

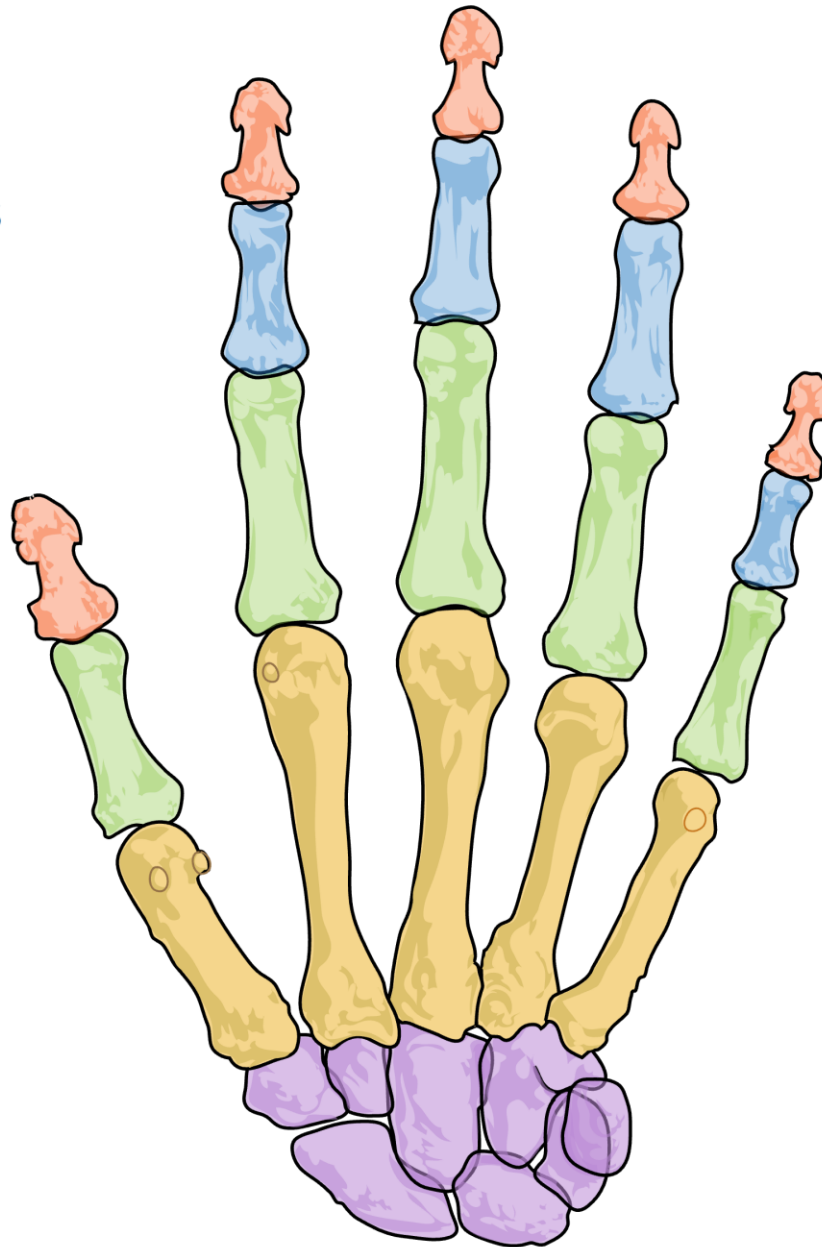
HAND DISORDERS

Done by momen alabbadi

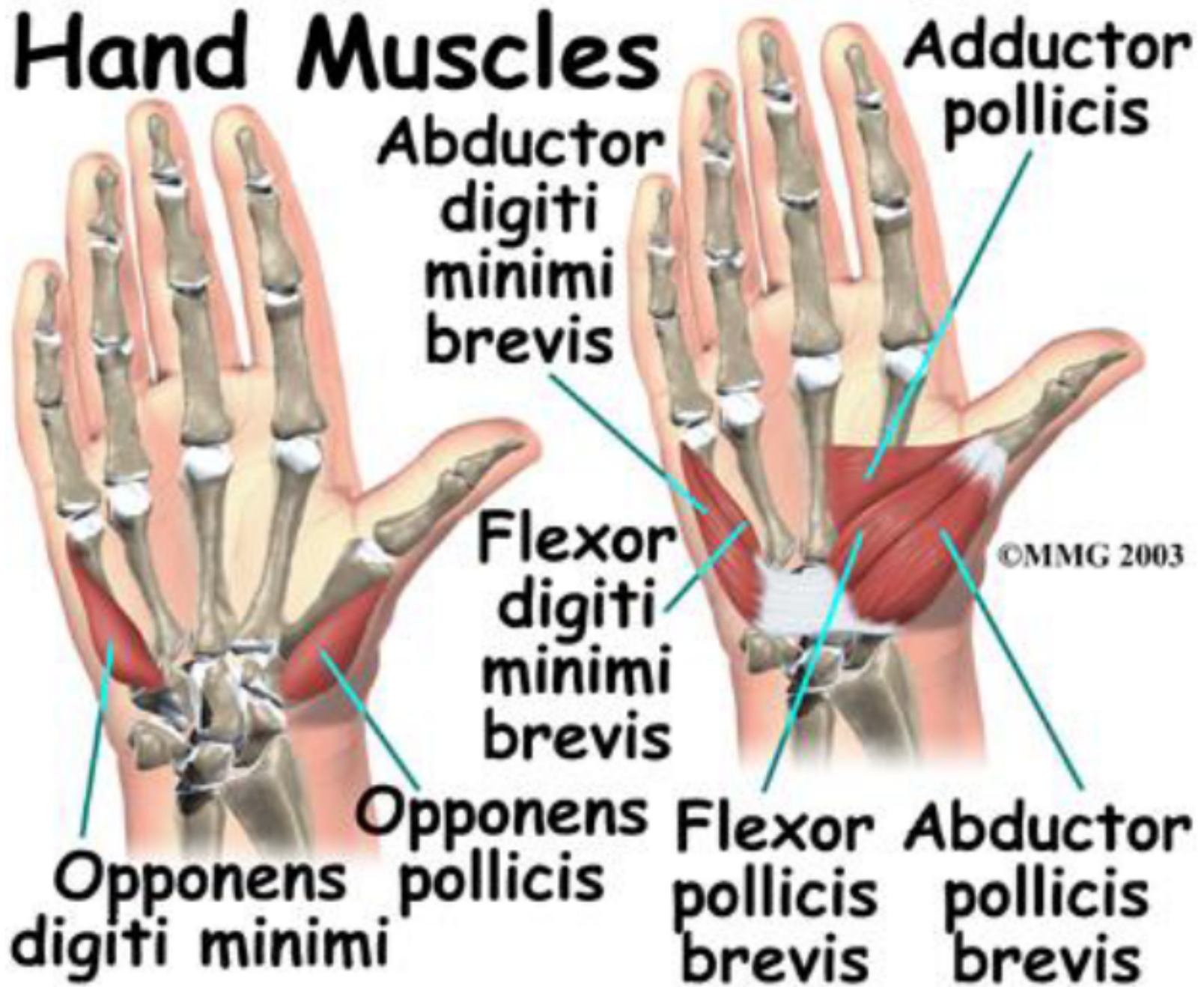
Outline

- ❑ Anatomy of the hand
- ❑ Congenital variations
- ❑ Acquired deformities
- ❑ Rheumatoid arthritis
- ❑ Osteoarthritis

