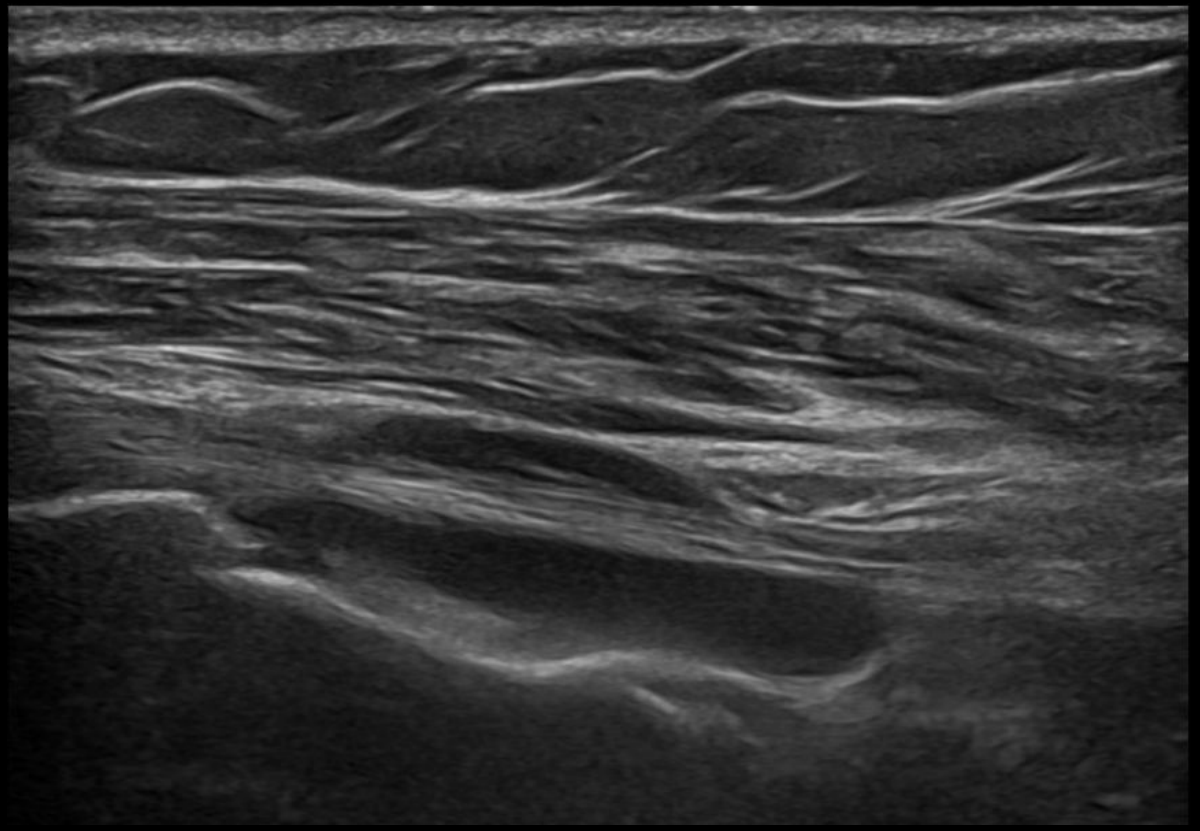
Differential diagnoses of dorsal forearm and hand pain: anatomy, imaging, and clinical insights



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Why dorsal forearm and hand?

Prevalence

- Forearm, hand and wrist pain affects 10-25% of adults at any given time.
- Athletes and manual workers report high incidence, especially in repetitive-motion tasks and upper limb-intensive sports.

Demographics

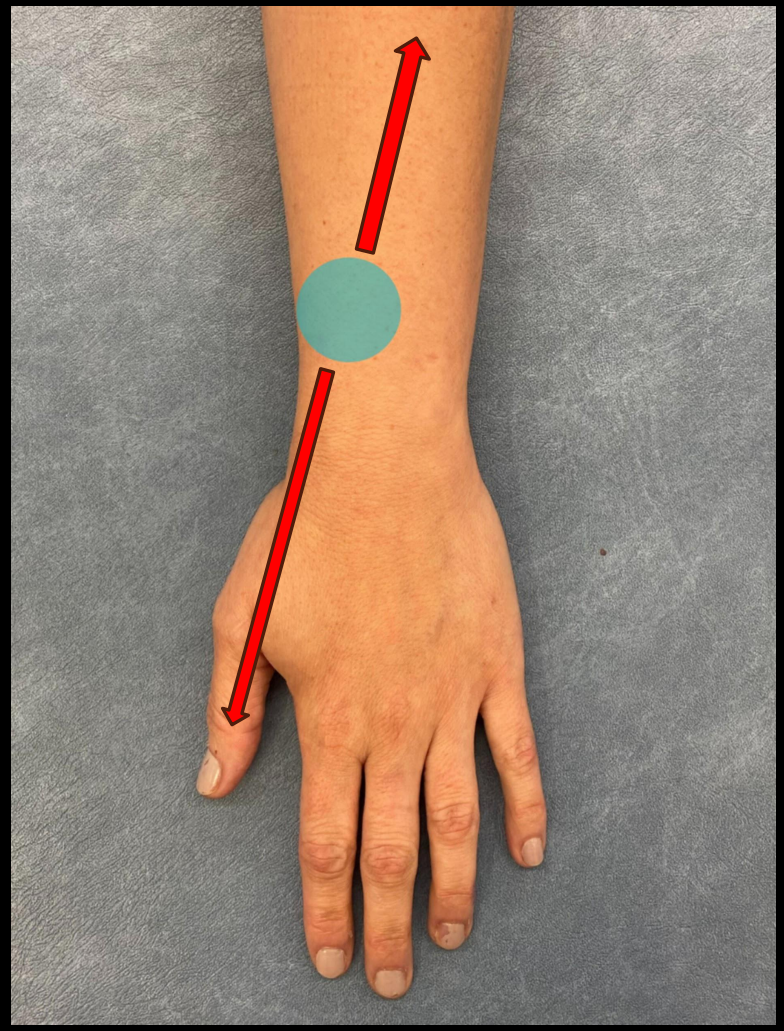
- Women report higher incidence.
- Middle-aged adults (40–60 years) are at highest risk, particularly in repetitive hand-intensive jobs.
- Dominant hand is more frequently affected across all studies.

