DUPUYTREN'S CONTRACTURE

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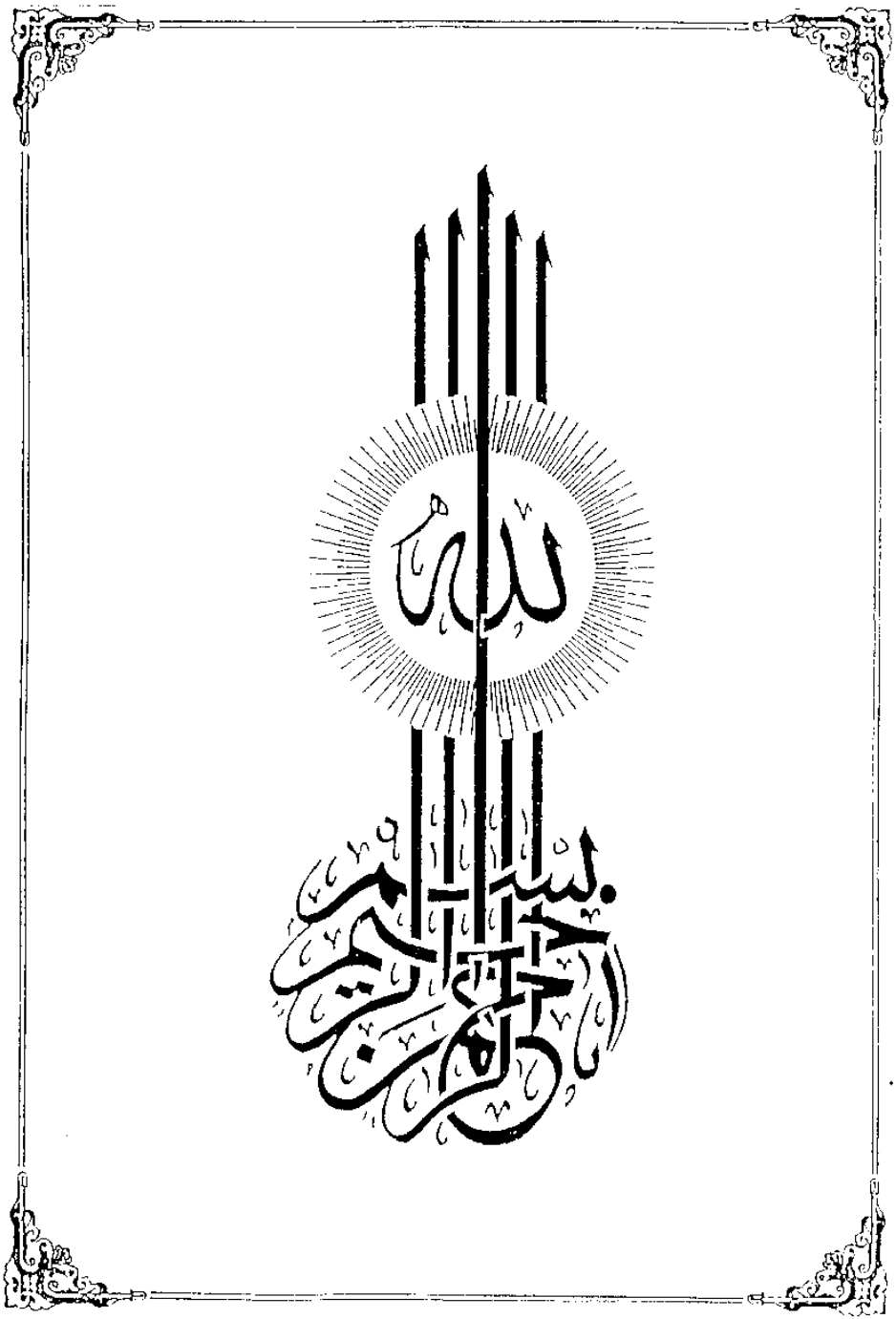


CONTENTS

INTRODUCTION AND AIM OF THE WORK

The function problems imposed by Dupuytren's contracture have been the scope of prolonged study since the condition first described by Dupuytren (1838).

