Acta orthop. scand. *53*, 557–559, 1982

ARTHRODESIS OF THE WRIST BY THE METHOD OF MANNERFELT

A Follow-up of 19 Patients

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Twenty-four wrists in 21 patients were treated with arthrodesis by the Mannerfelt method. Seventeen patients had rheumatoid arthritis and 4 osteoarthrosis. Stable radiocarpal ankylosis was obtained within 3 months in all cases. Postoperative complications were few and slight. Fusion of the carpo-matacarpal joints occurred spontaneously in a number of the patients. Minor mobility in the carpo-metacarpal joints of the transfixed digit was not the cause of essential complaints. It was not necessary to remove the osteosynthesis material in any patient. At follow-up all patients but 3 were satisfied with the position of the wrist, aimed to be close to neutral.

Key words: arthrodesis; rheumatoid arthritis; wrist joint

Accepted 2.xii.81

Arthrodesis of the wrist is indicated in a chronically painful and unstable wrist. No single method has come into general use (Smith-Petersen 1940, Clayton 1965, Dupont & Vainio 1968, Müller et al. 1969, Rechnagel 1971, Mannerfelt & Malmsten 1971, Carroll & Dick 1971, Millender & Nalebuff 1973, and Larsson 1974). Since Mannerfelt and Malmsten, in 1971, introduced a new method of arthrodesis, transfixing the wrist from the third metacarpal to high up in the shaft of the radius with a Rush pin, only one series treated by this method has been published (Mikkelsen 1980).

PATIENTS AND METHODS

From 1971 to 1980 a total of 24 wrist arthrodeses by the method of Mannerfelt were done on 21 consecutive patients in the Department of Orthopaedic Surgery, Hjørring Hospital, Denmark. Sixteen were women (19 arthrodeses) and 5 men (5 arthrodeses). Fifteen operations were right-sided and 9 left-sided. The mean age at operation was 54 years (range 26–72 years). The follow-up period averaged 5 years (1–10 years). The diagnoses were rheumatoid arthritis in 17 patients (20 arthrodeses), and osteoarthrosis in 4 (sequelae to osteomalacia of the lunate bone in 3 and to fracture of the scaphoid in 1).

As described by Mannerfelt & Malmsten (1971), the operation was performed through a dorsal longitudinal incision. Transfixion was done through the third metacarpal in all patients but one in whom it was through the second metacarpal. One or two Wiberg staples were inserted from the dorsal aspect between the radius and the carpus in order to secure rotational stability. In 4 hands this was not considered necessary. The head of the ulna was excised in all but one patient. At the operation it was aimed to place the wrist in a position of a few degrees of dorsiflexion and ulnar deviation. In 3 cases of bilateral arthrodeses the aim was to position the second hand in a little more dorsiflexion than the first one. In the first two cases, the wrist was immobilized in plaster for 3 months; in the remaining cases the wrist was immobilized in a splint for 10–21 days. Immediately after the operation an active programme of shoulder, elbow, and finger joint exercises was started.

0001-6470/82/040557-03 $02.50/0

Nineteen patients were seen at follow-up during the period April–May 1981. Two patients had died. At the follow-up the position of the operated wrist was assessed clinically and radiologically in dorso-volar and lateral views. The patients were questioned concerning function of the hand in the position obtained and whether another position was desired for certain functions. Moreover, the patients were asked about pain and examined for pain on movement and for minute motion of the radio-carpal joint and carpo-metacarpal joints. Forearm rotation was measured, and the position as well as mobility of the fingers before and after the operation were evaluated.

RESULTS

During the operation fracture of the third metacarpal occurred in 4 hands. These fractures healed at the same time as the arthrodesis and gave no sequelae. The skin incisions healed secondarily in 4 of the patients because of minor marginal wound necroses. In one patient an annoying, tense scar had to be excised later.

In wrist joints which were only splinted the stability of the arthrodesis, secured by the Rush pin, was so good that within 2 months all could resume at least their previous level of activities of daily living. The two cases immobilized in plaster were stable when the cast was removed. Solid radio-carpal ankylosis was demonstrable on the X-rays in all patients at the follow-up, and in the two deceased patients on their latest X-rays. At follow-up it was not possible to demonstrate even the slightest mobility in the radio-carpal joint in any patient.

The position of the wrist ranged from 2° volar flexion to 15° dorsiflexion and from 0° to 20° ulnar deviation, measured radiologically. In both planes there was a difference of up to approximately 10° from the intended position (when stated in the operative report). Sixteen patients felt that the position was satisfactory. Among the satisfied patients 3 had had bilateral arthrodesis. No one was dissatisfied with the adjustment between 0° and 20° ulnar deviation.

Five patients had slight pain while doing heavy or demanding handwork. Four of them had pain mainly on rotation (at the collum ulnae), one at a still open transfixed carpo-metacarpal joint. The remaining wrists were painless, but, generally, for lower than normal demands on hand function.

The osteosynthesis material was not palpable in 19 hands. So far it has not been necessary to remove the Rush pin or the Wiberg staples in any case.

The range of pronation-supination was un-

Figure 1. X-ray appearances 5 ½ years after Mannerfelt arthrodesis in a 65-year-old woman with rheumatoid arthritis. Ankylosis of the radiocarpal joint as well as of the third carpo-metacarpal joint (left hand).

Figure 2. The fused right wrist in a right-handed 33-year-old male blacksmith 7 years after arthrodesis. The indication for the operation was osteoarthrosis caused by pseudoarthrosis of the scaphoid bone. The carpo-metacarpal joints had not become ankylosed, and the Rush pin had broken at the site of these joints. The patient was working and did not complain of pain.

Figure 3. X-ray appearances 3 years after arthrodesis of the left wrist in a 75-year-old woman with rheumatoid arthritis. There is ankylosis of the radiocarpal joint, but not of the carpo-metacarpal joints, and there is a narrow zone of translucency around the Rush pin distally, in the third metacarpal.

changed after the operation. The operation was not estimated to have reduced the mobility of the fingers in any case, and there was no instance of adhesion to tendons. At follow-up there was from slight to no ulnar deviation in the metacarpo-phalangeal joints of 20 hands, while pronounced ulnar deviation in these joints was found in 2 hands of 2 patients who had had severe changes of the joints already prior to operation. Seventeen patients reported that function as a whole was considerably better after the operation. There was no case of tardive compression of the median nerve.

The method does not require resection of the carpo-metacarpal joints, but spontaneous ankylosis did occur in the transfixed digit in 10 hands (Figure 1). In 12 hands the joint space was still barely visible, and in 8 of them slight mobility was detected clinically. In one patient the Rush pin had broken in the carpo-metacarpal joint (Figure 2). In the remaining 7 there was a translucent zone around the Rush pin where it passed through the transfixed metacarpal (Figure 3).

DISCUSSION

The Mannerfelt method for arthrodesis of the wrist is technically simple, does not require bone grafting, and affords the possibility of early mobilization (Mannerfelt & Malmsten 1971).

In the present material, as in Mikkelsen's (1980), ankylosis in the radio-carpal joint was obtained in all patients. Thus, the results were up to expectations.

Most of the present patients felt that a position of the wrist close to neutral was satisfactory. This is in accordance with the experience of others (Clayton 1965, Millender & Nalebuff 1973, Mikkelsen 1980). As pointed out by Dupont & Vainio (1968) and by Rechnagel (1971), it is not necessary to fuse the carpo-metacarpal joints.

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