

Compression Neuropathies – N. radialis

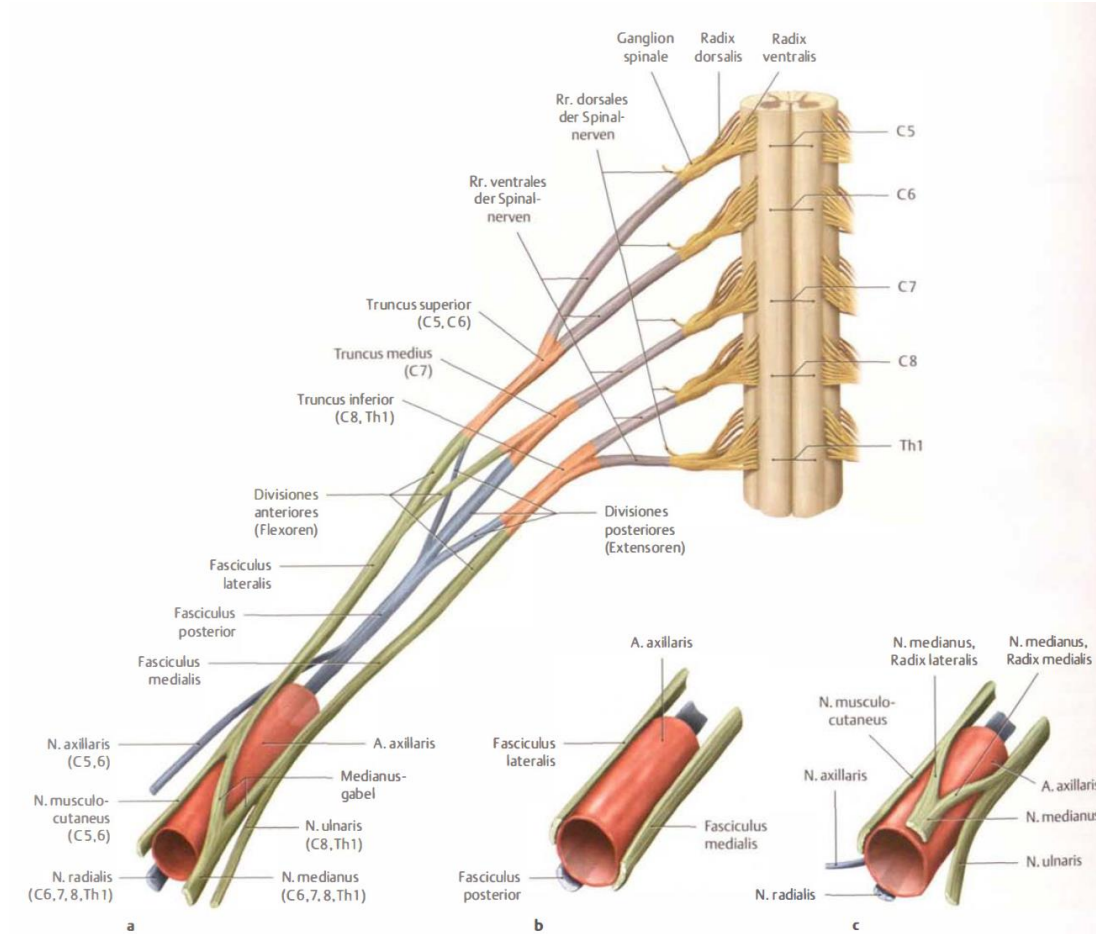
Sebastian Hediger

Incidence

- Compression Neuropathies of
 - N. medianus 3/1000
 - N. ulnaris 3/10'000
 - N. radialis 3/100'000

