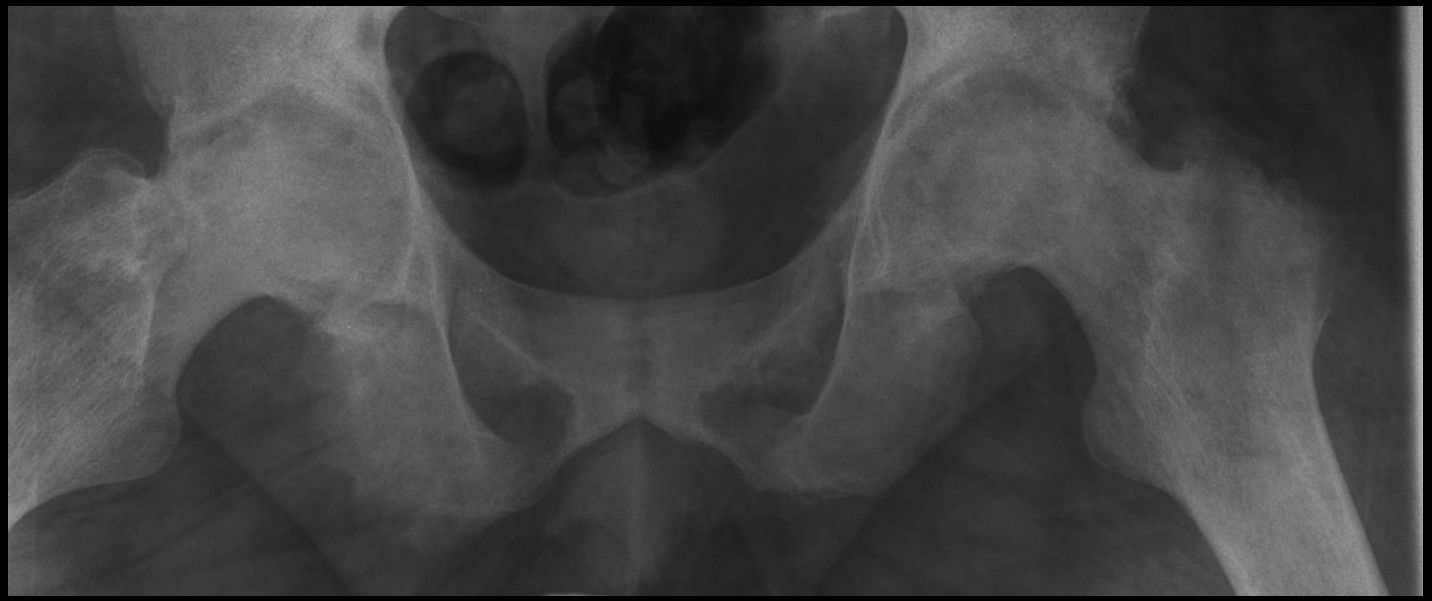
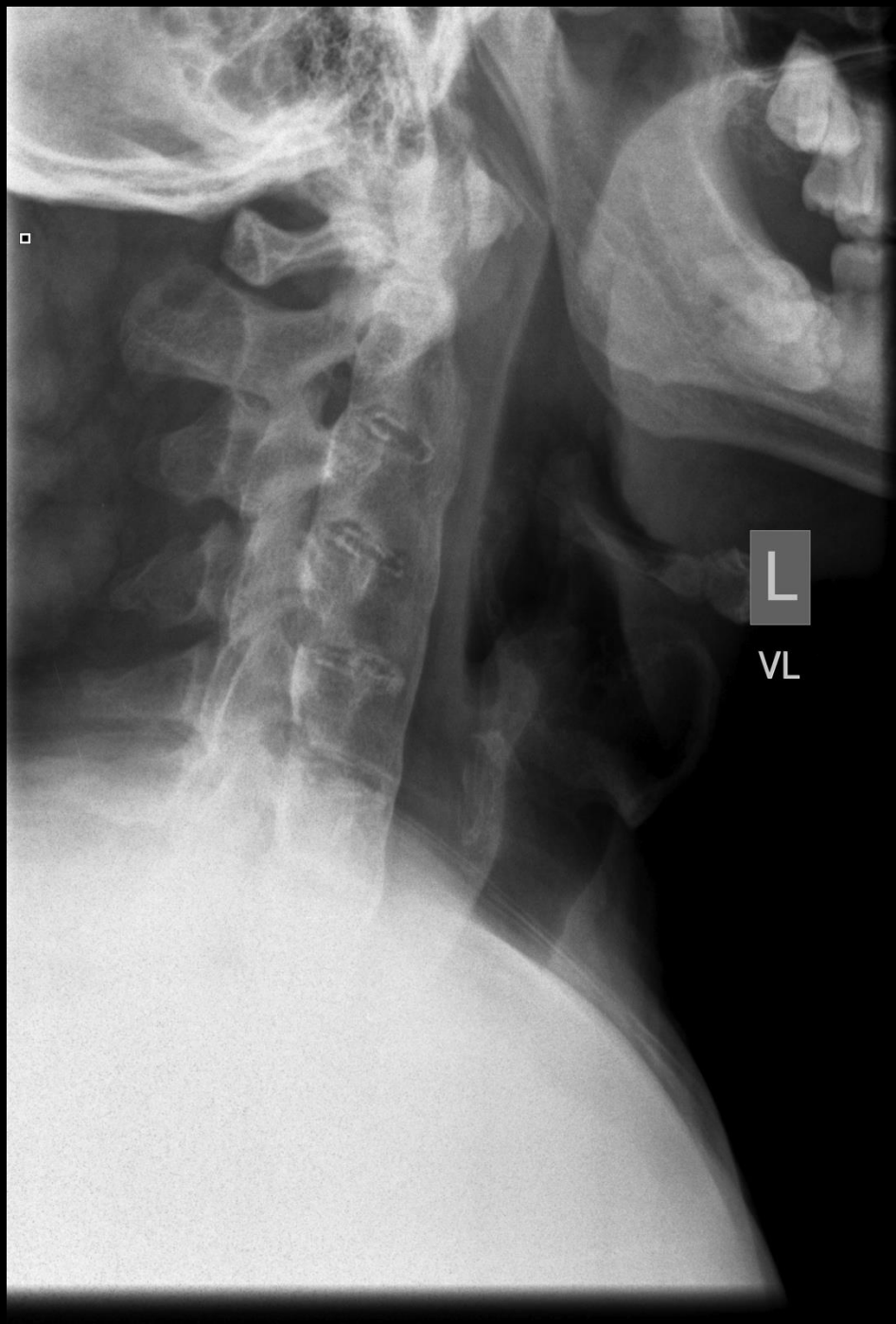
43 yo male s/p fall

