e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2025; 17(12); 2676-2681

Original Research Article

Traditional Bone Setters and Fracture Complications: A Retrospective Analysis

Sandesh S. Bobade[1], Vinod Deokate[2], Sangram Kharmale[3]

[1]Assistant Professor, Department of Orthopedics, P.A.H.G.M.C. Baramati, Baramati, Maharashtra, India

[2]Senior Resident, Department of Orthopedics, P.A.H.G.M.C. Baramati, Baramati, Maharashtra, India

[3]Junior Resident, Department of Orthopedics, P.A.H.G.M.C. Baramati, Baramati, Maharashtra, India

Received: 28-10-2025 / Revised: 27-11-2025 / Accepted: 28-12-2025

Corresponding Author: Dr. Sandesh S. Bobade

Conflict of interest: Nil

Abstract:

Background: Traditional bone setters continue to be a common first point of care for fractures in many low- and middle-income settings. Despite their widespread use, inappropriate fracture manipulation and immobilization are associated with significant complications that often present late to formal healthcare facilities. This study aimed to analyze the pattern of complications arising from fractures initially treated by traditional bone setters.

Material and Methods: A retrospective observational study was conducted at a tertiary care center over a five-year period. Medical records of patients presenting with fracture-related complications following initial management by traditional bone setters were reviewed. Demographic variables, mechanism and site of injury, delay in presentation, type of complications, definitive treatment, and duration of hospital stay were analyzed. Statistical analysis was performed to assess associations between delay in presentation and major complications.

Results: A total of 162 patients were included, with a predominance of males and individuals in the productive age group. High-energy trauma was the most common mechanism of injury, and long bones—particularly the tibia and forearm—were frequently involved. Most patients presented after a prolonged delay following injury. Malunion and non-union constituted the most common complications, followed by infection and joint-related sequelae. A significant association was observed between delayed presentation and major structural complications. The majority of patients required operative intervention, and prolonged hospital stay was common, reflecting the severity and complexity of complications encountered.

Conclusion: Fractures initially managed by traditional bone setters are associated with delayed presentation and a high burden of avoidable complications, often requiring complex surgical management. Early referral and increased public awareness regarding appropriate fracture care are essential to reduce morbidity and healthcare burden.

Keywords: Traditional Bone Setters; Fracture Complications; Malunion; Non-Union; Delayed Presentation; Orthopedic Trauma.

Introduction

Traditional bone setters (TBS) remain a commonly used source of fracture care in many low- and middle-income countries, even where formal orthopedic services are available. Systematic reviews consistently show that hospital-based orthopedic units continue to receive a substantial burden of patients whose fractures were initially managed outside the regulated health system and later present with complications that require definitive treatment [1,2]. The persistence of this care pathway reflects a complex mix of access barriers and patient preferences, rather than a simple lack of modern services.

Evidence from mixed-methods and cross-sectional studies suggests that the decision to seek TBS care is often influenced by perceived lower cost, cultural acceptability, expectations of rapid service, and family-driven decision-making [3,4]. In addition, qualitative work describing TBS practice indicates that many providers apply some elements resembling closed reduction and immobilization, but these are frequently combined with non-standard techniques and limited linkage to radiographic confirmation, follow-up documentation, or structured referral when complications arise [5]. Such features are clinically important because fracture outcomes depend on appropriate stabilization, timely detection of displacement, and early management of soft-tissue compromise—

factors that are difficult to ensure in unregulated settings.

Complications associated with TBS management have been repeatedly described and include malunion, delayed union or non-union, infection, joint stiffness, and severe soft-tissue injury. A systematic review focusing on contemporary fracture care in LMICs summarized a broad pattern of morbidity among patients presenting to modern orthopedic services after TBS treatment [1]. A more recent PRISMA-guided review spanning studies up to 2020 similarly documented limb- and life-threatening adverse outcomes, emphasizing that the clinical consequences extend beyond simple angular deformity and may involve avoidable disability and, in some settings, mortality [2]. Hospital series describing case mixes of TBS-related morbidity further reinforce that structural failure of healing and infection are common reasons for subsequent orthopedic consultation and intervention [6]. Collectively, these reports highlight that the complications are not sporadic events, but rather reflect predictable risks arising from inadequate immobilization, unrecognized open injuries, delayed escalation of care, and harmful pressure effects of splints or bandages.

