THE TREATMENT OF FINGERTIP INJURIES

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Injuries to the distal phalanx of the fingers are the commonest of all hand injuries. During a period of 12 months, of 112 cases of hand injuries treated by our department, 81 were limited to the distal phalanges.

In normal life the tips of our fingers are in constant use. This is because our fingertips, with their special quality of tactile sensation, have become in everyday life as important to us as our senses of hearing and sight.

The fingernail, which forms an integral part of the distal phalanx, has in our modern society, especially in the female, become a structure of great cosmetic importance. The loss of a fingertip and its nail is therefore not only a functional loss but also a social embarrassment (Fig. 1). It is very important, therefore, that treatment of injuries to the distal phalanx and the nail should be such that the best functional and cosmetic result is obtained in the shortest possible time.

Since our hospital group does not treat patients covered

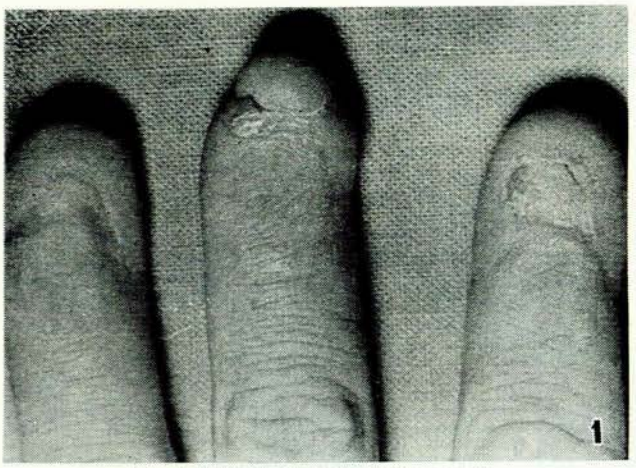

Fig. 1. Effect of loss of fingernails.

by the Workmen's Compensation Act, our cases were mainly limited to domestic injuries. The fingertip injuries were most frequently caused by doors. Injuries by metal lids of manholes were next in frequency—inquisitive children have a tendency to try to lift these lids. Thirdly, there were the cases of injury by machinery in untrained people attempting a 'do it yourself' job at home. Almost 70% of our cases were under the age of 12 years.

METHODS OF TREATMENT

All our patients with injuries to distal phalanges are operated on in the casualty theatre and treated afterwards as outpatients. In all children under 12 the operations are done under general anaesthesia.

The following methods of treatment can be used, according to the type of injury: (1) conservative; (2) direct suturing; (3) Thiersch graft; (4) Wolfe graft; (5) flaps (cross-finger, thenar, or distal); (6) amputation.

1. *Conservative Treatment*

It is often very difficult for the casualty officer to decide whether suturing is necessary or an ordinary dressing will suffice, especially in small children, in whom proper examination to assess the damage is often almost impossible without an anaesthetic. A partially amputated distal phalanx is often pushed back into position by the parents and what on first inspection appears to be a minor laceration may be an almost total amputation with partial avulsion of the nail.

Conservative treatment is only suitable in cases with very minor lacerations. It is definitely unwise where any of the pulp has been amputated, even though no bone is exposed. Not only does it take a long time to heal, leaving a permanently tender finger, but the soft tissues often retract during the next week or two, and bone becomes exposed at the distal end. This usually leads to prolonged hospital attendance and poor results. When a fingertip like this is allowed to heal on its own, it often becomes necessary to operate later to correct the painful and tender fingertip.

2. *Direct Suturing*

This is the method of choice if the type of injury permits. In 74 of our patients it was possible to suture the distal phalanx back into position after partial amputation. In only 3 of these patients did the fingertip not survive.

Most of the crushing injuries cause a dislocation of the nail proximally from underneath the nail fold, together with a partial amputation of the distal phalanx. The neurovascular bundle often remains intact on one or both sides although most of the soft tissues and bone have been cut through. Fingertips that are still attached by a small pedicle will almost always survive if they are handled carefully and sutured with care (Fig. 2). It is essential that the tip should not be handled with instruments like tooth forceps while suturing.

