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M1 Musculoskeletal

Andrew R. Barnosky, DO, MPH, FACEP

Fall 2008





A 59 – year old postal worker is seen in the outpatient department and later admitted to the hospital. He reports that for the last three years he has experienced transitory periods of dizziness with vertigo, nausea, and occasional fainting spells. These episodes are accompanied by blurring of vision and generally last from only a few seconds to a few minutes.



Now, however, they are occurring more often and interfering with his occupation. He also has noticed occasional pain and numbness in the left arm that increase on exercise. In addition, his arm fatigues easily.



On examination of this well-nourished, not acutely ill patient, a marked difference in blood pressure between right and left arm is noted. The pressure is 180/95 in the right, 93/70 in the left. The carotid pulsations are normal, but there is diminished pulsation in the left supraclavicular fossa, accompanied by a systolic bruit, that is, an auscultatory murmur.



The brachial and radial pulses are diminished on the left compared to the right. On exercise of the left upper extremity, the patient complains of numbness and tingling in the arm, lightheadedness, and vertigo.



Radiographic examination of the aortic arch and its branches by injection of a contrast medium via the left brachial artery (retrograde aortography) demonstrates severe narrowing of the left subclavian artery proximal to the origin of its vertebral branch. Cineangiographic studies reveal retrograde flow in the left vertebral artery, with the flow directed toward the subclavian artery.

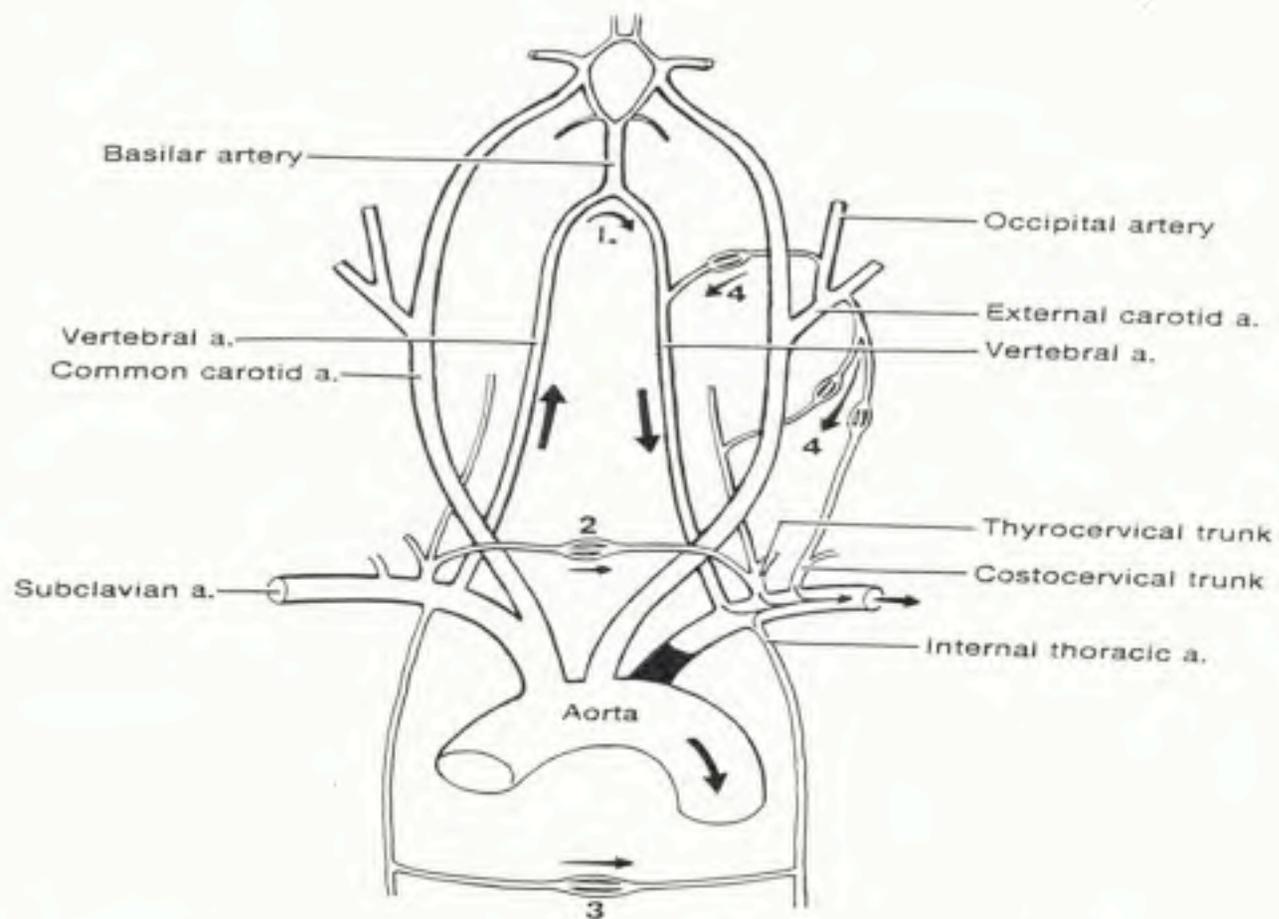


Figure 40-1. Various arterial pathways involved in proximal occlusion of the left subclavian artery. Collateral routes include branches of the two subclavian arteries such as the vertebrals (1), inferior thyroids (2), internal thoracics (3), and branches of the ipsilateral external carotid and subclavian arteries (4) distal to the occlusion.



A 13 year-old boy scout fell on his left shoulder while running down a steep incline and immediately complained of severe pain in the area of his collarbone. All movements of his left arm are painful. He tries to avoid painful motion by holding his left arm close to his body and by supporting the left elbow with his right hand.

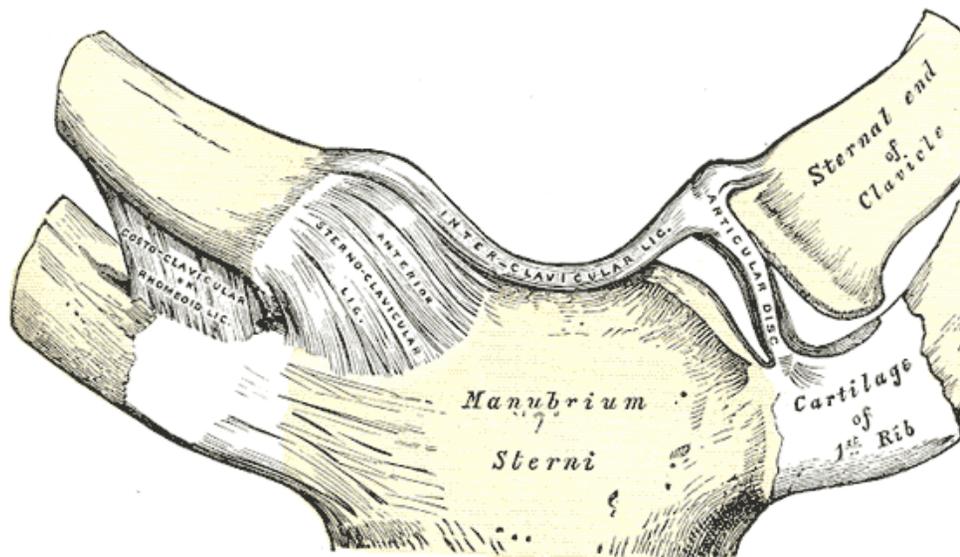


The boy is brought to a physician, who diagnoses a fracture of the clavicle. The fracture is located at the middle of the bone. There is marked tenderness and some swelling at the fracture site. Upon passing the finger along the border of the clavicle, the examiner can discern the projecting ends of the fragments.

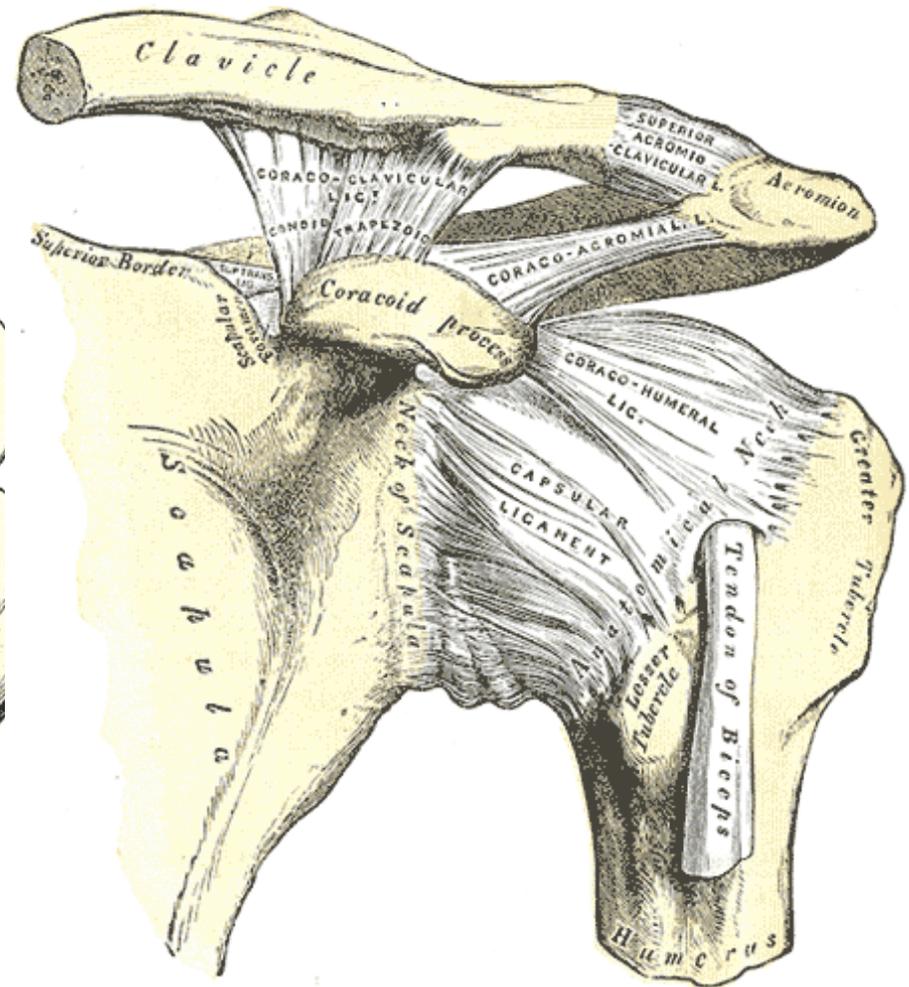


The sternal fragment is angulated upward. Passive movement of the left shoulder is quite painful. A radiograph confirms the diagnosis of clavicular fracture at the expected site and shows depression of the outer fragment.

Ligamentous Attachments of clavicle to sternum and acromion



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CLAVICLE FRACTURES

Middle Third Clavicle Fracture



CLAVICULAR FRACTURES

CLASS C: MEDIAL THIRD FRACTURES

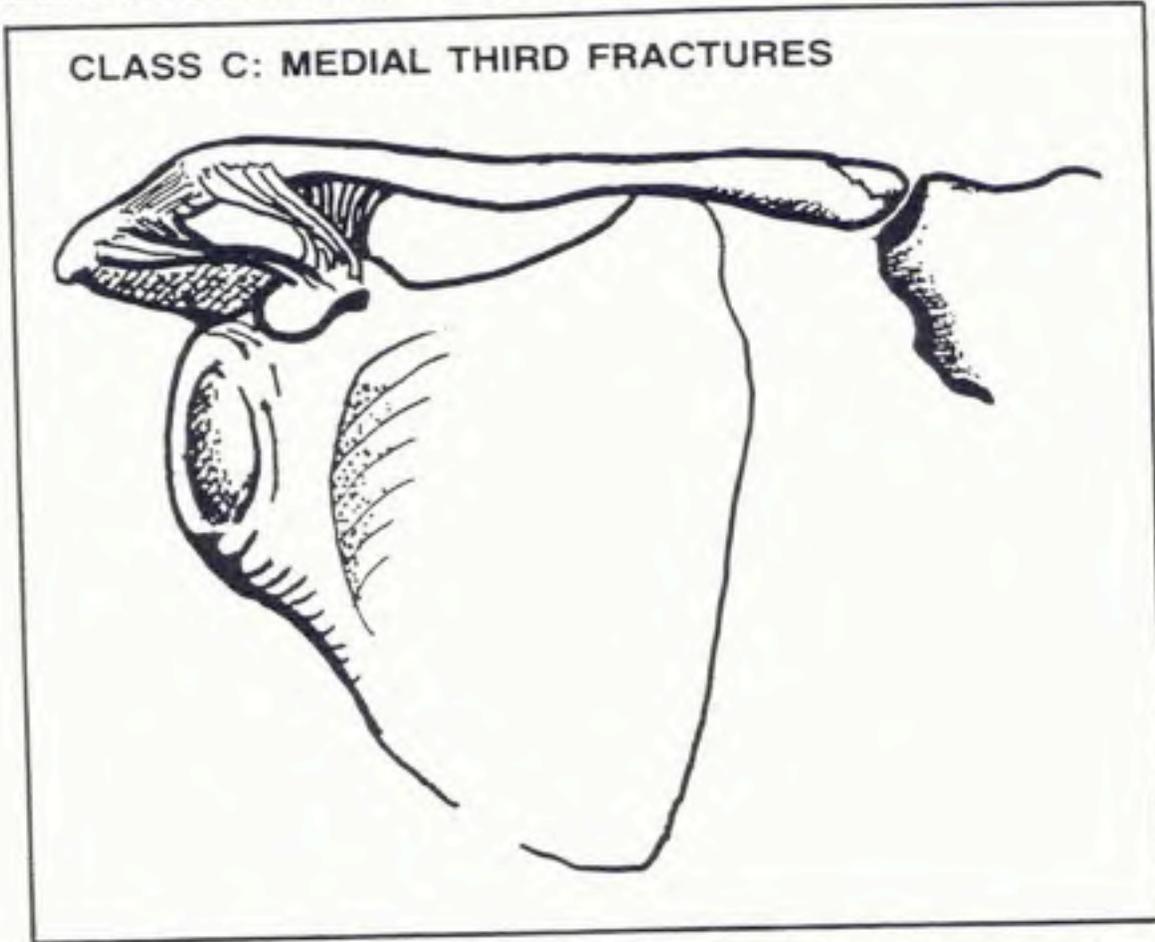


Figure 12-5. Fracture of the inner aspect of the clavicle involving the sternoclavicular joint. Tomograms may be necessary to visualize this.

