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MOVEMENT IS LIFE; LIFE IS MOVEMENT

By

Professor Akinyele Lawrence Akinyoola
Professor of Orthopaedic Surgery and Traumatology

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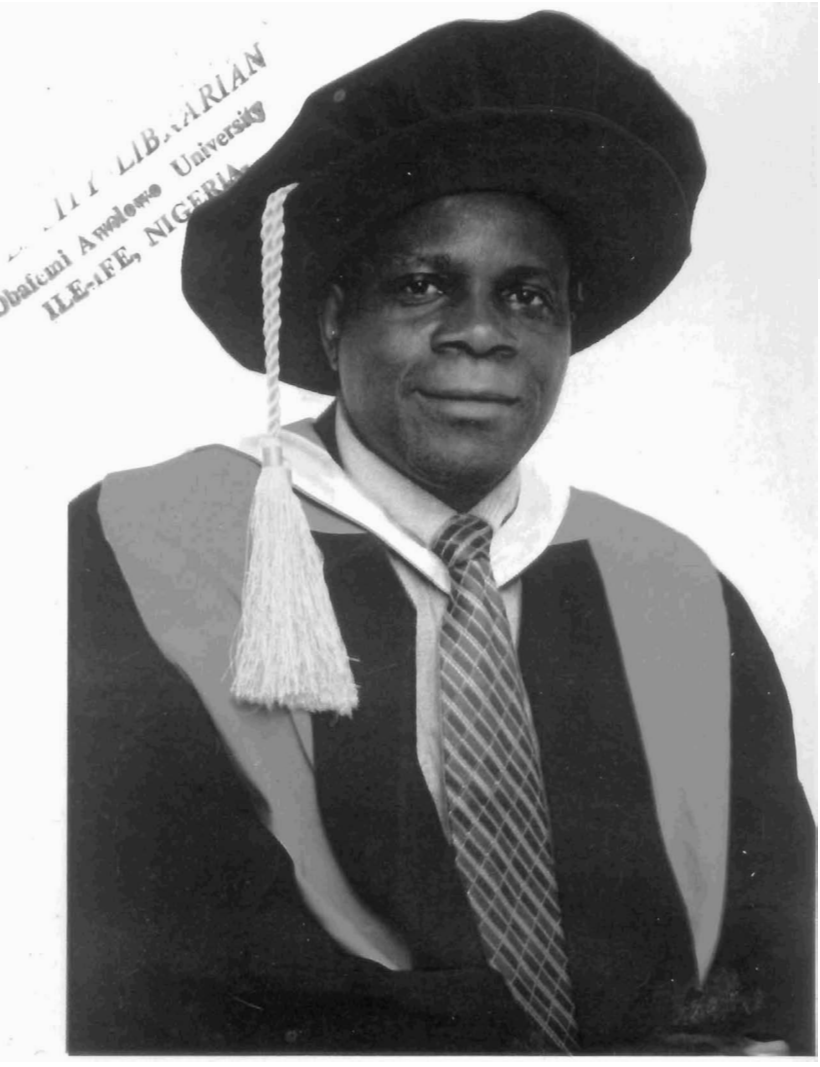

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PROLOGUE

Mr. Vice-Chancellor, Sir, other Principal Officers of the Obafemi Awolowo University, Ile-Ife, it is with great pleasure and a sense of gratitude that I stand before this august gathering today to present this Inaugural Lecture. This occasion could only have been possible because of the abundance of grace and mercy I enjoy from the Almighty God.

Can anything good come out of the bush? It is not only good herbs (thanks to Professor Anthony Elujoba) that can come out of the bush. To have grown from a young 'bush' boy at Oyere Kereja village, Ipetumodu, to a Professor of Orthopaedic Surgery and Traumatology is only possible with God because with Him, nothing shall be impossible. To God alone be the glory, who used some angels along my path to the present position.

The sudden death of my father in September 1974 dimmed any hope of secondary education for me, as I had just spent two weeks at the Origbo Anglican Grammar School. Surprisingly my mother, Mrs. Monisola Dorcas Akinyoola, ordered me back to school, promising to pay whatever price it would cost her to educate me. She remains my hero.

Fate later took me to Pa and Chief (Mrs) Ojeleye, the educationists per excellence, pioneers of education in Ipetumodu, who brought me and others from darkness that illiteracy represents to light. The family accommodated and guided me and my cousins throughout secondary and tertiary education.

The thought of being a medical doctor never occurred to me until my then English and History teacher at the Origbo Anglican Grammar School (OAGS), Mr Olu Owolabi (now Dr Olu Owolabi, retired Provost, College of Education, Ila Orangun), obtained a Joint Admissions and Matriculation Board form for me in 1979, at his own expense, and chose Medicine and Surgery and selected University of Jos, where he was a Masters degree student. He told me he had observed my attitude which would make me a good doctor.

I approached the JAMB examinations with a lackadaisical attitude since I had planned to work with my West African School Certificate (WASC) to assist my mother bring up my younger siblings. To underscore my lack of seriousness about university admission it was not until about 2 months after the JAMB results came out that late Pa Ojeleye sent one of my cousins to locate me in Lagos where I was working at the P & T Training School, Cappa, Oshodi, and gave me the admission letter.

Providence later made my path to cross that of Mr. and Mrs. Oyeyemi (former OAU Registrar) when the West African Examinations Council delayed the release of results of some students of OAGS due to delay in submitting the marks in one of the subjects in 1979. The role the family played in the release of the results and their subsequent adoption of me as their son till today remains indelible.

I was admitted to study Medicine and Surgery at the University of Jos in 1980 where I met Mr and Mrs Bisi Akinjogbin, Professor Femi Idowu (now in Baton Rouge, Louisiana, USA) and Mr Muritala Abedide(my cousin), all of who took good care of me and made my stay in Jos comfortable. I owe them a load of gratitude.

The choice of Orthopaedic Surgery as a Specialty was influenced by my contact with a well known Orthopaedic Surgeon in the then Oyo State, Dr Smith (now late), during my Housemanship. His humility and his handling of Orthopaedic and Trauma patients made him the toast of many patients in Ibadan.

Residency training took me to the University College Hospital, Ibadan from where I relocated to the National Orthopaedic Hospital, Igbobi, Lagos and some of my teachers are here today at this lecture. Coming to the Obafemi Awolowo University in January 1998 was the biggest challenge of my life as I resumed at the height of the Ife-Modakeke communal clash. I appreciate the roles of Professor L.M. Oginni, Professor Sanya Adejuyigbe(the then Provost of the College of Health Sciences), Professor Wale Akinsola(former Deputy Vice-Chancellor, Academics) and Mr Adeyeye(Director of Administration, OAUTHC, who gave me his official guest house in Phase three quarters, OAUTHC) which helped me to settle down in Ife.

This inaugural lecture will provide a record of my contributions to knowledge and practice of Orthopaedics and Trauma, digging into the past, addressing the present and taking a look at the crystal ball concerning the future of Orthopaedic practice in Nigeria. I would also talk about my community service especially in the prevention of injuries from road traffic crashes.

History of Orthopaedics

Orthopaedic Surgery is the branch of Medicine that is concerned with the preservation and restoration of the form and function of the locomotor system at all ages. An

Orthopaedic surgeon is a Physician who has a comprehensive knowledge of anatomy, physiology and pathology of the locomotor system and is responsible for treating the diseases arising from the system.

The term **'Orthopedics'** is from the Greek word '*Ortho*' meaning straight and '*Pedia*' meaning child. It was coined by Nicholas Andry (1658-1742), a Professor in the University of Paris, who in 1741 published '*L'Orthopedie ou l'art de prevenir et de corriger dans les enfants, les difformitis du Corps*'in Paris. This, translated to English, means the art of correcting and preventing deformities in children. Orthopaedics thus started with correcting deformities in children, hence the logo of the profession, depicting a crooked tree being conformed to grow straight around a straight pole. This was due to his belief that the prevention of deformity in adults depends on the development of straight children. Today, Orthopaedics has evolved into a highly specialized subject offering a variety of treatment options in children and adults who have congenital musculoskeletal deformities, bone and joint infections, degenerative joint disorders, trauma, etc. Orthopaedics is concerned with the locomotor system, parts of the body that have to do with moving from one point to another. It deals with all the disorders that challenge movement.

