Acta orthop. scand. 52, 103–105, 1981

LATE RESULTS OF ANKLE FUSION

ÅKE AHLBERG & ANDERS S. HENRICSON

Department of Orthopedic Surgery, Malmö General Hospital (University of Lund), Malmö, Sweden

Forty-four ankle joint fusions performed in the period 1950–1972 at the Department of Orthopedic Surgery, Malmö General Hospital, were evaluated. Thirty-one patients were re-examined. The mean follow-up time was 12.3 years (6.4–28 years). Two-thirds of the patients were much better or better than before operation, but still a lot of problems existed. Two-thirds of the patients had some kind of pain localized to the subtalar region. Three out of four patients had to use special footwear. The rate of forefoot deformities was not increased. In conclusion, patients with ankle fusion often have persistent trouble; therefore technical and clinical development of total ankle joint replacement seems to be indicated.

Key words: ankle joint; arthrodeses

Accepted 22.v.80

In recent years ankle joint replacement has often been used instead of ankle fusion. The choice between these methods depends largely on the late results it produces. So far no long-term results of ankle joint replacement are available.

The purpose of this paper is to present the late results achievable with ankle fusion.

MATERIAL AND METHODS

Between 1950 and 1972, 46 patients were treated with unilateral ankle arthrodesis at the Orthopedic Department of Malmö General Hospital. The hospital records of 44 patients (27 men and 17 women) were reviewed; two could not be found. Of these patients nine had died, three could not be traced and one did not wish to participate. The remaining 31 patients were re-examined clinically, and 27 also radiologically. The interval between the operation and the review was 12.3 years (6.5–28 years) (Figure 1). The preoperative diagnoses are given in Table 1. Arthritis after infection includes both primarily infected open fractures and fractures infected at operation. The miscellaneous group includes cases of hemophilic arthropathy, tuberculous arthritis, deformity following poliomyelitis, osteochondritis dissecans of the talus and congenital deformities. Fourteen fusions were done with the Charnley compression method (Charnley 1951), 16 with Adams' method using a transfibular approach (Adams 1948), seven with the Hatt method using a central graft (Hatt 1940) and five with an anterior tibial sliding graft. One ankle was fused with an iliac bone graft and one by stapling.

COMPLICATIONS

None of the patients died as a result of the operation. Deep infection was seen in six (14 per

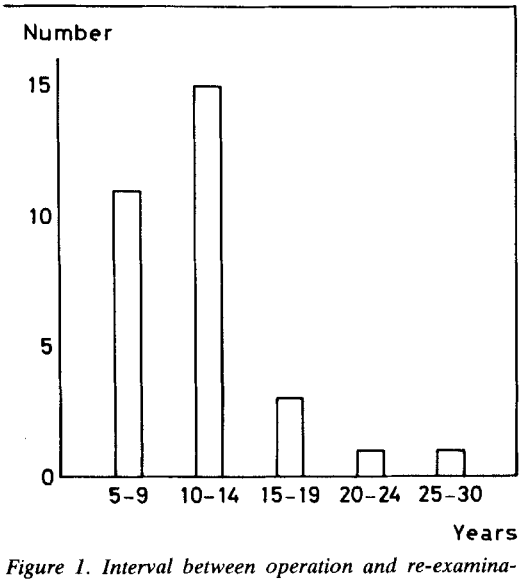

Figure 1. Interval between operation and re-examination.

0001-6470/81/010103-03 $02.50/0

Table 1. Preoperative diagnosis

Post-traumatic arthritis	24
Arthritis after infection (post-traumatic)	4
Primary arthrodesis after ankle fracture	3
Rheumatoid arthritis	3
Unknown	2
Miscellaneous	8

cent) cases, one of which was an exacerbation of tuberculous arthritis and another an exacerbation of long-standing chronic osteomyelitis. Five (11 per cent) superficial infections were also seen. Pseudarthrosis occurred in three of the deeply infected cases and in five other cases. The overall non-union rate was thus 18 per cent. Six of these were later successfully treated with re-arthrodesis without complications. Two patients (not infected) declined re-operation. All the infections except one were cured by chemotherapy alone or combined with re-operation. In the case that did not heal a discharge was still oozing from chronic fistulas 13 years after operation. Several attempts to excise the fistulas have failed. One patient was later re-operated upon because of fusion in a poor position (equinus). Another patient was re-operated on because of pseudarthrosis at the site of the fibular osteotomy, and later with arthrodesis of the subtalar joints because of persisting local pain. One patient was re-operated on because of compression of the tibial nerve in the tarsal tunnel.

