

ACHILLES TENDINITIS: PAINFUL FOR PATIENTS AND PAINFUL FOR YOU!

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DISCLOSURES

- ▶ Consultant/Speaker
 - ▶ Arthrex
 - ▶ Johnson and Johnson Medtech
 - ▶ Conventus

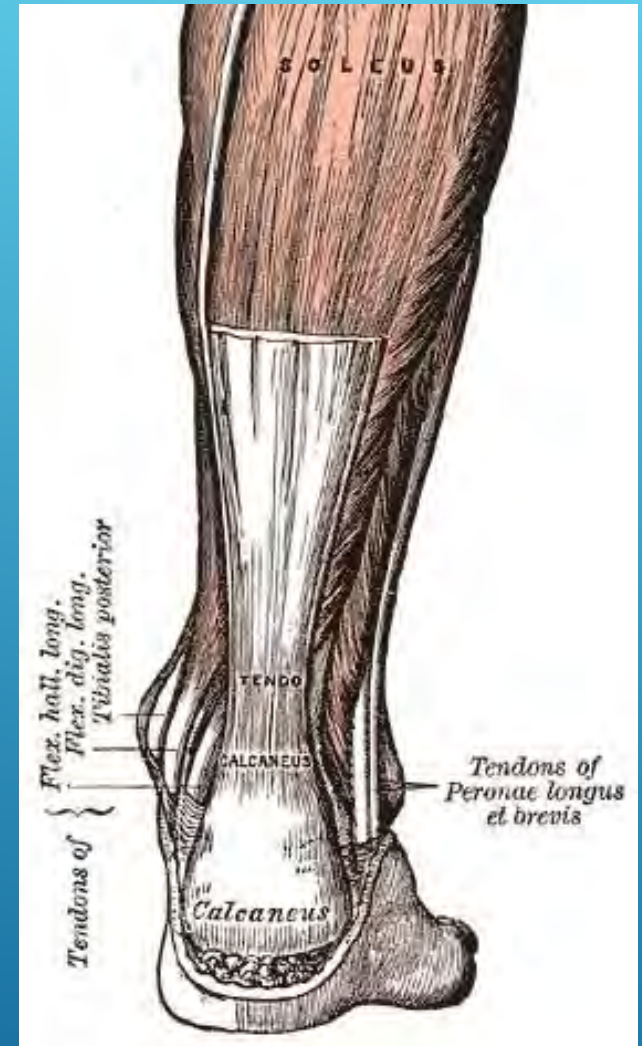
HISTORY

- ▶ Achilles
 - ▶ Greek History
 - ▶ Ἀχιλλεύς → *Achilleus*
 - ▶ *Grief of the People*
 - ▶ Greatest Warrior in Homer's Iliad
 - ▶ Son of nymph Thetis
 - ▶ *Demigod*
 - ▶ Dipped in River Styx after birth
 - ▶ Made Immortal → except for heel
 - ▶ Suffered mortal blow during Trojan War
 - ▶ *Arrow Shot through Heel*
 - ▶ "Achilles Heel" → Person's Principle Weakness
 - ▶ Achilles Tendon



ACHILLES TENDON

- Basics
 - Largest Tendon in the Body
 - 6-10x body weight during running
 - No Synovial Lining
 - **Instead enveloped by stretchy paratenon**
 - Retrocalcaneal bursa anteriorly and Achilles tendon bursa posteriorly
 - Functions
 - Rotates 90 degrees
 - Inverts the hindfoot
 - Plantarflexion



ACHILLES TENDON DYSFUNCTION

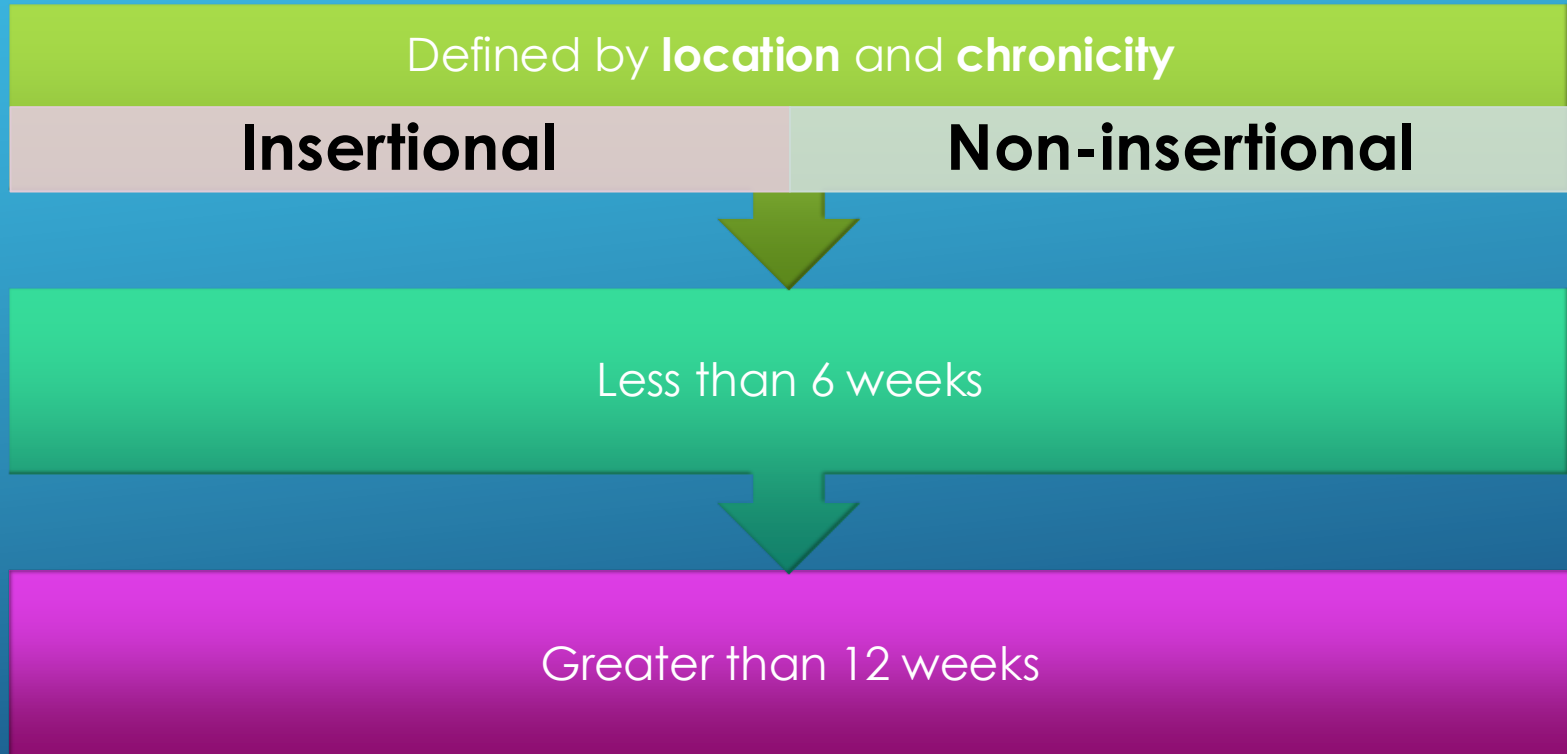
Defined by **location** and **chronicity**

