Acta Orthop Scand 57, 138–140, 1986

Silastic arthroplasty in rheumatoid MCP-joints

Resection arthroplasty using Swanson silicone prosthesis was performed in 74 MCP-joints in 22 patients, all with rheumatoid arthritis. Follow-up at 2 (1–7) years showed complete pain relief in 15 patients and considerable improvement in hand function; the average range of motion was unchanged but extension was improved and ulnar deviation and volar displacement were reduced. Complications included fracture of four implants, two superficial infections, one hematoma and one skin necrosis.

Correspondence: Præstevænget 7A, DK-4681 Herfølge, Denmark

Claus Munk Jensen
Michel E. H. Boeckstyns
Bjarne Kristiansen

Department of Orthopaedic Surgery, University of Copenhagen, Hvidovre Hospital, Denmark

In rheumatoid arthritis, the MCP-joints are frequently involved and present typical deformities. In advanced stages, several techniques for reconstructive surgery are available (Kestler 1946, Vainio et al. 1967, Weilby 1977). In recent years joint spacers, notably the Swanson silastic prosthesis, have gained wide acceptance (Swanson 1969, Rhodes et al. 1972, Swanson 1972, Millenden & Nalebuff 1973, Weingarden 1974, Mannerfelt & Andersson 1975, Kay et al. 1978, Gschwend 1980). We have reviewed our experience with this prosthesis.

Patients and methods

From 1977 to 1983 resection arthroplasty using Swanson silicone prosthesis was performed in 74 metacarpophalangeal joints in 22 patients (20 females, 2 males). The median age at operation was 58 (36–73) years. All patients suffered from rheumatoid arthritis according to the criteria of The American Rheumatoid Association. The operated joints were: MCP 2 – 19, MCP 3 – 20, MCP 4 – 19, MCP 5 – 16. The indications for operation were: radiographic destruction in all patients (Table 1), accompanied by pain in 19 patients, ulnar deviation greater than 10° in 18 patients, loss of extension over 20° in 15 patients, and volar dislocation in 10 patients.

Operative procedure. Under tourniquet control, a transverse incision was made over the heads of the metacarpals. The extensor apparatus was mobilized by an ulnar relaxing incision. The head of the metacarpal was resected and complete synovectomy was performed. Release of the ulnar intrinsic and abductor digiti quinti was always performed, but only in rare cases reinserted to the radial portion of the extensor apparatus of the neighbouring finger. The intramedullary canal was prepared and the largest possible prosthesis inserted. The radial portion of the extensor apparatus was duplicated in order to centralise the extensor tendon. The capsule was never resutured on the ulnar side. A voluminous compression dressing with the fingers slightly flexed was applied and the hand elevated. After 5 days, the dressing was removed, active exercises were started under the supervision of an occupational therapist and these were continued on an out-patient basis for several months.

The patients were followed for median 2 (1–7) years. The following cirteria were used to evaluate the results: subjective assessment of pain relief and hand function, objective assessment of the active range of motion, radiographic assessment of ulnar deviation, volar displacement, failure of the implant, and bone erosions as compared with the radiographs taken immediately preoperatively and within 1 week after operation.

Results

Only minor complications occurred: superficial infection 2, hematoma 1, and skin necrosis 1. All healed uneventfully. Complete pain relief was noted in 15 patients; patients without pain preoperatively were unchanged after surgery. Only three patients had pain that interfered with activity. An improvement in hand function was noted in 15 patients (Table 2). The average range of motion was unchanged, but was displaced in the direction of extension: preoperative 30–61°, postoperative 13–42°. Examination of individual joints revealed a slight

Table 1. Preoperative grading of radiographic destructions according to Larsen et al. (1977)

Grade	N. of joints[a]
0	–
1	–
2	12
3	29
4	10
5	15

[a] Preoperative radiograms of 8 joints were not available.

Table 2. The changes in subjective assessment of pain and function. Number of patients

	Pain		
	At rest	In activity	Function
Improved	18	16	15
Unchanged	4	6	3
Worse	0	0	4

decrease in range of motion in the MCP 5, while it was unchanged in the other joints.

Preoperatively 49 joints had ulnar deviation over 10°. At follow-up, 37 of these were improved and 12 joints had unchanged ulnar deviations.

