

Surgery of the Hand in Leprosy Patients

BY

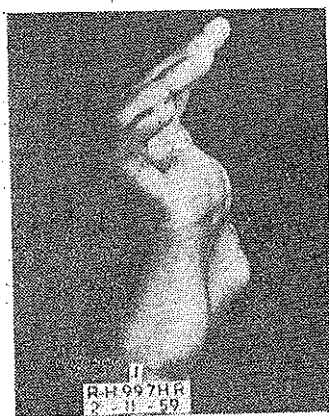
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LEPROSY affects the hands in two ways. Direct infiltration of the tissues occurs in a minority of patients due to the presence of the leprosy bacillus in the hand itself. This may result in generalised stiffness of the hand. Few of these patients are suitable for surgery. The majority of deformities of the hand, however, occur due to leprosy bacillus affecting not the hand itself but the nerves which supply the hand, at or above the wrist. Most commonly the ulnar nerve, and frequently both ulnar and median nerves, are involved. The deformity which occurs when these nerves are injured, *e.g.*, by a knife wound. These deformities can be corrected surgically. The patients come to us seeking improvement in the *appearance* of the hand and also in its *function*. Inability to grasp and to pinch means loss of efficiency in manual work and in writing. This coupled with the social barrier associated with the clawing of the fingers forces the patient to abandon his work. So that when we have improved both appearance and function there still remains the problem of getting the patient back to his job—*rehabilitation*. Apart from what we can do for the patient himself, there is another and potent reason for undertaking reconstruc-

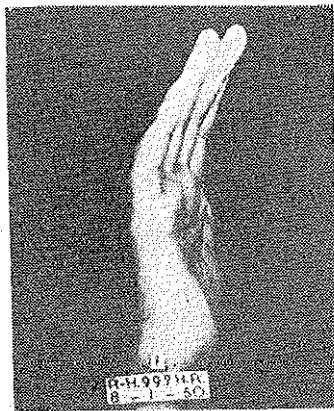
tive surgery of these hands, that is, as a demonstration that **LEPROSY CAN BE CURED**. A few patients getting complete recovery from the known deformities of leprosy in each Leprosy Subcentre, provide a powerful psychological impetus to an anti-leprosy campaign in a given area.

Operations for the claw-hand deformity were described as long ago as 1922 (Stiles) and later in 1942 (Bunnell), but it was not until 1948 that the first tendon operation for claw-hand was performed on a patient with leprosy. This was at the C.M.C. Hospital at Vellore, S. India, by Dr. Brand, whose war-time experience in re-constructive surgery in London, was now directed to restoring thousands of crippled and useless hands to an acceptable appearance and usefulness. During the 14 years which have followed, scores of surgeons have received training in this highly specialised field and the operations are now being carried out in a number of other countries—Thailand, Hong Kong, Nigeria, Philippines, E. Africa, Burma, Spain, S. America, Korea, and also in a number of other centres in India. Dr. Brand's work has also resulted in significant contributions being made to the understanding and treatment of deformities in the general field of hand surgery.

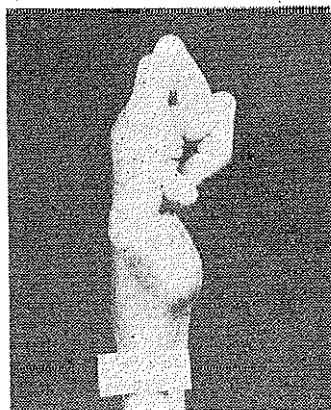
Now exactly what is required to restore the normal appearance and function to the paralysed hand? In the case of the fingers all that is needed is a muscle to bend each finger at the first knuckle. If we can do this then the clawing of the fingers at the 2nd joint will be straightened by the unparalysed extensor muscle. The photograph No. 1 illustrates the hyperextension of the 1st finger joints and the flexion of the 2nd joint. When the former is corrected the fingers can be held quite straight as shown in the photograph No. 2 (post operative). Photograph No. 3 shows the hand in action, the left (pre-operative) hand is totally unable to surround or pick up the bottle. The right (post-operative) hand shows clearly how the grasp mechanism has been restored. Instead of hyperextension of the 1st finger joint and flexion of the second, there is slight flexion of the first and the fingers are straight enough to be able to surround the bottle with ease. The early operations consisted in transferring the tendon which bends the middle finger joint in each finger so that it would bend the first finger joint. A good correction of the deformity resulted but there was a marked tendency for the fingers to bend backwards at the middle joint and



