

ANATOMY

1. Metacarpophalangeal joint [MPJ]

Flexion by long flexors [FDP. FDS]

Extension by extensor digitorum [ED]

2. Interphalangeal joint [IPJ]

Extension: With MPJ in flexion, the IPJ extension by extensors and intrinsic

With MPJ in extension IPJ extension by intrinsics [interossei & lumbricals]

Flexion of PIP [Proximal IPJ] Mainly FDS, partly FDP

Flexion of DIP [Distal IPJ] FDP

3. Long flexors and lumbricals

Each FDS tendon works independently while FDP tendons work as a unit.

Lumbricals originate from one tendon [FDP] and inserts to the extensor expansion on the radial side.

4. **ROM:** PIP has the largest arc of motion (120°). This joint accounts for an estimated 85% of the motion of finger required for grasping.

5. Beak ligament

The anterior oblique ligament is an important stabiliser of the carpo-metacarpal joint of the thumb. It is a thick, broad structure which originates from the palmar tubercle of the trapezium and inserts into the beak at the base of the first metacarpal.

6. Extensor tendon [ED]

ED are inter connected

ED forms extensor expansion over proximal phalanx

It is reinforced by intrinsic and lumbricals

Index finger has two extensors: extensor indicis and extensor digitorum

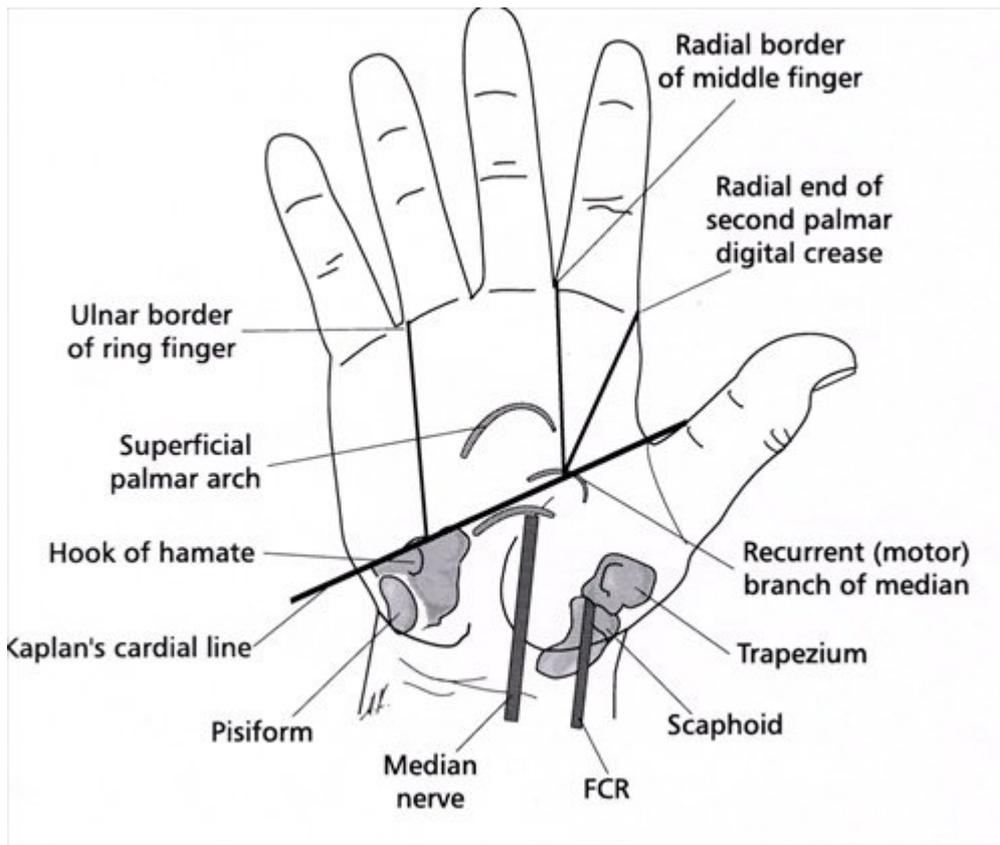


7. Surface anatomy:

SA vertical line along the radial border of the middle finger.

