# Regenerative Medicine Conference

Rahul N. Desai, MD



# Our talks are about the POSSIBILITIES!

OrthoBiologics &
Photobiomodulation



# My Story:
# From Radiologist to Regenerative Specialist



Diagnostic & interventional radiology → specialized in spine & joints



First exposure - Limits of steroids & surgery → search for biologic alternatives



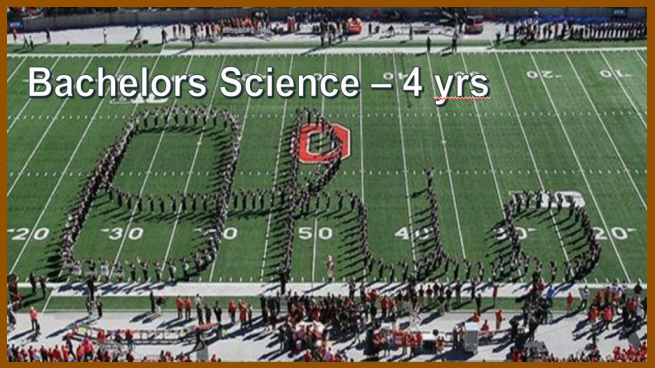
Early adoption: Among first radiologists to use imaging-guided PRP & stem cell injections



Precision model: Precision diagnosis, precision biologics, precision delivery”



Impact: Thousands of image-guided regenerative cases, publications, global lectures, advisory roles


Bachelors Science – 4 yrs


MD – 4 yrs
THE UNIVERSITY OF TOLEDO


Radiology Residency
4 yrs
THE UNIVERSITY OF TOLEDO


Internship – Internal Medicine
1 yr


Washington University School of Medicine in St. Louis
Spine & Joint Fellowship
Imaging & Interventional


14 years of school & training!!!

I was REALLY GOOD AT:

1. FIGURING OUT WHAT WAS WRONG WITH SOMEONE

2. PRECISELY PLACING A NEEDLE AND MEDICINE INTO THE INJURED AREA

# BEFORE REGEN




Physiotherapy
Medications – NSAIDS, Narcotics, Pain Relievers
Surgery
Alternative Medicine Therapies
Steroid Injections

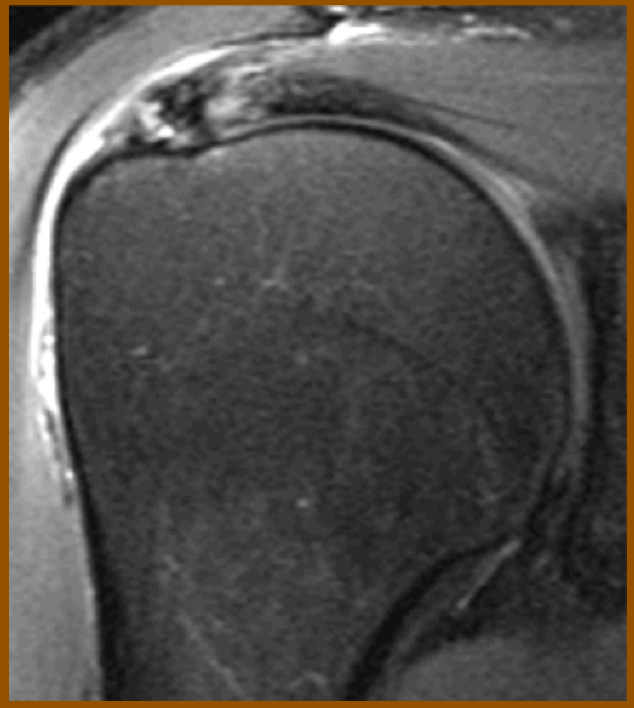
# Our Topics Today – Regenerative Medicine

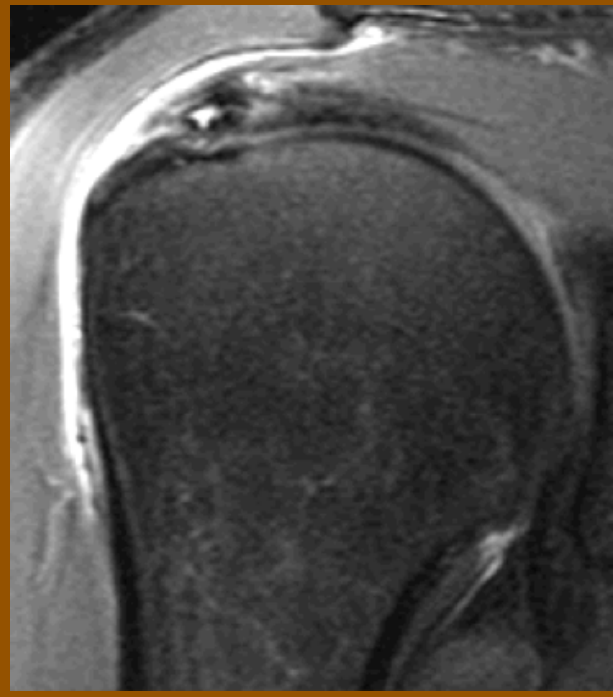
- Tendon
- Ligament
- Joints
- Bonus - Ultrasound

# Male With Shoulder Pain and Calcific Tendinitis of Partial Tears Supraspinatus Tendon

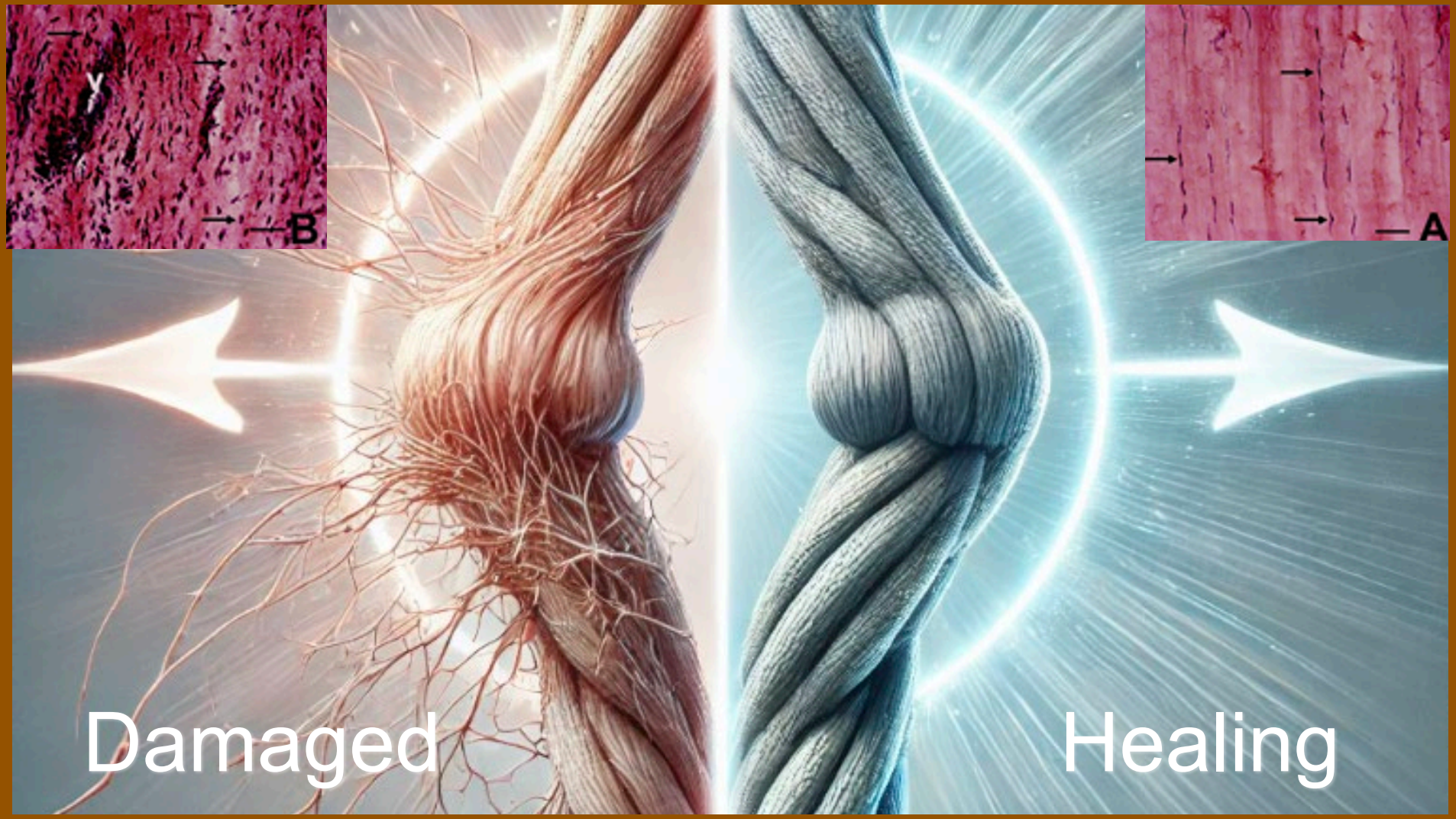









TAKING THE LEAP
2009


B
A
Damaged
Healing

- 30 years of experience

# Safety Profile

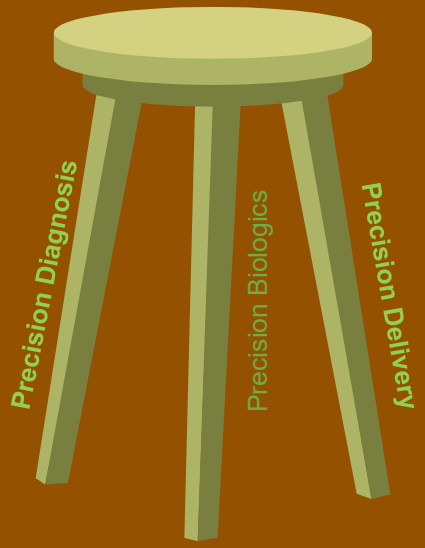




# Successful Regenerative Medicine Therapy

## Precision Diagnosis

History, Physical Exam, Diagnostic Imaging & Injections

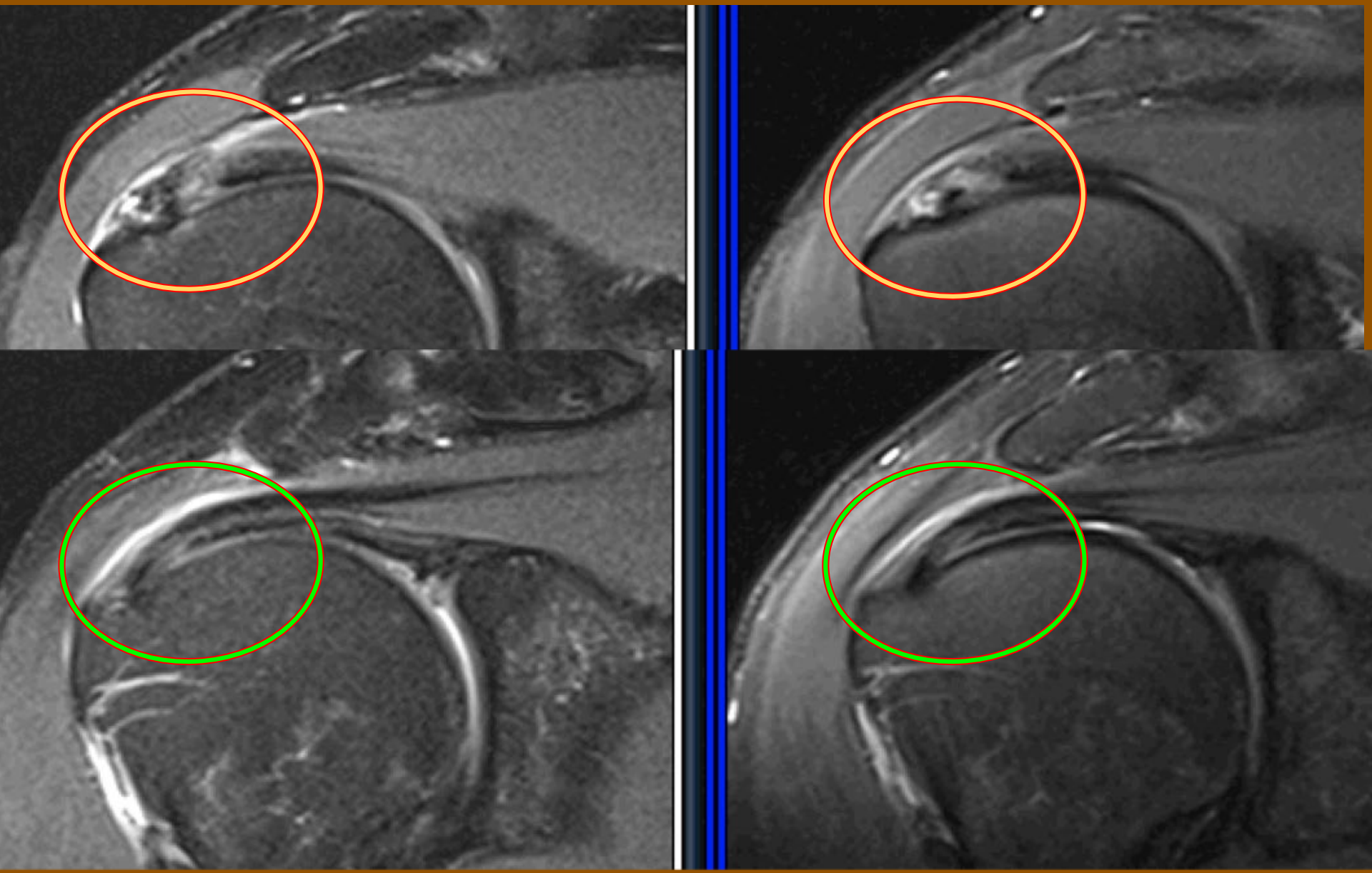



## Precision Delivery

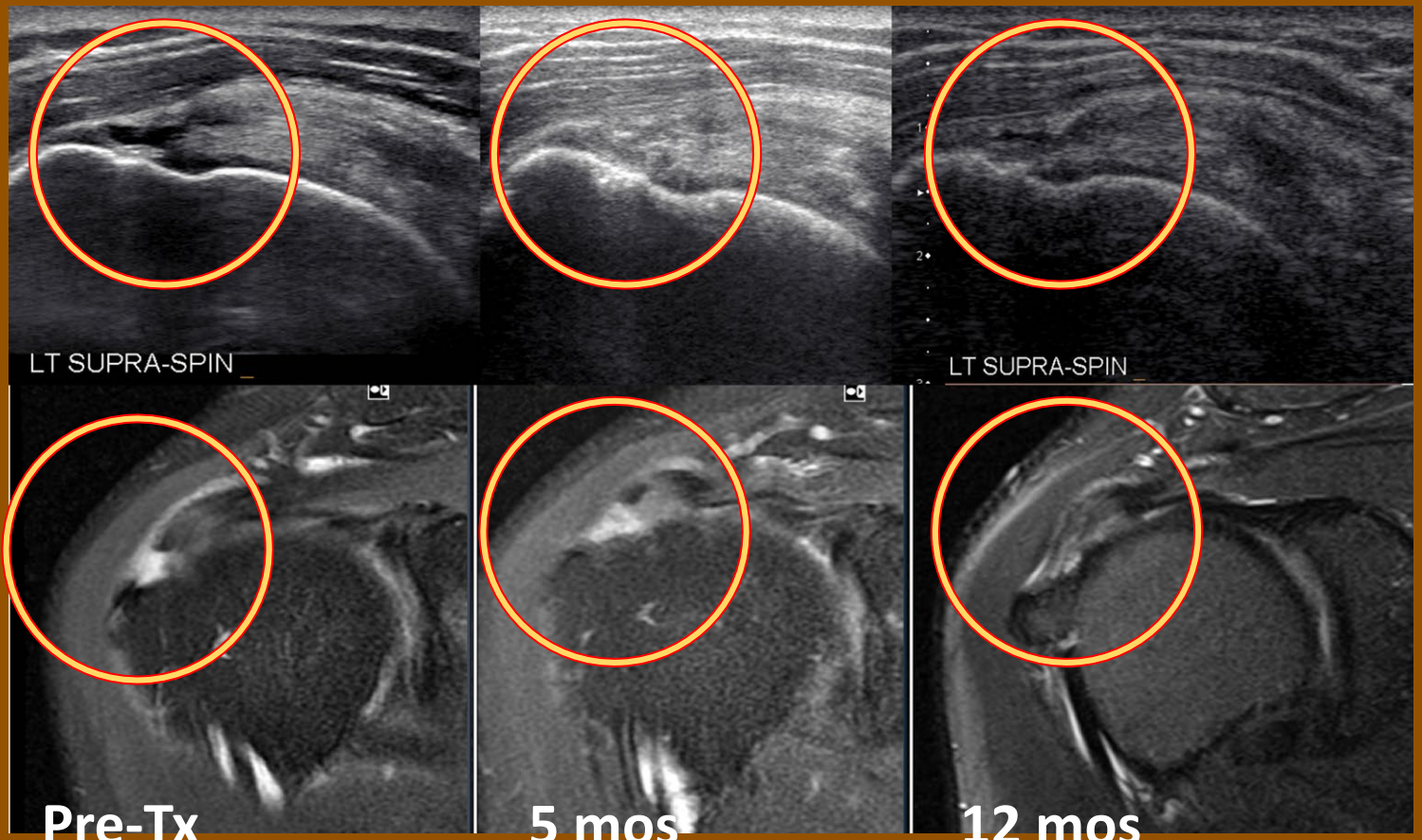
Image guided placement of needle/therapy into injured tissues

