BY THEIR TEETH YOU SHALL KNOW THEM: PROSTHODONTIST'S PERCEPTION OF THE CONTRIBUTION OF TOOTH LOSS TO HEALTH

AN INAUGURAL LECTURE,
2014/2015

UNIVERSITY OF IBADAN LIBRARY

OLUWOLE OYEKUNLE DOSUMU

UNIVERSITY OF IBADAN

BY THEIR TEETH YOU SHALL KNOW THEM: PROSTHODONTIST'S PERCEPTION OF THE CONTRIBUTION OF TOOTH LOSS TO HEALTH

An inaugural lecture delivered at the University of Ibadan

on Thursday, 27 August, 2015

By

OLUWOLE OYEKUNLE DOSUMU
Professor of Prosthodontics,
Faculty of Dentistry,
University of Ibadan,
Ibadan, Nigeria.

UNIVERSITY OF IBADAN

UNIVERSITY OF IBADAN LIBRARY

Ibadan University Press
Publishing House
University of Ibadan
Ibadan, Nigeria.

© University of Ibadan, 2015
Ibadan, Nigeria

First Published 2015

All Rights Reserved

ISBN: 978 – 978 – 8456 – 87 – 2

UNIVERSITY OF IBADAN LIBRARY

Printed by: Ibadan University Printery

The Vice-Chancellor, Deputy Vice-Chancellor (Administration), Deputy Vice-Chancellor (Academic), The Registrar and other Principal Officers, Provost of the College of Medicine, Dean of the Faculty of Dentistry, Deans of other Faculties and Postgraduate School, Dean of Students, Distinguished Ladies and Gentlemen.

Introduction

I am grateful to God Almighty for the honour and privilege to be nominated to deliver one of the August editions of 2014/2015 inaugural lecture on behalf of the Faculty of Dentistry. I am the eighth lecturer to deliver the inaugural lecture from the Profession of Dentistry in this University, the seventh from the Faculty of Dentistry, the first from the Department of Restorative Dentistry and the first from the specialty of Prosthetic Dentistry in Nigeria.

About 27 years ago, Professor I.O. Daramola, an Oral and Maxillofacial Surgeon delivered the first inaugural lecture from Dentistry on January 28, 1988. The second lecture was delivered by Professor A.E. Obiechina, also an Oral and Maxillofacial Surgeon, on December 18, 2003. The third was delivered by Professor Gbemisola Oke, a Community Dentist, on December 22, 2005 while the fourth lecture was delivered by Professor J.O. Lawoyin of the Department of Oral Pathology on December 13, 2006. The fifth lecture was delivered on August 12, 2010 by Professor M.O. Arowojolu, of the Department of Periodontology and Community Dentistry and the sixth by Professor J.T. Arotiba from the Department of Oral and Maxillofacial surgery on June 30, 2011. This was followed by Professor A.O. Fasola of the Department of Oral and Maxillofacial surgery who delivered the seventh inaugural lecture on June 13, 2013. It is therefore, with delight and pleasure that I give this inaugural lecture from my specialty.

Mr. Vice-Chancellor, Sir, many people seem to have the notion that Dentistry is all about the teeth. Permit me to join the crusade of previous lecturers in emphasizing that a dentist

UNIVERSITY OF IBADAN LIBRARY

is trained to manage the teeth and the associated structures of the head and neck regions in view of the relationship between the oral structures and other structures in the body. The dentist sees and treats the human being as a patient and not the tooth as a "patient" (Jeboda 2008) and an unhealthy patient may pose enormous challenge during management of oral conditions. With further training in skills and competences, the dentist specializes in a desired dental specialty. Therefore, I crave your indulgence to give an overview of dental specialties.

Dental Specialties

Dentistry is a branch of the health sciences that deals with the study of the oral and peri-oral tissues (the mouth and the surrounding tissues), in health and the prevention and management of the diseases of these tissues. It is still thought by many academics that Dentistry is a specialized course, but the reality is that it comprises of many dental specialties and sub-specialties which include:

(1) Community Dentistry
(2) Implant Dentistry
(3) Oral and Maxillofacial Surgery
(4) Oral Medicine and Oral Radiology
(5) Oral Pathology
(6) Paediatric Dentistry
(7) Periodontology
(8) Forensic Dentistry
(9) Restorative Dentistry

The sub-specialties of Restorative dentistry are:

(a) Aesthetic Dentistry
(b) Conservative Dentistry
(c) Endodontics
(d) Science of Dental Materials
(e) Prosthetic Dentistry (also known as Prosthodontics, Dental Prosthetics) which is made up of;

UNIVERSITY OF IBADAN LIBRARY

(i) Maxillofacial Prosthodontics
(ii) Fixed Prosthodontics
(iii) Removable Prosthodontics

Each of these specialties or sub-specialties can stand alone as a unit or combined to form a unit in a department and the name of the department is derived from the specialties that comprised the department. The nomenclature may vary depending on the institution. For example, University of Nairobi named the Department as Department of Conservative and Prosthetic Dentistry while University of Ibadan adopted Restorative Dentistry. But all of these specialties and sub-specialties are encompassed in the dental profession.

