ARTHRITIS IMAGING

SIGNS | FIGURES | DRAWINGS | PATTERNS

Jans | Chen

Teh | Vanhoenacker | Sutter | Verstraete | Sudoł-Szopińska | Rennie | Hermann | Maas | Becce | Herregods | Mascarenhas | Lecouvet | Feydy | Jaremko | Reijniers | Baraliakos | Maksymowych | Østergaard | Van den Bosch | Carron | Terslev | Elev | Haavardsholm | Kloppenburg | Malattia | Carlile | Conaghan | Dejaco | Weisman

TABLE OF CONTENTS

Soft tissue swelling

Thickening and increased density of soft tissue, usually fusiform around the inflamed joint.

Periarticular osteoporosis

Decrease of bone density, due to hyperemia, leaching calcium from bone.

Erosion

Cortical interruption with exposure of cancellous bone.

Bare area

Intra-articular bone surface without cartilage coverage adjacent to the insertion of the capsule.

Subchondral cyst

Well-defined fluid-filled lytic lesion at the periarticular surfaces.

Pencil-in-cup deformity

Pencil-like bone resorption of the proximal portion of the joint, and cup-like erosion of the distal portion.

Boutonnière deformity

Flexion of the PIP joint with hyperextension of the DIP joint of the fingers.

Swan neck deformity

Hyperextension in the PIP joint with secondary flexion in the DIP joint.

Z - thumb deformity

MCP joint flexion and DIP joint extension, or MCP joint extension and DIP joint flexion of the thumb.

Wrist collapse

Carpal bone destruction, radial deviation of the metacarpals, radioulnar joint dissociation.

Ulnar deviation and volar subluxation

The phalanx in the MCP joint subluxates to the palmar and ulnar side.

Synovitis

Thickening and inflammation of synovium in the joints, may cause adjacent erosions.

Tenosynovitis

Inflammation and thickening of the synovium lining the tendon sheath.

Bursitis

Inflammation of synovial-lined bursa.

Rice bodies

Detached synovial villi with low signal on fluid-sensitive MR sequences.

Hallux valgus

Valgus of the first MTP joint > 12°.

Hammer toe deformity

Flexion of the PIP joint and extension of the DIP joint of the toes.

Hindfoot valgus

Increased talocalcaneal angle, lateral talocalcaneal angle > 50°.

Midfoot collapse

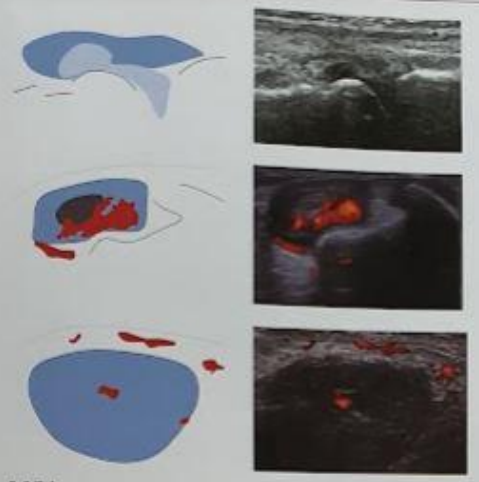
Sagging of the midfoot, with impingement of the small midfoot joints at the top.

Metatarsus primus varus

> 10° angle between 1st and 2nd metatarsal.

DIP: distal interphalangeal joints, PIP: proximal interphalangeal joints, MCP: metacarpal phalangeal, MTP: metatarsal phalangeal

Ultrasound



INFLAMMATION

Joint effusion

Synovitis
- Doppler: hypervascularity

Tenosynovitis and tendon tear

Bursitis
- Intermetatarsal bursa
- Pre-Achilles bursa

JOINT DAMAGE

Cartilage damage
Joint space narrowing
Secondary osteoarthritis

MRI

INFLAMMATION

Soft tissue edema

Joint effusion

Synovitis
Synovial thickening | enhancement
Tenosynovitis and tendon tear

Bursitis
- Intermetatarsal bursa
- Pre-Achilles bursa

Subchondral bone marrow edema

JOINT DAMAGE

Loss of cartilage
Erosions
Subchondral cysts
Joint space narrowing
Secondary osteoarthritis

OTHER FINDINGS

Insufficiency fracture

References:

CHAPTER 3 Psoriatic arthritis

Psoriatic arthritis (PsA) is the most prevalent coexisting condition in 10%-30% patients with psoriasis.

