

ACHILLES TENDINOPATHY

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TENDINOPATHY

- Tendon injuries have become a *major problem* in sports (Kannus 1997)

- Estimated that chronic tendon injuries account for approximately 50% of all occupational/recreational sports injuries

(Almekinders & Temple 1998)

TENDINOPATHY

- **Achilles tendon**; one of the most injured tendons especially *in athletes involved in running and jumping*

(Kvist 1994, Josza & Kannus 1997, Alfredsson 2000, Paavola 2000)

- Also found that 1/3 of patients with Achilles tendinopathy are *not physically active* (Rolf & Movin 1997)



TENDINOPATHY

- **Tendinopathy** – a health problem
- Tendon injuries are painful
- Recovery/healing takes a long time
- *Patients often avoid physical activity with potential negative impact on overall health; weight gain, etc*

CLASSIFICATION; ACHILLES TENDON INJURY

Acute injuries

Acute total
rupture

Partial
rupture

Overuse injuries

Acute
phase

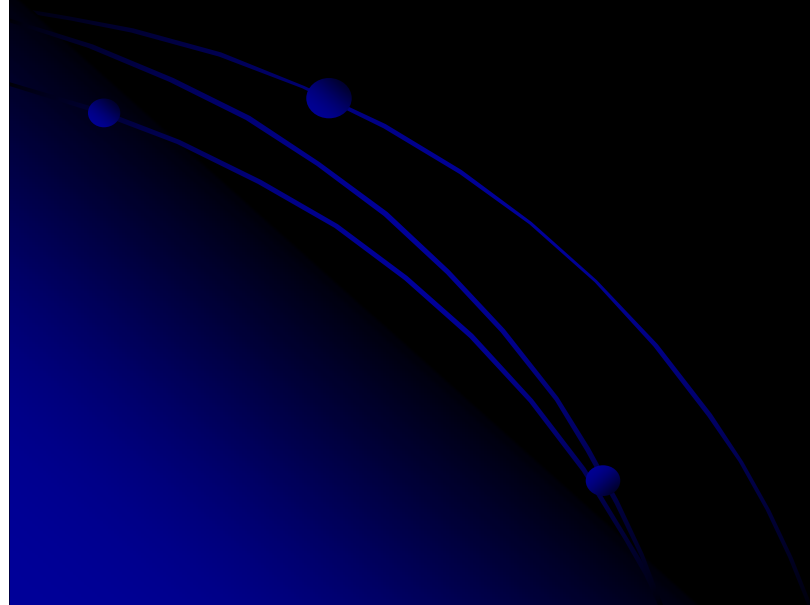
Distal
bursitis

Midportion
paratendonitis

Chronic
phase

Distal Achilles
tendinopathy

Midportion
Achilles
tendinopathy



TENDON INJURY

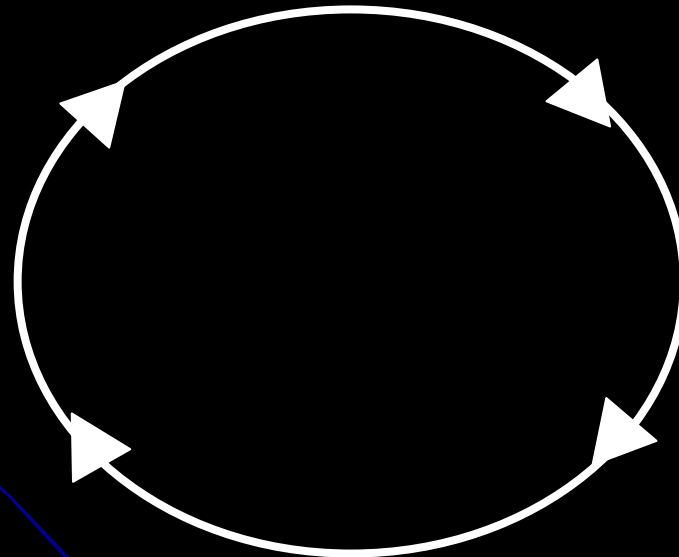
Increased loading
of the tendon

Adequate repair and
improved tissue quality

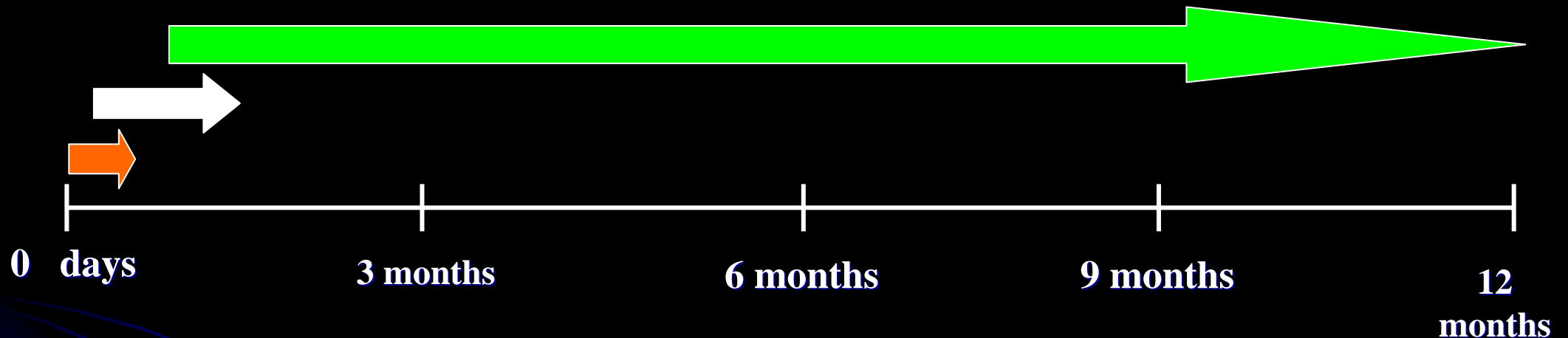
Increased risk
for injury

Inadequate
repair

Decreased ability to withstand
loading



Stages of tendon healing



Inflammatory phase

Repair phase

Remodelling phase

(Enwemeka 1989, Leadbetter 1992, Josza & Kannus 1997)

OVERUSE TENDON INJURY

- Studies have found *no signs of inflammation* at the site of injury

- No inflammation

- But then we are always referring to *chronic injuries*

CLASSIFICATION OF TENDINOPATHIES

Bonar's modification of Clancy's classification of tendinopathies

- Tendinosis
- Tendinitis/partial rupture
- Paratenonitis
- Paratenonitis with tendinosis

(Puddu et al 1976, Josza & Kannus 1997, Khan et al 1999)

OVERUSE (CHRONIC) TENDON INJURY

~~Tendinitis~~

Tendinopathy

SYMPTOMS OF TENDINOPATHY

- *Pain* with loading
- *Stiffness*
- Symptoms better with decreased activity
 - but reoccur when activity is resumed
- Many patients have had symptoms on and off for *many years*

ACHILLES TENDINOPATHY



- **Tenderness** to palpation
- **Morning stiffness**
- **Causes pain and difficulty with physical activity**

DIAGNOSIS

- Clinical diagnosis
- Diagnostic Ultrasound
(Åström et al 1996, Paavola et al 1998)
- Power Doppler Ultrasonography – PDU
related to function (Peers et al 2003)
- MRI (Shalabi, 2004)

TREATMENT OF TENDINOPATHY

- Anti-inflammatory medication
- Rest
- Surgery
- Sclerosing injections; PRP
- Shock-wave therapy



- Exercise

TREATMENT OF TENDINOPATHY

Exercise

- Always recommended as first course of treatment
- Always recommended in conjunction with other treatments



Why
exercise?



THE EFFECT OF LOADING ON TENDON

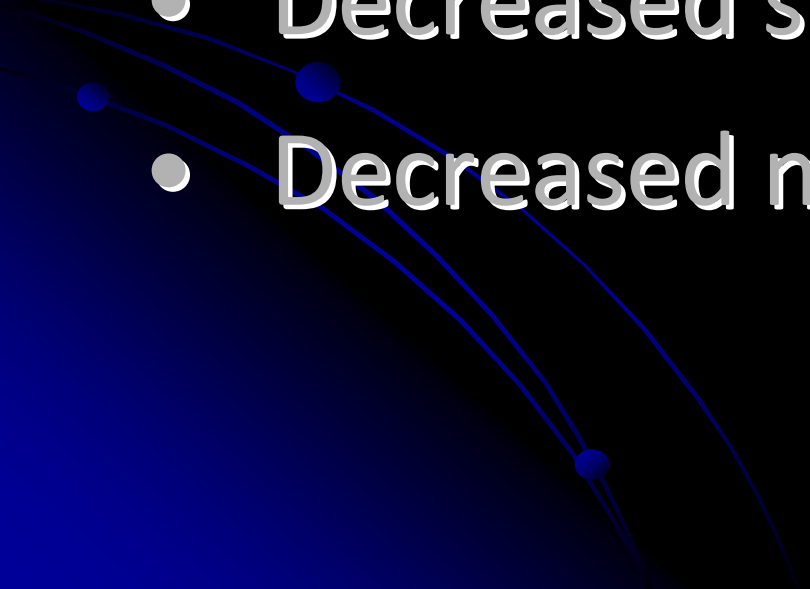
- Adaptive response slower than muscle
- Responds by becoming larger, stronger and more

resistant to injury


- *Recent research has shown that exercise increases circulation and increases collagen synthesis*

(Langberg et al. 1999, 2000, 2001, Kjaer 2004)

EFFECT OF INACTIVITY ON TENDON

- Slow effect
 - Decreased tensile strength
 - Decreased stiffness
 - Decreased net weight
- 

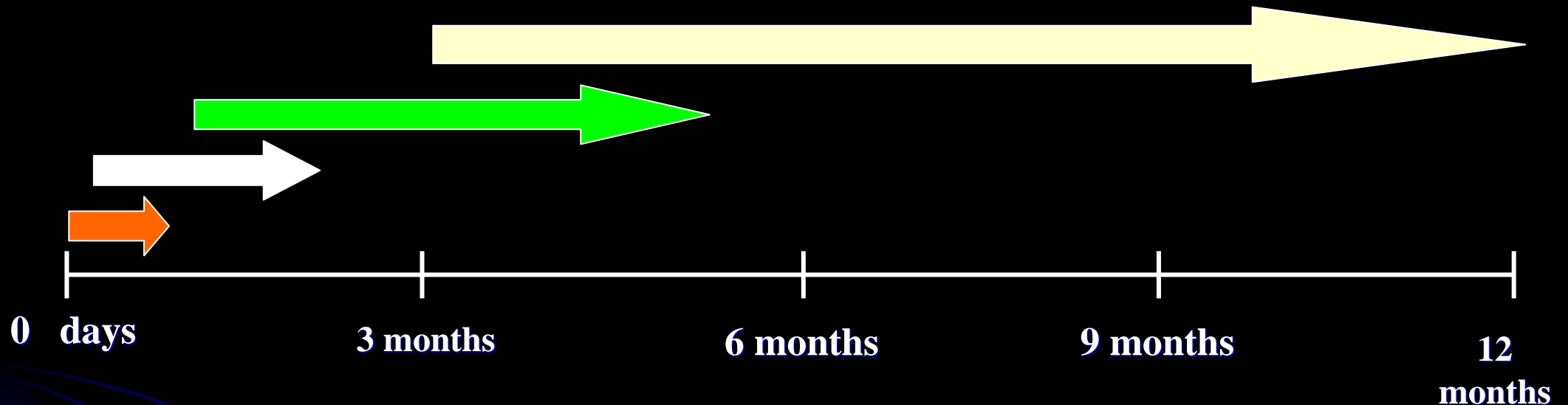
RECOVERY FROM TENDON INJURY

- Increased production of *Type III collagen in injured tendon* (Maffulli 2000)
 - The tendon needs to be *exposed to load during healing* to improve tendon structure
- 

TREATMENT WITH EXERVISE



Stages of Rehabilitation



Initial phase

Intermediate phase

Advanced phase

Return to Sports phase

CLINICAL QUESTION

Exercise as treatment is recommended initially for all patients and also after/in conjunction with other treatment options.

