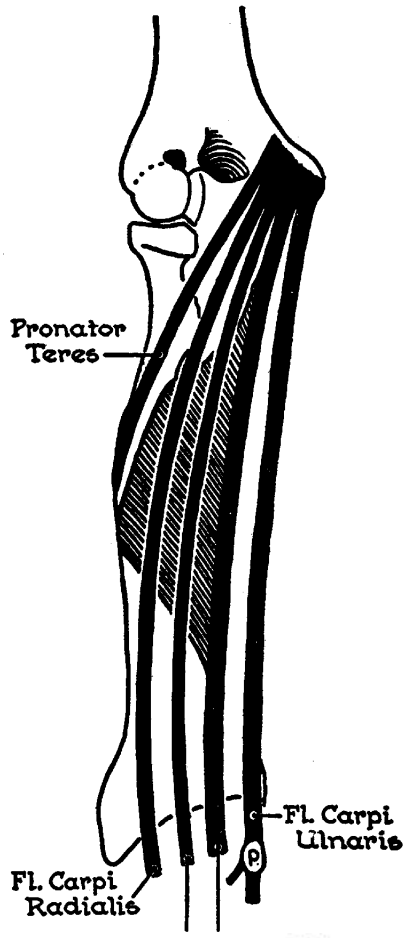
213: HUMAN FUNCTIONAL ANATOMY:

PRACTICAL CLASS 5: Forearm and Hand

FOREARM (Anterior compartment)

Identify the common flexor origin which is the fibrous extension of the medial collateral ligament of the elbow and extends a little way up the medial supracondylar line. Five superficial flexor muscles of the forearm arise from it:

Flexor carpi ulnaris
Flexor digitorum superficialis
Palmaris longus
Flexor carpi radialis
Pronator teres.



Trace the ulnar nerve behind the medial epicondyle, through the common flexor origin and among the muscles to the wrist.

What artery accompanies the ulna nerve? _____

What muscles does the ulnar nerve supply?

Forearm _____

_____

Hand _____

_____

What areas of skin are supplied by the ulnar nerve? _____

_____

_____

The median nerve enters with the brachial artery in front of the elbow – Trace it to the wrist.

What muscles does the median nerve supply?

Forearm _____

_____

Hand _____

_____

What areas of skin are supplied by the median nerve?

_____

_____

_____

Are the muscles of the anterior compartment and their nerve supplies embryologically dorsal or ventral ___

_____

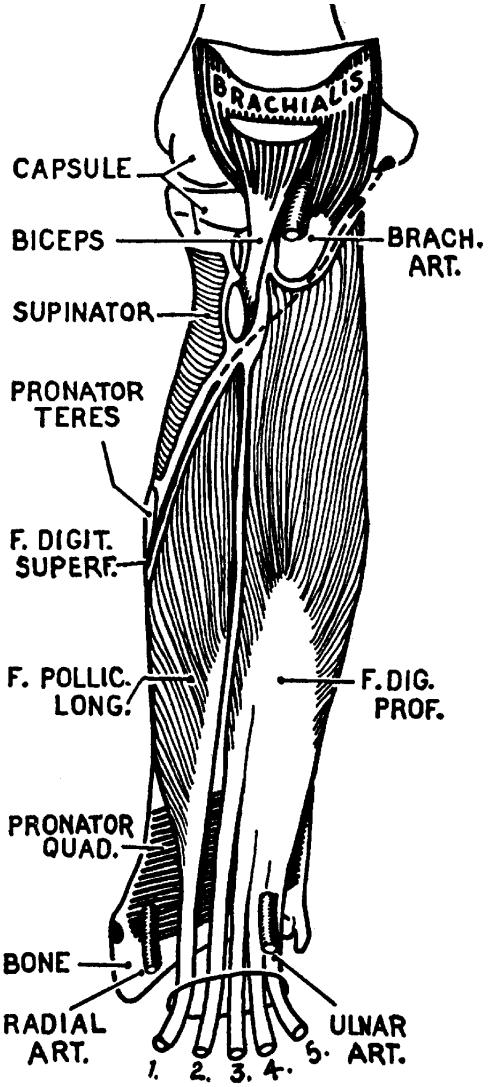
Follow the radial artery down the radial side of the forearm. It travels with the superficial branch of the radial nerve.

Examine the deeper muscles of the anterior compartment which take origin from the radius, ulna the and interosseous membrane.:

Flexor digitorum profundus

Flexor pollicis longus

Pronator quadratus



Identify the flexor retinaculum at the wrist, and the 9 tendons which pass through the carpal tunnel.

