International Journal of Orthopaedics Sciences

E-ISSN: 2395-1958
P-ISSN: 2706-6630
Impact Factor (RJIF): 6.72
IJOS 2025; 11(4): 88-91

www.orthopaper.com
Received: 04-07-2025
Accepted: 08-08-2025

Abdoul Karim BALDÉ
Centre Hospitalier Régional de N'Dioum, Sénégal

Abdoulaye CAMARA
Centre Hospitalier Régional de N'Dioum, Sénégal

Mamady Sékou CONDÉ
Centre Hospitalier Régional de N'Dioum, Sénégal

Charles Bertin DIÉMÉ
Centre Hospitalier Régional de N'Dioum, Sénégal

Corresponding Author:
Abdoul Karim BALDÉ
Centre Hospitalier Régional de N'Dioum, Sénégal

Evaluation of surgical treatment for diaphyseal leg fractures

Abdoul Karim BALDÉ, Abdoulaye CAMARA, Mamady Sékou CONDÉ and Charles Bertin DIÉMÉ

DOI: https://www.doi.org/10.22271/ortho.2025.v11.i4b.3832

Abstract
Introduction: These are extra-articular fractures, mainly diaphyseal, of one or both bones of the leg.
The objective of our study was to evaluate the results of surgical treatment of leg fractures in adults.
Materials and Methods: This was a prospective, descriptive, single-center study lasting two (2) years, from January 1, 2022, to December 31, 2023, involving 23 patients at the N'Dioum Regional Hospital (Senegal).
Results: We collected data on 23 patients, including 19 men (82.6%) and 4 women (17.4%), with a sex ratio (M/F=4.8). The average age of our patients was 25.95 years, ranging from 15 to 53 years. The most frequent circumstances were road accidents with 18 cases (78.3%). The left side was affected in 12 cases (52.2%). The fractures were open in 13 cases (56.5%), and Cauchoix and Duparc type II was the most common with 7 cases (53.8%). Fractures of both leg bones were found in 17 cases (73.9%), including one case of bilateral leg fracture. Fractures were located in the middle third in 12 cases (52.2%). The average time to treatment was 4 days, ranging from 2 to 17 days. Surgical treatment was dominated by lateral screw fixation in 12 cases (52.2%), while intramedullary nailing was performed in 11 patients (48.7%).
The immediate postoperative period was uneventful with no complications (no infection, compartment syndrome, or skin necrosis, etc.).
At the 24-month follow-up, we evaluated our patients according to anatomical criteria. All our patients healed well and we recorded no late complications (pseudarthrosis, malunion, osteoarthritis, loosening of osteosynthesis material, etc.).
We also evaluated our patients according to the functional criteria of Olerud and Molander: our results were excellent in 14 cases (60.9%) and good in 9 cases (39.1%).
Conclusion: Leg fractures are a real public health problem, exacerbated by the advent of motorized two-wheeled vehicles as a means of public transport in our societies. Treatment must be carried out within a short period of time in order to initiate early and continuous rehabilitation and avoid disabling complications that could impair the functional prognosis of the limb.

Keywords: Diaphysis, evaluation, fracture, leg, surgical, treatment

Introduction
These are extra-articular fractures, mainly diaphyseal, of one or both bones of the leg [1]. Leg fractures are a common traumatic emergency. They account for 15 to 20% of all fractures [2]. Skin opening remains an early complication found in more than 20% of cases [3]. Although closed intramedullary nailing remains the treatment of choice for most surgeons, osteosynthesis using screw plates, despite presenting a number of disadvantages related to potential complications, remains a valid therapeutic alternative, especially in under-equipped settings where image intensifiers remain a luxury for many poorly equipped facilities [4].
The objective of our study was to evaluate the results of surgical treatment of leg fractures in adults.

Materials and Methods
This was a prospective, descriptive, single-center study lasting two (2) years, from January 1, 2022, to December 31, 2023, involving 23 patients at the N'Dioum Regional Hospital (Senegal).