Insertional

Non-insertional

Less than 6 weeks

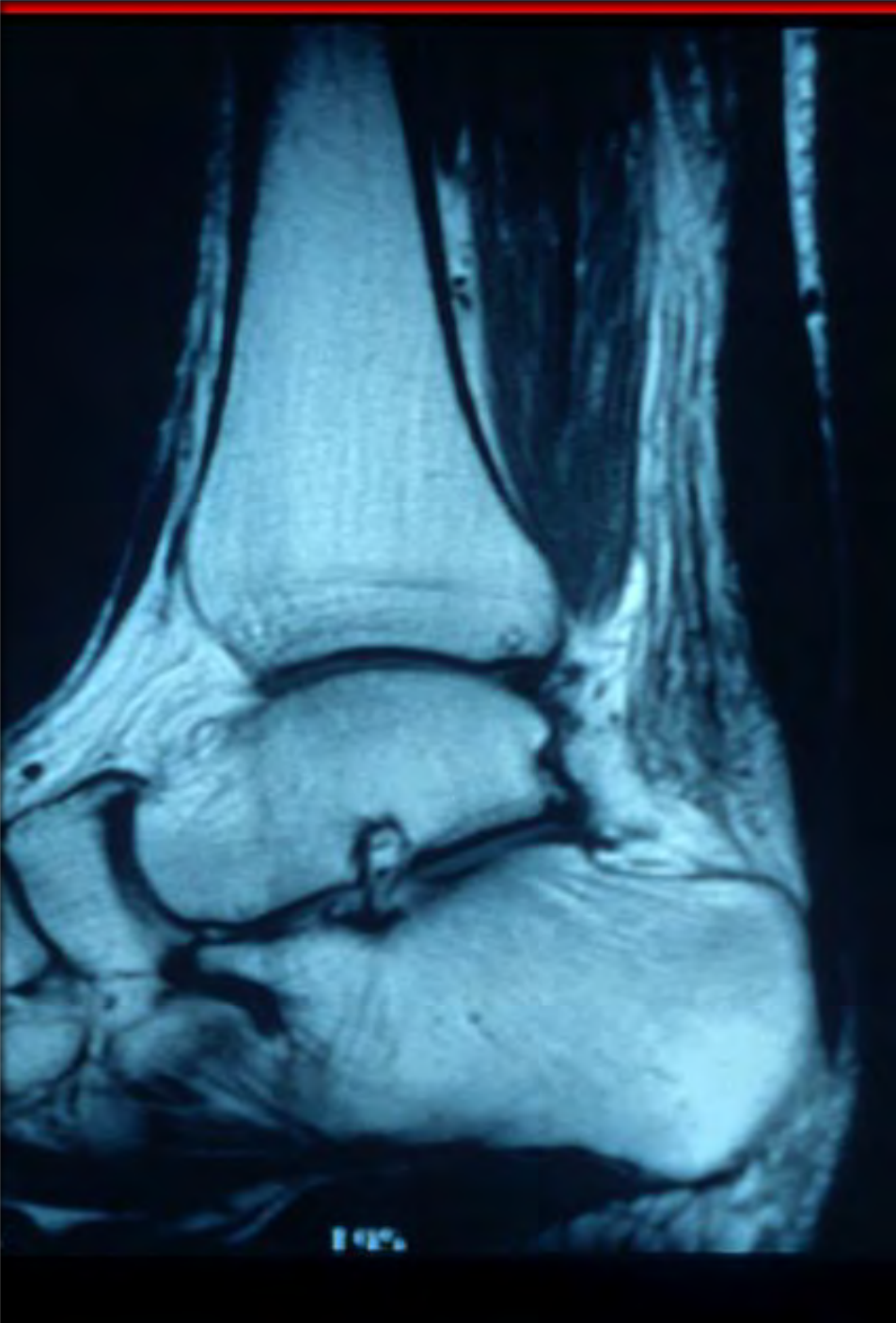
Greater than 12 weeks





TERMINOLOGY

- ▶ Peritendinitis
 - ▶ **Paratenonitis**
 - ▶ Inflammation and thickening of the paratenon
 - ▶ Adhesions
 - ▶ Myxomatous degeneration
 - ▶ Round cell inflammatory infiltrate
- ▶ **Peritendinitis + Tendinosis**
 - ▶ Paratenonitis
 - ▶ Greater Paratenon inflammation
 - ▶ Intratendinous degeneration
- ▶ Tendinosis
 - ▶ Noninflammatory intratendinous degeneration
 - ▶ Age
 - ▶ Microtrauma
 - ▶ Vascular compromise



RADIOLOGY

Plain Films

- ▶ Bone Changes
- ▶ Haglund's Deformity

MRI : When to get?

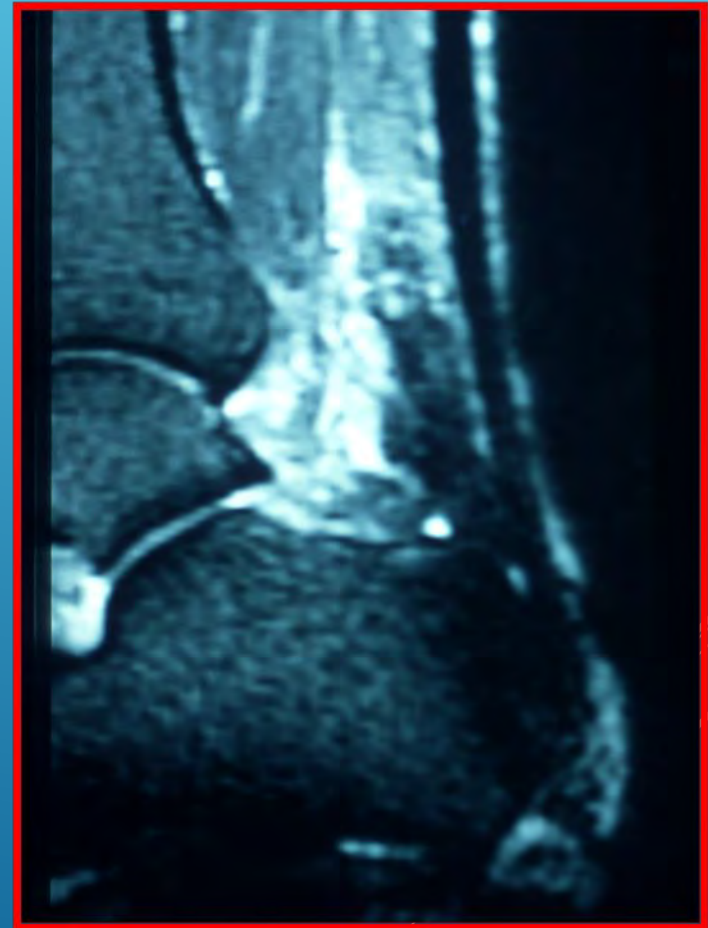
- ▶ Ambiguous Cases
- ▶ Pts who fail Non-op
- ▶ Surgical Plan

DO NOT NEED MRI FOR ACUTE RUPTURE



PERITENDINITIS

- ▶ Peritendinitis
 - ▶ Acute
 - ▶ < 3 months duration
 - ▶ Chronic
 - ▶ > 3 months duration
- ▶ MRI
 - ▶ Increased T2 Signal
 - ▶ Paratenon
 - ▶ No tendon signal changes



PANTENDINITIS

- ▶ Pantendinitis
 - ▶ Acute
 - ▶ < 3 months duration
 - ▶ Chronic
 - ▶ > 3 months duration
- ▶ MRI
 - ▶ Increased T2 Signal
 - ▶ Paratenon
 - ▶ Tendon



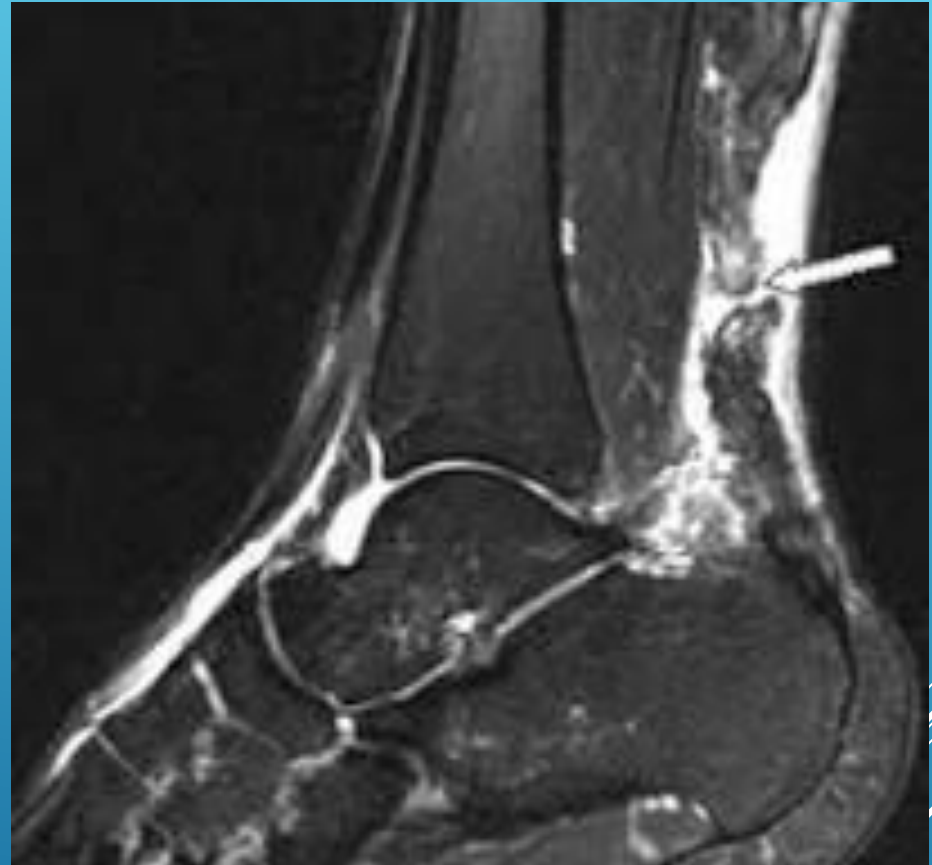
TENDONOSIS

- ▶ Tendonosis
 - ▶ Acute
 - ▶ < 3 months duration
 - ▶ Chronic
 - ▶ > 3 months duration
- ▶ MRI
 - ▶ Paratenon
 - ▶ No signal change
 - ▶ Tendon
 - ▶ Fusiform Thickening
 - ▶ Longitudinal Linear Signal

