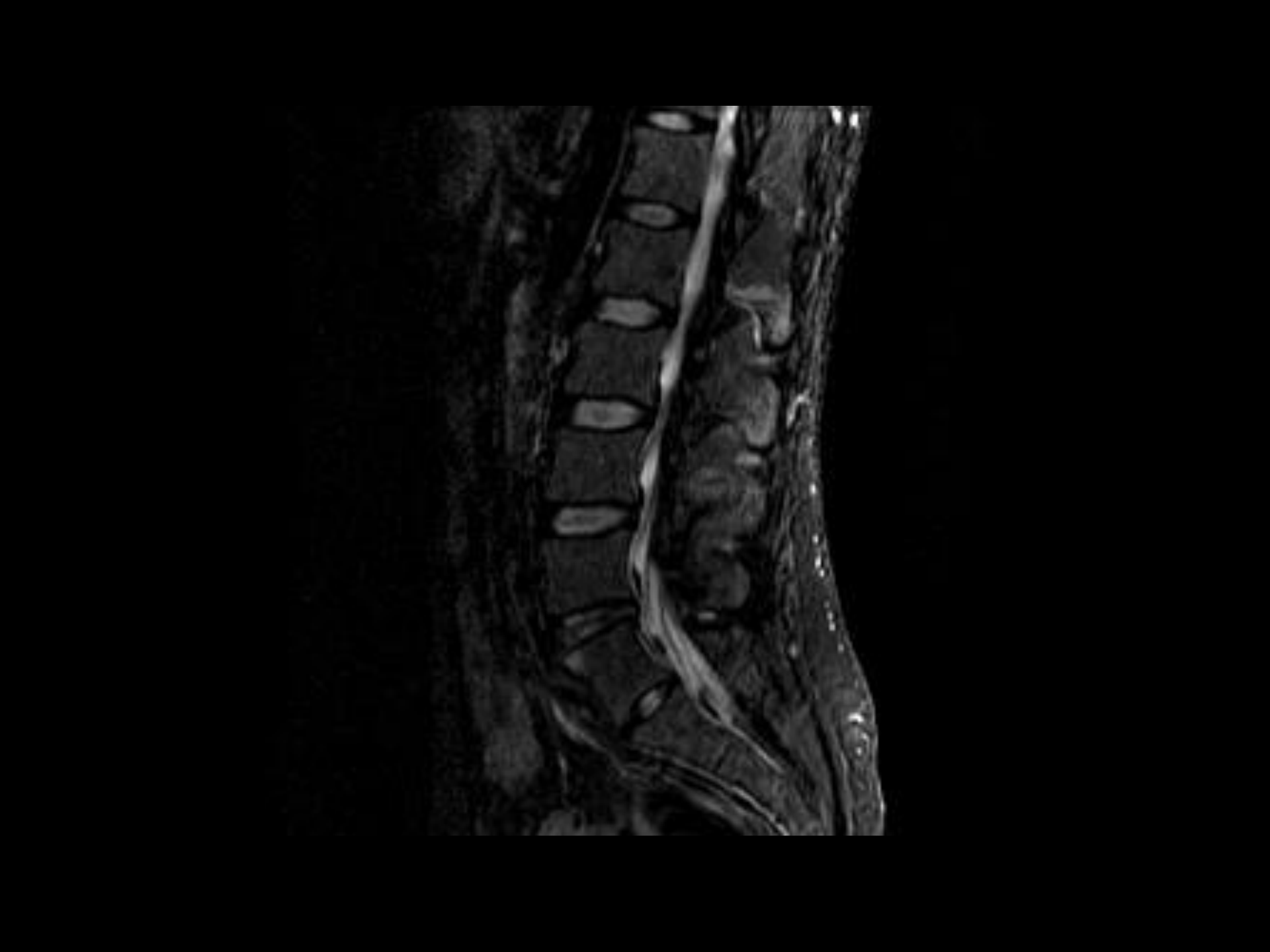
37 year old male with several year history of back pain

Inflammatory Low Back Pain Clues

- onset before the age of 40 years
- insidious onset, chronic (>3 months) pain
- morning stiffness for longer than 30 minutes
- improvement with exercise
- awakening with pain in the second half of the night
- alternating buttock pain

http://www.clevelandclinicmeded.com/medicalpubs/diseasemanagement/rheumatology/ankylosing-spondylitis/

Spondyloarthropathy

- Rheumatoid factor (RF) negative inflammatory arthritis and enthesopathy affecting spine and sacroiliac joints
  - Formerly called seronegative spondyloarthropathy

- most common is ankylosing spondylitis, which affects mainly the spine
- reactive arthritis (formerly known as Reiter's syndrome);
- psoriatic arthritis
- enteropathic arthritis/spondylitis associated with inflammatory bowel diseases (ulcerative colitis and Crohn's disease).

Spondyloarthritides

- common genetic factors including human leukocyte antigen (HLA) B27 gene.
- Axial involvement, including sacroiliitis, can be seen in all
- Enthesitis: inflammatory changes of the tendon and ligament attachment to bone
- extra-articular features including uveitis, dermatitis, and colitis.