What type of exercise?



ECCENTRIC EXERCISE; BACKGROUND

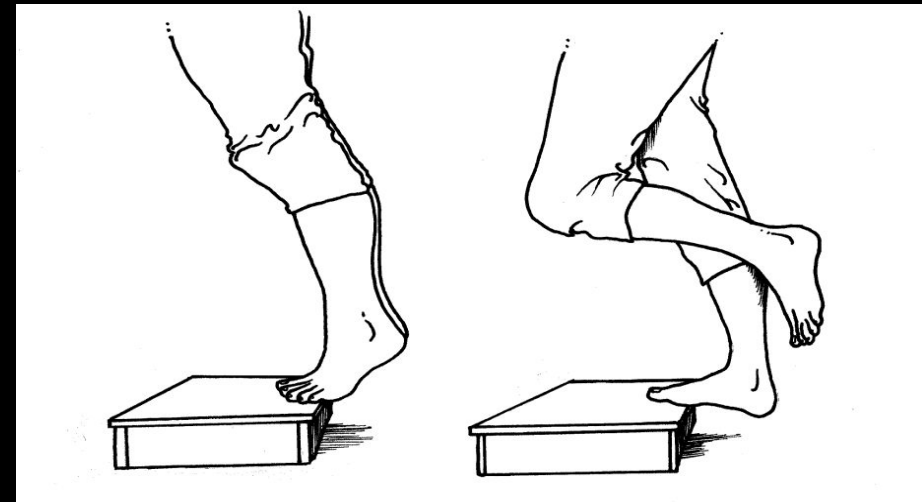
Curwin and Stanish (1986)

- Eccentric loading normal in activities
- Pain often in landing (eccentric contractions)
- Aim to strengthen the actual tendon tissue
- Increase load through eccentric exercise and by increasing speed of contraction

ECCENTRIC EXERCISE

Alfredson et al. 1998

- Heavy-load eccentric calf muscle training for treatment of chronic Achilles tendinosis
- Allowed to feel pain
- Perform exercises daily; 3 months (at least)



ECCENTRIC EXERCISE

Review of literature

(Woodley et al. 2006 BJSM, Kingma et al. 2006 BJSM)

- *Lack of evidence that eccentric exercise is superior to concentric exercise or stretching*
- Methodological shortcomings, but ***overall results are satisfactory***
- Need further RCT with evaluation of symptoms and function

TREATMENT OF TENDINOPATHY

Surgery

- Only when exercise treatment performed for at least 6 months has failed

(Khan et al. 1999, Kader et al. 2002, Paavola et al. 2002)

- Tendon structure *not normalized after surgery*
- Bahr et al. 2006 compared surgery with eccentric training in patients with Patella tendinopathy – groups had similar outcome

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- Mini-surgery, ultrasonography-guided
- Balance with maxi-surgery?
- Arthroscopic techniques
- **Problems?** Limited evidence from RCT:s

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- **What are we dealing with?**
- Paratenon problem
- Tendon problem; either general or localized
- Combined; paratenon and tendon
- Tendinosis; partial rupture (does it exist?)

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- **Indication for surgery**
- Failed non-surgical treatment, including eccentric training
- Pain and functional deficit
- At least 6 months duration

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- **Surgical technique**
- Excision of paratenon
- Excision of degenerated tendon
- Longitudinal incisions (scarring)
- In selected cases; reinforcement using turn-down flap(s)

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- **Day-care surgery**
- Supine, local anesthesia
- Always medial approach (less morbidity)
- Longitudinal incision of fascia
- Incision and/or excision of paratenon

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- In case of macroscopic tendon changes, excision of tendon tissue (until macroscopic normal tissue)
- 2-3 longitudinal tendon incisions
- Immobilization for 10-14 days, in order to rest the tendon; slow rehabilitation.

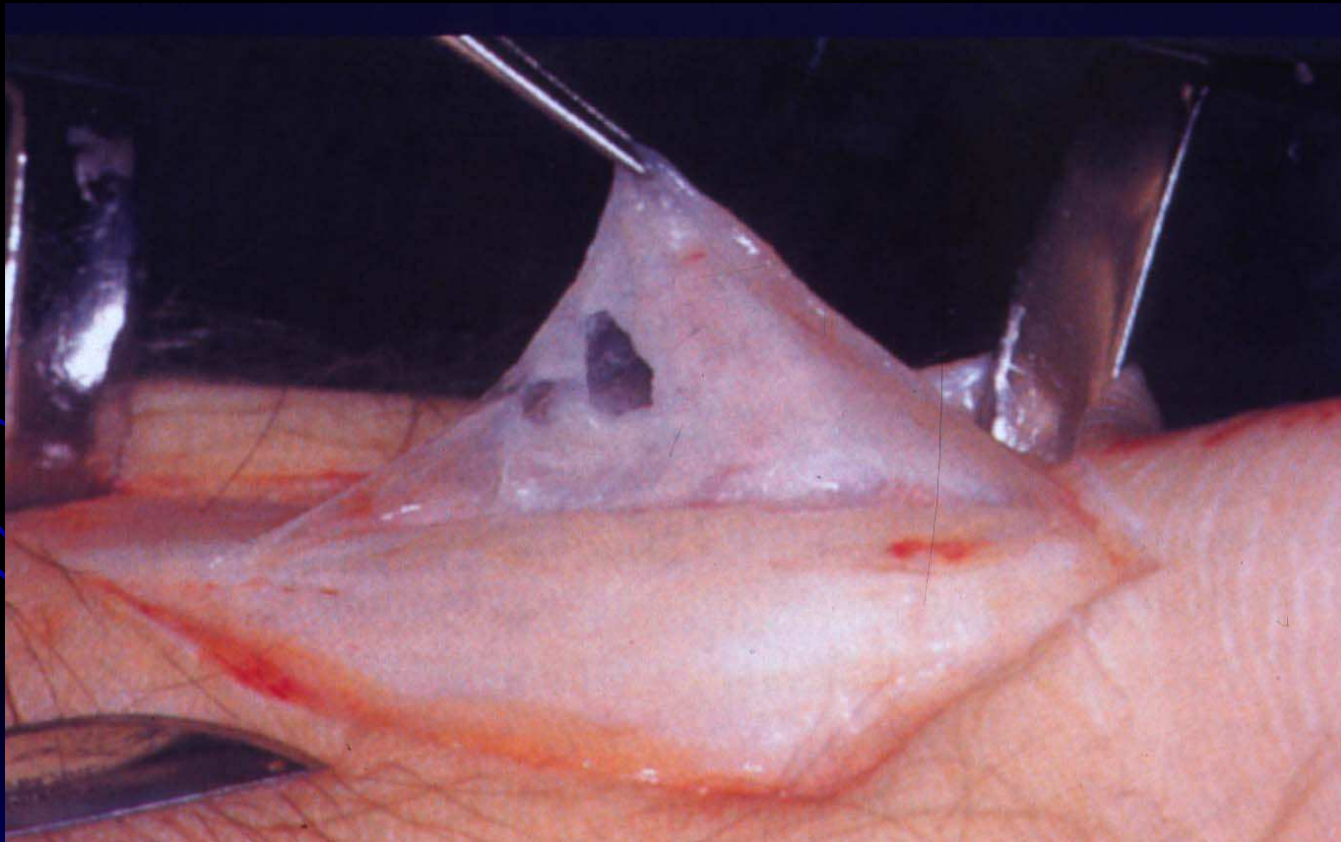
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- **Surgical technique; local anesthesia**



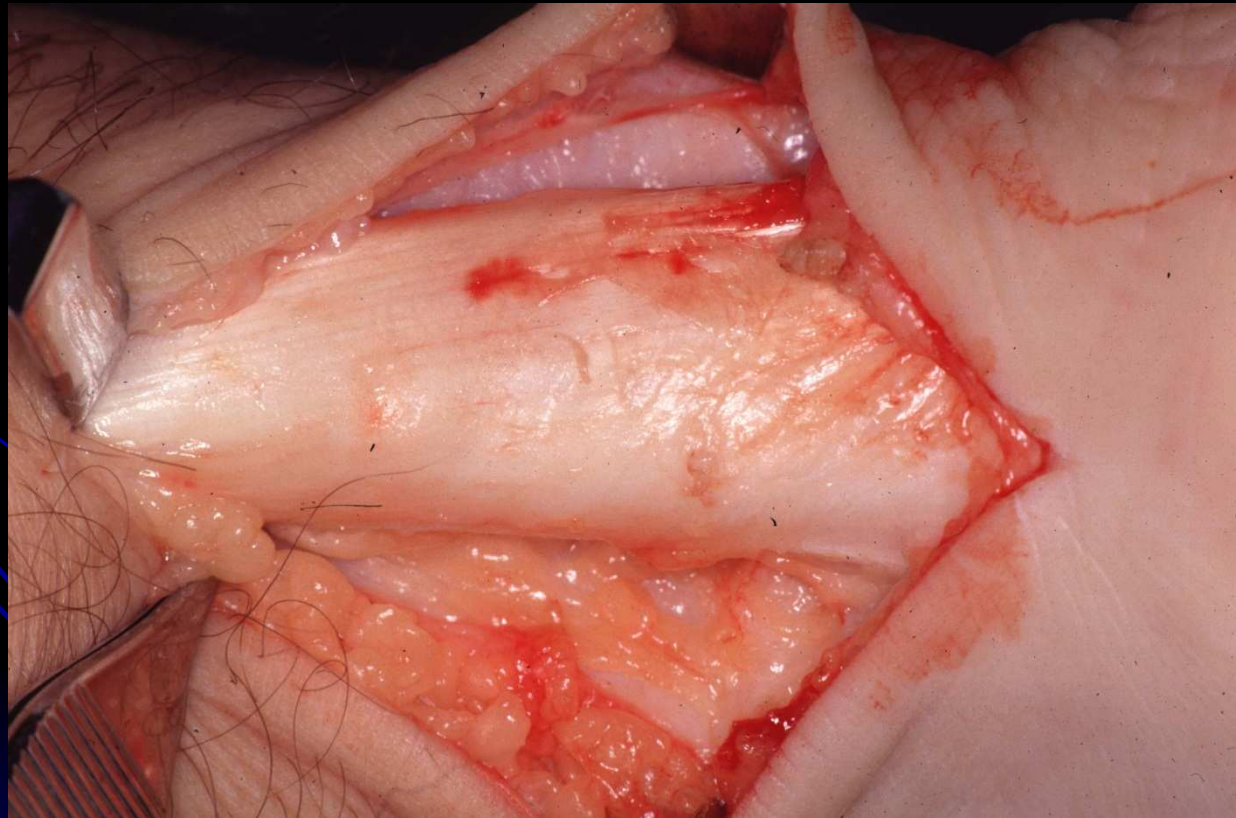
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- **Surgical technique; paratenon**