Inclusion criteria

All patients admitted for closed or open leg fractures of types I and II according to Cauchoix and Duparc, treated surgically and followed up in the department during the study period, were included in this study.

Exclusion criteria

All patients admitted for knee or ankle joint fractures involving both bones of the leg, open fractures of the leg classified as type III according to Cauchoix and Duparc, leg fractures in children, and patients lost to follow-up during the evaluation of results were excluded from our study.

Study population

All our patients received medical treatment with analgesics, anticoagulants, and antibiotics; patients with open fractures received tetanus vaccination. Our patients were under local anesthesia of the spinal type, positioned supine on a standard operating table, with a tourniquet at the root of the thigh and the leg hanging down for patients undergoing intramedullary nailing. The anterolateral approach was used for screw plates. Surgical treatment consisted of anatomical reduction, followed by closed intramedullary nailing under fluoroscopic guidance (image intensifier). When the image intensifier broke down, all remaining patients were treated with lateral screw plates after reduction of the fracture site. Open fractures were treated in two stages: first stage (surgical debridement in the operating room, immobilization with a splint, then local care); second stage (after wound healing, the patient returned to the operating room for reduction of the fracture site, then fixation with a lateral screw plate or intramedullary nailing). Postoperative follow-up X-rays were performed to assess the quality of the union. Rehabilitation began the day after the follow-up X-ray, with gentle mobilization of the knee and ankle. Patients were placed in an upright position and walking was authorized with early weight-bearing for patients who had undergone intramedullary nailing; weight-bearing was postponed for 12 weeks for patients who had undergone screw plate fixation.

At 24 months, we evaluated our patients according to the functional criteria of Olerud and Molander [5] using the following parameters: (pain, stiffness, swelling, stairs, running, jumping, squatting, walking aid, and work or activities); as well as anatomical (radiological) criteria to assess consolidation and late complications (pseudarthrosis, malunion, osteoarthritis, etc.).

Our data were collected on a pre-established survey form and entered using Word 2016 software, then analyzed using Epi Info version 7.2.2 software.

Results

We collected data on 23 patients, including 19 men (82.6%) and 4 women (17.4%), with a sex ratio (M/F=4.8). The average age of our patients was 25.95 years, ranging from 15 to 53 years. The socio-professional groups most affected were motorcycle taxi drivers with 9 cases (39.1%), followed by farmers with 5 cases (27.1%). The most frequent circumstances were road accidents with 18 cases (78.3%), among which motorcycle accidents were the most common with 9 cases (50%), followed by cart accidents with 6 cases (33.3%). The left side was affected in 12 cases (52.2%). The fractures were open in 13 cases (56.5%), and Cauchoix and Duparc type II was the most common with 7 cases (53.8%). Fractures of both leg bones were found in 17 cases (73.9%), including one case of bil ateral leg fracture (Figure 1).

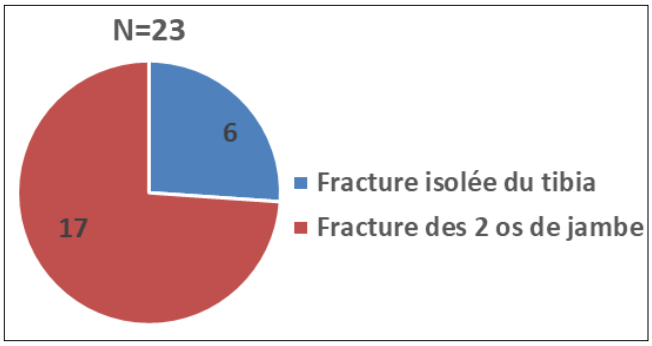

Fig 1: Distribution of patients according to bone lesions

Fractures were located in the middle third in 12 cases (52.2%); in the lower third in 7 cases (30.4%) and in the upper third in 4 cases (17.4%) (Table I).