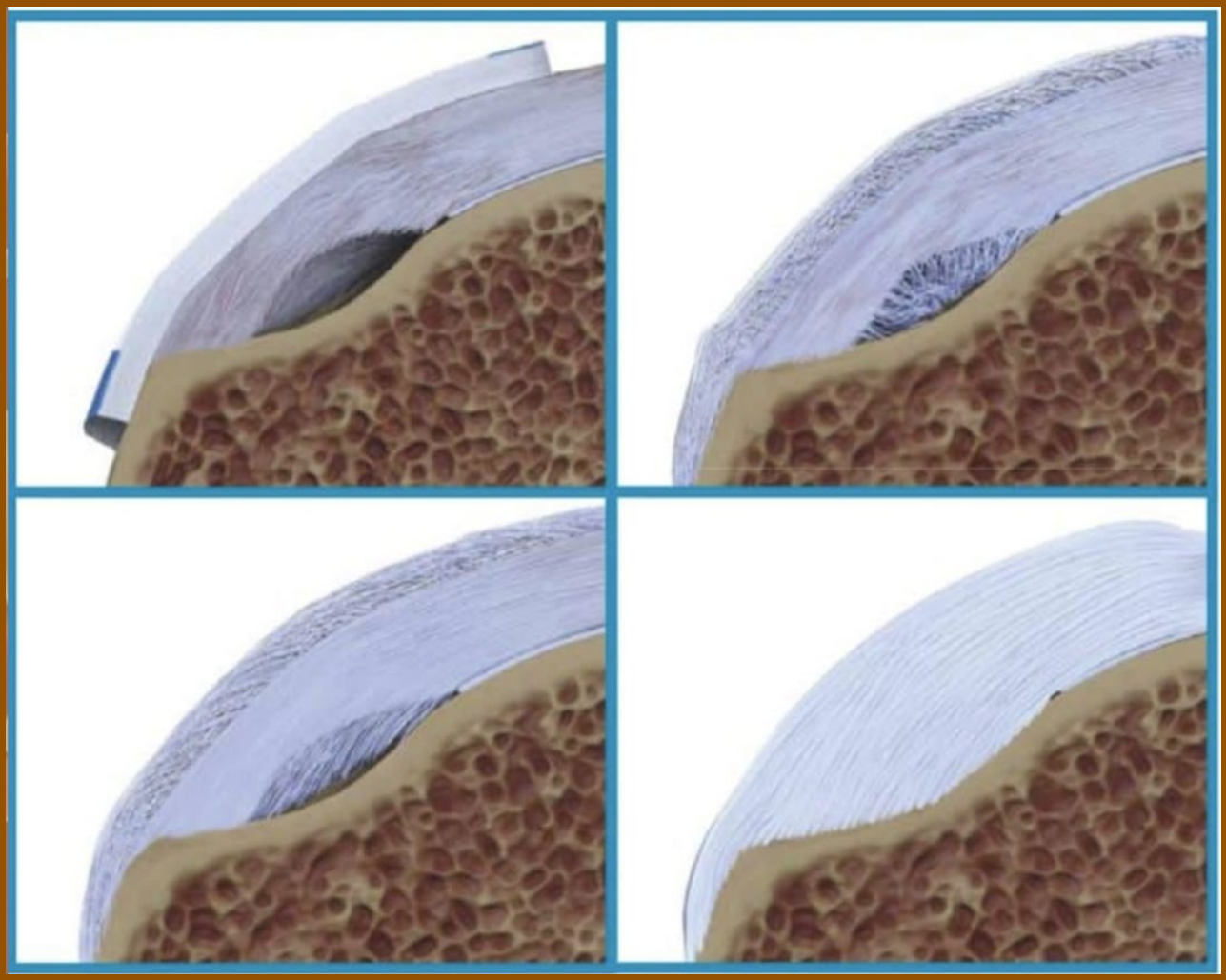
## Precision Biologics

The best biologic for the injury or disease process

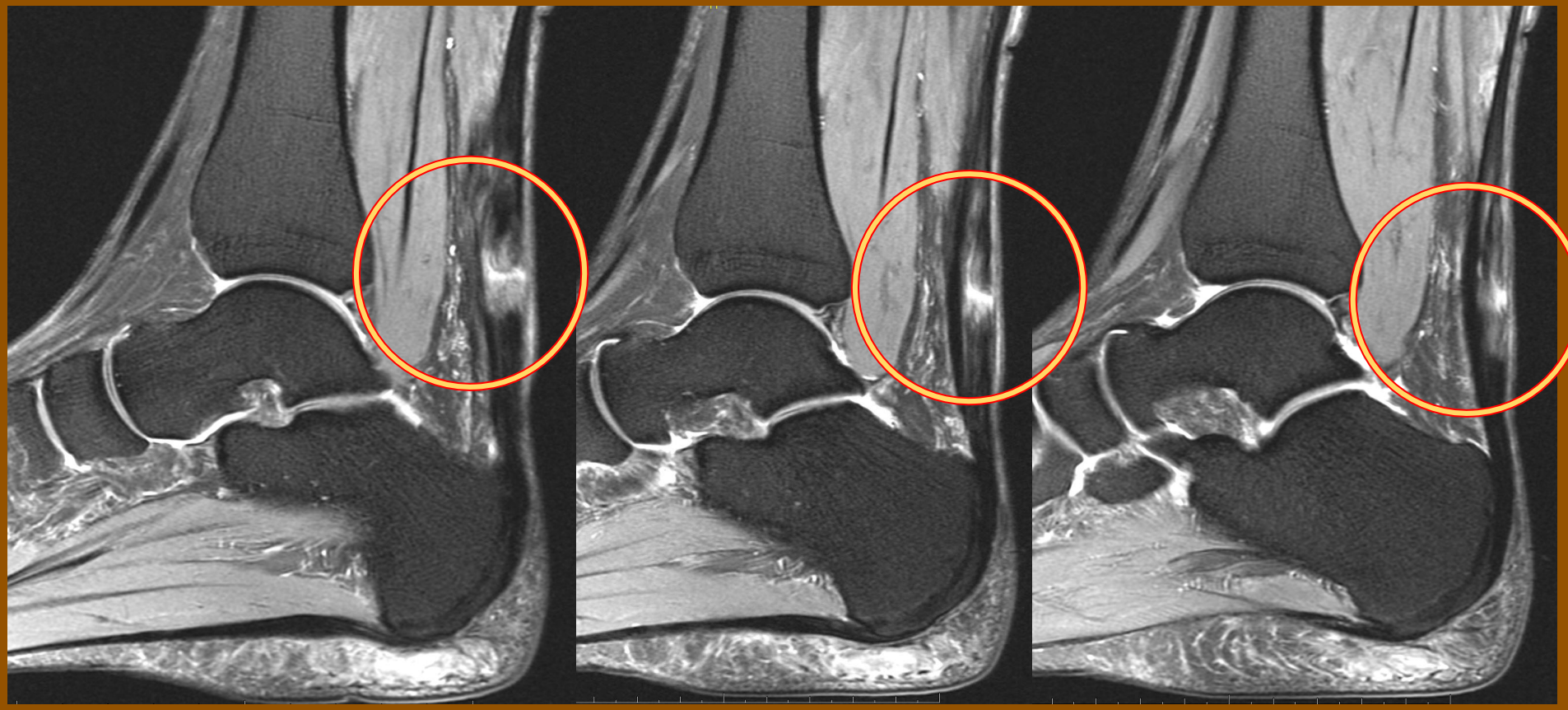


# Combination therapy PRP + mdHACM

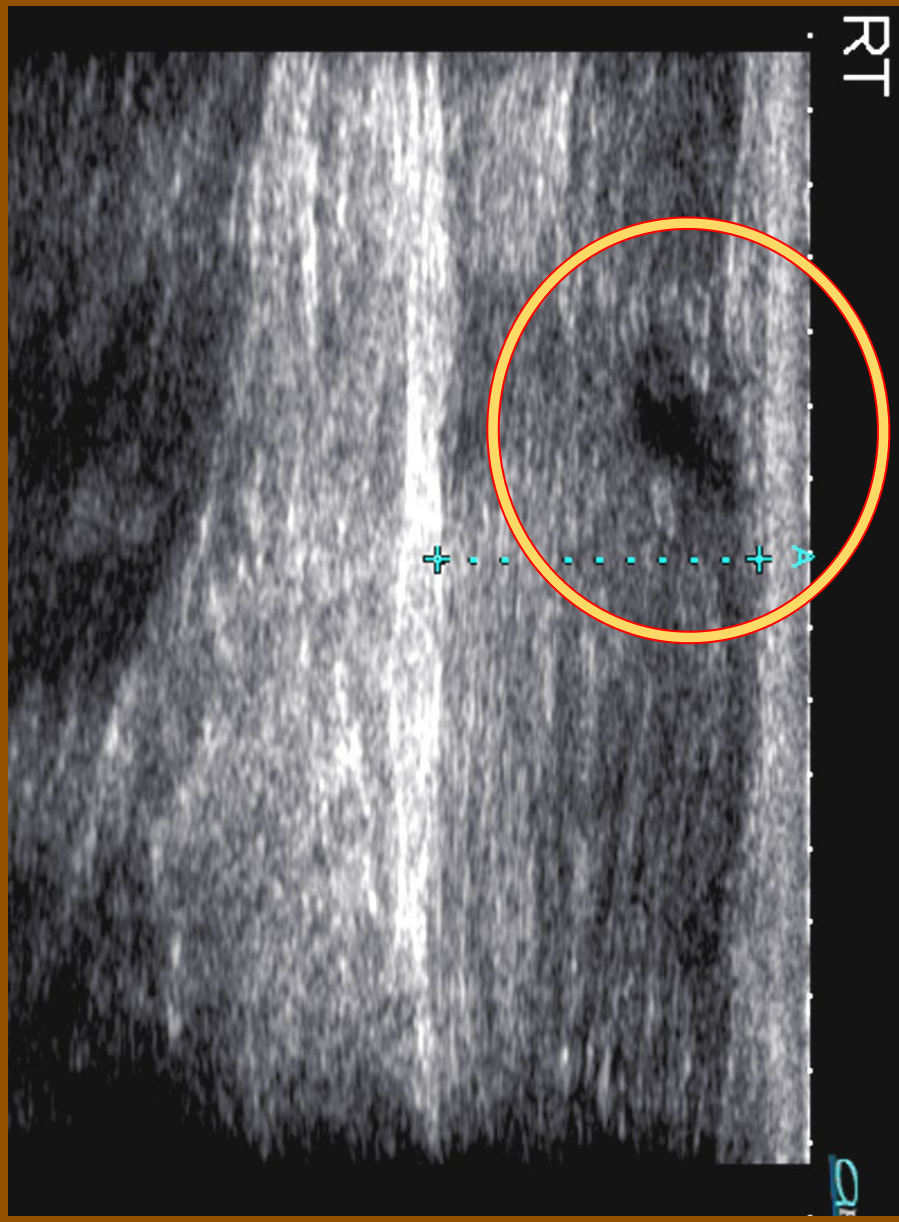


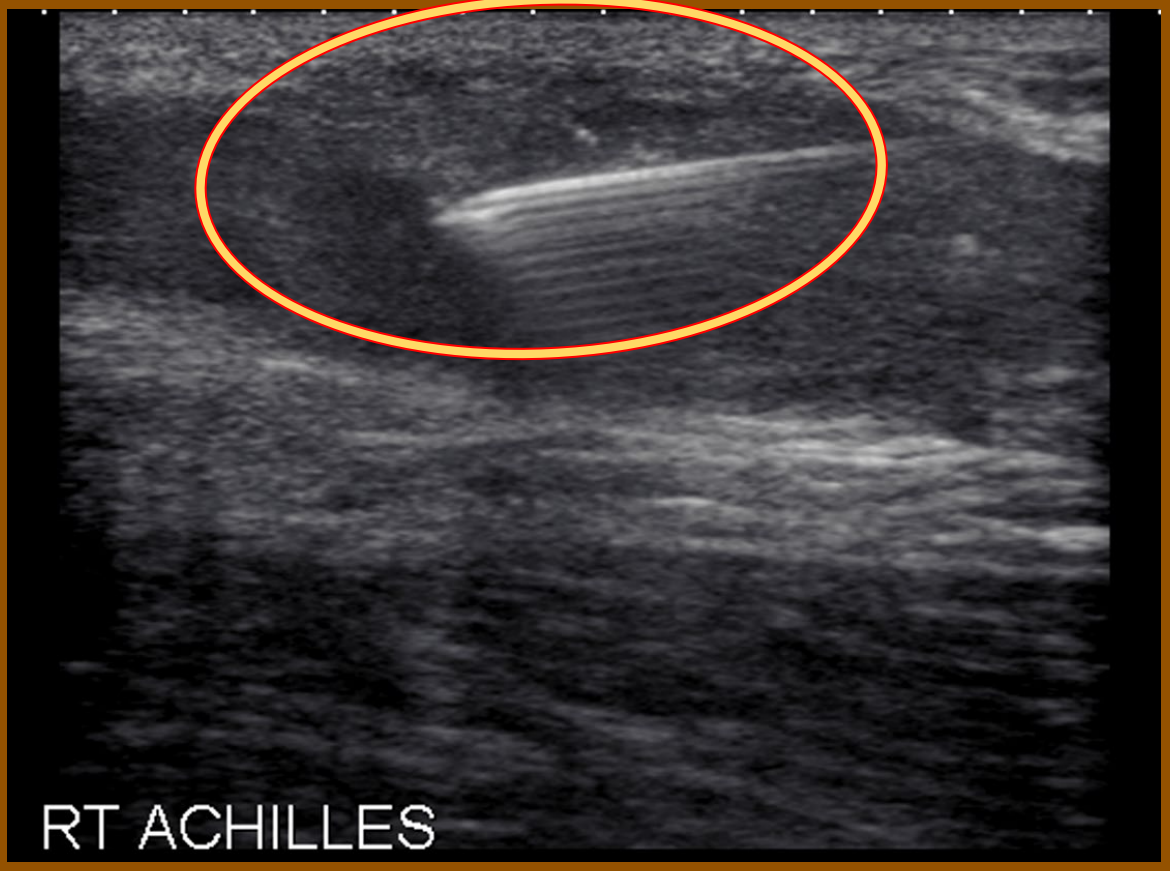


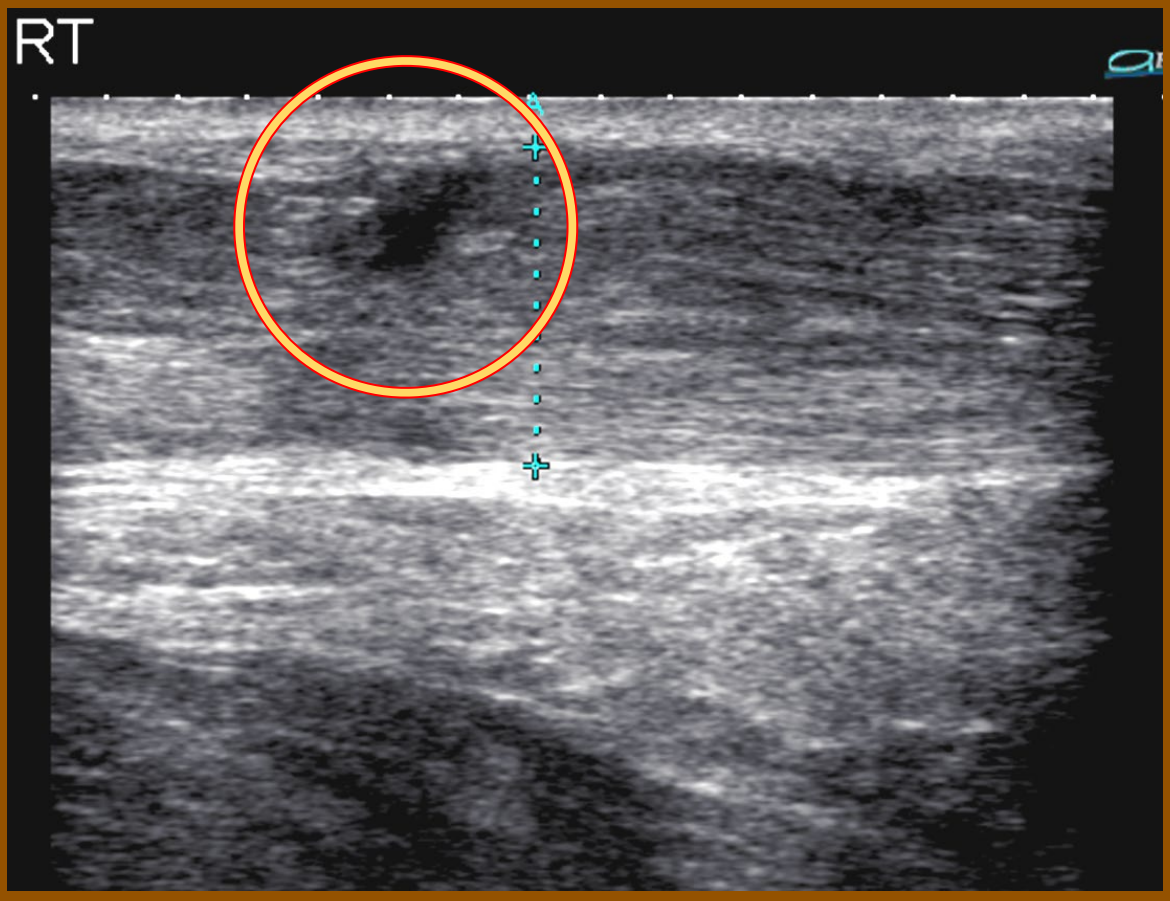
# 43 yo female w/achilles tear



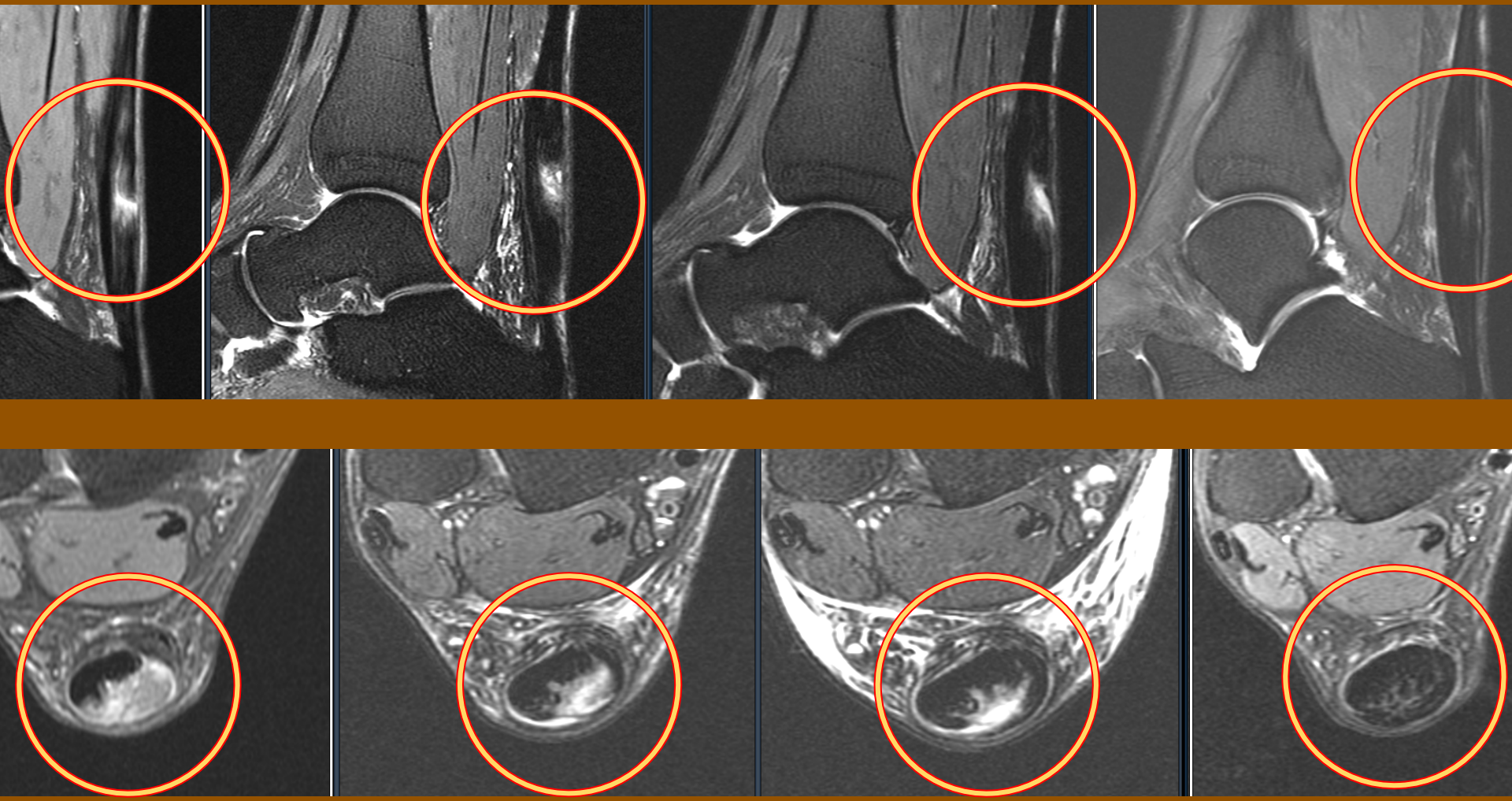



RT

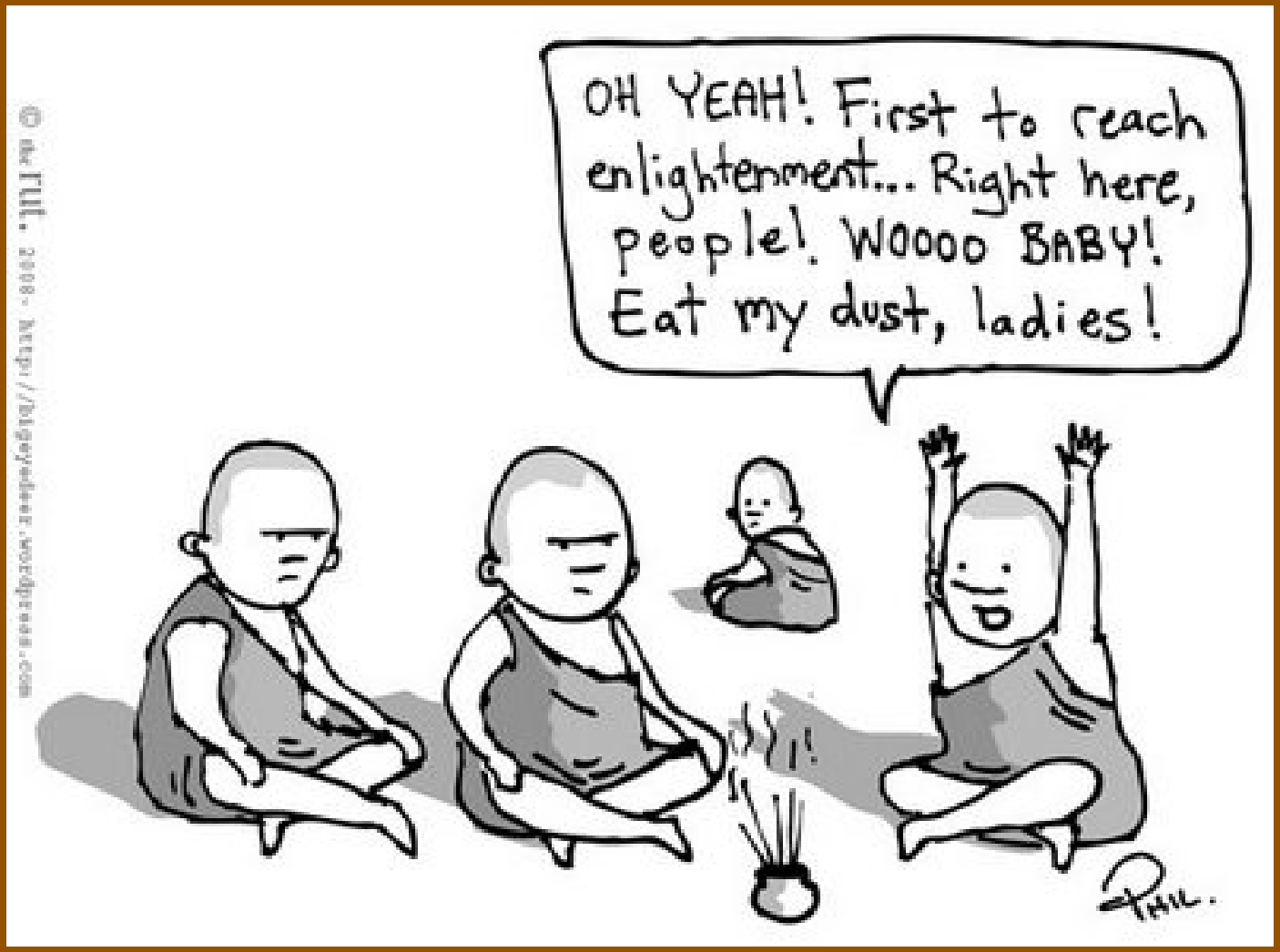

RT ACHILLES


RT

# 70% Achilles Tear – Complete Repair in 4 months



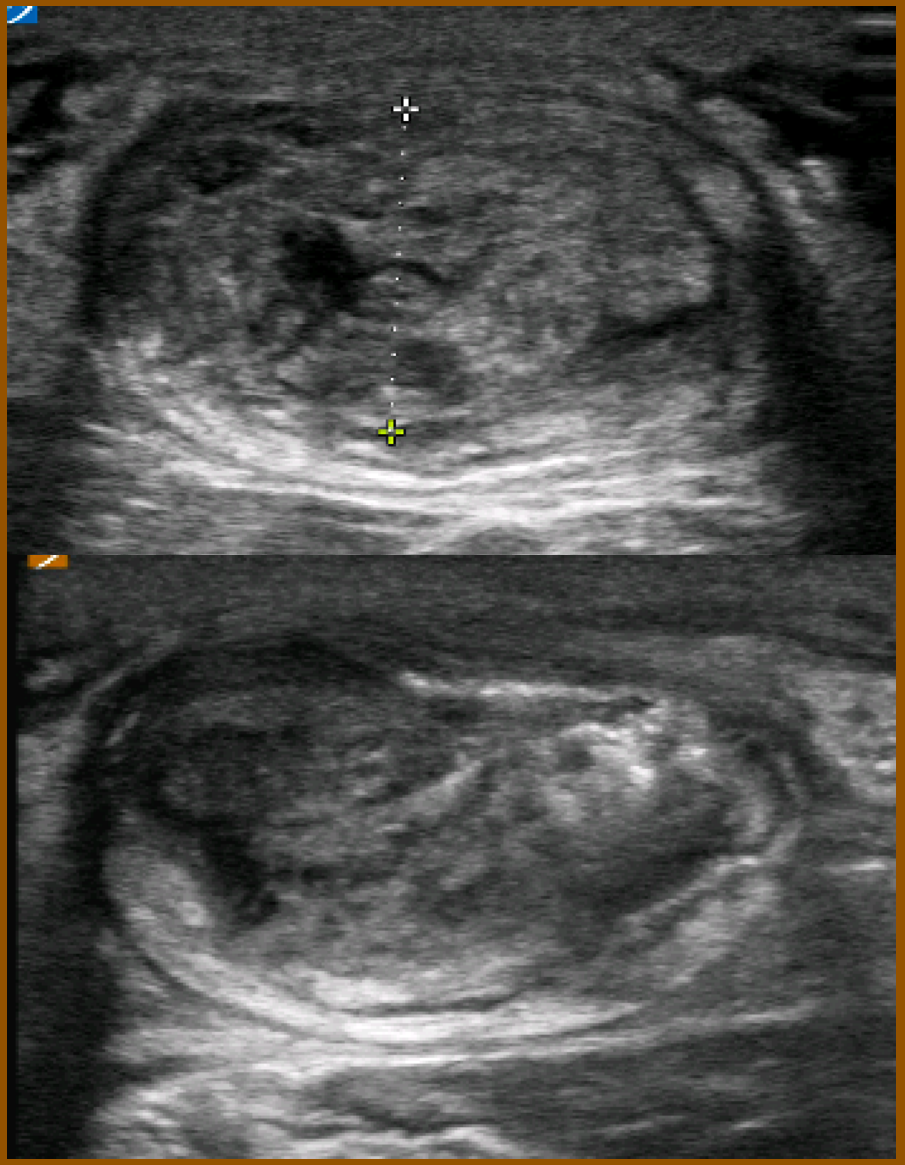
Two PRP treatments 2 months apart


OH YEAH! First to reach enlightenment... Right here, people! WOOOO BABY! Eat my dust, ladies!
PHIL.

