THE USE OF DORSAL SKIN FLAP FOR THE COVERAGE OF PALMAR DEFECTS AFTER APONEURECTOMY FOR DUPUYTREN'S CONTRACTURE*

JULIAN M. BRUNER, M.D.

Des Moines, Iowa

Manus Apostolicus, "the hand of the apostle", was the term historically applied to the condition known today as Dupuytren's contracture. This position of the hand, with the index and long fingers extended, but with the ring and little fingers drawn down into the palm, is characteristic of the deformity which was described in 1832 by Baron Dupuytren, chief surgeon to the Hotel Dieu, Paris.

The essential pathologic features of this condition are the proliferation and contraction of the palmar aponeurosis. The cause of this condition has been the subject of great speculation. A hereditary tendency probably exists in affected individuals, as indicated by family history. Trauma is generally discounted as the chief cause, although in certain cases chronic trauma may be a contributing factor. Recently, reports have been made of the development of typical contractures following coronary heart disease; the explanation of these cases is obscure.

The former method of treatment of this condition was by subcutaneous section of the contracting fascial bands, the method used originally by Dupuytren. With this method, only temporary relief was obtained, recurrence was the rule. It is now quite generally agreed that the successful permanent relief of this disabling condition requires: (1) complete removal of the palmar aponeurosis; (2) sound healing of the surgical wound permitting early movement of the hand to avoid joint stiffness. The importance of the above was emphasized by Kanavel, Koch, and Mason in 1929.

In advanced cases of Dupuytren's contracture there is often involvement of the palmar skin by the pathologic process; in those areas overlying the thickened fibrous bands there is loss of subcutaneous fat, and the skin itself is attenuated and actually invaded by the fibrous tissue. Such areas of skin are often so thin that they are not viable after removal of the palmar aponeurosis and must be excised to avoid a slough.

In addition, there is sometimes an appreciable shrinkage of the palmar skin near the bases of the fourth and fifth fingers incident to the long standing flexed position of the metacarpophalangeal joints. This is forcibly demonstrated when, after exposure and excision of the palmar aponeurosis through a transverse incision along the distal palmar crease, the metacarpophalangeal joints are brought into the fully extended position. We now observe that the narrow crevice created by the incision along the distal palmar crease is transformed

* Presented in conjunction with colored slides of operated cases at a meeting of the American Society for Surgery of the Hand, in Chicago, January 20, 1949.

into a crevasse which seems to beg for extra skin coverage. This gap is usually widest near the ulnar border of the hand.

The problem of palmar skin replacement after aponeurectomy is very important, difficult of solution, and no one method is applicable to all cases. Three methods are in general use: the Wolfe graft, the split graft, and the abdominal pedicle.

The free full thickness or Wolfe graft is one method commonly used. Such grafts can be cut to fit any skin defect and they furnish an elastic, though somewhat thin, covering for the palm or fingers. This type of graft requires meticulous technique and thorough splinting for its success. Despite the above, punctate sloughs are not uncommon, probably occasioned by the far from ideal bed into which the graft must be laid. If sloughs occur, low grade infection invades the surgical wound, healing is delayed, and furthur splinting is necessitated. Prolonged splinting, plus infection causes joint stiffness, which is difficult to overcome.

The split thickness graft has the advantage that a higher percentage of complete takes will be obtained, therefore this type of graft may be used in preference to the Wolfe graft if the recipient bed is not ideal. However, the shrinkage that often occurs in this graft may lead to a deficiency of skin in the palm which is undesirable. Neither Wolfe grafts nor split grafts form an ideal covering for the palm because they lack a subcutaneous fat cushion.

The abdominal tube pedicle may have an occasional indication in advanced cases of Dupuytren's contracture with marked involvement of palmar skin. However, such grafts are bulky and are often impractical due to the long period of hospitalization required, and greater discomfort to the patient. Patients with abdominal pedicle skin in the palm are not always happy with these grafts.

The plan of shifting dorsal skin flaps to replace palmar defects after aponeurectomy was employed by Lexer. This technique as illustrated in text books resulted in longitudinal suture lines in the palm. It is essential from the functional as well as the cosmetic standpoint that scars in the palm are not at odds with normal skin folds.