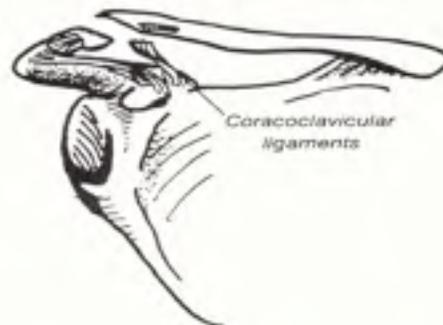
CLAVICULAR FRACTURES

CLASS B: DISTAL THIRD FRACTURES

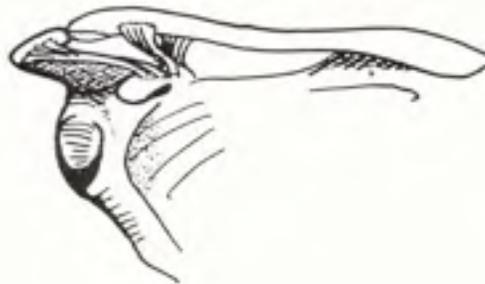
Type I: Nondisplaced, with ligaments intact



Type II: Displaced, with ligaments ruptured (unstable)



Type III: Articular surface involvement of the acromioclavicular joint



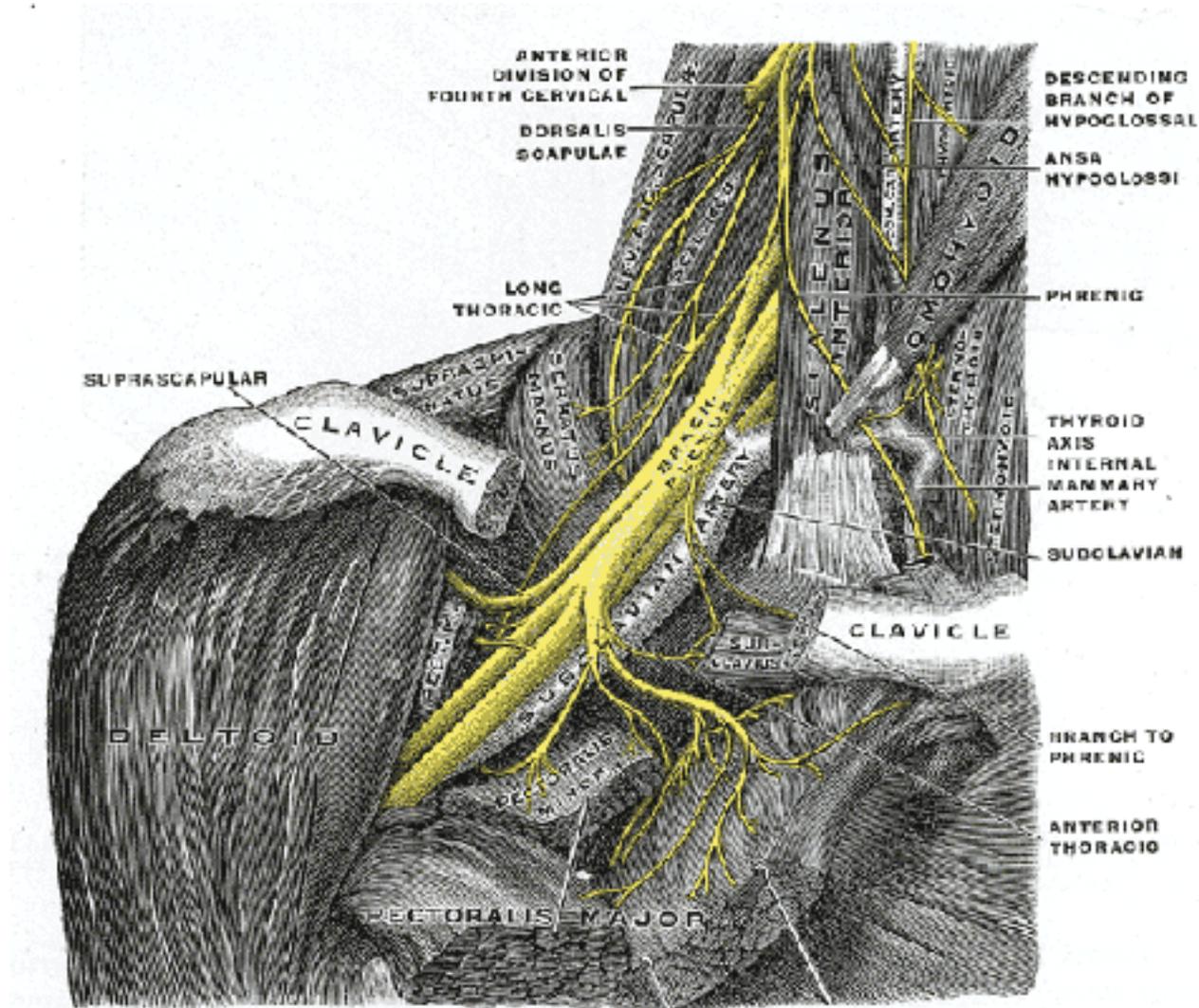


A 39 year-old woman has suffered for many years from “rheumatic” pains in the right arm. Recently, after the patient took on additional work, the pain worsened and now radiates down the medial side of the arm and forearm into the hand. Her pain increases toward the end of the day and at night. Sometimes the fingers on the ulnar side of the hand tingle and feel numb. The right arm seems weaker than the left.

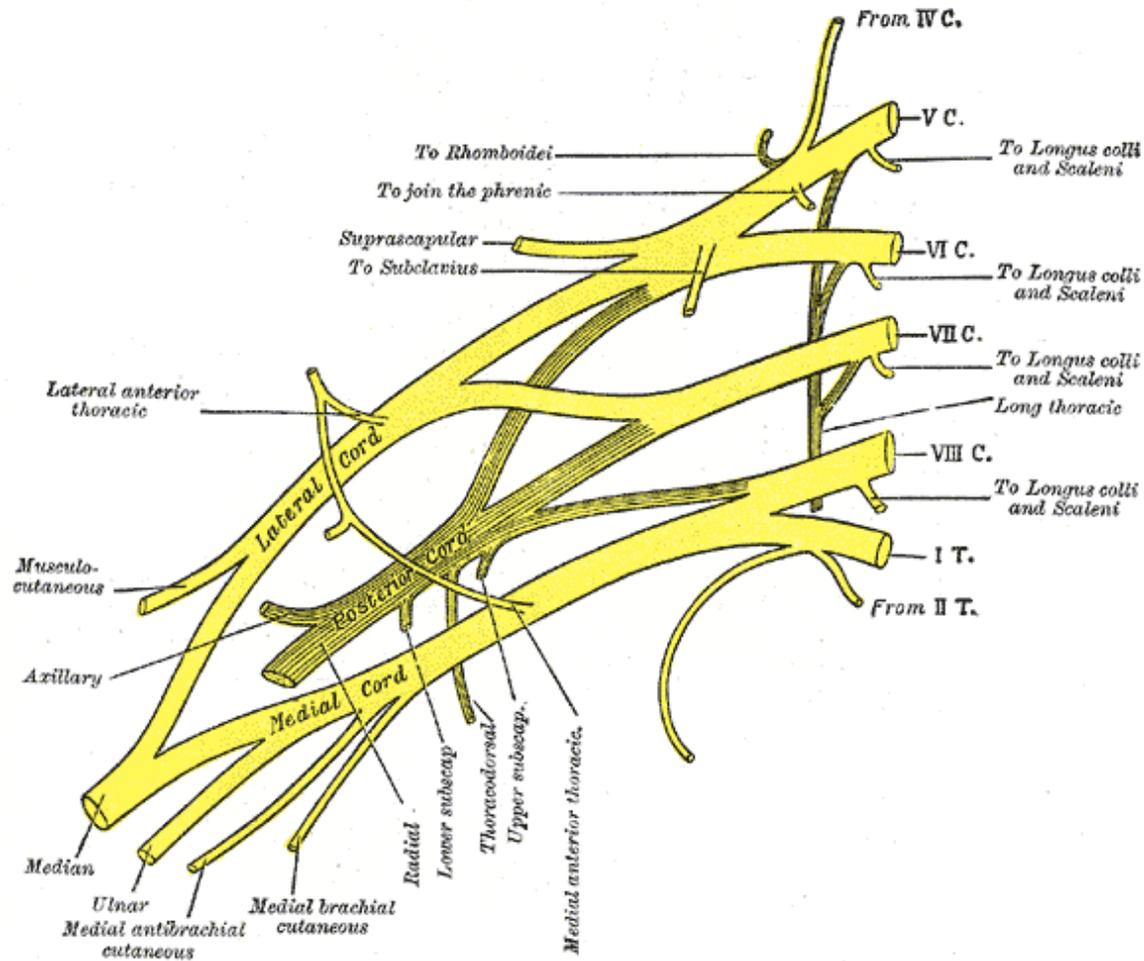


Examination shows some tenderness and resistance in the right supraclavicular area, but nothing definite can be palpated. Downward pulling on the arm increases the pain. There is obvious wasting of the right thenar eminence. On testing, the opponens pollicis and abductor pollicis brevis seem to be particularly involved.