# PRP/Platelet Rich Plasma







# Hypertrophic Fibrotic Tendinopathy

# Tenex Debridement

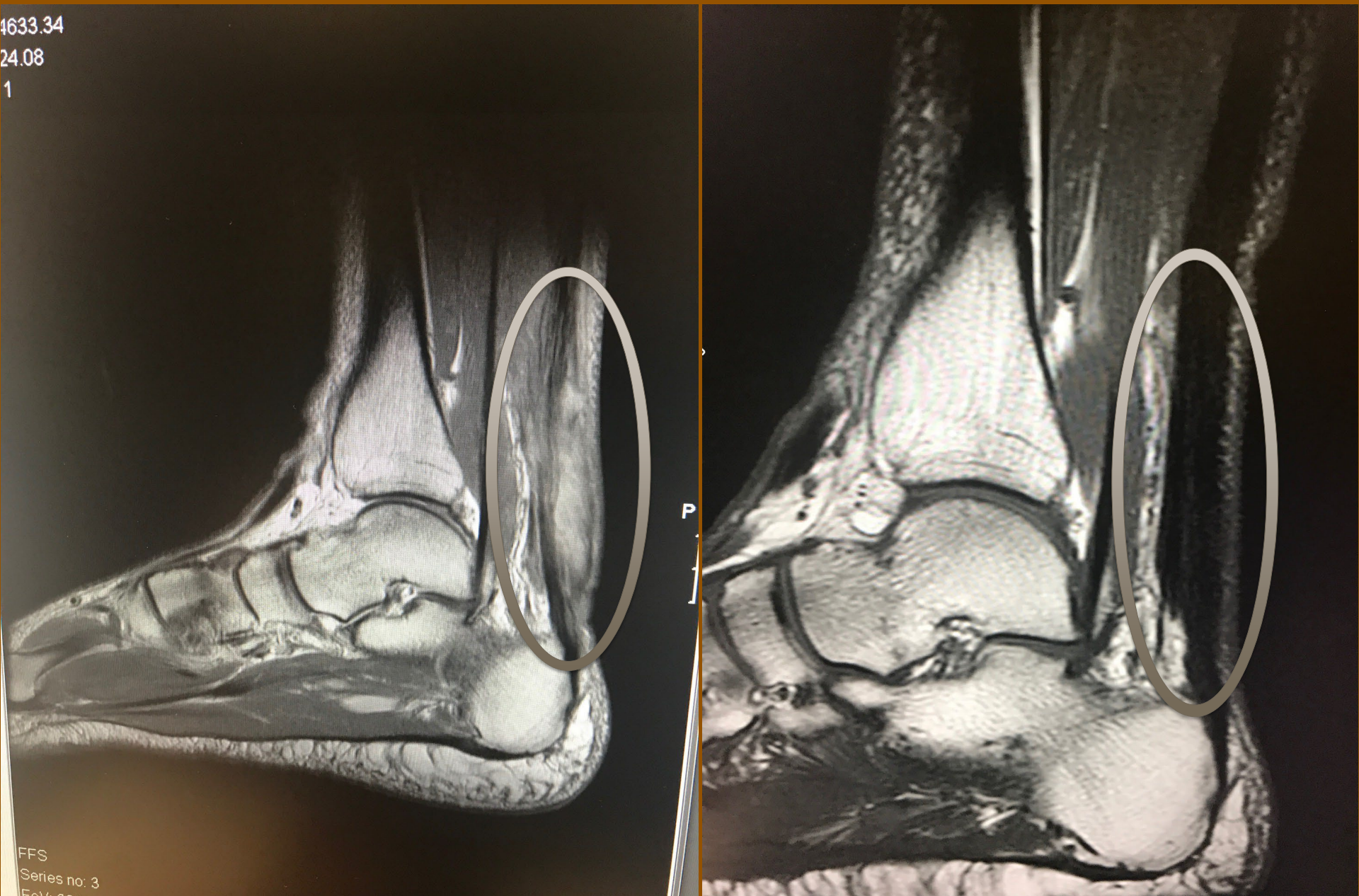
## Demolition and remodeling



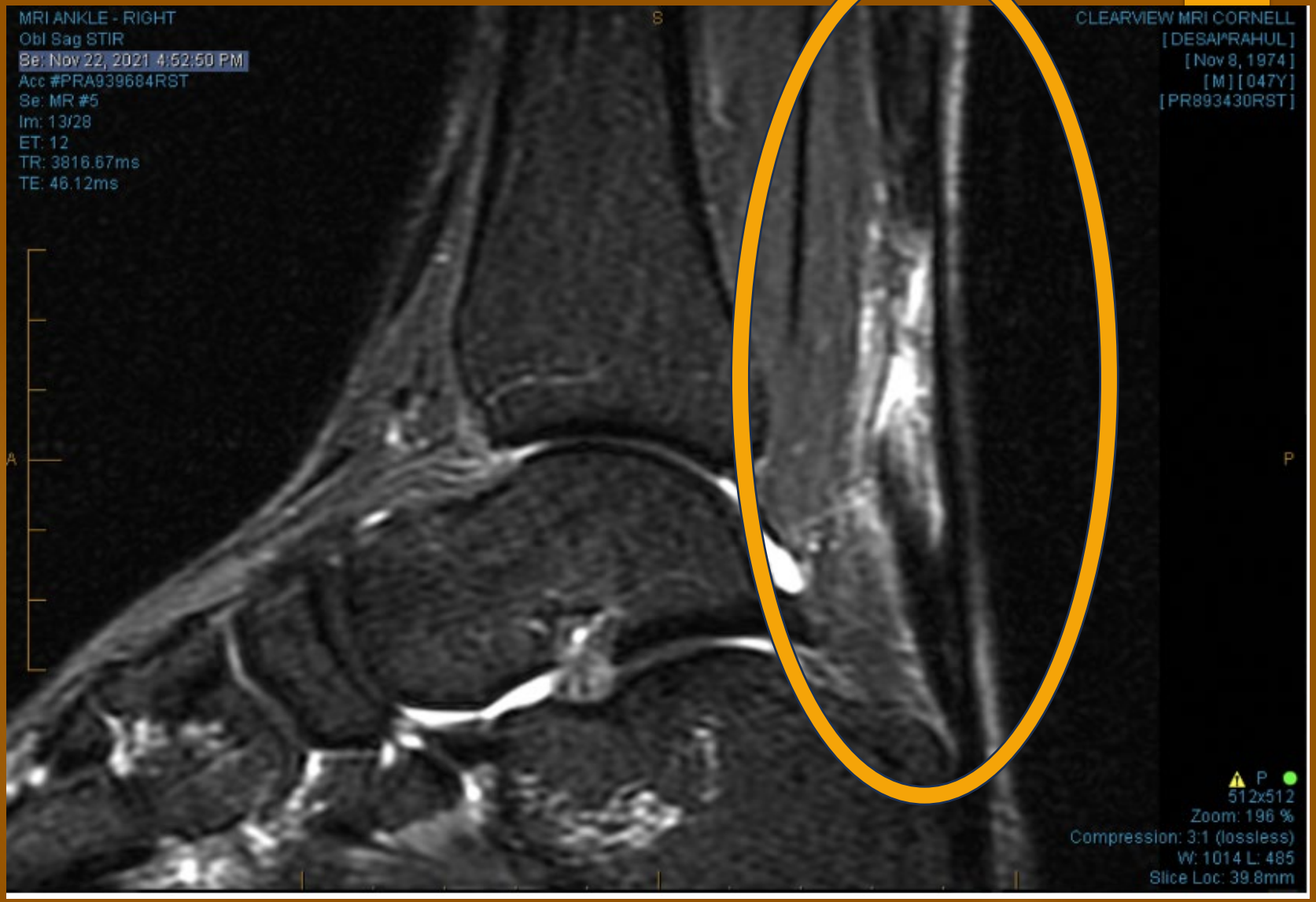




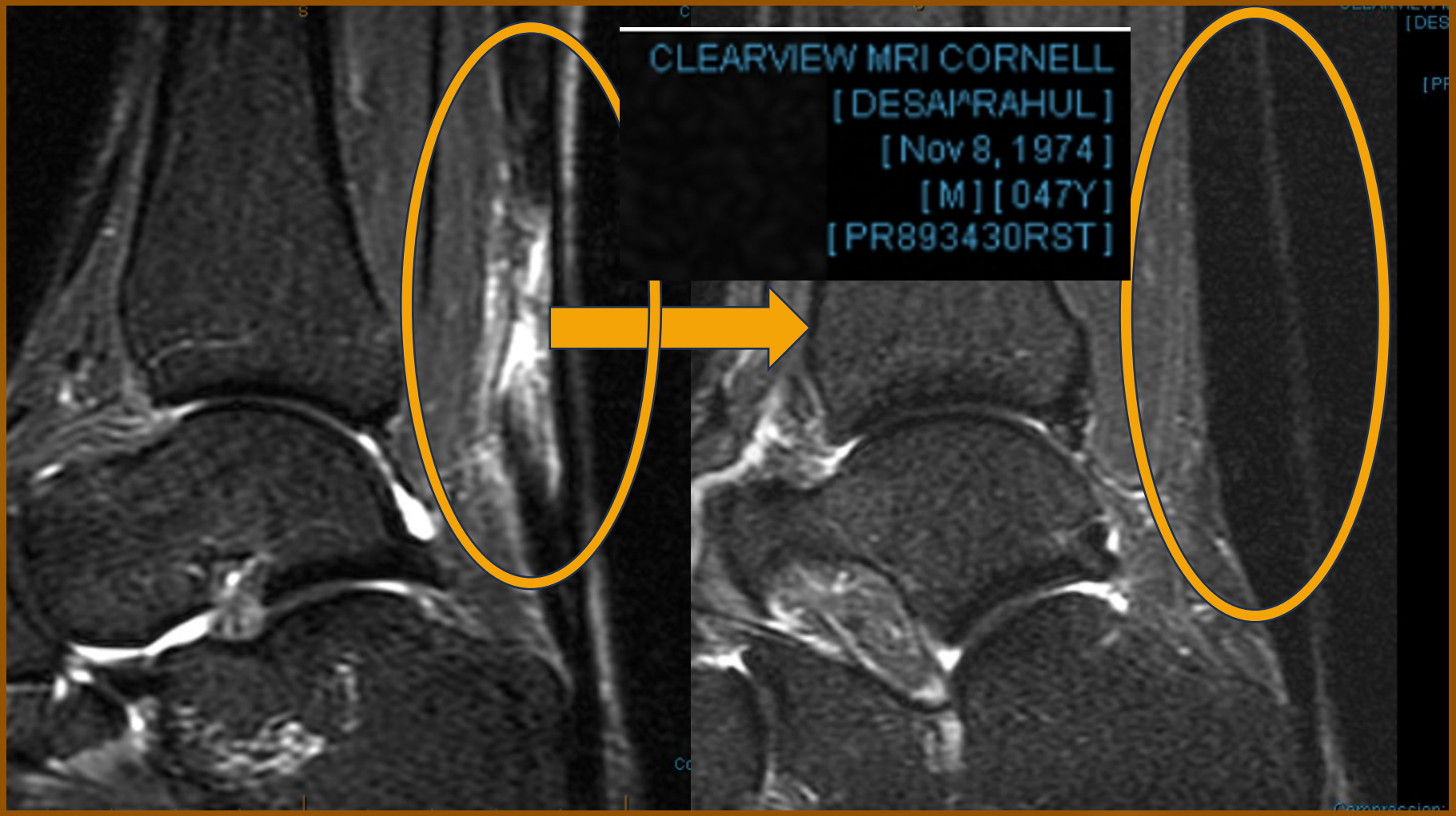

# 6 months to complete healing



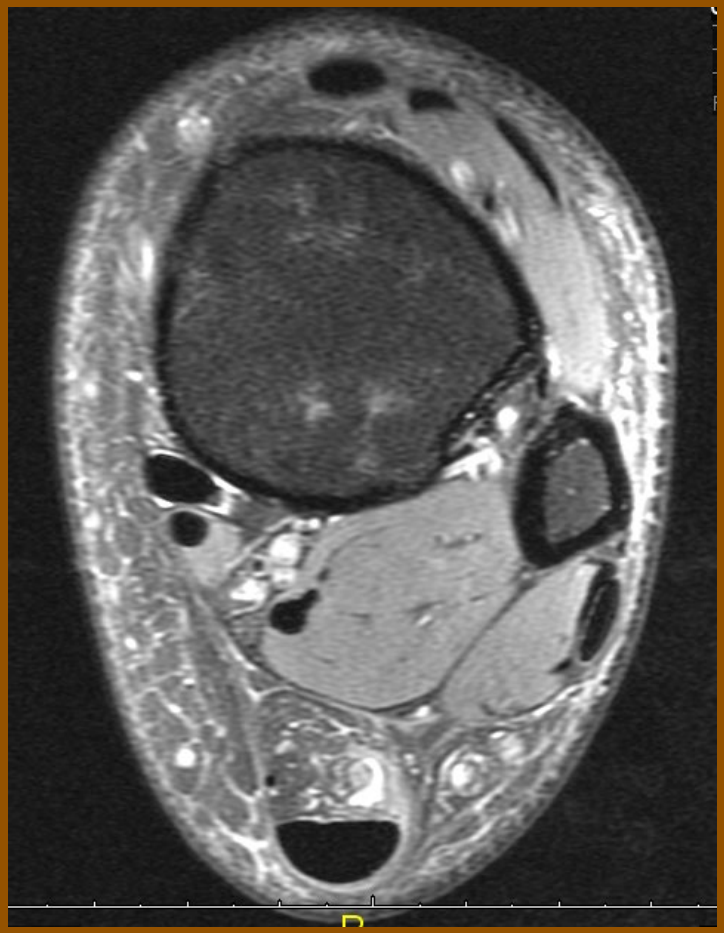
# 47 yo m achilles tendinopathy & tear



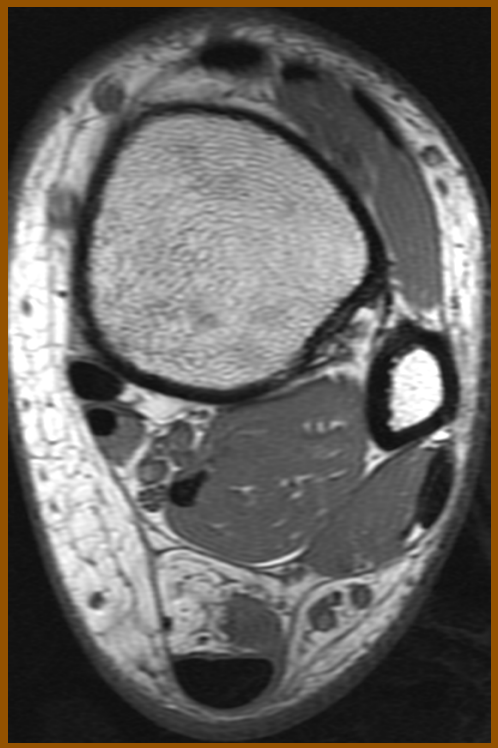
# Autologous Intra-lesional BLP

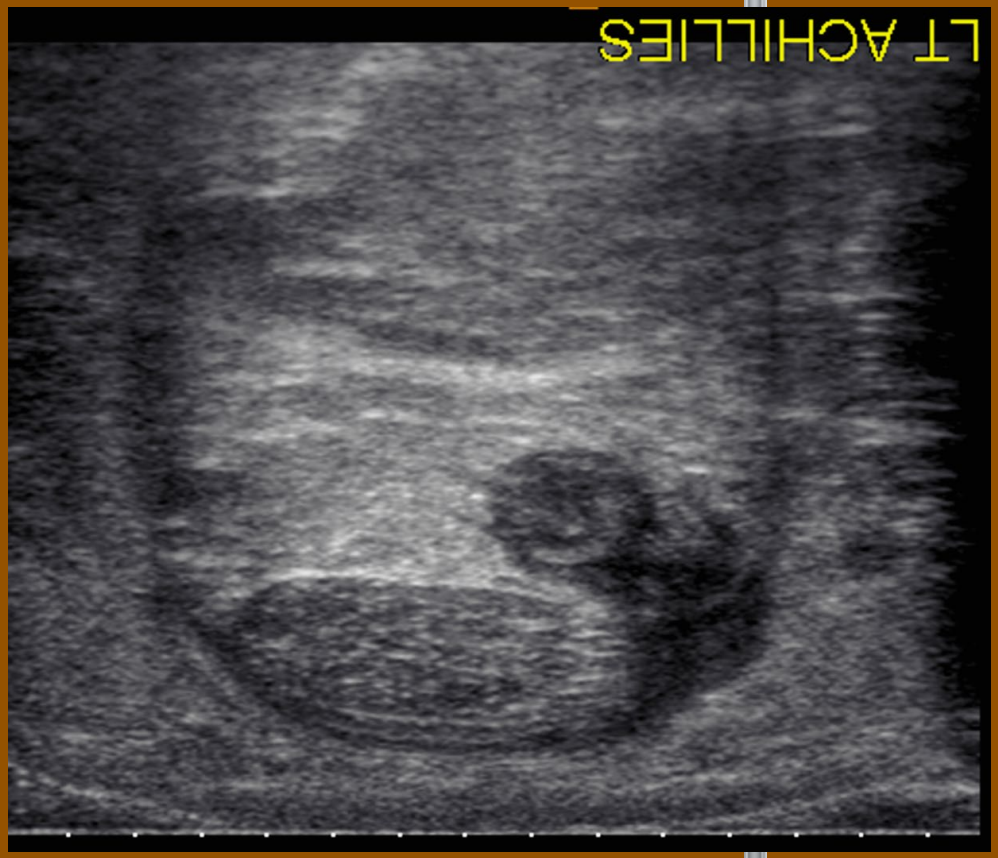


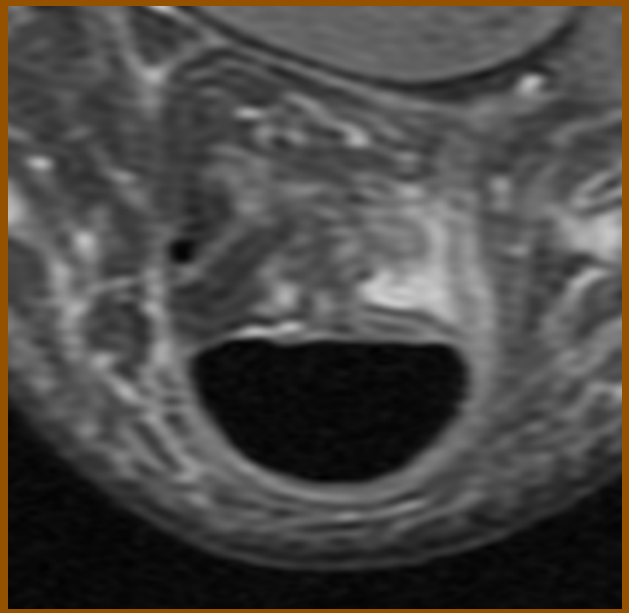
# 35 yo runner

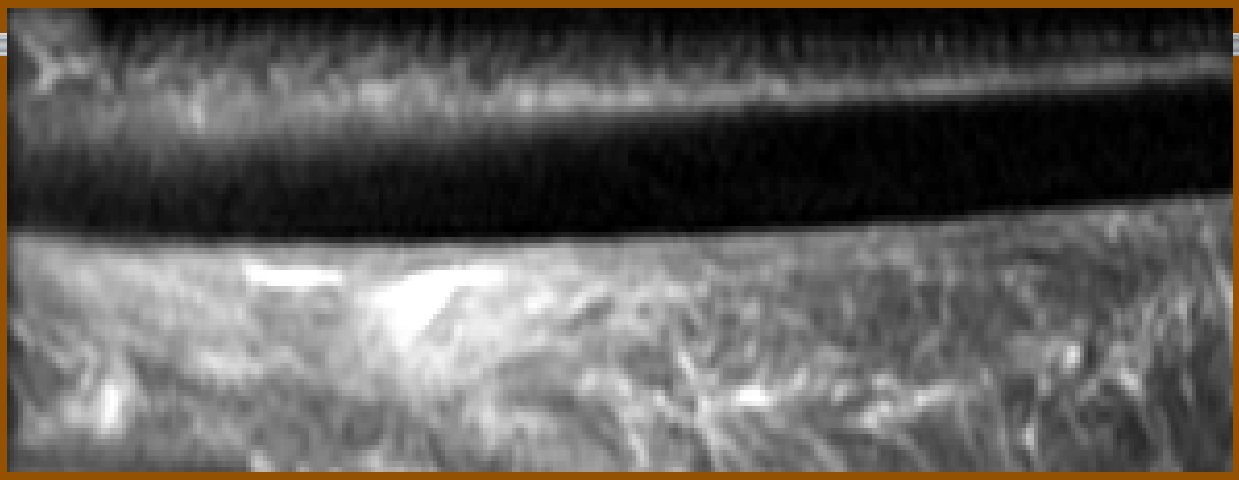


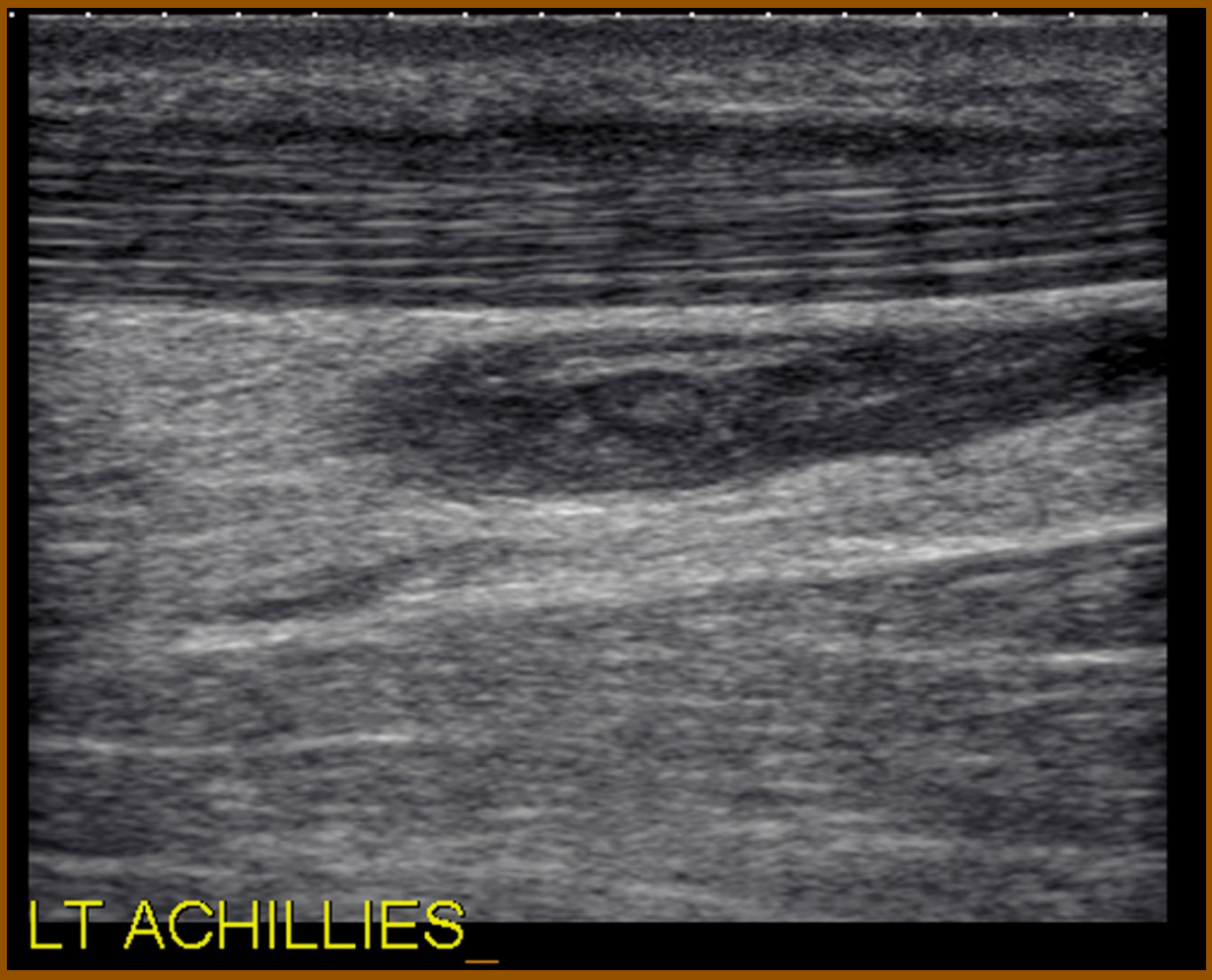


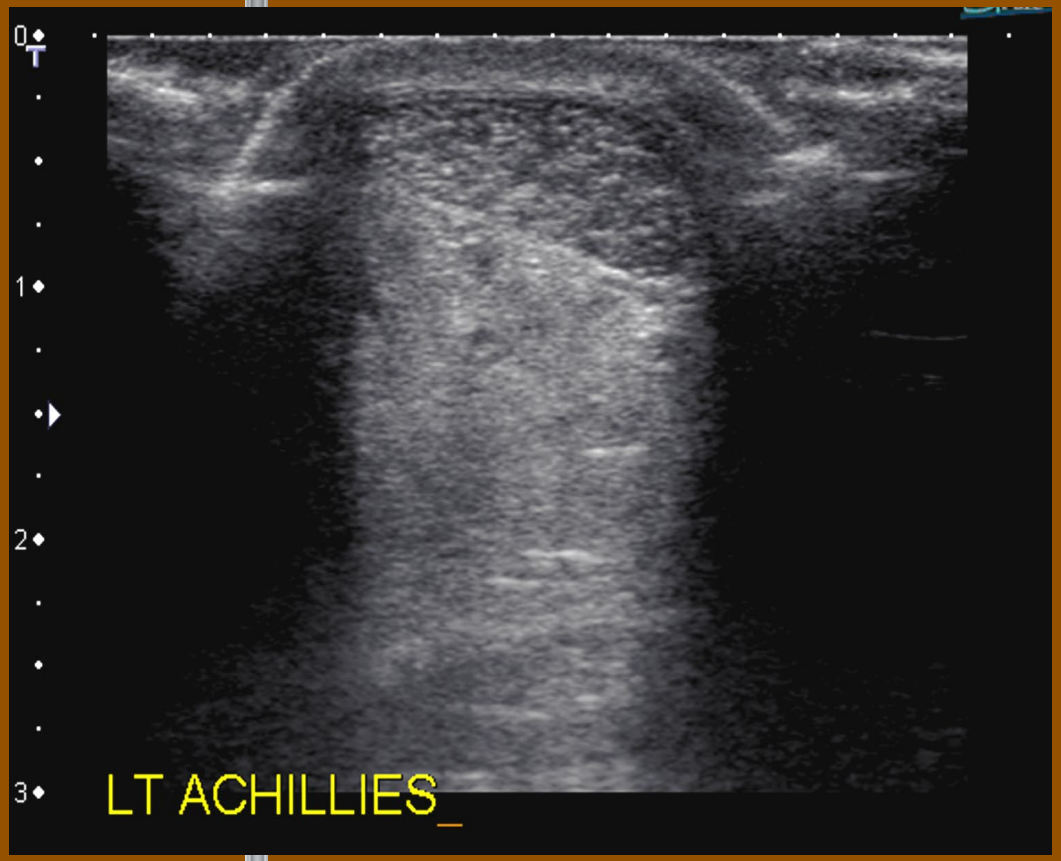


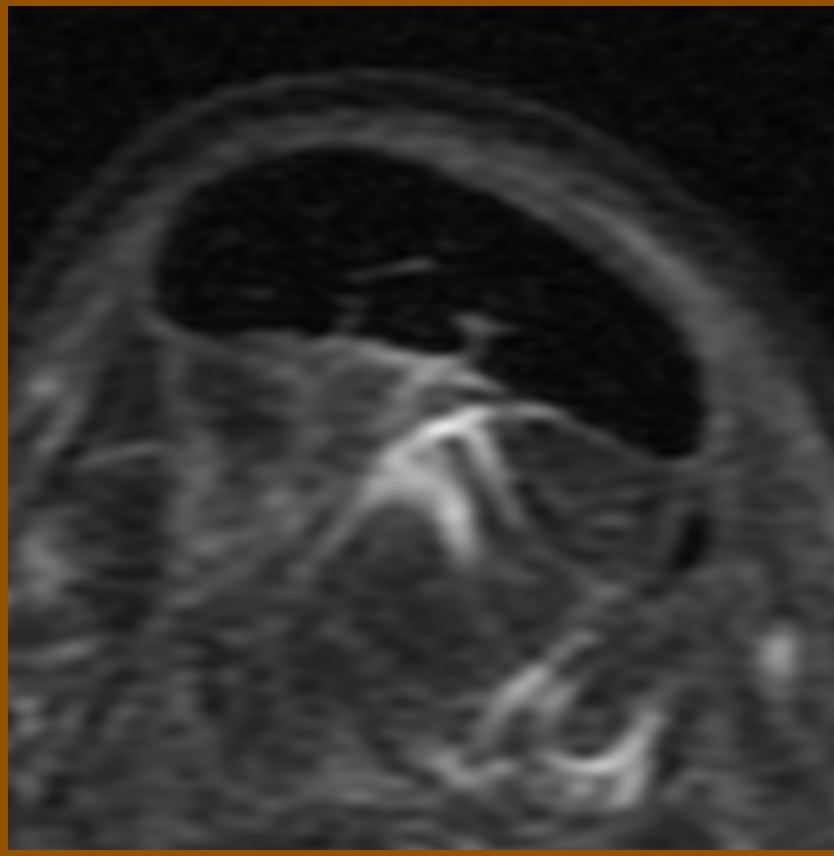

LT ACHILLIES

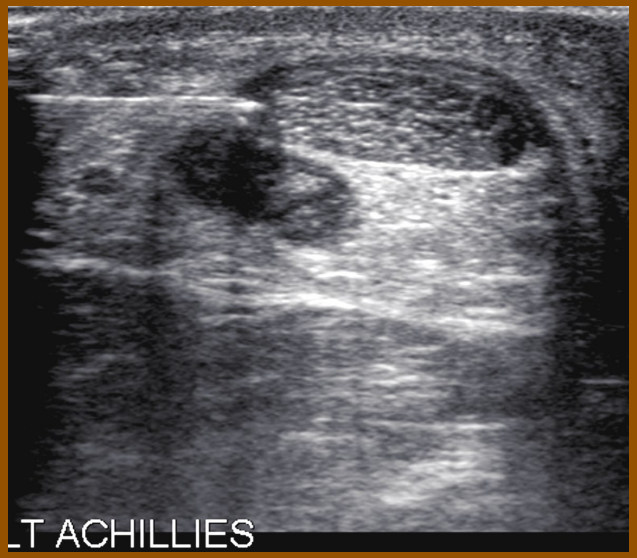


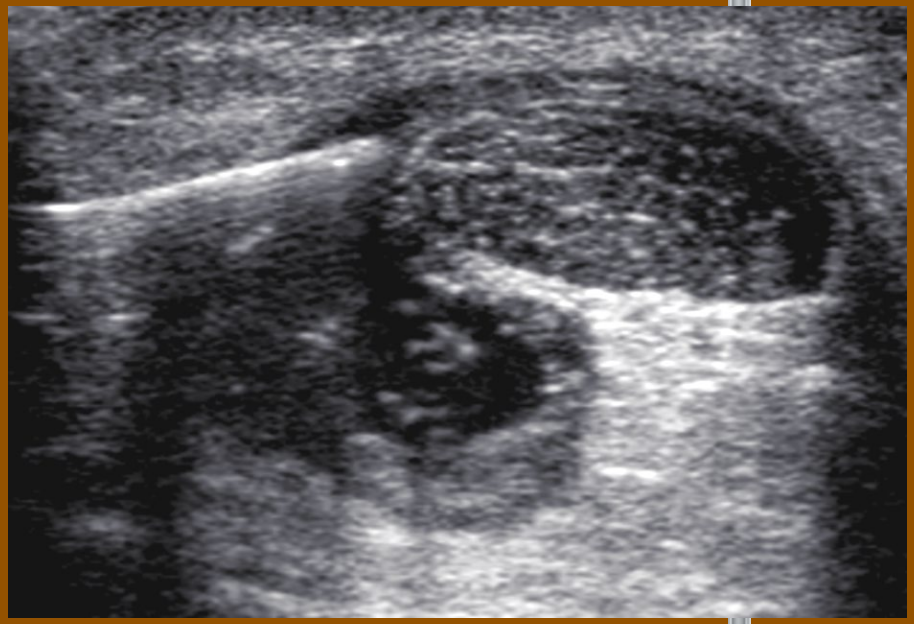


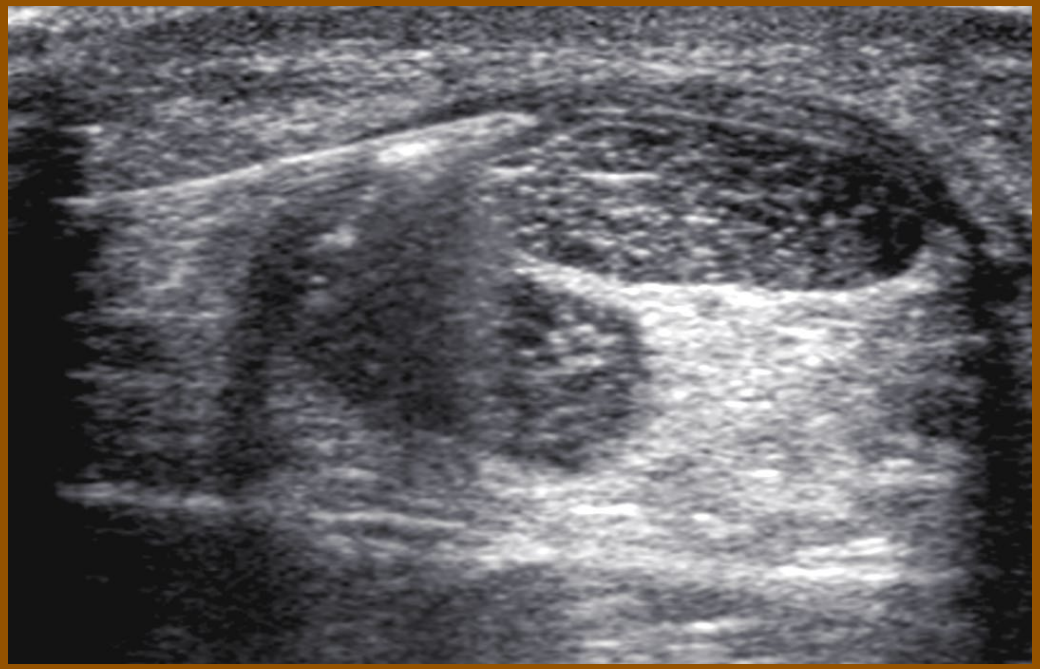

LT ACHILLIES_


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1
2
3
LT ACHILLIES_




LT ACHILLIES





# Achilles Paratenonitis







Growth Factors





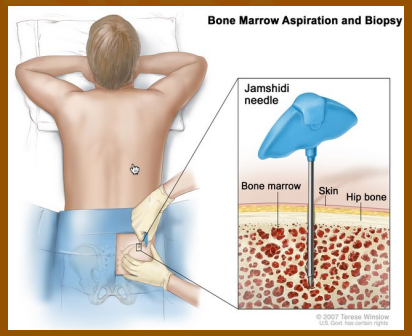


Cell Therapy

# CELLULAR THERAPY

1






2





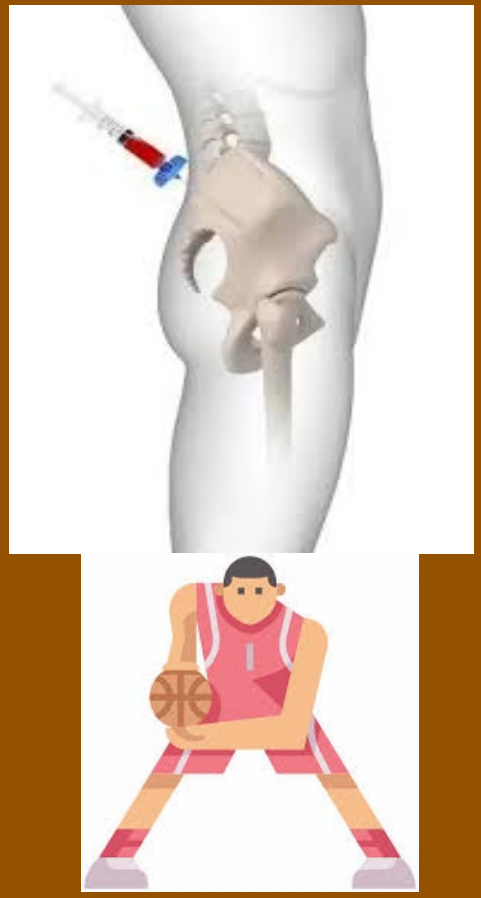

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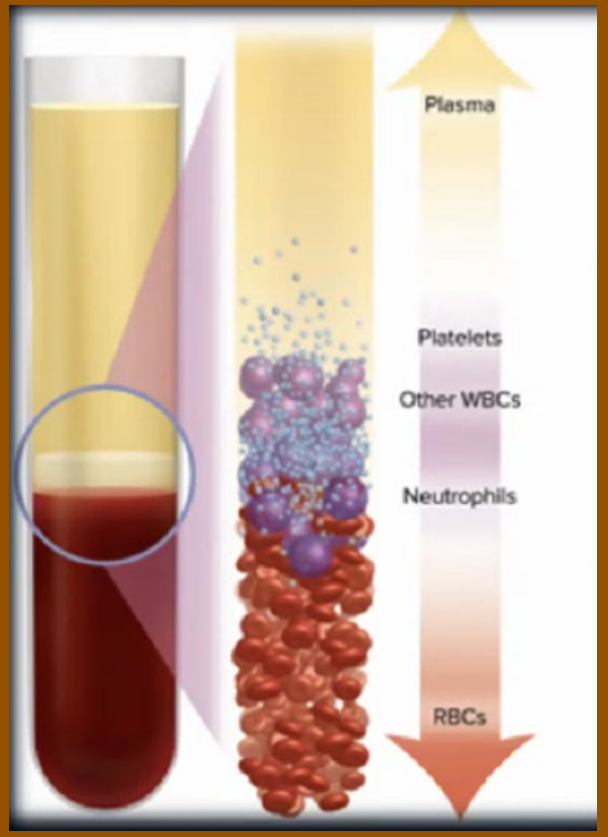



FOR SINGLE USE
MONOJECT
FOR SINGLE USE
FOR SINGLE USE

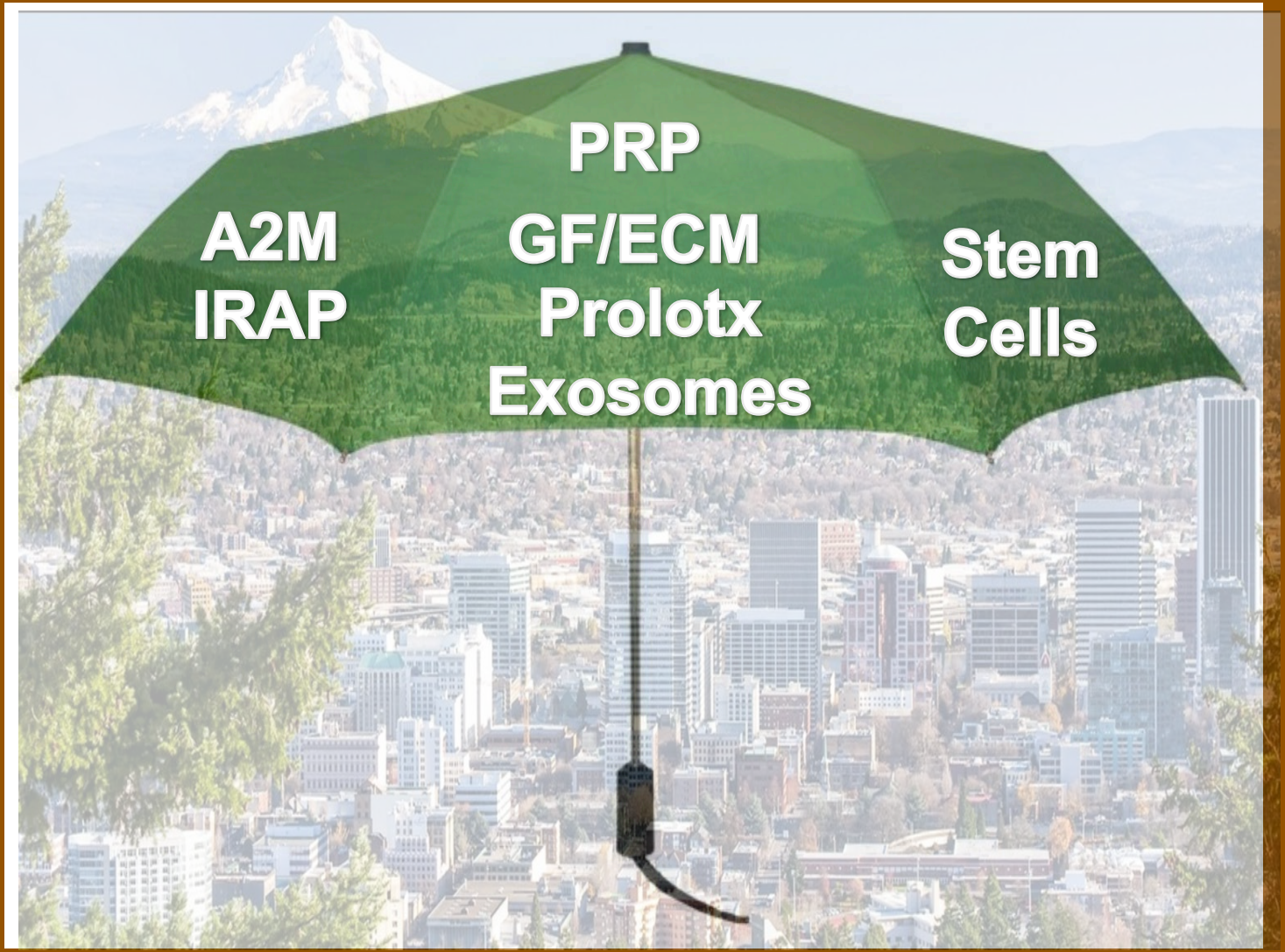

RestorePDX
FUNCTION PERFORMANCE LIFE

# Triple Threat





# Anti-inflammation to Healing



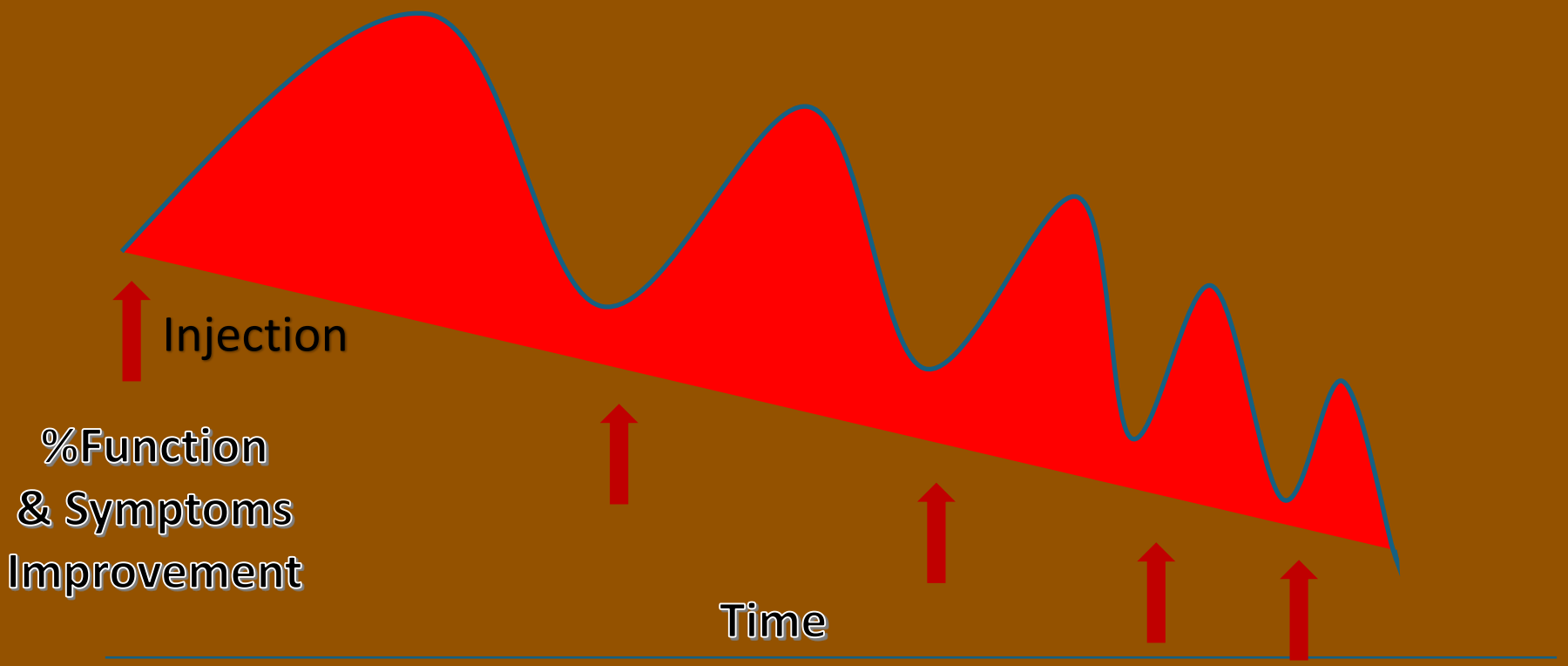

# Choices


Curative
tendons
ligaments
soft tissues
Maintenance
arthritis

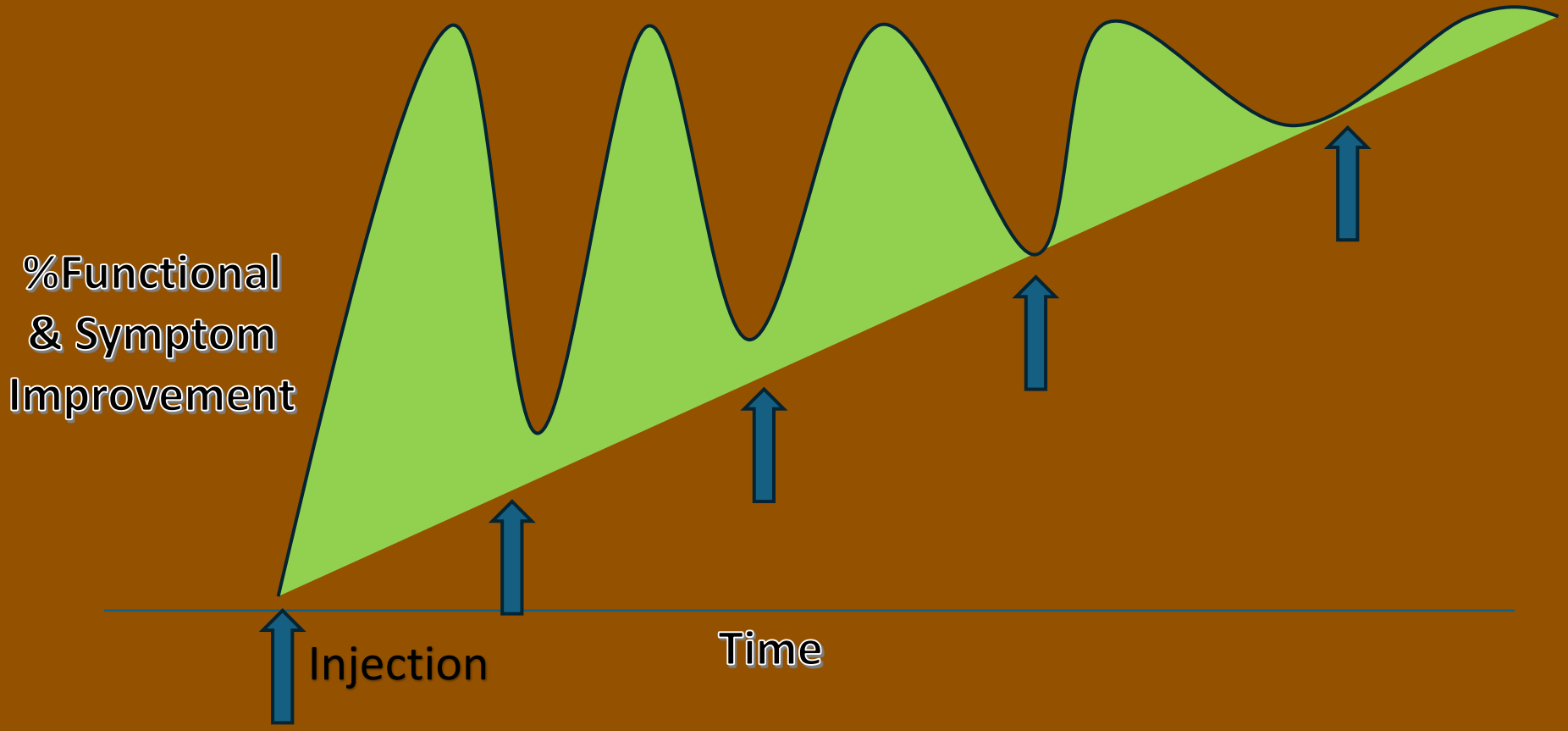


Close only Counts in Horseshoe s, Hand-Grenades and..... STEROIDS

# Steroid Diminishing Returns

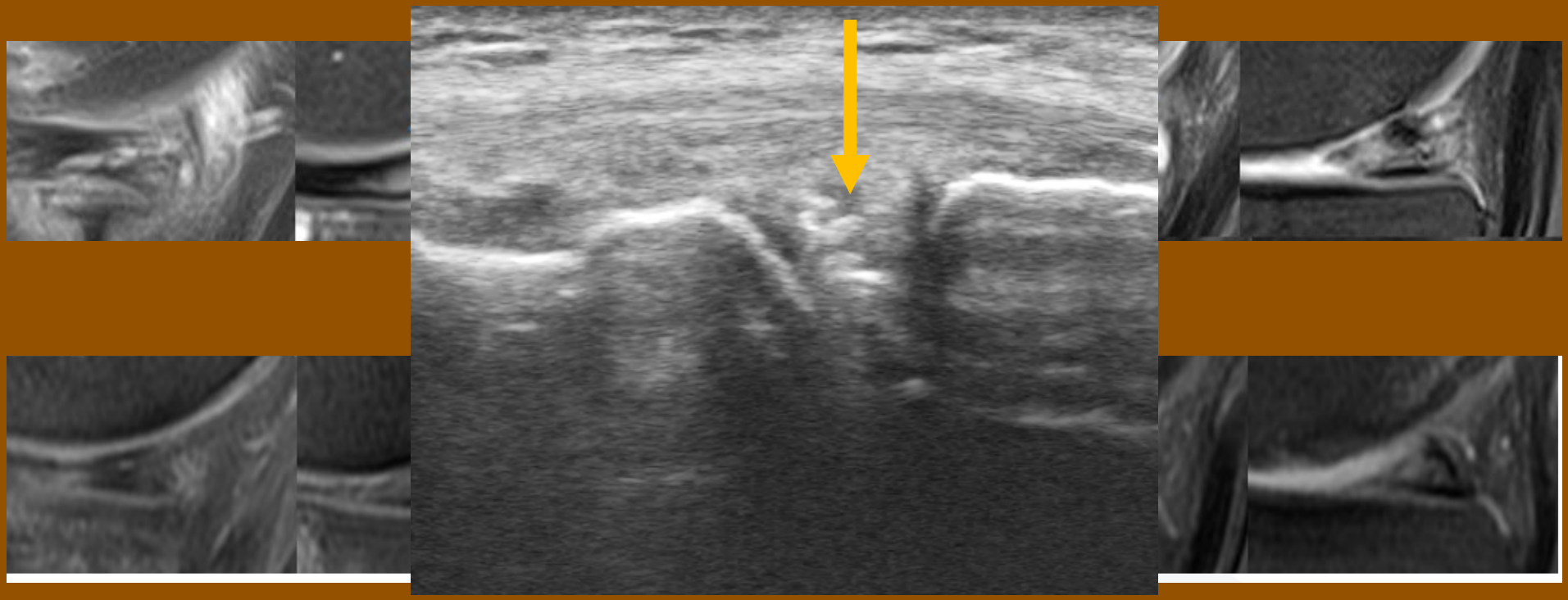


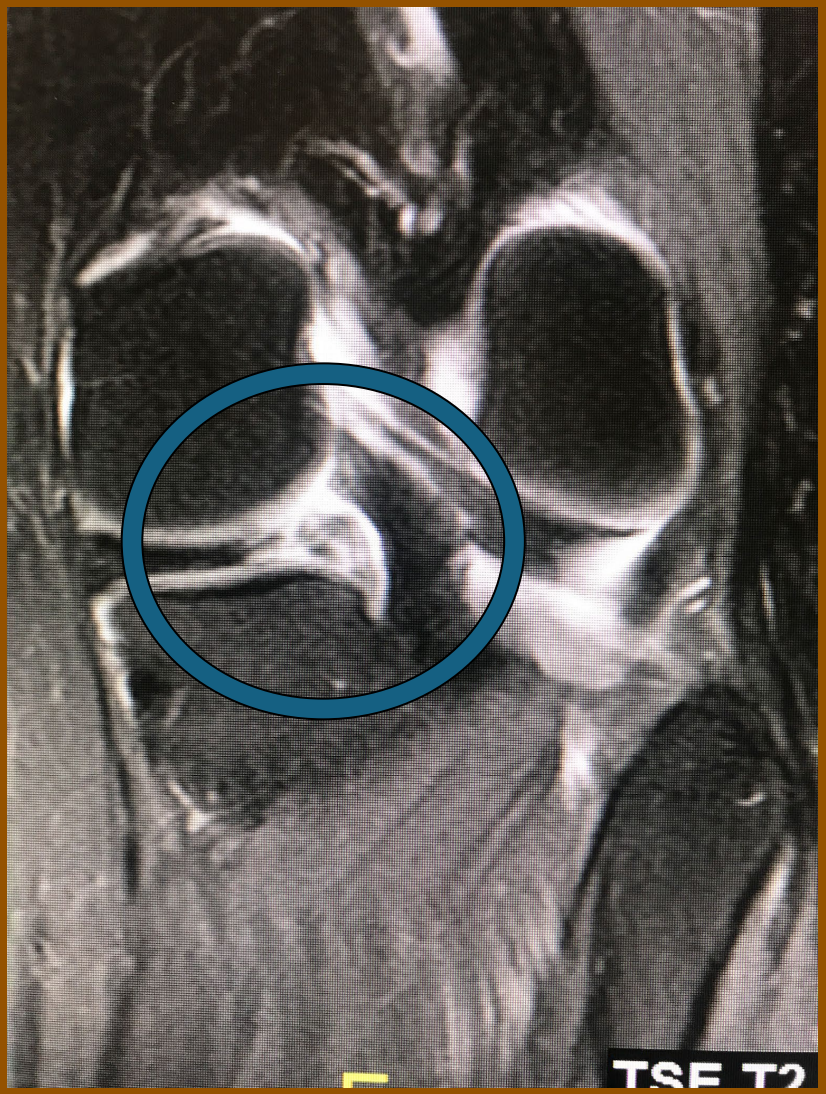
# Regen Cumulative Benefits



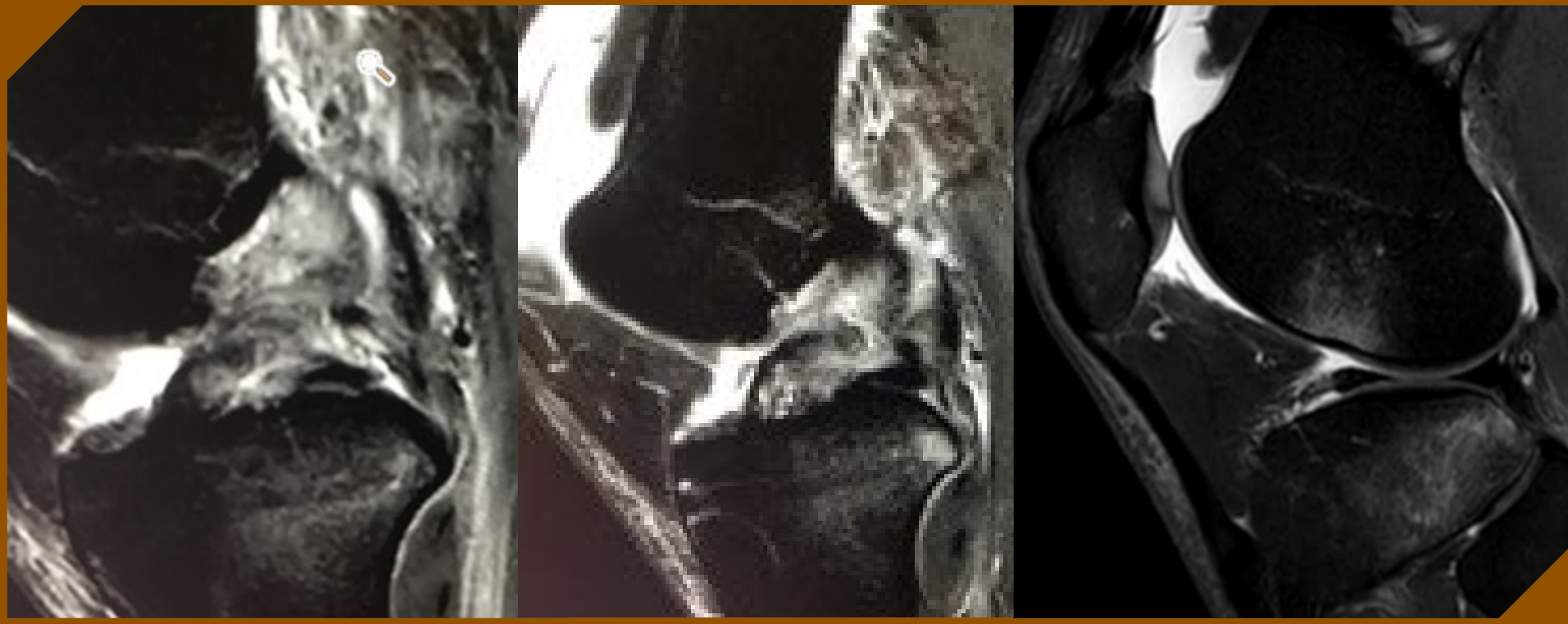
Our Talk is about the POSSIBILITIES!

