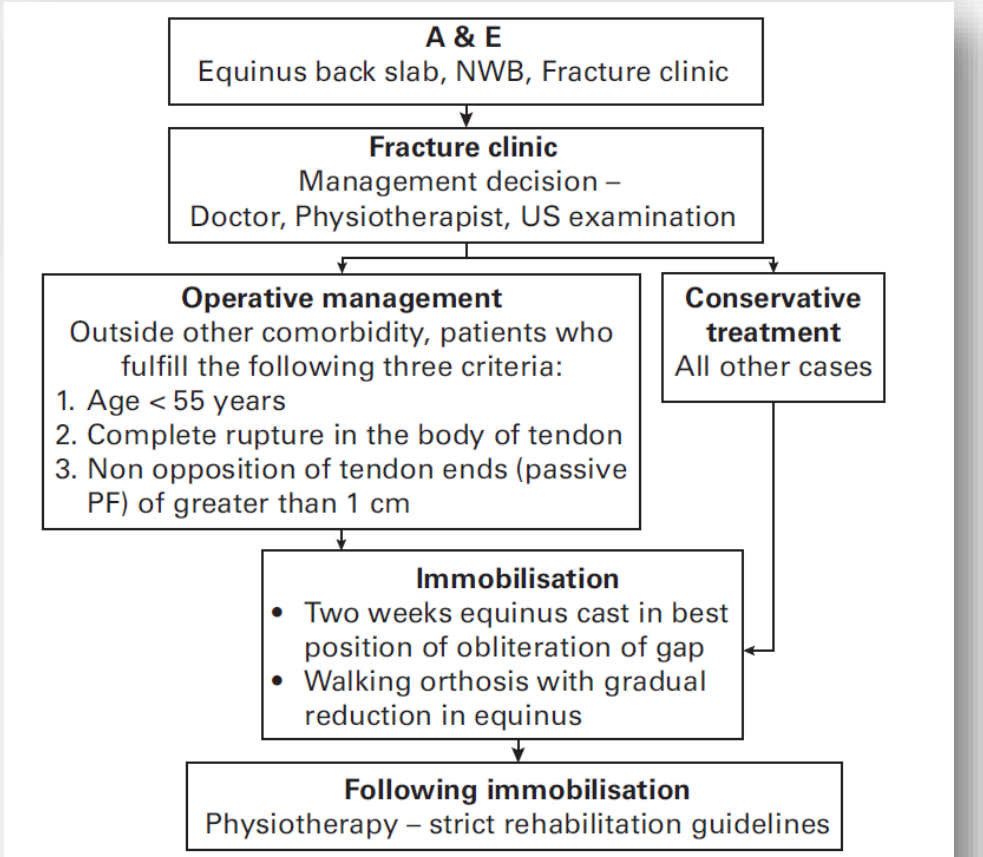


Fig. 1

Summary of the SMART protocol. (US, ultrasound, NWB, Non-Weight Bearing, PF, Plantar Flexion).

