MALIGNANT TUMORS OF THE HAND

THESIS

SUBMITTED IN PARTIAL FULFILMENT

FOR MASTER DEGREE

ORTHOPAEDIC SURGERY

By

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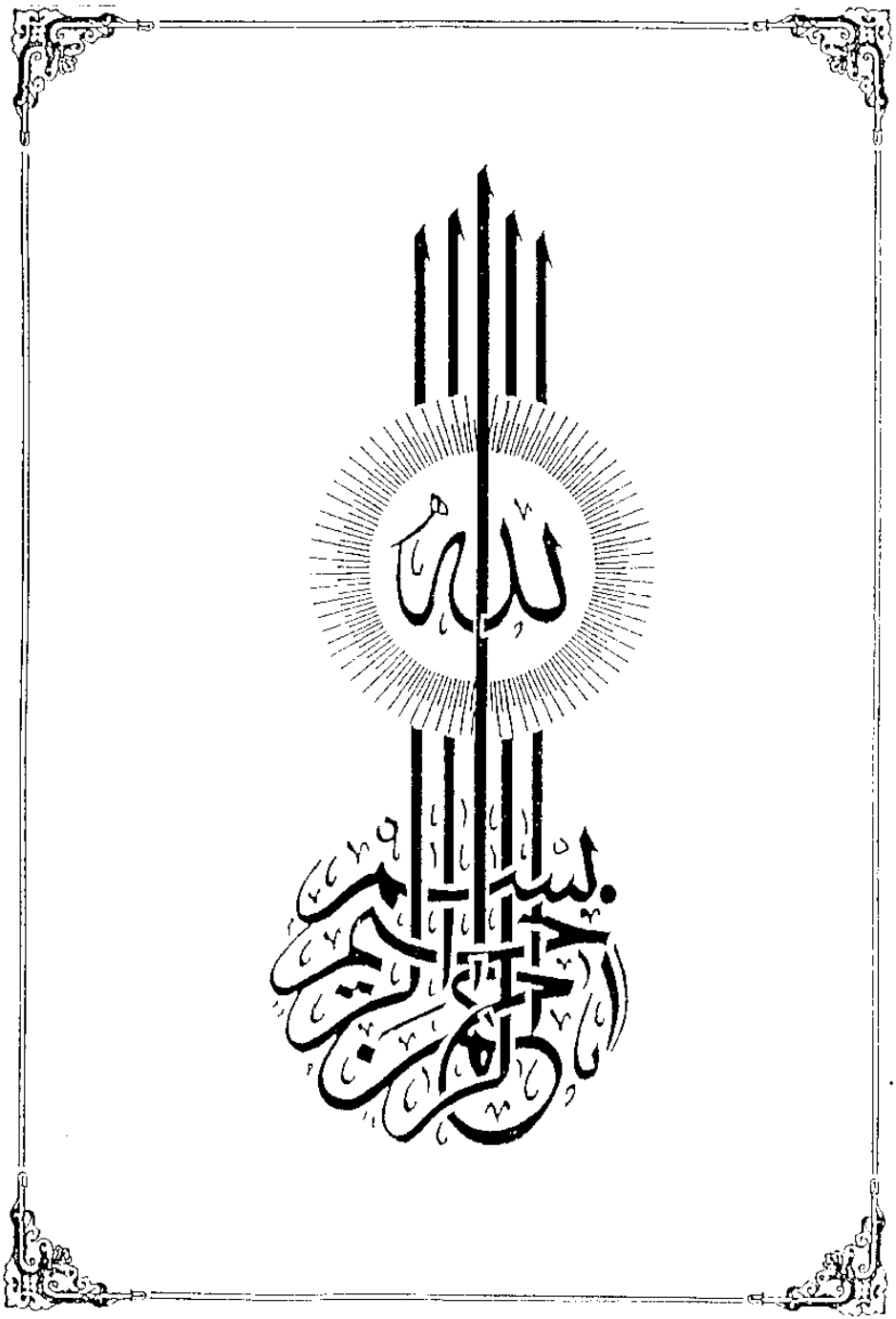
TO MY PARENTS



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INTRODUCTION

melanotic group. Man is again fortunate that the malignant growths of the hand are often preceded by benign lesion, which are well known precursors of cancer. If these are properly diagnosed and treated malignancy can be averted. (Caulfield, 1950).

Malignant tumors are uncommon, but, when primary in the hand, they offer a good chance for cure because of their location and early diagnosis.