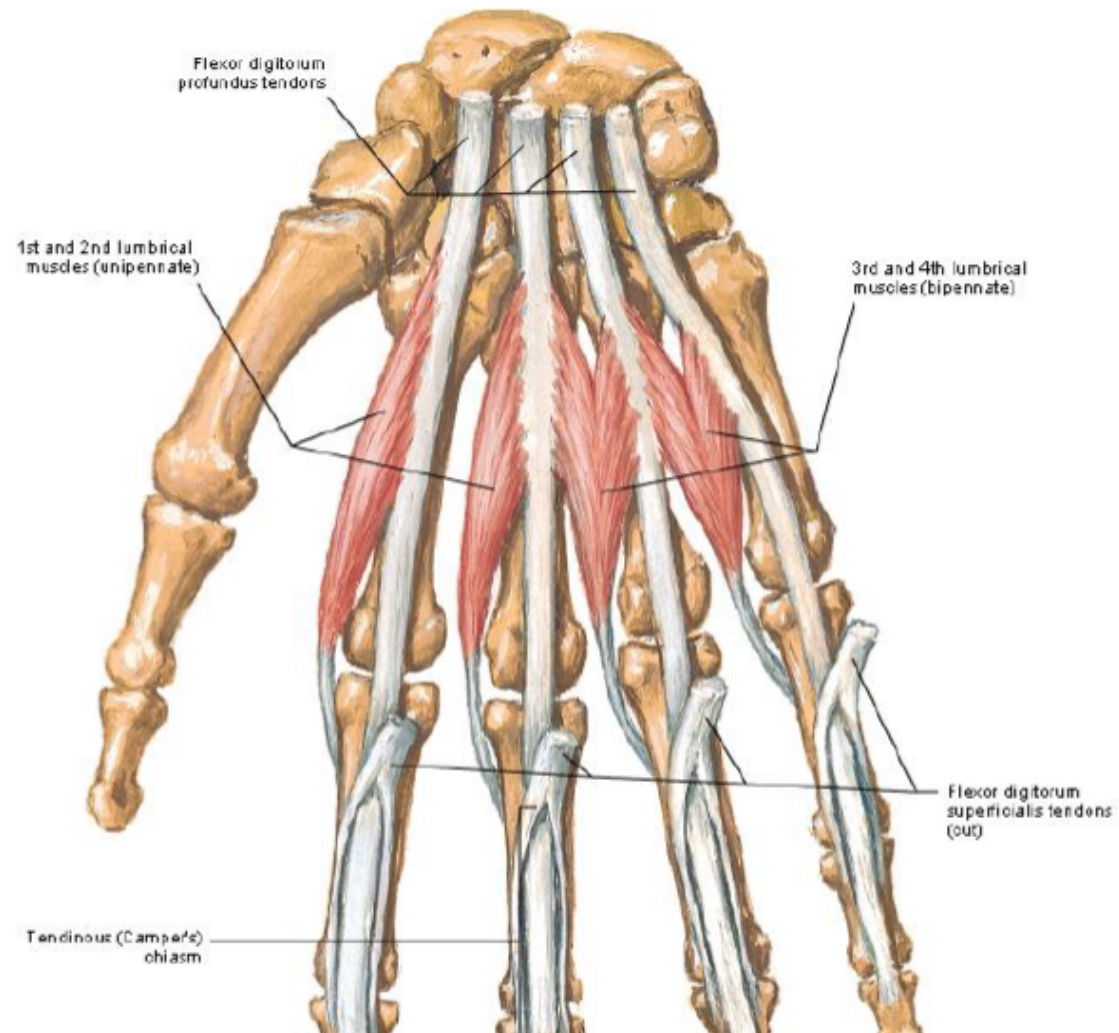
- Distal phalanges
- Intermediate phalanges
- Proximal phalanges
- Metacarpals
- Carpals



Hand Muscles



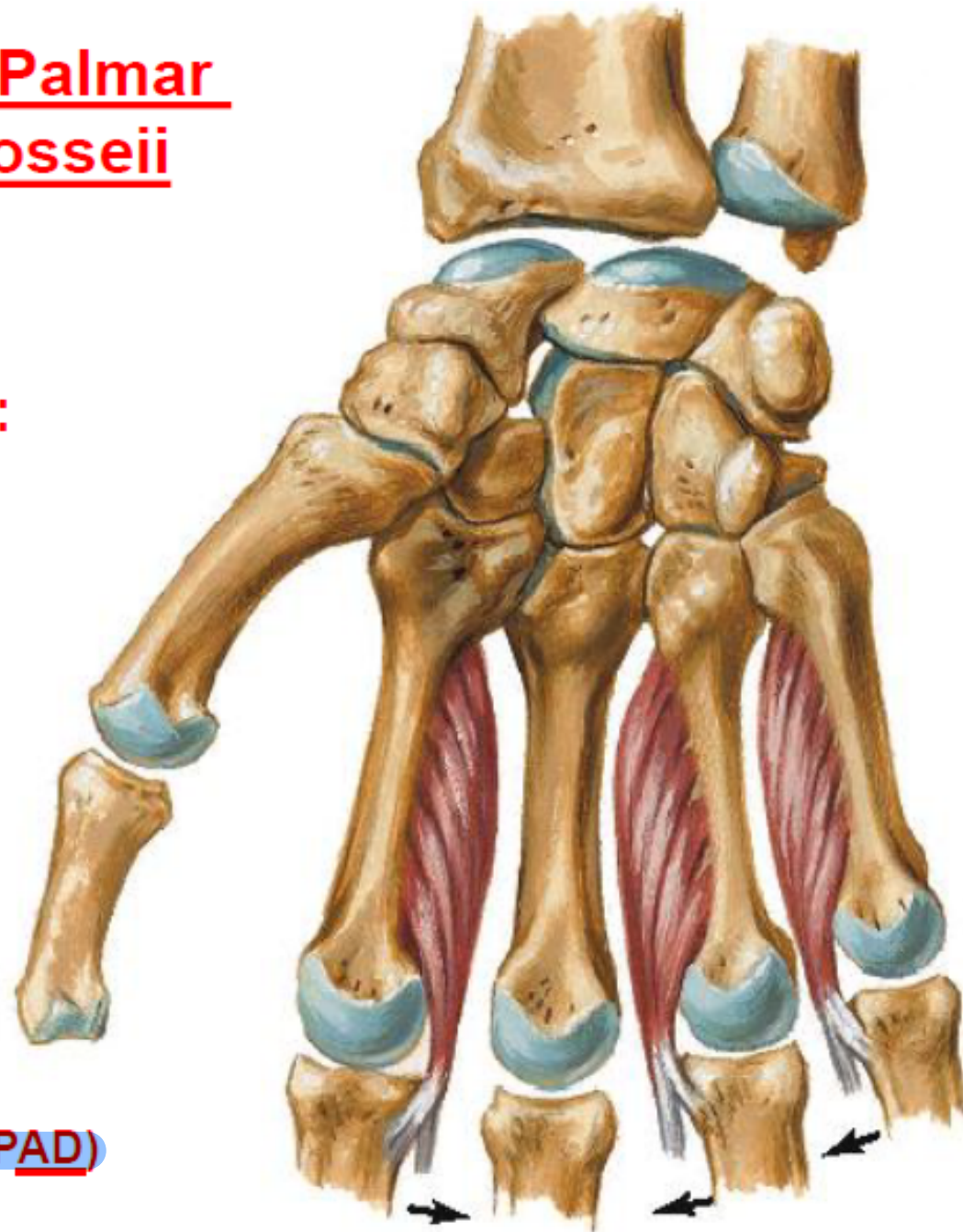
Lumbrical Is



**3 or 4 Palmar
interossei**

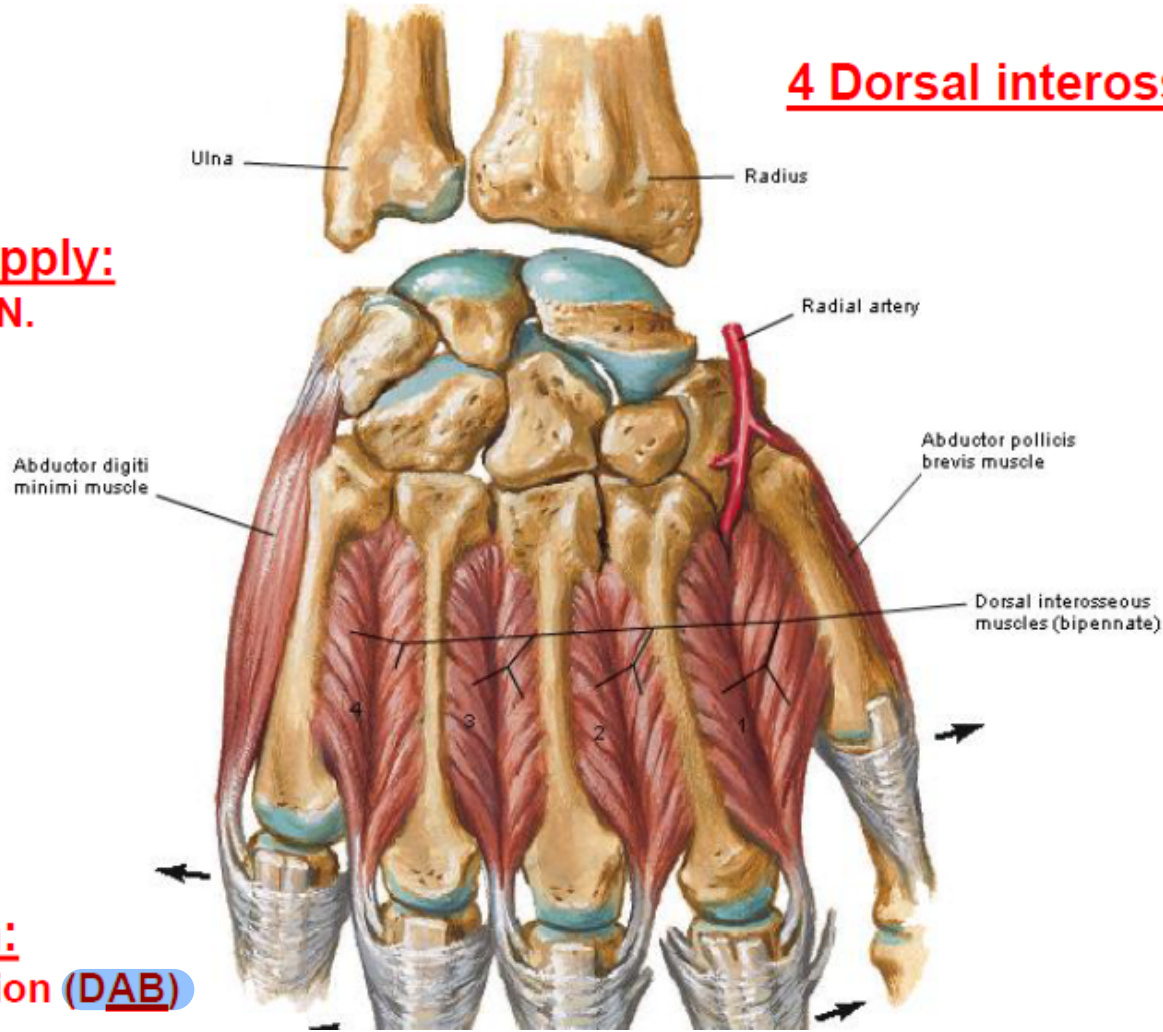
N. supply:
Ulnar N.

