MRI

4ο ΔΙΑΠΑΝΕΠΙΣΤΗΜΙΑΚΟ ΠΡΟΓΡΑΜΜΑ ΕΚΠΑΙΔΕΥΣΗΣ ΣΤΗ ΡΕΥΜΑΤΟΛΟΓΙΑ 2022-24

ΠΡΟΓΡΑΜΜΑ 17ου ΚΥΚΛΟΥ		
Σάββατο 24 Φεβρουαρίου 2024		
ΠΑΡΑΚΛΙΝΙΚΟΣ ΕΛΕΓΧΟΣ ΣΤΗ ΡΕΥΜΑΤΟΛΟΓΙΑ (ΑΠΕΙΚΟΝΙΣΗ-ΕΡΓΑΣΤΗΡΙΑΚΟΣ ΕΛΕΓΧΟΣ)		
9:00-09:30	Απλές ακτινογραφίες/CT	**Μπαλανίκα Α.**
9:30-10:00	Υπερηχογράφημα	**Ραφτάκης Ι.**
10:00-10:30	MRI	**Καραντάνας Α.**
10:30-11:00	Μέτρηση οστικής πυκνότητας	**Γαζή Σ.**
11:00-11:30	**Διάλειμμα**	
11:30-12:00	Αυτοαντισώματα	**Καψογεώργου Ε.**
12:00-12:30	Παρακέντηση αρθρώσεων και εξέταση αρθρικού υγρού	**Αυγουστίδης Ν.**
12:30-13:00	Βασικές αρχές επιδημιολογίας - στατιστικής: Τι πρέπει να γνωρίζει ο ρευματολόγος	**Μπερτσιάς Γ.**

Apostolos Karantanas

Professor of Radiology, University of Crete

Chairman, Dpt of Medical Imaging, Heraklion University Hospital

Objectives

Learn how to recognize on MR images

7 imaging signs used in Rheumatology

(aSpA / Inflammatory Joint Disease)

Με δυό λόγια

- Οι ασθενείς εισέρχονται σε σταθερό μαγνητικό πεδίο
- Τα πρωτόνια ευθυγραμμίζονται στον άξονα του πεδίου
- RF, αποκλίνουν τα πρωτόνια
- Σταματά το RF
- Λαμβάνουμε σήμα με αντένα (πηνίο)
- Το επιπρόσθετο βαθμιδωτό μαγνητικό πεδίο οριοθετεί στο χώρο το σήμα
- Ανάλυση σήματος με μετασχηματισμό Fourier
- Σχηματισμός εικόνας

Basic pulse sequences

- T1-w
- T2-w
- PD/T2 fat suppressed / STIR
- GRE
- Fat suppressed Gd enhanced T1-w

