COMPARISON OF TWO CONSERVATIVE METHODS OF TREATING AN ISOLATED FRACTURE OF THE LATERAL MALLEOLUS

A. M. PORT, J. L. McVIE, G. NAYLOR, D. N. KREIBICH

From Sunderland District General Hospital, England

We compared two conservative methods of treating Weber B1 (Lauge-Hansen supination-eversion 2) isolated fractures of the lateral malleolus in 65 patients. Treatment by immediate weight-bearing and mobilisation resulted in earlier rehabilitation than immobilisation for four weeks in a plaster cast. There was no significant difference in the amount of pain experienced or in the requirement for analgesics and early mobilisation was not associated with any complications. We therefore advocate early mobilisation for these stable ankle fractures.

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Isolated fractures of the lateral malleolus of the type classified by Lauge-Hansen (1956) as a supination-eversion stage 2 or in Weber’s (1966) anatomical classification as B1 (Fig. 1) comprise up to 40% of all ankle fractures (Ryd and Bengtsson 1992). Treatment varies from open reduction and internal fixation to restore anatomical alignment (Cedell 1967; Lindsjö 1981) to wearing a below-knee walking plaster for an average of six weeks (Bauer, Jonsson and Nilsson 1985; Kristensen and Hansen 1985) or functional management by an ankle brace (Stuart, Brumby and Smith 1989).

It has been suggested, however, that these fractures can be treated equally well by simple measures such as strapping (Ryd and Bengtsson 1992). We have therefore performed a prospective trial to compare two conservative methods of management.

PATIENTS AND METHODS

Between October 1993 and October 1994, we studied 65 patients with fractures of the lateral malleolus who attended the Accident and Emergency Department of Sunderland General Hospital. We excluded those with medial tenderness or swelling which raised the possibility of injury to the deltoid ligament and a potentially unstable B2-type bimalleolar injury (supination-eversion 4; Fig. 2). We also excluded skeletally immature patients, those with previous ankle trauma, and those with weakness or possible difficulty in using walking aids.

All the ankles were treated initially by the application of a plaster backslab and the patients were reviewed in a...
fracture clinic 24 hours after injury. They were then allocated to one of two treatment groups according to the routine practice of the consultant on call for that particular week. This did not involve a change in practice of the consultants concerned in the management of these injuries, and therefore approval of the ethical committee was not required.

*Group 1* was 35 patients who had a full plaster cast applied below the knee when the soft-tissue swelling had subsided at between one and seven days. The casts were removed four weeks later and physiotherapy begun. The 30 patients in *group 2* were given an elasticated support bandage and advice on the application of ice and the use of elevation. They had early mobilisation with the help of physiotherapy. Both groups were given analgesics and encouraged to bear weight on the injured ankle as soon as the pain allowed.

All patients were reviewed in a dedicated clinic and radiographs obtained at one week after injury and then at monthly intervals until three months and finally at six months if they still had symptoms. From five weeks onwards symptoms and function were assessed using the scoring system of Olerud and Molander (1984) (Table I). Patients treated in plaster had this removed one week before the first functional assessment. Pain was measured using a visual analogue scale and the amount and nature of analgesics required were recorded. The calf and malleolar circumferences were measured on each side to assess swelling, and joint mobility estimated by a goniometer attached to a foot pedal in an attempt to isolate true ankle movement (Rowley, Norris and Duckworth 1986).

The continuous variables were analysed between groups using Student’s two-sample *t*-test. Categorical variables were analysed between groups using the chi-squared test.

**RESULTS**

All patients were reviewed at one week, but five were later lost to follow-up. Two of them had initially been treated by immobilisation and three by elasticated stockings; all five
were excluded from subsequent analysis. No patient declined participation in the trial. After five weeks 33 patients in the plaster group and 27 in the mobilised group were available for assessment. There were no significant differences between the groups in age, gender or side (Table II). Figure 3 and Table III record the visual analogue pain scores during weight-bearing and show no significant difference between the groups. Patients in the mobilised group had significantly fewer symptoms related to their ankle with significantly higher Olerud scores up to three months after injury (Fig. 4 and Table IV). There was no significant difference between the groups at six months. Although the mobilised group required less analgesia the difference was not significant (Table V). At one week a third of the patients treated by strapping were able to walk without the use of walking aids compared with only 15% of the immobilised group.

The range of movement at the ankle was significantly better in the mobilisation group after one (p < 0.001) and two months (p < 0.01), but later there were no significant differences (Fig. 5 and Table VI). Measurement of calf and ankle swelling showed no differences between the two groups at any stage.

There was no significant difference in sick leave between those treated in a cast and the group with a support bandage.
(6.5 v 5.7 weeks) but the number in work (11) was not sufficient to allow statistical comparison.

One fracture in the immobilised group showed radiological evidence of nonunion at six months, but was free from symptoms. There was no evidence of malunion or shortening of the fibula.

**DISCUSSION**

Lauge-Hansen (1950) believed that a supination-eversion injury produces a predictable and sequential failure of structures around the ankle. In a type-II injury (Weber B1) the first structure to give way is the lateral malleolus. There is an associated tear of the anterior tibiofibular ligament, and a spiral fracture line extending between the anterior and posterior tibiofibular ligaments. In contrast, in a Weber type-C injury of pronation-eversion, the medial structures fail first either by rupture of the deltoid ligament or avulsion of the medial malleolus. When this has occurred the damage may extend with rupture of the tibiofibular ligaments and interosseous membrane, ending in a spiral fracture of the fibula above the inferior tibiofibular syndesmosis.

Proponents of open reduction and internal fixation suggest that restoration of the normal anatomy will reduce the risk of subsequent osteoarthritis due to incongruency. Michelson et al (1992), however, have shown by using CT that the apparent displacement and external rotation of the distal fragments are actually due to internal rotation of the proximal part of the fibula. The talofibular articulation is commonly normal, which is to be expected since the talofibular and calcaneofibular ligaments are unaffected by this injury.

Clinical studies have consistently failed to show any difference in outcome between fractures treated operatively and those managed conservatively. Yde and Kristensen (1980) compared operation using AO techniques with closed treatment and immobilisation in a plaster cast. They found no difference in outcome at a minimum follow-up of three years. Bauer et al (1985) and Kristensen and Hansen (1985), in separate papers, published 30-year retrospective studies which showed that closed treatment did not carry any appreciable risk of arthritis. More recently, Stuart et al (1989) have demonstrated that functional bracing is preferable to treatment in plaster in terms of comfort and speed of rehabilitation. Such braces, however, are expensive and not widely available.

Our experience has shown that early mobilisation with an elasticated support was associated with a shorter period of rehabilitation, a significant improvement in the range of movement in the first two months, and fewer symptoms attributable to the ankle in the first three months. We found no significant difference in the amount of pain experienced. Our follow-up was short, and it may be that later review would show a difference in outcome, but published experience of this type of fracture suggests that it has a benign long-term outcome.

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**REFERENCES**


