

PARTIAL CARPAL ARTHRODESIS AS TREATMENT OF LOCAL DEGENERATIVE CHANGES IN THE WRIST JOINTS

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Twelve patients with partial arthrodesis of the wrist were re-evaluated. The follow-up time ranged from 1 year 2 months to 13 years. In 10 cases the indication for operation was isolated scapho-trapezial osteoarthritis, and in two cases isolated degenerative changes following perilunar luxation. Bony union was achieved in 9 cases, and these patients experienced relief of pain. One of the patients with non-union did not improve at all, another used a stabilizing bandage at work and the third had no complaints.

Degenerative changes in the adjacent joints of the wrist were not seen. A disadvantage of this operation seems to be the long period of treatment.

Key words: partial arthrodesis; therapy; wrist pain

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Osteoarthrosis of the wrist is best treated with radiocarpal arthrodesis, which in successful cases gives relief of pain and good strength. The price for these achievements is stiffness of the wrist. For degenerative changes located only to part of the wrist joint, minor operations of different types have been tried in order to re-establish function without affecting the range of wrist movements.

Local degenerative changes in the wrist are mostly found in the radial part – but can be present in any part of the wrist as a sequel to trauma (Figures 1 and 2).

MATERIAL AND METHODS

From 1965–1977, 12 patients with local degenerative changes in the wrist underwent surgical treatment in the form of partial carpal arthrodesis. Indications for surgery were based on clinical symptoms, such as weak-

ness of pinch and grasp, tenderness and pain on using the hand. The series includes 7 women and 5 men with an age range from 27–64 years. In 10 cases isolated degenerative changes had developed in the scapho-trapezial joint (ST joint) – and these patients were treated with ST arthrodesis. In two patients degenerative changes in the adjacent joints following perilunar luxation were present. One of these patients was treated with a fusion between the two carpal rows, and in the second the capitate and the lunate bones were fused.

In 4 patients homologous grafts were used; in the rest of the cases autologous grafts were employed. External postoperative immobilization was achieved by plaster cast for 8–14 weeks (mean 11.4 weeks). Hereafter the patients were given training by the hand therapist for several weeks – up to 3 months.

Operative technique for ST arthrodesis: A curved incision is made on the radial base of the thenar region. The ST joint is exposed between the tendons of musculus extensor pollicis brevis and musculus abductor pollicis longus and the tendons are retracted to either side. Care is taken not to damage the branches of the superficial radial nerve. The ST joint is resected and a bridge-shaped bone graft is inserted.



Figure 1. Osteoarthritis of the scapho-trapezial joint.



Figure 2. Same patient as shown in Figure 1, 6 years and 4 months after partial ST arthrodesis.

RESULTS

The follow-up time ranged from 1 year 2 months to 13 years (mean 7 years and 2 months).

At the re-evaluation a wrist mobility of 75 per cent of that of the non-operated hand was found (Table 1). The strength as regards pinch and grasp relative to the non-operated hand varied from 50–300 per cent and 50–200 per cent, respectively, measured with a vigorimeter (Table 2). The great difference in strength between the operated and non-operated hand in some cases could be due to inaccuracy of the method of

measurement. Most patients considered the strength in their hands to be practically equal.

X-ray examinations showed bony union in 9 cases. One patient with non-union failed to improve at all, and during the follow-up period an arthrodesis of the wrist was performed. The second patient with non-union used a stabilizing bandage at work, but could manage his activities of daily living without this support. The third patient had no complaints as a result of the non-union of the ST arthrodesis.

Degenerative changes in the adjacent carpal joints were seen only in one patient who at the time of the operation 13 years earlier had some radiocarpal osteoarthrosis, which had increased. In this patient a styloidectomy on the radius was performed at the time of the ST arthrodesis. None of the other patients had supplementary operations performed.

Judging by the following criteria, pain, tenderness, strength of pinch and grasp, and X-ray findings, the partial carpal arthrodesis was successful in 8 patients, fair in one and had failed in 3. Based on the patients' subjective relief of pain and ability to use the hand, 10 patients considered that the operation had been successful. Some patients complained about the relatively long period of treatment, including the time of training needed after the period of immobilization.

Table 1. Postoperative range of movement of the wrist joint as a percentage of the range of movement in the non-operated wrist joint

Dorsal	Volar	Radial	Ulnar
70	86	64	77
(43–110)	(63–127)	(0–100)	(50–125)

Table 2. Strength of the operated hand as a percentage of the strength of the non-operated hand

Grasp	Pinch
102	110
(50–200)	(50–300)

DISCUSSION

Until recently very little has been written about isolated osteoarthritis in the ST joint. The clinical picture of this affection has been reported by Carstam et al. (1968). Crosby et al. (1978) reported the result of non-operative and operative treatment of this condition. In 5/20 cases an ST arthrodesis was performed, and these cases were noted to have the greatest increase in strength of pinch and grasp. This fusion was predicted to interfere with the kinematics of the wrist, and in this way lead to degenerative changes in the adjacent carpal joints. The fear of further degenerative changes after intracarpal fusion seems not to have been justified, as also reported by Eiken (1979). A reason for this might be that the range of movement between any two carpal bones is extremely limited – or that the follow-up period presented in this paper is too short. However, after CM arthrodesis of the thumb, Weilby (1971) reported that 5/15 cases developed isolated changes, producing symptoms, in the ST joint. In the present series the CM joint of the thumb showed no degenerative changes at the follow-up.

Eiken (1979) has reported the result of surgical treatment of 24 hands with isolated degenerative changes in the ST joint. In 7 hands an ST arthrodesis was performed and normal function was achieved in 4/5 hands with bony union. Non-union developed in 2 hands and these 2 patients did not improve. In 17 hands an arthroplasty with removal of the distal articular surface of the scaphoid and interposition of a heat-moulded silicone rubber implant was undertaken. The problem seems to be the strength and shaping of the implanted material as some implants fractured during the follow-up period. However, following successful arthroplasty the patients regained normal functional use of the hand within 4–6 weeks.

An advantage of the implant – or other interposition procedures – is the considerably shorter period of treatment (Swanson 1973). Partial carpal fusion needs about 3 months of immobilization and, in some cases, a following period of several weeks of training.

Isolated degenerative changes in the wrist may be asymptomatic. Indications for operative treatment should therefore always be based on clinical findings and subjective complaints. Failure of conservative treatment is also an indication.

The decision as to which surgical technique should be chosen must depend on the patient's individual needs as regards the use of the hand. Partial carpal arthrodesis is mainly recommended for younger patients who suffer from isolated degenerative changes in the wrist following trauma. Implant operations, and other interposition procedures without using foreign material, seem to be more suitable for elderly patients with primarily isolated degenerative changes in the wrist joints.

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