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Is traditional bone setting a risk factor for postoperative complications in limb fractures? A prospective case-control study from Mali

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Abstract

Traditional bone setting is widely practiced in many African countries, including Mali, as the first line of care for fractures. While culturally embedded, its impact on subsequent surgical outcomes remains unclear. This study aimed to evaluate whether prior traditional fracture treatment increases the risk of postoperative complications. We conducted a prospective, monocentric, case-control study over 24 months (July 2017 - July 2019) including 60 patients with limb fractures. Thirty cases underwent osteosynthesis following traditional treatment, and 30 controls received direct surgical management without prior traditional care. Cases and controls were matched for age, sex, fracture type, and osteosynthesis method. Sociodemographic, clinical, and postoperative outcomes were collected. Statistical analysis was performed using SPSS v20, with significance set at $p < 0.05$. The mean age was 37.7 years (range: 5-71), with a predominance of males (66.7%). The most affected segment was the lower limb (73.3%), primarily femur and tibia fractures. In the case group, the median delay from trauma to surgery was 26 days (range: 3-732), while all controls were operated within 21 days. Postoperative complications occurred in 33.3% of cases versus 6.7% of controls ($p < 0.001$). Complications included surgical site infection, embolism, displacement, neurapraxia, and pseudarthrosis. Family recommendation and cultural beliefs were the main reasons for choosing traditional treatment. Prior traditional bone setting significantly increases the risk of postoperative complications in limb fractures. Early surgical intervention without prior traditional manipulation may reduce morbidity.

Keywords: Traditional bone setting, limb fractures, postoperative complications, osteosynthesis, non-union, Mali

Introduction

According to the World Health Organization (WHO), traditional medicine is "the sum of practical knowledge, whether explainable or not, for diagnosing, preventing, or eliminating physical, mental, and social imbalances, based exclusively on experience and observation passed down from generation to generation, either orally or in writing" [1]. Traditional medicine is defined as "all knowledge, use of substances, measures, and practices, whether explainable or not, based on the sociocultural and religious foundations of a given community, relying exclusively on experience and observations passed down from generation to generation orally or in writing, and used to diagnose, prevent, or eliminate physical, mental, or social imbalances" [2]. In many African societies, traditional treatment of fractures remains the first line of treatment, motivated by cultural, economic, and geographical reasons [3]. It is widespread (60.7%) in Mali and retains an important place alongside modern medicine [4]. However, an increasing number of complications following this treatment are being reported [4-6]. This study aimed to evaluate whether prior traditional fracture treatment increases the risk of postoperative complications.

Materials and Methods

This is a prospective, single-center case-control study of a cohort of 119 eligible patients, 30 patients in the case group (patients who underwent osteosynthesis after initial traditional treatment) and 30 patients in the control group (patients who underwent surgery directly

without contact with the traditional therapist) over a 24-month period between July 1, 2017, and July 3, 2019. The two groups were matched so that each patient in the case group was paired with a control with identical characteristics in terms of age, sex, type of fracture, and type of osteosynthesis. The exclusion criteria were as follows:

- Patients previously treated traditionally whose care was not surgical;
- Patients who underwent surgery but did not receive osteosynthesis (limb amputations, hip replacements)
- Incomplete files and patients lost to follow-up;
- In the control group, patients who underwent multiple surgeries were not selected.

Data was collected from emergency room, outpatient, operating room, and hospitalization records.

We collected socio-epidemiological, clinical, therapeutic, and evolutionary data. Open fractures were classified according to the Gustillo and Anderson classification [7]. Standard preoperative and postoperative radiographs were taken systematically in all patients. Fractures were classified according to the AO Muller classification [8]. Statistical data analysis was performed using SPSS Statistics version 20 software. The significance threshold was set at $p < 0.05$ with a 95% confidence interval.

Results

In this case-control study, both groups had the same average age, gender distribution, fracture types, and osteosynthesis. The average age was 37.7 years (range 5-71). Fifty-three-point three percent of our patients were between 31 and 50 years old, with a clear male predominance (20 men, or 66.7%).

Manual workers were the most represented in the case group with 23 cases (43.3%), while Government employees dominated with 10 cases (33.3%) in the control group (Table 1 characteristics of the two groups according to occupation).

Pain and functional impairment were consistent in both groups. Road traffic accidents were found in 20 cases (66.7%) in both groups, followed by domestic accidents in 10 cases (33.3%) in the case group and 5 cases (16.7%) in the control group.

The fracture line was simple in 60% of cases, followed by comminuted fractures in 33.3% of cases. The lower limb was most affected in 73.3% of cases, broken down as follows: femur fracture (36.7%), leg fracture (26.7%), and malleolus fracture (10%). Type A3 of the AO classification was the most common in 60% of cases, followed by type A2 (Table 2).

The time to surgery (trauma-surgery) in the case group was greater than 21 days in 86.7% of cases (mean: 48 days; range: 3-732 days). In the control group, only 4 patients (13.3%) underwent surgery after the 21st day, with a minimum of 3 days.

Screw plates were the most commonly used osteosynthesis material (70%), followed by intramedullary nails (16.7%) (Table 3).