According to Moshe Feldenkrais "Movement is life. Without movement life is unthinkable." **Moshé Pinchas Feldenkrais** (May 6, 1904 – July 1, 1984) was an Israeli physicist and the founder of a method which is claimed to improve human functioning by increasing self-awareness through movement. Mobilization is one of the activities of living. For man to

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explore and extend his living space he has to move. Life means movement. Everything we do and everything we perceive comes down to movement. Human body thrives on activity and decays with prolonged immobility (**Yusuf et al, 2013; Yusuf et al, 2015**). Blood cells that don't move cannot transport oxygen, lungs that don't move can't breathe, hearts that don't move can't pump blood. The connection between movement and life is also understandable if one remembers what happens when one engages in healthy behaviours, such as consistent physical activity. Research has shown that regular exercise improves circulation and gives you a greater ability to accomplish more physical tasks.

Movement of the human body is made possible through the coordinated action of bones, joints, muscles, nerves and blood vessels. One of the greatest enemies of the locomotor system, and indeed of health to man, is impaired mobility. Movement can suddenly or gradually be brought to a halt by an accident or a disease, such as trauma(fractures and dislocations), bone and joint infections, degenerative joint conditions like osteoarthritis, bone tumours and hereditary conditions like sickle cell disease.

Evolution of Orthopaedic Practice in Nigeria.

The history of orthopaedic practice in Nigeria cannot be separated from the history of the National Orthopaedic Hospital Igbobi, Lagos. The National Orthopaedic Hospital, Igbobi, Lagos, commenced operations as a rehabilitation centre for wounded returning soldiers from World War II in 1943. The centre later developed to a hospital under the British Colonial Medical Services in December 6, 1945 and in

1956 it was named the Royal Orthopaedic Hospital. The National Orthopaedic Hospital, Lagos, has since developed into a tertiary health institution for training many categories of health care professionals, research and care of varieties of musculoskeletal disorders. This inaugurant is a product of the centre. Two other National Orthopaedic Hospitals, National Orthopaedic Hospital, Enugu and National Orthopaedic Hospital, Dalla, Kano, were later established for the increasing population of Nigeria. Orthopaedic Units and Departments were also established in many Nigerian Teaching Hospitals. It is worthy of note that the first full-fledged University Department of Orthopaedic Surgery and Traumatology in Nigeria was that of the Obafemi Awolowo University, Ile-Ife, established in 1983.

Orthopaedic practice in Nigeria initially witnessed an era of growth in the late 70s and early 80s. In fact many of the courses that we now have to travel out of Nigeria to attend, like the Association for the study of Internal Fixation (AO) and Advanced Trauma Life Support(ATLS) courses, were hosted in Nigeria. The Nigerian Orthopaedic Association (NOA) was inaugurated in 1977 to *"promote, develop and project the science, art and practice of Orthopaedic and allied Trauma surgery in Nigeria with regards to clinical practice, service, research, training and ethics"*. By 1989 the Association had 58 full members and 26 associate members before the massive exodus of many members to Saudi Arabia and other Middle East countries which almost brought it on its knees. There was thus a period of interregnum during which many university teaching hospitals were deserted by orthopaedic surgeons. It was however left for great

orthopaedic surgeons like Dr (Chief) F.A.O. Owosina, Dr (Chief) E.A. Bamgboye, Dr Z.O. Alabi, Dr G.A.A. Oyemade, Dr B.O. Onabowale, Dr Jery Grange and some others who kept the flag flying.

We are yet to recover from the over ten years interregnum with its attendant generational gap. Nigeria presently, with a population of about 182 million (by recent National Population Commission pronouncement), has less than three hundred (300) practicing orthopaedic surgeons in the country. There is therefore a dearth of orthopaedic surgeons with some states in Nigeria without a single one. This has led to many Nigerians patronizing traditional bone setters.

The common orthopaedic problems that prevent movement and take life out of individuals include bone and joint infections, trauma(fractures and dislocations), tumours, degenerative conditions like osteoarthritis, autoimmune disorders like rheumatoid arthritis, metabolic diseases like rickets and osteoporosis, hereditary disorders like sickle cell disease and congenital musculoskeletal conditions like club foot.

BONE AND JOINT INFECTIONS.

Musculoskeletal (bone and joint) infections are common orthopaedic problems and continue to pose a challenge to Orthopaedic surgeons in our environment. This is especially true of osteomyelitis and septic arthritis.

Osteomyelitis.

Osteomyelitis simply means infection of bone and its covering. It could be acute or chronic. The acute form commonly presents as pain in a limb, difficulty with using the limb, fever, with the affected patient looking very sick, the

limb swollen, warm and tender. Most of the patients are children. Chronic osteomyelitis may follow acute osteomyelitis or arise *de novo* especially by organisms that cause chronic infections like tuberculosis and fungi. It commonly presents as a recurrent, chronic discharge of pus from the affected limb.

Chronic Osteoyelitis of Tibia with exposed dead bone
Courtesy: African Journal of Paediatric Surgery

Chronic osteomyelitis resulting from undiagnosed or improperly treated acute haematogenous osteomyelitis remains a common orthopaedic disease especially in developing countries. It is a debilitating disease affecting mostly children and adolescents and characterized by persistent purulent discharges from bone due to the presence of infected and dead pieces of bone encased by new bone. This is a very difficult infection to treat. The standard treatment of chronic osteomyelitis consists of adequate surgery and antibiotics. One of the main challenges is in identifying the causative agents of chronic osteomyelitis.

Identifying the causative agent(s) is essential to the choice of antibiotics and thus rational treatment of osteomyelitis. Prior to our study the choice of antibiotic therapy in the management of chronic osteomyelitis was usually based on microscopy, culture and sensitivity of sinus track (external opening) . Together with my co-researchers, I was able to show that microbiologic analysis of intra-operative pus, curetting and sequestra(small pieces of dead bone) had the highest sensitivity, specificity and positive predictive value in identifying the causative bacterial agents of chronic osteomyelitis. We therefore recommended that sinus track specimen culture be confirmed by intra-operative bone culture and/or biopsy for the microbiologic diagnosis of chronic osteomyelitis. This would ensure that as many of the infecting organisms as possible will be identified, thereby reducing treatment failures to the barest minimum**(Akinyoola, et al, 2009)**.

Osteomyelitis and sickle cell disease

Osteoarticular infection, especially osteomyelitis, remains one of the most common complications of sickle cell disease, a common genetic disorder in Nigeria. In our study comparing osteomyelitis in patients with sickle cell disease with those without sickle cell disease **(Orimolade et al, 2009)** it was found that bone pain, upper limb involvement and leucocytosis were commoner in patients with sickle cell disease. The study supported earlier reports that *Staphylococcus aureus* is the most common causative agent of osteomyelitis in both sickle cell disease and non-sickle cell disease patients.

Septic arthritis

Septic arthritis refers to all joint infections caused by pyogenic (pus forming) bacteria excluding tuberculosis. Though not as common as osteomyelitis it is a medical emergency and delay in recognition and initiation of appropriate therapy can increase morbidity and permanent sequelae. Pus and articular cartilage are incompatible. Though any synovial joint may be the seat of septic arthritis the most commonly affected joint in our study was the hip joint **(Akinyoola et al 2006)**. The mean age of septic arthritis patients in our study was 3 years (range 12 days-16 years).

One important feature of Orthopaedic practice in our environment is late presentation of patients with orthopaedic diseases. This is especially true of bone and joint infections. There was an average delay of two weeks before presentation in our patients. About 40 % of patients with septic arthritis of the hip presented late with irreversible joint destruction manifesting as limping, joint stiffness and shortening of the leg. Many cases of osteoarticular infections were usually first diagnosed by the emergency room physicians as malaria, especially in the early stages when the symptoms may be non-specific. We therefore recommended early diagnosis through a high index of suspicion and commencement of therapy.

Orthopaedic complications of HIV/AIDS

The first report of osteonecrosis (bone death due to lack of blood flow) in HIV/AIDS in Nigeria was from the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria. This was a 56 year old woman, on treatment for HIV/AIDS, who presented to our Orthopaedic service with a 7 month history of painful and stiff shoulders and hips, fever and weight loss. X-rays confirmed osteonecrosis of both

heads of humerus and femur. This was believed to be the side effect of treatment of HIV/AIDS with highly active antiretroviral therapy with protease inhibitors, possibly related to the induced hyperlipidaemia. Through this report **(Akinyoola, et al, 2006)** I and others have been able to raise the awareness of this bone and joint complication of HIV/AIDS in our environment and beyond.