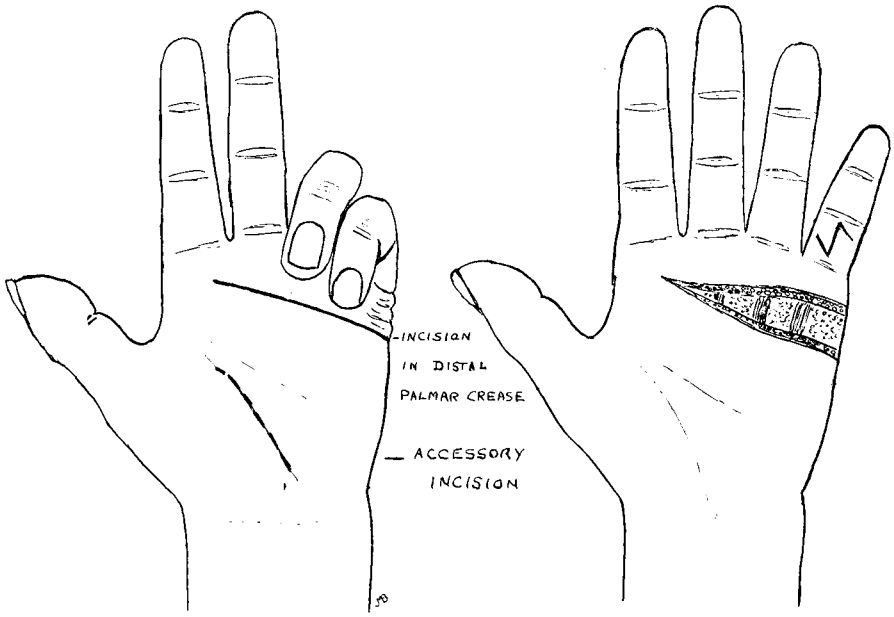
A method of dorsal flap rotation which results in suture lines conforming with existing skin creases has been found useful in cases of Dupuytren's contracture with marked involvement of the fourth and fifth fingers. In such cases, there is often a shrinkage of the palmar skin near the ulnar end of the distal palmar crease. Excision of non-viable skin in this area may further increase the defect which appears at operation when the metacarpophalangeal joints are completely extended.

Access to the palmar aponeurosis for resection is obtained through a transverse incision in the palm along the distal crease; the incision curves proximally at the ulnar border of the hand to intersect the mid-lateral line at an angle of about sixty degrees. A short additional incision is made if necessary along the thenar crease near the base of the palm to expose the proximal portion of the palmar fascia (Fig. 1).

The triangular sheet of fascia comprising the palmar aponeurosis, including its arcades over the flexor tendons and lumbrical structures, is dissected out in

toto. Great care must be taken to avoid trauma to digital nerves; otherwise paresthesia or anesthesia will result. All ramifications of the diseased fascia in the palm should be completely removed. The technique for accomplishing complete removal of the offending fascia is graphically described by Bunnell in his textbook, "Surgery of the Hand."

Exposure of the fibrous digitations in the fingers is made through mid-lateral incisions, or through median-longitudinal incisions with Z-plasty as suggested by McIndoe. The displacement of the digital nerves and vessels from their normal anatomical locations as brought out by Mason should be borne in mind.