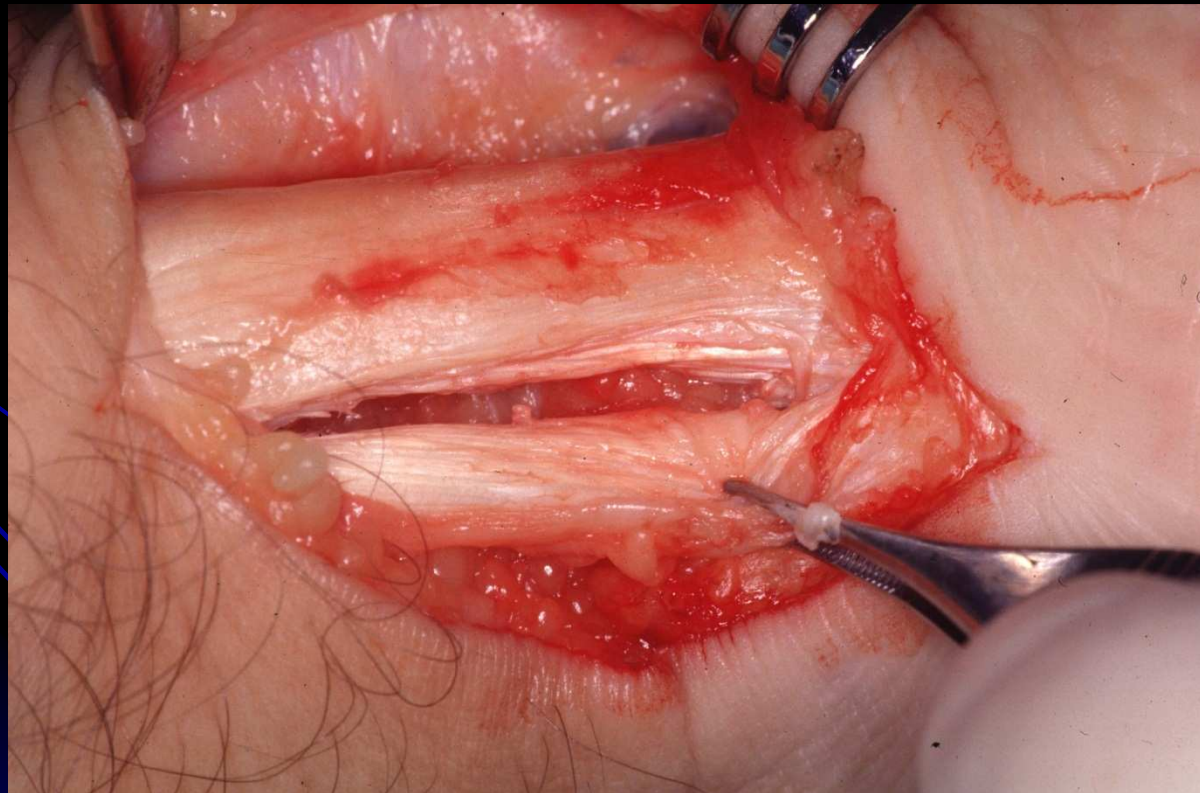
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- **Surgical technique; tendon damage**



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- **Surgical technique;** excision of tendon tissue



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- **Surgical results**
- 36-100% Excellent/Good results
- Wide variation
- Problems; long rehabilitation (6-12 mo) and surgical morbidity
- Surgical complications (11%; Paavola et al, 2000)

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- **Alternative technique**
- Arthroscopic "tendon cleaning", combined with arthroscopic longitudinal tendon incisions
- Advantage?
- Less surgical morbidity and easier rehabilitation
- Can be done via 4 small wounds

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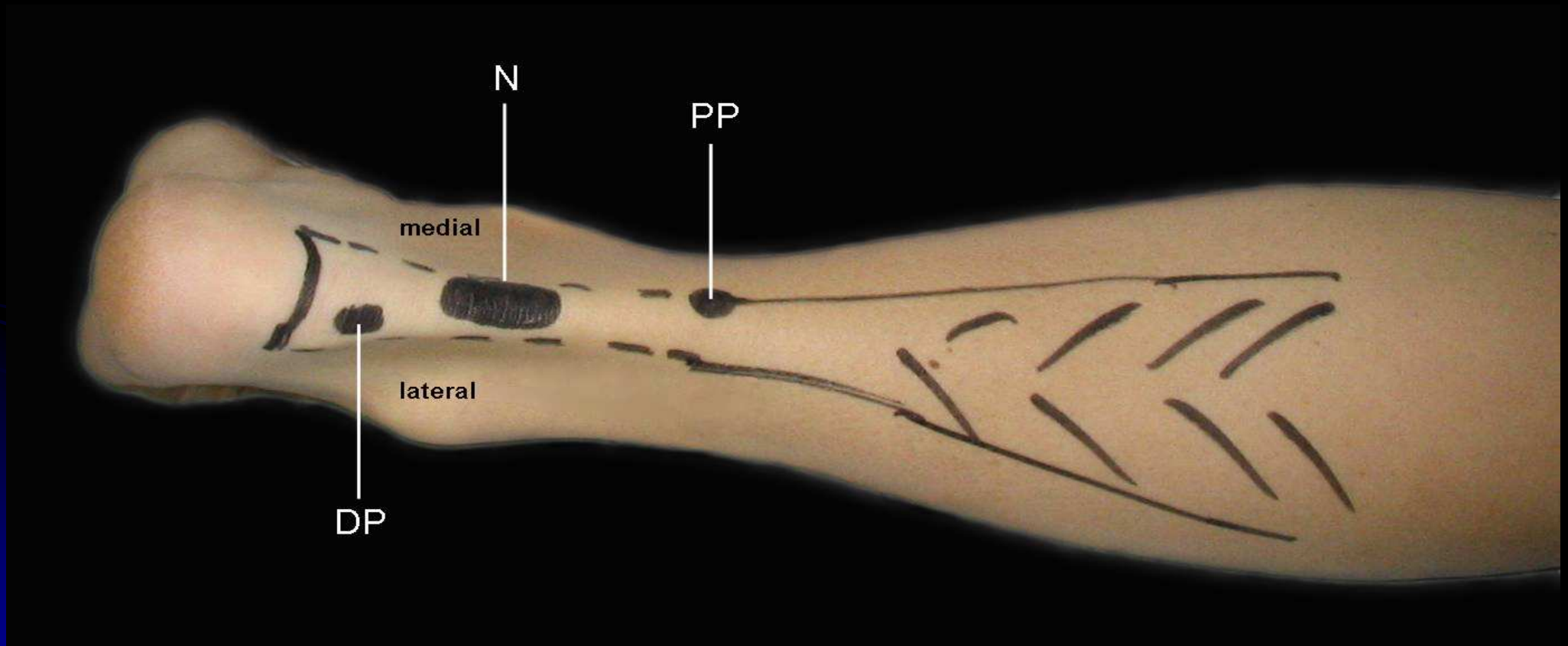


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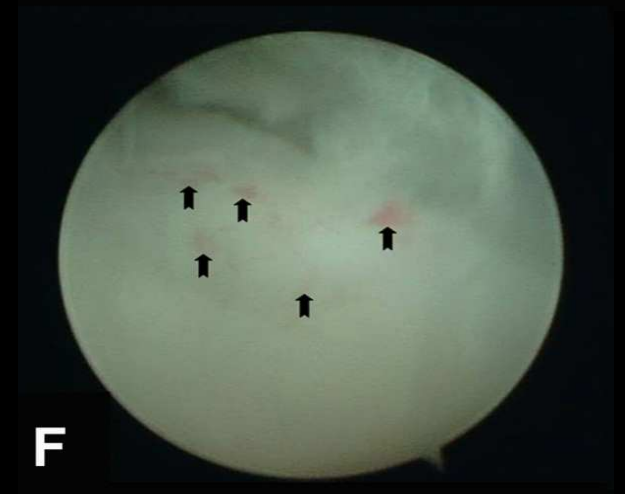
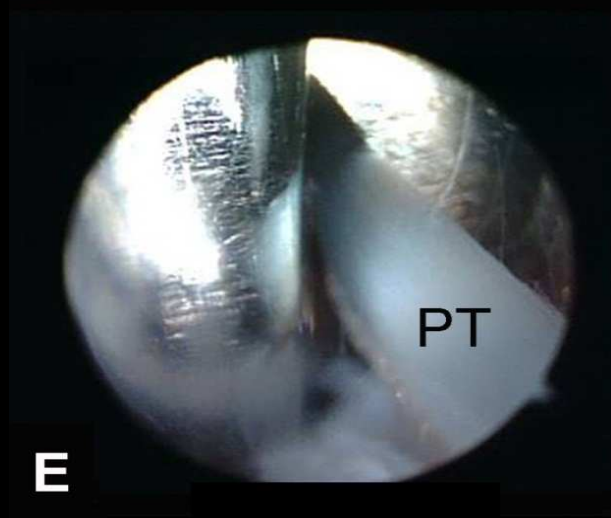
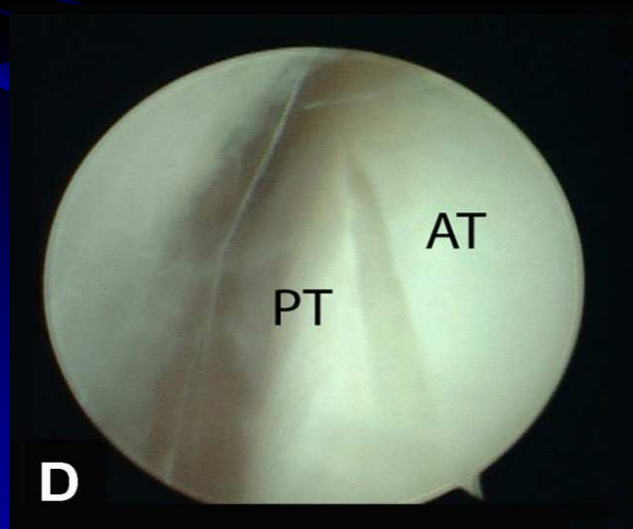
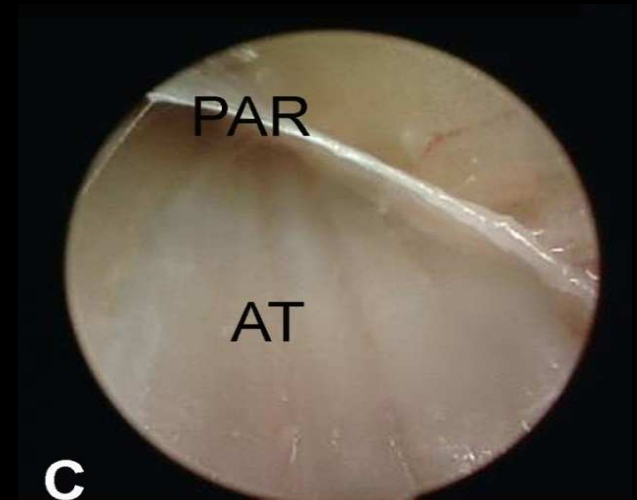
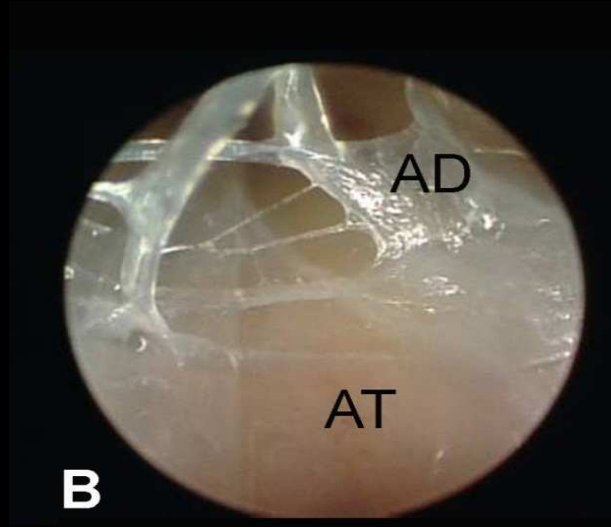
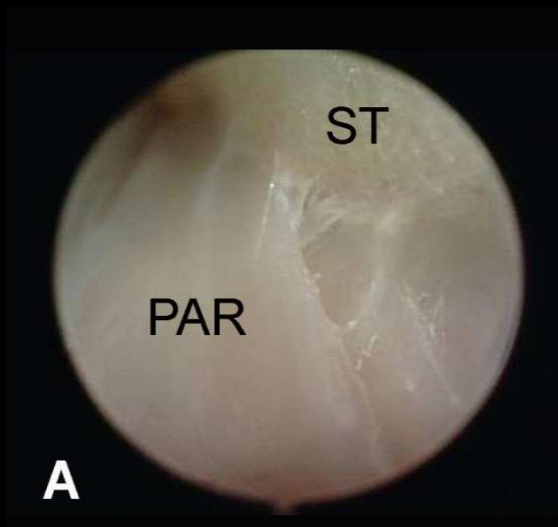