Peachy Piana, MD


WT BEARING
R
GEG


CROSSTABLE
R
GEG

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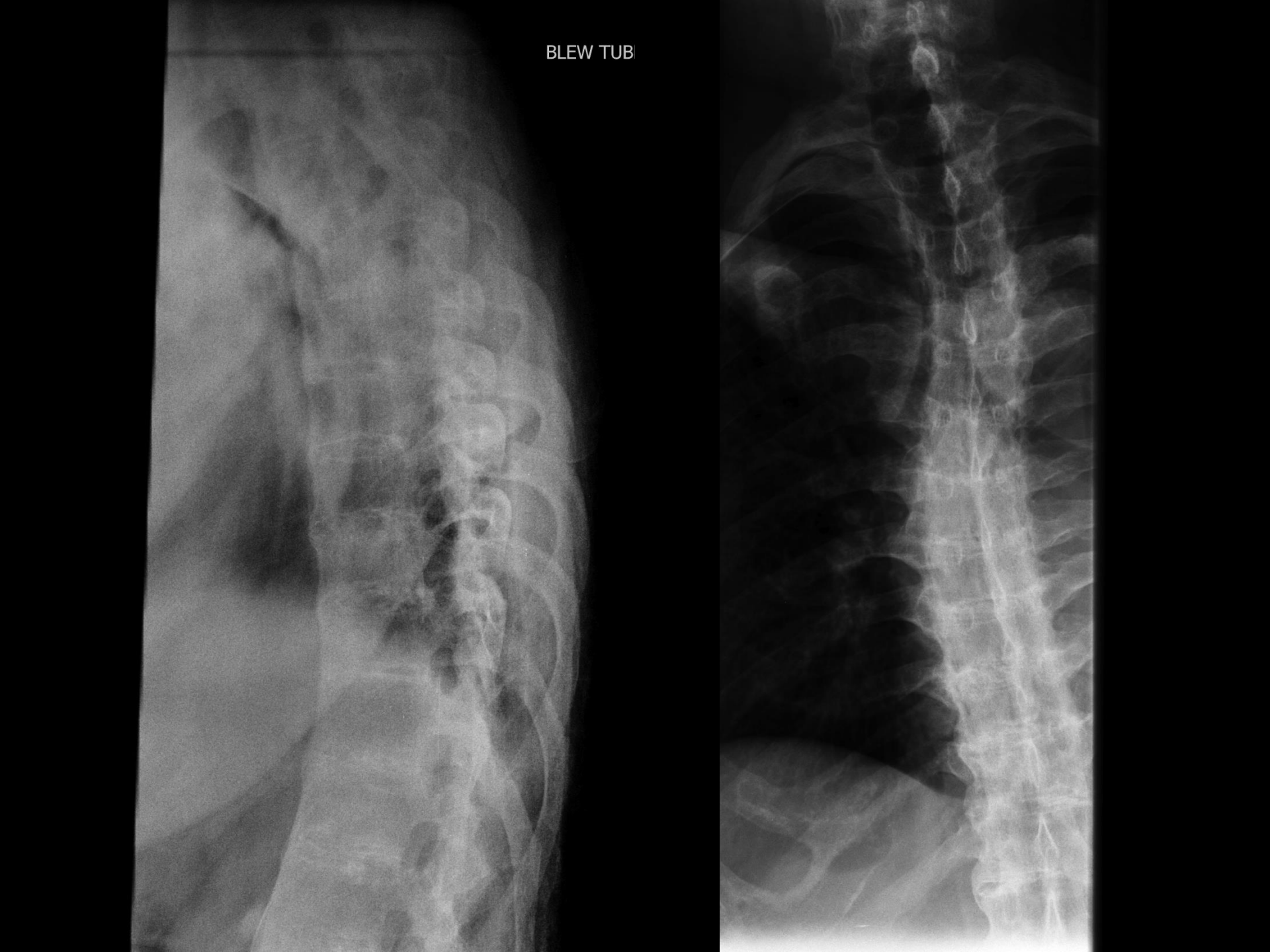
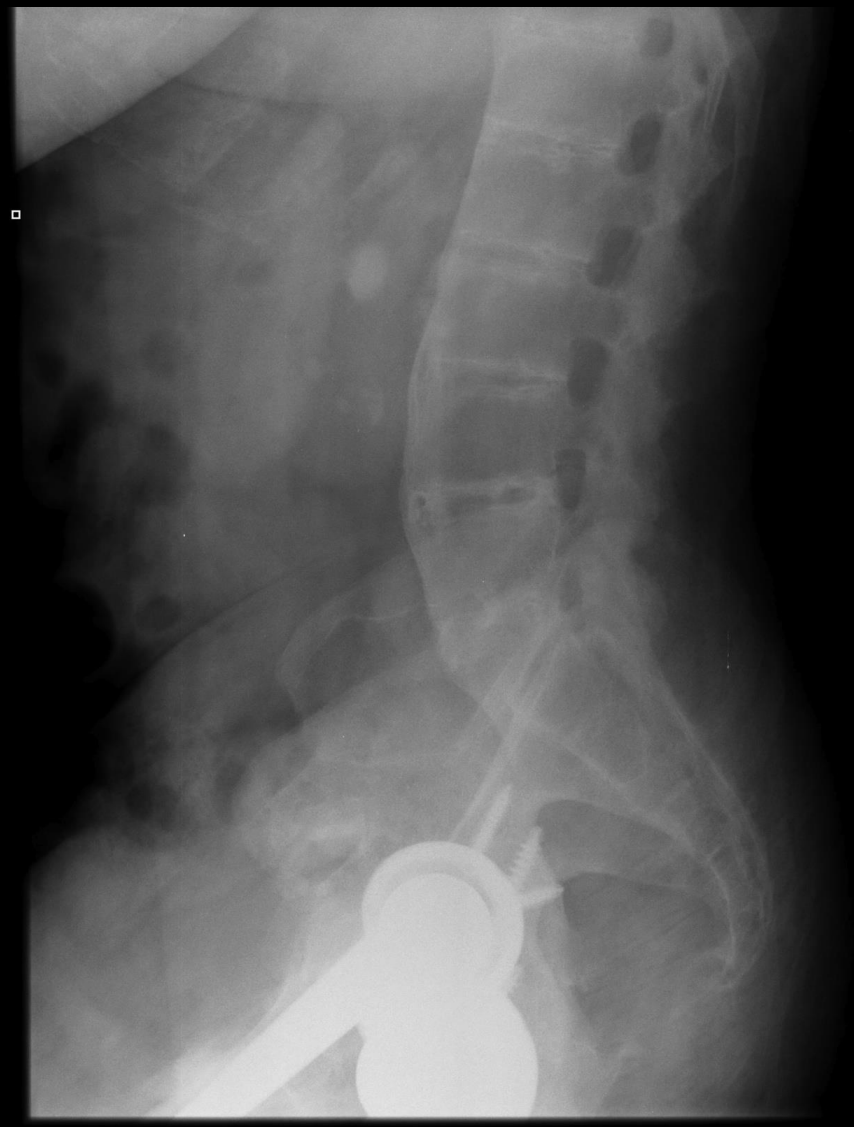
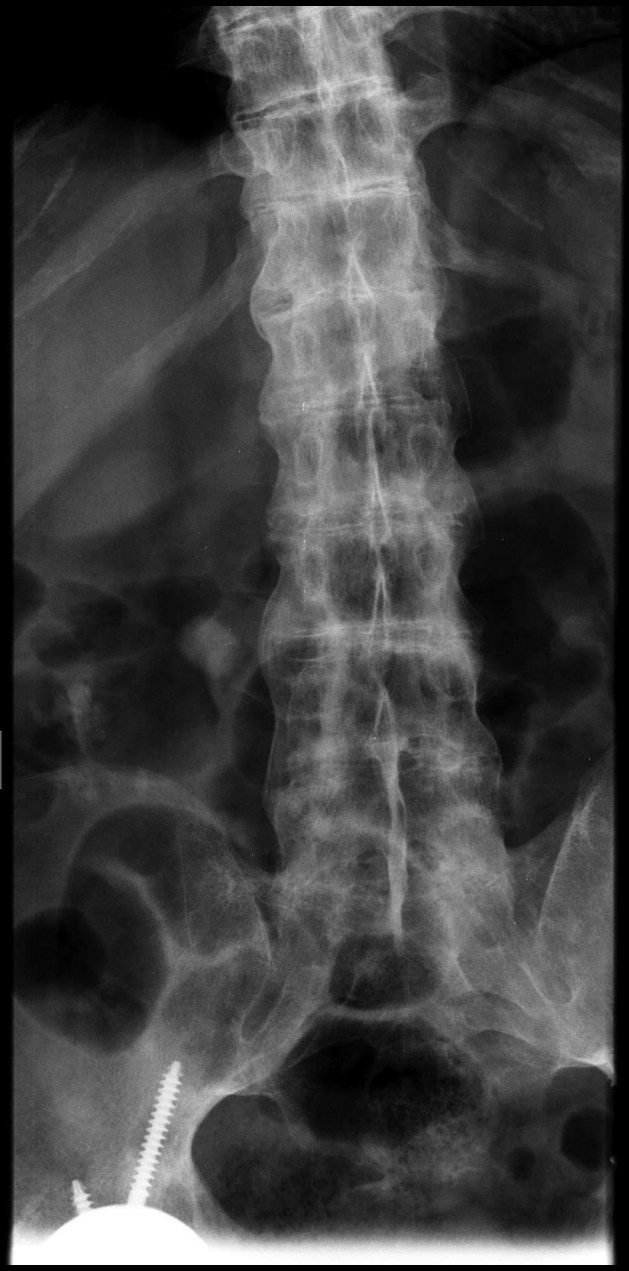
VL