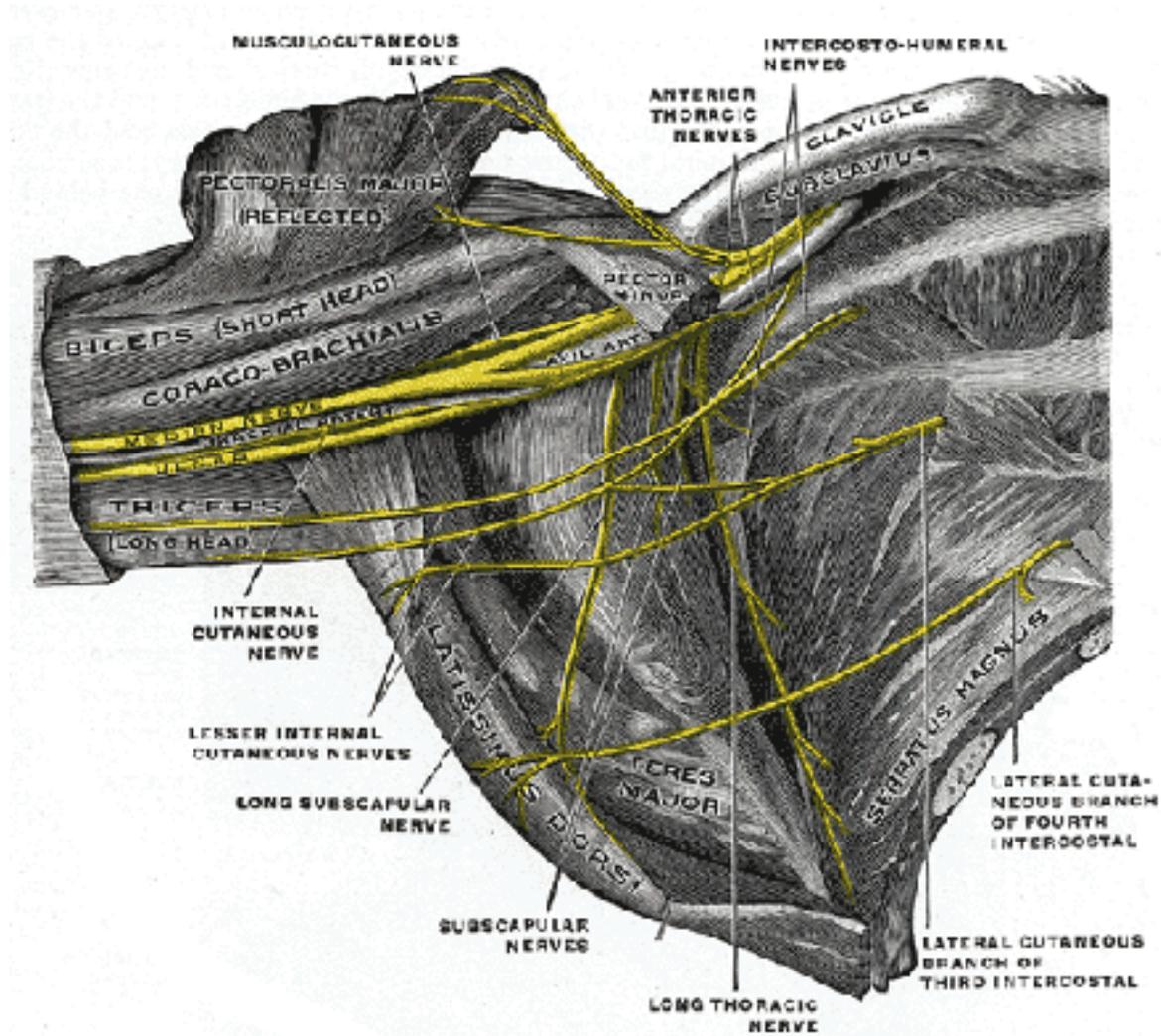
Brachial Plexus



Brachial Plexus



Brachial Plexus



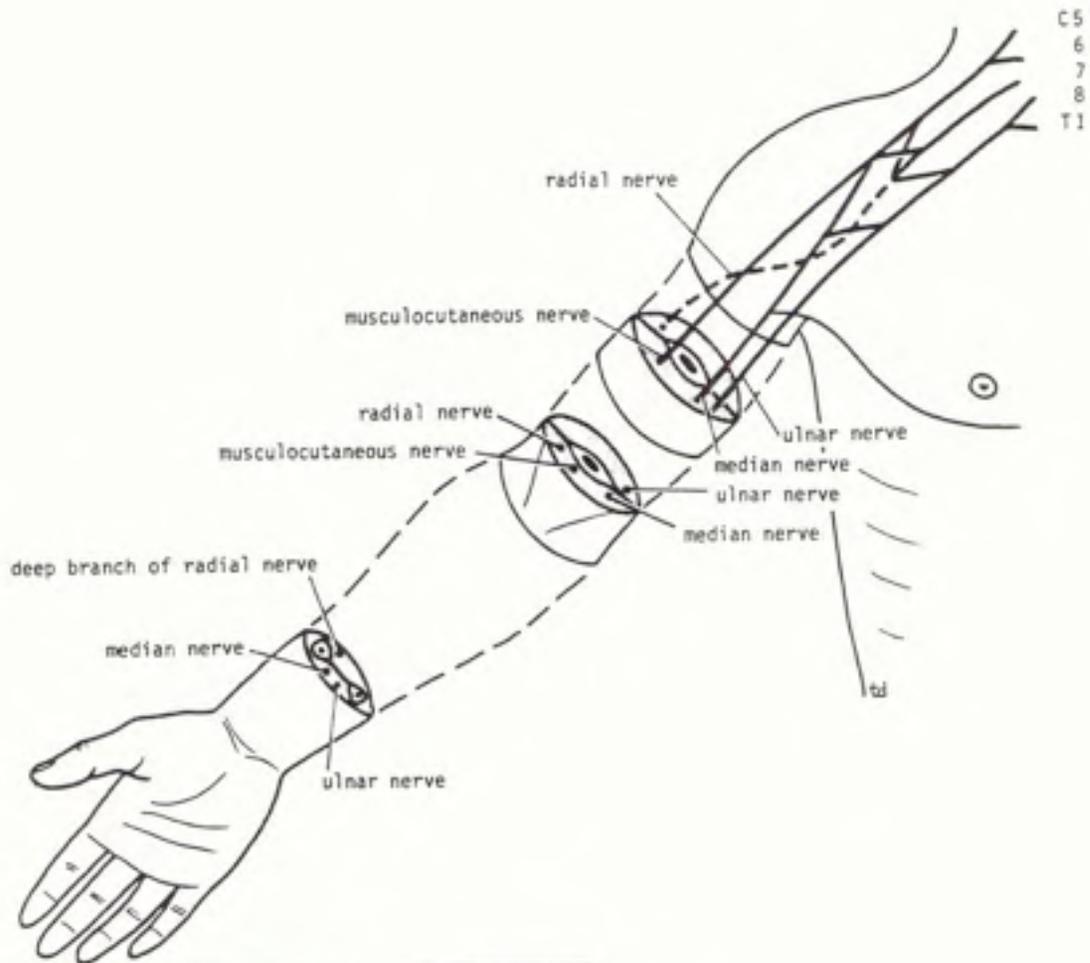


Fig. 9-24. Distribution of main branches of brachial plexus to different fascial compartments of arm and forearm.

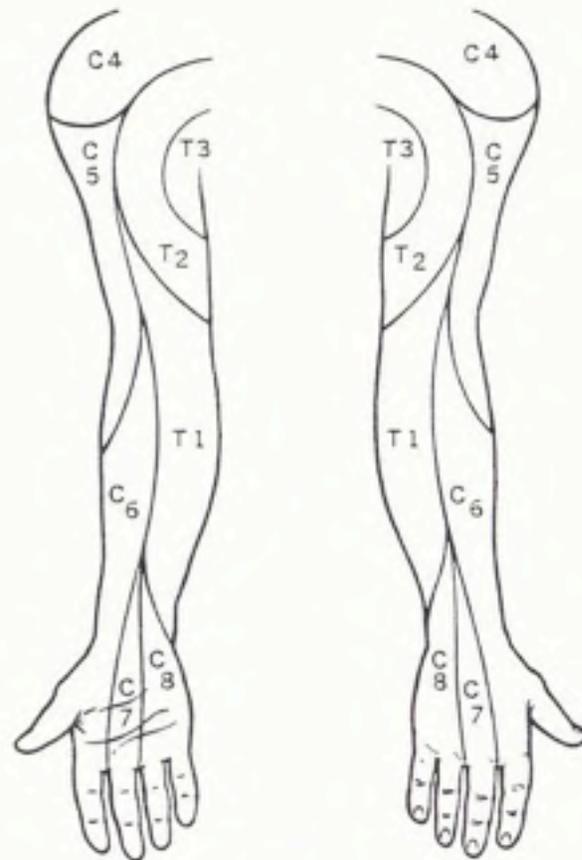
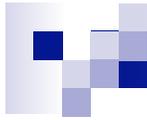


Figure 39-2. Dermatome chart of anterior and posterior aspects of upper extremity (after Foerster). Note particularly the representation of segments C8 and T1 on the medial side of the arm, forearm, and hand.

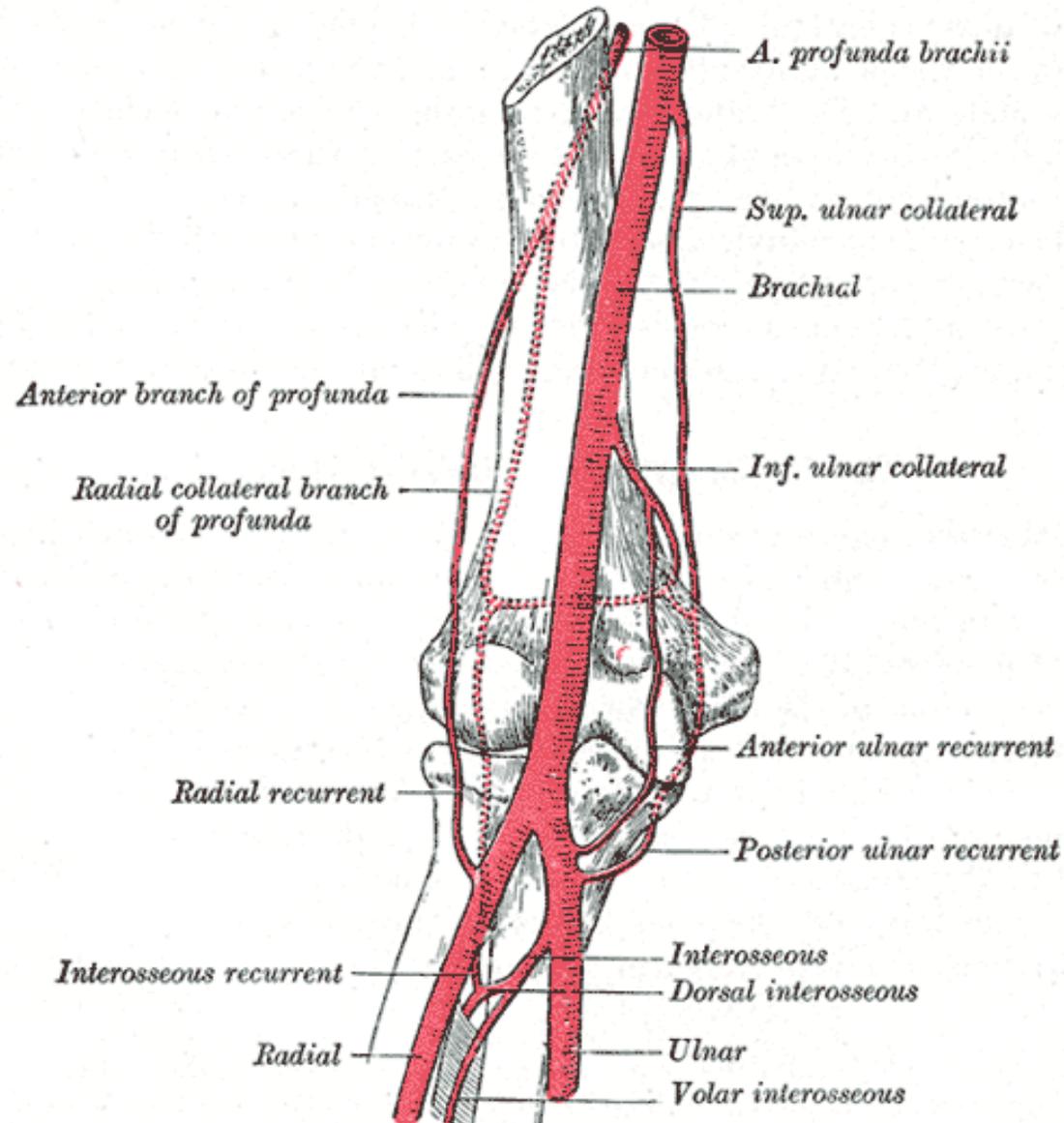


The patient, aged 51 years, is admitted to the hospital for generalized arteriosclerosis, lesions of the aortic valves, and cardiac failure. During his stay in the hospital he suddenly complains of pain and partial paralysis of the right forearm of about an hour's duration.



On examination the forearm is cold and pale, with the hand and fingers drawn up in a contracted position. There is loss of movement and sensation below the elbow. Radial and ulnar pulsations are absent.

