

Original Article

Better is the foe of good: Outcome of operatively treated ankle fractures in the elderly



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ARTICLE INFO

Keywords:

Ankle
Fracture
Surgical treatment
ORIF
Elderly

ABSTRACT

Background: Ankle fractures are the second most common fractures of the lower extremities. Nonetheless, no standardized treatment protocol for unstable ankle fractures of the elderly exists today. Choices to treat ankle fractures are debated controversially, including (1) conservative treatment, (2) open reduction and internal fixation (ORIF), and (3) primary hind-foot arthrodesis. This retrospective study aimed to examine the healing result in patients treated by ORIF after unstable ankle fractures.

Methods: The study was designed as a retrospective comparative series. The American Orthopaedic Foot and Ankle Society (AOFAS) score was followed to assess the postsurgical outcome. Data was obtained from 66 patients younger than 65 (median age, 42 years; range, 18–63) and 28 patients aged 65 or older (median age, 71 years; range, 65–81). The mean follow-up period for the younger-than-65 group was 48 months; for patients older than 65, it was 49 months.

Results: An AOFAS score of 86.4 in the older and 92.4 in the younger group was determined, p -value < 0.05. Elderly patients suffered from significantly more open-ankle fractures and comorbidities than the younger group did, p -value < 0.05 each. The duration of hospital stay and the time needed to reach sufficient self-mobilization were both significantly different between the two groups, p -value < 0.05.

Conclusion: ORIF treatment of ankle fractures resulted in good functional assessment after a mean follow-up of 49 months in the elderly. Pre-fracture health condition positively affected the healing results in younger patients. This study confirms the basic AO Foundation principles for good postsurgical results.

Level of evidence: Level III, retrospective comparative series.

1. Introduction

The overall incidence of ankle fractures exceeds 10% of all fractures [1]. Since the 1950s, numbers and incidence of ankle fractures have increased because of demographic changes in the Western world. An overall incidence of 126–169 per 100,000 people in the past decade is described. For example, incidence peaked in people older than 60 years in Finland, with 169 per 100,000 in 1997, which then declined to 126 per 100,000 in 2014 [1–3]. Despite the high frequency in the elderly and the socioeconomic impact, a standardized ankle fracture treatment continues to be debated. Healing of ankle fracture is negatively affected by comorbidities, such as peripheral vascular disease, diabetes mellitus,

or osteoporosis, and are more frequent in the elderly than in younger patients [4,5]. Conservative-treatment studies report better clinical results after 37.5 months or equivalent clinical results after 6 months, with fewer wound complications and less intervention cost [6,7]. To the authors' knowledge, no long-term follow-up of conservative treatment of ankle fractures in the elderly reports the consequences for not following AO foundation principles. However, better results from surgical treatment than from conservative treatment are still debatable [8–10].

Although postsurgical complications and functional assessment are important to study clinical results, complications of lower-limb injuries are less frequently considered, especially in the elderly. Several criteria can assess treatment results and the socioeconomic impact, such as (1)

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<https://doi.org/10.1016/j.foot.2018.04.002>

Received 7 December 2017; Received in revised form 8 April 2018; Accepted 18 April 2018

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self-sufficient mobilization, (2) time of recovery, (3) duration of physiotherapy (PT), and (4) duration of pain management.

This work identifies demographic data, comorbidities, and functional outcome at every follow-up examination. The study highlights clinical results after a long-term follow-up.

2. Patients and methods

The present investigation was approved by the responsible ethics committee of the physicians association of Westfalen-Lippe and the Westfälischen-Wilhelms-University under permit number 2012-143-f-S.

The study was designed as a retrospective comparative study and included subjects who underwent surgical treatment of ankle fractures between January 2003 and December 2010 at the Department of Trauma, Hand, and Reconstructive Surgery, University Hospital Muenster, Germany. The consenting subjects' medical records were reviewed for evidence of isolated, unstable ankle fractures. The subjects were asked to undertake a clinical examination of mobility and healing assessment.

Patients 18 years old or older were included in this study. Healthy volunteers were accepted, and no random sample was taken. Ankle fracture was considered unstable when a medial widening gap greater than 4 mm was measured on radiographs. Unstable fractures were investigated in bimalleolar and trimalleolar fracture patterns as well as in isolated lateral malleolar fractures.

Fracture types were determined according to the AO classification (Fig. 1). Surgical treatment aimed to restore bone morphology (anatomical reduction). Therefore, the included cases encompassed open reduction and internal fixation by using plates, screws, and K-wire fixation. Excluded cases encompassed conservative treatment, closed reduction, and external fixation with primary ankle arthrodesis.