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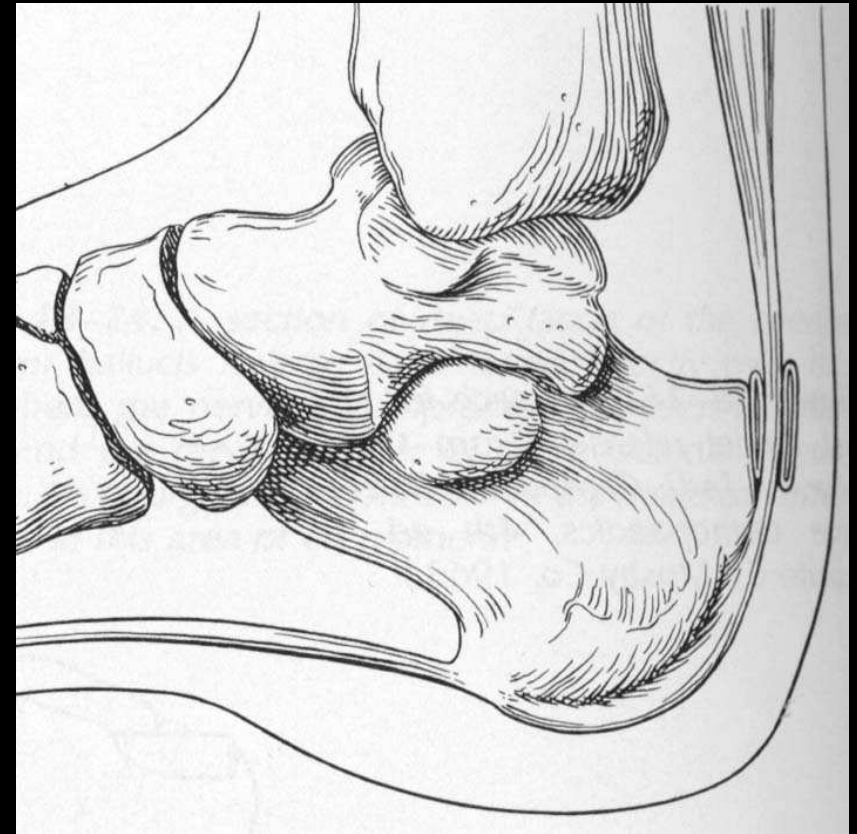


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- **Distal tendon pain**
- Haglund's heel (1907)
- Osteochondrosis; juvenile

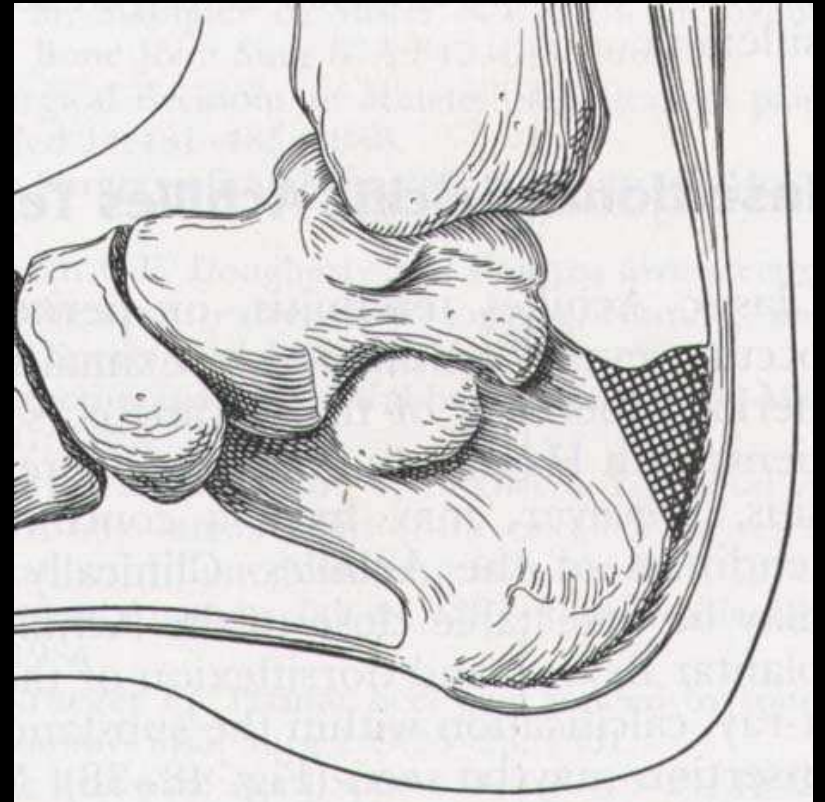
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- **Distal tendon pain**
- Haglund's heel
- Tendon injury/tendinosis
- Calcaneal osteophytes
- Broad heel
- Bursitis; retrocalcaneal or subcutaneous



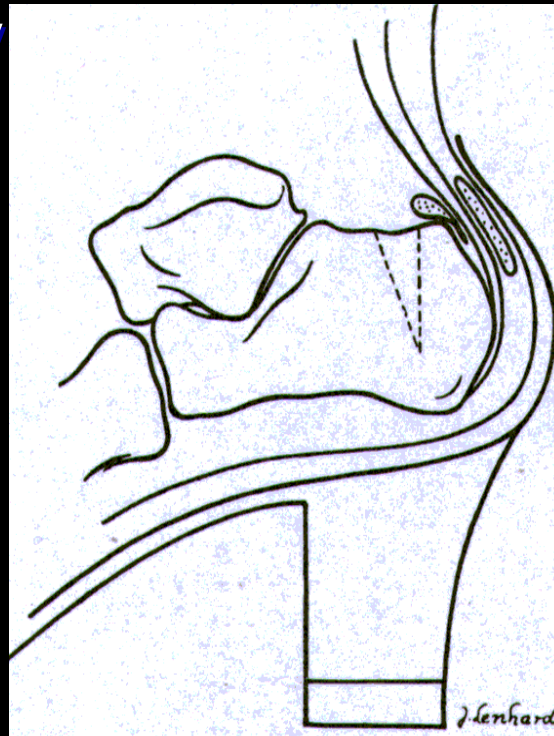
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- **Surgical treatment**
- Removal of osteophytes
- Open
- Arthroscopic; calcaneoplasty
- Can - always - be done with the arthroscope



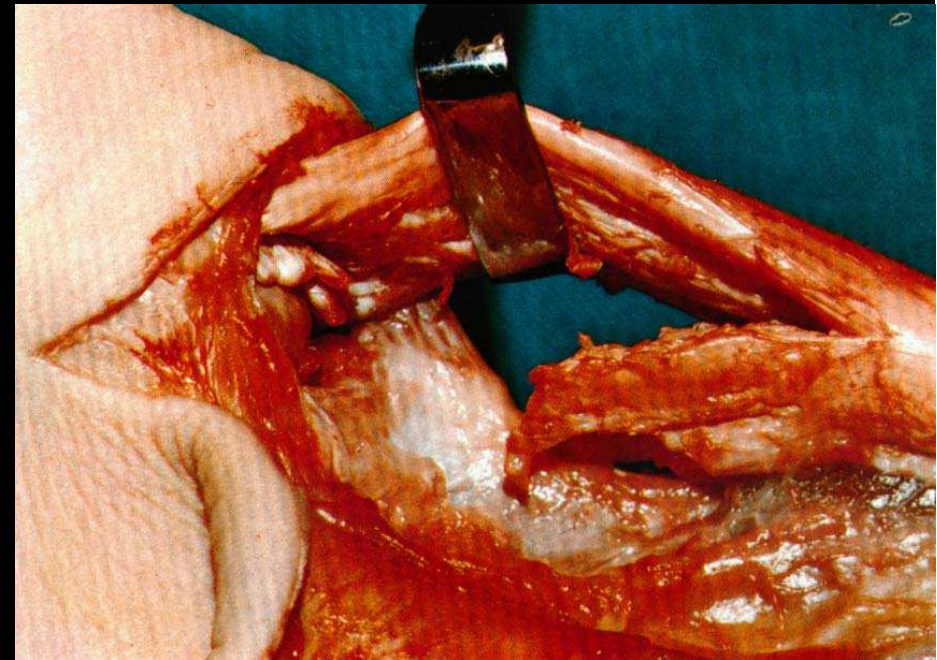
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- **Surgical treatment**
- Calcaneal osteotomy
- Open
- Screw fixation
- Low morbidity



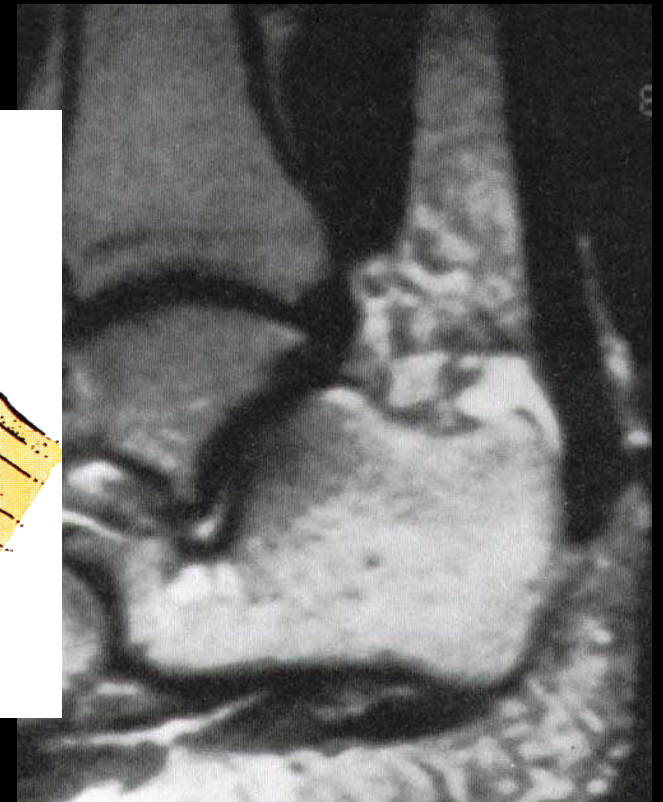
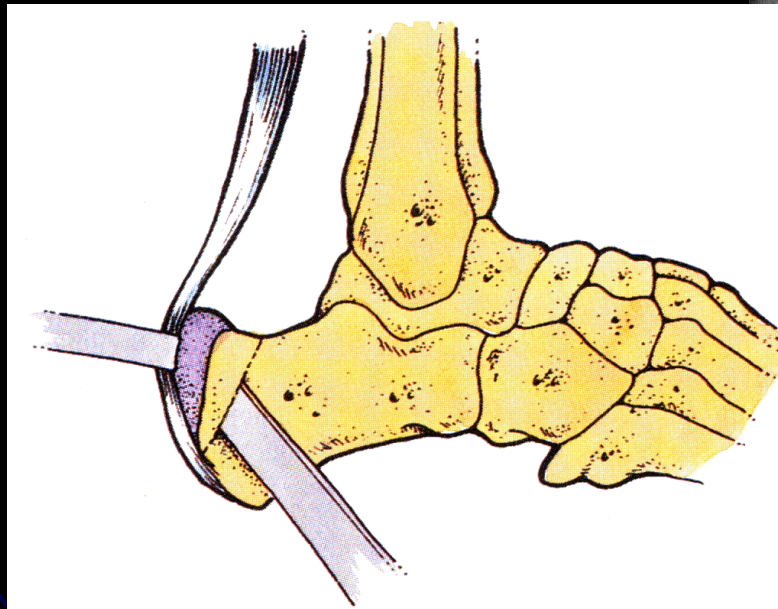
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- **Surgical treatment**
- Distal tendon injury
- Excision; midline tendon incision
 -
- Longitudinal tendon incision
- Reinforcement if needed



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- **Surgical treatment**
- Bursitis
- Excision
- Open
- Arthroscopic
- preferred -