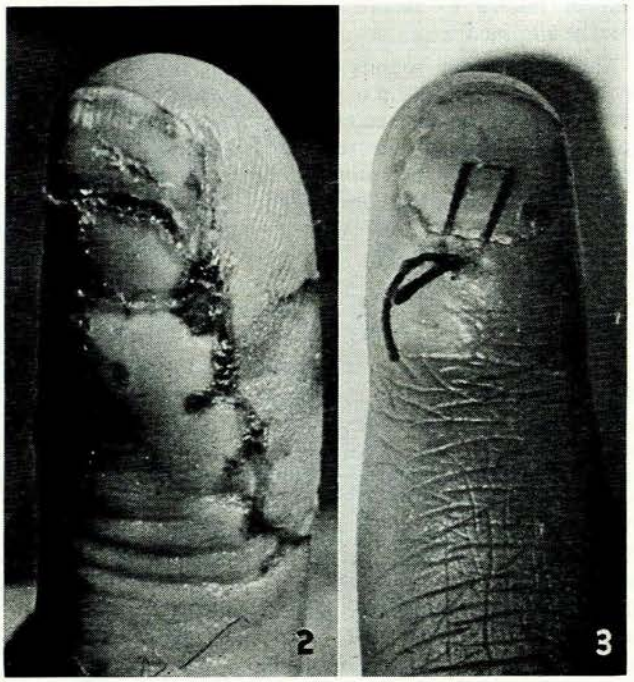

Fig. 2. Careful suturing of fingertip.
Fig. 3. Suturing nail into position after avulsion.

The first and most important suture is one that brings the nail back into position underneath the proximal nail fold (Fig. 4). This will splint the fingertip immediately and make the rest of the suturing very easy. By using 4/0 black silk on an atraumatic reverse cutting needle, it is often not necessary to drill holes in the nail before passing the suture. When the nail is too thick to push the needle through, two little holes are burned into the nail with an ordinary paper clip that has been straightened and heated in a small spirit flame. The rest of the suturing should be done very carefully with a 4/0 black silk on an atraumatic needle. Care should be taken not to twist the fingertip. To avoid this it is helpful to pass the first suture through the nail fold just lateral to the repositioned nail.

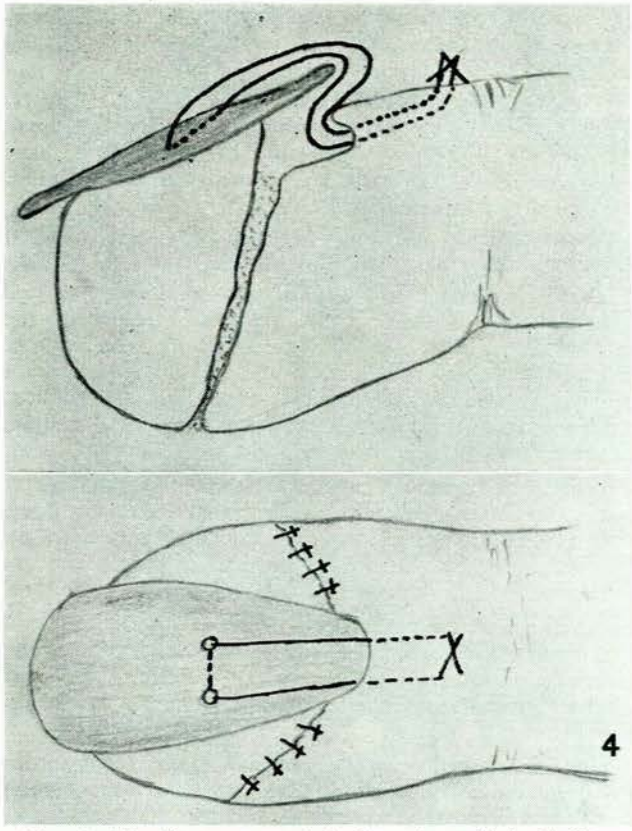

Fig. 4. The first suture, bringing the nail back into position underneath the proximal nail fold.

