

Department of Bone and Joint Surgery (Head: E. Moberg), University of Gothenburg, Sweden.

ARTHRODESIS OF THE FIRST CARPO-METACARPAL JOINT FOR OSTEOARTHRITIS

H. S. MATTSSON

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Painful osteoarthritis in the first carpo-metacarpal joint is a very troublesome condition and produces an obvious decrease in hand function. It seems that women over fifty are most commonly affected. The first carpo-metacarpal joint is often the only joint involved, but the condition can also be part of a generalized joint disease.

The aetiology is obscure, except for the post-traumatic joint changes following a Bennett's fracture or dislocations of the joint. However, these latter conditions are nearly always unilateral. The present series contains only cases with bilateral changes and in no case was there any known trauma. However, the patient's history is not completely reliable as the trauma may be very old and forgotten.

Apart from trauma, several aetiological factors are discussed in the literature, *e.g.* acute and chronic arthritis, continuous use of the joint, hormonal disturbances, etc. For most of the cases, however, the aetiological riddle is unsolved. One interesting finding may be mentioned. Lassarre et al. (1949) have shown that the changes in the cartilage of trapezium begin in the medial part of the joint surface, *i.e.* in that part of the joint which is least exposed to weight-bearing.

CLINICAL PICTURE

The osteoarthritis of the first carpo-metacarpal joint has a very characteristic clinical picture, and the disease can be diagnosed clinically. The patient complains mainly of pain at rest and when using the hand. The grip becomes weaker, things are dropped, and there is difficulty in, *e.g.*, wringing, peeling potatoes, holding a cup of coffee, knitting and embroidering, etc.

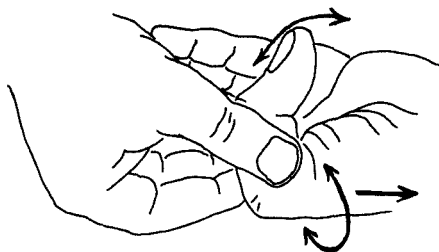


Figure 1. Proximal pressure during rotation clearly demonstrates the rotation pain. The tip of the thumb is an indicator of the extent of rotation.

On examination, there is tenderness over the joint, which is often dislocated. It is important to test passive rotation. Pain on rotation and painful crepitations are the most common signs. Rotation is also limited. This test can be performed in a very simple way, as shown in Figure 1. With maximal flexion of the metacarpophalangeal joint, the collateral ligaments of this joint are under tension and the proximal phalanx can be used as a handle. The tip of the thumb is then an indicator of the extent of rotation. Proximal pressure during rotation clearly demonstrates the rotation pain.

Radiographically, the signs of arthritis are seen, including decreased joint space, osteophytes, sometimes loose bodies in the joint, and dislocation of the first metacarpal base. There seems to be no correlation between the radiographic findings and the patient's complaints.

