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The surgical treatment for degenerative disease of the ankle

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Abstract Although a variety of surgical techniques are available for the surgical treatment of early degenerative disease of the ankle, arthrodesis remains the preferred treatment for severe cases. We studied 126 ankles with an average follow up of 39 months of whom 25 with early disease underwent debridement and cheilectomy, 18 with intermediate disease underwent lower tibial osteotomy and 83 with severe disease underwent either arthrodesis (78) or total ankle replacement (5). In 96% of cases there was a satisfactory functional outcome.

Résumé Bien qu'il soit généralement admis que l'arthrodèse de cheville est le traitement le plus sûr de l'arthrose chez la majorité des patients, des avancées ont été faites récemment dans le traitement conservateur en conservant la fusion comme le dernier mais non le seul traitement possible. Les auteurs rapportent le traitement de 126 chevilles avec un suivi en moyenne de 39 mois. Il y a 25 cas d'arthrose précoce traités par lavage articulaire, 18 cas d'arthrose moyennement évoluée traités avec une ostéotomie tibiale basse, 83 cas d'arthrose évoluée traités 5 fois par prothèse et 78 fois par arthrodèse. Ces différents groupes sont évalués radiologiquement et fonctionnellement. Il y a globalement, 96% de résultat fonctionnel satisfaisant.

Introduction

Degenerative disease of the ankle is less common than that of the hip or knee, but can be equally disabling; and may be secondary to many aetiological factors including trauma, chronic instability, rheumatoid disease, osteochondritis, septic arthritis and neuropathy. Surgical treatment should only be advised when conservative methods

including medication, local injections, the wearing of ankle supports and orthotics have failed.

Materials and methods

We studied 126 ankles in 125 patients treated surgically between 1989–1995; there were 79 males and 46 females with an average age of 42 years (18 to 46 years). The degenerative changes were primary in 39 ankles, secondary to trauma in 72, infection in 10 and rheumatoid disease in 5. The ankles were assessed clinically and with weight-bearing radiographs. The drawer test with stress radiographs or arthrography was used to assess instability, and CT and MRI scans, and arthroscopy were used in some cases to aid management. A modified classification of the degenerative changes [3] based on weight-bearing radiographic appearance was used; degrees 1 and 2 were mild, 3 intermediate and 4 severe. The treatment plan is set out in Table 1. Surgical treatment was divided into four groups: Group A (25 ankles) involved joint debridement, subchondral drilling and cheilectomy; Group B (18 ankles) involved lower tibial osteotomy; Group C (5 ankles) involved total ankle replacement and Group D (78 ankles) involved arthrodesis. Ligamentous reconstructive procedures were also used in cases in Groups A, B & C where there was associated instability. At follow-up a functional score comprising 50 points for pain; 40 for function and 10 for motion (7) and classified as excellent (85–100 points), good (70–84 points) or poor (0–44 points) was recorded as well as routine radiological appearances.

Results

The 25 cases in Group A, included 20 cases of post-traumatic and 5 of degenerative arthritis, treated by joint debridement and cheilectomy (Fig. 1). The average follow-up was 28 months (26 to 48). The functional score improved from an average of 56 (range 23 to 84) preoperatively to 86 (range 68 to 96) at follow up. However, there were in this group 8 cases with advanced disease, 7 of which had not at follow up progressed beyond degree 2. One case whose arthrosis progressed to degree 3 maintained a functional score of 78 points at 2 year follow up.

