

# Complications of Fracture Treatment by Traditional Bone Setters in Wolaita Sodo, southern Ethiopia

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## Abstract

**Introduction:** Majority of the population in developing countries use traditional medicine due to the fact that the majority reside in rural areas where modern health service is relatively inaccessible and expensive.

**Methods:** Prospective hospital based cross sectional survey was conducted in Wolaita Sodo to assess complications of fractures treatment by traditional bone setters admitted at Sodo Christian Teaching Hospital (SCGH), Wolaita Zone, southern Ethiopia. All patients with fractures presented to SCGH during the period from March – August 2012 were included in the study.

**Results:** Among patients exhibited complications during their first visit for fracture treatment at emergency unit in the hospital 70 (56.91%) had a history of having fracture treatment by TBS. Out of which 37 patients (52.87%) had stiffness of joint, 6 patients (8.57%) developed infection, 6 patients (8.57%) had mal union, 4 patients (5.71%) had lengthening discrepancy, 4 patients (5.71%) had nonunion, 4 patients (5.71%) had Volkman's ischemic contracture, 3 patients (4.29%) developed gangrene, 3 patient (4.29%) had swelling, 1 patient (1.43%) had nerve injury, 1 patient's (1.43%) case resulted in delayed union and 1(1.43%) resulted in instability. Multivariate analysis indicated the presence of significant association between treatment of fractures by TBS and falling accident with complications.

**Conclusion:** Treatment of fractures by TBS and falling accident were found associated with complication. However, the majority believe in the importance of the role of TBS in treating fracture.

**Key words:** Traditional Bone Setters, Fracture Treatment, Complication

## 1. Introduction

Majority of the population in the developing countries rely on traditional practitioners in order to meet their health care needs (WHO 2003). According to the World Health Organization (WHO) definition traditional medicine includes health practices, approaches, knowledge and beliefs incorporating plant, animal and mineral based medicines, spiritual therapies, manual techniques and exercises, applied singularly or in combination to treat, diagnose and prevent illnesses and maintain well-being (WHO 2001). Traditional medical practice has been existed from antiquity as evidenced in China (LI L 2000). Even though it is not well documented; the use of traditional medicine in Africa especially in rural areas as folk healing has been existed long ago. In Ethiopia large proportion of the population use traditional medicine due to the fact that the majority reside in rural areas where the modern health service is not relatively accessible and traditional medicine is reasonably available with low cost and culturally acceptable (Eshete 2005). Traditional medicines practiced in Ethiopia include bonesetters, birth attendants, tooth extractors, *herbalists*, as well as witch doctors and spiritual healers (Kassaye 2006).

Bone setting is one of the popular traditional medicines in Ethiopia, which is recognized to have attained a level of success comparable to that in modern medicine. Regardless of this success, complications in the form of gangrene, nonunion, joint stiffness and infections of limbs caused as a result of traditional bone setting are quite common (Onuminya et al. 1999). These could be due to lack of knowledge on human anatomy and physiology; fear of loss of source of income and acceptance and ignorance about causes and effects of complications by bone setters. Bone setters often do not appreciate the dangers of tight splint; which can cause gangrene; that could be due to their success story of anatomical reunion of fractures (Eshete 2005).

With the growing rate of accident of different forms in Ethiopia and because of fractures management by Traditional Bone Setters (TBS) (WHO 1999); complications of fractures treatment may increase. Therefore, the objective of this study is to assess complications of fractures treatment managed by TBS admitted at Sodo Christian General Hospital (SCGH), Wolaita Zone, southern Ethiopia.

## 2. Materials and methods

The total population of Wolaita Zone is estimated to be 1527908. Wolaita Sodo, the capital of the Zone is located at 326 km south of Addis Ababa and inhabited with 76,780 populations.