3. *Thiersch Graft*

The use of this, the split-thickness graft, is often advised for amputation of the fingertip where bone has not been exposed.[3] We have found the Thiersch graft rather unsatisfactory because, although the grafted area contracts to a very small size, it always remains tender.

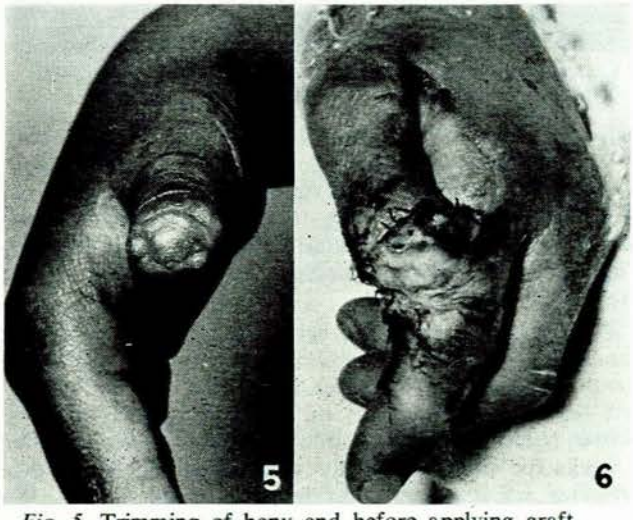

Fig. 5. Trimming of bony end before applying graft.
Fig. 6. Cross-finger flap.

4. *Wolfe Graft*

The use of this, the full-thickness graft, is the method of choice where the fingertip has been fully amputated and no bone, or only bone still covered by periosteum, is exposed. We have used it when the bone was not covered by periosteum, but in such cases we usually trim the bony end till it is slightly below the level of the soft tissue before applying the graft (Fig. 5).

A good take of a full-thickness graft requires meticulous suturing along the edges of the graft. The sutures along the edge of the graft are left long and are tied over a small bolus of cottonwool soaked in acriflavine emulsion.

We prefer to take our full-thickness graft from the abdominal wall just above the inguinal ligament (Fig. 7).

Fig. 7. Graft taken from abdominal wall just above inguinal ligament.

This gives a skin of fair thickness and a scar in an area that is seldom exposed.

In cases where the patient brings the amputated fingertip along, it can definitely be used as a graft. We prefer to remove all the subcutaneous tissue and fat from the amputated tip and to use only the skin as a Wolfe graft. The use of the fully amputated tip as a composite graft is not advised because the success rate is low.

5. *Flaps*

Flaps are usually advised in cases where bone has been exposed, as is often seen in avulsion types of injury.

(*a*) *Cross-finger flaps* (Fig. 6) are a very useful procedure, but can only be used if the injury is such that two fingers can be matched. The operation can be performed under local anaesthesia, but it is preferable to ensure a bloodless field with a tourniquet, which requires general anaesthesia or a brachial block. A bloodless field renders the dissection and identification of the neurovascular bundle on the donor finger easier while the flap is being raised. It is a tragedy to cut the neurovascular bundle and cause anaesthesia of a normal finger. The disadvantages of this operation arise out of the difficulties in immobilization of the fingers and the fact that most men

have hair on the dorsum of their fingers, which is transferred with the flap to the tip of the injured finger.

(*b*) *Thenar pedicle flaps*. This is an operation we hardly ever use. It is often difficult to suture the flap into position on the fingertip, and the scar on the palm is often troublesome afterwards. The best way of immobilization for thenar flaps is by the use of a narrow aluminium splint covered with orthopaedic felt.[2]

(*c*) *Distal pedicle flaps* are only used when the area exposed cannot be suitably covered with a Wolfe graft or a cross-finger flap—mainly in avulsion types of injury,

Fig. 8. Distal pedicle flap from infraclavicular region.

where a large piece of bone has been exposed (Fig. 8). The disadvantage of distal flaps is that they are often flabby and loose on the fingertips. The donor site we prefer for distal flaps is the infraclavicular region.