About 150 years later, these problems are not yet fully solved. The aim of this thesis is to lay some light on the different parameters of the problem and the best lines to avoid and deal with the condition.

ANATOMICAL CONSIDERATIONS

(I) ANATOMICAL CONSIDERATIONS

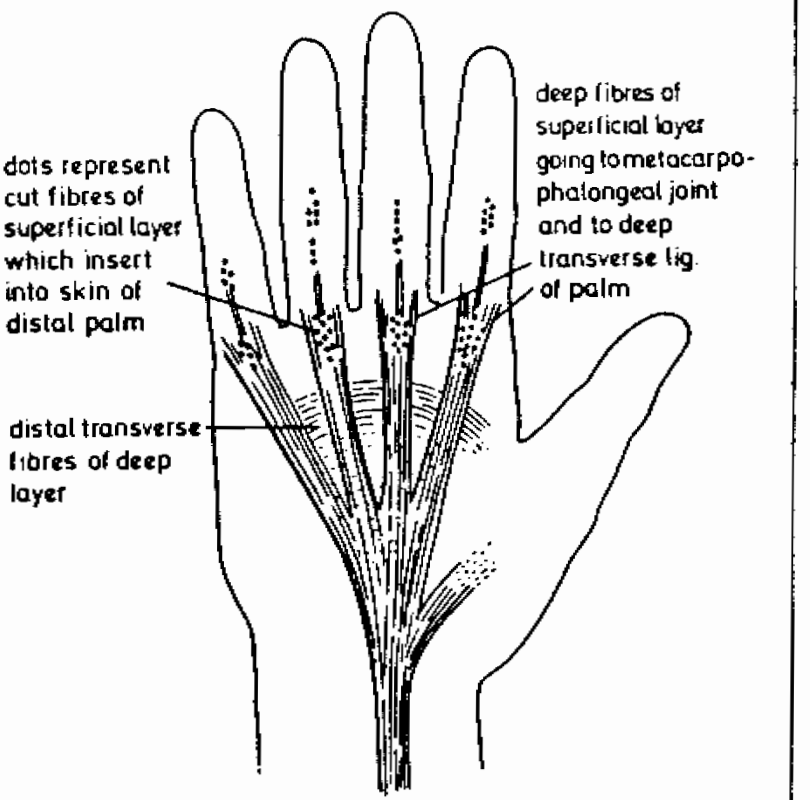
(a) Skin and Subcutaneous Fascia of the Hand: (Lampe, 1969)

In the palm of the hand innumerable minute but strong fibrous fasciculi extend from the palmar aponeurosis to the skin, these hold the skin close to the underlying palmar aponeurosis permitting comparatively little sliding movement of one upon the other, on the other hand these thread-like fibrous strands divide the subcutaneous fat into small, irregular masses, numerous, minute blood vessels pass through this subcutaneous tissue to the derma, the relationship of these fibrous fasciculi to the skin, fat and blood vessels has got a clinical significance in Dupuytren's contrcture where hypertrophy and hyperplasia of these fibrous bands result in ultimate displacement of the fat masses and partial obliteration of the blood vessels, thereby interfering markedly with the nutrition of the skin. Obviously, this point to the wisdom of early surgical excision of the palmar aponeurosis in Dupuytren's contacture, contrary to this tight relationship of the structures on the palmar aspect of the hand, the structures on the dorsum of the hand are noted for their looseness which creates the so called dorsal subcutaneous space, this tissue is lax that a fold of skin grasped between one thumb and index finger can be elevated several centimeters off, the underlying deep fascia can be separated by blunt dissection quite different from the palm, where this must be done by very sharp knife dissection. It is important to emphasize that most