Kaplan's line is a line along the abducted thumb.

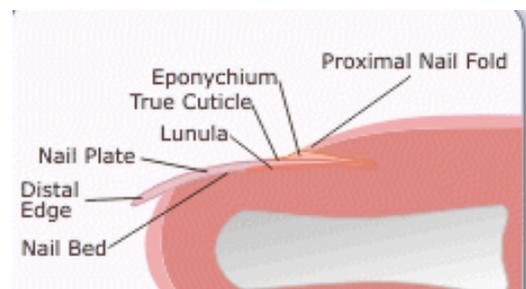
Where these lines intersect is the landmark of the recurrent thenar branch of the median nerve



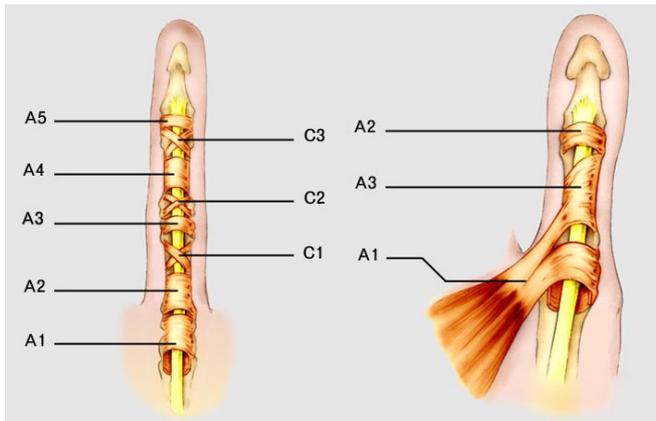
Produces 90% of the nail tissue.

Sterile matrix: Distal to lunula
Produces keratin.

Rate of nail growth:
0.1 mm per day
A complete nail may take 100 days



9. Tendon sheath pulleys of a finger and thumb



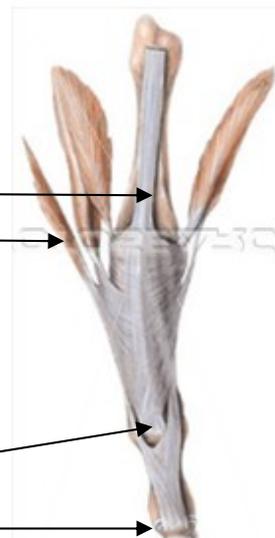
A2 and A4 pulleys are more important and should be preserved.

A2 and A4 are at the mid phalanx of the proximal and middle phalanx

Pulleys are thickened portion of the tendon sheath. It's function is to prevent bowstring of tendon. A1 pulley is at the entrance of the fibrous sheath. This pulley is released in trigger finger.

10. Components of Extensor Mechanism

Extensor mechanism is mainly formed by extensor digitorum and reinforced by interossei and lumbricals