BLEW TUB

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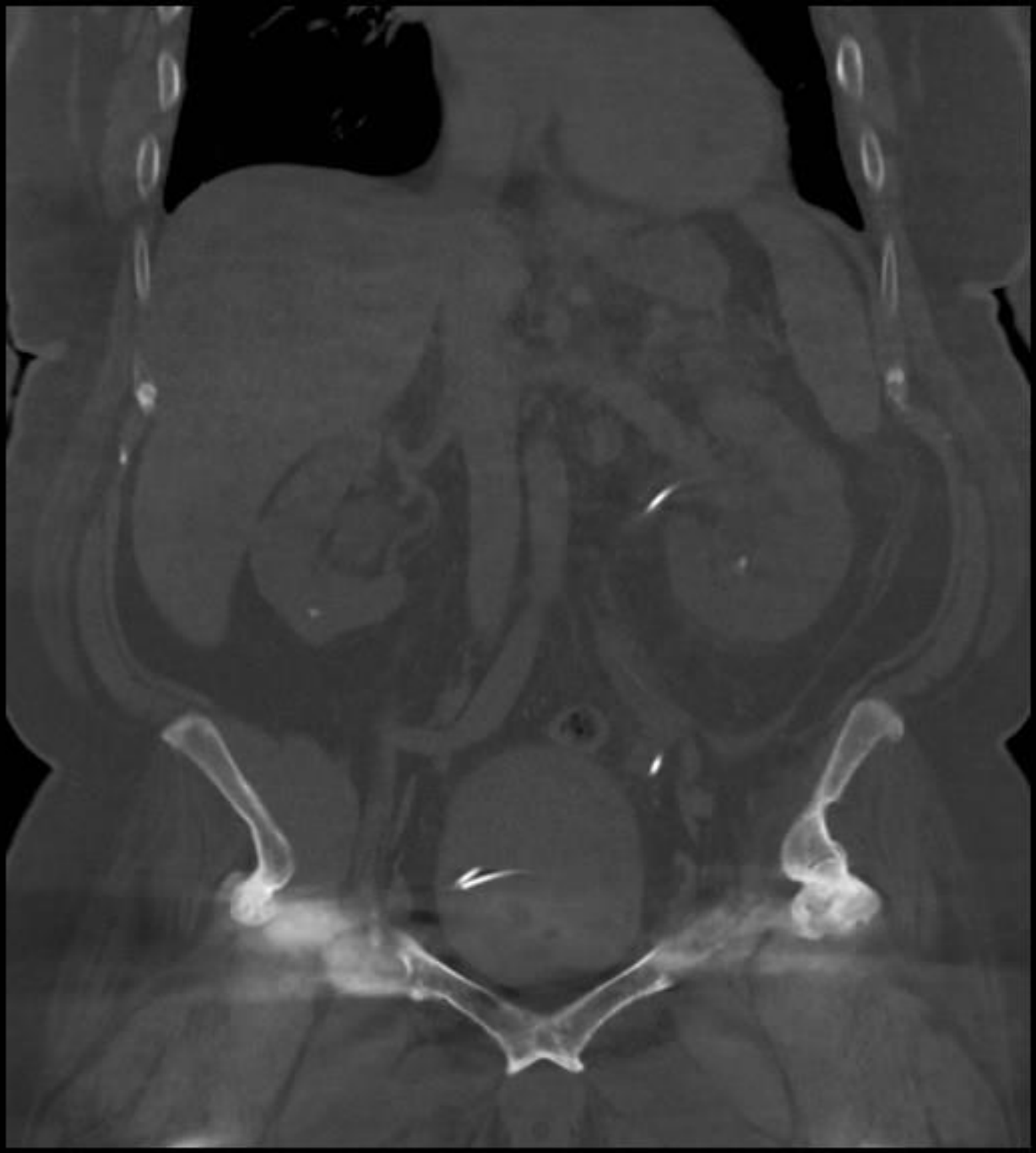