Tuberculosis of bone and joints

Initially thought to be reducing in incidence, tuberculosis has bared its fangs again, especially with deterioration in the economic and health status of Nigerians. In 1986 when I qualified as a Medical Doctor, one US Dollar exchanged for between 75 kobo and 83 kobo. One US Dollar is now 470 Naira. Tuberculosis of the spine is now seen more frequently in our clinics than before, due to the economic woes and its unholy alliance with HIV/ AIDS whose incidence is not going down either.

Tuberculosis remains an intractable infectious disease in our environment. According to WHO, there are about 8-10 million new cases of tuberculosis per year with approximately 3 million deaths, 80% of which are in developing countries. Tuberculosis therefore remains a major public health problem and it will be difficult to eradicate it as long as poverty, overpopulation and malnutrition remain with us.

In our study of 62 patients with tuberculosis of the spine **(Akinyoola et al 2007)**, both males(49%) and females(51%) were equally affected. Students (30.6%), traders (26.5%) and farmers (18.4%) were most affected. Many patients (83.7%) presented when they became unable to walk, by which time

the bones and joints of the spine had been destroyed (TB Paraplegia). About 37 % presented with back deformity.

There is need for the establishment of specialized spinal units in many of our hospitals in Nigeria to deal with the spinal complications of tuberculosis and training of the appropriate personnel involved in the care of patients with tuberculous paraplegia.

The first case of congenital (present at birth) tuberculosis with spinal involvement in Nigeria was reported from our centre **(Akinyoola , et al, 2005)**. This was a 3 month old girl child who was referred to our service with a history of cough since birth, difficulty with breathing for four weeks and swelling on the back for one week. Laboratory investigations and x-rays confirmed congenital pulmonary tuberculosis with spinal involvement. She and her mother were treated with anti-tuberculous drugs. By this publication an awareness of this condition was created, underscoring the need to screen high risk women for genital tuberculosis.

Fungal infections of bone

An important differential diagnosis of a malignant bone tumour(bone cancer) in our environment is a deep fungal infection. This was vividly illustrated by a case report I and others published **(Akinyoola et al, 2006)**. This was a 23 year old immuno-competent woman who presented to our centre with two month history of exuberant fleshy outgrowth with. Ulceration in the shoulder extending to the elbow, fever, weight loss and anaemia. X-rays showed destruction of the clavicle and humerus. All the features were suggestive of cancer. Biopsy confirmed African Histoplasmosis, a deep fungal infection. She was treated with the appropriate

chemotherapy and the patient was saved from unnecessary amputation.

Wound infection

Every wound, whether an intentionally made surgical incision or accidentally caused, has the potential to be contaminated and infected. The battle against wound infection has been a long one from the time of Hippocrates (Greek physician and surgeon, 460-377 BCE), to Galen (Greek surgeon to Roman gladiators, 130-200 CE) to Louis Pasteur (French bacteriologist, 1822-1895) and Joseph Lister (Professor of Surgery, London, 1827-1912) till date. The infection of any wound increases morbidity and cost of treatment. Infection of musculoskeletal wounds, especially those involving insertion of hard wares like fracture fixation and joint replacement, is regarded as a disaster.

At the initial presentation of patients with open musculoskeletal wounds, especially open fractures, to the Accident and Emergency Department it is sometimes difficult to decide which antibiotics will be of use to the patient. Orthopaedic and Trauma surgeons usually depend on best guess or tradition or on data obtained from outside the African continent to determine antibiotic policy in most of our hospitals. This led to our study to determine the microbial isolates in early swabs and biopsy of open musculoskeletal injuries at the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria. About 73 % of the wounds were from road traffic accidents and 72.3 % were severe (Grade III A to C) open fractures. Staphylococcus aureus constituted 22,2%, coagulase negative Staphylococci accounted for 21.4%(about half of which are Staph

Epidermidis). Gram negative rods constituted 40.5% (Pseudomonas 11%). The study showed that open wounds of the musculoskeletal system are usually contaminated at presentation with pathogenic organisms. Furthermore we were able to show that quinolones group of antibiotics, represented by Ofloxacin, were the most effective in either preventing or treating the established wound infection. This study has greatly influenced antibiotic policy in our centre as the first drugs of choice in open musculoskeletal wounds presenting to the Accident and Emergency Department are the quinolones except and until culture and sensitivity dictates otherwise. **(Akinyoola et al 2006).**

The use of prophylactic antibiotics in some orthopaedic operations, particularly prosthetic joint surgery and internal fixation of fractures, is an accepted standard of care because of the consequences of postoperative infection. It is customary to administer the prophylactic antibiotic before application of tourniquet. In our study comparing the administration of antibiotic before and after application of tourniquet, I, working with my colleagues, found that administration of prophylactic antibiotics before application of tourniquet did not give better outcomes than its administration after tourniquet application **(Akinyoola et al, 2011)**. This was a revolutionary study, turning what we used to know and accept (administering prophylactic antibiotic before exsanguination and application of tourniquet), upside down. Notwithstanding the fact that it is one of the most cited of my research work, the study needs further validation by other researchers.

Closed suction drainage of orthopaedic implant surgery is still controversial with inconclusive evidence for its use. It is

believed to reduce wound tension and incidence of haematoma formation, leading to reduced incidence of wound infection. But we also know that drains may become contaminated and serve as conduits for deep wound infection. Most of the published reports were on total joint arthroplasty. Furthermore there are very few randomised controlled studies on the use of wound drains in open reduction and internal fixation of fractures. Patients with fractures often present late for treatment in our setting, necessitating open reduction and internal fixation with extensive dissection and bleeding. We therefore carried out a randomized controlled study of patients who presented with malunion or non-union of femoral shaft fractures. They were randomized into Closed Suction Drainage and No Wound Drainage. The outcomes measured were:

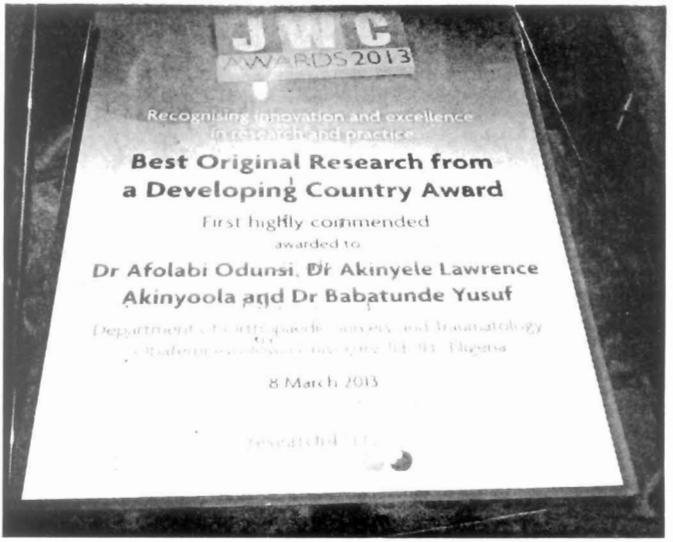
1. Blood transfusion requirement,
2. Presence of wound infection and
3. Duration of wound healing.

There was no significant difference in the outcomes between the two groups. In fact the Closed Suction Drainage group required more blood transfusion. We therefore concluded that there was no benefit in the routine use of wound drains following open reduction and internal fixation of fractures, whether fresh or old. Since the publication of this study **(Akinyoola et al, 2012)** I do not routinely use wound drain following open reduction and internal fixation of my patients' fractures. **It is worthy of note that this work was selected as the best research work by *Journal of Wound Care*, based in London, in 2012**. I received the award, on behalf of

my co-researchers, at a colourful ceremony in London in March, 2013.