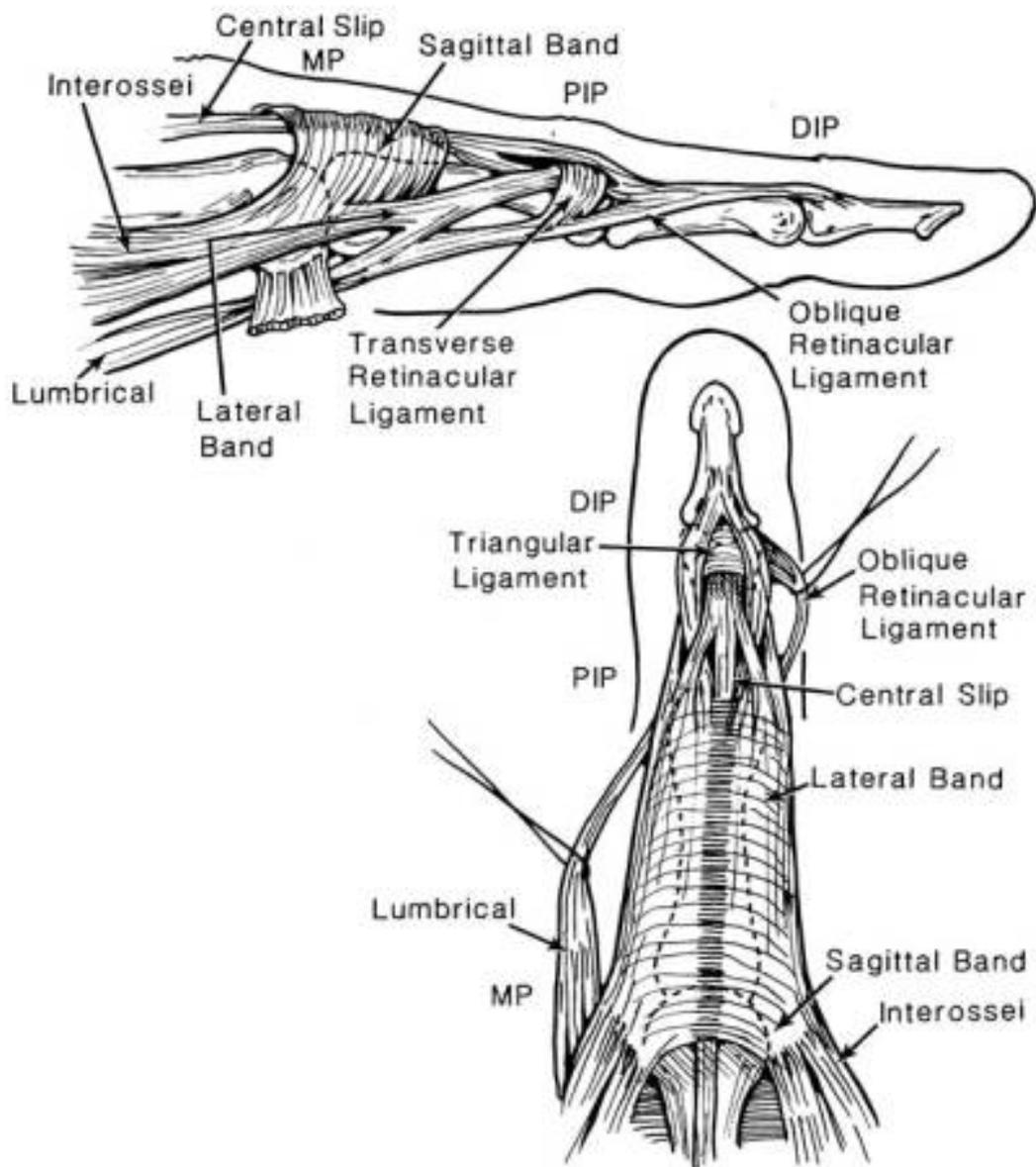
Extensor expansion distally divides into
 Central slip attached to base of middle phalanx
 Lateral slips to base of distal phalanx

11. Oblique retinacular ligament (ORL)

ORL attach at the sides of the proximal phalanx and tendon sheaths, and proceed to distal portion of lateral bands. Thus, the ORL's line of application is volar to the PIP joint's lateral axis and dorsal to the DIP joint's lateral axis.

