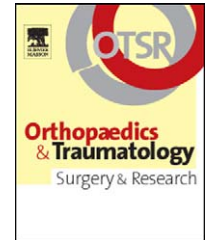




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ORIGINAL ARTICLE

Distal leg fractures: How critical is the fibular fracture and its fixation?

P. Bonneville^{a,*}, J.-M. Lafosse^b, L. Pidhorz^c, A. Poichotte^d, G. Asencio^e,
F. Dujardin^f, The French Society of Orthopaedics and Traumatology
(SOFOT)^g

^a The Musculo skeletal Institute, Toulouse Teaching Hospital Center, Purpan Orthopaedics and Traumatology Unit, place Baylac, Toulouse 31052 cedex, France

^b The Musculo skeletal Institute, Toulouse Teaching Hospital Center, Rangueil Orthopaedics and Traumatology Unit, avenue Poulhes, Toulouse 31052 cedex, France

^c Le Mans Hospital Center, 194, avenue Rubillard, 72037 Le Mans cedex 09, France

^d F.-Grall Hospital Center, 1, rue Pecan-Lavallot BP 71, 92967 Landerneau, France

^e Department of Orthopaedic Surgery and Traumatology, Caremeau Teaching Hospital Center, place Pr-Debré, Nîmes 30029 cedex 9, France

^f Orthopaedic Surgery and Traumatology Academic Clinic, Charles-Nicolle Hospital, Rouen Teaching Hospital Center, 1, rue de Germon, 76031 Rouen cedex, France

^g 56, rue Boissonade, 75014 Paris, France

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KEYWORDS

Supramalleolar fracture;
Distal diaphyseal fracture of the tibia;
Fibula fracture;
Fibula internal fixation;
Intramedullary locked nailing;
Locked plate;
External fixator

Summary

Introduction: Extra-articular distal tibia fractures include a tibial fracture line located partially or totally in the metaphyseal bone and a fibular fracture in variable areas or sometimes absent. There is no consensus in the literature on the conduct to address the fibula fracture. The main objective of this study was to assess its impact on tibial reduction and union.

Hypothesis: Fibular fixation plays a positive role in reducing tibial displacement and improving mechanical stability of the entire lesion.

Material and methods: This study was based on the multicenter observational group of the 2009 SOFCOT symposium, i.e., 142 metaphyseal fractures of the tibia. The fibula was intact in 10 cases and fractured in 132. In the three main categories of surgical treatment for the tibia (nailing, plating, external fixation) (126 fractures), the fibular lesion was not treated in 79 cases (61%) in this series, nine were treated with intramedullary pinning, and 38 with plate and screw fixation.

* Corresponding author.

E-mail address: bonneville.p@chu-toulouse.fr (P. Bonneville).

Results: There was no statistical relation between the anatomic situation of the diaphysis and the anatomic type of the fibular fracture or between the anatomic type of the fibular fracture and its situation compared to the tibial fracture line. The intertubercular and neck fractures were type A1 or B1 ($P < 0.001$) and were combined to a tibia fracture with a torsional component; the medial-diaphyseal and subtubercular fractures were associated with tibial fracture lines with a simple transversal or comminution or metaphyseal-diaphyseal component ($P < 0.032$). The rate of pseudarthrosis of the fibular fracture was 4.7% at 1 year; in all these cases, fibular treatment had been conservative. All treatments combined, the tibial axes were statistically better corrected when the fibula was treated with fixation. In four of the 11 cases of axial tibial malunion, the primary fibular fixation caused or worsened them.

Discussion: The present clinical series provides results similar to the biomechanical studies. The consequences of fibular fixation perpetuating a tibia reduction abnormality or on the contrary the absence of fibular fixation appeared as probable factors of residual reduction defects, lack of stability of the tibiofibular complex, and tibia non-union.

Level of evidence: Level IV (prospective cohort study).

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Introduction

Extra-articular fractures of the distal end part of the tibia, also called supramalleolar fractures, were characterized by Gerard and Evrard [1], Zucman and Roux [2], and Utheza et al. [3]. They included a tibial fracture line located partially or totally in metaphyseal cancellous bone and were associated inconsistently with a fibular fracture at different levels. These lesions have recently been the subject of descriptive studies but the fibular fracture was not or was insufficiently integrated [4–6]. However, several biomechanical studies have underscored its importance in overall stability when the tibial fracture was surgically treated with fixation [7–10]. Therefore, surgically intervening on the fibula has not met with consensus, oscillating between conservative management [11,12], quasi-systematic or strongly recommended fixation [13–20], or an eclectic attitude taking into account the anatomic fibular lesions and their reducibility [21–26]. The “competitive” nature of fibular fixation in union of the tibia has even been raised [27,28]. Based on a multicenter series of distal fractures of the leg, this study’s main objective was to detail the characteristics of the fibular lesions and study their correlations as well as their impact on reduction and union in terms of the tibial fracture, with the final goal of proposing a therapeutic course of action. This study is all the more important in that publications based on the experience of French teams are rare [6,29,30]. The hypothesis was to show the role played by the fibular lesion in the reduction of the displacement and the mechanical stability of the entire lesion.

Material and methods

This study was based on a multicenter continuous observational series collected from 1/1/2008 to 31/12/2008 in the 2009 French Society of Orthopaedic and Traumatology Surgery (Société française de chirurgie orthopédique et traumatologique [SOFCOT]) symposium: 142 fractures of the distal quarter of the leg in the distal epiphyseal square according to the AO criteria [4] were collected. The diverse aspects of the fibular lesion in both their anatomic and evol-

ing components in the entire tibiofibular lesion were studied based on the AO precepts.

The series

The 142 tibial metaphyseal fractures were broken down into three main types summarized in Fig. 1: 77 A1 fractures, 28 A2, and 37 A3. The fibula was intact in 10 cases and had two fragments in 83 cases, spiral wedge or bending wedge in 30

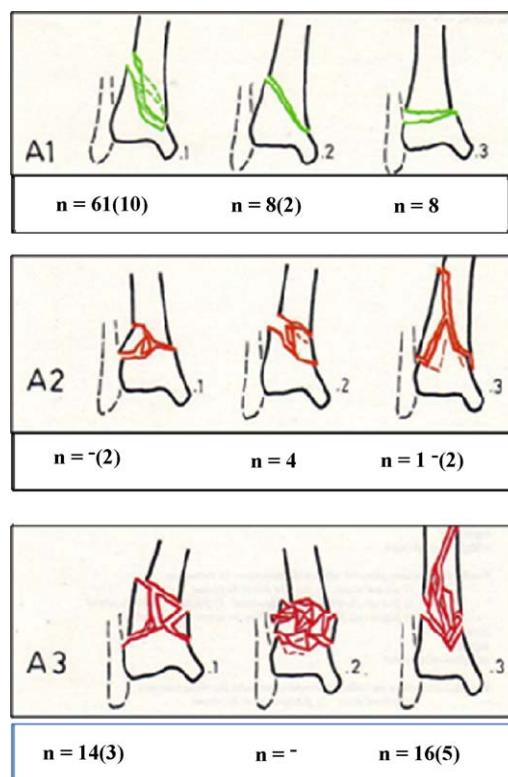


Figure 1 AO classification [4] of 142 metaphyseal tibial fractures broken down into 77 A1 fractures, 28 A2, and 37 A3. The epiphyseal irradiation, noted (●), was present in 24 cases.

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