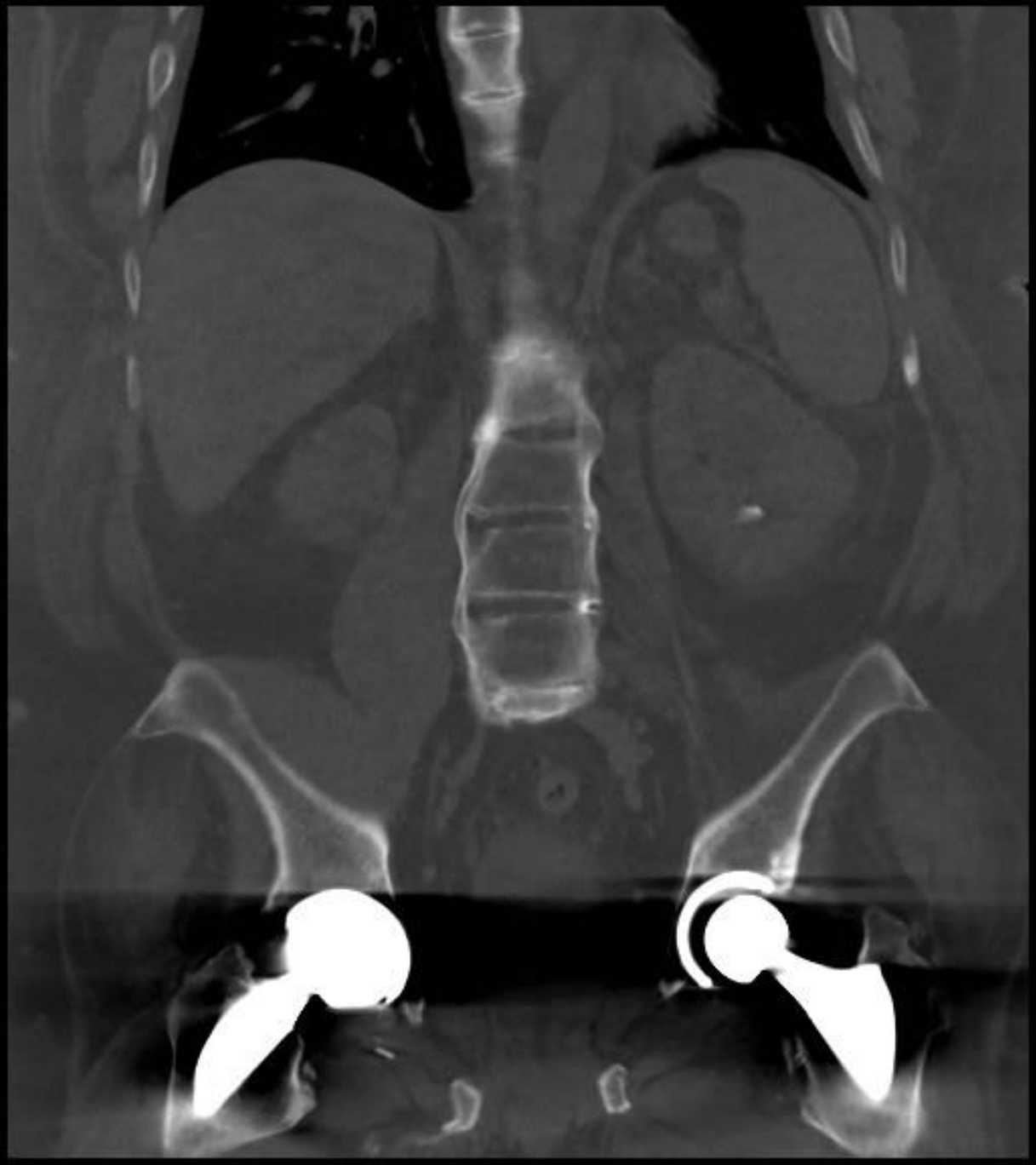

Ankylosing Spondylitis

- Inflammatory arthropathy and enthesopathy with predilection for axial skeleton with eventual fibrous ankylosis
- Hallmark: inflammation of enthesis- attachment of joint capsules, ligaments or tendons to the bone
- Etiology unknown
- Hypothesis: results from exposure to arthritogenic bacteria that resemble HLA-B27
- Strong multigenetic inherited component
  - HLA-B27 strongest association
  - AS develops in 1-2% of HLA (+) individuals
  - 20% risk of AS if HLA (+) and have 1st deg relateive with AS

Demographics

- Peak onset- 15-30 yo, Rare after 50 yo
- M>F (2.5-5:1)
- Females more likely to have peripheral joint involvement, osteitis pubis, and isolated c-spine disease (fewer cases of axial and hip disease)
- Increased prevalence in Native American (5%)

