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Dr. Sarr Lamine
Orthopedics-Traumatology, Aristide Le Dantec teaching hospital Dakar, Senegal

Diop Badara
Orthopedics-Traumatology, Saint Louis Regional Hospital, Senegal

Dembélé Badara
Orthopedics-Traumatology, Aristide Le Dantec teaching hospital Dakar, Senegal

Diouf Alioune Badara
Orthopedics-Traumatology, Peace Hospital, Ziguinchor, Senegal

Diao Souleymane
Orthopedics-Traumatology, Peace Hospital, Ziguinchor, Senegal

Diouf Joseph
Orthopedics-Traumatology, Idrissa Pouye Hospital, Dakar, Senegal

Coulibaly Ndeye Fatou
Orthopedics-Traumatology, Aristide Le Dantec teaching hospital Dakar, Senegal

Diémé Charles Bertin
Orthopedics-Traumatology, Aristide Le Dantec teaching hospital Dakar, Senegal

Corresponding Author:
Dr. Sarr Lamine
Orthopedics-Traumatology, Aristide Le Dantec teaching hospital Dakar, Senegal

Orthopedic management of recent bimalleolar fractures in adults: A report of 68 cases

Sarr Lamine, Diop Badara, Dembélé Badara, Diouf Alioune Badara, Diao Souleymane, Diouf Joseph, Coulibaly Ndeye Fatou and Diémé Charles Bertin

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Abstract
Bimalleolar fractures are still common. They often occur in young individuals with a high-energy, velocity-of-impact mechanism. Treatment can be orthopedic or surgical. We report 68 cases of bimalleolar fractures treated orthopedically. Treatment consisted of a full leg cast or a cast boot with or without reduction. The average duration of cast immobilization was 84 days. The average follow-up at evaluation was 12 months, with 49 patients evaluated. Our results were generally satisfactory, with 83.68% excellent or good outcomes. The clinical course was marked by complications such as secondary displacement of the cast (2 cases), malunion (2 cases), nonunion (3 cases), and tibiotalar osteoarthritis (1 case). The total cost of orthopedic treatment with a cast was four times lower than that of surgical treatment. Orthopedic treatment still holds a prominent place in the management of bimalleolar fractures.

Keywords: Bimalleolar fractures, orthopedic treatment, cast immobilization

Introduction
Bimalleolar fractures, affecting the lateral and medial malleoli of the ankle, are serious fractures that can compromise the stability and function of the joint. They occur mainly in young, active individuals after high-energy accidents and in the elderly following low-energy trauma in osteoporotic patients. They can lead to major disabilities if poorly managed. The main objective of this study is to evaluate the orthopedic management of bimalleolar fractures in an orthopedic department.

Materials and methods
We conducted a retrospective, single-center, descriptive study. The study included all patients over 15 years of age admitted to the emergency department of the Pikine National Hospital Center (CHNP), regardless of sex, who presented with a bimalleolar fracture on X-ray between January 1, 2022, and June 30, 2024 (36 months) and who received orthopedic treatment. Sixty-eight cases were collected, with a male predominance (male-to-female ratio 1.83). The average age of the patients was 41 years, ranging from 16 to 75 years. Domestic accidents (48.53%), road traffic accidents (23.53%), and road traffic accidents (17.65%) were the most frequent causes of injury. Clinically, the indirect mechanism of injury, external rotation, was the most common, accounting for 60.29% of cases. Tibiotalar dislocation was the most frequent associated traumatic injury. Intertubercular fractures (Duparc and Alnot type 2) were found in 58.82% of cases. Patients were assessed at follow-up using the FAAM score.

Results
All patients received medical treatment. This consisted of analgesics and/or non-steroidal anti-inflammatory drugs. Patients with an open fracture and an incorrect vaccination status received tetanus immunoglobulin and tetanus vaccination (SAT-VAT). Prophylactic antibiotic therapy based on the combination of clavulanic acid and amoxicillin was initiated in patients with open fractures. Prophylactic treatment for thromboembolic disease with an

anticoagulant was administered to almost all patients. Table I illustrates these different therapeutic interventions.

Table 1: Type of medical treatment administered

Medical Treatment	Number
Analgesic	68
Non-steroidal anti-inflammatory drug	45
SAT-VAT	12
Antibiotic	17
Anticoagulant	65

All patients were treated orthopedically with a full leg cast or a plaster cast with or without reduction (Table II).