Palmer, 2003; Keir et al., 2021; Dutton et al., 2024

Case report – patient presentation

- Female patient (34yo), nursery practitioner, with gradual-onset dorsal forearm and hand pain over several days.
- Pain was exacerbated by occupational activity, especially repetitive overhead lifting of a 4–5 kg basket from a high shelf.
- Discomfort intensified after physically demanding shifts, particularly at night, and eased by morning or over weekends.
- Did not engage in sports but performed repetitive household tasks (e.g., lifting and carrying).
- Ice application offered only temporary relief.

Mild dull ache extending proximal and distal from the main site of pain.

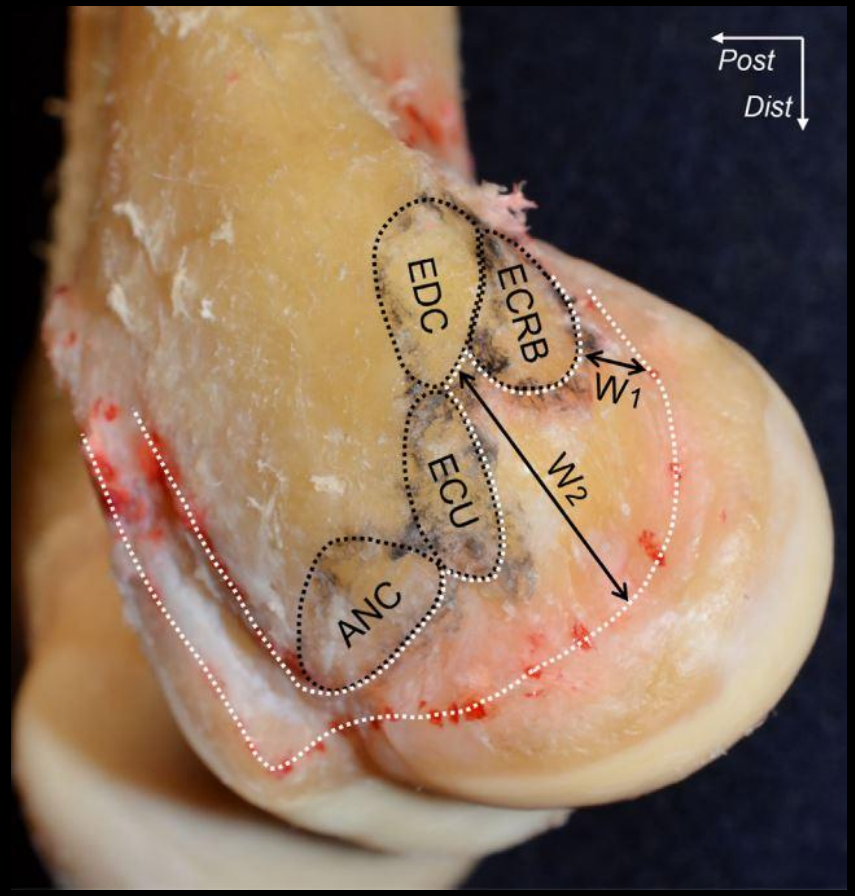


Keep the case in mind - where does your mind go anatomically?

Tendons – Lateral epicondylitis

- The extensor carpi radialis brevis (ECRB) has been the most subject to the etiology of lateral epicondylitis
- Lateral collateral ligamentous complex (LCLC) may also be involved.
- ...symptoms may also present as a dull, aching pain that radiates distally along the forearm.

A narrow origin = higher load per unit area.



Nimura et al., 2024

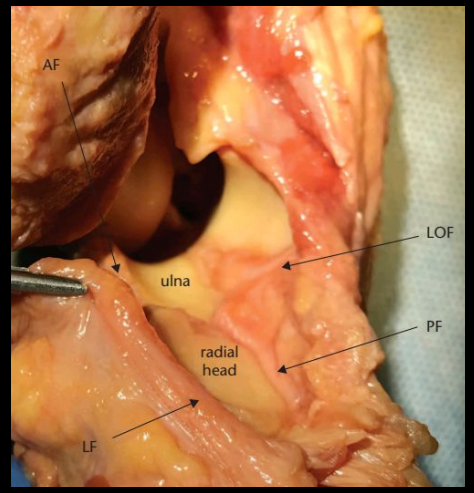
Elbow joint – Radiohumeral synovial plica (RHSP)

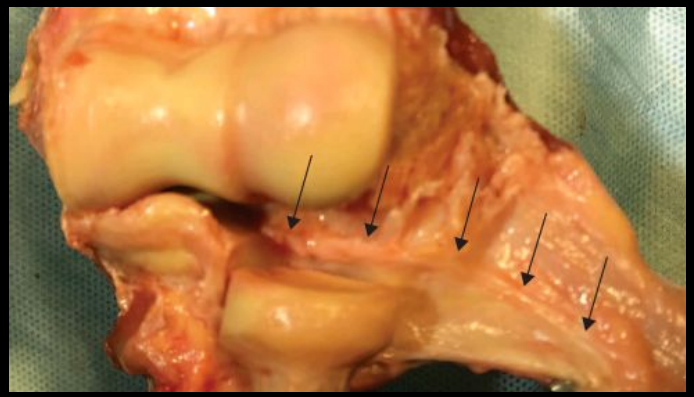
AKA humeroradial/lateral/posterolateral synovial plica; synovial fold/fringe/meniscus/recess

Debate about whether RHSP is or is not a meniscus-like structure. In two studies, folds appeared histologically as meniscus (fibrocartilage) and considered as congenital.