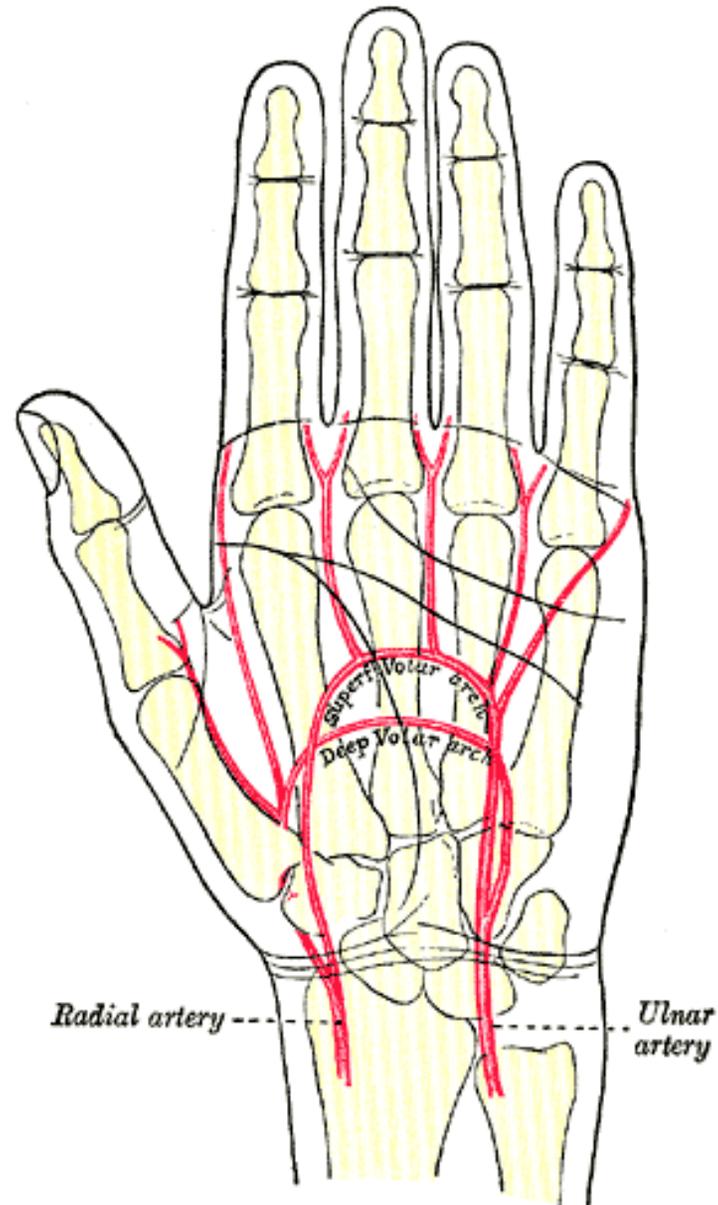
Brachial Artery



Radial & Ulnar Arteries



Arteries of Hand





A 55 year-old seamstress consults her physician, complaining of tingling and burning pain over the palmar aspect of her thumb, index, middle, and lateral side of the ring finger of her right hand. The symptoms began gradually over the past two years and lately have become more intense. They are most marked during the night, keeping her awake.



She complains that in getting up in the morning her fingers feel puffy and stiff, but her symptoms gradually subside during the morning. If she overworks, particularly if she does heavy ironing, the pain and discomfort increase again. Recently, she has experienced difficulties in holding tableware, resulting in frequent breakage. Also she can hardly keep her grasp on a sewing needle.



At the same time, she notices that the movements of her right thumb are not as strong as before. This change is accompanied by some wasting in the outer half of the ball (thenar eminence) of this thumb. For the last few weeks, she also complains of occasional burning in the corresponding area of the thumb and fingers of her left hand.



On examination of her right hand, flattening of the outer half of the thenar eminence is noticed. On testing, there is loss of power and limitation of range of motion on abduction and opposition of the thumb.



Diminished sensibility (hypesthesia and hypalgesia) over the palmar aspect of the thumb, index, middle, and lateral aspect of the ring finger on the right had is demonstrated by imparied appreciation of light touch and pin pricks and decreased differentiation between sharp and blunt stimuli.



Sensation over the lateral aspect of the palm, including the thenar eminence, is unaffected. Pressure and tapping over the lateral portion of the flexor retinaculum cause tingling and a sensation of “pins and needles” in the involved fingers.



On study of the motor functions of the muscles of the right forearm and fingers, no interference with active motion of the elbow, wrist, and fingers (except for the described deficiencies in the motion of the thumb) is noted, but extreme flexion and extension of the wrist reproduces the typical pain the lateral 3 ½ digits of her hand.

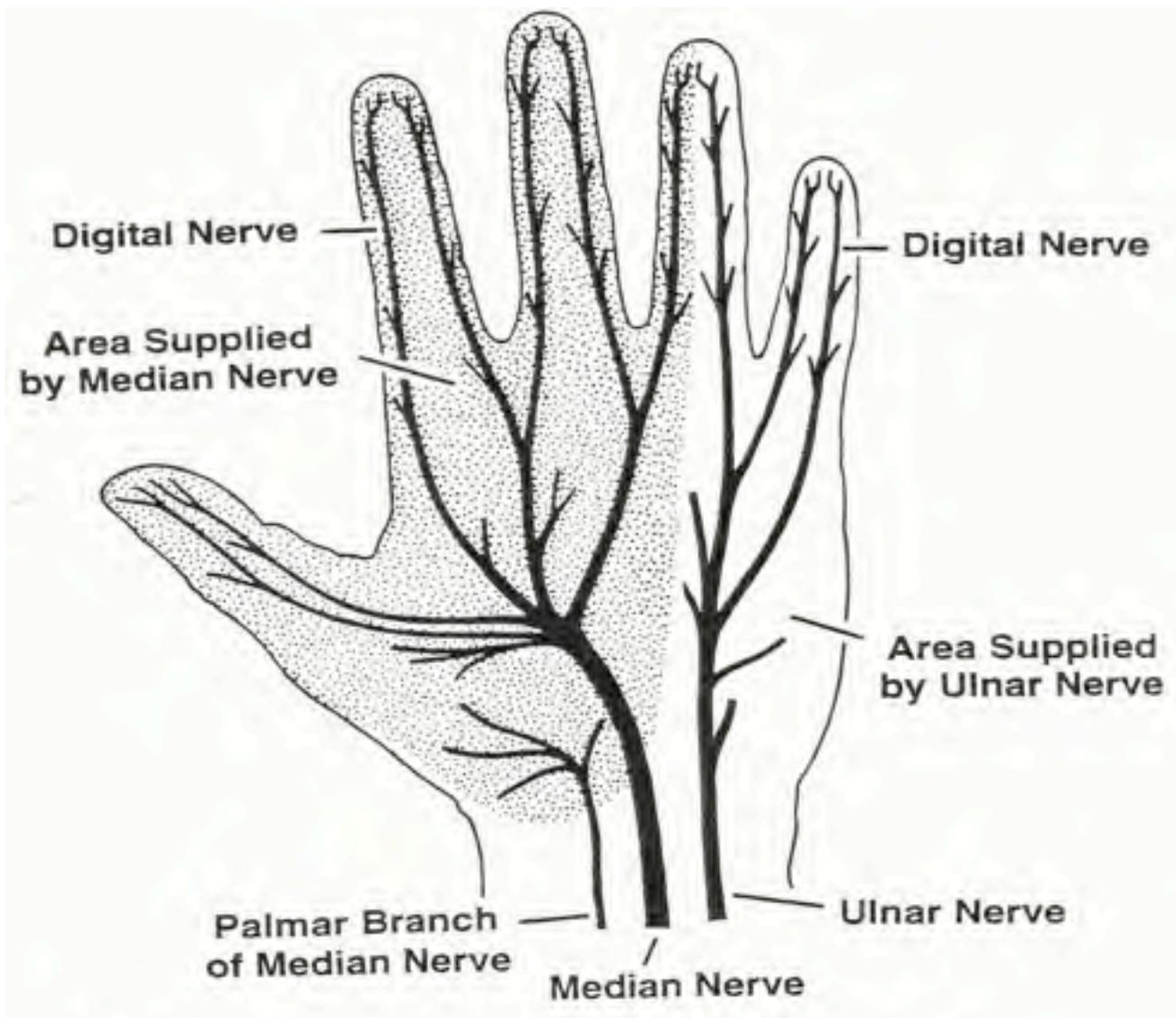
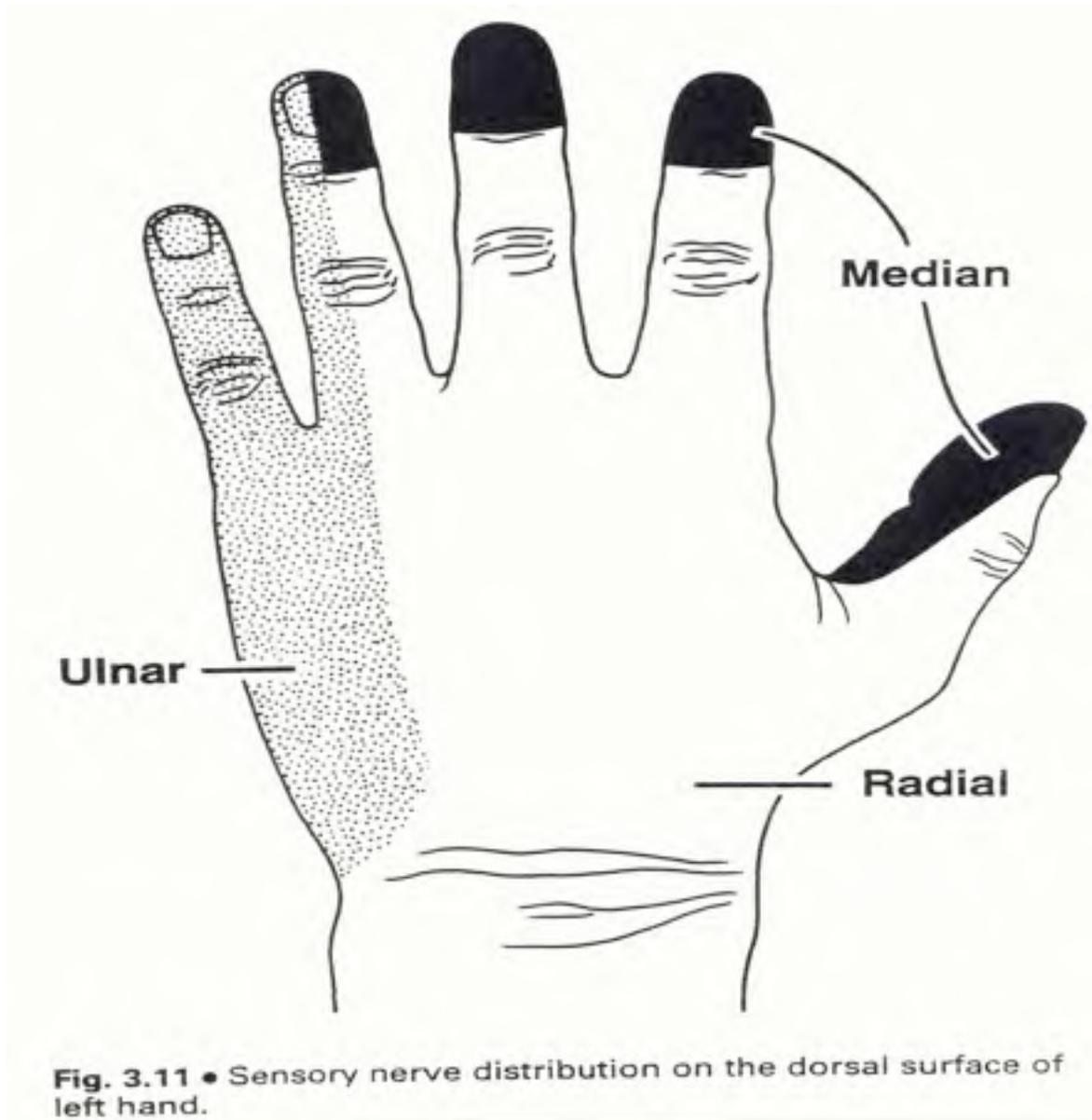
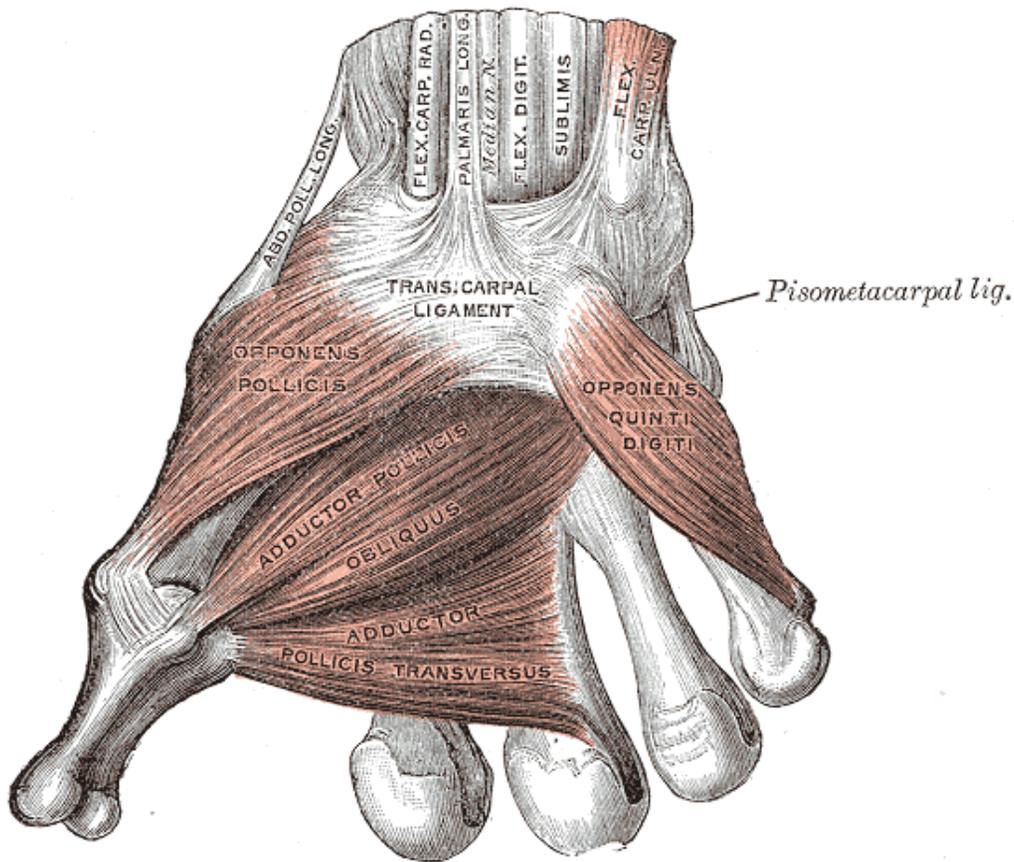
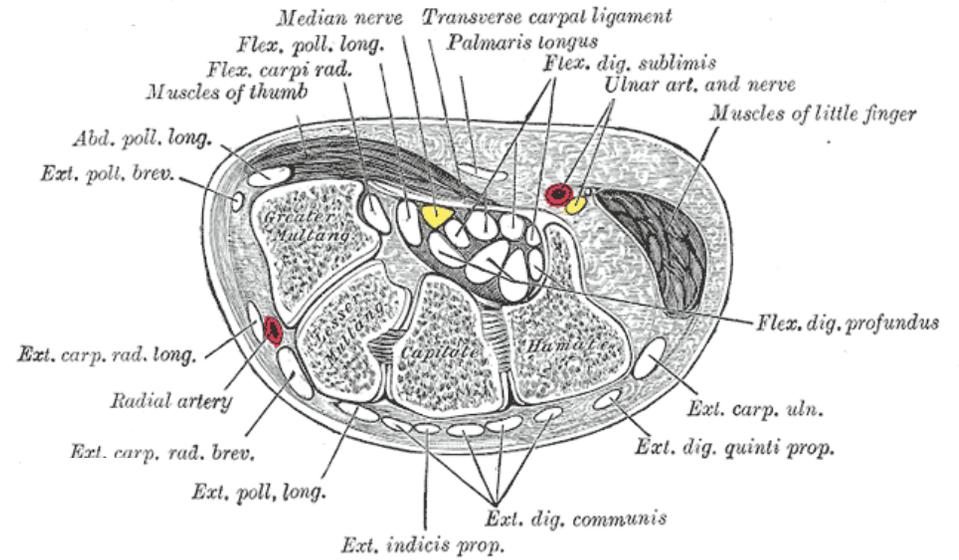