Five clinical subtypes of PsA are polyarticular, oligoarticular (≤4 joints), distal, axial, arthritis mutilans

Clinical key points

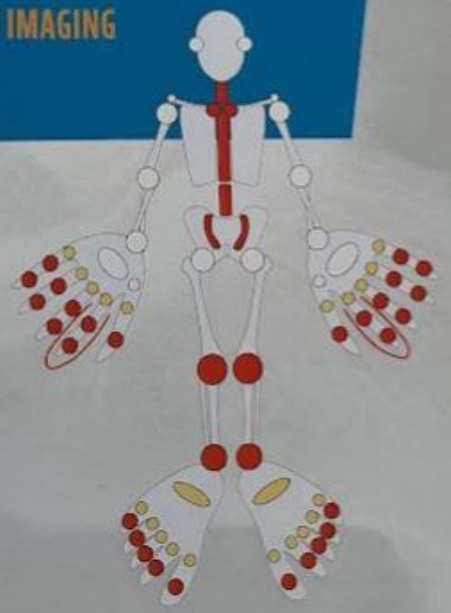
- SKIN PSORIASIS AND PSORIATIC NAIL LESIONS: NAIL PITS AND ONYCHOLYSIS.
- DACTYLITIS: "SAUSAGE" DIGIT
- TYPICAL PATTERN: INFLAMMATORY ASYMMETRIC POLY- OR OLIGOARTHRITIS.

Key imaging findings

- EARLY STAGE: NORMAL.
- INTERMEDIATE STAGE: MARGINAL EROSIONS WITH PERIOSTITIS AND MARGINAL NEW BONE FORMATION.
- LATE STAGE: EROSIONS, SCLEROSIS RESULTING IN IVORY PHALANX, JOINT DEFORMITY (PENCIL-IN-CUP), ARTHRITIS MUTILANS, ANKYLOSIS, AND JOINT DESTRUCTION WITH LUXATION AND POTENTIAL ACRO-OSTEOLYSIS.

GOLDEN BULLET POINT IN IMAGING

SLOWLY PROGRESSING EROSIONS IN THE INTERPHALANGEAL JOINTS WITH NEW BONE FORMATION.



CHAPTER 12 POLYMYALGIA RHEUMATICA

Polymyalgia rheumatica (PMR) is an inflammatory disease that affects the shoulder, the pelvic girdles, and the neck, usually in individuals older than 50 years, especially in elderly women.

It can be isolated or concomitant with giant cell arteritis.

In view of the prominent inflammatory involvement of bursae, PMR might be considered a disorder predominantly of the extra-articular synovial structures.

Clinical key points

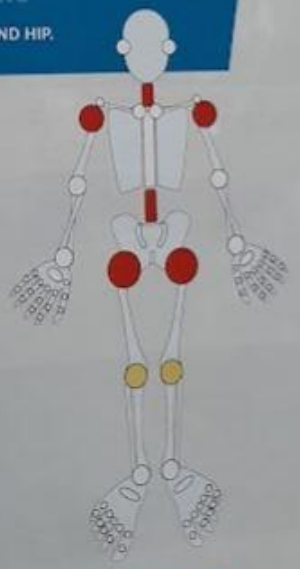
- ACUTE ONSET SEVERE PAIN AND STIFFNESS AFFECTING THE SHOULDERS AND PROXIMAL ASPECTS OF THE ARMS BILATERALLY. INVOLVEMENT OF NECK AND HIP GIRDLE IS ALSO COMMON.
- INCREASE IN ESR AND CRP.
- RESOLVES RAPIDLY AFTER THE ONSET OF GLUCOCORTICOID THERAPY.

Key imaging findings

- SYMMETRICAL BURSITIS.
- CONCURRENT ARTERITIS.

GOLDEN BULLET POINT IN IMAGING

SYMMETRICAL BURSITIS OF THE SHOULDER AND HIP.