12. Triangular ligament

Is between two lateral slip at DIP



13. Transverse retinacular ligaments:

Extends from lateral band to fibrous sheath at the level of PIP

14. Sagittal band

Extends from the extensor hood to the volar plate at MPJ

Extrinsic Tendons

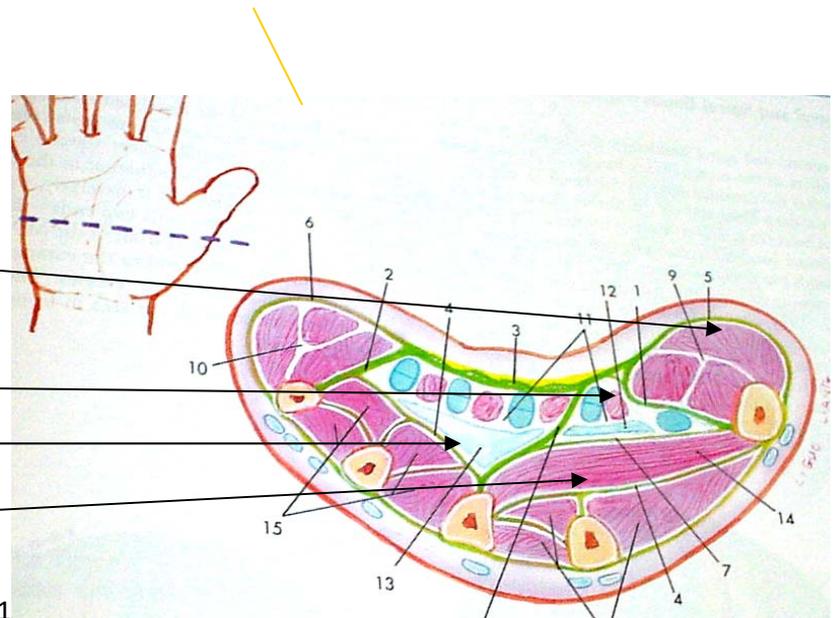
1. Extensor tendon
2. Sagittal band

- 3. Central slip
- 4. Lateral band
- 5. Triangular ligament
- 6. Terminal tendon
- 7. Intrinsic Tendons

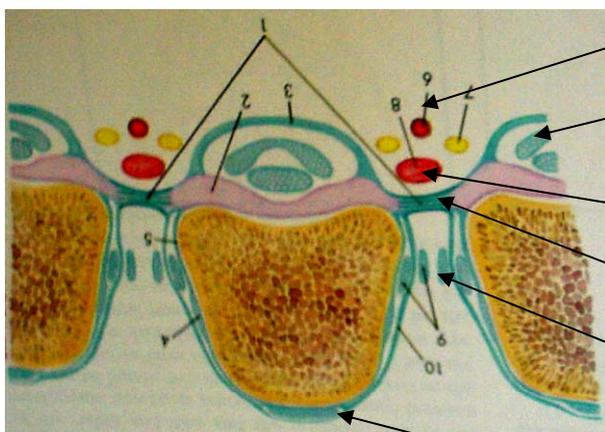
15. Palmar spaces

There are three compartments

- 1. Thenar compartment
- 2. Central compartment:
 - thenar space
 - midpalmar space
 - adductor space
- 3. Hypothenar compartment



16. Web Space



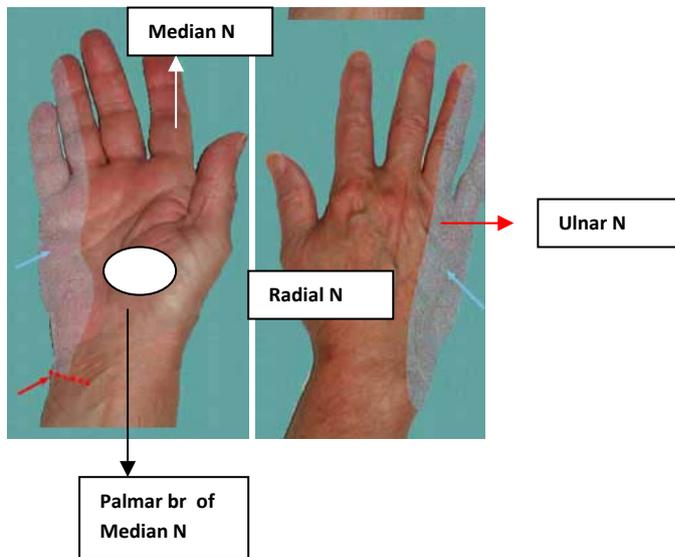
- 1. Neurovascular bundle
- 2. Flexor tendon within the sheath
- 3. Lumbrical
- 4. Deep transverse ligament
- 5. Interossei
- 6. Extensor digitorum

Web space is bounded laterally by MPJ with flexor tendons in the sheath.

Structures superficial to deep transverse ligament which connects volar plates are: Lumbricals, digital Neurovascular bundle.

Structures deep to deep transverse ligament : Interossei.