AS Etiology and Prevalence

- Unknown etiology; presumed immune mediated
- Strong genetic component /familial association
  - HLA B27 gene
- discovered to be the etiology in 4% to 5 % of patients with chronic low back pain
- In North American Caucasians:
  - HLA B27 gene is found in 7% of the normal population
  - more than 90% of patients with ankylosing spondylitis.
  - A person who is HLA B27 positive has a 5% to 6% chance of developing the disease.
  - There is a fivefold to 16-fold increase in having ankylosing spondylitis if a first-degree relative HLA B27 factor makes up about a third of the overall genetic risk.
- male-to-female ratio is closer to 3:1.
- median age of onset is 23 years. Ankylosing spondylitis rarely has its initial manifestation after age 40 years; however, there can be a delay in diagnosis.

http://www.clevelandclinicmeded.com/medicalpubs/diseasemanagement/rheumatology/ankylosing-spondylitis/

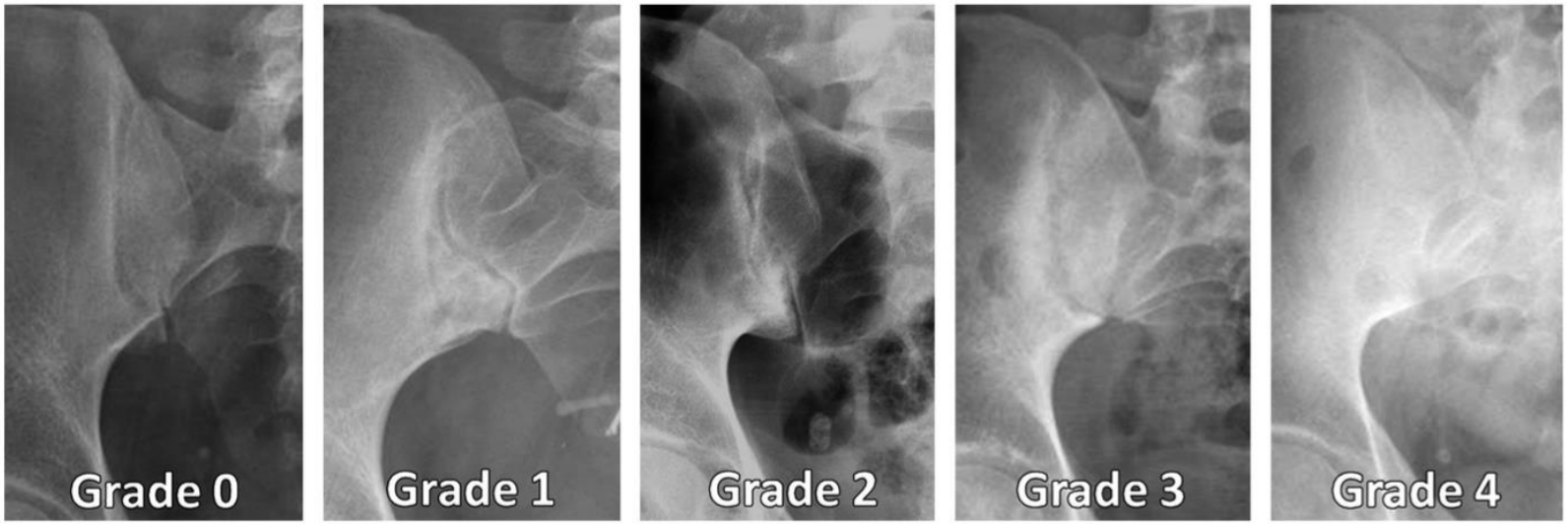


Figure 6. Radiographic grading of sacroiliitis according to the modified New York criteria. **(a)** Grade 0: normal findings. **(b)** Grade 1: suspicious changes of questionable sclerosis or joint margin blurring. **(c)** Grade 2: small localized areas with erosion or sclerosis without alteration in joint width. **(d)** Grade 3: unequivocal abnormality with widening, erosions, and sclerosis. **(e)** Grade 4: total ankylosis.

Chang, Eric Y., et al. "Adult Inflammatory Arthritides: What the Radiologist Should Know." *RadioGraphics* 36.6 (2016): 1849-1870.