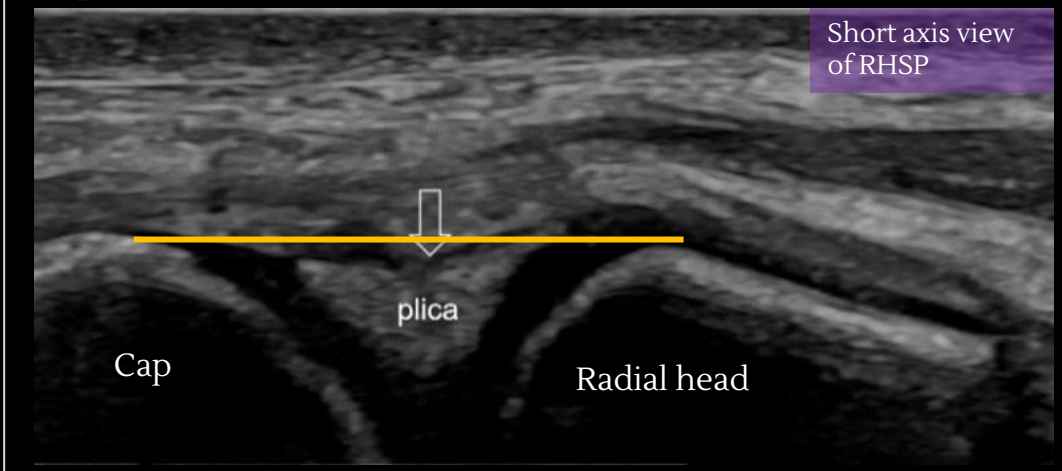
- It is a formation of prominent folds in continuity with the capsule
- Blends with the CET
- 77% prevalence of RHSP in asymptomatic patients

Linan et al., 2020; Kholine et al., 2021





Lubiatowski, et al. 2020



Normal appearance

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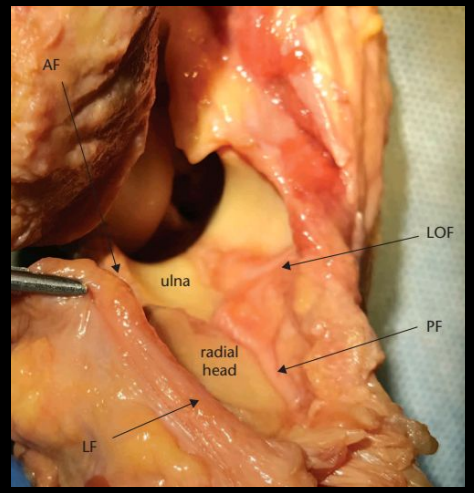
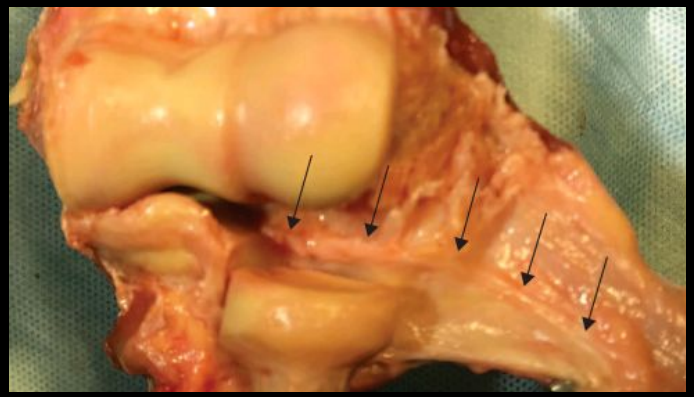
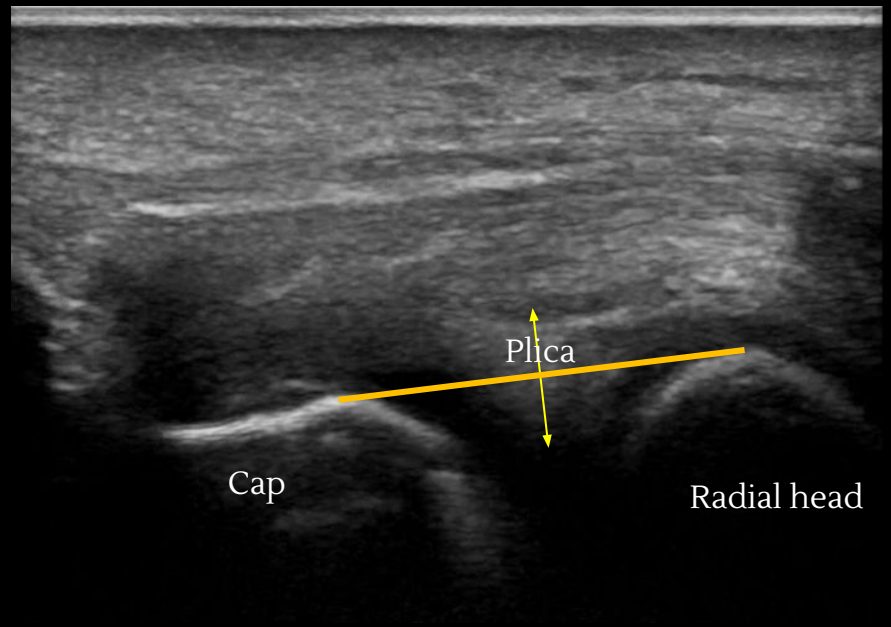