Gd: only with T1

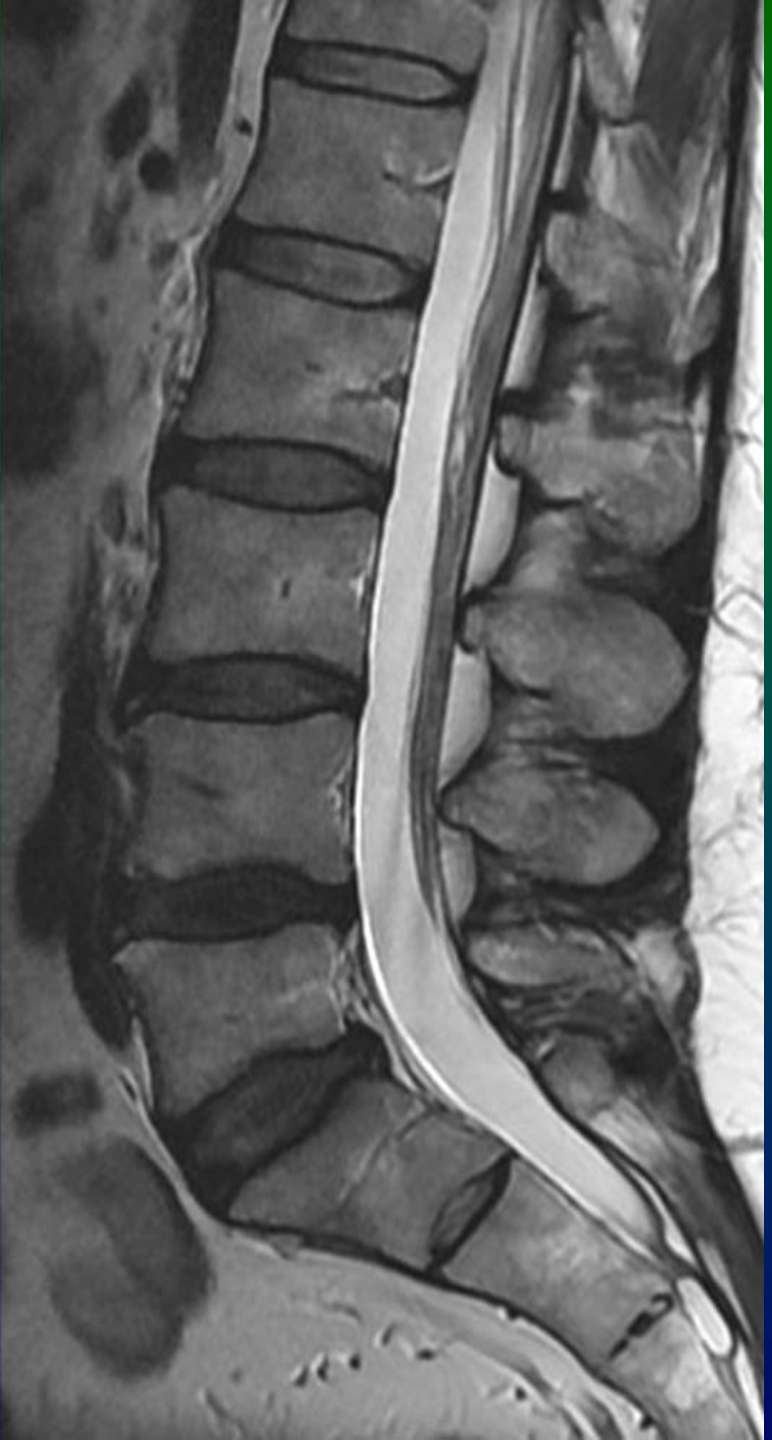
Fluid sensitive

T1-w

Water: dark

Fat: bright

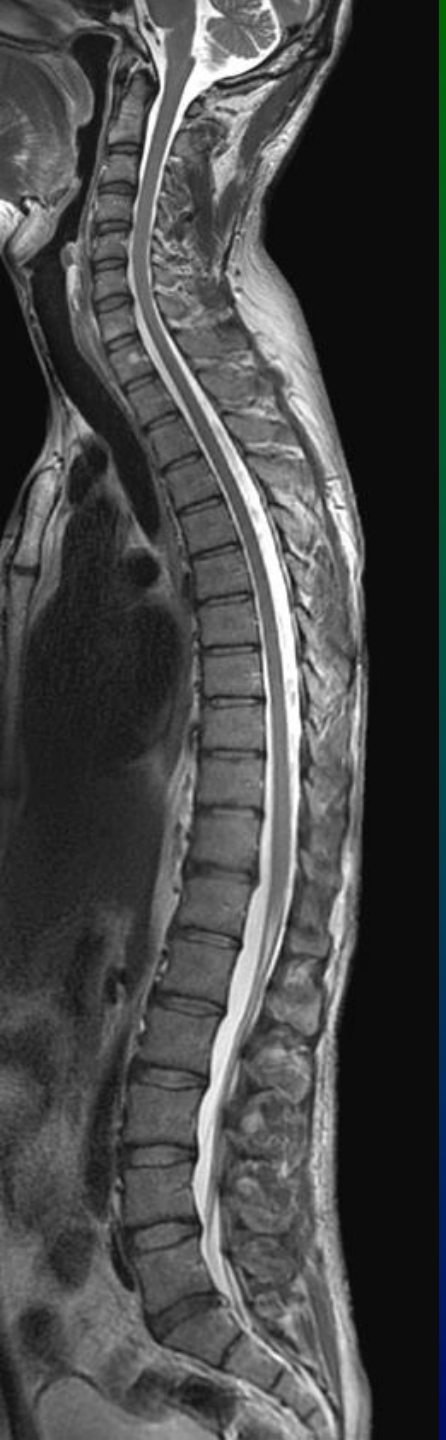
Bone marrow SI > discs



T2-w

Water: bright

Fat: variable



T2-w

mainly neurologic/orthopaedic/neurosurgery use

Spinal cord, roots, discs

CSF: bright

Bone marrow: limited value

Fat suppression: bright on black

essential to detect edema

Fat suppressed PD/T2

Spectral presaturation with extra RF pulse

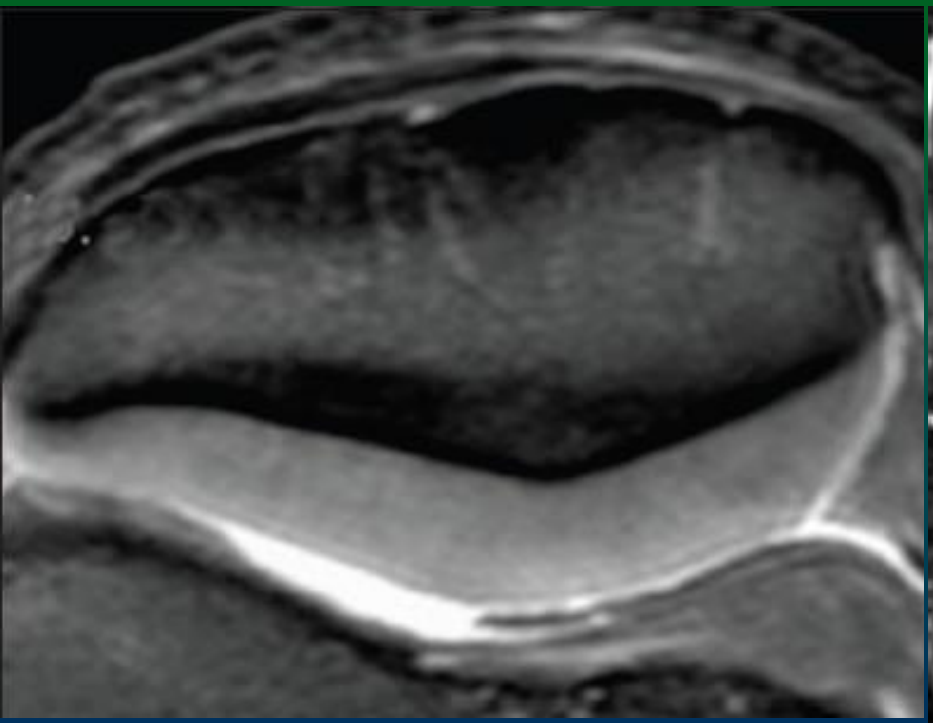
STIR

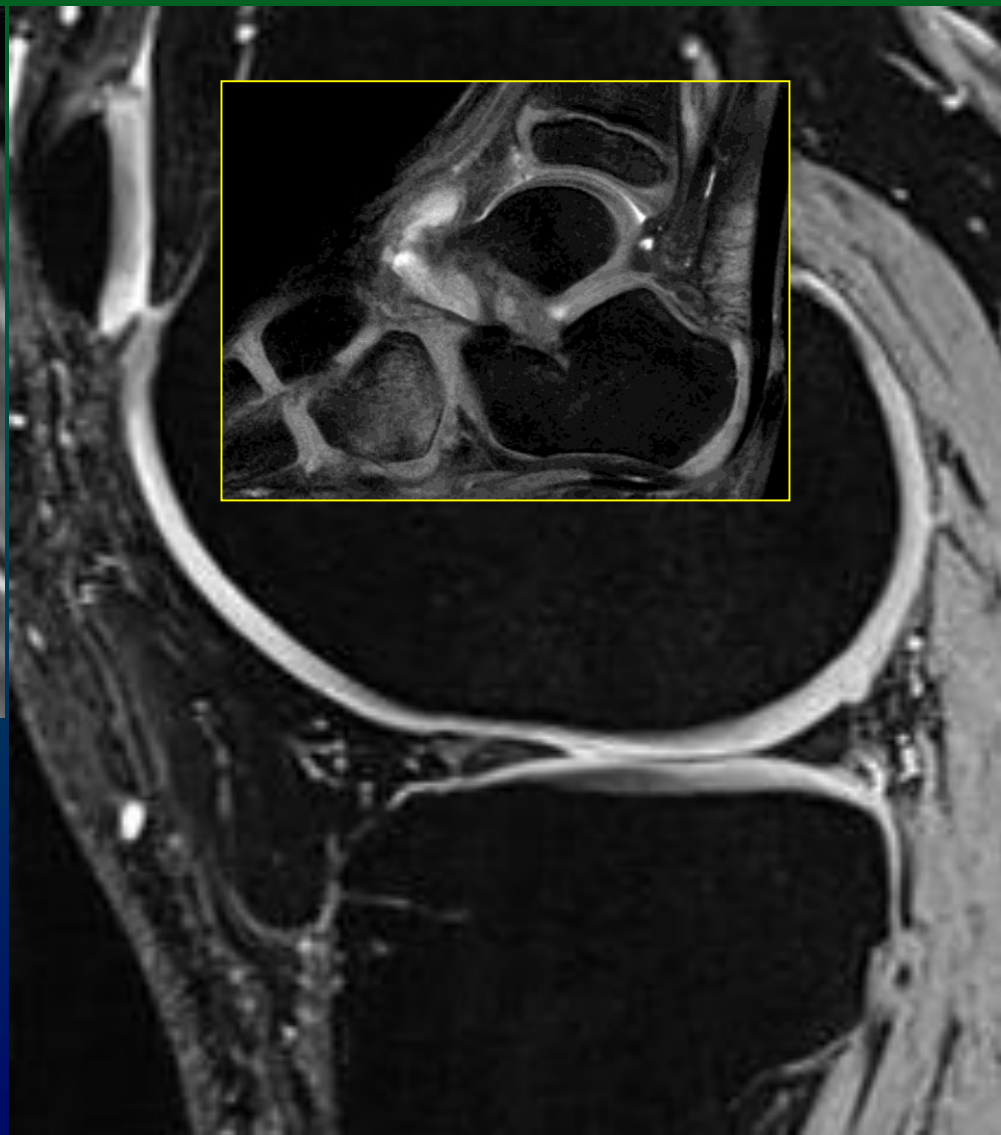
Inverted RF pulse

Gd-enhanced T1

Spectral presaturation

Intermediate weighted - GRE



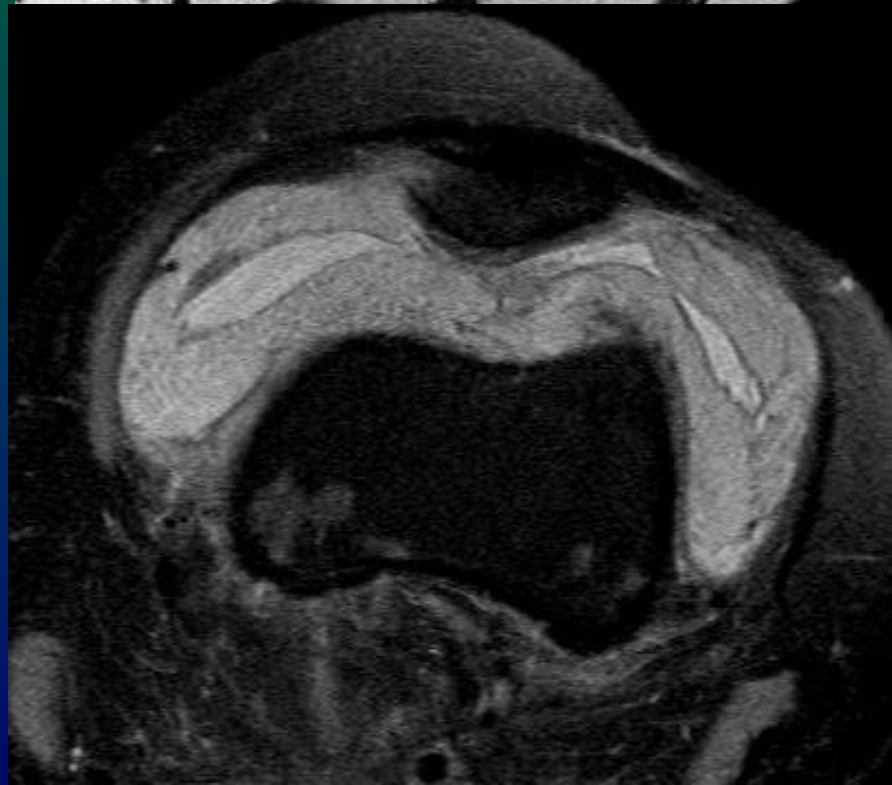


Basic terminology

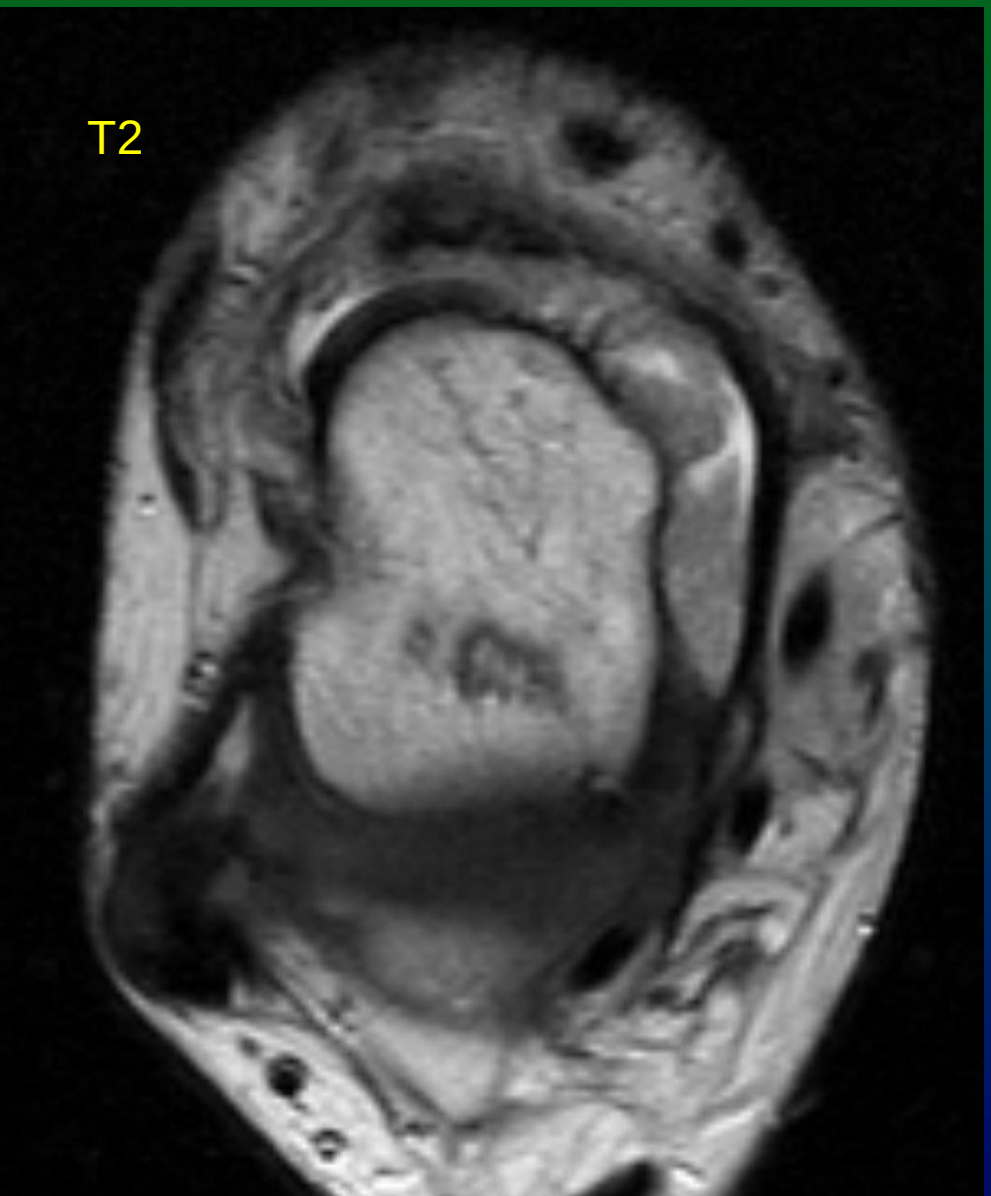
- Synovitis
- Bone marrow edema
- Enthesopathy
- Erosion
- Fat deposition
- Subarticular sclerosis
- Ankylosis

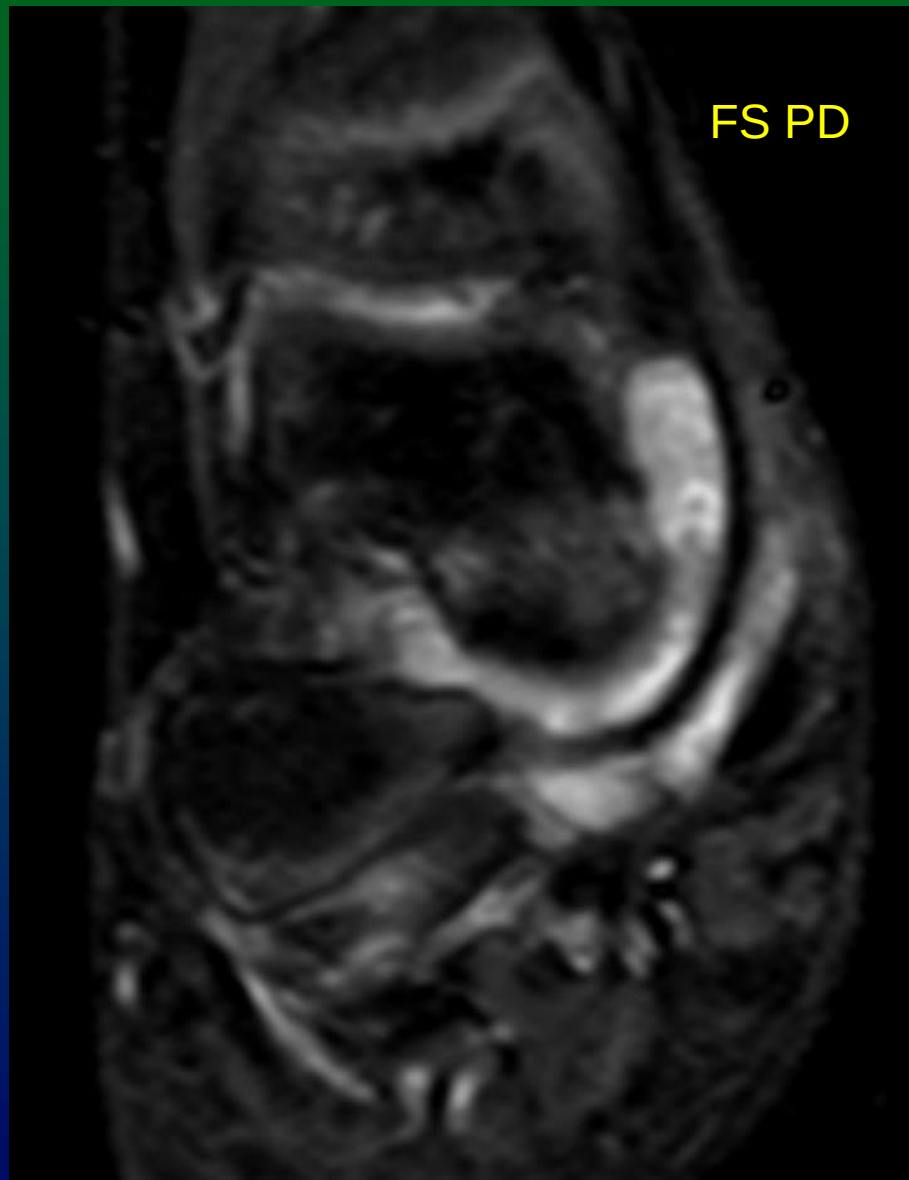
- **Synovitis**
- Bone marrow edema
- Enthesopathy
- Erosion
- Fat deposition
- Subarticular sclerosis
- Ankylosis

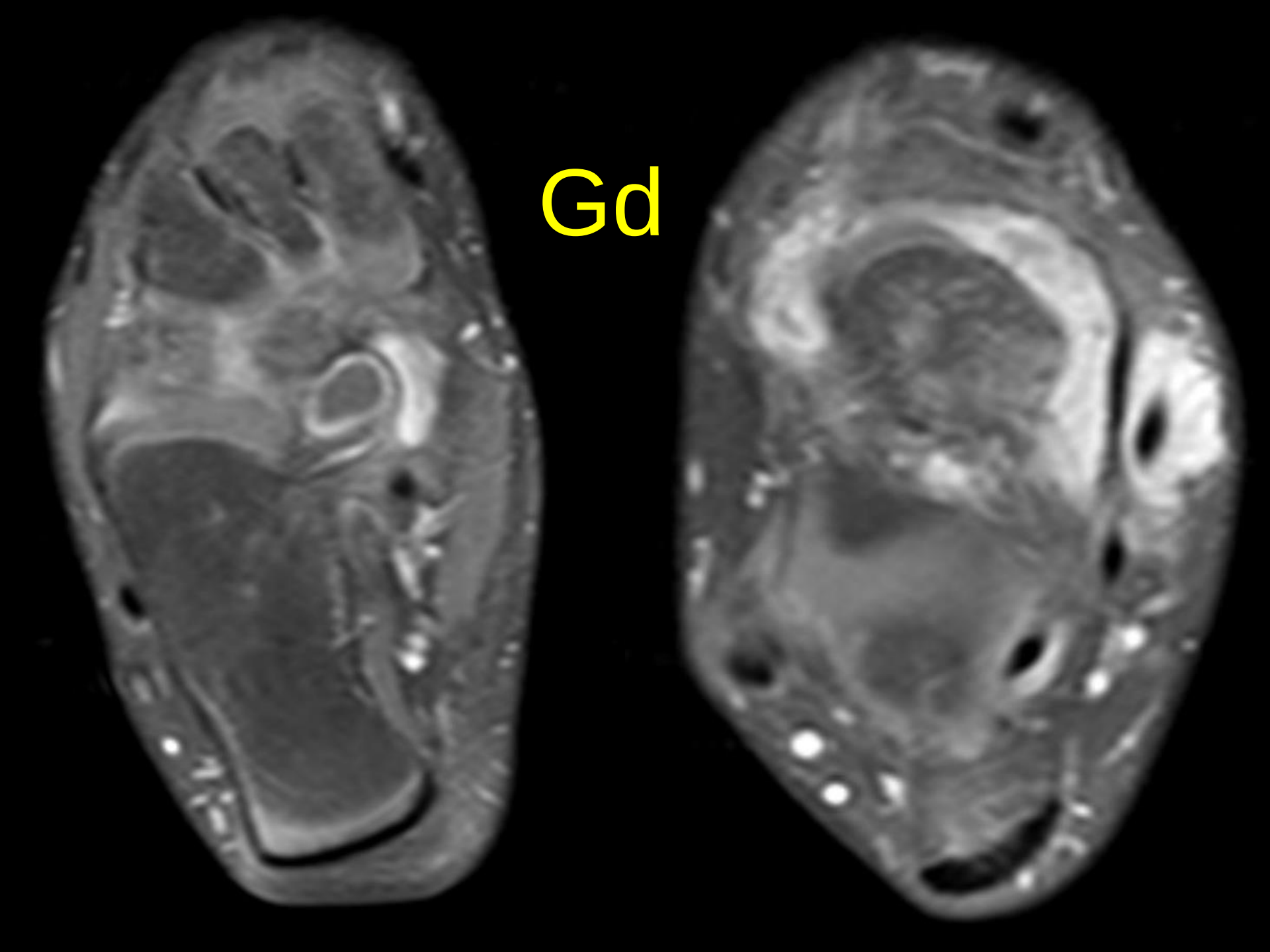
- “dirty” effusion
- Apparent thickening
- Synovial enhancement