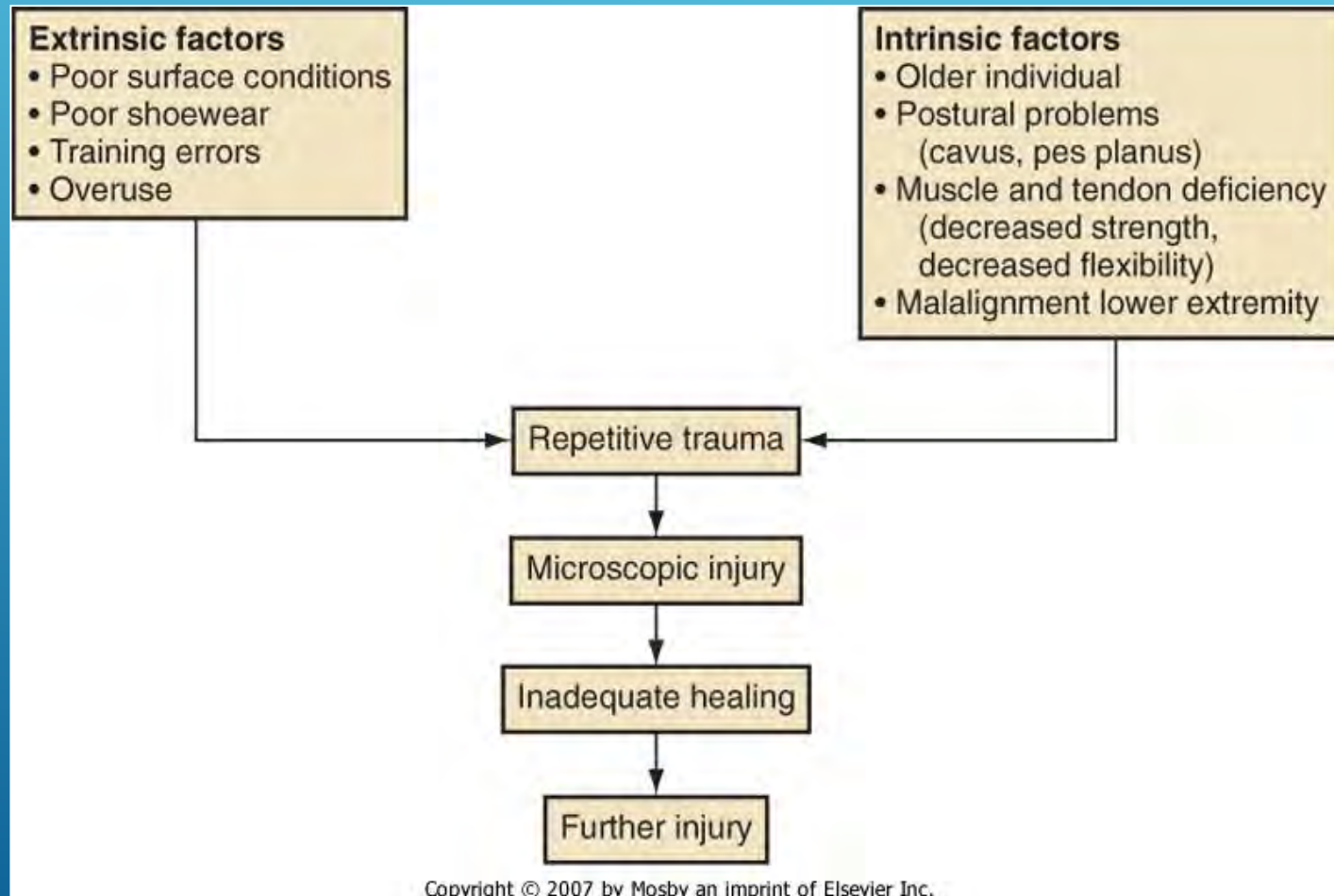


RUPTURE

- ▶ Rupture
 - ▶ Acute
 - ▶ Acute + Tendinopathy
 - ▶ Chronic



PATHOPHYSIOLOGY OF ACHILLES TENDON DYSFUNCTION



- ▶ Degenerative lesions of the tendon without evidence of peritendinitis.
 - ▶ No inflammatory cells on histology
- ▶ Altered tendon structure with decreased luster, yellowish discoloration, and softening.
- ▶ Avascular central aspect to the tendon shields it from the normal inflammatory response preventing “clean up”

TENDINOSIS –NOT
INFLAMMATORY



AGE RELATED

- ▶ Advanced age is associated with tendon changes including
 - ▶ Decreased blood flow
 - ▶ Calcific tendinopathy
 - ▶ Lipoid degeneration
 - ▶ Decreased collagen content



AGE RELATED?



- ▶ Inflammatory changes localized to the paratenon
- ▶ Tendon normal in appearance
- ▶ Paratenon → thickened, adhesions can develop

PARATENONITIS



PARATENONITIS + TENDINOSIS

- ▶ Macroscopic tendon thickening, nodularity, yellowing, decreased luster, and fibrillation
- ▶ Microscopically → inflammation in the peritendinous structures with focal degeneration within the tendon

Pain in distal Achilles tendon (2-6 cm) proximal to insertion

Pain develops with initial AM activity and can increase with exercise

Increased tendon involvement → pain with walking and running

HISTORY

Several thin, white, parallel diagonal lines are positioned on the right side of the slide, extending from the middle towards the bottom right corner.

Early Sxs = sharp transient pain or recurrent episodes of sharp pain with running

Over time → less activity incites Sxs, some will get pain at rest

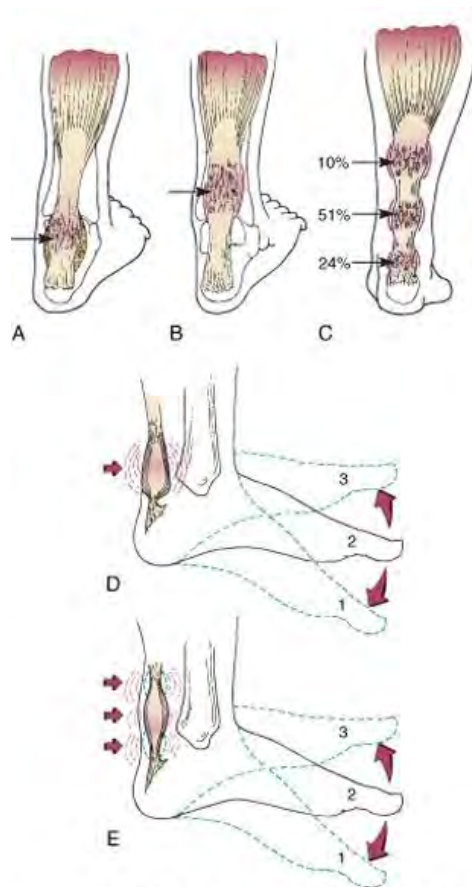
Insertional problems → pain localized to junction of bone & tendon

HISTORY

Several white lines of varying lengths and angles are drawn on the right side of the slide, extending from the middle towards the bottom right corner.

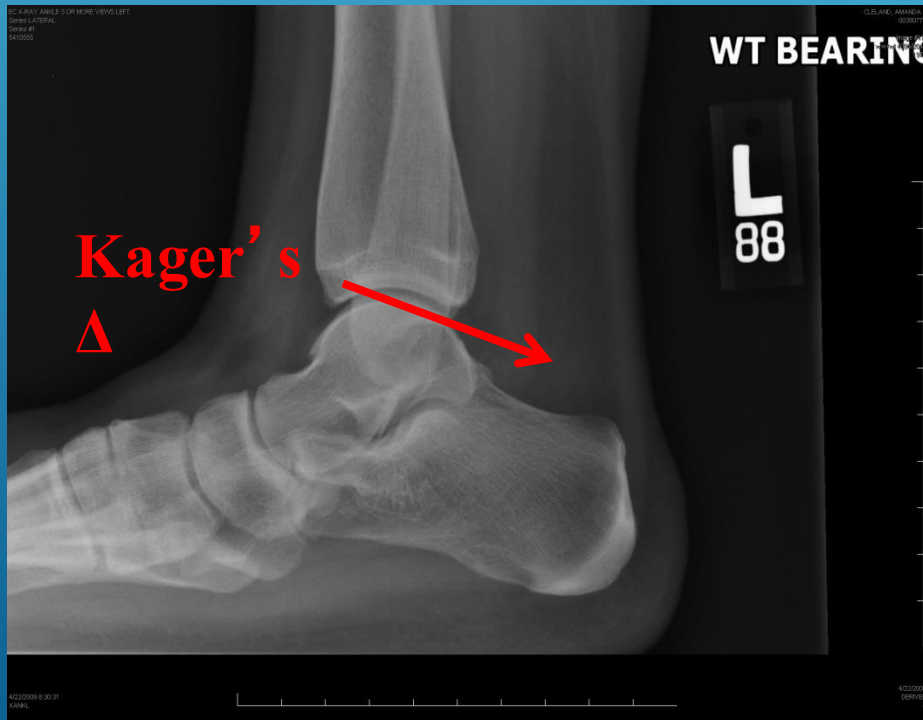
PHYSICAL EXAM

- ▶ Paratenonitis
 - ▶ Tenderness and thickness remain fixed with AROM
- ▶ Tendinosis
 - ▶ Movement of the ankle & foot into DF and PF is characterized by the abnormality moving along with the tendon (*painful arc sign*)
- ▶ Retrocalcaneal Bursitis



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- ▶ Radiographs (lateral of ankle)
 - ▶ Cortical erosion → inflammatory arthropathy
 - ▶ Calcification (within tendon or at insertion)



- ▶ Paratenonitis
 - ▶ Rest
 - ▶ Ice
 - ▶ Stretching
 - ▶ NSAIDs
 - ▶ Cam Walker **with mild heel lift**
 - ▶ Use brace until no symptoms for 2 weeks (up to 2-3 months)

