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TRADITIONAL BONE SETTING AS A COMMUNITY-BASED HEALING SYSTEM: A REVIEW OF INDIGENOUS ORTHOPAEDIC PRACTICES AND NATURAL REMEDIES FROM KARNATAKA

(An ICSSR Funded Study)

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Abstract

Traditional bone setting represents an indigenous system of fracture management that integrates manual realignment techniques, immobilization methods, and natural therapeutic agents derived primarily from medicinal plants. Despite its continued utilization in rural and semi-urban populations, this practice remains insufficiently documented within scientific literature.

The present review combines primary documentation of traditional bone setting practices in Karnataka with a narrative synthesis of published studies to examine indigenous orthopaedic techniques and natural remedies employed in fracture care. Emphasis is placed on materials used, procedural variations, regional diversity, and proposed mechanisms of action.

The findings indicate that traditional bone setters utilize tactile diagnosis, controlled manipulation, herbal pastes, medicated oils, and locally sourced splints to manage fractures and joint injuries. While accessibility and cultural acceptance contribute to sustained use, concerns related to standardization and delayed referral remain. This review highlights the need for systematic documentation and scientific validation to enhance safety while preserving indigenous knowledge.

Keywords: Traditional bone setting; Indigenous orthopaedics; Herbal fracture therapy; Ethnomedicine; Community-based healthcare.

1. Introduction

Indigenous medical systems have long served as essential sources of healthcare, particularly in regions with limited access to institutional medical services [1,2]. Prior to the development of modern orthopaedics, fracture management relied largely on experiential knowledge and locally available natural resources [3,4]. Traditional bone setting represents one such specialized healing system focused on restoring musculoskeletal integrity through non-surgical means [5,6].

Traditional bone setters acquire knowledge through intergenerational transmission or apprenticeship rather than formal academic training [7,8]. Their therapeutic approach typically involves manual correction of displaced bones, immobilization using natural or improvised materials, and topical or internal administration of herbal preparations [9,10]. These practices are embedded within cultural frameworks that emphasize holistic recovery and patient trust [9,10].

Although biomedical orthopaedics has advanced considerably, traditional bone setting continues to attract patients due to affordability, accessibility, and sociocultural familiarity [13,14]. In many rural communities, bone setters act as first-contact providers for trauma cases [15,16]. However, scientific discourse has frequently focused on

adverse outcomes, while limited attention has been given to systematically documenting therapeutic techniques and medicinal resources [5,17].

This review aims to synthesize evidence on traditional bone setting as a community-based healing system, with specific emphasis on indigenous orthopaedic practices and natural remedies, and to systematically record and describe indigenous fracture management practices followed by traditional bone setters across Karnataka while integrating these findings with existing literature on natural remedies used in fracture healing [8,18,19].

2. Methodological Framework For Indigenous Fracture Care Review

The study employed an integrative approach combining primary documentation with a narrative literature review. Primary data were collected through field interactions with practicing traditional bone setters in selected districts of Karnataka. Informal interviews and observational documentation were undertaken to record diagnostic techniques, materials used, preparation of remedies, and treatment procedures.

In parallel, a narrative review of published literature was conducted using electronic databases including PubMed, Google Scholar, Scopus, and Web of Science. Keywords such as traditional bone setting, indigenous fracture healing, herbal remedies for fractures, and ethnomedicine were applied. Peer-reviewed articles describing fracture management practices or herbal therapies were included. Studies lacking therapeutic relevance or methodological clarity were excluded. Data from primary and secondary sources were extracted on treatment techniques, natural remedies, mechanisms of action, sociocultural aspects, and outcomes. The information was synthesized thematically under indigenous orthopaedic practices, herbal applications, biological mechanisms, and public health relevance.

3. Indigenous Fracture Management Practices In Karnataka

Field documentation demonstrated considerable diversity in fracture management techniques across different regions of Karnataka, indicating adaptation to local ecological resources and cultural traditions [8,22]. Traditional bone setters employed tactile and visual assessment to identify the nature and extent of injuries, followed by controlled manual manipulation to restore anatomical alignment [5,17]. Therapeutic interventions commonly involved the application of herbal pastes, medicated oils, or plant-based poultices prepared from locally available medicinal plants [10,23,24]. Immobilization was achieved using bamboo, cane, or wooden splints secured with cotton or cloth bandages to restrict movement and support healing [9,16]

These practices were not uniform but varied according to regional knowledge systems and availability of materials, reflecting a dynamic and context-specific approach to indigenous fracture care [11,12]. In several instances, treatment protocols also incorporated massage, dietary advice, and symbolic elements that reinforced patient confidence and community trust in the healer [2,7]. Together, these observations illustrate that traditional bone setting in Karnataka functions as an integrated therapeutic system combining diagnostic skill, mechanical correction, and natural remedies within a culturally embedded framework [5,8]

