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<td>Author 1</td>
<td>NWANKWO, O. E</td>
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<td>Author 2</td>
<td>KATCHY, A. U.</td>
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<td>Author 3</td>
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<td>Title</td>
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<tr>
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<td>Amputation, Indication, Traditional Bone Setting</td>
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<tr>
<td>Category</td>
<td>Health Sciences</td>
</tr>
<tr>
<td>Publisher</td>
<td>Nigerian Journal of Orthopaedics and Trauma</td>
</tr>
<tr>
<td>Publication Date</td>
<td>2004</td>
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SURGICAL LIMB AMPUTATION: A FIVE-YEAR EXPERIENCE AT HILLTOP ORTHOPEDIC HOSPITAL, ENUGU, NIGERIA

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SUMMARY:

BACKGROUND: Limb amputation is one of the oldest and commonest surgical procedures known to man. It is performed by the orthopedic, general, vascular and trauma surgeons. At Hilltop Orthopedic Hospital, Enugu, limb amputation is found prevalent, yet most times it is objectionable to the patient.

METHOD: A prospective study was decided and carried out on all limb amputations over a five-year period, between January 1998 and December 2002.

AIM: The aim was to analyze the indications for the amputations and the outcome to see if they are really justifiable.

RESULTS: 43 amputations were done in 44 patients in the age range of 9 to 81 years with the peak age incidence in the 4th decade. Trauma was commonly found in our study region as the commonest indication for amputation in 52% of cases. However, it was found out that mismanaged trauma constituted the greater majority of cases due to trauma making up 34%, while trauma per se made up the remainder 18%.

All the cases of mismanaged trauma were by the traditional bone setters. Ignorance was found to be the reason for this mismanagement. Ways of eliminating this ignorance are suggested.

There was a mortality of 15%, which is on the high side but within the general range quoted for amputation for trauma in civilian practice. Most of the survivors, 35 out of 47 (74%) were able to lead a reasonable degree of independent life.
CONCLUSION:

Traditional bone setting is a problem even in our culture. Legislation might be necessary to stem the tide of these avoidable problems.

KEY WORDS: Amputation, Indication, traditional bone setting.

INTRODUCTION

The aim of surgical limb amputation is removal of a limb or part of it on account of irreparable damage from disease or injury that has failed to respond to treatment or endangers life. The writings of Hippocrates, the father of Western medicine who lived in the 4th and 5th centuries BC mentioned three indications for amputation, which are still valid even today; to remove useless members, to reduce invalidism and to save life.

However, more recent history indicates that amputation serves more purposes other than medical. It has been observed to be associated with ritual, religious, and punitive practices.

Even though limb amputation is probably one of the oldest forms of surgery known to man, loss of a limb by any individual is associated with very severe physical and emotional problems.

And surgical ablation itself is fraught with dangers such that as far back as 100 AD, Celsius, after describing a technique for extirpation amputation warned that "patient often die under operation either from blood loss or from syncope".

Therefore, before one embarks on surgical amputation the indication should be unequivocal and the operation indispensable. The patient and his relatives must also be carried along by explicit explanation of the necessity for the amputation. This is very necessary especially in our environment where mismanagement of limb trauma is very common and patients commonly present with iatrogenic limb gangrene following traditional bonesetters' treatment of the injuries (traditional bonesetter's gangrene) without the knowledge that the limb is dead.
Thus, the surgeon who plans an amputation should be prepared not only to execute the surgical operation with efficient intraoperative and postoperative care to keep the patient alive and safe but also a prolonged follow-up. This follow-up will deal with the patient’s psychological problems, direct and active physical therapy and rehabilitation that will include selection and fitting of prosthesis, training in its use and return of the patient to his previous or new engagement or at least to an independent useful life.

The aim of this study is to analyze the indications for our amputations and observe the outcome over a 5-year period at Hilltop Orthopedic Clinics, which is a 50-bed specialist hospital in Enugu Metropolis, Nigeria.

PATIENTS AND METHOD:

This is a prospective study in which all the patients booked for limb amputation at Hilltop Orthopedic Hospital, Enugu were included and were evaluated as they came. The study period was from January 1998 to December 2002.

On presentation, each patient is evaluated and data collected include, the biodata, the clinical history especially that of injury and previous treatment by traditional bonesetter or any other healer, the type of treatment administered and the progression of the illness. Clinical examination was carried out with particular attention to the type of lesion, the extent and limb involved.

Patients, after clinical examination, are subjected to necessary investigations including X-rays and histological studies where indicated. Then a definitive diagnosis is made and this invariably becomes the indication for the amputation. In making the diagnosis of mismanaged limb trauma by traditional bonesetter leading to iatrogenic gangrene (traditional bonesetter’s gangrene), we relied mainly on the history of limb injury, of treatment by a traditional bonesetter and of progression of the limb during the treatment from a normal looking limb to a dark coloured one with or without shrunken extremities (figure 1).

