Isolated fracture of the lateral malleolus requires no treatment

49 prospective cases of supination-eversion Type II ankle fractures

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54 patients with isolated SE II fractures through the lateral malleolus, with 2 mm maximum dislocation, were treated with an elastic bandage and immediate weight bearing. 2 patients suffered dislocation but both should not, on reassessment, have been included in the study. 49 of the remaining patients were assessed after an average of 1.5 years. All but 4 patients had very minor, if any, symptoms. The average sick leave was 6.3 weeks and the patients were back to normal activity in about 4 months. This virtual nontreatment was safe and beneficial to both the patients and the health service.

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Isolated fracture through the lateral malleolus of the supination-eversion type, SE II according to Lauge-Hansen (1954), comprises between 20 and 40 percent of all ankle fractures (Cedell 1967, Lindsjö 1981, Bauer et al. 1987). At our department, the principles of treatment by Cedell's (1967) method, i.e., operative fixation, have been implemented. Others, however, have considered the fracture through the lateral malleolus to be stable (Wilson 1975) and conservative treatment to be equally satisfactory (Burwell et al. 1965, Yde et al. 1980). Bauer et al. (1985b) have shown that, in the isolated fracture through the lateral malleolus, a residual displacement of up to 3 mm is quite compatible with good results and that arthrosis does not develop even after 30 years. We have therefore attempted to treat cases of isolated fracture through the lateral malleolus with only an elastic bandage and early weight bearing, amounting to virtual nontreatment.

Patients and methods

From March 1988 through January 1990, patients with a fresh fracture through the lateral malleolus of the SE-II type (Lauge-Hansen 1954), with a maximum displacement in either the frontal or lateral radiogram of 2 mm and with closed physes were included in this study. No or only minimal pain on the medial side was also a prerequisite, safeguarding against a ligamentous SE IV injury of the deltoid ligament. 54 patients (21 men and 33 women) with a mean age of 50 (14–89) years were identified. The study was consecutive, and all patients who met the inclusion criteria were entered without any further selection.

The patients had an ordinary elastic bandage, were given crutches for pain relief, and were told to start weight bearing as soon as possible. The study was prospective; the patients were followed after 1 and 6 weeks and after 3 months; radiograms of the ankle were obtained after 1 week and 3 months; the activity level prior to injury, modified according to Tegner and Lysholm (1985), was recorded. The Tegner scale assesses activity in 10 increments and is heavily focused on sport activity. It was modified to a state where level 1 represented the ability to walk 500 m with difficulty, level 5 represented light work and the ability to jog 1–3 km, level 8 represented recreational racket sports and level 10, finally, represented elite athletics. One patient was an elite athlete while 2 belonged to level 1 with an even distribution of the remaining 51 patients between the other eight levels. At each examination the ankle circumference was measured. Range of motion was recorded in the weight-bearing position using a goniometer and was compared to the normal ankle. The global status of the ankle joint was registered on a Visual Analog Scale (VAS). Furthermore, the Olerud score (Olerud et al. 1984), compiled from subjective data such as pain and ability to walk, run and jump, as well as semi-objective data such as stiffness (yes/no) and swelling (constant/evenings only/no) was used. After a mean of 18 (12–42) months a questionnaire was sent to the patients. From the questionnaire data for the Olerud score were obtained (semi-quantitative but objective

Table 1. VAS and Olerud scores of 49 SE II fractures treated conservatively. Mean *SD*

	VAS		Olerud
1 week	43 *25*	$P < 0.01$ [b]	24 *16*
	$P < 0.001$ [a]		$P < 0.001$ [b]
6 weeks	78 *19*	$P < 0.001$ [b]	58 *18*
	$P < 0.002$ [a]		$P < 0.001$ [b]
3 months	90 *11*	$P < 0.005$ [b]	80 *20*
	NS [a]		$P < 0.001$ [b]
1.5 years	95 *10*		95 *10*

[a] paired t-test, [b] Wilcoxon rank sum test.

data were taken as their subjective equivalents relative to the contralateral side). The VAS results, the total sick leave and the time until full activity was reached also were recorded.

3 patients were unable to answer the questionnaire; 2 had died and 1 had suffered a cerebral hemorrhage, and are not further included in this report. 2 patients had displacement of the fracture and were excluded from further treatment according to the protocol. The report on the late results thus includes 49 patients.