17. Sensation



Palmar surface

Median Nerve	Radial 3 and ½ fingers
Ulnar Nerve	Ulnar 1 and ½ fingers
Palmar branch of Median N	Palmar triangle

Dorsal surface

Radial nerve	Radial 3 and ½
Ulnar nerve	Ulnar 1 and ½ fingers

18. Palmar fascia

The palmar aponeurosis is the continuation of the palmaris longus tendon and sends extensions of the aponeurosis up to the distal phalanx.



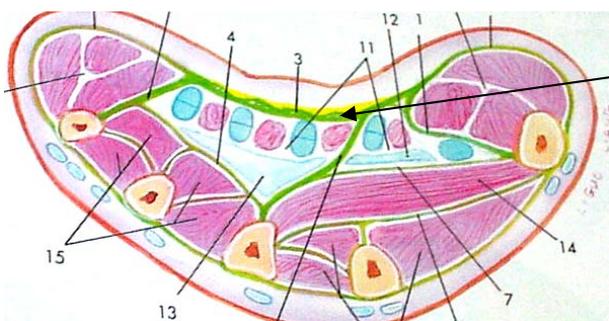
It is a triangular structure with vertical fibers with the transverse fibers and the paratendinous bands form a kind of tunnel around the flexor tendons.

The development of the hand
 By 5 weeks of the intra-uterine life, the palmar aponeurosis is already present and the two components, longitudinal and transversal, can be discerned.

Proximally the longitudinal fibers blend with the transverse carpal ligament [Flexor retinaculum] and the ante brachial fascia. This flexor retinaculum is divided in carpal tunnel surgeries.

The longitudinal sections show the development of three layers:

1. Superficial consisting of longitudinal fibers, natatory ligament and Grayson's ligaments
2. Retinacular consisting of the transverse carpal ligament, the transverse fibers of the aponeurosis and the flexor tendon sheath
3. Deep consisting of the interosseous fascia, the transverse metacarpal ligaments and Cleland's



Midpalmar is the central triangular portion

ligaments.

Palmar Fascia has following parts

In the palm: Medial over the thenar muscles,
 Lateral over the hypothenar

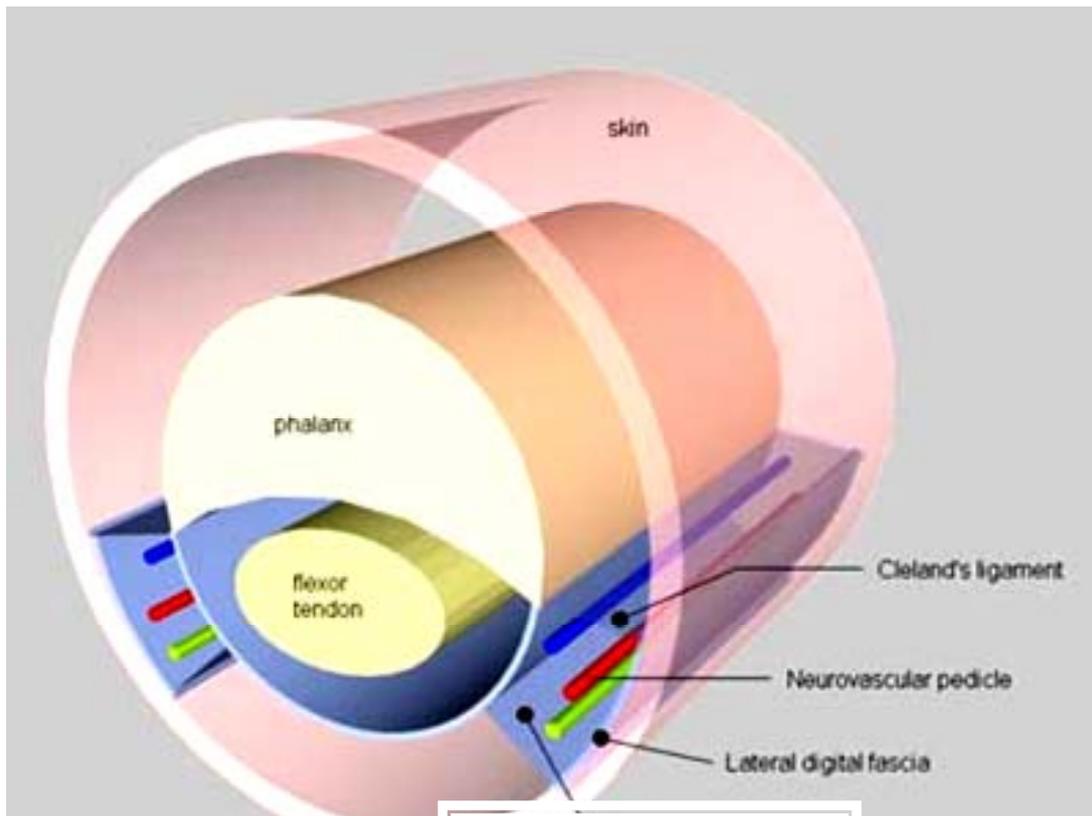
Midpalmar is the central triangular portion