6.1.1 PERIPHERAL JOINTS

Mostly involved:
1st MTP joint
Midfoot

Any peripheral joints

Usually asymmetric

Radiography

Soft tissue swelling

Tophi:
Soft tissue dense nodules, calcification (+/-)

Erosions:
Extramarginal/ articular / intraosseus
Well-circumscribed with overhanging sclerotic margins
Look like 'Ω'

Preserved bone density and joint space in the early stage

(Dual-energy) CT

CONVENTIONAL CT

Erosions:
Juxta-/ intra-articular/ intraosseous
Well-circumscribed with overhanging
Sclerotic margins

Soft tissue swelling

Tophi
Soft tissue dense nodules adjacent to
calcification (+/-)
Preserved bone density

ADDITIONAL FINDINGS ON DUAL-EN

Postprocessing algorithm
for MSU crystal deposition

MSU crystal deposition around joints
tendons and bursae

6.3.1 PERIPHERAL JOINTS

Monoarticular

Most common: shoulder (rotator cuff)

Other joints:
Knee, hip, elbow, wrist, and hand

Radiography & CT

PERIARTICULAR HA deposition (common)
Mostly in tendons

Dynamic changes:

Amorphous | homogeneous
→ denser | well-defined
→ may resolve

Can extend (migrate) into bursa, muscle, joint and bones (cortical erosion)

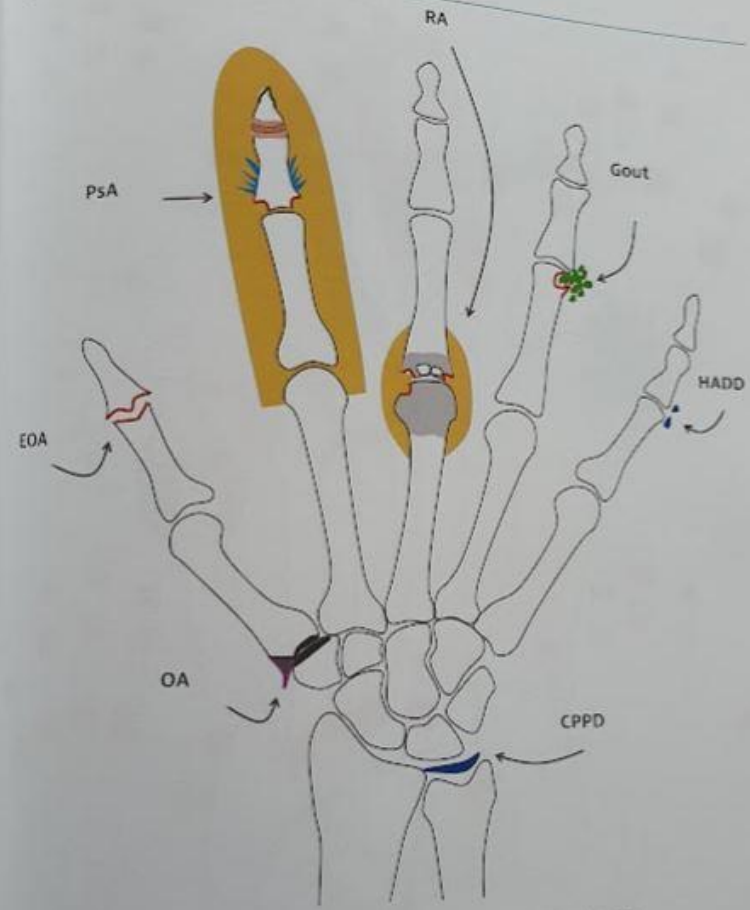
INTRAARTICULAR HA deposition
Rapidly destructive arthropathy (uncommon)

Milwaukee shoulder

Glenohumeral joint space narrowing
Bone erosions, sclerosis, bone cysts
Rapid joint destruction
and bone fragments
Subluxation of the humeral head
Subtle or absent osteophytes

GRAPHIC DIFFERENTIAL DIAGNOSIS

Hand



RA	Rheumatoid arthritis. Soft tissue edema, erosions, subchondral cysts and periarticular osteoporosis in the MCP joints.
PsA	Psoriatic arthritis. Sausage finger (dactylitis), erosions, periostitis, ankylosis and acro-osteolysis in the IP joints.
Gout	Tophus and erosions with overhanging edges.
CPPD	Calcium pyrophosphate deposition disease. Calcium pyrophosphate deposition in the triangular fibrocartilage.
HADD	Hydroxyapatite deposition disease. Homogeneous calcification in the tendon.
OA	Osteoarthritis. Joint sclerosis, osteophytes and joint space narrowing.
EOA	Erosive osteoarthritis. Gull-wing deformity in the IP joints.