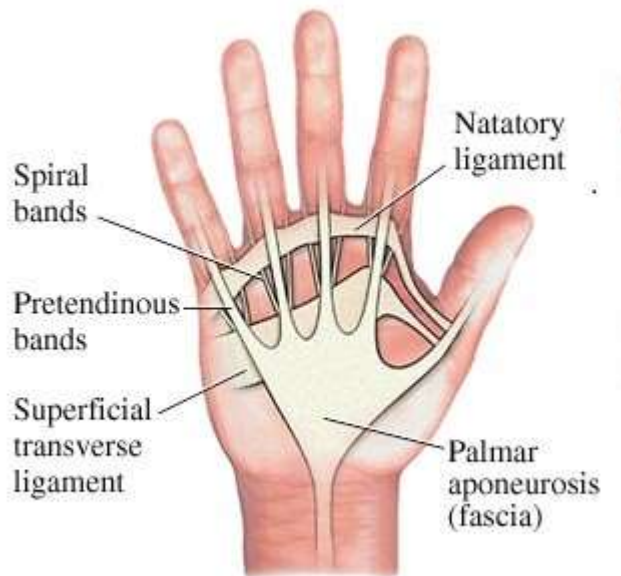


PALM

Palmar aponeurosis (LE)/ (SE)

Palmar aponeurosis is the deep fascia in the central region of the palm.
It is regarded as the degenerated tendon of palmaris longus.



Features

It is Triangular in shape and has
Apex, Base, Medial border and Lateral border

Apex

Is the narrow proximal end.

It blends with flexor retinaculum.

Base

is the broad distal end

divides into four longitudinal slips proximal to heads of metacarpals
to medial four digits

each slip further divides into two slips which blend with fibrous flexor sheath of
corresponding digits.

The digital nerves, vessels and tendon of lumbricals emerge through the interval
between four longitudinal slips

Medial border

Continuous with deep fascia covering the hypothenar muscles

Gives origin to palmaris brevis

Lateral border

Continuous with deep fascia covering the thenar muscles

From the medial and lateral borders, medial and lateral palmar septa pass backwards and
divide the palm into compartments.

Functions:

- Helps to improve the grip of hand by fixing the skin
- Protects the underlying tendons, nerves and vessels

ADDUCTOR POLLICIS MUSCLE (SE)

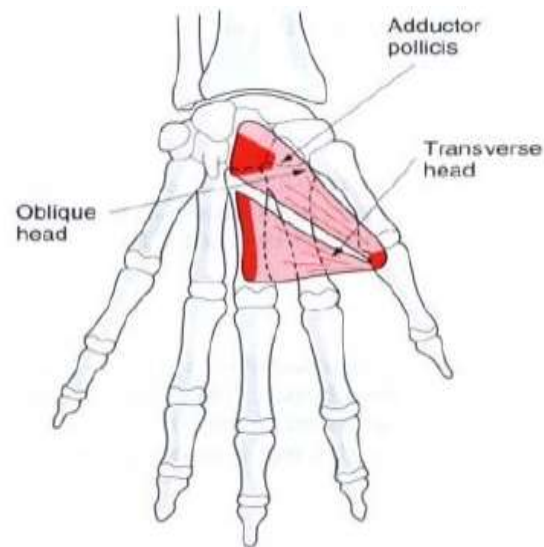
Adductor pollicis is a fan shaped muscle located deep in the palm.

Origin

Consists of two heads **(a) oblique (b) transverse**

Oblique head : base of 2nd and 3rd metacarpal

Transverse head: shaft of 3rd metacarpal

**Insertion:**

Base of proximal phalanx of thumb

Nerve supply:

Deep branch of *ulnar nerve* (C8, T1)

Action:

Adduction of the thumb

Lumbricals - attachments , nerve supply and actions (SE)/**Nerve supply and actions (SA)**

Lumbricals are four small, worm-like muscles in each hand.

Origin

All arise from 4 tendons of flexor digitorum profundus.