In addition to primary tumors metastatic tumors also occur although only rarely (Kerin, 1958) .

Panebianco and Kaupp (1968) reported a case of involvement of the distal phalanx of both thumbs in a patient with carcinoma of the breast. Green (1957) reported a metastasis of a bronchogenic carcinoma to the thumb, appearing before symptoms were present from the primary lesion (Boyes, 1970).

ANATOMY

THE SKELETON OF THE HAND

The skeleton of the hand has two segments: (1) the metacarpal bones of the palm, and (2) the phalanges or bones of the digits.

THE METACARPUS

The metacarpus consists of five bones, conventionally numbered from lateral to medial. The metacarpals are long bones, each possessing a rounded head, a shaft and an expanded base. The heads are ends, and articulate with the proximal phalanges. The prominence of the Knuckles is produced by the metacarpal heads. The bases of the metacarpals are their expanded proximal ends, which articulate with the distal row of the carpus and with one another. The first metacarpal bone is isolated and does not articulate with the second metacarpal bone. The shafts are concave logitudinally on their palmar surfaces, forming a hollow containing certain palmar muscles (Warwick and Williams, 1973).

THE PHALANGES

There are fourteen phalanges, three in each finger, and two in the thumb. Each has a head, shaft and base. The bases of the proximal phalanges are marked by concave, oval facets for articulation with the heads of the metacarpal bones. Their heads are smoothly grooved like

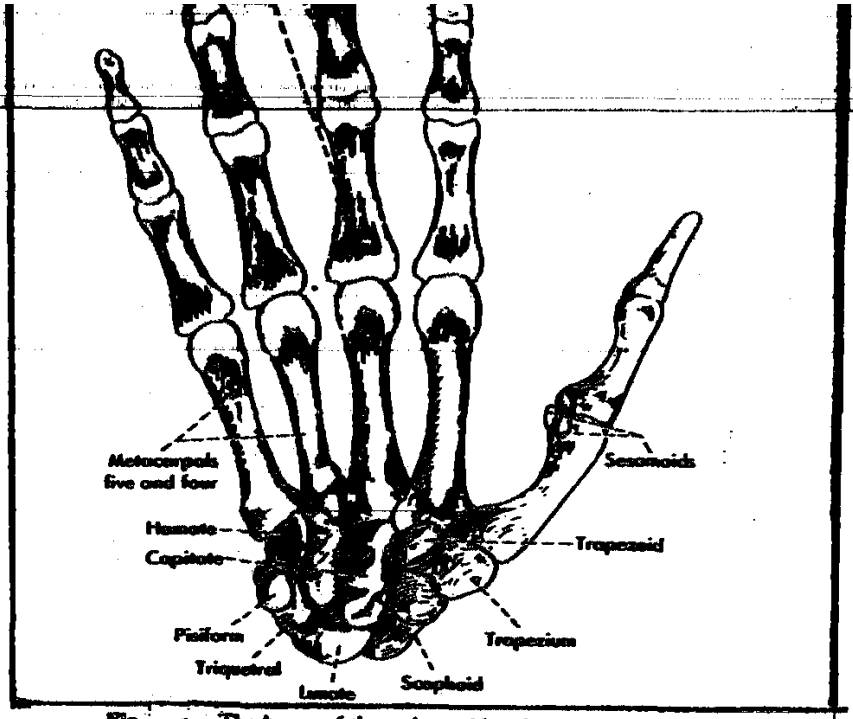


Fig. 1 The bones of the wrist and hand, palmar view.
(From Hollinshead, 1974).

