

Work Joint Injuries and Pre-existing Osteoarthritis

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Classification of Work Hand Injuries

- Traumatic
 - Crush/Laceration/Open wound/Fracture
- Overuse
 - Trigger Finger
 - DeQuervain's
 - Nerve Disorders
 - Epicondylitis (e.g. Tennis elbow)
 - ***Joint Degeneration - Osteoarthritis***



Joint Degeneration and Injury

- Degenerative joints:
 - Distal Interphalangeal (DIP)
 - Thumb Basal Joint (CMC Thumb)
 - Proximal Interphalangeal (PIP)
- Relationship between degenerative OA and occupational activities have been reported
- Clear irrefutable evidence to support this is lacking

Definition of Osteoarthritis

- Pathologic
- Radiologic
- Clinical



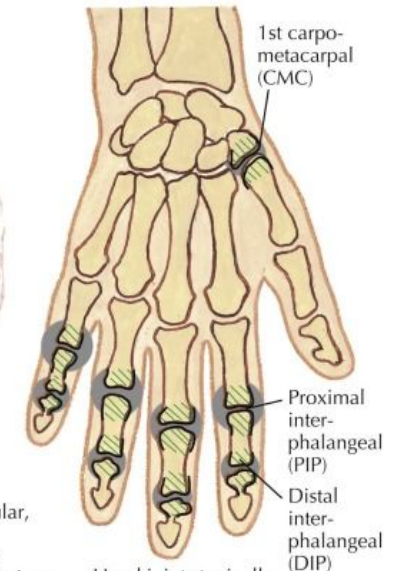
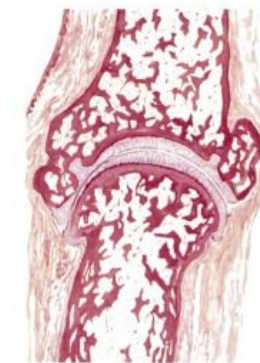
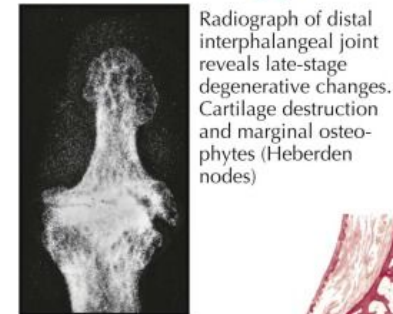
Definition of Osteoarthritis

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Osteoarthritis: Digits

- The age-standardized prevalence of hand osteoarthritis was 44.2% in women and 37.7% in men