Three hospitals exist in the zone of which SCGH is systematically selected for this study, for the fact that the hospital serves as a referral centre for orthopaedic cases at a country level and receives senior orthopaedic students for attachment. The hospital has 4 operating theatre and 120 beds of which 30 is present in surgical ward.

Prospective hospital based study; that involved all patients with fractures presented to SCGH during the period from March to August 2012; was employed. A standardized and pretested closed and open-ended questionnaire was used as the data collection instrument. Interviews were completed with each patient including age, sex, income, level of education, origin, patient's views on traditional healing and beliefs and history of previous treatment by traditional bonesetter. The presence of complications was recorded from the patient's record card on the data registration format intended for this purpose following clinical and radiological evaluation. Patients were interviewed either at the emergency department before leaving the hospital or the surgical ward during their admittance.

Data regarding complications of fractures treatment by TBS were coded, entered and analysed using SPSS version 16 statistical software. Complication was correlated to socio-demographic and characteristics of bone setting. Relations between complication and patients' age, place of residence, education, occupation, knowledge of patients' about tight splint, visits of patients to TBS and causes of fracture were determined.

Official Ethical Clearance was obtained from Wolaita Sodo University Research Ethical Review Committee. Oral informed consent was also obtained from the study subjects and the rights to decide on the participation of the study were disclosed. The identities of the study participants were kept confidential.

## 3. Results

A total of 219 patients with radiological proven fractures were participated in the study. The male: female ratio was 3:1. Age ranged between 3 and 70 years (mean  $\pm$  SEM was  $28.68 \pm 13.26$ ). One hundred fifty nine patients (72.6%) were from urban while 60 (27.4%) from rural descents. In terms of formal education status, 24 (11%) were illiterate, 2 (0.9%) were able to read and write, 63 (28.8%) were educated at elementary school level, 53 (24.2%) had secondary school level of education, 70 (32%) claimed to have a Bachelor degree or more and the rest 7 (3.2%) were categorized under others such as people with informal education at religious institution.

### 3.1 Knowledge, attitude and practice of patients about traditional bone setting

Out of the total fracture patients, 100 (45.7%) had past history of treatment by TBS in their previous condition. In terms of knowledge of human anatomy and physiology; 138 (63%) and 153 (69.9%) patients respectively had no confidence on TBS about their knowledge. With respect to the knowledge of patients about the effect of tight splint; 187 (85.39%) patients are knowledgeable.

One hundred twelve (51.1%) patients believed on the ability of TBS in treating fracture, while 107 (48.9%) not. However, out of the total patients only 14 (6.4%) preferred TBS for fracture treatment. There was a preponderance of importance and sometimes importance (62.6%) about the role of TBS in treating fracture; while 57 (26.0%) reflected not important. The rest (11.4%) did not know about the role of TBS in fracture treatment. When it comes to the modern health workers, the majority of patients (58.9%) responded as only orthopedists are effective. With regard to modern health service institutions, 169 (77.2%) considered specialized hospitals as the only place where effective fracture treatment is available followed by general hospitals 48 (21.8%). In terms of number of visits of patients with the past history of treatment to TBS 35 (35%) visited once, 30 (30%) visited twice, 13 (13%) visited three times and 22 (22%) visited four or more times.

### 3.2 Diagnosis and treatment of fracture

All the 219 patients were diagnosed by orthopedists supported by radiological investigation. There were 178 (81.3%) and 41 (18.7%) closed and open fractures respectively among the total study subjects. One hundred three (47.0%) patients acquired their fractures as the result of Road Traffic Accident (RTA) and 88 (40.2%) acquired the same problem as the result of domestic fall (Table 4). Among those who have got fracture as the result of RTA and falling down; 34 (33.0%) and 57 (64.8%) respectively had a history of visiting TBS (Table 1).