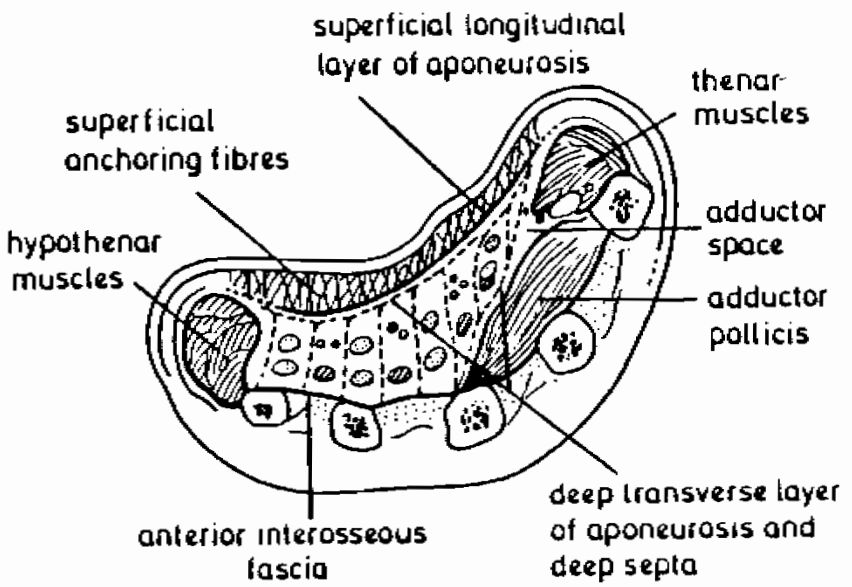
of the lymph on the palmar aspects of the fingers, web areas, hypothenar and thenar eminence flows into myriads of lymph channels and lacunae located in the dorsum of the hand, this anatomic fact accounts for the lymphedematous swelling frequently seen on the back of the hand even when the focus of infection is on the palmar aspect of the finger web space, hypothenar and thenar area.

* **Dorsal deep fascia** on the dorsum of the hand the deep fascia and the extensors of the fingers fuse to form the roof for the dorsal subaponeurotic space, because the barrier formed by the metacarpal bones and interosseous muscles and the manner of flow and location of the lymphatics, this space is not very frequently involved in the hand functions.

Palmar deep fascia there is intimate contact of the deep fascia to the thenar and hypothenar group of muscles, this relationship prevents formation of a space over these muscles within which pus may accumulate, the proximal end of the triangular-shaped part of the palmar aponeurosis is continuous with the tendon of palmaris longus muscle, it is this attachment that enables the palmaris longus muscle to assist in flexion of the wrist (Lampe, 1969).



. Superficial and deep layers of palmar aponeurosis.



An oblique section through the palm showing elements of the palmar aponeurosis

fades away inside the thenar fascia. The four slips of the distal part of the palmar aponeurosis terminate by sending most of the fibers into the skin of the distal palm. Some fibers however, continue in their course towards the fingers and the mode of their termination is complex. Some of them run dorsally and distally on both sides of M.P. joints and reach the deep transverse ligament of the palm; the capsule of the M.P. joint, the fibrous flexor sheath and become continuous with the Cleland's ligament, some fibers contribute to the deep septa in the distal palm derived from the transverse deep layer of the palmar aponeurosis, while the most distal fibers run in the superficial direction (skin fibers) and are attached to the superficial transverse ligament of the palm, the skin over the palmar aspect of the fingers and become continuous with the Grayson's ligaments.

(3) Deep layer of the palmar aponeurosis:

According to Skoog, It is composed predominantly of transverse fibers, which during dissection of the palm become visible at the distal part of the palm in the intervals between the slips of the superficial layer (Lamb & Kuczynski, 1981). These distal transverse fibers of the deep layer of the aponeurosis extend proximally for a variable distance (Sometimes as far proximally as the level of the trapezium) into thenar fascia. Again this transverse slip of the thumb is not attached to any deep structures but fades away gradually without leaving the layer of the thenar fascia. In many broad hands the deep aspects of the palmar aponeurosis provide a very considerable area

of attachment for the white strong fibers of the aponeurotic origin of the flexor pollicis brevis muscle just distal to the flexor retinaculum. The deep aspect of the palmar aponeurosis also gives rise to the septa (deep anchoring fibers) which extends to the anterior interosseous fascia. The two marginal septa are attached as follows:

(a) The ulnar one to the shaft of the fifth metacarpal bone.