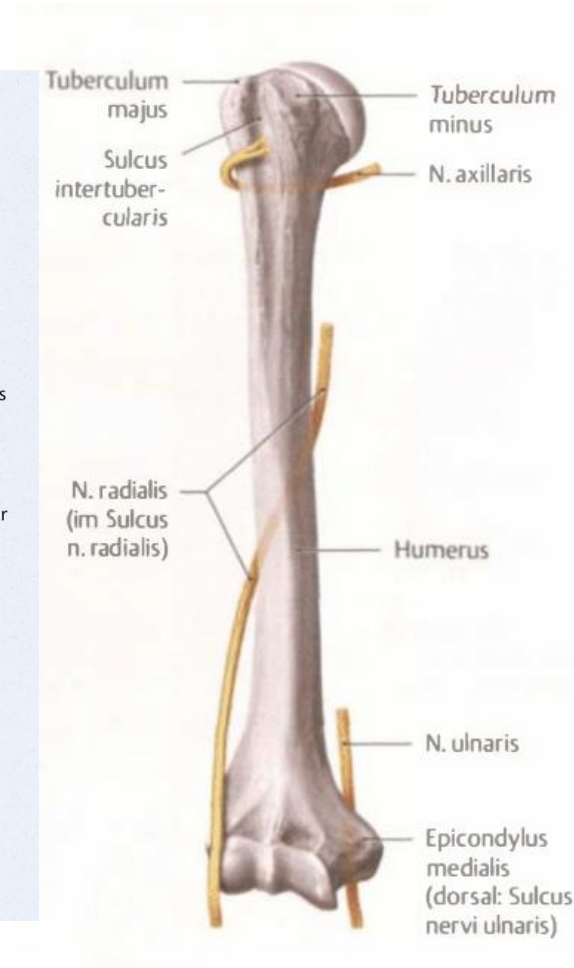
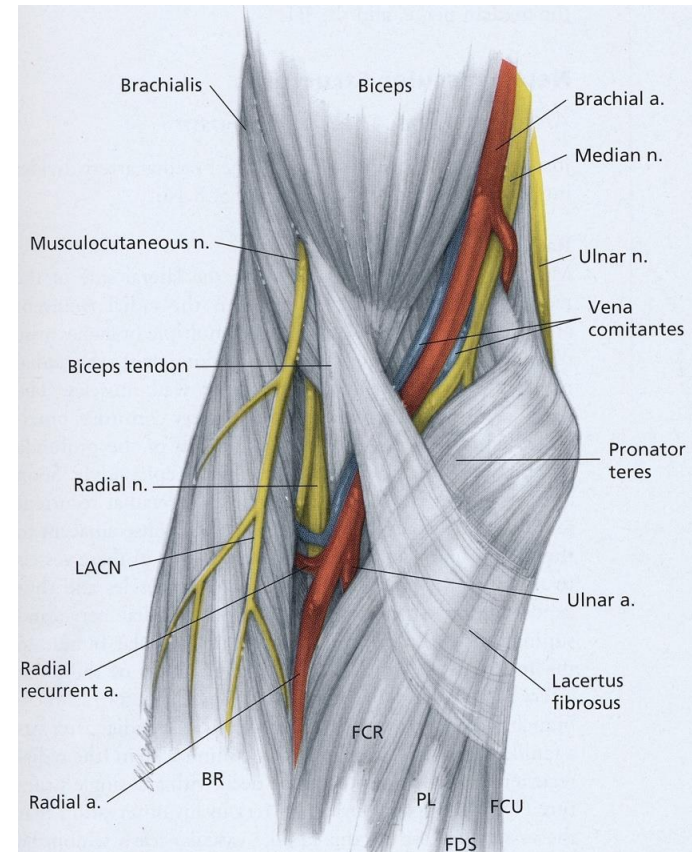
Radial Nerve Anatomy

- C5-8 (T1)
- 3 posterior divisions converge to form posterior cord
- Largest branch of brachial plexus