Table1: Closed suction drainage of wounds following fracture fixation: Comparison of Patient/fracture characteristics and outcomes between groups

	CSD	NWD	p-value
No of patient (n)	33	32	0.316
Age (year)	38.7±15.8	41.2±20.3	0.537
Male :female	17:16	21:11	-
No of fractures (n)	37	38	0.836
*Malunions (n)	12(32%)	20(53%)	0.83
*Non unions (n)	25(68%)	18(47%)	0.213
Duration of injury (weeks)	17.1±13.3	15.3±9.6	0.414
Blood transfusion (pints)	8	6	0.181
Mean length of operation (min)	135±33	112±40	0.072
Time to wound healing (days)	23.6±20.7	29.1±23.6	0.188



Award plaque by Journal of Wound Care

My study and publication of the microbiology of amputation wound infection **(Akinyoola, et al, 2008)** was the first from this environment. Wound infection is a major complication of amputation wounds, especially in our part of the world, occurring in about 48 percent of amputation wounds. This was because most of limbs requiring amputation in our setting were gangrenous. This prolongs the patient's length of hospitalization and increases the overall cost of treatment. In addition the study showed that most of the bacteria isolates (73%) were sensitive to the quinolones group of antibiotics. This knowledge is important in the antibiotic prophylaxis of amputation surgery.

Tetanus

Tetanus is one of the infections that may complicate open wounds, especially of the musculoskeletal system. It remains

a major health problem in many developing countries, including Nigeria. It is still an endemic disease with high prevalence. The majority of the global annual incidence of about 700,000 to 1million cases are in underdeveloped setting. There has been no reduction in the incidence of tetanus over the years in spite of availability of protective immunization and mortality rate is still as high as 40 to 50 % **(Arogundade et al, 2004; Komolafe et al, 2007; Orimolade et al, 2009))**. Most cases of tetanus are in the young, productive segment of the population (under 40 years) in developing countries unlike in the developed countries where tetanus mainly afflicts the elderly who are believed to have lost their immunity to tetanus. Studies have also shown tetanus to be less common in females, with male to female ratio ranging from 2:1 to 4:1. Reasons adduced include males' higher tendency to engage in activities that predispose to tetanus and the fact that females of child bearing age may have had protective tetanus immunization as part of their prenatal care.

Because of the high mortality rate from tetanus, prevention remains the best form of treatment. This is further underscored by the lower prevalence in the female gender.

To what extent is the current tetanus immunization schedule in our setting protective? My research team decided to measure the serum levels of anti-tetanus antibody in patients presenting with open injuries at the Accident and Emergency Department of the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile Ife, Nigeria and in controls who are mainly hospital staff. This was to determine if the serum levels of anti-tetanus immunoglobulins are up to the acceptable levels for protection against tetanus with a

view to formulating appropriate strategies to reduce the presently high prevalence and mortality from tetanus in our setting. A total of 159 injured subjects were investigated comprising 114 males (mean age 34 years) and 45 females (mean age 36 years) who sustained injuries ranging from contusion, abrasion, lacerations, and avulsion to severe crush injuries from road crashes, domestic violence, gun -shot, snake bite, accidental fall, human bite and others. The results showed slightly higher serum IgG anti-tetanus antibody in females in the study and control groups. This could only be explained by previous anti-tetanus immunization in women during antenal visits.

By international standards, 47.2% (75 of 159) of the subjects required immunization as their serum level of antibody to tetanus were less than 0.10 IU/mL., which is the acceptable protective level. However, the number reduced to 10% four weeks after immunization. Four weeks post-immunization, there was more than 8-fold rise in serum anti-tetanus immunoglobulin levels in the subjects compared to their pre-immunization values (9.22 ± 11.25 vs 1.13 ± 2.37 IU/mL.; p = 0.000). This further underscores the need for continuing immunization to adulthood in our environment to avoid the consequences of poor immunity to tetanus infection. Our study concluded with the fact that many adults in our environment are not protected against tetanus (**Akinyoola et al, in press).** Tetanus immunization should be continued in adults in our environment with booster doses as stipulated by WHO.

Table 2: Serum Anti-tetanus IgG levels in Subjects Pre- and Post-Immunisation

	Subjects	Controls
Age (years)	34.80 ± 16.05 M = 114; F = 45 [M = 33.98 ± 14.34; F = 36.87 ± 19.77]	29.08 ± 8.88 M = 78, F = 12 [M = 28.42 ± 8.03; F = 33.33 ± 12.82]
BS Anti-tetanus IgG (IU/mL)	1.13 ± 2.37 [M = 1.12 ± 2.64; F = 1.15 ± 1.50]	0.76 ± 1.39 [M = 0.59 ± 1.24; F = 1.96 ± 1.80 (t = -3.21, p < 0.001]
PoI Anti-tetanus IgG (IU/mL)	9.22 ± 11.25 [M = 10.67 ± 12.11; F = 5.26 ± 7.81]	NA
Past Immunisation (IU/mL)		NA
Baseline (NI vs IM)	1.02 ± 1.51 vs 1.19 ± 2.67	
After immunisation (NI vs IM)	9.40 ± 11.57 vs 8.69 ± 10.74	

Legends:- M = Male, F = Female; BS = Baseline value anti-tetanus IgG before immunisation; PoI = Post immunisation anti-tetanus IgG level; Past Immunisation = Previous history of anti-tetanus immunisation; NI = No history of anti-tetanus immunisation, IM = previous history of anti-tetanus immunisation; NA = Not Applicable

Bone and Joint disorders in sickle cell disease.

Sickle cell disease is a hereditary and life- long ailment arising from the inheritance from both parents the gene for sickle haemoglobin (HbS) or gene for HbS from one parent and another pathological variant of hemoglobin such as HbC (Hb SC) or Thalassemia (HbSbthal) from the other parent. This disorder affects millions of Africans, some parts of Middle East, Mediterranean countries, African Americans and some parts of India. The disorder is uniformly distributed among various ethnic groups in Nigeria with a prevalence of 1-3 % and an annual incidence of about 80,000.

Avascular necrosis (AVN), death of bone when the blood supply is cut off or obstructed, especially of the femoral head, has long been recognized as a manifestation of sickle cell disease (SCD) with prevalence rates from 3.2–26.7%. The sex incidence is almost equal. It usually begins in adolescence or early adult life., with peak incidence at 21-30 years. Avascular necrosis of femoral head usually manifests as pain in the affected hip and limping. In the late stages of the disease the affected patient complains of stiffness of the hip, like being unable to sit square on a chair, and shortening of the lower limb. Our study (**Akinyoola et al, 2007**) showed that the prevalence of AVN of femoral head in Hb SC and HbSS was similar. This was contrary to the findings of earlier workers on this condition where a preponderance of HbSS was observed (**Iwegbu et al, 1985**). Most of our patients presented late with advanced disease, as only 18% of our patients presented early. Considering the paucity of facilities available for total hip replacement (the best treatment for late disease) and the exorbitant cost in Nigeria, coupled with the young age group affected we recommended regular screening

of patients with sickle cell disorder for AVN and regular community educational programmes for early diagnosis.

Some aetiopathogenetic mechanisms have been suggested for osteonecrosis in sickle cell disease. Some studies have implicated thrombophilia and decreased fibrinolysis as a result of decreased levels of natural coagulation inhibitors. High haematocrit, low foetal haemoglobin levels, and coexistent alpha-thalassemia trait along with increased frequency of painful crises have also been positively associated with osteonecrosis. Many studies have shown that patients with sickle cell disease have decreased levels of natural coagulation inhibitors.

Identification of risk factors helps in screening and placement of appropriate measures to prevent osteonecrosis in high risk patients. This is very important because most patients with osteonecrosis in our setting present very late when the only treatment option is total hip replacement with its attendant unsatisfactory results in this group of patients. Furthermore, it has been shown that the natural history of asymptomatic osteonecrosis of the femoral head in adults with sickle cell disease is progression to collapse. Our study (**Akinyoola et al, 2009**) showed that sickle cell disease patients with avascular necrosis of the femoral head had a significantly higher mean number of hospitalizations and frequency of painful crises. The study also showed that decreased fibrinolytic activity appears to be an important factor in the pathogenesis of osteonecrosis of the femoral head in our population of sickle cell disease

Bilateral avascular necrosis of femoral heads (worse on right)

TRAUMA AND INJURY PREVENTION.

Trauma is an important cause of limitation of movement and health. Trauma is usually sudden in its manifestations and is usually in form of injury to bones, joints and associated soft tissues. Trauma could be from road crashes, gunshot injuries, blasts and explosions, collapsed building, falls from heights, sports injuries, assaults, falls at home and abuse.

The care of the injured patient has been fundamental to the practice of medicine since recorded history. Trauma is as old as mankind. It is a global disease and is a leading cause of death in the developed and developing countries. It has aptly been described as the "the neglected disease of modern society" by the American College of Surgeons Committee on Trauma.