Lubiatowski, et al. 2020

RHSP syndrome

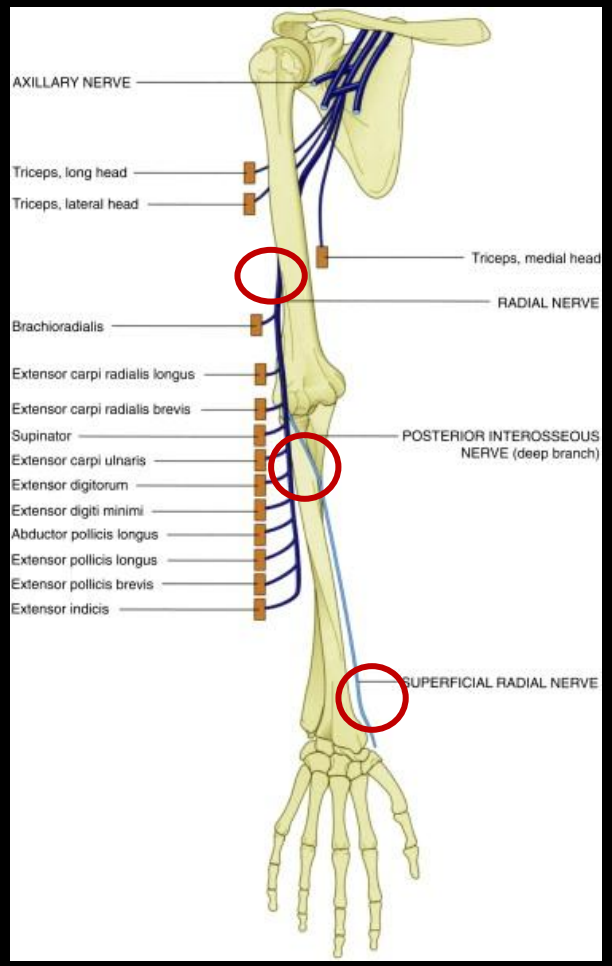


Thickness of RHSP is asymptomatic patients ranges from 1.7mm to 2.2mm

Linan et al., 2020; Kholine et al., 2021

Peripheral neuropathies – Radial nerve

Common entrapment sites



1. Spiral groove syndrome / Saturday night palsy

- Prevalence at 0.4% Adabala V., 2020
- Acute focal compression/humeral shaft fractures

2. Posterior Interosseous Nerve (PIN) syndrome

- Prevalence at 0.7%. Bevelaqua AC., 2012
- Mechanical stress; space-occupying lesions (SOL)

3. Wartenberg's syndrome

- Prevalence at 0.003%. Nirjan A et al., 2024
- Wearing tight bracelets, watches; venipuncture/cannula insertion

Peripheral neuropathies – Radial nerve (Arcade of Frohse)

(Ceri et al., 2019)

Arcade of Frohse

- DBRN (deep branch of radial nerve) passes between the superficial and deep layers of supinator muscle – the supinator/radial canal.
- Becomes the PIN (posterior interosseous nerve) after it exits the canal

Benes et al., 2021

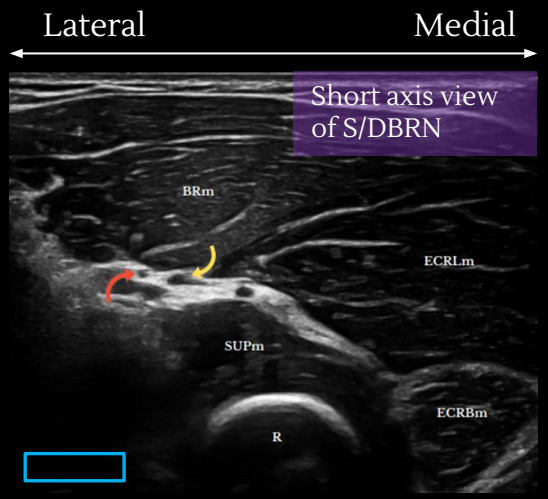
Classification of the Arcade

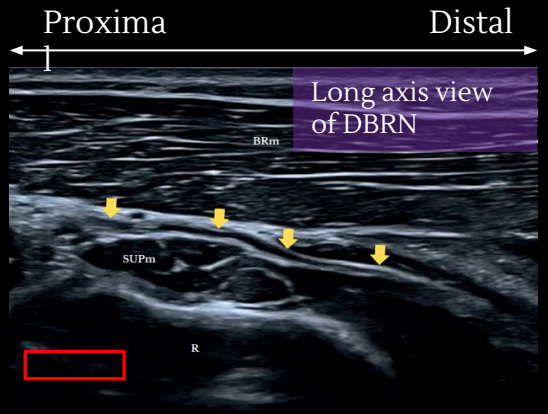
Type A: resistant tendinous
Type B: musculotendinous
Type C: muscular
Type D: thin, elastic membranous

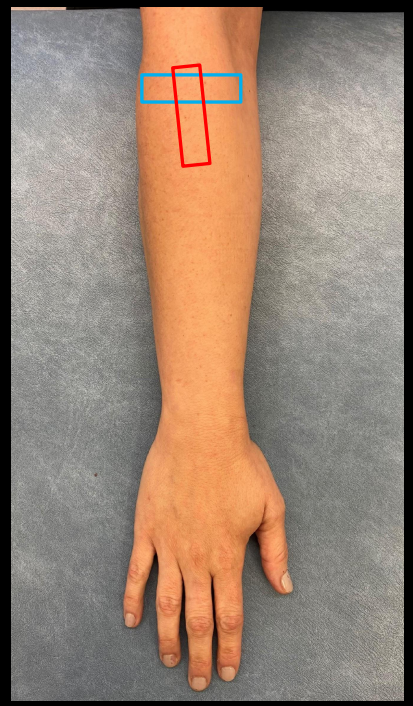
Wegiel et al., 2023

⚠ Arcade of Frohse refers specifically to TYPE A. Otherwise, ***proximal border of the supinator muscle/proximal margin of the superficial layer of supinator muscle*** .