TABLE 1. INDIGENOUS FRACTURE MANAGEMENT TECHNIQUES AND REGIONAL DISTRIBUTION IN KARNATAKA

No.	Technique	Materials Used	Procedural Description
1	Puttur Kattu	Kasamarda herb, egg albumin, turmeric, cotton bandages, bamboo/wooden splints	Fracture identified by touch; bones repositioned manually, herbal paste applied, and limb stabilized using splints and wraps.
2	Naati Kattu	Regional medicinal plants, natural binders, cotton strips, bamboo/wood	Injury assessed by palpation; manual correction followed by application of herbal

No.	Technique	Materials Used	Procedural Description
		splints	paste and firm bandaging.
3	Bamboo/Cane Splint Fixation	Bamboo or cane rods, cotton cloth, medicated oils or herbal pastes	After alignment, rigid splints and herbal dressings are applied to restrict movement.
4	Mozhi Nool Method	Cotton thread, cloth bandages, herbal oils, bamboo/wood supports	Gentle manipulation followed by tying of thread to guide binding and immobilization.
5	Classical System-Based Bone Setting	Medicinal herbs, sesame oil, cotton bandages, dietary formulations	Constitutional assessment followed by bone realignment, oil massage, herbal application and bandaging.
6	Coin Compression Bandage	Metallic coins, cloth strips, occasional herbal powders	Coins placed over fracture site after realignment and tightly secured to exert pressure.
7	Khasi-Influenced Method	Adiantum phillippense, Acorus calamus, native gingers, bamboo splints	Manual adjustment with fresh herbal poultices and splint fixation.
8	Harjura-Based Therapy (*Cissus quadrangularis*)	Fresh stems/leaves, decoctions, bamboo splints	External paste or oral decoction administered followed by splinting.
9	Marma-Based Therapy	Herbal oils and pastes, cotton wraps	Vital point-focused manipulation combined with massage and immobilization.
10	Tripura Ethno-Orthopaedic Method	Local medicinal plants, plant fibers, bamboo splints	Controlled manipulation and application of herbal poultices with natural splints.

4. Natural Remedies In Fracture Care

In traditional bone setting, herbal preparations form the core of therapeutic intervention and are closely intertwined with the healer's experiential knowledge and local ecological resources. Practitioners prepare fresh pastes, medicated oils, and plant-based poultices using plants gathered from nearby fields, forests, or home gardens [8]. Species such as Cissus quadrangularis, Vitex negundo, Curcuma longa, and Azadirachta indica are repeatedly cited by healers as essential ingredients in fracture care, selected not only for their medicinal properties but also for their long-standing cultural association with wound healing and bodily repair [19].

Preparation of remedies is typically carried out immediately before application. Plant parts such as stems, leaves, or rhizomes are crushed using stone grinders or wooden mortars and mixed with natural binders like egg white, sesame oil, or plant extracts to form a cohesive paste. These mixtures are applied directly over the injured area, often accompanied by gentle massage to facilitate penetration and relieve discomfort 5. The treated limb is then wrapped with cloth or cotton bandages and supported with bamboo, cane, or wooden splints to restrict movement.

Healers emphasize the need for repeated application of these herbal formulations, which are renewed at regular intervals during the immobilization period. In some traditions, decoctions or powdered plant materials are also administered orally to strengthen the body and "support bone joining from within" . The use of these remedies is embedded in a broader therapeutic routine that may include dietary advice, avoidance of strenuous activity, and symbolic gestures aimed at reinforcing patient confidence.

Through these practices, herbal agents are not viewed merely as topical medicines but as biologically active substances that participate in the healing process. The sustained reliance on plant-based therapies reflects an indigenous understanding of fracture recovery that integrates mechanical stabilization with natural biological

support, shaped by generations of observation, cultural belief, and local environmental knowledge.

5. Proposed Mechanisms Of Action

The healing potential of indigenous remedies used in traditional bone setting is understood to arise from their action on multiple biological processes involved in tissue repair. Many of the plant-based formulations employed by traditional healers possess pronounced anti-inflammatory properties, which help to reduce localized swelling and limit tissue damage at the site of injury. Their analgesic effects further contribute to patient comfort by alleviating pain and minimizing reflex muscle spasm, thereby supporting proper immobilization and alignment of the fractured limb.

In addition to controlling inflammation and pain, several medicinal plants used in fracture care exhibit antimicrobial activity, which plays a crucial role in preventing secondary infection, particularly in cases involving open wounds or skin abrasions 18. By reducing microbial load, these remedies help maintain a favorable environment for healing and lower the risk of delayed union or complications.