Action:
Adduction (PAD)



4 Dorsal interossei

N. supply:
Ulnar N.



Action:
Abduction (DAB)

CONGENITAL HAND ANOMALIES

- ❓ The incidence of congenital upper limb abnormalities is estimated to be about 1 in 600 live births.
- ❓ Some are confined to the hand but in most cases the wrist and forearm are involved as well.

(1) Failure of formation

- total or partial absence of parts.

a) Transverse (congenital amputations)

b) Axial (missing rays)



(a) Transverse Failure



(b) radial club hand and absent

b) RADIAL DYSPLASIA/ radial club hand

- ? A longitudinal deficiency of the radius and usually the thumb
- ? Associated with VACTERL and Fanconi Syndrome

VACTERL stands for vertebral defects, anal atresia, cardiac defects, tracheo-esophageal fistula, renal anomalies, and limb abnormalities

? Treatment:

A) Type 1 and 2 : conservative (Splinting and stretching)

B) if type 3 and 4 :

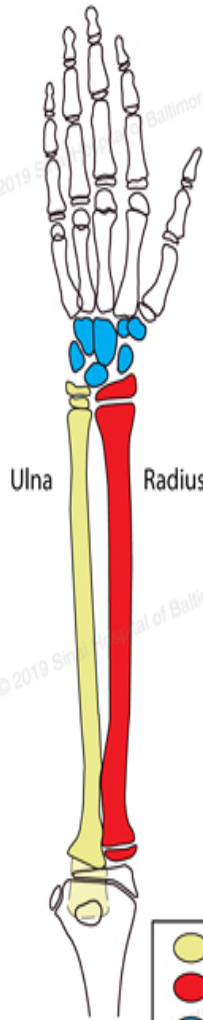
-Hand centralization

-Radialization

-Vascularized metatarsophalangeal (MTP)-joint transfer



Normal Bone Anatomy in a 9-Year-Old

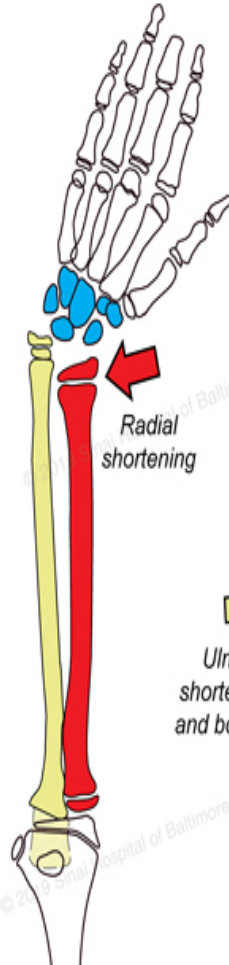


- Ulna
- Radius
- Carpus

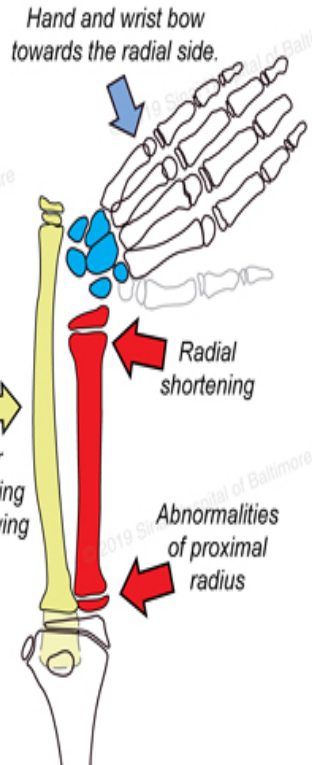
Heikel Classification of Radial Dysplasia

*5 stages
normal → Absent*

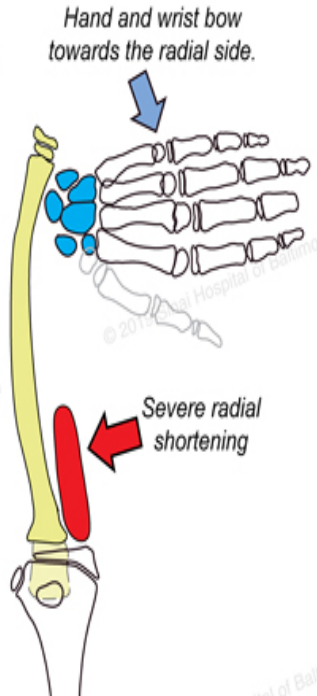
Type I: Mild Hypoplasia
Mild shortening of the distal (far end) of the radius.



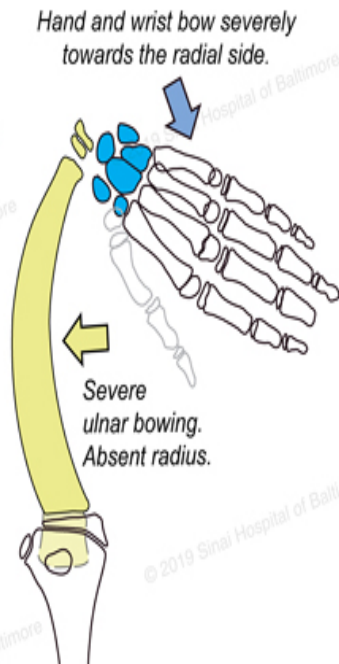
Type II: Hypoplasia
More severe shortening of radius. May have absent thumb, ulna shortening and bowing.



Type III: Severe Dysplasia
Severe shortening of radius. May have absent thumb, hand and wrist bowing towards the radial side.



Type IV: Absent Radius
Complete absence of radius. May have absent thumb. Ulna, hand and wrist severely bow towards the radial side.



(2) Failure of differentiation

- *fingers may be partly or wholly joined together (syndactyly).*
- corrected by separating the fingers and repairing the defects with skin grafts.



