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ESSENTIAL SURGICAL TECHNIQUES

KEY PROCEDURES

Open Reduction and Internal Fixation of Distal Tibial Pilon Fractures

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Published outcomes of this procedure can be found at: *Bone Joint J*. 2016 Aug;98-B(8): 1106-11.

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Abstract

Intra-articular fractures of the distal end of the tibia, more commonly referred to as pilon fractures, account for approximately 5% to 7% of all tibial fractures[1,2]. Type-C fractures present a unique surgical challenge: a total articular fracture contained within a vulnerable soft-tissue envelope. Treatment options include internal fixation[3], external fixation with or without limited internal fixation[4], and primary ankle arthrodesis[2]. The management, and particularly the timing, of surgery is often dictated by the patient's general state of health, soft-tissue condition, and fracture comminution as well as the experience of the surgeon. The surgical goals are to reconstruct the articular surface of the plafond, restore limb alignment, and protect the soft-tissue envelope. Since the publication of the seminal paper by Sirkin et al.[5] in 1999, it has become orthopaedic orthodoxy to stage the surgery of pilon fractures, adopting a so-called span, scan, and plan approach. We more commonly operate early, and in a recently published retrospective review of 102 type-C pilon fractures in 99 patients, 73 patients (73 fractures; 71.6%) underwent primary internal fixation[6]. Outcomes were equivalent to the results of a staged protocol: 36 complications in 28 patients (28 fractures; 27.5%), with superficial (n = 9) and deep (n = 9) infection being the most common. Forty-one fractures (40.2%) required at least 1 additional operation, with removal of symptomatic metalwork being the primary indication (n = 30). No patient required an amputation. At a mean follow-up of 6 years, both the mean Foot and Ankle Disability Index (FADI) and mean Foot and Ankle Outcome Score (FAOS) were 76 (range, 0 to 100). Median patient satisfaction was 7 of 10. The results demonstrated a satisfactory outcome following primary internal fixation in appropriately selected patients. This instructional video outlines the surgical technique used. The key steps of the procedure are (1) preoperative planning with assessment of imaging and soft tissues; (2) application of a thigh tourniquet and placement of the patient predominantly in the supine position, unless the fracture configuration requires a prone position; (3) intraoperative use of a spanning external fixator; (4) careful exposure of the distal end of the tibia, dictated by the fracture configuration, with the anterolateral,

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anteromedial, and direct medial approaches most commonly used, elevating full-thickness tissue flaps wherever possible; (5) fracture reduction and fixation through a joint arthrotomy and fracture windows, allowing visualization of the articular margins, followed by initial Kirschner wire stabilization and definitive lag screw fixation; (6) application of a low-profile, locking or nonlocking plate in either buttress or bridging mode, joining the articular-metaphyseal block to the distal tibial diaphysis; (7) fixation of an associated fibular fracture, typically with intramedullary nailing and removal of the external fixator; (8) layered closure according to surgeon preference; and (9) postoperative protocol, consisting of a removable orthosis with a strict non-weight-bearing restriction for up to 3 months.

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