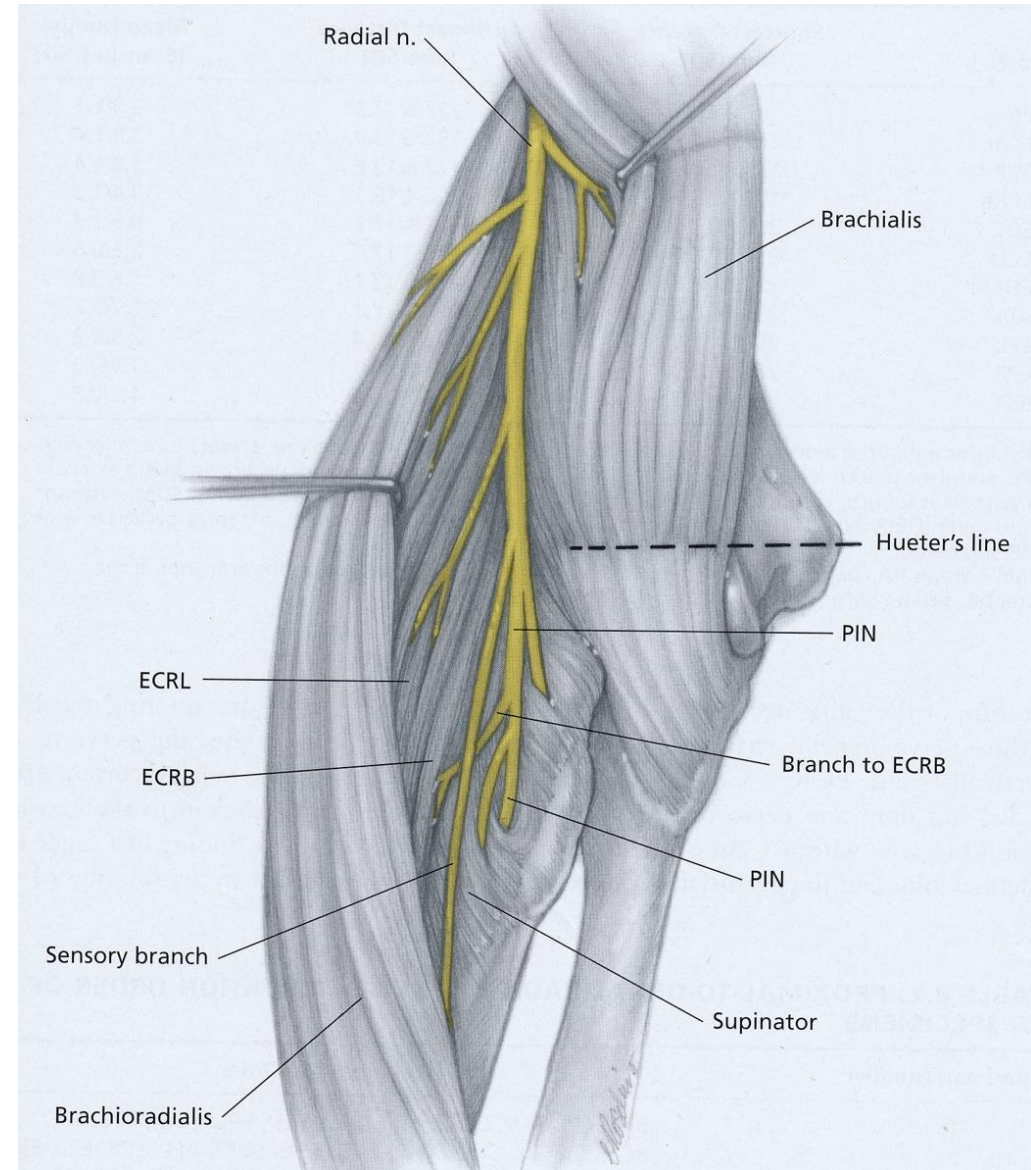
Anatomy

- Spirals around posterior aspect of Humerus with profunda brachii artery (13cm prox. to trochlea)
- Pierces lateral intermuscular septum (7.5cm prox. to trochlea)
- Between brachialis & brachioradialis (Cave LABCN between biceps & brachialis)
- Anterior to lateral epicondyle



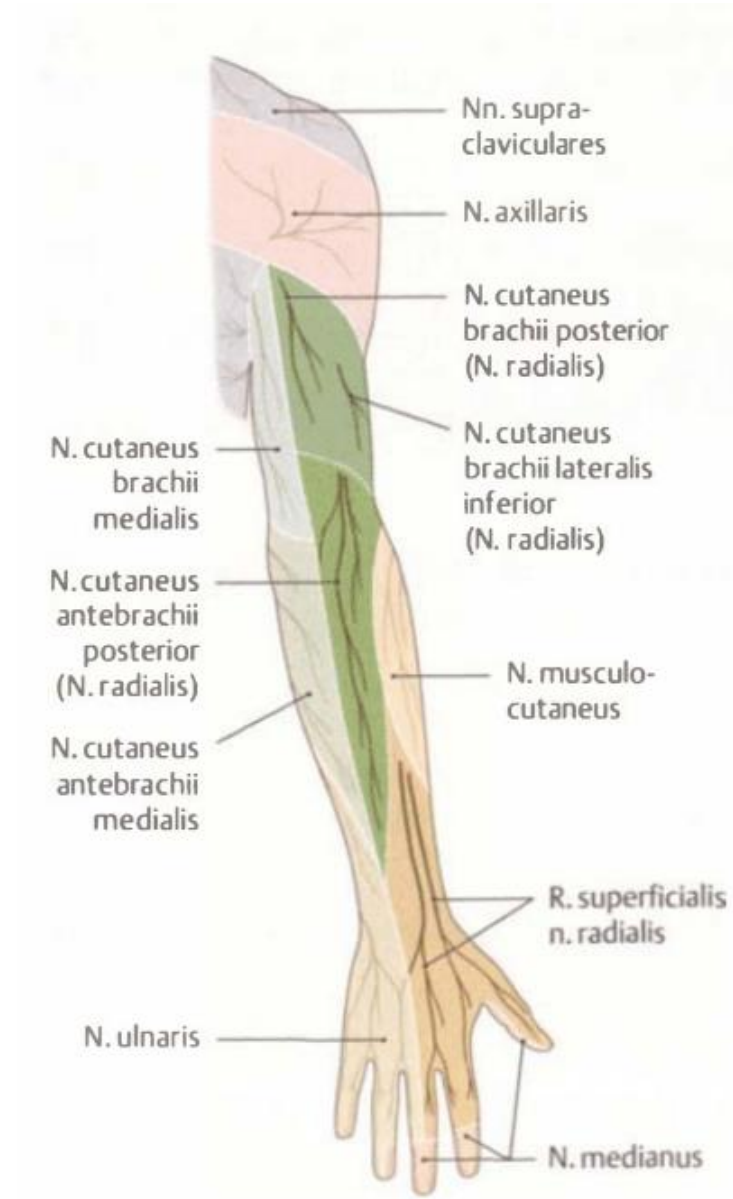
Anatomy

- Divides into superficial/
deep branches
 - Deep (PIN)
 - Splits supinator muscle
 - Innervates extensor muscles (S, EDC, EDM, ECU, APL, EPB, EPL, EI)
 - Except mobile wad ((B),BR, ECRL, ECRB)
 - Superficial
 - Between BR and ECRL
 - Sensation to dorsal radial aspect of hand



Anatomy

- Sensation: skin posterior aspect of arm/forearm & dorsal/radial aspect of hand



Anatomy – Radial Tunnel

- Sites of compression
 - Fascial bands between B & BR
 - Recurrent leash of Henry
 - ECRB origin
 - **Proximal supinator- leading edge / Arcade of Frohse** (between superf. and deep layer)
 - Distal supinator (tendinous bands)

