

## Front of forearm.

Q. Skin incision of forearm.

Q. Write down the origin, insertion, nerve supply and action of the muscles of front of forearm in a tabulated form.

Ans.

• Read the skin incision from Monnan's dissection book.

• Read the table of BD that is in front of forearm chapter. You can take help from the figure of attachment of bone either from BD or Atlas.

(All muscles of front of forearm are supplied by median nerve except flexor carpi ulnaris & medial half of flexor digitorum profundus are supplied by Ulnar nerve)

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✓ **Table 9.1: Attachment of the superficial muscles**

Muscle	Origin	Insertion
1. <b>Pronator teres</b>	Medial epicondyle of humerus	Middle of lateral aspect of shaft of radius
2. <b>Flexor carpi radialis</b>	Medial epicondyle of humerus	Bases of second and third metacarpal bones
3. <b>Palmaris longus</b>	Medial epicondyle of humerus	Flexor retinaculum and palmar aponeurosis
4. <b>Flexor digitorum superficialis</b> (see Figs 2.22 and 9.8)		
• Humeroulnar head	Medial epicondyle of humerus; medial border of coronoid process of ulna	Muscle divides into 4 tendons. Each tendon divides into 2 slips which are inserted on sides of middle phalanx of 2nd to 5th digits (Fig. 9.3b)
• Radial head	Anterior oblique line of shaft of radius	
5. <b>Flexor carpi ulnaris</b>		
• Humeral head	Medial epicondyle of humerus	Pisiform bone; insertion prolonged to hook of the hamate and base of fifth metacarpal bone (see Fig. 2.32a)
• Ulnar head	Medial aspect of olecranon process and posterior border of ulna	

Table 9.2: Nerve supply and actions of the superficial muscles

<i>Muscle</i>	<i>Nerve supply</i>	<i>Actions</i>
1. <b>Pronator teres</b>	<u>Median nerve</u>	<u>Pronation</u> of forearm
2. <b>Flexor carpi radialis</b>	Median nerve	Flexes and abducts hand at wrist joint
3. <b>Palmaris longus</b>	Median nerve	Flexes wrist joint
4. <b>Flexor digitorum superficialis</b> (Figs 9.4 and 9.5)	Median nerve	Flexes middle phalanx of fingers and in flexing proximal phalanx and wrist
5. <b>Flexor carpi ulnaris</b>	Ulnar nerve	Flexes and adducts the hand at the wrist

Table 9.3: Attachments of the deep muscles

Muscle	Origin	Insertion
1. <b>Flexor digitorum profundus</b> (composite or hybrid muscle) (Figs 9.5 and 9.7)	<ul style="list-style-type: none"> <li>Upper three-fourths of the anterior and medial surface of the shaft of ulna</li> <li>Upper three-fourths of the posterior border of ulna</li> <li>Medial surface of the olecranon and coronoid processes of ulna</li> <li>Adjoining part of the anterior surface of the interosseous membrane</li> </ul>	<ul style="list-style-type: none"> <li>The muscle forms 4 tendons for the medial 4 digits which enter the palm by passing deep to the flexor retinaculum in ulnar bursa and digital synovial sheaths</li> <li>Opposite the proximal phalanx of the corresponding digit, the tendon perforates the tendon of the flexor digitorum superficialis (Fig. 9.8)</li> <li>Each tendon is inserted on the palmar surface of the base of the distal phalanx (Fig. 9.3b)</li> </ul>
2. <b>Flexor pollicis longus</b>	<ul style="list-style-type: none"> <li>Upper three-fourths of the anterior surface of the shaft of radius (see Fig. 2.22)</li> <li>Adjoining part of the anterior surface of the interosseous membrane</li> </ul>	<ul style="list-style-type: none"> <li>The tendon enters the palm by passing deep to the flexor retinaculum</li> <li>It is inserted into the palmar surface of the distal phalanx of the thumb</li> </ul>
3. <b>Pronator quadratus</b>	Oblique ridge on the lower one-fourth of anterior surface of the shaft of ulna, and the area medial to it (see Fig. 2.22)	<ul style="list-style-type: none"> <li>Superficial fibres into the lower one-fourth of the anterior surface and the anterior border of the radius</li> <li>Deep fibres into the triangular area above the ulnar notch</li> </ul>

Table 9.4: Nerve supply and actions of the deep muscles

Muscle	Nerve supply	Actions
1. <b>Flexor digitorum profundus</b> (Fig. 9.4)	<ul style="list-style-type: none"> <li>Medial half by ulnar nerve</li> <li>Lateral half by anterior interosseous nerve (C8, T1) (branch of median nerve)</li> </ul>	<ul style="list-style-type: none"> <li>Flexor of distal phalanges after the flexor digitorum superficialis has flexed the middle phalanges</li> <li>Secondarily, it flexes the other joints of the digits, fingers, and the wrist</li> <li>It is the chief gripping muscle. It acts best when the wrist is extended</li> </ul>
2. <b>Flexor pollicis longus</b>	Anterior interosseous nerve	<ul style="list-style-type: none"> <li>Flexes the distal phalanx of the thumb. Continued action may also flex the proximal joints crossed by the tendon</li> </ul>
3. <b>Pronator quadratus</b>	Anterior interosseous nerve	<ul style="list-style-type: none"> <li>Superficial fibres pronate the forearm</li> <li>Deep fibres bind the lower ends of radius and ulna</li> </ul>

## Palm of the hand

- Superficial fascia and modification of deep fascia
- Flexor retinaculum - Short note.
- Structures passing superficial & deep to the flexor retinaculum.
- Palmar aponeurosis - Short note?
- What is Dupuytren's contracture?
- Write in tabulated form the names of muscle, nerve supply and action of all muscles of palm of the hand.
- Write ~~do~~ down the origin, insertion, nerve supply and action of Lumbricals, palmar & dorsal interossei.

