

# Intra-articular Osteotomy for Correction of Malunions and Nonunions of the Tibial Pilon



Stefan Rammelt, MD, PhD<sup>\*</sup>, Hans Zwipp, MD, PhD

## KEYWORDS

- Tibial pilon • Fracture • Malunion • Nonunion • Correction • Osteotomy
- Intra-articular • Supramalleolar

## KEY POINTS

- Malunions after tibial pilon fractures lead to painful malfunction of the ankle joint and rapidly progress to posttraumatic arthritis.
- Nonunions may result from faulty operative technique or focal necrosis at the distal tibial metaphysis.
- Most malunions and nonunions of the tibial pilon can be salvaged by corrective ankle fusion.
- Joint-preserving corrective osteotomies may be pursued in selected active, compliant patients with good bone stock and cartilage quality at the time of presentation.
- Both intra-articular and supramalleolar deformities have to be corrected in the same setting.

## INTRODUCTION

Fractures of the tibial pilon are severe injuries with complex fracture patterns and significant associated articular cartilage and soft tissue damage. The treatment of pilon fractures is challenging, and functional deficits are likely to remain even with perfect anatomic reduction.<sup>1,2</sup>

Most pilon fractures result from high-energy injuries with axial loading like motor vehicle accidents and fall from a height typically involving some degree of

---

The authors have nothing to disclose.

Foot and Ankle Section, University Center for Orthopaedics & Traumatology, University Hospital Carl Gustav Carus at the TU Dresden, Fetscherstrasse 74, Dresden 01307, Germany

<sup>\*</sup> Corresponding author.

E-mail address: [strammelt@hotmail.com](mailto:strammelt@hotmail.com)

Foot Ankle Clin N Am 21 (2016) 63–76  
<http://dx.doi.org/10.1016/j.fcl.2015.09.008>

[foot.theclinics.com](http://foot.theclinics.com)

1083-7515/16/\$ – see front matter © 2016 Elsevier Inc. All rights reserved.

impaction of the metaphyseal bone often with fragmentation and severe damage to the joint surface. The primary cartilage damage caused by axial forces predisposes to the development of posttraumatic arthritis and is a potential source of poor outcomes despite anatomic joint reconstruction.<sup>3,4</sup> Murray and colleagues<sup>5</sup> showed chondrocyte death in all 6 histologic samples taken from comminuted fragments of tibial plafond fractures. Several investigators have noted a close correlation between fracture type and associated complications with signs of posttraumatic arthritis seen in up to 68%.<sup>3,6,7</sup> After Rüedi type 3 and AO/Orthopaedic Trauma Association type C fractures some radiographic changes of the joint space can be observed in nearly all patients regardless of the kind of treatment.<sup>6</sup> However, arthritis that is detected radiographically does not necessarily become symptomatic, and arthrodesis of the ankle is required in only a small percentage of these cases. The reported rates of secondary ankle fusion range between 1% and 9% after staged open reduction and internal fixation in recent studies.<sup>4,8–10</sup>

Malunions of the tibial plafond, that is, the articular surface of the distal tibia, will lead to eccentric loading of the ankle joint and add to the cartilage wear induced by the injury mechanism. As with other intra-articular fractures, residual steps on the articular joint surface caused by imperfect reduction are a negative prognostic factor, as has been shown in several studies.<sup>8,10,11</sup> In a retrospective review of 113 patients, Kilian and colleagues<sup>12</sup> saw only poor and fair functional results after sole treatment of AO type C pilon fractures with external fixation and related this to improper joint reduction.

Recent studies found higher rates of posttraumatic arthritis, nonunion, and, above all, malunion after external fixation compared with open reduction and internal fixation.<sup>4,13,14</sup> Papadokostakis and colleagues,<sup>15</sup> in a systematic review, found 15 articles referencing 465 pilon fractures treated with external fixation. Malunions were more frequent in ankle-spanning frames (13.4%) than in ankle-sparing frames (5.7%). The same was observed with respect to nonunions, which were reported in 6% and 5%, respectively. It appears that anatomic reduction cannot be achieved with external fixation alone in complex fractures, and secondary dislocation can occur after limited internal fixation.

In addition to intra-articular malunions owing to residual steps and gaps, improper reduction of the metaphyseal area in comminuted pilon fractures lead to supramalleolar axial deviation.<sup>16</sup> These deformities have to be addressed simultaneously during corrective surgery.

## INDICATIONS/CONTRAINDICATIONS

Because of the initial cartilage damage at the time of injury and the early onset of symptomatic posttraumatic arthritis in the presence of malunions and nonunions after tibial pilon fractures, only a small percentage of patients will be amenable to joint-preserving corrections.<sup>16</sup>

Intra-articular deformities may be subject to corrective osteotomies along the former fracture planes in the following cases:

- Young, active patients
- Good bone stock
- Sufficient cartilage cover over the weight-bearing areas (first- to second-degree chondromalacia)
- Good compliance with the postoperative protocol to regain a maximum of residual ankle function

Download English Version:

<https://daneshyari.com/en/article/4053578>

Download Persian Version:

<https://daneshyari.com/article/4053578>

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