Family recommendation was the main reason for seeking treatment from a traditional practitioner (46.7%), followed by belief in traditional medicine (30%).

Postoperative complications: There were five times as many complications in the case group (Table 4). In fact, there were 10 complications (33.3%) in the case group, compared with 2 complications (6.66%) in the control group. This difference was statistically significant ($p < 0.001$).

Table 1: Characteristics of the two groups according to occupation

	Case Group	Control Group
Manual workers	13 (43.3%)	7 (23.3%)
Government employees	7 (23.3%)	10 (33.3%)
Students	7 (23.3%)	6 (20%)
Housewife	2 (6.7%)	6 (20%)
Unemployed	1 (3.3%)	1 (3.3%)
Total	30(100%)	30 (100%)

Table 2: description of fractures and affected segments

		Case Group	Control Group
		Number (%)	Number (%)
Types of fractures	Simple	18 (60%)	18 (60%)
	Complex	2 (6,7%)	2 (6,7%)
	Comminuted	10 (33,3%)	10 (33,3%)
Segments	Upper limb	8 (26,7%)	8 (26,7%)
	Lower Limb	22 (73,3%)	22 (73,3%)
Displacement		Oui	Oui
AO Classification	A3	9(30%)	9(30%)
	A2	18(60%)	18(60%)
	C3	3(10%)	3(10%)

Table 3: Type of osteosynthesis material in the two groups

	n	%
Screw plate	21	70
Insolated pin + cerclage	2	6.66
Blade Plate	1	3.3
DHS plate screw	1	3.3
Intramedullary nail	5	16.7

Table 4: Postoperative complications in the two groups

Groups	Complications	Number	Percentage
Cases Group	Surgical Site Infection	3	10
	Pulmonary embolism	2	6.66
	Secondary displacement	1	3.3
	Neurapraxia	1	3.3
	Pseudarthrosis	3	10
	Total	10	33.33
Control Group	Surgical Site Infection	2	6.66

Discussion

Our case-control study highlights a significantly higher incidence of postoperative complications in the case group (patients who underwent surgery after initially receiving traditional fracture treatment) compared to the control group (patients who underwent surgery without first contacting a traditional therapist), with 33.33% versus 6.6% respectively ($p < 0.001$). In fact, there are five (5) times more complications overall in the case group. These results confirm that the use of traditional treatment is a major risk factor for postoperative complications, particularly infections, delayed healing, and functional sequelae.

Our results are consistent with those reported in several African and Asian studies that highlight the high frequency of complications after treatment by traditional practitioners, including infections, pseudarthrosis, joint stiffness, and skin necrosis [4-6,9]

A systematic review by Azodo *et al.* [10] of 27 African studies showed that 41 to 55% of patients treated by a traditional healer experience complications, compared with 8 to 12% of those treated directly in hospital. The authors conclude that traditional treatment of fractures is an independent determinant of postoperative complications.

A similar study conducted in Mopti (Mali) by Koné [11] had

already shown an overall complication rate of over 30% after traditional treatment, with a predominance of infections and pseudarthrosis. Garikapati ^[12] *et al.*, in their systematic review, confirm that the majority of complications arise from delays in surgical treatment and inadequate manipulation of fracture sites by traditional healers.

Several mechanisms may explain this increased postoperative mortality and morbidity:

- **Delayed surgical treatment:** the often-prolonged delay between fracture and surgery leads to trophic disorders, underlying infection, or malunion ^[7, 13]. In our series, 86.7% of patients in the case group had a delay in surgery of more than 21 days, with a maximum of 732 days.
- **Inadequate manipulation and restraint:** the use of rods, sheets, ropes, or compression bandages promotes ischemia, infection, and skin necrosis according to Omololu *et al* ^[14] and Nwachukwu *et al* ^[15] series.
- **Lack of asepsis and analgesia:** the absence of hygienic conditions and standardized therapeutic protocols increases the risk of infection and prolonged pain.
- **Cultural and socioeconomic barriers:** Proximity, low cost, and sociocultural trust in traditional practitioners perpetuate these practices, despite their documented morbidity ^[1, 3, 16].

However, some authors suggest that traditional healers could play a role in the care chain if they received basic training in identifying and referring serious fractures ^[14, 16]. The WHO strategy on traditional medicine (2014-2023) encourages an integrative rather than an exclusive approach ^[1]. Structured cooperation could reduce referral times and limit the occurrence of major complications.

Our study remains limited by its sample size and monocentric nature. The measurement of the exact time between trauma and surgery was not consistent. However, the strength of this study lies in the direct comparison between two groups matched for age, sex, type of fracture, and osteosynthesis, and in the demonstration of a clear difference in postoperative complications.

Conclusion

This study highlights that the use of traditional treatment for limb fractures is a significant risk factor for post-operative complications. Patients initially treated by traditional healers have a higher incidence of delayed pseudarthrosis, infections, and joint stiffness compared to those treated in hospital from the beginning. This result underscores the need to strengthen health education, early referral to specialized facilities, and the development of supervised collaborative approaches between traditional healers and modern facilities in order to reduce avoidable morbidity.

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