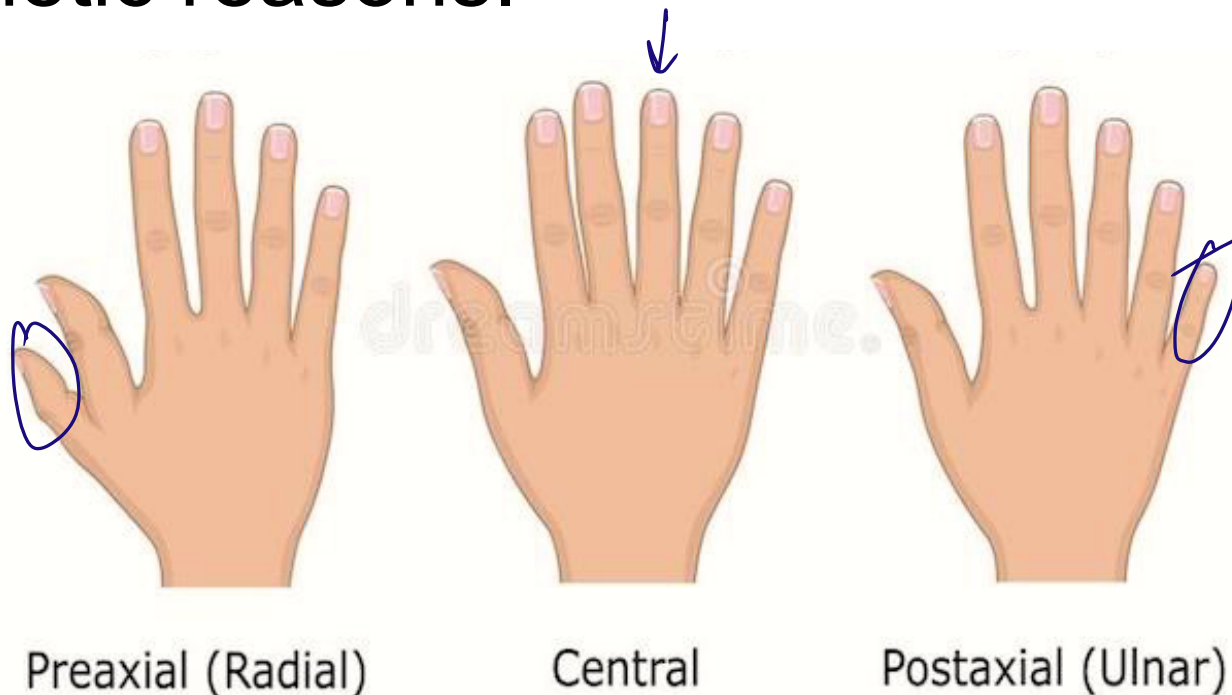
Complete syndactyly



Incomplete syndactyly

(3) Duplication

- ? polydactyly (extra digits) is the most common hand malformation.
- ? The extra finger usually amputated, for cosmetic reasons.



(4) Under-growth and Over-growth:

- the thumb can be very small or even absent.
- a giant finger is unsightly, but attempts at operative reduction are fraught with complications.

(5) Constriction bands

- *the* appearance of an elastic band constricting the finger.
- may lead to amputation

* I saw a case on
it → infant, constriction
below knee



(6) Generalized malformations

 *the hand may be* involved in generalized disorders such as ;

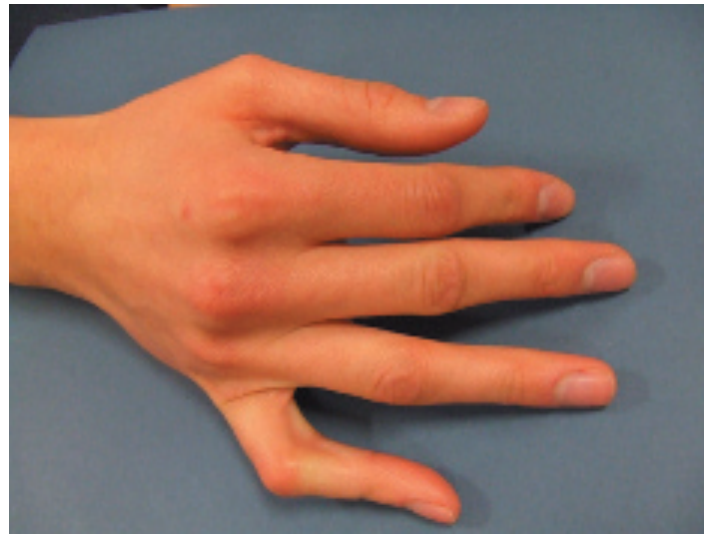
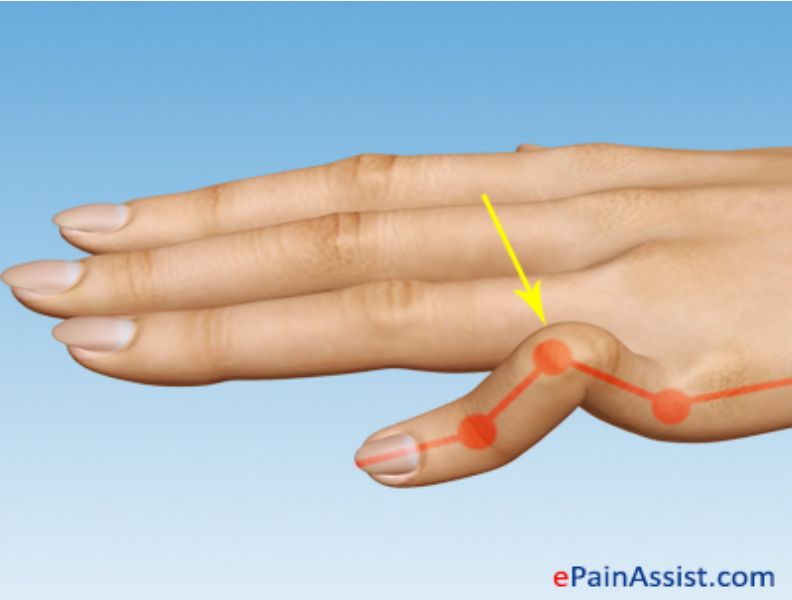
- Marfan's syndrome (spider hands)
- achondroplasia (trident hand)



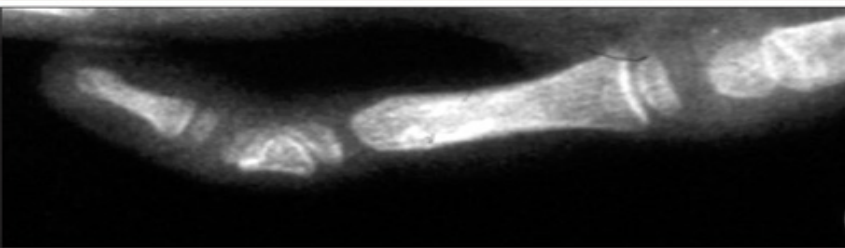
Marfan's syndrome (spider hands)



achondroplasia (trident hand)



Camptodactyly



Clinodactyly



Acquired deformities

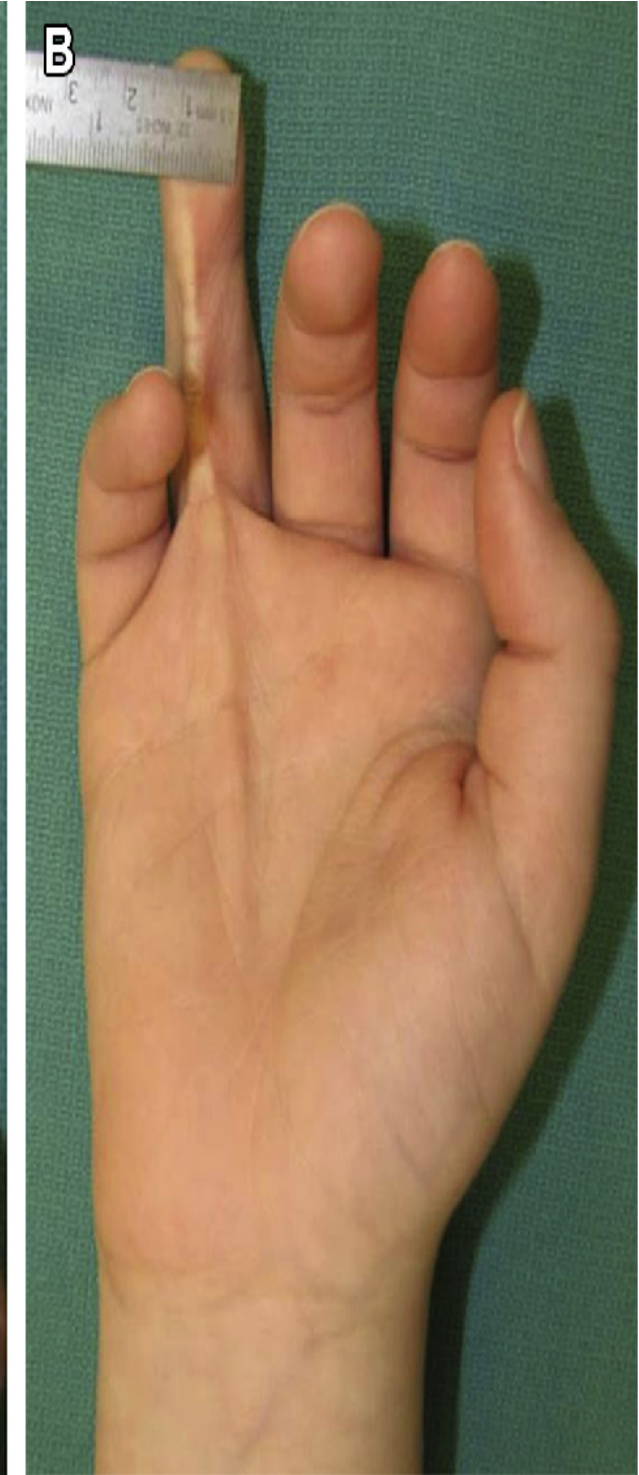
(1)Skin contracture

? Cause :

