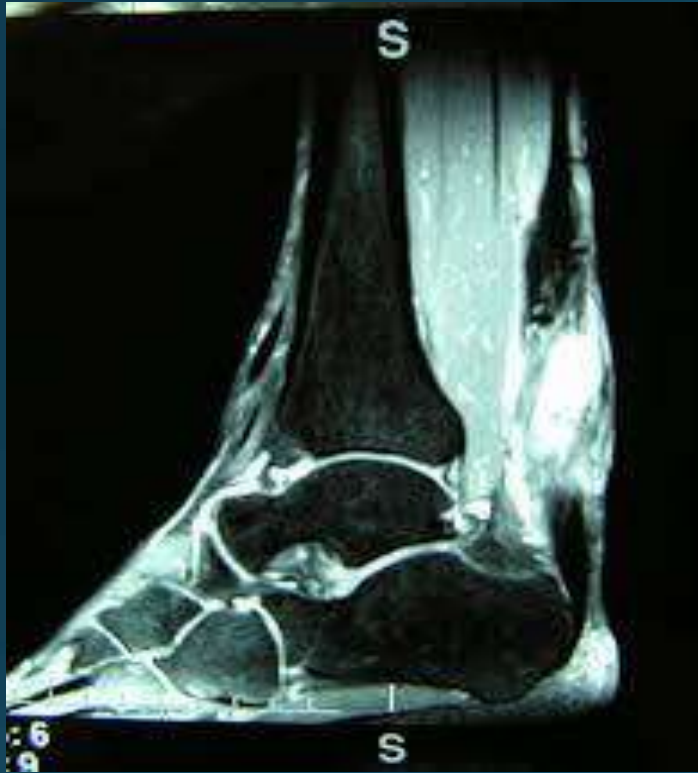


Surgeon's perspective- tendinopathy



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Hartlepool, UK

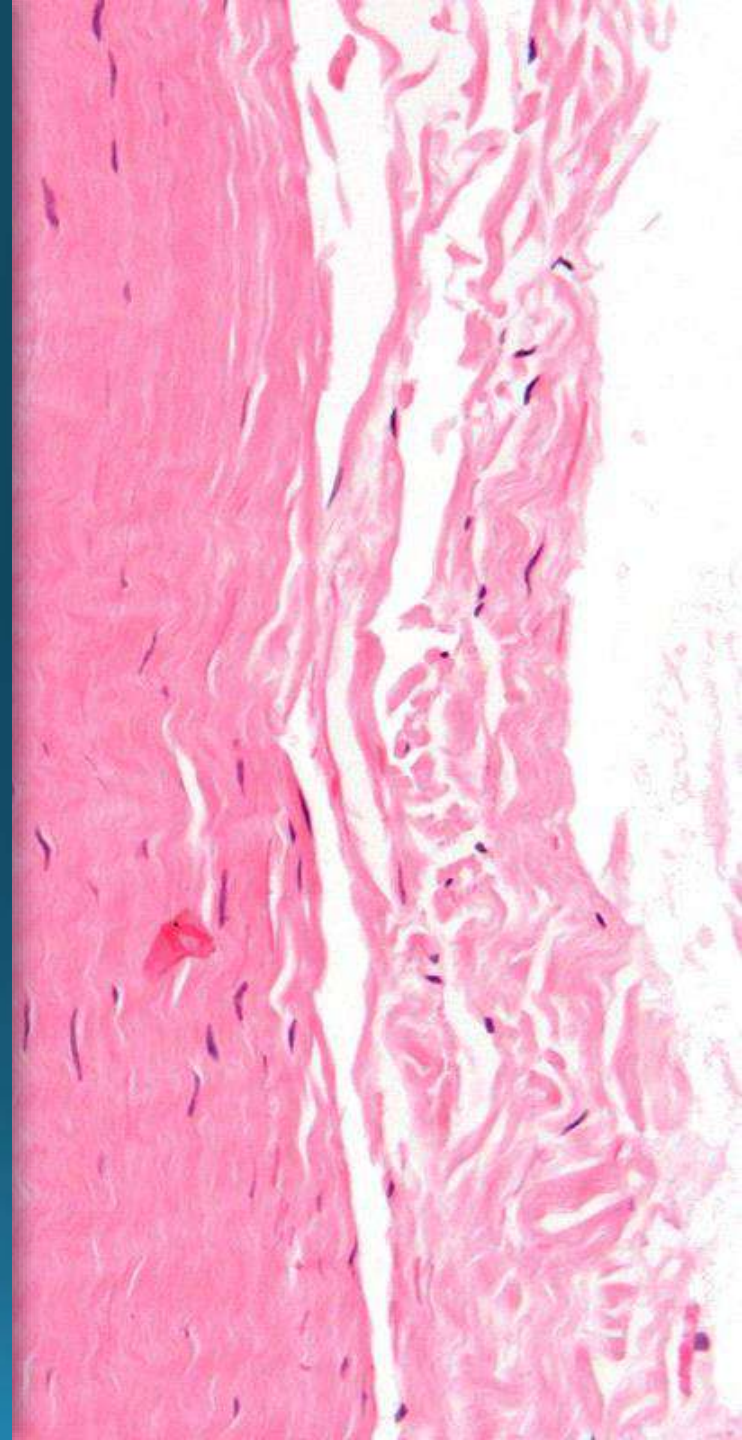
Tendinopathy.....
How does it
happen?

mechanical stresses on the
tendon with repetitive loading

Impingement of the tendon
between adjacent structures
(bones, ligaments) and impaired
blood supply

Physiology

- Remarkable response to stress
 - Exercise induces tendon diameter increase
 - Inactivity or immobilization causes rapid atrophy
- Young athletes- repetitive stress response to the tendon causes severe degeneration
- Age-related decreases in cell density, collagen fibril diameter and density
 - Older athletes have higher injury susceptibility