Certain botanicals are also believed to exert osteogenic effects by stimulating osteoblast proliferation and enhancing collagen synthesis, both of which are essential for callus formation and bone remodeling . The presence of bioactive compounds such as flavonoids, alkaloids, and mineral-rich constituents may contribute to these regenerative processes.

Furthermore, the application of herbal pastes and medicated oils is thought to improve local blood circulation, facilitating the delivery of nutrients and oxygen to injured tissues. Enhanced circulation, together with the promotion of granulation tissue and epithelial repair, supports overall recovery and structural restoration. Collectively, these mechanisms illustrate that indigenous fracture remedies function not merely as symptomatic treatments but as biologically active agents that influence several stages of the healing cascade.

6. Synthesis Of Indigenous Orthopaedic Practices And Natural Therapies

The findings of this review highlight the continued relevance of traditional bone setting as a community-based system of fracture care. The documented practices demonstrate a combination of tactile diagnosis, manual manipulation, herbal therapy, and immobilization using locally available materials. These approaches reflect an empirical understanding of musculoskeletal injury management developed through long-term observation and practice.

Regional variation in techniques across Karnataka indicates adaptive responses to ecological availability and cultural influences. Methods such as Puttur Kattu and Naati Kattu employ herbal pastes combined with splinting, whereas Marma-based approaches integrate pressure-point manipulation with medicated oils. Such diversity suggests that traditional bone setting is not a uniform practice but a constellation of localized healing systems tailored to community needs.

The frequent use of medicinal plants such as Cissus quadrangularis, Vitex negundo, and Curcuma longa supports the biological plausibility of these practices. These plants are known to exhibit anti-inflammatory, antimicrobial, and tissue-regenerative properties, which may contribute to pain relief and fracture stabilization. Herbal applications may also reduce secondary infection risk and promote local circulation, thereby supporting healing.

Despite these therapeutic elements, limitations remain evident. The absence of radiological assessment and standardized protocols increases the risk of improper alignment and delayed diagnosis of complications. Variability in practitioner expertise further influences treatment outcomes. Such limitations underscore the importance of integrating indigenous fracture care with biomedical referral systems rather than positioning it as a replacement for modern orthopaedics.

From a public health perspective, traditional bone setters continue to serve as first-contact providers for trauma in rural and underserved regions. Their social acceptance and geographical proximity allow early intervention in fracture cases. Structured training in hygiene, wound care, and recognition of severe injuries could enhance patient

safety. Collaboration with hospitals through referral linkages may further reduce the burden of complications.

The review also emphasizes the need for scientific validation of herbal formulations used in fracture care. Pharmacological studies, standardization of preparation methods, and controlled clinical trials are required to evaluate safety and efficacy. Ethical documentation of indigenous knowledge is equally important to preserve cultural heritage while ensuring responsible application.

Overall, traditional bone setting should be viewed as a complementary system that can contribute to fracture management when appropriately regulated and scientifically examined. Preservation of indigenous knowledge, combined with evidence-based integration, may enhance community health outcomes while respecting cultural practices.

7. Public Health Significance Of Traditional Bone Setting Practices

Traditional bone setters continue to play a critical role in the delivery of trauma care in rural and resource-limited settings, where access to formal orthopedic services is often constrained by geographical distance, economic barriers, and limited health infrastructure. In many communities, these practitioners' function as the first point of contact for individuals sustaining fractures or joint injuries, owing to their cultural acceptability, affordability, and immediate availability. Their presence helps bridge gaps in emergency care, particularly in remote areas where delayed treatment could otherwise lead to severe disability.

Despite their importance, traditional fracture care is associated with potential risks arising from the absence of standardized diagnostic tools, sterile techniques, and formal training. Targeted capacity-building initiatives focused on hygiene practices, basic wound management, early recognition of complicated fractures, and timely referral to hospitals could substantially enhance patient safety. Equipping traditional bone setters with fundamental knowledge of fracture classification and warning signs of vascular or nerve compromise may help prevent adverse outcomes such as infection, malunion, or chronic deformity.

Establishing collaborative linkages between indigenous practitioners and biomedical health facilities offers a pragmatic strategy for improving fracture management at the community level. Referral networks and mutual recognition of roles could facilitate prompt transfer of severe cases while allowing traditional healers to manage minor, uncomplicated injuries within their scope of practice. Such integrative approaches not only respect cultural traditions but also strengthen the overall health system by incorporating trusted community-based providers into formal care pathways.