RESULTS

Twenty-one patients (68 per cent) had pain. Six described it as severe, eight as moderate and seven as mild. Thus only 10 patients (32 per cent) had no pain at all. Of these 21 patients, 14 had pain when walking, 11 when standing and 9 at rest. Fourteen patients had pain in the ankle, five in the middle of the foot and only one in the forefoot. Twenty-one patients (68 per cent) reported tiredness of the foot on exertion. Twenty-six (84 per cent) found it difficult to walk on uneven ground. Eighteen (58 per cent) had difficulties in walking up and down steps. Many had problems with their footwear. Twelve (39 per cent) had to wear special orthopedic shoes. Another twelve (39 per cent) could rarely wear ready-made shoes without having them altered in some way. Only seven (23 per cent) had no trouble with their footwear. The patients were asked whether the difficulties they had before the operation were better or worse after the operation. Nine (29 per cent) felt much better, 14 (48 per cent) better and four (13 per cent) felt no difference at all. Two (6 per cent) felt worse and another two much worse after the operation than before.

Seven (23 per cent) walked with a severe limp, 13 (42 per cent) with a moderate limp and three (10 per cent) with a slight limp. Eight (26 per cent) patients walked without any limp at all. Three (10 per cent) had to use two sticks when walking and 12 (39 per cent) used one stick. All three with two sticks and four of those with one stick had some co-existing disease impairing locomotion.

The angle of the talo-crural fusion varied between zero and 20°. The pain seemed to be less severe in those with an angle of 10° of equinus. Residual deformity was seen in 12 patients (39 per cent), seven of valgus type and five of varus type. All deformities in varus and five of those in valgus were considered slight. Subtalar movement was absent in two (6 per cent) cases, including one with subtalar arthrodesis. In 14 (44 per cent) subtalar movement on the operated side was less than half that on the unoperated side. In 10 (32 per cent) patients subtalar movement was better than this but still not as good as that on the other side. In five (16 per cent) subtalar movement was equal on both sides. No significant increase in the frequency of hallux valgus, digitus malleus or pes transverso planus was found on the operated side. Of the 27 patients examined radiologically no signs of osteoarthritis of the subtalar joints were seen in 14 (52 per cent). Three cases (11 per cent) showed severe subtalar osteoarthritis and nine (33 per cent) showed moderate osteoarthritis. One patient had ankylosis of these joints.

DISCUSSION

Evaluation of the results is difficult owing to the heterogeneity of the indications for arthrodesis and the choice of surgical methods used. This applies also to other series on record (Adam & Ranavat 1976, Detwiler et al. 1976, Said et al. 1978) presumably because no particular method has proved quite satisfactory for most surgeons to meet most clinical requirements (White 1974). The technical difficulties are reflected also in the frequency (18 per cent) of non-union in our material. Similar figures have also been reported by others (Lance et al. 1971, Detwiler 1976). The main purpose of the present investigation was to get a clearer impression of the late results of ankle joint fusion. Although two-thirds of the patients reported that they felt much better or better after the operation, most of them still had more or less troublesome symptoms. Thus, two-thirds had some degree of severe pain and fatigue in the subtalar region. Most of the patients also had decreased mobility of the subtalar joints. These symptoms may be ascribed to increased stress on the subtalar joints after the ankle joint fusion. In our material, however, the frequency of symptoms referable to the forefoot, e.g. hallux valgus, transversoplanus and/or toe deformities, was not increased. As many as 78 per cent of the patients complained of difficulty obtaining suitable footwear and half of this group had to wear orthopedic shoes. It is thus clear from the investigation that permanent symptoms are common even after bony healing. Efforts to develop and improve ankle replacement as an alternative to fusion therefore appear warranted. Since no late results of ankle replacement are yet available, it would appear wise to reserve this method for patients of advanced age, at least for those with post-traumatic or degenerative arthritis. As for rheumatoid arthritis, no conclusions can be drawn from our material but, since these patients often have changes in the subtalar joints and the forefoot, preservation of a certain degree of mobility of the ankle joint is still more important in this group (Adam & Ranawat 1976).

REFERENCES

Adam, W. & Ranawat, C. (1976) Arthrodesis of the hind foot in rheumatoid arthritis. *Orthop. Clin. N. Amer.* **7**, 827–840.

Adams, J. C. (1948) Arthrodeses of the ankle joint. *J. Bone Jt Surg.* **30**-B, 506–511.

Charnley, J. (1951) Compression arthrodesis of the ankle and shoulder. *J. Bone Jt Surg.* **33**-B, 180–191.

Detwiler, C. K., Frenette, J. P. & Chiroff, R. T. (1976) Ankle arthrodesis. *N.Y. St. J. Med.* **76**, 1803–1807.

Hatt, R. N. (1940) The central bone graft in joint arthrodesis. *J. Bone Jt Surg.* **22**, 393–402.

Lance, E. M., Pavel, A., Patterson, R. L., Fries, L. & Larsen, I. J. (1971) Arthrodesis of the ankle. A follow-up study. *J. Bone Jt Surg.* **53**-A, 1030.

Said, E., Hunka, L. & Siller, T. N. (1978) Where ankle fusion stands today. *J. Bone Jt Surg.* **60**-B, 211–214.

White, A. A. (1974) A precision posterior ankle fusion. *Clin. Orthop.* **98**, 239–250.

Correspondence to: Anders Henricson, M. D., Department of Orthopedic Surgery, Malmö General Hospital, S-214 01 Malmö, Sweden.