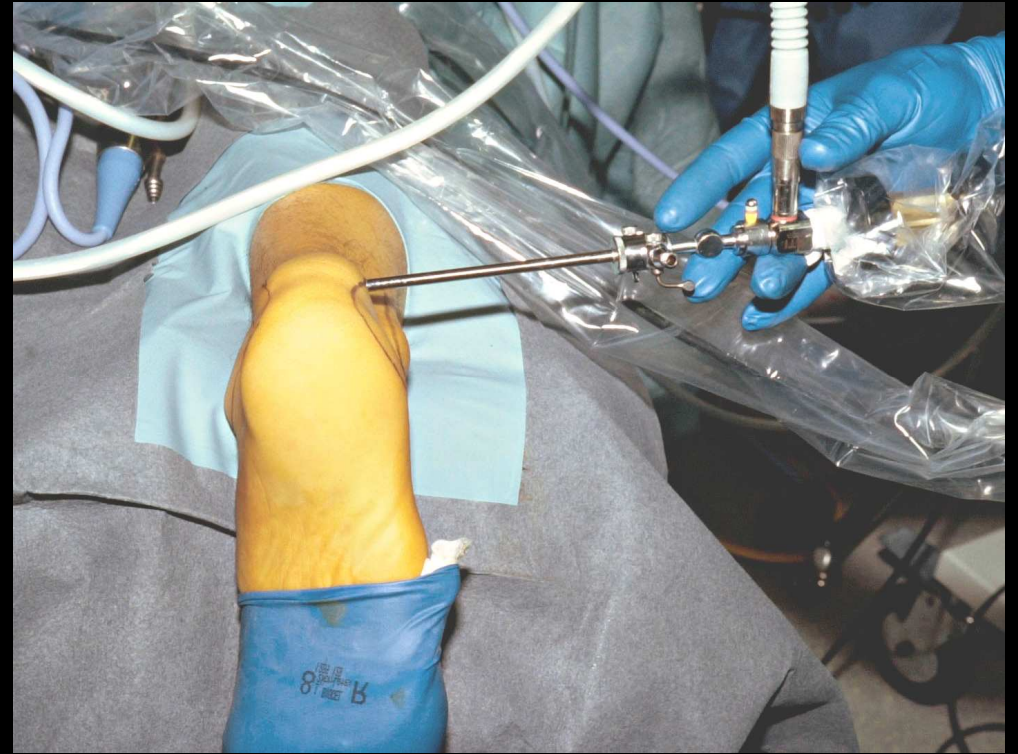
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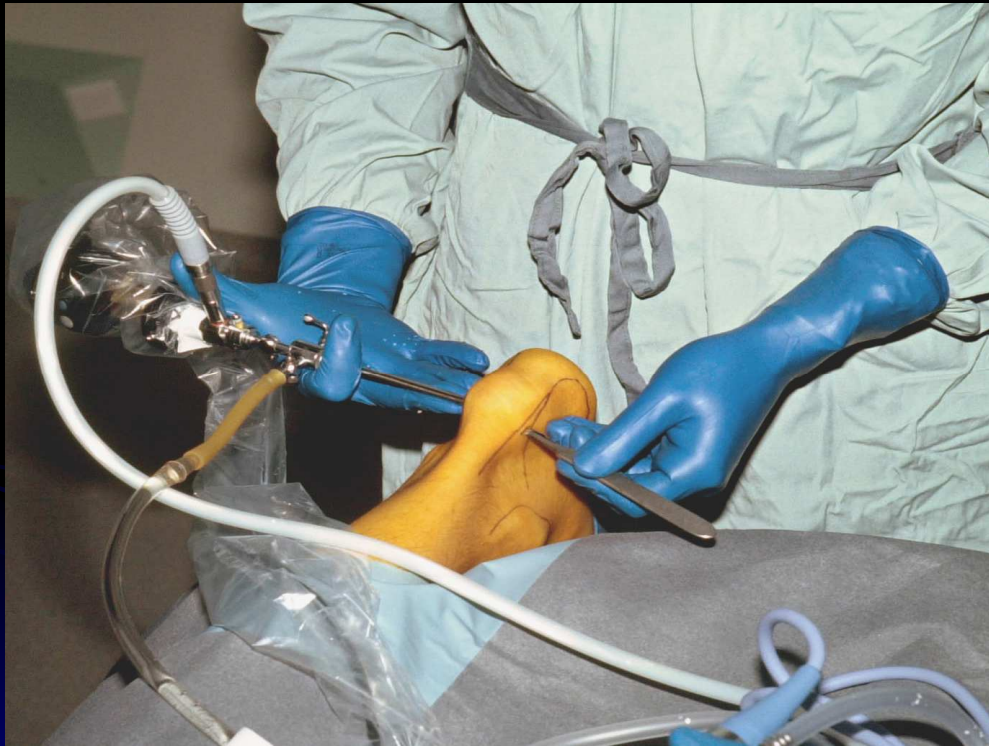
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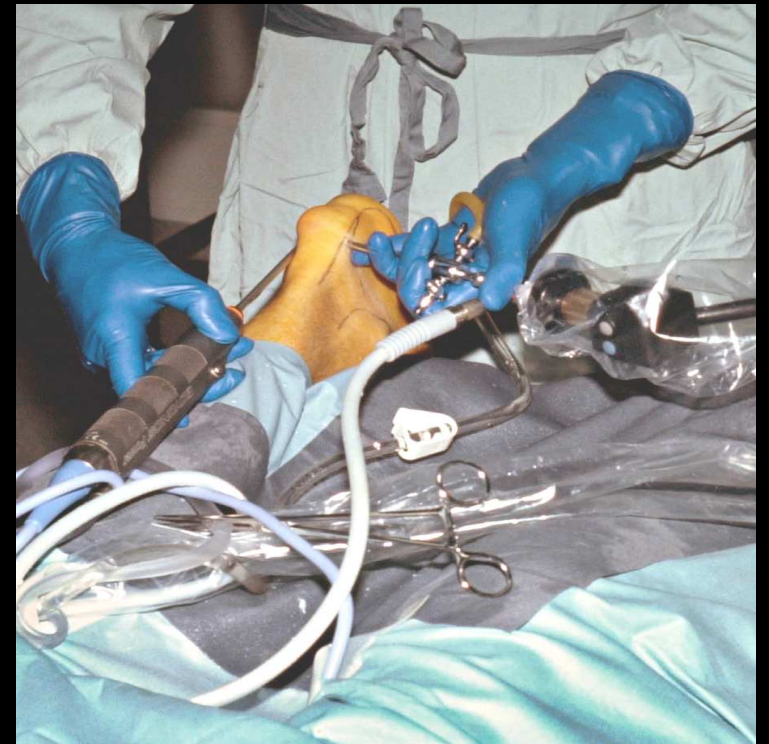
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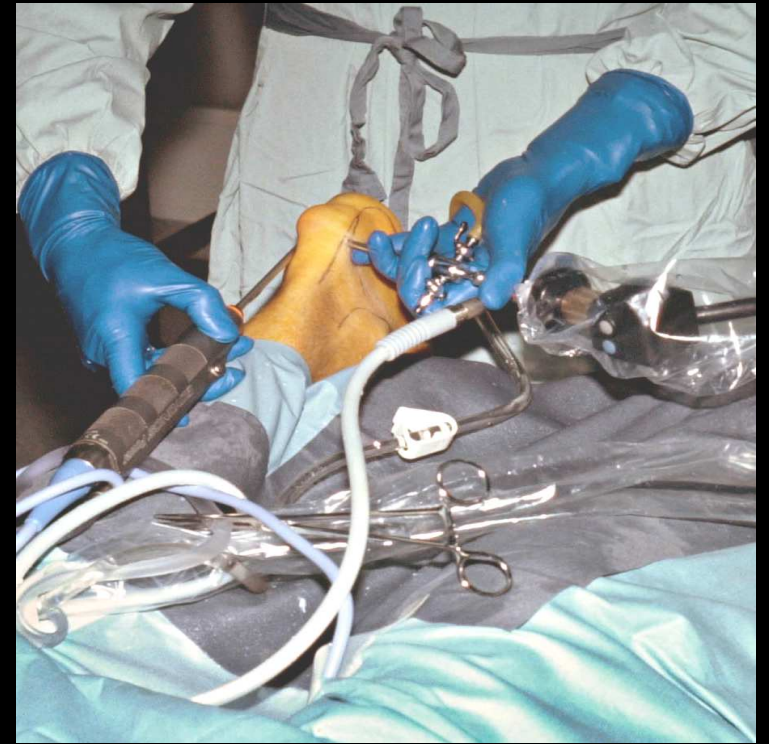
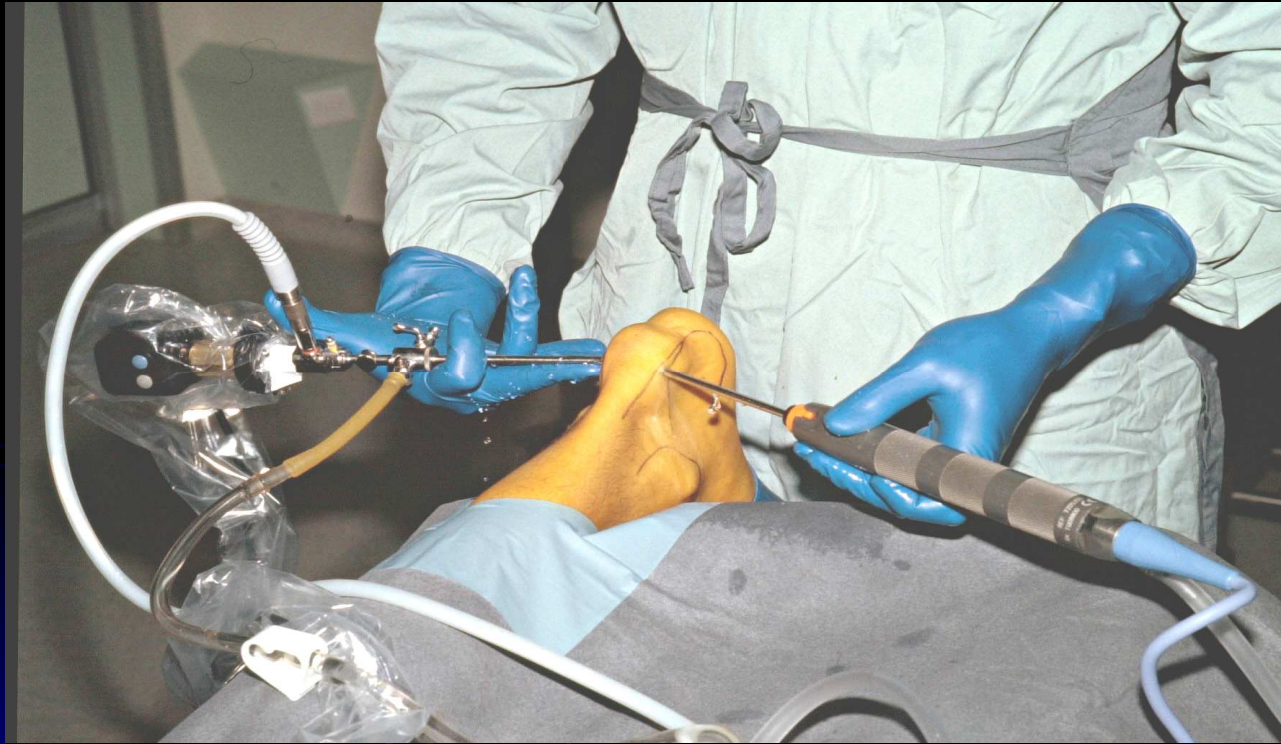
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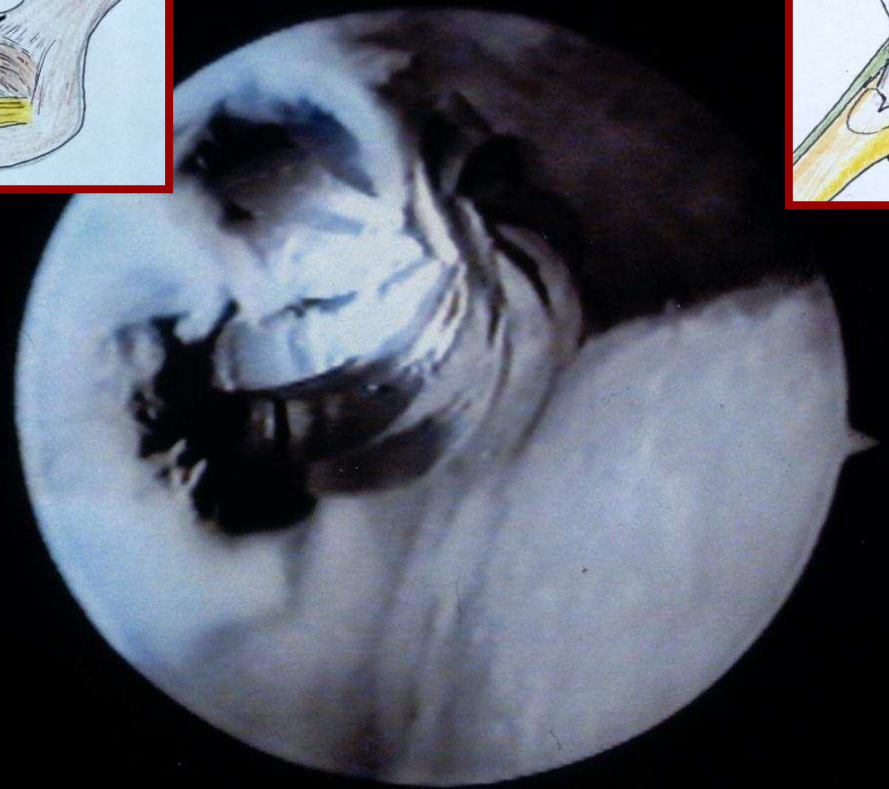
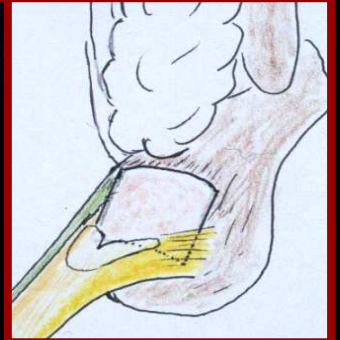
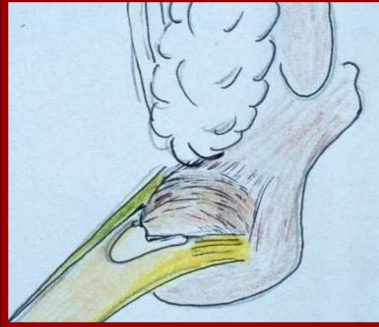
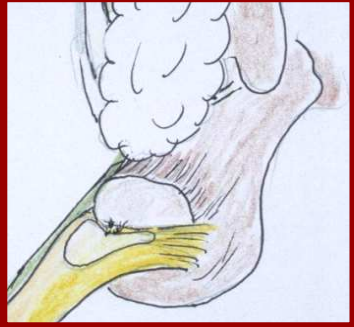
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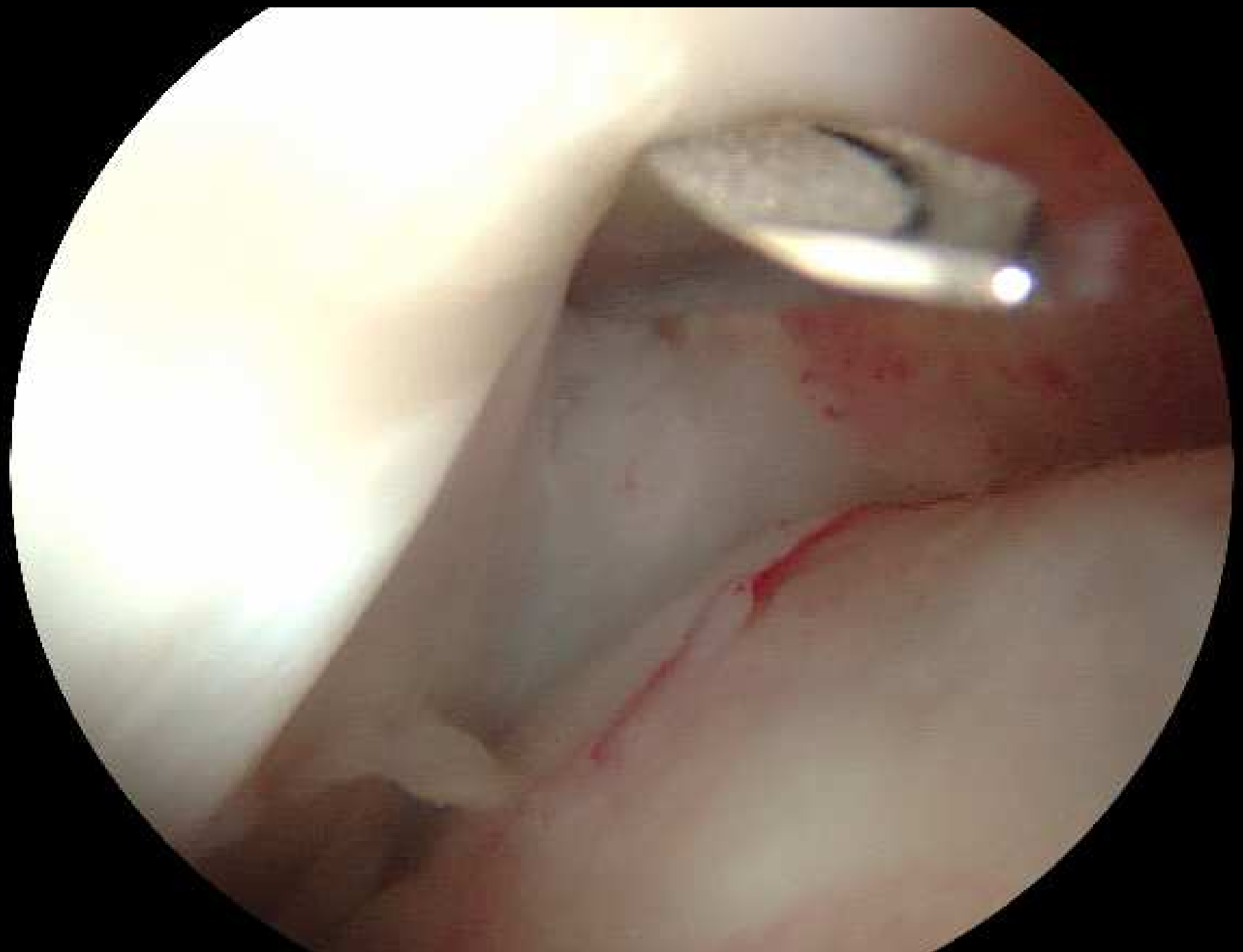


