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15 The extensor mechanism and knuckle changes

Swellings over the finger joints in association with Dupuytren's disease (DD) were noted in 1893 by Archibald E. Garrod, Assistant Physician at St Bartholomew's Hospital, and later described by Garrod in the British Medical Journal (1904) as 'pads' (Fig. 15.1).

Sir James Paget (1875) had previously written in the same journal an article entitled 'On the minor signs of gout in the hands and feet' and wrote of the 'formation of abnormal bursae'. He described the evolution of such a swelling as follows:

> this soon became thickened and hardened, and almost rigid, and all the integuments over it grew thick and dense, so that a considerable nodular mass was the result; not, however, let it be observed, connected at all with a diseased articulation, but situated only in the subcutaneous tissue just beneath the integument.

Fig. 15.1 Illustration from Garrod (1893); On an unusual form of nodule upon the joints of the fingers.

This curious description may today be confusing unless one appreciates the rather wider scope of the diagnosis 'gout' in the 19th century; contracture of the palmar fascia 'was often characteristic of gout'.

Skoog (1948) has reviewed the literature of this condition and the origins of the terms '*Fingerknockelpolster*', '*coussinets des phalanges*', '*symmetrischer Fibromatose*', '*helodermia*', '*callosités dorsodigitales*', '*keratomes en nappe de mains*', '*keratosis supracapitularis*'.

It has been suggested that knuckle pads occur in sheep shearers (Wilson 1972) and other occupations (Hueston & Wilson 1973), but epidemiological evidence is lacking.

The incidence of knuckle pads in association with DD has been variously reported to be 44% (Skoog 1948), 20% in primary cases and 75% in those with recurrence (Hueston 1963), and in 45% of men and 62% of women operated on for DD (Mikkelsen 1977).

In his general population group Mikkelsen noted 9% of men (women 8.6%) to have knuckle pads and Lund (1941) found 29% of epileptic men to have these changes; most also had palmar contractures.

Hueston (1963) considers this physical sign to indicate a strong diathesis or tendency towards DD, but Mikkelsen (1977) disagrees.

These accounts, however, do not seem adequate to describe the clinical signs present in the wrinkle skin. A study was undertaken (McGrouther & Walton, unpublished observations) to describe knuckle pads and other knuckle changes and record their frequency. Readers will note from their own hands that the wrinkle skin over the dorsum of the proximal interphalangeal joint,

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Fig. 15.2 The middle finger shows a common pattern of loss of the distal skin wrinkles and slight tethering of the proximal wrinkles. Hyperkeratosis is most marked in the index finger.

Fig. 15.3 A skin thickening is apparent in the index finger. In the middle and ring fingers a discrete lump is palpable.

which is apparent on full extension of the digit, is much less obvious when the hand is in the neutral resting position (semi-flexed). There is considerable individual variation in the development of these wrinkles. The appearance of the wrinkle skin reflects the range of motion in the underlying joint; it disappears in the stiff or arthrodesed joint. In the normal hand the skin is thrown into a series of wrinkles forming a transverse oval ellipse. The skin wrinkles proximal and distal to the joint are concave towards the joint line and the centre of the wrinkle skin area.

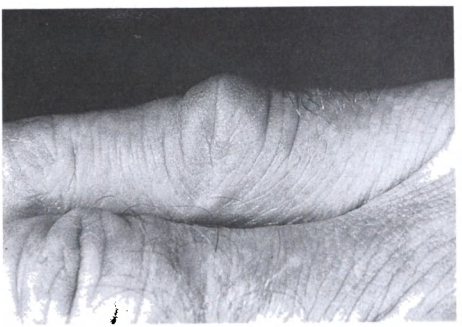

Fig. 15.4 A knuckle pad.

Fig. 15.5 Marked skin tethering in the ring finger.

In DD there was a tendency towards loss of the distal wrinkles (83% of digits in a series of 50 patients; Fig. 15.2). This loss was associated with either skin thickening or a discrete nodule in 45% of digits (Figs 15.3 and 15.4). The site of the thickening or nodule varied, being either in the digital midline or off-centre in the radial or ulnar aspects. Proximal tethering of the proximal wrinkles was noted in 56% (Fig. 15.5) with deeper valleys between the skin wrinkles and a suggestion of tethering of the skin by a deep contracture process.

There was frequently a degree of hyperkeratosis of the skin apparent on clinical examination (see Fig. 15.2). Sequential examination in a few patients over 5 years showed that the knuckle pads may develop, regress, or show little change.

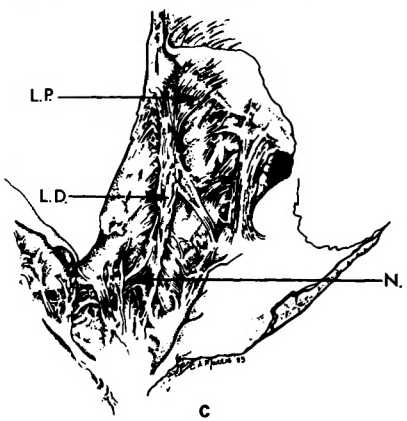

Fig. 15.6 **A** The arrow indicates the line of the natatory ligaments extending via the lateral peritendinous cutaneous fibres to the dorsal skin over the proximal interphalangeal joint. Contracture of these structures may be the cause of proximal tethering. **B** and **C** Dissection of ring finger with pin marking lateral peritendinous (LP) cutaneous fibres. Continuity of these with the lateral digital (LD) sheet and dorsal extent of the natatory (N) ligament is shown.

This study suggested that knuckle pads are part of a spectrum of *knuckle changes* which occur frequently — in 87% of digits — in Dupuytren's patients and that they are not indicative of the stage of palmar disease or its severity. There is a spectrum of change from the normal appearance through skin thickening to a palpable nodule and there is therefore some debate about what exactly constitutes a 'pad', which may explain the wide difference in reported incidence. Changes in the skin wrinkle pattern have received little attention, except in a case report by Hueston (1985) in which he suggests that tethering may be a precursor of knuckle pads. It is possible that the proximal tethering is due to contracture in the ligamentous system, described by Law & McGrouther (1984) as the lateral peritendinous cutaneous fibres (Fig. 15.6). These fibres, inserted into the outer part of the wrinkle skin, are continuous proximally with the lateral digital sheet which in turn is continuous with the natatory ligament and spiral cord of Gosset. Thus there is a fascial continuity between palmar structures and the dorsal wrinkle skin over the proximal interphalangeal joint.

The frequent finding of knuckle changes in patients with DD suggests that palmar contracture, although being of considerable functional significance to the patient, is not an indication of the extent of pathological change. Knuckle changes are present even in non-contracted fingers. DD therefore seems to be a more wides-

pread affliction of the connective tissues than is immediately apparent from study of the palm of the hand.

The importance of knuckle changes requires further clarification by epidemiological survey in different parts of the world. The recognition of a diffuse set of knuckle changes may prove useful in recognizing the Dupuytren's-prone patients long before Garrod's nodules become apparent and before the palmar changes develop.