

**EXTREMITY AMPUTATIONS IN CHILDREN FROM COMPLICATIONS OF
TRADITIONAL BONE SETTERS' CARE SEEN IN A TERTIARY HOSPITAL IN
PORT HARCOURT, NIGERIA.**

ABSTRACT

Background:

The ancient practice of traditional bone setting dates back many centuries. In most developing world, the traditional bone setters are still patronized despite numerous limb and life-threatening complications that result from their treatment of limb injuries. Limb amputation in children resulting from bonesetter's gangrene is a common and a disturbing complication.

Aim: To present six consecutive cases of extremity amputations in children resulting from bonesetters' gangrene.

Results: Six consecutive extremity amputations resulting from bonesetters' gangrene were done at the study site from April 2013 to March 2016, constituting 8% of all limb amputations and 73% of all extremity amputations done in children within the same period. Five of the patients were males while one was female. Ages ranged from 18months to 17 years with a mean age of 10.2 ± 13.3 years. All amputations involved the upper limb. All patients visited the traditional Bone setters (TBS) with five of patients 'admitted' in the Bone Setter's place for more than two weeks.

The treatment method was similar in all patients and involved the use a tight splint localized to the fracture site and intermittent massage using a local ointment. All patients had

26 satisfactory wound healing and were discharged home not later than the 14th-day post
27 surgery.

28 **Conclusion:** Limb gangrene is one of the most regrettable complications following
29 Traditional Bonesetters treatment of extremity injuries. With the poor rehabilitative function
30 of amputated limbs and the high cost of functional prosthesis in the sub-region, urgent steps
31 are needed to prevent such complications in the sub-region.

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33 **Keywords:** Amputation, Bonesetter's gangrene. Extremity amputation, Children,

34

35 **Introduction:**

36 **Background:**

37 A traditional bone setter (TBS) is a person recognized by the community where he lives as
38 competent to set bones using traditional appliances [1]. Traditional bone setting is an ancient
39 practice dating back many centuries especially in countries like Egypt, China and a few
40 others and is regarded as a specialized aspect of traditional medicine with interest in
41 orthopaedics [2 - 4]. In the developing world, the traditional bone setter (TBS) still receives
42 high patronage⁵ despite the numerous limb and life-threatening complications resulting from
43 his treatment of limb injuries. This level of patronage may be fuelled by the strong faith in
44 traditional healing methods⁶, easy accessibility to rural dwellers (constituting a significant
45 fraction of the population in most developing nations) [6], presumed lower cost compared to
46 orthodox orthopaedic care, [7], [8] fear of amputation in conventional centres and service
47 interruptions (from industrial strike actions) in hospitals [7], [9]. The hallmark of TBS
48 complications of care on the injured limb is neurovascular compromise from tight application
49 of splints at fracture sites leading to distal limb gangrene aptly called bone setters gangrene
50 [10-12].

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52 Most hospital-based studies in sub-Saharan Africa report regrettably high rates of extremity
53 amputations in children from bonesetters' gangrene [13], [14]. Children's inability to
54 contribute to their own health care decisions when injured, their complete financial
55 dependence of parents/ guardians and the strong societal faith on TBS practice irrespective of
56 educational and economic status, may have contributed to the high rate.

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58 **AIM:** To present six consecutive cases of extremity amputations in children resulting from
59 bonesetters' gangrene.