# Intra-Mensical Therapy




TSE T2





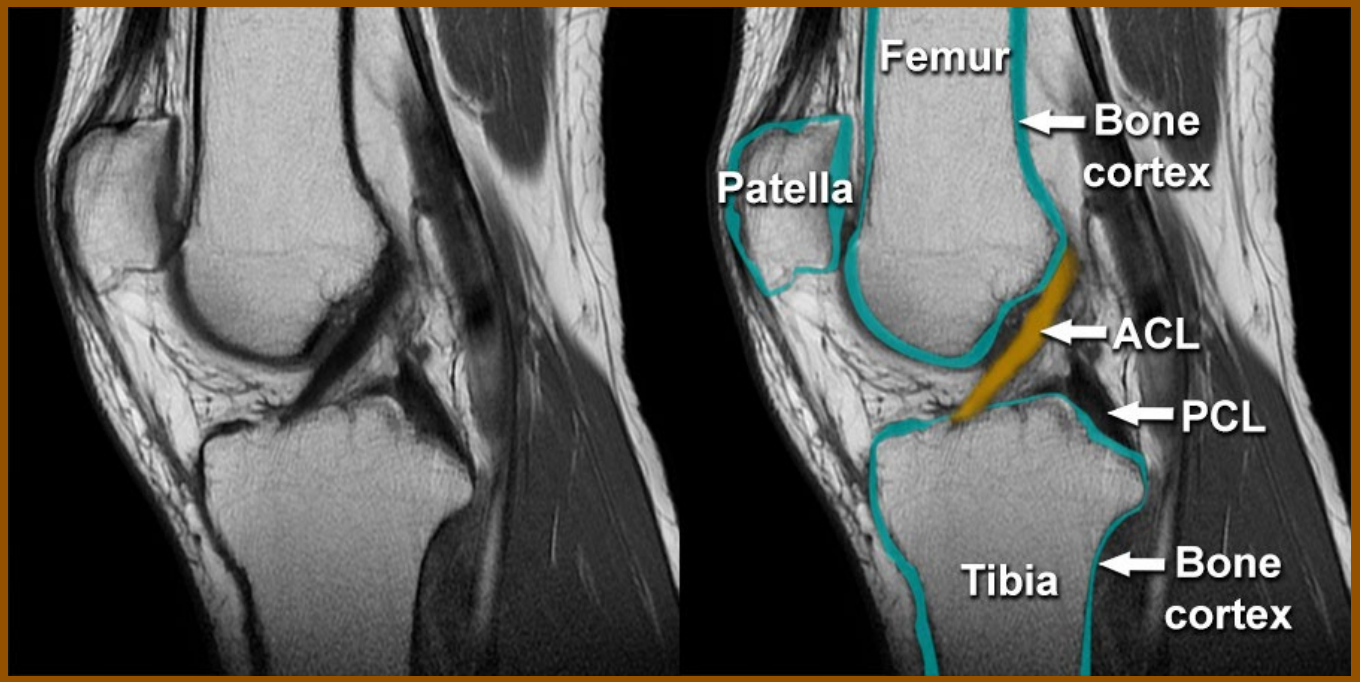
Complete ACL tear?