Causes

Intrinsic Factors

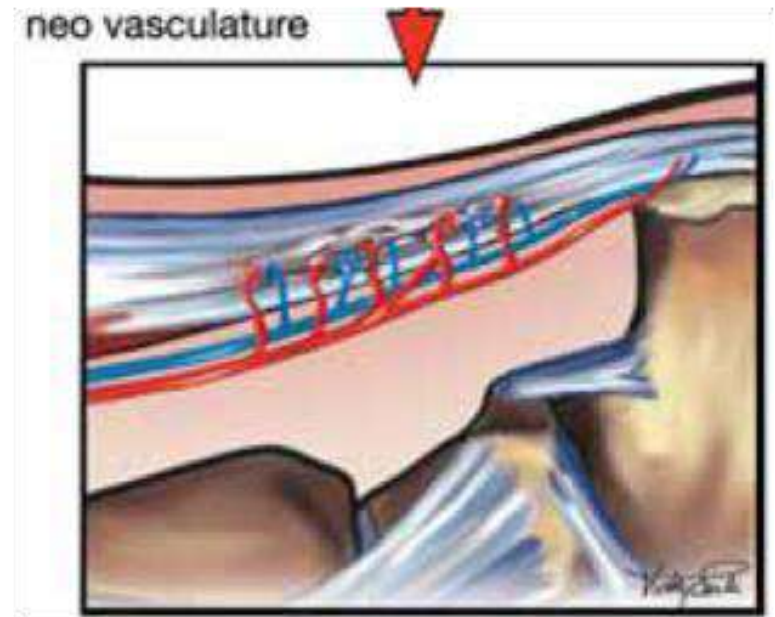
- Age – ‘mature’ tissues heal less efficiently
- Chronic disease – diabetes, rheumatoid arthritis, connective tissue disease
- Biomechanics – adverse mechanical stress

Extrinsic Factors

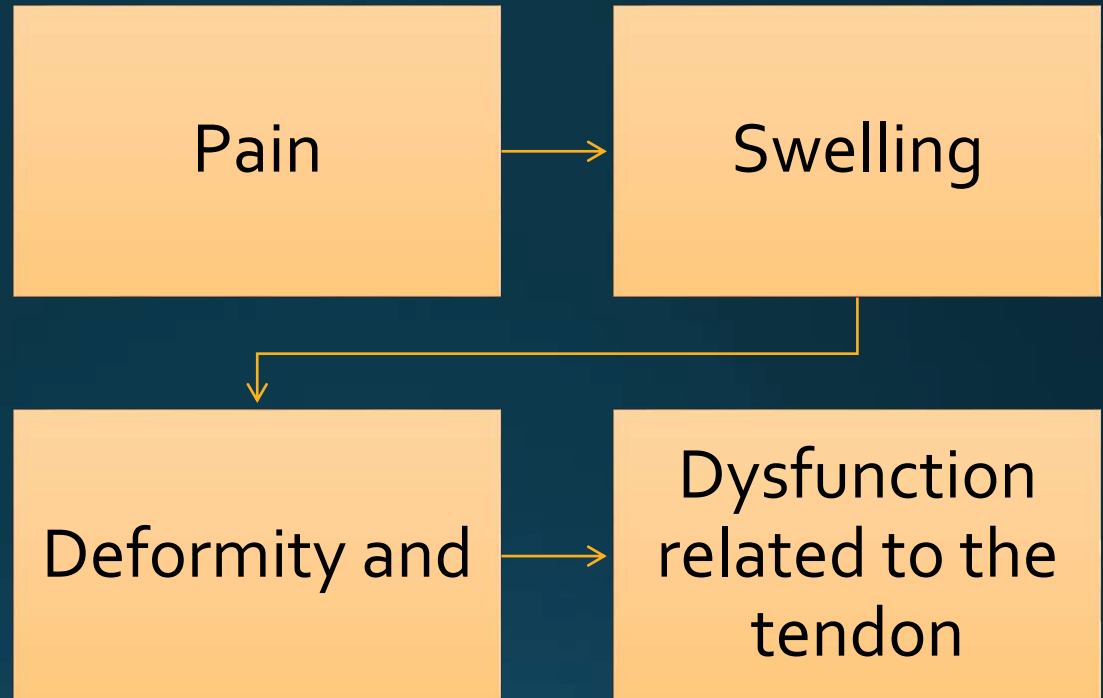
- Repetitive activity in work, sport or leisure
- Often a sudden burst of DIY activities (gardening, painting)
- Sport – an increase in training load

Pathology

- Tendon histopathology: there is not much inflammatory change in symptomatic tendons
- Pathological process is mucoid degeneration with inadequate repair and remodeling.
- Loss of tightly bundled collagen structure and increased proteoglycan ground substance in tendon
- Evidence of neovascularization, with growth of nerve fibers into tendon