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61 **METHOD:**

62 Appropriate Ethical approval according to Helsinki Declaration 1977 was obtained from the
63 Hospital Authority. Information from all the cases of children presenting to the hospital with
64 gangrene after a visit to traditional bone setter was collected after securing informed consent
65 from their parents or legal surrogate. Information on the cause of injury, reasons for the visit
66 to traditional bone setter, treatment received at the bone setter home, and reasons for seeking
67 discharge from the traditional bone setters' home were collected. Data was analysed and
68 presented

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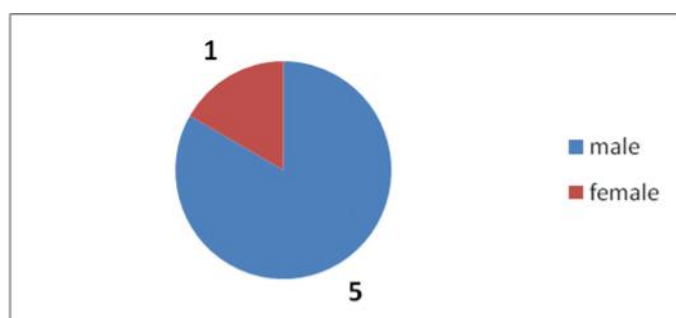
70 **RESULTS:**

71 Six consecutive extremity amputations resulting from bonesetters' gangrene were done at the
72 study site from April 2013 to March 2016, constituting 8% of all limb amputations and 73%
73 of all extremity amputations done in children within the same period. 5 of the patients were
74 males while one was female.

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77 Figure1. Gender Distribution



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80 Age of the patients ranged from 18months to 17 years with a mean age of 10.2 ± 13.3 years.

81 All amputations involved the upper limb, with a left to right ratio of 1:2. The initial injury in

82 3 cases (50%) was closed proximal humeral fracture while one case (16.7%) was a closed

83 supracondylar fracture. Closed humeral shaft fractures were responsible for 2 of the cases

84 (33.3%).

85

86 Table1. Distribution of Primary Injuries

Primary injury	Nos.	Percentage
Closed proximal humeral fracture	3	50%
Closed humeral shaft fracture	2	33.3%
Closed supracondylar fracture	1	16.7%
Total	6	100%

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88 All the patients visited traditional Bone setters (TBS) with five of the patients 'admitted' in

89 the Bone Setter's place for more than two weeks. The treatment method was similar in all

90 patients. It involved an initial application of a tight splint localized to the fracture site for 48

91 to 72 hours with the subsequent intermittent release for massage using a local ointment. Two

92 patients, however, reported that incisions were also made at the fracture site (using unsterile

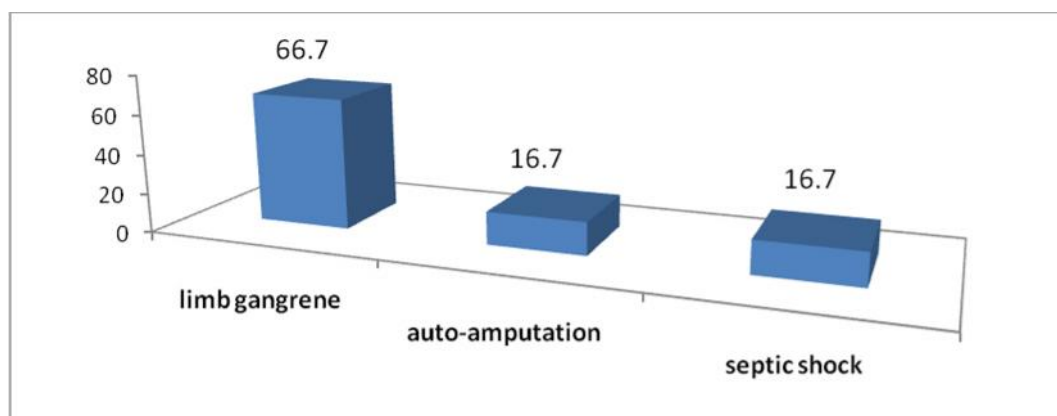
93 instruments) at the time of 'tourniquet-splint' release followed by application of locally-made

ointment to the wound. The onset of severe deep-seated pain that worsened with passive motions across the wrist was noticed by all patients earlier than 24 hours into the commencement of TBS treatment. All the six children also raised concerns about changes in the appearance and function of their limbs but were repeatedly reassured by both parent/guardian and the Traditional Bone Setters.