- 1)healing with contracture due to cuts and burns of the palmer skin
- 2) Surgical incisions crossing flexor creases (*Surgical incisions should never cross skin creases perpendicularly; they should lie more or less parallel or oblique to them*)

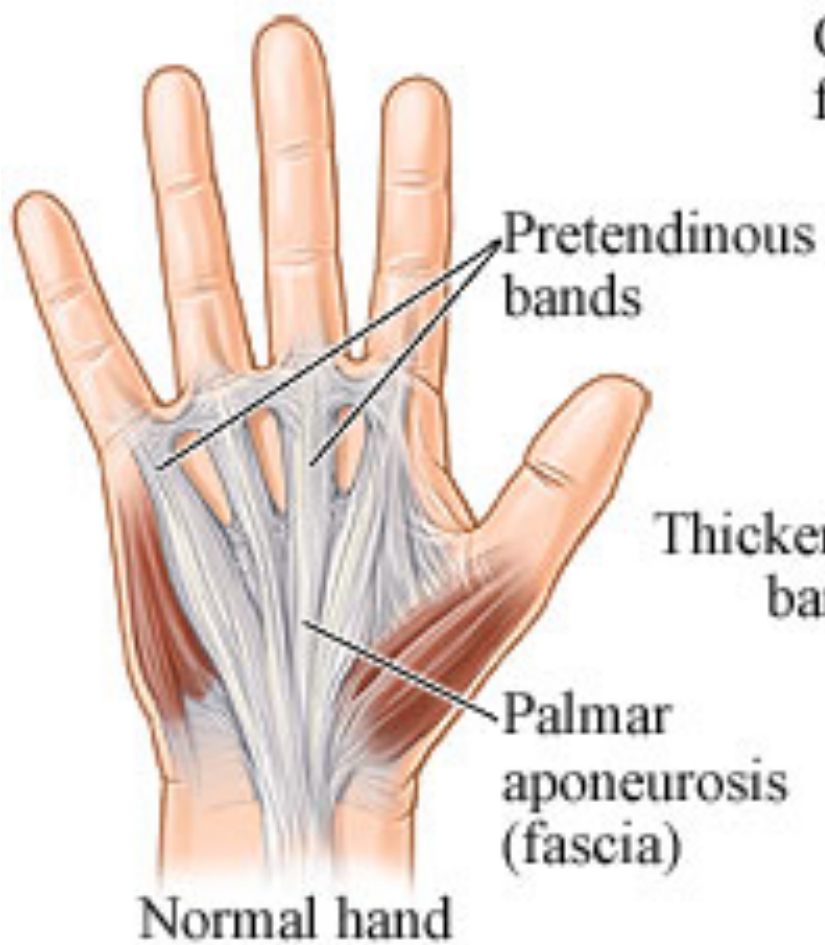
? **Result** : puckering of the palm or fixed flexion of the fingers.

? **Management** : excision of the scar and Z-plasty of the overlying skin (a zigzag incision with the middle part of the Z in the skin crease)



(2) Dupuytren's contracture

- is a nodular hypertrophy and contracture of the superficial palmar fascia (palmar aponeurosis).
- Familial
- There is a high incidence in epileptics receiving phenytoin therapy; associations with diabetes, epilepsy, smoking, alcoholic cirrhosis, AIDS and pulmonary tuberculosis have also been described.



Dupuytren's contracture

-Clinical features:

- ❑ usually a *middle-aged man*
- ❑ nodular thickening in the palm.
- ❑ progresses distally to involve the ring or little finger.
- ❑ Pain is unusual.
- ❑ *both hands are involved*, one more than the other.
- ❑ may produce flexion deformities at the MCP and

DIP joints



Nodules and pitting may appear in the hand



Rope-like cord forms in the palm



Fingers bend toward the palm

Management

- ❑ If the deformity is static and there is no loss of function❑ *no treatment is needed.*
- ❑ If the condition is marked❑ operative treatment.
- ❑ satisfactory outcome is more predictable at the MCP joint than the PIP joint, there is a risk of recurrence or extension.
- ❑ Following operative correction the hand is splinted for a few days and then active movement is encouraged, but night splinting for a few months may reduce recurrence.
- ❑ *An alternative to surgery* is the injection of a drug, **collagenase**, to dissolve the cord.

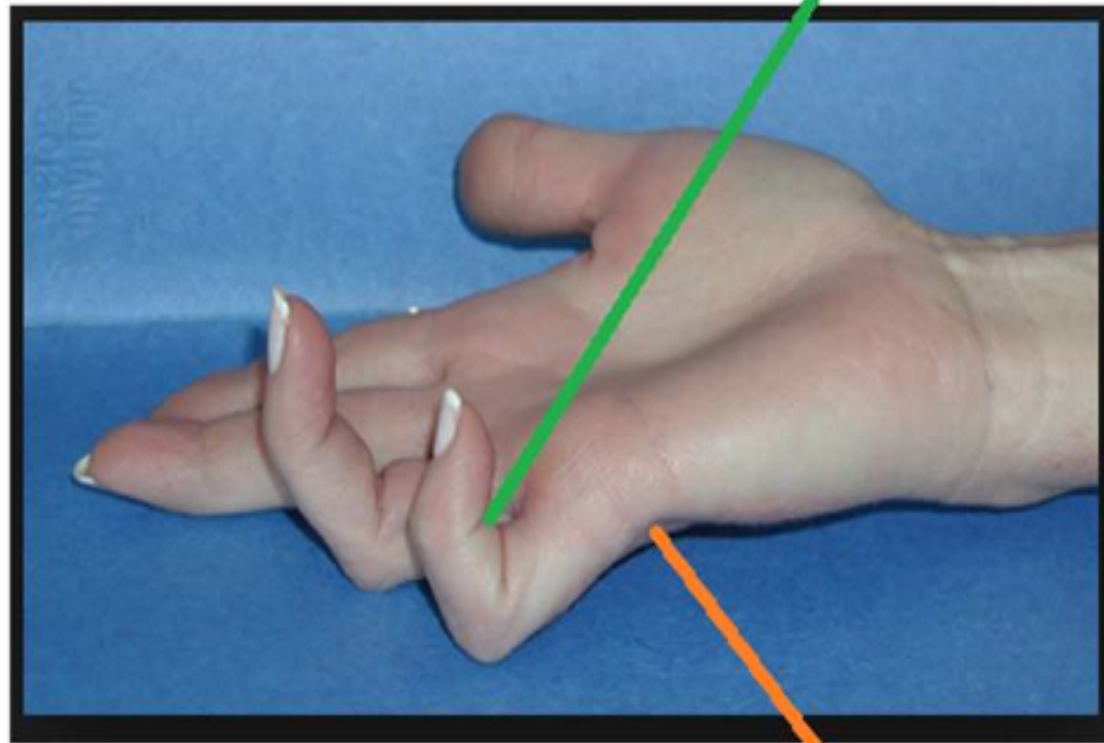
(3) Neuromuscular disorders

-(A) Ulnar 'claw-hand' aka "intrinsic-minus deformity"

- ❓ *Cause* : Ulnar nerve lesions causing paralysis of the intrinsic muscles (normally activate MCP flexion and IP extension)
- ❓ *causes hyperextension* at the MCP joints and *flexion* at the IP joints.

Ulnar Claw Hand (Paralysed lumbricals for ring & little fingers)

Interphalangeal flexion (unopposed flexor digitorum muscles)