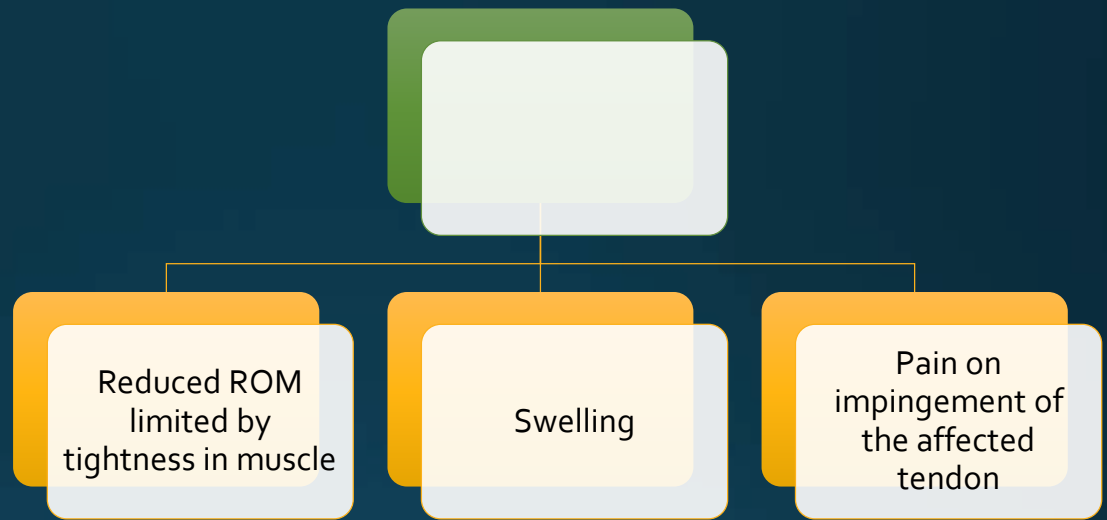
Presentation



Why is there pain?

- Pain is due to neovascularization and neural growth
- Irritation of mechanoreceptors by vibration, traction or shear forces, which trigger nociceptive receptors by neurotransmitters such as substance P and by biomechanical irritants
- Modern treatments aim to reverse the neovascularization and encourage healing and remodeling

Assessment



Imaging

Not usually required to make a clinical diagnosis

Used to exclude other pathology and plan surgery

Ultrasound – preferred option

Partial tears are quite a common finding, even in asymptomatic tendons especially better picked up on MRI

When is surgery indicated

In chronic cases > 10 weeks

Failed conservative therapy

Failed steroid injections

Steroids have a role in treating any associated bursitis

Physiotherapy with an eccentric loading programme has greater long term benefits, but if failed

How big is the problem?

30% > risk in runners (Kujula et al 2007)

More active population and hence seen in all ages

Repetitive loads on the tendon- fatigue failure

Insufficient recovery leads to further micro-tears (Millar et al 2010)

Improper repair leading to degenerative changes in the tendon (Kujula 2007)

Involvement
in foot and
ankle

Posterior tibial tendon

Achilles tendon

Peroneal tendons

Tibialis anterior tendon

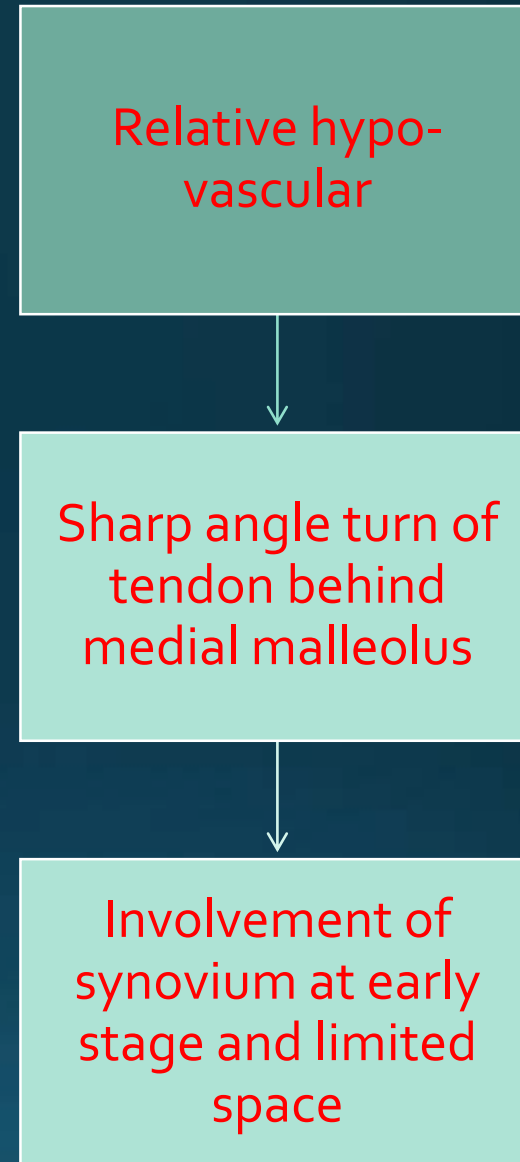
And smaller tendons

Posterior Tibial tendon

- Tibialis post tendon arises from posterior compartment
- Present deep initially, but becomes superficial later
- Just post to medial malleolus
- Inserts in all tarsal bones except talus with multiple slips



Anatomical reasons for dysfunction



Patho-physiology



Clinical stages- stage 1



- Pain and tendonitis, but normal working tendon
- Swelling near medial side of ankle
- Can be missed at this stage!

Stage 2



- More inflammation leads to elongation in tendon
- Flexible flat foot
- Pain increases and becomes more localised
- Instability in foot and restricted walking

Stage 3

- Pain starts to disappear from medial side of ankle and becomes more on lateral side
- Impingement bet fibula and calcaneum
- Fixed hind-foot and no correction passively
- More flattening of foot and midfoot break



Stage 4

- Rigid fixed flatfoot
- Associated with Pan talar arthritis



Management

- Goes with the stages of the disease
- Associated conditions should be addressed
- Rheumatologists involvement may be required