Lumbricals 1 and 2 (unipennate)

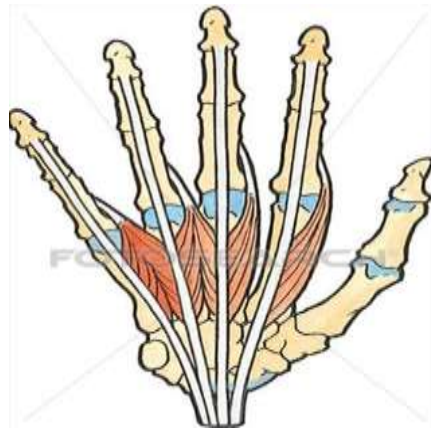
From lateral side of lateral two tendons of flexor digitorum profundus

Lumbricals 3 and 4 (bipennate)

From adjacent sides of medial three tendons of flexor digitorum profundus

Insertion

To lateral side of dorsal digital expansion of 2nd to 5th digits



Nerve supply

1st and 2nd lumbricals - median nerve

3rd and 4th lumbricals- deep branch of ulnar nerve

Actions

Flexion at metacarpophalangeal joints

Extension at proximal and distal interphalangeal joints

PALMAR APONEUROSIS (SA)

It is central part of the **deep fascia** of the palm and degenerated tendon of palmaris longus.

Features

It is triangular in shape

It has Apex, Base, Medial border, & Lateral border

Apex

Is the narrow proximal end.

It blends with flexor retinaculum.

Base

Is the broad distal end

Divides into four longitudinal slips to medial four digits

Each slip further divides into two slips which blend with fibrous flexor sheath of corresponding digits.

The digital nerves, vessels and tendon of lumbricals emerge through the interval between four longitudinal slips

Medial border

Continuous with deep fascia covering the hypothenar muscles

Gives origin to palmaris brevis

Lateral border

Continuous with deep fascia covering the thenar muscles

Functions

(1) Helps to improve the grip of hand by fixing the skin

(2) Protects the underlying tendons, nerves and vessels

ADDUCTOR POLLICIS (SA)

Origin:

Oblique head : base of 2nd and 3rd metacarpal

Transverse head: shaft of 3rd metacarpal

Insertion:

Base of proximal phalanx of thumb

Nerve supply

Deep branch of ulnar nerve (C8, T1)

Actions

Adduction of the thumb

MUSCLES OF HYPOTHENAR EMINENCE (SA)

(a) abductor digiti minimi

(b) flexor digiti minimi

(c) opponens digiti minimi

Supplied by deep branch of ulnar nerve.

NERVE SUPPLY OF DORSAL INTEROSSEI OF HAND (SA)

All the four dorsal interossei are supplied by deep branch of ulnar nerve.

ACTIONS OF INTEROSSEI OF HAND (SA)**Palmar interossei:**

Adduct fingers towards centre of middle finger

Dorsal interossei:

Abduct fingers from centre of third digit.

Both palmar and dorsal interossei flex the metacarpophalangeal joints and extend the interphalangeal joints.

DUPUYTREN'S CONTRACTURE (SA)

It is a condition in which there is fixed forward curvature of one or more fingers,

Cause

Progressive fibrosis in the medial part of palmar aponeurosis



Results in permanent contraction



Causing fixed flexion deformity of little and ring fingers



Proximal and middle phalanges are acutely flexed but distal phalanges remain unaffected.

POSTERIOR COMPARTMENT OF FOREARM**SUPINATOR MUSCLE (SE)**

Supinator is a deep muscle of forearm.

Origin

Lateral epicondyle of humerus

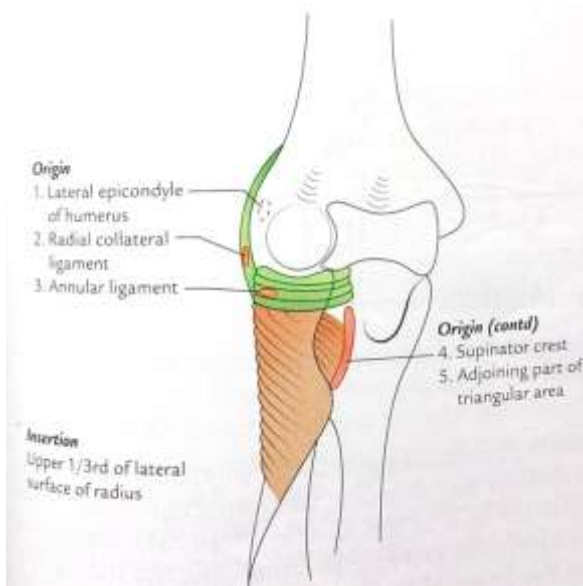
Lateral ligament of elbow joint

Annular ligament

Supinator crest of ulna.