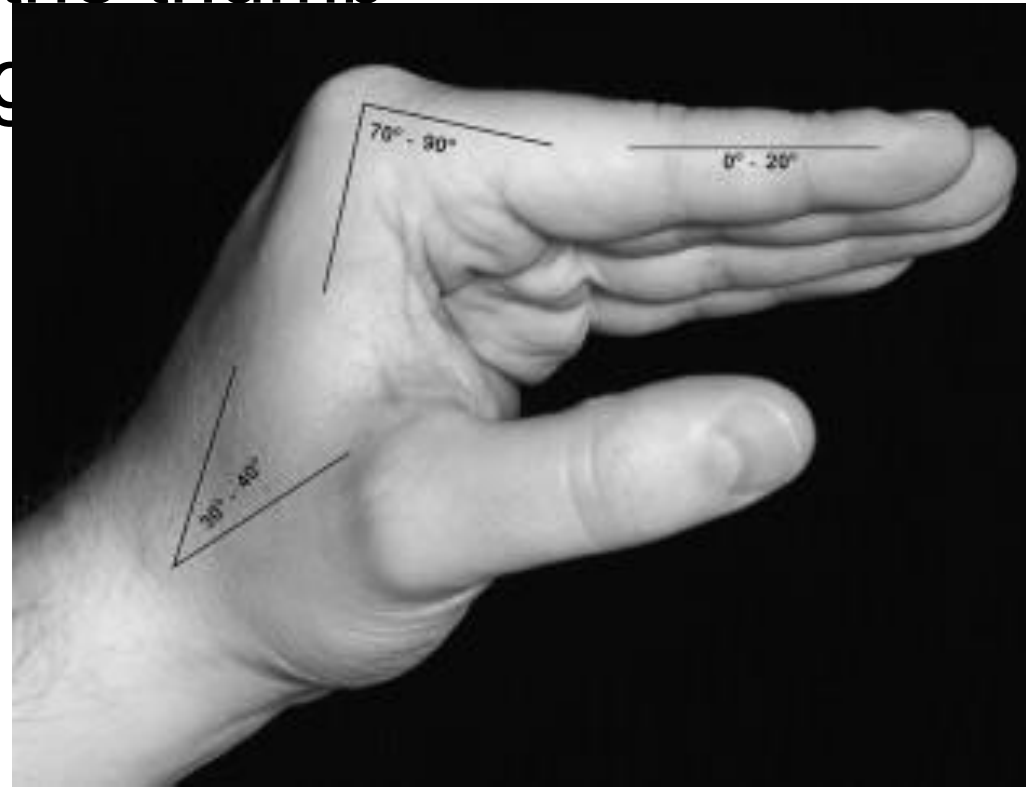


Hyperextension at metacarpophalangeal joint (unopposed extensor digitorum muscles)

(b) Shortening of intrinsic muscles (intrinsic-plus deformity)

? flexion at the MCP joints with extension of the IP joints and adduction of the thumb

Cause : muscle scarring or infection.



(c) Ischemic contracture of the forearm muscles (VOLKMANN'S ISCHAEMIC CONTRACTURE)

- ❓ **Cause** : Due circulatory insufficiency at or below the elbow
- ❓ There is shortening of the long flexors and causes the fingers to be held in flexion.
- ❓ **Management** : If disability is marked, some improvement may be obtained by lengthening the shortened tendons, or by excising the fibrosed muscles and restoring finger movement with tendon transfers