Although the harms are well recognized, there is increasing interest in pragmatic strategies that reduce complications while acknowledging the reality of TBS utilization. Studies evaluating engagement approaches report that many TBS practitioners' express interest in learning basic principles of fracture care and improving referral practices, suggesting a potential avenue for harm reduction [5]. A proof-of-concept training program in Ghana demonstrated measurable improvements in knowledge and self-reported practice, alongside the establishment of a functioning referral pathway to local hospitals, supporting the feasibility of structured collaboration in selected contexts [7]. However, the clinical profile of patients who present with complications after TBS management—and the resource implications for tertiary orthopedic services—remains highly relevant for planning prevention and designing targeted community and health-system responses.

In this context, the present retrospective analysis was undertaken to characterize fracture complications among patients treated initially by traditional bone setters who later presented to a tertiary care hospital. By describing patterns of injury, delays in presentation, and the spectrum of complications requiring orthopedic management, this study aims to quantify a preventable burden of morbidity and provide data that can inform early referral messaging and locally appropriate strategies to reduce adverse outcomes.

Material and Methods

Study design and setting: A retrospective observational study was conducted to evaluate fracture-related complications following treatment by traditional bone setters. Medical records of patients presenting with complications after prior non-institutional fracture care were reviewed. The study was carried out at a tertiary-level teaching hospital in India.

Study period: Records from a 5-year period were analyzed to ensure an adequate sample size and temporal representation of injury patterns and complications.

Study population and sample size: All consecutive patients who presented during the study period with complications attributable to prior fracture management by traditional bone setters were screened. Based on record availability and eligibility criteria, a total sample size of 162 patients was included. The sample size was deemed adequate to allow meaningful descriptive and comparative analysis of complication patterns across fracture types and anatomical locations.

Inclusion criteria

- Patients of any age and sex
- History of acute fracture initially managed by a traditional bone setter
- Subsequent presentation to the study center with one or more fracture-related complications
- Availability of complete clinical records and radiological documentation

Exclusion criteria

- Patients who received initial fracture care at a registered medical facility
- Pathological fractures unrelated to trauma
- Isolated soft tissue injuries without radiological evidence of fracture
- Incomplete or illegible medical records

Data collection: Data were retrieved from hospital medical records, orthopedic admission registers, operative logs, and radiographic archives. The following variables were systematically recorded using a standardized data extraction form:

- Demographic details: age, sex
- Injury characteristics: mechanism of injury, anatomical site, fracture pattern (open/closed)
- Details of traditional treatment: type of immobilization, manipulation history, duration of treatment before hospital presentation
- Time interval between injury and presentation to the hospital
- Documented complications at presentation

Outcome measures: The primary outcome measure was the type of fracture-related complication observed at presentation. Complications were categorized as:

- Malunion
- Non-union or delayed union
- Infection (superficial or deep)
- Compartment syndrome
- Neurovascular injury
- Joint stiffness or deformity
- Skin necrosis or pressure sores

Secondary outcomes included the need for surgical intervention, type of definitive orthopedic management provided, and duration of hospital stay.

Radiological assessment: All available radiographs were reviewed to confirm fracture characteristics and complications. Union status, alignment, and presence of infection-related changes were assessed using standard orthopedic criteria. Radiological evaluation was performed by two independent orthopedic surgeons to minimize observer bias.

Statistical analysis: Data were entered into a spreadsheet and analyzed using standard statistical software. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. Associations between fracture location, delay in presentation, and type of complication were analyzed using chi-square or Fisher's exact test, as appropriate. A p-value <0.05 was considered statistically significant.

Results

A total of 162 patients who developed fracture-related complications following initial management by traditional bone setters were included in the analysis. The study population demonstrated a predominance of males and individuals in the economically productive age group, indicating a higher exposure of this demographic to traumatic injuries and subsequent non-institutional care (Table 1).

High-energy trauma constituted the major mechanism of injury, with road traffic accidents and falls from height together accounting for the majority of fractures. This pattern suggests that injuries requiring definitive orthopedic stabilization were frequently subjected to traditional treatment methods (Table 2). Long bones of the lower and upper limbs were most commonly involved, particularly the tibia and forearm bones, reflecting their vulnerability to improper immobilization and manipulation (Table 3).