(b) The radial one to the shaft of the third metacarpal. These marginal setpa superficially are attached to the ulnar and radial edges of the palmar aponeurosis. The remaining deep septa do not extend as far proximally as the marginal ones and are to be found in the distal palm only. They contribute in the formation of the eight tunnels: four for the flexor tendons to the fingers and four for the lumbricals and accompanying digital nerves and vessels.

(4) Anterior interosseous fascia:

Which covers the palmar aspect of the interossei muscles and the metacarpal bones and is contineous distally with the volar plates on M.P. joints and with the Cleland's Ligaments, proximally with the floor of the carpal tunnel and laterally with the dorsal fascia of the first dorsal interosseous muscle. In the fingers the deep fascia is organized into fibrous flexor sheaths and digital ligaments (Cleland's post. to the neurovascular bundle and Grayson's anterior to it.) (Lamb & Kuczynski, 1981).

* **The digital ligaments**

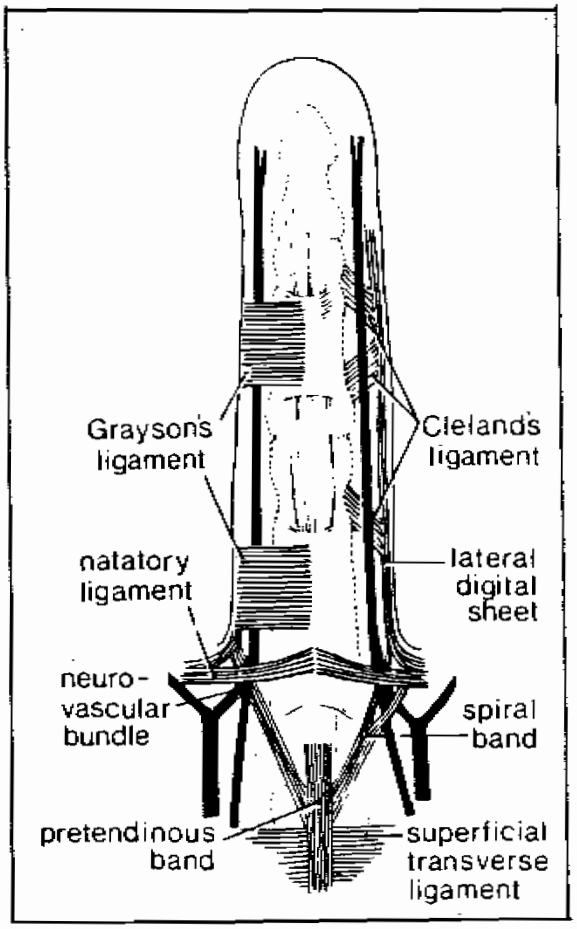
- **Cleland's ligament:**

Lies dorsal to neurovascular bundle and attached to the sides of the shafts of the phalanges and to the skin of the lateral and medial aspects of the fingers. It serves to retain the dorsal skin in position during flexion of the fingers and provides part of the support for the gripping pads of the fingers. Opposite the proximal I.P. joint the oblique retinacular ligament (Landsmeer) passes through the opening between ligament. Fibers of this ligament can be traced proximally to the deep transverse ligament of the palm and to the deep anchoring fibers from the four slips of the superficial part of the palmar aponeurosis.

These ligaments share in the formation of the spiral cord which displaces the neurovascular bundle and increases the possibility of injury to the vessels or nerves during dissection (Lamb & Kuczynski, 1981).

- **Grayson's Ligament**

The fibers of this ligament are much thinner than those of the Cleland's ligament; their attachment is rather inconstant and quite often they seem incorporated into the fibers of the gripping pads and the 'skin fibers' of the distal attachment of the four slips of the palmar aponeurosis into the digital palmar skin. These ligament, lie anteriorly to the neurovascular bundles. The fibers of these ligaments can be traced proximally into the superficial transverse ligament of the palm (Lamb & Kuczynski, 1981).