Clinical Presentation

- Insidious onset of low back pain and stiffness
- Asymmetric oligoarticular peripheral disease
- Chest pain and decreased chest expansion due to involvement of the thoracic girdle joints and muscle insertions sites.
- Uveitis or Iritis in 40%
- Fever, weight loss, anorexia
- Fx associated with long column fusion & osteoporosis
  - 4x increase in fracture risk in AS
  - Delayed dx common
  - On admission 67% of AS pts with fx have neurologic deficits
  - 18% mortality rate within 3 months of fracture

Imaging

- Early disease: MR
  - High signal enthesopathy
  - “Shiny corners” or Romanus lesions: Inflammatory change at the vertebral body corners
- Advanced Disease: Radiographs
  - “Bamboo spine” with “dagger” sign
  - Symmetric bilateral sacroiliitis
  - Osteitis at the anterior corners of the vertebral bodies
  - Long column fusion of bodies and facets
  - Erosions → fusion of sternoclavicular, costochondral, costovertebral, pubis
- Trauma
  - CT: Evaluate subtle transverse fractures through spine
  - MR

Fusion at cartilaginous articulations

Inflammatory enthesopathy of the symphysis (cartilaginous articulation) at the diskovertebral junction in a patient with ankylosing spondylitis.

a and **b.** Photograph (**a**) and radiograph (**b**) of a macerated spine reveal a typical syndesmophyte bridging the intervertebral disk space. Note its thin configuration, vertical orientation, and origin from the margins of the vertebral bodies.

D Resnick, G Niwayama. Entheses and Enthesopathy. Anatomical, Pathological, and Radiological Correlation. Radiology 146:1-9, January 1983.

Fusion at synovial articulations

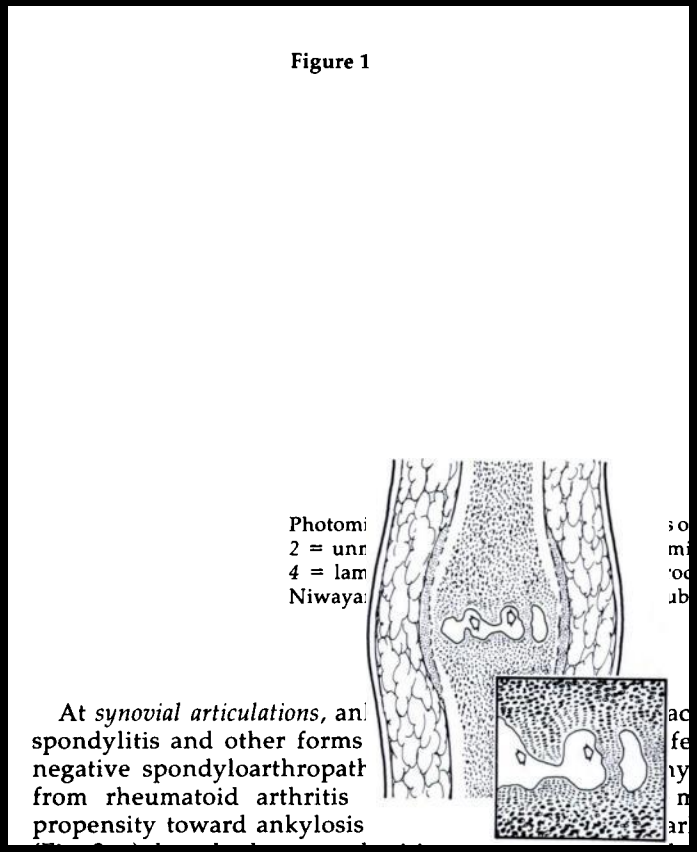

Figure 1

Photomi
2 = unr
4 = lam
Niwaya

At *synovial articulations*, an
spondylitis and other forms
negative spondyloarthropath
from rheumatoid arthritis
propensity toward ankylosis

D Resnick, G Niwayama. Entheses and Enthesopathy. Anatomical, Pathological, and Radiological Correlation. Radiology 146:1-9, January 1983.

Extra-articular enthesitis

Treatment

- Decrease pain & stiffness, maintain posture and mobility
- NSAIDS modify symptoms but not progression of disease
- Intraarticular corticosteroids for localized disease
- Disease Modifying Antirheumatic Drugs (DMARDS) improvement to peripheral but not axial disease
- Anti-TNF alpha
  - Significant improvement in symptoms and spinal mobility
  - Need more studies to determine if it modified disease progression

Clin Rheumatol (2015) 34:1073–1078
DOI 10.1007/s10067-015-2939-5

ORIGINAL ARTICLE

Performance of ultrasound to monitor Achilles enthesitis in patients with ankylosing spondylitis during TNF-a antagonist therapy

Cong-hua Wang[1] · Yuan Feng[1] · Zhen Ren[1] · Xichao Yang[1] · Jun-feng Jia[1] · Meng-yao Rong[1] · Xue-yi Li[1] · Zhen-biao Wu[1]

- GOAL: Investigate the potential of US to detect early changes after TNF-alpha antagonist therapy of Achilles enthesitis of AS pts
- 100 AS pts with active disease requiring TNF alpha antagonist therapy
- PE to evaluate disease activity and detect Achilles enthesitis and/or retrocalcaneal bursitis
- US of Achilles was performed bilaterally pre treatment
- F/U US after 3 months after initiation of therapy