X-rays of the limb were done in all cases. Then the original injury sustained
before treatment by traditional bone setter is reasoned out from the history, clinical examination and x-ray findings.

All the patients were resuscitated and necessary preparations for amputation carried out including informed consent. The level of amputation and the type were determined based on the clinical judgment. Thereafter, the amputation was done. After operation, the patients were followed up for post-amputation care and outcome.

RESULTS:
During the period under review a total of 44 patients were entered into the study. Each had a single amputation, i.e. 44 amputations. Their age range was between 9 and 83 years. The mean age was 43 years. There were 36 males and 8 females giving a male to female ratio of 4.5:1.

The peak age incidence was in the 4th decade with 21 (48%) of cases falling within this decade. 33 (75%) of cases fell within the age range of 21-60 years which is the most productive age period.

INDICATIONS FOR AMPUTATION
The indications for amputations were as follows:
Trauma 23 (52%) divided into trauma per se 8 (18%) and mismanaged limb trauma 15 (34%); malignant tumours 12 (27%); diabetic gangrene 7 (15%) and gangrene secondary to peripheral vascular disease 2 (6%).

Further analysis of the indications shows that those due to trauma per se consists of 3 cases of Gustilo-Anderson's type III open fractures from gunshot, 2 of damage to major blood supply to the limbs from gunshot, one traumatic amputation and 2 of mangled of the feet.

Those of mismanaged limb trauma as reasoned out from history, clinical examination and x-rays consists of 3 cases of soft tissue injury to the joints, 7 closed fractures and 5 type 1 and 2 open fractures.

All the patients have received some form of treatment from one or more medical or paramedical institutions before presentation. All the lesions were infected at the time of presentation.

All the patients have received some form of treatment from one or more medical or paramedical institutions before presentation. All the lesions were infected at the time of presentation.
Those of malignant tumours consists 2 cases of osteosarcoma, 9 of squamous cell carcinoma ulcers and 1 case of Kaposi sarcoma. All tumours were confirmed by histology. Table 1 shows the indications.

Post Amputation Care
All the cases had open (provisional) amputation because of the accompanying infection. Soft dressing concept was therefore used for all the stump wounds to allow for frequent dressing needed. All the cases of diabetic gangrene and peripheral vascular disease required re-amputation at a higher level because of flap necrosis resulting in projection of the bony stump.

Secondary wound closure was done in all cases, because they all had open amputation. 41 out of the 44 stump wounds healed primarily after the secondary closure. The remaining 3, all of them diabetic had wound breakdown from infection and flap edge necrosis. They had several dressing before healing.

Level of Amputation
There were 20 (45%) below-knee amputations. Above-knee were 19 (43%); partial foot amputation was 1 (2%); above-elbow were 4 (9%). Lower-limbs were involved in 40 cases and upper-limbs in only 4 cases giving a ratio of lower-limbs to upper-limbs of 10:1. Table 2 illustrates the distributions of the levels of amputation.

Complication
Seven of the patients died and all during the post-operative period giving an overall mortality of 15%. Majority of the deaths 4 (57%) were among the iatrogenic limb gangrene from mismanaged trauma. Two of these cases were complicated with gas gangrene while in the remaining two there was overwhelming sepsis and toxemia. Two of the deaths occurred in the diabetics who because of uncontrolled state lapsed into diabetic coma and never recovered. The remaining one (14%) occurred in an osteosarcoma case whose lungs were riddled with metastasis and whose lesion were quite extensive and grossly
infected from previous interventions and late presentations.

All the stump wounds were infected because their accompanying infections of the lesion for which amputations were done. There was flap necrosis in all the 7 diabetics and 2 cases of peripertual vascular disease. After the secondary wound closure was done in all the cases, there were only 3 cases of delayed wound healing from flap edge necrosis and sepsis. Table 3 shows the mortality, its distribution and causes.

Post-amputation. Mobilisation of the patients were started post-operatively as soon as pain and debility will allow, usually after 48 hours. All the lower-limb amputees were able to ambulate with a pair of crutches (axillary or elbow) by 2 weeks except the two very elderly patients aged 82 and 83 years respectively. These two could only be mobilized to wheelchair use.

Acquisition and use of Prosthesis

None of the above-elbow 4 amputees was able to acquire any form of prosthesis. The partial foot amputee was able to walk with normal footwear of slip-on or shoe type. Of the 19 above-knee amputees only 2 were able to acquire and use prosthesis. In the 20 below-knee amputees, 16 were able to acquire and use prosthesis, 4 have not been able to acquire because of cost.