The parts of the digital fascia that become diseased

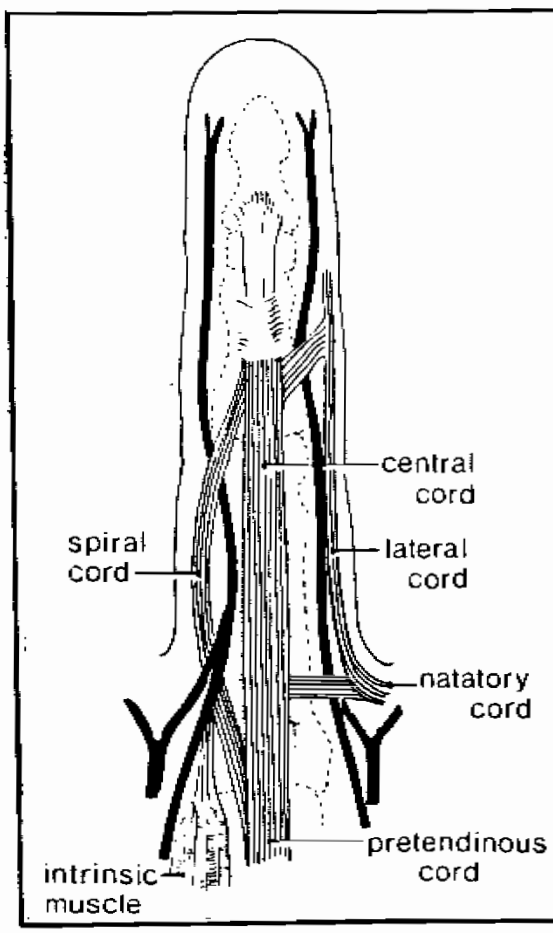


Illustration showing the distribution of diseased cords.

* **The pretendinous cord:** (Gosset, 1972)

It primary attaches to the skin at the distal palmer crease. It does not disturb the neurovascular bundle. In Dupuytren's contracture it is the only cause for contracture of the M.P. joint.

• **The natatory ligament:** The fibers of this ligament pass from side to side, but some fibers pass distally on either side of each finger, therefore contracture of the natatory ligament not only prevents separation of the fingers, but also contributes to the contracture at the PIP joint. The natatory ligament is present also in the web space of the thumb and terminates at the proximal crease of the thumb (McFarlane, 1982).

• **The superficial transverse ligament of the palm:**

Is deep to the pretendinous bands of the palmar aponeurosis. According to Skoog, this structure should be retained to support the deeper structures of the palm because it is not involved in the Dupuytren's disease process, its fibers lie transversely in a flat band best developed on the radial side and thinning out over the more mobile little finger - the ligament supports the fold of skin at the web (McFarlane, 1982).

The lateral digital sheet:

Is a condensation of the superficial fascia on either sides of the finger. It receives fibers from the natatory ligament and the spiral band.(The spiral band is thus named because the

fibers spiral around the neurovascular bundle). This band (the spiral band) is a continuation of the pretendinous band, which not only attaches to skin but also bifurcates just distal to the M.P. joint to form a spiral band on either sides. The fibers of the spiral band pass deep to the neurovascular bundle to reach the lateral digital sheet. Normally there is longitudinally oriented fascia deep to the neurovascular bundle which is called retrovascular cord. This tissue is frequently diseased and adds to the flexion contrcture of the finger joints (McFarlane, 1982).

The central cord: develops from the fibrofatty superficial layer that lies between the neurovascular bundles, it is always in continuity proximally with a pretendinous cord. The central cord attaches distally to bone and tendon sheath over the middle and may be associated with a nodule at the level of PIP joint (McFarlane, 1982).

The lateral cord: The lateral cord; which represents the diseased lateral digital sheath of Gosset and Thomine, arises from the superficial fascia on either side of the finger and is intimately adherent to the skin throughout its course. It attaches to the tendon sheath over the middle phalanx through fibers of Grayson's Ligament (Strickland & Bassett, 1985).

The spiral cord: may be a continuation of the pretendinous cord throughout the spirl band, or it may arise at the musculo-tendinous junction of an intrinsic muscle especially the abductor digiti minimi, the cord attaches distally to bone or tendon sheath of the middle phalanx (McFarlane, 1982).