Monitoring Response to Treatment

- Physical exam and clinical scoring systems: BASDAI, BASMI, BASFI, and Masstricht ankylosing spondylitis enthesitis score (MASES), to evaluate disease activity and disease & detect Achilles enthesitis and/or retrocalcaneal bursitis
- US eval- by 2 experienced rheumatologist trained in MSK US blinded to clinical data.
- Grayscale, Power Doppler scores

Table 1 Classification of ultrasound findings indicative of inflammation

Ultrasound findings	Scores range (per Achilles enthesis)
Gray scale (GS) score	
Tendon hypoechogenicity	0–2
Tendon thickening	0–2
Enthesis hypoechogenicity	0–2
Bursal effusion	0–2
Total GS score	0–8
Power Doppler (PD) score	
PD signal at tendon level	0–2
PD signal at enthesis level	0–2
PD signal at bursal level	0–2
Total PD score	0–6
Total additive score (TS)	0–14

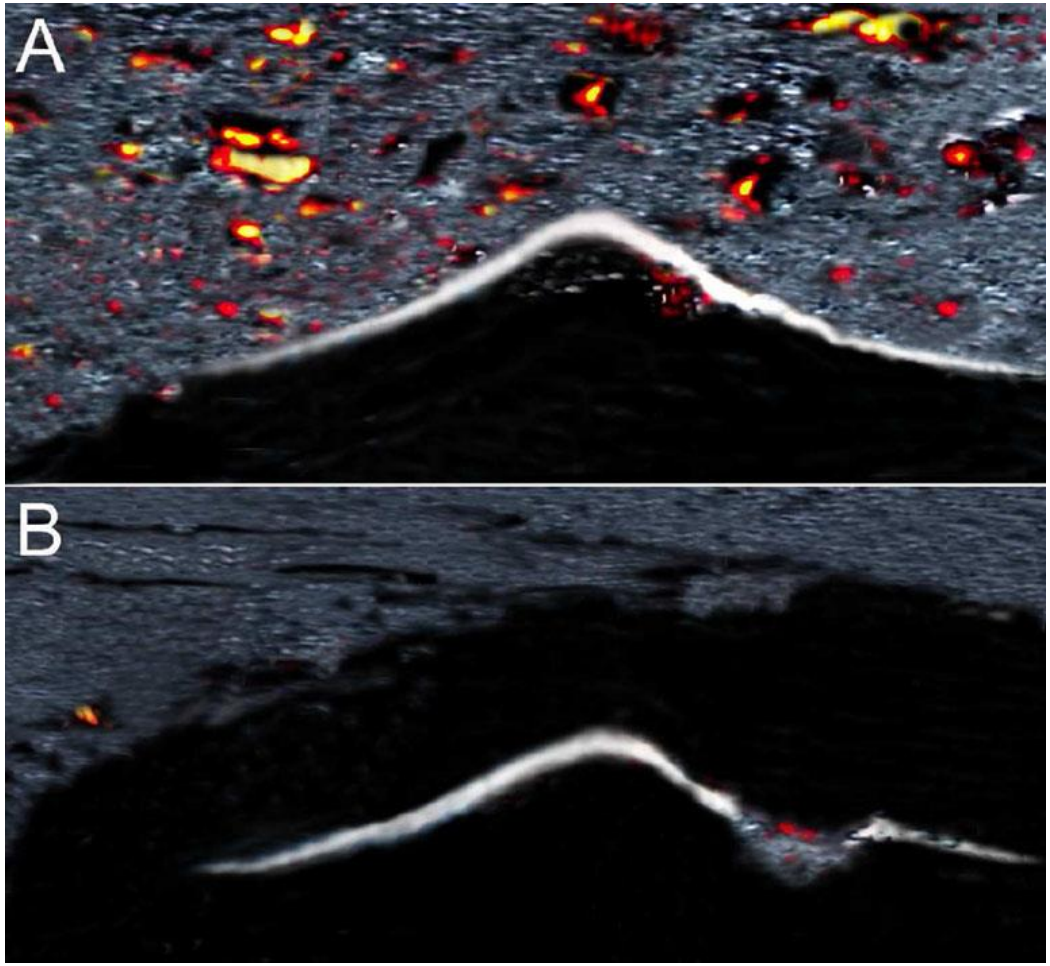

Fig. 1 Representative sonographic images at baseline (**a**) and after 3 months of TNF-a antagonists therapy (**b**). At follow-up, US examination showed a clearly evident decrease in Power Doppler signal

Correlation between clinical and US

- MASES, BASDAI, and US findings (including GS score, PD score, and total score) were significantly higher in symptomatic pts.
- Reduction in Achiles US findings correlated positively with changes in MASES and BASDAI clinical findings.
- Other than Achilles, they looked at other enthesial sites- 12 sites per person (1200 enthesitis sites).
  - After 3 months of treatment with TNF alpha, tendon thickness scores decreased in 58%, decrease in hypoechogenicity of tendon observed in 65%, decrease in hypoechogenicity of the enthesis in 67%, and decrease in bursal enlargement in 84%.
  - Although only 40% of enthesial sites were clinically tender or swollen, more than 50% had US signs of inflammation. Increased sensitivity for detecting early enthesitis in AS patients before a clinical response can be observed.
  - ESR and CRP had no concordance with US findings of enthesitis
- US can be used as first step screening tool to assess the presence of enthesitis and to evaluate effects of different therapies