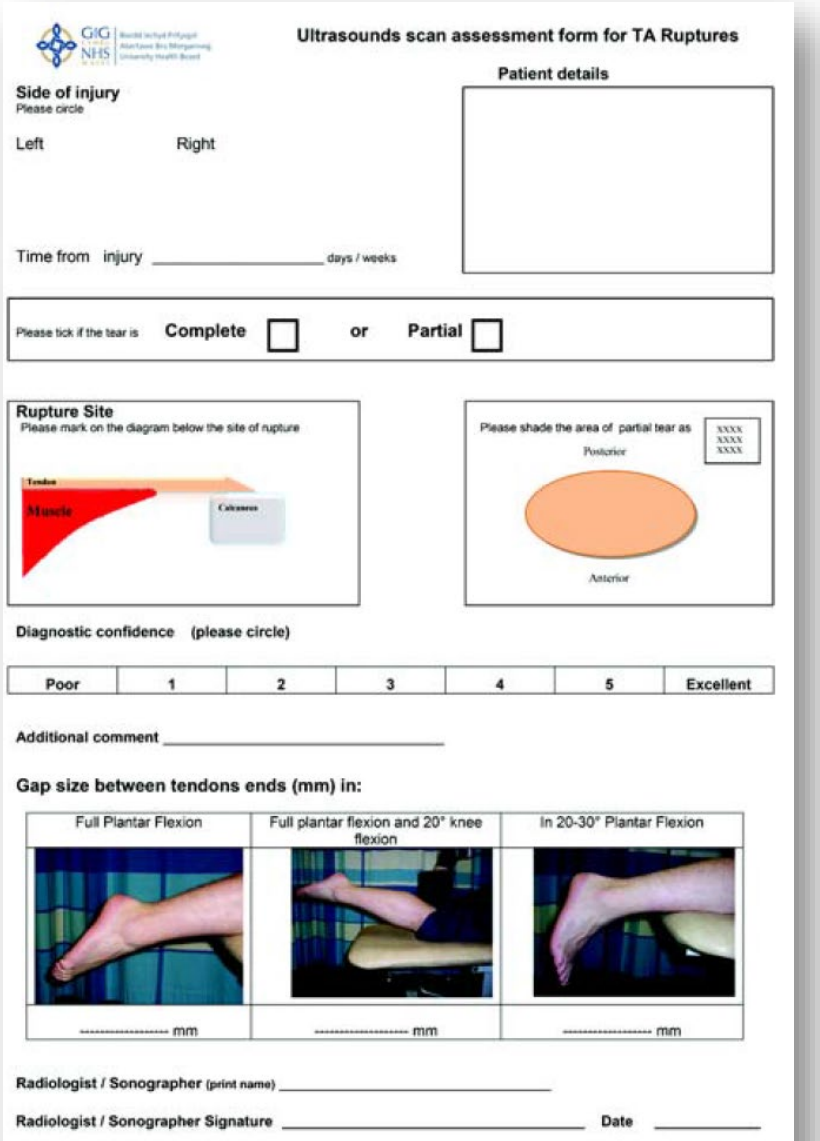


Fig. 2

Ultrasound scan form completed by the Consultant Radiologist.

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Table I. Management of patients during immobilisation period for operative and non-operative patients

Week	Conservative	Surgical
0 to 2	Equinus FWB cast with a wedge in the best position that opposes the tendon ends	Back slab NWB
2 to 5	Vacoped boot locked at 30 degrees FWB	Vacoped boot locked at 30° FWB
5 to 7	Vacoped boot 30° to 15° FWB	Vacoped boot 30° to 15° degrees
	Yellow theraband exercises for soleus and gastrocnemius	Yellow theraband exercises for soleus and gastrocnemius
7 to 9	Vacoped boot 0-30 degrees with a flat wedge FWB	Vacoped boot 0-30 degrees with a flat wedge FWB
9 to 10	Vacoped boot fully unlocked FWB	Vacoped boot fully unlocked FWB
10 to 16	Removal of boot	Removal of boot
	To wear only in vulnerable environments (6/52)	To wear only in vulnerable environments (6/52)

FWB, Full Weight Bearing, NWB, non weight bearing

Table III. Modification of final question on achilles tendon repair score

Score	
Excellent (15 points)	Single leg heel raise to same height as other leg, no hand support required
Good (10 points)	Single leg heel raise not to the same height as other leg, min hand support required
Fair (5 points)	Just about Single leg heel raise, maximum hand support required
Poor (0 points	Unable to single leg heel raise

Table II. Rehabilitation guidelines after immobilisation for operative and non operative patients)

