

Original Research Article

Traditional bone setting: an avoidable cause of major limb amputations

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ABSTRACT

Background: Despite the availability of modern health care services, patients in Nigeria still seek treatment by traditional bone setters. One of the major complications of this type of native fracture treatment is limb gangrene necessitating amputations. The objective of this study was to determine the role of traditional bone setting in major limb amputations.

Methods: This retrospective study was carried out at a government orthopedic referral hospital. The study involved all patients who underwent major limb amputation between January 2015 and December 2019 in our center. Data were retrieved from medical records and operation registers. Information regarding age, sex, indications and levels of amputation and complications were studied.

Results: During the study period; of the 297 major limb amputations performed, 194 (65.3%) were due to traditional bone setting. The median age of the patients was 11.0 years (1 to 45 years) and the interquartile range was 10 years. Majority of the patients 86 (44.3%) affected were children less than 10 years of age. Male were more affected than female (M:F=1:2). Lower limb is more affected than the upper limb. The commonest amputation done was below knee amputation in 79 (40.7%) of cases. The commonest complication was surgical site infection which occurred in 32 (16.5%) patients.

Conclusions: Traditional bone setting is a leading cause of major limb loss especially in children.

Keywords: Traditional bone setting, Amputation, Gangrene

INTRODUCTION

Traditional bone setters (TBS) are individuals who are recognized by their communities as competent enough to provide healthcare for their musculoskeletal problems (including fractures and dislocations) by using herbs, animal and mineral substances, or other methods.¹ Traditional bone setting is widely practiced in developing countries though the principles differ between communities.^{1,2} However, there are certain characteristics that are common to all. The traditional bone setters are usually uneducated or barely educated and they rely mainly on inheritance, experience and spiritual intuition.²

The practice is usually preserved as a family treasure and it passed from generation to generations. However, individuals outside the family can acquire their skills via apprenticeship.³ They use bamboo stick, rattan cane or palm leaf axis with cotton thread or old cloth to splint the dislocated or fractured limb.^{4,5} The tightly applied splint is often left in place for few days before it is intermittently released for treatment with herbs and massage as shown in the Figure 1.

This mode of treatment often resulted in compartment syndrome and subsequent limb gangrene or Volkmann ischemic contracture.⁶ They also make use of scarification and application of unprocessed herbal medicine which often resulted in infections.⁶ Generally TBS do not have

access to imaging investigations. However, some of the practitioners have started inculcating some orthodox practices into their treatment albeit wrongly. This includes wound dressing and suturing and even use of plain radiographs.^{7,8}



Figure 1: Traditional bone setter’s splints (A) 9 years old boy with un displaced supracondylar left humerus fracture; (B) 38 years old accountant with open right tibia fracture.

Traditional bone setting; despite civilization and available modern health care services, is still much practiced among Africans. Indeed, their patronage cuts across every aspects of the society; young and old including the educated and the rich.⁶ In Nigeria; more than 80% of patients with fractures attend traditional bone setting before subsequently presenting for orthodox care at the stage of either failure of TBS treatments or more often when there are complications of their treatments.⁷ Some of the reasons alluded to the wide acceptability of this form of treatment in poor resource climes include easy accessibility, cultural belief, less expenses, pressure from friends and families among others.^{2,8}

traditional bone setting lacks the knowledge of basic medical sciences, basic principles of infection prevention and control and soft tissue care. These gross inadequacies have led to limb and life-threatening complications following traditional bone setters’ care.^{3,9} The complications associated with their intervention include fracture mal-union and non-union, joint stiffness, compartment syndrome, Volkmann ischemic contracture, osteomyelitis and limb gangrene among others.¹⁰ Their application of tight splints leads to obstruction of blood flow to the distal end of the limb resulting in the gangrene necessitating limb amputation.

Limb loss has profound economic, social and psychological effects as its associated with disability, marital conflicts and psycho-affective disorder especially in developing countries like ours where effective prostheses when available are not affordable.^{11,12} It may also cause distress not only due to the loss of a body part but due to the role limitation and the need for lifestyle modification.^{13,14} Adolescent and children are the usual victims of the TBS complications as their parents prevent them from removing the tight splints on instruction of the bone setters.¹⁰

Many studies have reported various complications of TBS, but only few have quantified their roles in major limb loss.^{4,9,10} Ajibade et al in a five-year retrospective descriptive study of 132 patients who had major limb amputations found that 38.1% are due TBS.¹⁵ Similarly, Seid et al in a retrospective study of 99 children who had amputations in Ethiopia noted that 55% were due traditional bone setter splinting.¹⁶ Onuminya et al in a study of 25 consecutive complications of TBS treatment, documented compartment syndrome, cellulitis and limb gangrene. They further noted that 15 out of 25 (60%) complications were limb gangrene.¹⁰ The objective of this study was to determine the role of TBS in major limb amputations in our setting.