NON-OPERATIVE TREATMENT

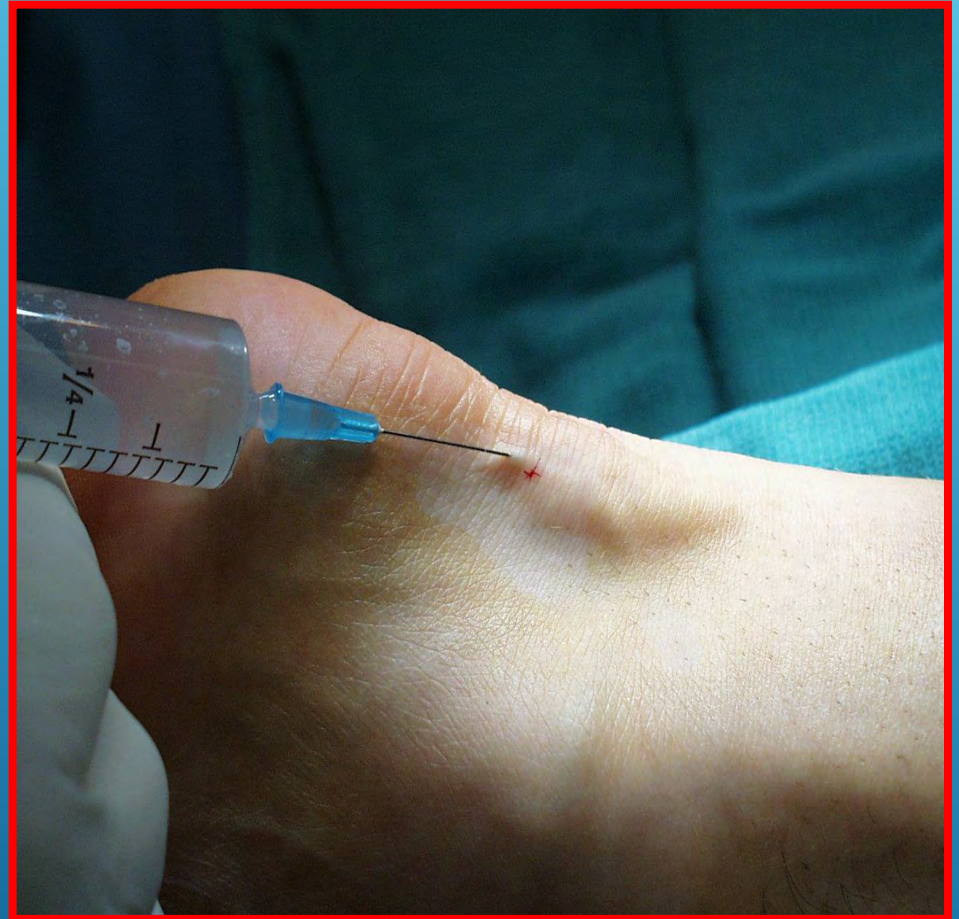
CHRONIC PERI-, PANTENDINITIS

- ▶ Min 3 mo duration

- ▶ “Brisement”

 - infuse local

 - aggressive ROM





Percutaneous long. tenotomy

- ▶ Scalpel inserted parallel to fibers
- ▶ Incisions also prox/dist, med/lat
- ▶ Can add brisement
- ▶ Early ROM, weightbearing
- ▶ Return to jogging @ 2 weeks

Maffulli,et

al: AJSM, 1997

TENDONOSIS



NON-OPERATIVE TREATMENT



Eccentric Load Exercises

NON-OPERATIVE TREATMENT



6-12
months
of Sxs

OPERATIVE TX

Debridement
of Achilles

MRI?

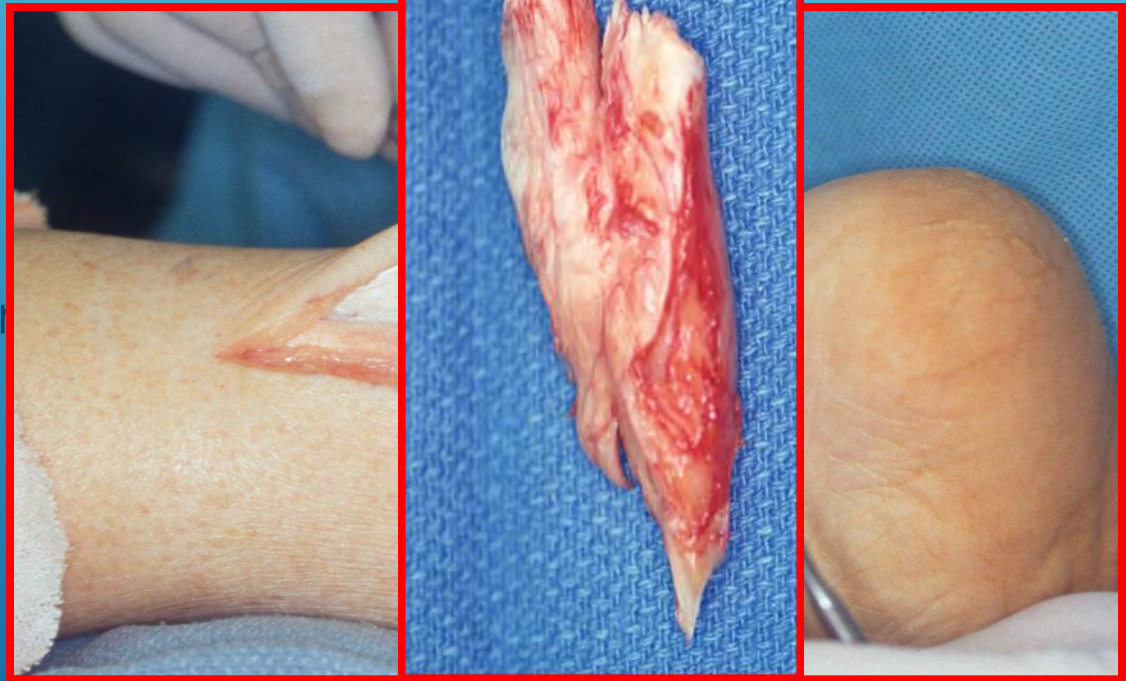
SURGICAL TECHNIQUE

- ▶ Medial incision
- ▶ No undermining
- ▶ Excise adhesions
- ▶ Minimize anterior dissection



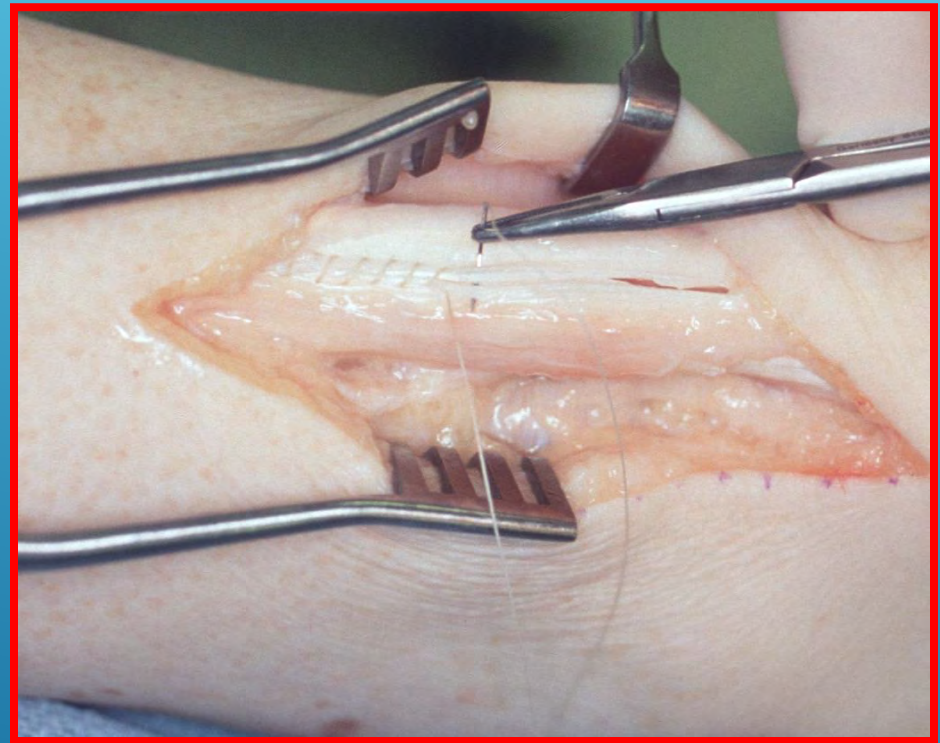
SURGICAL TECHNIQUE

- ▶ Inspect tendon
- ▶ Debride as indicated
- ▶ Longitudinal incisions within tendon



SURGICAL TECHNIQUE

- ▶ Tendon: 2-0 fiberwire
- ▶ Paratenon: 4-0 vicryl
- ▶ Skin: 4-0 nylon
- ▶ Boot brace- equinus
- ▶ Rehab dictated by extent of surgery



- ▶ Still conservative tx for 6 months
- ▶ Stretching
- ▶ NSAIDS
- ▶ Topical nsaids
- ▶ Heel lift
- ▶ Achilles gel sleeve
- ▶ PRP? ESWT? Nitrates?

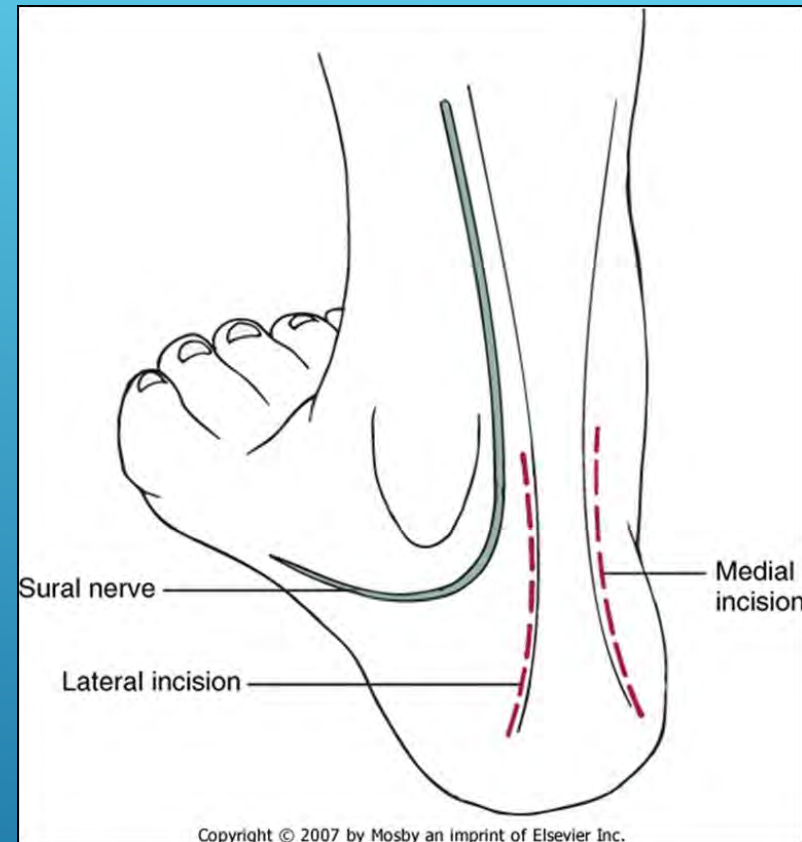
INSERTIONAL ACHILLES TENDON DYSFUNCTION

- ▶ 6-12 months of Sxs
- ▶ MRI
- ▶ Open vs Endoscopic resection of Haglunds
- ▶ Retrocalcaneal Bursa excision
- ▶ Debridement of Achilles
- ▶ FHL Tx (1 versus 2 incisions) >50% of tendon involvement