Peripheral neuropathies – Radial nerve (Arcade of Frohse)



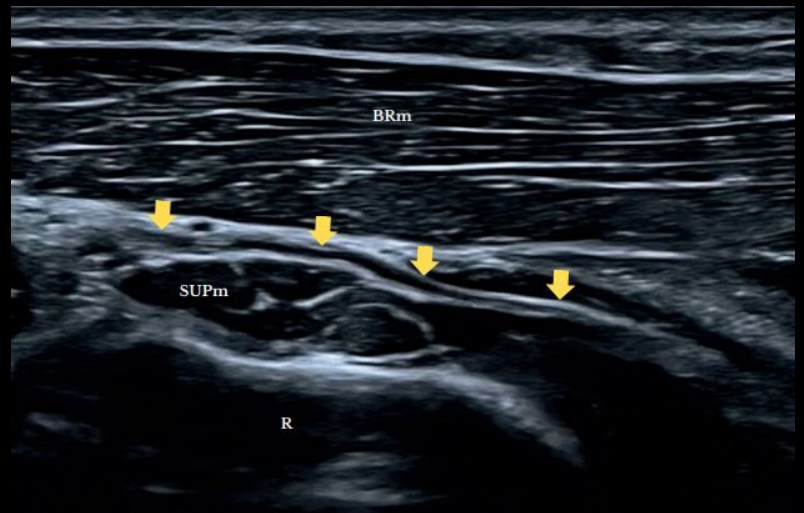




Red arrow: Superficial branch of radial nerve (SBRN)

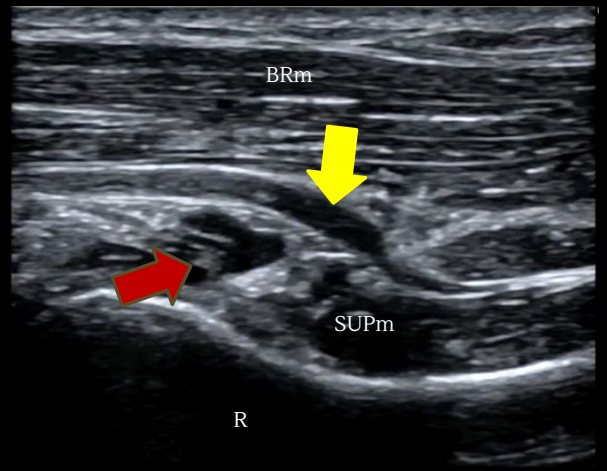
Yellow arrow: Deep branch of radial nerve (DBRN)

Peripheral neuropathies – Radial nerve (Arcade of Frohse)

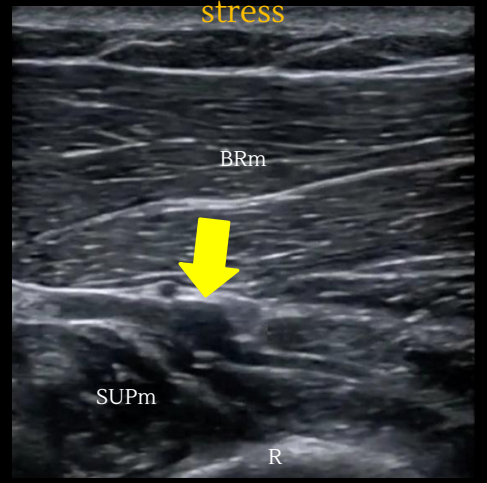


Normal appearance

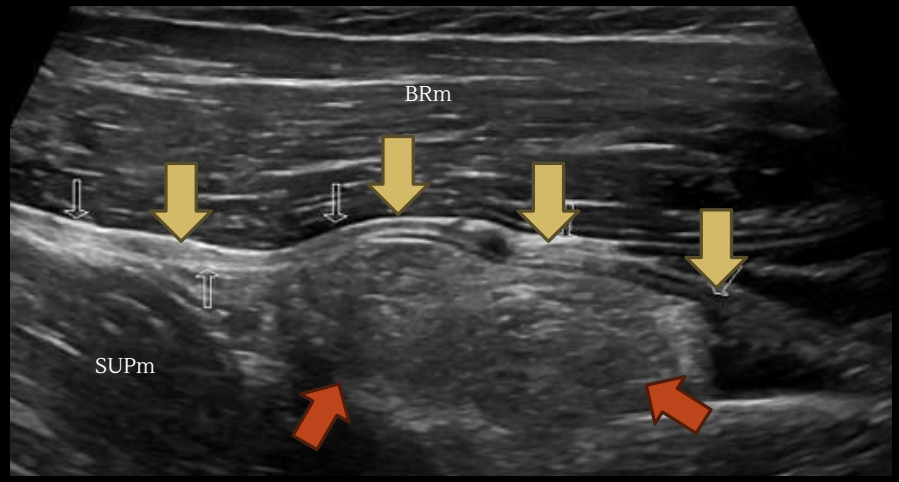
Ganglion cyst - DBRN entrapment neuropathy



DBRN entrapment neuropathy – mechanical stress



Intramuscular lipoma (supinator)