Mr. Vice-Chancellor, Sir, distinguished ladies and gentlemen, I would like to educate this great audience about this specialty and my journey to becoming a prosthodontist. In the academic setting of the dental profession is the slang "The fear of Restorative Dentistry is the beginning of wisdom". Among other numerous goals, the department provides the foundation knowledge for clinical operative training and skill competences for students in a mini skill laboratory setting called Phantom Head Laboratory. It is the most feared among dental departments (definitely not because of the personalities) but probably because of the manual dexterity required in the laboratory which is a major factor. Other factors are the mindset of the students that "the course is vague and difficult", non affordability of instruments and phantom head teeth, use of equipment such as face bow, articulator and many procedures and techniques involved in prosthodontic management that have to be learned. To buttress my view, I believe that the impact of the major factor earlier mentioned, had in the life of the seventh inaugural lecturer from the profession of Dentistry is that "The arrival into the clinical years is usually one of challenges, excitement and expectation. Moreover, the manual dexterity expected from the dental students in the laboratory was a unique test of abilities" Fasola (2013)[1].

UNIVERSITY OF IBADAN LIBRARY

The Choice of Specialty

After the completion of my National Youth Service Corps posting at 22 Armoured Brigade Sobi, Ilorin, Kwara State in 1984, I sought for job as a young dentist. Dr. Obiechina, now Professor of Oral and Maxillofacial Surgery called my attention to the Residency Programme that was being run at the University College Hospital, Ibadan. Out of all the available specialties for training, only Restorative Dentistry was yet to be filled and this was a pointer to a sub-specialty that is not popular or favoured among students and doctors. I was all alone in this specialty until 6 years after I had completed my training as a prosthodontist, I got a registrar companion in this specialty. My colleagues in the University of Lagos and Ife would likely have had the same experience.

My interest in the specialty was steered by the fact that since my childhood years, I had enjoyed creative works using my hands such that my undergraduate training was not of much stress but fun to handle the practical sessions. Nevertheless, little did I know that much difficulty awaited my progress in residency training. The teacher and mentor that I thought I was going to drink from his wealth of knowledge Dr. S.P. Luthra (Acting Head of Department) answered the great call beyond. The sad event was a shocking news which hit me like a thunder bolt and sent a simple message "fasten your training belt, you are on your own". As God will not leave His own alone, I was very fortunate to secure outside training under a very skillful and promising trainer in Lagos University Teaching Hospital, Idi-Araba, Dr. I.E.E. Bassey, though for a short period of three months. He supervised my dissertation with Professor Dickson Ufomata, a conservative dentist at the University of Benin Teaching Hospital, Benin City. I then became the first prosthodontist by examination from National Postgraduate Medical College of Nigeria in November, 1992. Dr. Bassey passed on to glory in 1998. May their gentle souls, rest in perfect peace, Amen.

Mr. Vice-Chancellor, Sir, presently, there are ten (10) dental prosthetic teachers in Nigeria Universities trained from both National Postgraduate Medical College of Nigeria and

UNIVERSITY OF IBADAN LIBRARY

West African College of Surgeons as shown in table 1. Out of this number, five (*) were trained in the University College Hospital Ibadan, four of which were trained and mentored by me. This number is inadequate to facilitate both under-graduate and postgraduate training as well as patients' management.

Table 1: Distribution of Prosthodontists in Nigerian Universities (2015)

Ibadan	OAU Ile-Ife	Lagos	Port-Harcourt	Benin	Bayero	Ladoke Akintola
2*	1	2	1*	2	1*	1*

Table 2 was adopted from Adenubi (2013)[2], in his lecture titled "The Dental Profession in Nigeria: What future?" It shows that Oral and Maxillofacial Surgery (OMS) had the largest number of fellows in the faculty 42(32.3%), followed by conservative dentistry 22(16.9%) and prosthodontics specialty had the least number 5(3.84%) from 1985-2013.

Table 2: Number of Fellows by Examination in the Faculty of Dental Surgery National Postgraduate Medical College of Nigeria by Specialties from 1985-2013. Adenubi (2013)[2]

S/N	Specialty	Number of Fellows (%)
1	Community Dental Health	9 (6.92)
2	Conservative	22 (16.92)
3	Oral & Maxillofacial Surgery	42 (32.30)
4	Oral Medicine	7 (5.38)
5	Oral Pathology	12 (9.23)
6	Orthodontics	12 (9.23)
7	Paediatric Dentistry	10 (7.69)
8	Periodontology	11 (8.46)
9	Prosthodontics	5 (3.84)

Table 3 shows the total number of Fellows and Prosthodontists in the Faculty of Dental Surgery, National Postgraduate Medical College of Nigeria (NPMCN) from

UNIVERSITY OF IBADAN LIBRARY

1970-2015[3]. Prosthodontists are 5(2.4%) of the total number of fellows in the Faculty of Dental Surgery in this College over a period of 45 years of training.