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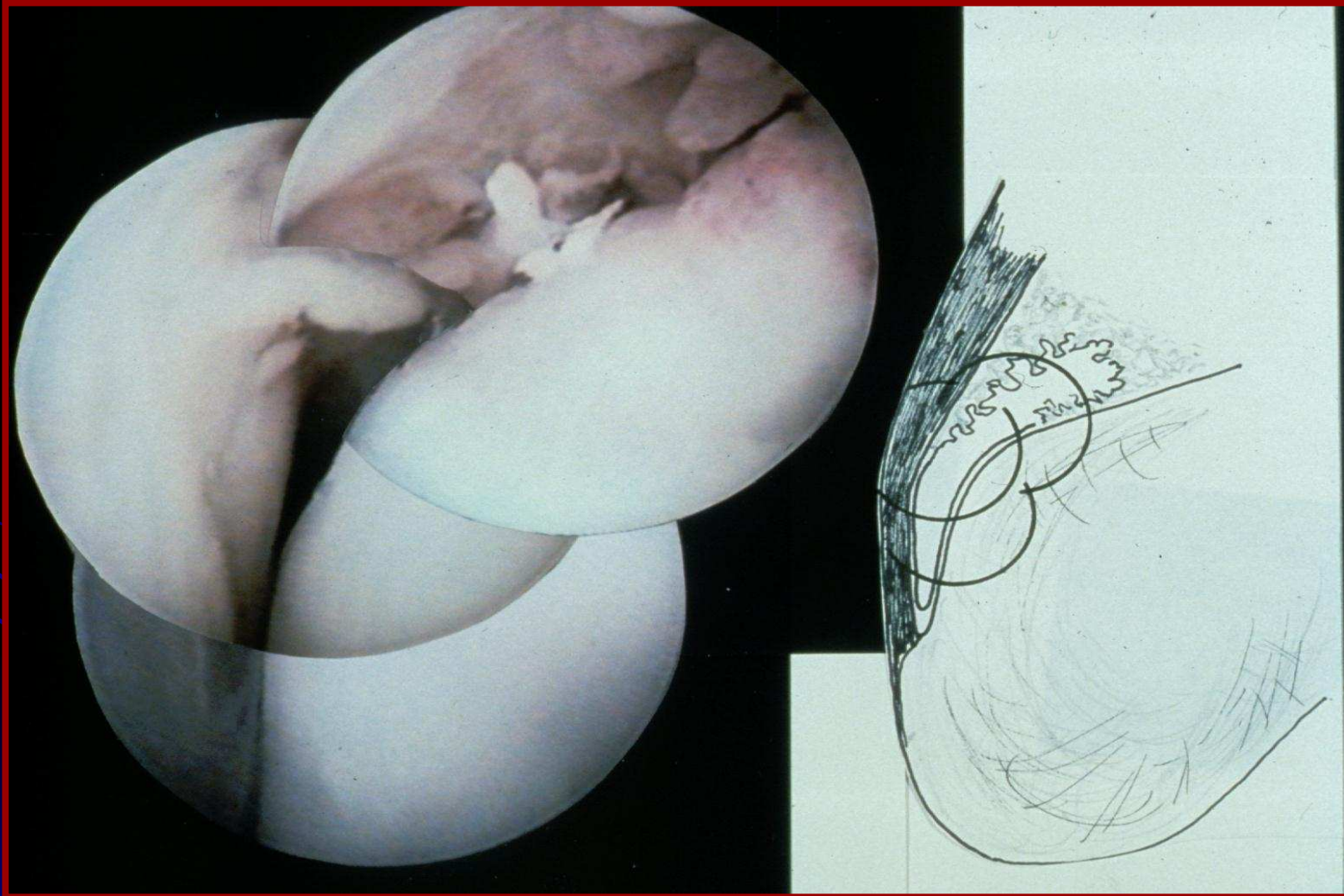


