FROM MARTINA HANSEN'S HOSPITAL, SANDVIKA, NEAR OSLO
CHIEF: DR. JOHN K. HALD

CARPO-METACARPAL ARTHRODESIS FOR OPPONENS PARALYSIS

BY

IVAR ALVIK

Permanent paralysis of the opponens pollicis robs the hand of one of its most important movements, namely opposition of the thumb (hand-grip). Treatment aims to restore the opposition of the thumb. When the nerves and muscles concerned have been damaged irreparably three types of treatment may be considered:

1) Plastic operations, which may be classified according to whether they are concerned with a) tendons or b) fascia.
2) Corrective skeletal operations, which may be classified according to whether the operation is an arthrodesis or an osteotomy.
3) Orthopaedic splinting.

I do not propose to discuss further the plastic tendon operations: these are the most frequently used. The most important corrective skeletal operation is arthrodesis of the carpo-metacarpal joint. *Bunnel* says that arthrodesis is unsatisfactory, as it renders the hand more liable to fracture. The choice between the various methods of treatment depends, however, to a certain extent on the particular conditions and requirements of each case.

A common complication of paralyses is a faulty position of the affected joint, and cases of opponens paralysis of long standing also tend to develop a faulty position, especially at the carpo-metacarpal joint, due to the alterations in the static

and dynamic conditions. There are two components of this faulty position:

1. *Rotation.* The thumb, with the metacarpal, is held always in supination; this is especially marked if the other thenar muscles are also affected, so that the supination becomes exaggerated and the dorsal surface of the thumb gradually comes to lie in line with the dorsal surfaces of the four fingers.
2. *Subluxation* of the carpo-metacarpal joint. This occurs partly as a result of the rotation, and partly by a displacement of the base of the first metacarpal both radially and towards the palm in relation to the greater multangulum (trapezium).

These faulty positions must be regarded as complications of opponens paralysis; and the results of the plastic operations are probably less good when they are present. On the other hand these complicated cases should be very suitable for corrective bone operations. Recently a carpo-metacarpal arthrodesis was carried out in such a case at Martina Hansen's Hospital.

A man, A. O., born 2.3.96, had severe paresis of both lower limbs as a sequel to poliomyelitis at the age of 4 years, and had since walked on crutches. 9 years ago he developed an unexplained opponens paralysis of the right hand, and he had recently become unable to follow his trade as a shoemaker.

Local condition: Atrophy of the right thenar muscles with complete paralysis of the opponens and marked weakness of the adductor pollicis brevis. Flexion and extension unimpaired. The thumb was held supinated so that its dorsal surface lay almost in line with the dorsal surfaces of the four fingers. There was subluxation of the carpo-metacarpal joint so that the base of the first metacarpal was dislocated radially and slightly towards the palm. With passive opposition the subluxation was corrected, though the pronation was still inadequate. The patient could pick up and hold light objects between the ulnar side of his thumb and the radial side of his index finger, but only feebly. He could touch the palmar surface of his index finger and part of his middle finger with the ulnar half of the nail of his thumb.

On 29.6.48, carpo-metacarpal arthrodesis was performed under local anaesthesia. An incision was made along the radial border of the palmar

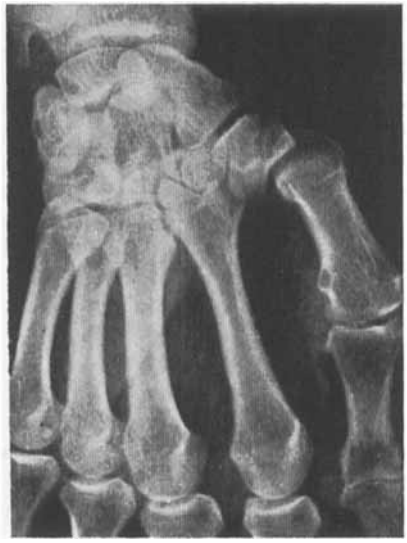

Fig. 1.
Before operation.

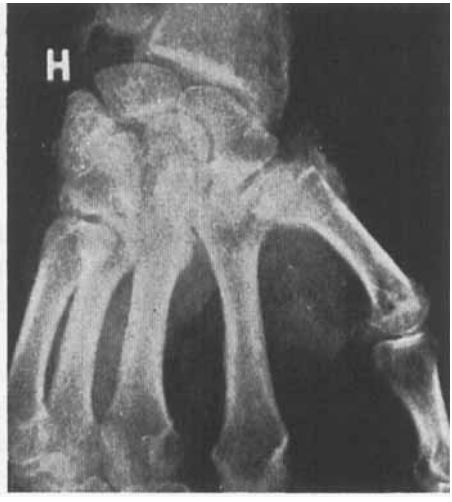

Fig. 2.
Carpo-metacarpal arthrodesis.

surface of the proximal part of the first metacarpal to a point just proximal to its base. The carpo-metacarpal joint was exposed and opened. The articular surfaces and adjoining spongiosa of the base of the first metacarpal and of the greater multangulum were chiselled off, mainly from the ulnar and palmar surfaces, so as to correct the position. The metacarpal was then pronated and held in maximum opposition. There was satisfactory contact of the resected surfaces. A thick bone suture of catgut was tied so as to assure initial immobilisation. After closing the wound a plaster of paris cast was appled from the elbow to the middle of the terminal phalanx of the thumb. The patient was able to be up and get about, as he could still hold a crutch with his immobilised hand. The plaster of paris was left on for 10 weeks because of the strain on the hand; when it was removed there was clinical and radiographic ankylosis of the carpo-metacarpal joint (see fig. 2). The opposition was satisfactory and he could grip both small and large objects quite strongly. He could now touch the palmar surfaces of the second, third and fourth, but not of the fifth, digits with the palmar surface of the thumb. Soon after the plaster was removed he was able to resume his work as a shoemaker.

In this case the aetiology of the opponens paralysis was uncertain, but it may have been due to pressure from the handle of his crutch. When he went upstairs he used to rest the palmar surface of the thumb along the handle, with the hand in maximum dorsi-flexion, and it is possible that the motor branch of the median nerve which runs transversely over the palmar ligament was compressed in this position.

SUMMARY

Carpo-metacarpal arthrodesis is recommended for cases of paralysis of opposition which are complicated by supination of the thumb and subluxation of the first carpo-metacarpal joint.

A case in which the operation was done with successful result is described. The etiology may have been damage to the motor nerve as it crossed the palmar ligament; the patient was an invalid who could only walk with the aid of crutches.

RESUME

L'arthrodèse carpo-métacarpienne est recommandée dans les paralysies opposées compliquées de supination du pouce et sub-luxation de la première articulation carpo-métacarpienne.

Il est rendu compte d'un cas dans lequel l'opération a été pratiquée avec succès. Dans ce cas, il est possible que l'on puisse attribuer l'étiologie au nerf moteur qui passe à travers le ligament palmaire; le malade était un invalide qui ne pouvait marcher qu'à l'aide de béquilles.

ZUSAMMENFASSUNG

Eine Carpometacarpalarthrodese wird empfohlen bei Opponens-Paralyse, wenn diese durch Supination des Daumens und eine Subluxation des ersten Carpometacarpalgelenks kompliziert ist. Es wird über einen Fall berichtet, bei dem diese Operation mit Erfolg durchgeführt wurde. Die Aetiologie dieses Falles kann vielleicht auf einen Druck auf den motorischen Nerven zurückgeführt werden, der über das Ligamentum volare läuft; der Patient war ein Krüppel, der an Krücken gehen musste.