# Ligament & Tendon Healing Biologically Active Scaffold

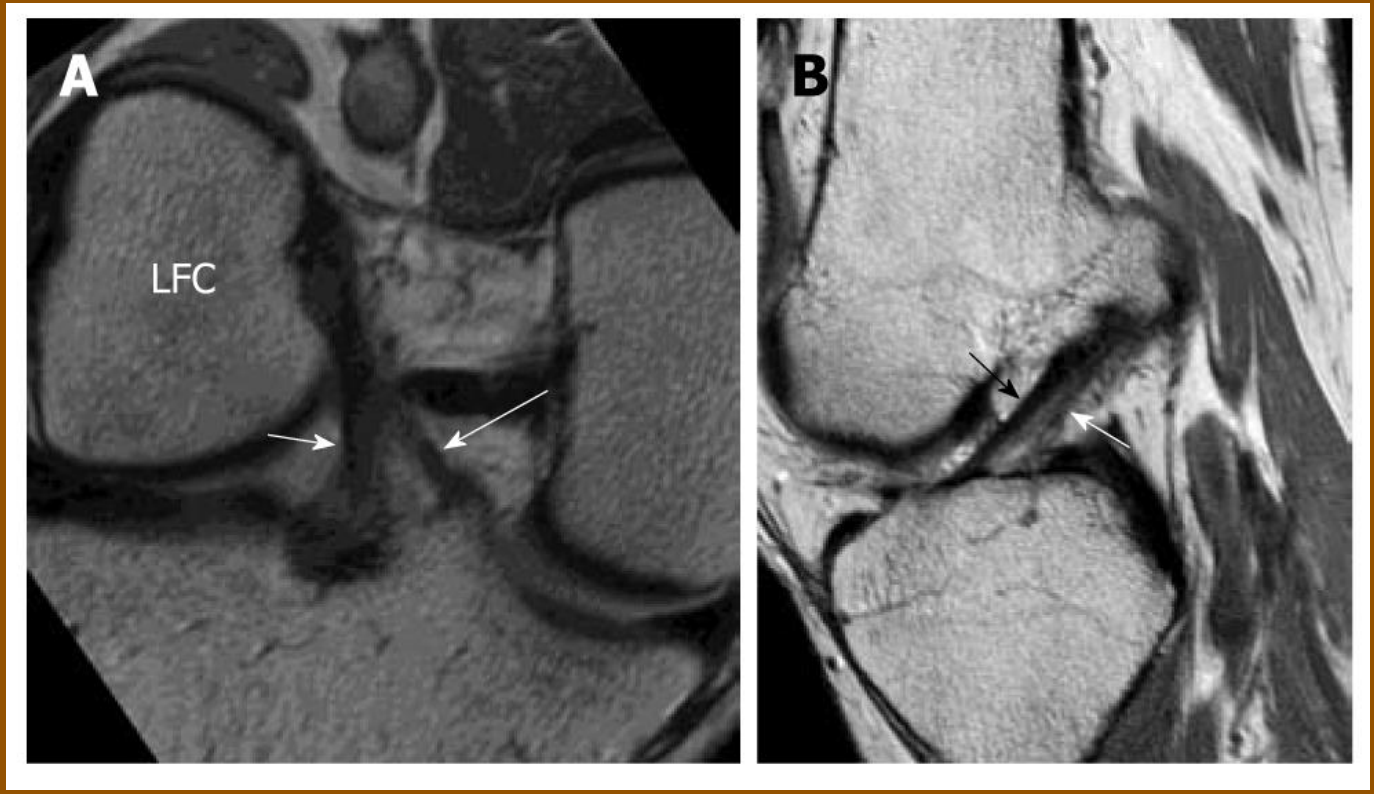




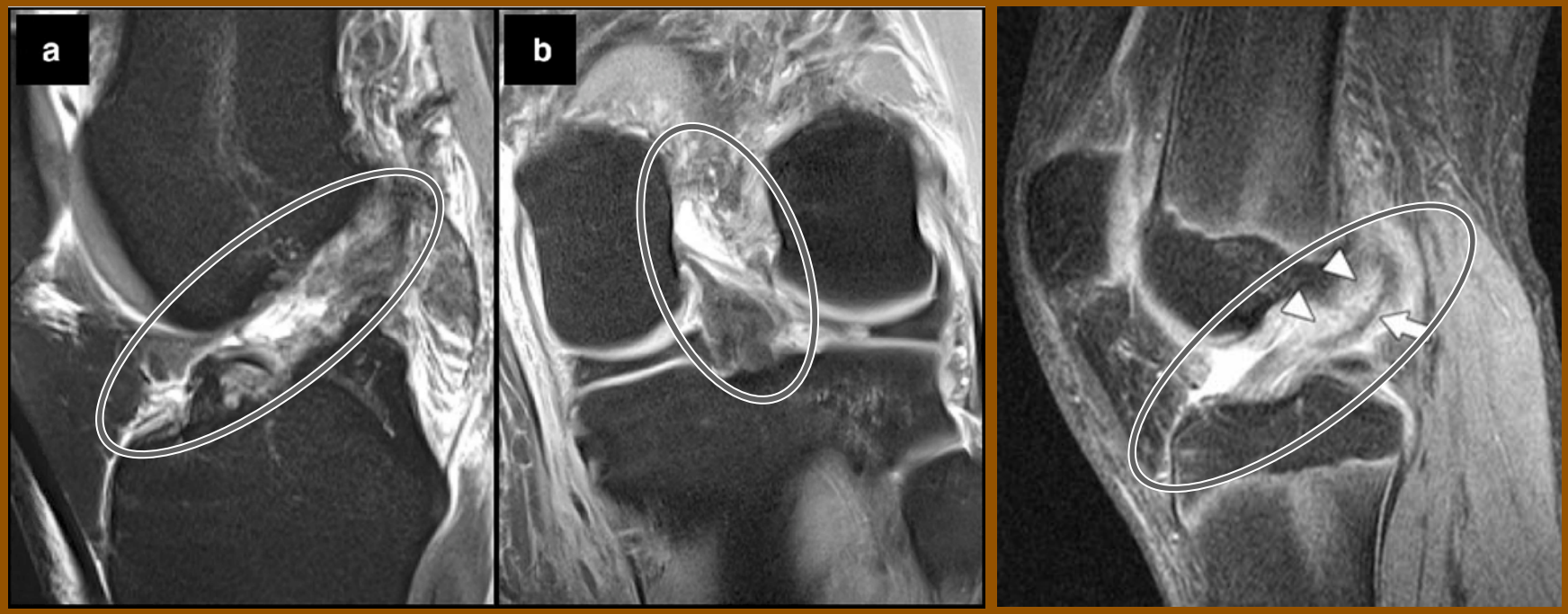
# Normal



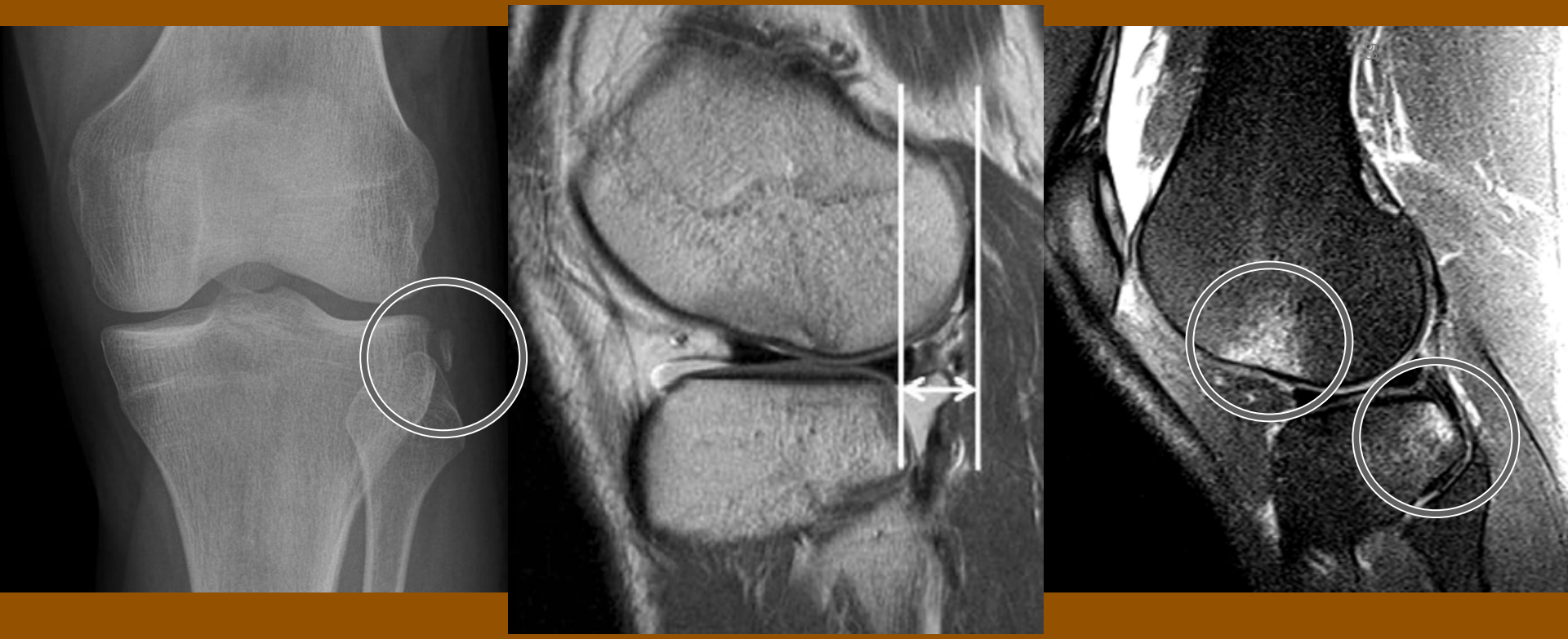
# Oblique Coronal and Sagittal Planes



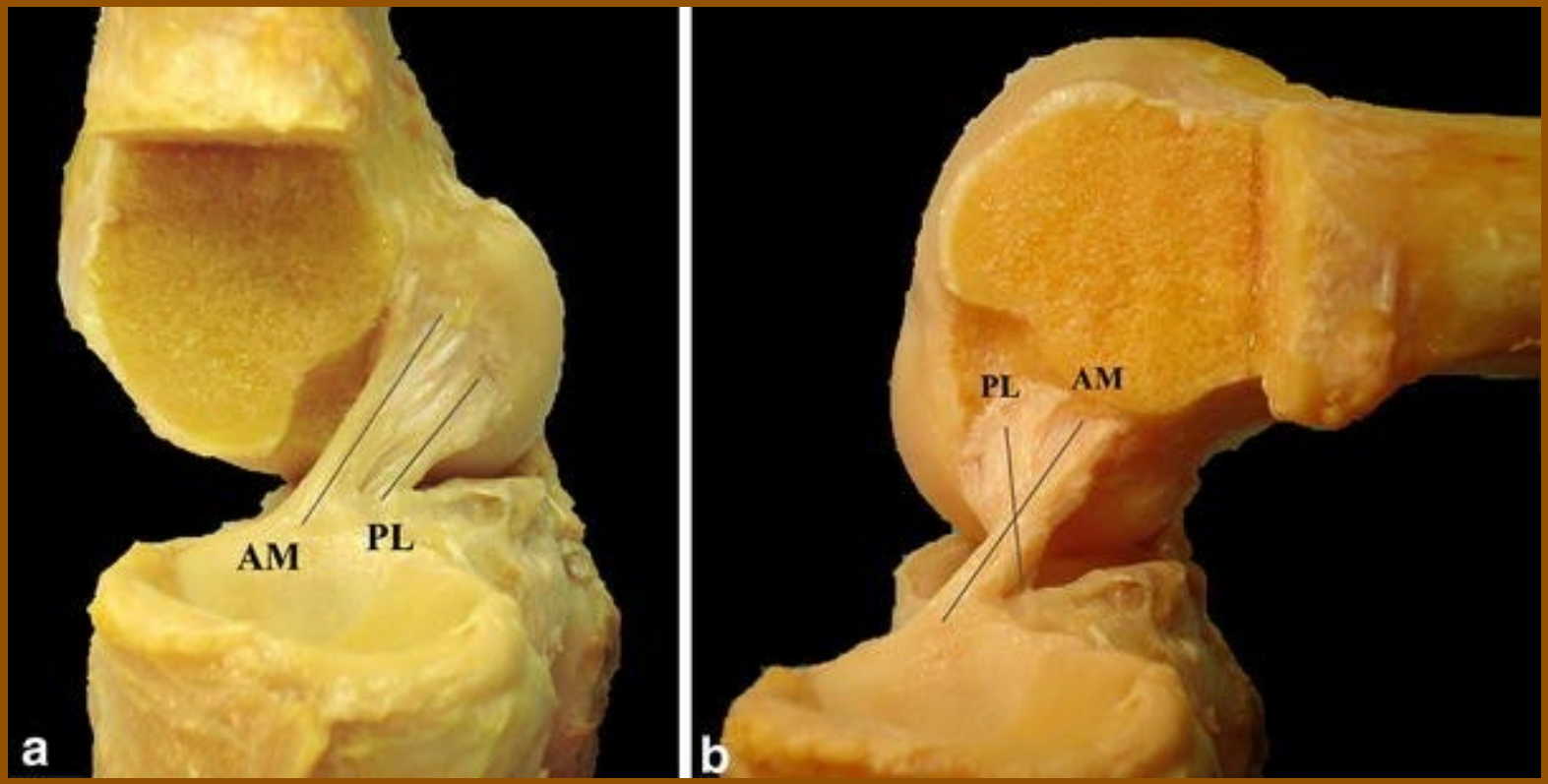
# Primary Sign

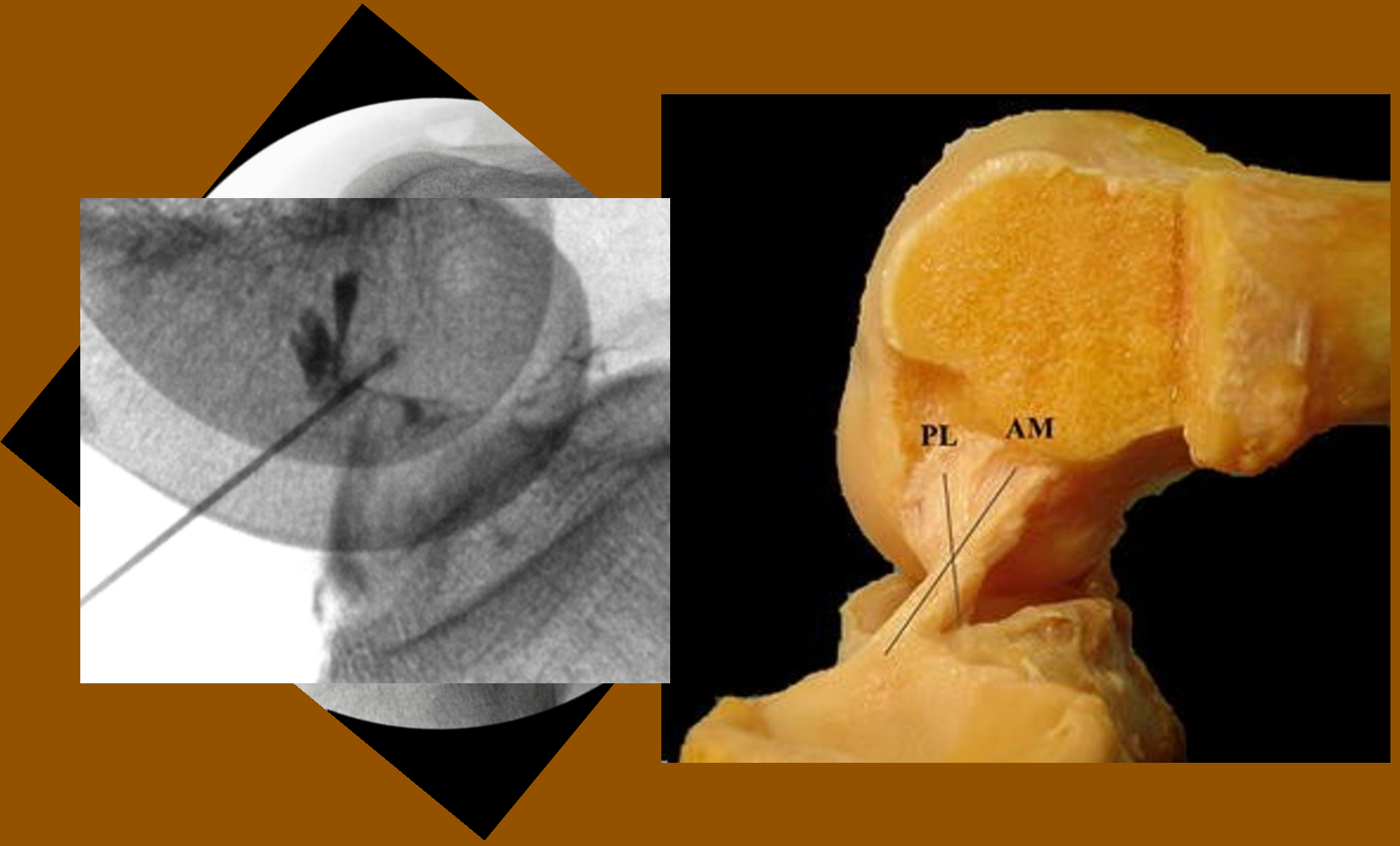


# Secondary Signs



# ACL double bundle – straight & flexed knee




PL
AM





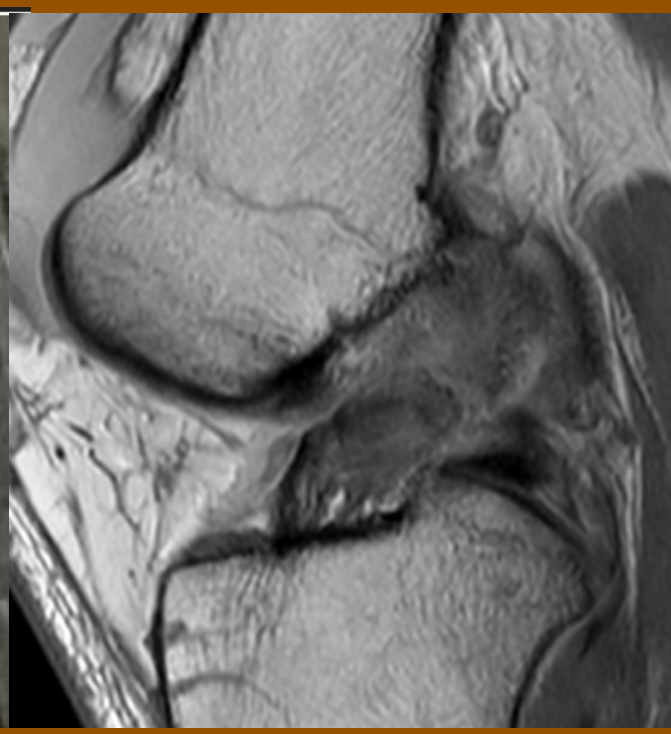
# 32 yo female

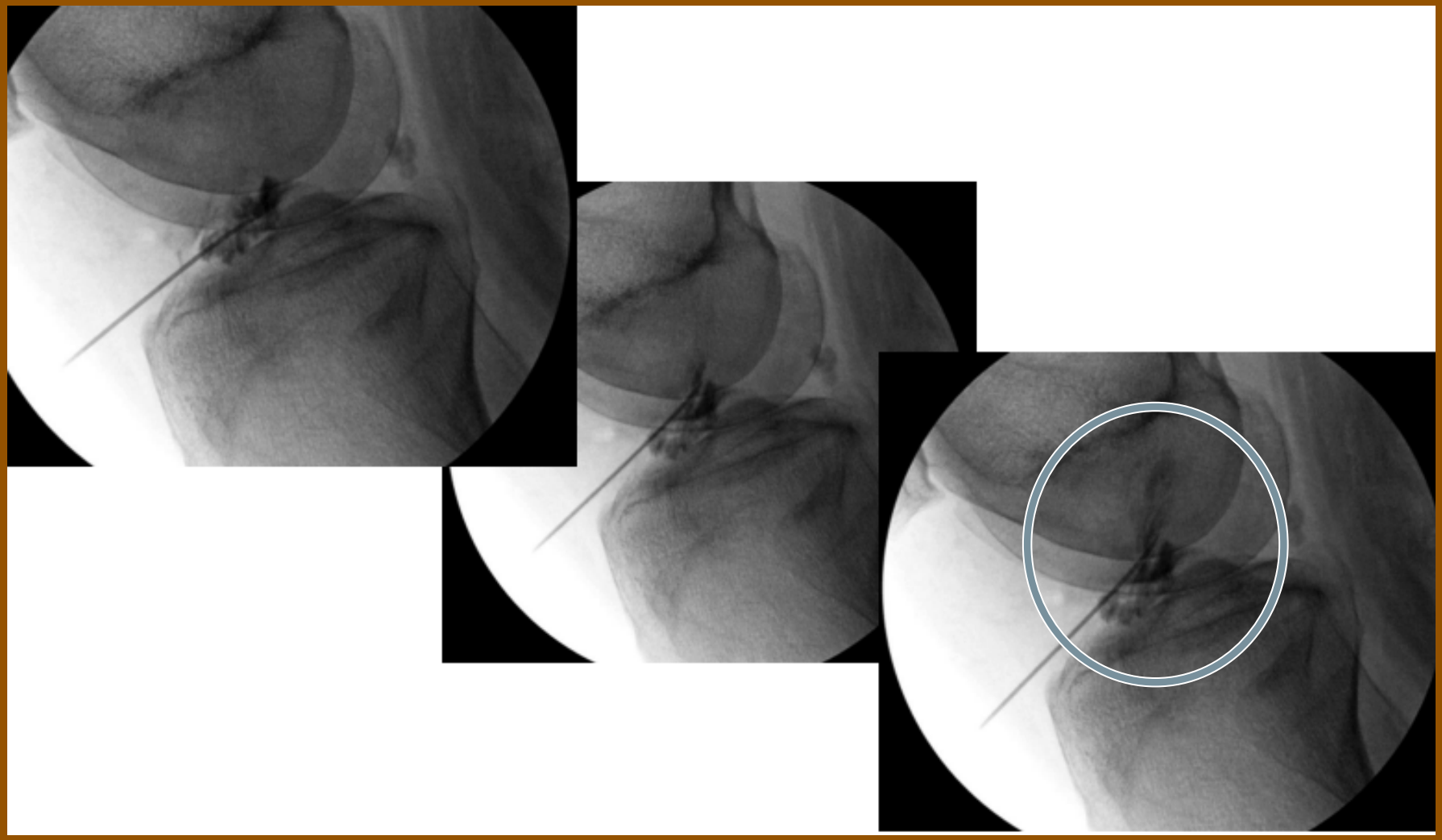


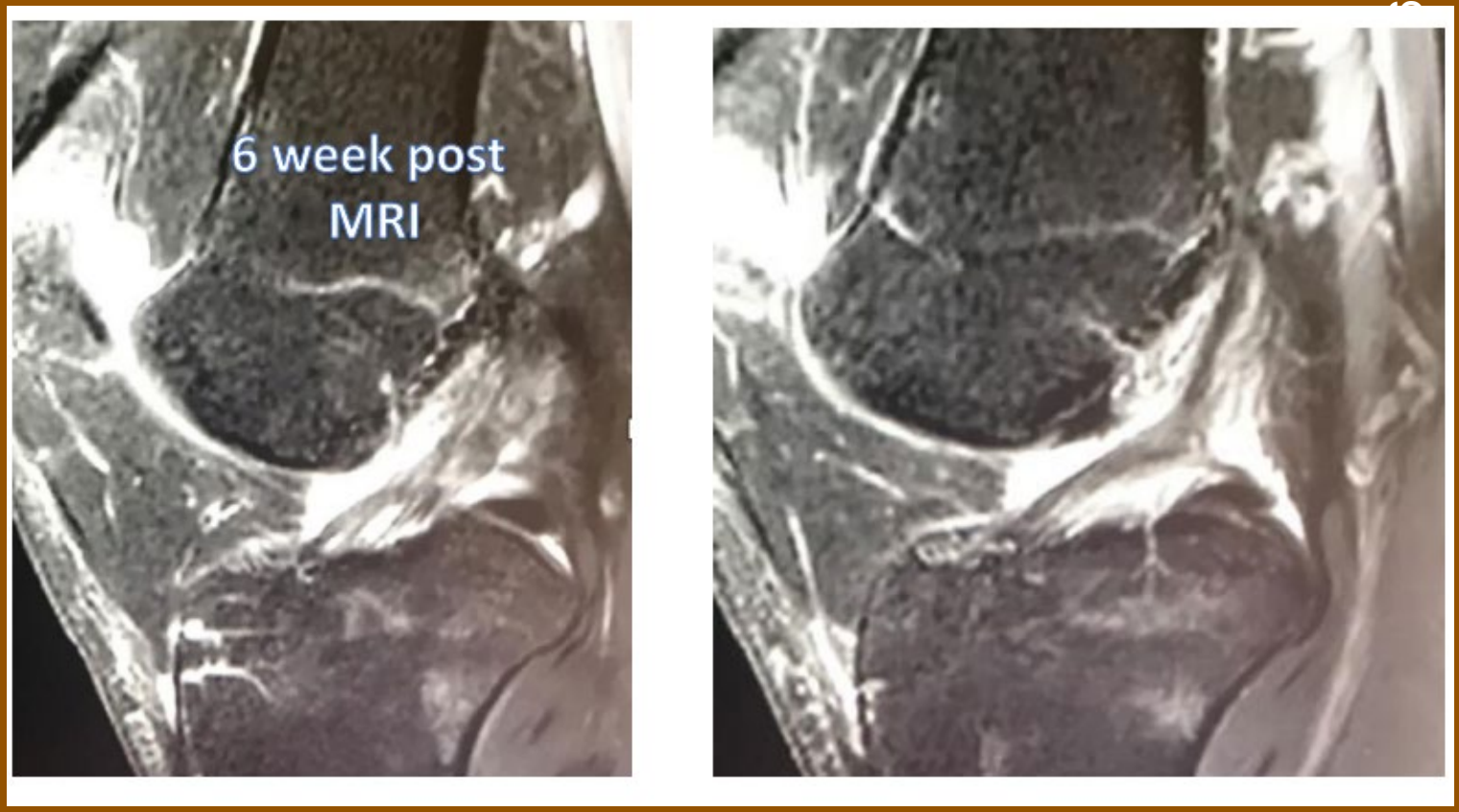




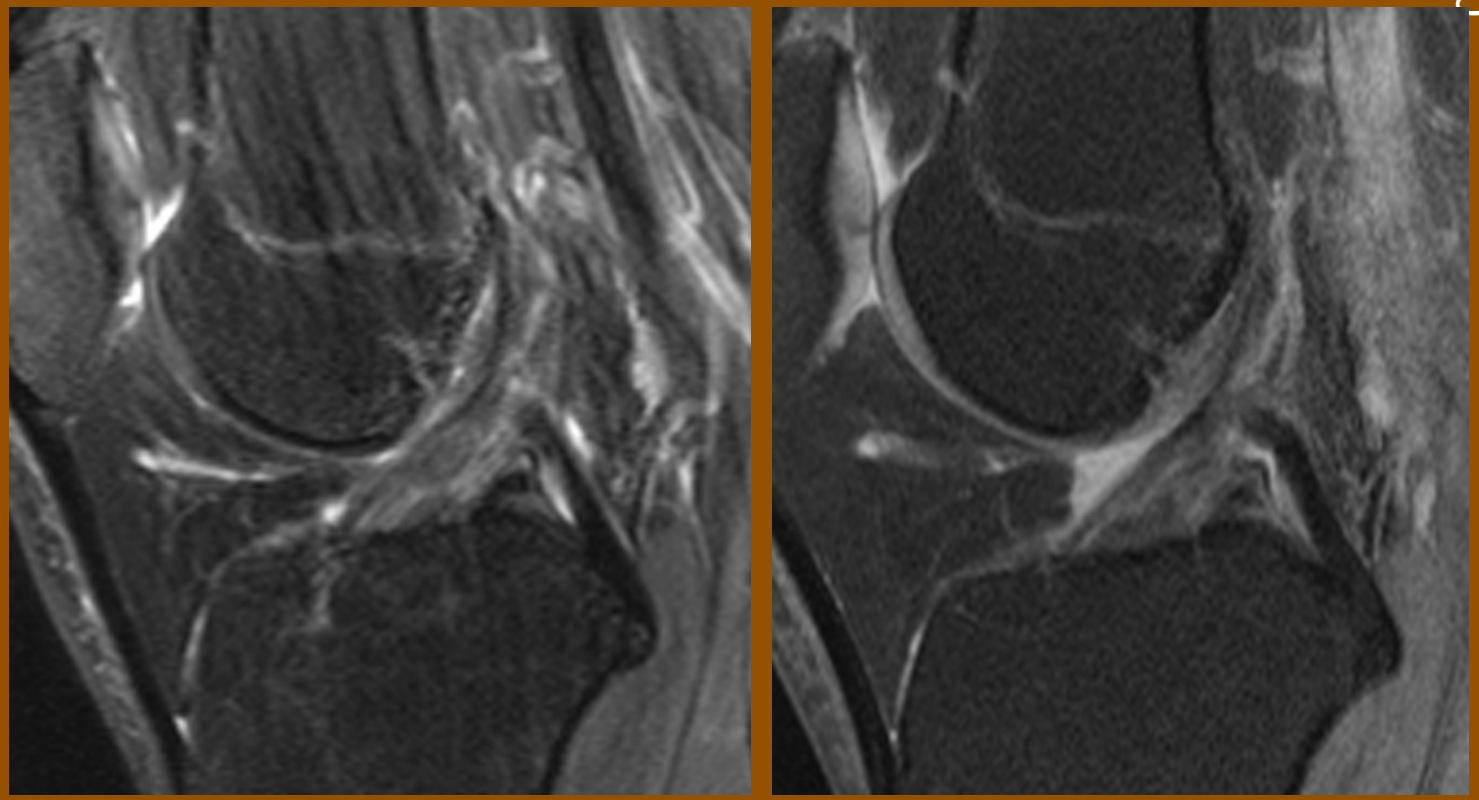





6 week post
MRI

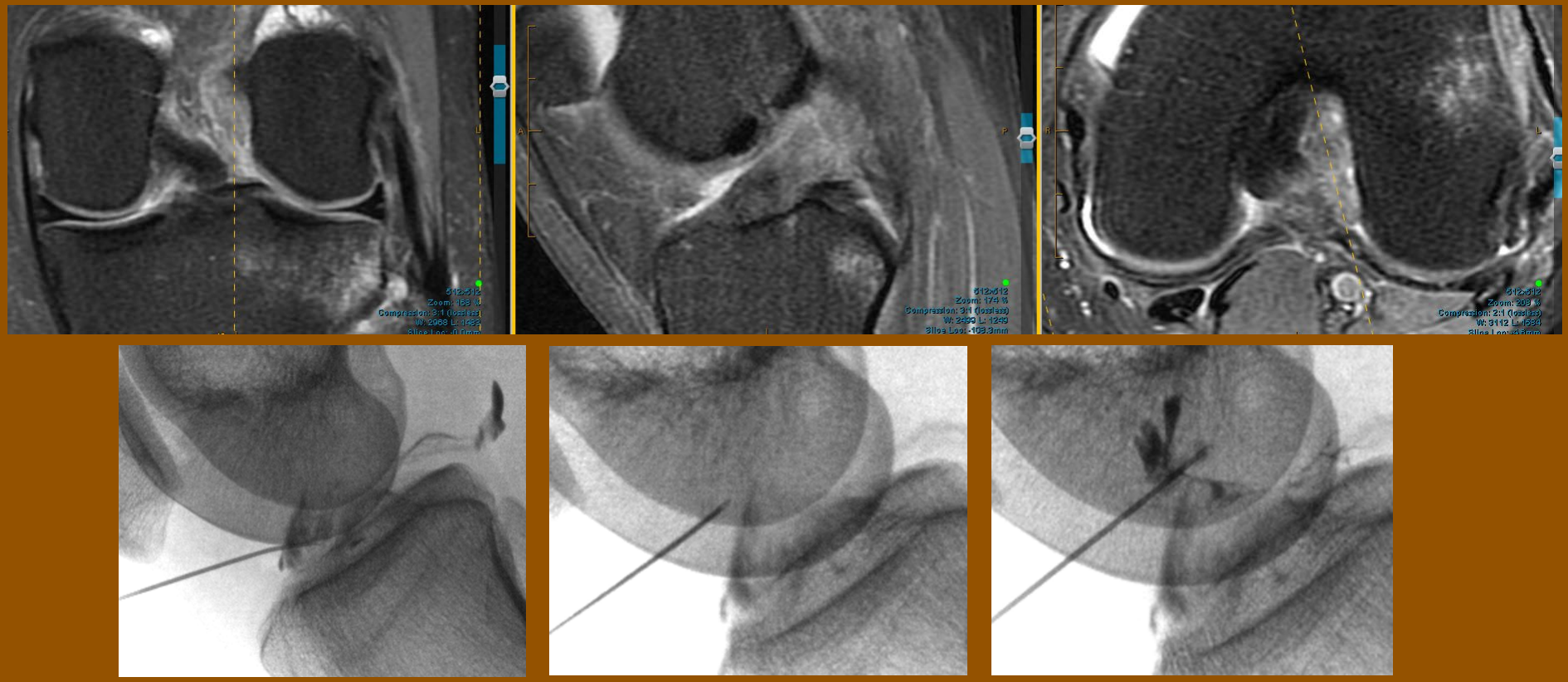
# 6 month post-procedure



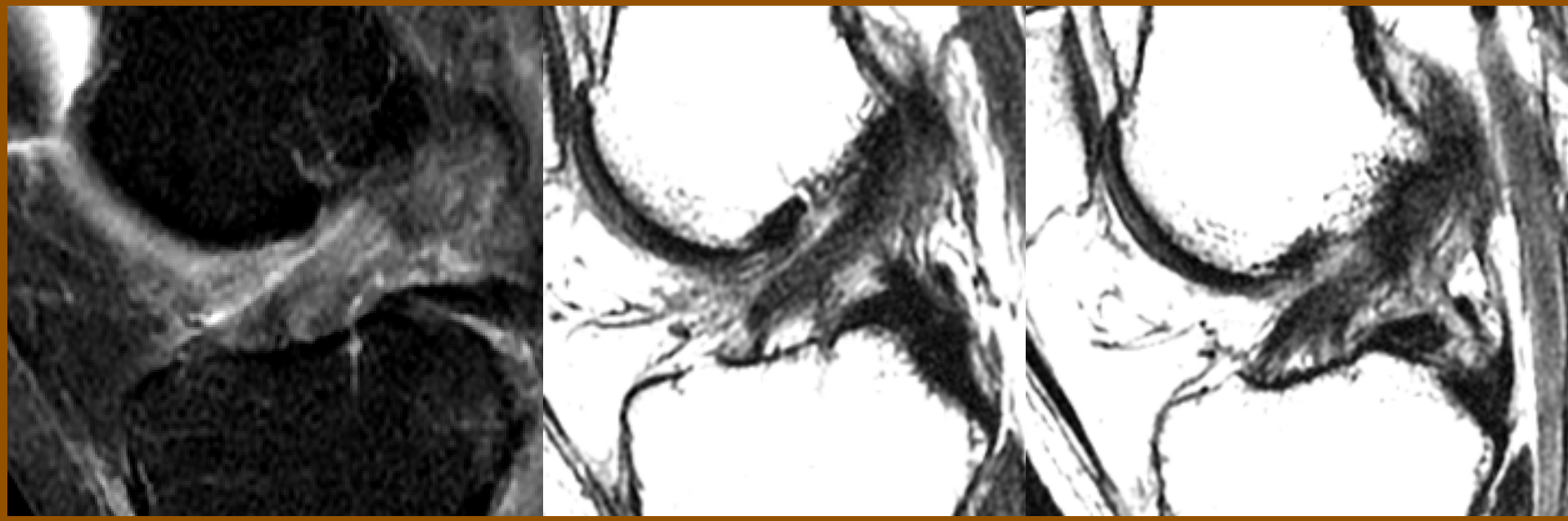
# 40 yo Ski injury



# Oct 25, 2018 MRI  Nov 28, 2018 Treatment



# April 15, 2019



# Another Ski Injury



# Complete Tear Proximal Root



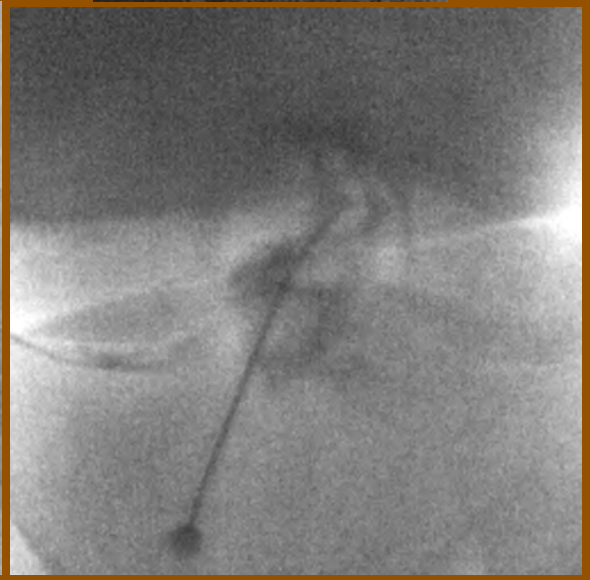




# March 22







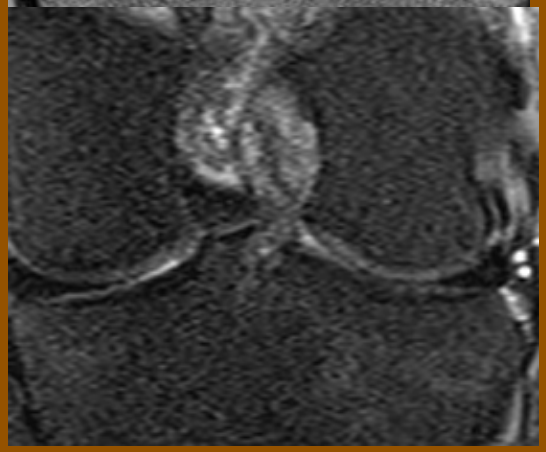


# Feb 22 to Feb 23











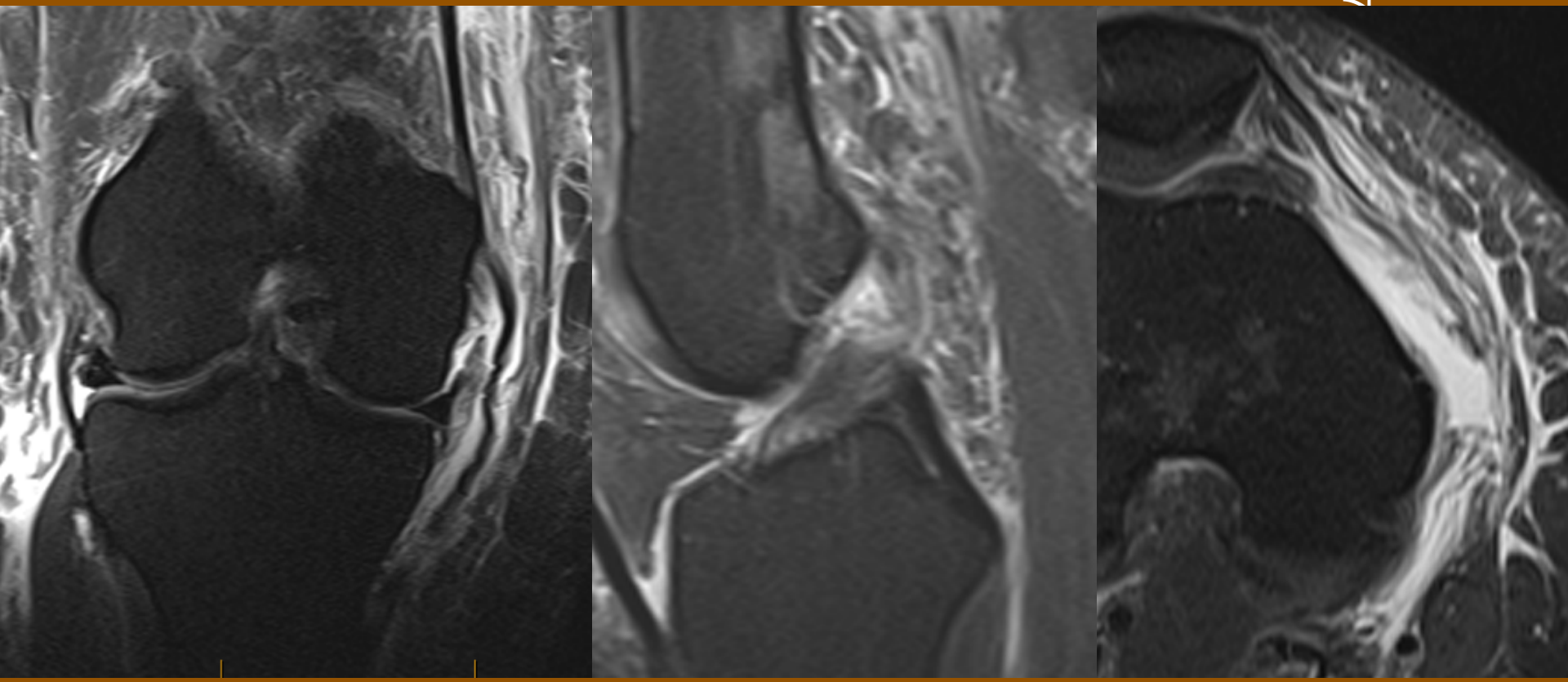
# 45 Athlete – spooked her horse -



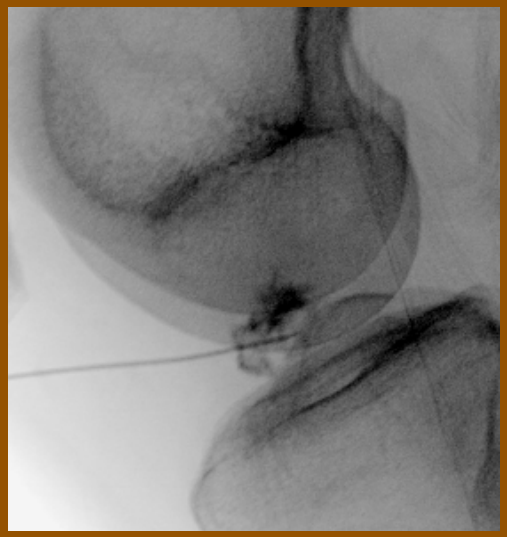


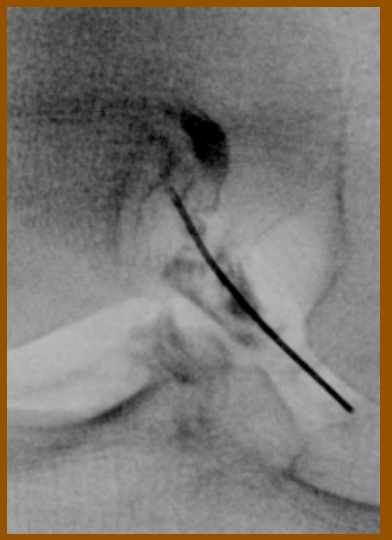
# Complete tears

## ACL MCL MPFL

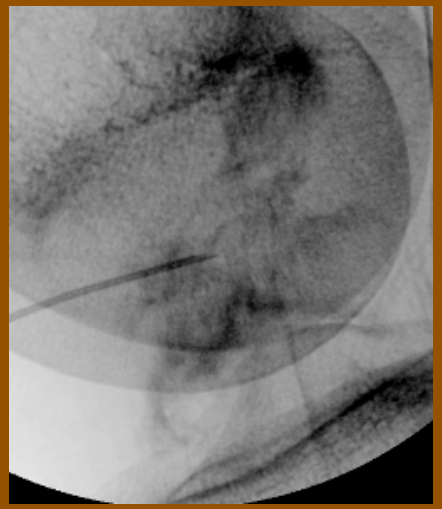


JP Knee - Sept 10, 2023



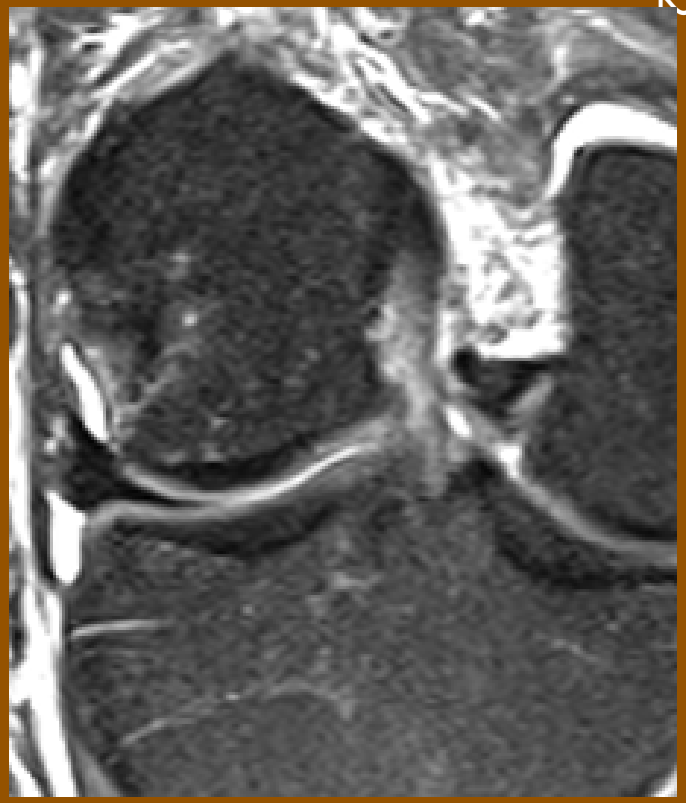



Oct 5, 23

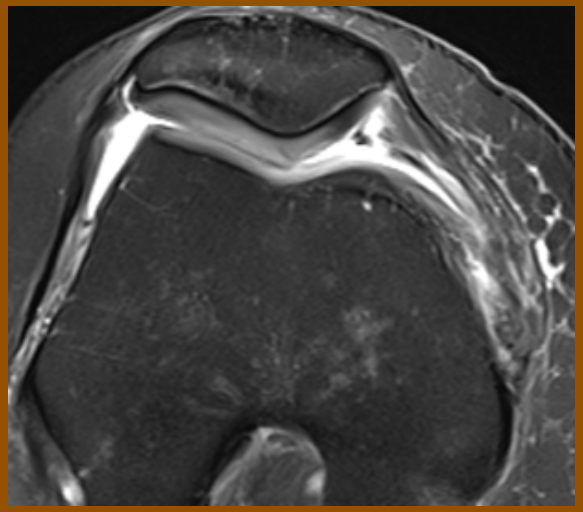

# Nov 24, 2023

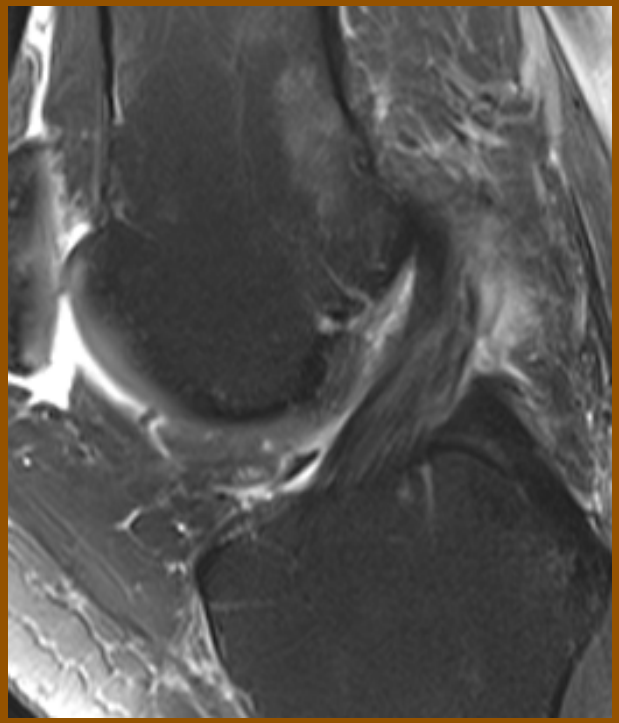


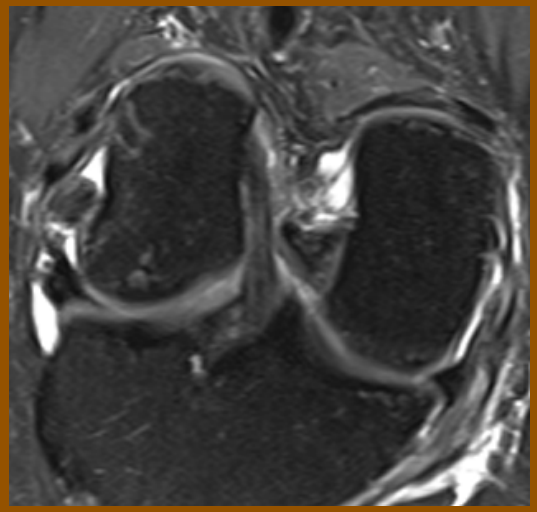


# JP Knee – Dec 28, 2023

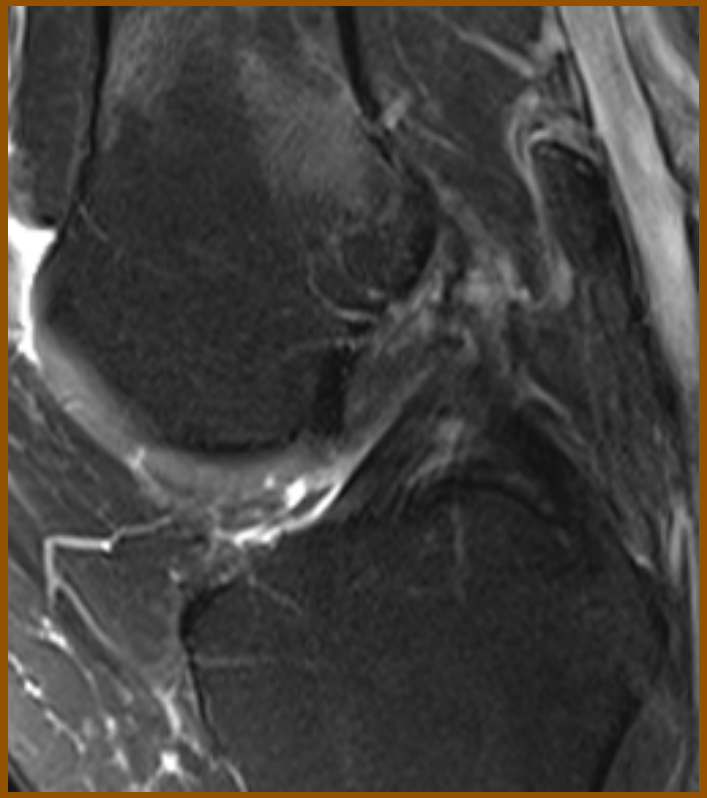


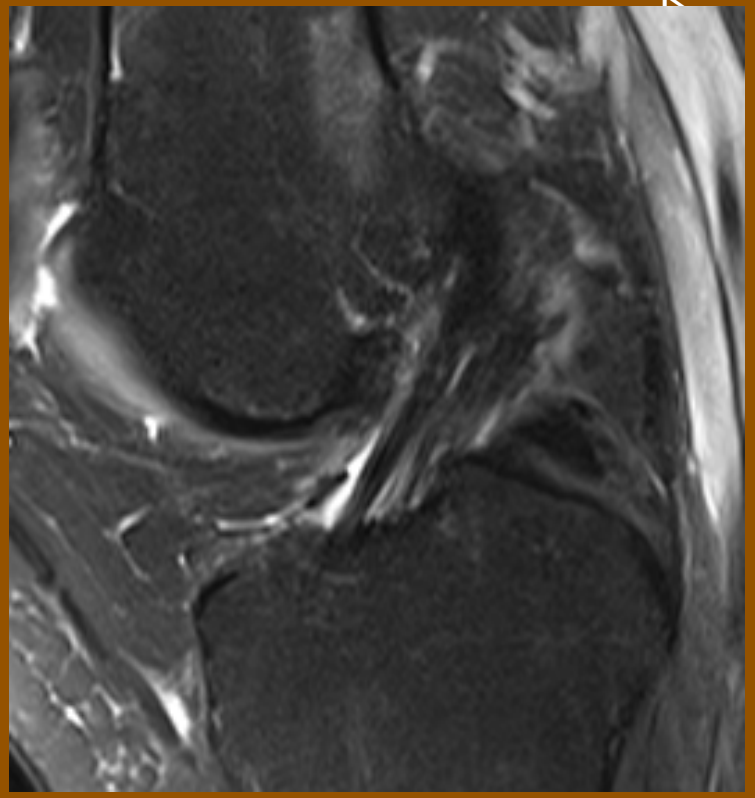






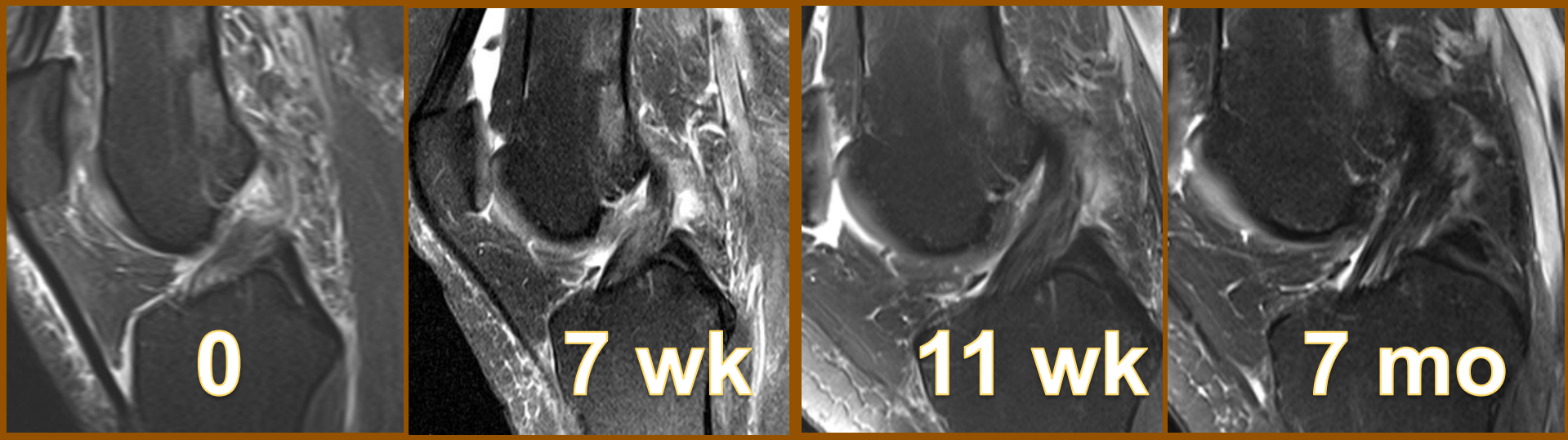
# Healed ACL



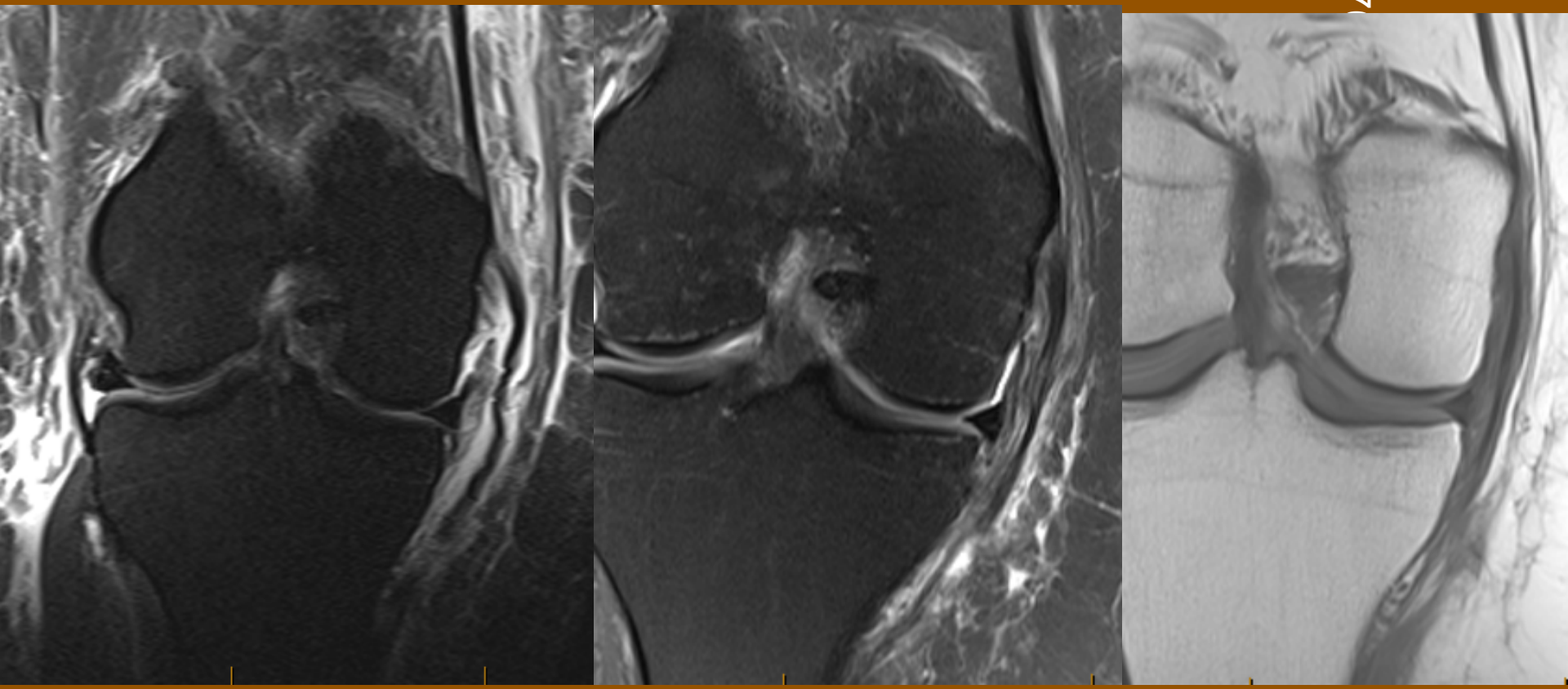


# Progression of Healing





# MCL Healing – 0,3,7 months



# DOES IT MATTER IF IT STICKS AROUND?

## Bioscaffolds?

# Ligament Healing Biologically Active Scaffold



# Combo Therapy –

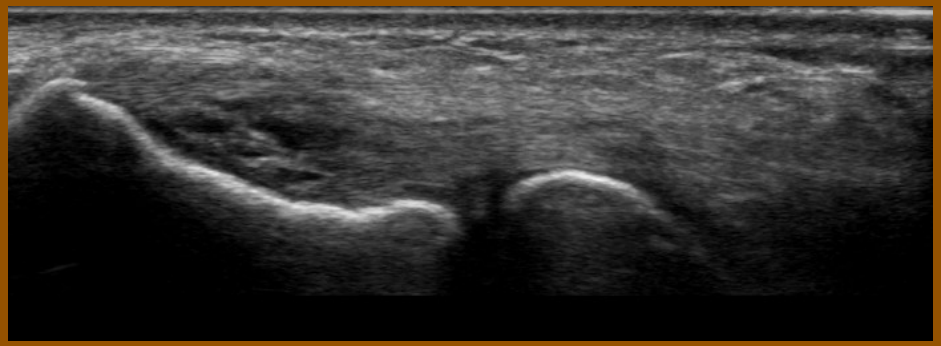


# Diagnostic Ultrasound

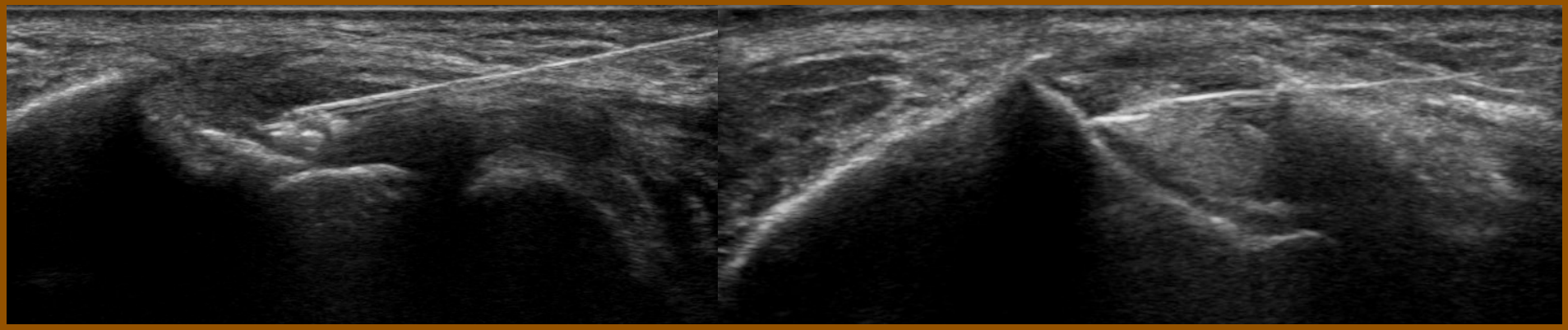
Left Side: Asymptomatic



Right Side: Symptomatic

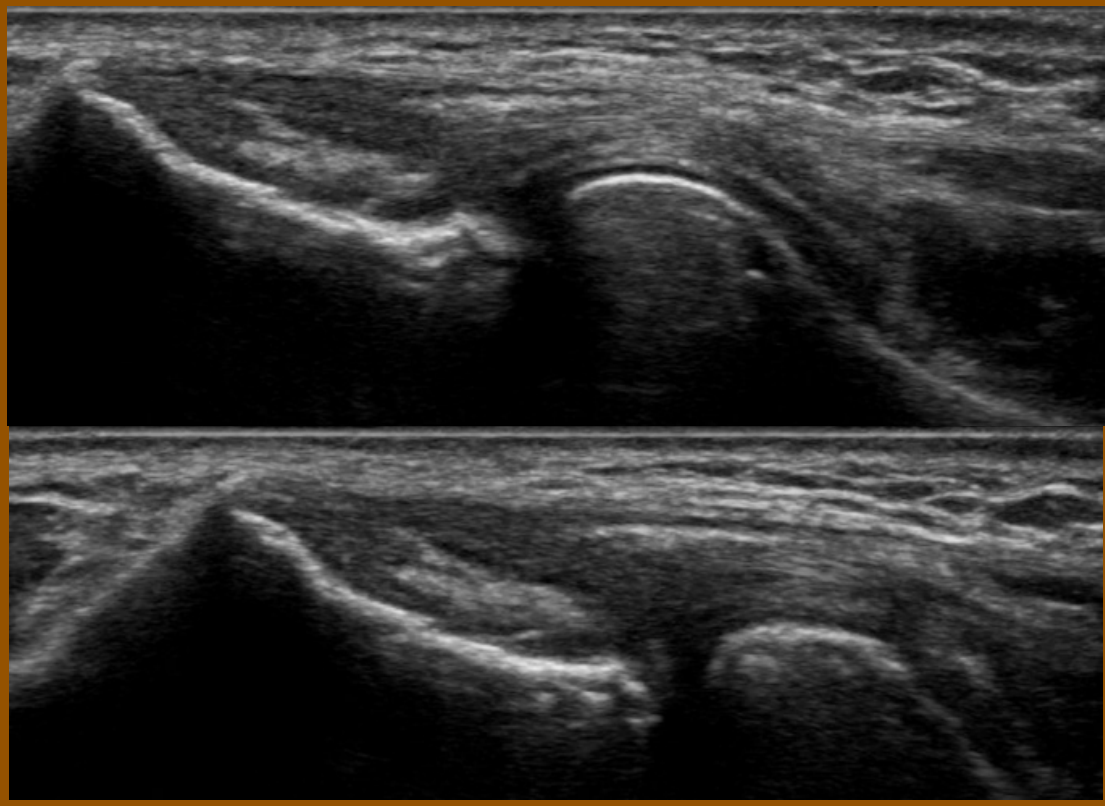


# Intervention



# Follow up- 3 months post

- 0/10 pain score at visit
- At worse 3/10 pain with repetitive motions, overall less severe and less frequent
- 80% improvement
- Increased function
- Continuing PT and meeting all milestones, ready for discharge



# Follow up-4.5 months post

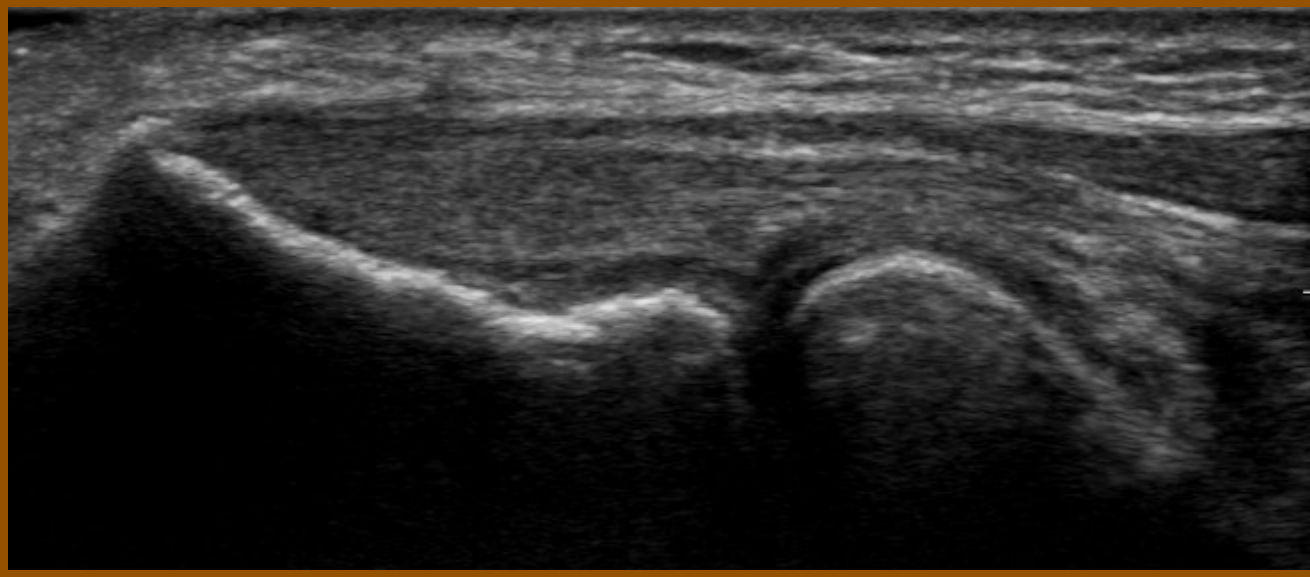
- Continued improvement
- 0/10 pain daily
- Very occasional pain with repetitive wrist extension movements