Broadening the differentials

Tendons

- De Quervain's tenosynovitis
- Extensor digitorum tenosynovitis

Wrist joint

- Osteoarthritis
- Rheumatoid arthritis
- Ganglion cysts

CMCJ of the thumb

- Osteoarthritis
- Rheumatoid arthritis
- Gout arthritis or CPPD arthropathy

Other

- Nerve sheath tumour (schwannoma, neurofibroma)
- Soft tissue sarcomas
- Osteosarcoma

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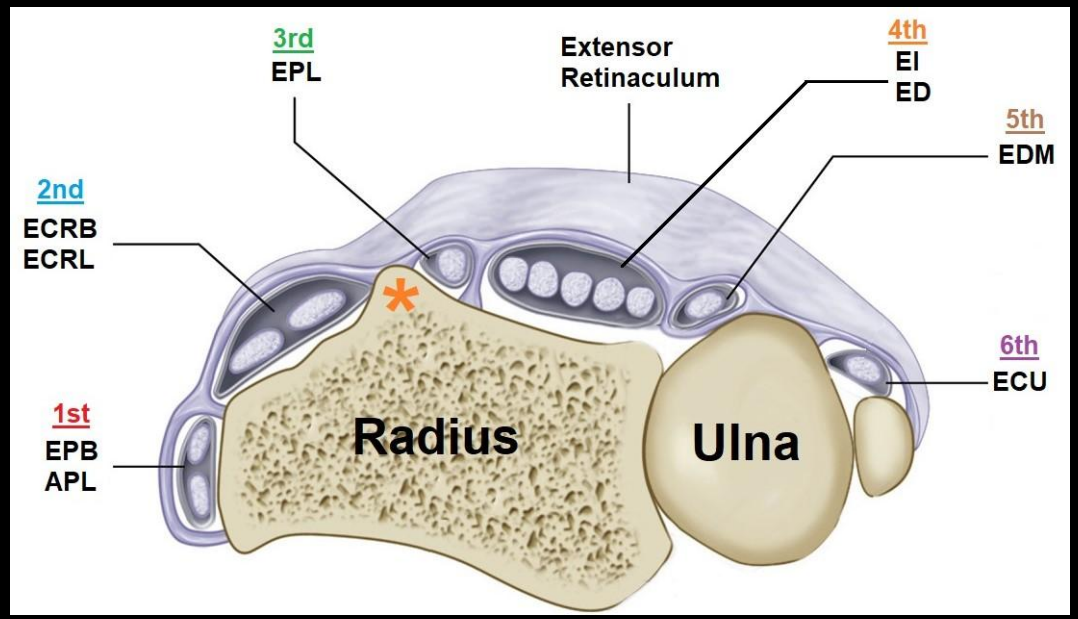
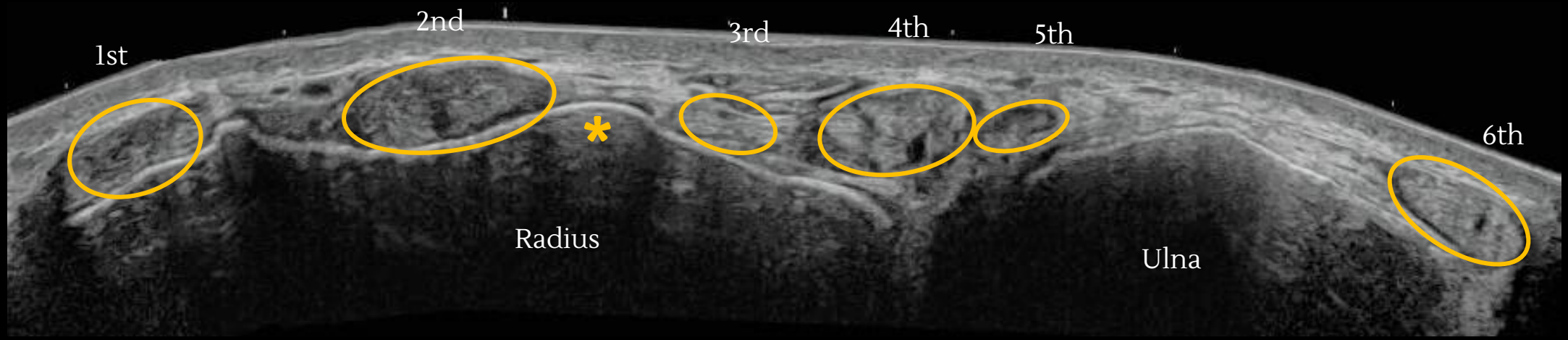
Musculotendinous junctions – Dorsal compartment