5f, JIA

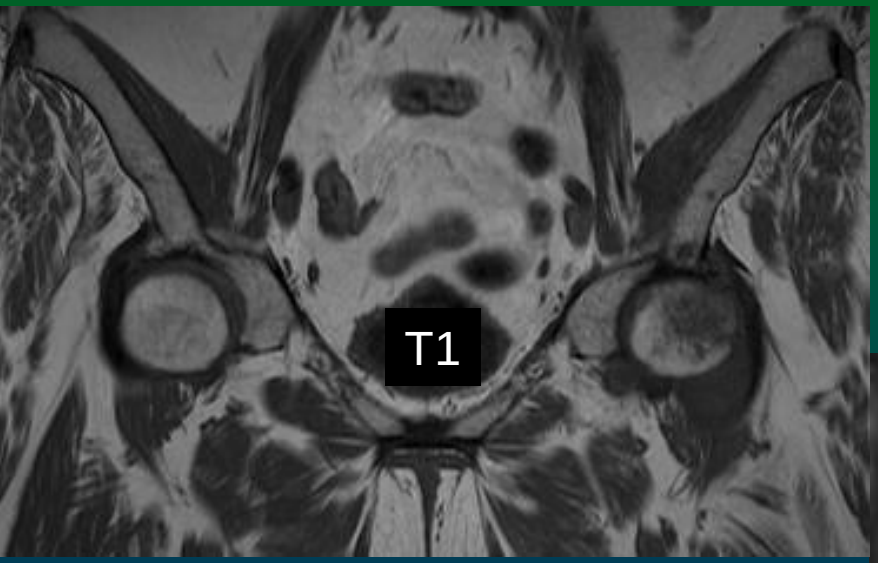





Gd

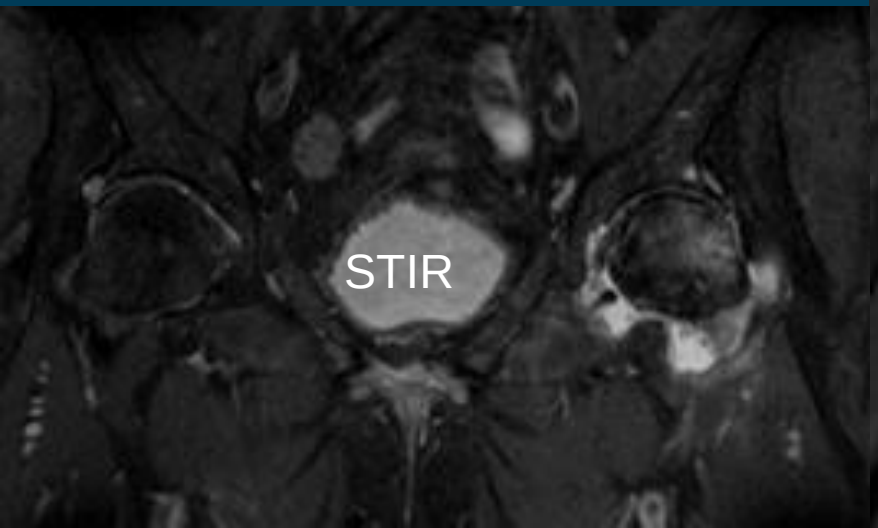
- Synovitis
- **Bone marrow edema**
- Enthesopathy
- Erosion
- Fat deposition
- Subarticular sclerosis
- Ankylosis

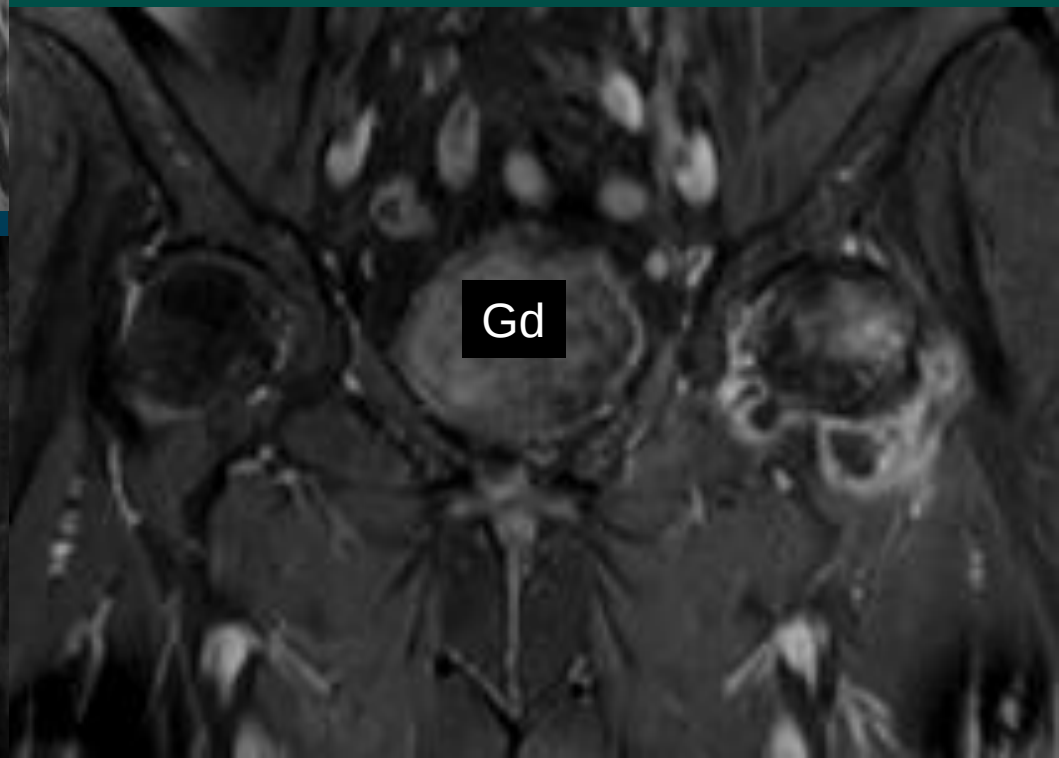
BME



66f,10y Seronegative RA

4m painful hip L.





aSpA: Early disease

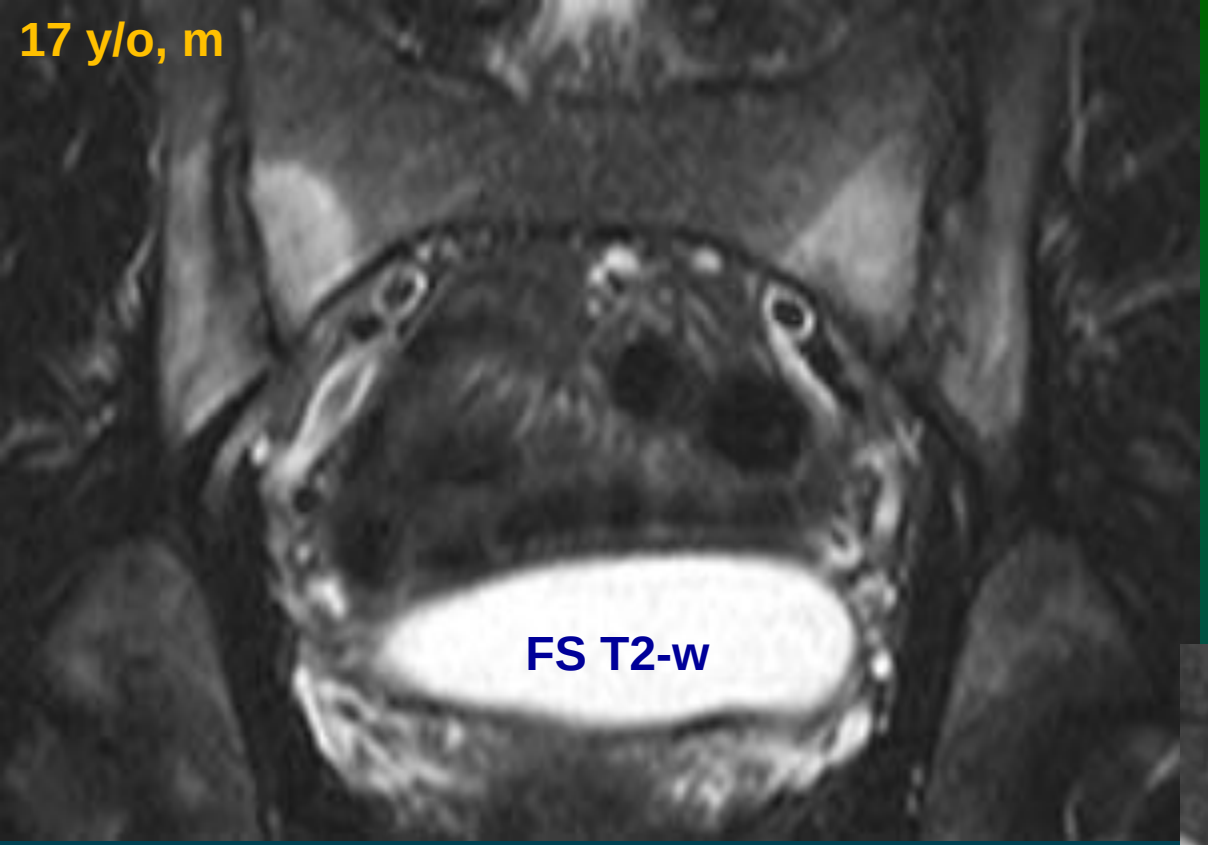
- **Subchondral BME**

- **Sacroiliitis: hallmark of AS, especially in early stage**

- **MRI: method of choice** (fat suppressed PD/T2-w, STIR) **Sens. >90%**

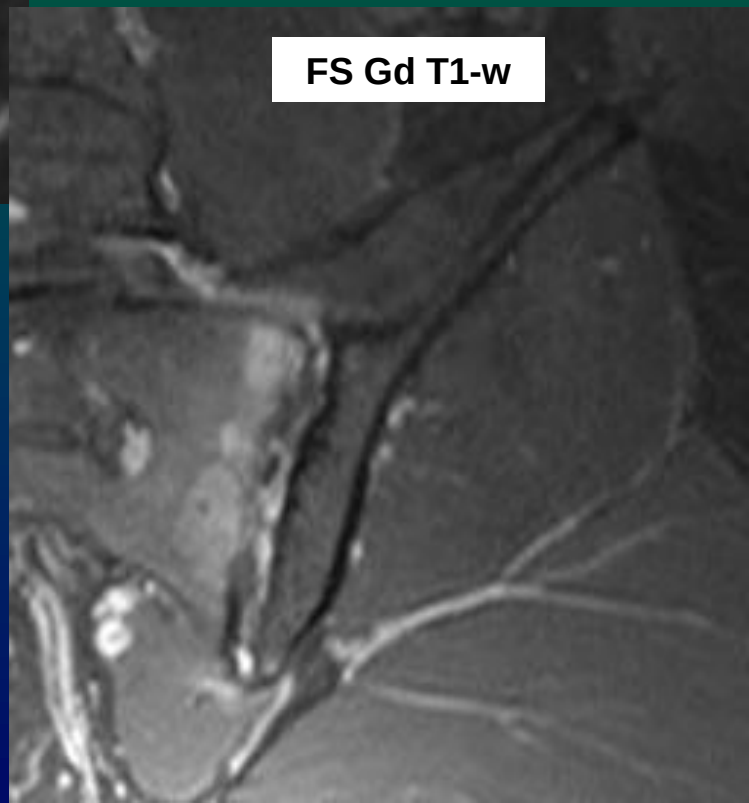
Jochling J, et al. 2010; Sieper J, et al. ASAS handbook. ; Ann Rheum Dis 2009; Braun J, Sieper J. Lancet 2007