Table 1: Causes of accident versus the status of visit to TBS

Cause of accident	Visit to TBS				Total	Percent
	Yes	Percent	No	Percent		
<b>RTA</b>	34	34.0	69	57.9	103	47.0
<b>Fall down</b>	57	57.0	31	26.1	88	40.2
<b>Fighting</b>	5	5.0	5	4.2	10	4.6
<b>Natural deformity</b>	0	0.0	2	1.7	2	0.9
<b>Others</b>	4	4.0	12	10.1	16	7.3
<b>Total</b>	100	100.0	119	100.0	219	100.0

Out of the total patients 123 (56.2%) exhibited complications during their first visit for fracture treatment at emergency unit in the hospital. Among those with the history of complication during their first visit to the hospital 70 (56.91%) had a history of having fracture treatment by TBS; while the rest responded no treatment by TBS. There were 68 (31.1%) fracture patients with a single complication, 38 (17.4%) with double complications, 11 (5.0%) with triple complications and the rest 06 (2.7%) were with four or more complications during their first visit to the hospital. Different forms of complications were presented to the hospital; of which stiffness of joint (44.72%) was proportionally high (Table 2).

Table 2: Types of complications exhibited during the first visit of the fracture patients at emergency clinic in the hospital versus the status of visit to TBS

Types of complications	Visit to TBS				Total	Percent
	Yes	Percent	No	Percent		
<b>Stiffness of joint</b>	37	52.87	18	33.97	55	44.72
<b>Infection</b>	6	8.57	13	24.53	19	15.45
<b>Mal union</b>	6	8.57	2	3.77	8	6.50
<b>Lengthening discrepancy</b>	4	5.71	3	5.66	7	5.68
<b>Non union</b>	4	5.71	2	3.77	6	4.88
<b>Volkman's Isch. contracture</b>	4	5.71	1	1.89	5	4.07
<b>Gangrene</b>	3	4.29	2	3.77	5	4.07
<b>Swelling</b>	3	4.29	3	5.66	6	4.88
<b>Nerve injury</b>	1	1.43	4	7.55	5	4.07
<b>Delayed union</b>	1	1.43	2	3.77	3	2.43
<b>Instability</b>	1	1.43	-	-	1	0.81
<b>Open dislocation</b>	-	-	1	1.89	1	0.81
<b>Bleeding</b>	-	-	1	1.89	1	0.81
<b>Pain</b>	-	-	1	1.89	1	0.81
<b>Total</b>	70	100.00	53	100.00	123	100.00

### 3.3 Association of socio-demographic and characteristics of bone-setting with complication of fracture

The bivariate analysis of some socio-demographic characteristics such as residing in rural area, illiteracy and age of patients below 18 showed significant association with complication of fracture. From the stated characteristics of bone setting; Visit of patients to TBS and falling accident were found to be significantly associated with complication of fracture (Table 3).

Table 3: Association of socio-demographic factors and characteristics of bone setting with complication of fracture, Wolaita, 2012

Factors		Complication		P-value	COR (95%CI)
		Yes	No		
<b>Age</b>	Productive	98	82	0.272	0.67 (0.33, 1.37)
	Dependent	25	14		1.00
<b>Residence</b>	Rural	44	16	0.002	2.79 (1.45, 5.34)
	Urban	79	80		1.00
	Illiterate	16	8	0.022	3.36 (1.19, 9.48)
<b>Educational Status</b>	Read & write	5	4	0.636	1.40 (0.35, 5.66)
	Primary	39	24	0.089	1.82 (0.91, 3.64)
	Secondary	28	25	0.532	1.26 (0.61, 2.57)
<b>Occupational Status</b>	Tertiary	33	37		1.00
	Under age	30	14	0.026	2.74 (1.13, 6.63)
	House wife	8	2	0.055	5.11 (0.96, 27.09)
	Merchant	13	19	0.779	0.87 (0.34, 2.23)
	Farmer	16	3	0.006	6.82 (1.72, 27.06)
	Daily laborer	6	6	0.709	1.28 (0.35, 4.64)
<b>Visit to TBS</b>	Private employee	15	14	0.519	1.37 (0.53, 3.57)
	Non-Government employee	7	6	0.532	1.49 (0.43, 5.22)
	Others	10	9	0.529	1.42 (0.48, 4.23)
	Government employee	18	23		1.00
<b>Knowledge on the effect of tight splint</b>	Yes	70	30	0.000	2.91 (1.66, 5.09)
	No	53	66		1.00
<b>Cause of fracture</b>	Yes	109	78	0.129	0.56 (0.26, 1.19)
	No	14	18		1.00
<b>Cause of fracture</b>	Fighting	6	4	0.329	1.93 (0.52, 7.26)
	Falling	62	26	0.000	3.07 (1.69, 5.60)
	Natural Deformity	1	1	0.859	1.29 (0.08, 21.18)
	Others	9	7	0.351	1.66 (0.57, 4.79)
	RTA	45	58		1.00