Recurrence of volar displacement was noted in 5 joints (subluxation in 4 and complete luxation in 1 joint). Bone erosions were found in 13 joints, most frequently in the proximal phalanx. In one patient at 1 year, all 4 implants had fractures of the distal stem, near the midsection of the implant.

Discussion

We achieved good releif on pain with silastic rubber arthroplasty of MCP-joints, but the average range of motion of the joints was not improved. However, the range of motion was moved in the direction of extension, in a way that permitted better opening of the hand. Like Gschwend (1980), we found that most of the cases with poor preoperative mobility were improved, while the majority of those with initially good mobility were worse or unchanged. Ulnar deviation and volar displacement were reduced significantly after the operation and recurred in only a few joints. Our results confirm previous studies (Swanson 1969, Rhodes et al. 1972, Swanson 1972, Millende & Nalebuff 1973, Weingarden 1974, Mannerfelt & Andersson 1975, Kay et al. 1978, Gschwend 1980).

Our follow-up was too short to disclose the entire gamut of late complications; the incidence of implant fractures increases with the period of observation (Hagert et al. 1975, Kay et al. 1978).

Like Swanson (1972) and Gschwend (1980), we believe that the use of the Swanson prosthesis offers some advantages in comparison with resection arthroplasty using interposition of an extensor tendon or a volar plate: the operative procedure is simple, the stability achieved is greater, and the cosmetic result better, because shortering is avoided. One disadvantage is the necessity of introducing foreign material; however, after an infection, a salvage resection arthroplasty can be performed (Gschwend 1980).

In view of the fact that decreased flexion can be expected in the MCP-joints, impaired flexion of the other finger joints may constitute a contraindication for operation in the MCP-joints. In cases with impaired mobility but without significant pain, the operation should be considered only if severe flexion contracture or ulnar deviation is present.

References

Gschwend, N. (1980) *Surgical treatment of rheumatoid arthritis, pp. 111–126. Georg Thieme Verlag, Stuttgartd, New York.*

Hagert, C.-J., Oddvar, E., Ohlsson, N., Aschan, W. & Mvin, A. (1975) *Metacarpophalangeal joint implants. Scand. J. Plast Reconstr. Surg.* **9**, 147–157.

Kay, A. G. L., Jeffs, J. V. & Scott, J. T. (1978) Experience with silastic prostheses in the rheumatoid hand. *Ann. Rheum. Dis.* **37**, 255–258.

Kestler, O. C. (1946) A surgical procedure for the painful arthritic hand. *Bull. Hosp. Joint Dis.* **7**, 114.

Mannerfelt, L. & Andersson, K. (1975) Silastic arthroplasty of the metacarpophalangeal joints in rheumatoid arthritis. *J. Bone Joint Surg.* **57-A**, 484–489.

Millenden, L. H. & Nalebuff, E. A. (1973) Metacarpophalangeal joint arthroplasty utilizing the silastic rubber prosthesis. Orthop. Clin. North Am. **4**, 349–371.

Rhodes, K., Jeffs, J. V. & Scott, J. T. (1972) Experience with silastic prostheses in rheumatoid hands. *Ann. Rheum. Dis.* **31**, 108.

Swanson, A. B. (1969) Finger joint replacement by silicone rubber inplants and the concept of implant fixation by encapsulation. *Ann. Rheum. Dis.* 28 Suppl., 47–55.

Swanson, A. B. (1972) Implant arthroplasty for arthritic finger joints. *J. Bone Joint Surg.* **54-A**, 435–455.

Vainio, K., Reiman, I. & Pulkki, T. (1967) Results of arthroplasty of the metacarpophalangeal joints in rheumatoid arthritis. *Wiederherstellungschir. Traum.* **9**, 1–7.

Weilby, A. (1977) Resection arthroplasty of the metacarpophalangeal joint a.m. Tupper using interposition of the volar plate. *Scand. J. Plast. Reconstr. Surg.* **11**, 239–242.

Weingarden, T. L. (1974) Rheumatoid arthritis of the hand: a review of silastic prosthesis arthroplasty in 36 patients. *J. Am. Orthop. Assoc.* **74**, 209–216.