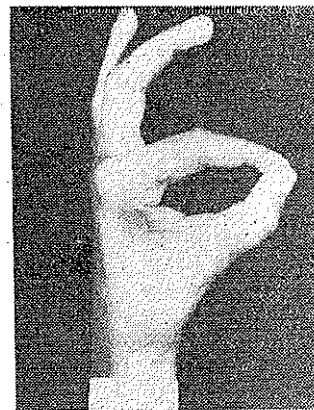
No. 1. R.H. 2-11-59



No. 2. R.H. 8-1-60



No. 4. L.H. 14-8-53



No. 5. L.H. 12-10-53

in addition to this the grasp was significantly weakened by the removal of a powerful finger flexor. A search was made for another muscle which could more easily be spared, and which would not at the same time cause any other deformity. Here we are greatly helped by the fact that leprosy regularly spares the three muscles which extend the wrist (in only about 1/5 of 1 per cent. of patients are these muscles involved). By taking one of these muscles away the remaining two are able to maintain a good extension of the wrist while the one we have taken can be used to flex the 1st finger joint—the action required to correct the claw hand deformity. The tendon of this muscle is lengthened by attaching to its cut end, a graft consisting of



Photo No. 3

another tendon or a piece of fascia. The tendon graft most often used is the plantaris, taken from the leg; its absence does not inconvenience the patient in any way. The graft is attached to the tendon and provides four slips which splay out for attachment to each finger. The tendon passes in its new course through from the back to the front of the forearm and then to the palm where the four slips divide to pass to the sides of the fingers. Now when the muscle contracts instead of extending the wrist it bends the first finger joint forwards, and at the same time the 2nd joint automatically straightens. Other operations include that commonly done to mobilise the thumb and bring it forward from lying beside the palm in the characteristic useless position taken up by it in

leprosy. One only of the tendons which move one of the fingers is removed and transferred to the thumb through a carefully planned tunnel and inserted so that when it contracts, it will enable the thumb to be opposed to the index and long fingers as in pinching, or to all the fingers as in grasping. This is well illustrated in photographs 4 and 5, shown of a hand before and after this operation. Frequently when the hand has been paralysed for several years, both fingers and thumb become stiff in a useless position. Very careful pre-operative physiotherapy is needed in these cases. In some of them it will be possible to loosen the fingers enough to go ahead with a tendon transfer, but in others, special operations will be needed. For the thumb, the contracture of the web may be corrected by freeing of the contracted tissues and the use of a full-thickness skin graft and occasionally a Z-Plasty. For the fingers that are too stiff to be mobilised by physiotherapy, again a skin graft may be necessary and this is followed by an operation to fuse the proximal and middle phalanges so that the finger is still in a position which will give an acceptable appearance and at the same time provide a satisfactory degree of usefulness, that is, almost straight. A finger in this position appears normal, can slip into the pocket easily, and is also useful.

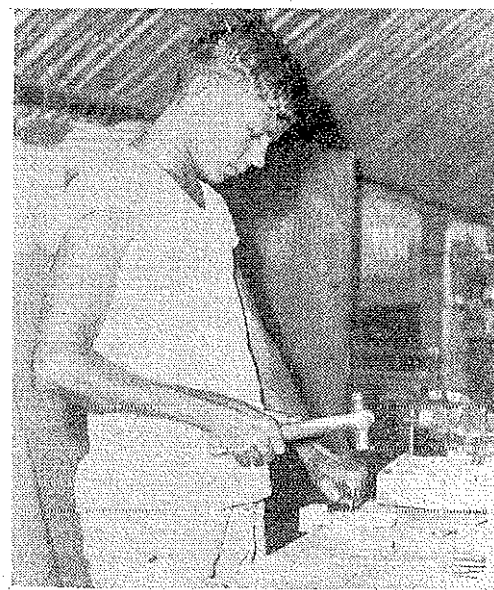
After operation the patient is immediately put into a light forearm cast consisting of a volar slab and bandage including the fingers and thumb, taking care to separate each finger and not to encircle the thumb completely. At the end of three weeks the cast is removed and the sutures, and a course of post-operative physiotherapy is instituted under careful supervision. Ranges of movement are recorded on each finger and the line of treatment is decided upon. This varies with the individual patient.

It should be mentioned that there are a number of serious hazards which may be encountered in hand surgery in leprosy and this work requires skill and training of a high order. Operations embarked upon without adequate physiotherapy preparation, or where there is a risk of sepsis, may lead to the wrecking of a hand, leaving it

considerably worse than if no surgery had been attempted. Also, in the absence of adequate physiotherapy treatment post-operatively, disasters will be encountered. A few such cases will quickly bring these procedures into disrepute and hinder, rather than forward, the overall anti-leprosy campaign.

Finally, reconstructive surgery is always coupled with a rehabilitation programme. The fact that we cannot restore sensation to these hands means that we must provide an intensive course of instruction in the care of the anaesthetic extremity. To restore function and a good appearance to the hands, will not prevent the ulceration and absorption of fingers which inevitably follows misuse of these hands. It is now well established and accepted that it is not the leprosy but the anaesthesia coupled with external factors such as trauma, burns, excessive pressures, and the inattention to minor injuries which gives rise to the shortening of the fingers, so that in every case education in the care of the hands, precedes surgery.

The boy shown in the photograph has had surgical correction for his clawed fingers, and he is seen using the specially adapted tools which are part of the planned programme through which he is brought to full integration into society as a self-respecting wage-earner.



Useful activity