Hospital presentation was necessitated by apparent signs of limb gangrene in 4 of the 6 (66.7%) of cases, auto-amputation of the limb in one case (16.7%) and manifestations of septic shock in one case (16.7%).

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103 Figure2. Reasons for Presentation to Hospital



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All six patients had upper limb amputations less than 24hours into hospital presentation for wet gangrene of the involved limb (from the fracture to the rest of the distal limb) or refashioning of the stump of the already amputated limb. Five of the cases (83.3%) were trans-humeral amputations while one case (16.7%) was at a level about 5cm above the elbow.

The mean duration for delayed primary wound closure was 14.6 ± 2.4 days. All patients had satisfactory wound healing and were discharged home not later than the 14 days post surgery.

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115 **DISCUSSION**

116 Limb gangrene is one of the most regrettable complications following Traditional Bonesetters
117 treatment of extremity injuries, especially in children. The incidence of this complication is
118 also high from most hospital-based reports [15], [16].

119 Nwandinigwe et al. [15] in Enugu showed that bonesetters gangrene was responsible for 44%
120 (n=59/134) of amputations at the National Orthopaedic Hospital Enugu within a five year
121 period while Garba et al. [16] in a ten-year hospital-based study in Zaria showed 39.6% of
122 amputations from TBS gangrene. Bonesetters gangrene contributed to 8% of all amputations
123 and 73% of paediatric limb amputations within a three year period in this study. This was
124 Similar to findings by Umaru et al. [17] in Maiduguri (31.7%). Onuminya et al. [18] in a
125 multi-centre study however showed that bonesetters gangrene was responsible for 60% of
126 100 amputations within a 10-year period. The higher figure (73%) in this study may stem
127 from the age restriction on the study population especially as acquired amputation from
128 trauma is not very common in children as compared to adults [19] partly because high energy
129 trauma is also not as common in children as in adults. Acquired amputation in children more
130 often results from treatment of malignant tumors of the extremity. Congenital amputations
131 are commoner in children. Despite the fact that pediatric limb amputations are rare and
132 unique, they account for a disproportionately significant component of the morbidity
133 associated with trauma [20]. It has been reported that children who had amputations as a
134 result of malignancy adapted better to disability in comparison with those that had
135 amputations due to trauma [21].

136

137 Avoidance as coping styles is a significant predictor of psychosocial adaptation for children
138 amputee. Such avoidance has been strongly associated with emotional anguish and poor

adjustment [22], [23]. Presence of significant depressive symptoms in up to 28.3% of patients and significant anxiety symptoms in about 35.5% of paediatric patients with limb amputations, as measured by the Hospital Anxiety and Depression Scale, Depression subscale (HADS-D) have been reported [22], [24]. Post-traumatic Stress Disorder (PTSD) is a common psychiatric disorder experienced after such traumatic events and can be observed in not only the pediatric amputee, the immediate family as well as in their primary caretaker of the amputee. This psychological disorder ultimately influences the overall rehabilitation of the child²⁵.

Children are vulnerable to such complications from TBS treatment for reasons that they are prone to road traffic crash-related injuries especially in environments where road safety regulations are either non-existent or poorly upheld. Street hawking and street begging for alms especially by the under aged is still rife in the environment. Such practise presents a particular question on child safety legislation and enforcement in the system. Seasonal Injury patterns resulting from falls from mango trees and other fruit bearing trees are also known in the environment [26], [27].

Secondly, children rely on parents and guardians to take decisions on where to receive care for injured limbs and when to move from one point of care to another. Solagberu [28] has aptly termed this "the external locus of control in decision making" which he believes overwhelmingly suppresses the patient's innate desire on where to seek treatment; "the internal locus of control in decision making". Lastly, since children are seen as not capable of contributing to their health care, their complaints and opinions may not be considered even in the course of treatment. For instance, all six children in the study raised concerns about

changes in the appearance and function of their limbs which were repeatedly ignored by both parent/guardian and the Traditional Bone Setters.