4x_____

_____

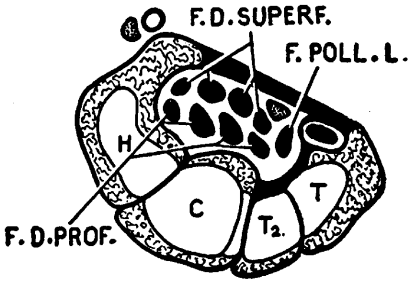
4x_____

_____

1x_____

_____

Notice that the median nerve goes through carpal tunnel but the ulnar nerve and artery pass superficial to the flexor retinaculum. Label them on the diagram below

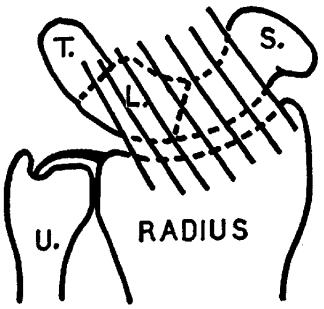


Pronation and supination

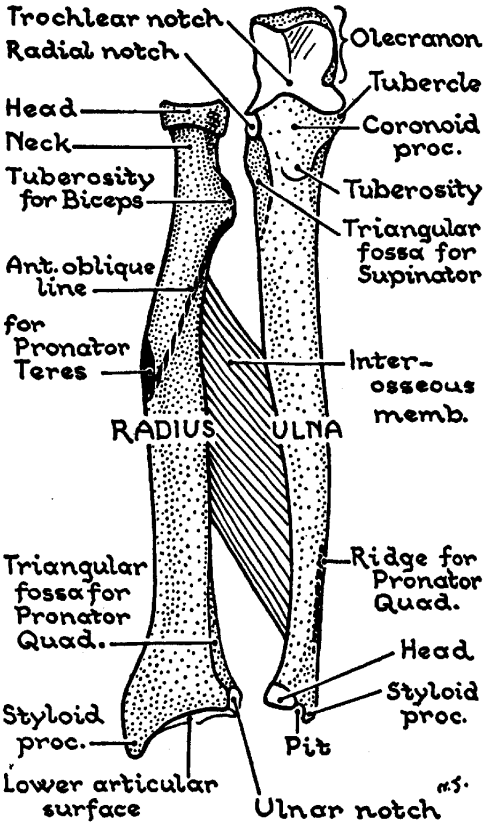
Study the bones and ligamentous prosections of the forearm and make sure you understand how the proximal, distal and intermediate radio-ulnar joints function in pronation and supination.

Notice how the head of the radius rotates within the annular ligament at the elbow, and how the distal end of the radius swivels around the head of the ulna distally

Notice also that all the pronators and supinator attach to the radius



Label the intrarticular disc of the distal radioulnar joint



Surface anatomy

Distal radioulnar joint Feel the head of your ulna at the wrist, now pronate and supinate your forearm and feel the ulnar head being covered and uncovered by the radius, also try to feel the ulnar styloid process.

Proximal radioulnar joint Feel the head of your radius at the elbow, now pronate and supinate and feel the it rotating inside the annular ligament.

Which muscles produce supination and pronation?

Pronation _____

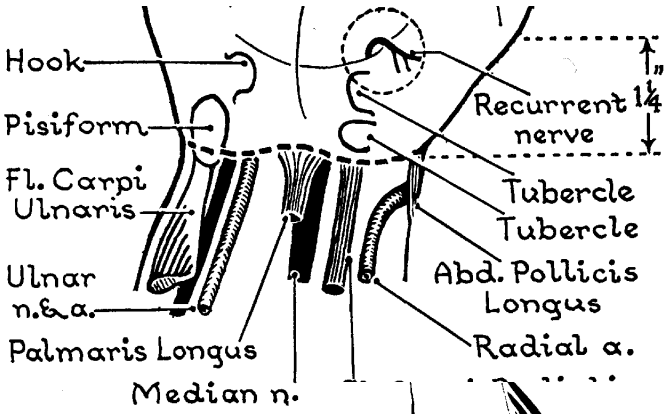
Supination _____

Hold your elbow at right angles and feel your biceps muscle, now pronate and supinate your forearm. Can you explain what you feel? _____

On the front of your own wrist, identify: your radial pulse, the tendon of flexor carpi radialis, tendons of flexor digitorum superficialis, and the tendon of flexor carpi ulnaris.