Midpalmar is the important portion of palmar fascia.

It has longitudinal, sagittal and transverse fibers.

Distally it forms 4 slips.: 4 slips are joined by natatory ligament at the web space and proximally by superficial transverse fibers.

The bands from this fascia extending into the fingers are:



Grayson's ligament

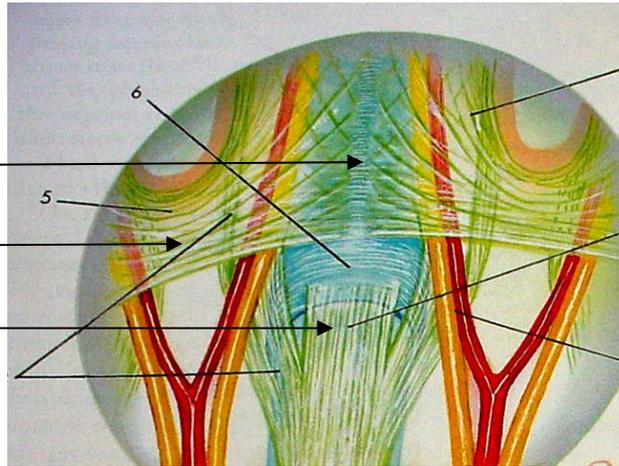
Natatory ligaments

These ligaments span the distal palm at the palmar digital junction. Their fibers run around the apex of the web skin from digit to digit. The equivalent of the natatory ligament in the first web is also called distal commissural ligament. They limit the spreading of the skin in the webs.