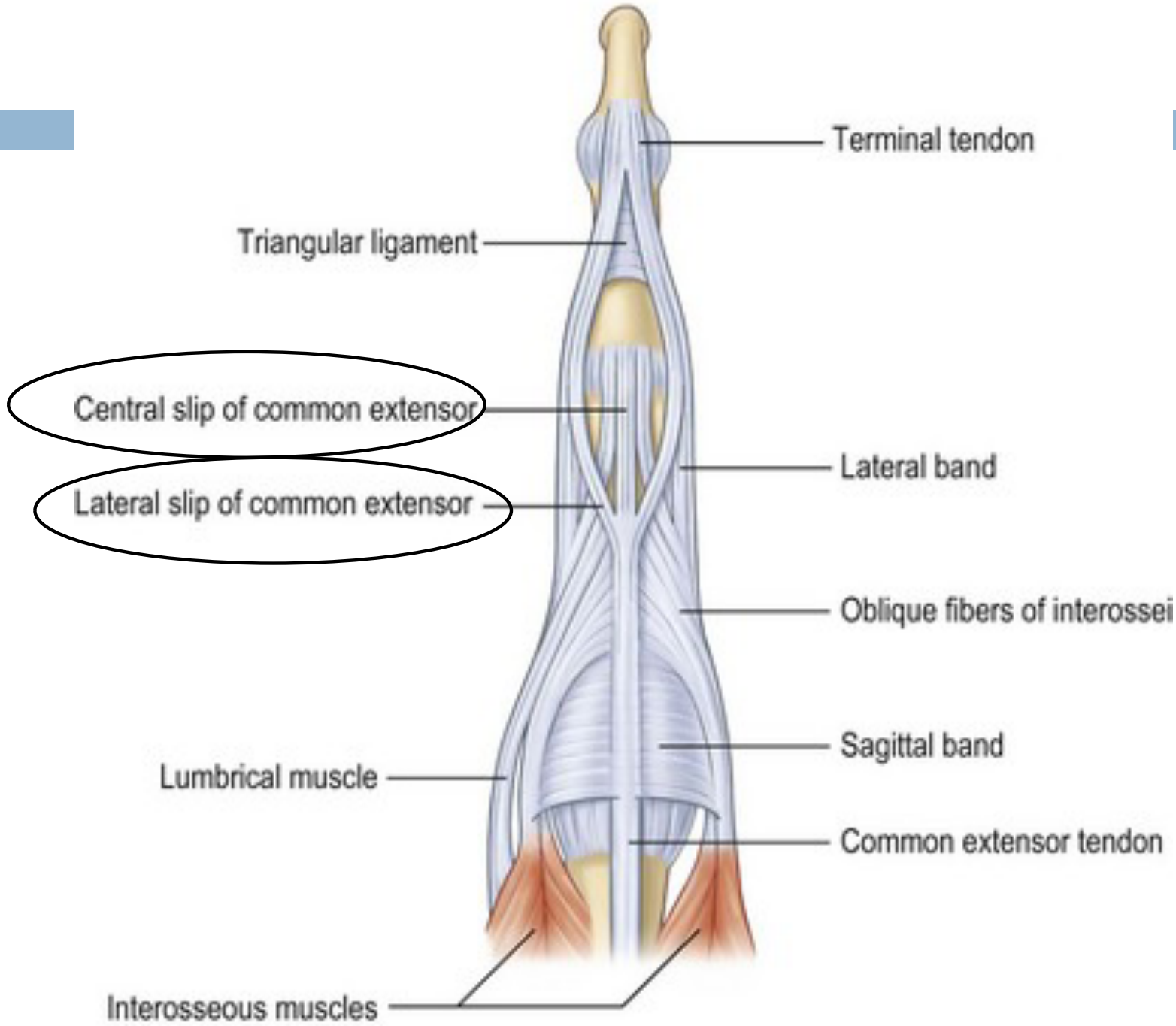
(4) Tendon Lesions

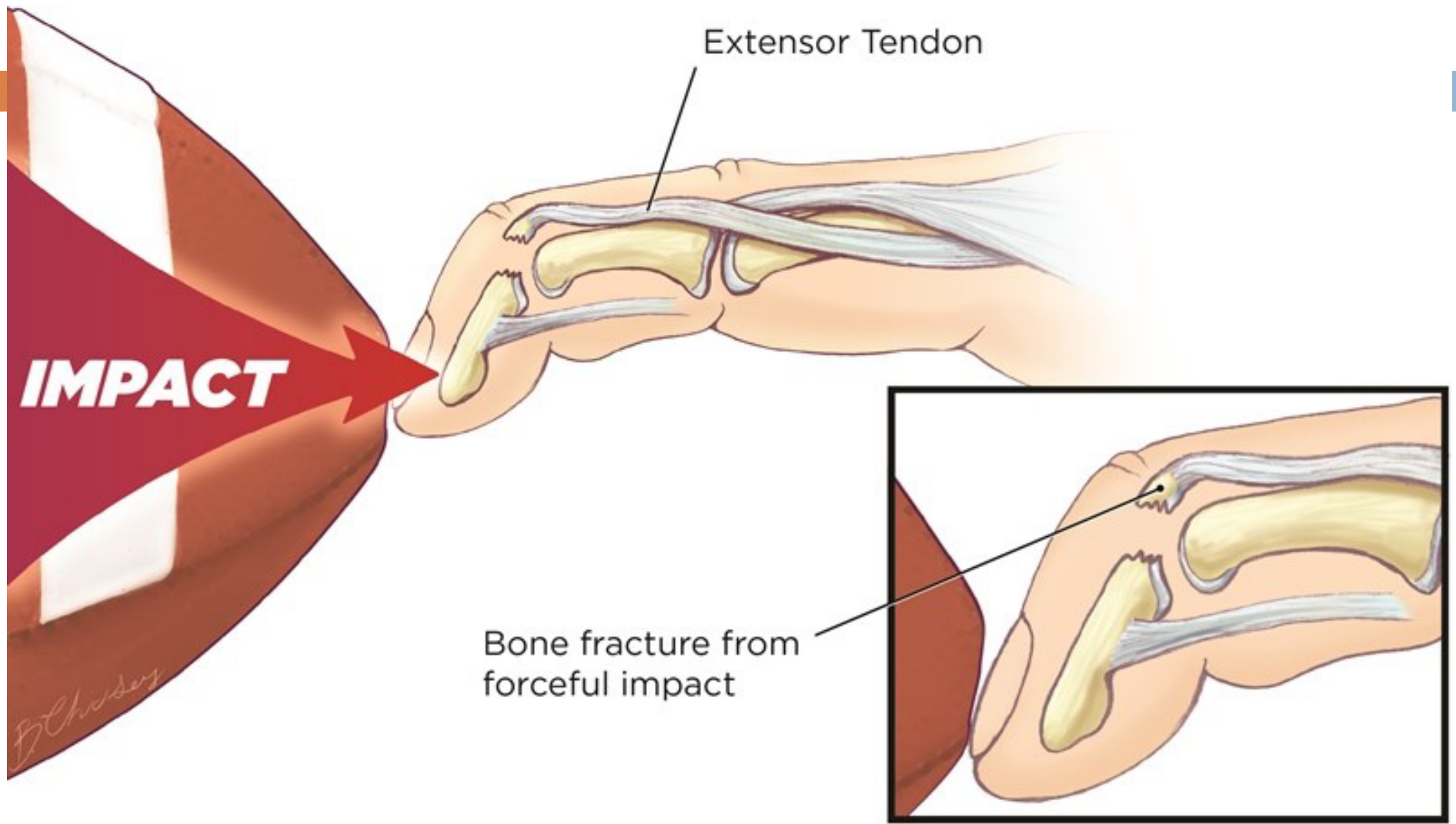
(A)- 'Mallet' finger

- ? **Cause** : injury at the attachment of the extensor tendon to the terminal phalanx.
- ? The patient cannot straighten the terminal joint, but passive movement is normal.
- ? **Management** : mallet finger without bone injury is treated with a **plastic splint** with the DIP joint in extension for **8 weeks**, followed by **4 weeks** of **night splintage**.

Mallet Finger Splint







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? ***(B) Dropped fingers***

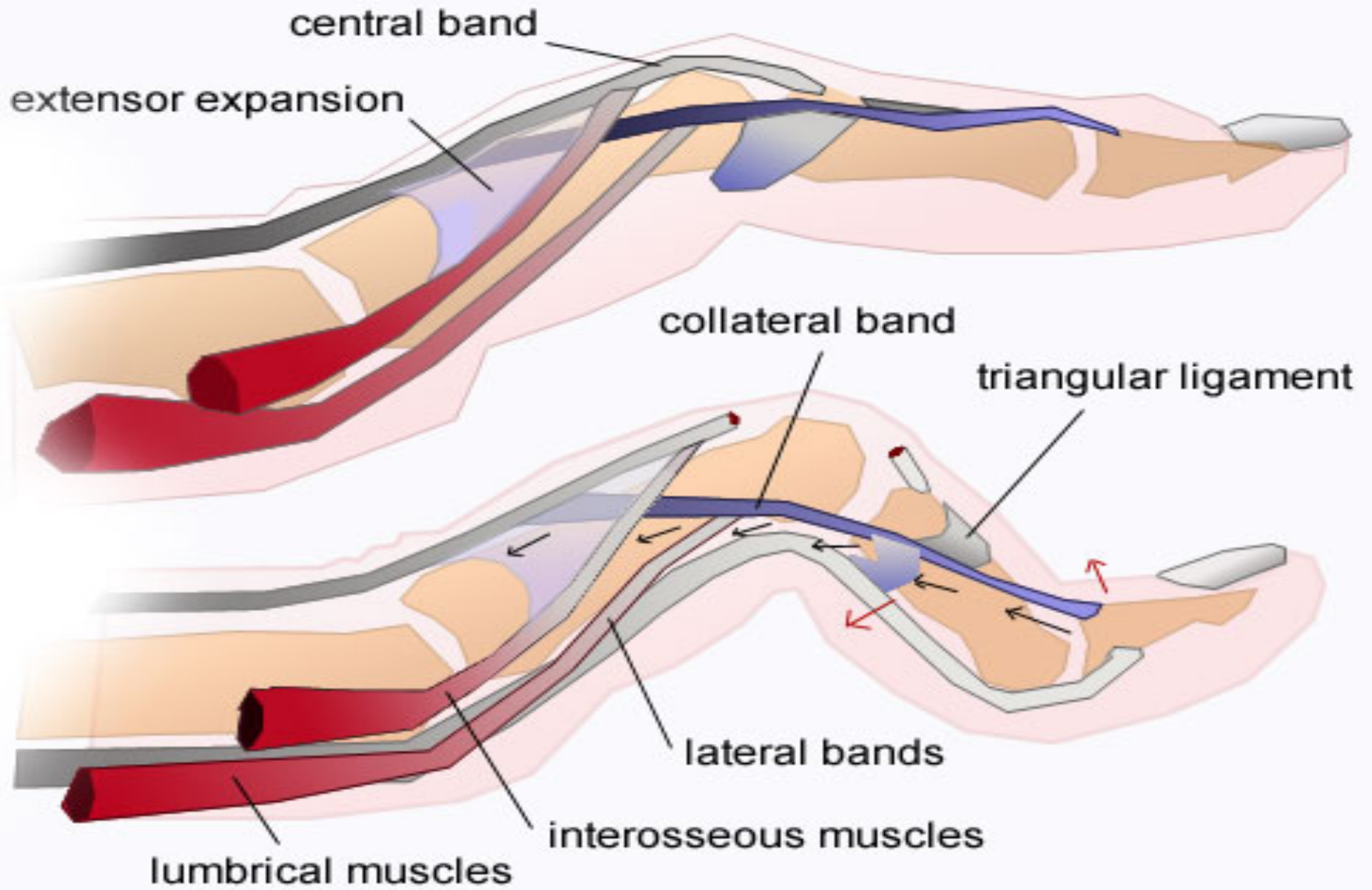
? Sudden loss of finger extension at the MCP joint.

? It is usually due to **tendon rupture** at the wrist (e.g. in rheumatoid arthritis).

? If direct repair is not possible, the distal portion of the tendon can be attached to an adjacent finger extensor.

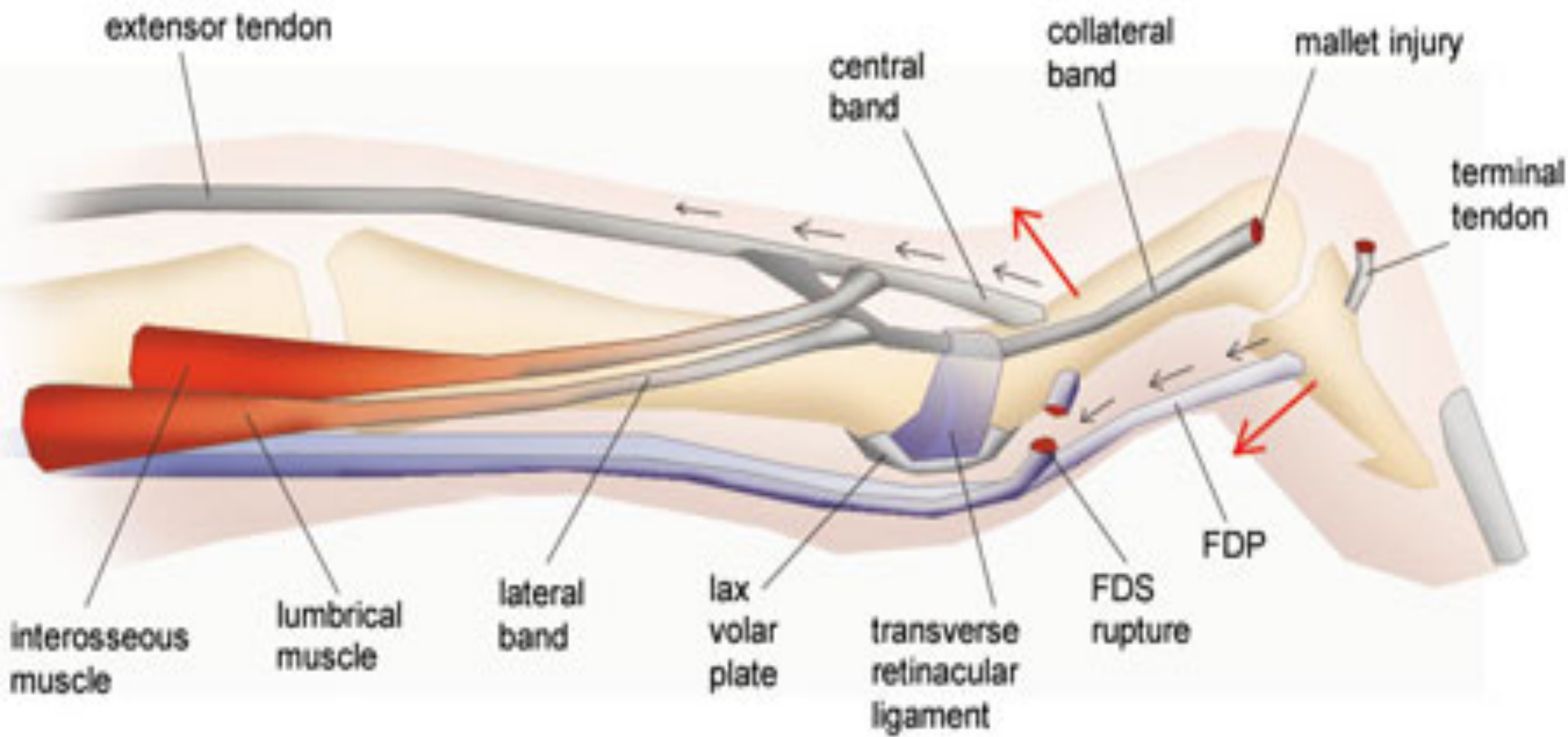
(c) Boutonnière :