Table 3: Total number of Fellows and Prosthodontists in the Faculty of Dental Surgery National Postgraduate Medical College of Nigeria from 1970 – 2015[3]

Period	Total number of Fellows	No. of Prosthodontists
1970 – 1975	7	0
1976 – 1980	4	0
1981 – 1985	34	0
1986 – 1990	8	0
1991 – 1995	15	1
1996 – 2000	15	1
2001 – 2005	35	2
2006 – 2010	38	0
2011 – 2015	51	1
Total	**207**	**5 (2.4%)**

Adeyemo (2015), Faculty of Dental Surgery NPMCN[3]

Two studies[4,5] investigated the choice of specialty training among Nigerian dental graduates and assessed the level of interest, change in the trend, factors influencing their choice and suggestions to achieve a positive change. During the nine years interval (1997-2006) when the number of Prosthetic Dentistry teachers had increased from 2 to 5, Arowojolu, Aderinokun, Arotiba and Dosumu (1997)[4] and Dosumu et al. (2006)[5] found out that the choice of specialty was not equitably distributed. Oral and Maxillofacial Surgery specialty was the most favoured probably because majority of the founding fathers of the faculty of Dental Surgery were Oral and Maxillofacial surgeons (OMS) who were seen as role models and mentors that influenced their choice of specialty.

In both studies, Prosthetic Dentistry specialty was the least favoured (table 4a)[4, 5] and the reason considered by majority of the respondents was that, this specialty is challenging. However, orthodontics and conservation were

UNIVERSITY OF IBADAN LIBRARY

observed to be more lucrative while OMS was most stressful (table 4b)[4]. The studies also revealed that choosing a specialty may be related to exposure, experience gained and the influence of lecturers during the period of clinical training which became consolidated at post qualification level (table 4c). It is not unlikely that many of the respondents did not even know about Prosthetic Dentistry until after the pre-clinical years. Few number of available specialists and inadequate supply of materials and equipment rather than lack of interest[5] may be responsible for its unpopularity. The trend has been the same "As it was in the beginning so it has been".

Table 4a: Distribution of Respondents in relation to Choice of Specialty[4,5]

Specialty	No of respondents to choice of specialty (%)	
	Arowojolu et al. (1997)[4]	Dosumu et al. (2006)[5]
Dental public health	5 (6.8)	6(7.7)
Oral & maxillofacial surgery	27 (39.9)	16(20.5)
Conservation	9 (12.3)	14(17.9)
Prosthodontics	1 (1.4)	2(2.6)
Oral pathology	2 (2.7)	10(12.8)
Orthodontics	12 (16.4)	15(19.2)
Paedodontics	7 (9.6)	8(10.3)
Dental general practice	1 (1.4)	2(2.6)
Periodontology	6 (8.2)	3(3.8)
Dental Radiology	Nil	8(10.3)
No choice yet	3 (4.1)	Nil
Total	73(100)	78(100)

Arowojolu, Aderinokun, Arotiba, Dosumu (1997)[4] and Dosumu et al. (2006)[5]

UNIVERSITY OF IBADAN LIBRARY

Table 4b: Respondents' Perception of Specialty Characteristics[4]

Specialties	Most stressful	Most challenging	Most lucrative
Dental public health	1	1	–
Oral & maxillofacial surgery	37	25	2
Conservation	5	4	18
Prosthodontics	–	1	
Oral pathology	–	3	–
Orthodontics	1	6	26
Paedodontics	–	1	–
General Dental Practice	–	–	–
Periodontology	1	2	–

Arowojolu, Aderinokun, Arotiba, Dosumu (1997)[4]

Table 4c: Time when Decision on Choice of Specialty was made[4, 5]

	Arowojolu et al. (1997)	Dosumu et al. (2006)
Pre-University	4 (5.5%)	3 (3.9%)
Pre-Clinicals	- (0.0)	4 (5.1%)
Clinical	33 (45.2%)	32 (41.0%)
Post Qualification	30 (41.1%)	28 (35.9%)
No Response	6 (8.2%)	11 (14.1%)
Total	**73 (100%)**	**78 (100%)**

Arowojolu, Aderinokun, Arotiba, Dosumu (1997)[4] and Dosumu et al. (2006)[5]

Mr. Vice-Chancellor, Sir, Prosthetic Dentistry is a branch of dental art and science pertaining to the restoration and maintenance of oral function by the replacement of lost or missing teeth and supporting structures by artificial devices (dental prosthesis). In actual practice however, the term has come to mean the fitting of artificial substitutes such as dentures, bridges, obturators and maxillofacial prostheses,

UNIVERSITY OF IBADAN LIBRARY

and it is in this sense that the term can be classified as being Fixed or Removable Prosthodontics.