A substantial delay between injury and presentation to a formal healthcare facility was observed. Most patients sought institutional care only after several weeks or months of traditional treatment, implying delayed recognition or progression of complications. The prolonged interval before presentation appeared to contribute significantly to the complexity of clinical findings at admission (Table 4).

Structural complications such as malunion and non-union emerged as the most frequent adverse outcomes, underscoring the biomechanical inadequacy of non-scientific immobilization techniques. Infective and soft tissue–related complications were also notable, reflecting compromised fracture care and poor local wound management (Table 5).

Delayed presentation was significantly associated with a higher burden of major structural complications. Patients reporting after extended periods were more likely to exhibit malunion or non-union compared to those presenting earlier, highlighting the detrimental impact of prolonged inappropriate treatment on fracture healing (Table 6).

The majority of patients ultimately required operative intervention, indicating advanced pathology at the time of hospital presentation. Definitive management frequently involved internal fixation or external stabilization, while a smaller proportion necessitated corrective procedures or infection control measures. Only a limited subset could be managed conservatively, reflecting the severity of complications encountered (Table 7).

Hospitalization duration varied considerably and was influenced by the nature and extent of complications as well as the complexity of surgical management. Prolonged hospital stay was more commonly observed among patients requiring staged or reconstructive procedures, emphasizing the additional healthcare burden associated with delayed and improper fracture management (Table 8).

Table 1: Demographic Characteristics of the Study Population (n = 162)

Variable	Frequency	Percentage (%)
Age group (years)		
≤18	28	17.3
19–40	64	39.5
41–60	46	28.4
>60	24	14.8
Mean age ± SD (years)	38.6 ± 16.9	—
Sex		
Male	108	66.7
Female	54	33.3

Table 2: Mechanism of Injury among Study Participants

Mechanism of injury	Number (n)	Percentage (%)
Road traffic accident	74	45.7
Fall from height	52	32.1
Domestic fall	21	13.0
Assault / blunt trauma	15	9.2

Table 3: Anatomical Distribution of Fractures

Fracture site	Number (n)	Percentage (%)
Tibia	46	28.4
Forearm bones	38	23.5
Femur	27	16.7
Humerus	24	14.8
Ankle / foot	17	10.5
Others (clavicle, hand, etc.)	10	6.1

Table 4: Delay between Injury and Hospital Presentation

Time interval	Number (n)	Percentage (%)
≤1 week	18	11.1
1–4 weeks	52	32.1
1–3 months	61	37.7
>3 months	31	19.1
Mean delay ± SD (weeks)	7.8 ± 4.6	—

Table 5: Types of Complications Observed at Presentation

Complication	Number (n)	Percentage (%)
Malunion	49	30.2
Non-union / delayed union	41	25.3
Infection	28	17.3
Joint stiffness / deformity	22	13.6
Skin necrosis / pressure sores	13	8.0
Neurovascular injury	9	5.6

Table 6: Association between Delay in Presentation and Major Complications

Delay >4 weeks	Malunion / Non-union	Other complications	Total	p-value
Yes	62	30	92	
No	28	42	70	**0.003**
Total	90	72	162	

Table 7: Definitive Orthopedic Management Provided

Treatment modality	Number (n)	Percentage (%)
Open reduction and internal fixation	61	37.7
External fixation	29	17.9
Debridement ± antibiotics	24	14.8
Corrective osteotomy	21	13.0
Conservative management	27	16.6

Table 8: Duration of Hospital Stay

Hospital stays (days)	Number (n)	Percentage (%)
≤5 days	34	21.0
6–10 days	69	42.6
>10 days	59	36.4
Mean stay ± SD (days)	9.2 ± 3.8	—

Discussion

This retrospective analysis highlights a consistent pattern of potentially preventable fracture-related morbidity among patients who initially sought care from traditional bone setters (TBS). Across the cohort, the injury profile was dominated by long-bone trauma, and patients frequently reached formal orthopaedic services after a clinically meaningful

delay (Table 1, Table 2). Delayed presentation is a recurring determinant of adverse outcomes in populations that consult TBS and has been shown to independently increase the likelihood of complications after TBS care, reinforcing the plausibility of the association observed in our dataset (Table 7) [8].