- ❑ Extensor tendon injuries characterized by PIP flexion and DIP extension
- ❑ **Cause** : interruption of the central slip of the extensor tendon. The lateral slips separate and the head of the proximal phalanx pops through the gap **like a finger through a buttonhole**.
- ❑ seen after trauma or in RA
- ❑ **Management**: Post-traumatic rupture can sometimes be repaired, **splinting** the PIP joint in full extension for **6 weeks** usually leads to healing.
- ❑ Longstanding fixed deformities are extremely difficult to



(d) Swan-neck deformity:

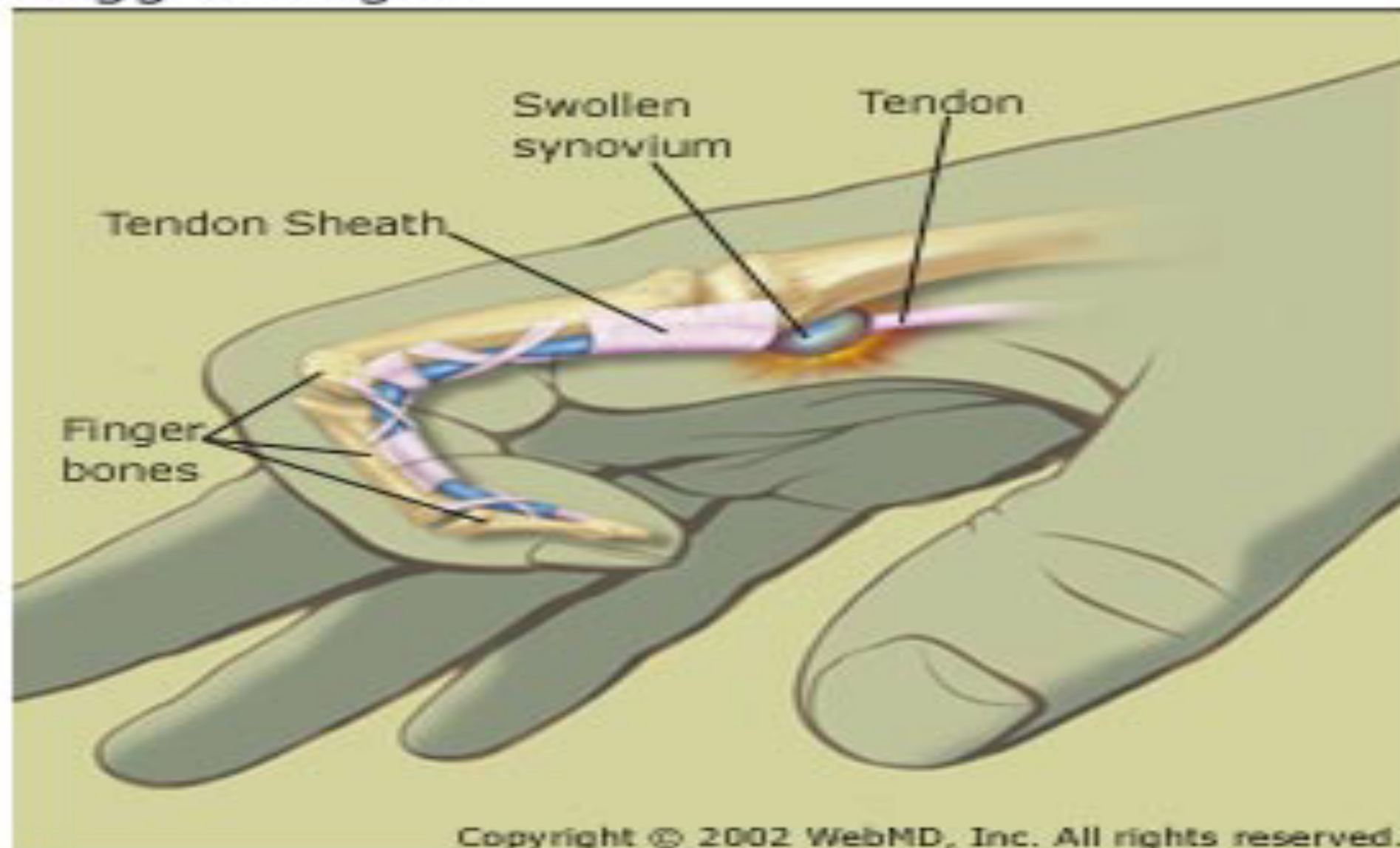
- ? the reverse of boutonnière.
- ? the PIP joint is hyperextended and the DIP joint flexed.
- ? **Cause** : imbalance of extensor versus flexor action in the finger
- ? seen in rheumatoid arthritis.
- ? **Management** : The deformity may be corrected by tendon rebalancing.



(E) Trigger finger :

- ? A common condition presents as an intermittent 'deformity', of the *ring* or *middle* finger, sometimes of the thumb.
- ? when the hand is clenched and then opened, the finger (or thumb) gets stuck in flexion; with a little more effort, it suddenly snaps into full extension.
- ? **cause** : ***thickening of the fibrous tendon sheath***: the flexor tendon becomes temporarily trapped at the entrance to its sheath and then, on forced extension, it passes the constriction with a snap.
A similar entrapment may occur due to a bulky ***tenosynovitis*** (e.g. in rheumatic disorders).

Trigger Finger



Treatment

- ? The condition often improves spontaneously.
- ? if it persists, or is particularly annoying, it can usually be cured by **an injection of corticosteroid** at the entrance of the tendon sheath.
- ? Refractory cases **need operation: the fibrous sheath is incised**, allowing the tendon to move freely.
- ? For children treatment (as above) can be deferred

until the child is 3 years old, as spontaneous

Bone lesions

- ❓ Malunited fractures may cause metacarpal or phalangeal deformity.
- ❓ corrected by osteotomy and internal fixation.

Rheumatoid arthritis

- ? The hand, more than any other part of the body, is where rheumatoid arthritis displays its story.
- ? Early Stage : synovitis of the proximal joints and tendon sheaths
- ? Then , joint and tendon erosions
- ? Final stage: joint instability and tendon rupture
 - ? cause progressive deformity and loss of function.

Clinical features

- ❑ Pain and stiffness of the fingers are early symptoms.
- ❑ Examination :swelling of the MCP and PIP joints; both hands are affected, more or less symmetrically.
- ❑ Joint mobility and grip strength are diminished.
- ❑ In the late stage ,
 - 1) ulnar deviation of the fingers
 - 2)subluxation of the MCP joints
 - 3)swan-neck or boutonnière deformities.When these abnormalities become fixed, functional

Rheumatoid arthritis (late stage)

Boutonniere
deformity
of thumb

Ulnar deviation of
metacarpophalangeal
joints

Swan-neck deformity
of fingers





treatment

treatment is directed at controlling the systemic disease and the local synovitis.

- ❑ Persistent synovitis may benefit from local injections of **methylprednisolone**, but sometimes **surgical synovectomy** is needed.
- ❑ As the disease progresses,
- ❑ Uncontrolled synovitis ❑ synovectomy followed by physiotherapy.
- ❑ Isolated tendon ruptures ❑ appropriate tendon transfers.
- ❑ Joint instability ❑ stabilization or arthroplasty.
- ❑ In late cases with established deformities, reconstructive surgery

Osteoarthritis

- ? very common in the DIP joints in a postmenopausal women
- ? a manifestation of polyarticular osteoarthritis.
- ? It often starts with pain in one or two fingers; the distal joints become swollen and tender then spread to all the fingers of both hands.
- ? Examination:
 - **Heberden's nodes** : bony thickening around the DIP joints
 - restriction of movement.**
 - Not infrequently, some of the PIP joints are

- ❓ RA vs. OA
- ❓ In both conditions, the finger joints are swollen and stiff.
- ❓ In RA affects the proximal joints (particularly the MCP joints)
- ❓ osteoarthritis affects mainly the terminal DIP joints.



Done