Acta Orthop. Scand. *58*, 398–400, 1987

Metatarsal osteotomy in rheumatoid arthritis

Mats Åström and Carl-Axel Cedell

Thirty-eight feet in 28 patients with rheumatoid forefoot deformity were operated on with a proximal valgus osteotomy of the first metatarsal bone to reduce splaying of the forefoot. Each patient also underwent additional surgical procedures for associated conditions of the forefoot. The mean follow-up period was 3.7 years. Both the entire forefoot and the medial border of the foot were substantially improved in all but 2 cases. Residual symptoms were slightly more pronounced in the anterior footpad and the lesser toes (5 cases).

A proximal valgus osteotomy of the first metatarsal bone, performed in combination with other surgical procedures, affords a good correction of the rheumatoid foot deformity with long-term improvement.

The painful forefoot in rheumatoid arthritis is more often caused by mechanical deformity than by the inflammatory process itself (Marmor 1963); splaying of the forefoot is a common feature in addition to dislocation of the metatarsophalangeal joint and probably equally important in producing discomfort. In severe cases surgical treatment is well established and mostly involves a partial or total excision of the metatarsophalangeal joints (Cracchiolo 1982). A valgus osteotomy of the first metatarsal bone, bringing it closer to the midline of the foot, may help to restore a normal shape of the forefoot and thereby provide further symptomatic relief. This is a common procedure in static disorders, but rare in rheumatoid patients (Kay 1950, Joplin 1969, Gould 1982). We have previously published good results with a proximal valgus osteotomy of the first metatarsal bone in primarily nonarthritic hallux valgus (Cedell & Åström 1982). We report the effects of the same procedure in a group of patients with forefoot deformity due to rheumatoid arthritis.

Department of Orthopedics, Central Hospital, Växjö, Sweden

Correspondence: Dr. Åström, Department of Orthopedics, Malmö General Hospital, S-214 01 Malmö, Sweden

Patients and methods

During the period February 1976 to May 1985, 38 feet in 28 patients were operated on. There were 26 women and 2 men with a mean age of 58 (35–80) years. All the patients had rheumatoid arthritis. A proximal wedge osteotomy eliminating the abnormal varus position of the first metatarsal bone and an excision of the pseudoexostosis were combined with a soft-tissue plasty at the first metatarsophalangeal joint to correct the valgus deformity of the great toe (Cedell & Åström 1982). In arthritic patients cartilage destruction and severe deformity frequently necessitate a Keller resection arthroplasty instead of a soft-tissue procedure. In most cases a number of other operations were performed simultaneously as a part of our normal routine for surgical treatment of arthritic feet (Table 1).

Table 1. Additional procedures in 28 patients with rheumatoid forefoot deformity treated by valgus osteotomy of the first metatarsal bone

	No of feet
Soft-tissue plasty only	5
Keller resection arthroplasty	18
Resection of the lateral four metatarsal heads	26
Resection of the proximal interphalangeal joint for hammertoe deformity in the lesser toes	8
Others (synovectomy, arthrodesis, excision of the sesamoids, tenotomy)	11

Postoperatively, the foot was immobilized for 6 weeks with a strip of plaster along the medial border. The patients were allowed to bear weight on the heel and the lateral part of the foot to facilitate ambulation, especially in elderly patients and patients with multiple joint involvement.

All the patients completed a questionnaire regarding the subjective result. Because the arthritic foot presents a rather complex problem, they were asked to separately indicate present symptoms from the anterior foot pad, the great toe (medial border of the forefoot), the lateral toes, and the forefoot in general. The results were graded as excellent (no symptoms), good (a definite improvement), or poor (unaltered or increased symptoms). The intermetatarsal angle and the valgus angle of the great toe (Houghton & Dickson 1979) were measured preoperatively and at follow-up using a standardized radiographic technique with a frontal projection of the forefoot bearing full weight. The difference between preoperative and postoperative angles indicates the amount of correction achieved.

The mean follow-up period was 4 (0.5–10) years. Only three feet were followed less than a year and an additional 6 feet less than 2 years.

The material was not only studied in its entirety, but also by dividing it into two subgroups: one operated on between 1976 and 1981 (16 feet) and one operated on between 1982 and 1985 (22 feet), with a mean follow up of 6.3 and 2 years, respectively. By comparing the two subgroups with regard to the subjective result and amount of correction achieved, we hoped to learn if symptoms and deformity recur to any extent with the passage of time.

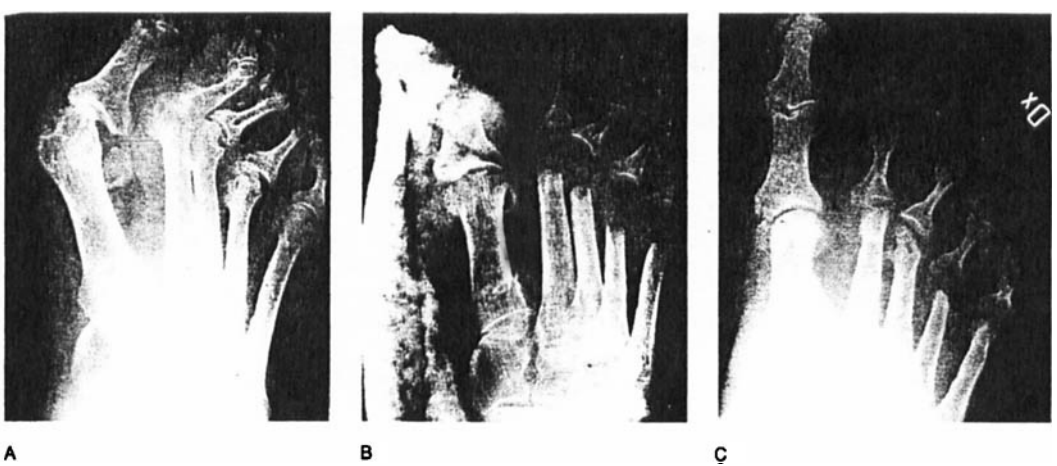
For statistical evaluation in this comparison, the Student's *t* test was used.