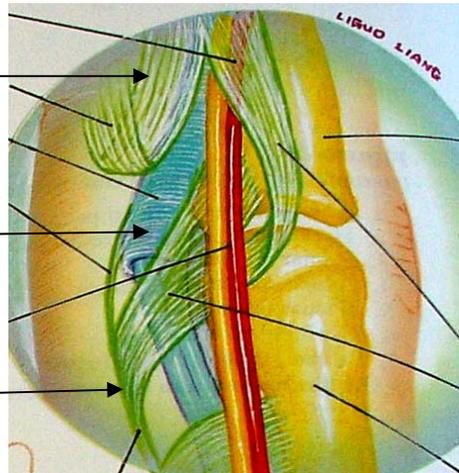
19. Bands of Palmar Fascia

Palmar

1. Central band
2. Natatory ligament
3. Pretendinous band



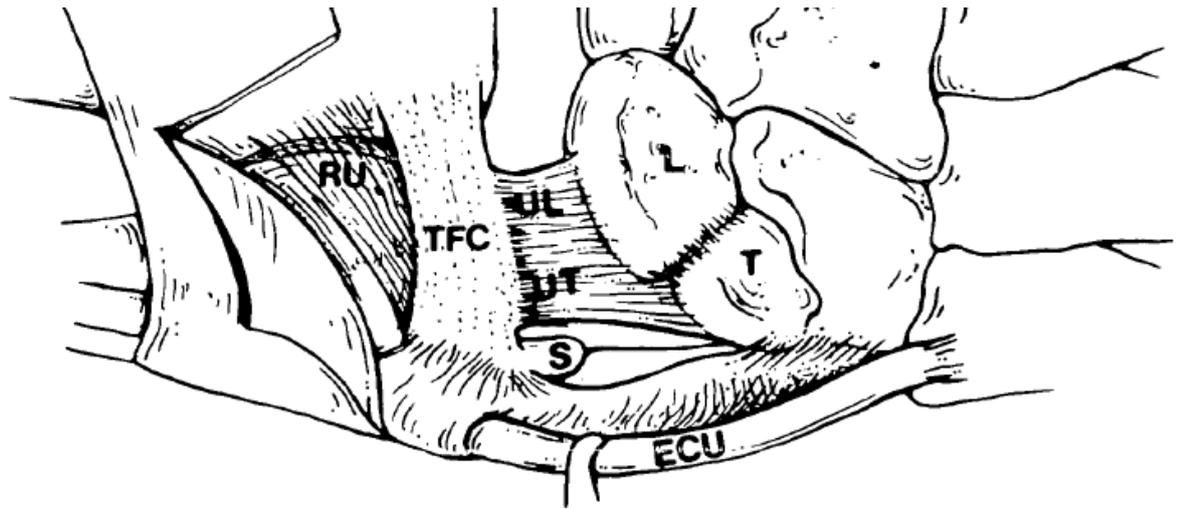
4. . Lateral digital sheet septum
5. Volar plate
6. Spiral band



20. TFCC complex (Taleisnik)

TFCC complex consists of

- Triangular fibrocartilage [TFC proper]
- Volar extension of disc: Ulnocarpal ligament (UC)
- ECU and its sheath (ECU)
- Distal RU capsular ligament
- Luno-triquetral interosseous ligament(LT)



Anatomy

The triangular fibrocartilage complex is composed of the articular disk (or TFC proper) spanning the distal radioulnar joint, the distal radioulnar capsular ligaments (RU), the suspensory ulnocarpal ligaments (UL, UT) attaching to the ulnar carpus, the extensor carpi ulnaris (ECU) sheath with its thick fibrocartilagenous floor, and the lunotriquetral (LT) interosseous ligament adjoining the distal confluence of the ulnocarpal ligaments. The articular disk (TFC) is the keystone of the complex as its integrity is essential to both distal radioulnar and ulnocarpal joint stability. (ER, extensor retinaculum; R, radius; S, ulnar styloid.) Conforming with this schematic, all illustrations that follow are depicted with the distal ulna to the left, the articular disk in the center, and the carpus to the right.

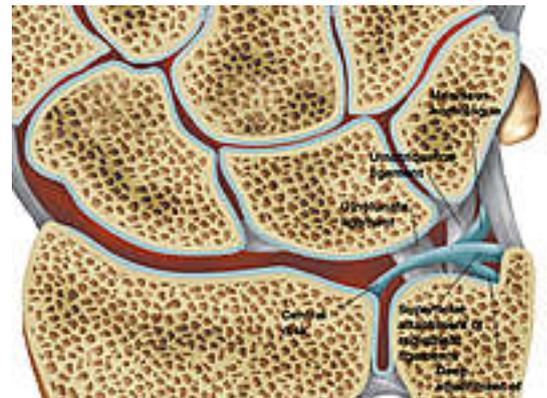
Triangular fibro cartilage [TFC]

It extends from sigmoid notch of the radius
to the base of styloid process of ulna.

It is a cartilaginous disc which is thinner in the centre.

At its periphery it is attached to Volar and dorsal RU ligament.

Ulnocarpal ligament is volar extension of the disc to Lunate and Triquetrum. It resists volar and ulnar displacement force created by the flexor. This ligament is attenuated in RA



21. Extensor Retinaculum

Thickened deep fascia at the dorsum of the wrist is extensor retinaculum. The vertical fibrous septae from the retinaculum to the radius and ulna form 6 compartments of the wrist. 1 compartment is at the radial side and VI at the ulnar side

Compartment Contents

I	APL, EPL
II	ECRL and ECRB
III	EPL
IV	ED, EI
V	EDMi
VI	ECU

