ARTHROSCOPIC ANKLE ARTHRODESIS

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We performed arthrodesis of the ankle in eight patients by arthroscopic joint excision and fixation with crossed tibiotalar compression screws. Two patients had rheumatoid arthritis and six had post-traumatic osteoarthritis. None had a serious deformity of the ankle. Clinical ankylosis was achieved in all cases and there was radiological evidence of bone fusion in four.

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A new approach to intra-articular arthrodesis of the ankle is described using arthroscopic visualisation and instrumentation of the joint.

PATIENTS AND METHODS

Five men and three women underwent arthroscopic ankle arthrodesis. Their ages ranged from 31 to 67 years (average 51). Two had rheumatoid arthritis; the other six had osteoarthritis after previous injury to the ankle joint.

The indication for surgery was pain localised in the ankle joint caused or exacerbated by activity. All patients had experienced pain relief while wearing a below-knee walking plaster to immobilise the ankle for three weeks. Only if this measure eliminated the pain while walking were patients considered suitable for arthrodesis.

Operative technique. The operation is performed under general anaesthesia with a thigh tourniquet in place and the leg exsanguinated. Two non-threaded Steinmann pins are inserted, one through the distal tibia 3 cm above the joint and the other through the body of the calcaneum. A Charnley clamp is fitted, with the butterfly screws between the Steinmann pins, so that on turning the screws the pins and the joint are distracted.

The joint is distended with saline injected through an 18-gauge needle inserted anteriorly. The injection continues until the joint is visibly distended; 10 to 15 ml are usually required.

The arthroscopic portals used are the anteromedial and anterolateral. The former is medial to the tendon of tibialis anterior. Care is taken to avoid the long saphenous vein lying anterior to the medial malleolus. The anterolateral portal is just lateral to the tendons of extensor digitorum longus and peroneus tertius. A third portal is necessary in some cases to improve access, either the anterocentral or the posteromedial. The portals are incisions 1 cm in length, made with a number 11 blade. Vertical incisions are made to maximise access and to reduce the risk of neurovascular damage.

A 4.0 mm, 30° arthroscope is used to give a wide view of the joint. An 18-gauge needle is placed in the joint in the anterocentral position and is allowed to drain freely. A rapid flow of irrigation fluid is essential and this is provided from a three-litre bag of saline suspended at least two metres above the floor. No additional pump or suction devices are required to maintain a clear view in the joint.

Removal of the remnants of articular cartilage and abrasion of the underlying bone surfaces are usually possible throughout the entire joint from these approaches using a small curette and an air-powered rotary osteotome. The procedure is facilitated by interchange of the instrument and the arthroscope between the two anterior portals.

When all the articular surfaces have been satisfactorily prepared, the screws on the Charnley clamp are removed and reapplied to allow compression of the joint. At this stage the position of the foot must be carefully assessed. We aim to fuse the joint with the foot in neutral flexion, minimal valgus and 5° of external rotation. When this position has been achieved, and secured by the clamps, two partially-threaded 6.5 mm cancellous screws are inserted between the talus and the tibia in a crossed configuration. In order for them to apply compression, the first screw is fully tightened before inserting the second. The screws are inserted in a distal to proximal direction into the talus and then into the tibia. They cross at the level of the joint line (Fig. 1). At this stage of the procedure it is essential to use an image intensifier to ensure correct positioning of the screws.

Postoperatively, the patients spent no more than two days in hospital, followed by a period of six weeks in a plaster cast. The plaster was changed after three weeks as the swelling diminished. For the first four weeks the
patients did not bear weight, but for the last two weeks they were allowed partial weight-bearing with crutches. After removal of the plaster they were instructed to continue partial weight-bearing for a further four weeks.

The first three patients in the series had the Charnley clamp removed at the time of the first plaster change. This required a second anaesthetic. In the last five patients we removed the clamp at the completion of the surgical procedure.

RESULTS
The average follow-up of our eight patients was 24 months from operation (16 to 32) and all of them have clinical evidence of a painfree ankylosis or arthrodesis.

Seven had a radiograph of the ankle taken at the most recent review. The radiographs show sound bone fusion in four and fibrous union in three (Fig. 2). There have been no complications.

To date only four patients have had the screws removed. We had planned to remove all the screws because we expected that the screw heads would cause discomfort, but this has not occurred in any patient.

DISCUSSION
Many different techniques of arthrodesis have been described to treat post-traumatic degenerative arthritis and rheumatoid arthritis of the ankle and others have been developed to correct gross deformities in conditions.
such as poliomyelitis and tuberculosis. In our experience, however, these conditions are rare indications nowadays for this procedure. The results of arthroplasty for the osteoarthritic ankle have been disappointing, most authors reporting high failure rates after relatively short periods (Bolton-Maggs, Sudlow and Freeman 1985). The results of arthroplasty have been better in rheumatoid arthritis (Lachiewicz, Inglis and Ranawat 1984) and in these patients fusion of the ankle is thought to hasten deterioration in the ipsilateral knee and forefoot (Hamblen 1985).

The reported fusion rates for different techniques of arthrodesis have varied from 100% in some smaller series, down to between 89% and 60% in others. Factors which lead to a high rate of nonunion are fixed ankle deformities and poor-quality soft tissues around the joint (Scranton, Fu and Brown 1980).

In our small group of patients we achieved a high rate of fusion, but the technique was used only on patients with slight deformities. The presence of avascular necrosis of the dome of the talus is a further contraindication to this technique. The principal limitation of the method is the inability to alter the position of the foot because of the small amounts of bone resected from the joint surfaces. In all our cases it was possible to place the foot in the optimal position for fusion as recommended by Buck, Morrey and Chao (1987). The advantages are that the method is less painful than an open procedure and requires a shorter period in hospital. Conservation of the malleoli retains stability in the fused joint and provides a good cosmetic result. There is minimal loss of length in the limb and the patient is able to wear normal shoes.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

REFERENCES