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Our experience with osteosynthesis of tibial pilon fractures

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Summary

This study documents our experience with osteosynthesis of tibial pilon fractures. We discuss the procedures used in the synthesis of fractures of the rear foot and the tibial pilon with a "systemic" surgical approach aimed at the anatomical-functional restoration of the talus compplex. We suggest the potential synthesis of the 3rd malleolus and/or tibial metaphysis through the lateral access to the fibula (enlarged).

Key Words

Tibial pilon fractures, osteosynthesis, surgery.

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INTRODUCTION

We discuss the procedures used in the synthesis of fractures of the rear foot and the tibial pilon with a "systemic" surgical approach aimed at the anatomical-functional restoration of the talus complex. Namely: 1) the reconstruction of the malleoli as a guide and buttresses of the talus; 2) the reconstruction of the tibial pilon, as load transmitter and guide of the talus; 3) the reconstruction of the talus itself, as the focal center of all tarsal mechanics; 4) the reconstruction of the heel as leverage for walking and to protect the talus (Fig. 1).

Among the methods, we consider effective the "modern" osteosynthesis with angular stability plates. In order to minimize surgical invasiveness, if possible, we suggest the synthesis of the 3rd malleolus and/or tibial metaphysis (Fig. 2) through the lateral access to the fibula (enlarged).

This study was conducted following and also consulting the bibliography on the subject (see for example: Destot, 1911; Burwell & Charnley, 1965; Bonin, 1950; Bour et al., 1992; Bone et al., 1993; Barbieri et al., 1996; Babis et al., 1997).

MATERIAL AND METHODS

From 2005 to 2018 we surgically treated over 30 cases of tibial pilon fractures (Fig. 3).

In our experience, we gained some insights that proved to be crucial in obtaining good results. In particular: a) early application of transcalcaneal traction reduces sub-dislocation, vascular distress and then facilitates surgery; b) when possible, carry out only one large anterolateral surgical access, widened to the tibiotarsal joint and tibia; from here, in order, proceed to reduce and stabilize the fibula (preferably with angular stability plates), the articular surface and distal tibial metaphysis and diaphysis (with free screws and/or lateral tibial plate), complete (when necessary) with osteosynthesis of the tibial malleolus; c) maximum caution in the post-operative period, with plaster for (minimum) 20 days, cautious mobilization in ankle unloading, NSAIDs and antithromboembolic drugs. In general, we can proceed (based on the type of lesion and after X-ray checks): after 30 days, light load, connective tissue massage and lymphatic drainage; after 45 days partial load; after 60 days total load; after 75-90 days load-free. In particular, during the resumption of walking, it is better to avoid the onset and persistence of edema, with any suspensions in the discharge and the impromptu application of bandages or elastic pants too restraining.

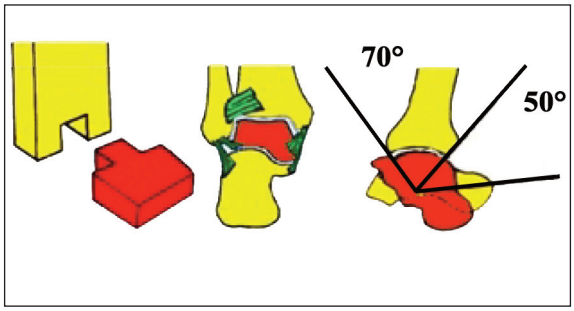


Figure 1. Anatomy and function of the ankle with the calcaneus as it is placed to protect the talus and leverage for walking.

Figure 2. Material used in osteosynthesis interventions with angular stability plates with their positioning on the 3rd malleolus and/or tibial metaphysis.

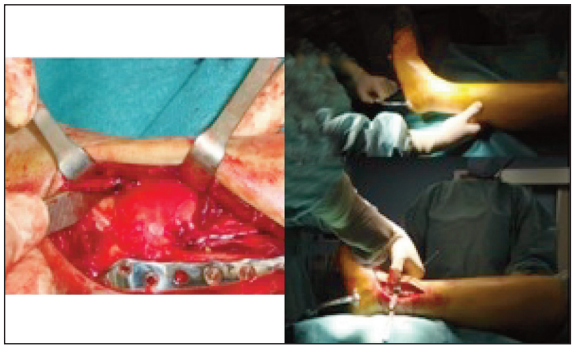


Figure 3. Some moments of surgery on a patient with tibial pilon fracture with plate and screw placement and and reduction of the 3rd malleolus.

