

Tibiototalcalcaneal fusion using retrograde intramedullary nails as a salvage procedure for failed total ankle prostheses in rheumatoid arthritis

A report on sixteen cases

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Abstract

Between 1996 and 2002, 16 patients with rheumatoid arthritis and failed total ankle prosthesis underwent tibiototalcalcaneal fusion using retrograde intramedullary nails. The functional outcome was evaluated using the AOFAS scoring system and the patients were also asked about their satisfaction. Radiographs were obtained for all 16 cases minimum 1 year after surgery.

Thirteen of the 16 ankles were considered radiographically healed, 11 at the first attempt and two after repeat arthrodesis. The median AOFAS pain and total scores were 40 and 58, respectively. Two deep infections resulted in a fused ankle after antibiotic treatment.

In patients with rheumatoid arthritis and a failed total ankle prosthesis, tibiototalcalcaneal arthrodesis with a retrograde intramedullary nail resulted in primary healing in two-thirds of the cases. Only two patients with a fused ankle were dissatisfied with the final result. The procedure is recommended in selected cases as an alternative to external fixation.

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1. Introduction

A tibiototalcalcaneal arthrodesis of the ankle using a retrograde intramedullary nail was according to our knowledge first described by Adams [1] in a case of pseudarthrosis after attempted primary arthrodesis of the ankle joint. This method was later adopted by others [2–7]. Also ante-grade intramedullary fixation has been attempted but with less successful results [8].

Arthrodesis of the ankle joint as a salvage procedure for a failed total ankle replacement is a more challenging procedure than when performed as a primary procedure. In 1995, Makwana et al. [9] recommended a retrograde intramedullary nail to achieve fusion in such situations and reported on three cases. On the other hand, external fixation

may be successful although pin tract infections are common [10].

The objective of the present study was to retrospectively evaluate radiographic healing rate, complications, functional scores and patient satisfaction after explantation of a total ankle prosthesis and introduction of a retrograde intramedullary nail.

2. Patients and methods

From 1996 to August 2002, 16 ankles in 15 patients with failed total ankle prostheses were operated on in our hospitals with tibiototalcalcaneal arthrodesis using a retrograde intramedullary nail. Four surgeons performed the operations. In 10 cases, the explanted prosthesis had been uncemented (STAR) (Fig. 1) and in six cases cemented (Bath and Wessex, ICLH and Buechel-Pappas). There were 14 women with 15 ankles and one man. The median age was

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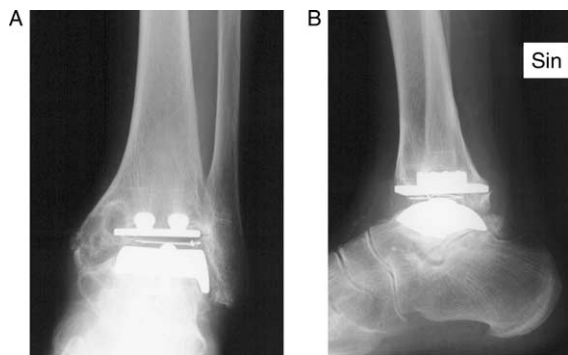


Fig. 1. (a) A-p and (b) lateral radiograph, of an ankle before conversion to arthrodesis (case no. 12). The ankle was painful and in the lateral view it can be seen, that the talar component has subsided.

62 years (17–82). The diagnosis was rheumatoid arthritis (RA) in 14 patients and in addition one woman with two ankles had juvenile rheumatoid arthritis (JRA). The subtalar joints were in all 16 cases radiographically ankylosed or destroyed by the rheumatic disease at the time of surgery—when the prostheses were explanted and an intramedullary nail introduced in order to fuse the ankle joint.

Demographic data, design of the explanted prosthesis, type of intramedullary nail, and postoperative course are presented in Table 1.

During the period September 2001–May 2004, a retrospective clinical follow-up was undertaken by one of the authors (TA). The only exception was case no. 4 that could be evaluated with respect to radiographic healing only before her death. The median follow-up time, excluding case no. 4, was median 34 months (15–88). The AOFAS scoring system was used for evaluation of pain and function [11]. The maximum total score when used in cases operated on with ankle arthrodesis can reach 86 points. The patients were also requested to express their subjective opinion regarding the ankle operation in the terms ‘satisfied’, ‘somewhat satisfied’ and ‘dissatisfied’ as suggested by Makwana et al. [9].

The radiographs obtained between 13 and 81 months (median 24 months) after surgery were evaluated by one of

the authors (JB), who were unaware of the clinical results. He classified the ankles as fused or not fused, based on the presence of bridging bone or not. If less than one-fourth of the body of the talar bone remained, the fusion was considered to have occurred between tibia and calcaneus. The results of the radiographic evaluation are also presented in Table 1.

2.1. Surgical technique

Surgery was performed using a tourniquet and with the patient in a supine position. A lateral approach and oblique resection of the lateral malleolus at the level of the ankle joint was most frequently used. After extraction of the ankle prosthesis an intramedullary nail was introduced from the plantar aspect in a retrograde fashion after preparing and over-reaming the entry hole and the marrow cavity in the tibia by 0.5 mm.

Three different designs were used. The three-flanged Thornton nail, which was used in three cases, the ‘Revision nail’ (Smith and Nephew, Inc., Memphis TN) in 11 cases (Fig. 2) and the ‘Aim’ nail (DePuy Orthopaedic, Inc., Warsaw, IN). The later two designs have holes for transverse screw fixation in the proximal and distal end, and distal fixation in the calcaneus was always applied. However, proximal fixation in the tibial diaphysis was only applied in seven of the 13 cases in which it was possible. Introduction of the nails and screws was controlled by fluoroscopy.

Bone grafting was considered necessary in all cases except for the two ankles in the patient with JRA. Morcellised allograft alone was used in six cases and autologous bone alone in six cases. In two cases, both auto and allograft were used.

Postoperatively all but three patients were supplied with a plaster cast for a time period that varied from 6 weeks to 4 months. Full weight bearing was allowed within 2 weeks in eight cases, within 4 weeks in two cases and after 6 weeks in six cases.

2.2. Statistics

Statistica 6.1 software was used for the statistical calculations. For comparison between groups with respect to position of the hind-foot we used the Mann–Whitney *U*-test.

3. Results

The individual results of the clinical and radiographic evaluation are presented in Table 1. Thirteen of the 16 ankles were considered radiographically healed, 11 at the first attempt and two after repeat arthrodesis. The two cases that underwent repeat arthrodesis (case nos 2 and 11) are described in detail below.

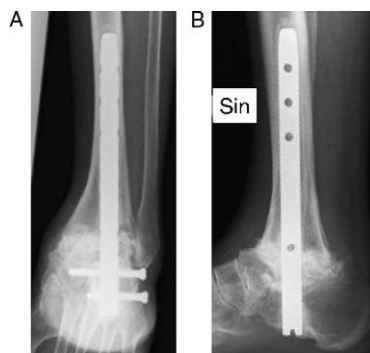


Fig. 2. (a) A-p and (b) lateral radiograph, of the same ankle (case no. 12), 24 months after fusion. At surgery the talar body was found to be necrotic. The arthrodesis healed uneventfully.

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