Fig. 3.10 • Nerve supply to the volar aspect of the hand.



Median Nerve In Carpal Tunnel



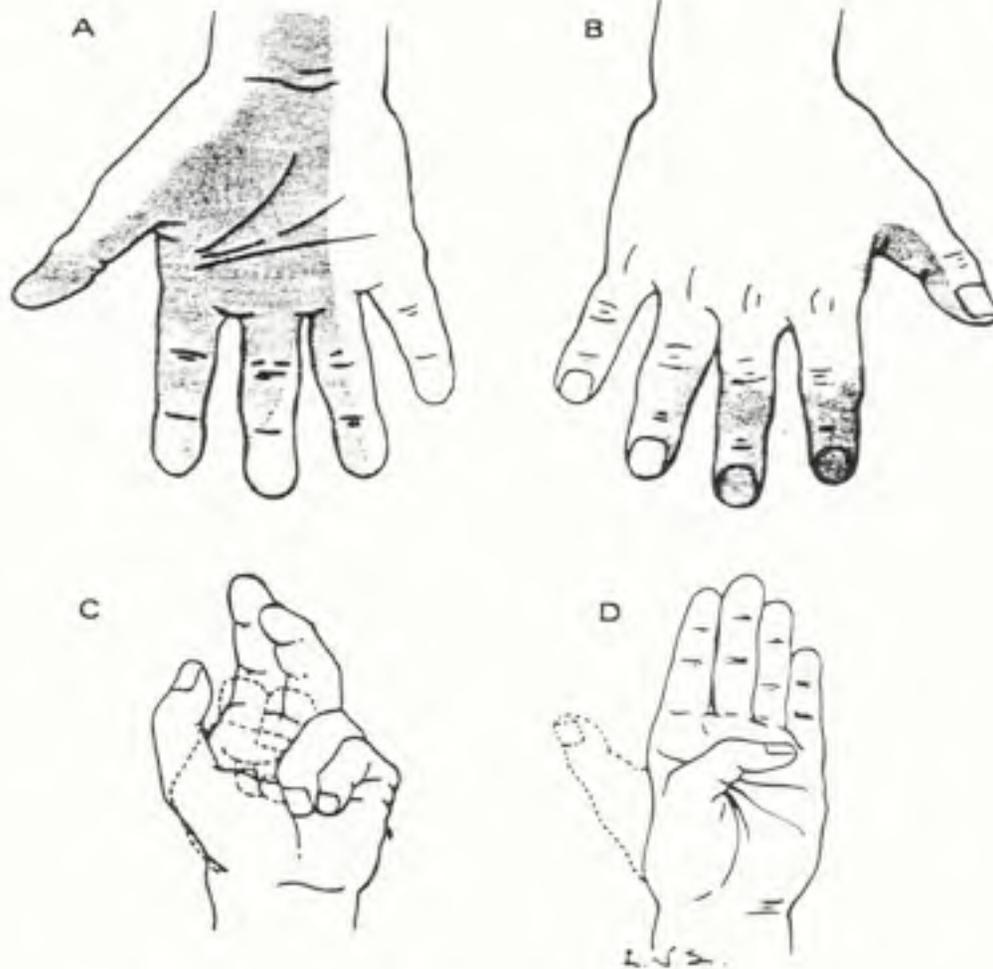
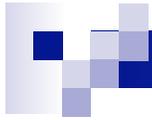


Figure 23-7. A and B: Autogenous median nerve sensibility is indicated by the shaded areas. The profundus of the index and long fingers **(C)** are innervated by the median nerve, as is the flexor pollicis longus **(D)**.



A 35 year-old gymnast is seen by his physician months after he sustained a fall to an outstretched right arm from the parallel bars. He complains of persisting pain with exercise involving the anatomical “snuff-box” of the right wrist. He had been seen in a hospital emergency room for the initial injury, but was told that x-rays were negative, and than it was a simple sprain.

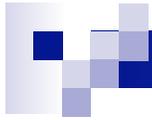


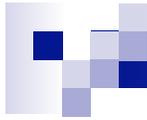
What is wrong with this picture?

Scaphoid: Anatomical Snuff Box



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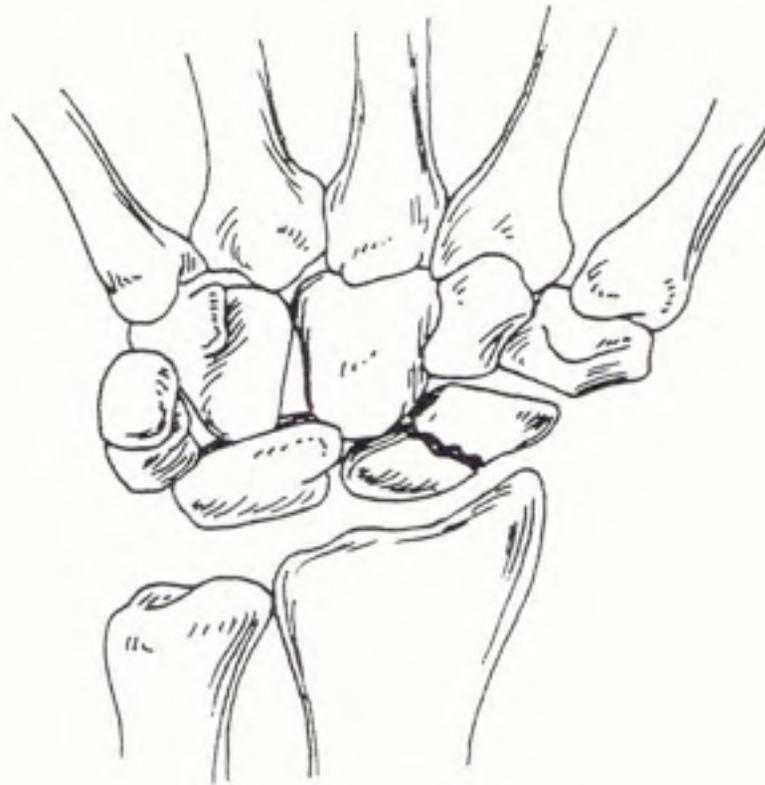




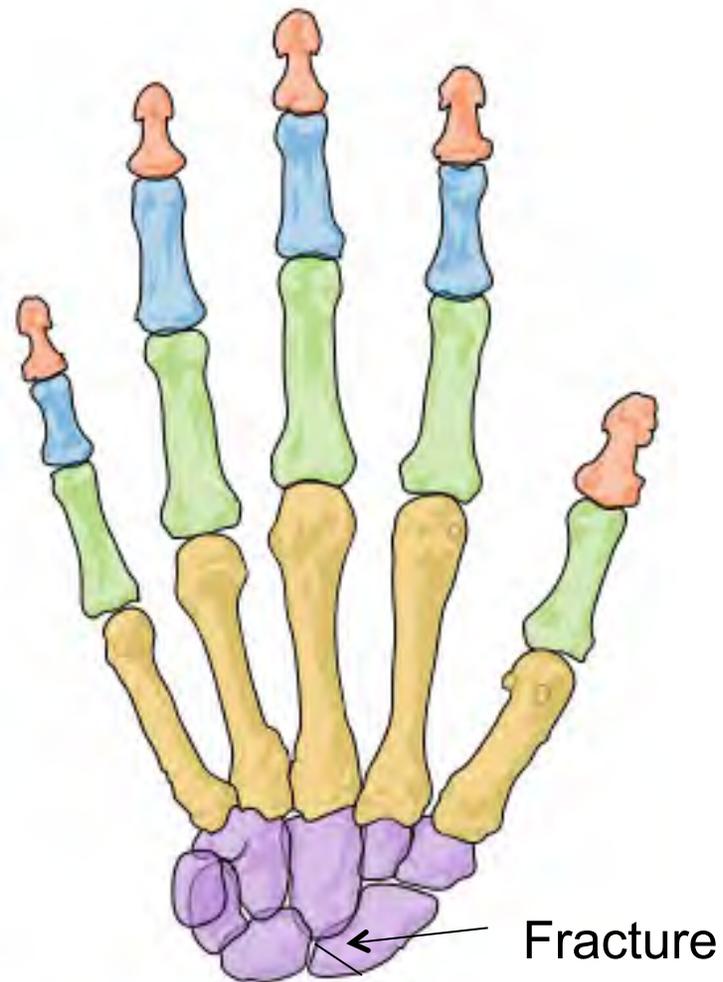
Fracture at Waist of Scaphoid



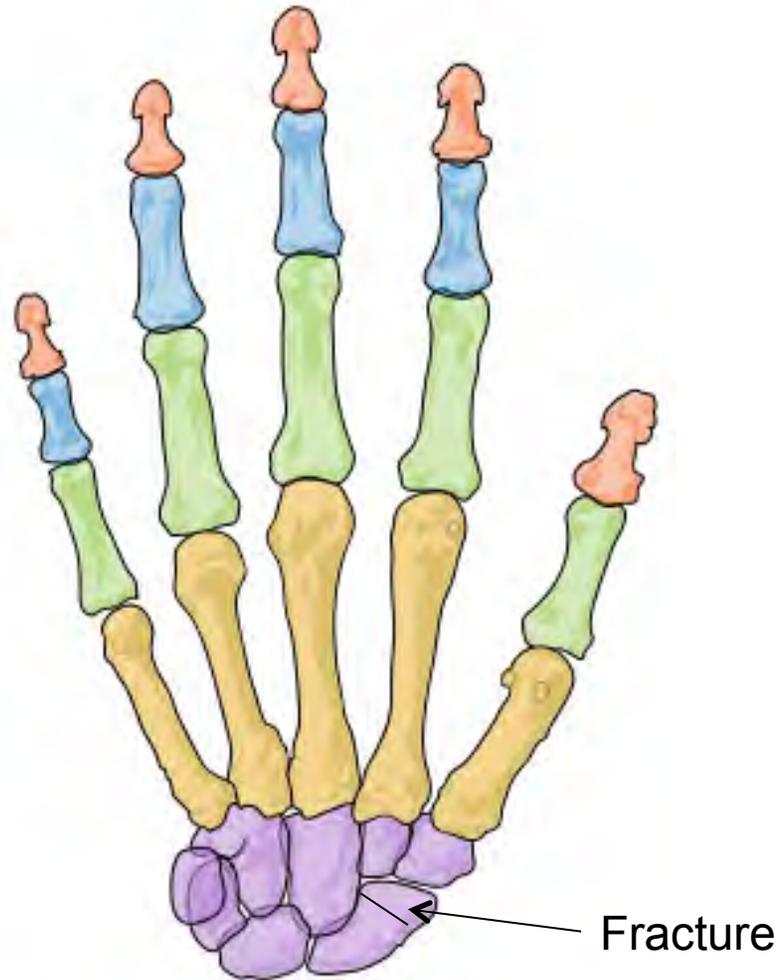
**CLASS A: FRACTURE THROUGH THE WAIST
(p. 96) (MIDDLE THIRD)**