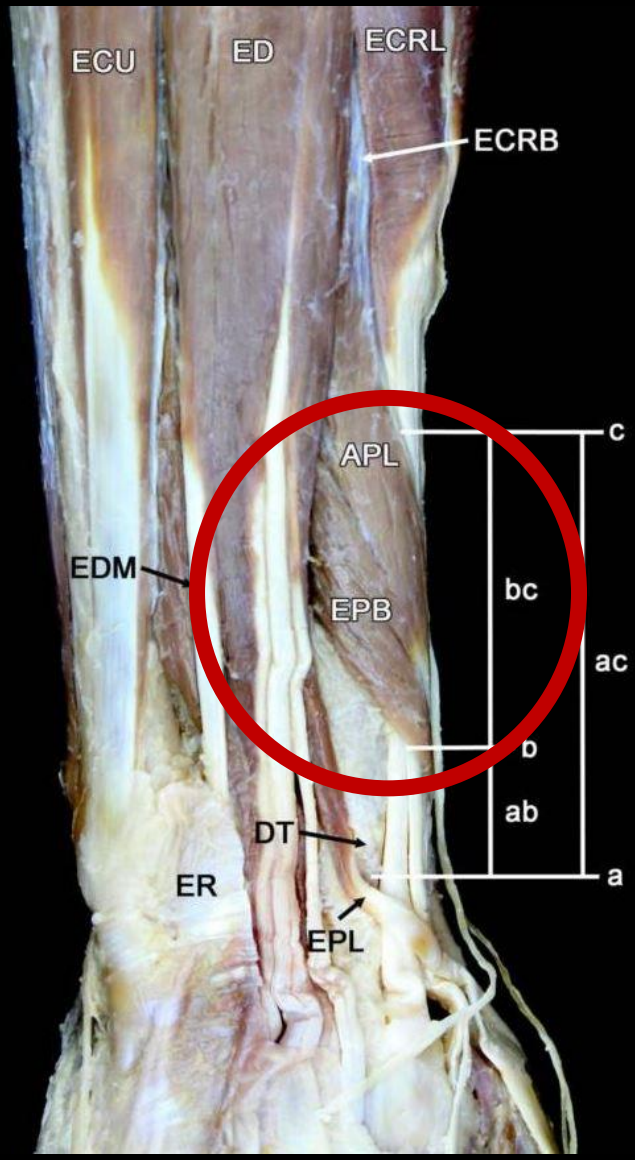
Dorsal compartment – Proximal intersection

- Proximal intersection:

1st comp (APL-EPB) intersects with the 2nd comp (ECRB-ECRL)

- 4-6cm proximal to Lister's tubercle
- May lead to proximal intersection syndrome
- Typically characterised as stenosing tenosynovitis
- Repetitive wrist extension with fist clenching and pronation–supination movements
- Prevalence **0.2-0.37%**