Do	Do not
Weeks 10 to 12 post injury	
Issue patient with a heel raise for shoe	
Warn the patient that most re-ruptures occurs during this phase	
Advise the patient to avoid activities which involve extreme dorsi flexion of the ankle combined with active plantar flexion	
Advise the patient that they will not return to sports which involve running until they are 6 to 8 months post injury	
Advise the patient on a PWB gait pattern; particularly re-educating the toe off phase of gait	Do NOT attempt running, jumping or hopping
Work on ROM of the ankle and foot. Particularly length of soleus and gastrocnemius	
Lower limb muscle strength work. Particularly of the plantar flexors	Do NOT attempt eccentric lowering exercise off a step used for tendonopathies. Do not attempt resistance plantar flexion exercises which requires more than half the patients body weight
Proprioception exercises	
Gentle plyometric exercises	
Hydrotherapy – particularly good during this phase	
For surgical patients take care of the scar. Any sign of break down refer patient back to clinic as soon as possible	
3 to 5 months post injury	
Dispense of heel raise	
Continue to avoid activities of extreme dorsi flexion combined with active plantar flexion	
Aim to single leg heel raise	
Plyometric – progress for example start with 2 feet jumps (bunny hops), jogging on trampet, PWB jogging, i.e., leaning on table	
5 to 6 months post injury	
Gait – Start jogging on the flat	
Strength – start eccentric exercises off step	
Progress proprioceptive exercises as appropriate	
Sports specific rehab exercises	
6 to 8 months post injury	
Gait – introduce hill running	Return the patient to competitive sports until they can: single leg heel raise; sprint with the toe off phase of gait; until horizontal single leg hop × 3 is at least 75% of good leg and vertical hop is at least 75% of good leg
Introduce hopping and progress to long horizontal and vertical hops	
Return to sport as able	

ROM, range of movement



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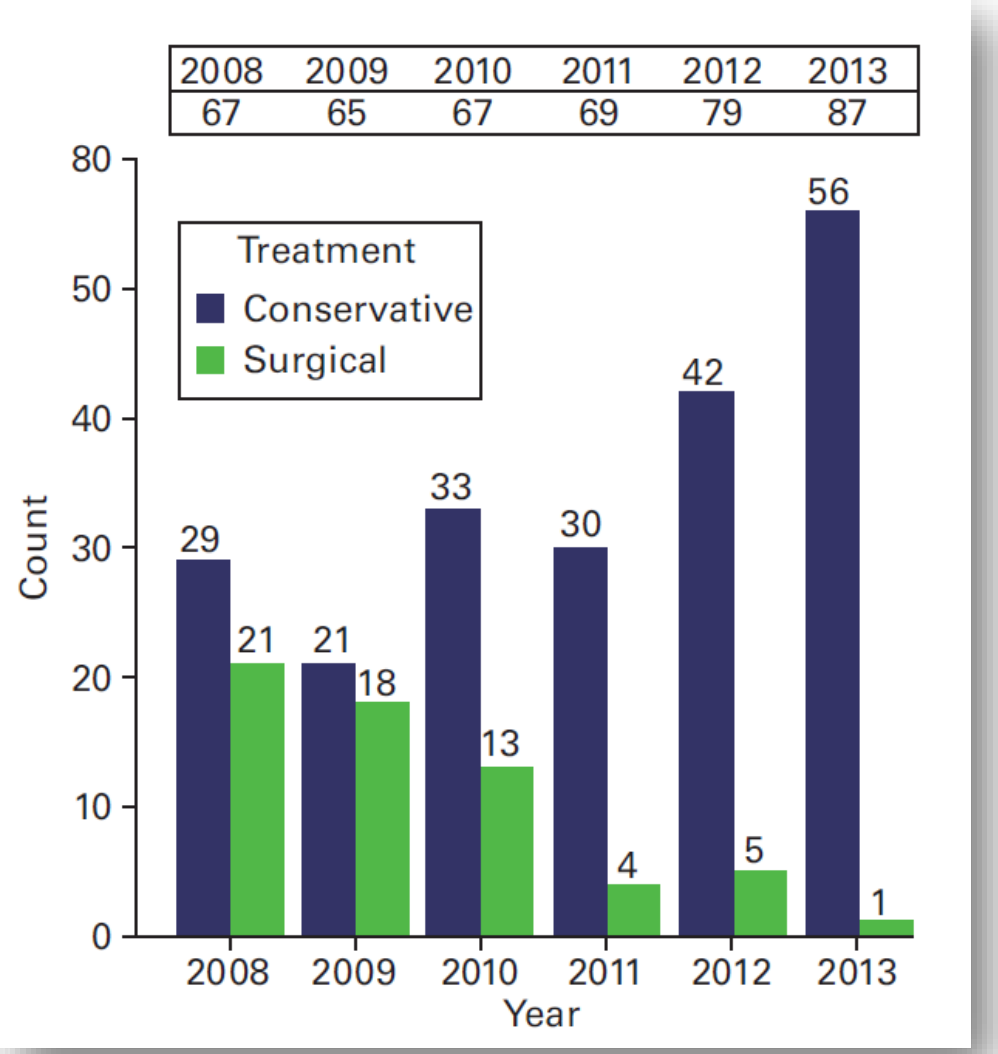
Table V. Annual cost implications of The Swansea Morriston Achilles Rupture Treatment protocol comparing 2008 and 2013