Insertion

Upper 1/3rd of posterior, lateral and anterior surface of radius.



Nerve supply

Posterior interosseous nerve - branch of radial nerve.

Action

Supination of forearm.

Posterior interosseus nerve (SE)

Posterior interosseus nerve is the deep terminal branch of radial nerve.

It is the chief nerve of the back of forearm.

It begins at the cubital fossa and passes through supinator muscle to reach the back of forearm.

It ends in a pseudoganglion in the 4th compartment of extensor retinaculum.

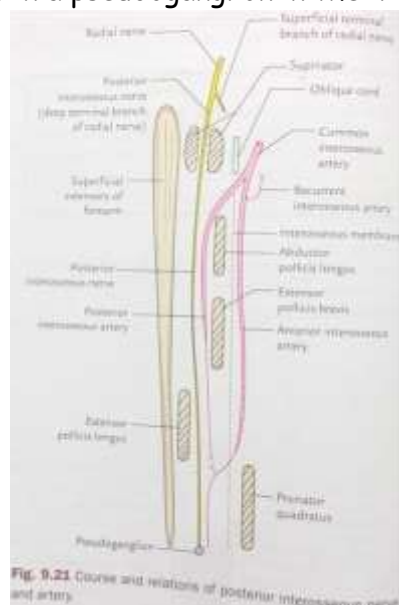


Fig. 9.21 Course and relations of posterior interosseous nerve and artery.

Branches

Muscular branches - to the extensor group of muscles

To extensor carpi radialis brevis, supinator, extensor digitorum, extensor digiti minimi, extensor carpi ulnaris, abductor pollicis longus, extensor pollicis brevis, extensor pollicis longus, extensor indicis.

Articular branches to wrist joint, distal radioulnar joint.

Sensory branches to radius and ulna.

RETINACULA AND SPACES OF HAND

Name the spaces in the palm. Describe the boundaries of midpalmar space.

Add a note on its applied anatomy (LE)

Boundaries and contents of midpalmar space (SA)

Spaces in the palm-

Midpalmar space

Thenar space

Web space

Pulp space

Midpalmar space

Boundaries-

Anterior

skin, superficial fascia, medial part of palmar aponeurosis, superficial palmar arch, ulnar bursa

Posterior

3rd and 4th dorsal and palmar interossei with the anterior interosseous fascia covering them

Medial

hypothenar septum (medial palmar septum)

Lateral

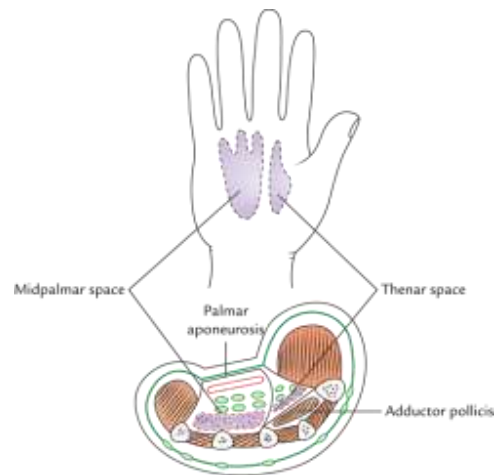
midpalmar septum separating it from the thenar space

Distal

space is continuous with medial 3 web spaces through lumbrical canals

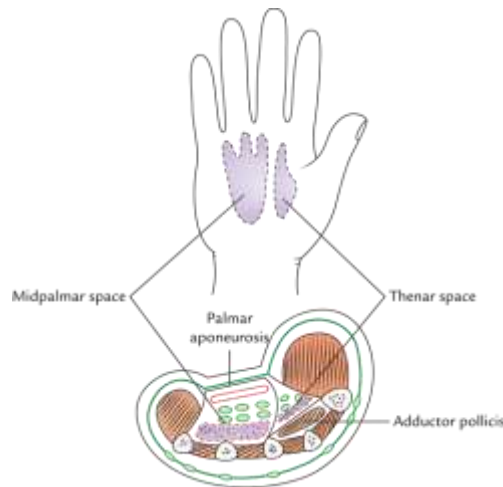
Proximal

space is continuous with space of parona in the forearm between flexor tendons and pronator quadratus



Contents - 2nd, 3rd, 4th lumbrical muscles

Applied anatomy - Infections may spread into the midpalmar space through ulnar bursa and can spread to lumbrical canals and web space. The pus in the space is drained by putting vertical incision in the medial 2 web spaces



FLEXOR RETINACULUM OF HAND (SE)

FLEXOR RETINACULUM ATTACHMENTS (SA)

STRUCTURES SUPERFICIAL TO FLEXOR RETINACULUM (SA)

It is thickened part of deep fascia over the carpus

Attachments

Medial

pisiform, hook of hamate

Lateral

tubercle of scaphoid, crest of trapezium. Near the trapezium it splits into two slips, superficial attaches to crest and deep to medial margin of groove on trapezium.