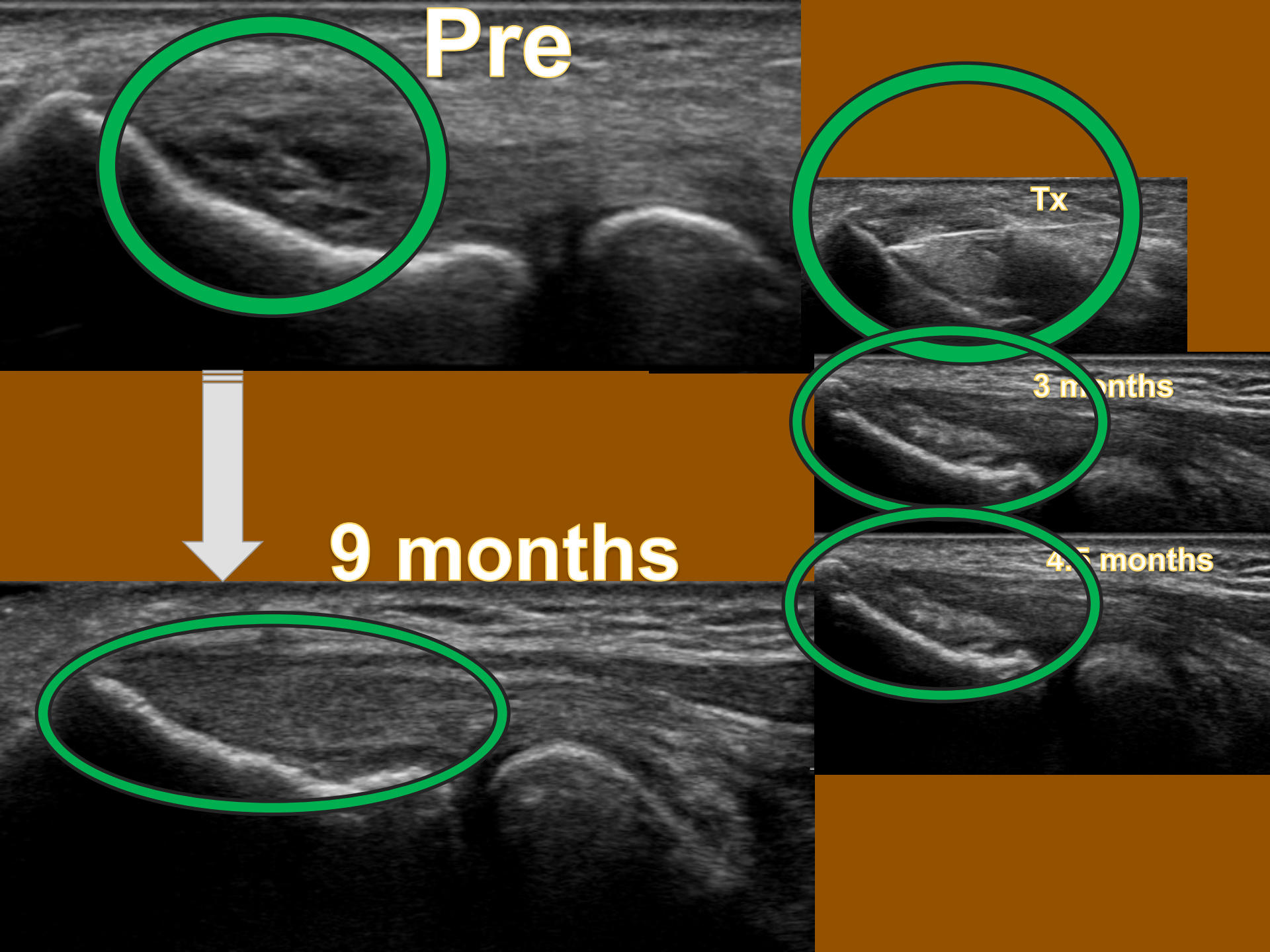




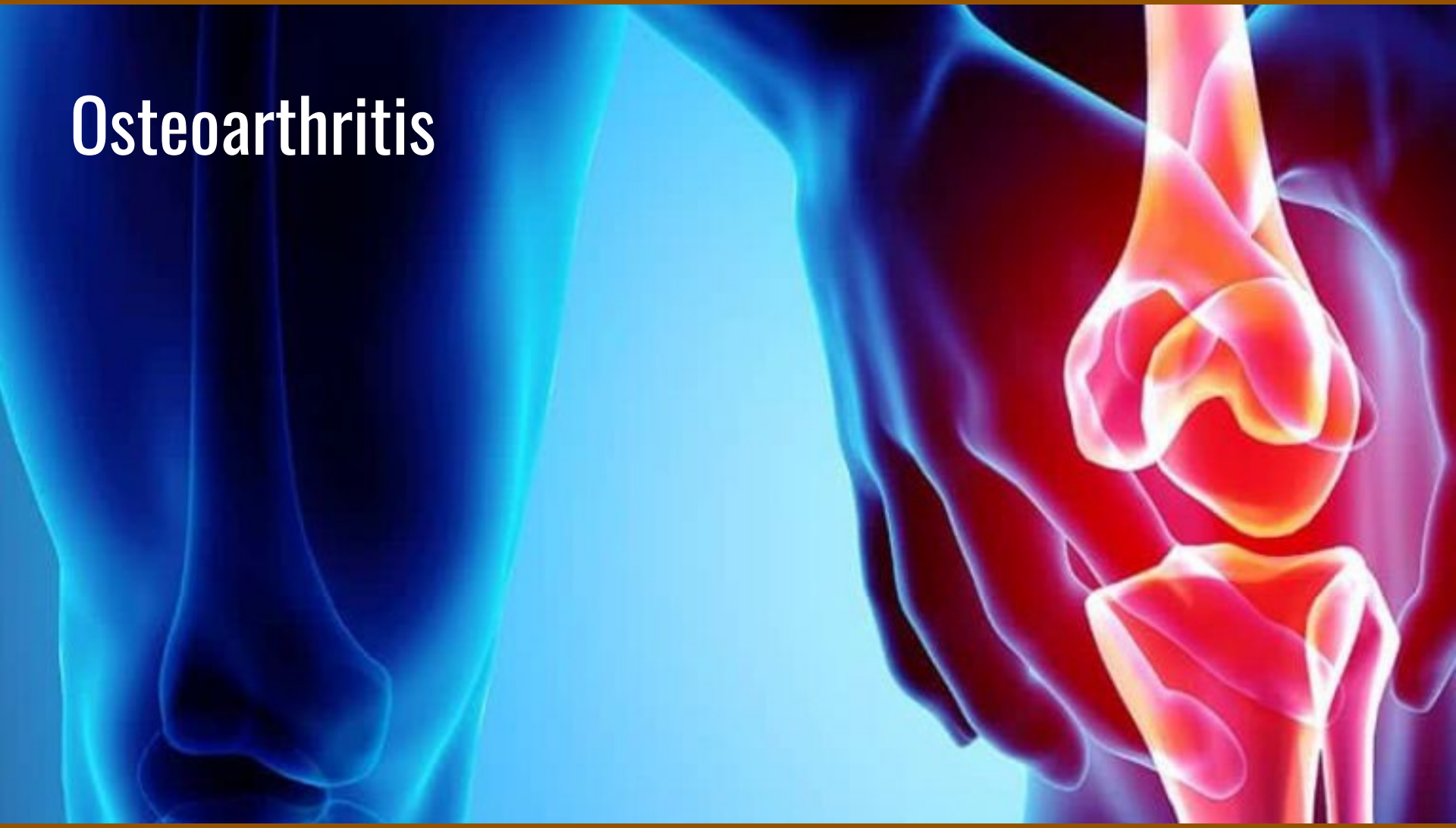
# Follow up-9 months post

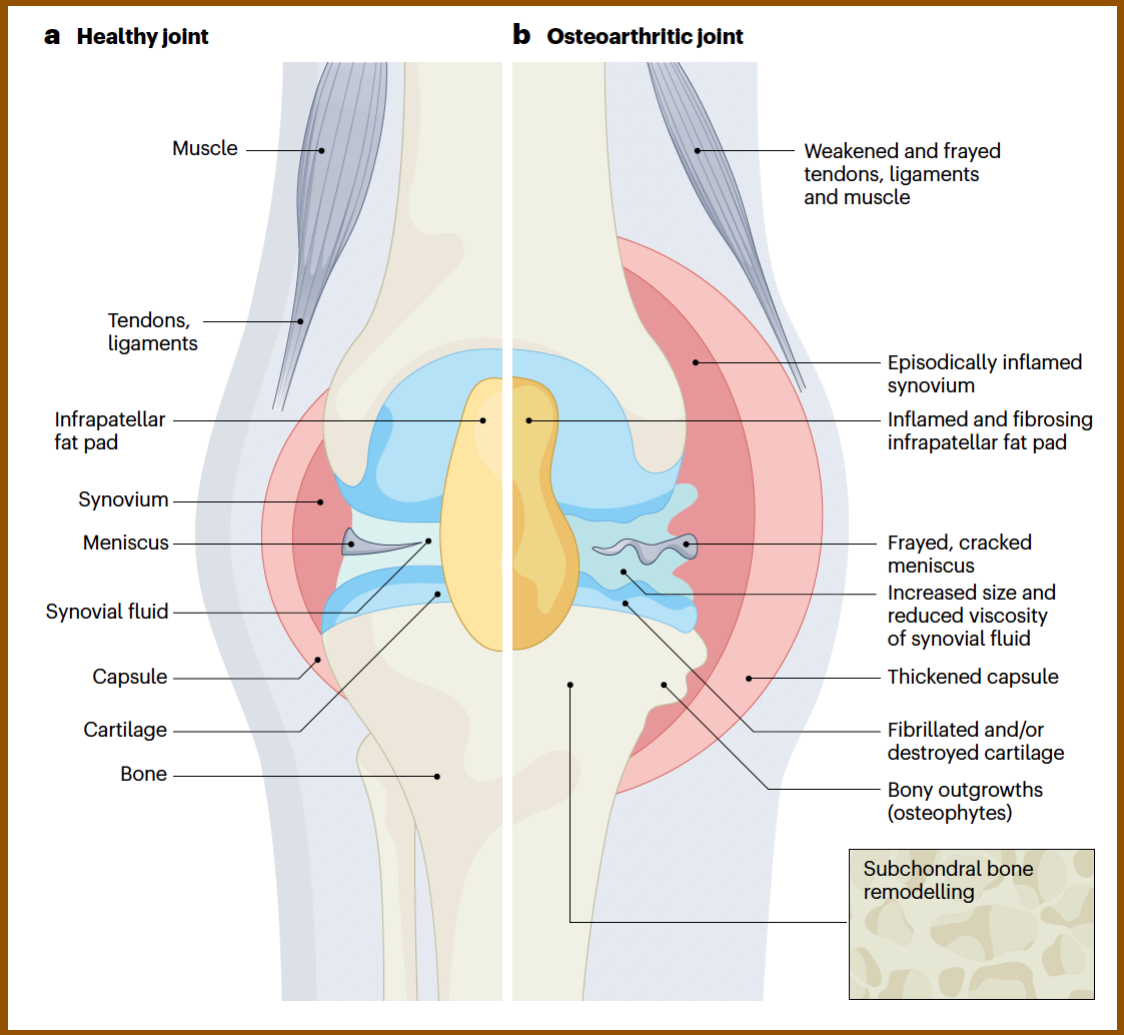
- 95% improvement
- Continuing to improve
- No pain and no pain with activities

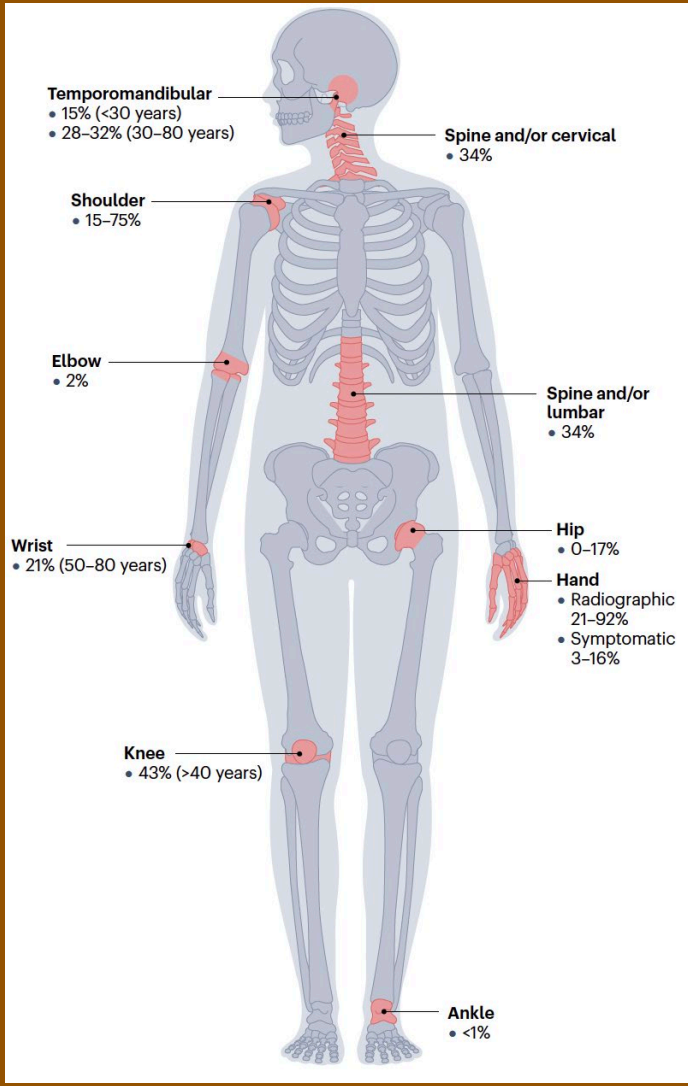


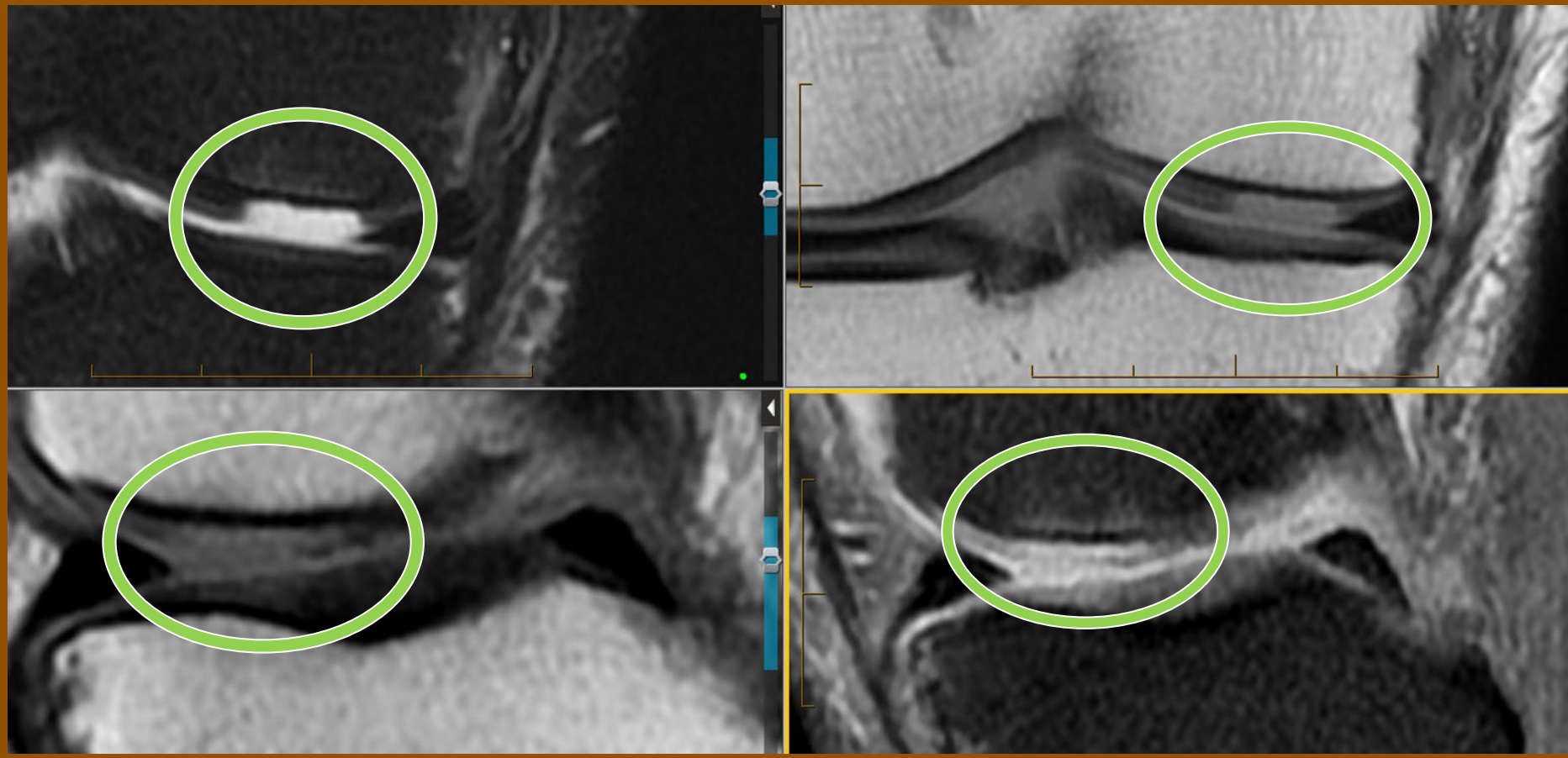

Pre
Tx
3 months
4.5 months
9 months

# Osteoarthritis

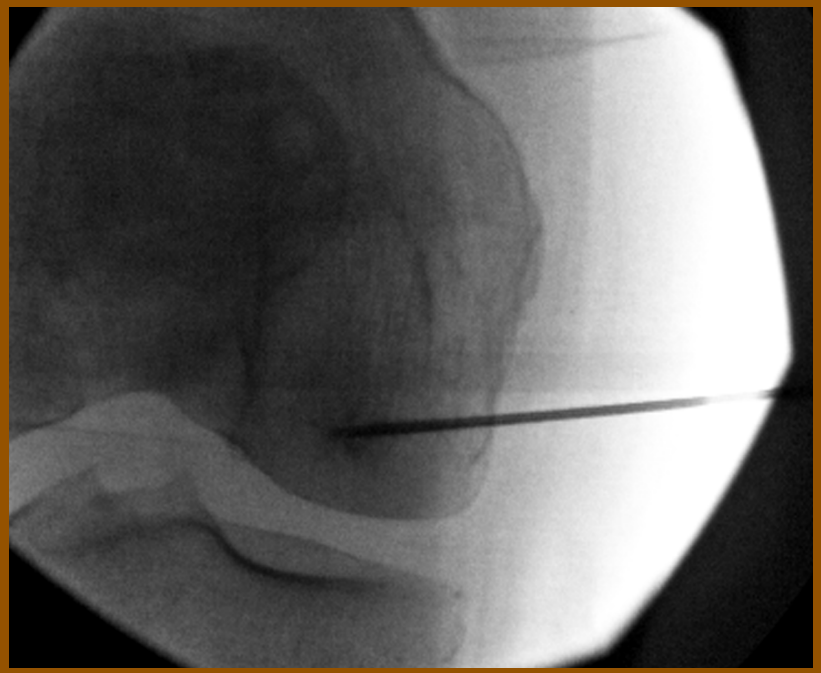


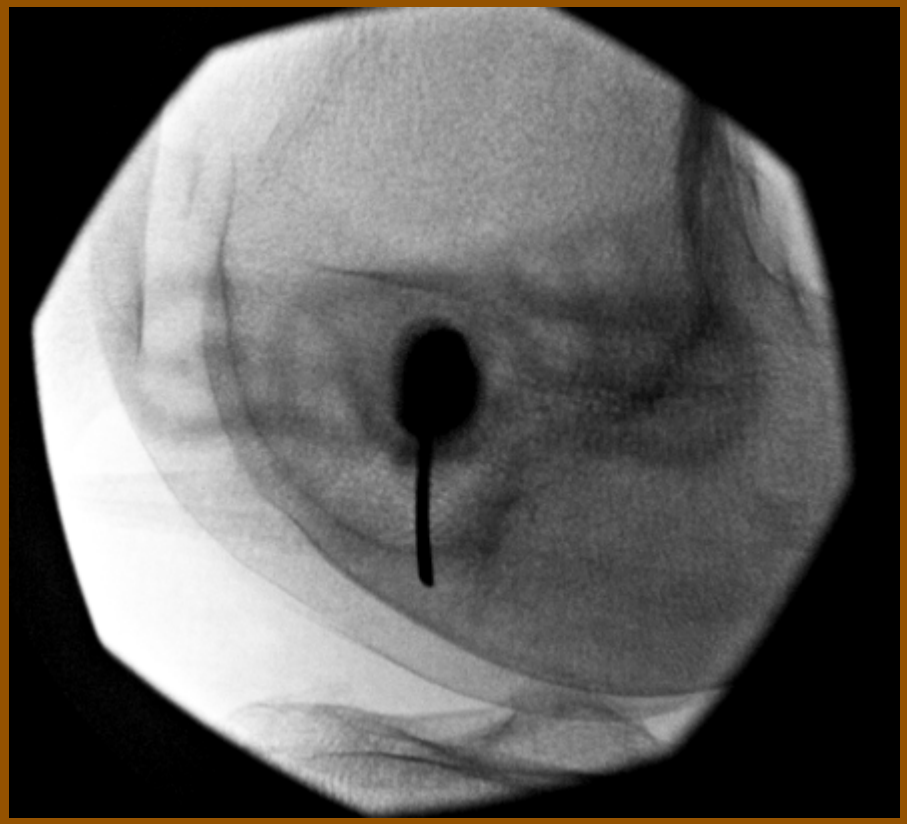

a Healthy joint
b Osteoarthritic joint
Muscle
Tendons, ligaments
Infrapatellar fat pad
Synovium
Meniscus
Synovial fluid
Capsule
Cartilage
Bone
Weakened and frayed tendons, ligaments and muscle
Episodically inflamed synovium
Inflamed and fibrosing infrapatellar fat pad
Frayed, cracked meniscus
Increased size and reduced viscosity of synovial fluid
Thickened capsule
Fibrillated and/or destroyed cartilage
Bony outgrowths (osteophytes)
Subchondral bone remodelling

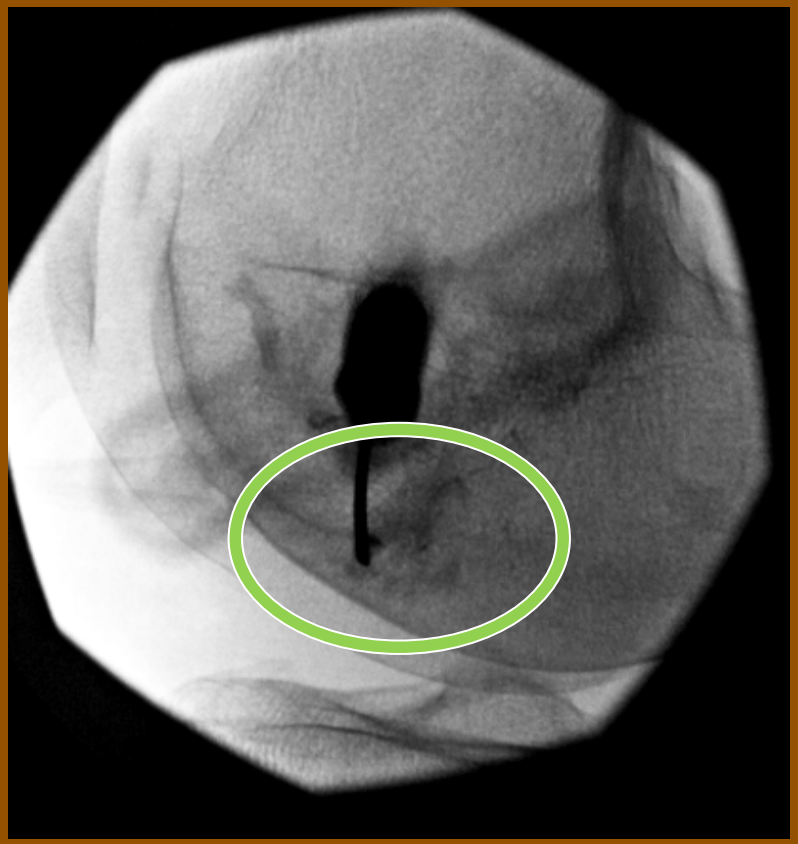

Temporomandibular
• 15% (<30 years)
• 28–32% (30–80 years)
Spine and/or cervical
• 34%
Shoulder
• 15–75%
Elbow
• 2%
Spine and/or lumbar
• 34%
Wrist
• 21% (50–80 years)
Hip
• 0–17%
Hand
• Radiographic 21–92%
• Symptomatic 3–16%
Knee
• 43% (>40 years)
Ankle
• <1%



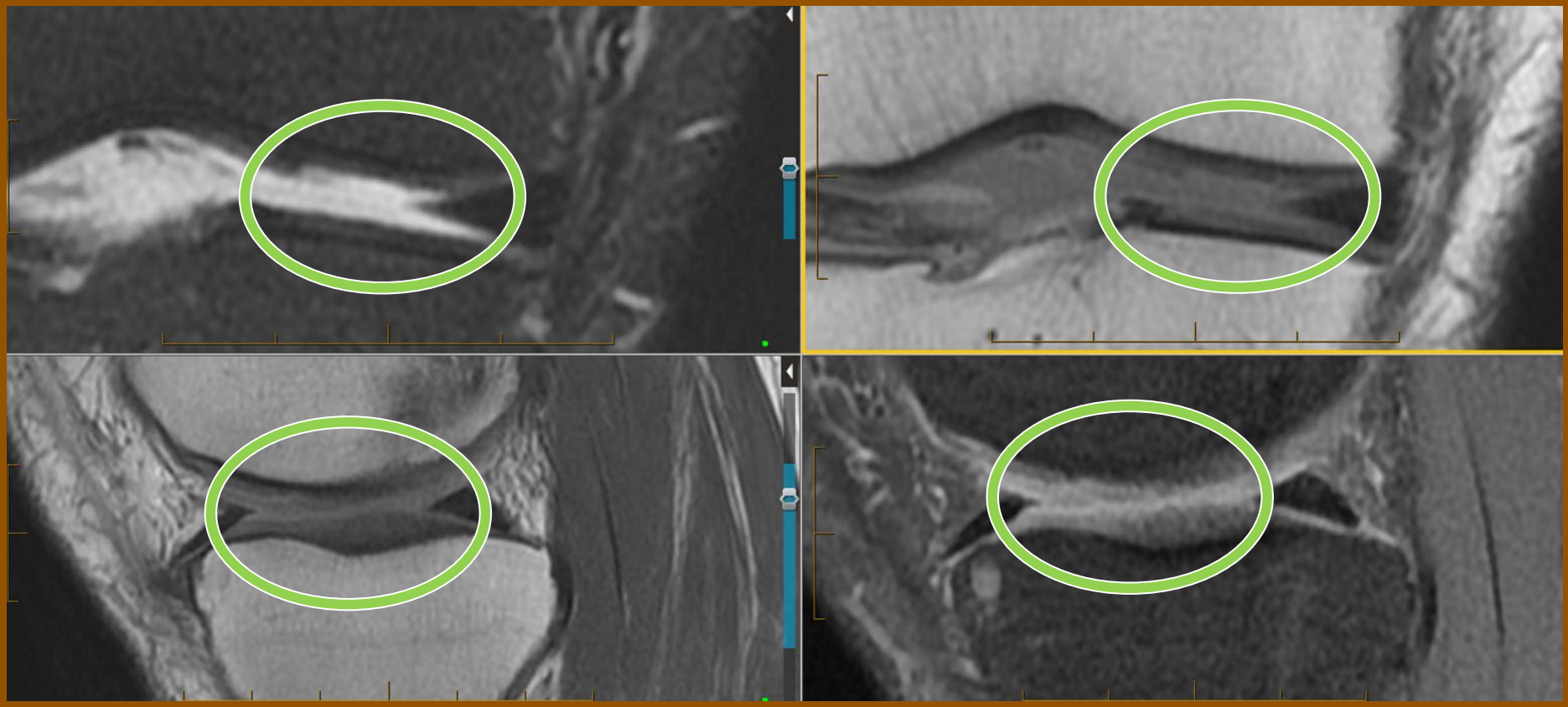


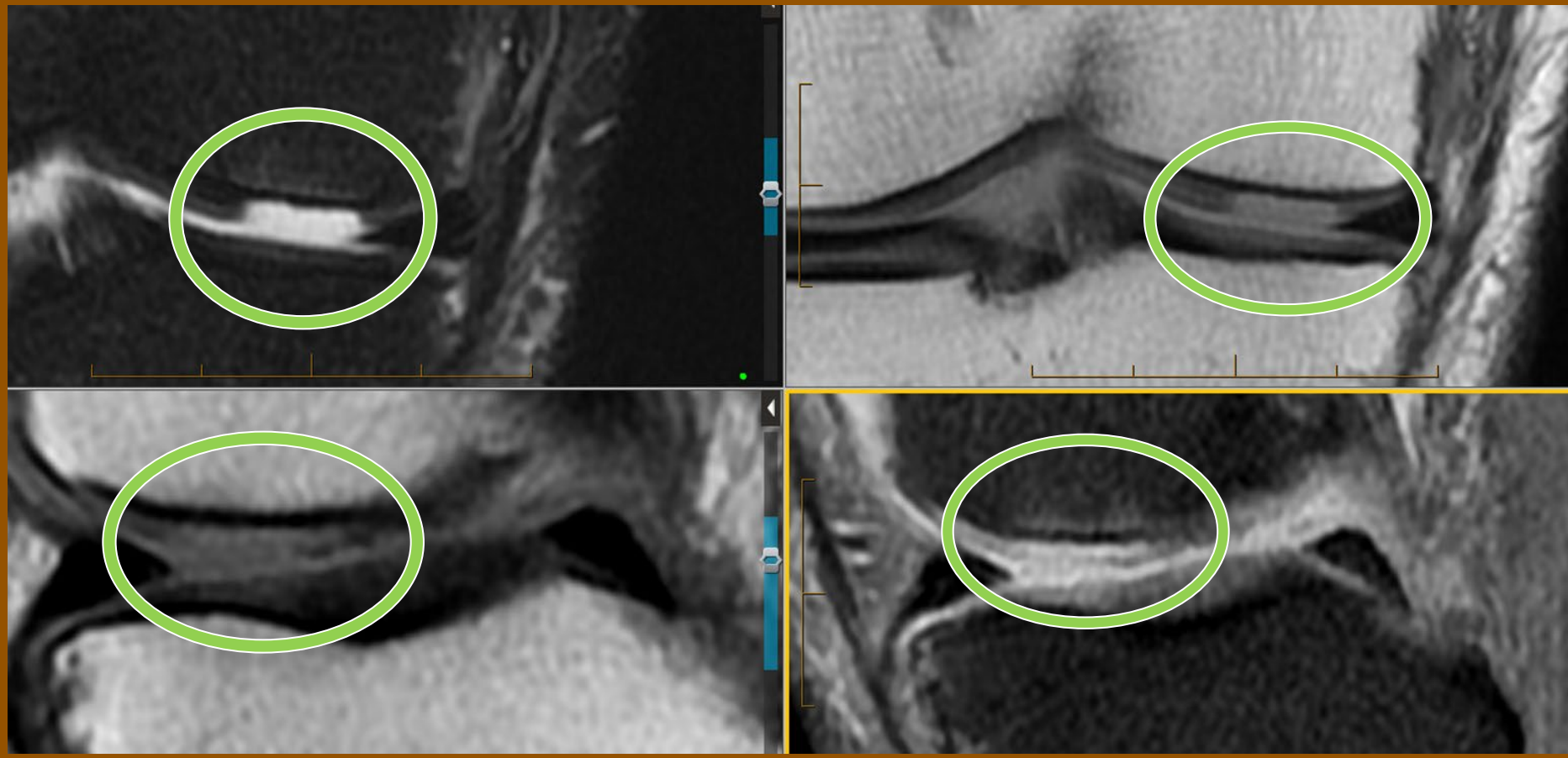






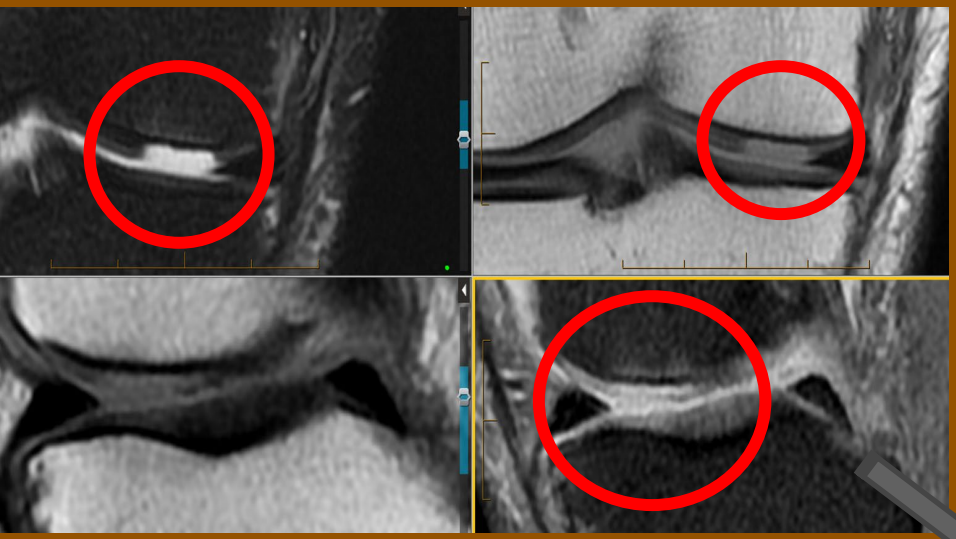
# POST

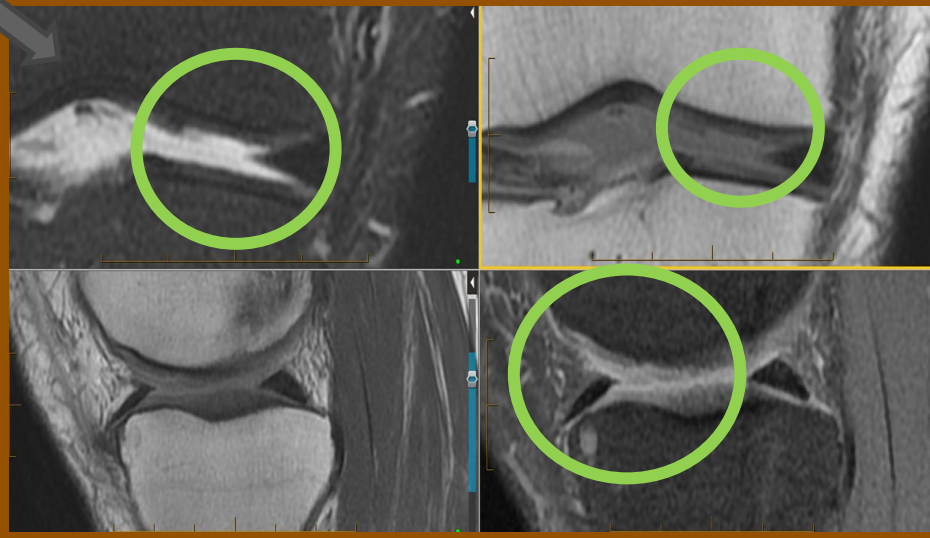





PRE

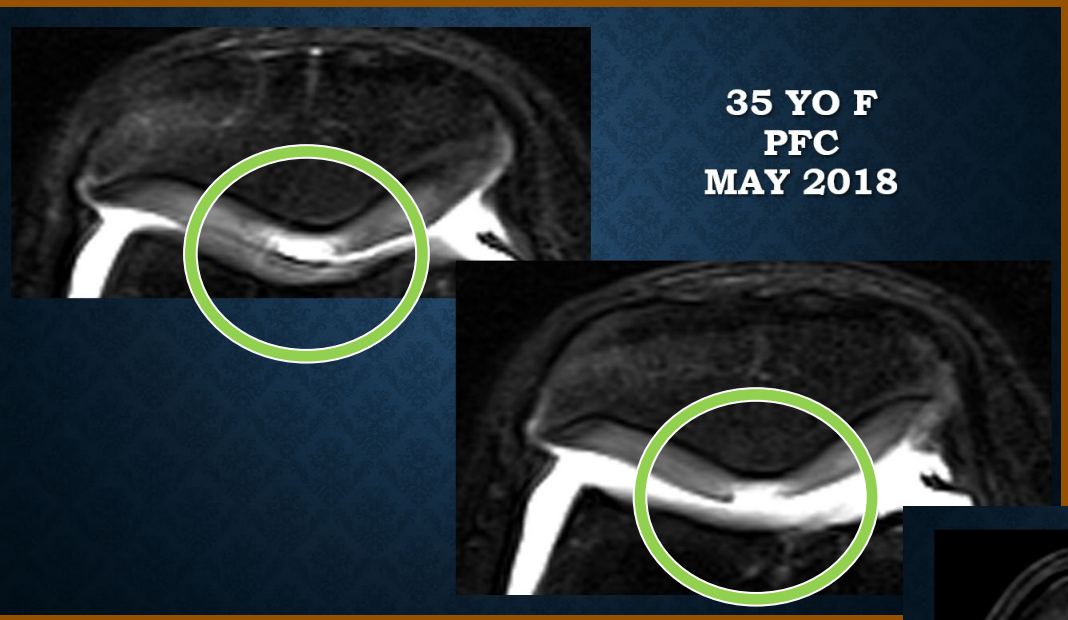

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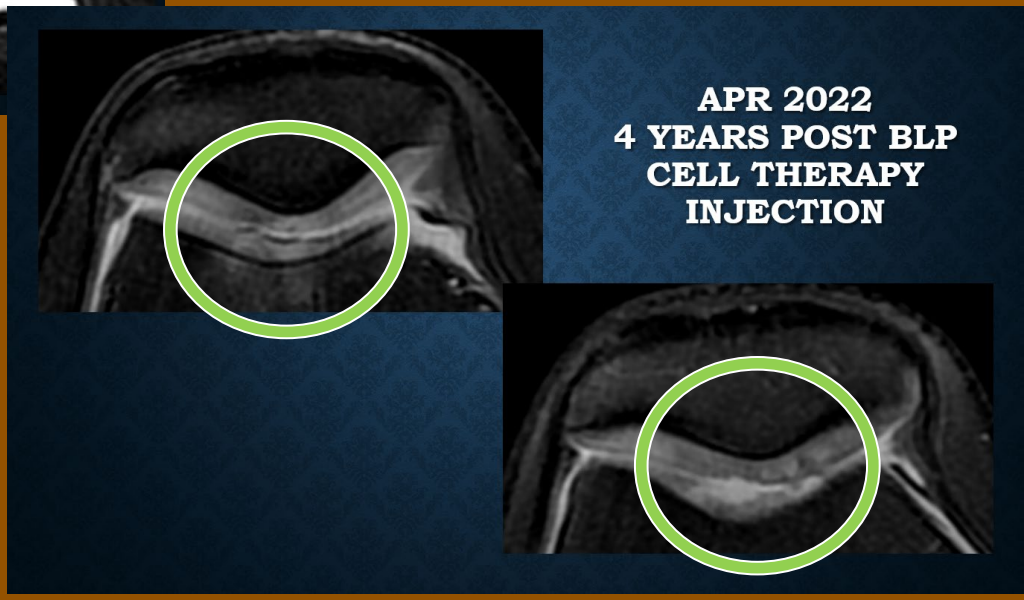