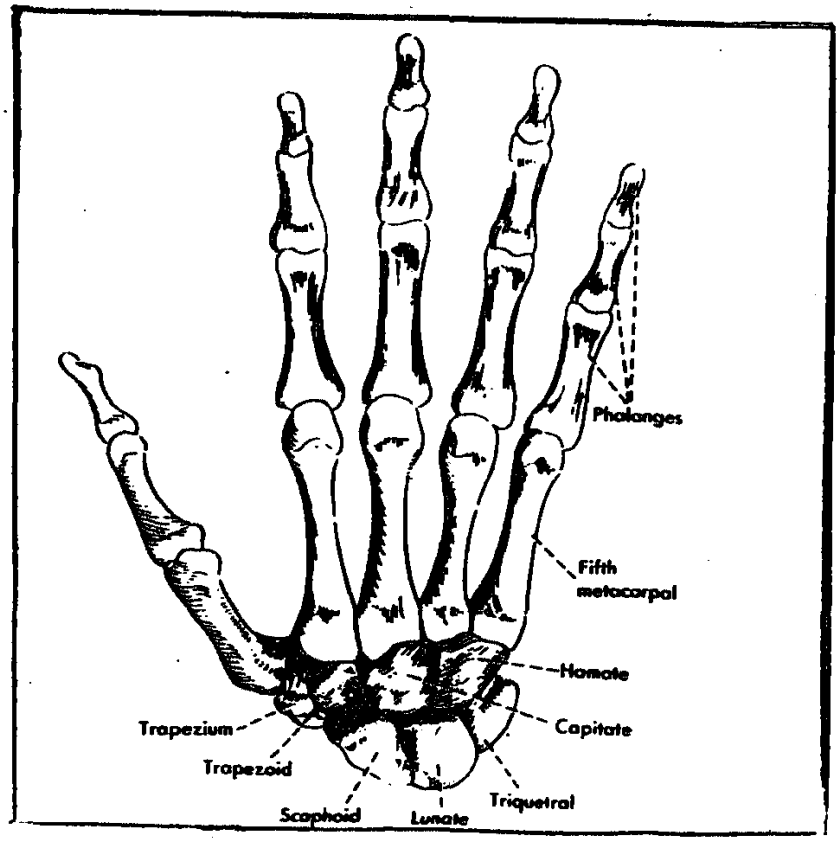


Fig. 2 Bones of the wrist and hand, dorsal view.

pulleys and encroach farther on the palmar than dorsal surfaces. The base of the middle phalanx is marked by two small, concave facets separated by a smooth ridge. The head of the middle phalanx also is pulley-shaped and the base of the distal phalanx conforms to it. The head of the distal phalanx is non-articular, but is marked on its palmar surface by a rough, horseshoe-shaped tubersity, to which connective tissue strands attach the soft tissues "pulp" of the finger tip. (Warwick and Williams, 1973).

CARPO-METACARPAL JOINTS

An S-shaped midcarpal joint forms a continuous synovial space between the two rows of carpal bones, and this extends proximally and distally between adjacent carpal bones as a continuous intercarpal joint. A similar synovial joint lies between the distal row of carpal bones and the metacarpal bones of the four fingers. This carpo-metacarpal joint commonly communicates with the intercarpal joint.

The joint between hamate and fifth metacarpal is the most mobile of the four and slight flexion possible here aids in "cupping" the palm. The carpometacarpal joint of the thumb is a separate synovial cavity between the trapezium and first metacarpal bone. It is called trapeziometacarpal joint.