17 y/o, m



High SI on fluid sens. Imagea

Gd: enhancement

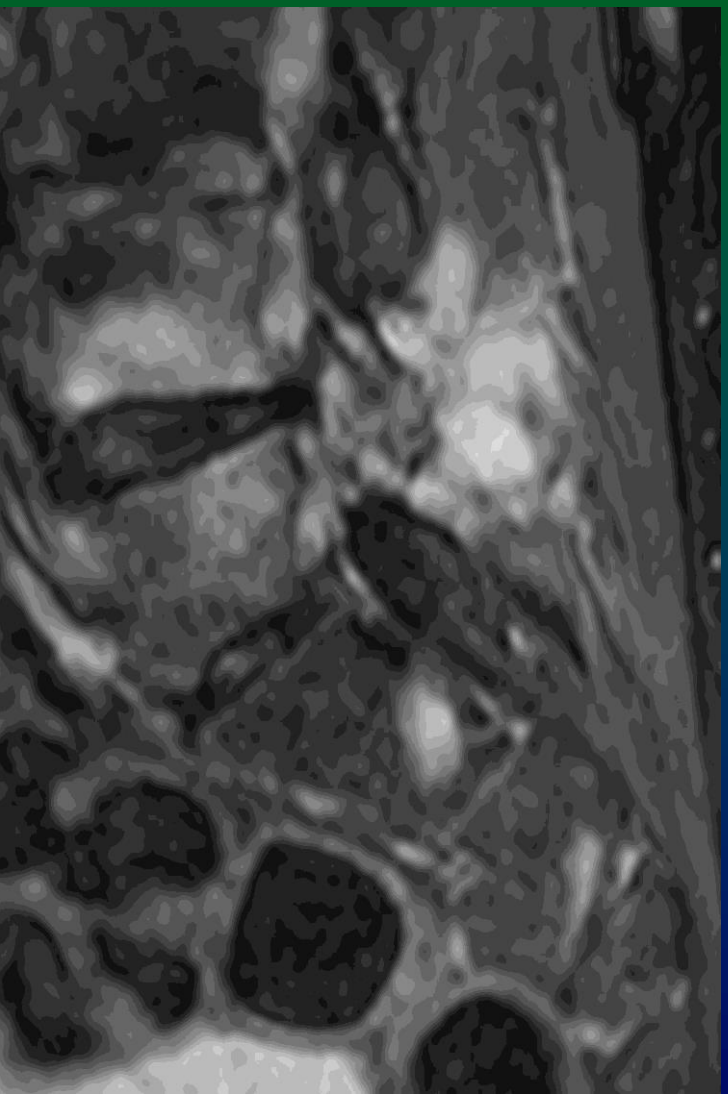


BME: observed within a few w of IBP presentation

Subchondral BME: osteitis

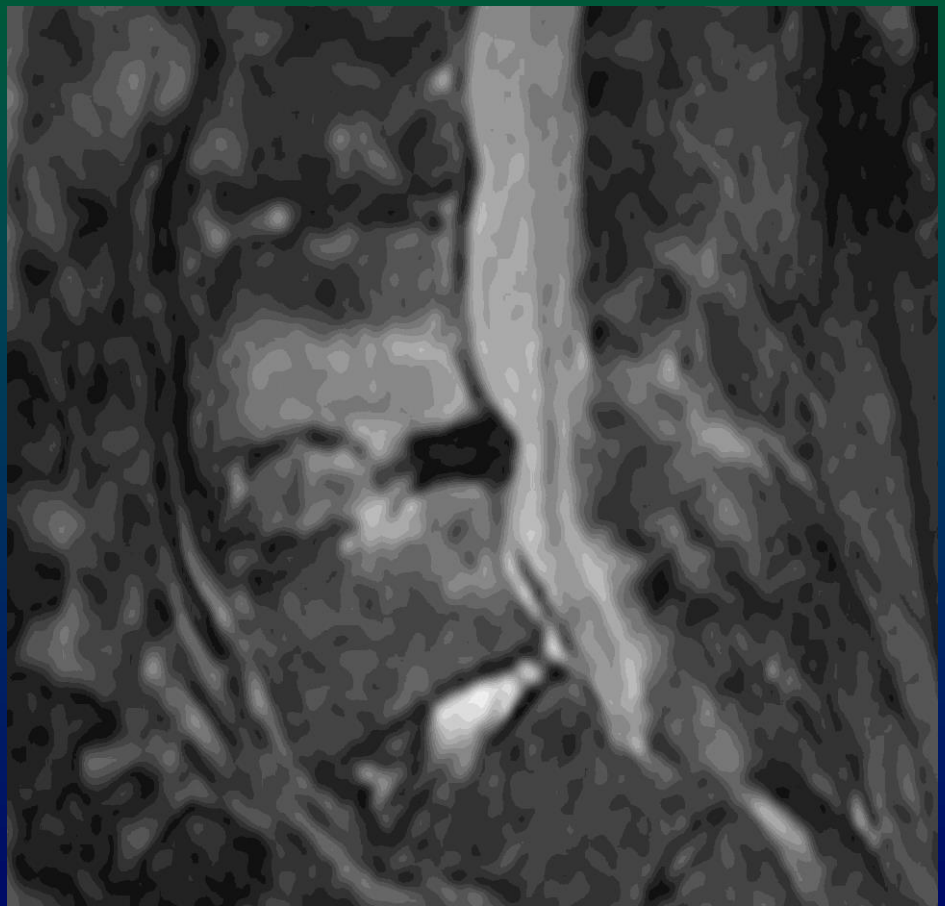
- Synovitis
- Bone marrow edema
- **Enthesopathy**
- Erosion
- Fat deposition
- Subarticular sclerosis
- Ankylosis

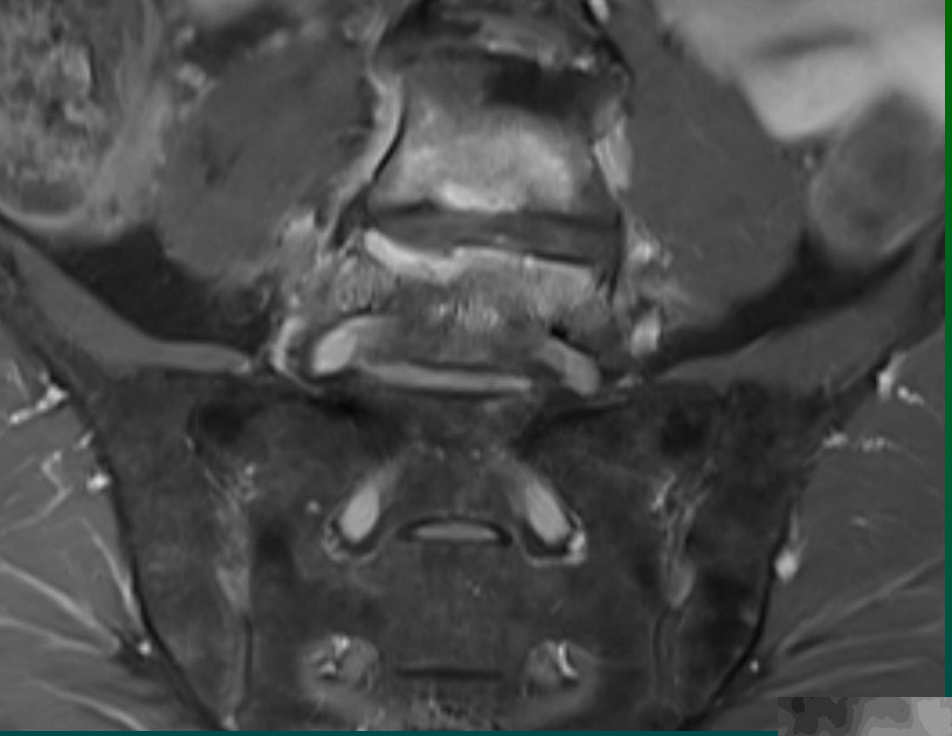
Enthesitis



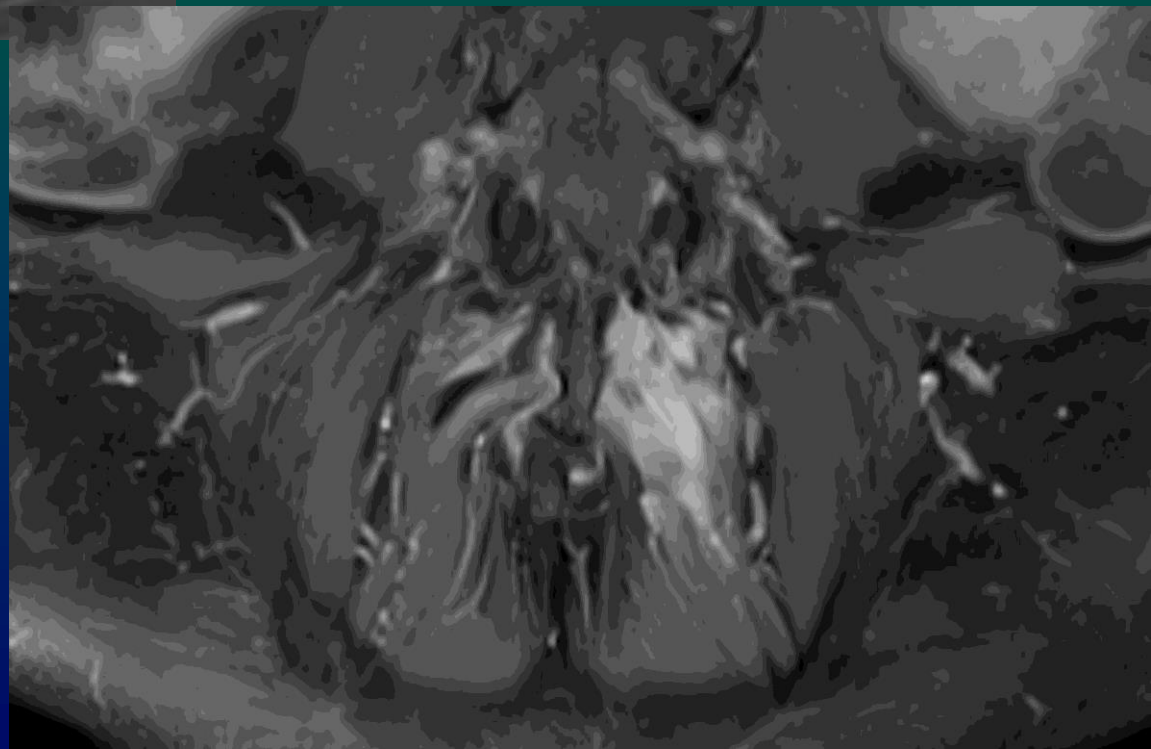
High SI at junctional areas

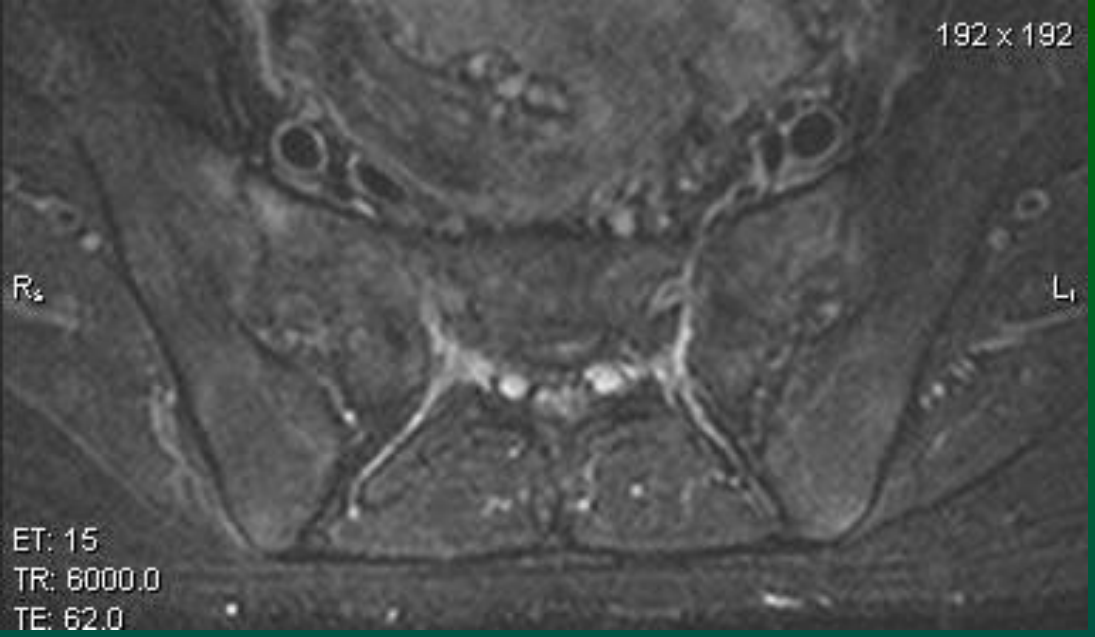
May extend to adjacent BM and surrounding ST