The complication mix in our series (Table 3) is consistent with known consequences of inadequate reduction, prolonged immobilization in non-anatomical alignment, and unmonitored tight splintage. Malalignment-related sequelae (malunion and stiffness) plausibly reflect both initial fracture instability and subsequent immobilization without radiographic assessment, while infection-related outcomes likely represent a combination of delayed definitive care, repeated manipulation, and soft-tissue compromise (Table 3, Table 4). Similar categories of complications—ranging from deformity and nonunion to limb-threatening events—are frequently described in the TBS literature and remain a central concern in expert guidance on fracture care in settings where TBS practice is prevalent [9,10].

A notable proportion of patients in our study required operative management after arrival at the hospital (Table 5). This aligns with the concept that what may begin as a potentially straightforward injury can progress to a surgically complex problem when early stabilization and soft-tissue monitoring are absent. Training/triage models proposed for TBS settings emphasize early identification of high-risk injuries and prompt referral—particularly for open fractures, neurovascular compromise, and unstable long-bone injuries—precisely because these conditions are prone to deterioration if treated with tight splints or prolonged traditional immobilization (Table 6) [11].

Although catastrophic ischemic complications were not universal, their presence is clinically important because even a small absolute number translates into profound disability and socioeconomic impact. Tight circumferential bandaging with evolving swelling can precipitate compartment syndrome and distal ischemia; when unrecognized, this pathway culminates in gangrene and major amputation. Classic clinical descriptions of "traditional bone setter's gangrene" document this mechanism and its association with proximal amputations [12]. Contemporary institutional experiences similarly describe preventable limb loss linked to traditional splintage, including in pediatric populations, where delays and sepsis can further worsen outcomes (Table 4, Table 8) [13,14].

The relationship between time-to-presentation and complication burden in our analysis (Table 7) is supported by prospective facility-based evidence showing delayed arrival after TBS care as a major risk factor for complications. Beyond timing, the observed distribution of complications (Table 3) likely reflects case-mix severity and injury type, but also modifiable process factors: non-standardized splinting, lack of neurovascular monitoring, and absence of structured escalation pathways. These issues have motivated training initiatives and pragmatic collaboration frameworks aimed at reducing harm without disregarding the sociocultural and access drivers that lead patients to seek TBS care [10,15].

Our findings support two parallel priorities. First, community-facing interventions should focus on early recognition of red-flag symptoms (increasing pain, numbness, swelling, discoloration, foul discharge, fever) and the need for urgent hospital evaluation (Table 8). Second, system-facing strategies should improve affordability, geographic access, and trust in orthopaedic services—because patients often choose TBS due to convenience and perceived acceptability. Expert consensus from East and West Africa emphasizes regulation/standardization and targeted training of TBS to reduce avoidable complications, alongside broader strengthening of essential orthopaedic capacity [9,10]. Evidence from structured training efforts suggests that educational engagement can reduce severe outcomes such as gangrene-related amputation, indicating that harm-reduction approaches may be feasible in resource-limited contexts (Table 8) [15].

A key strength is the structured capture of clinical patterns and outcomes across multiple complication domains (Table 3–Table 8), allowing internally consistent interpretation of how initial TBS care may shape downstream hospital burden. The principal limitations are those typical of retrospective designs: incomplete documentation of the exact techniques used by TBS practitioners, potential referral bias toward more severe complications, and limited ability to establish causality between specific TBS practices and outcomes (Table 6). Future work should prioritize prospective registries of TBS-associated complications, standardized definitions, and context-specific evaluation of referral/training interventions.

Conclusion

The findings of this study demonstrate that fractures initially managed by traditional bone setters are frequently associated with delayed presentation and a high incidence of preventable complications, particularly malunion, non-union, infection, and functional impairment. Prolonged reliance on non-scientific treatment methods was significantly linked to adverse structural outcomes, often necessitating complex surgical interventions and extended hospitalization. These results highlight the

substantial clinical and healthcare burden imposed by improper fracture care and underscore the need for early referral, public awareness, and integration of evidence-based orthopedic practices to reduce morbidity associated with traditional fracture management.

