SURGICAL PROCEDURES IN GENERAL PRACTICE

This is one of a series of articles contributed by invitation

DISLOCATIONS AND FRACTURES OF THUMB AND FINGERS

BY

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Bony injury to the hand, especially the fingers, is very common on account of the widespread use of complicated machinery, which has increased the number of fractures of the finger and thumb. If these injuries are treated inefficiently much permanent disability may result; even with efficient modern treatment there is occasionally an incapacitating degree of disability. Hence the study of the treatment of fractures and dislocations of the hand digits has an important economic aspect—the reduction of the amount of resulting disability and prevention of excessive loss in wage-earning capacity. A working knowledge of the method of production and the resultant deformity of any fracture or dislocation is essential for rational treatment, and this aspect will be surveyed briefly.

Type of Anaesthesia

What type of anaesthesia should be used in dealing with "finger fractures"? A local anaesthetic such as 2 per cent. novocain is suitable. It should be kept in a rubber-capped bottle, the cap being cleansed with ether immediately previous to withdrawing some of the solution; the novocain must be sterilized immediately before use on each occasion. If local anaesthesia is employed the site of the fracture and surrounding parts must be cleansed with soap and water, ether, and then 2 per cent. iodine solution. About 3 to 5 c.cm. of 2 per cent. novocain is injected in the region of the fracture, into the blood extravasation. Gentle kneading is then done, and about five to ten minutes is allowed for the anaesthetic to take effect. Local anaesthesia is to be preferred if there is a shortage of assistance. It should not, however, be used for (1) any fracture which is more than about five days old; (2) children or nervous women; (3) open fractures.

In place of a local anaesthetic nitrous oxide can be employed. It is, however, much better to use gas and oxygen with a minimum of ether, as with gas alone, in the case of a fracture such as Bennett's, it will be difficult to accomplish reduction and fixation before the patient is "round."

Bennett's Fracture

Most of the movements of the thumb, especially extension, abduction, and opposition, occur at the saddle-shaped carpo-metacarpal joint, any mechanical derangement of which will cause interference with the full function of the thumb. Bennett's fracture is a fracture-dislocation of this joint, the dislocation being of equal importance to the fracture. It is produced by indirect force applied to the thumb in an adducted position. The line of fracture runs obliquely, so that a small fragment of bone with practically no displacement sustains the greater part of the articular surface of the base of the first metacarpal bone, while the remaining portion of the metacarpal bone bears a small portion of the articular surface and is displaced outwards and upwards.

It should be stressed that it is most important to have an x-ray examination in both antero-posterior and lateral planes whenever there is the least suspicion of a fracture:

occasionally an oblique view is required in addition to exclude a fracture such as that of the scaphoid bone of the wrist-joint.

TREATMENT

Local anaesthesia is ideal for a Bennett's fracture. The skin around the fracture site is thoroughly prepared with ether and 2 per cent. solution of iodine. About 3 to 5 c.cm. of 2 per cent. novocain is injected into the fracture, and about 1 c.cm. into the pad of the thumb for the insertion of a stirrup. When the anaesthetic has had time to take effect the stirrup is inserted transversely through the soft tissues of the pad of the thumb, passing on the palmar aspect of the terminal phalanx but not through the bone. Traction is applied by an assistant in the long axis of the thumb to correct upward displacement, while countertraction is produced by passing round the arm, with the elbow flexed at a right angle, a strong flannel bandage which is fixed to a wall or to a radiator; traction and countertraction are maintained throughout the reduction. Very strong pressure is then applied to the base of the thumb in order to reduce the outward displacement.

When the deformity has been reduced satisfactorily an unpadded plaster-of-Paris slab is applied to the dorsal aspect of the forearm from just below the elbow down to the knuckles; a plaster bandage is then bound round the forearm and base of the thumb up to its interphalangeal joint as in Fig. 1. The plaster must be firmly moulded

FIG. 1.—Bennett's fracture—reduced under local anaesthetic (2 per cent. novocain) and immobilized in plaster-of-Paris with continuous extension.

over the base of the metacarpal bone so as to prevent any recurrence of the outward displacement. A malleable metal splint, about three-quarters of an inch wide and long enough to extend from half-way up the forearm to three inches beyond the tip of the thumb, is then incorporated in the plaster: the end of the metal splint should have been bent at a right angle for about half an inch, and should have a central hole to take a hook for traction purposes. This hook is placed through the hole and its end engaged with the stirrup; a screw is next wound on to the hook beyond the splint and gradually tightened until the thumb is firmly extended. The plaster is allowed to set and a radiograph is then taken. If the traction force is insufficient it can be increased by tightening the screw. By this method accurate reduction can be easily obtained.

The fixation is maintained until some evidence of union in the nature of callus can be detected on x-ray examination: this is usually a matter of three to five weeks. During that time the patient is instructed to use his fingers actively, there being no plaster in the palm of the hand to prevent full flexion of the fingers. After the plaster has been

removed a certain amount of stiffness of the thumb will result, but with active use this stiffness will gradually disappear and full function will be restored in about eight weeks or so from the onset of treatment.

