# OPERATIVE SURGERY

## THE HAND

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Edited by

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## SECOND EDITION

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# INTRODUCTION

Successful surgery depends upon an accurate assessment of the problem, a knowledge of what can be achieved by treatment, the quality of the surgery and the after care. In this volume, the first in *Operative Surgery* to be concerned entirely with the hand, is collected the practical advice of surgeons with wide experience in this work. The section which appeared in Volume 6 of the First Edition has been revised and expanded.

During recent years hand surgery has grown into a special subject. In an increasing number of countries it is now possible for some men to devote the whole or a large part of their time to the hand. There are also many surgeons, both in Britain and overseas, who have other duties to perform in addition to hand surgery. There are others who only occasionally are required to deal with these problems.

Although surgery cannot be learned solely from a book, it is hoped that the technical features here described will be of practical help, particularly when the work is read in conjunction with *Clinical Surgery*. We trust that the specialist in hand surgery may also find something of value, even though he may practise techniques differing from those to be found in these pages.

R. GUY PULVERTAFT

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# SYNDACTYLY

T. J. S. PATTERSON, M.D., M.Ch., F.R.C.S.
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## PRE-OPERATIVE

Webbing of the fingers is one of the most common malformations of the hand. It is important to distinguish two groups, since the prognosis and timing of treatment are different. In the first group, two or more normal fingers are joined by a web of skin which may extend to the tips; this is often bilateral and familial, and the toes are commonly affected. The characteristic of the second group is that the skeleton is abnormal; this is usually unilateral, there is no family history and the toes are not affected. The prognosis depends more upon the condition of the underlying skeleton than the webbing. Indiscriminate division of the webs may leave individual fingers which are weak and stiff. It may be better to delay treatment until careful observation and x-ray evidence have shown that separation of one or more fingers will improve the function of the hand.

### Timing of operation

The best age at which to separate webbed fingers is four years. By this time the child is old enough to tolerate his stay in hospital and to co-operate in treatment. The hand is big enough to make the operation and post-operative dressings easier. Treatment can be completed before the child goes to school at five years.

If a longer finger is joined to a shorter (usually ring and little fingers) the longer finger may be distorted as the hand grows. These fingers should be separated as soon as any distortion is noticed. Occasionally the fingers are fused by bone at the tips; here the longer finger is already distorted at birth. Separation of these fingers involves dividing bone, and inevitably opens the terminal interphalangeal joints. Despite early operation some distortion of the terminal phalanges may persist.

When both hands are affected it is kinder to operate on one hand at a time to allow the child some freedom of movement. Since the first dressing needs a general anaesthetic, the second hand is operated on at this time—usually 10–14 days later.

If three fingers are webbed together, only one pair should be separated at a time; exposure of both sides of a finger at one operation carries the risk of damaging the blood supply to the tip.

### Instruments required

General soft tissue set; skin grafting set; small bone-cutters.

### Anaesthesia

The operation is carried out under a general anaesthetic. A pneumatic tourniquet is applied to the upper arm after the limb has been exsanguinated.

### Separation of webbed fingers

The principle of treatment is to make a skin-lined cleft which will not contract as the child grows. Occasionally, if the web is lax, it may be possible to design the incisions so that the cleft can be re-surfaced by local skin. In the great majority of cases there is not enough skin, and a graft must be added. If a graft is used as a continuous sheet round both sides of the cleft, there is a tendency for the marginal scar to contract and pull skin down from the hand so that the web partially recurs. To avoid this a local flap or flaps should be used at the base of the cleft to break up the continuous scar lines. Since the base of a normal

cleft extends further up the dorsum of the hand a single, dorsally-based flap gives the most natural-looking result.

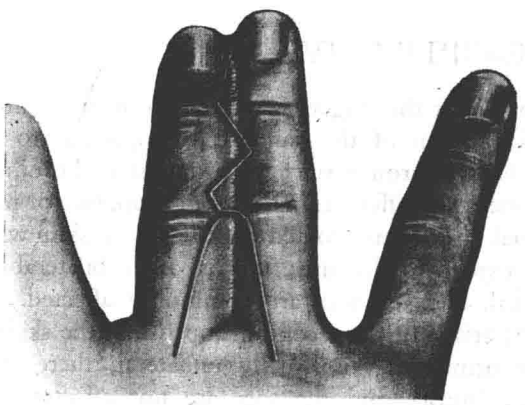
The skin graft may be either thick split-thickness or a Wolfe graft. The former is easier and quicker to handle, and satisfactory for all cases. A Wolfe graft must be taken from a hairless area—the outer third of the groin crease is convenient; unless it is dissected with care it may be too thick on the sides of the fingers.