Findings on MRI

- 90% involvement of SI Joints

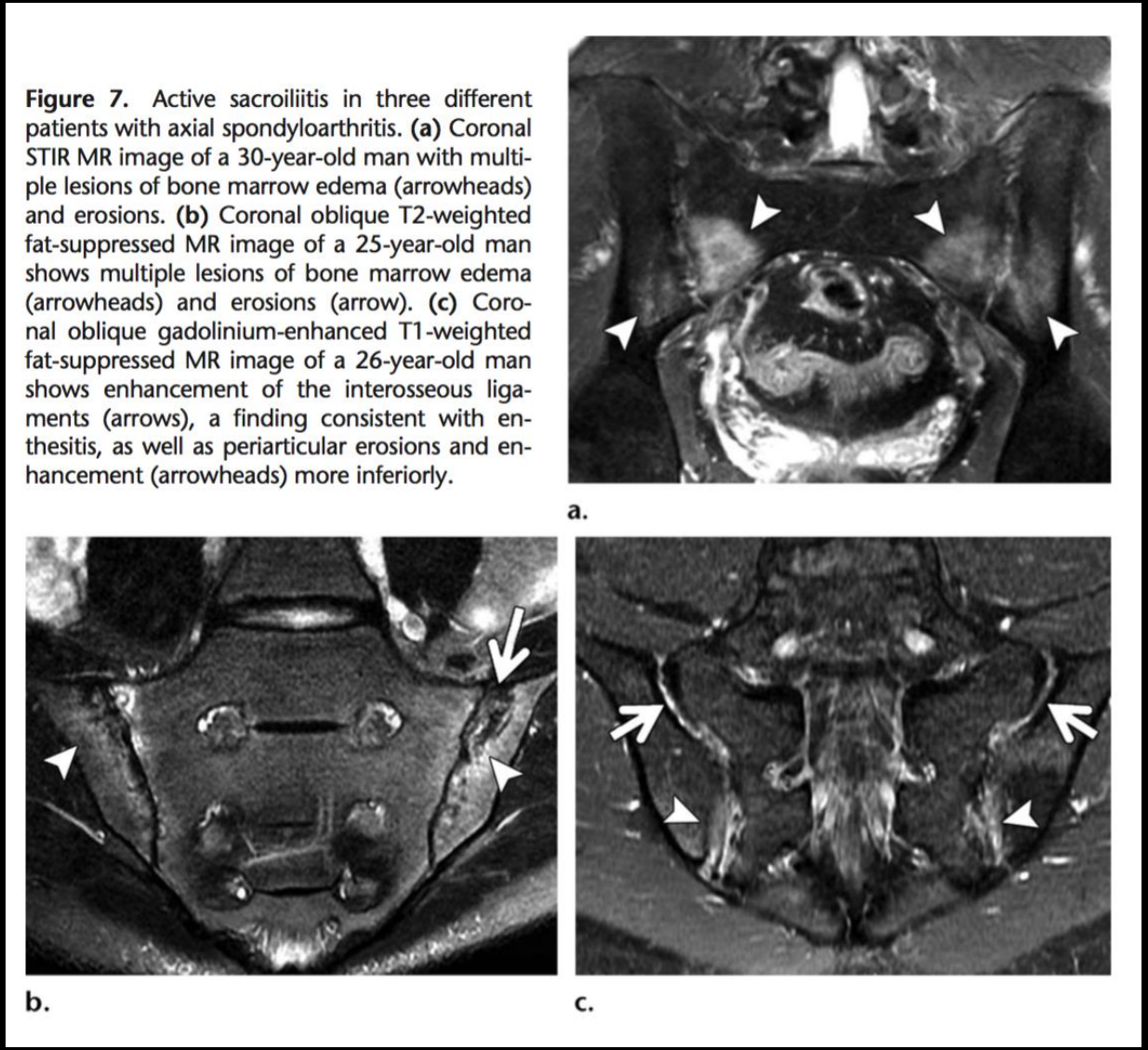


Figure 7. Active sacroiliitis in three different patients with axial spondyloarthritis. **(a)** Coronal STIR MR image of a 30-year-old man with multiple lesions of bone marrow edema (arrowheads) and erosions. **(b)** Coronal oblique T2-weighted fat-suppressed MR image of a 25-year-old man shows multiple lesions of bone marrow edema (arrowheads) and erosions (arrow). **(c)** Coronal oblique gadolinium-enhanced T1-weighted fat-suppressed MR image of a 26-year-old man shows enhancement of the interosseous ligaments (arrows), a finding consistent with enthesitis, as well as periarticular erosions and enhancement (arrowheads) more inferiorly.

a.

b.

c.

Chang, Eric Y., et al. "Adult Inflammatory Arthritides: What the Radiologist Should Know." *RadioGraphics* 36.6 (2016): 1849-1870.