METHODS

This retrospective study was carried out at a government orthopedic referral hospital. All patients who underwent major limb amputation between January 2015 and December 2019 in our center were studied. The case files of the patients were retrieved from the hospital medical record for analysis after obtaining approval from the hospital ethics committee. Additional information was collected from the operation register. Data analysed included patients’ demography, indication for amputation, levels of amputation and complications. Statistical analyses were performed using statistical package for the social sciences (SPSS 22.0 IBM, New York City, USA). Categorical data were tabulated with frequencies and percentages, and continuous data were expressed as the median and range.

RESULTS

During the study period, a total of 297 major limb amputations were performed due to the various indications. Gangrene from traditional bone setting (TBS) accounted for 65.3% of all cases of major amputations. The median age of the patients with TBS gangrene was 11.0 years, range-one to 45 years and interquartile range of 10 years. Majority of the patients 86 (44.3%) affected were children less than 10 years of age. Males were more affected than females with male to female ratio of 2:1. The lower limb is more frequently involved than the upper limb. For the upper limb amputations; dominant limb was involved in the majority 29 (64.4%) of cases as shown in the Table 1.

Table 1: Patients' demographic characteristics.

Demography	Frequency	Percentage (%)
Age distribution (years)		
<10	86	44.3
11-20	76	39.2
21-30	20	10.3
31-40	9	4.6
41-50	3	1.5
Sex distribution		
Male	129	66.5
Female	65	33.5
Limb affected		
Upper limb	45	23.2
Dominant limb	29	64.4
Non-dominant	16	35.6
Lower limb	149	76.8
Right	68	45.6
Left	81	54.4

The commonest amputation done was below knee amputation (BKA) in 79 (40.7%) of cases as shown in the Table 2.

Table 2: Levels of amputation due to TBS.

Type of Amputation	Frequency	Percentage (%)
Below knee amputation	79	40.7
Knee disarticulation	8	4.1
Above knee amputation	57	29.4
Hip disarticulation	5	2.6
Below elbow amputation	13	6.7
Elbow disarticulation	4	2.1
Above elbow amputation	26	13.4
Shoulder disarticulation	2	1.0
Total	194	100

The most common problem was closed fracture of the limb accounting for 70 (36.1%) of cases. The significant number of patients 59 (30.4%) had only the soft tissue trauma without fracture or dislocation as shown in the Table 3.

The commonest complication was surgical site infection which occurred in 32 (16.5%) patients. Others include wound dehiscence, phantom limb, phantom pain and chronic osteomyelitis of the stump as shown in the Table 4.

Table 3: Initial diagnosis before the TBS intervention.

Diagnosis	Frequency	Percentage (%)
Soft tissue injury	59	31.0
Open fracture	53	27.0
Closed fracture	70	36.0
Dislocation	12	6.0
Total	194	100.0

Table 4: Postoperative complications.

Complications	Frequency	Percentage (%)
Surgical site infection	32	16.5
Phantom limb	4	2.1
Phantom pain	7	3.6
Chronic osteomyelitis	3	1.5
No complications	148	76.3
Total	194	100.0

DISCUSSION

Traditional bone setting is a well-known and largely practiced in Africa despite the painful experience by the patients from manipulations of fresh fractures and dislocations (without anesthesia or analgesia) and the high rate of complications including limb gangrene.^{8,17}

In our study, 65.3% of amputations done during the study period were due to traditional bone setting. This has doubled that of Ajibade et al who documented 38.1% over a separate 5-year period in the same study centre.¹⁵ This high rate of amputation due to TBS gangrene is similar to what has been found by other studies.¹⁹⁻²¹ This further stresses the fact that traditional bone setting has become dangerous to Africans' well-being and immediate intervention is needed to curtail the rate of preventable limb loss. This intervention should include enlightenment and education of the practitioners and legislation by the government to control their practice. In addition, citizens should be educated to seek treatment for their trauma victims in approved trauma centers.

The median age of our patients was 11.0 years (range 1-45 years). Majority 86 (44.3%) of the patients are children less than 10 years of age. This is similar to findings of previous studies.^{10,18} Similarly, Nwosu et al documented that the commonest cause of amputation in children was TBS which accounted for 62.5% in children below the age of 16 years.¹⁸ Males are more affected than females as it has been observed by several other studies probably due to undisputed reason that males sustain injury more than females due to their levels of activity.¹⁹⁻²²

The most common amputation performed in our study was below knee amputation which was done in 79 (40.7%) of cases. This is similar to what was found by Nwosu et al who documented 44 below knee amputations out 112 major limb amputations (39.3%). The similarity may be

because the studies were done in the same area of north west Nigeria.¹⁸ Other studies with similar results are those of Kidmas, Seid and Umaru et al.^{16,21,23}

Our study revealed that a significant number of patients 59 (30.4%) had only soft tissue trauma (with no fracture or dislocation) which ordinarily do not require any manipulation or splinting. However, because of lack of basic clinical skill to rule out fractures or dislocations; traditional bone setters embark on unnecessary manipulations and splintage which lead to vascular compromise and subsequent limb loss.