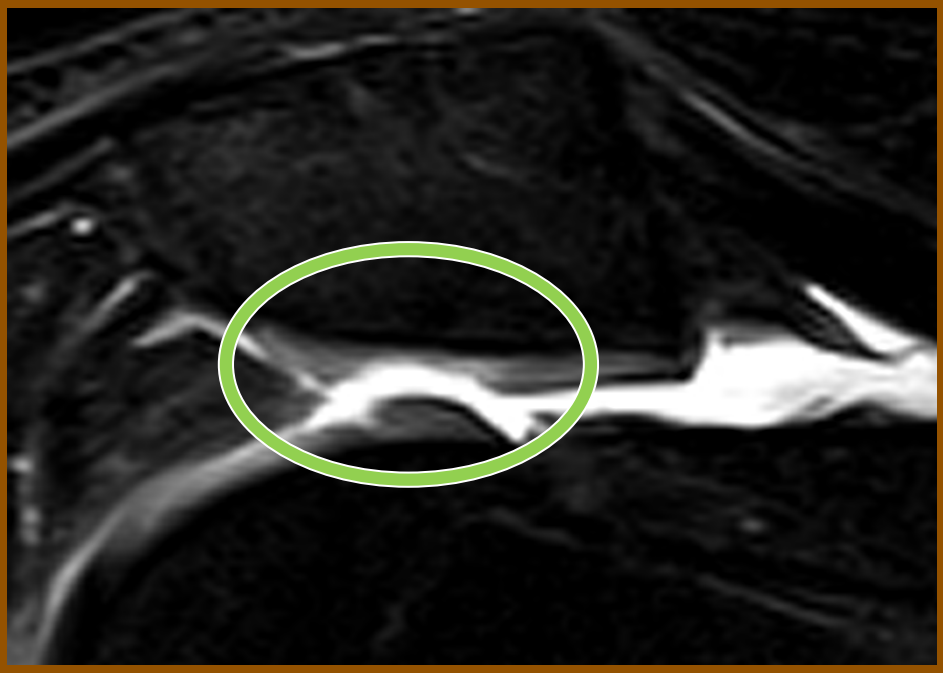


# Knee osteoarthritis

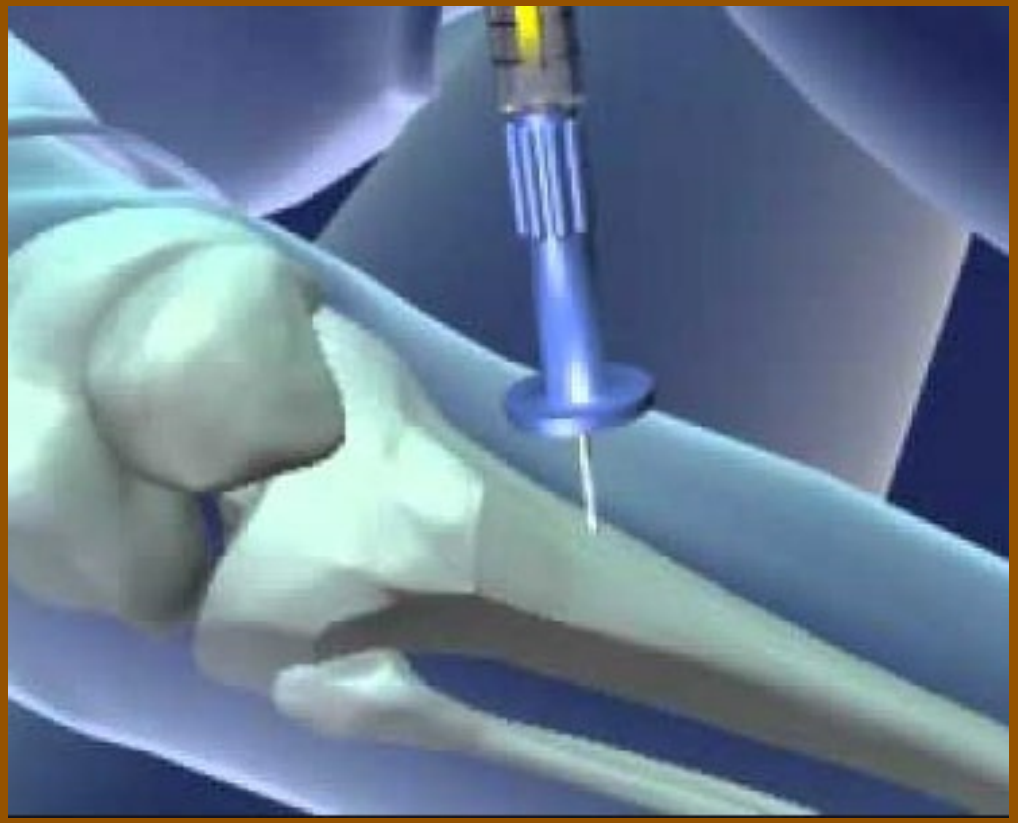


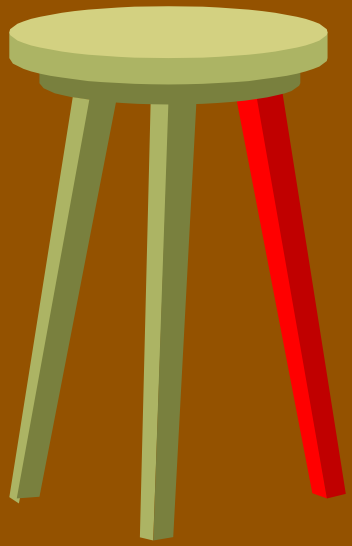

35 YO F
PFC
MAY 2018


APR 2022
4 YEARS POST BLP
CELL THERAPY
INJECTION



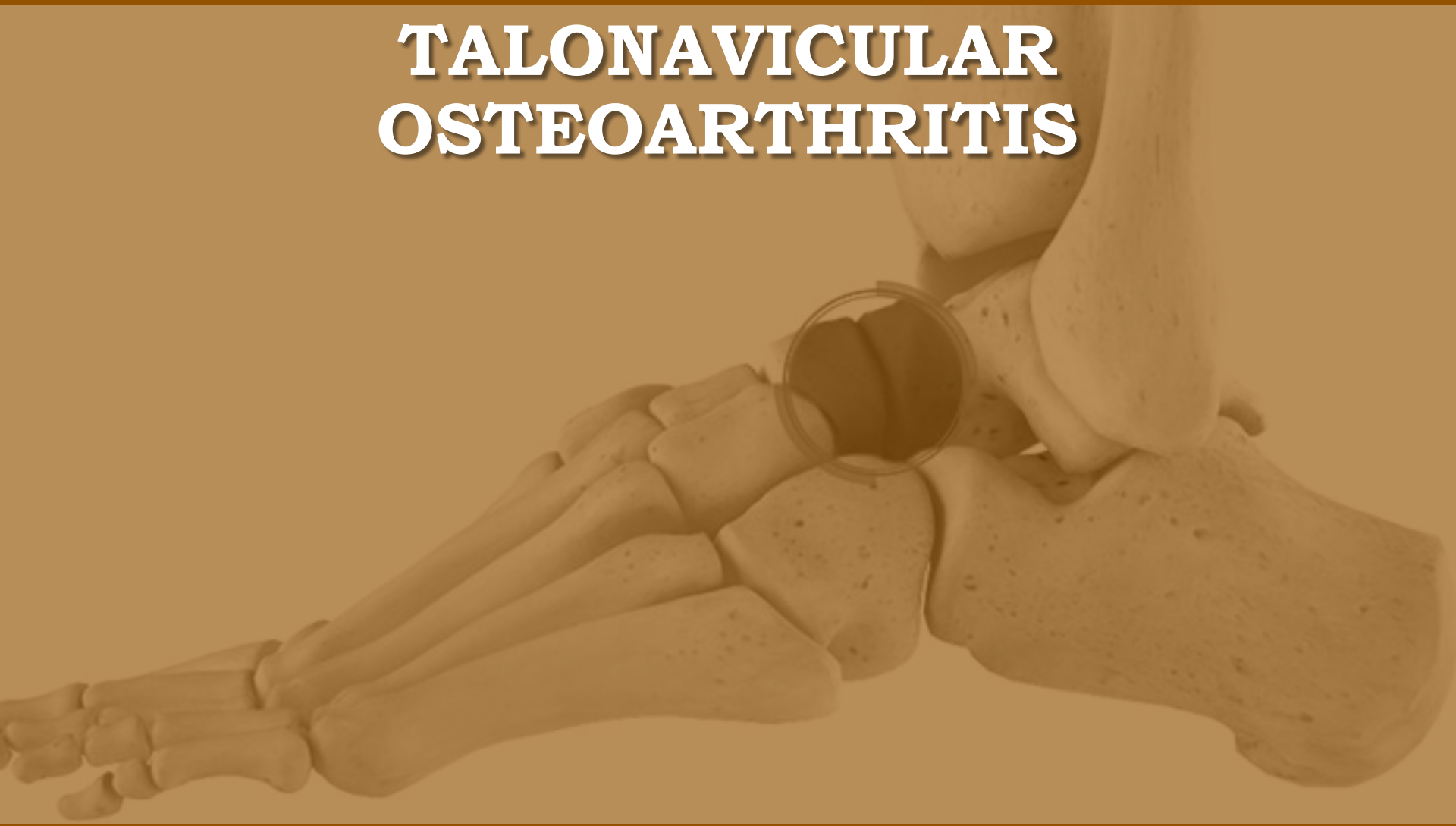
# Intra-Osseous Injections

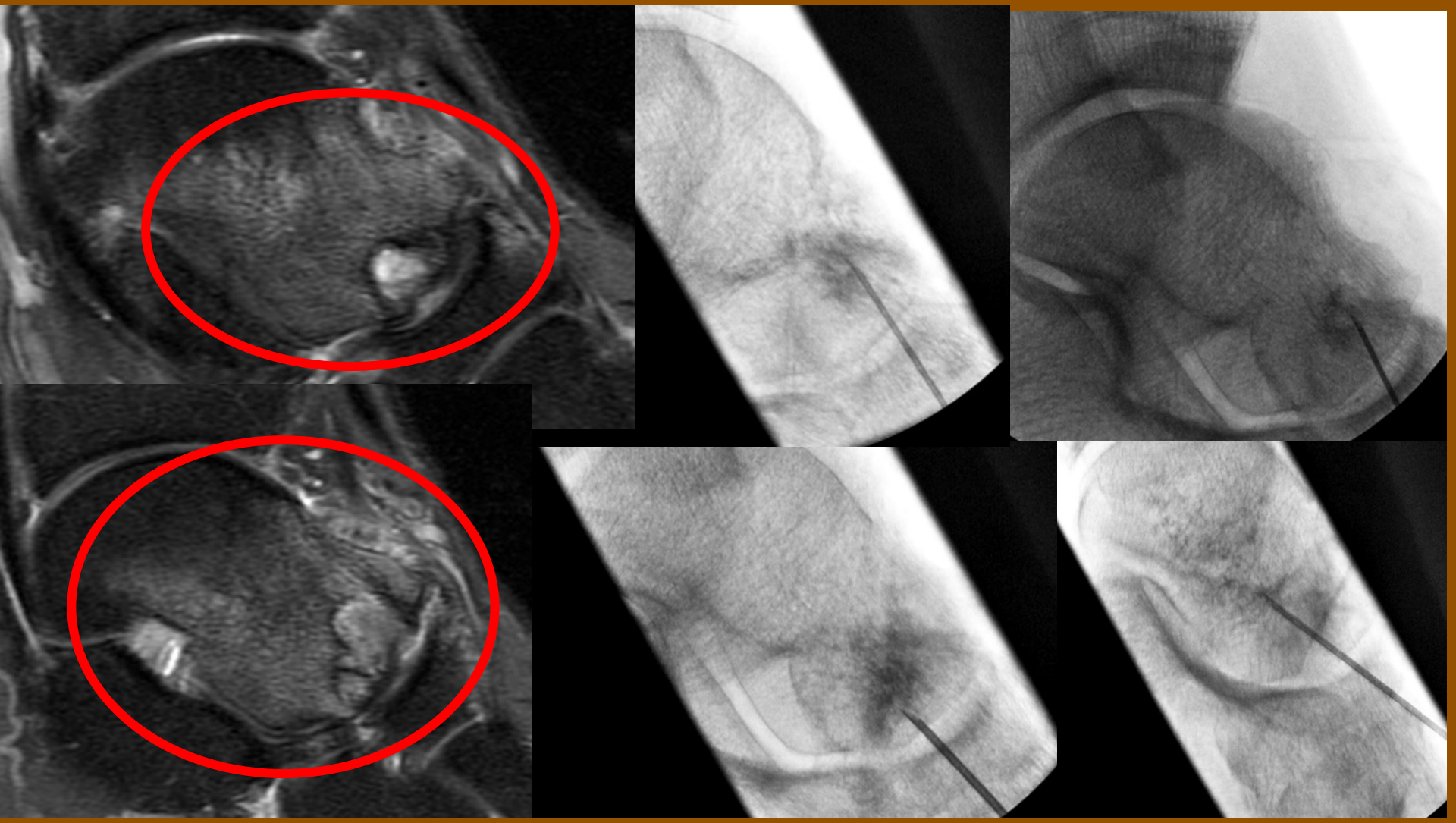


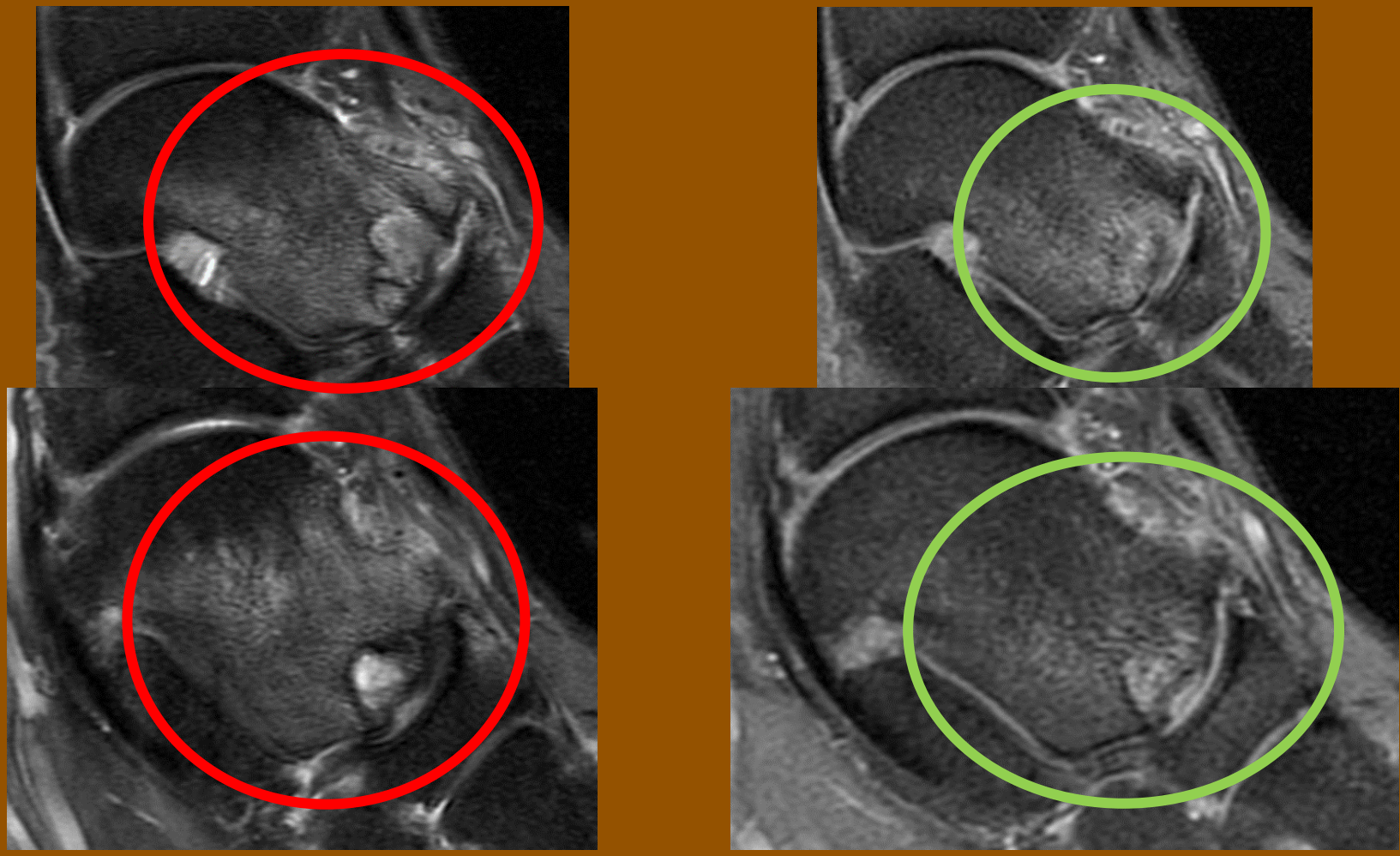


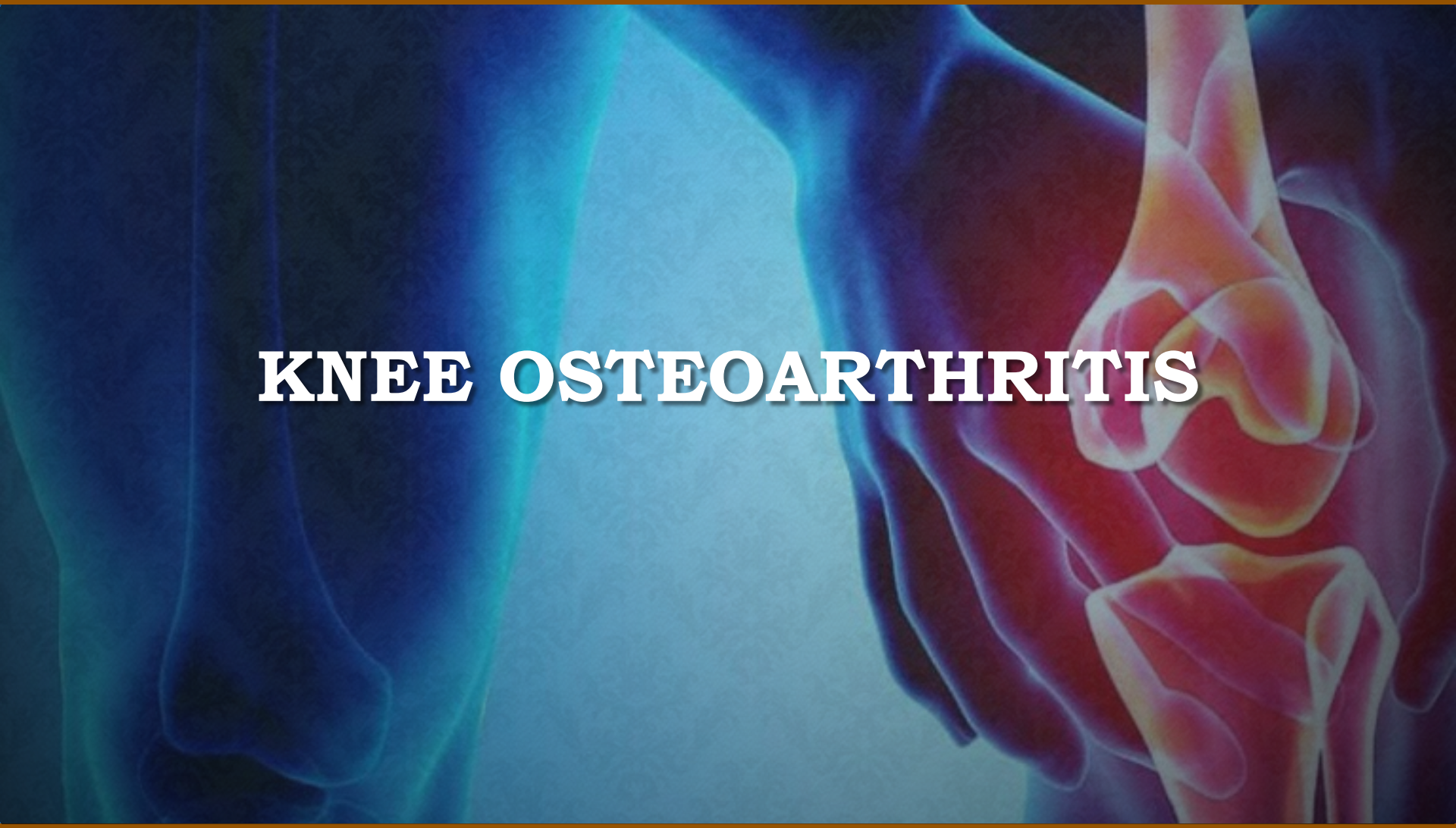


# TALONAVICULAR OSTEOARTHRITIS








KNEE OSTEOARTHRITIS




› Arthrosc Tech. 2014 Dec 15;3(6):e713-7. doi: 10.1016/j.eats.2014.09.006. eCollection 2014 Dec.

# Intraosseous infiltration of platelet-rich plasma for severe knee osteoarthritis

Mikel Sánchez [1], Nicolás Fiz [2], Jorge Guadilla [1], Sabino Padilla [3], Eduardo Anitua [3], Pello Sánchez [4], Diego Delgado [4]

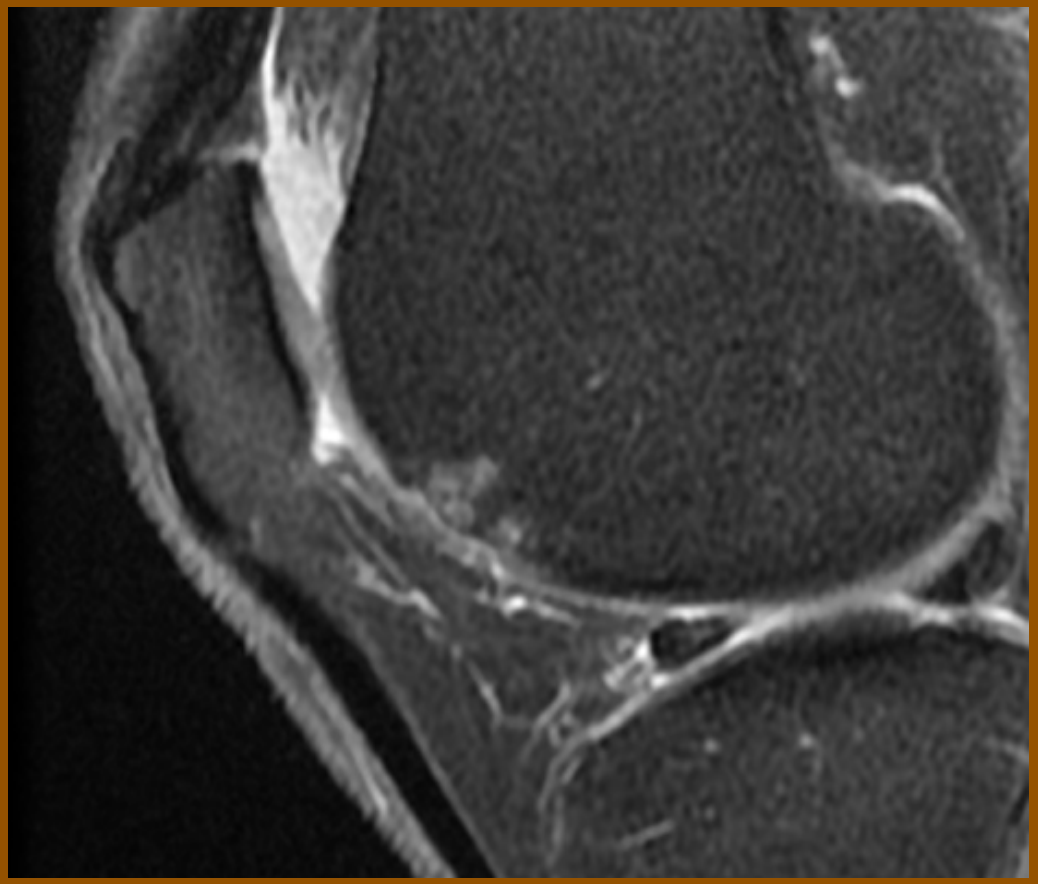
Affiliations + expand

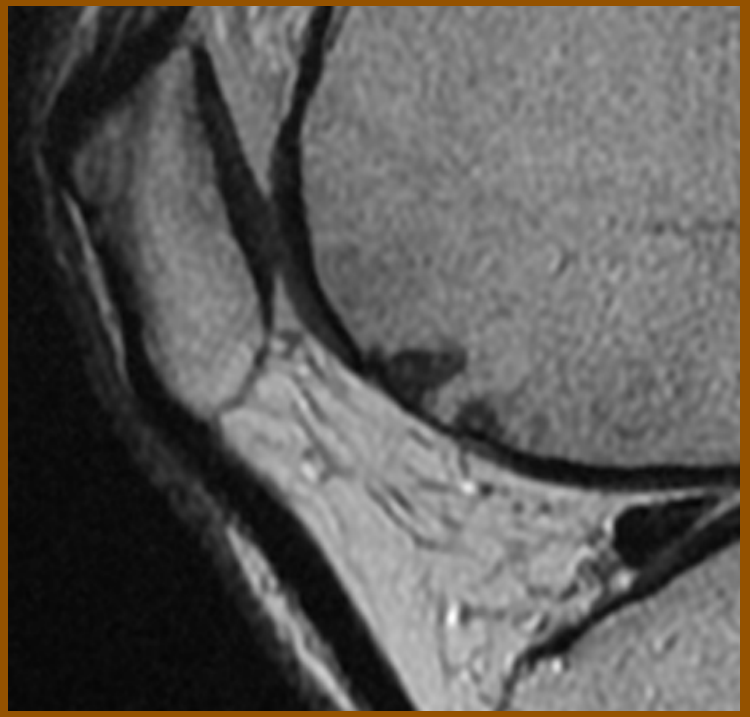
PMID: 25685680 PMCID: PMC4314556 DOI: 10.1016/j.eats.2014.09.006

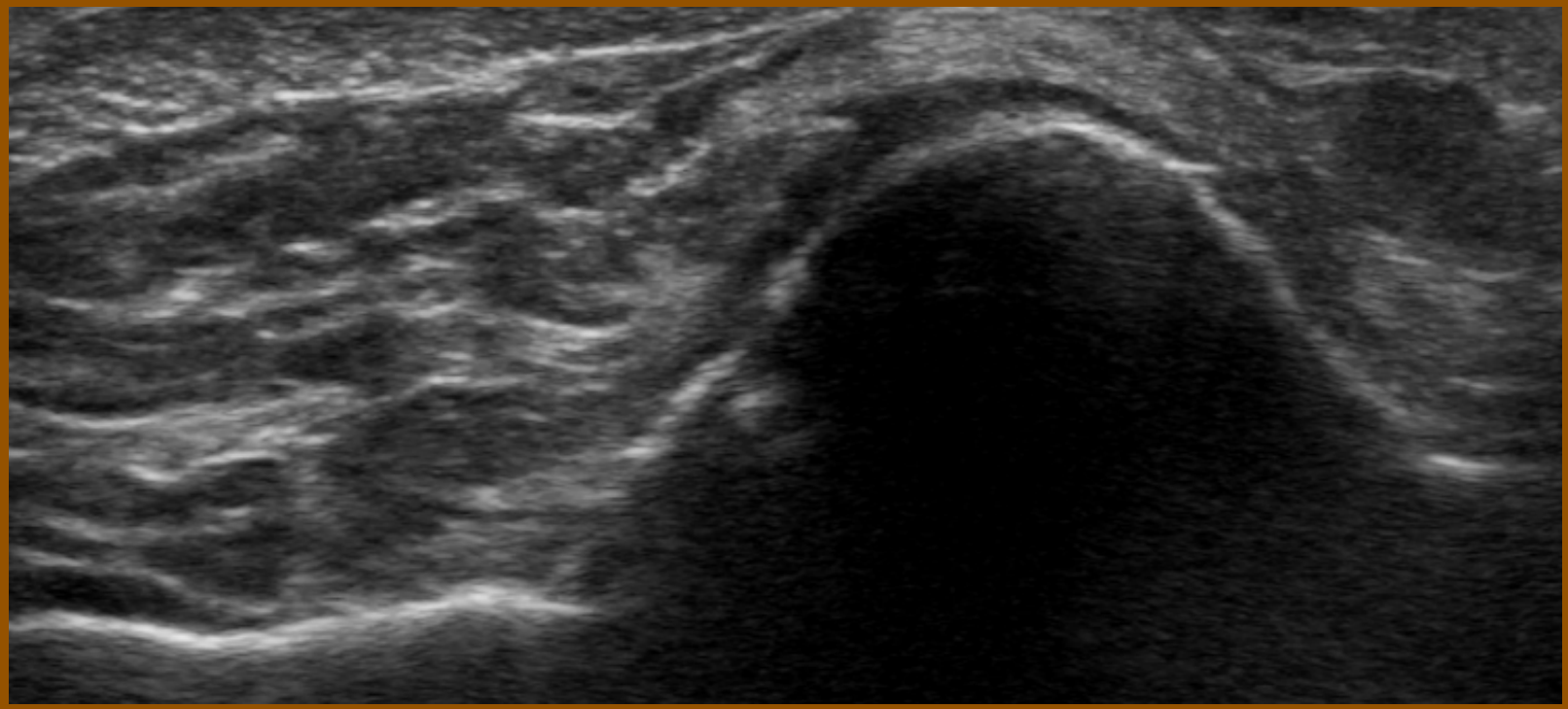
## Abstract

We describe a new technique of platelet-rich plasma (PRP) infiltration for the treatment of severe knee osteoarthritis. PRP intra-articular infiltration is a promising treatment for knee osteoarthritis, but it still has some limitations in high-degree osteoarthritis. Diagnosis of osteoarthritis is based on clinical and radiographic findings, and patients with grade III or IV knee tibiofemoral osteoarthritis based on the Ahlbäck scale are considered candidates for this technique. The technique consists of performing intraosseous infiltration of PRP into the subchondral bone, which acts on this tissue and consequently on cartilage-bone communication. Although the intraosseous injection hinders the conventional knee intra-articular infiltration, it allows an extension of the range of action of the PRP, which acts directly on the subchondral bone, which is involved in the progression of osteoarthritis. Thus this technique involves a new administration of PRP that can delay knee arthroplasty; moreover, it can be applied for not only severe osteoarthritis but also other pathologies in which the subchondral bone is critical in the etiology, such as necrosis and osteochondral lesions.