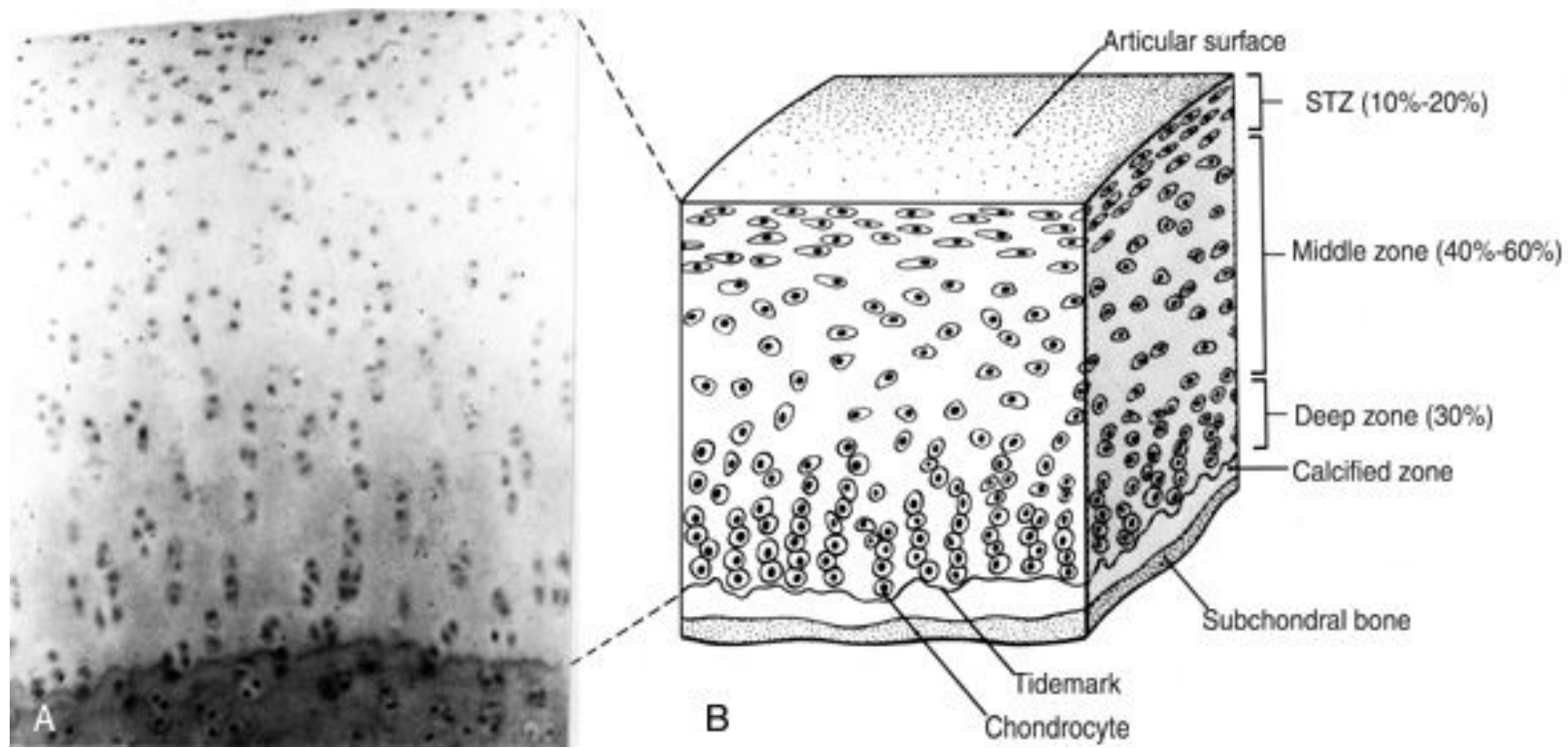


Osteoarthritis

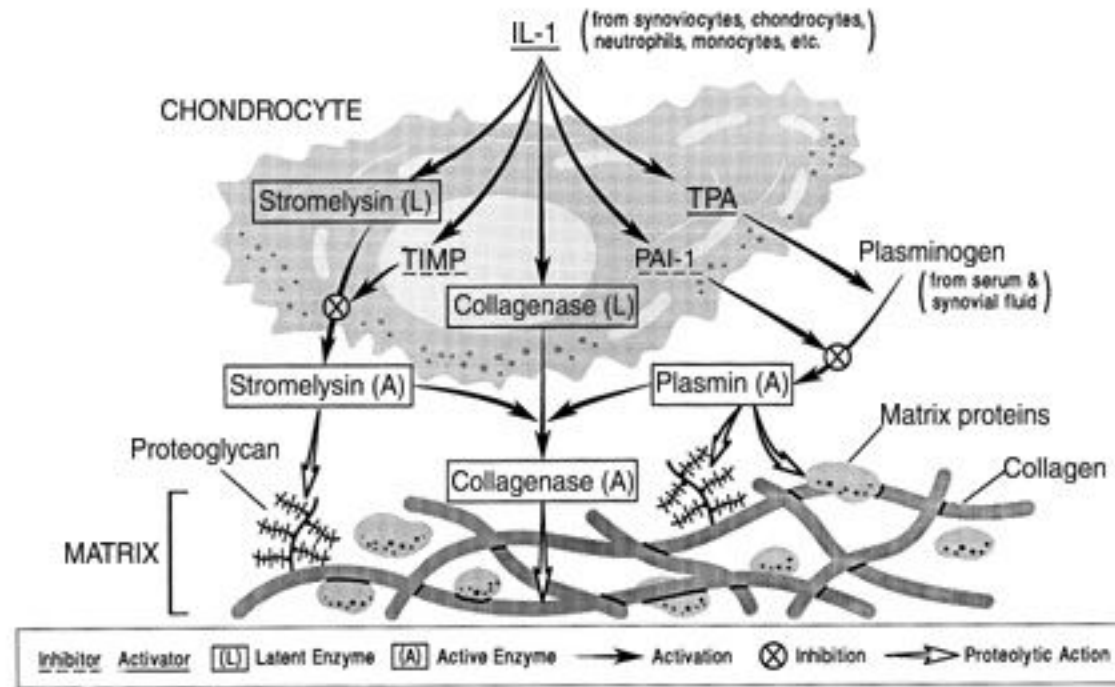
- Osteoarthritis (OA) is the most common form of arthritis. It is strongly associated with aging and typically affects the knee, hip, spine, great toe, and hands
- Osteoarthritis can be defined pathologically, radiographically, or clinically, and the choice of definition can substantially affect prevalence estimates