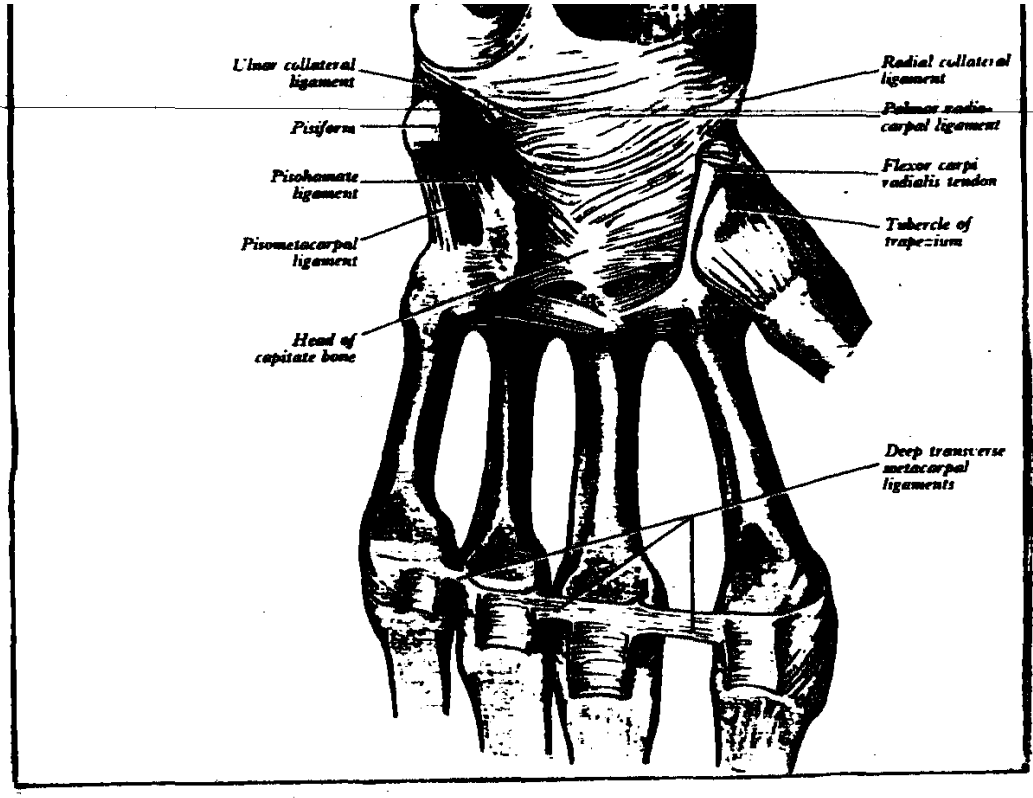


Fig. 3 The ligaments of the left wrist and metacarpus. Palmar aspect.
(From Warwick and Williams, 1973).