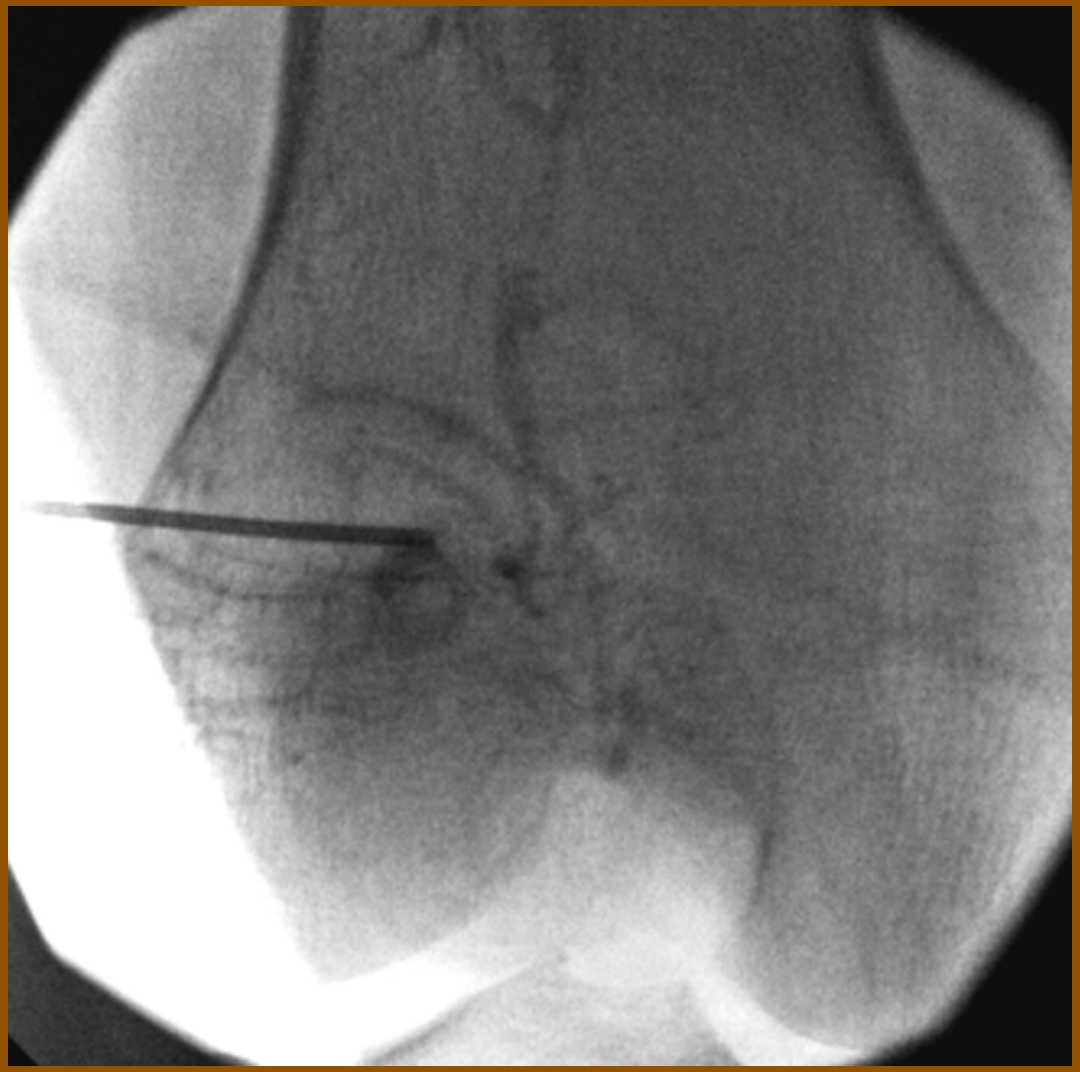
PubMed Disclaimer

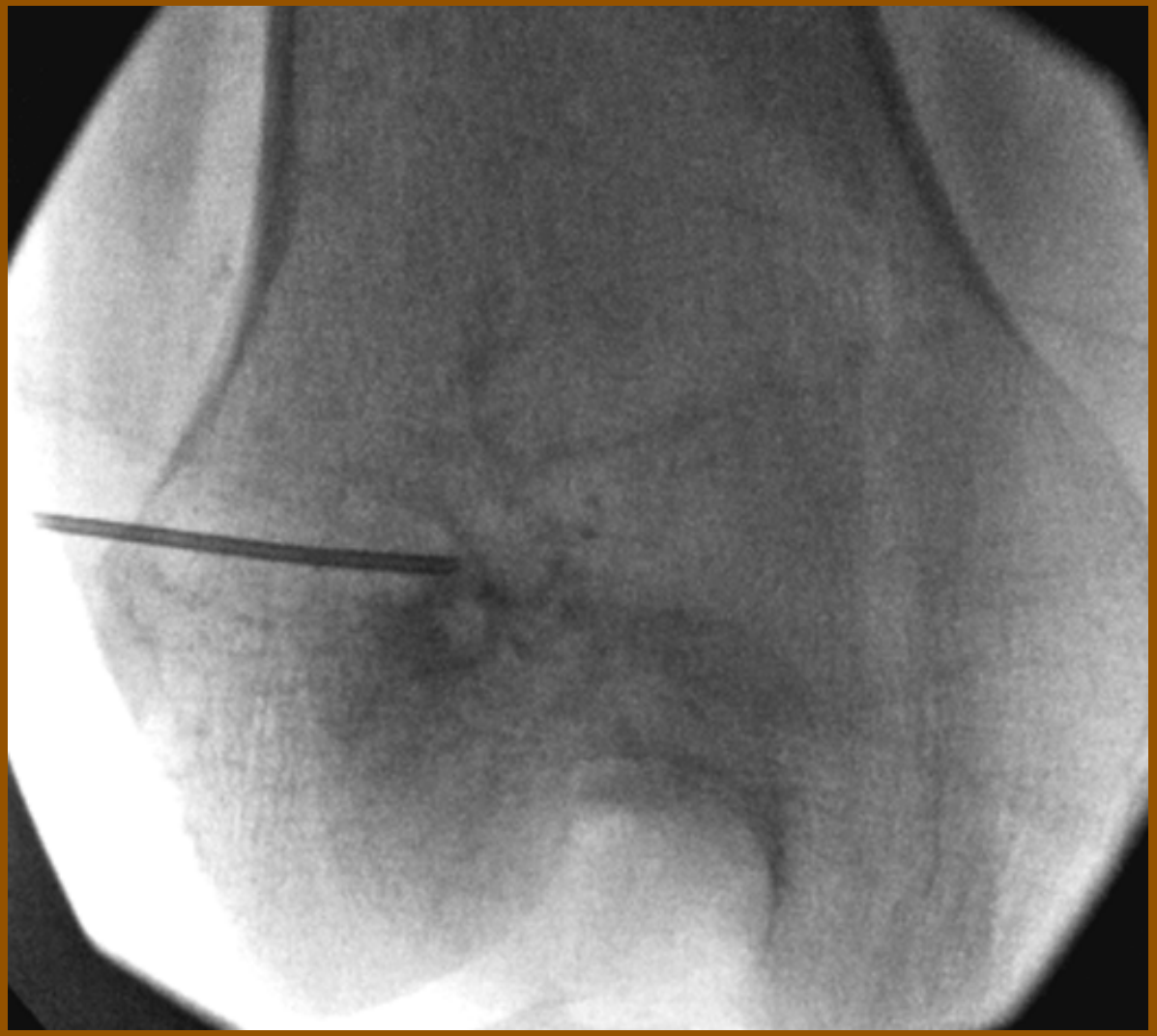


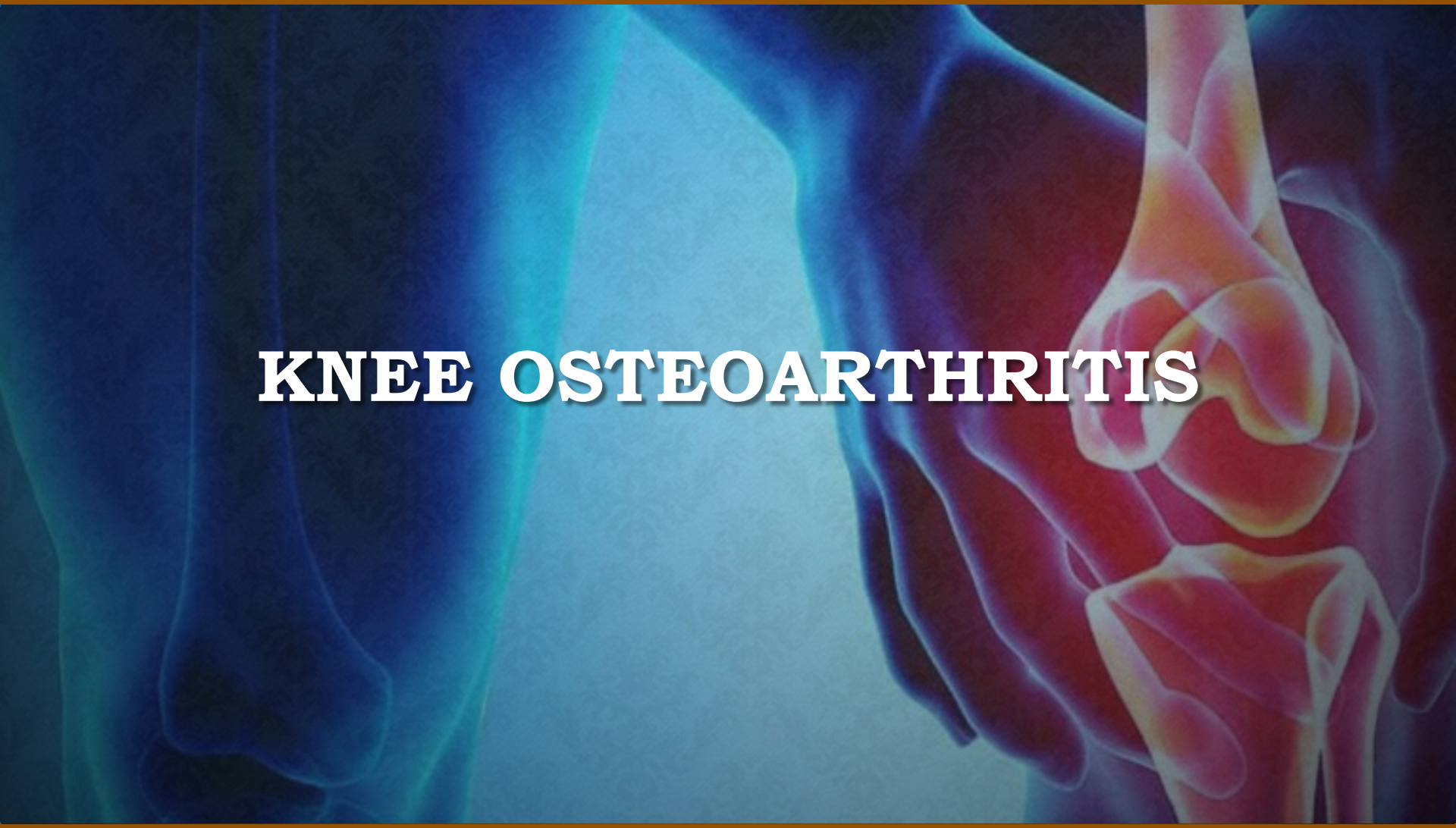


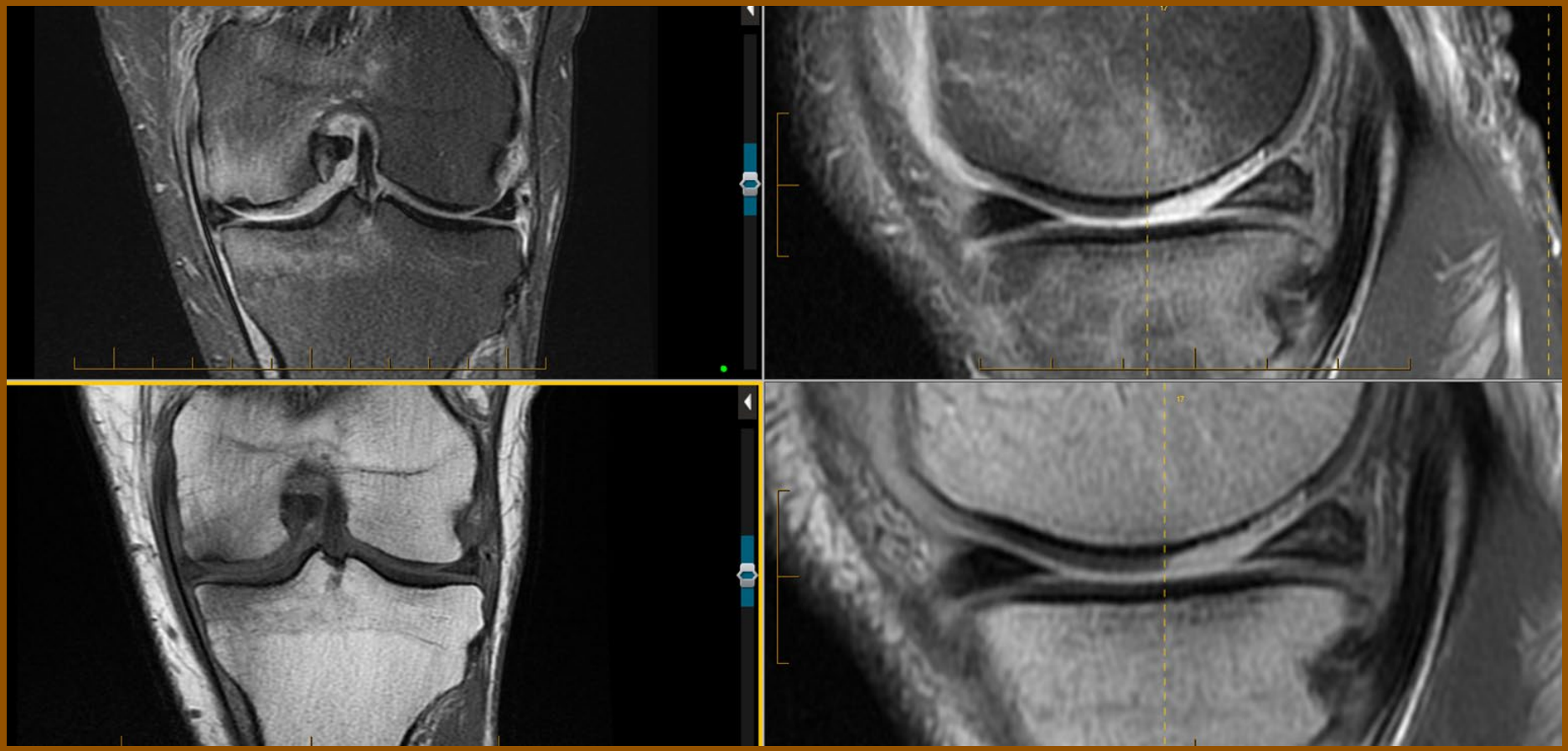






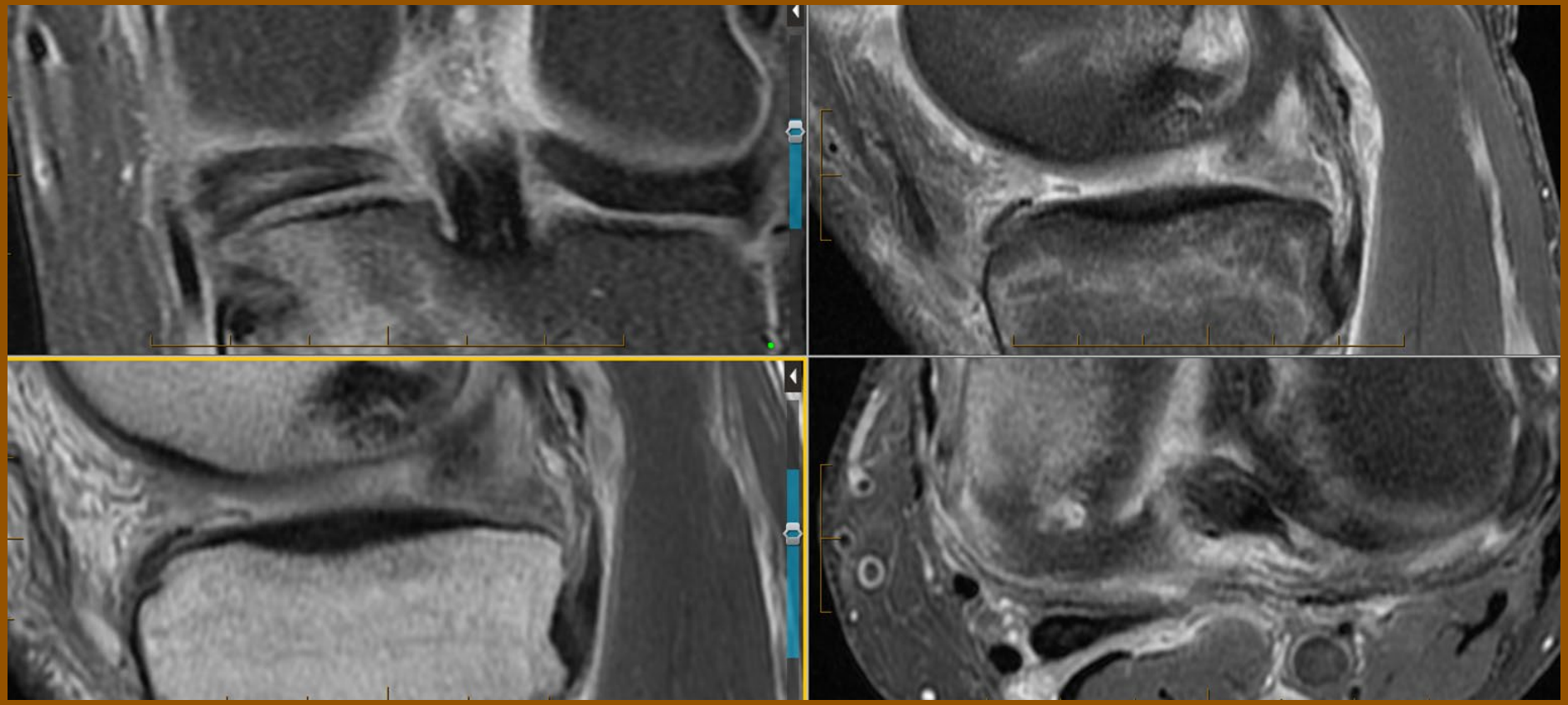


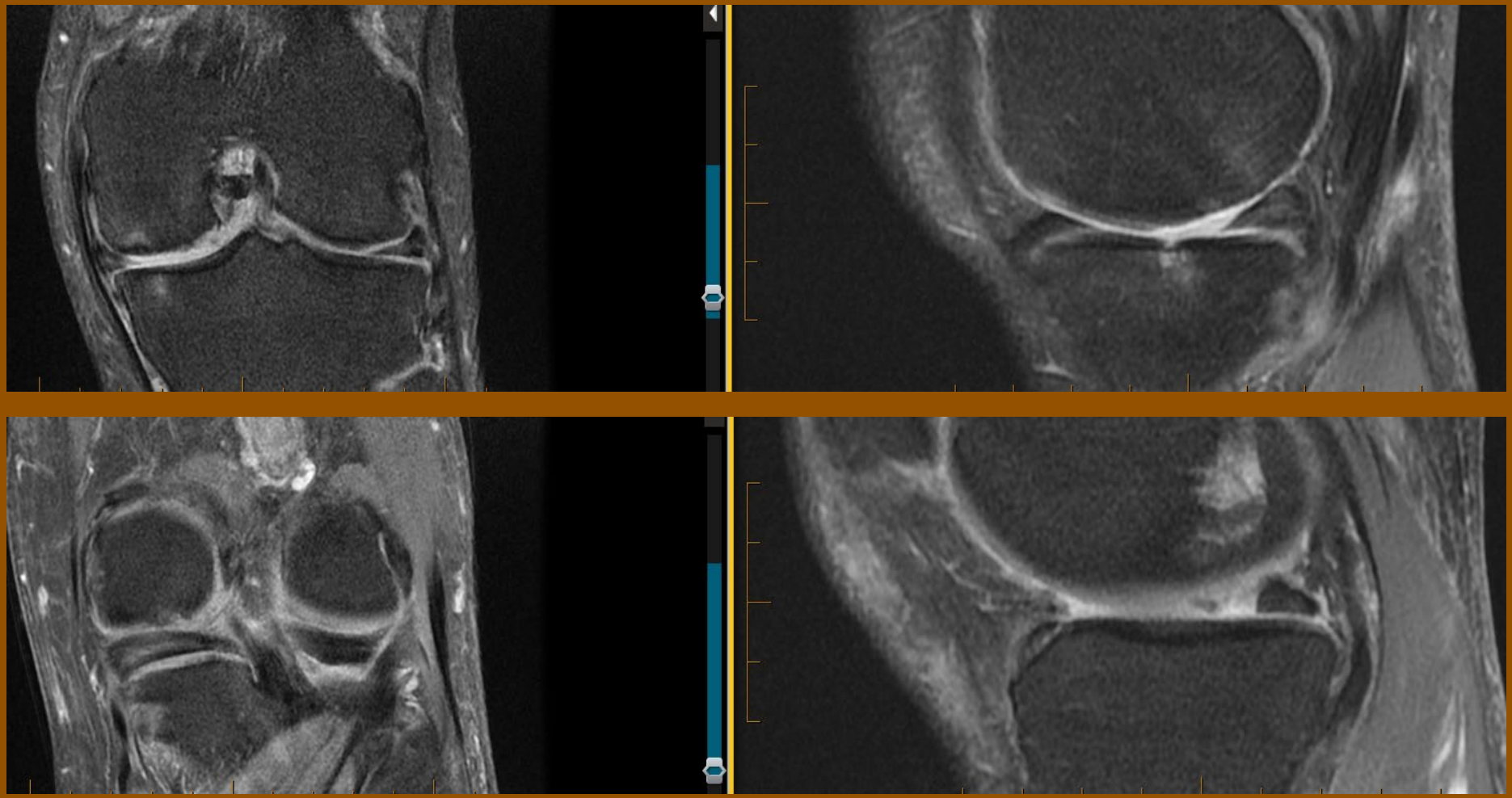

KNEE OSTEOARTHRITIS











FOR THE REGENERATIVE PODIATRIST

# SEE WHAT OTHERS CAN'T

*The Ultrasound Imperative for Next-Level Regenerative Care*

Dr. Rahul Desai | The Regenerative Radiologist | Vive Life Sciences

# THE HARD TRUTH

**1 in 5**

blind knee injections
miss the joint entirely

*Fang et al., ASMR 2021*
*Systematic Review of RCTs*

**BLIND HIP INJECTION**

**72%**

*accuracy landmark-guided*
*(US: 100%)*

**AC JOINT INJECTION**

**68%**

*accuracy landmark-guided*
*(US: 93.6%)*

**BICEPS TENDON SHEATH**

**27%**

*accuracy landmark-guided*
*(US: 87%)*

*Aly et al., BJSM 2015 | Hoeber et al., BJSM 2016*

# WHY IMAGING CHANGES EVERYTHING



## Precision Diagnosis

US reveals pathology invisible to palpation — partial vs. full tears, bursal effusions, plantar fascia thickness, neuroma location, tendinosis grading. MRI adds bone marrow edema, chondral lesions & stress reactions.



## Real-Time Injection Guidance

Watch your needle tip, your injectate spread, and your target in real time. No guessing. US-guided injections demonstrated 96% vs. 78% accuracy vs. blind — and lower procedural pain scores.



## Superior Patient Outcomes

Meta-analyses confirm US guidance improves pain relief, function scores, and patient satisfaction across knee, hip, ankle, and small joints — the exact anatomy you treat every day.



## Competitive Market Position

Cash-pay regenerative patients research their providers. US + MRI proficiency signals elite expertise — differentiating you from every landmark-guided competitor in your market.

# FOOT & ANKLE PATHOLOGY YOU'RE MISSING WITHOUT US

### Plantar Fasciitis

Measure fascial thickness, confirm fibrosis vs. partial tear, guide hydrodissection or PRP precisely into the fascio-osseous junction — impossible blind.

### Peroneal Tendon Tears

Dynamic US assessment with eversion stress reveals longitudinal splits and subluxation that MRI can miss on static imaging. Real-time is everything.

### Morton's Neuroma

US identifies neuroma diameter, location, and perineural fluid — guiding PRP or alcohol sclerosing injection to within 1mm accuracy.

### Achilles Tendinopathy

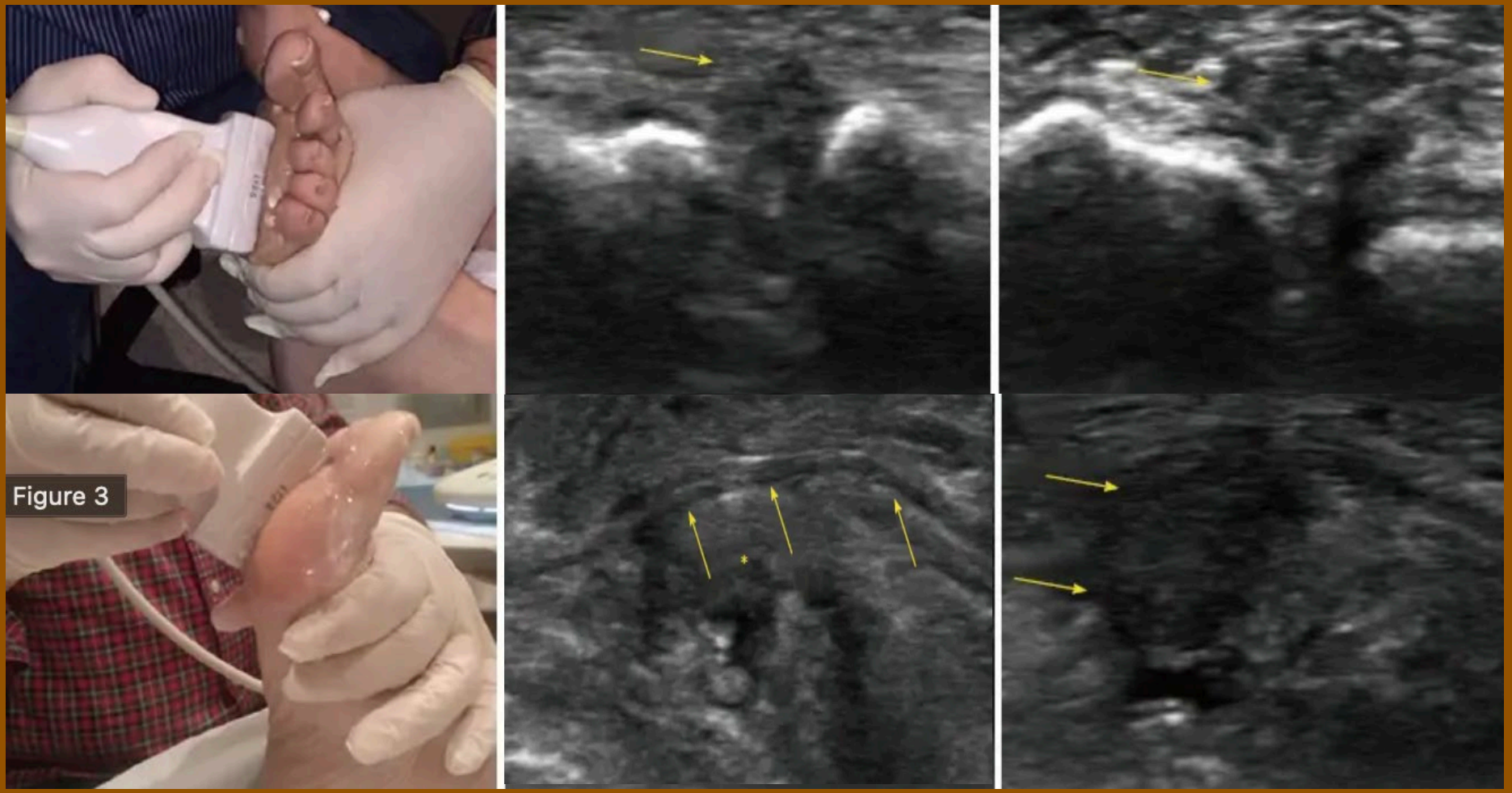
Neovascularization mapping with Doppler, intratendinous tear grade, and paratenon thickening — all visible, all actionable for PRP targeting.

### Ankle Joint & Subtalar

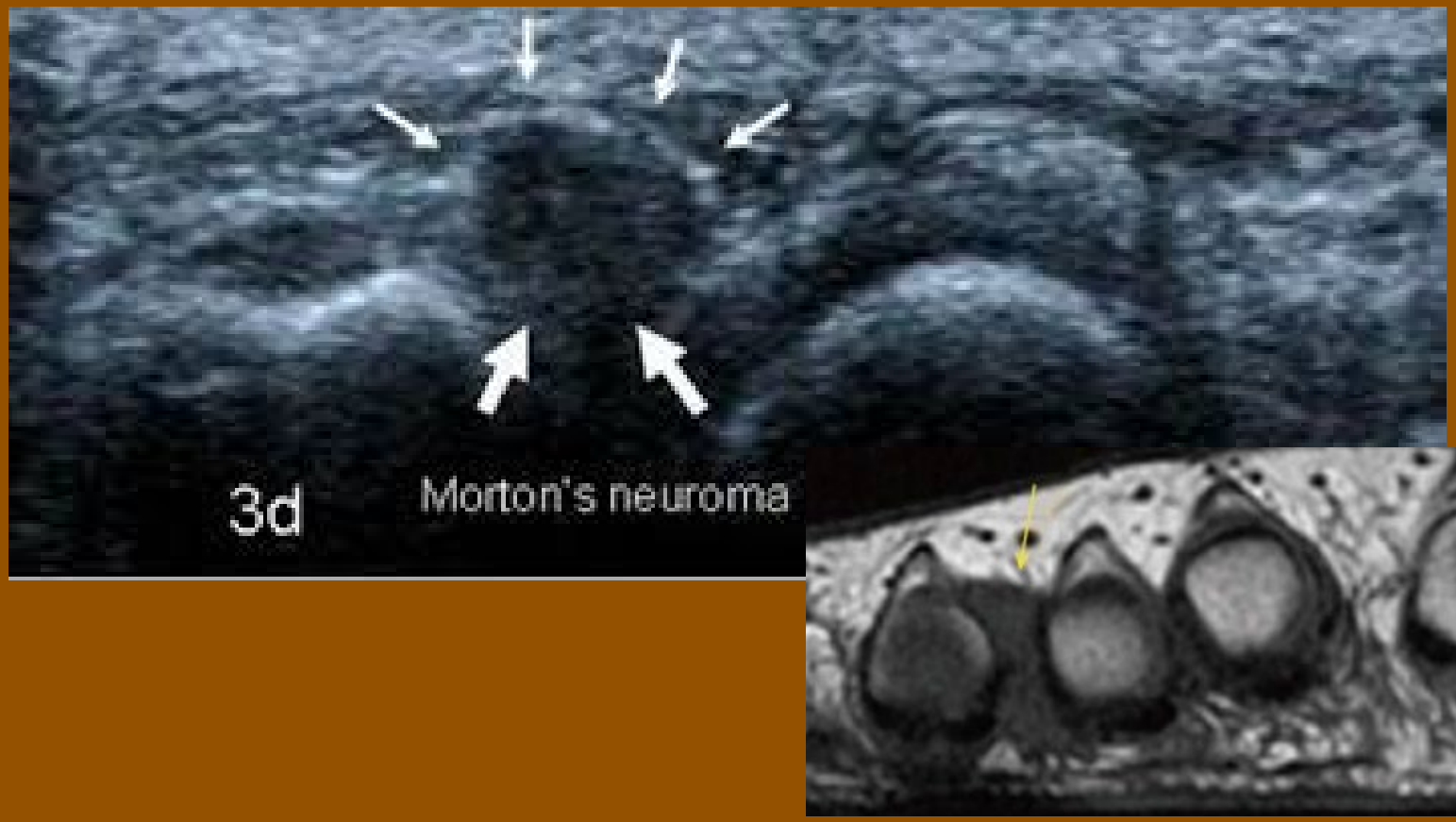
US-guided IA injections for PRP/HA with real-time confirmation of intra-articular spread — critical for small joint anatomy.

### Tarsal Tunnel Syndrome

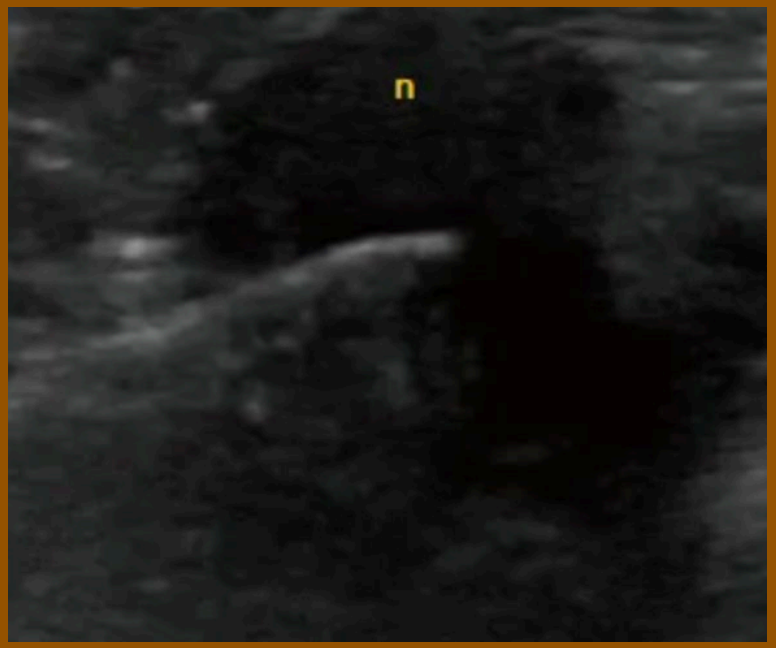
Dynamic nerve imaging, identification of space-occupying lesions, and hydrodissection guidance around the posterior tibial nerve.




Santiago FR, Muñoz PT, Pryest P, Martínez AM, Olleta NP. Role of imaging methods in diagnosis and treatment of Morton's neuroma. World J Radiol 2018; 10(9): 91-99 [PMID: 30310543 DOI: 10.4329/wjr.v10.i9.91]


3d
Morton's neuroma




n

# THE EVIDENCE IS OVERWHELMING

*Systematic reviews & meta-analyses across 17+ publications confirm the same story:*

**100%**

US-guided hip injection accuracy

*Hoeber et al., BJSM 2016*

**96%**

US-guided IA injection accuracy vs. 78% blind

*Oo et al., AJUM 2024*

**87%**

US biceps tendon sheath vs. 27% landmark

*Aly et al., BJSM 2015*

**↓ Pain**

Significant reduction in procedural pain with US

*Multiple meta-analyses*

**BOTTOM LINE:** Umbrella review of 17 meta-analyses (PubMed to March 2024): US guidance is a reliable, evidence-based standard for
MSK injections. It is not optional for the practitioner claiming regenerative expertise.

# THE COMPETITIVE REALITY

## WITHOUT IMAGING

- ✗ Palpation-based diagnosis — subjective, incomplete
- ✗ Blind injections: 20–30% miss rate for key structures
- ✗ PRP/biologics deposited in wrong tissue plane
- ✗ Can't see what you're treating — outcomes suffer
- ✗ Ortho, sports med, PM&R are already using US
- ✗ Patients Google your competitors — and find them

→

## WITH US + MRI MASTERY

- ✓ Objective, reproducible, measurable diagnosis
- ✓ Real-time confirmation of injection accuracy
- ✓ Biologics precisely deposited — outcomes improve
- ✓ Document disease, treatment & response objectively
- ✓ Differentiate in any market — cash-pay patients choose you
- ✓ Unlock millions in regenerative revenue over your career

# THE INVESTMENT & RETURN

**$20–30K**

**Ultrasound Unit**

Point-of-care MSK-grade system

**$5–10K**

**Education Spend**

Courses, cadaver labs, proctored scanning sessions, online curriculum

**12–24 mo**

**Timeline to Mastery**

Dedicated daily practice — your skills will compound every week

## THE RETURN

**$500–5,500**

per US-guided regenerative procedure (cash-pay)

**2–4x**

more procedures/day vs. palpation-only practice

**Millions**

in career revenue unlocked for early adopters

# YOUR LEARNING JOURNEY

PHASE 1

## 0–3 Months

### Foundation

- US anatomy & probe technique
- Basic tendon/ligament imaging
- First guided injections w/ supervision
- MRI correlation — learn to read your own studies

PHASE 2

## 3–12 Months

### Competence

- Independent diagnostic scanning
- Full foot/ankle pathology library
- Dynamic assessment protocols
- Billing & documentation workflow

PHASE 3

## 12–24 Months

### Mastery

- Complex guided procedures
- Teach & mentor peers
- Build referral reputation
- Differentiate practice as US-guided expert

# YOUR GUIDE ON THIS JOURNEY



**20,000+**

Regenerative procedures performed



**Fellowship**

Trained Regenerative Radiologist



**National**

MSK & Regenerative Medicine Faculty



**IOF**

Board of Directors & President-Elect

## WHY ME AS YOUR GURU

- I've performed 20,000+ image-guided regenerative procedures — I know every pitfall
- I bridge radiology, orthobiologics & podiatric anatomy seamlessly
- I teach from the needle out — procedural, not theoretical
- Curriculum built for busy practitioners: focused, efficient, applicable Day 1
- I will be your accountability partner across the full 12–24 month journey
- My network connects you to the best US & MRI resources, vendors, and co-management pathways

THE CHOICE IS YOURS

# Be The Provider Patients Choose.

*The regenerative field is being won by providers who invest in imaging mastery.*
*US + MRI is not a luxury — it is the minimum standard for elite regenerative care.*

**01 Invest in Technology**

$20–30K US system
The tool that pays for itself within weeks of use

**02 Invest in Education**

$5–10K in structured learning — cadaver labs, courses, mentorship

**03 Invest in a Mentor**

Let me guide your 12–24 month journey to US + MRI mastery