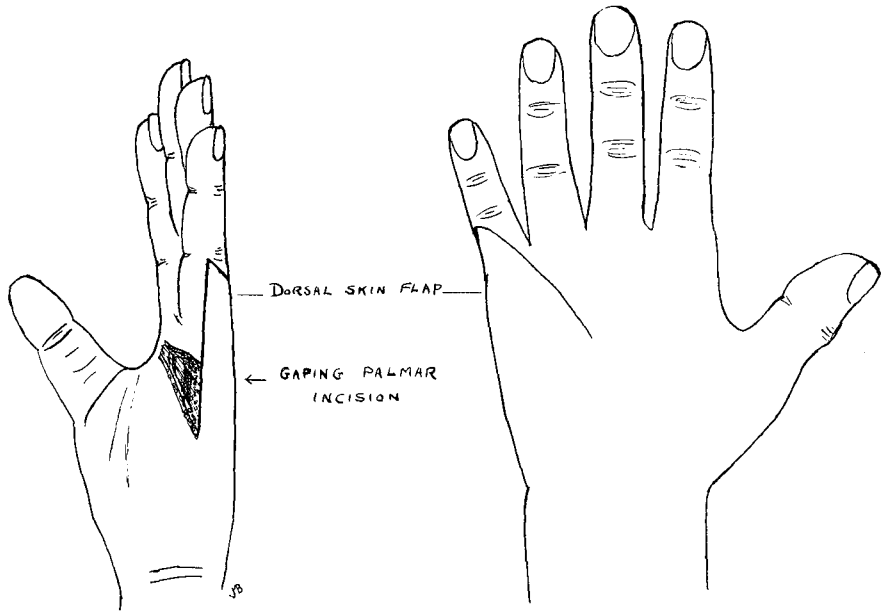


1 2

FIG. 1. INCISION IN DISTAL PALMAR CREASE
FIG. 2. Gap due to skin defect at ulnar end of transverse palmar incision.

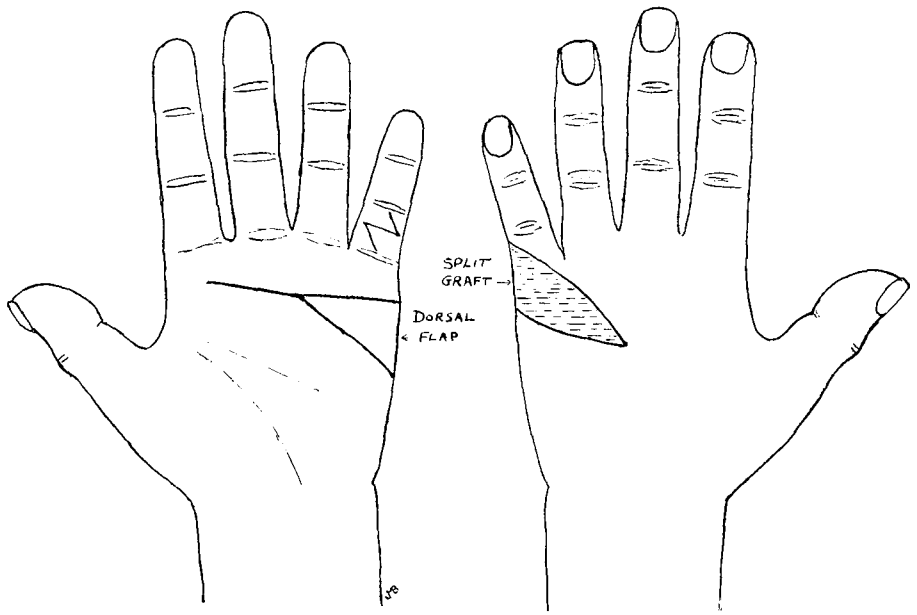
Subcutaneous division of fibrous bands in the fingers is dangerous because the digital nerves may lie between the layers of fascia comprising these bands.

If, after aponeurectomy, a considerable gap exists (Fig. 2) at the ulnar end of the transverse palmar incision, the following plan may be used. A dorsal triangular flap is laid out, one side of which is the mid-lateral line on the ulnar border of the hand. The tip of this flap will lie at some point proximal to the middle joint of the fifth finger (Figs. 3 & 4). This skin flap, including subcutaneous tissue, is elevated and is transposed into the gap at the ulnar end of the palmar incision in the manner of a partial Z-plasty (Fig. 5). The resulting defect on the dorsum of the hand and fifth finger is covered with a split thickness graft (Fig. 6).



3 4

FIG. 3. DORSAL TRIANGULAR FLAP OUTLINED
FIG. 4. DORSAL TRIANGULAR FLAP OUTLINED



5 6

FIG. 5. Dorsal flap elevated and transposed into gap at ulnar end of palmar incision
FIG. 6. Defect on dorsum of hand covered with split thickness graft

Proper dimensions of the dorsal flap are important and will follow the general rules pertaining to Z-plasty flaps. In cases where an unusually large flap is required, preliminary elevation (delay) of the flap may be done; so far this has not been found necessary.

The palmar incision may now be closed without tension, and sound healing may be expected if the flap has adequate dimensions. Splinting of the hand is maintained with immobilization of the metacarpo-phalangeal joints until healing of the palmar skin is perfect.