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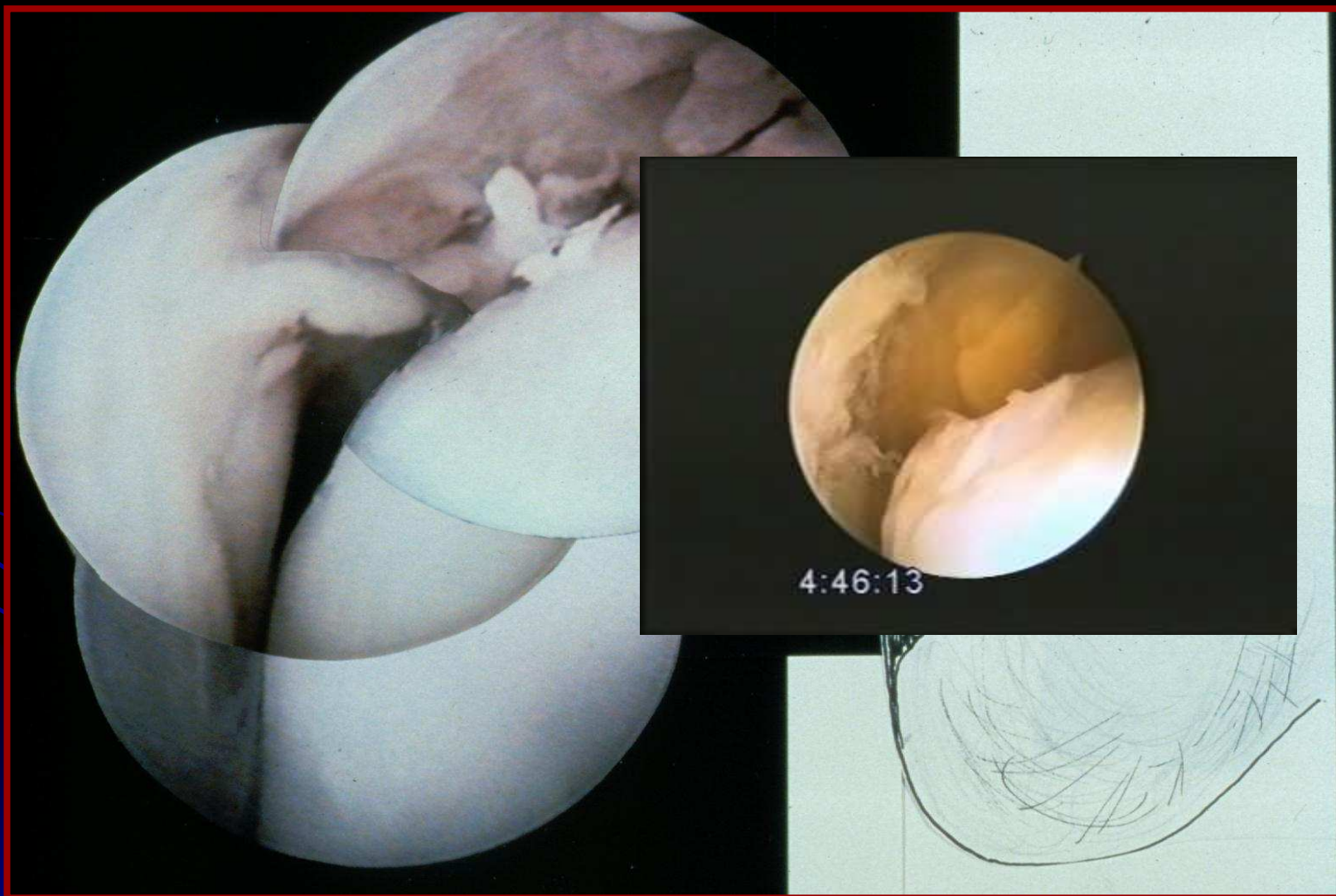




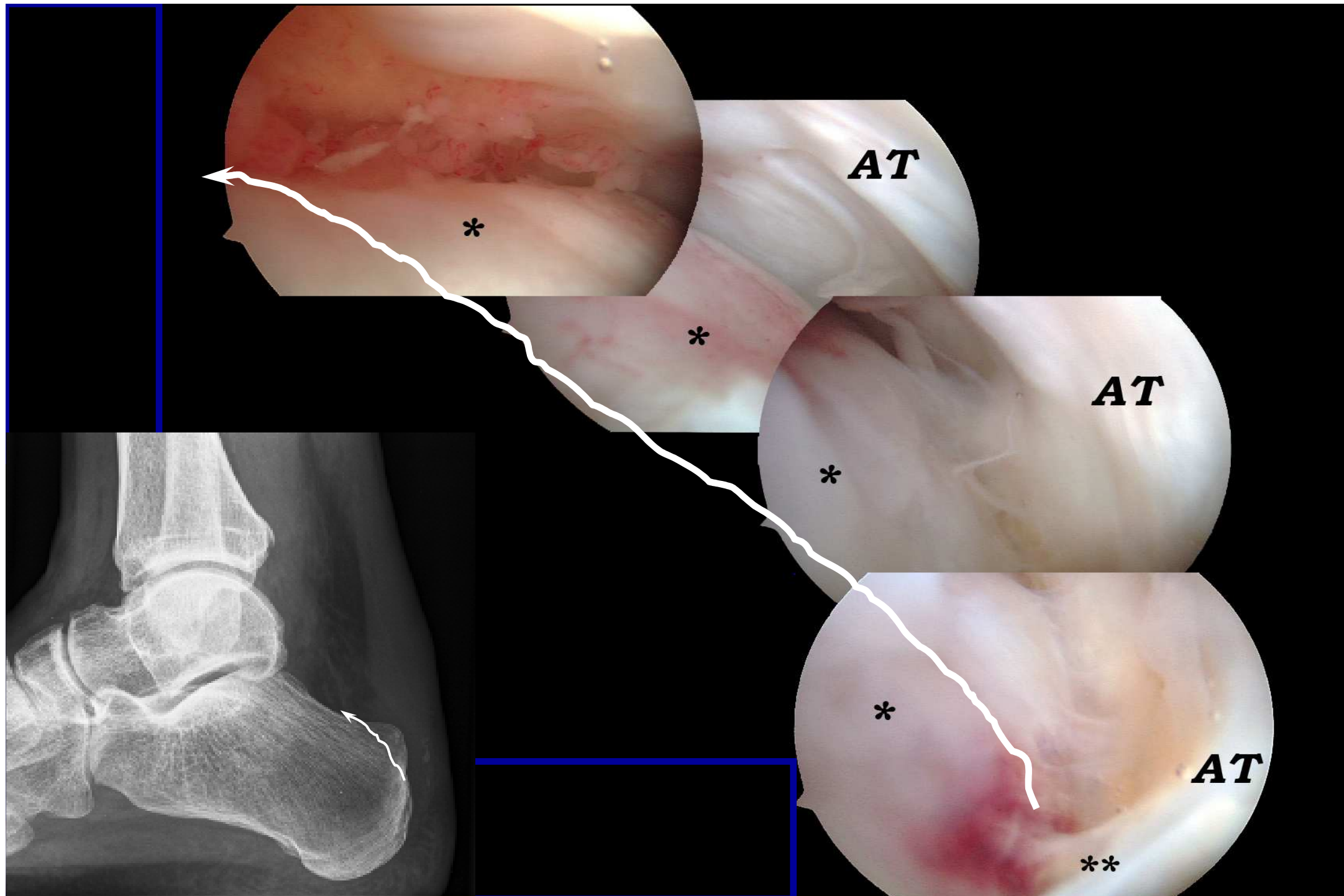
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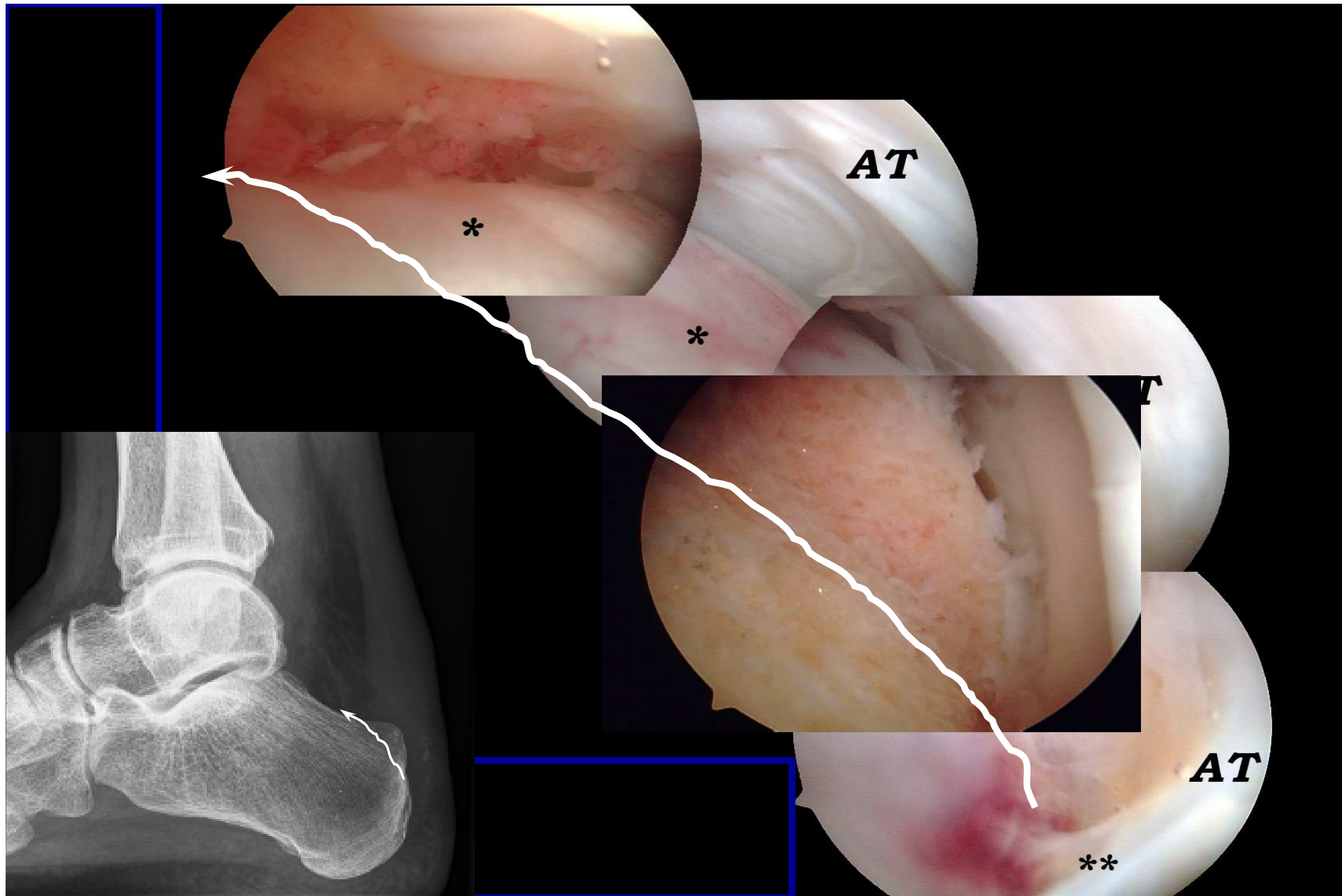