As a Prosthodontist, I have majored on removable prosthodontics which include removable partial dentures RPD (flexible and metallic), complete dentures, immediate dentures, overdentures, sectional dentures, obturator dentures and implant supported dentures. Removable Prosthodontics is the branch of prosthodontics concerned with the replacement of teeth and contiguous structures for edentulous and partially edentulous patients by artificial substitutes that are removable from the mouth.

Human Dentition and Functions of the Teeth[6]

Humans are diphyodont, meaning they develop two sets of teeth (the primary or deciduous set and the permanent teeth). Humans usually have 20 primary (incisors, canines and molars) and 32 permanent teeth (incisors, canines, premolars and molars) (figs. 1a & 1b). These teeth are firmly embedded in the alveolar bone tissues of the jaws for the following functions:

(1) To divide the food finely so that a large surface area is available for the action of the digestive juices.
(2) To assist the tongue and lips to form some of the sounds of speech.
(3) It forms an important feature of the face, and by supporting the lips and cheeks enable these structures to perform their functions of manipulating food and expressing emotion.
(4) It is also an object of beauty (aesthetic).

UNIVERSITY OF IBADAN LIBRARY

Fig. 1a: Deciduous dentition (Baby teeth).

Fig. 1b: Permanent dentition (Adult teeth).

The teeth are also mutually interdependent such that premature loss of any tooth may cause a collapse of the dental arch and movement of an individual tooth with loss of inter-proximal contacts (fig. 2). Consequently it gives rise to food-packing, gum damage and bone destruction with further loss of teeth.

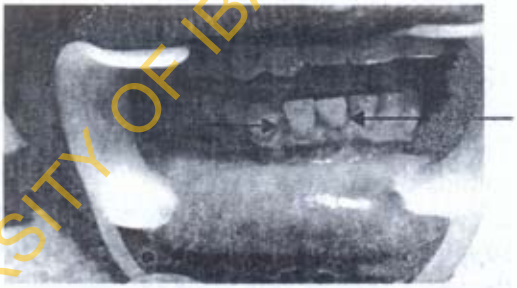

Fig. 2: Missing lower right canine associated with tilting and spacing of adjacent teeth.

Prior to the comparatively modern development of highly refined foods, the loss of natural teeth often resulted in severe malnutrition but, nowadays, it is quite possible to eat healthily with no teeth at all. In spite of this, total loss of teeth is an unpleasant state for the following reasons:

(1) It places limitations on the diet because all hard and fibrous foods need to be finely divided or else digestive troubles may result.

UNIVERSITY OF IBADAN LIBRARY

(2) It produces certain sibilance in the speech because those consonant requiring the presence of the teeth cannot be made efficiently.
(3) It results in a prematurely aged appearance due to the loss of support and consequent falling in of the lips and cheeks, and the fact that the jaws can be over-closed producing a bunching up of the soft tissues around the mouth and close approximation of chin and nose (figs. 3a & 3b).
(4) It can produce loss of confidence and even psychological disturbances from the mutilated appearance.

We therefore know the person with indigestion, defective speech, aged appearance and loss of confidence by their lost teeth.

Fig. 3: Edentulism: (a) and collapse of upper lip; (b) and bunching of soft tissues. (Courtesy Prof. Peter Berthold, School of Dental Medicine, Univ. of Pennsylvania)

UNIVERSITY OF IBADAN LIBRARY

The Teeth and Facial Appearance from Literary Archives

In the Holy Bible, the Hebrews considered sound teeth as a symbol of strength and beauty and loss of these was considered weakness and imperfection, *the psalmist wrote* "Arise O Lord, save me, O my God: for Thou hast smitten all mine enemies upon the cheek bone, thou hast broken the teeth of the ungodly" *(Psalm 3:7KJV)*. Literally, this may imply that the enemies of David were rendered powerless by loss of their teeth. Richardson (2001)[7] wrote that the teeth form an important feature of the human face, while some are beautiful

and aesthetically pleasing, (figs. 4a & 4b) some are ugly and unsightly, disfiguring an otherwise beautiful face. He documented extracts from the literary archive written by novelists, playwrights, journalists and essayists focusing on the contribution of teeth to favourable and unfavourable facial appearance by their presence or absence, their use as a guide to facial character and as a means of identification.

The literature also described that the teeth can be a diagnostic of poor health or specific disease. Trollope[8] described a character's beautiful teeth as "white as pearls, regular and lofty as a new row of houses in a French city such that when the lips are apart, the fine finished lines and dainty pearl-white colour of that perfect set of ivory could be seen". Whilst he described beautiful teeth as a new row of houses in a french city, a yoruba adage also signified unpleasant sequalae of tooth loss as a fallen house i.e "Bi eyin ba ti ka, ile erin a wo". Andre Maurois[9] also described a character's teeth as a means of identification. He said "I can recognize by the teeth anyone with whom I have talked. I always watch the mouth, it tells me what the eyes try to conceal". While Luigi Barzini[10] wrote about a popular belief that teeth set wide apart is a sign of good luck which may then imply that we know lucky people by their teeth that are set apart.

