# THE CUTANEOUS LIGAMENTS OF THE DIGITS

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The so-called cutaneous ligaments of the human digits were first described by Prof. John Cleland in 1867. These ligaments constitute a distinct fibrous septum dorsal to the digital nerves and vessels. Their function is presumably that postulated by Cleland of retaining the skin at the sides of the joints and thus preventing "bagging" during movements of the joint. The ligaments arise from the sides of the phalanges and are inserted into the skin over the interphalangeal joints. In a series of dissections undertaken by the writer it has been demonstrated that these ligaments are present not only in the human adult and in the human foetus, but also in a lemur (*L. varius*), in the Celebes Black Ape (*Cynopithecus niger*) and in more generalized mammalian forms. Cleland's description of the human condition was verified in every case, except that in *Lemur* the ligaments are somewhat thin and diffuse, forming parts of a continuous membrane rather than a series of discrete individual structures. In other animals dissected, and especially in adult man, they are relatively strong, well defined and discrete, and clearly capable of functioning as skin ligaments, acting from their fixed attachment to the bone.

But in addition to these structures it was apparent that there is also a fibrous septum volar to the digital nerves and vessels. This septum forms a series of retinacula which, if we refer to Cleland's ligaments as the deep digital skin retinacula, might well be termed the superficial or volar retinacula. Their distribution is such that they could obviously subserve precisely the same function as their deeper fellows (see Fig. 1).

The volar skin retinacula arise, not from the phalanges themselves, but from the flexor sheaths, and they are associated in pairs with each interphalangeal joint. Those associated with the proximal interphalangeal joint consist of two pairs of ligaments. The proximal members arise from the flexor sheath over the distal third of the proximal phalanx, and the distal pair from the sheath over the proximal third of the intermediate phalanx. These ligaments pass respectively in a distal and proximal direction as they go to be inserted into the skin over the sides of the proximal interphalangeal joint. In dissections of the distal interphalangeal joint only the proximal pair of ligaments could be demonstrated with certainty. It is of interest to note that Cleland described a deep ligament of the distal joint: but this is not shown in the figure accompanying his paper, nor was its presence satisfactorily demonstrated in the present investigation.

It seems obvious, from the examination of the types dissected here, that the strength of the volar ligaments is in inverse proportion to that of their

deep fellows. Thus in *Lemur* the superficial ligaments are by far the thicker and are clearly the only structures that can act as skin retinacula. *Cynopithecus* and the human foetus showed the volar ligaments developed to about the same degree; but in *Cynopithecus* the dorsal retinacula, although strong, are not well differentiated as separate entities. In the adult human digit the volar ligaments are thin and membranous, almost as though they had undergone passive stretching in the growth of the digit from the foetal condition. It was noted that the volar retinacula occupy the same plane as the ligamenta natatoria of Grapow (bandelette transversale sous-cutanée of Bourgery or interdigital ligaments of Legueu and of Juvara) and the superficial transverse ligament, both probably derivatives of the primitive interdigital web. It seems, therefore, not unlikely that the volar retinacula are derived from the same fibrous layer. In order to test this hypothesis, the manus of *Ornithorhynchus* was dissected and it was found that in its web there are two distinct membranous layers between which the digital vessels and nerves run. The volar of these two membranes passes from flexor sheath to flexor sheath of adjacent digits, whereas the dorsal membrane arises from the phalanges and occupies the intervening interphalangeal spaces. This double web membrane may well be the basis from which both superficial transverse ligaments, the ligamenta natatoria, and both sets of digital skin ligaments are derived. Reacting to the stresses imposed by continuous flexion, these two membranous planes would appear to give rise to a dual series of skin retinacula variably differentiated according to the varying demands of specialized digital mobility.

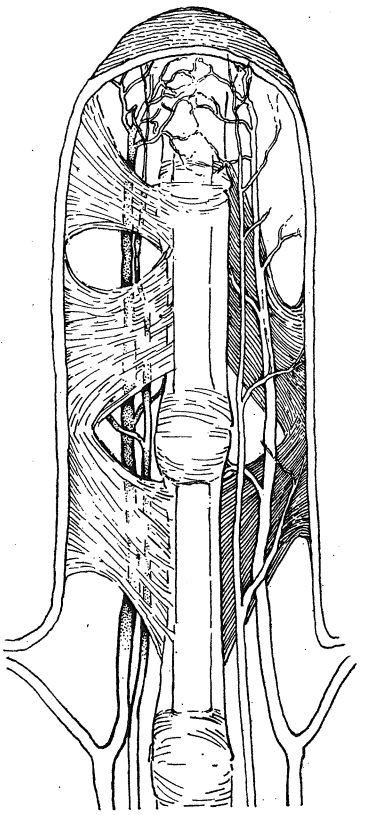

Fig. 1. A composite drawing, made from drawings of a number of dissections, showing the cutaneous ligaments of the digits from the volar aspect. The dorsal ligaments are seen on the right side of the figure, and the volar ligaments on the left.

I have to thank Prof. Wood Jones for the figure which is a composite made from my own drawings of the dissections carried out during the investigation.

## REFERENCE

CLELAND, J. (1878). *J. Anat. Phys.* **12**, 526, Pl. XVII. (Cleland first reported the existence of these ligaments at the Meeting of the British Association in Dundee in 1867.)