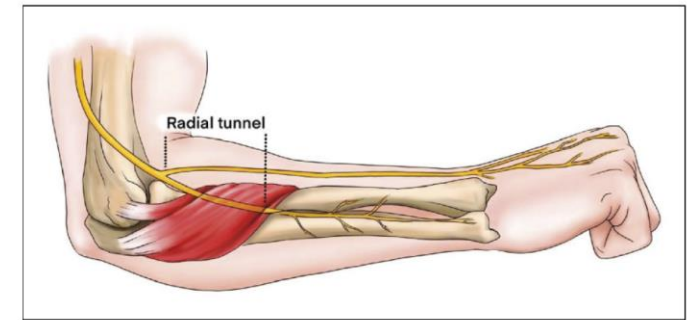
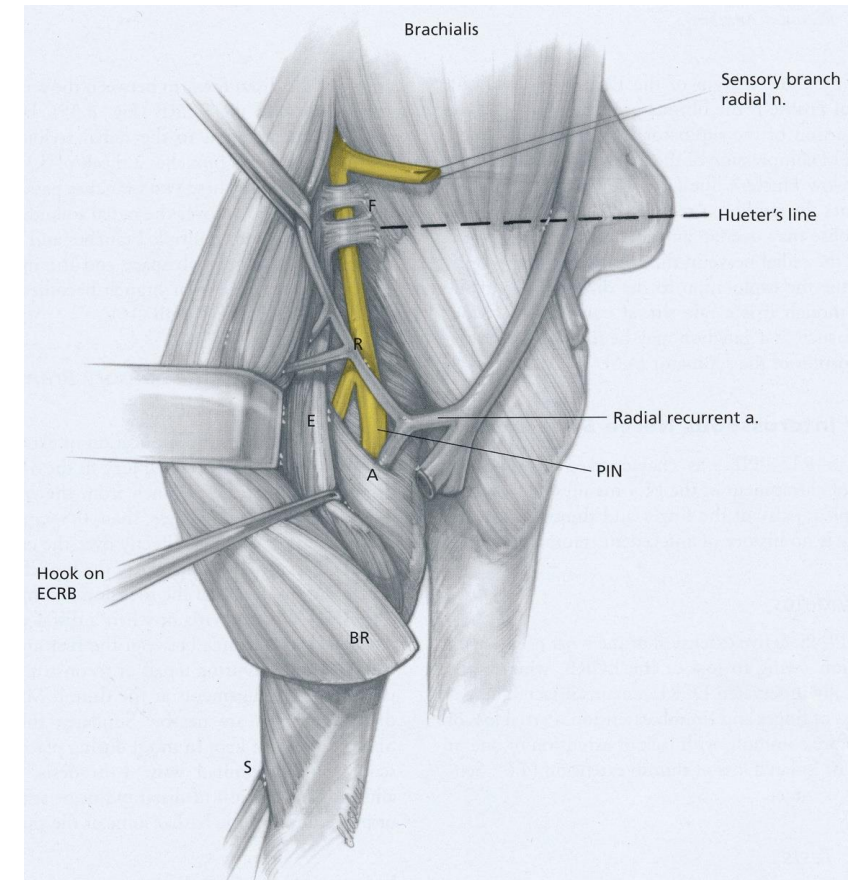


Figure 3. I suggest that the radial tunnel be consistently defined as a continuous spiral space around the PIN *starting from the point of bifurcation to the superficial sensory branch and ending at the distal border of the supinator.* The radial tunnel is shown between two vertical lines. (Copyright, Julia Ruston).



Other causes

- Trauma (humeral fx, Monteggia fx, radial head fx)
- iatrogenic (plate fixation)
- Mass
- External compression – Saturday night palsy
- elbow synovitis- rheumatoid
- Neuralgic amyotrophy

Posterior Interosseus Nerve Syndrome

- Compression neuropathy
- Progressive muscle weakness, atrophy
- Presentation
 - Progressive loss of PIN muscle function
 - Wrist extends in radial deviation (ECU weakness)
 - Cannot actively extend MCPJ
 - DD rheumatoid tendon rupture DD sagittal band rupture
 - No sensory deficit

Radial Tunnel Syndrome «Pain Syndrome»

- Night pain
- No sensory (sometimes sensory disturbance lateral forearm/ dorsal hand)/ no motor disturbance
- EMG/NCS usually not helpful
- May coexist with **tennis elbow** (point tenderness at ECRB-insertion, exacerbated with resisted wrist extension with extended elbow)

Radial Tunnel Syndrome «Pain Syndrome»

- Pain over postero-lateral aspect of elbow (Radial Tunnel – 4-5cm distal to lateral epicondyle/ mobile-wad)
- Pain increases with passive pronation/ wrist flexion or active supination/ wrist extension

Radial Tunnel Syndrome vs. PIN Syndrome ?

- distinct clinical presentations
- Identical sites of nerve interference
- avoid considering them as two diseases!