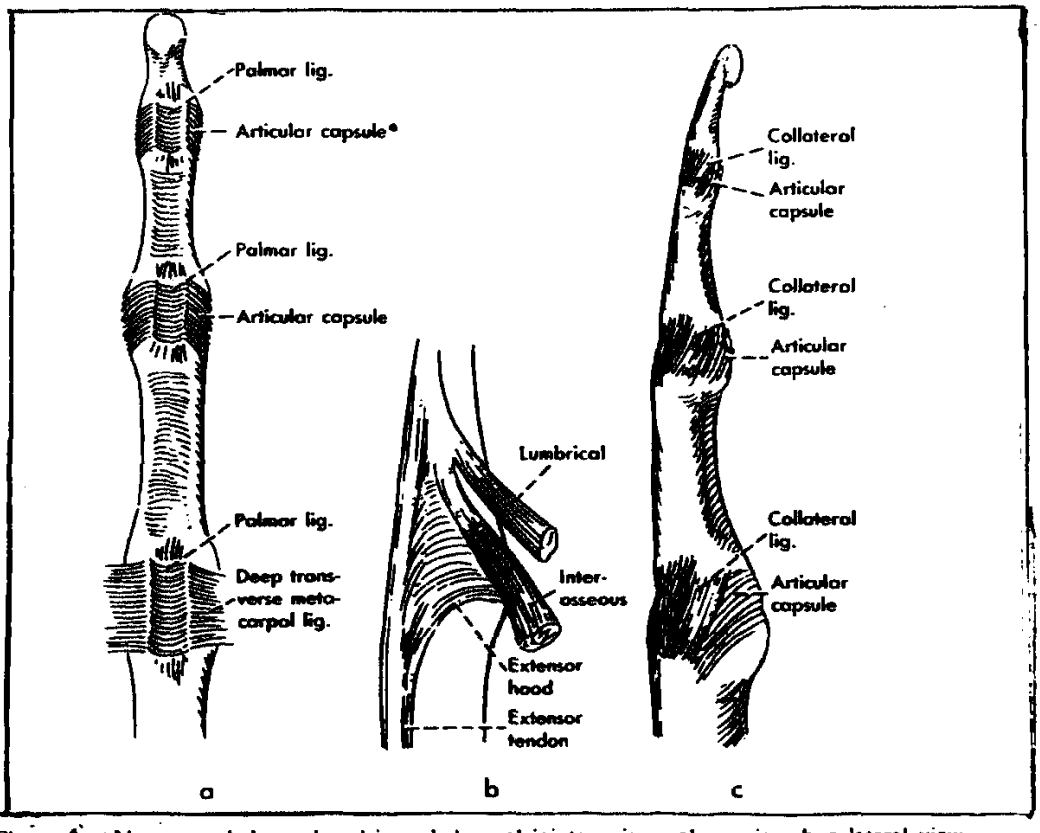


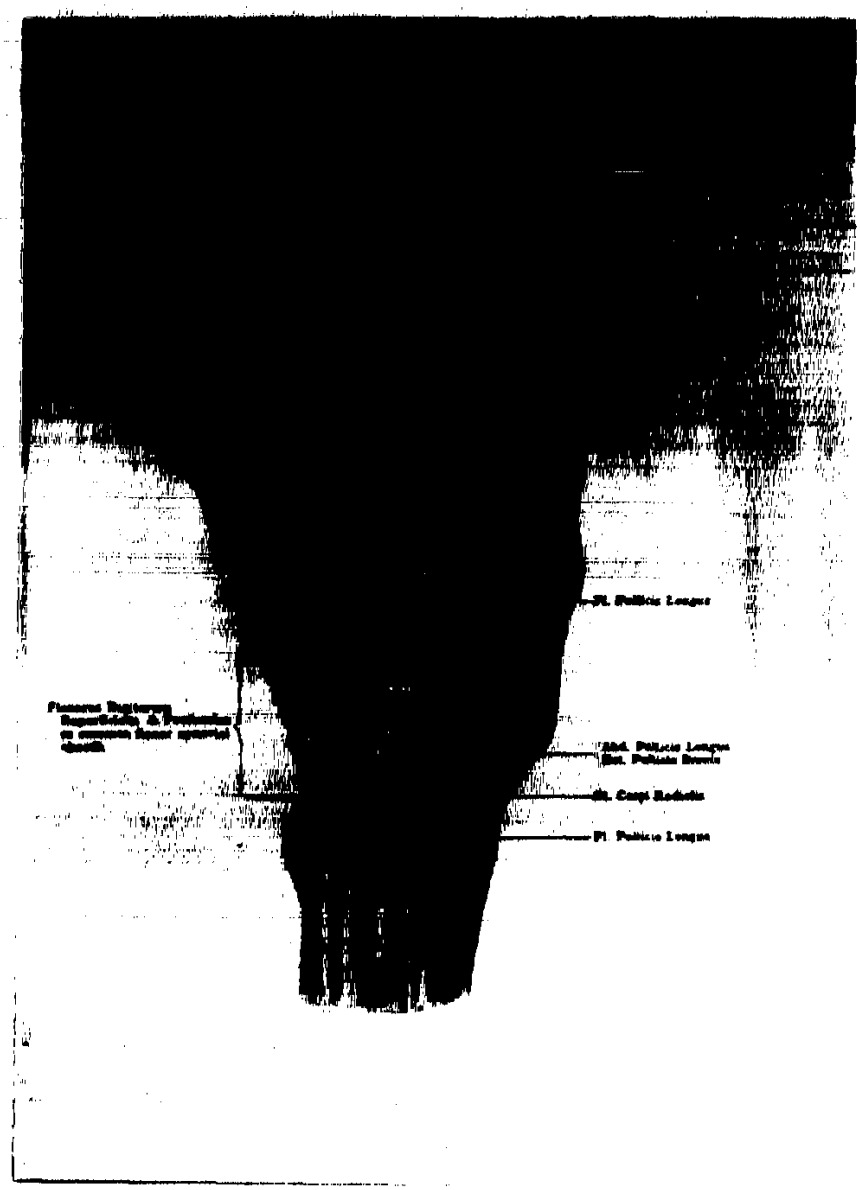
Fig. 4 . Metacarpophalangeal and interphalangeal joints; a is a palmar view; b, a lateral view of the metacarpophalangeal joint with the extensor tendon in place; c, a lateral view of a digit.

The joint surfaces are reciprocally saddle-shapped. The capsule is loose and permits independent movement of the whole thumb.