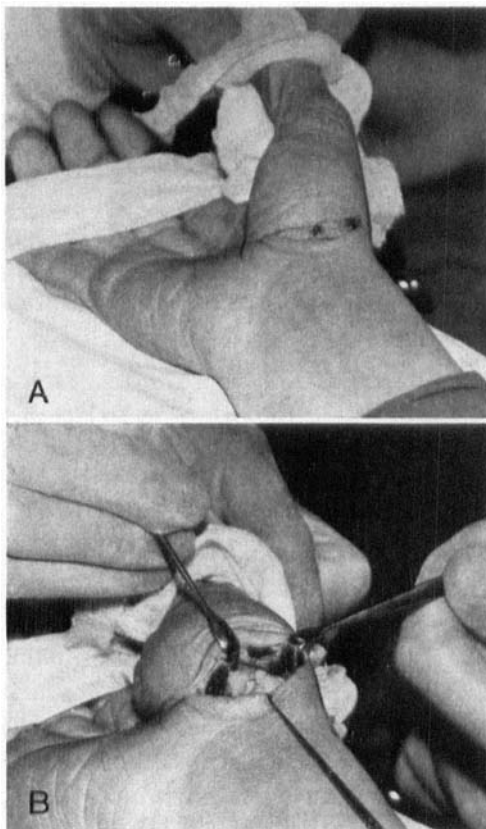
TREATMENT

Different treatments have been suggested, for instance heat, short-wave therapy, immobilization, X-ray, local injections of steroids, etc. The effects of these are doubtful. Surgical treatment is to be preferred. Excision of trapezium is usually recommended in the literature. The method appears to give good results for pain, but there is some loss of power. In addition, there is great danger in using the recommended dorsal incision because of the risk of damage to the radial nerve and thus troublesome neuromas in the scar. For instance, in a series of cases with dorsal incisions, Murley (1960) found persistent complaints due to neuromas in 65 per cent.

It would seem that arthrodesis is the method of choice if reduction of strength of the hand is to be avoided.

At the Department of Bone and Joint Surgery, University of Gothen-

Figure 2. A. The incision follows the volar crease at the base of the thumb. B. After cutting the proximal insertion of the thenar muscles and dissecting the muscles free from the carpus in distal direction, the first carpo-metacarpal joint is well exposed.



burg, such cases have been treated by arthrodesis, using a method developed by Moberg.

TECHNIQUE

A volar incision is made, following the crease at the base of the thumb (Figure 2A). The proximal insertion of the thenar muscles is cut and, without injuring the muscles, they are dissected free from the carpus in a distal direction. The first carpo-metacarpal joint is thus well exposed (Figure 2B). The joint surfaces of the first metacarpal and trapezium are resected. The surfaces are fitted to each other with the thumb in the position of function and stabilized by fixation with 2-mm-thick steel wire. This wire is drawn through holes in trapezium and the first metacarpal and then twisted (Figure 3). The twisted end is buried in the cortical bone of the metacarpal. The thenar muscles are then

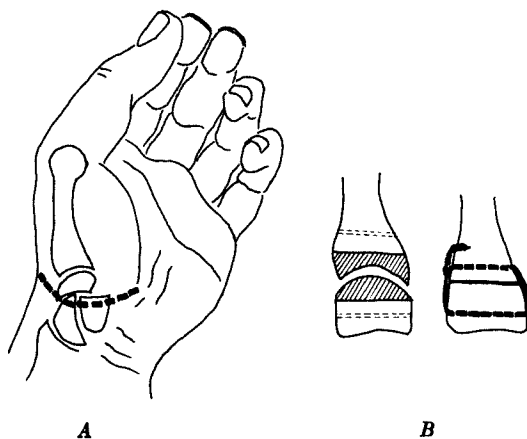


Figure 3. A. Skeleton drawing showing the anatomical correlation between the skin incision (dotted line) and the first carpo-metacarpal joint. B. After resection of the joint surfaces a 2-mm-thick steel wire is drawn through holes in the metacarpal and trapezium and twisted. This fixation gives a good stability as well as compression in the arthrodesis. The twisted end of the wire is buried in the cortical of the metacarpal.

sutured back in place and the skin is closed with interrupted steel wire sutures. Immobilization in plaster of Paris for 6–8 weeks.

FOLLOW-UP

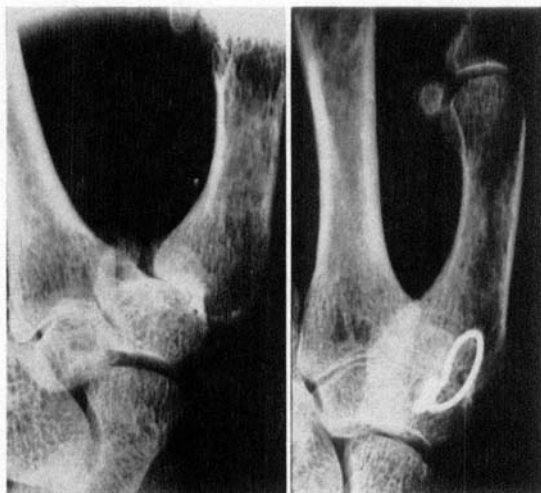
During the years 1959–1964, 22 patients have been operated on. Nineteen of these have been traced and examined, of whom 3 have been operated bilaterally. There were 17 women and 2 men, between 36 and 74 years of age, with an average of 58 years. Prior to operation half of the patients had received various treatments with only temporary effects. The patients were followed-up 1–5½ years after operation.