Increase costs
20 extra ultrasound scans per year at £60 per scan = £1200
Boots compared with cast × 3 £6867 (inclusive VAT)
Total = £8067
Decreased costs or savings
37 fewer operations at £2300 per operation + £400 a night hospital stay
Total = **£99 900**
Total saving = £ 91 813 per annum

Table IV. Outcome scores at four, six and nine months post rupture

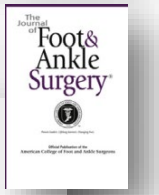
Mean score at:	Achilles tendon rupture score	Mean achilles repair score
4 months (n = 135)	53.0 (SD14)	64.9 (SD 15)
6 months (n = 103)	67.8 (SD 16)	73.8 (SD 15)
9 months (n = 43)	72.4 (SD 14)	72.3 (SD 13)



i. Immobilisatie

	Wijze	Duratie	Stand	Evolutie
Nillson-Hellander 2010	Gips, na 2w brace	8w	Plantair Flexie	30° , 10°, -10° 4, 2, 2w
Maughan 2018	CAM	?	Plantair Flexie	/
Lantto 2016	Gips, na 1w brace	7w	Plantair Flexie	30°, 15°, 0-30° 3, 2, 2w
A.M Hutchinson 2015	Gips, na 2w brace	10w	Plantair Flexie	30°, 15°, 0°, 0-30° 5, 2, 2, 1w
Van der Eng 2013	Gips,+- brace	6-8w	Plantair Flexie	variabel
Grubor 2012	Gips	10w	Plantair Flexie	30°, -, 0° 4, 4, 2w
Olsonn 2013	Brace	8w	Plantair Flexie	22°
El-Akkawi 2018	Gips+/- brace	8w-12w	Plantair Flexie	variabel





Effect of Early Versus Late Weightbearing in Conservatively Treated Acute Achilles Tendon Rupture: A Meta-Analysis

Ali Imad El-Akkawi, MD [1], Rajzan Joanroy, MD [2], Kristoffer Weisskirchner Barfod, MD, PhD [3], Thomas Kallemose, MSc [4], Søren Skydt Kristensen, MD [5], Bjarke Viberg, MD, PhD [6,7]

ii. Belasting

- El Akkawi 2018: Geen significant verschil tussen vroegtijdig en laattijdig belasten
- Barfod 2014: Vroegtijdige belasting => ↑ QoL
- Young 2014: Gips met belasting ~ gips zonder belasting
- Willits 2010: Vroegtijdige belasting => ↑ genezingsproces
- Nilsson-Helander 2010: Vroegtijdige belasting => ↑ genezingsproces (intacte peesuiteinden)

Tijdsinterval variabel gedefinieerd

iii. eROM

		Oefening	Outcome
Barfod, 2014	Vanaf 2w	5x/d brace af Zittend, voet afhangend Actief dorsiflexie tot horizontale pos.	Verbetering (Health) related QOL
Nilsson-Helander, 2009	Vanaf 2w	Aanpasbare brace met vrije plantairflexie & beperkte dorsiflexie w2-4: tot - 30° w4-6: tot -10° w6-8: tot + 10°	Daling re-ruptuur rate

- Zhou 2018: eROM < 2w : ~ re-ruptuur na chirurgie

voetbaltrainer Achilles ruptuur

- Achilles tendon rupture
  - Operative indication
    - Gap > 1 cm passive PF and < 55 yrs
  - Conservative management
    - Immobilisation (position depending on gap)
    - Duration ? 2-4 weeks
    - Progressive mobilisation and strengthening





Tendinopathy:

it’s all about

loading



thanks for your attention



Tendinopathie

Pentalfa - Leuven
28 maart 2019

@stijnbog