Fig. 4a: Beautiful teeth.

Fig. 4b: Beautiful teeth with midline space.

Richardson (2001)[7] further commented from the literary archive that ugly teeth may be because of poor oral hygiene, neglected caries and discolouration which make the face of the beholder never to be fine and may sometimes have a

UNIVERSITY OF IBADAN LIBRARY

repercussion of negative comments on the general appearance. He also described ugly teeth as "mossy, awful, and untidy looking like lumps of sugar soaked in tea which can make someone sick when seen". Ugly teeth may look like "a machine of some kind in the mouth that is fit to bite nails" (figs. 5a & 5b).

(a) (b)

Fig. 5: Awful ugly teeth.

Even missing teeth have been used in the descriptions of facial expressions or appearance of characters in the literature. Patrick Fermor[11] noted the effects of partial and complete edentulism on facial appearance and documented in his write up as this "She was very pretty except for two missing teeth. They had been knocked out in a brawl the week before, she told me…..The smile of her totally dismantled gums had the innocence of an infant…. The middles of the faces are simultaneously flaccid and clenched, features start sliding out of shape, noses fall askew, eyes grow bleary and mouths hang open like those of snowmen". These documentations from the literature, established the knowledge of the authors on the association of teeth arrangement and facial appearance of their characters thereby, knowing the beautiful, the ugly, the under nourished, the healthy or the unhealthy, the lucky person and the dead man by their teeth. We prosthodontists likewise know them by their teeth.

UNIVERSITY OF IBADAN LIBRARY

Tooth Loss (Edentulism, Edentulousness)

This is a state without a natural tooth or teeth[12]. This state may be partial when one or more natural teeth are missing or total, when all the natural teeth are missing from one or both jaws (figs. 6a & 6b).

Fig. 6a: Partial edentulism.

Fig. 6b: Total edentulism.

Tooth loss is an irreversible but common condition described as the "final marker of disease burden for oral health"[13, 14]. It affects all ages including children but more prevalent in the elderly. I am not talking about the physiologic exfoliation of teeth when permanent teeth are replacing primary teeth. Although edentulism is a condition affecting the oral cavity locally, it has a far reaching debilitating and handicapping outcome on the whole body. Ephesians 4 verse 16 (NKJV) I quote "From whom the whole body, joined and knit together by what every joint supplies, according to the effective working by which every part does its share, causes growth of the body for the edifying of itself in love" so the tooth contributes its own part to the health of the entire body. Tooth loss thus affects wind instrument players and singers that are quite unable to perform well, clergymen cannot preach efficiently, actors and photographers' models cannot follow their employment and the pipe smoker loses half the enjoyment of his pipe because he cannot hold it between his teeth.

Brief History of Tooth Loss

Mr. Vice-Chancellor, Sir, the occurrence of tooth loss may have dated back to the ancient times and records of the

UNIVERSITY OF IBADAN LIBRARY

replacement with denture dates back to 1600 BC. Harold Supplee[15] documented the evolution of complete and partial dentures and stated that between 1600-687 BC., Phoenecians (inhabitants of the country about Sidon and Tyre now modern Lebanon) made prosthetic appliances, binding lost and artificial teeth in place with gold and silver wires, bands and rivets and using human and oxen teeth for replacement. Etruscans living in a region which is now middle Italy in 753-300 BC made many dental prosthetic appliances using similar methods to those of the Phoenicians, though with a higher degree of skill and craftsmanship.

The earlier denture made by the Etruscans is one of the lower six anterior teeth bound together with gold wire and attached by the same means to adjacent natural teeth[16] (figs. 7a & 7b). Dentistry was said to be probably practised before medicine by the Romans in 450-218 BC and were indebted to the developments of the Etruscans, although with improved mechanical construction. The use of gold and silver teeth among the Hebrews in 320 BC was contained in the literature but the use of prostheses was not described. In China, teeth of bone and ivory were filed to their proper forms and fastened to the natural teeth with copper wire for ages, even before they were introduced in Europe[15].