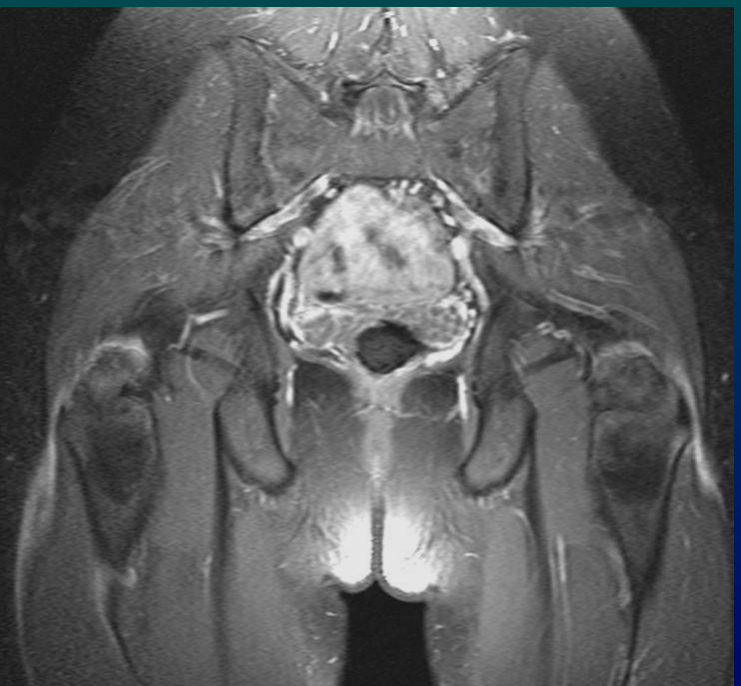


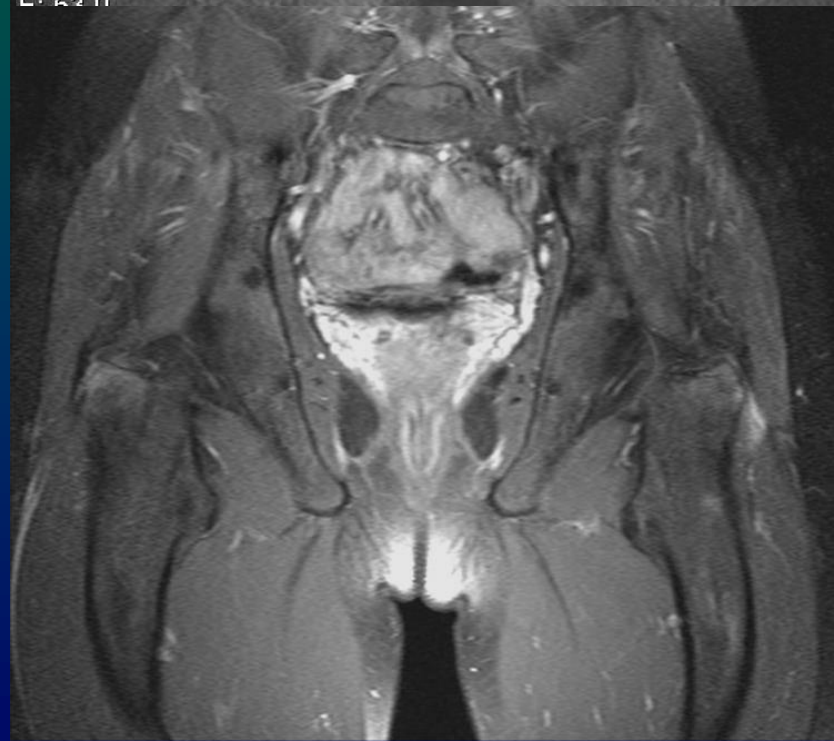
Gd

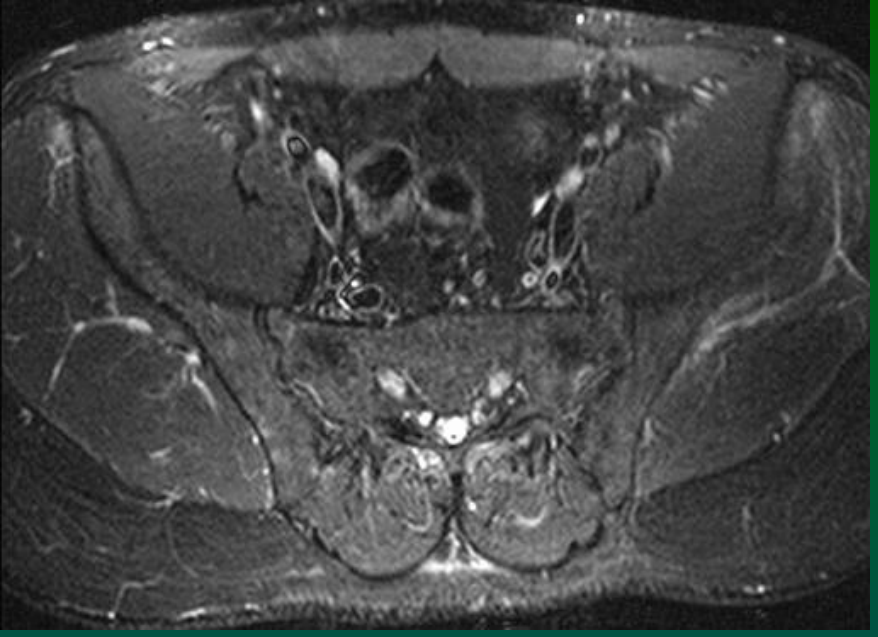


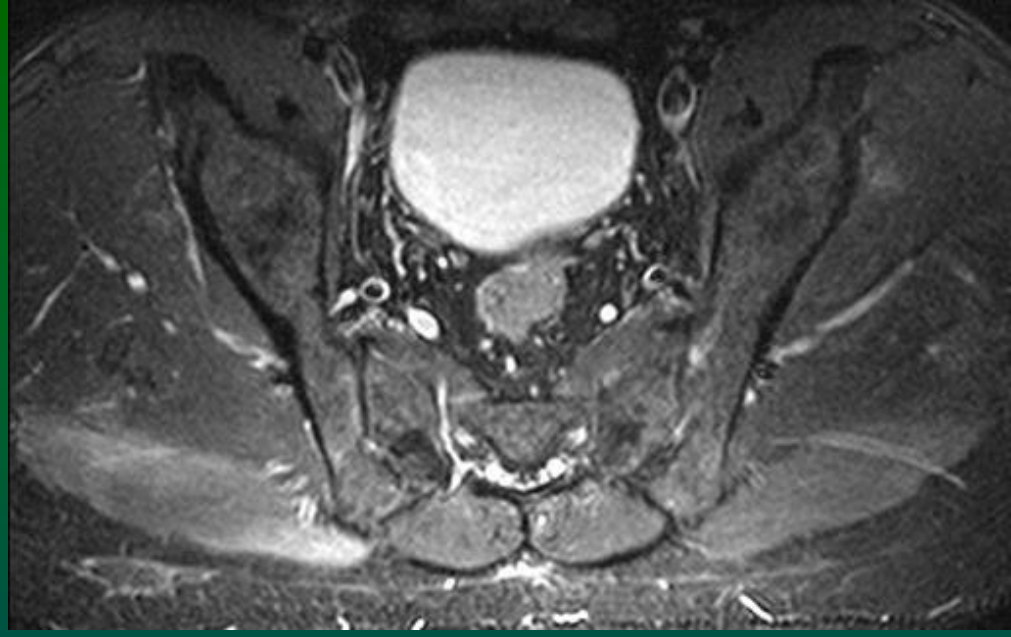


19 y/o, m Hip enthesitis + early SI



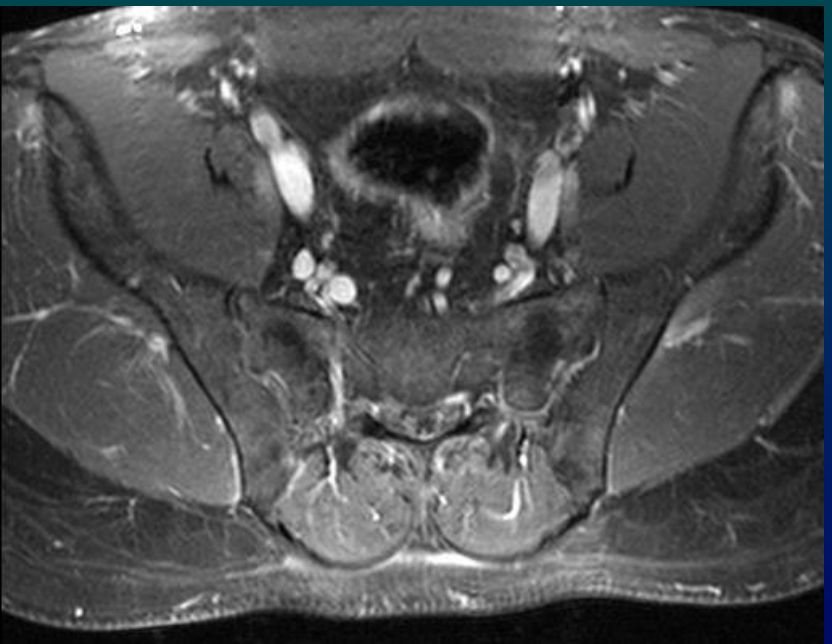






39 y/o, m

2 month pain

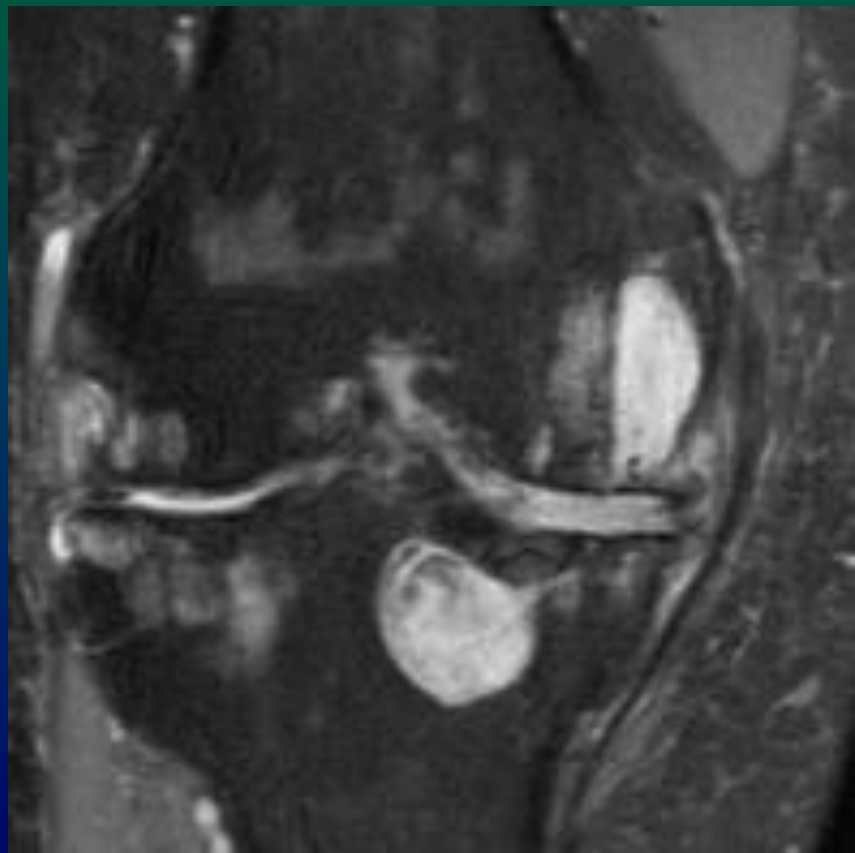


- Synovitis
- Bone marrow edema
- Enthesopathy

- **Erosions** → Cortical disruption
- Fat deposition
- Subarticular sclerosis
- Ankylosis

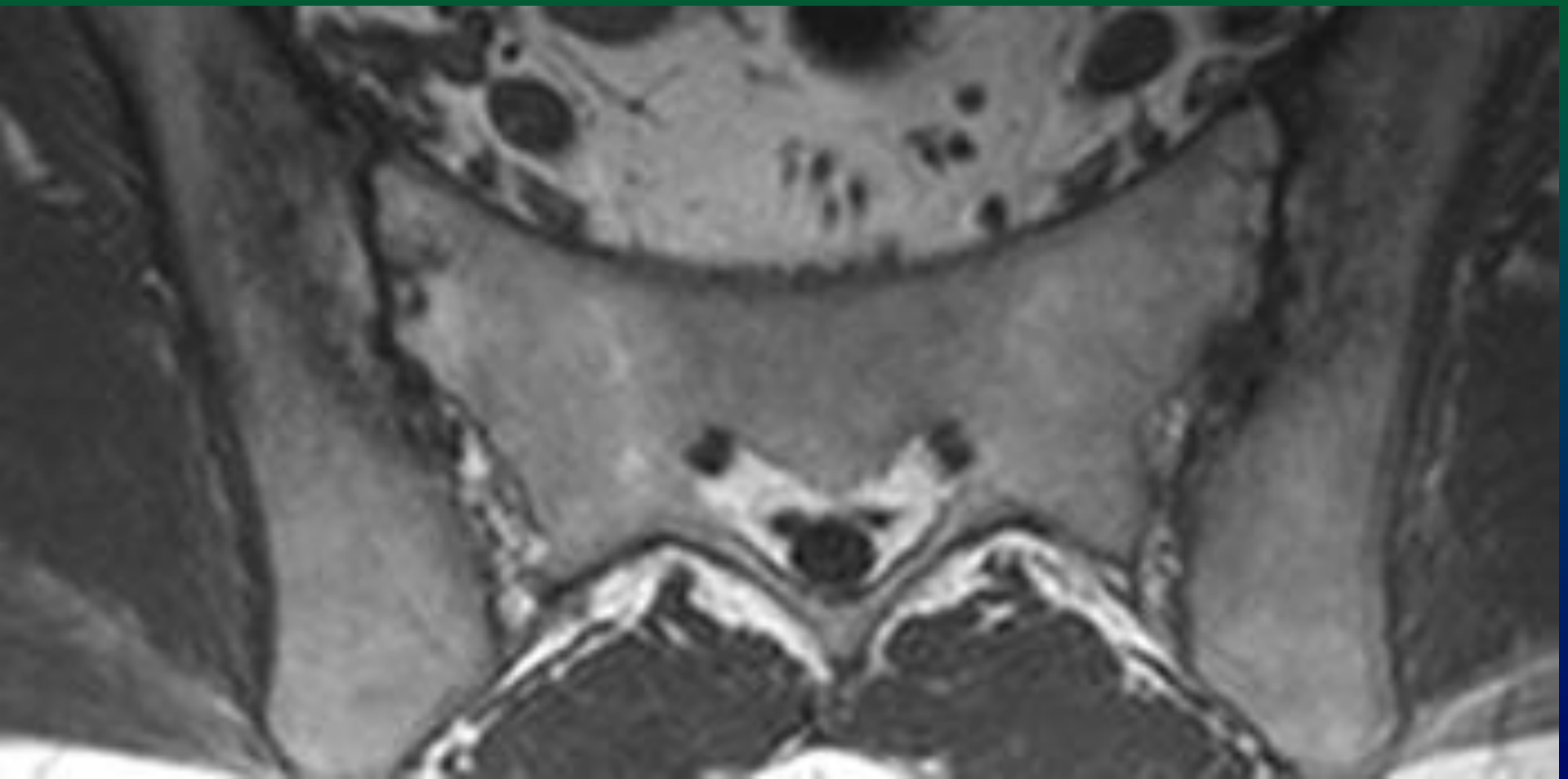
Bony defects at the joint surface
Low SI on T1-w