- **Mild RTS** (neurapraxia leading to pain)
- PIN Syndrome = **severe type of RTS** (compression leading to palsy, but complete compression of unmyelinated axons > no pain)

Jin Bo Tang, JHS (E), 10/2020

Further Knowledge on Featured Topics

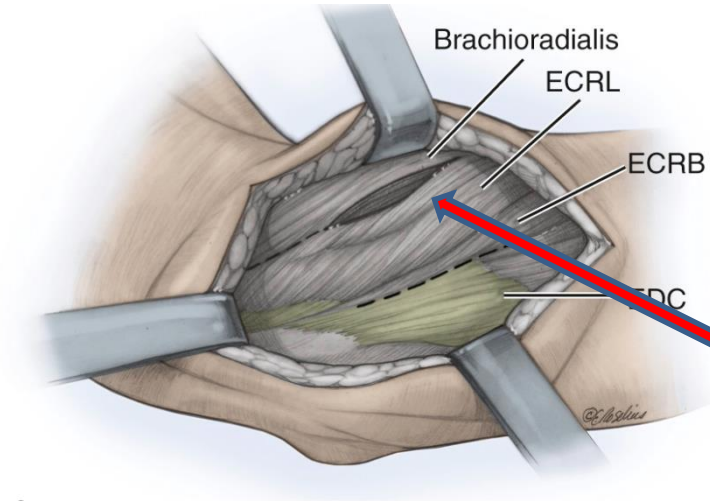
JHS(E)

Radial tunnel syndrome: definition, distinction and treatments

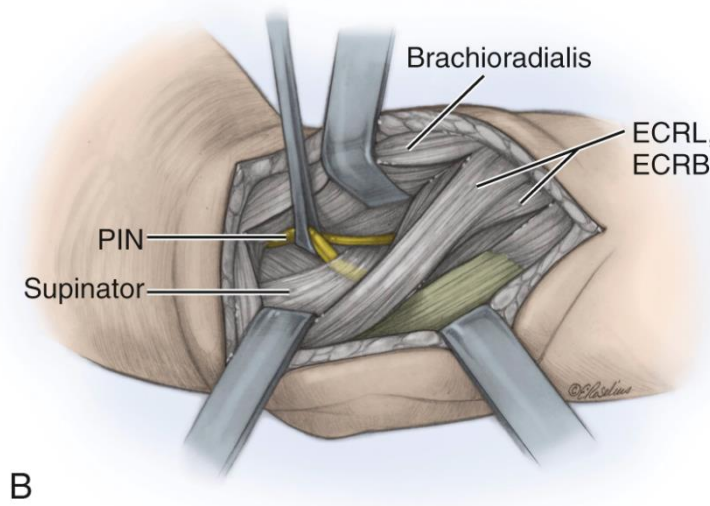
Journal of Hand Surgery
[European Volume]
2020, Vol. 45(8) 882-889
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sagepub.com/journals-permissions
DOI: 10.1177/1753193420953990
journals.sagepub.com/home/jhs


Radial Tunnel Syndrome

- Treatment
 - Conservative 6mths!
 - Activity Mod., Splinting, Injection
 - Surgical Release - if all else fails
 - Approach (post./ ant. Etc. – **Mackinnon – intervall between ECRL and BR**)