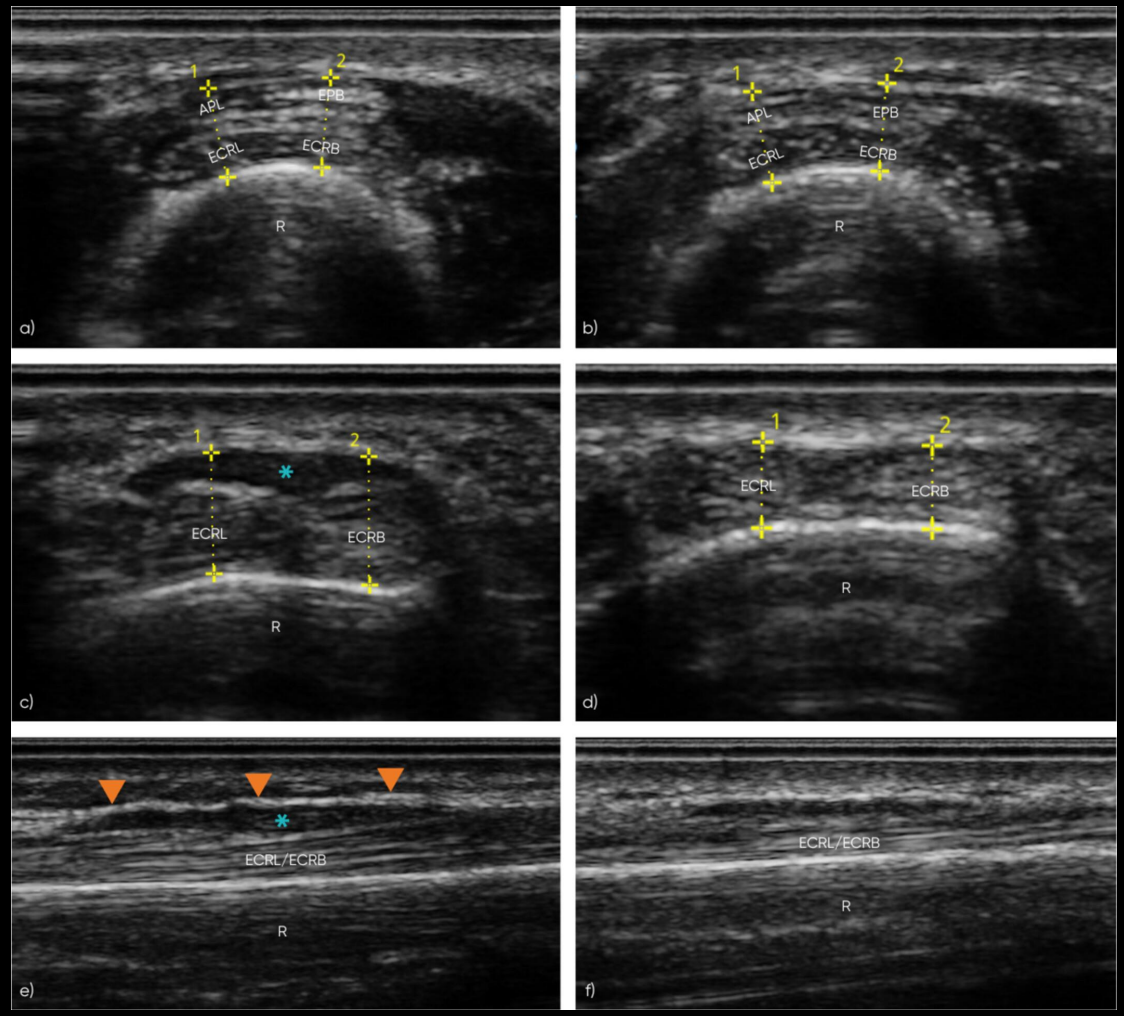
Chatterjee et al., 2018



Naredo et al., 2024

Dorsal compartment – Proximal intersection syndrome

Symptomatic | Asymptomatic

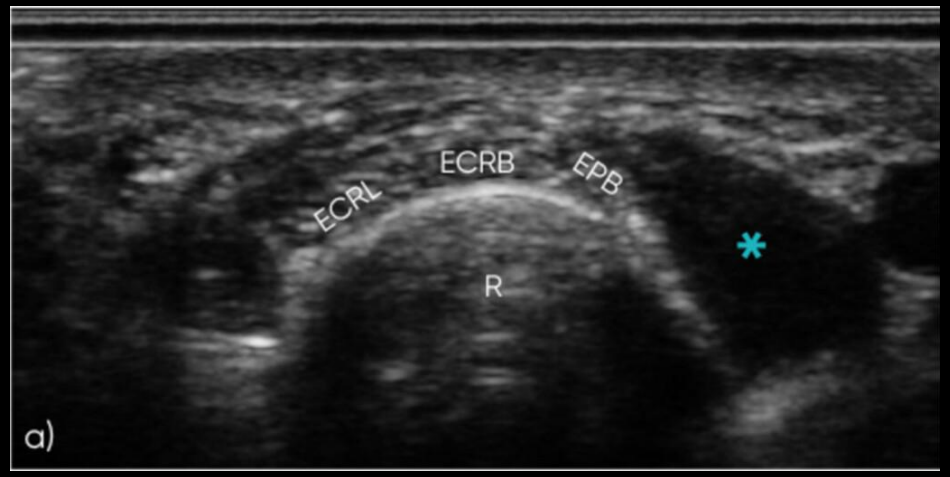


Hypertrophied EPB muscle and oedema (blue asterisk), and tendinosis of ECRL/ECRB

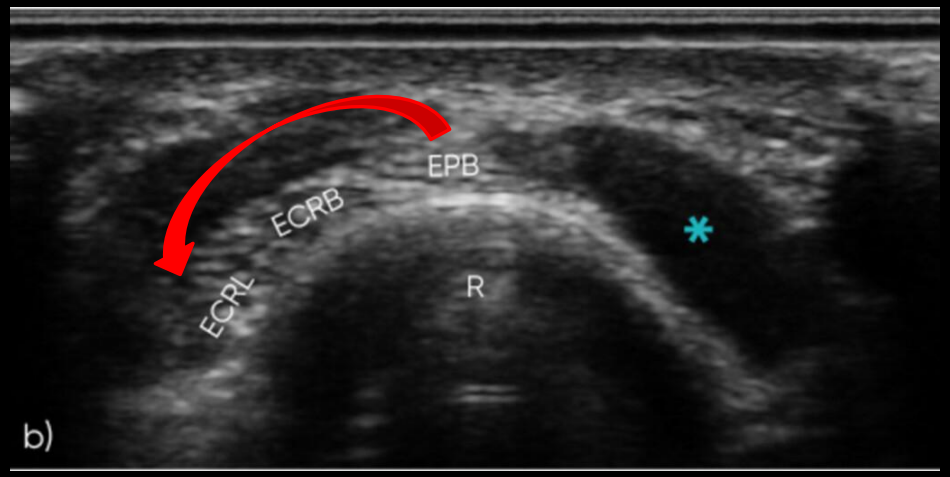
Thickened superficial connective tissue/fascia (orange arrowheads)

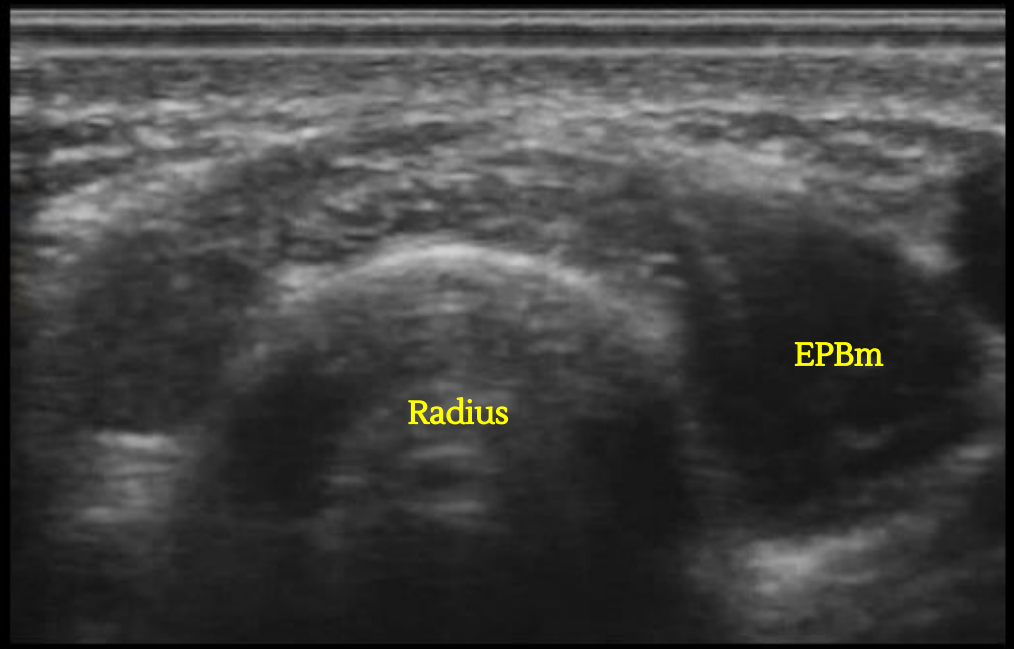
Dorsal compartment – Proximal intersection syndrome

At rest



During extension of MCPJ of the thumb





Contraction of the EPB muscle, during extension of the 1st MCPJ, resulted in significant radial displacement of the second compartment tendons

Take-home message

- Uncommon doesn't mean unimportant
- Think broadly, scan or examine systematically
- Anatomy remains your foundation

Thank you

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