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Table 9.6: Nerve supply and actions of small muscles of the hand

Muscle	Nerve supply	Actions
<b>Muscles of thenar eminence</b>		
Abductor pollicis brevis (Fig. 9.20)	Median nerve	Abduction of thumb Flexes <sup>of the</sup> metacarpophalangeal joint of thumb
Flexor pollicis brevis	Median nerve	Pulls thumb medially and forward across palm (opposes thumb towards the fingers)
Opponens pollicis	Median nerve	
<b>Adductor of thumb</b>		
Adductor pollicis	Deep branch of ulnar nerve which ends in this muscle	Adduction of thumb
<b>Muscle of medial side of palm</b>		
Palmaris brevis	Superficial branch of ulnar nerve	Wrinkles skin to improve grip of palm
<b>Muscles of hypothenar eminence</b>		
Abductor digiti minimi	Deep branch of ulnar nerve	Abducts little finger
Flexor digiti minimi	Deep branch of ulnar nerve	Flexes little finger
Opponens digiti minimi	Deep branch of ulnar nerve	Pulls fifth metacarpal forward as in cupping the palm
<b>Lumbricals (Fig. 9.21)</b>		
Lumbricals (4)	First and second, i.e. lateral two by median nerve; third and fourth by deep branch of ulnar nerve	<sup>of the</sup> Flex <u>metacarpophalangeal joints</u> , extend <u>interphalangeal joints</u> of 2nd–5th digits
<b>Palmar interossei</b>		
Palmar (4) (Fig. 9.24b)	Deep branch of ulnar nerve	Palmar interossei <u>adduct fingers</u> towards centre of third digit or middle finger <sup>Ab</sup> <u>Adduction</u>
<b>Dorsal interossei</b>		
Dorsal (4) (Figs 9.23 and 9.24a)	Deep branch of ulnar nerve	Dorsal interossei <u>abduct fingers</u> from centre of third digit. Both palmar and dorsal interossei flex the metacarpophalangeal joints and extend the interphalangeal joints

**Lumbricals (Fig. 9.21)**

Lumbricals (4)

Arise from 4 tendons of flexor digitorum profundus

2nd layer

2nd layer

- 1st Lateral side of tendon of flexor digitorum profundus of 2nd digit
- 2nd Lateral side of same tendon of 3rd digit
- 3rd Adjacent sides of same tendons of 3rd and 4th digits
- 4th Adjacent sides of same tendons of 4th and 5th digits

Via extensor expansion into dorsum of bases of distal phalanges

**Palmar interossei**

Palmar (4)  
(Fig. 9.24b)

4th layer

- 1st Medial side of base of 1st metacarpal
- 2nd Medial side of shaft of 2nd metacarpal
- 3rd Lateral side of shaft of 4th metacarpal
- 4th Lateral side of shaft of 5th metacarpal

Medial side of base of proximal phalanx of thumb or 1st digit  
Via extensor expansion into dorsum of bases of distal phalanges of 2nd, 4th and 5th digits (Fig. 9.54)

**Dorsal interossei**

Dorsal (4)  
(Fig. 9.24a)

4th layer

- 1st Adjacent sides of shafts of 1st and 2nd MC
- 2nd Adjacent sides of shafts of 2nd and 3rd MC
- 3rd Adjacent sides of shafts of 3rd and 4th MC
- 4th Adjacent sides of shafts of 4th and 5th MC

Via extensor expansion into dorsum of bases of distal phalanges of 2nd, 3rd, 3rd and 4th digits

## Flexor Retinaculum

Flexor retinaculum (Latin *to hold back*) is a strong fibrous band which bridges the anterior concavity of the carpal bones and converts it into a tunnel, the *carpal tunnel* (Fig. 9.15).

### Attachments

Medially, to

- 1 The pisiform bone.
- 2 The hook of the hamate.

Laterally, to

- 1 The tubercle of the scaphoid, and
- 2 The crest of the trapezium.

On either side, the retinaculum has a slip:

- 1 The lateral deep slip is attached to the medial lip of a groove on the trapezium which is thus converted into a tunnel for the tendon of the flexor carpi radialis.
- 2 The medial superficial slip (*volar carpal ligament*) is attached to the pisiform bone. The ulnar vessels and nerves pass deep to this slip (Figs 9.15 and 9.16).

on the trap

### Palmar Aponeurosis

This term is often used for the entire deep fascia of the palm. However, it is better to restrict this term to the central part of the deep fascia of the palm which covers the superficial palmar arch, the long flexor tendons, the terminal part of the median nerve, and the superficial branch of the ulnar nerve (Fig. 9.16).

### Features

W+V  
Palmaris longus

Palmar aponeurosis is triangular in shape. The apex which is proximal, blends with the flexor retinaculum and is continuous with the tendon of the palmaris longus. The base is directed distally. It divides into superficial and deep strata, superficial is attached to dermis. Deep strata divides into four slips opposite the heads of the metacarpals of the medial four digits. Each slip divides into two parts which are continuous with the fibrous flexor sheaths. Extensions pass to the deep transverse metacarpal ligament, the capsule of the metacarpophalangeal joints and the sides of the base

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