Multivariate analysis depicted association of patients visit to TBS and falling accident with complication of fracture. No association was found in a multivariate analysis of socio-demographic variables with complication (Table 4).

Table 4: Association of socio-demographic factors and characteristics of bone setting with complication of fracture, Wolaita, 2012

Factors	Complication			Adjusted		
	Yes	No	COR (95%CI)	P-value	AOR (95%CI)	
<b>Age</b>	Productive	98	82	0.67 (0.33, 1.37)	0.350	2.07 (0.45, 9.50)
	Dependent	25	14	1.00		1.00
<b>Residence</b>	Rural	44	16	2.79 (1.45, 5.34)	0.075	2.15 (0.93, 4.97)
	Urban	79	80	1.00		1.00
	Illiterate	16	8	3.36 (1.19, 9.48)	0.700	1.33 (0.32, 5.56)
<b>Educational Status</b>	Read & write	5	4	1.40 (0.35, 5.66)	0.811	0.81 (0.14, 4.60)
	Primary	39	24	1.82 (0.91, 3.64)	0.775	0.86 (0.32, 2.35)
	Secondary	28	25	1.256 (0.61, 2.57)	0.712	0.84 (0.34, 2.10)
<b>Occupational Status</b>	Tertiary	33	37	1.00		1.00
	Under age	30	14	2.74 (1.13, 6.63)	0.242	2.77 (0.50, 15.22)
	House wife	8	2	5.11 (0.96, 27.09)	0.144	4.07 (0.62, 26.72)
	Merchant	13	19	0.87 (0.34, 2.23)	0.980	1.01 (0.33, 3.12)
	Farmer	16	3	6.82 (1.72, 27.06)	0.149	3.54 (0.64, 19.71)
	Daily laborer	6	6	1.28 (0.35, 4.64)	0.518	1.64 (0.36, 7.41)
	Private employee	15	14	1.37 (0.53, 3.56)	0.144	2.37 (0.75, 7.55)
<b>Visit to TBS</b>	Non-Government employee	7	6	1.49 (0.43, 5.22)	0.499	1.60 (0.41, 6.27)
	Others	10	9	1.42 (0.48, 4.23)	0.906	0.93 (0.28, 3.13)
	Government employee	18	23	1.00		1.00
<b>Knowledge on the effect of tight splint</b>	Yes	70	30	2.91 (1.66, 5.09)	0.005	2.54 (1.32, 4.88)
	No	53	66	1.00		1.00
<b>Cause of fracture</b>	Yes	109	78	0.56 (0.26, 1.19)	0.098	2.10 (0.87, 5.05)
	No	14	18	1.00		1.00
	Fighting	6	4	1.93 (0.52, 7.26)	0.603	1.50 (0.33, 6.90)
	Falling	62	26	3.07 (1.69, 5.60)	0.004	2.85 (1.40, 5.80)
	Natural Deformity	1	1	1.29 (0.08, 21.18)	0.771	1.54 (0.09, 27.90)
<b>Others</b>	Others	9	7	1.66 (0.57, 4.79)	0.410	1.64 (0.50, 5.37)
	RTA	45	58	1.00		1.00