AS Disease progression

- edema
- Erosion
- Ossification
- ankylosis

- Edema, fatty marrow degeneration, ankylosis

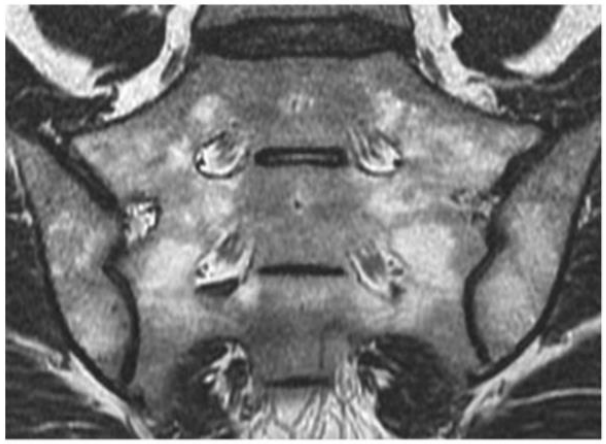
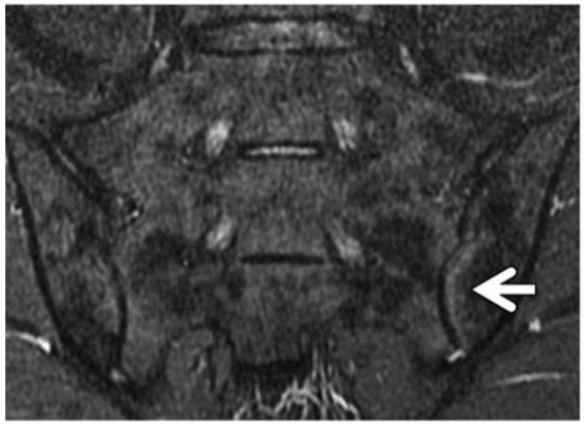
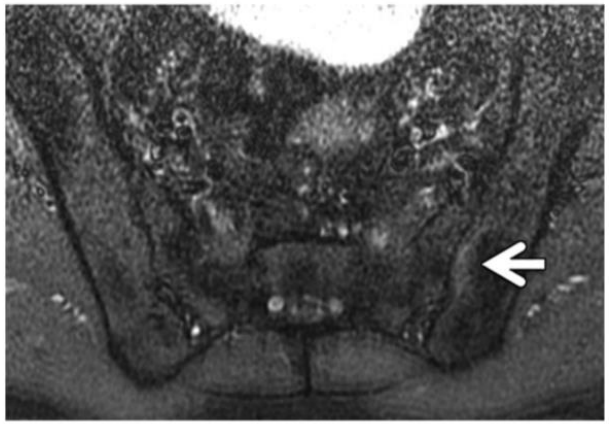


Figure 9. Imaging findings in a 31-year-old man with inflammatory back pain, uveitis, and a positive reaction for HLA-B27. **(a)** Oblique coronal T1-weighted MR image shows multifocal nonspecific bone marrow fat infiltration, without identifiable erosions or sclerosis. **(b, c)** Oblique coronal **(b)** and oblique axial **(c)** STIR MR images show subtle bone marrow edema (arrow) at the iliac portion of the left lower sacroiliac joint on more than one section, a finding consistent with active sacroiliitis. The findings in this patient fulfill both arms of the ASAS criteria for axial spondyloarthritis.

a.

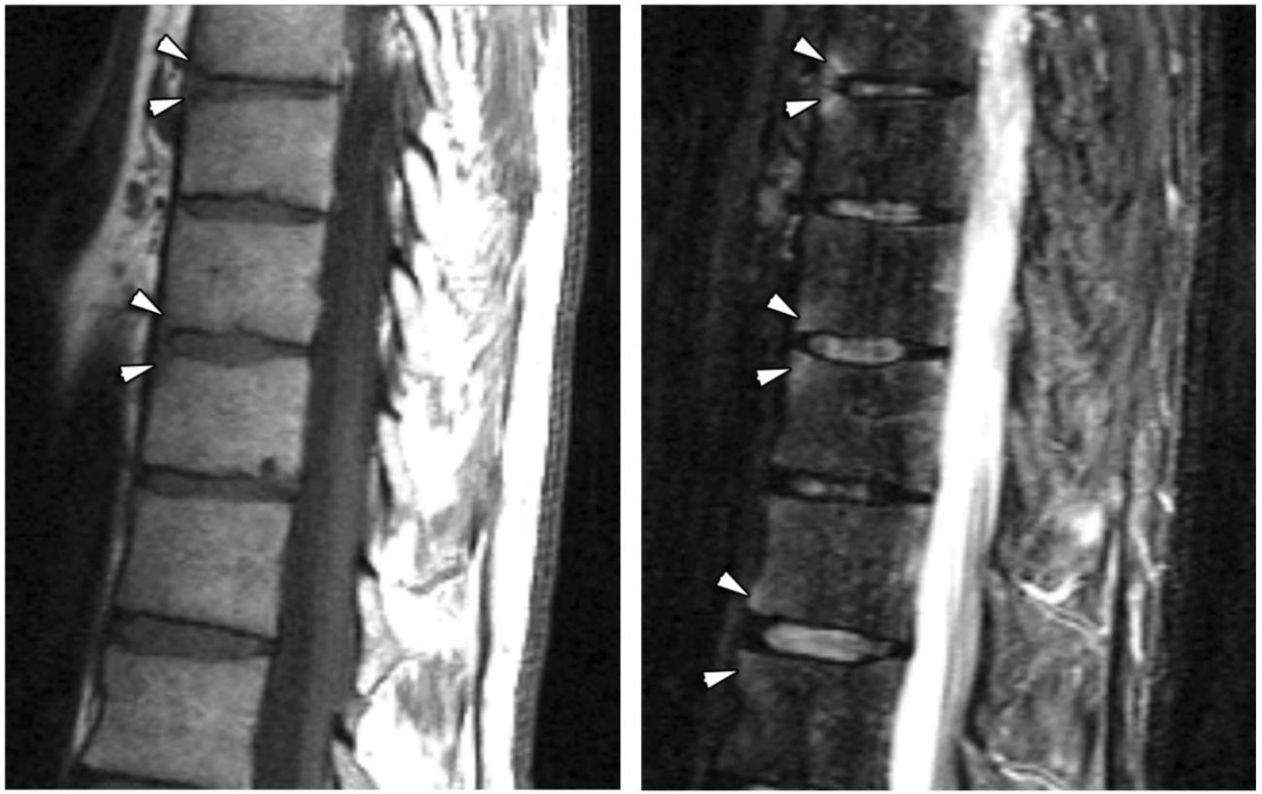


b.



c.