INSERTIONAL ACHILLES TENDON
DYSFUNCTION
OPERATIVE TREATMENT

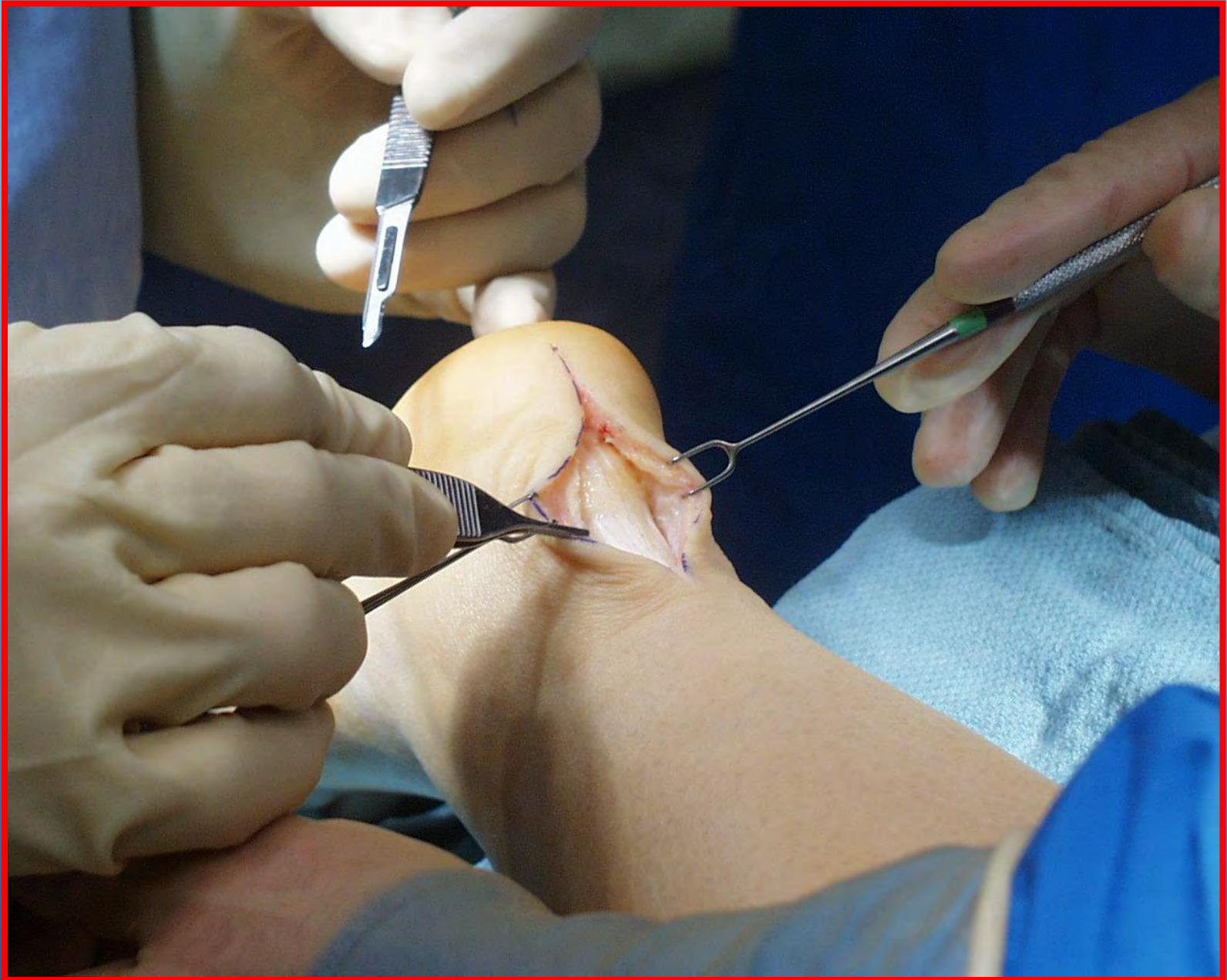
- ▶ Lateral **“Sutton’s law”**
- ▶ Central - if insert. tendinopathy
- ▶ Medial - if transfer required
- ▶ Alternate 2nd incision for additional tendon length