Results

The results were generally good at the final follow-up with a mean Olerud score of 95 (45–100); 46 of the patients had a score > 80 and only two patients had a score < 70; 39 patients were excellent, 8 were good, two were fair and none were poor by Olerud's criteria (1984). There was an excellent agreement between the Olerud score and the VAS reading at the final follow-up, but in the early stages the VAS reading gave better values (Table 1). The injured ankle rapidly recovered normal motion; at the final follow-up few patients complained of stiffness or swollen ankle joints.

Age did not affect the results at final follow-up. However, women had a mean Olerud score of 92 versus 98 in men ($P = 0.01$, Mann-Whitney U). The difference regarding VAS score did not reach a significant level. The pre-injury activity level also proved prognostic; patients with a higher activity level fared better at final follow-up than did more sedentary patients as indicated by the Olerud score ($P = 0.04$, Spearman *Rho*); the difference measured by the VAS scale was not significant.

The mean sick leave was 6 (0–20) weeks while the time to complete recovery, i.e., back to normal activity including athletics, was about twice as long, 14 (4–26) weeks. Age, gender, and activity level did not influence the speed of recovery.

Complications

2 patients suffered a redislocation, diagnosed at the 1-week radiographic examination, and they were excluded from further treatment according to the protocol. The first (woman, aged 81 years) had an initial displacement of 3 mm on reassessment of radiographs. She was treated with closed reduction and plaster for 6 weeks; at final follow-up she could not tell the injured ankle from the noninjured one (VAS 100). The second patient (woman, aged 75 years) had considerable tenderness on the medial side suggesting rupture of the deltoid ligament. She was operated on according to the routines at our department (Cedell 1967), and at the final follow-up she had considerable complaints concerning the injured ankle.

A third patient was initially treated at another hospital. After having had the plaster removed at our emergency department two days later, she felt so vulnerable that she requested plaster treatment for an additional two weeks. At the final follow-up this patient had very minor complaints only (VAS 95).

Discussion

The results of this study were judged to be encouraging. Some cases had residual complaints but this was the case in other studies as well, even after operative treatment (Vasli 1957, Cedell 1967, Bauer et al. 1985a), and symptoms are not uncommon also when exact reduction has been accomplished (Lindsjö 1981). In his large study of 791 nonoperatively treated ankle fractures, Magnusson (1944) had 118 isolated lateral fractures, 10 percent of whom had continuous pain. He stated that approximately 1/3 of his cases of isolated fracture through the lateral malleolus developed arthrosis; however, only one case was worse than "slight narrowing of the joint space"; he found no correlation between arthrosis and clinical results. Cedell (1967) operated on his cases and found one case of arthrosis among 38 SE II fractures and two cases clinically less than "good", corresponding to the one "fair" case in our study. In a comparative study on conservatively and surgically treated fractures through the lateral malleolus, no difference was found after a minimum follow-up of 3 years despite the fact that 25 out of 35 conservatively treated cases had a "poor" radiographic result; "conservative treatment" was equivalent to 6–8 weeks of plaster treatment (Yde et al. 1980). Since other studies have indicated that the fracture through the lateral malleolus is stable (Wilson 1975) there was sufficient support for the study presented here.

Prior to initiation of this study, possible randomization against a control group was discussed. Since, however, residual dislocation is often present after the Cedell operation (Cedell 1967, Bauer et al. 1985, Olerud et al. 1986), which is the routine at our department, and since exact reduction and osteosynthesis according to AO have not been implemented, prospective comparison with operative treatment seemed redundant. The treatment given in this study differed from previous ones (Yde et al. 1980) in that "conservative treatment" was really no treatment at all. The patients were given an elastic bandage and crutches for pain relief but were told to bear weight as soon as possible in much the same way as ankle sprains are treated at our department. The additional benefits from this, apart from not having to go through an operation, are faster mobilization, less joint stiffness, and shorter periods on sick leave. Some patients complained that their ankle felt unprotected, especially when they were in contact with children. For this reason a plastic support, allowing motion, may be indicated, but it is not needed for other reasons.

In 2 cases, there was a further dislocation at the 1-week follow-up. Both cases, however, should not have been included in the study, one because of an initial dislocation which was too large and the other because of medial tenderness. In ankle fractures, ligamentous parts of the injury are radiographically silent and an apparently innocent SE II fracture may in reality be a highly unstable SE IV fracture. At the moment of injury the only way the lateral malleolus will be displaced is by being pushed laterally and posteriorly by the talus. It is known that the intact deltoid ligament allows a lateral dislocation of the talus up to 2 mm (Grath 1960). A larger dislocation of the distal fragment than 2 mm is then an indication that the talus, at the time of injury, made a larger excursion than the deltoid ligament allows, i.e., the ligament has ruptured and a SE IV type injury is at hand. This is probably the reason for failure in these cases and it is therefore imperative that patients with tenderness on the medial side and/or a dislocation > 2 mm be treated preferably with surgery so as to prevent further dislocation. It is obvious that the reverse is not necessarily true; a dislocation less than 2 mm does not preclude a medial injury.