Normal Cartilage



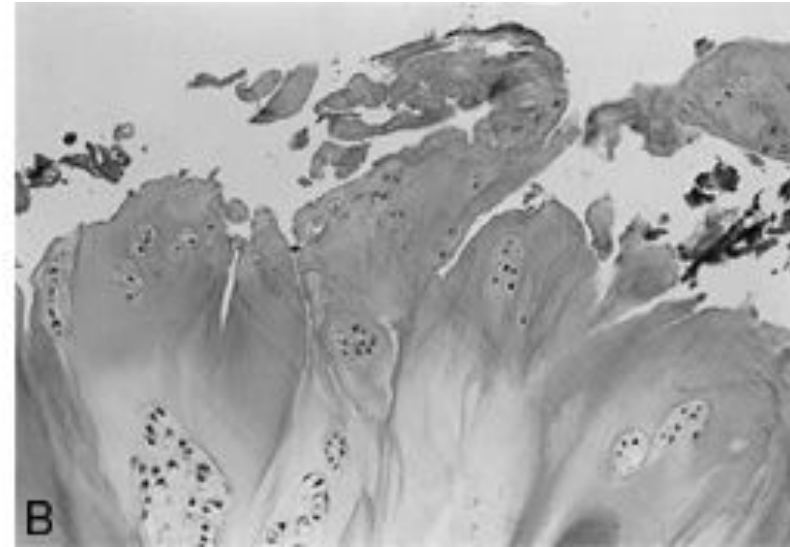
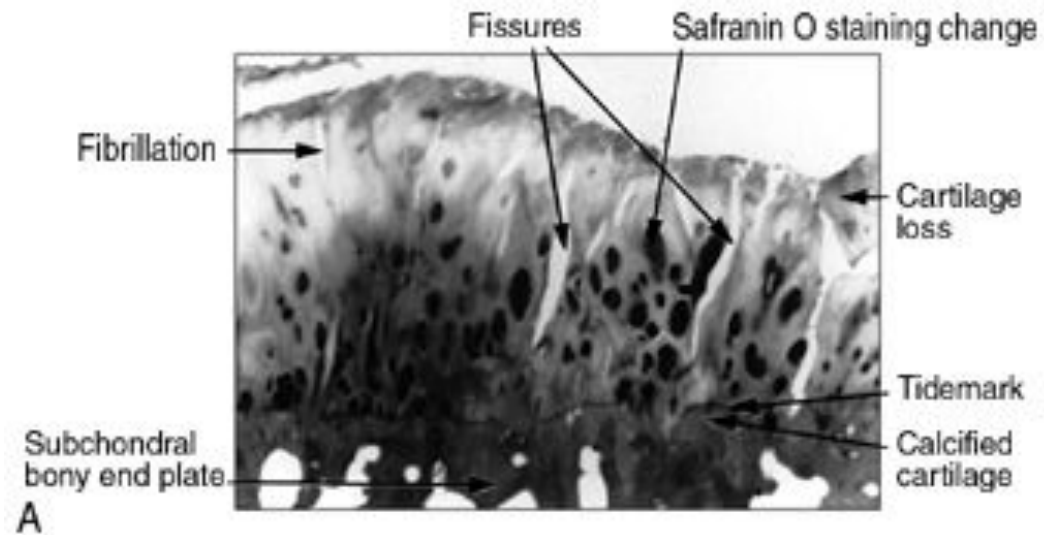
Osteoarthritis: Pathogenesis



Osteoarthritis: Pathology

- Joint degeneration that affects all aspects of the joint
- Thinning and fibrillation of the cartilage
- Loss of joint space
- Osteophyte formation
- Subchondral bony sclerosis, subchondral cysts
- Degradation of synovium and ligaments
- End stage OA with significant joint deformity

Cartilage Degeneration



End Stage Arthritis



Definition of Osteoarthritis

- Pathologic
- **Radiologic**
- Clinical



Radiographic Arthritis

Kellgren-Lawrence radiographic grading system for osteoarthritis

Adapted from Kellgren JH, Lawrence JS, editors. The epidemiology of chronic rheumatism, atlas of standard radiographs. Oxford: Blackwell Scientific; 1963.