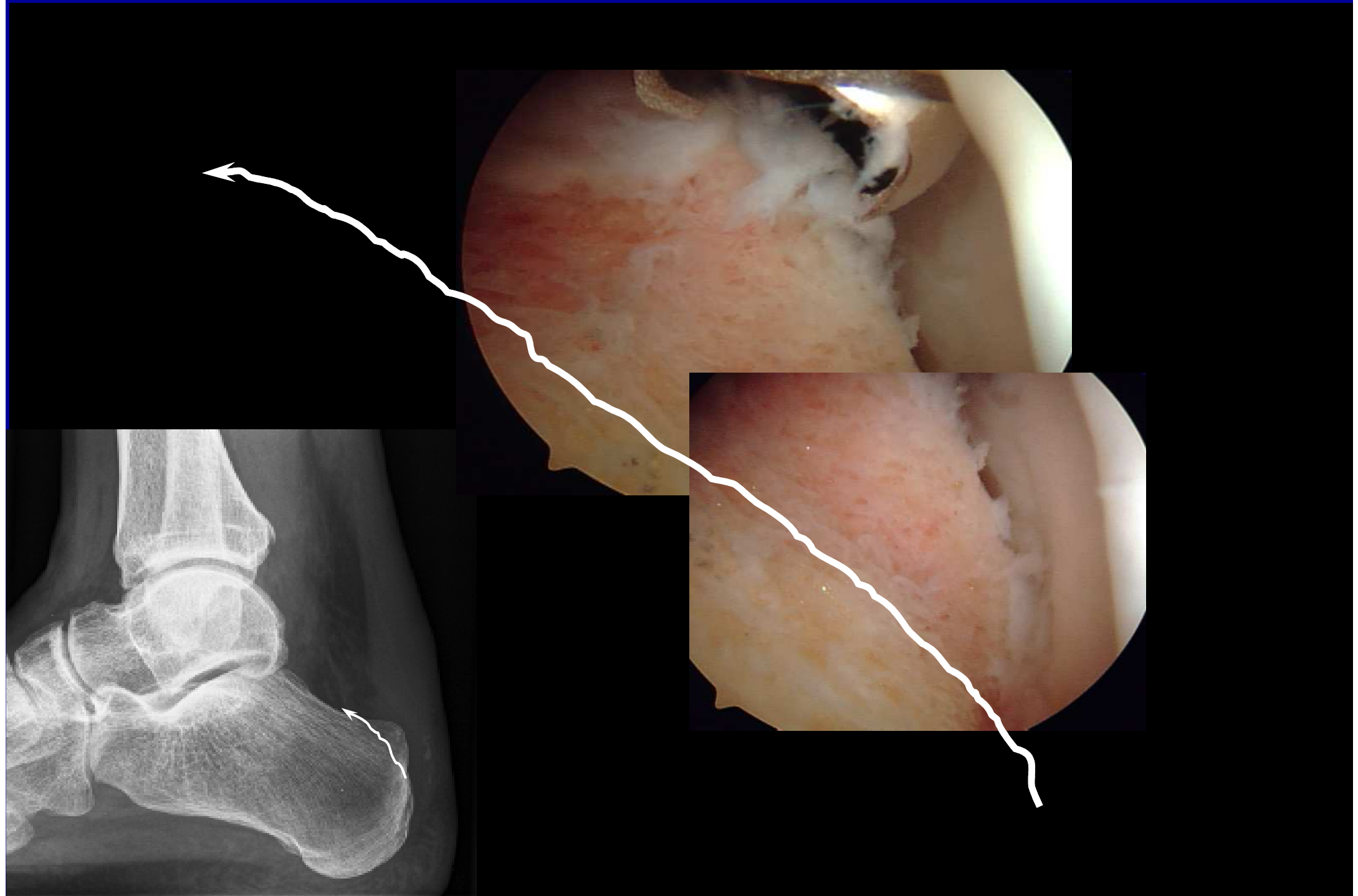
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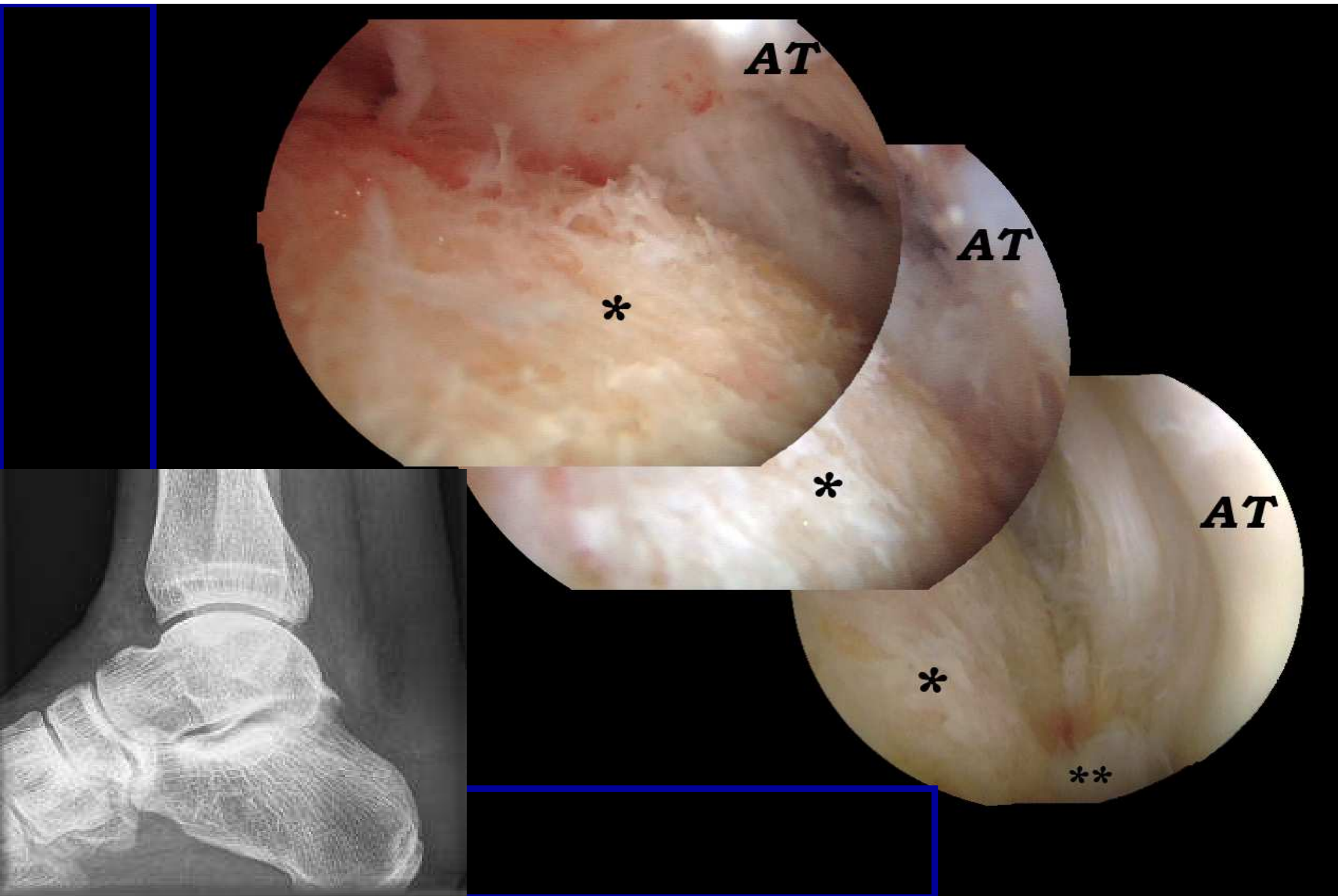




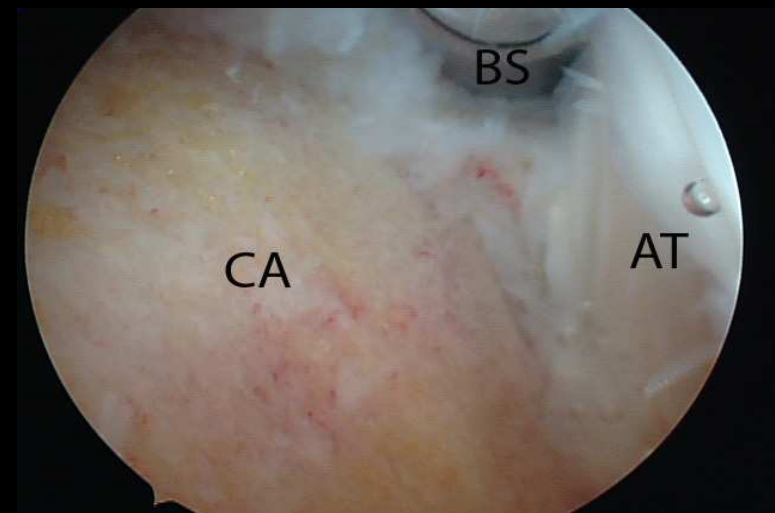
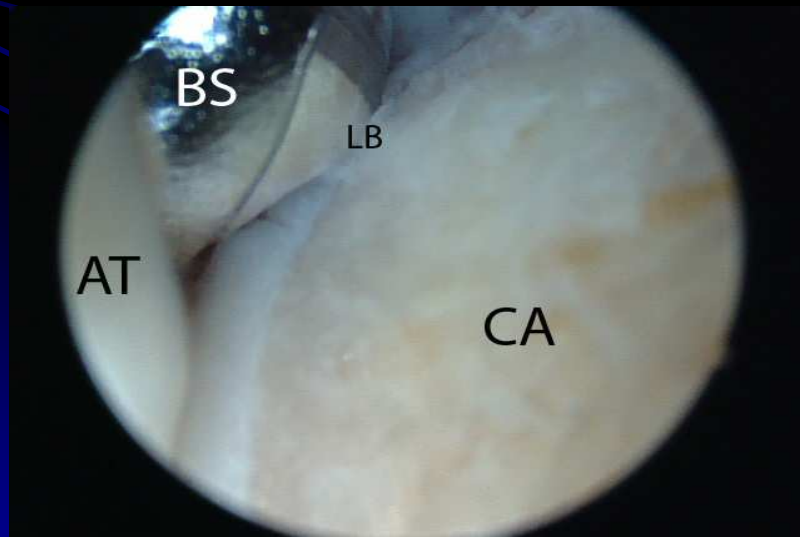
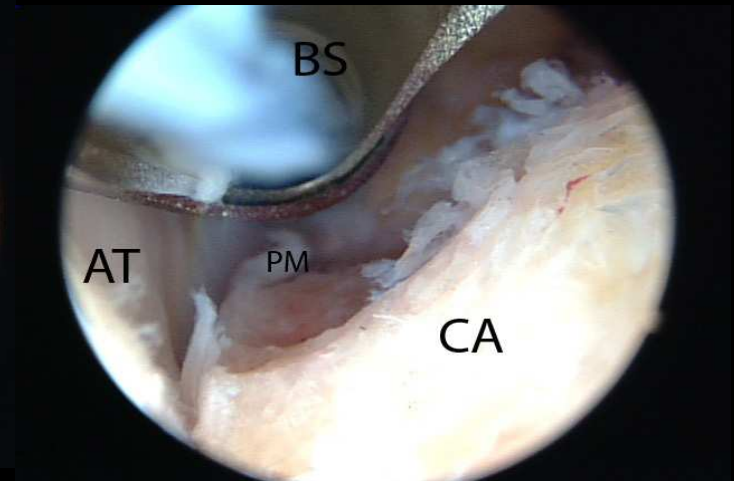
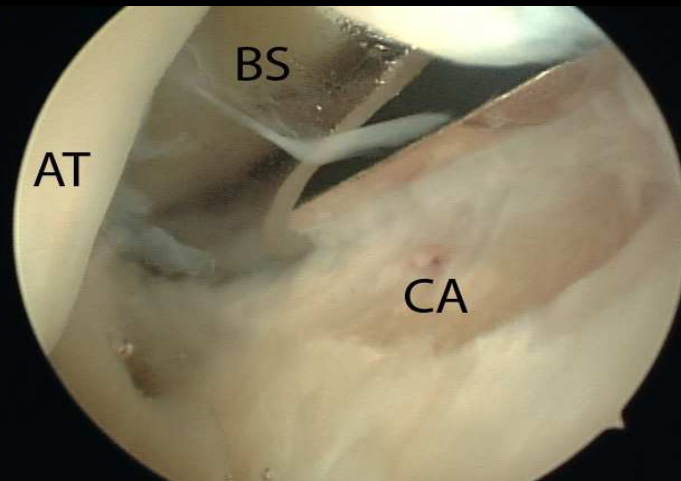
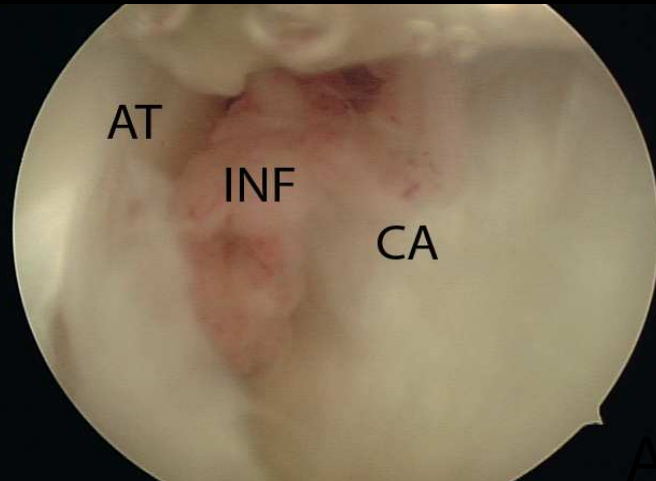








CALCANEOPLASTY



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ACHILLES TENDINOPATHY

- **Major advances in recent years**
- Better understanding of tendon healing
- Exercise treatment
- Sclerosing injections; PRP

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- **Major advances in recent years**
- Mini-surgery, US-guided
- Arthroscopic surgery
- However, still problems....
- Limited evidence from RCT:s; no comparisons between different techniques and treatments

ACHILLES TENDINOPATHY

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Thank you