Stage 1 management

Mainly non-operative

Arch supports, quarter inch medial heel, sole wedge

Ultra-sound

Immobilisation in cast if required

NSAIDS

Surgery for decompression of tendon and teno-synovectomy

Stage 2 management

Mainly surgical

Either lateral column lengthening or

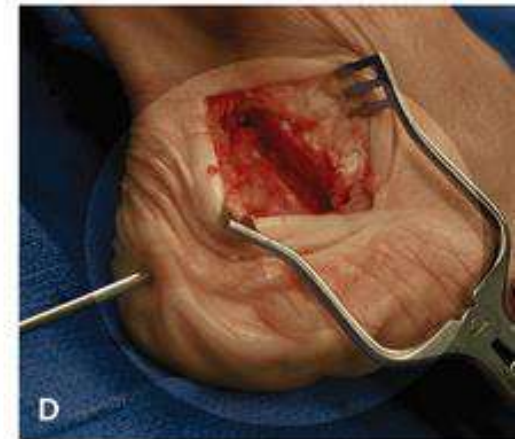
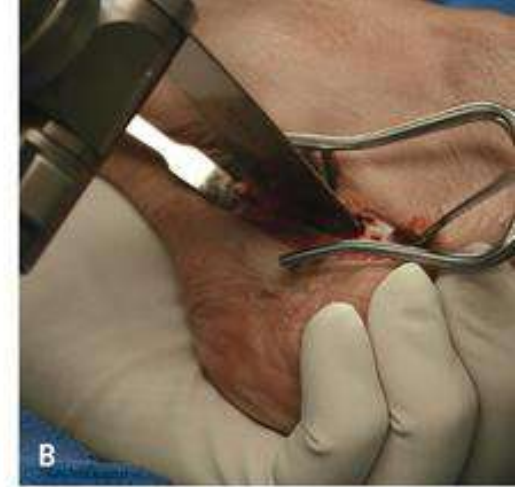
- tendon decompression, FDL tendon transfer and medial calcaneal sliding osteotomy

Repair of tendon is usually not enough

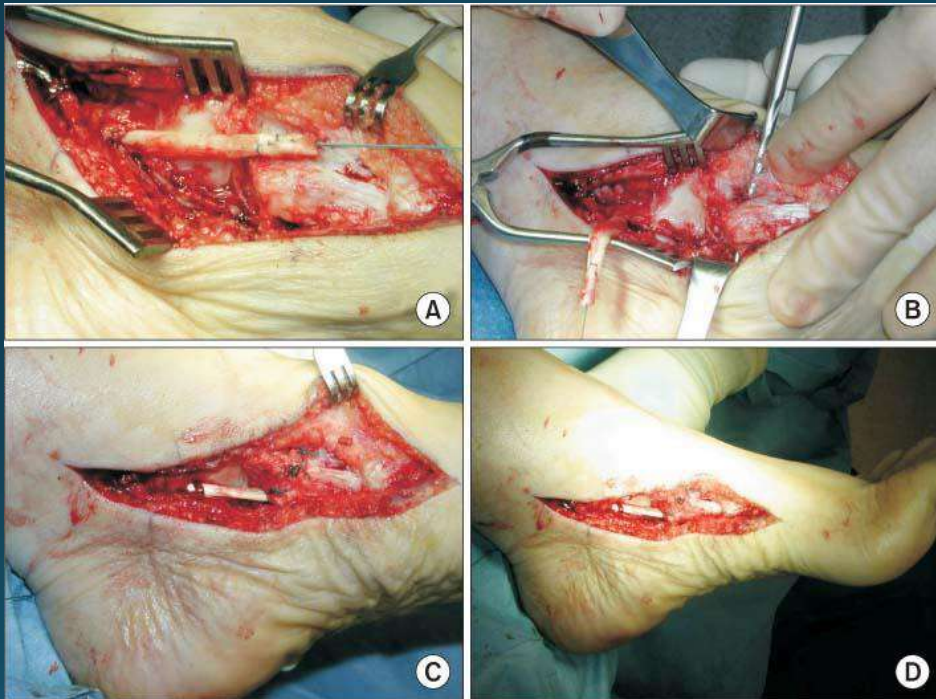
Occasional reports on split tib Ant transfer