Can you find your ulnar pulse?

Do you have a palmaris longus tendon?.



FOREARM (Posterior compartment)

Identify the common extensor origin which is the fibrous extension of the lateral collateral ligament of the elbow and extends a up the lateral supracondylar line of the humerus. The superficial group of forearm extensor muscles arise from it:

Lateral group of superficial muscles:

Brachio-radialis

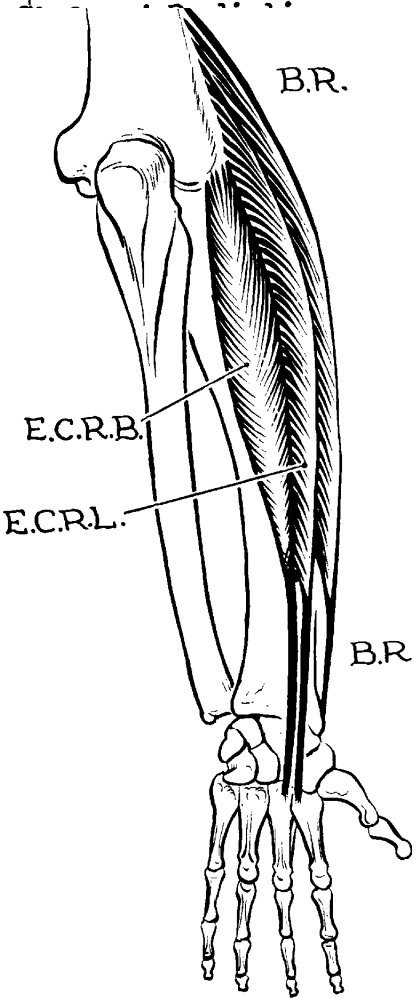
Extensor carpi radialis longus

Extensor carpi radialis brevis)

(Why) Is brachio-radialis a "misfit"_____

_____

_____



Find the radial nerve as it crosses the elbow under cover of the brachioradialis muscle. Here it gives off branches to the superficial group of posterior compartment muscles.

Note the superficial branch of the radial nerve (cutaneous) down the forearm beside brachioradialis.

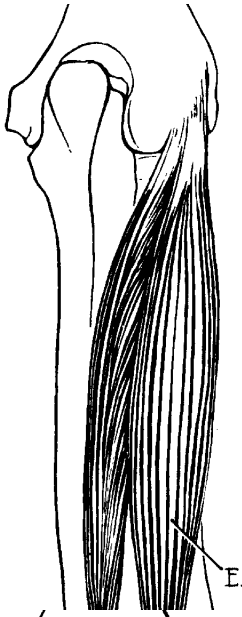
Find the deep branch of the radial nerve as it enters supinator muscle and passes around the radius to the back of the forearm, it supplies the deep group of posterior forearm muscles

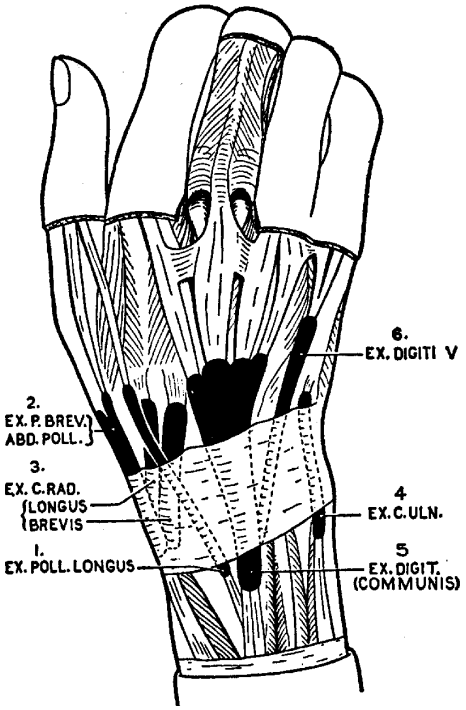
Medial group of superficial muscles: (also arising from a common extensor origin)

Extensor digitorum

Extensor digiti minimi

Extensor carpi ulnaris





Deep muscles of the posterior forearm: (arising from the back of the radius, ulna and interosseus membrane):

