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Landing on Your Own Two Feet: A Case Report of Bilateral Calcaneus and Open Pilon Fractures

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ABSTRACT

High energy fractures of the distal tibial plafond and calcaneus have been associated with high functional morbidity and wound complications. Although both of these fractures result from a similar mechanism, they have rarely been reported to occur on an ipsilateral extremity. The combination of these 2 injuries on the same extremity would increase the likelihood of an adverse surgical or functional outcome. We present the case and management strategy of a 43-year-old male with bilateral open pilon fractures and closed calcaneal fractures after falling from a height. A staged protocol was used for the bilateral pilon fractures, with external fixation until operative fixation on day 9. Nonoperative management of the calcaneal fractures resulted in a successful functional outcome at 10 months of follow-up. Treatment of this fracture pattern must incorporate the condition of the soft tissues, an understanding of the fractures, and minimize patient risk factors to optimize the functional and surgical outcomes.

High-energy calcaneal and tibial plafond (pilon) fractures of the distal lower extremity have been associated with high morbidity and functional impairment (1–3) and are commonly caused by an axial force sustained after a fall from height or motor vehicle accident (2,4). Treatment options have included closed reduction nonoperative casting, definitive external fixation, and open reduction internal fixation. Open reduction internal fixation with restoration of the articular surface and limb alignment can help prevent post-traumatic arthritis and optimize the functional outcome for both of these fracture patterns (5,6). However, the wound complication rate after open reduction has been reported as high as 20% and 32% for calcaneal and pilon fractures respectively (7,8). This increased rate of wound complications with open reduction internal fixation has continued to be of major concern when encountering these fractures.

Owing to the similar mechanism of injury, it would seem that these fractures would occur together on an ipsilateral extremity. Cadaver studies have reproduced ipsilateral pilon and calcaneal fractures after a direct axial load to the hindfoot (9,10); however, clinical reports of ipsilateral calcaneal and pilon fractures and their management have been limited. Treatment of isolated calcaneal and tibial plafond fractures is complex; however, when these injuries occur together, the concern for post-traumatic arthritis, soft tissue complications, and functional morbidity are greatly magnified (11–13). Minimizing adverse events and optimizing the functional outcome requires attention to the soft tissues, understanding the fracture pattern, and controlling patient risk factors. Patient compliance with weightbearing status, diabetic glucose control, tobacco use, and substance abuse are important when forming a treatment plan for ipsilateral calcaneal and pilon fractures (12). To our knowledge, only 2 reports describing this injury pattern have been published (11,13). Management of this injury combination has been daunting given the lack of clinical information. We report the first case and management strategy for bilateral open pilon with ipsilateral intra-articular calcaneal fractures.

Case Report

A 43-year-old intoxicated male presented with bilateral leg deformities after jumping from a height of 20 ft. The initial physical examination revealed stable vital signs with a Glascow coma score of 15. His bilateral lower extremities were neurovascularly intact with palpable pulses. The left ankle exhibited a 1.5-cm open lateral wound that expressed lipohemophilic fluid (Fig. 1). The right ankle had a 1.0-cm lateral wound that communicated with the underlying pilon fracture (Fig. 2). Both limbs had extensive swelling of the overlying soft tissues. Radiographs and a computed tomography scan revealed a

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Fig. 1. Left lower extremity open pilon and calcaneal fracture with 1.5-cm soft tissue wound (Bohler angle = 10°).

left Gustillo grade I and right grade II open pilon fractures with bilateral Sanders type III calcaneal fractures (Figs. 1 to 3).

Immediate management included tetanus prophylaxis and cefazolin with washout and splinting. Emergent operative intervention consisted of bilateral formal washout and debridement with delta frame external fixation (Fig. 4). Definitive fixation was delayed until the soft tissue swelling had resolved. The bilateral pilon fractures underwent removal of the external fixation with limited incision bridge plating and allograft bone grafting on postinjury day 9. Additional incisions and soft tissue risks were deemed too great to proceed with the calcaneus fixation at that operative visit.

Owing to illicit drug use and tobacco dependence, the concern for noncompliance and wound complications dictated conservative calcaneal management. He began range of motion exercises at 4 to 5 weeks postoperatively but remained non-weightbearing and wheelchair bound for 12 weeks until radiographic and clinical union of both fractures had been observed. At 10 months postoperatively, he was full weightbearing. The right and left ankle exhibited 10° and 8° of dorsiflexion, respectively. The left subtalar motion was 10° of inversion and 15° of eversion. The degree of right sided inversion and eversion was 20° and 30°, respectively. Radiographs demonstrated healed fractures with a maintained implant position (Figs 5 to 8). His

Fig. 2. Right lower extremity open pilon and calcaneal fracture with 1.0-cm wound over the lateral distal leg (Bohler angle = 20°).