References

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3. Wang et al. Performance of US to monitor Achilles enthesitis in patients with ankylosing spondylitis during TNF alpha antagonist therapy
4. Aydin et al. A relationship between spinal new bone formation in AS and the sonographically determined Achilles enthesophytes. Rheumatol Int (2016) 36:397-404
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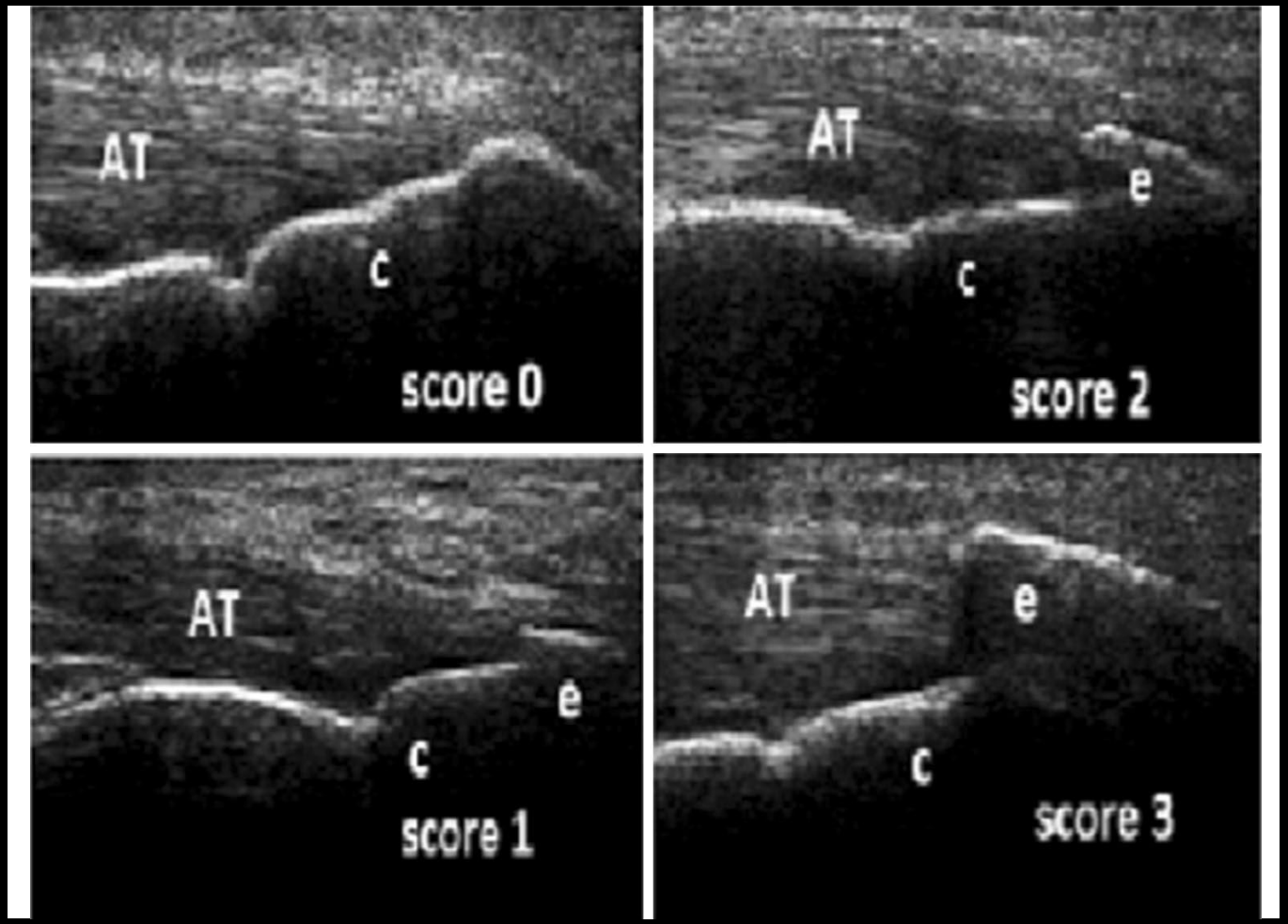

Aydin et al. A relationship between spinal new bone formation in AS and the sonographically determined Achilles enthesophytes. Rheumatol Int (2016) 36:397-404

Monitoring Response to Treatment

- Histology potential gold standard but impractical
- Assessment of AS enthesitis predominantly performed by eliciting tenderness at the enthesis.
- However, physical exam can be inadequate for diagnosis enthesitis which is time consuming with poor interobserver reliability.
- US is sensitive, noninvasive, rapid, and less expensive tool for enthesitis assessment, may provide a more objective and reliable index of enthesitis than clinical exam.
- MR can be used but more expensive and not as accessible