Table 2. Subjective results in 28 patients treated surgically for rheumatoid forefoot deformity. Some patients failed to answer all questions.

Anatomic region	No. of feet		
	Excellent	Good	Poor
Anterior foot pad	15	17	5
Great toe	22	12	2
Lateral toes	15	17	5
Total forefoot	10	25	2

Results

The majority of the patients were quite content with the result (Table 2). The number of cases in each group varies slightly as some patients failed to complete all questions. One wound infection with a positive culture and a local skin necrosis occurred. Seven cases of slight necrosis of the wound edges medially at the site of the osteotomy were also noted. All the latter showed rapid healing without treatment and did not alter the postoperative course. All the osteotomies healed uneventfully. Preoperatively, a mean valgus angle



A B C

Figure 1. Rheumatoid arthritis in the forefoot of a 65-year-old woman.
A. Preoperative.
B. After proximal osteotomy of the first metatarsal bone and resection of the lateral metatarsal heads. A strip of plaster is placed along the medial border of the foot.
C. Appearance at follow-up 3 years later.

of 47° and a mean intermetatarsal angle of 15° were recorded. At follow-up the angles were reduced to 24° and 8°, respectively. Comparing results in the two subgroups, we found a slightly greater mean valgus angle in the group first operated on ($P < 0.05$), but no difference as regards the intermetatarsal angle or the subjective result.

Discussion

Our results in rheumatoid arthritis were not quite as good as in our previous study of static hallux valgus (Cedell & Aström 1982). Clayton (1973) pointed out that surgical results in rheumatoid arthritis are inferior to those in static disorders. This is not surprising as we are dealing with a chronic, debilitating progressive condition. Multiple joint involvement in regions near the forefoot (subtalar and ankle joints), as well as a general rise in disease activity, will no doubt have a negative effect on the outcome of surgery (Raunio & Laine 1970). However, the aim is not to restore the foot to normal, but to correct gross deformity and regain a reasonable degree of function (Key 1950). Results of surgery in the rheumatoid foot are difficult to classify (Lipscomb et al. 1972), and there is no generally accepted scheme. We used the same simple system of classification as in our previous study (Cedell & Aström 1982) because it is easy to manage and similar to those used by several other authors (Flint & Sweetnam 1960, Newman & Fitton 1983).

Our results were quite satisfactory and compare favorably with those of various other procedures. Of particular interest is the fact that the best result was noted at the medial border of the forefoot where two thirds were free of symptoms and one third improved. We interpret this as an effect of the proximal osteotomy of the first metatarsal whereby a normal shape fo the medial forefoot is regained. Long-term surgical results in arthritic feet often deteriorate (Craxford et al. 1982). Our comparison of the early and the late subgroups appears to contradict this statement since they were very similar in most respects despite a 5-year difference in follow-up time.

The rheumatoid foot presents a complex surgical problem that must be dealt with in a number of different ways. A proximal valgus osteotomy of the first metatarsus will only alleviate the discomfort caused by metatarsus primus varus and hallux valgus, and can therefore not replace resection arthroplasties and other standard procedures. It should be regarded as a complement to the various methods for surgical treatment of the rheumatoid foot.

References

Cedell C A, Aström M. Proximal metatarsal osteotomy in hallux valgus. Acta Orthop Scand 1982 Dec;53(6): 1013–8.

Clayton M L. Surgical treatment of the rheumatoid foot. In: Foot disorders, medical and surgical management (Ed. Giannestras, N.J.). Lea and Febiger, 1973.

Cracchiolo A. Management of the arthritic forefoot. Foot Ankle 1982 Jul-Aug;3(1):17–23.

Craxford A D, Stevens J, Park C. Management of the deformed rheumatoid forefoot. A comparison of conservative and surgical methods. Clin Orthop 1982 Jun;(166):121–6.

Flint M, Sweetnam R. Amputation of all toes. J Bone Joint Surg (Br) 1960;42:90–6.

Gould N. Surgery of the forepart of the foot in rheumatoid arthritis. Foot Ankle 1982 Nov-Dec;3(3): 173–80.

Houghton G R, Dickson R A. Hallux valgus in the younger patient: the structural abnormality. J Bone Joint Surg (Br) 1979 May;61(2):176–7.

Joplin R J. Surgery of the forefoot in the rheumatoid arthritic patient. Surg Clin North Am 1969 Aug; 49(4):847–78.

Key J A. Surgical revision of arthritic feet. Am J Surg 1950;79:667–72.

Lipscomb P R, Benson G M, Sones D A. Resection of proximal phalanges and metatarsal condyles for deformities of the forefoot due to rheumatoid arthritis. Clin Orthop 1972 Jan–Feb;82:24–31.

Marmor L. Rheumatoid deformity of the foot. Arthritis Rheum 1963;6:749–52.

Newman R J, Fitton J M. Conservation of metatarsal heads in surgery of rheumatoid arthritis of the forefoot. Acta Orthop Scand 1983 Jun;54(3):417–21.

Raunio P, Laine H. Synovectomy of the metatarsophalangeal joints in rheumatoid arthritis. Acta Rheumatol Scand 1970;16(1):12–7.