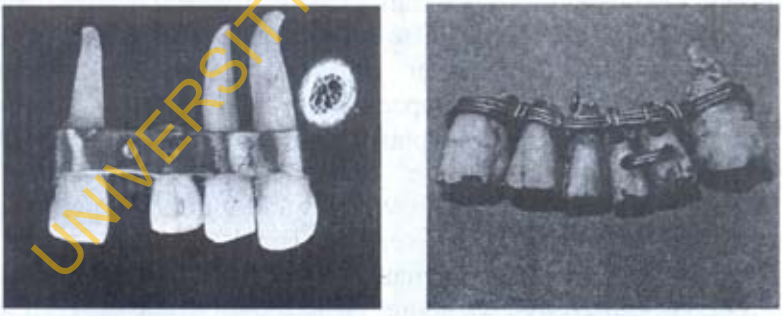

Fig. 7: Prosthetic appliances: (a) Etruscan fixed partial denture with tooth of oxen riveted to gold strap; (b) Prosthetic appliance dating from about 400 BC. (Adapted from Ring, M.E. (1985) *Dentistry an illustrated history*)

UNIVERSITY OF IBADAN LIBRARY

Other accounts documented by Harold Supplee[15] in his notes are:

(1) Albucasis 1100 AD, reported the case of an Arabian General slain in battle, who was identified by his false teeth which were held in place by gold wedges and wire.

(2) Ambroise Pare, 1560 AD a French chief surgeon to the courts of Charles IX and Henry III made the first recorded obturator for a palatal fissure using a gold plate and sponge. These dead men were recognized by their artificial teeth.

Aetiology of Tooth Loss

Tooth loss has been associated with old age particularly in our environment and the knowledge of it is necessary even as the population of the elderly increases. This increasing population may have attending chronic conditions such as diabetes mellitus, compounded by factors such as poverty, oral hygiene habits and inadequate health facility. Studies have been carried out on the causes of tooth mortality in various locations and even in Nigeria[17-26]. But extensive literature review has revealed that the main factors responsible for tooth mortality generally, are caries and periodontal disease which also show a wide geographical and cultural variation between different populations. Other reasons include trauma, impaction, prosthetic consideration, orthodontic reasons, neoplasia and behaviour such as smoking[27].

In Rhonda Valley, South Wales[18] and India[19], periodontal disease predominated, whereas in Israel[20] and Australia[21] caries appeared to be the main cause of tooth loss. A third group is typified by Singapore[22] where both diseases seem to cause more or less equal numbers of tooth extractions. In my study Dosumu (1992)[23] titled 'Edentulousness in Adult Patients seen at the Dental Centre, UCH Ibadan from May 1990 - April 1992', I found that periodontal disease was the most common cause of tooth mortality (48.8%) followed by

UNIVERSITY OF IBADAN LIBRARY

caries (32.4%) while Aderinokun and Dosumu (1997)[24] also reported the most common reason for extraction in this environment as periodontal disease (61.9%) then caries (31.4%). These studies were corroborated by epidemiological studies that recorded high prevalence of periodontal disease in Nigeria but some other studies[25, 26] reported a contrary view.

Periodontal Diseases

Periodontal disease has different meanings and it is used rather ambiguously in a general sense to encompass all diseases of the periodontium in much the same way as are terms such as liver and kidney diseases (Carranza 1990)[27]. Juvenile (Aggressive (Ag)) periodontitis is a variant of periodontal disease in adolescents which is characterized by severe alveolar bone loss, pronounced loss of periodontal attachment and subsequent tooth loss. Ag is a rare disease entity which is distinctly different from the common plague-induced periodontitis (PIP) because of its extensive periodontal destruction that is not commensurate with the amount of plague accumulation (figs. 8a, 8b & 8c).

Fig. 8a: Tooth loss in plaque induced periodontitis.

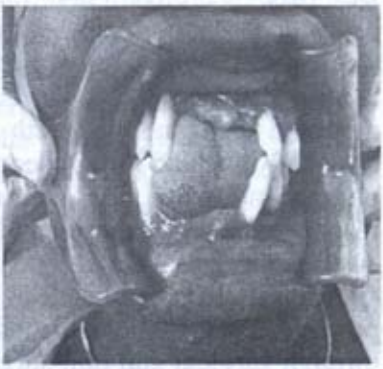

Fig. 8b: Tooth loss in aggressive periodontitis.

UNIVERSITY OF IBADAN LIBRARY

Fig. 8c: Periapical x-ray in aggressive (juvenile) periodontitis.

In our study, (Dosumu, Dosumu & Arowojolu 2003)[28] on the pattern of tooth loss in this group of patients and PIP, we found that Ag significantly lost more teeth than PIP and the most frequently lost teeth in Ag were the lower incisors as opposed to upper incisors in PIP and the least frequently lost teeth in PIP were the upper canines but the lower premolars in Ag (table 5). The pattern of tooth loss in Nigerians with plaque induced periodontitis and juvenile (aggressive) periodontitis is different (Dosumu, et al. 2003)[28] and hence we may therefore say that we know the aggressive periodontitis individual by the type of tooth that they lose frequently. The striking typical clinical features of Ag which is characterized by a large number of teeth loss, tilted, migrated and mobile teeth that disfigures an otherwise beautiful face and the subsequent severe psychological effect on the individual, led to our study on the rehabilitative management of these individuals (Dosumu, Dosumu, Arowojolu & Babalola 2005)[29]. In this study, we reported a significant improvement of the clinical parameters and positive psychological dispositions of this group of people through surgical and non-surgical periodontal therapy, partial denture replacement of lost teeth and psychotherapy at individual, group and conjoint family levels. The prostho-dontist's perception of the holistic rehabilitation of this group of individuals to good general health, does not lie on the clinical management alone but it is rather inclusive of the psychotherapy which improved their quality of life.