Calcaneal medial shift osteotomy

- Lateral incision
- Medial shift of calcaneum
- Fixation using screw



FDL tendon transfer with internal brace and repair of spring ligament



Stage 3 management

Usually surgical



End stage flat foot
with hind foot or
triple joint arthritis



Surgery is usually
salvage with
arthrodesis

Arthrodesis



Stage 4 disease

Usually very disabling

Results are disappointing

Many surgeries may be required

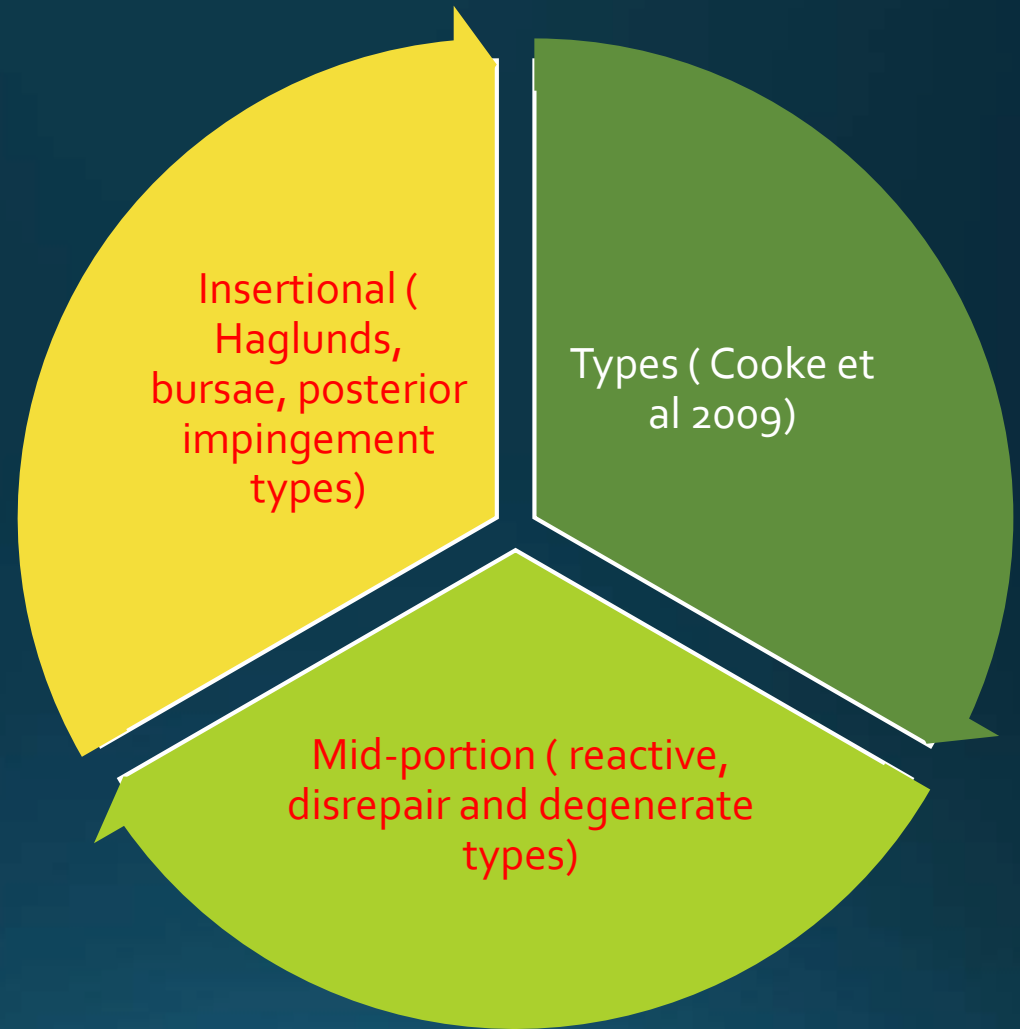
Pan talar Fusion using retrograde nail from calcaneum upwards

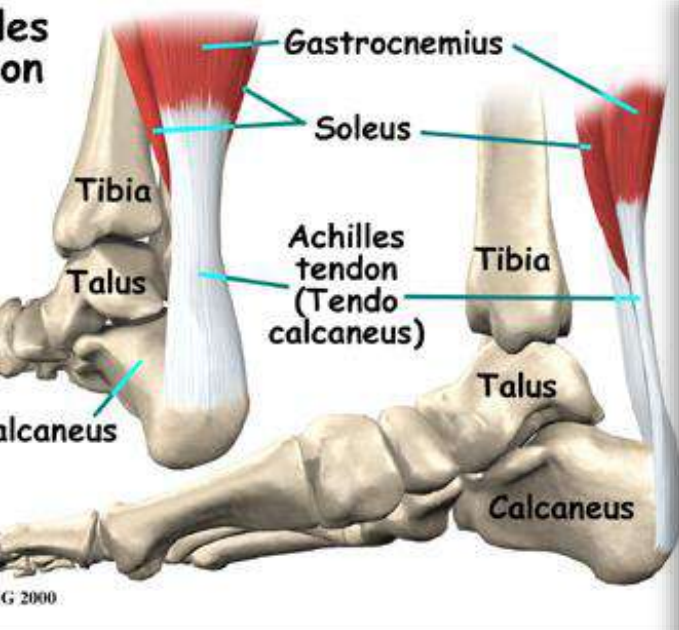
TTC fusion / Pan talar fusion

- Nail inserted to fuse hindfoot joints
- Leads to stiff foot and ankle
- Correction of deformity is possible



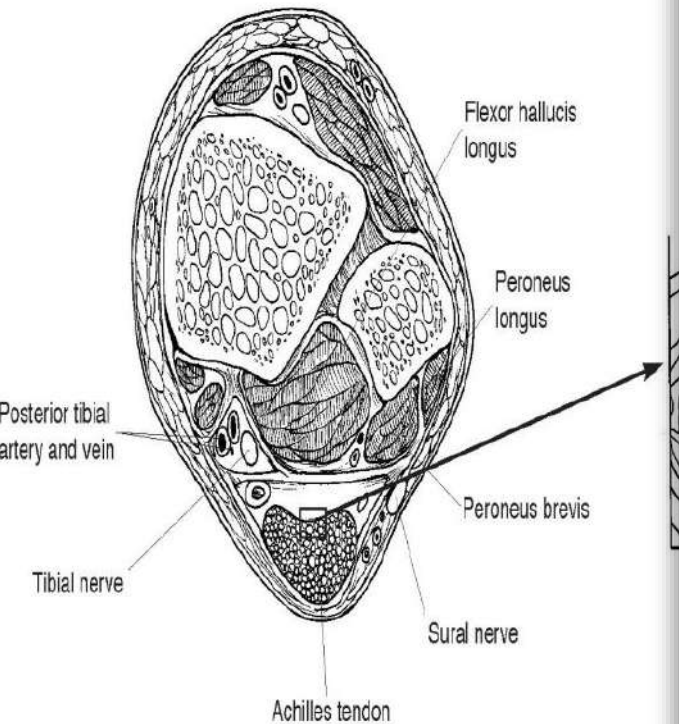
Achilles tendinopathy





Anatomy

- Largest tendon in the body
- Origin from gastrocnemius and soleus muscles
- Insertion on calcaneal tuberosity
- Lacks synovial sheath
- Has a para tenon





