

67 y/o Female with joint pain

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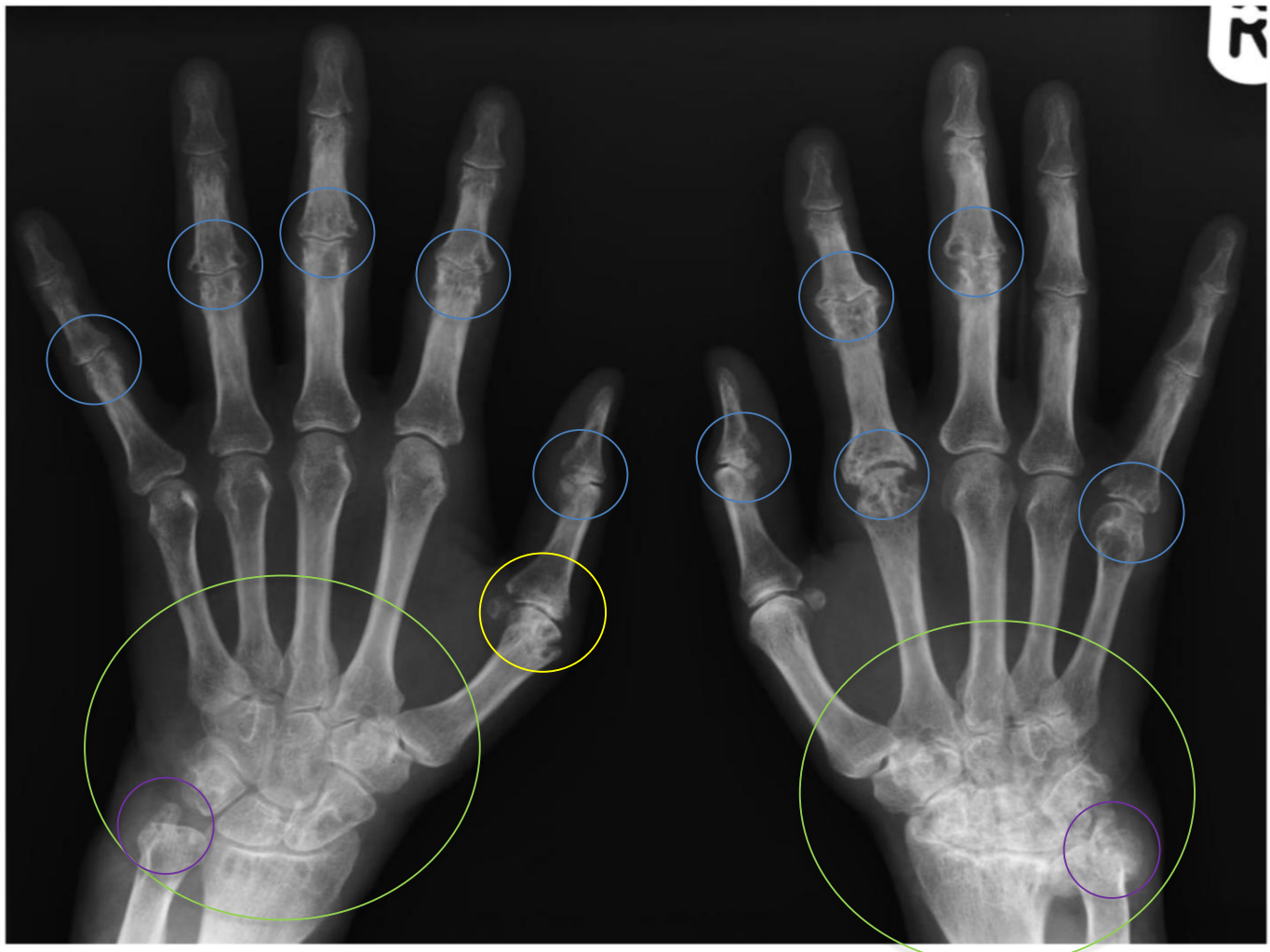




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A large, stylized oak leaf graphic in a dark blue color, positioned on the left side of the slide. The leaf has a prominent central vein and several smaller veins branching off it. The leaf's edge is serrated.

Advanced Rheumatoid Arthritis



- Bone erosions with joint space destruction and soft tissue swelling
- Ulnar subluxation
- Pancarpal and radiocarpal involvement with erosions
- Erosive changes at ulnar styloid

Frontal view of the hands in a patient with Rheumatoid Arthritis demonstrating symmetric involvement.

Normal Hand Anatomy



Case courtesy of Dr Benoudina Samir, Radiopaedia.org, rID: 42878

1. Styloid process of radius.
2. Metaphysis of radius.
3. Metaphysis of ulna.
4. Styloid process of ulna.
5. Scaphoid.
6. Lunate.
7. Triquetrum.
8. Pisiform.
9. Trapezium.
10. Trapezoid.
11. Capitate.
12. Hamate.
13. Base of second metacarpal.
14. Shaft of third metacarpal.
15. Neck of fifth metacarpal.
16. Head of fourth metacarpal.
17. Metacarpophalangeal joint.
18. Proximal phalanx.
19. Middle phalanx.
20. Distal phalanx.
21. Sesamoid bones (flexor pollicis brevis, adductor pollicis).
22. Terminal tuft



Normal Hand Anatomy

- Symmetric joint spaces:
 - Distal radioulnar joint
 - Radiocarpal
 - Intercarpal
 - Carpometacarpal
 - Interphalangeal (1st digit)
 - PIP
 - DIP

Rheumatoid Arthritis

- Most common in women aged 30-60 years
 - 3:1 female to male ratio
- Serologic markers
 - Rheumatoid Factor
 - Anti cyclic citrullinated peptide

Rheumatoid Arthritis

Overview

- Systemic arthritis
 - Joint space narrowing
 - Inflammatory changes (erosions, swelling)
 - > 1 joint involved
- Proximal distribution
 - Carpal bones (involved in 80% of patients with RA)
 - MCP joints (involved in 85% of patients with RA)
 - PIP joints (involved in 75% of patients with RA)
- Lack of bone proliferation (osteophytes)

Rheumatoid Arthritis

Location

- Classically symmetric (involvement of right and left sides)
- Early involvement
 - MCP, PIP joints
 - Distal radioulnar joints
 - Radiocarpal joint
- Late Involvement
 - Intercarpal joints
- DIP and 1st CMC joints are spared until end stage disease

Rheumatoid Arthritis

Inflammatory changes

- Synovium is the site of pathologic process
 - Synovial hyperplasia mediated by inflammatory cytokines
 - Synovial tissue invaded by local inflammatory cells
 - Invasion of articular cartilage and bone by secretion of degrading enzymes
- Erosions
 - Occur earliest where the bone is covered only by synovium, and not by cartilage
 - Direct contact of bone with this synovial tissue without the protecting cartilage makes these locations very susceptible to synovitis-induced bone destruction
- Tendon and ligament disruption lead to malalignment
 - Ulnar drift and volar subluxation at MCPs
 - Boutonnière deformity - hyperflexion PIP, hyperextension DIP
 - Swan neck deformity - hyperextension PIP, hyperflexion DIP

References

- Sommer, Oliver J., et al. “Rheumatoid Arthritis: A Practical Guide to State-of-the-Art Imaging, Image Interpretation, and Clinical Implications.” *RadioGraphics*, vol. 25, no. 2, 2005, pp. 381–398., doi:10.1148/rg.252045111.