UNIVERSITY OF IBADAN LIBRARY

Table 5: Pattern of Tooth Loss in Chronic Periodontitis Subjects[28]

Type of tooth loss	Mean no. of teeth loss in JP subjects	Mean no. of teeth loss in PIP subjects	P value
Upper incisors	2.58 ± 0.57	2.99 ± 0.65	0.5794
Lower incisors	3.26 ± 0.78	2.42 ± 0.74	Not significant 0.0414 (<0.05)
Upper canine	1.17 ± 0.76	0.67 ± 0.296	Significant 0.0562
Lower canine	1.37 ± 0.58	0.70 ± 0.420	Not significant 0.0406
Upper premolar	0.75 ± 0.28	2.11 ± 0.74	Significant 0.0029
Lower premolars	0.50 ± 0.2918	2.24 ± 0.5163	Significant 0.0048
1st & 2nd Upper molars	1.67 ± 0.4770	2.58 ± 0.5183	0.0559 (<0.0550) Not significant
1st & 2nd Lower molars	1.67 ± 0.4587	2.42 ± 0.5288	0.0022 Significant

Dosumu, Dosumu & Arowojolu (2003) [28]

Caries or Rampant Caries and its Sequel

Rampant caries which was described by Winter et al (1966)[30] as a lesion of acute onset involving many or all of the erupted teeth (fig. 9) and dental caries involving the deciduous and permanent teeth in children were found to be a common cause of tooth loss in children (Denloye & Dosumu 1998)[31], (Dosumu & Denloye 1999)[32] and (Denloye, Dosumu & Arotiba 1999)[33] compared to periodontal diseases reported as the commoner cause in adults (Aderinokun & Dosumu 1997)[34] (table 6). From this studies, we know the 'comforted' individual by the incidence of rampant caries on their teeth because of the role of the 'comforter' (Baby Bottle Syndrome) in the aetiology of rampant caries in children (Winter et al. 1966)[30] and the "opportunists" that work in refined sugar producing industry who consume excess of these products because they have them free.

UNIVERSITY OF IBADAN LIBRARY

Fig. 9: Rampant caries in a **'comforted'** child.

Table 6: Distribution of Tooth Type in Children in relation to reasons for Loss

Tooth type	Caries and sequelae	Trauma	Periodontal disease	Orthodontics
Incisors	-	16	-	-
Canines	-	-	-	3
Premolars	2		-	8
Molars	52		-	-
Total	54(66.67)	16(19.75)	-	11(13.58)

Dosumu, O.O. and Denloye, O.O. (1999) [32]

In our study (Dosumu & Denloye 1999)[32] on the pattern of tooth loss in Nigerian children and their prosthetic replacement, we found that molars accounted for 64.2% of tooth type lost while the incisors accounted for only 19.75%. In spite of the considerable higher percentage of loss of the molars, 81.25% of the 16 lost incisors due to trauma, were replaced because of their conspicuous position in the mouth while none of the lost molars were replaced. This again shows the psychosocial and emotional effect of teeth loss in an individual and the reason for their replacement (table 7).

UNIVERSITY OF IBADAN LIBRARY

Table 7: Age Distribution in Relation to Type of Permanent Tooth Loss

Age	Incisors	Canine	Premolars	Molars	Total
5-8	2	-	-	3	5
9-12	8	3	5	23	39
13-16	6	-	5	26	37
Total	16(19.75)	3(3.70)	10(12.35)	52(64.20)	81

Dosumu and Denloye (1999)[32]

Surgical Excision of Tumour

Teeth loss can also be a sequalae of maxillectomy or mandibulectomy following surgical excision of jaw tumours and the individuals are known by their un-aesthetic facial appearance and psychosocial disturbances. The prosthodontist perceives and recognizes the importance of their rehabilitation devising methods to overcome the attending challenges in the fabrication of the rehabilitative prosthesis (figs. 10a & 10b). Maxillary obturators are fabricated as a speech rehabilitation aid and improvement in speech intelligibility which are found to be very significant both with interim and definitive obturation (Arigbede, Dosumu et al. 2006)[34].

Restoring the patient to normal function (masticatory & speech) and satisfactory facial appearance (aesthetics) is the mainstay of prosthetic rehabilitation (Arigbede, Dosumu & Shaba 2006)[35] and the class of the surgically acquired maxillary defect affects the resultant facial appearance and perception of facial aesthetics following prosthetic obturation (Arigbede, Dosumu & Shaba 2006)[35]. Mastication, deglutition and speech disturbances are the side effects of maxillectomy in patients with orofacial tumours. Prosthetic rehabilitation of some mandibulectomy patients can be extremely challenging especially when surgical reconstruction that provides a suitable tissue foundation is not done (Dosumu et al. 2007)[36] (figs. 10c & 10d).