#### 4. Discussion

The aim of fracture treatment is anatomical reduction, fracture union and functional outcome of injured part as close as possible to normal at pre injury level. In developing countries large proportion of the population use traditional medicine due to the fact that the majority reside in rural areas where the modern health service is not relatively accessible and traditional medicine is reasonably available with low cost and culturally acceptable. However, there are growing concerns over the development of complications of fractures treated by TBS as reported by several studies across developing countries (Chowdhury et al. 2011; Dastgir et al. 2012; EL Hag et al. 2010; Memon et al. 2009; Ngohi et al. 2009; Omolulu et al. 2002).

The present study found significant association (0.005) between treatment of fractures by TBS and complications. Among patients exhibited complications during their first visit for fracture treatment at emergency unit in the

hospital 70 (56.91%) had a history of having fracture treatment by TBS. This is in agreement with the findings of other prospective studies carried out somewhere else in third world countries (Chowdhury et al. 2011; Dastgir et al. 2012; EL Hag et al. 2010; Memon et al. 2009; Ngohi et al. 2009; Omolulu et al. 2002). This is due to the technique used by bone setters such as tight splintage by bamboo rulers wrapped around fractures with fragments of local bandage and massaging with the application of excessive traction.

RTA (47%) and falling from height (40.2%) are reported to be the predominant causes of bone injury. This supports the findings from studies conducted in countries from developing world (Chowdhury et al. 2011; Dastgir et al. 2012; Memon et al. 2009; Ngohi et al. 2009). Falling was found to be associated with complication. Falling accident is not as complicated as RTA that demands complex and expensive orthopedic procedure. For this reason TBS preferred to be the first choice of emergency fracture treatment that in turn created association with complication.

Forty five point seven percent of the fracture patients subjected to our investigation had past history of treatment by TBS. This indicated TBS appears to be the first choice of emergency fracture treatment for considerable proportion of the population. In line with this, majority (62.2%) of the study subjects responded as the role of TBS is important in treating fracture. This supports the findings of other studies elsewhere in Africa (Arie's et al. 2007; Udosen et al. 2006). Even though treatment of fractures by TBS is associated with complication; the orthopedic care vacuum covered by TBS in a situation, where modern orthopedic care service is located at distant from mainstream population cannot be underestimated. Therefore, much has to be done to integrate the practice of traditional bone setting with the modern orthopedic health care.

## 5. Conclusion and recommendation

Treatment of fractures by TBS and falling accident were found associated with complication. However, the majority believe in the importance of the role of TBS in treating fracture. In order to mitigate the associated problems the general public should be educated about the causes and effects of harmful practices of bone setting through regular static and outreach programs of health department. Appropriate legislation has to be enacted by the government to integrate traditional bone setting with the contemporary orthopedic care service. As part of the integration training should be provided for TBS on the basics of orthopedic care service. Bone setters need to be trained and made responsible to refer open wounded and complex cases to orthopedic care centers. If feasible, they should be taught to read and request radiography. Measures should also be taken to increase the coverage of health care service delivered by specialist orthopedist as the public have no trust on the orthopedic skill of other health professionals as indicated in this study.

## Abbreviations

**AOR:** Adjusted Odds Ratio

**COR:** Crude Odds Ratio

**SCGH:** Sodo Christian General Hospital

**SPSS:** Statistical Package for Social Sciences

**TBS:** Traditional Bone Setters

**RTA:** Road Traffic Accident

**WHO:** World Health Organization

## Authors' contributions

WPK designed the study. WPK and EWW were responsible for data collection and supervision. WPK, EWW and BYK did the reviewing of manuscript. WPK wrote the paper.

## Conflict of interest

The author(s) declare that they have no competing interests.

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