High SI on fluid sensitive sequences

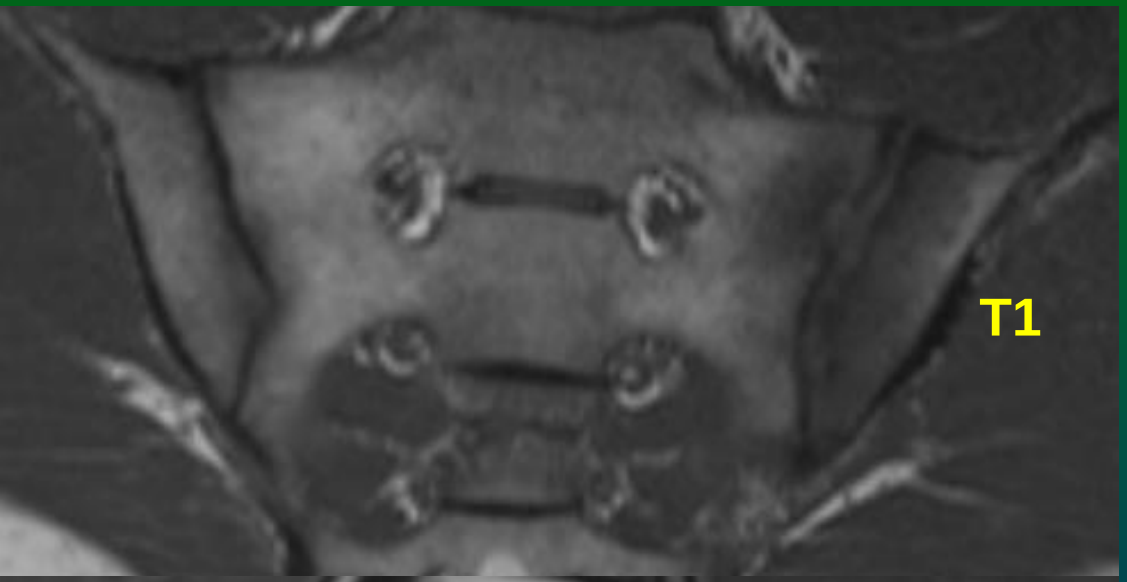


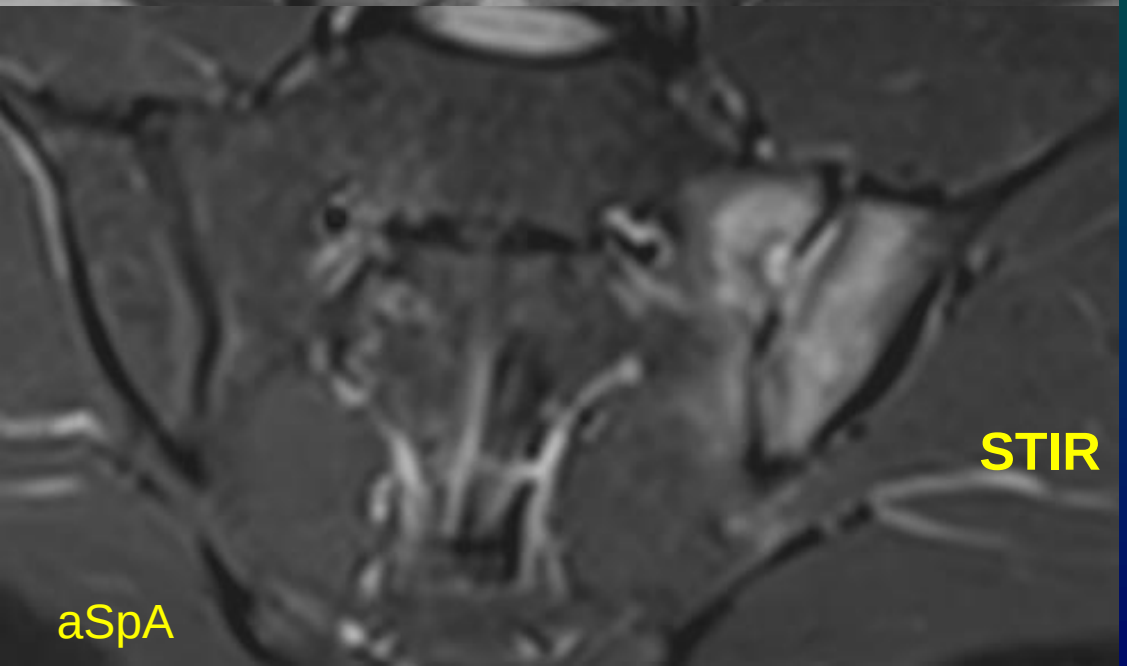
Erosions

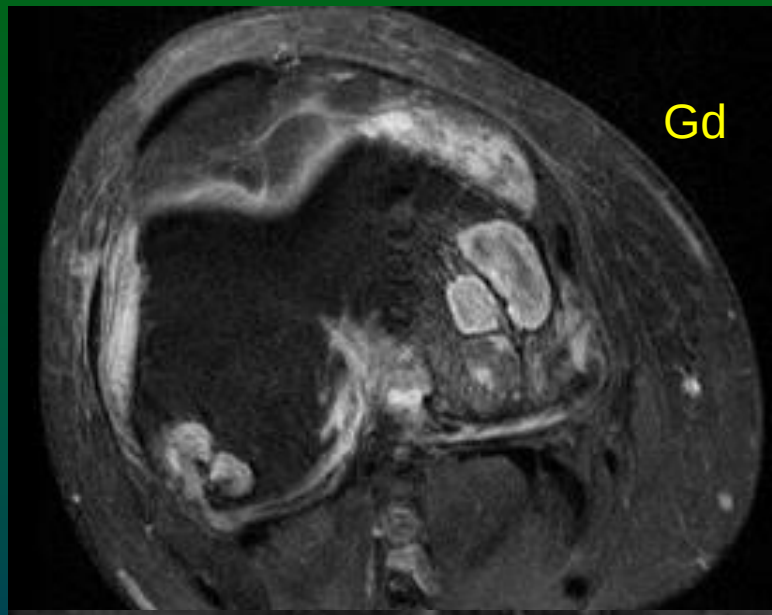
- **Confluent lesions cause a false widening**