Trauma, the commonest direct consequence of disasters, continues to exact a heavy toll on many Nigerians in their prime of life.

Professor Adeola Adeloye, a foremost Neurosurgeon, had, in 1970, predicted that trauma in developing countries would assume public health significance in years to come. The same was re-emphasized in 1976 at the First International Postgraduate Symposium of the West African College of Surgeons on the care of the injured. This was a prophetic statement as it is now a disease of endemic proportion in Nigeria. It is the leading killer of working age adults in Nigeria **(Orimolade et al, 2011).**

The factors that determine the outcome in trauma and other emergency situations include the severity of the injury, the lapse before definitive care and the quality of the care. An inclusive trauma care is one that is fully integrated into the Emergency Medical Service System and strives to meet the needs of all injured patients requiring an acute care facility, regardless of severity of injury, geographic location or population density.

The most common cause of trauma to limbs, and thus limitation of movement, is a road traffic crash.

The burden of Road Traffic Injuries in Nigeria

A Road Traffic Injury (RTI) or crash is said to have happened where in the course of operating or using a motor vehicle on the highway any injury is caused to any person, property or livestock in the charge of any person. In line with current usage the word **"accident"** is now replaced with **"injury" or "crash". Accident** connotes what befalls us from fate or bad luck. Road Traffic Injuries are caused, they do not just happen. This fact is necessary so that we can focus on the factors that contribute to their occurrence with a view to controlling them. This means they are factors we can deal with.

Road Traffic Injuries (RTIs) or crashes are now the most common cause of emergencies we have to deal with in most of our hospitals in Nigeria. Road crashes are the second leading cause of death between the age of 5 and 44 in African countries. In Nigeria there are an estimated 161 deaths per 10,000 vehicles. These crashes kill over 1.2 million people all over the world annually and disable about 50 million. About 90 percent of these deaths occur in low and medium income countries many of which are found in Africa. In 1988 the World Health Organization ranked Nigeria as one of the countries with the highest fatality per frequency index rates of road crashes in the world. A joint study once carried out by the World Health Organization (WHO), World Bank and Harvard University forecast that in 2020, road crashes would become the third leading causes of deaths and disability. The carnage on our roads has been described as a monster bigger than the HIV/AIDS. World Health Organization (WHO) in 2004, realizing the enormity of the damage caused by RTIs all over the world, dedicated the World Health Day to road safety. A high rate of road traffic injury is an index of a low level of socio-economic development.

Available figures show that the number injured in RTIs has steadily climbed from 1980 till date. Between 1988 and 2005 no fewer than 123,933 deaths were recorded from 309,874 road accidents. There is an average of one death in 2.65 crashes and one person gets injured in every crash. According to the latest WHO data published in May 2014, Road Traffic Accidents Deaths in Nigeria reached 51,633 or 2.71% of total deaths. From January to December 2016, according to the

FRSC, there were 9,000 road crashes and 4,600 deaths. The age adjusted Death Rate of 35.39 per 100,000 of population ranks Nigeria 9th in the world. This is worrisome when one compares this with fatality figures from other countries. For example, in CZECH Republic there is one death in 175 crashes, in France, one death in 170 crashes and in South Africa one death in 47 crashes.

The human and economic costs of these crashes are tremendous. The suffering, pain, fear and distress brought about when there is a crash are better imagined. Road crashes are now important causes of Post Traumatic Stress Disorder (PTSD) in Nigeria (**Mosaku et al, 2015**). The loss of earnings during incapacity, damage to property, cost of medical treatment, loss to the society of the services of those killed or maimed increase the overall cost to the society. The effort to reduce death and disability from crashes on our roads is therefore a big challenge. There is no family in Nigeria today which has not experienced the anguish of the sudden loss of a beloved one as a result of road crashes that could have been avoided.

Causes of RTIs. The causes of road crashes can be broadly grouped into:

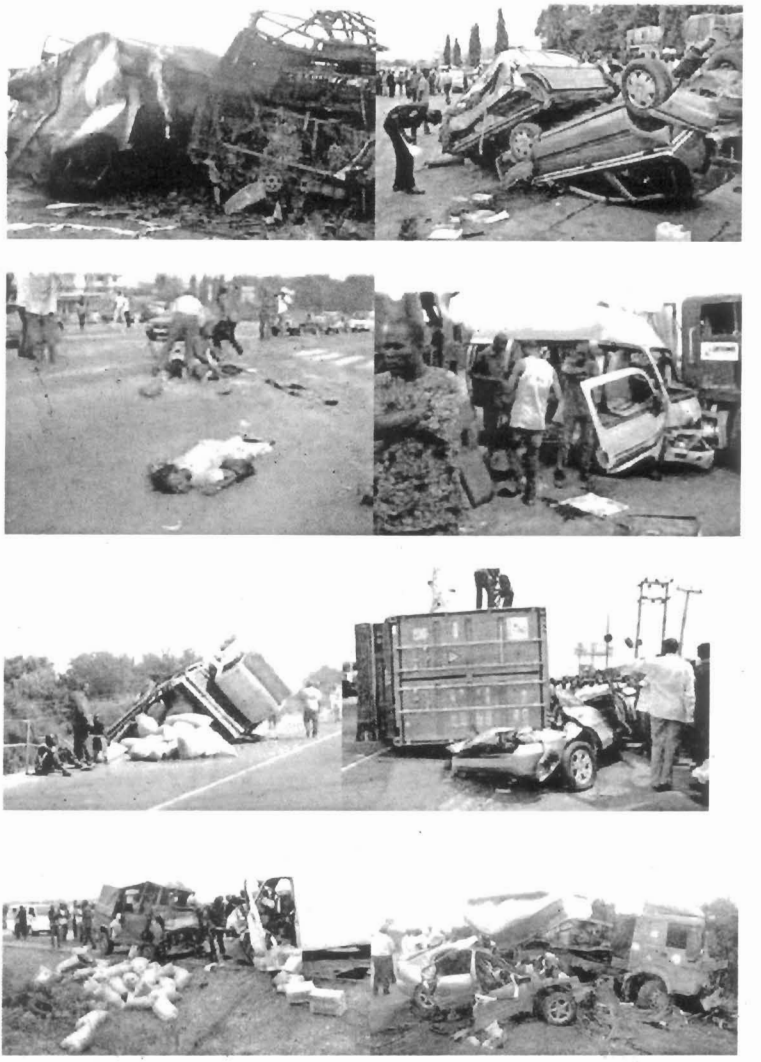
1. Human Factor-80%
2. Mechanical Factor-10%
3. Environmental Factor-5%
4. Others-5%

Man is the most important of these factors as he controls the other factors.

Human factors that cause road crashes are: (i) The drivers, through drunkenness while driving, overloading, excessive speeding, fatigue, lack of concentration, under aged drivers, overconfidence manifesting as Accident Delusion Syndrome

or Accident Immunity Delusional Syndrome (AIDS) where drivers drive recklessly because they believe in certain supernatural power or *juju* which would carry them safely from the scene of accident. Drunkenness on the part of the drivers (or pedestrian) is responsible for over 50% of RTIs in our setting. Therefore if you drink do not drive; if you drink do not walk on major roads. Many of our commercial vehicle drivers are illiterates-many are ignorant of road traffic code and signs. There are too many unqualified licensed drivers on our roads in Nigeria.

Many Nigerians have bad driving habits. These habits include wrongful overtaking, refusal to give right of way, especially at round-about and road junctions, errors when changing directions, failure to keep a sufficient following distance, unreasonable speed, reversing faults and so on. From 1988 to 2005, over five million (5,369,712) drivers were arrested out of which 4,784,375 were directly associated with recklessness **(FRSC)**. Other human factors include ineffective enforcement of the traffic laws due to corruption, inadequate monitoring and communication facilities, lack of operational vehicles, etc.



