



Original article

Shorter recovery can be achieved from using walking boot after operative treatment of an ankle fracture

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Abstract

Background/Objective: Ankle fractures, even if treated surgically, usually take a long time to heal. For all patients with ankle fracture, immobilisation is a critical part of treatment. Short-leg walking boots (WBs) have been reported to be an effective alternative to plaster casts (PCs) that could shorten this postoperative recuperative period. The aim of this study was to compare the functional recovery of a conventional PC with that of a WB after surgery for ankle fractures.

Methods: Forty-seven patients (mean age, 53.9 ± 12 years) who had undergone surgical operation for an unstable ankle fracture from January 2008 to October 2014 were reviewed retrospectively. Either a PC or a WB was prescribed postoperatively, with 25 patients and 22 patients, respectively. The time that it took the patient to stand unipedal on the affected side after allowing full-weight bear and to walk without crutches were used for assessment of functional recovery. The prevalence of postoperative loss of reduction and nonunion was also reviewed.

Results: Both the time of being able to stand unipedal on the injured side and to walk without crutches were significantly shorter in patients using WBs (WB, 2.6 weeks; PC, 4.5 weeks, $p = 0.01$; WB, 1.4 weeks; PC, 3.1 weeks, $p = 0.03$). There were no patients with loss of reduction or nonunion.

Conclusion: Patients who used WBs showed a significantly faster recovery. WBs have an adjustable heel lift that allows users to change the ankle position slightly plantarflexed that helps walking in a postoperative swollen ankle. WBs are easy to slip on, and it is easy to adjust the ankle position in conformity with swelling so that the least painful position could be maintained during walking. WBs have good fixity to allow immediate weight-bearing postoperatively, and there were no cases with loss of reduction postoperatively. The Rocker bottom design minimises the sagittal plane motion in the specific joint of the foot, which also facilitates the course of recuperation. An ankle fracture fixed appropriately endures loading when a WB is used. The WB treatment results in faster functional recovery, allowing the patients to return to normal activity at a faster rate.

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Keywords: ankle fracture; plaster cast; postoperative care; rehabilitation; walking boot

Introduction

Ankle fractures are relatively common,^{1–3} often occurring as a result of injuries during sports, a fall, or twisting the ankle. The treatment of an ankle fracture depends on the type of the fracture and patient factors. It may take time for a fracture to

heal even if it is treated surgically. The time required for the healing process can be affected by many factors, including the fracture type, age, underlying medical condition, and methods of rehabilitation. For all patients with ankle fracture, immobilisation is a critical part of treatment on rehabilitation regimens. Ankle fractures require restricting load on the affected ankle by putting on a plaster cast (PC) or a splint for a certain length of time. It has always been a challenge for orthopaedic surgeons to shorten this postoperative recuperative period. Numerous postoperative care regimes have been proposed

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including the method of immobilisation and when to start mobilisation and weight-bearing.^{4–18} Nevertheless, postoperative immobilisation of the ankle joint remains a critical component of postoperative care, although controversy persists regarding its method. Historically, Lindsjö¹⁹ applied a PC after an operation for ankle fracture. Since then, it has become the main immobiliser for the postoperative treatment of ankle fractures and injuries. Meanwhile, a semirigid functional orthosis is easy to use and has been shown to provide good functional results for stable lateral malleolar fractures.⁶ It suggested light immobilisation and promoted the idea that orthosis is good enough to maintain the stability only in the treatment for stable ankle fracture. A thorough consideration of the method of immobilisation depending on the condition of the postoperative ankle may be of benefit. Short-leg walking boots (WBs) have been reported to be an effective alternative to PCs for various foot and ankle diseases. Various advantages of removable WBs have been reported including the ease of application without requiring specialised training and the facility to take them off and perform range of motion (ROM) exercises.¹⁴ Yet, previous studies have only focused on the foot plantar pressure and gait patterns in WBs.^{20–22} Only a few reports have investigated their functional effects.⁴ In Japan, it is much less common to put on a WB than a PC after ankle surgeries. The aim of this study was to investigate the functional effect of WBs in patients with an ankle fracture treated surgically. The hypothesis was that the postoperative treatment of an ankle fracture with a WB would result in a better functional recovery compared to the conventional PC method. A retrospective, 6-month follow-up study of postoperative management of patients with ankle fracture was carried out, and functional evaluations were compared.

Materials and methods

The records of 47 patients (mean age, 53.9 ± 12 years) who were treated surgically for an ankle fracture at our hospital from January 2008 to October 2014 were reviewed retrospectively. This study was conducted in conformity with the principles of the Helsinki Declaration. The study was a retrospective review of the medical records and hence did not require a review by the Local Research Ethics Committee. The diagnosis was made with a plain radiograph, which was a displaced or an unstable fracture of the ankle including unimalleolar, bimalleolar, and trimalleolar injuries. Patients who were treated surgically and were followed up for at least 6 months were included. Patients with a pilon fracture of the tibia, an open fracture, multiple trauma, a history of previous ankle surgery, and who were unable to adhere to the postoperative protocol were excluded. The surgical procedure in all patients was an open reduction and an internal fixation in accordance with the AO/ASIF (Association for Osteosynthesis/Association for the study of Internal Fixation) methods.²³ Either a PC (25 patients) or a WB (22 patients) (Bledsoe Brace Systems, Grand Prairie, TX, USA: [Figure 1](#)) was prescribed postoperatively. The patient demographics are



Figure 1. Bledsoe Walking Boot used in the study.

given in [Table 1](#). Patients in the WB group were significantly older with more severe cases than those in the PC group.

Lateral malleolus fractures were fixed by using a plate and screws, and medial malleolus and posterior malleolus fractures were fixed by using screws. All patients were treated by general or spinal anesthesia.

After a rigid internal fixation, all patients were treated in a backslab half cast for 7–10 days postoperatively and were not allowed to weight-bear. After the stitches were removed, the PC group was managed with the conventional treatment of a below-knee PC. The primary surgeon decided when to start weight-bearing. The WB group was treated with WBs with weight-bearing as tolerated. All patients were seen weekly as outpatients by physiotherapists. Patients were advised to conduct exercises every day. Standard anteroposterior and lateral radiographs were taken at 14 days, 6 weeks, 3 months, and 6 months postoperatively to assess the healing of the fracture and the alignment of the affected ankle.

Functional recovery was assessed in terms of the time it took the patient to stand unipedal on the affected side after being allowed to full-weight bear, the time it took the patient to walk without crutches, and the final ROM of the affected ankle joint. The type of internal fixation (locking or non-locking), operative duration, and the time it took until the

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