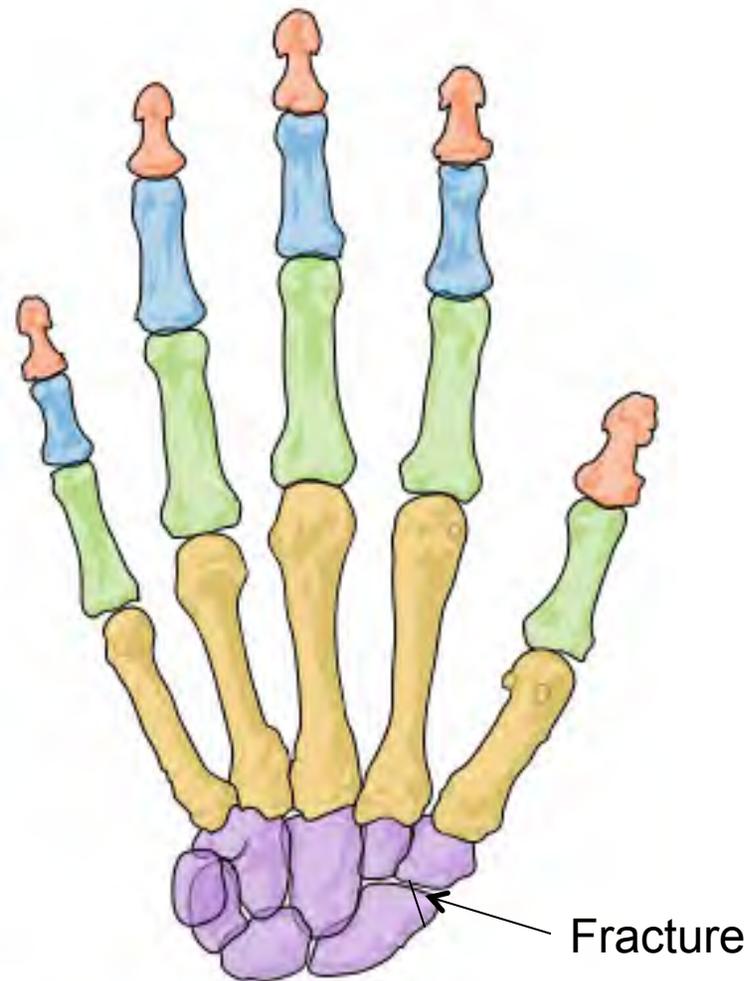
Fracture Through Proximal Third



Fracture Through Distal Third



Fracture Through Tubercle



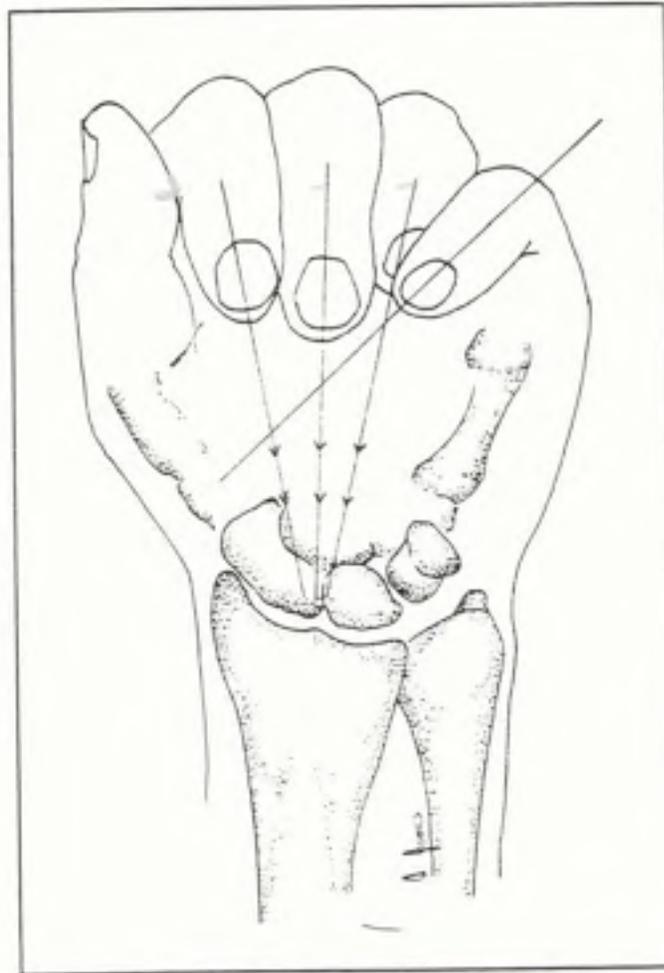
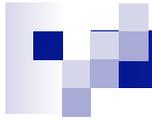


Figure 6-2. In the patient with rotational malalignment of a fracture, the fingernail of the involved digit does not point to the scaphoid.



A 49 year-old cellist sustains a laceration to the thenar eminence on broken glass while washing dishes. The laceration is noted as shown on the following diagram.



What are clinical considerations in achieving satisfactory anesthesia prior to repair of this laceration?

What are considerations for other lacerations involving the hand and fingers?

