INTERMETACARPAL FUSION

I. S. SMILLIE, DUNDEE, SCOTLAND

From the Department of Orthopaedic Surgery, University of St Andrews

Fusion of the metacarpal of the opposed thumb to that of the index finger may be applied to the hand grossly paralysed by anterior poliomyelitis when tendon transplants are not available or have failed, and to certain cases of spastic paralysis and trauma.

The disadvantages of the current operation are the difficulty of slotting a bone graft into the atrophic metacarpals of a paralytic hand and thereafter the necessity of maintaining accurate opposition by a plaster until fusion is sound.

The procedure to be described requires no more attention to detail than is necessary in the standard method but has the additional desirable feature that at the termination of operation the metacarpals are locked in the required position, avoiding the need for external means of immobilisation.

TECHNIQUE OF OPERATION

The metacarpal necks are exposed under pneumatic tourniquet through separate inch-long incisions placed on the dorso-medial aspect of the first metacarpal and the dorso-lateral aspect of the second. The periosteum of the first is incised lengthwise on the medial aspect and the second lengthwise on the palmar aspect; a tunnel through the soft tissues is established between the two. A piece of fibula of appropriate length is removed subperiosteally, with care to avoid splitting the cortex. A graft consisting of the full thickness of the iliac crest might prove equally suitable. One end is hollowed in order to bring the maximum area of bone in contact with the roughened metacarpal neck, and bevelled to fit the “V” of the gap between the metacarpals. The graft is then placed in the tunnel and the prepared end brought in contact with the neck of the first metacarpal. A fine pin or thick Kirschner wire is introduced at right angles to the long axis from the radial side and along the medullary cavity of the fibular graft until it appears at the open end, which is then nibbled to the correct length and inclination so that it fits firmly under compression in the gap between the necks. When the degree of opposition has been decided the pin is driven on through the second metacarpal neck so that the point appears on the radial side of the extensor tendons in such a manner that tension will be avoided when the adjacent skin incision is closed. The graft is now locked in position and the metacarpals immobilised in opposition. The periosteum is adjusted round the ends of the graft and the skin incisions closed. When the bandage has been applied, the protruding points of the pin are guarded by corks or other means (Figs. 1 and 2).

POST-OPERATIVE TREATMENT AND RESULTS

The theoretical objection to the technique described is the possibility of infection of the pin track. Limited experience suggests that with reasonable care the advantages greatly outweigh the risk. In the four cases in which the method has been used, the pin was removed after the arbitrary interval of eight weeks; all points of entrance and exit were dry. Thereafter protection in the form of a light plastic opposition splint was provided. The grafts were revascularised and united in twelve to sixteen weeks (Fig. 3).
Photograph showing position of transfixion pin immobilising the metacarpals and the graft.

Figure 2—Early post-operative radiograph. The pin holds the graft in place and at the same time immobilises the metacarpals in the required position of opposition. Figure 3—Twelve weeks after operation there was sound fusion of the graft. Pin removed at eight weeks.