From a public health perspective, recognizing and responsibly integrating traditional bone setting into primary healthcare frameworks could reduce the burden of untreated musculoskeletal injuries and improve functional outcomes among rural populations. Structured engagement, regulation, and ethical documentation of indigenous knowledge can further support safe practice while preserving valuable cultural heritage.

8. Research Gaps And Future Directions In Indigenous Fracture Care

Although traditional bone setting remains widely practiced and culturally embedded, systematic scientific evaluation of these methods remains limited. Most existing evidence is derived from ethnographic observations, case reports, and small-scale studies, which restrict the ability to draw definitive conclusions regarding safety, efficacy, and standardization. There is a notable lack of controlled clinical trials assessing outcomes such as fracture union rates, functional recovery, and complication profiles in patients treated with indigenous methods compared to biomedical interventions. This gap hinders the development of evidence-based guidelines for the responsible use of traditional fracture therapies.

Another critical limitation lies in the inadequate pharmacological characterization of herbal formulations used in fracture care. While several medicinal plants are reputed to enhance bone healing, few studies have systematically identified their active constituents, mechanisms of action, and dose–response relationships. Variability in plant species, preparation techniques, and application frequency further complicates reproducibility and comparison across studies. Future research should focus on phytochemical profiling, in vitro and in vivo evaluation of

osteogenic activity, and toxicity assessment to ensure both therapeutic validity and patient safety.

Sociocultural dimensions of traditional bone setting also remain underexplored. There is limited documentation of healer training pathways, knowledge transmission, and decision-making processes regarding case selection and referral. Understanding these factors is essential for designing culturally sensitive interventions that support collaboration between traditional practitioners and formal healthcare systems. Research exploring patient perceptions, treatment-seeking behavior, and economic considerations would further contribute to a comprehensive understanding of indigenous fracture care within broader health systems.

Future directions should prioritize interdisciplinary research integrating ethnomedicine, orthopedics, pharmacology, and public health. Community-based participatory approaches may facilitate ethical documentation of indigenous knowledge while fostering trust between researchers and practitioners. The development of training modules for hygiene, early complication detection, and referral protocols could be evaluated through pilot implementation studies. Ultimately, strengthening the evidence base for traditional bone setting has the potential to enhance fracture care in underserved populations while preserving valuable indigenous healing traditions.

9. Conclusion

Traditional bone setting continues to function as a deeply rooted and socially trusted system of fracture management in many parts of India, particularly in rural and underserved regions. The practice represents an integrated therapeutic approach in which tactile diagnosis and manual realignment are combined with the use of herbal formulations and natural immobilization techniques. This combination reflects a holistic understanding of injury care that addresses both mechanical stabilization and biological support for tissue repair.

The persistence of these practices highlights their accessibility, cultural legitimacy, and practical relevance in communities with limited access to formal orthopedic services. Indigenous healers often serve as the first point of care following trauma, thereby playing a crucial role in reducing delays in treatment and providing immediate support. The use of medicinal plants with anti-inflammatory, antimicrobial, and regenerative properties further strengthens the therapeutic rationale underlying these practices.

However, the long-term contribution of traditional bone setting to modern healthcare depends on systematic scientific documentation and ethical validation. Rigorous investigation into the pharmacological properties of herbal remedies, standardization of preparation techniques, and evaluation of clinical outcomes are essential to establish safety and efficacy. At the same time, culturally sensitive integration with biomedical services—through referral systems, basic training, and collaborative frameworks—could minimize complications while preserving indigenous knowledge.

With appropriate research, regulation, and cooperation between traditional practitioners and formal healthcare providers, traditional bone setting has the potential to complement contemporary fracture management strategies. Such integration may enhance access to musculoskeletal care in resource-limited settings while safeguarding an important component of India’s intangible medical heritage.

Declaration of Competing Interests

The authors declare no financial or personal conflict of interest that could have influenced the research presented in this study.

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Ethical Compliance Statement

All procedures performed in studies involving human participants were in accordance with the ethical standards of the RNSIT research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Statement of Contributorship

Dr. P. Archana conceptualized the study, designed the review framework, and contributed to data interpretation and manuscript preparation. Dr. U. Bhojanna provided overall supervision, critical intellectual input, and guided the methodological approach of the study. Dr. G. V. M. Sharma contributed to literature acquisition, analysis of indigenous practices, and assisted in drafting and revising the manuscript for important intellectual content. All authors reviewed and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

Data Sharing Statement

The data supporting the findings of this study are derived from field documentation and published literature. Field-based data are qualitative in nature and were collected from traditional practitioners; therefore, they are not publicly available due to ethical considerations, confidentiality, and protection of indigenous knowledge. Relevant extracted data from published sources are included within the manuscript and reference list. Additional information may be made available by the corresponding author upon reasonable request.

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