After surgery, ankles were cast in plaster to replace orthosis. Mobilization of the patient started under supervision of a

physiotherapist. Patients maintained partial weight bearing of up to 20 kg on the injured lower extremity by using crutches or a walker for 6 weeks. Physical therapists instructed patients on active and passive range-of-motion exercises within their pain tolerance. Thus, the post-operative mobilization protocol followed the guidelines for the treatment of ankle fractures of the German Society of Trauma Surgery in the then-current version. At 6 weeks after surgery, patients were allowed to bear weight within their pain tolerance and offered referral to a physiotherapist. Patients who underwent syndesmotic screw fixation underwent screw removal 6 weeks after surgery as an outpatient procedure.

A follow-up period of at least 12 months post-surgery was needed to assess the functional outcome of fully consolidated ankle fractures. Associated injuries were not a reason for exclusion. A cut-off of 65 years between young and elderly was taken as the pensionable age in Germany and other industrial countries in the 2010s. The cut-off did not consider longer life expectancy and increased activity levels. Thus, using the age of 65 as cut-off, two cohorts of patients with surgically treated unstable ankle fractures were compared.

Patients were recruited through telephone conversations and written invitation. The enrolled patients were then educated in verbal and written form, and they signed a consent form, after which the American Orthopaedic Foot and Ankle Society (AOFAS) score was determined. Predisposing causes for poor surgical results were assessed. The study focused on comorbidities, which represent impaired vascular, neurological, and skeletal conditions for fracture healing such as arterial hypertension, diabetes mellitus, and osteoporosis.

Data was based on a patient survey, which was performed before examination. Further, medical records were consulted to extract information about diagnosed diseases. Besides this, the ankle-brachial index (ABI) was measured in the follow-up examination to determine possible peripheral arterial occlusive disease (PAOD).

Assessments of functional status, recovery time, duration of pain

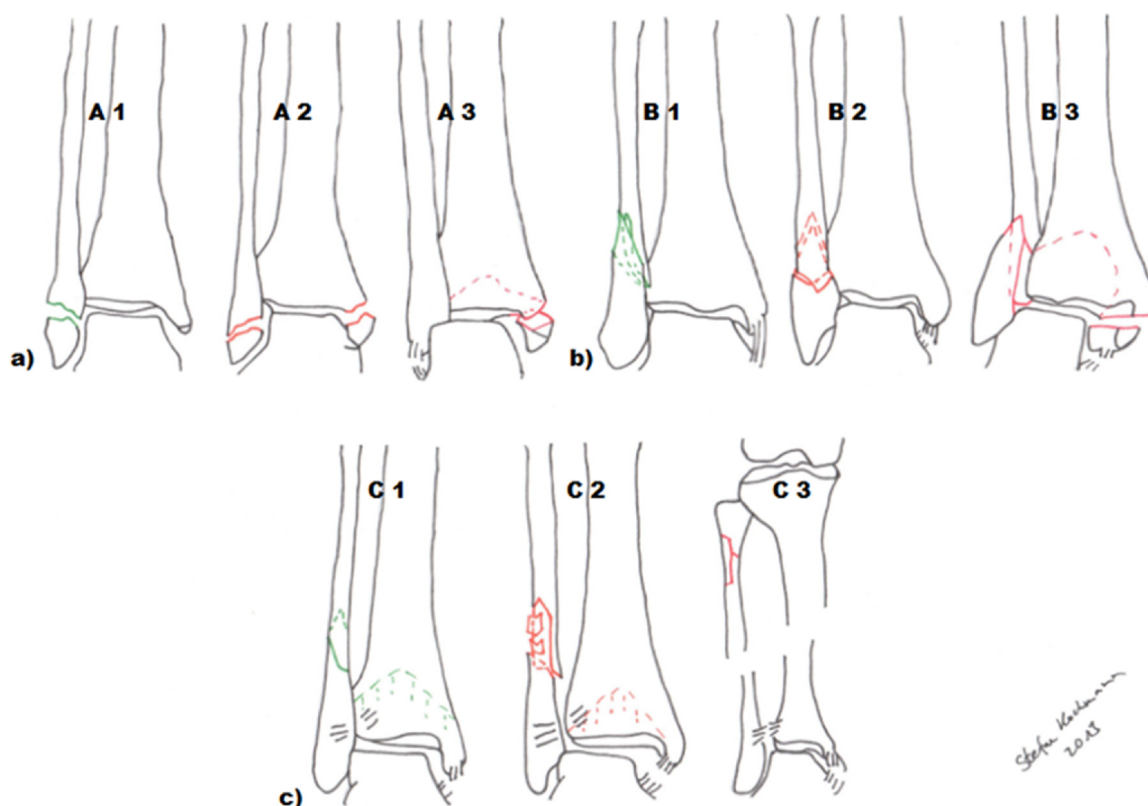


Fig. 1. AO classification of ankle fractures. Weber types A, B, and C fractures are extended, depending on fracture severity. A and B fractures describe unifocal (1), bifocal (2), and circumferential or trifocal fracture patterns. C fractures are divided into simple diaphyseal (1), multi-fragmentary (2), and proximal (3).

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