Upper margin-

continues with deep fascia of forearm and Palmaris longus

Lower margin-

gives attachment to the apex of palmar aponeurosis

It gives origin to thenar and hypothenar muscles of hand

Relations

Superficial to flexor retinaculum

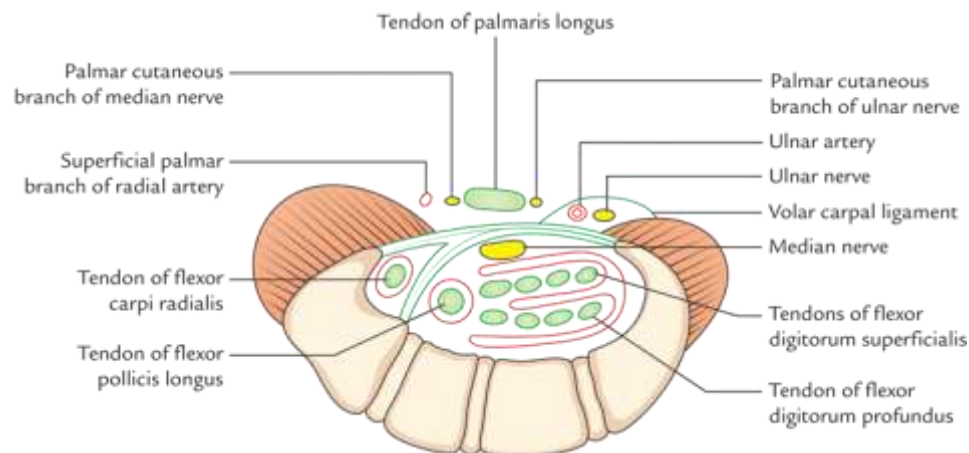
ulnar nerve, ulnar vessels, palmar cutaneous branch of ulnar nerve, tendon of Palmaris longus, palmar cutaneous branch of median nerve, superficial palmar branch of radial artery

Deep to flexor retinaculum

long flexor tendons of digits, median nerve

Applied anatomy-

carpal tunnel syndrome-



median nerve is compressed leading to burning pain along three and half fingers and wastage of thenar muscles

CARPAL TUNNEL SYNDROME (SE)

Carpal tunnel syndrome (CTS) is a medical condition due to compression of the median nerve as it travels through the wrist at the carpal tunnel

Causes- Exact cause is not known

Risk factors include obesity, repetitive wrist work eg computer work vibrating tools, pregnancy hypothyroidism and rheumatoid arthritis.

Symptoms

The main symptoms are pain, numbness and tingling, in the thumb, index finger, middle finger, and the thumb side of the ring fingers.

Symptoms typically start gradually and during the night. Pain may extend up the arm. Weak grip strength may occur and after a long period of time the thenar muscles may waste away. In more than half of cases both sides are affected.

Treatment

Symptoms can be improved by wearing a wrist splint or with corticosteroid injections. Surgery to cut the transverse carpal ligament is effective with better results

PALMAR APONEUROSIS (SE)

It is triangular deep fascia which occupies central area of palm and has following features

Apex

It is directed proximally and attached to flexor retinaculum.

Base

Is directed distally and divides into 4 slips. Each slip divides into two bands one passing to skin, and the other passing deep to the root of finger and attached to fibrous flexor sheath and deep transverse ligaments.

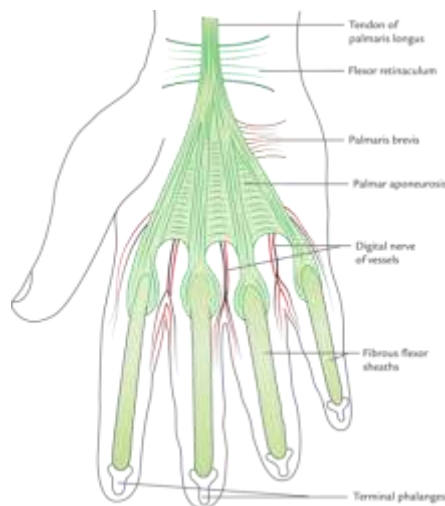
Medial and lateral borders

Are continuous with thinner deep fascia covering hypothenar and thenar muscles and sends septa posteriorly.