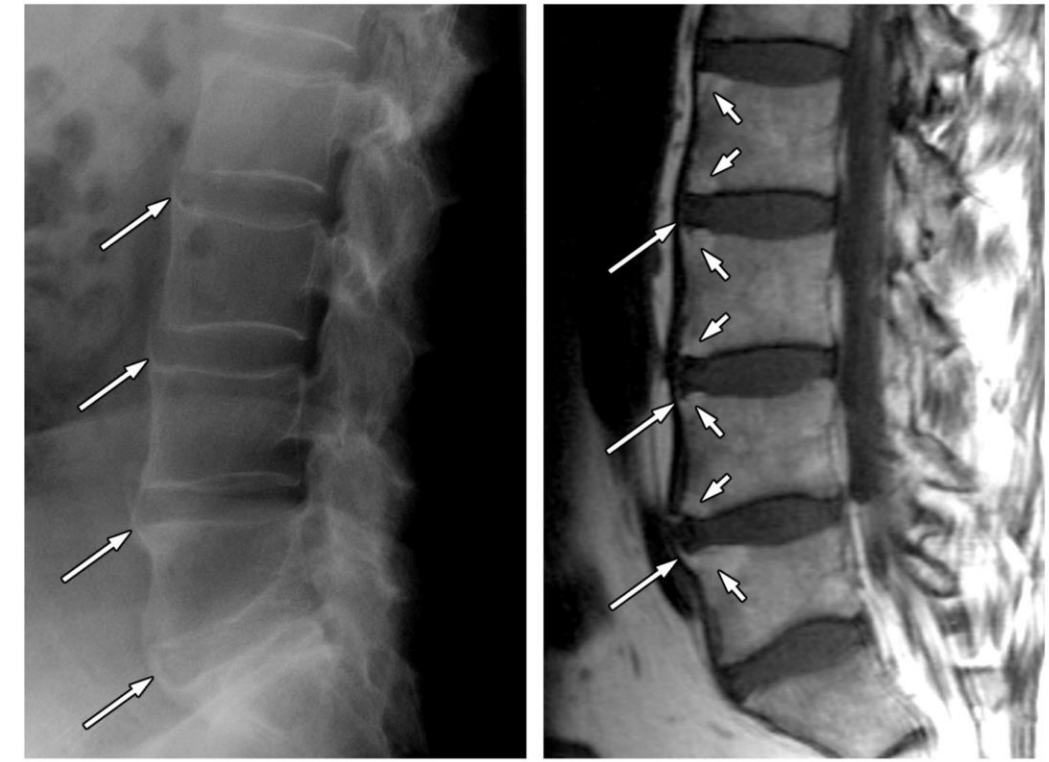
Chang, Eric Y., et al. "Adult Inflammatory Arthritides: What the Radiologist Should Know." *RadioGraphics* 36.6 (2016): 1849-1870.



a. b.

Figure 1. Spondylitis (active Romanus lesions) in a 34-year-old patient with ankylosing spondylitis. Sagittal T1-weighted turbo spin-echo **(a)** and STIR **(b)** images of the thoracic spine show florid Romanus lesions (anterior spondylitis) at T6–7, T8–9, and T10–11 (arrowheads). The lesions are seen at the anterior vertebral edges as a circumscribed increase in signal intensity on the STIR image and a decrease in signal intensity on the T1-weighted image.

Hermann, Kay-Geert A., et al. "Spinal Changes in Patients with Spondyloarthritis: Comparison of MR Imaging and Radiographic Appearances 1." *Radiographics* 25.3 (2005):



a. b.

Figure 2. Spondylitis (inactive Romanus lesions) in a 39-year-old patient with ankylosing spondylitis. **(a)** Lateral radiograph of the lumbar region shows syndesmophytes (arrows) at L3 through S1 and a shiny corner at the superior endplate of L5. **(b)** On the corresponding T1-weighted fast spin-echo image, the syndesmophyte at L5 (lower long arrow) is barely visible. Postinflammatory fatty bone marrow degeneration of the anterior vertebral edges is seen (short arrows), findings compatible with inactive Romanus lesions. (Fig 2a and 2b reprinted, with permission, from reference 23.)

Hermann, Kay-Geert A., et al. "Spinal Changes in Patients with Spondyloarthritis: Comparison of MR Imaging and Radiographic Appearances 1." *Radiographics* 25.3 (2005): 559-569.