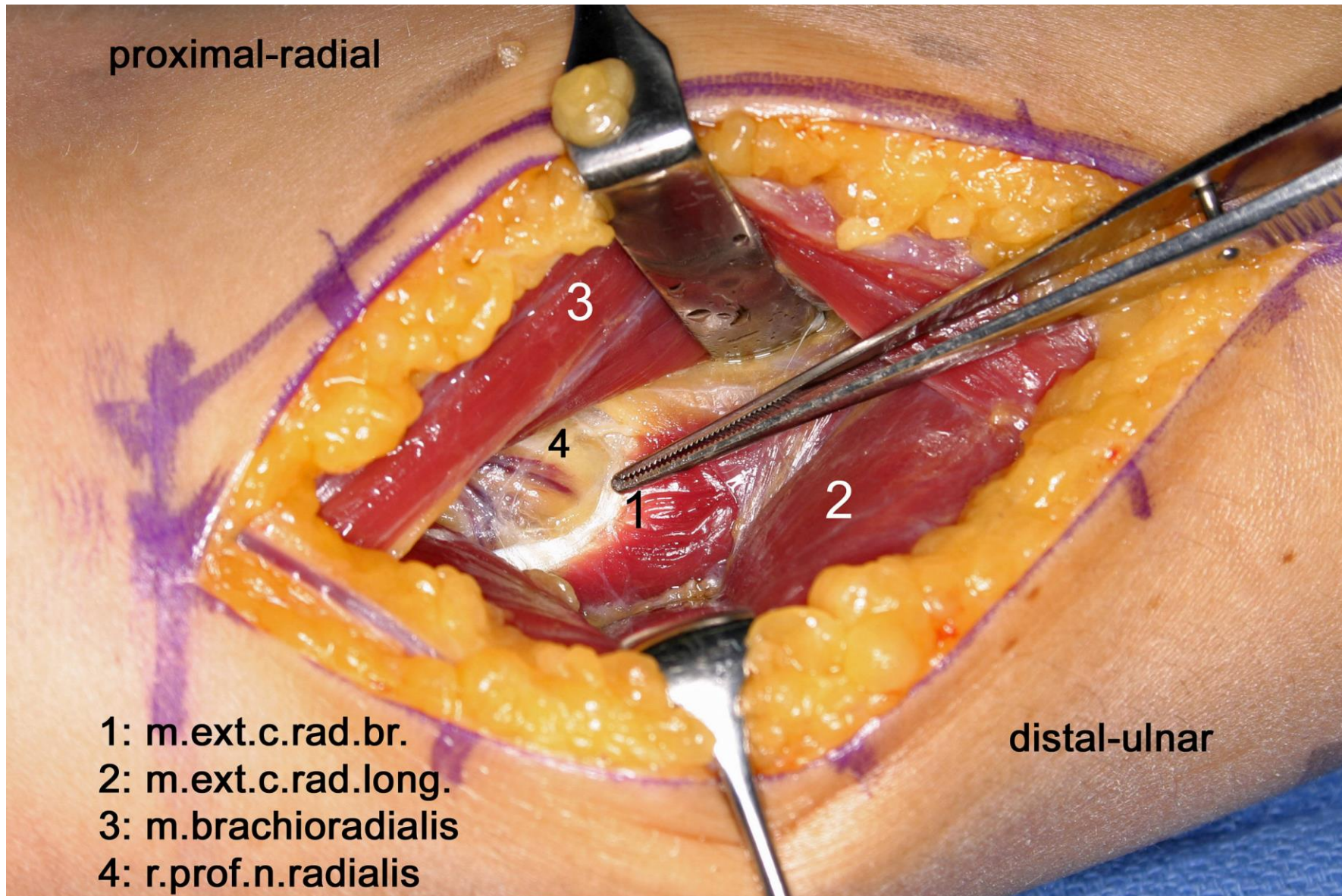
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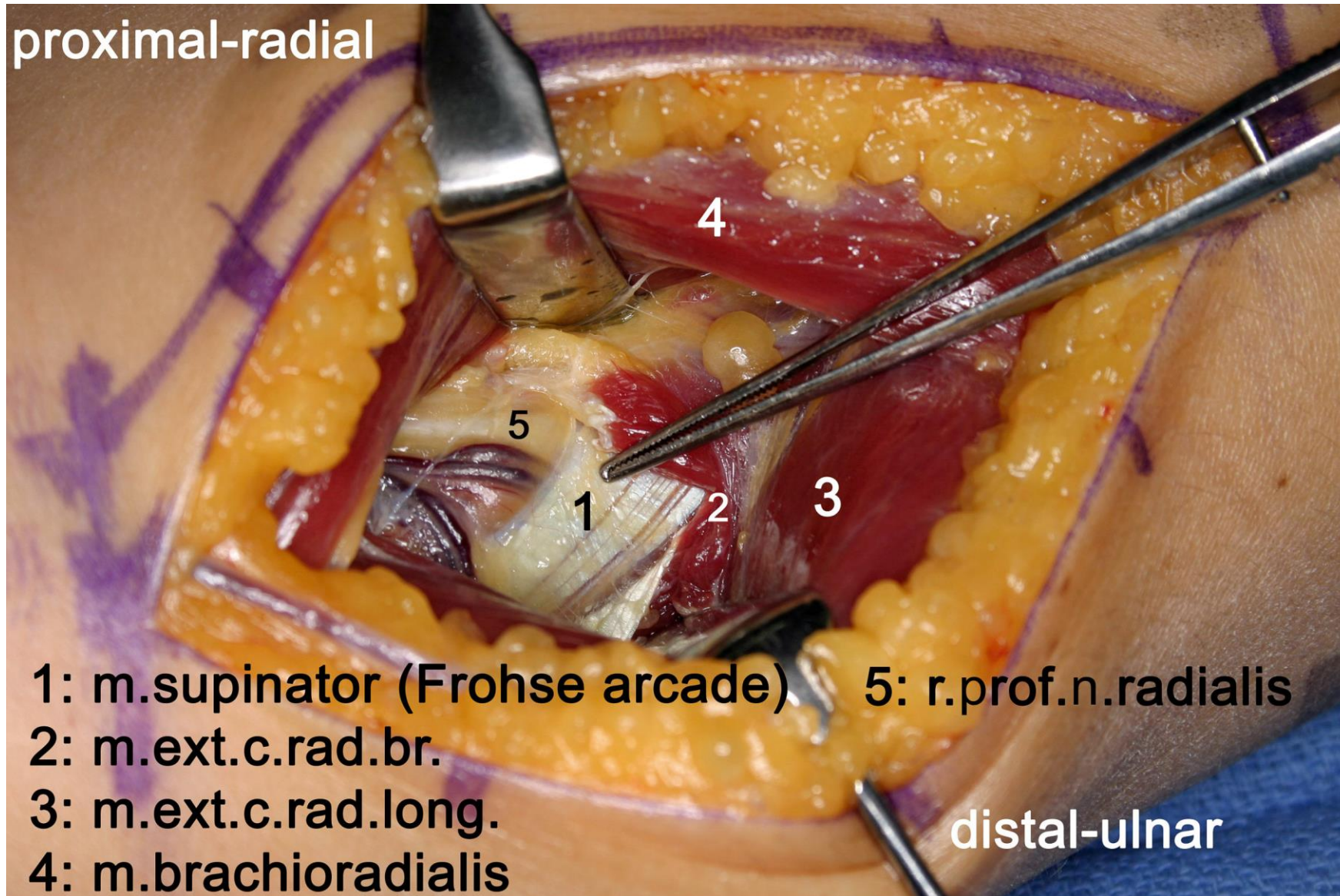


