



Contents lists available at [ScienceDirect](#)

Foot and Ankle Surgery

journal homepage: www.elsevier.com/locate/fas



The functional outcome and quality of life after treatment of isolated medial malleolar fractures

Sini Hanhisuanto MD*, Tero Kortekangas MD, Harri Pakarinen MD, PhD,
Tapio Flinkkilä MD, PhD, Hannu-Ville Leskelä MD, PhD

Oulu University Hospital, Department of Surgery, Division of Orthopedic and Trauma Surgery, Oulu, Finland

ARTICLE INFO

Article history:

Received 1 April 2016

Received in revised form 5 June 2016

Accepted 5 June 2016

Keywords:

Medial malleolar fracture

Medial malleolus

Ankle fracture

Functional outcome

ABSTRACT

Background: The optimal treatment of isolated medial malleolar fractures is widely debated. The aim of this study is to analyse the different treatment methods.

Methods: The study included 137 patients with an isolated medial malleolar fracture treated at our hospital between 2000 and 2010. Functional outcome was assessed using Olerud–Molander score and health-related quality-of-life (HRQoL) was measured with RAND36 item health survey. Patients were sent follow-up questionnaires after an average of 9.5 years (4.3–15.2) from the date of treatment.

Results: The overall improvement in function was equivalent in both operative and non-operative treatment groups. However, the outcome scores declined in both groups as the primary displacement increased, regardless of the treatment method. HRQoL was similar in both groups.

Conclusions: If maximal fracture displacement is ≤ 2 mm, isolated medial malleolar fractures can be treated non-operatively with good outcome, but the operative treatment may also be performed without serious complications. The degree of fracture displacement is an independent risk factor for inferior functional result, regardless of the treatment method.

Level of evidence: Therapeutic level of evidence: IV, retrospective cohort study.

© 2016 European Foot and Ankle Society. Published by Elsevier Ltd. All rights reserved.

1. Introduction

Isolated medial malleolar fractures account for 10% of all ankle fractures, with an incidence of 10–12/100,000 person-years [1–5]. Epidemiological characteristics [2,3] and the mechanism of injury [6] differ from those of the more common lateral malleolar fractures. Unlike the stable lateral malleolar ankle fractures, which are usually treated non-operatively [5–13], treatment of the less common medial malleolar fractures is still controversial [9,14,15]. Herscovici et al. [14] suggested that regardless of the degree of displacement, isolated closed medial malleolar fractures can be treated non-operatively with high union rate and good short term outcome. Medial malleolar fractures associated with bi- or trimalleolar fractures are typically surgically fixed to prevent non-union [15]. Research suggests, however, that minimally

displaced (< 2 mm) medial malleolar fractures with bi- or trimalleolar fractures do not need surgery if lateral or posterior malleolar fractures are fixed [16].

The congruity of the ankle mortise is crucial to tibiotalar joint function [17,18]. Even one millimetre of talar displacement can decrease the contact area in the tibiotalar joint by approximately 40% leading to post-traumatic osteoarthritis and poor recovery outcomes [19,20]. In a recent biomechanical study [18], the tibiotalar contact area reduced up to 42% when the specimens with medial malleolar fracture were loaded with coronal and sagittal forces. Clinical and biomechanical studies have shown that the medial side of the ankle is the primary source of stability of the ankle mortise [5,10,11,21,22]. Following research suggesting that all isolated displaced closed medial malleolar fractures can be treated nonoperatively with good results, our hospital's standard treatment protocol shifted away from operative treatments [14]. There is, however, no conclusive research on the effectiveness of operative as compared to non-operative treatment of isolated medial malleolar fractures. In this study we examined the mid-term functional outcome and quality of life following the operative and nonoperative treatment of fractures.

* Corresponding author at: Division of Orthopedic and Trauma Surgery, Department of Surgery, Oulu University Hospital, PL 21 90029 Oulu, Finland. Tel.: +358 8315 2352; fax: +358 8315 4499.

E-mail address: sini.hanhisuanto@ppshp.fi (S. Hanhisuanto).

<http://dx.doi.org/10.1016/j.fas.2016.06.004>

1268-7731/© 2016 European Foot and Ankle Society. Published by Elsevier Ltd. All rights reserved.

2. Materials and methods

2.1. Patients

A computer search of electronic patient records identified 137 skeletally mature patients with a history of isolated medial malleolar fracture treated at our hospital between the years 2000–2010. Twenty-four patients were excluded – seven patients had no primary radiographs, one did not appear for follow-up, 14 had died during follow-up due to causes unrelated to their ankle fractures, and two patients had congenital mental retardation and were unable to provide informed consent. The remaining 113 patients (83 male, 30 female, mean age 38 years [range 16–75]) were included in further analysis. The radiographs and patient records were retrospectively reviewed to classify fractures, measure primary displacement and the method of treatment, and identify any possible complications and re-operations. Additionally, we collected data on trauma mechanism, concomitant diseases, smoking and alcohol use (Table 1). First, the patients were contacted by phone to inform them about the on-study, and afterwards the questionnaires were sent by postal mail. Those patients who did not return the questionnaires were contacted by telephone and the same forms were completed during the interview. All protocols were approved by the local ethics committee.