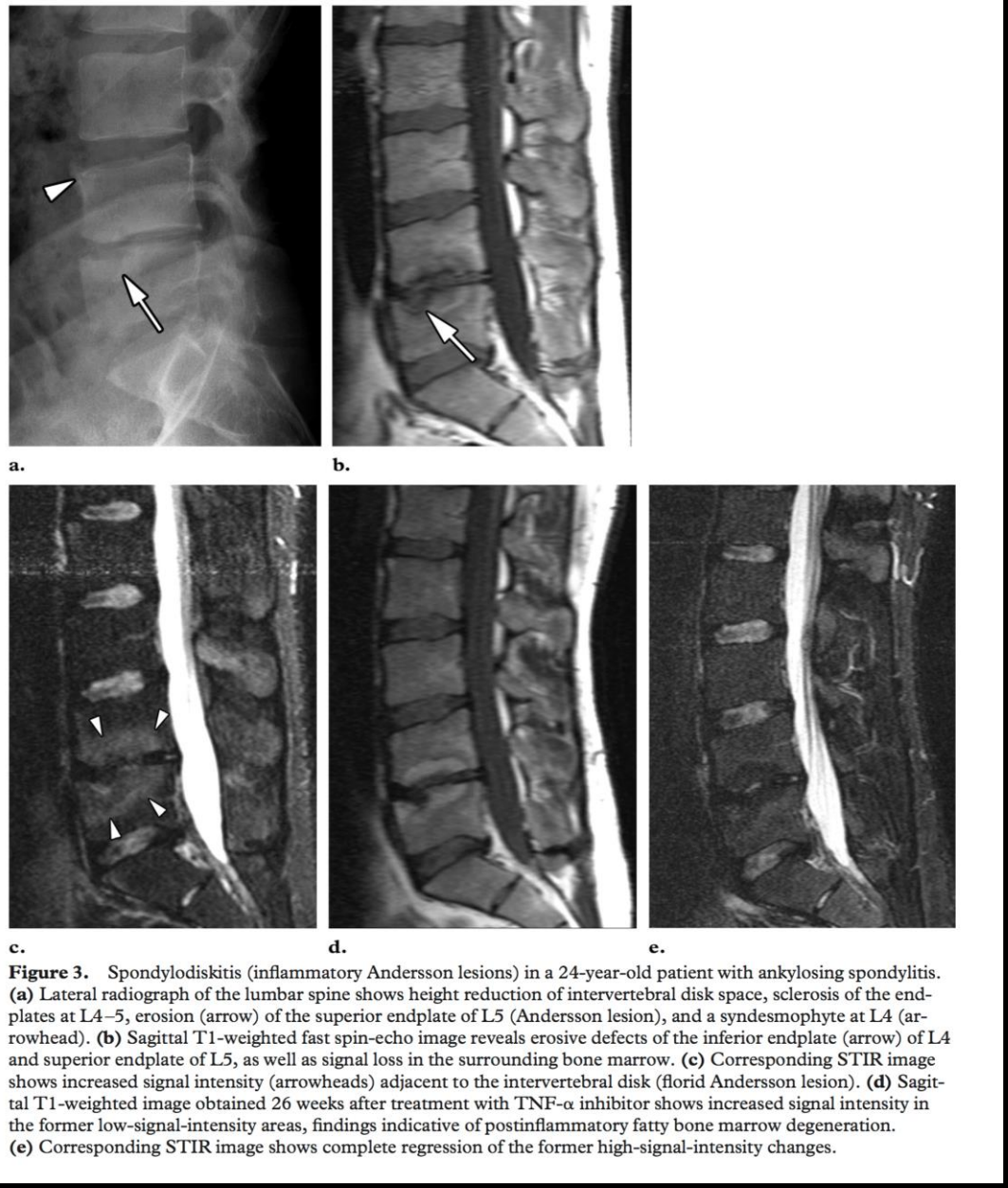


Figure 3. Spondylodiskitis (inflammatory Andersson lesions) in a 24-year-old patient with ankylosing spondylitis. **(a)** Lateral radiograph of the lumbar spine shows height reduction of intervertebral disk space, sclerosis of the endplates at L4–5, erosion (arrow) of the superior endplate of L5 (Andersson lesion), and a syndesmophyte at L4 (arrowhead). **(b)** Sagittal T1-weighted fast spin-echo image reveals erosive defects of the inferior endplate (arrow) of L4 and superior endplate of L5, as well as signal loss in the surrounding bone marrow. **(c)** Corresponding STIR image shows increased signal intensity (arrowheads) adjacent to the intervertebral disk (florid Andersson lesion). **(d)** Sagittal T1-weighted image obtained 26 weeks after treatment with TNF-α inhibitor shows increased signal intensity in the former low-signal-intensity areas, findings indicative of postinflammatory fatty bone marrow degeneration. **(e)** Corresponding STIR image shows complete regression of the former high-signal-intensity changes.

Hermann, Kay-Geert A., et al. "Spinal Changes in Patients with Spondyloarthritis: Comparison of MR Imaging and Radiographic Appearances 1." *Radiographics* 25.3 (2005): 559-569.