Many authors have stressed the importance of exact reduction of ankle fractures (Proctor 1954, Burwell and Charnley 1965, Yablon et al. 1977, Huges et al. 1979, Lindsjö 1981). However, Bauer et al. (1985) did not find a dislocation of up to 3 mm to be associated with the development of arthrosis and residual symptoms, even after as long as 30 years. Apart from dislocation, the type of fracture is the second most important factor correlating to residual symptoms (Lindsjö 1981). It thus seems that the two most decisive factors are either beyond the surgeon's control or are irrelevant concerning the specific SE II type fracture, which, as this study has shown, can be treated extremely conservatively, if the dislocation does not exceed 2 mm and there is no medial tenderness. Such virtual nontreatment of SE II fractures is safe and gives good results in terms of residual problems. The treatment is highly appreciated by the patients who can return to work after 6–7 weeks, which is about half of that after an operation (Cedell 1967). They can also return to sports in a much shorter time than after conventional plaster or operative treatment. The SE II fracture constitutes a large proportion of all ankle fractures; our simple treatment regimen should therefore benefit not only the patient but also strained emergency resources.

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References

Bauer M, Bergström B, Hemborg A, Sandegård J. Malleolar fractures: nonoperative versus operative treatment. A controlled study. Clin Orthop 1985a; 199: 17–27.

Bauer M, Jonsson K, Nilsson B. Thirty year follow up of ankle fractures. Acta Orthop Scand 1985b; 56 (2): 103–6.

Bauer M, Bengnér U, Johnell O, Redlund Johnell I. Supination eversion fractures of the ankle joint: changes in incidence over 30 years. Foot Ankle 1987; 8 (1): 26–8.

Burwell H N, Charnley A D. The treatment of displaced fractures at the ankle by rigid internal fixation and early joint movement. J Bone Joint Surg (Br) 1965; 47 (4): 634–60.

Cedell C A. Supination outward rotation injuries of the ankle. A clinical and roentgenological study with special reference to the operative treatment. Acta Orthop Scand (Suppl 110) 1967.

Grath G B. Widening of the ankle mortise. Acta Chir Scand (Suppl 263) 1960.

Hughes J L, Weber H, Willenegger H, Kuner E H. Evaluation of ankle fractures: non–operative and operative treatment. Clin Orthop 1979; 138: 111–9.

Lauge-Hansen N. Fractures of the ankle. III. Genetic roentgenologic diagnosis of fractures of the ankle. Amer J Roentgenol 1954; 71: 456–71.

Lindsjö U. Operative treatment of ankle fracture. Acta Orthop Scand (Suppl 189) 1981; 52: 36.

Magnusson R. On the late results in non-operated cases of malleolar fractures. Acta Chir Scand (Suppl 84) 1944.

Olerud C, Molander H. A scoring scale for symptom evaluation after ankle fracture. Arch Orthop Trauma Surg 1984; 103 (3): 190–4.

Olerud C, Molander H, Olsson T, Hagstedt B. Ankle fractures treated with non-rigid internal fixation. Injury 1986; 17 (1): 23–7.

Proctor H. Lateral rotation fracture dislocation of the ankle. J Bone Joint Surg (Br) 1954; 36: 148.

Tegner Y, Lysholm J. Rating systems in the evaluation of knee ligament injuries. Clin Orthop 1985; 198: 43–9.

Vasli S. Operative treatment of ankle fractures. Acta Chir Scand (Suppl 226) 1957.

Wilson F C. Fractures and dislocations of the ankle. In: Fractures (Eds. Rockwood, C. A, Green, D. P.). J B Lippincott Co, Philadelphia 1975; 2: 1361–99.

Yablon I G, Heller F G, Shouse L. The key role of the lateral malleolus in displaced fractures of the ankle. J Bone Joint Surg (Am) 1977; 59 (2): 169–73.

Yde J, Kristensen K D. Ankle fractures. Supination eversion fractures stage II. Primary and late results of operative and non-operative treatment. Acta Orthop Scand 1980; 51 (4): 695–702.