INFERIOR TIBIO-FIBULAR DIASTASIS TREATED BY CROSS SCREWING

M. G. H. SMITH, GLASGOW, SCOTLAND

From the Orthopaedic Department, Western Infirmary, Glasgow

A study has been made of diastasis of the inferior tibio-fibular joint treated by cross screwing in an attempt to clarify the apparent contradictions associated with this procedure.

Close (1956) and Grath (1960) showed that during the movement of dorsiflexion two types of movement occur at the ankle joint. The first is a spreading apart of the malleoli with a lateral movement of the fibula from the tibia—mainly when the foot moves from full plantar flexion to the neutral position: the second movement is lateral rotation of the fibula in relation to the tibia. Close (1956) recommended the removal of screws that had been placed across the joint to maintain reduction of diastasis, before movement was allowed, because the screws broke when left in position. Alldredge (1940), Lee and Horan (1943) and Bonnin (1950) concurred with this, and Burns (1942) said that when bolts were used they had to be removed before full dorsiflexion could occur. On the other hand Costigan (1953) and Mullins and Sallis (1958) reported patients from whom the screws were not removed and in whom no loss of dorsiflexion was found.

Grath (1960) in a large number of patients found no difference in the range of movement between those treated with internal fixation and those without.

MATERIAL

Twenty-three patients with fracture dislocation of the ankle joint treated with a cross screw across the lower tibio-fibular joint were reviewed out of a total of forty-three such patients seen in the Orthopaedic Department of the Western Infirmary, Glasgow. The other twenty patients could not be traced. The ages varied from thirteen to sixty-eight years, the average being forty-two years. The time between injury and review varied from seven months to eight years. Fifteen patients were reviewed more than two years after operation, and only five were seen less than a year after operation.

In twenty-two patients the reduction of the diastasis was maintained by standard Vitallium bone screws and, in one patient, by a stainless steel lag screw. Thirteen patients had other operative procedures to the medial side of the ankle joint, including six patients in whom the medial malleolus was held in place by a screw.

The cross screw was usually inserted either horizontally or slightly obliquely upwards, one to two centimetres above the level of the ankle joint, and with the foot held in the neutral position.

RESULTS

As well as a clinical examination, each patient had radiographs of both ankles which included lateral radiographs, taken with the ankles in the greatest dorsiflexion possible. The extreme range on the injured side was expressed as a percentage of that found on the normal side.

Eighteen of the twenty-three patients had slight induration of the anterior aspect of the inferior tibio-fibular joint, which was not tender, and the other three had generalised swelling of the ankle. None of the patients had more than trivial complaints regarding the ankle and none had symptoms referable to the screw, but two patients had previously had the screws removed for such symptoms, with relief: one of these patients did not improve a restricted range of dorsiflexion thereafter.
Eight patients had clinical and radiological limitation of dorsiflexion to less than 75 per cent of the normal side.

Twenty-two patients had resorption of bone about the screw (Fig. 1), most marked in the fibula, and the remaining patient had broken the screw. Serial radiographs of five patients indicated that the bone resorption took place between two and four months after operation.

There was no evidence of bone resorption around other screws, such as those used in the medial malleolus (Fig. 1). Only two patients had slight recurrence of the diastasis.

Spur formation at the anterior—and occasionally posterior—articular margins of the tibia and the talus was found frequently and in two patients, with severely limited dorsiflexion, impingement of the spurs was shown radiographically (Fig. 2). Dorsiflexion was severely limited in both.

DISCUSSION

The induration over the anterior aspect of the inferior tibio-fibular joint was caused by the natural repair processes. The presence of bone resorption about the cross screw and the absence of a similar reaction about other screws used for internal fixation suggest that it had been caused by a slight movement between the bone and the screw.

In correlating spur formation at the articular margins of the ankle and the limitation of dorsiflexion, two patients were excluded because the limitation of dorsiflexion was readily accounted for by severe osteoarthritis secondary to an imperfectly reduced tri-malleolar fracture in one and, in the other, by an abnormal formation of the tibia in a patient with osteogenesis imperfecta. Spur formation at the anterior articular margin of the tibia and talus was found in fourteen of the twenty-one patients and this was severe in five out of the eight patients in whom the range of dorsiflexion was less than 75 per cent of the range of the normal ankle. The other three of these eight patients had slight spur formation. The range of dorsiflexion was 75 per cent of normal, or more, in thirteen patients, and there was slight spur formation only in six. The finding of eight out of twenty-one patients with less than 75 per cent of the normal range of dorsiflexion compares with that of Grath (1960). This
suggests that the presence of severe anterior bone spur formation influences the range of dorsiflexion. Other factors, such as the length of time after injury, or occupation, were found to have no correlation with the limitation of movement.

SUMMARY
1. Twenty-three patients were treated by cross screwing for diastasis of the tibia and fibula in fractures at the ankle.
2. It is suggested that limitation of ankle dorsiflexion after this treatment was caused by the presence of a mechanical block to dorsiflexion by spur formation at the margins of tibia and talus.
3. An ordinary bone screw controlled the diastasis satisfactorily in twenty patients.
4. The screw did not interfere with movement at the inferior tibio-fibular joint because bone resorption about that part of the screw in the fibula allowed a small range of movement.
5. Discomfort from the screw was relieved by its removal.

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REFERENCES