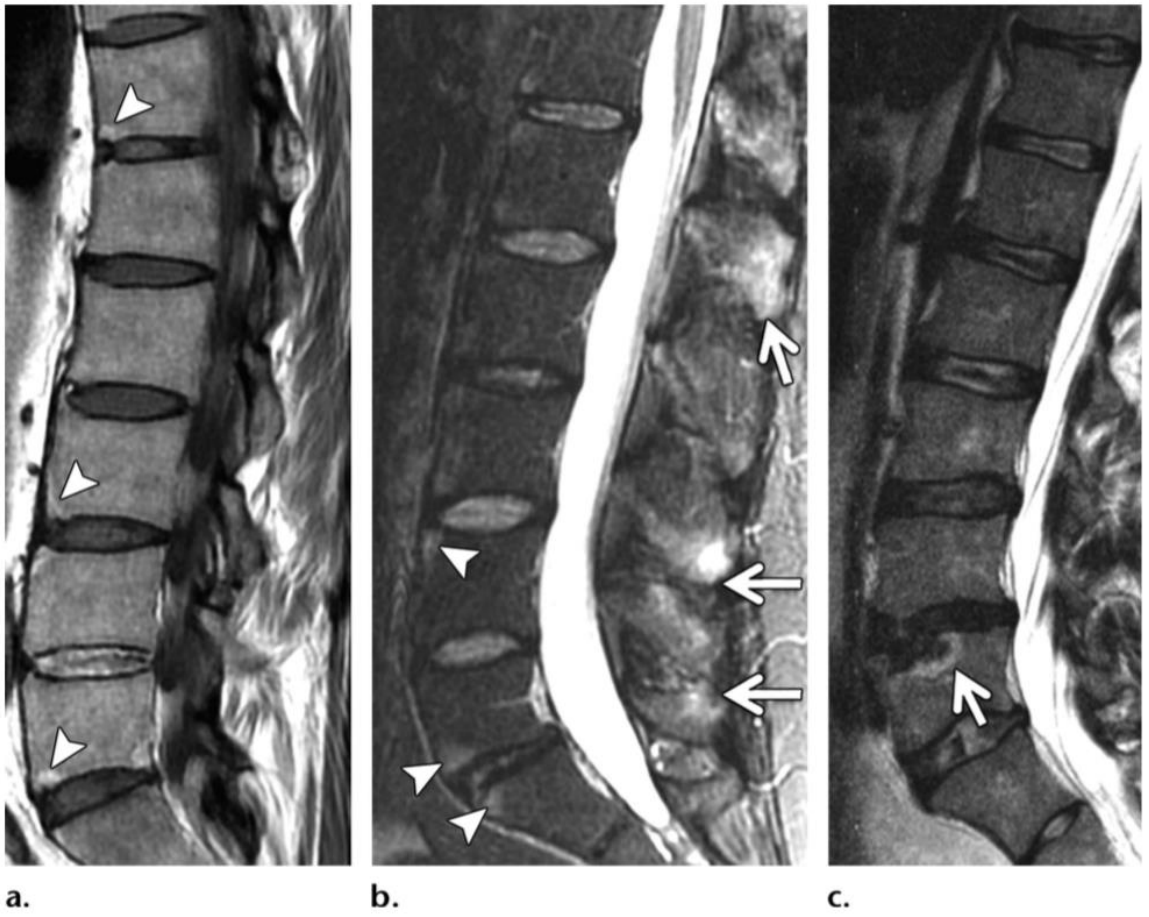


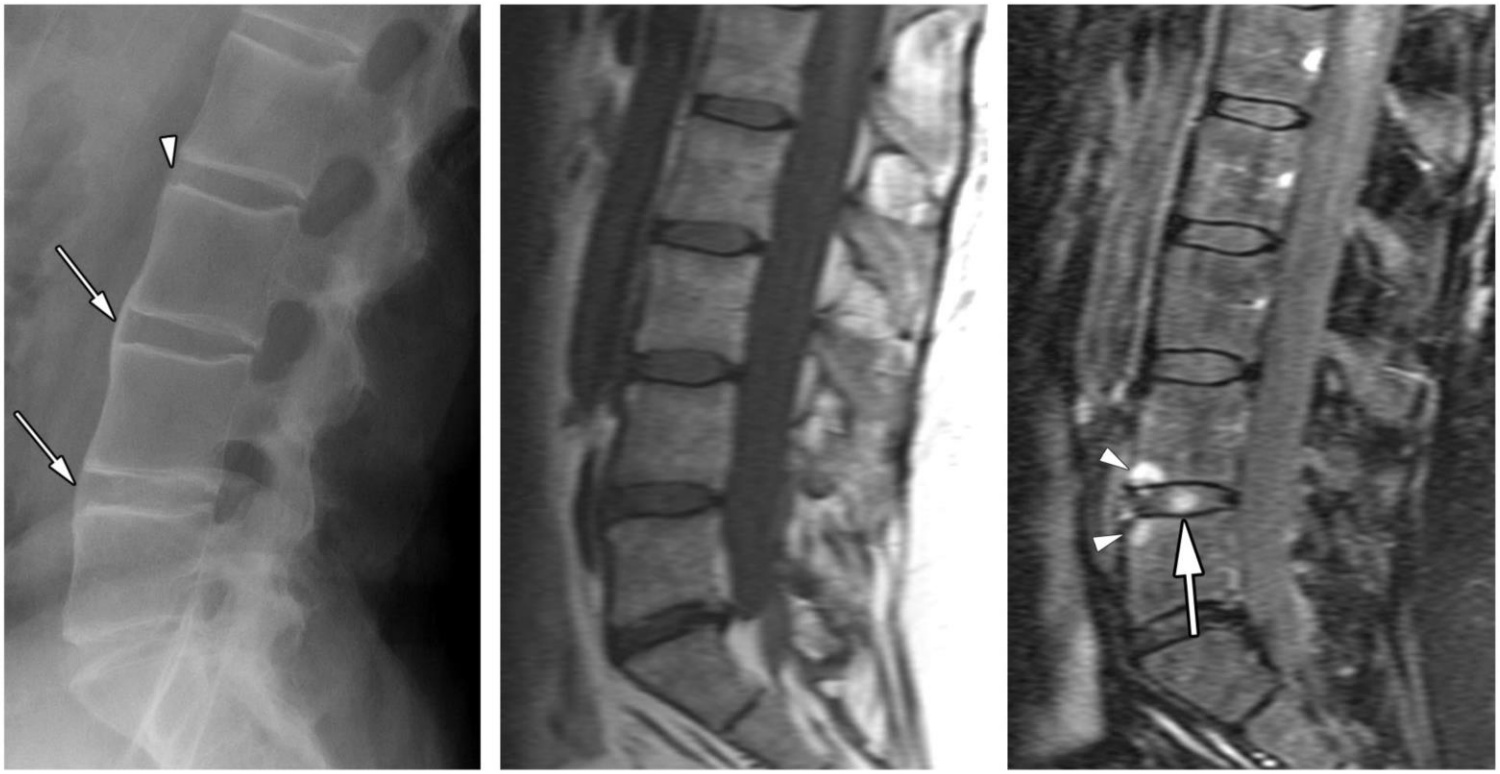
Figure 10. Characteristic spinal lesions in three different patients with ankylosing spondylitis. **(a)** Sagittal T1-weighted MR image of a 44-year-old man shows multiple fatty Romanus lesions (arrowheads indicate the three largest), lesions that are highly specific for ankylosing spondylitis. **(b)** Sagittal STIR MR image of a 40-year-old man shows edematous Romanus lesions at every level (arrowheads indicate the three most hyperintense). Involvement of the posterior elements represents enthesitis from interspinous ligament inflammation (arrows). **(c)** Sagittal T2-weighted fat-suppressed MR image of a 43-year-old man with ankylosing spondylitis shows erosive change at the superior discovertebral junction of L5, with surrounding edema (arrow), findings consistent with an Andersson lesion.

Chang, Eric Y., et al. "Adult Inflammatory Arthritides: What the Radiologist Should Know." *RadioGraphics* 36.6 (2016): 1849-1870.

a. b.

Figure 6. Enthesitis in a 47-year-old patient with ankylosing spondylitis. **(a)** Sagittal unenhanced T1-weighted fast spin-echo image shows thickening of the supraspinal ligament from C7 through T3 (arrows). **(b)** Sagittal contrast-enhanced fat-saturated T1-weighted turbo spin-echo image shows pronounced enhancement in the area of the interspinal and supraspinal ligaments (arrows), a finding indicative of enthesitis. (Patient was positioned on a gel cushion to improve signal-to-noise ratio.)

Hermann, Kay-Geert A., et al. "Spinal Changes in Patients with Spondyloarthritis: Comparison of MR Imaging and Radiographic Appearances 1." *Radiographics* 25.3 (2005): 559-569.



