25.1 Introduction

Arthrodesis of the ankle was described by Albert in 1879 [2]. The next major advance was the emphasis of compression of the arthrodesis site by Charnley in 1951 [4], four of which contributed to lower rates of non-union. Unfortunately, in the 1970s and 1980s, arthroplasty of the ankle failed to match the success of total joints in other locations. For this reason, arthrodesis of the ankle remains the current treatment of choice for painful arthrosis of the ankle joint.

While there are many techniques used to carry out an arthrodesis of the ankle, in this series, the transfibular approach and fixation with two retrograde 6.5-mm cancellous screws was utilized. An initial report utilizing this technique in 18 ankle joints has previously been presented, and the current chapter represents our further experience with this technique. The patient's age and mobility of the foot were also carefully analyzed, since these factors have not been clearly delineated in the literature [1, 7, 10, 14].

25.2 Materials and Methods

The current study represents a follow-up of patients between January 1990 and January 1995. Review of the patients' charts at the time of their most recent follow-up produced 81 procedures in 77 patients, with a mean follow-up of 35 months (12–74 months). The study included 46 males and 31 females with a median age of 56 years (24–82 years). The most frequent diagnosis was post-traumatic arthrosis in 46, non-union in 12, primary arthrosis in 10, rheumatoid arthritis in 4, and 9 other miscellaneous diagnoses.

The chief complaint was pain in 67 ankles, followed by deformity in 10 and instability in 4. The patients' symptoms were present from 4.5 years to 8.3 years and 75% had tried an ankle-foot orthosis or similar brace for 1 year (6 weeks–15 years).

Radiographic union was stated to occur when osseous trabeculae were present across more than 50% of the joint in all three views [antero-posterior
At their last follow-up visit, radiographs in the sagittal plane with forced dorsiflexion and plantar flexion were obtained to establish the degree of sagittal plane motion.

25.3 Operative Technique

The procedure was performed through a transfibular approach, with the incision starting approximately 10 cm proximal to the tip of the fibula, and carried distally towards the base of the fourth metatarsal. A full thickness flap of skin was created dorsally and plantarward, through which the distal tibia and ankle joint was exposed anteriorly and posteriorly. Distally, the sinus tarsi and posterior facet of the sub-talar joint were exposed. The fibula was removed approximately 1.5 cm proximal to the ankle joint. A distal tibial cut was made perpendicular to the long axis of the tibia, approximately 2 mm above the dorsal surface of the ankle joint. The foot was placed into a plantigrade position of 0° of dorsiflexion, E-W of valgus, and rotation to match the contralateral side. The proximal portion of the talus was cut parallel to the tibial cut, removing approximately 3 mm of talus. The two flat surfaces were opposed and, if there was any distraction, the medial malleolus was exposed through an anteromedial approach, the deltoid ligament carefully removed from the medial malleolus to protect its blood supply and the distal centimeter of bone removed. The amount of medial malleolus removed depended on the degree of shortening necessary to obtain apposition of the tibia and talus. In some cases with severe post-traumatic deformity, the entire medial malleolus was removed in order to realign the foot under the long axis of the tibia.

Fixation was achieved utilizing two 6.5-mm partially threaded cancellous screws. The arthrodesis site was first stabilized by two 065-K wires, after which one screw was placed in the sinus tarsi area through the neck of the talus and angled as far proximally as possible and through the cortex on the medial side of the tibia. A second hole was placed in the lateral process of the talus as parallel as possible to the first screw and, again, penetrating the cortical surface of the distal tibia.

By placing the screws in this manner, inter-fragmentary compression of the talus against the tibia could be achieved through the cortical purchase of the screws. In four ankles, a third screw was utilized for fixation if the rigidity of the construct at the time of surgery was not deemed to be satisfactory. As a general rule, no iliac-crest bone graft was utilized in this series unless a major reconstructive procedure was undertaken.

The post-operative care included a short-leg, non-weight-bearing cast for 6 weeks and was followed by a short-leg, weight-bearing cast until fusion was complete.