Motor Vehicle Crashes

Mechanical factors

These are very important contributors to the high rate of road crashes and loss of lives on our roads in Nigeria. Many vehicles plying our roads are in poor state. Many are moving coffins or accidents waiting to happen. Most of the commercial vehicle operators are more concerned with how much money they earn in a day than their lives and that of the occupants of their vehicles. Many are operated with worn out tyres and still drive at excessive speed. Many lives have been lost due to burst tyres while vehicles are in motion. Even some of the so called new tyres are of doubtful quality. Nigeria recently lost a Minister and some members of his family to burst tyres of questionable quality. Some vehicles have poor braking systems. The electrical system that should ensure traffic signs for the other vehicles behind and in front are non- existent in most commercial vehicles. Many carry loads which obscure the view of the driver completely. There was a report recently that more than 75% of the spare parts in Nigeria are either fake or obsolete. It is obvious that all these mechanical factors are controllable by man

Environmental Factors

Environmental factors are more important contributors to human carnage in Nigeria than in most other settings. Our roads are death traps. More than 95% of Nigerian roads are not motor able. Many are riddled with pot holes, some large enough to swallow a whole car. Very few of our roads have functioning street lighting system. There are very few road signs to warn drivers of impending dangers on the roads. Broken down vehicles are left for days or weeks until one or more vehicles have a head-on collision with them with the attendant loss of lives. Many lives have been wasted on bad roads in Nigeria.

Our roads are so bad that traveling that used to be fun and a hobby is no longer so in Nigeria. One now needs to fast and pray hard before embarking on any journey on Nigerian roads.

Fracture epidemiology in Nigeria.

Fracture is a break in the structure of bone. The break could be closed or open (compound, with overlying wound), simple or comminuted (broken into more than two pieces). Fractures may be caused by high velocity forces, as in road crashes, gunshot injuries, blasts, falls from heights or caused by insufficiency or weakness in bones (pathologic fractures) due to infections (osteomyelitis), metabolic disorders (rickets, osteoporosis, osteomalacia) or bone tumours (cysts and cancers).

Management of fractures and dislocations dominate trauma research and practice in our setting. In all our studies it is obvious that the practice of Orthopaedic Trauma in an underdeveloped environment like ours is dominated by late presentation of patients and the activities of quacks. Mercer Rang, a Professor of Paediatric Orthopaedics at the Hospital for Sick Children in Toronto, Canada, who died in October, 2003, aptly described Africa, in his 1993 Instructional Course Series, as an" orthopaedic desert".

Fractures most commonly affect Nigerian patients in their productive life, with a mean age of 39.6 years, mostly from Road traffic crashes **(Oginni, 1993; Ikem et al, 2007; Akinyoola et al, 2011).** The management of fractures continues to be a challenge to surgeons practicing in an underdeveloped setting like Nigeria. Over the years treatment has evolved from non-operative methods of immobilization to open reduction and plate fixation, unlocked and subsequently locked nailing. The standard treatment of femoral shaft fractures, for example, is closed locked nailing. However, in Nigeria, there are many occasions where closed nailing may not be feasible. Many centres do not have the necessary

infrastructure, for example, image intensifier (C-arm). It is not uncommon for patients to present for treatment of their fractures months or years after the injury, after failed treatment by traditional bone setters. Many present as mal-union (fracture united in abnormal position), non-union (failed union), with contracted soft tissues, stiff joints and shortening of the affected limbs. The outcome of such fractures cannot be expected to be as that of fresh fractures **(Akinyoola, et al, 2011; Akinyoola et al, 2013).**

In our study of femoral shaft fractures in children (aged 14 years or younger) we found that 77% of our study population were children of parents of low socio economic status. Many parents therefore found it difficult to finance operative method of management as they may have to wait for weeks looking for funds thereby increasing the length of hospitalization before surgery **(Akinyoola, et al, 2008).** We therefore compared the outcome of non-operative methods of treatment of femoral shaft fractures in children (skin traction, Gallow's splint, hip spica or rarely, skeletal traction) with those of other centres that utilize operative methods. The results of non-operative treatment of femoral shaft fractures in our setting were comparable to the results of other workers. Except for the longer length of hospitalization in our study (mean of 6.7 weeks) the cost of treatment (average 51.2 US$) was far lower than the average cost of 5,000 US$ in industrialized world **(Akinyoola et al, 2011)**.

Pathologic or spontaneous fractures, though not as common as in adults, are causes of morbidity in children. The aetiology of pathologic fractures in Nigerian children is different from their causes in Caucasian children. The most common cause of pathologic fractures in Caucasian children is simple or unicameral bone cyst, usually in the humerus and proximal femur. The most common cause of pathologic fractures in our population of Nigerian children (74.5%) was chronic

osteomyelitis, usually following inadequately treated or misdiagnosed acute osteomyelitis by quacks or some health workers **(Akinyoola et al, 2008)**. This underscores the need to educate many of our primary health care providers on the presentation of acute haematogenous osteomyelitis to ensure early diagnosis and prompt referral and treatment.

Traditional bone setters in Orthopaedic practice in Nigeria and their menace.

A traditional healer can be defined as a person who is recognized by his/her community as competent enough to provide healthcare by using herbs, animal and mineral substances, or other methods. These methods are based on social, cultural and religious principles, including knowledge, attitudes and beliefs regarding the physical, mental and social well-being that are prevalent in their community **(WHO)**.

Traditional bone setters are a specialized group of traditional healers. They exist in almost all countries of the world and have existed from time immemorial. In Nigeria, they use splints, like bamboo and raffia palm with cotton or old cloth wrapped round the limb, apply ointments, scarifications marks and recite incantations to the limb **(Oginni, 1992)**. Their knowledge is passed, as a family secret, from one generation to another.

Hugh Owen Thomas, of the Thomas' splint fame, practiced as a traditional bone setter. He trained his nephew, Sir Robert Jones, the art but the latter studied orthodox medicine later and is acknowledged as the Father of modern orthopaedic practice in Britain.

The reaction of the Nigerian populace to the dearth of Orthopaedic surgeons and the high cost of orthopaedic care is

to turn to the traditional bone setters (TBS). These bone setters are available in every town and village and are relatively cheaper, at least in the short term **(Oginni, 1995).**

About 85% of patients with fractures in Nigeria present first to the traditional bone setters before coming to the hospital **(Onumiya, 2004; Akinyoola, et al, 2006; Omololu et al, 2008**). The patronage of TBS, which cuts across all age groups, social strata and educational levels, continues to increase despite the poor outcome of their treatment. They are immensely popular with Nigerians. The reasons that have been adduced for their popularity among our people are: the belief that they are more skillful than orthodox orthopaedic surgeons, low cost, fear of plaster cast, fear of amputation, ignorance, third party advice **(Ogunlusi, et al., 2007; Dada, et al., 2009)**, affordability, familiarity and custom **(WHO, 1999, 2000; UNESCO, 2013)**. Limb gangrene (death) leading to amputations is the most common complication of treatment of fractures by traditional bone setters. Other complications are failure of union (non-union), union in abnormal position (mal-union), like bending and overlap of the fracture fragments, leading to shortening of the limb, wound infections, bone Picture of Chronic Osteomyelitis of Fibia with exposed bone

Gangrene of right upper limb following TBS treatment

Amputation of right Upper limb following TBS treatment

Infections (osteomyelitis) and tetanus. Unfortunately most of the victims usually present to the Orthopaedic Surgeons very late when they are financially exhausted and their prognosis poor.

Going through a major limb amputation is an unpleasant and horrible experience in the life of any individual. Only few(5.7% in our study in Ife-**Akinyoola et al, 2006**) amputees have access to appropriate prosthetic fitting due to poverty and lack of facilities for prosthetic fitting and adequate rehabilitation in most of our centres in Africa. The loss of a limb in our setting is a disaster of monumental proportion with grave social, economic and psychologic effects on the patient and family. Our study on psychologic reactions to amputations in a sample of Nigerian amputees **(Mosaku et al, 2009)** found a high prevalence of anxiety (64.3%) and depression (59.5%).

Unlike in the technologically more developed societies where the commonest indication for limb amputation is peripheral vascular disease, trauma is the commonest indication in Nigeria. Most of these are simple fractures and soft tissue injuries that first present to the traditional bone setters. Many traditional bone setters splint fractures with tight and constricting dressing at the fracture site. This causes ischaemia followed by gangrene (death) of the limb **(Solagberu et al, 2001; Ogunlade et al, 2002; Omololu et al, 2002; Onumiya, 2004; Akinyoola, et al, 2006).**

MY CONTRIBUTIONS TO ORTHOPAEDIC PRACTICE AND COMMUNITY SERVICE IN NIGERIA.

Vice-Chancellor Sir, permit me to enumerate some of my contributions to orthopaedic practice and community service.