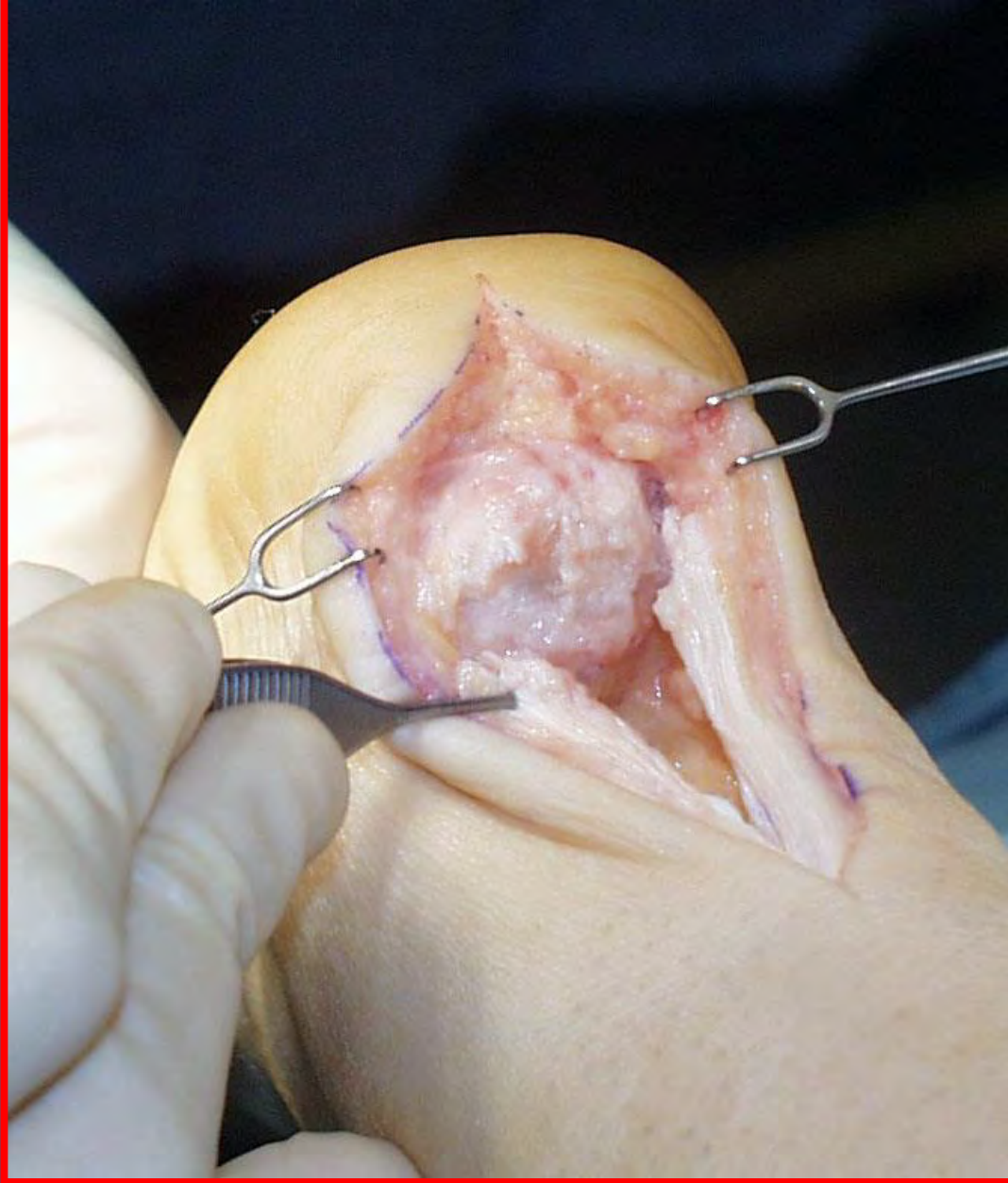
SURGICAL APPROACH

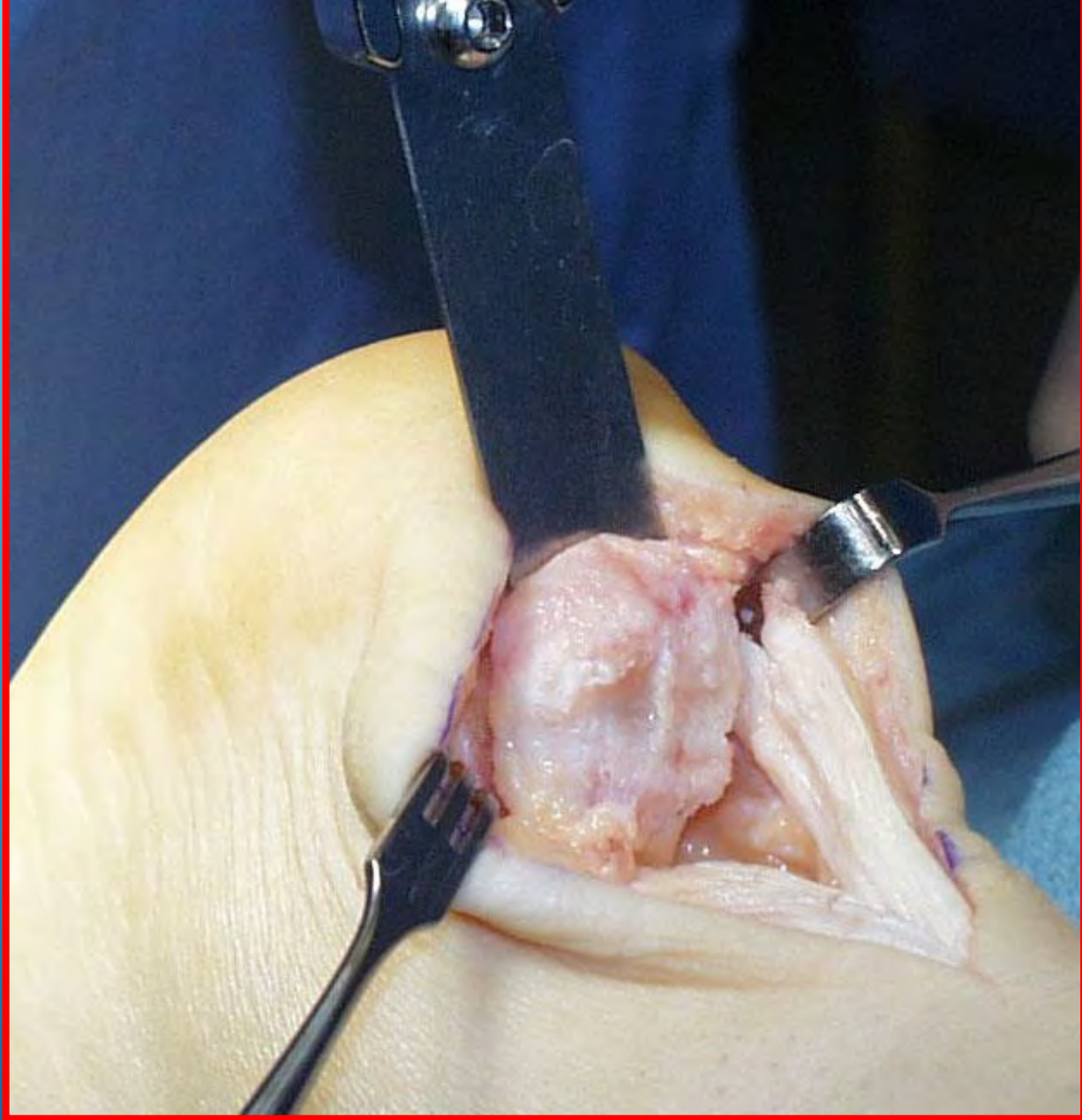






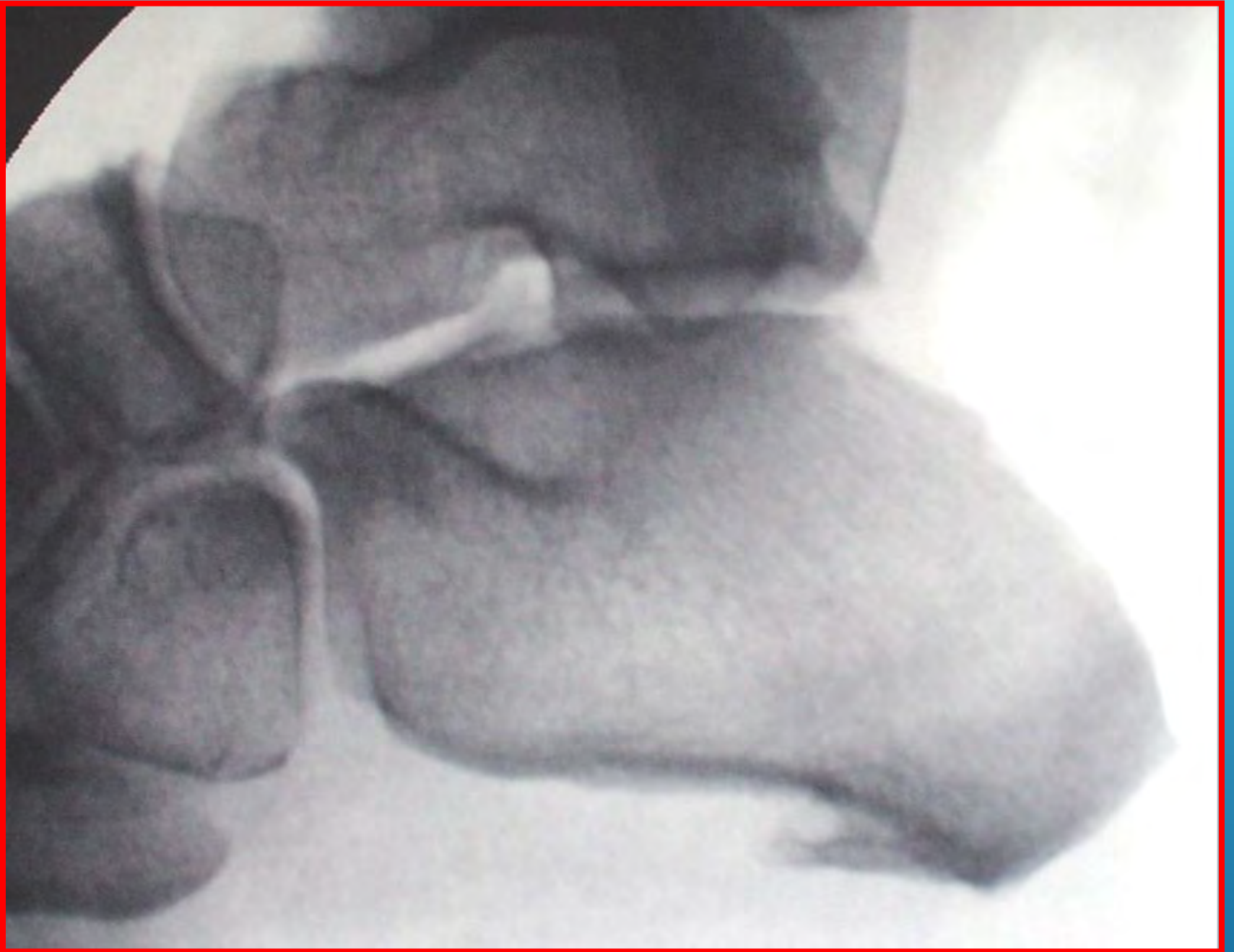








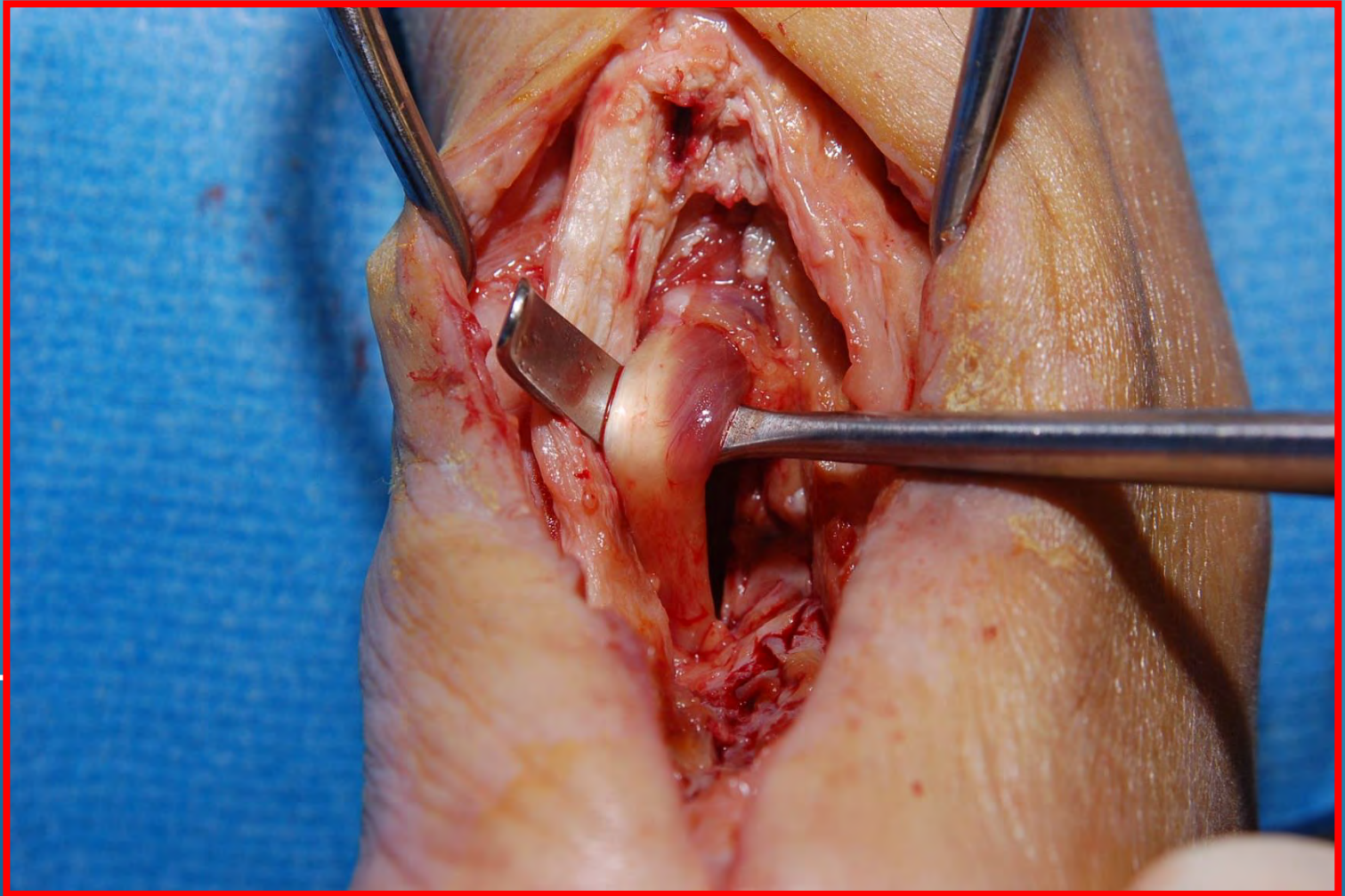




FH



FH



FHL HARVEST



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- ▶ Mean Age = 40.6 years for men
- ▶ Mean Age = 44.5 years for women
 - ▶ Recently operated on 15-year-old gymnast
- ▶ Incidence 4X greater among men vs women
- ▶ 2-6 cm above insertion → “Watershed Zone”

ACHILLES TENDON RUPTURE



- ▶ Viscoelastic material with rapid loading of the muscle-tendon unit.
- ▶ Modulus of elasticity increasing → tendon becomes stiffer → more prone to rupture

ACHILLES TENDON RUPTURE
WHY DID THIS HAPPEN TO ME?



ACHILLES TENDON RUPTURE

- ▶ Concomitant factors:
 - ▶ Systemic inflammatory arthritis
 - ▶ RA, Gout, Lupus
 - ▶ Infection
 - ▶ Tumors
 - ▶ ? ABO blood type
 - ▶ **Fluoroquinolones**
 - ▶ Oral corticosteroids & local injxns
- ▶ Prodromal Sxs → 10% of cases



ACHILLES TENDON RUPTURE

- ▶ Bilateral Ruptures
(nonsimultaneous)
 - ▶ 20 cases reported
 - ▶ 26% risk of a contralateral rupture with return to sporting activities similar to the type that led to the initial rupture



ACHILLES TENDON RUPTURE

- ▶ Several authors suggest that ruptures occur only in abnormal tendons
 - ▶ Intratendinous degeneration + increased mechanical stress = tendon failure
 - ▶ After 3rd decade of life the vascular supply is diminished
- ▶ Histologic examinations of Achilles tendons from rupture site →
 - ▶ tendinous degeneration, calcification, disruption of normal collagen fibers, decreased # and size of blood vessels

TENOCYTES FROM RUPTURED AND TENDINOPATHIC ACHILLES TENDONS PRODUCE GREATER QUANTITIES OF TYPE III COLLAGEN THAN TENOCYTES FROM NORMAL ACHILLES TENDONS