2.2. Treatment methods

The senior orthopaedic trauma surgeon was responsible for the patient care and for the final decision of the method of treatment, based on plain mortise and lateral ankle radiographs, but also

Table 1
Demographics and treatments.

	Nonoperative	Operative	p [*]
Patients, n	53	60	ns
Male/female, n	38/15	45/15	ns
Age, mean (SD) range	37 (18) 16–75	38 (17) 16–75	ns
Follow up time, years, mean (SD)	9.0 (3.0)	9.9 (2.6)	ns
Co-morbidities, n (%)			
Arteriosclerosis obliterans	3 (6)	7 (12)	ns
Diabetes	4 (8)	4 (7)	ns
Smoking	4 (8)	10 (17)	ns
Alcoholism	5 (9)	4 (7)	ns
Hypertension	6 (11)	11 (19)	ns
Trauma energy, low/high	28/11	39/19	ns
Open fracture, n (%)	0 (0)	4 (7)	ns
Fracture classification, n (%)			
A	16 (30)	5 (8)	0.003
B	18 (34)	21 (35)	ns
C	7 (13)	16 (27)	ns
D	12 (23)	18 (30)	ns
Fracture displacement, n (%)			
0 mm	13 (25)	0	<0.001
1 mm	20 (38)	20 (33)	ns
2 mm	20 (38)	26 (43)	ns
3 mm	0	6 (10)	0.018
4 mm	0	4 (7)	ns
5 mm	0	2 (3)	ns
8 mm	0	2 (3)	ns
Additional operation, n (%)			
Mechanical irritation	0	2	ns
Deep infection	0	1	ns

ns, no statistically significant difference.
* Significance from χ^2 test.

regarding patient’s demands and expectations. The ankle mortise was evaluated from the primary radiographs, also lateral injury was examined by palpation. Proximal fibular fractures were excluded by palpating along the fibula and, if necessary, radiographs were taken to rule out high fibular fractures and potential unstable ankle mortise. Manual external rotation stress test was also carried out under fluoroscopy to exclude the instability of the ankle mortise if suspected. A total of 60 patients underwent operative treatment consisting of either open reduction and screw fixation (57 fractures), Kirschner wire and a screw (1 fracture), Kirschner wires only (1 fracture), or tension band-fixation (1 fracture). A short leg cast was applied to each patient on first postoperative day. Different weight-bearing protocols were used, varying from no-weight bearing to partial and full-weight bearing, depending on the surgeon’s preference. The cast was changed and the sutures removed two weeks post-operatively. At five to six weeks after the operation, the cast was removed, the ankle was examined; mortise and lateral plain radiographs were obtained. The physiotherapist then provided rehabilitation instructions for the patient. Further outpatient visits were scheduled as needed.

Fifty three patients were treated nonoperatively with a short leg cast for 5–6 weeks. Weight-bearing protocols varied depending on the surgeon’s preference. After two weeks, the cast was changed and mortise and lateral radiographs were taken to confirm alignment of the ankle mortise. A second follow-up visit was carried out five to six weeks after the initial trauma; the cast was removed and radiographs were obtained. The physiotherapist then provided rehabilitation instructions for the patient.

2.3. Fracture classification and radiographic measurements

The radiographs were analysed retrospectively by two independent researchers who were blinded to clinical outcome variables. The fractures were classified into four simple patterns (A–D) according to Herscovici et al. [14] (Fig. 1). The maximal fracture displacement of the fracture fragments was measured from digital radiographs (mortise view) using a diagnostic workstation. The measurements were calibrated using a constant 115 cm source-to-detector distance; in the operatively treated patients, the dimension of the head of the small fragment fixation screw (3.5 mm, Synthes) was used as an additional reference. Measurements were made to 1 mm accuracy. For inter-observer reliability, radiographic analyses were compared between investigators. For the intra-observer reliability analyses, one of the

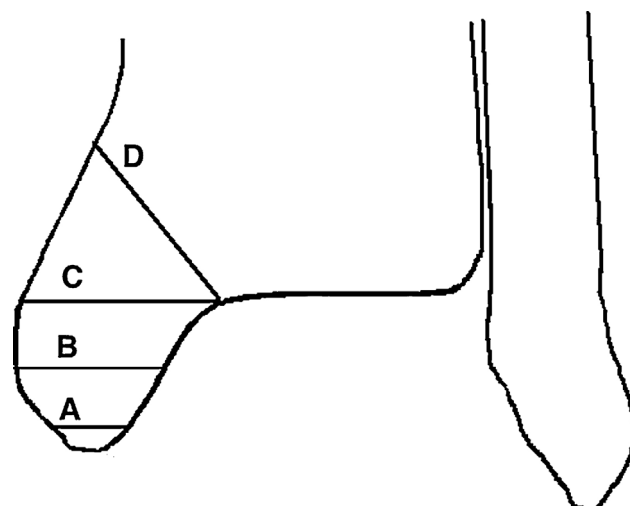


Fig. 1. Isolated medial malleolar fracture classification by Herscovici et al. [14].

Download English Version:

<https://daneshyari.com/en/article/8798251>

Download Persian Version:

<https://daneshyari.com/article/8798251>

[Daneshyari.com](https://daneshyari.com)