Table I: Distribution of patients according to fracture location

Seats of the fracture	Workforce	Percentage (%)
Upper third	04	17.4
Middle third	12	52.2
Lower third	07	30.4
Total	23	100

The average time to treatment was 4 days, ranging from 2 to 17 days. Surgical treatment was dominated by lateral screw fixation in 12 cases (52.2%), while intramedullary nailing was performed in 11 patients (48.7%) (Figure 2).

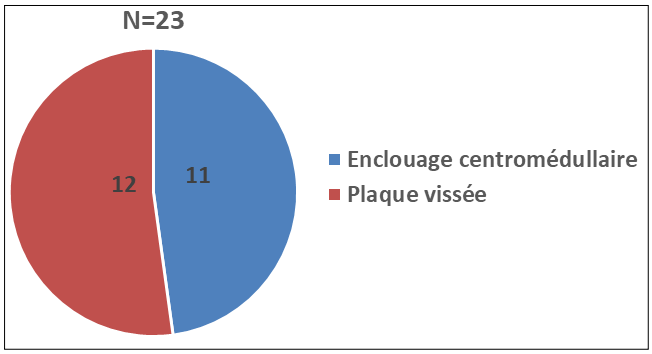

Fig 2: Distribution of patients according to type of surgical treatment

The immediate postoperative period was uneventful with no complications (no infection, compartment syndrome, or skin necrosis, etc.).

At the 24-month follow-up, we evaluated our patients according to anatomical criteria. All our patients healed well and we recorded no late complications (pseudarthrosis, malunion, osteoarthritis, loosening of osteosynthesis material, etc.).

We also evaluated our patients according to the functional criteria of Olerud and Molander: our results were excellent in 14 cases (60.9%) and good in 9 cases (39.1%). We did not record any average or poor functional results in our series (Table II).

Table 2: Distribution of patients according to the Olerud and Molander score [5]

Olerud and Molander's score	Workforce	Percentage (%)
Excellent	**14**	**60.9**
Good	9	39.1
Average	0	0
Bad	0	0
Total	23	100

Fig 3: Bilateral mid-diaphyseal fracture of the leg

Fig 4: Osteosynthesis using static locked intramedullary nailing (ECMVS)