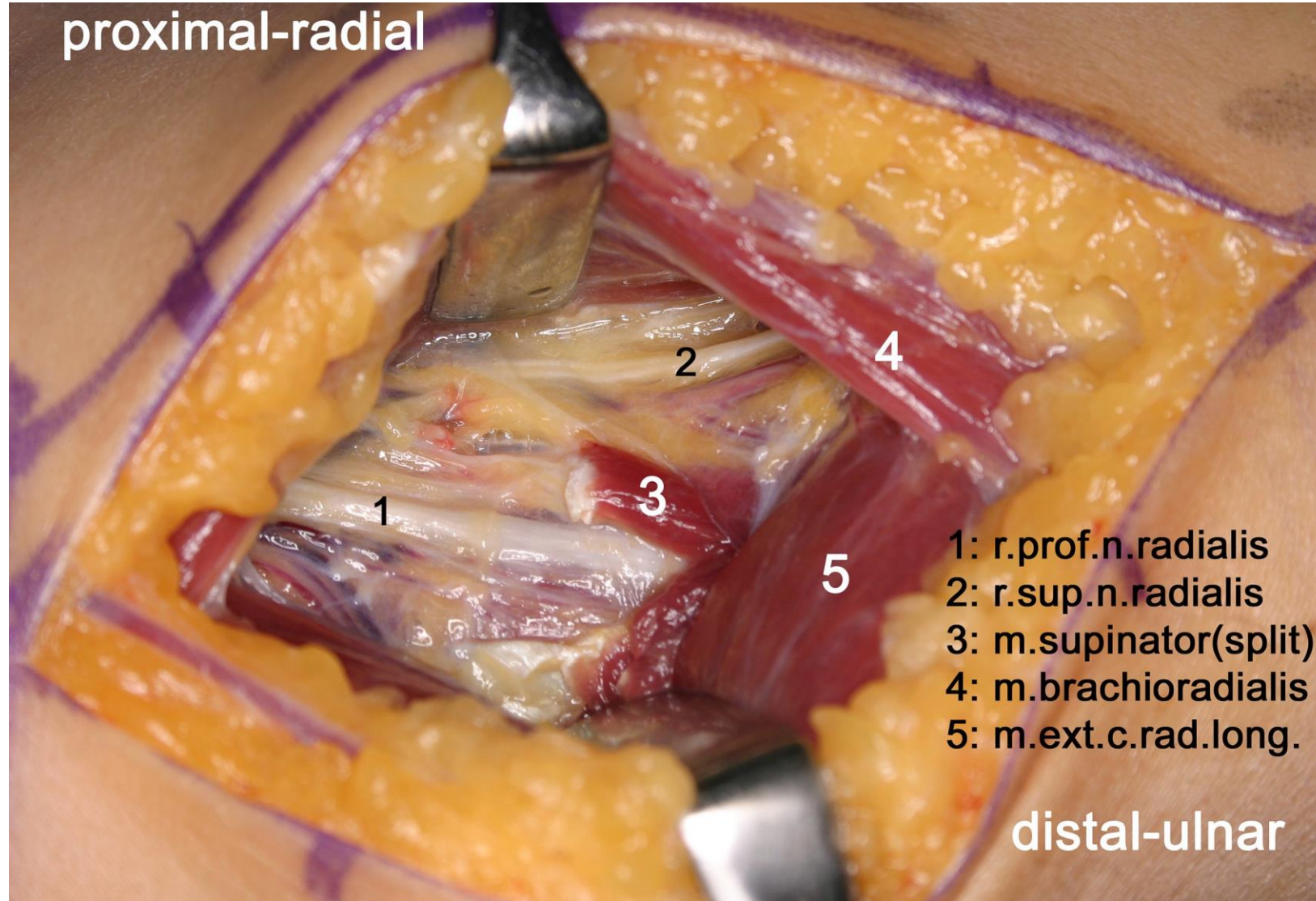
B

- Preoperative Marking!
- Intervall between BR (red) & ECRL (lighter/white)
- PABCN
- Correct intervall > finger dissection possible!