References

1. Onyemaechi NO, Menson WNA, Goodman X, Slinkard S, Onwujekwe OE, Enweani UN, et al. Complications of traditional bonesetting in contemporary fracture care in low- and middle-income countries: A systematic review. Trop Med Int Health. 2021 Nov;26(11):1367-1377. doi: 10.1111/tmi.13662.
2. Garikapati V, Konadu-Yeboah D, Mengesha MG, Marenah K, Harrison WJ. Systematic review of complications associated with treatment by traditional bone setters for musculoskeletal injury. Trop Doct. 2023 Jan;53(1):13-19. doi: 10.1177/00494755221122543.
3. Worku N, Tewelde T, Abdissa B, Merga H. Preference of Traditional Bone Setting and associated factors among trauma patients with fracture at Black Lion Hospital in Addis Ababa, Ethiopia: institution based cross sectional study. BMC Res Notes. 2019 Sep 18;12(1):590. doi: 10.1186/s13104-019-4643-z.
4. Yempabe T, Edusei A, Donkor P, Buunaaim A, Mock C. Factors affecting utilization of traditional bonesetters in the Northern Region of Ghana. Afr J Emerg Med. 2021 Mar;11(1):105-110. doi: 10.1016/j.afjem.2020.09.002.
5. Card EB, Obayemi JE, Shirima O, Lazaro M, Massawe H, Stanifer JW, et al. Practices and Perspectives of Traditional Bone Setters in Northern Tanzania. Ann Glob Health. 2020 Jun 16;86(1):61. doi: 10.5334/aogh.2878.
6. Odatuwa-Omagbemi DO, Adiki TO, Elachi CI, Bafor A. Complications of traditional bone setters (TBS) treatment of musculoskeletal injuries: experience in a private setting in Warri, South-South Nigeria. Pan Afr Med J. 2018 Jul 2;30:189. doi: 10.11604/pamj.2018.30.189.15730.
7. Konadu-Yeboah D, Yempabe T, Bo-Ib Buunaaim AD, Konadu P, Owusu R, Arthur J, et al. Training Traditional Bonesetters in Basic Principles of Fracture Treatment: A Proof of Concept in Ghana. J Bone Joint Surg Am. 2023 Dec 20;105(24):1995-2001. doi: 10.2106/JBJS.22.01304.
8. Carmina E, Azziz R, Bergfeld W, Escobar-Morreale HF, Futterweit W, Huddleston H, et al. Female pattern hair loss and androgen excess: a report from the Multidisciplinary Androgen Excess and PCOS Committee. J Clin Endocrinol Metab. 2019 Jul;104(7):2875–2891. doi:10.1210/jc.2018-02548.
9. Askew MR, Hinchman C, Rayel IM, Jenkins P, Dada A, Diallo M, Mengesha MG, Konadu-Yeboah D, Ndasi HT, Onyemaechi NO, Agarwal-Harding KJ. The continued role of traditional bonesetters in East and West Africa: an expert consensus statement. East Cent Afr J Surg. 2023;28(1):4–9.
10. Binnerts JJ, Hendriks TCC, Hussein S, Bempong-Ahun N, Ibbotson GC, Harrison WJ, et al. Intersectoral Collaboration Between Traditional Bonesetters and Formal Healthcare: A Systematic Review on Past Initiatives and Stakeholder Perspectives. World J Surg. 2025 Mar;49(3):652-663. doi: 10.1002/wjs.12503.
11. Omololu AB, Ogunlade SO, Gopaldasani VK. The practice of traditional bonesetting: training algorithm. Clin Orthop Relat Res. 2008 Oct;466(10):2392-8. doi: 10.1007/s11999-008-0371-8.
12. Onuminya JE, Onabowale BO, Obekpa PO, Ihezue CH. Traditional bone setter's gangrene. Int Orthop. 1999;23(2):111-2. doi: 10.1007/s002640050320.
13. Echem RC, Eyimina PD. Lower extremity gangrene in children from traditional bone setters care: an avoidable cause of limb loss. Int J Res Med Sci. 2020;8(7):2524–2530. doi:10.18203/2320-6012.ijrms20202889.
14. Winanto ID, Tirta C. Management of dead limb following traditional practices in Indonesia: A case report. Int J Surg Case Rep. 2024 Oct;123:110215. doi: 10.1016/j.ijscr.2024.110215.
15. Eshete M. The prevention of traditional bone setter's gangrene. J Bone Joint Surg Br. 2005 Jan;87(1):102-3.