The advantages of this method when indicated are as follows: 1. The dorsal skin flap provides a more normal covering for the palm than free grafts because it includes both skin and subcutaneous tissue. 2. In the absence of scars on the back of the hand, such a flap is always available. 3. The resulting suture lines are transverse, and conform to normal flexion creases. 4. Sound healing may be expected if the general rules for local flaps are observed, permitting early motion of the hand and preventing joint stiffness. The substitution of a split graft in a

FIG. 7. Pre-operative photo of right hand showing marked involvement of fifth finger and lesser involvement of ring finger.

small area on the back of the hand and fifth finger is not disabling and has no serious objections.

The above method is applicable only in those cases where there is a deficiency of palmar skin near the base of the fifth finger, due to shrinkage or surgical excision. The method works best where there is marked, long standing contracture of the fifth finger alone, or where there is marked involvement of the fifth finger with lesser contracture of the ring finger. It is not indicated where the ring finger alone is contracted, the little finger being free. Nor will it relieve contracture of the proximal inter-phalangeal joint due to shrinkage of finger skin; Z-plasty or skin graft on the finger is necessary for this purpose.

It is emphasized that this method of skin replacement is presented only to supplement other methods currently used. No one method can be used routinely; various methods should be kept in mind to be used when needed. These include the Wolfe graft, the split thickness graft and the abdominal pedicle when indicated.

Amputation with filet and use of the finger skin to cover defects in the palm is occasionally indicated for stiff or hopelessly damaged fingers. In the case of the fifth finger, amputation with filet provides skin in the distal ulnar area of the

palm, where it is needed. However, the little finger is well worth preserving both functionally and cosmetically, and many patients would refuse treatment involving such amputation.

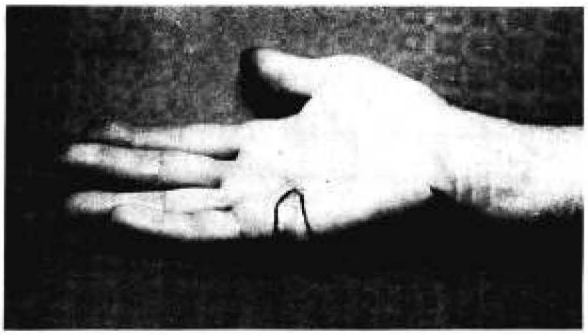


FIG. 8. Post-operative photo showing complete extension of fingers, with dorsal skin flap outlined in palm.

FIG. 9. Post-operative photo showing normal flexion of all fingers.

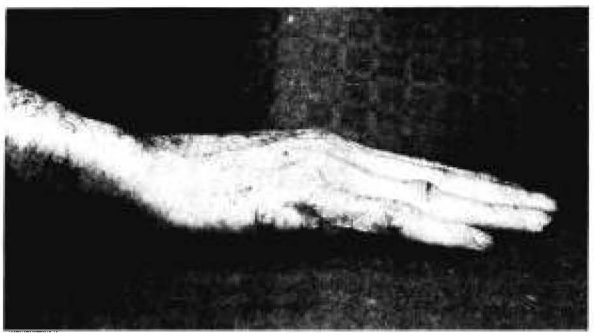


FIG. 10. Post-operative photo showing inconspicuous split-grafted area on the dorsum of the proximal segment of the fifth finger.

Since the fifth finger holds second place in incidence of involvement (34% according to Davis), it is felt that the dorsal skin flap method described above may have rather frequent application in properly selected cases.

Repair of Dupuytren's contracture of five years duration in Mr. H. B., age 60, is illustrated in Figs. 7–10.

BIBLIOGRAPHY

1. Bunnell, Sterling: Surgery of the Hand, Lippincott, 1944.
2. Kanavel, A. B., Koch, S. L. and Mason, M. L.: Surgery, Gynecology and Obstetrics, February 1929.
3. Koch, S. L.: Journal of A. M. A., March 25, 1949.
4 Mason, M. L.: Surgical Clinics of North America, Feb. 1939.
5. McIndoe, A. H.: personal communication.
6. Skoog, Tord: Acta Chirurgica Scandinavica, Vol. XCVI (96), Supp. 139.