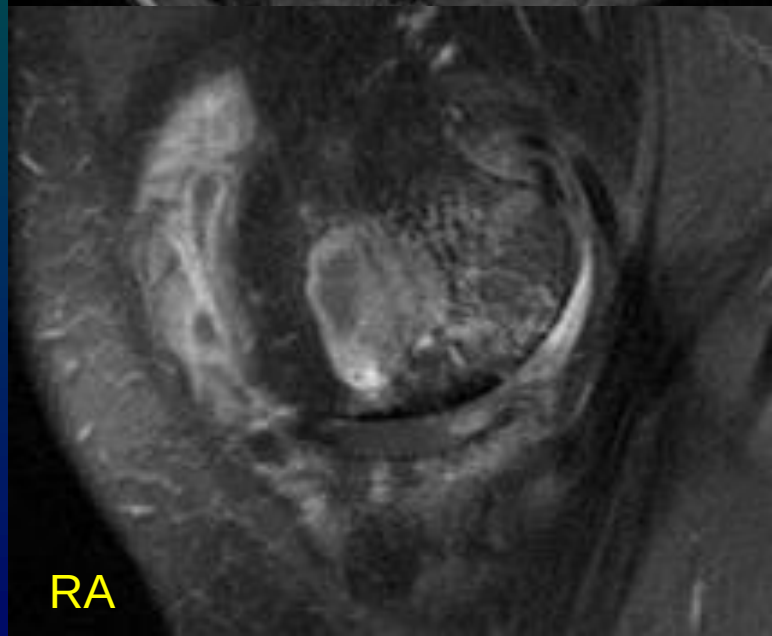


Acute on chronic



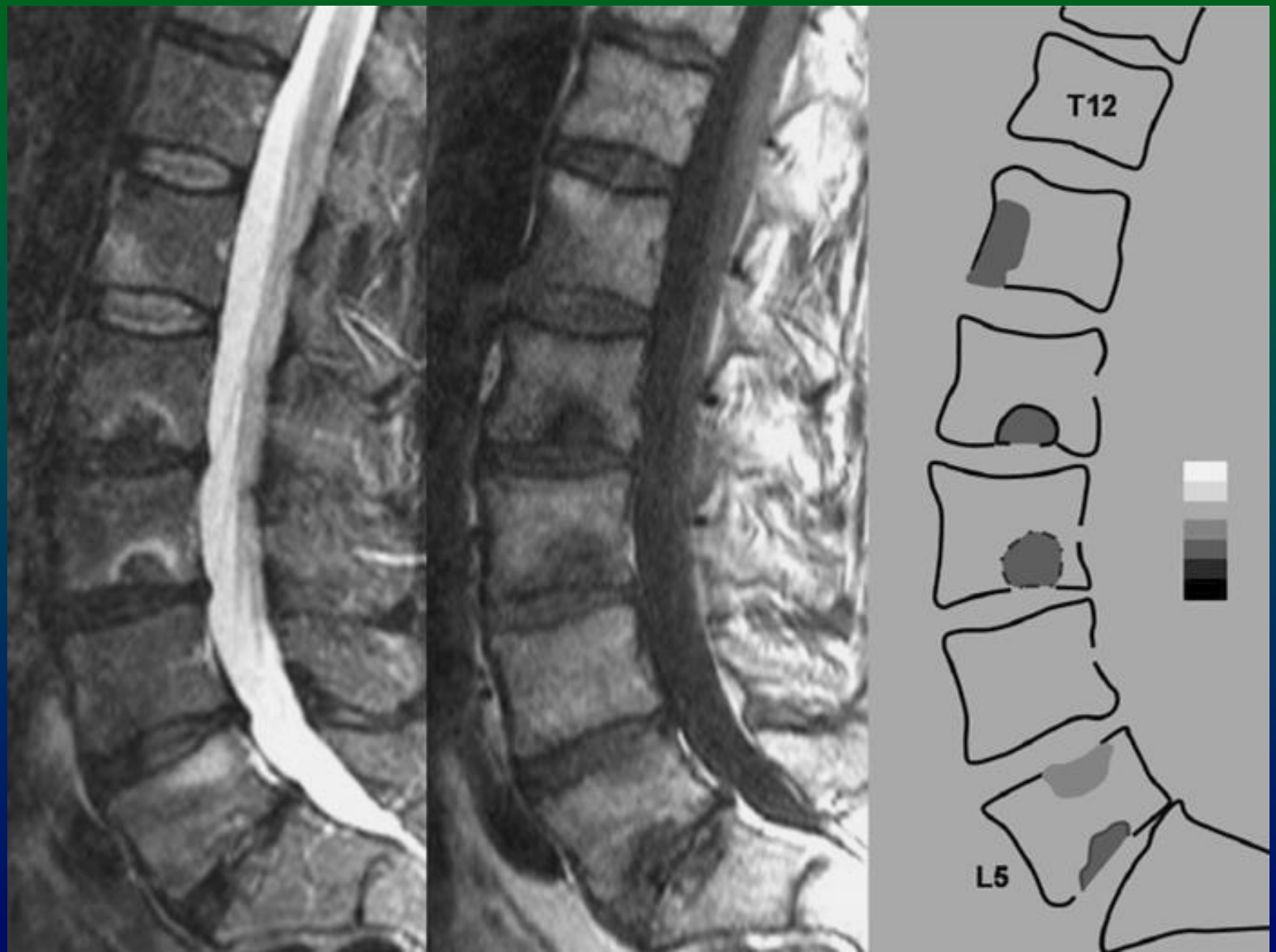


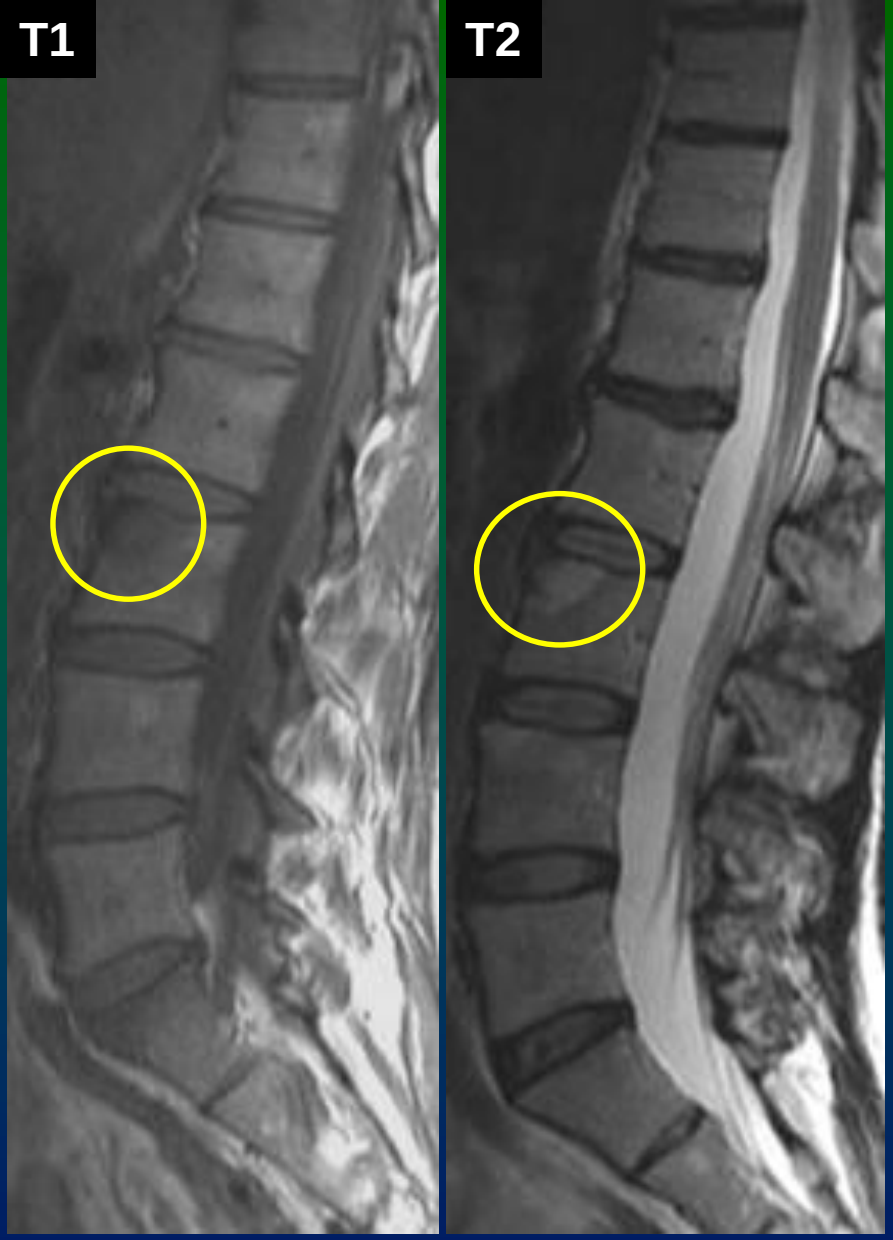




Erosions

Combined inflammatory lesions Romanus and Andersson





>3 corners in the absence of osteophytes of Schmorl nodes

spec. 97% in pts<40y

Romanus lesion

67% of pts with SPa

Andersson lesions:
Erosions within intervertebral spaces

2 adjacent levels is characteristic of AS

33% of pts with Spa

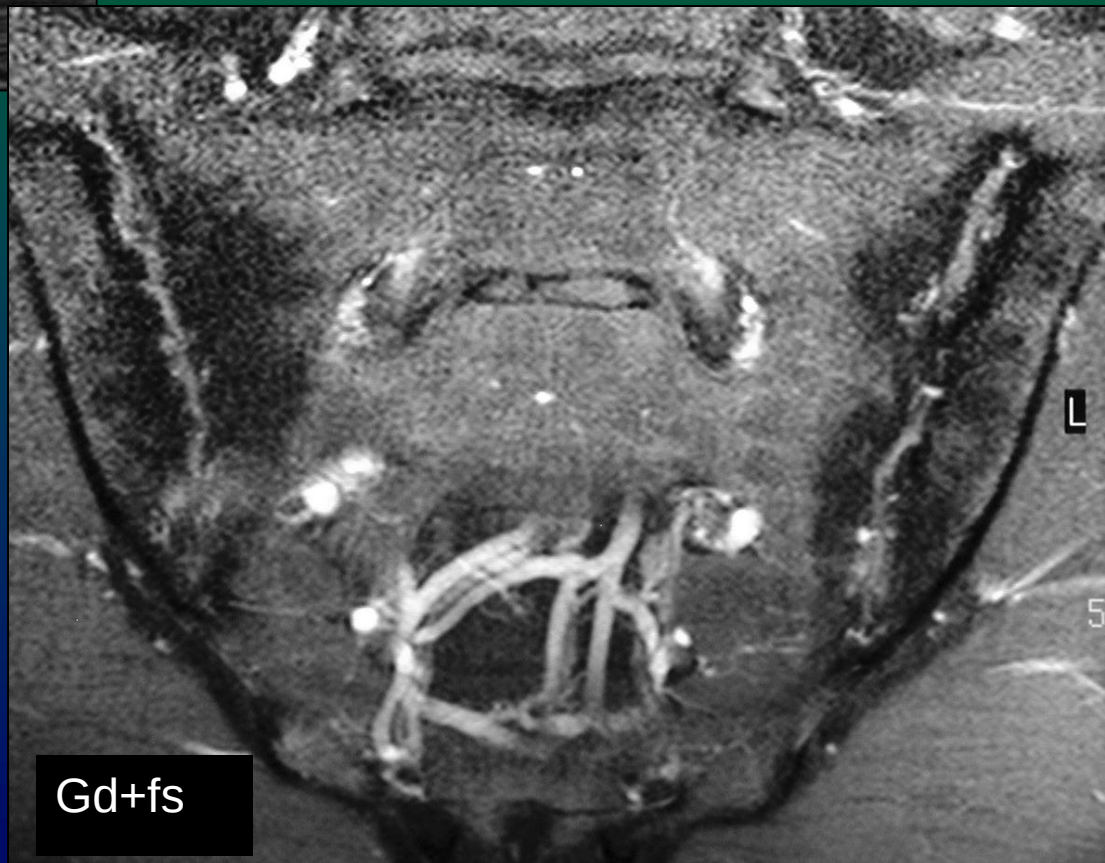
Specificity 59%

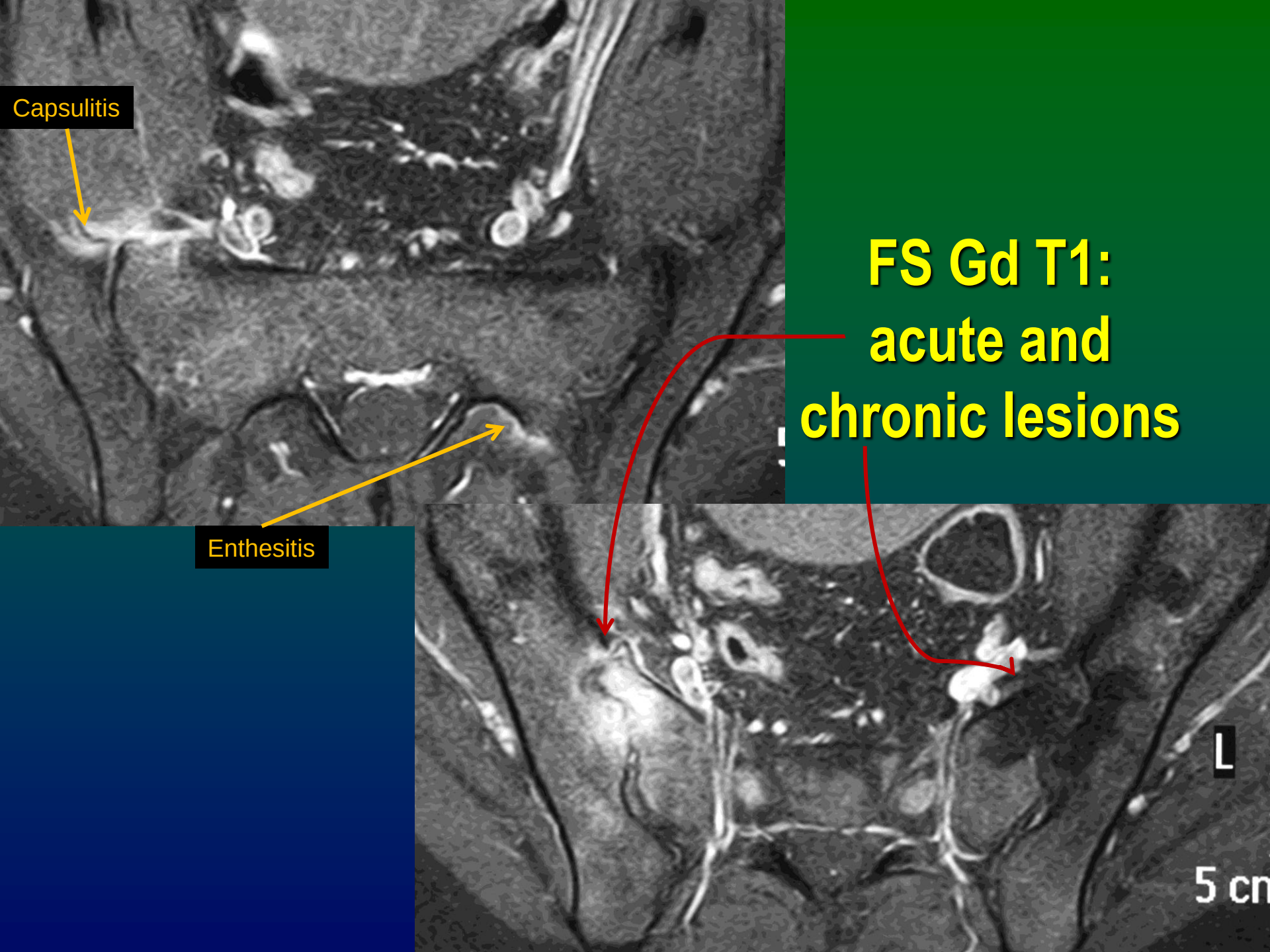
- Synovitis
- Bone marrow edema
- Enthesopathy
- Erosion

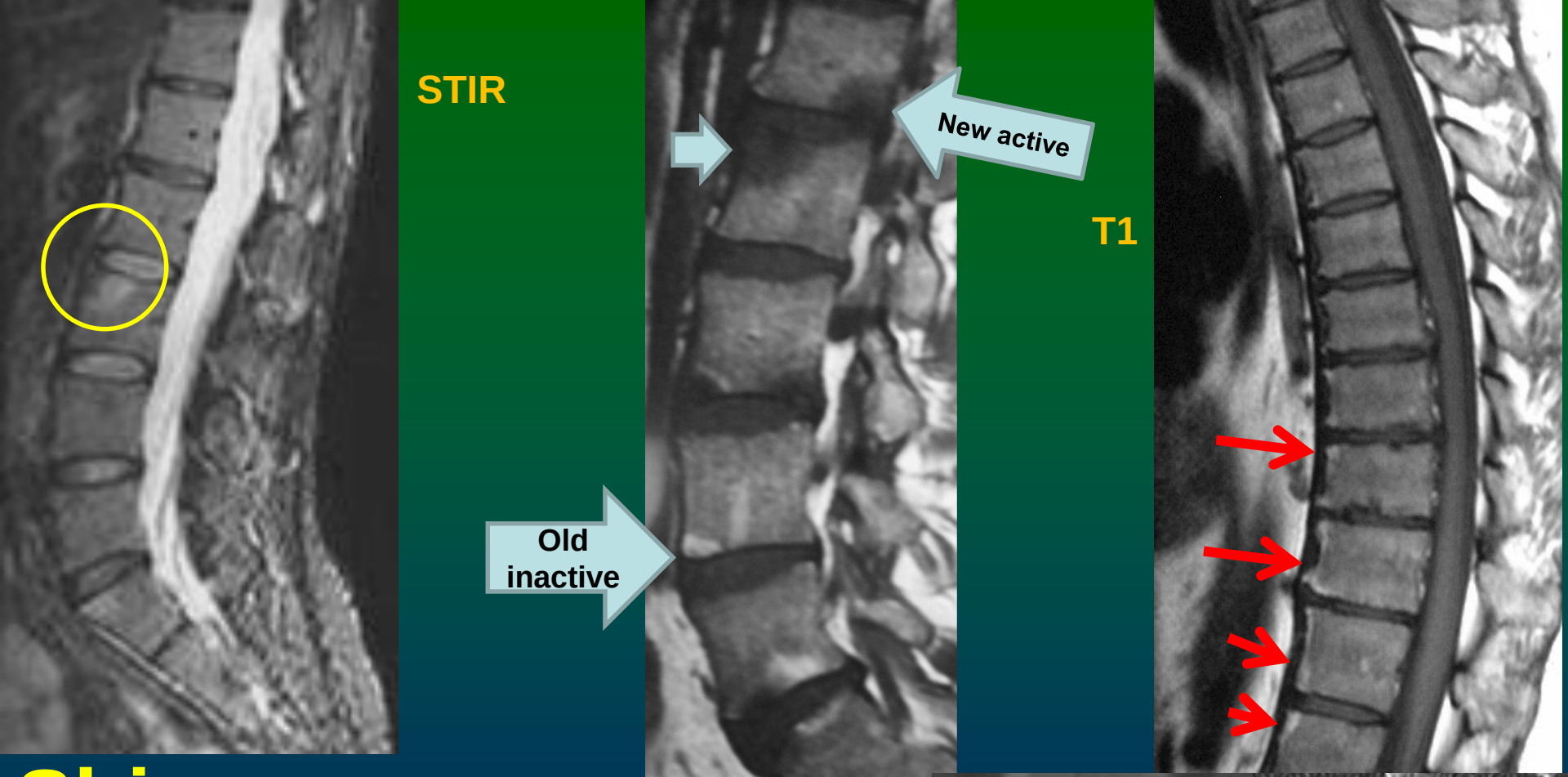
- **Fat deposition**

- Subarticular sclerosis
- Ankylosis

- Fatty infiltration: healed inflammation, inactive lesion
- High SI T1, low SI on fluid sensitive seuqences, no enhancement
- Indicates previous inflammation