It was also noted that despite many works that has been done on the menace of traditional bone setting in our setting and the recommendations from those researches, the number of limb loss over the years due to TBS has not reduced. A total of 44 major limb amputations were performed in 2015 and 41 in 2019 due to TBS.

The commonest complication we recorded was surgical site infection which occurred in 32 (16.5%) patients. Others include phantom limb and pain and chronic osteomyelitis. This is in agreement with previous researchers who documented SSI as the most common complication following major limb amputations.^{11,25}

CONCLUSION

In conclusion, traditional bone setting is an avoidable leading cause of major limb loss especially in children in our environment. We recommend enlightenment and change of culture by people. There should be strict legislation by government to monitor and control the activities of traditional bone setters. Primary health care should be improved to make orthodox treatment available at the grassroots and comprehensive health insurance should also be made available by the government for all citizens. These will go a long way in curtailing the lifelong disabilities caused for innocent children by traditional bone setting.

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REFERENCES

- Alegbeleye BJ. Traditional Bone Setting Practice in the Northwest region of Cameroon. *East Cent Afr J Surg.* 2019;24(1):47-60.
- Ekere AU. A review on the challenge of traditional bone setting to orthodox ortho/trauma practice in the developing world. *Nigerian Health J.* 2004;4:219-23.
- Ogunlusi JD, Okem IC, Oginni LM. Why patients patronize traditional bone setters. *Internet J Orthop Surg.* 2007;4(2).
- Dada AA, Yinusa W, Giwa SO. Review of the practice of TBS in Nigeria. *Afr Health Sci.* 2011;11(2):262-65.
- Khan I, Saeed M, Inam M, Arif M. Traditional bone setters; preference and patronage. *Professional Med J.* 2015;22(9):1181-5.
- Thanni LO. Factors influencing patronage of traditional bonesetters. *West Afr J Med.* 2000;19(3):220-24.
- Omololu AB, Ogunlade SO, Gopaldasani VK. The practice of traditional bone setting: Training Algorithm. *Clin Orthop Relat Res.* 2008;466(10):2392-8.
- Solagberu BA. Long bone fractures treated by traditional bone setters: a study of patients' behaviour. *Trop Doct.* 2005;35(2):106-8.
- Chowdury M, Khandkher H, Ahsan K, Mostafa D. Complications of Fracture Treatment by traditional Bone setters at Dinajpur. *Dinajpur Med J.* 2011;4(1):15-9.
- Onuminya JE, Onabowale BO, Obekpa PO, Ihezue CH. Traditional bone setter's gangrene. *Int. Orthop.* 1999;23(2):111-2.
- Yinusa W, Ugbeye ME. Problems of amputation surgery in a developing country. *Int Orthop.* 2003;27(2):121-4.
- Essoh JB, Kodo M, Dje VD. Limb amputations in adults in an Ivorian Teaching Hospital. *Niger J Clin Pract.* 2019;12(3):245-7.
- Sinha R, Van Den Heuvel WJ. A systematic literature review of quality of life in lower limb amputees. *Disabil Rehabil.* 2011;33:883-99.
- Cavanagh SR, Shin LM, Karamouz N, Rauch SL. Psychiatric and emotional sequelae of surgical amputation. *Psychosomatics.* 2006;47:459-64.
- Ajibade A, Akinniyi OT, Okoye CS. Indications and Complications of Major Limb Amputations in Kano, Nigeria. *Gha Med J.* 2013;47(4):185-8.
- Seid Y, Birhanu A, Bahiru B, Biruk W. Causes of Paediatric Limb Amputations at Tikur Anbessa Specialized Hospital and the Role of Traditional bone Setters. *Ethiop Med J.* 2018;56(2):1-6.
- Udosen AM. The role of orthopedic and trauma assistants in improving rural orthopedic and trauma care. *Ann Afr Med.* 2004;3(3):150-2.
- Nwosu C, Babalola MO, Ibrahim MH, Suleiman SI. Major limb amputations in a tertiary hospital in North Western Nigeria. *Afri Health Sci.* 2017;17(2):508-12.
- OlaOlorun DA, Oludiran IO, Adeniran A. Complications of fracture treatment by traditional bone setters in South Western Nigeria. *Fam Pract.* 2001;18(6):635-7.
- Nwandiari HC, Kidmas AT, Ozoilo KN. Outcome of traditional bone setting in the middle belt of Nigeria. *Nig J Surg Res.* 2006;1(2):44-8.
- Umaru RH, Gali BM, Ali N. Role of inappropriate traditional splintage in limb amputation in Maiduguri, Nigeria. *Ann Afr Med* 2004;3(3):138-40.
- Butt J, Weinberg RS, Breckon JD, Claytor RP. Adolescent physical activity participation and

- motivational determinants across gender, age, and race. *J Phys Act Health.* 2011;8(8):1074-83.
23. Kidmas AT, Nwadiaro CH, Igun GO. Lower limb amputations in Jos, Nigeria. *East Afr Med J.* 2004;81(8):427-9.
 24. Amene SS, Afshin TA. Amputation: A 10-year survey. *Trauma Mon.* 2013;18(3):126-9.

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