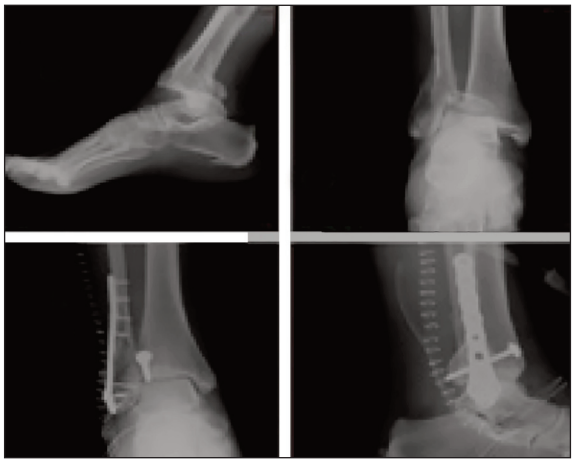


Figure 4. Fracture of the tibial pilon and external malleolus. Osteosynthesis: angular stability plate positioned on the external malleolus and a return screw on the posterior malleolus.

RESULTS

Out of 13 patients (6 males and 8 females) we obtained good results in 85% of cases, with early resumption of home and/or work activities.

A few cases as examples:

Case 1 - Pre and post-operative fracture-dislocation of the tibial pilon and external malleolus, treated with an angular stability plate on the external malleolus and one (1) recall screw on the posterior malleolus (Fig. 4).

Case 2 - Pre and post-operative fracture of the tibial pilon and external malleolus, treated with medial plate and lag screw on the tibia plus plate and free screws on the fibula (Fig. 5).

Case 3 - Pre- and post-operative exposed comminuted fracture of the tibial pilon and external malleolus, treated with plate and free screws on the external malleolus plus External Tibia Fixator with interfragmentary K-wires (Fig. 6).

CONCLUSIONS

Based on our experience, we believe that treatment of tibial pilon fractures following the above guidelines shows satisfactory results. We reiterate the importance of traction to limit damage to the soft parts and to improve surgical reduction maneuvers and the accuracy of the synthesis, mainly in cases of severe decomposition - otherwise to be treated with less invasive, but also less accurate, methods of External Fixation. The “modern” synthesis of tibial pilon fractures is “systemic” and it cannot simply be

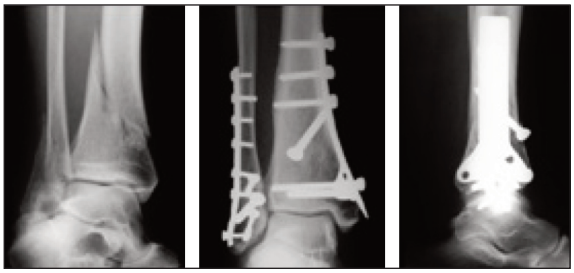
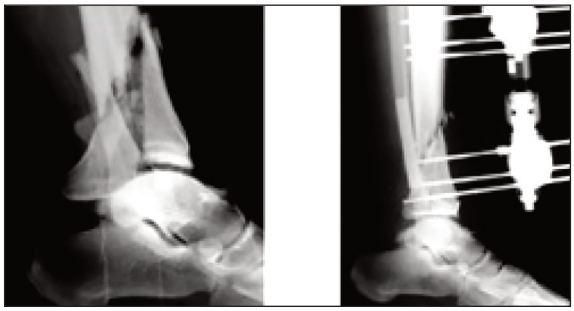


Figure 5. Pre and post-operative fracture of the tibial pilon and external malleolus, treated with medial plate and lag screw on the tibia plus plate and free screws on the fibula.



Figures 9, 10. Pre- and post-operative exposed comminuted fracture of the tibial pilon and external malleolus, treated with plate and free screws on the external malleolus plus External Tibia Fixator with interfragmentary K-wires.

reduced to a technical fact or to the availability of advanced technological devices, such as, for example, angular stability plates. It is very important, today, as in the past, to address this pathology with our best understanding not only of the biology of the injury, but also of the biomechanics of the ankle, to aim at the anatomical-functional restoration of the talus complex.

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