## THE PROCEDURE

### Dorsal flap

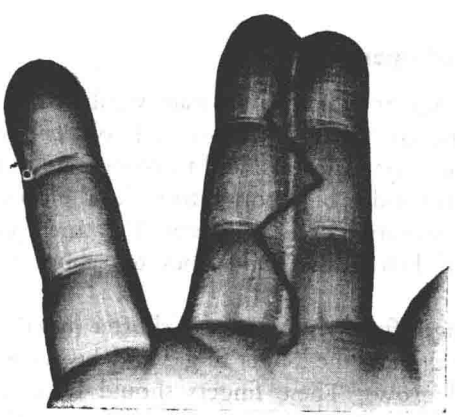
The dorsal flap for the base of the cleft extends from the level of the heads of the metacarpals to the proximal crease over the proximal interphalangeal joints.

1



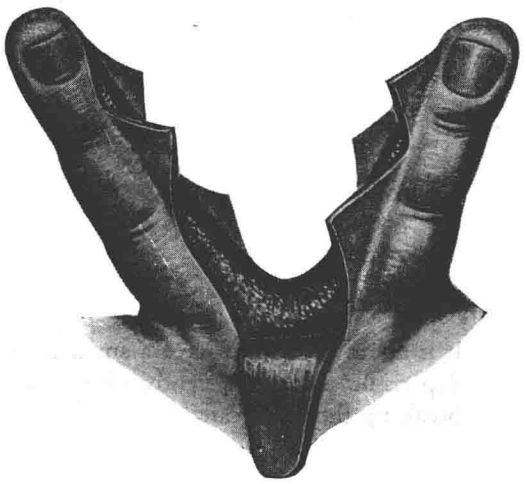
### Staggered incisions

2 Staggered incisions on the fingers avoid the risk of contracture of a straight scar. When the web is lax these edges may be raised as small flaps which are inter-digitated to cover the sides of the fingers.



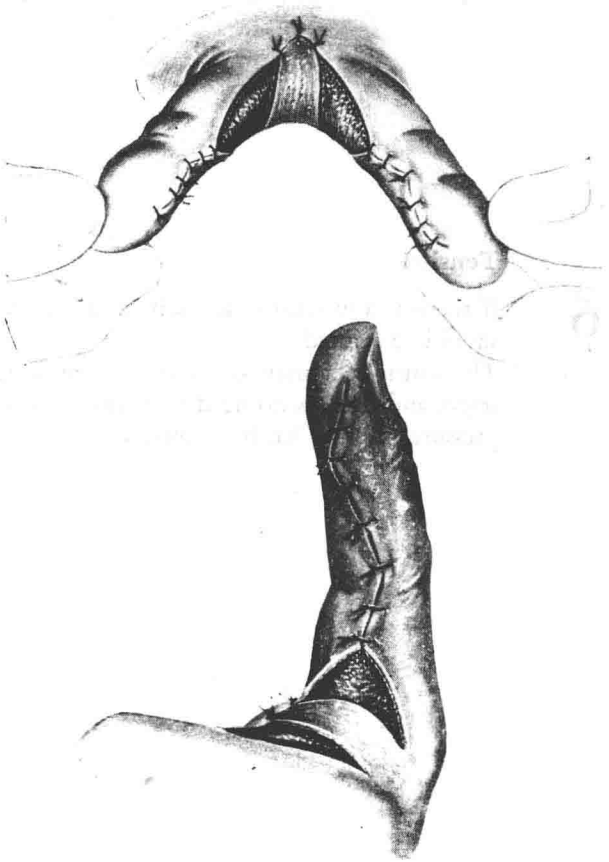
**Separation of fingers**

3 The flaps are raised and the fingers separated. The dissection is carried up between the heads of the metacarpals with care to preserve digital vessels and nerves which may be abnormally placed.