1. Injury Prevention-my role as a Special Marshal of FRSC.

The Federal Road Safety Commission (FRSC) is the foremost organization responsible for prevention of road traffic accidents in Nigeria. In February 1988, the Federal Government created the Federal Road Safety Commission through Decree No. 45 of 1988 as amended by Decree 35 of 1992 referred to in the statute books as the FRSC Act cap 141 Laws of the Federation of Nigeria (LFN). The FRSC is responsible for making the highway safe for motorists and other road users, among other functions.

Not satisfied with just receiving and treating injured victims of road crashes in the hospital I decided to be commissioned as a Special Marshal of the FRSC some years ago. This has enabled me to study the organization and road users at close quarters during our patrols. I wish to use this occasion to appreciate our men and women in the Federal Road Safety Commission who work tirelessly to make our roads safe. The FRSC , being the first to get to sites of road crashes, have found themselves being saddled with search, rescue and transportation of the injured to the nearest hospitals. I implore all health workers to cooperate with them in the discharge of this difficult assignment. The Federal Government should increase the funding and staffing of FRSC while state

governments should support these efforts for example by donating ambulances and operational vehicles. They need these vehicles to transport and resuscitate injured victims of road crashes.

The FRSC and the Nigerian Police should be equipped and trained to enforce traffic rules. There are too many organizations pretending to be enforcing traffic rules in Nigeria. The fact is that many of them were established as revenue generating arms of local, state and federal governments. The FRSC lacks operational vehicles to patrol and apprehend erring drivers. They do not have enough facilities, like cameras and electronic equipments to monitor the speed of vehicles. The organization needs facilities to monitor the alcohol level of drunk drivers. The FRSC must not be made to generate their operational costs. This has a tendency to make them lose focus and become a revenue generating arm of government. This is not to say that offenders must not be made to pay appropriate fines to serve as a deterrent to others.

2. Total Joint Arthroplasty in OAUTHC

The history of total joint replacement is very short in Nigeria as we are very far behind the rest of the world in offering this treatment to our patients. The procedure is indicated for the relief of unrelentingly painful and stiff joints from severe osteoarthritis, rheumatoid arthritis and avascular necrosis among other indications. Total Joint Arthroplasty is carried out in few centres in Nigeria due to lack of expertise and appropriate facilities for the procedure. The most commonly replaced joints in Nigeria at this time are the hip and knee.

Total Hip Replacement in OAUTHC, Ile-Ife.

The first Total Joint Replacement in OAUTHC was carried out by Professor L.M. Oginni and his team in the early 90s. This was followed by many years of inactivity due to lack of fund and high cost of the operation. On return from an Arthroplasty Fellowship in Israel in 2008, coupled with my appointment as the Acting Head of Department, I approached the companies responsible for providing the implants. One of the companies, Johnson and Johnson/de Puy, sponsored four members of our department and two peri-operative nurses for training in their Surgical Skills Institute in Ghana in 2009. This culminated in the resumption of Total Joint Arthroplasty at the OAUTHC. The department resumed Total Joint Arthroplasty (Replacement) on 30 May, 2013. The procedure is now routinely done in our Department in OAUTHC. However, the operation remains very costly. A Total Hip/ Knee Replacement costs over 1 million naira and many patients cannot afford it.

3. Siamese (conjoined) Twins separation

I was a member of the team (led by Professor Sanya Adejuyigbe, a foremost Paediatric Surgeon) that carried out the first successful separation of Siamese twins in Ile-Ife on 6th May, 2002. The conjoined twins presented to the OAUTHC at six weeks of age and separation was carried out when they were four months old. They shared a common anus and were joined at the sacral and coccygeal (lower) spine **(Adejuyigbe et al, 2005)**. I was involved in the separation, especially of the sacro-coccygeal bony union and was given a letter of commendation by the management of the OAUTHC, Ile-Ife.

4. Contribution to Orthopaedic manpower development in Nigeria.

I wish to recognize the contributions of my teachers, senior colleagues, colleagues and generations of resident doctors to the development of the Department of Orthopaedic Surgery and Traumatology of the Obafemi Awolowo University and Teaching Hospitals Complex, Ile-Ife. The department has developed from 1983 when it was established as the first University department of Orthopaedic surgery and Traumatology (independent of Department of Surgery) in Nigeria to its present size and status. I salute the foresight, courage and sacrifices of pioneers of the Department, Chief (Dr) E.A. Bamgboye and Dr. Z. A. Alabi, who established the department and nurtured it before handing it over to Professor L.M. Oginni, the first alumnus and first Professor in the Department. Professor Oginni continues to guide and provide leadership for the Department.

From 1998 when I joined the department till date I have contributed to the training of 28 Orthopaedic surgeons who are making waves in the provision of orthopaedic and trauma care for Nigerians and in leadership positions. The three pioneers mentioned above provided the shoulder for me to stand on to see the front. I am equally grateful to my colleagues in the department and co-researchers in and outside my department for their contributions to my academic and professional development.

EPILOGUE

Mr. Vice-Chancellor Sir, I would like to make the following recommendations to ensure that our people are able to enjoy life that is in movement.

Reducing the human carnage on our roads.

The approach to preventing the presently high death toll on our roads would necessarily be multidimensional. These measures include prevention and control of the causes listed above (primary prevention) and a better organization of our emergency services (secondary prevention).

Prevention and control of RTIs

In public health, prevention is preferable to treatment as it saves both the individual and society from having to deal with injuries and avoids needless expenditure of resources, suffering and physical and emotional trauma. Prevention is the vaccine for the disease of injury. It is based on a triad (an Epidemiologic triangle) of **HOST, AGENT and ENVIRONMENT.**

The strategy is based on the 3 **E's – Education,**

Enlightenment and Enforcement.

Education and Enlightenment

It is a well known fact that public education leads to a change in behavior and thus minimizes injury exposure. Many of our **drivers** need education on proper conduct while driving:

- Don't drive while drinking
- Don't drink while driving
- Avoid excessive speeding
- Obey traffic rules
- Ensure road worthiness of vehicles

- Use seat belt while driving.
- Wear crash helmet while riding a motorcycle (driver and passenger).
- Don't make or receive phone calls while driving.
- Consider other road users, assume the other drivers might not be in the right frame or state of mind.

The passengers also need education:

- Don't distract the driver while on motion.
- Don't shout many instructions at a driver at the same time.
- Report any erring driver to the nearest law enforcement agent. This may save your life. I do it regularly any time I travel by public transportation.
- Avoid night traveling in Nigeria.

Pedestrians need education:

- Look very well before crossing the road.
- Obey traffic rules-use zebra crossing where available

Education and enlightenment should be a regular feature of the mass media in Nigeria.

Another aspect of education is for the government, may be through the Federal Road Safety Commission, to sponsor research into all aspects of road traffic injuries.

Enforcement has been discussed earlier.

Need to improve our road network

The Federal and State governments in Nigeria should declare our roads a national disaster. The present state of our roads is a big shame. There is an urgent need to rehabilitate all our roads and construct new ones. Lay-bys where defective or broken down vehicles can stop and be serviced need to be constructed on all our roads. Broken down vehicles should be towed away immediately before it is dark. Tow truck services operating 24 hours daily should be provided along all our highways.

Organization of Emergency Medical Services in Nigeria

It is sad to note that pre-hospital emergency services are virtually absent in Nigeria. Only Lagos and Osun states in Nigeria presently operate anything that looks like pre-hospital emergency services for trauma victims.

There is a tri-modal distribution of deaths following RTI's. About 50% of deaths occur at the immediate phase, within the first hour of injury, before the patient arrives in hospital. These deaths are usually caused by severe brain or cardiovascular injury and there is little anybody can do about the causes of these deaths. A second peak of trauma deaths (30%) occurs between 1 and 4 hours after injury, usually from haemorrhage (excessive bleeding) and hypovolaemic shock. These are the deaths that can be prevented by well organized pre-hospital and trauma systems. The third peak appears days or weeks after injury, usually from complications of trauma, infection and multiple organ failure.

A good pre-hospital care involves the following:

At the Scene of the accident

- Victim extrication requires well organized search and rescue teams
- Resuscitation, using Basic Trauma Life Support (BTLS) and Advanced Trauma Life Support (ATLS) methods, most especially airway management and control of external bleeding. It is sad to note that we have lost many Nigerians to the absence of this basic facility at the scene of accident.
- Notification of the receiving hospital to enable them assemble their emergency team and equipment.
- Stabilize spine and splint major fractures.
- Minimize scene time
- Immediate transport to the closest facility with well equipped ambulance.