Incapacity for work after operation varied from 2½–6 months, on the average about 4 months. When fit for work, all the patients went back to their previous occupations, even if these were heavy.

RESULTS

Of the patients, 4 were functionally perfect. Fourteen had no pain at rest, but slight pain on grasping, some clumsiness, etc., and one patient was unimproved. Thus 18 of the 19 patients were free of pain at rest.

Figure 4. Osteoarthritis in the first carpo-metacarpal joint before treatment (left) and after a healed arthrodesis (right).



In spite of this the radiographs showed bony healing in only 50 per cent of the cases. No correlation was found between the painlessness and bony healing of the arthrodesis.

In one patient the results were bad. She was operated on twice. The second operation was made because of persistent complaints and an unhealed arthrodesis. This second arthrodesis healed well, but the patient's complaints were the same. Radiographically, however, there were signs of other joint destruction in her wrist, especially in the trapezio-scaphoid joint. This points to the importance of checking this joint before attempting an arthrodesis in the first carpometacarpal joint.

There were no preoperative figures of the gross power, so the hand grip in those cases operated unilaterally was compared with the other hand, assuming that the weaker hand was operated on. This evaluation showed no difference in gross power between the two sides.

There was very little decrease in opposition of the thumb. On the other hand, there was a decrease in the adduction of the thumb, but none of the patients had any complaints. Even when the arthrodesis had healed, there was a certain amount of mobility at the base of the metacarpal. This mobility is in the joint between trapezium and the carpus and may improve postoperatively.

The incision described has in all cases healed well with a hardly visible scar and with no neuromas.

SUMMARY

A new operative technique is described for arthrodesis of the first carpo-metacarpal joint, together with a follow-up of 19 operated patients. In 18 of 19 cases, the patients became free of pain, in spite of the fact that only 50 per cent of the arthrodeses healed with bony union.

The operation did not decrease the power of the grip.

Before attempting an arthrodesis of the first carpometacarpal joint, it is important to check the mobility of the metacarpo-phalangeal and the interphalangeal joints of the thumb, and also for the absence of osteoarthritis in the trapezio-scaphoid joint.

REFERENCES

- Aune, S. (1955) Osteo-arthritis in the first carpo-metacarpal joint. *Acta chir. Scand.* **109**, 449-456.
- Forestier, J. (1937) L'ostéo-arthrite sèche trapézo-métacarpienne. *Presse Méd.* **45**, 315-317.
- Gervis, W. H. (1948) Excision of the trapezium for osteo-arthritis of the trapezio-metacarpal joint. *Postgr. med. J.* **24**, 262-264.
- Gervis, W. H. (1949) Excision of the trapezium for osteoarthritis of the trapezio-metacarpal joint. *J. Bone Jt Surg.* **31 B**, 537-539.
- Goldner, J. L. & Clippinger, F. W. (1958) Excision of the multangular bone as an adjunct to mobilization of the thumb. *J. Bone Jt Surg.* **41 A**, 609-625.
- Gyelling, B. (1960) Surgical treatment of painful arthrosis in the carpo-metacarpal joint of the thumb. *Op. med.* **5**, 350-352.
- Lassarre, Ch., Pauzat, D. & Derennes, R. (1949) Osteoarthritis of the trapezio-metacarpal joint. *J. Bone Jt Surg.* **31 B**, 534-536.
- Michele, A. A., Skinner, H. L. & Kreuger, F. J. (1950) Repair and stabilization of the first carpometacarpal joint. *Amer. J. Surg.* **79**, 348-349.
- Murley, A. H. (1960) Excision of the trapezium in osteoarthritis of the first carpo-metacarpal joint. *J. Bone Jt Surg.* **42 B**, 502-507.
- Müller, G. M. (1949) Arthrodesis of the trapezio-metacarpal joint for osteoarthritis. *J. Bone Jt Surg.* **31 B**, 540-542.