Insertional Achilles tendinopathy

Insertional tendinopathy- <50%

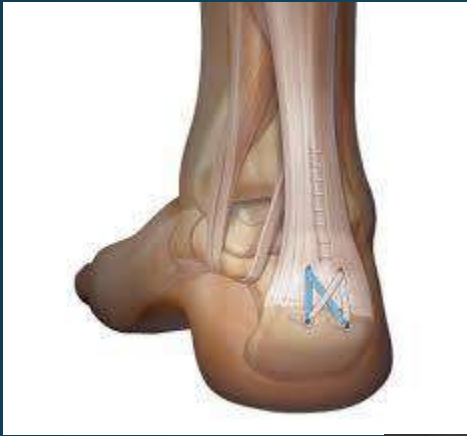
Multiple surgical options (Elias et al, Johnson et al, Maffulli et al, Wagner et al, Watson et al)

Techniques revolve around 5 procedures

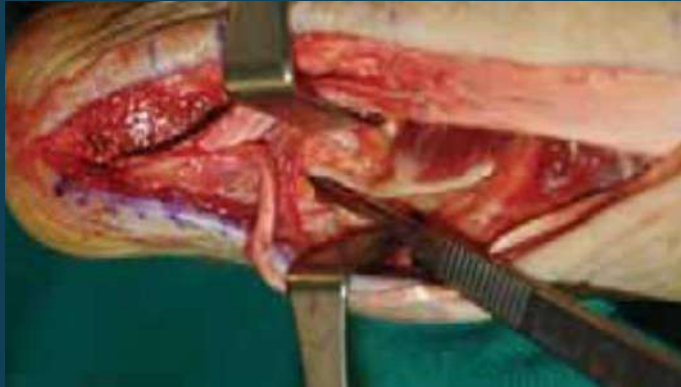
3 studies showed benefit of Postero-medial/ midline incisions, resection of bony prominence, excision of bursa, calcific deposits and reattachment of TA using suture anchors

2 studies described all above, but augmentation using FHL tendon transfer and plantaris tendon

Drilling of anchors and reattachment of tendoachilles



If $> 50\%$ tendon degenerate, FHL harvesting and attachment to calcaneus



Arthroscopic techniques

- Endoscopic calcaneoplasty is a relatively new procedure
- Published literature suggests mixed outcomes (van Dijk, Maffuli et al)
- Higher learning curve
- Incomplete resection being the problem



Our experience

15-16

42 patients

VAS 9.5-3

4

recurrences

repeat surgery required



Non-insertional Achilles Tendinopathy

- Diagnosis with history and clinical examination
- Pain, most intense on first moving after a period of rest
- Clinical tests- Palpation test, tendon loading tests, Royal London Hospital test
- Imaging



How common is the problem?

Very common (Pearce et al-
EFORT open review 2016)

37.3/100000 in European
population

Represent 55-60% of the total
spectrum of TA disorders

Combination of inflammation
and degeneration

Training errors, drugs such as
steroids can contribute to its
development

Who needs operation

- Up to 50% need surgery (Faro et al 2013)
- Risks of open surgery is around 11% (Maquirrain et al)
- Open surgery has 50-100% success rates with traditional excision of tendinosis with or without FHL augmentation



Surgical Management

- Tendoscopy- will be discussed shortly
- MIS procedure- stripping of para tenon and anterior fat pad (Alfredson et al)
- Open technique- stripping, excision of area of tendinosis and augmentation of tendon using FHL or plantaris tendon

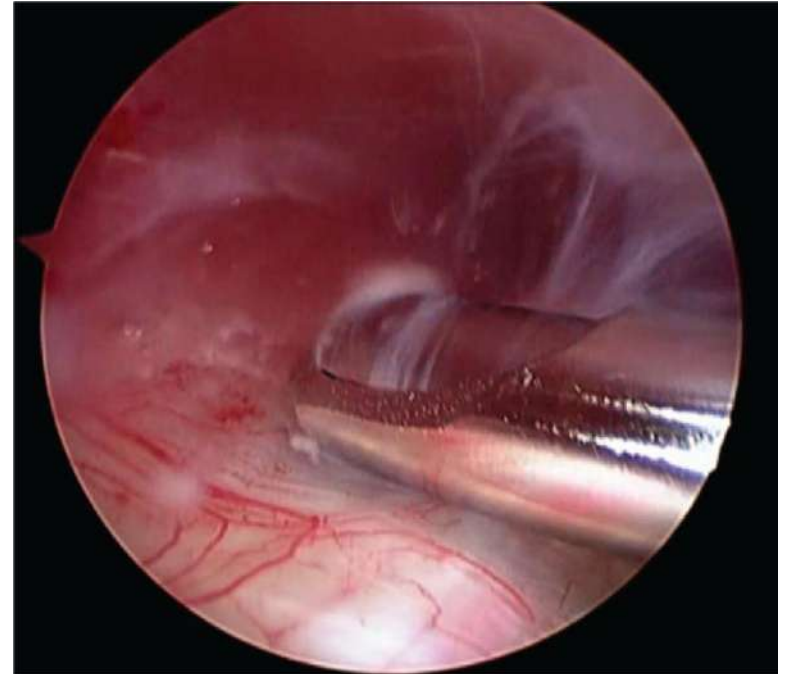
Tendoscopy

- Under direct vision
- Promising initial results seen with minimal complications
- Steep learning curve