All these are the duties of a well organized and well run Ambulance System. Unfortunately our Ambulance System is almost non- existent and at best poorly organized in Nigeria.

The few functioning ones are operated by the private sector usually affordable by the expatriate workers in the oil companies and the extremely rich Nigerians. What we call ambulances in public hospitals are used to convey dead bodies and health workers. Indeed in some hospitals it is used to carry money to the banks. There is no doubt that both the Basic Ambulances and the Intensive Care Ambulances are needed to make the injured live to receive definitive care.

Primary Care Approach to Trauma Care

Mr. Vice-Chancellor Sir, in the absence of the political will by the government to provide these facilities I hereby suggest that we use the **Primary Care Approach** to trauma care to solve the problem. This involves community participation in trauma care.

We carried out a study from 2015 to 2016 (**Akinyoola, et al-publication in process**) to identify the modes of transporting the injured from road crashes to the Accident and Emergency Department of the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife. Three hundred and one (301) patients (200 males and 101 females) satisfied the study criteria. It was found that 75.4 % of the victims were brought to the A&E by private vehicles, commercial drivers, relatives or Good Samaritans, 21.2 % were brought by FRSC staff, 1.7% by the police and 1.7% by Osun State Ambulance Service **(Tables 3&4)..** Evidence has shown that provision of basic first aid training to commercial drivers leads to increased provision of safe and effective first aid to injured persons at an affordable cost. The drivers presently in the employment of public hospitals should be similarly trained.

Table3: Age and sex distribution of RTA victims brought to A&E of OAUTHC

Age	Male	Female	Total (%)
16-20	14	10	24
21-30	75	29	104
31-40	62	29	91
41-50	29	11	40
51-60	15	13	28
61-70	5	6	11
71-80	-	2	2
81-90	-	-	0
91-100	-	1	1
>100	-	-	0
Total	200	101	301

Table 4: Mode of Transportation/Referral of RTA victims to OAUTHC

Federal Road Safety Commission	64(21.2%)
Police	5 (1.7%)
Osun State Ambulance	5 (1.7%)
Private /Relations/Good Samaritans	227 (75.4%)
Total	301(100%)

Bystander Care

Some roads in Nigeria are notorious for recording high rate of RTI's. Such roads should be identified by the Federal and State Ministries of Works and FRSC. People (villagers) living along these roads should be consulted and organized. A

training programme in extrication of victims and other elements of Basic Trauma Life Support should be organized for them. Appropriate incentives could be offered to them.

Role of voluntary agencies in pre-hospital care.

Voluntary agencies like the Red Cross, Red Crescent, Rotary Club, Lions Club, etc, have played some roles in the health care delivery system in Nigeria. However, their efforts have not been felt significantly in the provision of emergency services. In the State of Israel, for example, pre-hospital care is entirely the domain of their equivalent of the Red Cross (*Magen David Adom*-Red Star of David). This organization has many non-medical persons like lawyers, teachers, drivers, artisans, students in addition to medical practitioners like Traumatologists, Intensivists, Haematologists and Phlebotomists as members, many of who provide their services free. Our spirit of volunteerism needs to be reawakened in Nigeria. The voluntary agencies could purchase well equipped Basic and ICU ambulances and either hand these over to hospitals or even operate them using their volunteers.

In-hospital care.

There is a high rate of deaths from preventable causes like airway obstruction and bleeding in many patients arriving at our Accident and Emergency (A&E) Departments in Nigeria. This unsatisfactory situation is caused by inadequate resources and poor planning. Victims of road crashes should have an unfettered access to emergency services. Access should not be denied for lack of ability to pay the bill.

In conclusion, road crashes have taken and continue to take a heavy toll on Nigerians. Journeys are now embarked upon with trepidation and fear of the unknown. We need to take urgent action, especially in primary and secondary prevention, to stem the present unacceptable carnage on our roads

Handling the menace of TBS.

The role of the Traditional Bone setters in fracture care in Nigeria was referred to earlier in this presentation. It appears there is not much we can do to dissuade people from patronizing them. Africans have implicit confidence in traditional medicine. Many developing nations have integrated traditional practitioners into mainstream healthcare. For example, prenatal and birthing attendants and herbal practitioners have each found places in established healthcare schemes in Nigeria.

Mr. Vice-Chancellor, Sir, I propose that Orthopaedic surgeons and bonesetters work collaboratively. The first step toward integration involves undertaking studies to better understand the morbidities associated with bone setting care as well as the types of injuries that bonesetters typically handle proficiently. Informed by this knowledge, healthcare policy makers can develop a fracture care scheme in which bonesetters manage fractures for which they can achieve acceptable outcomes, referring others to local or regional hospitals.

A study of knowledge system and innovations among traditional bone setters in Southwestern Nigeria **(Asa, et al 2015)** revealed that there had not been appreciable innovations in the practice of traditional bone setting. The only innovations found in the study were erection of signboards, use of x- rays for diagnosis of fracture and

patients' record keeping by those who are literate among them. These innovations would help their integration into the country's health care system.

All TBS should be registered by the government so that their locations are known and they can be held accountable for any violation of the rules governing their practice. For example, I have not seen nor heard of any patient who got his leg destroyed by TBS ask for compensation from the TBS practitioners. Training should be organized for them as is done for traditional birth attendants in Nigeria. Studies in Ethiopia have shown a decrease in the rate of amputations from limb gangrene when such trainings were instituted **(Eshete, 2005)**. Training algorithm has also been recommended by some orthopaedic surgeons **(Omololu et al, 2008)**

Such an integrated scheme will benefit patients, orthopaedic surgeons and bonesetters alike in developing nations. Patients will receive culturally compatible, streamlined care with fewer complications, while physicians and bonesetters will be able to address the burden of fractures in developing countries with an optimal deployment of culturally compatible care and technical expertise.

Training more Orthopaedic Surgeons.

In Nigeria, presently we have about 300 practicing Orthopaedic Surgeons serving a population of 182 million people. In the United States, 28,047 Orthopaedic Surgeons serve a population of 303 million while Israel, with a population of 7 million people, has about 2,000 registered Orthopaedic Surgeons . Orthopaedic Surgeons in Nigeria are thus overworked and inadequately remunerated. We therefore need to step up the training of Orthopaedic Surgeons in

Nigeria and provide the necessary infrastructure for good orthopaedic care. Orthopaedic surgery is technology dependent and driven all over the world.

Table 5: COMPARISON OF NIGERIA AND USA HEALTH INDICES

	USA	Nigeria
Population	302,841,000	182,000,000
Gross national income per capital	44,070	1,410
Probability of dying under 5 (per 1000 lives birth)	8	191
Per capital health expenditures($)	6,714	50
Life Expectancy	75/80	48/49
Total Expenditure as % of GDP	15.3	4.1
Physician density (per 1000)	2.56	0.28
Ortho Surgeons Density (per 100,000)	6.06	0.14

Source: Information extracted from World Health Organization Country Profile: Nigeria and United States.

Subsidizing Orthopaedic care

One of the main reasons patients patronize quacks and TBS is the exorbitant cost of orthopaedic and trauma care. In addition, many aspects of trauma, especially fracture, care are not covered by the National Health Insurance Scheme. Government therefore should subsidize orthopaedic care for

the indigents and those requiring implants, most notably total joint arthroplasty.

Mr. Vice-Chancellor, Sir, ladies and gentlemen, the art of movement is a significant part of living, it is indispensable to life. Life is a continuous movement. Without movement humanity degenerates. In concluding this lecture I would like to quote Abdu'l Baha in his book, **Divine Philosophy**. *'Just as being in motion is the test of life, so being stationary is the test of death and when a moving object stops it retrogrades. To stop means to fall. When a tree stops giving fruit it decays. In other words, man must throughout all the degrees of life evolve and progress day unto day, for life is continuous'*. To keep moving requires a healthy musculoskeletal system. Therefore, life is movement and movement is life.

Thank you all for your attention.

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IMPORTANT NOTE

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I dedicate today to all my colleagues in my department, my research colleagues and all my students (Residents, PhD students, Masters students and Medical Students). It is obvious from the references (bibliography) that what I have presented today is the product of our joint efforts.