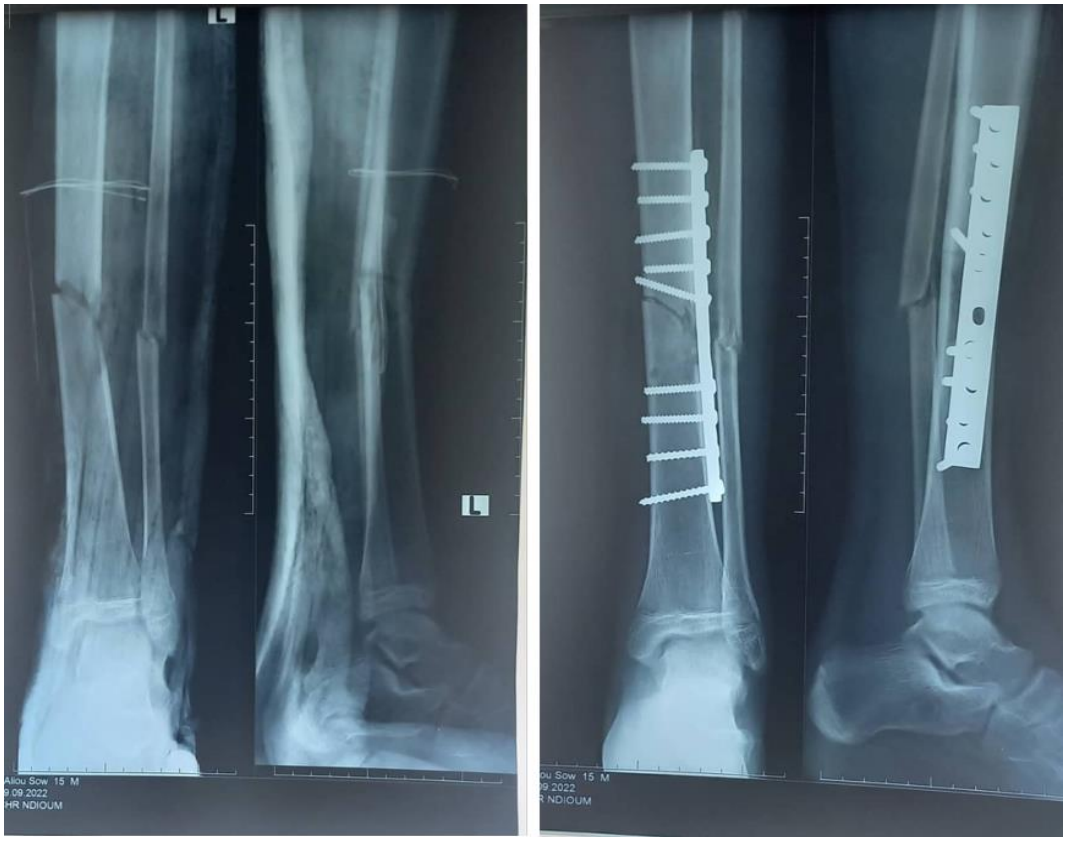

Fig 5: Diaphyseal fracture of both bones in the left leg, treated by reduction + lateral screw plate fixation of the tibia

Discussion

Our study was conducted at the regional hospital in N'Dioum, a town in northeastern Senegal, located in the Saint-Louis region, in the department of Podor. Transportation in the city is mainly provided by motorized two-wheelers and carts, generally driven by young, uneducated males between the ages of 15 and 25, who are unaware of and unfamiliar with the basic rules of the highway code. This phenomenon is the root cause of the high rate of road accidents in this region.

In our series, we recorded a clear predominance of males among young subjects. The circumstances of occurrence were dominated by road accidents. These results are similar to several series published in the literature in sub-Saharan Africa, which highlight the increasingly high frequency of road accidents involving motorized two-wheelers driven by young males [6-9].

The left side was the most affected in our series. However, NAJEB Y *et al.* [10] reported a predominance of right-sided injuries. Open fractures were the most common, dominated by Cauchoix type II, and fractures of both bones of the leg were predominant. Our results are similar to those found in several series in the literature [8-10]. These results may be due to the anatomical position of the leg, which is exposed to trauma, with the tibia being subcutaneous in the anteromedial position along its entire length and therefore vulnerable to trauma.

The middle third was the most common site of fracture, followed by the lower third. Bakriga B *et al.* [11] reported similar results. The average time to treatment was 4 days, and all of our patients were treated surgically with screw plates and intramedullary nailing. Lateral screw plates were the most commonly used, with DCP plates. Abiome R *et al.* [4] performed 100% of treatments with lateral screw plates. Other authors [8, 9] performed 100% of surgical treatments with external fixators. The use of nails and screw plates in our series can be explained by the fact that Cauchoix and Duparc type III open fractures and infected fractures were excluded from our study, on the one hand, and on the other hand, the treatment delay was relatively short and initial treatment was performed on an emergency basis by trimming for open fractures. In our series, the immediate postoperative outcomes were straightforward, with no complications. However, immediate postoperative complications such as infection and secondary skin necrosis are reported in the series. In the long term, we did not record any late complications. However, several authors have reported varying rates of complications such as septic or non-septic pseudarthrosis, disassembly or rupture of osteosynthesis material, malunion, osteitis, or osteoarthritis [4, 6, 8].