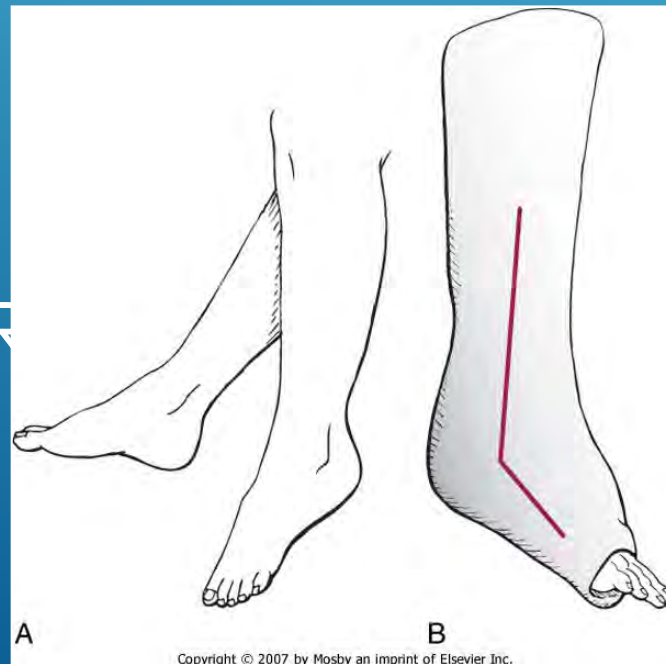
▶ Maffulli-Scotland-2000

- ▶ Tenocytes from normal and ruptured / tendinopathic Achilles tendons were compared
- ▶ Cells from ruptures tendons produced an abundance of type III collagen rather than normal type I collagen
- ▶ **Repetitive microtrauma in predisposed tendons may produce type III collagen leading eventually to gross changes seen in tendinopathy**

- ▶ Ultrasound
- ▶ MRI
 - ▶ May be helpful when soft-tissue swelling makes PE difficult or if suspect a “high” tear or “chronic”
 - ▶ Not necessary most of the time

RADIOGRAPHIC EXAMINATION

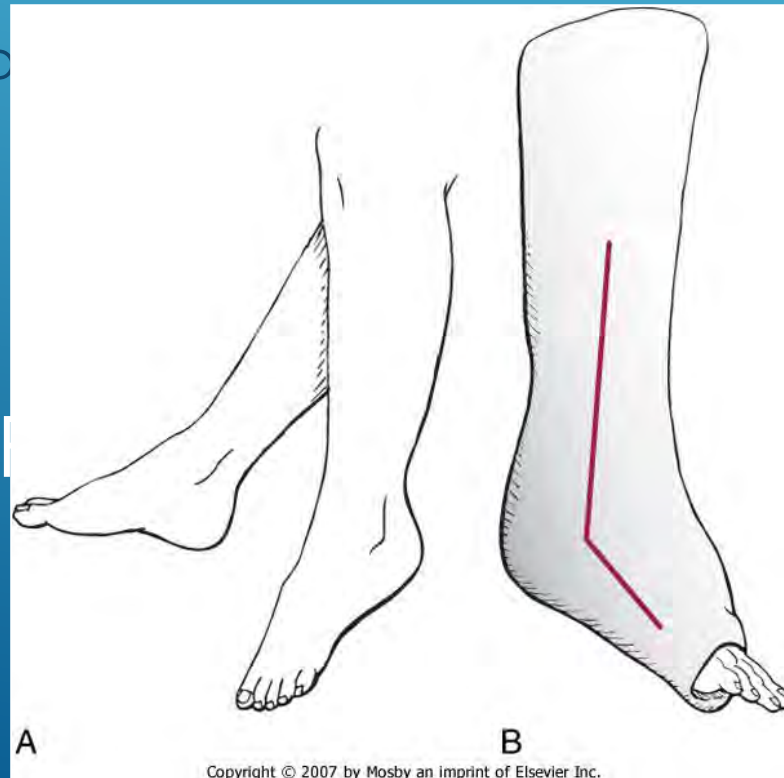
- ▶ Nonsurgical was the standard in the 1800s and 1900s
- ▶ 1920's surgical repair gradually increased
- ▶ Basis → placing foot in equinus, the ends of the ruptured tendon are brought into apposition



► PROs

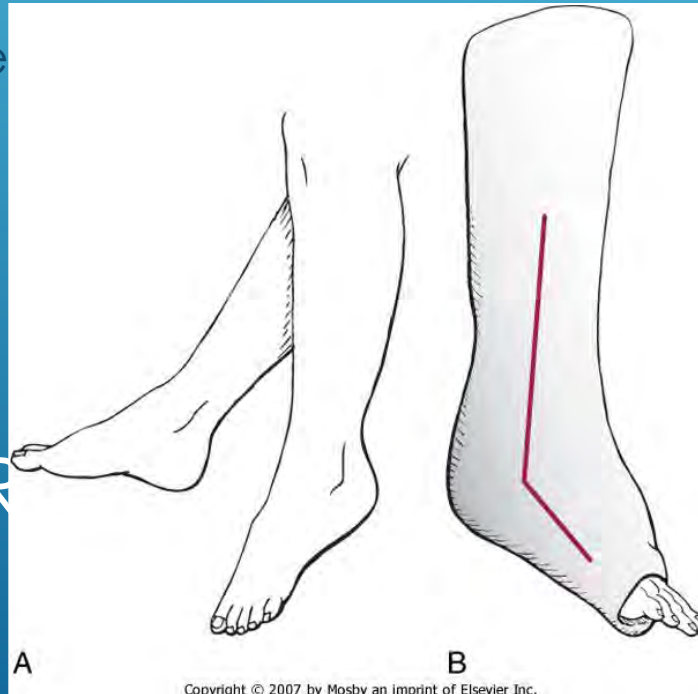
- “Relatively” risk free
- Avoid surgical complications
- Medical costs are minimized
- Time off work is less
- Results comparable to repair

NON-OPERATIVE



► CONs

- Increased Rerupture Rate
- Healing of the tendon with residual lengthening
 - Increased DF, gastrocnemius weakness and calf fatigue
 - Post-tre



NON-OPER

- ▶ Not usually performed in young or middle-aged serious athletes due to resultant strength deficit
- ▶ Most commonly used in middle-aged or older recreational athletes or sedentary patients or those at risk for complications of OR tx

NON-OPERATIVE TREATMENT

- ▶ If see patient within 7-10 days of injury can plantarflex ankle and cast. If ultrasound or MRI shows tendon ends are apposed then continue nonoperative treatment
- ▶ Every two weeks bring patient back and progressively dorsiflex ankle so by eight weeks ankle is slightly above neutral.