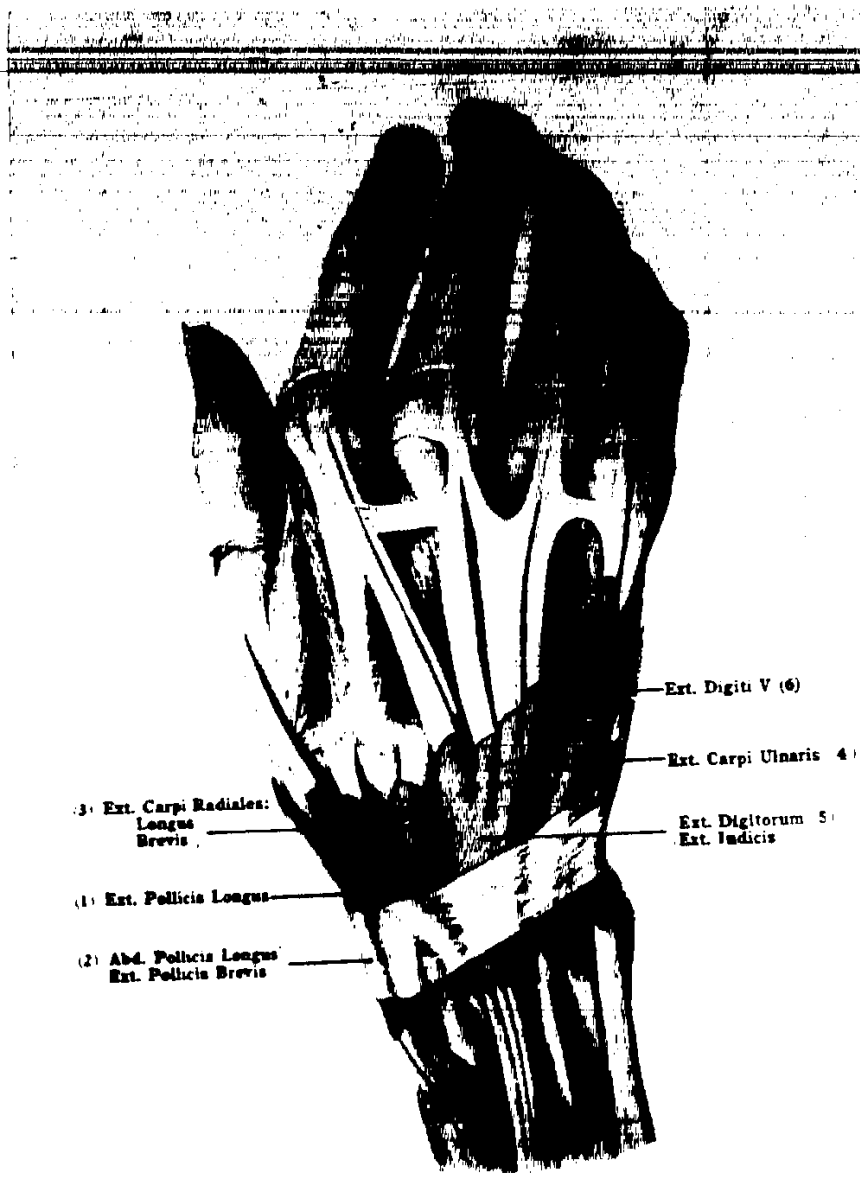
THE METACARPOPHALANGEAL JOINTS

The metacarpophalangeal joints are synovial joints. These articulations are usually classified as ellipsoid, but the heads of the metacarpals, fitting into shallow concavities on the bases of the proximal phalanges, are not regularly convex; their articular surfaces are partially divided on their palmar aspects so as to resemble condyles. Each joint has a palmar and two collateral ligaments.

The palmar ligaments are unusual in that they are thick, dense, fibrocartilaginous structures, placed upon the palmar surfaces of the joints in the intervals between the collateral ligaments, to which they are connected; they are loosely united to the metacarpal bones, but are very firmly attached to the bases of the proximal phalanges. Their palmar surfaces are intimately blended with the deep transverse ligaments of the palm, and are grooved for the flexor tendons, the fibrous sheaths of which are connected to the sides of the grooves. Their deep surfaces from parts of the articular areas for the heads of the metacarpal bones.



(Fig. 5) Synovial Sheaths of the Long Flexor Tendons of the Digits (From Grant, 1972).



(Fig. 6) Synovial Sheaths on the Dorsum of the Wrist

Note

These six sheaths occupy [illegible] fibrous tunnels deep to the extensor retinaculum.

They contain 9 tendons

1 for the thumb in sheaths (1 & 2),

2 for extensors of wrist in 2 sheaths (3 & 4),

3 for extensors of fingers in 2 sheaths (5 & 6)

(From Grant, 1972).

digitorum superficialis and profundus, The other for flexor pollicis longus. These sheaths extend into the forearm for about 2.5 cm proximal to the flexor retinaculum. The sheath of the flexor digitorum tendons reaches about half way along the metacarpal bones, where it ends in blind diverticula around the tendons to the index, middle and ring fingers. It is prolonged around the tendon to the little finger and is usually continuous with the digital synovial sheath. The sheath of the flexor pollicis longus, which is usually separated but occasionally communicates with the common flexor sheath behind the flexor retinaculum, is continuous along the thumb as far as the insertion of the tendon. (Warwick and Williams, 1973).

THE SYNOVIAL SHEATHS OF THE CARPAL EXTENSOR TENDONS

Deep to the extensor retinaculum there are six tunnels for the passage of the extensor tendons, each contains a synovial sheath. They are as follows: (1) On the lateral side of the styloid process of the radius for the tendons of abductor pollicis longus and extensor pollicis brevis; (2) Behind the styloid process, for the tendons of the extensors carpi radiales longus and brevis; (3) on the medial side of the dorsal tubercle of the radius, for the tendon of the extensor pollicis longus; (4) on the medial