Functions

The palmar aponeurosis give firm attachment to the overlying skin, improves the grip and protect the underlying tendons

Clinical anatomy - Dupuytren's contracture- localized thickening and contracture of palmar aponeurosis which limits the hand functioning and eventually disable the hand.



EXTENSOR RETINACULUM OF WRIST (SE)

Attachments-

Medial-

triquetral, pisiform bones

Lateral-

lower part of anterior border of radius

The retinaculum sends five septa and divides the space beneath it into 6 compartments. The structures passing through the compartments are as follows

1st compartment- abductor pollicis longus, extensor pollicis brevis

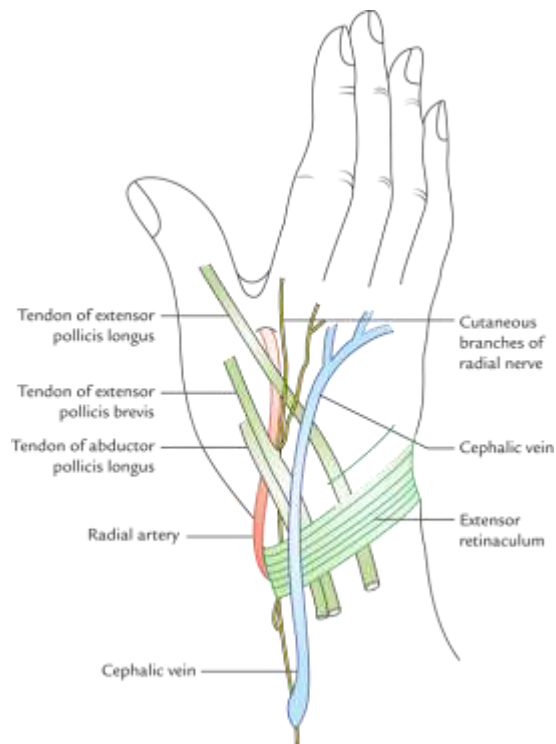
2nd compartment- extensor carpi radialis longus, extensor carpi radialis brevis

3rd compartment- extensor pollicis longus

4th compartment- extensor digitorum, extensor indicis, anterior interosseous artery, posterior interosseous nerve

5th compartment- extensor digiti minimi

6th compartment- extensor carpi ulnaris



STRUCTURES PASSING THROUGH CARPAL TUNNEL (SA)

Tendons of Flexor digitorum superficialis

flexor digitorum profundus

median nerve

STRUCTURES AFFECTED IN CARPAL TUNNEL SYNDROME (SA)

Tendons of Flexor digitorum superficialis

flexor digitorum profundus

median nerve

PALMAR APONEUROSIS (SA)

The palmar aponeurosis give firm attachment to the overlying skin, improves the grip and protect the underlying tendons

Apex is directed proximally and attached to flexor retinaculum

Base is directed distally and divides into 4 slips. Each slip is attached to skin, fibrous flexor sheath and deep transverse ligaments.

Medial and lateral borders are continuous with thinner deep fascia covering hypothenar and thenar muscles and sends septa posteriorly.

FASCIAL SPACES OF HAND (SA)

They are certain potential spaces which become obvious when infected

Dorsal spaces of hand-

Dorsal subcutaneous space

Dorsal subaponeurotic space posterior interosseous space

Palmar spaces-

Midpalmar space

Thenar space

Web space

Pulp space

CONTENTS OF 4TH COMPARTMENT UNDER EXTENSOR RETINACULUM OF HAND (SA)

extensor digitorum

extensor indicis

anterior interosseous artery

posterior interosseous nerve

CARPAL TUNNEL SYNDROME (SA)

median nerve is compressed due to thickening of synovial sheaths of fingers or fracture dislocation of carpal bones leading to burning pain along three and half fingers and wastage of thenar muscles

DUPUYTREN'S CONTRACTURE (SA)

It is a localized thickening and contracture of palmar aponeurosis which limits the hand functioning and eventually disable the hand