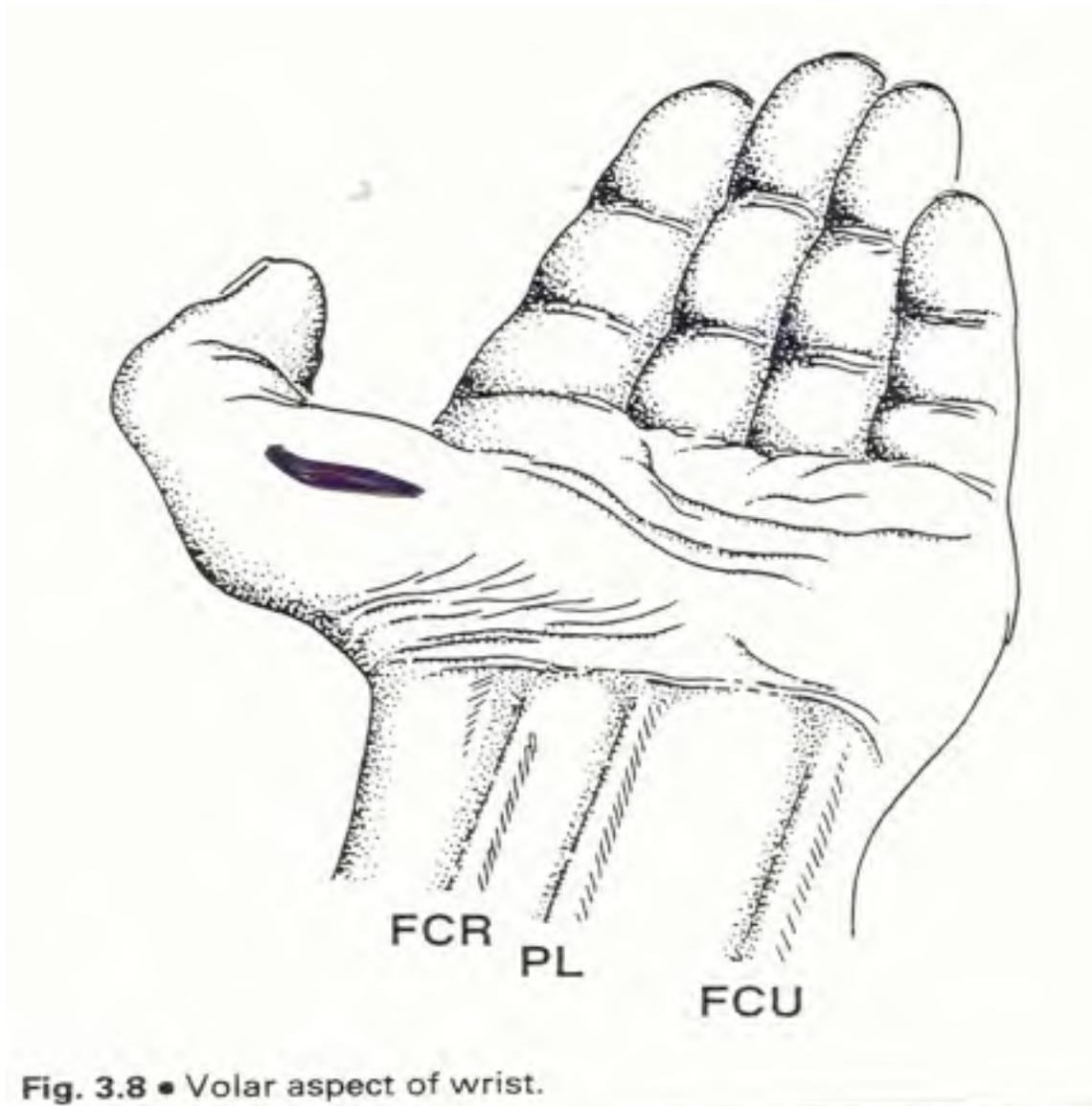
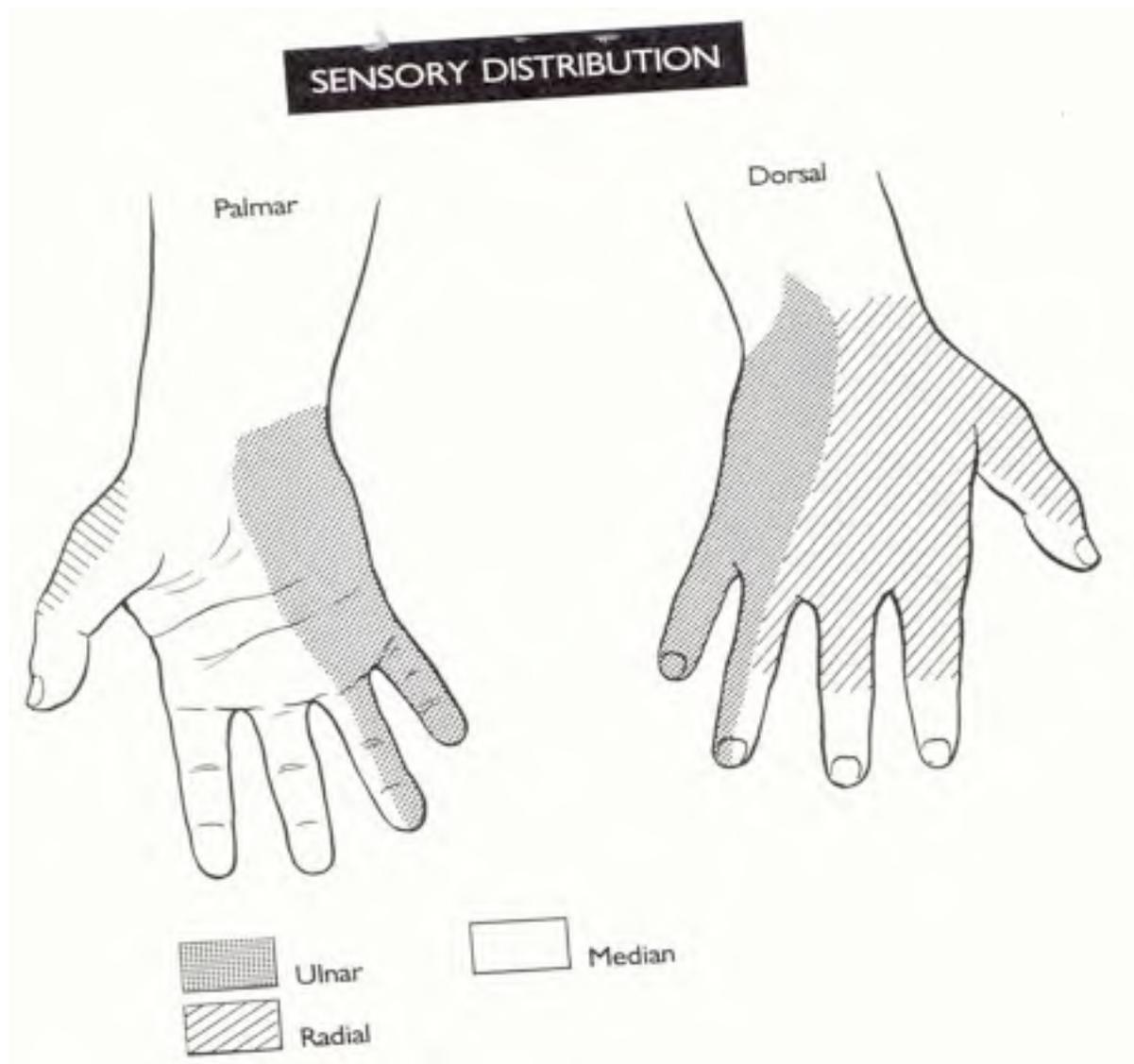
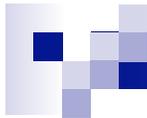
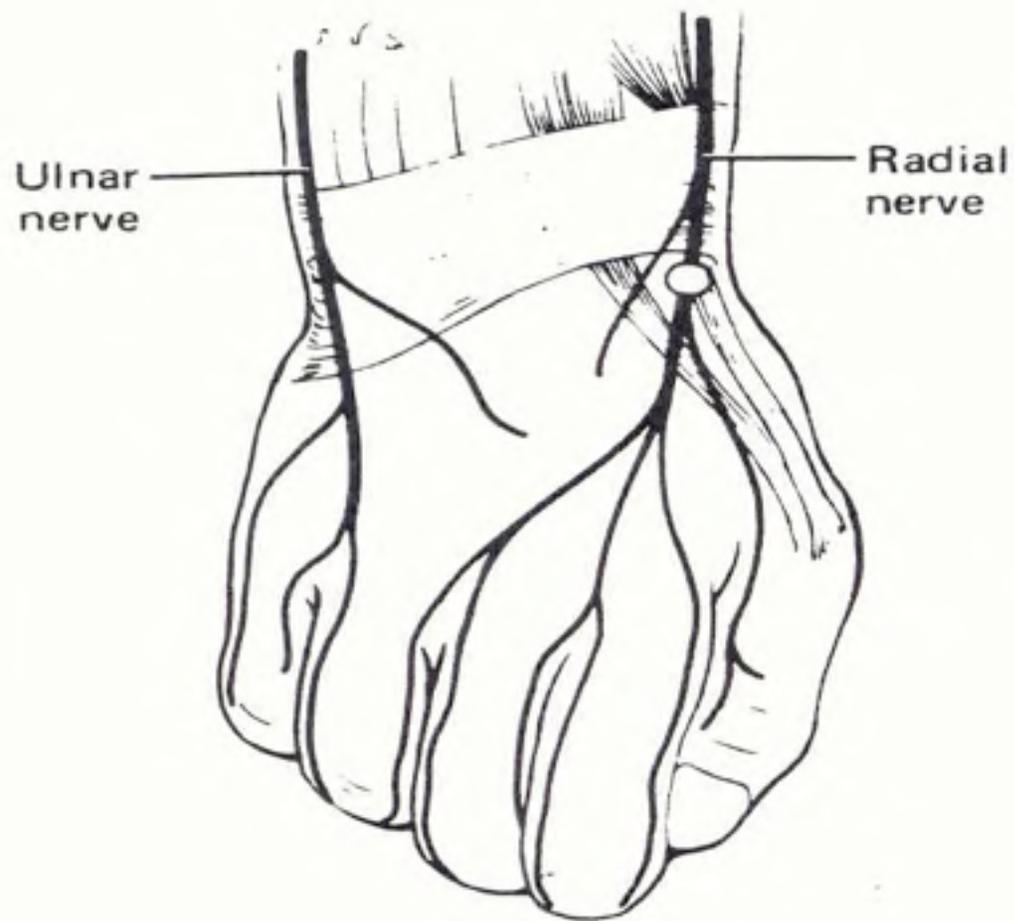
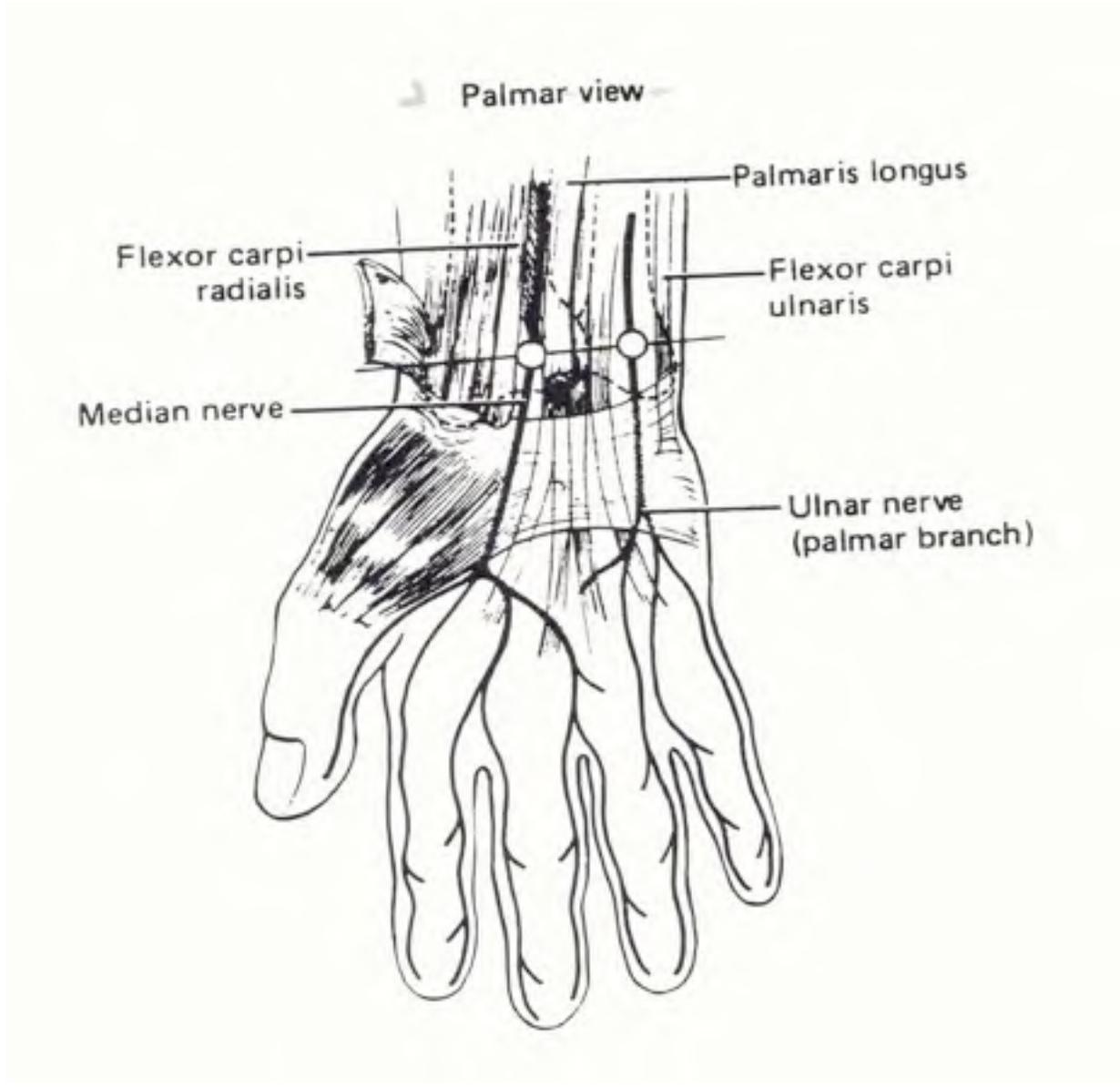
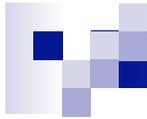


Fig. 3.8 • Volar aspect of wrist.