Capsulitis
Enthesitis
FS Gd T1:
acute and
chronic lesions
L
5 cm

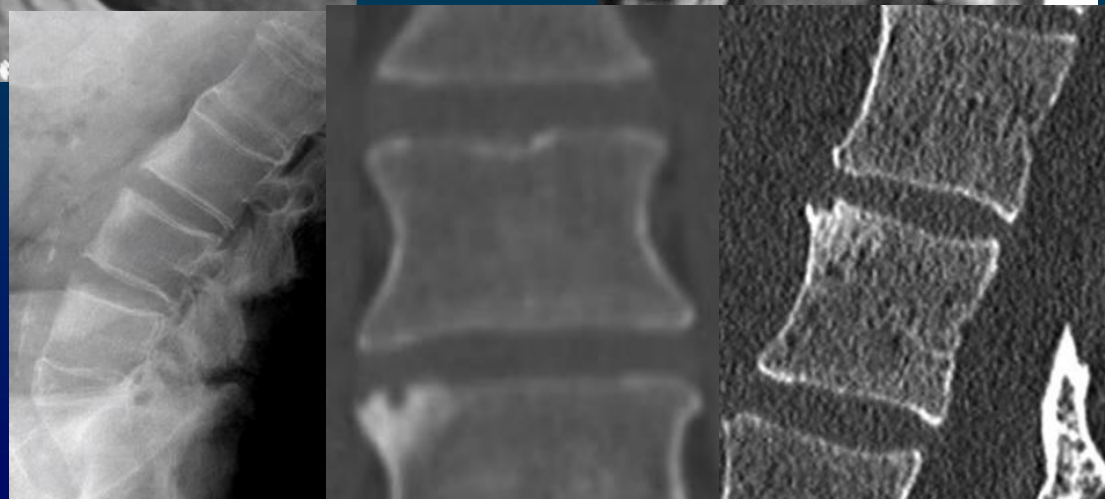


Shiny corners

MRI edema: active lesions

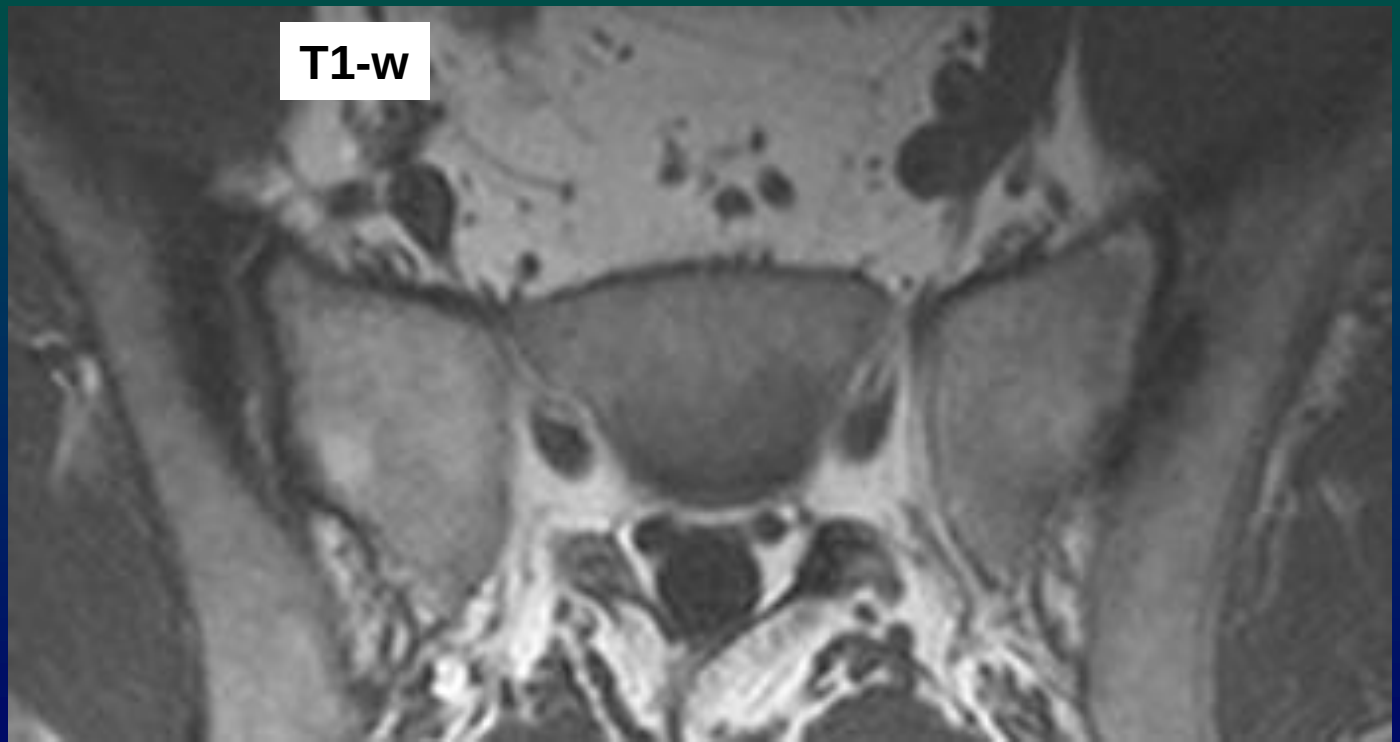
MRI fat/sclerosis: inactive

XR/CT sclerotic: chronic



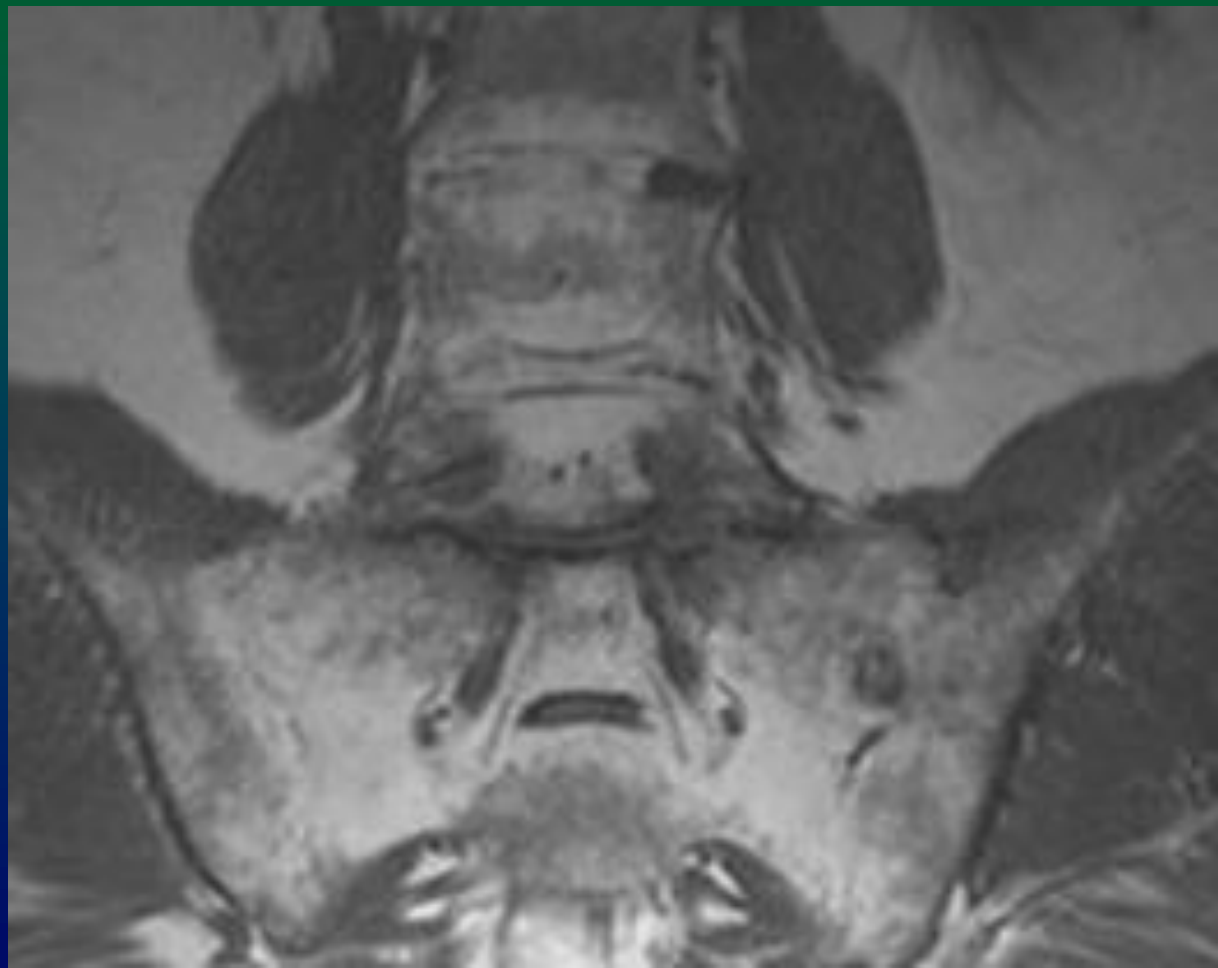
- Synovitis
- Bone marrow edema
- Enthesopathy
- Erosion
- Fat deposition
- **Subarticular sclerosis**
- Ankylosis

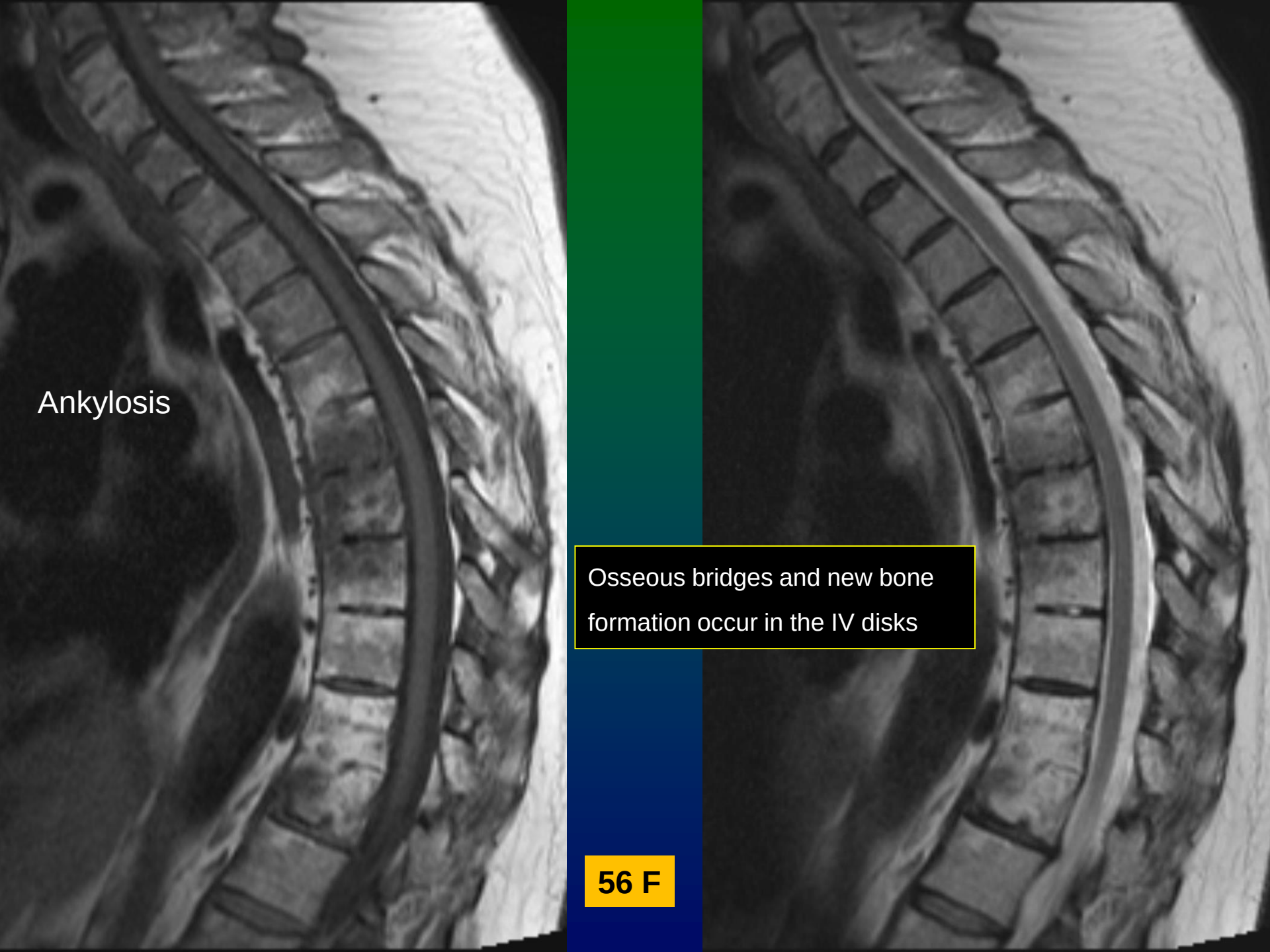
- Low SI on T1-w/STIR, not enhancing
- Typically extends >5mm from the joint surface



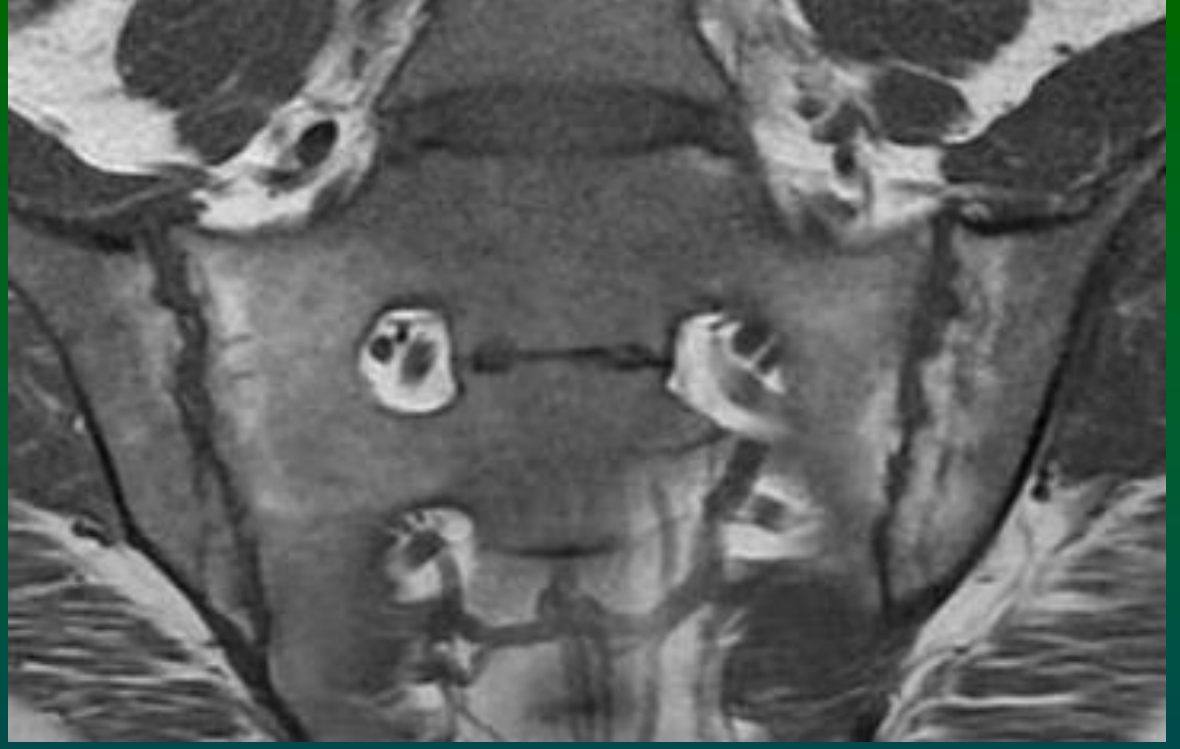
- Synovitis
- Bone marrow edema
- Enthesopathy
- Erosion
- Fat deposition
- Subarticular sclerosis
- **Ankylosis**

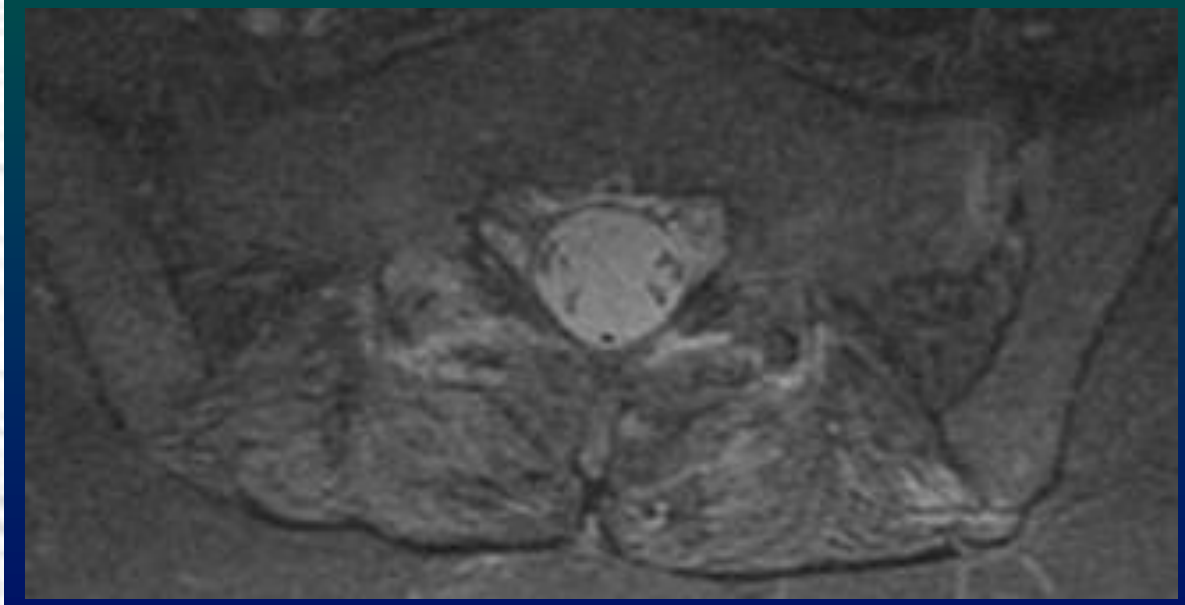
- Fusion of bone surfaces via osseous bridges across the joint




Ankylosis
Osseous bridges and new bone formation occur in the IV disks
56 F


Ankylosis





- Synovitis
- Bone marrow edema
- Enthesopathy
- Erosion
- Fat deposition
- Subarticular sclerosis
- **Ankylosis**

Disc paradox

Early ankylosis

Early changes

- **MRI>>Scintigraphy>CT>>X Rays**

- **Soft tissue changes**

- **Bone marrow edema**