Marquirriain Arthroscopy 2002

Marquirriain J Foot Ankle Surg
2013

Calder et al 2014

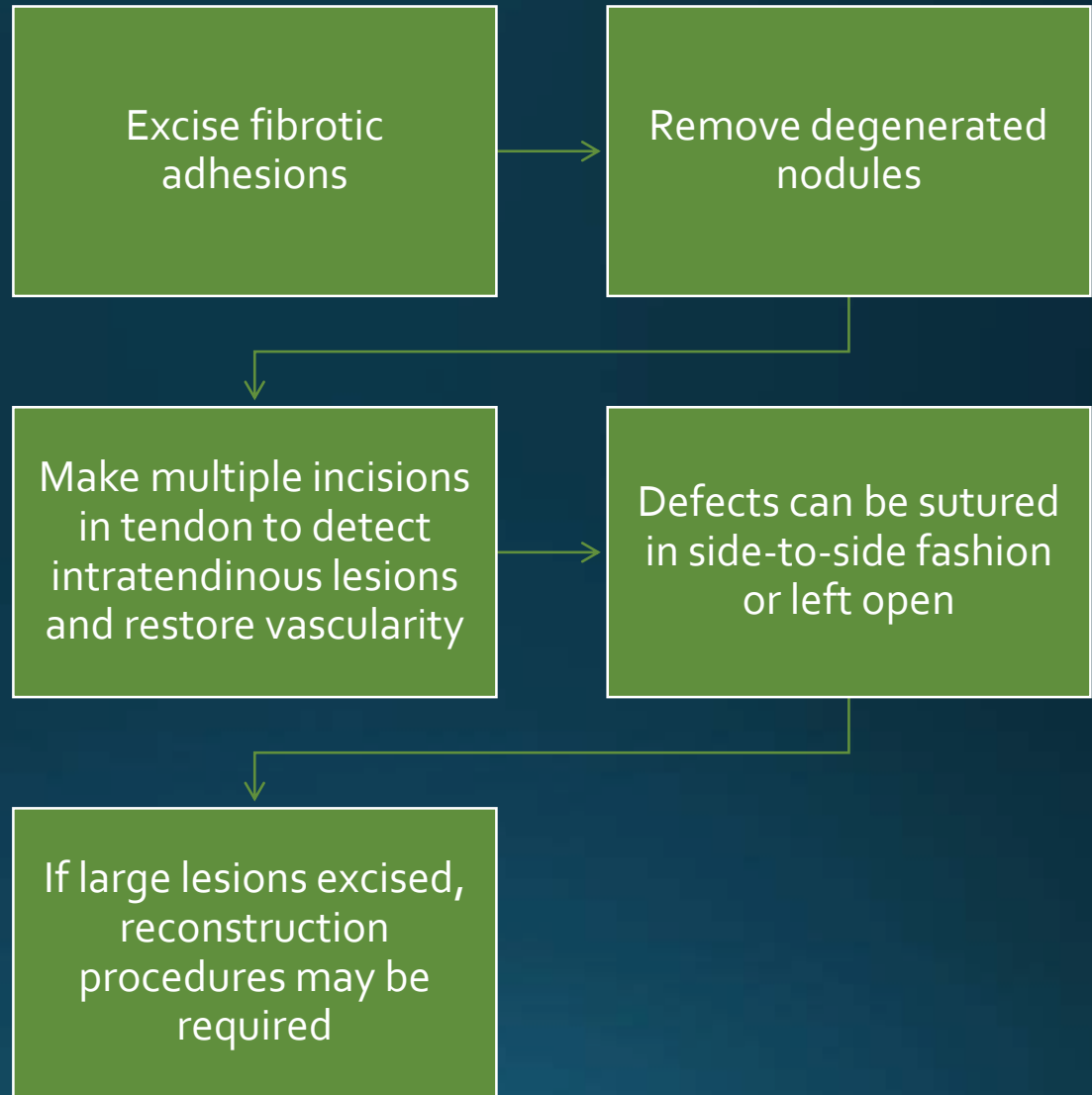


Resection of plantaris tendon- is it needed??

- Symptoms most often on medial side has led to the postulation of plantaris involvement
- Good results with both endoscopic and minimally invasive techniques
- Prospective study of 32 elite athletes at mean 23 months showed 90% success rates (Calder/ Pollock et al 2014)
- Resection of neo vascularisation by shaving
- In our unit we are still identifying the role of this procedure

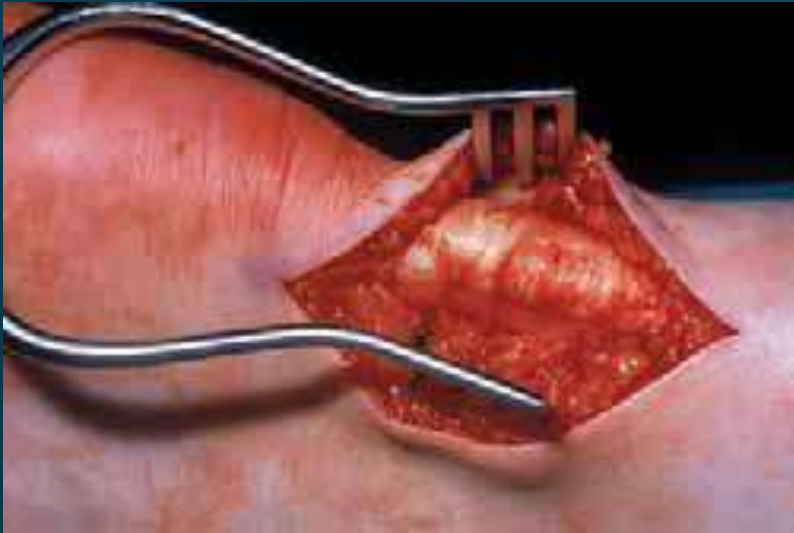
Open technique

Principles



Open Technique

- Prone position
- Posterior longitudinal incision; slightly medial to midline
- Sural nerve protected
- Pre-achilles fascia opened longitudinally; paratenon exposed
- Careful separation of paratenon from tendon
- Important to free full tendon from adherent diseased paratenon
- Unhealthy scarred tendon debrided, leaving adjacent healthy longitudinal fibres and repair of the tendon



Our experience

- Mostly with open technique
- We aim to offer arthroscopic treatment to the correct indications
- AOFAS scoring/VAS scoring
- 2015-2016= 25 patients (M/F 17/8)
- VAS dropped from 9 to 2
- AOFAS scoring 26 to 90
- Excellent outcome measures for these conditions as we have audited our own results
- **Small percentage of patients can benefit with Ostenil tendon injection**

Achilles Tendon Rupture

- Antecedent tendinitis/tendinosis in 24%
- 75% of sports-related ruptures happen in patients between 30-40 years of age.
- Most ruptures occur in 4cm proximal to the calcaneal insertion.