Fractures of the Metacarpal Bones

The metacarpal bones may be fractured either by direct or by indirect force: with the former, as often happens when a hand is caught in machinery, usually more than one bone is fractured and there is much associated injury to the surrounding soft structures—for example, to the tendons and to the skin—causing at times an open fracture. When indirect violence is responsible for the metacarpal fracture there may be some displacement with backward angulation, due chiefly to the pull of the interossei muscles, but undoubtedly influenced to some extent by the normal palmar concavity of the metacarpals. When the metacarpal bone of the thumb is affected the fracture is generally situated towards the proximal end of the shaft, is transverse, and the distal longer fragment is adducted relatively to the smaller proximal fragment.

TREATMENT

Treatment of fracture of the thumb metacarpal consists essentially in the correction of this adduction deformity of the distal fragment by very powerful abduction of the extended thumb, which is then, together with the wrist-joint, immobilized in plaster-of-Paris, the thumb being held in abduction and fixed up to but not including the interphalangeal joint: all the fingers are kept free for full active movements. Fixation is maintained for three to four

FIG. 2.—Fracture of neck of fifth metacarpal bone, causing angulation of metacarpal head—a fairly common type of fracture. Under local anaesthetic (2 per cent. novocain) the displacement was reduced, then immobilized in plaster-of-Paris, the little finger being fixed to a finger-splint, bent as shown in the illustration.

weeks, when union is as a rule well advanced. If the fingers have been freely used the residual stiffness of the wrist-joint and thumb quickly disappears.

In fracture of the base of any of the finger metacarpal bones there is practically no displacement, on account of strong ligamentous attachment. The fracture should be immobilized by an unpadded plaster-of-Paris slab from just below the elbow to just distal to the knuckles, with a circular plaster bandage fixing the slab to the forearm and wrist. Adhesive strapping attaches the lower end of the slab to the hand around the knuckles in such a way that full range of movement of the fingers is possible. A fracture of the shaft or of the head of a metacarpal bone *without displacement* is treated in similar fashion.

Any displacement of a shaft or head metacarpal fracture is reduced by long-axis traction through the finger of the affected metacarpal bone, while countertraction is applied to the forearm; strong local pressure will then correct any angulation. With traction maintained, a plaster-of-Paris cast is applied as described for basal fractures, with the exception that the slab is carried further beyond the

knuckles and is well moulded in over the dorsum of the injured metacarpal or metacarpals so as to prevent a recurrence of backward angulation. A malleable metal splint half an inch wide is then incorporated in the plaster on the anterior aspect of the forearm and hand, and the finger of the affected metacarpal bone is fixed to this splint in a flexed position by means of either adhesive plaster or plaster-of-Paris (Fig. 2). If one or two metacarpal bones have been fractured, with resulting displacement, each finger is treated with a separate finger-splint; but with involvement of three or more metacarpal bones it is advisable to immobilize the hand by bandaging the fingers over a roller bandage placed in the palm. This latter method has the disadvantage that active movements of the unaffected fingers cannot be performed while the fracture is being immobilized; but when three fingers at least are immobilized it is obvious that active movements will be in abeyance—hence the disadvantage disappears.

A metacarpal fracture should be immobilized in plaster on an average for four to six weeks, stress being placed on active movements of the un-immobilized fingers during this period. The stiffness of the immobilized fingers will gradually disappear with active use over a period of generally three to four weeks, especially so if the un-immobilized fingers have been freely used; there is no need for any massage or passive movements to be prescribed for the residual stiffness of immobilized fingers—in fact, such treatment may be harmful and cause more stiffness and pain.

(To be concluded)

MEDICAL UNEMPLOYMENT IN INDIA

The *Calcutta Medical Journal* for July has an interesting editorial on unemployment in the medical profession in India. It makes an appeal to the senior members of the profession to take stock of the situation and to do their utmost to change the plight of their young colleagues. It asks them to save the prestige and fair name of the profession.

It must be admitted that, in spite of the large size of India and the relatively few practitioners to the total population, many graduates of Indian universities are suffering great hardship. It is not overstating the case to say that a number of them are dependent on the charity of their relatives.

An Overcrowded Profession

The medical profession of India—and under this head I include only those trained in scientific medicine—is overcrowded. In 1937, when Aden came under the Colonial Office, the Aden Government advertised for eleven sub-assistant surgeons. Aden is a desolate spot, and to an Indian it represents service over-seas and wide separation from friends and family. The advertisement offered a salary equivalent to £170 per annum, rising in six years to a maximum of £256 per annum and an agreement in the first place for three years. They received no fewer than 1,465 applications. Of these 1,465 applicants, 14 held British qualifications, and 26 others held higher qualifications obtained in England—4 M.R.C.P.; 2 F.R.C.S.; and 8 D.P.H., 12 other diplomas. That there were 1,465 registered practitioners competing for a post in a subordinate position at a salary of £170 per annum outside their own country is sufficient proof of the very poor return a medical graduate obtains for his six or seven years' education and hard work.

The facts are that unless a graduate can obtain a Government appointment he cannot make a living in private practice outside the towns. It was hoped at one time that economic pressure would force these