Dorsal view

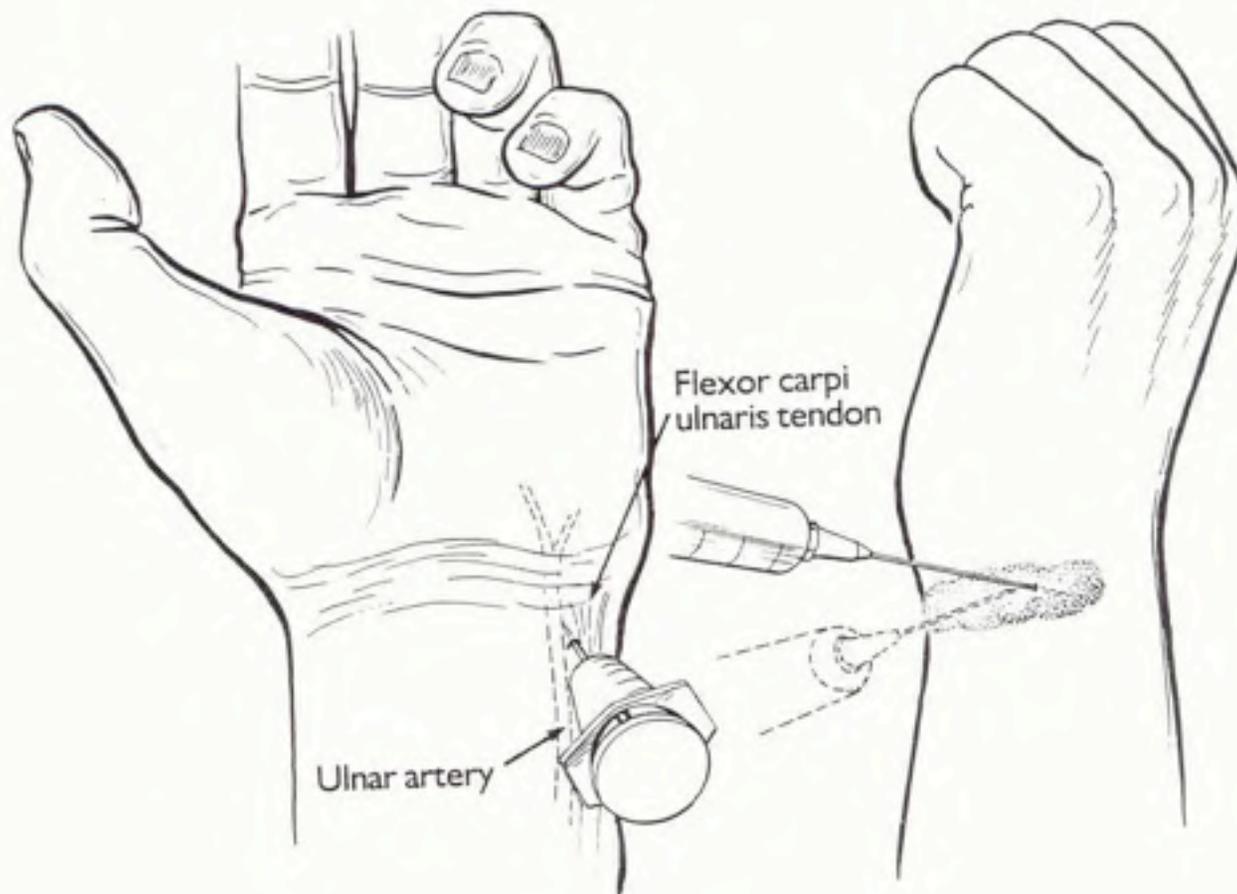




MEDIAN NERVE BLOCK

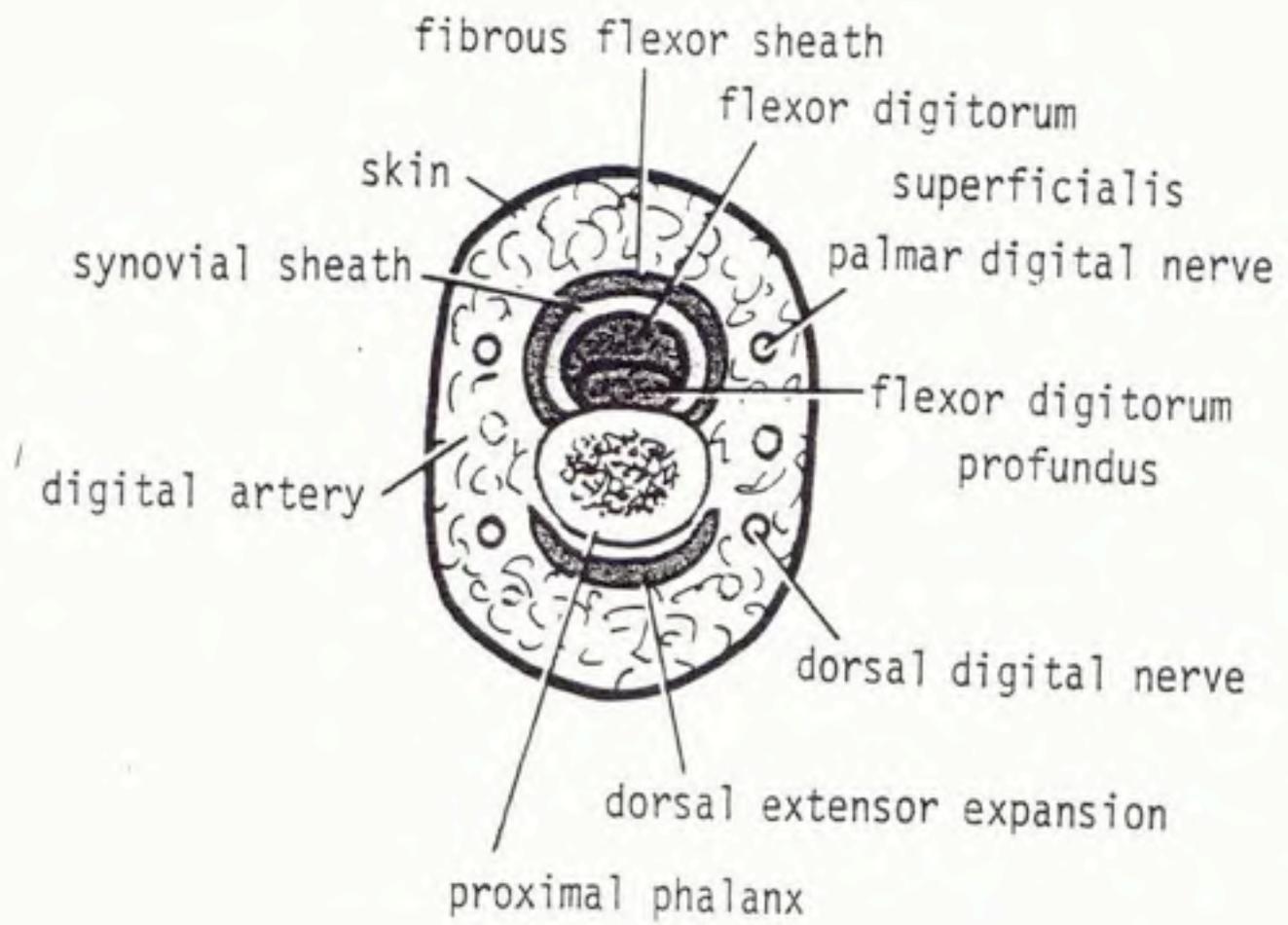


ULNAR NERVE BLOCK



RADIAL NERVE BLOCK





DIGITAL NERVE BLOCK (WEB SPACE APPROACH)



RING BLOCK (FOR THUMB)

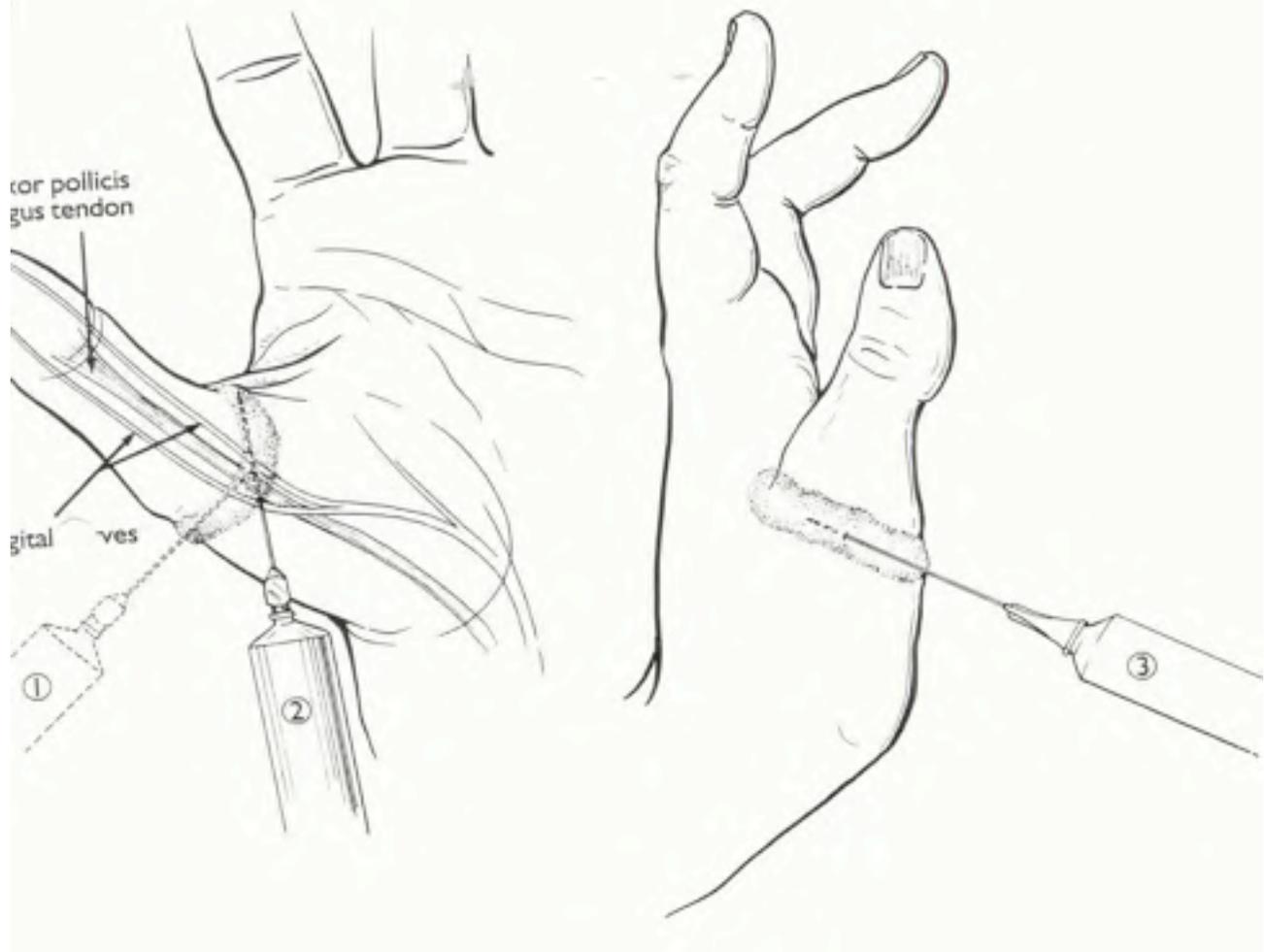
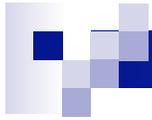




Fig. 6.1 • Nerve block at wrist: (a) median or ulnar nerve; (b) radial nerve.



What are significant clinical anatomical considerations pertaining to peripheral venous access involving the upper extremity?

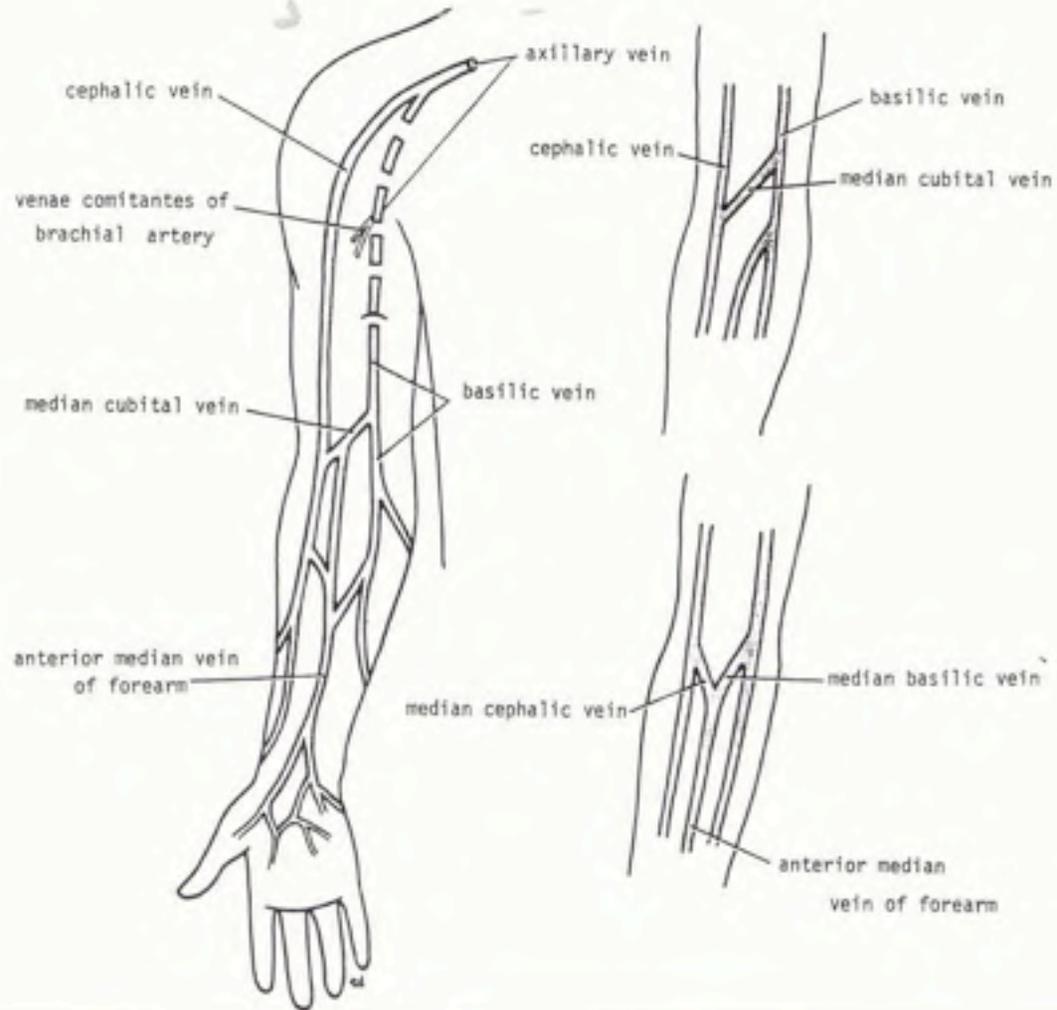


Fig. 9-8. Superficial veins of upper limb. Note common variations seen in region of elbow.

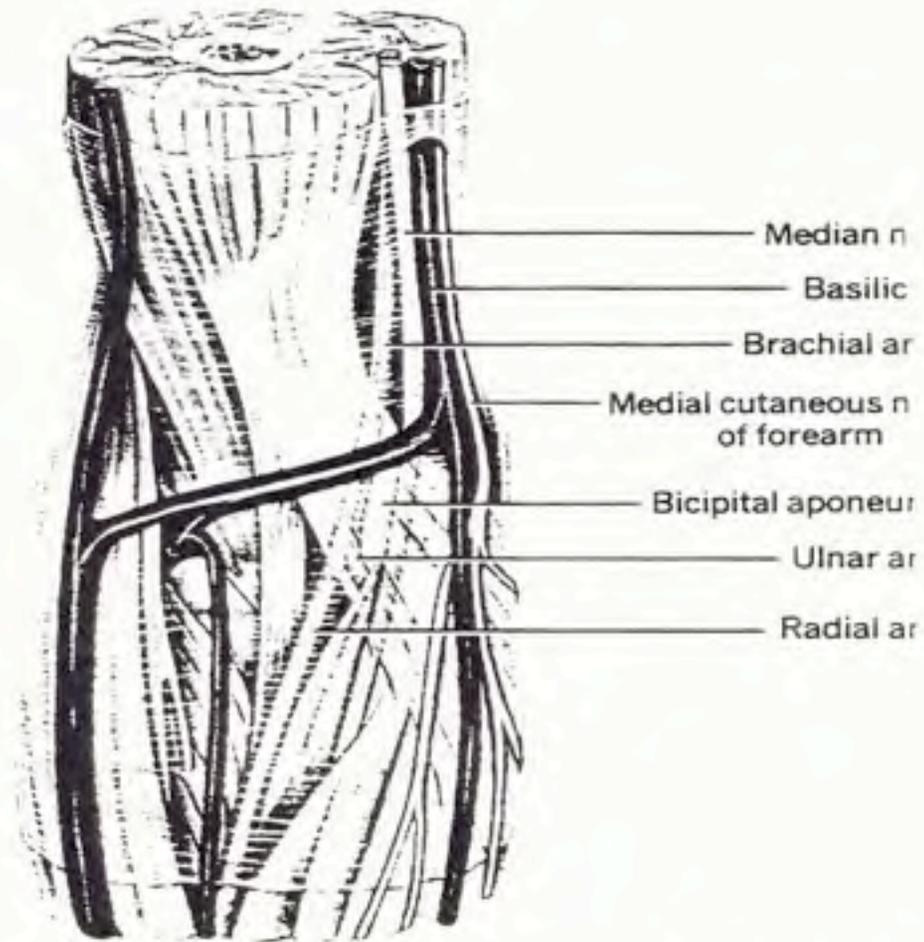


Figure 41-1. Structures along the medial asp

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