Table 2: Distribution of patients according to the type of orthopedic treatment

Type of treatment		Number
Orthopedic treatment without réduction	PCP Plaster Boot	39 18
Orthopédic Traitement with reduction	PCP Plaster Boot	11 0

The mean duration of plaster immobilization was 84 days.
The mean follow-up at evaluation was 12 months with 49 patients evaluated. Our results were generally satisfactory with 83.68% excellent and good results (Table III).

Table 3: Functional assessment according to the FAAM score

Functional assessment according to the FAAM score	Number (49)	Percentage (%)
Excellent	28	57,14
Good	13	26,54
Average	4	8,16
Poor	4	8,16

The patient's condition was complicated by secondary displacements in the cast (2 cases), malunion (2 cases), nonunion (3 cases), and tibiotalar osteoarthritis (1 case).
The total cost of orthopedic treatment with a cast was four times lower than that of surgical treatment.

Discussion

The widespread use of orthopedic treatment in our sample could be explained by the early admission of trauma patients, limited access to the operating room, reluctance towards surgical treatment, and finally, the patients' lack of financial resources for surgery. The Skinner test, with the axis of the tibial shaft passing through the midpoint of the talus on anteroposterior and lateral views, allows for assessment of the quality of the reduction. Immobilization is achieved with a thigh-to-foot cast or a boot. Orthopedic treatment is nevertheless compatible with good long-term clinical and anatomical results, as reported by Biga N. [1].
Orthopedic treatment offers numerous advantages [2, 3]:

- Its low cost;
- Its technical implementation is generally relatively simple;
- Preservation of the fracture hematoma increases the chances of consolidation;
- The absence of surgical intervention reduces the risk of infection.

This makes it a preferred option in the management of patients with leg fractures. The consolidation time, and therefore the immobilization period, is estimated at 3 months in the literature. This period can be longer, given the unpredictable nature of consolidation.
The disadvantages [4] are therefore:

- The long immobilization period;
- The risk of secondary displacement during immobilization;
- The possibility of changing the indication after a waiting period, resulting in a loss of time;
- Joint stiffness requiring prolonged rehabilitation.

Medical treatment was based on the administration of analgesics and/or anti-inflammatories, with or without tetanus immunoglobulin and vaccination, antibiotic therapy, or anticoagulant therapy. Plaster cast immobilization in adults carries thromboembolic risks. This explains why 65 patients (95.58%) received anticoagulant treatment. Anticoagulants are prescribed from adolescence onwards at a preventive dose in the absence of cardiovascular risk. In cases of cardiovascular risk, the administered dose is therapeutic. The high rate of good short-term results (83%) encourages us to continue using this type of treatment. The progression of bimalleolar ankle fractures in adults can be complicated. These accounted for 11.82% of cases in our series. Malunion was found in 2.94% of cases, which is comparable to the results obtained by Ezzahra F [5] and Doumane D [6], at 4.87% and 7%, respectively. Nonunion was found in 4.41% of cases, which is close to the 3% reported by Berhil A. [4] and the 11.29% reported by Chelfi M. [7]. One case of tibiotalar osteoarthritis was found in our series. Consolidation defects create instability that will later lead to osteoarthritis [8]. Two patients (3%) experienced secondary displacement while in a cast. This is often due to inadequate monitoring of patients in casts, especially those who experienced significant edema after trauma; the reduction of edema under the cast decreases limb stability and leads to secondary displacement. We did not find any thromboembolic complications in our series. The orthopedic treatment of the patients in our series was generally satisfactory, with 83.68% achieving excellent or good results. This result is similar to those found in the literature by Fotso S. [9], which show a rate of 87.1%. Other authors have reported less favorable results, such as Chelfi M. [8] 60.6% and Dembélé E. [10] 76.3%.

Case 1: Secondary tibiotalar osteoarthritis following an open fracture at 12 months.

Fig 2: Lateral malleolar pseudarthrosis and malunion of the medial malleolus

Conclusion

Bimalleolar fractures are serious articular fractures that can compromise ankle stability and function. They are relatively common in ankle injuries. Their management is a medical emergency. Orthopedic treatment, which is easy and inexpensive to perform, allows us to achieve good results.

Conflict of Interest

Not available

Financial Support

Not available

Références

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