The 18 cases in Group B, included 6 of post-traumatic and 12 of degenerative arthritis who were treated by low

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Table 1 Protocol for the management of ankle arthritis according to the degrees of arthrosis **Table 2** Grading of clinical results according to functional scale

Treatment	n	Poor	Fair	Good	Excellent
Debridement	25	0	0	8	17
Lower tibial osteotomy	18	0	0	10	8
Total ankle replacement	5	0	1	4	0
Arthrodesis	78	5 ^a	11	42	20
Total	126	5	12	64	45

^a including 3 non-unions

tibial osteotomy (Fig. 2). The average follow up period was 47 months (25 to 82). The functional score improved from an average of 49 (35 to 86) preoperatively to an average of 88 (73 to 98) at follow up. All osteotomies united unremarkably. The antero-posterior tibio-ankle surface angle was corrected from an average of 81° preoperatively to an average of 90° at follow up, while the lateral tibio-ankle surface angle was altered from an average of 79° preoperatively to an average of 82° at follow up. Both angles were thus brought within the normal range. In one case there was infection 4 months after surgery, successfully treated by removal of implants. Two cases with delayed union required revision procedures. Thus there was no progression to advanced disease in these cases.

The 5 cases in Group C, included 1 post-traumatic, 1 degenerative and 3 cases of rheumatoid arthritis, treated by total ankle replacement (Fig. 3). The average follow up was 5 years (2 to 7). The functional score improved from an average of 34 preoperatively to an average of 86 at two years follow up and remained improved at an average of 79 at the last follow up. The increased

functional score was mainly due to pain relief. The functional improvement was maximal at 2 years and thereafter decreased without evidence of loosening or sinking of the prosthesis.

The 78 cases in Group D, included 45 post-traumatic, 21 degenerative, 10 infective and 2 cases of rheumatoid arthritis, treated by ankle arthrodesis (Fig. 4). The average follow up was 38 months (26 to 62). The functional score improved from an average of 28 preoperatively to an average of 70 at follow up. There were 64 cases with satisfactory union, 11 cases with delayed union and 3 cases with nonunion. The average time to fusion was 4.5 months. Different methods of ankle arthrodesis were used, with different times to fusion. If the 3 cases of non-union are excluded, the average time to fusion was 6 months for the 33 ankles with a Blair fusion, 4 months for the 7 ankles with an external compression arthrodesis, 7 months for the 3 ankles with staple fixation and 3 months for the 32 ankles with internal compression arthrodesis. There was improvement in the functional score in all groups. There was particular improvement in pain scores in Groups C & D, who had advanced disease and severe pre-operative pain. The total functional scores are higher in Groups A & B than C & D, which shows that in this series of 126 cases of degenerative disease of the ankle treated by differing surgical techniques, with an average follow up of 39 months, there were poor results in 5 cases, fair results in 12 cases, good results in 64 cases and excellent results in 45 cases.

Discussion

Satisfactory function after arthrodesis requires sound fusion in a good position, without significant degenerative

Fig. 1 A case of traumatic arthritis treated by cheilectomy and joint debridement

Fig. 2A,B Low tibial osteotomy in the treatment for degenerative (A) and traumatic (B) arthritis

Fig. 3 A case of rheumatoid arthritis treated by total ankle replacement

Fig. 4 A case of degenerative arthritis treated by ankle arthrodesis with cross compression screws

changes in the subtalar or midtarsal joints. [2, 4, 6, 9]. Debridement and cheilectomy may give good results in early disease with radiographic narrowing of the joint space [9, 11]. Low tibial osteotomy is indicated in intermediate disease, particularly with medial joint involvement, and very good results have been obtained [12]. Our series shows good results in degenerative and post-traumatic disease; however, it is contraindicated where there are pan-articular changes as in rheumatoid disease or after septic arthritis. We have previously reported good results, although radiological evidence of widening of the joint space may not be seen for a year after operation.

Bilateral ankle disease and multiple joint involvement in elderly patients are indications for prosthetic replacement [1], however variable results have been reported [5, 10, 14]. A good functional result may be obtained in

rheumatoid patients with the restoration of only a small range of movement [13].

Unilateral degenerative disease, and arthritis secondary to sepsis or trauma, particularly in young patients, are indications for arthrodesis. Good results have been reported following compression arthrodesis with bone graft [7, 8]. Compensatory increase in the range of movement of the midtarsal joints limits the functional loss of ankle movement. Our results suggest that early treatment may halt the progression of the degenerative changes and that for severe disease arthrodesis offers a satisfactory functional outcome in 80% of cases.

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