a. b. c.

Figure 7. Ankylosis and syndesmophytes in a 36-year-old patient with ankylosing spondylitis. **(a)** Lateral radiograph of the lumbar spine shows anterior syndesmophytes at L3–4 and L4–5 (arrows) and a defect of the epiphyseal ring at the anterior edge of L3 (arrowhead). Beginning ossification of intervertebral spaces L1–2 and L2–3 is evident. **(b)** On the T1-weighted turbo spin-echo image, syndesmophytes are not seen. **(c)** Sagittal contrast-enhanced fat-saturated T1-weighted turbo spin-echo image shows enhancement in the area of the epiphyseal rings at L4–5 (arrowheads), a finding representing a Romanus lesion. Subtle enhancement (arrow) of intervertebral disk L4–5 (an early Andersson lesion) is also seen.

Hermann, Kay-Geert A., et al. "Spinal Changes in Patients with Spondyloarthritis: Comparison of MR Imaging and Radiographic Appearances 1." *Radiographics* 25.3 (2005): 559-569.

Take Home Points

- 90% of AS patients will have SI joint involvement
- anterior spondylitis (or Romanus lesion)
- diskitis (Andersson lesion)
- Look at posterior elements
- Be suspicious for AS in young males with chronic back pain.

References

- https://my.statdx.com/document/spondyloarthropathy/b96b1d44-f7ef-47a7-95d6-3ebf5113a88d?searchTerm=seronegative
- http://www.clevelandclinicmeded.com/medicalpubs/diseasemanagement/rheumatology/ankylosing-spondylitis/
- Chang, Eric Y., et al. "Adult Inflammatory Arthritides: What the Radiologist Should Know." *RadioGraphics* 36.6 (2016): 1849-1870.
- Hermann, Kay-Geert A., et al. "Spinal Changes in Patients with Spondyloarthritis: Comparison of MR Imaging and Radiographic Appearances 1." *Radiographics* 25.3 (2005): 559-569