With the poor rehabilitative function of amputated limbs in the sub-region, the impact of preventable limb amputations in children in the sub-region is difficult to estimate. Onuminya et al. 18 noted that 73.9% of 96 amputees who became crutch or wheelchair ambulators and were viewed with suspicion from members of their societies. For children, the burden is beyond societal suspicion. Limb amputations especially those involving the lower limb will increase the energy requirements needed to walk from home to school particularly in regions with fewer schools and longer distance between homes and schools. With limited availability of affordable, safe mobility, this will contribute to school drop-out rates and further reduce literacy levels in the society. Also, these children will find it difficult to participate in recreational and sporting activities needed for the child's complete psycho-social development.

Furthermore, limb amputations limit the employment options available to the child upon graduation from school. A child with the desire to pursue a career in a particular profession may be forced to squander his dreams on the altar of a preventable amputation. This loss of future ambition is even more worrisome as there is little or no social insurance or welfare scheme for the disabled in the region [29].

With the poor rehabilitative function of amputated limbs in our sub-region, the impact of preventable limb amputations in our sub-region is difficult to estimate. The need to periodically change prosthesis in growing children even present more challenge for most of the children and their parents especially where there are not readily available functional prosthesis in the region 29.

More worrisome is that these amputations involved the upper extremity. Upper extremity prostheses at the moment remain more complicated and more problematic than those of lower extremity. The prosthetic replacement of upper-limb function can be a daunting task for the rehabilitation team. Part of the reason for this is that a substantially more considerable amount of neurological area within the human brain is dedicated to the motor and sensory functions of the upper limb than the lower limb³⁰. This complexity of children prosthesis has to be considered in the design and fabrication of a good prosthesis to reduce the psychosocial morbidity from amputations especially acquired traumatic amputations. An overall 90 percent upper-limb impairment and 54 percent whole person impairment exists when a person loses his or her fingers and thumb³¹.

An important and significant problem with traumatic pediatric amputations is also the osseous overgrowth which can lead to difficulty with prosthesis fitting, pressure ulcers and skin perforation, numerous surgical revisions, therefore, may be required to avoid such consequences of osseous overgrowth ³². Such revisions may not be readily affordable to the parents of the child amputee as and when due thus leading to significant secondary complications.

Lastly, in societies with deeply held religious and cultural beliefs, these patients may be termed "structurally incomplete" and may be subjected to intense discrimination bordering on inheritance rights, marriage options, choice of friends and playmates and sometimes place of burial on demise. The authors strongly appeal to health care planners in developing countries to look into the morbidity caused by unsupervised treatment of limb injuries by traditional bone setters. Bickler and Sanno-Duanda in the Gambia estimate that 7% of children living in urban areas of sub-Saharan Africa will require care for fractures by the time they reach

15years 33. The lack of primary trauma care for these children will place a considerable number at significant risk of morbidities and sometimes mortalities from inadequate medical treatment including those from TBS. Cases of amputations arising from traditional Bone setter treatment for simple soft tissue injuries without fracture had been recorded mainly as some TBS do not utilize radiographs and insists that their clients do not do any radiographic studies 34. Also, with the majority of Injuries and fractures in rural Africa being treated by Traditional bone setters, the authors believe that African countries should start considering providing basic training to the TBS on care for fractured limbs. This training should focus on proper orientation on the TBSs capabilities, education preferable with (pictorial evidence) on the potential dangers of applying a splint too tightly, identification of a threatened limb and quick referral of such patients to orthodox health centres.

Conclusion:

The menace of Traditional Bone Setters resulting in amputations in children in the region is real. Such complications contribute to the significant disability Adjusted Life lost to injuries in the region especially when they occur in children who are meant to live with such avoidable deformity and disability for life. Urgent steps are required to stem these catastrophic consequences.

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