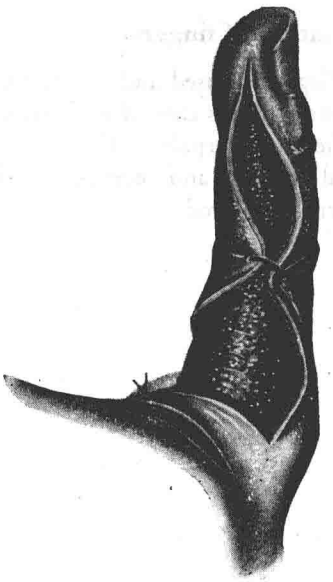
**Suture of dorsal flap**

4 The tip of the dorsal flap is sutured into place, and the defects on the sides of the fingers are covered by suturing the small flaps together *if this can be done without tension*. A small raw area is usually left at the base of the fingers which must be grafted.



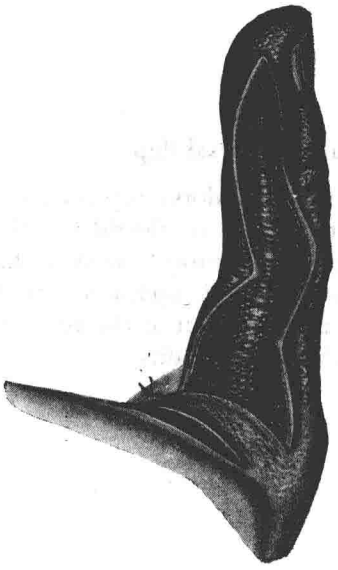
**Flap tissue**

5 It is an advantage to have a small amount of flap tissue across the centre of the defect to break up the free graft.



**Tension**

6 If there is any tension the whole raw surface should be grafted.
The tourniquet may safely be left on at this stage, and there is no need to release it until a pressure dressing has been applied.



## POST-OPERATIVE CARE

The fingers are covered with a single layer of tulle gras, and the cleft is packed with wool wrung out in saline so that the fingers are held straight and slightly separated. The hand and wrist are enclosed in a "boxing-glove" type of dressing. The tourniquet is then released. The hand and forearm are elevated for 48 hours.

The first dressing is done at 10–14 days. This usually needs an anaesthetic. All sutures are removed. The grafted fingers are held straight on a simple tongue-depressor splint, and the rest of the hand may be left unbandaged. After a further 10 days the splint is discarded by day but should be worn at night for 3 weeks.

Careful follow-up is required. There is a tendency for grafts to contract in the early stages. If this occurs night-splinting should be prolonged.

As the child grows, the scars at the margins of the grafts may not keep pace with the child, and secondary contracture may occur. This is particularly common if the operation has had to be carried out when the child is under four years of age—when a longer finger is joined to a shorter. A series of Z-plasties on the marginal scars may be adequate. If the contracture is more severe it will be necessary to incise across the graft to create an oval defect which can best be filled by a small Wolfe graft. Night-splinting after these secondary procedures should be prolonged.

[*The illustrations for this Chapter on Syndactyly were drawn by Mr. R. N. Lane.*]

# POLYDACTYLY

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## PRE-OPERATIVE

Polydactyly—duplication of one or more digits or part of a digit—is the most common congenital anomaly in the hand. There may be associated abnormalities in the hand or the rest of the limb, the most usual being syndactyly—the abnormal digit is webbed to its neighbour. The deformity may range from a small skin tag to duplication of the whole limb. There is a definite familial tendency. The condition is often bilateral and the feet are similarly affected in many cases. The abnormal digit is usually marginally placed on the hand; polydactyly in the centre of the hand is less common.

On the *ulnar side* of the hand a small tag of soft tissue is common. This may be sessile, although without bony connexion, or there may be two diminutive phalanges attached to the hand by a thin pedicle—the "pedunculated post-minimus". This is liable to undergo torsion which, if not relieved, may cause gangrene of the digit.

A reasonably well-formed digit may be flail or attached to the hand by bone. In the latter case the digit often sticks out at an angle to the hand.

On the *radial side* duplication of part of the thumb is the most common of all types of polydactyly. There may be a small skin-tag on the radial border of the thumb, or the thumb may be split into two more or less equal parts including a double metacarpal. One or both parts of the completely duplicated thumb may be triphalangeal. In the most severe form, the "mirror-hand", the thumb is replaced by an accessory hand set at right-angles to the palm.

### Timing of treatment

Many of the small tags can be simply removed when the child is first seen. In the more complicated deformities surgical correction is easier at the age of two, by which time the parts are large enough to allow precise repair. However, these are unsightly deformities, and the surgeon may be under heavy pressure from the parents to complete the treatment as soon as possible.

In the *foot* the extra digit should be removed at the time when the child needs to wear a normal shoe.