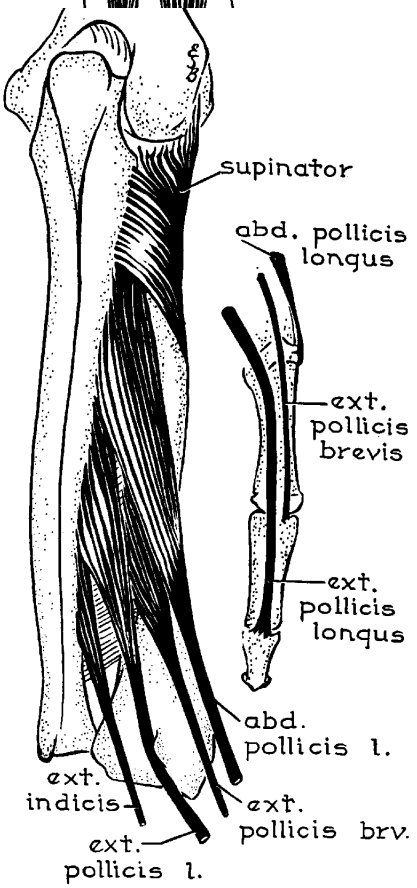
Supinator

Extensor indicis

Extensor pollicis longus

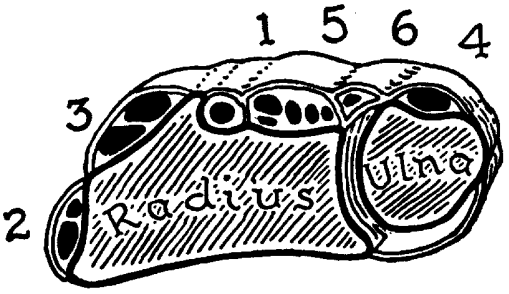
Extensor pollicis brevis

Abductor pollicis longus.



Follow the tendons of the muscles and see how they pass through the extensor retinaculum on the back of the radius and ulna at the wrist.

Label the tendons in the compartments (1 to 6) of the extensor retinaculum



Surface anatomy

On the lateral and posterior aspects of your own wrist try to identify the tendons of: extensor pollicis longus and brevis, abductor pollicis, extensor digitorum, extensor indicis and extensor digiti minimi.. Extend your thumb and identify the "anatomical snuff box". What two tendons form the boundaries of the anatomical snuff box?

_____

_____

Try to find the abductor pollicis longus tendon alongside extensor pollicis brevis on the lateral side of the snuffbox. Feel for the radial pulse in the snuffbox.

Are the muscles of the posterior compartment and their nerve supplies embryologically dorsal or ventral_____

MUSCLES MOVING THE WRIST

Flex and extend your wrist. How much movement can you produce?

Flexion _____

Extension _____

At which joint do these movements take place? _____

Adduct and abduct your wrist. How much movement can you produce?

Adduction _____

Abduction _____

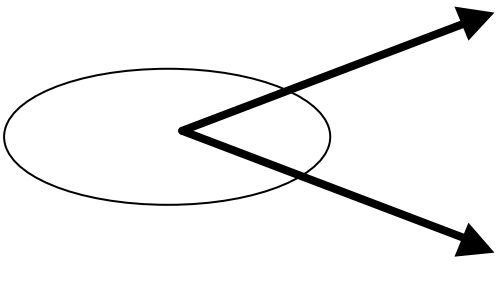
At which joint do these movements take place? _____

Using the diagram of the wrist joint below, add all the muscles crossing the wrist, place them in positions which reflect their potential for moving the wrist.

Flexion (palmar side)

Eg flexor carpi ulnaris

Abduction
(radial side)



Adduction
(ulnar side)

Eg. Ext carpi ulnaris

Extension (dorsal side)

Feel the tendons of flexor and extensor carpi ulnaris at the ulnar side of the wrist, and at the same time extend you thumb. Explain why these muscles contract during thumb extension _____

What term do you give to this kind of muscle action? _____

Clench your fist, unclench it, clench it again. What movement of the wrist accompanies finger flexion? _____

What muscles produce this wrist movement? _____

Why is this helpful? (Try clenching your fist with your wrist flexed) _____

What term do you give to this kind of muscle action _____

Shape you hand as if to grasp a screw driver, or golf club. What position does your wrist adopt? _____

What other activities require this wrist posture? _____

Practical anatomy checklist

Osteology

Radius and ulna
Parts, muscles, ligaments, joints and orientation

Muscle Compartments
Anterior compartment – superficial and deep

Posterior compartment – superficial and deep

Carpal tunnel
Bones and contents

Nerves
Radial, Ulnar and median nerves – course and distribution

Surface anatomy
Pronation and supination
Structures crossing the wrist