▶ NON-OPERATIVE TREATMENT

- ▶ WB and PT at 8 weeks.

- ▶ Patient selection
- ▶ SLC vs LLC
- ▶ Casting at each f/u visit or use of an Orthoplast heat moldable splint or Cam walker boot which allows active plantarflexion but blocks dorsiflexion
- ▶ Weightbearing status

NON-OPERATIVE TREATMENT CONTROVERSIES

SURGICAL VS NON-SURGICAL TREATMENT OF ACHILLES TENDON RUPTURE: A PROSPECTIVE, RANDOMIZED STUDY

- ▶ Moller, et al-Sweden-2001
- ▶ Compared repair and early functional rehab using a brace vs 8 weeks of plaster cast
- ▶ F/U = 2 years
- ▶ Rerupture rate: 2% surg vs 21% nonsurg
- ▶ Otherwise no differences between groups at longterm f/u
- ▶ No surgical complications

Surgical Versus Nonsurgical Treatment of Acute Achilles Tendon Rupture

A Meta-Analysis of Randomized Trials

Alexandra Soroceanu, MD, CM, MPH, Feroze Sidhwa, MD, MPH, Shahram Aarabi, MD, MPH,
Annette Kaufman, MPH, PhD, and Mark Glazebrook, MD, PhD

Investigation performed at Dalhousie University Queen Elizabeth II Health Sciences Center, Halifax, Nova Scotia, Canada

► Dec 2012

JBJS

- ▶ Meta-analysis of 10 studies
- ▶ Faster return to work (3 weeks) with operative tx
- ▶ More complications ~15%
- ▶ No difference in re-rupture, calf circumference, PF strength
- ▶ Functional bracing and early ROM

JBJS 2012



WILLS CA, ET AL, CORR, 1986

- ▶ *Achilles tendon rupture. A review of the literature comparing surgical versus nonsurgical treatment.*
- ▶ 155 / 777 cases (20%) had surgical complications
 - ▶ Keloid formation
 - ▶ Sural nerve injury
 - ▶ Adhesions
 - ▶ Infection
 - ▶ Skin slough
 - ▶ Rerupture (most occur within first 6 months)
- ▶ Many complications were minor and had little effect on functional outcome

- ▶ 20 major studies
- ▶ Rerupture rates after surgery are extremely low
- ▶ Overall Incidence of rerupture:
 - ▶ 12/777 (1.5%) → after surgery
 - ▶ 40/226 (18%) → after non-operative treatment

WILLS CA, ET AL, CORR, 1986

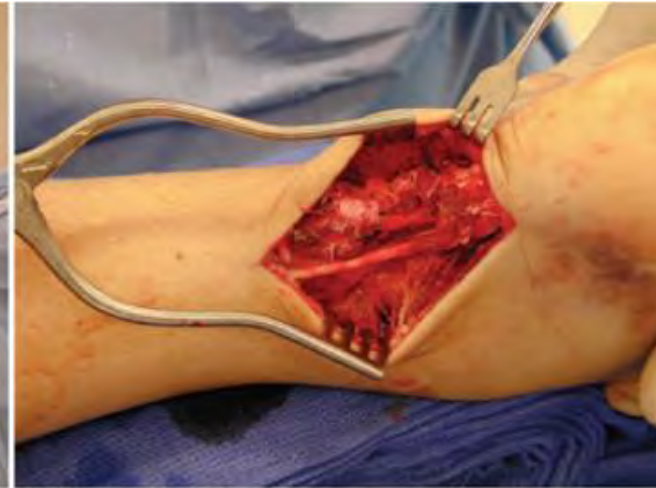
OPERATIVE TREATMENT

- ▶ Results are consistently good
- ▶ Respect the soft tissues!
- ▶ Complications lessened by proper surgical technique. Keep paratenon and skin intact as one layer

OPERATIVE TREATMENT



A



B



C

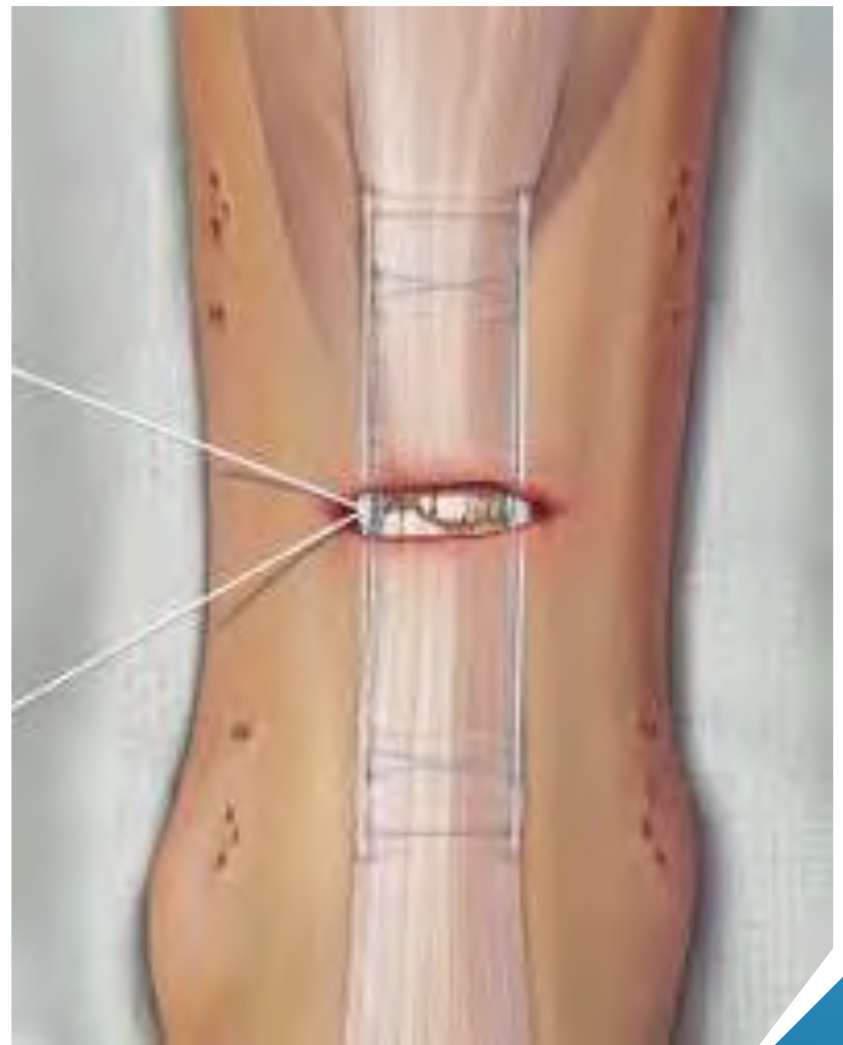
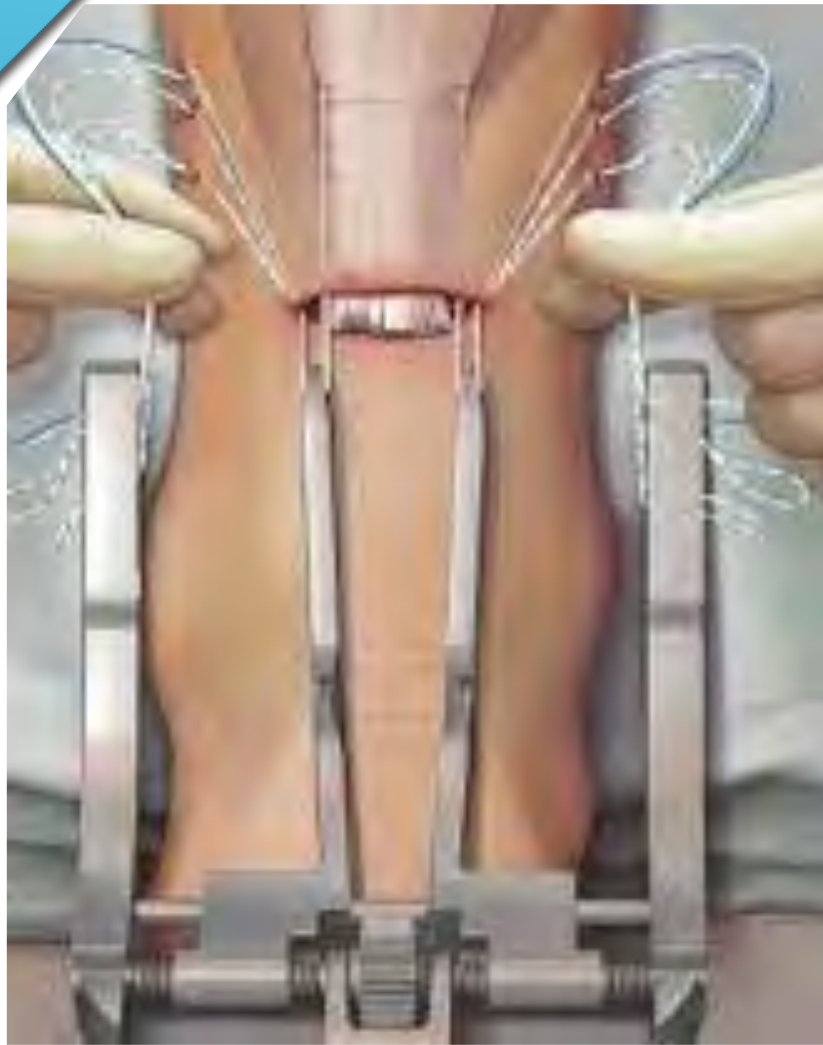


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MIS ACHILLES REPAIR













Thank You