Grade	Classification	Description
0	Normal	No features of osteoarthritis
1	Doubtful	Minute osteophyte, doubtful significance
2	Minimal	Definite osteophyte, unimpaired joint space
3	Moderate	Moderate diminution of joint space
4	Severe	Joint space greatly impaired with sclerosis of subchondral bone



Definition of Osteoarthritis

- Pathologic
- Radiologic
- **Clinical**



Arthritis: Clinical definition

- Clinical OA is usually defined by abnormalities on physical examination consistent with OA, such as Heberden or Bouchard nodes in the hand
- Symptomatic OA is usually defined as the presence of joint symptoms such as pain, aching, or stiffness, in a joint with radiographic OA
- Onset of pain can be
 - Gradual
 - Sudden
 - **Post-traumatic**
- Early on, may not have visible nodes, joint appears normal on exam – but may be symptomatic

Osteoarthritis vs. Inflammatory arthritis

- Inflammatory:
- Disease where the body attacks its own joints:
- Rheumatoid
- Psoriatic
- Gout/Pseudogout
- Associated with another condition



Basal Joint Arthritis:Thumb

- Extremely common
- Earlier onset in Women
- 50% of women at age 50 will show radiographic evidence of basal joint arthritis

THUMB CARPOMETACARPAL OSTEOARTHRITIS



Osteoarthritis causes stiff, adduction deformity at the CMC joint resulting in secondary hyperextension of the MP joint and stretching out of the volar plate.



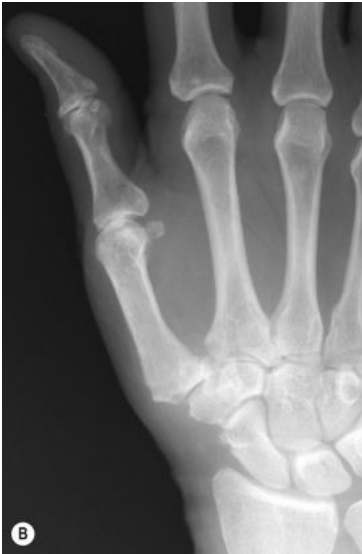
Deformity as at left and signs of advanced degenerative change in the CMC and MP joints with joint space narrowing and subchondral sclerosis.



Despite deformity most patients have adequate function unless their osteoarthritis is painful.

K. Mason

Stages of Thumb CMC Joint Degeneration



Evidence in Literature

- [J Hand Surg Am.](#) 2007 Apr;32(4):459-65.
- **Osteoarthritis of the thumb carpometacarpal joint in women and occupational risk factors: a case-control study.**
- [Fontana L](#)¹, [Neel S](#), [Claise JM](#), [Ughetto S](#), [Catilina P](#).
- Results:
 - Occupational risk factors
 - Occupations involving repetitive thumb motion
 - Jobs perceived by the subject having not enough rest breaks
- Conclusion:
 - There is some evidence to support the role of certain occupational factors in the occurrence of CMC OA in women

Evidence in Literature

- **Occupational use of precision grip and forceful gripping, and arthrosis of finger joints: A literature review**

V. Jensen, H. Bøggild, J. P. Johansen

- *Occupational Medicine*, Volume 49, Issue 6, August 1999, Pages 383–388
- A systematic review of arthrosis of finger joints in relation to occupational exposure
- Arthrosis of the proximal interphalangeal joints and first carpo-metacarpal joints was not related to any specific occupational task

Evidence in Literature

- **Associations of work activities requiring pinch or hand grip or exposure to hand-arm vibration with finger and wrist osteoarthritis: a meta-analysis**
- *by [Hammer PEC](#), [Shiri R](#), [Kryger AI](#), [Kirkeskov L](#), [Bonde JP](#)*
- **Conclusion** Epidemiological studies provide limited evidence that pinch grip may increase the risk of wrist or finger OA, but causal relation cannot be resolved because of cross-sectional designs and inadequate characterization of biomechanical strain to the hand and wrist.