Life Post-amputation

All the surviving 37 amputees were able to lead to a reasonable degree of independent lives except the two most elderly ones who remained on wheelchair. All the amputees in trading and marketing business have no problem going back to their previous engagements. The students among them are coping up with their studies and work respectively. The problem is with the artisans like drivers, carpenters, masons and farmers. None of them has been able to go back to their previous engagements. They prefer going into trading business than going back to their previous engagements.
Figure 1

Traditional bonestructure's iatrogenic gangrene

Table I: Indications for Amputations

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<th>Indications</th>
<th>Frequency</th>
<th>Percentage (%)</th>
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<tr>
<td>Unmanaged trauma</td>
<td>15</td>
<td>34</td>
</tr>
<tr>
<td>Trauma per se</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>Malignant tumour</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>Diabetic gangrene</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Peripheral vascular disease</td>
<td>12</td>
<td>27</td>
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Table II: Distribution of Level of Amputations

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<th>Level of Amputation</th>
<th>Frequency</th>
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<tr>
<td>Above knee</td>
<td>19</td>
<td>43</td>
</tr>
<tr>
<td>Below knee</td>
<td>20</td>
<td>45</td>
</tr>
<tr>
<td>Partial Amputation</td>
<td>113</td>
<td></td>
</tr>
<tr>
<td>Above elbow</td>
<td>4</td>
<td>9</td>
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Table III: Distribution of Level of Amputations

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<th>Frequency</th>
<th>Percentage (%)</th>
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<tbody>
<tr>
<td>Above</td>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>Below Gas Gangrene</td>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>Partial Amputation</td>
<td>2</td>
<td>28</td>
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<tr>
<td>Above elbow</td>
<td>1</td>
<td>14</td>
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DISCUSSION

Trauma, especially mismanaged trauma to the limbs were found to be the commonest indication for amputation in this study. Trauma with few exceptions has been consistently found to be commonest indication for amputation in the developing world especially in this subregion. This is at variance with the finding in the developed world where peripheral vascular disease and complication of diabetes mellitus are the commonest indications with trauma following in a distant third position.

It was found also that it is not trauma per se that led directly to the amputation in most cases but the mismanagement of it. In the cases of mismanaged trauma that led to amputation in this study, the original injuries as reasoned out from the history, examination and X-ray findings wouldn't have on their own lead to amputation.

Our findings are very similar to that of Garba and Daud; in Zaria, Nigeria where they equally found trauma and mismanaged trauma as the commonest indications for their amputations despite the larger volume of their patients and longer period of their study.

The commonest culprit of this mismanagement of the limb trauma in this study is the traditional bonesetter. This has consistently been the observation of other workers in this subregion. It is observed also that iatrogenic ischemic gangrene of the injured limb sometimes called traditional bonesetter's gangrene (because of its frequent association with the traditional bonesetter’s method of treatment) is the end result of this mismanagement. This frequent complication of their treating limb trauma has been found to arise from many reasons. They include mainly ignorance of the natural physiological swelling following trauma and therefore of the consequences that may follow when their inexpansible splint is tied early to an injured limb. They are not aware of the fact that frequent manipulation of the injured limb damages the tissues further and increases swelling. They are also unaware of the need for asepsis and antisepsis in their method even when
One finding in this study is very worrisome and that is, that 34% or 113 those who had limb amputation shouldn’t have had it but for the mismanagement of their mild to moderate limb injuries by the traditional bone-setters. This same experience has been observed by other workers in this sub region over the years. Lind amputations is a disaster to any person because of its life long disability and stigma. For it to be inflicted on any person when not necessitated by his or her condition is an abominable act to say the least. Therefore, serious and persistent effort should be made by those entrusted with health care delivery and safety of the populace to curb this state of affairs.

The main culprits of this mismanagement of limb trauma leading to these unwanted amputations both in this study and others have found to be the traditional bone-setters. However, it is also observed, that this act is not intentional but arose mainly from ignorance.

Therefore, attention should be directed towards eliminating this ignorance that makes their practice very
hazardous. One of the ways of doing this is through education and continuing education for those who practice traditional bone setting as a trade. For this to be effective, it has to be in an organized manner. There is need, therefore, for traditional bone setters to be organized in body to be registered by a government agency that will regulate this body and their practice. Through this body organized education and continuing education can be delivered to them.

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CERVICAL SPINE INJURY: NATURE AND COMPLICATION

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ABSTRACT

Traumatic cervical spine injury is the commonest and most devastating injuries of the musculoskeletal system occurring more commonly in young patients from high energy vehicular accidents. This is particularly important considering the state of health care delivery system in Nigeria, increasing use of vehicles and dangerous flouting of traffic rules.

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