At 24 months, we evaluated our patients according to anatomical criteria, and all of our patients had consolidated without complications. Our functional results were excellent in 60.9% of cases and good in 39.1%. Cases of moderate and poor functional results were reported [6]. The absence of complications in our series can be explained by the small size of our sample, the early and two-stage management of open fractures, and the early and continuous rehabilitation of all our patients until they were able to bear weight without crutches.

Conclusion

Leg fractures are a real public health problem, exacerbated by the advent of motorized two-wheeled vehicles as a means of public transport in our societies. Treatment must be carried out within a short period of time in order to initiate early and continuous rehabilitation and avoid disabling complications that could impair the functional prognosis of the limb.

Conflicts of Interest: The authors declare no conflicts of interest related to this work.

References

1. Thoreux P, Bégué T, Masquelet AC. Fractures fermées de jambe de l'adulte. In: EMC (Elsevier Masson SAS, Paris), Appareil locomoteur. 2007;14-086-A-10.
2. Merle d'Aubigné R. Traumatismes de la jambe. In: Nouveau précis de pathologie chirurgicale. Paris: Masson; 1998. p. 639-650.
3. Court-Brown CM, Rimmer S, Prakash U, McQueen MM. The epidemiology of open long bone fractures. Injury. 1998;29(7):529-534.
4. Abiome R, Mikiela A, Djembi YR, Nguema F, Allogo Obiang JJ. Évaluation du traitement des fractures diaphysaires du tibia et du fémur par plaque vissée au CHU d'Owendo: étude préliminaire à propos de 58 cas. Health Sciences and Diseases. 2019;20(5):1-7.
5. Olerud C, Molander H. A scoring scale for symptom evaluation after ankle fracture. Archives of Orthopaedic and Trauma Surgery. 1984;103(3):190-194.
6. Diop M, Ndaw A, Daffé M, Sow M, Dembele B, Seck K, *et al.* Les fractures diaphysaires de jambe liées aux accidents de moto: expérience du service d'orthopédie-traumatologie de l'hôpital Dalal Jamm de Guediawaye. Dakar Médical. 2025;69(1):1-6.
7. Kouassi KJE, Manon J, Fonkoué L, Kodo M, Detrembleur C, Cornu O. La prise en charge des fractures ouvertes de jambe dans une structure hospitalière en Côte d'Ivoire pose-t-elle problème et pourquoi? Revue de Chirurgie Orthopédique et Traumatologique. 2019;105(5):654-658.
8. Camara T, Bah ML, Madjirabe NH, Kéita K, Diallo MM, Youla M, *et al.* Fractures ouvertes de la jambe traitées par fixateur externe au service d'orthopédie-traumatologie du CHU Ignace Deen Conakry. Health Sciences and Diseases. 2022;23(12):16-19.
9. Traoré T, Touré L, Diallo M, Amassou F, Chigblo P, Hans-Moevi A. Traitement par fixateur externe des fractures ouvertes des membres type III de Gustilo-Anderson. Journal Africain de Chirurgie Orthopédique et Traumatologique. 2019;4(2):77-82.
10. Najeb Y, Abkari I, Massous A, Kechkar T, Latifi M, Essadki B. Résultats du traitement des fractures de jambe par un fixateur externe low cost d'adaptation locale. Revue Marocaine de Chirurgie Orthopédique et Traumatologique. 2008;36:14-17.
11. Bakriga B, Akpoto MY, Kombate N, Ayouba G, Delanh Y, Abalo A. Aspects cliniques et thérapeutiques des fractures diaphysaires récentes de jambe chez l'adulte au Centre Hospitalier Universitaire Sylvanus Olympio de Lomé. Revue Marocaine de Chirurgie Orthopédique et Traumatologique. 2018;74:1-6.

How to Cite This Article
BALDÉ AK, CAMARA A, CONDÉ MS, DIÉMÉ CB. Evaluation of surgical treatment for diaphyseal leg fractures. International Journal of Orthopaedics Sciences. 2025;11(4):88-91.