Clinical Perspective:

- Radiographs demonstrate evidence of small joint (CMC, IP) arthritis in patients routinely, symptomatic or not
- There appears to be no consistent correlation to work activities
- Injuries or overuse can make an otherwise asymptomatic, but with radiographically present changes, painful and symptomatic
- Causation is difficult to prove
- Aggravation of underlying condition is more appropriate
- Documentation and understanding of the legal process

Case Review: Thumb CMC

- 54-year-old rural carrier, filed an occupational disease claim alleging that the bone-to-bone condition of her left thumb was a result of her federal employment
- Very sharp, stinging pains, weakness, dropping mail at times
- Orthopaedic surgeon - diagnosed carpometacarpal arthritis, left thumb, chronic “and related to her work as a mail carrier”
- Attending physician’s form report - diagnosis was caused or aggravated by employment activity

Case Review: Thumb CMC

- Employer confirmed that worker did use her hands and thumbs as a letter carrier
- Employer provided a position description describing the duties and responsibilities of a rural carrier
- Worker was denied claim for compensation
- ***Discussion:***

Case Review: Legal Course

- Denial based on:
 - failure to establish the element of fact of injury
 - evidence did not support that the injury occurred as alleged
 - did not submit any medical evidence to establish that her diagnosed medical condition was causally related to the work injury or events the injury or events occurred as alleged

Case Review: Legal Course

- Appeal

- attributes her left thumb condition to the duties she performed as a rural carrier, in particular, using her left hand to hold mail
- no dispute that she performed such activities at work
- employing establishment confirmed that she did use her hands and thumbs as a letter carrier
- Board finds that appellant has met her burden to establish that she experienced a specific event, incident or exposure occurring at the time, place and in the manner alleged

Case Review: Legal Course

- Did the work activities cause or aggravate any diagnosed medical condition?
- Orthopedic surgeon found chronic left thumb carpometacarpal arthritis was “related to her work as a mail carrier”
- Attending physician form report indicated diagnosis was caused or aggravated by employment activity

Case Review: Legal Precedent Federal Claims

- Employee seeking benefits has the burden of proof to establish the essential elements of his or her claim
- Employee must submit sufficient evidence to establish that he or she experienced a specific event, incident or exposure occurring at the time, place and in the manner alleged
- He or she must also establish that such event, incident or exposure caused an injury

Case Review: Legal Precedent Federal Claims

- Medical evidence generally required to establish causal relationship is rationalized medical opinion evidence
- The opinion of the physician must be based on a complete factual and medical background of the claimant
- Must be one of reasonable medical certainty
- Must be supported by medical rationale explaining the nature of the relationship between the diagnosed condition and the established incident or factor of employment

Case Review: Federal Appeals Board Analysis

- Surgeon did not provide medical rationale to support opinion
- Any opinion on causal relationship must be supported by medical rationale explaining the nature of the relationship between the diagnosed condition and the established incident or factor of employment
- Surgeon did not discuss from an orthopedic perspective how holding mail in the left hand, or any other employment activity, caused or aggravated the diagnosed arthritis, or on what basis he could make such a determination

Case Review: Conclusion

- Board found that appellant has not met her burden to establish that she sustained an occupational disease in the performance of duty
- The medical opinion evidence, although supportive, is insufficiently rationalized to establish the element of causal relationship

Post-Traumatic Arthritis

- Develops after acute direct injury to the joints
- History of physical trauma
- Results in immediate or long term late symptoms of arthritis
 - Swelling
 - Joint effusion
 - Acute and chronic pain
- Differs from osteoarthritis:
 - Isolated joint arthrosis resulting from defined injury
 - Occurs specifically to injured joint before onset of typical arthritis

Post-Traumatic Arthritis

- Causes:
 - Fractures
 - Dislocations
 - Articular contusion and injury
 - Poorly treated fracture/joint injury
 - Joint penetrating injury
 - Infection
- Key is the ability to relate a specific traumatic event to the early and unusual development of arthritis in a specific joint

Repetitive Strain and Arthritis

- Concept of occupational related arthritis has been studied extensively
- Mixed conclusions
- Some job demands do appear to result in arthritis localized to a particular joint
- Cotton and industrial workers are more likely to develop arthritis in their hands than are control groups without similar repetitive occupational demands
- Environmental variables are unique to each occupation and avocational activity, making their risk difficult to stratify

Conclusions:

- From clinical perspective – it is important to document the work activities and relate it to the injury being alleged
- Limited scientific evidence to provide clear causality for OA and work activities
- Lack of scientific consensus on causation makes the process inconsistent and results in other factors determining the course of the work claim
- Understanding of the legal process in compensation claims