6. *Amputation*

Amputation as a method of covering a defect at the fingertip should be avoided at all cost, especially in females. Amputation is often considered an easy way out of the difficulties following an injury but, no matter how well it is done, cosmetically and functionally the results are poor.[3]

In a follow-up study of 134 cases of fingertip injuries Jörgen Bojsen-Möller and Schmidt[4] found that the worst results, functionally and cosmetically, were obtained with amputation. They also found that amputation did not bring the patient back to work any sooner than the other methods of treatment.

The Nail and Nail Bed

Because of its cosmetic value as well as a protection to the fingertip, all possible attempts should be made to preserve the nail together with its nail bed.

The nail provides an excellent temporary splint, suturing edge, and dressing for the underlying nail bed and fingertip. If the nail bed is left exposed without a nail covering, it will dry out and become corrugated. The result is that any new nail growing forward over the nail bed will take the same shape and corrugated appearance of the nail bed. This leads to the formation of an irregular and cosmetically unattractive nail.

Where the nail has been partially or fully avulsed it should therefore never be discarded but must be sutured back with a special suture that makes it possible to pull the nail back underneath the nail fold (Fig. 3). When the nail has been fully avulsed it is sometimes necessary to add a small suture at the distal end to keep it well down on the nail bed. A nail that has been sutured back will usually come away after 3 - 4 weeks, but by that time the new nail is well formed and the nail bed is smooth and ready to receive the new nail.

In cases where the nail bed and nail root have been destroyed, it is possible to make a new nail and nail fold. The best way to do this is by the Esser method.[5]

Dressings and Method of Immobilization

Dressings and immobilization are as important in the treatment of fingertip injuries as the operation itself. Inadequate immobilization is a common cause of failure in treatment.

After the finger or graft has been sutured the suture line is covered with a single layer of *tulle gras* covered by gauze. Cottonwool is next packed between the fingers and also wrapped around the forearm. The fingers are then bandaged in a semi-flexed position with a *crêpe* bandage. When one of the medial four fingers has been injured, all four fingers are included in the bandage and

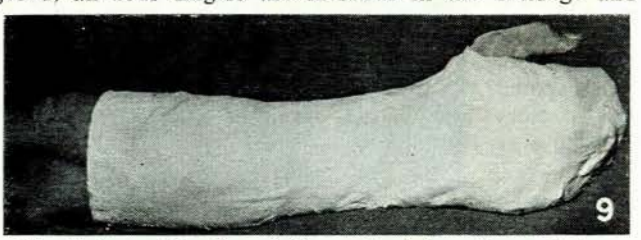

Fig. 9. Immobilization of fingers by below-elbow plaster-of-paris bandage.

only the thumb is left exposed. When the thumb only has been injured, the medial four fingers are not covered. In children especially it is futile to try and dress one finger only. Below-elbow plaster-of-paris is then applied, covering the fingers in a kind of boxing glove (Fig. 9). This plaster will keep the dressing in position and protect the treated finger.

The patient is advised to carry the arm in a triangular bandage to prevent congestion in the treated area, and should be seen once or twice a week so that the plaster can be checked and signs of infection looked for. The plaster is left for 2 weeks if no infection develops. After 2 weeks the finger is usually well healed and no further dressings are necessary after removal of the sutures. We have not seen stiff fingers develop with this type of immobilization, even in old people.

SUMMARY

The different methods of treatment for fingertip injuries are discussed. The importance of saving the nail and nail bed is stressed.

I wish to thank Prof. J. H. Louw, Head of the Department of Surgery, for his advice and encouragement, as well as Dr. J. G. Burger and Dr. J. Mostert, Medical Superintendents of Groote Schuur Hospital and the Red Cross War Memorial Children's Hospital, for permission to publish.

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