Management Goals

- Restore musculotendinous length and tension.
- Optimize gastro-soleus strength and function
- Avoid ankle stiffness



Surgical Management



- Preserve anterior para-tenon blood supply
- Beware of sural nerve
- Debride and approximate tendon ends
- Use 2-4 stranded locked suture technique
- May augment with absorbable suture
- Close para-tenon separately

Percutaneous versus open repair

Percutaneous repair



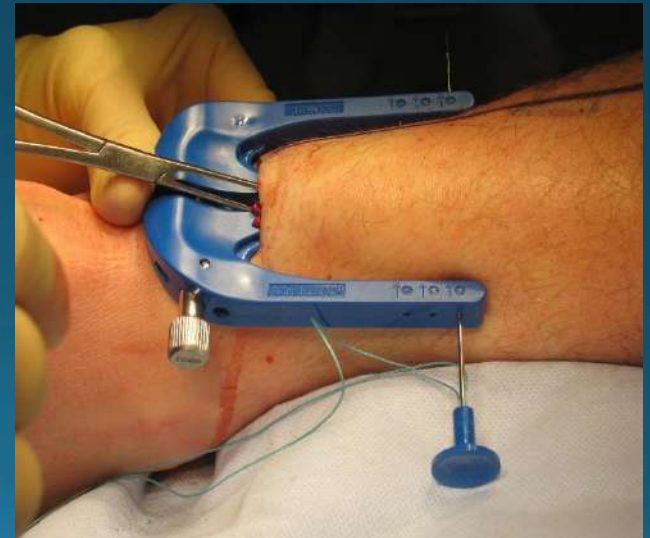
Open repair



Mini- open technique

1. **Outcome of achilles tendon ruptures treated by a limited open technique.** Jung HG, Lee KB, Cho SG, Yoon
Foot Ankle Int. 2008 Aug;29(8):803-7.
2. **Repair of achilles tendon rupture under endoscopic control.** Fortis AP, Dimas A, Lam
Arthroscopy. 2008 Jun;24(6):683-8.
3. **Minimally invasive repair of ruptured Achilles tendon.** Chan SK, Chu
Hong Kong Med J. 2008 Aug;14(4):255-8.

Mini-Open techniques



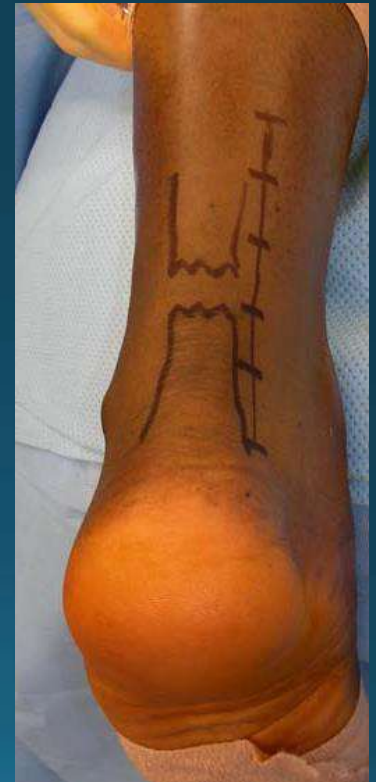
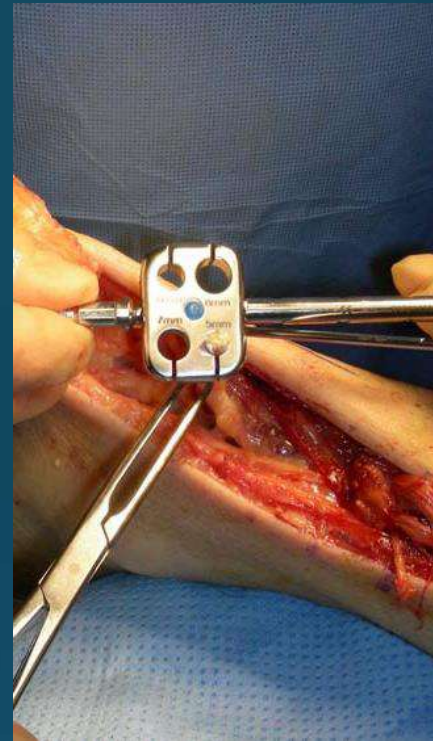
Neglected ruptures

- Becoming a common problem
- Especially in elderly population
- Reduces strength significantly and leads to recurrent falls
- Assessment can be tricky



Surgery in neglected ruptures

- Prone position
- Isolation of FHL tendon
- Tendon transfer into the calcaneum and fixation using screw
- We have treated 10 cases so far with this technique



Neglected TA ruptures

our
experience

Review article in February OPN 2018-
M. Salim and R Limaye

Very difficult problem to resolve

Pre-op MRI to identify the gap, plan
surgery and offer FHL tendon transfer

Excellent outcomes achieved in all 10
patients operated so far.

Conclusion

Common entity in sports and in non-sports population

Surgical management only indicated after failed non-operative measures in various conditions

Outcomes should be aimed to the needs of the individual patient- however can achieve predictable outcomes in correct indications

Mr Rajiv Limaye
FRCS, FRCS Orth

www.nefaas.co.uk

Thank
you