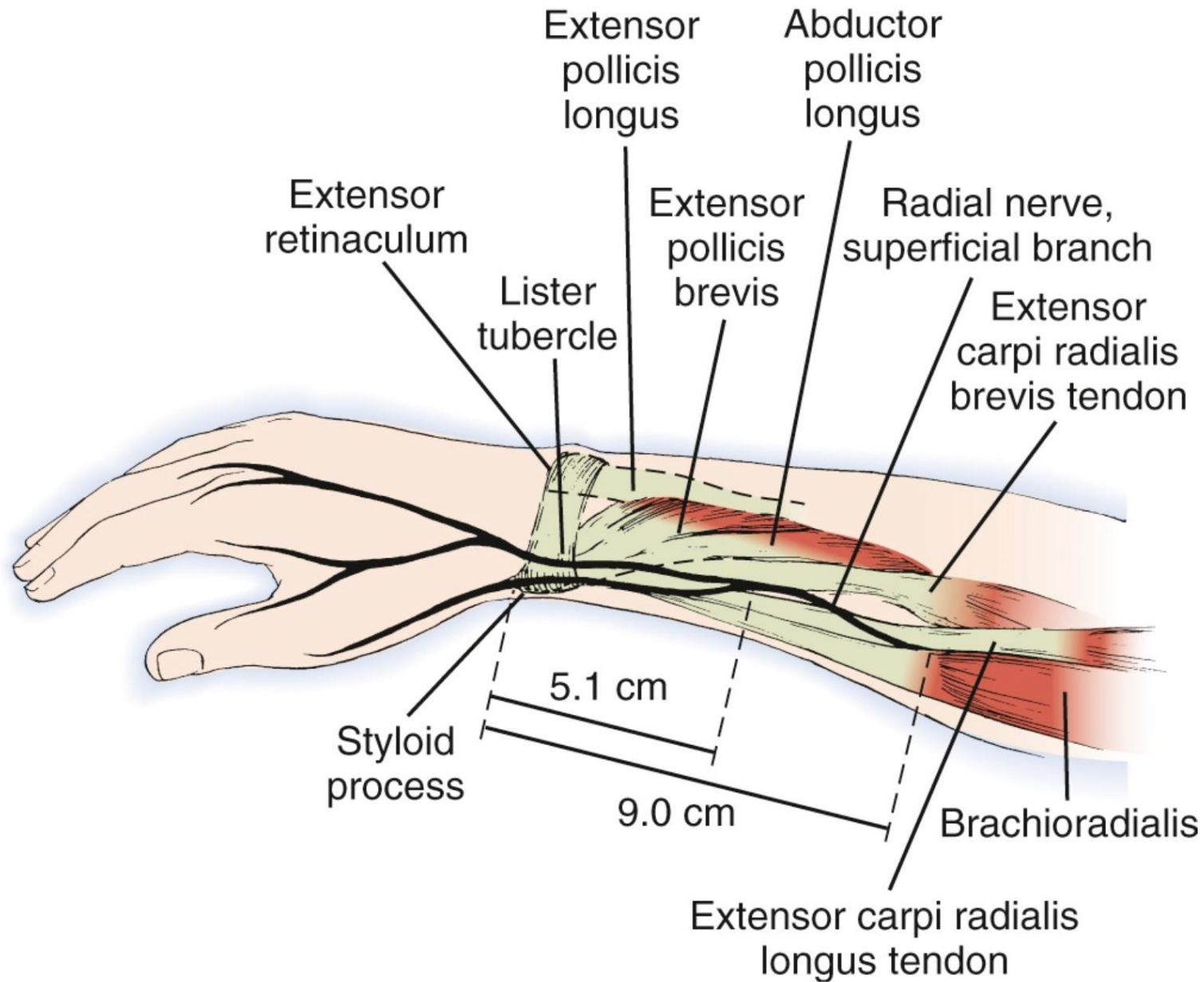






Cheiralgia Paresthetica

- Wartenberg's Syndrome
- Superficial branch of the radial nerve
 - External Compression – Jewelry and Watches
 - Compressed by BR and ECRL, ca. 9cm proximal to radial styloid
 - With pronation of forearm, wrist flexed and in ulnar deviation
 - Scissor-like action between tendons
- DD de Quervain, intersection syndrome



Cheiralgia Paresthetica

- Radiodorsal hand
 - Pain
 - Numbness
 - Paresthesias
- Work-Up > Diagnostic injections
- Provocative test
 - Tinel's sign over nerve
 - Pain on pronation

Cheiralgia Paresthetica

- Conservative – Activity Mod., no jewelry
 - Thumb splint
 - NSAID
 - Steroid injection
- Surgical
 - Muscle tenotomy of BR tendon, BR is expendable (Biceps,B)



Incision on lateral aspect, just volar to interval BR/ECRL, palpate lateral aspect of radius

Just off the exact nerve location > avoid scarring

Protect LABCN (superficial course)





Between BR
and ECRL

The nerve is
where the fat is

Complete
tenotomy of BR
+ resect a
portion of
tendon

THANK YOU FOR YOUR ATTENTION

References

Wolfe S, Green's Operative Hand Surgery, 7th edition, 2015
Mackinnon SE, Nerve Surgery, 2015

Prometheus, LernAtlas der Anatomie, 2. Auflage

Jin Bo Tang, JHS (E), 10/2020

YouTube - Posterior Interosseous Nerve Release - Extended
(Feat. Dr. Mackinnon) -
<https://www.youtube.com/watch?v=drARpLo5lqo>