UNIVERSITY OF IBADAN LIBRARY

Fig. 10a: Missing front teeth following surgical excision of tumour.

Fig. 10b: Obturator denture replacing front teeth and sealing the post-operative nasal defect.

Fig. 10c: Missing teeth and collapse of the jaw segments following mandibulectomy.

Fig. 10d: Rehabilitation with prostheses.

UNIVERSITY OF IBADAN LIBRARY

Congenital Loss of Teeth

Mr. Vice-Chancellor, Sir, there is a Yoruba proverb which says *'Ibi ti adie ti nsunkun aileyin, ni ajanaku ti nsunkun airi ete bo tie'* which implies that while some people are congenitally endowed with excess teeth, the reverse is the case for some in ectodermal dysplasia. Ectodermal dysplasia is a striking, rare hereditary disorder that can affect several ectodermal structures (Pavarina et al. 2001)[37] and we know them by their characteristic dental features of anodontia or hypodontia, hypoplastic conical teeth, underdeveloped alveolar ridge and reduced lower facial height (Denloye,

Dosumu et al. 1996)[38]. Challenging issues for the prosthodontist in the fabrication of prosthesis for this group of patients are that these patients are children or adolescent that present with hypodontia or anodontia and attending socio-psychological problems due to impaired aesthetics, masticatory deficiency and underdeveloped jaw bone that mimics marked residual ridge resorption (RRR). Their underdeveloped ridge and reduced facial height require complex and expensive prosthetic treatment because of the attending challenges.

We (Dosumu & Ogunrinde 2008)[39] therefore came up with a prosthetic treatment procedure that is simple, non-invasive, and relatively cheap which offered the reported case that have severe hypodontia quality outcome (figs. 11a & 11b). In order to overcome the challenge of providing affordable, and functional removable dentures with good retention, support and stability, we used the selective impression technique and rehabilitated the patient with well fitting functional dentures that improved his appearance, psychological and social behaviour (Dosumu & Ogunrinde 2008)[39].

Fig. 11a: Eighteen year-old Ectodermal Dysplasia boy provided.

Fig. 11b: Rehabilitation with non-invasive acrylic RPD retained with clasps. (Dosumu & Ogunrinde 2008)[39]

UNIVERSITY OF IBADAN LIBRARY

Oligodontia

This is a developmental defect characterized by the absence of six or more permanent teeth presenting with abnormal occlusions or altered facial appearance which can cause

psychological distress and its early diagnosis is important to prevent its attending consequences (Bankole, Iyun & Dosumu 2010)[40] (figs. 12a, b, c).

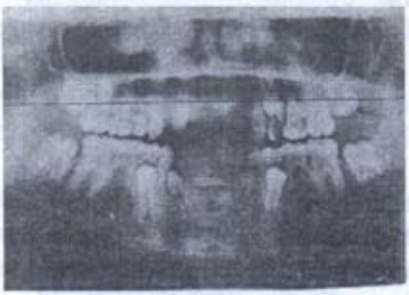

Fig. 12a: Panoramic radiograph of 12year old patient with Oligodontia.

Fig. 12b: Missing upper and lower anterior teeth of 12year old patient with Oligodontia.

Fig. 12c: Rehabilitation with upper and lower prostheses.

Mr. Vice-Chancellor, Sir, edentulism remains a major public health problem throughout the world, especially among adults despite advances in preventive dentistry[41]. Nevertheless, the prevalence of complete tooth loss has declined over the last decade and has shown intra- and inter country variations in the prevalence[42]. In a study titled 'Decline in Complete Dentures patient's Turn-out in Dental schools: Our Experience at UCH, Ibadan Nigeria' conducted by Arigbede and Dosumu (2007)[43] we observed a downward trend in the number of edentulous patients at the Prosthodontics out-

UNIVERSITY OF IBADAN LIBRARY

patient clinic in Ibadan over a six year period (2000-2005). The factors responsible for this were observed to include upward review of the cost of treatment, fear of being used by students as 'guinea pigs', lack of steady supply of consumables, epileptic electric power supply and frequent industrial actions during the period under study.

The rate of edentulism tend to vary among different regions within a country.[44] In the United States[45], the prevalence of edentulism amongst adults over 60 years of age was 25% and rate of edentulism in Canada[46] among adults between 60 and 79 years of age, was reported to be 21.7%. In Canada, there is a wide variation between provinces, from 14% (Quebec) to 5% (Northwest Territories) due to associated factors such as access to fluoridated water and smoking [42]. In Brazil, the wealthier, more industrialized states tend to have lower rate of tooth loss than other parts of the country [47]. In South West Nigeria, the prevalence of total edentulism in the age group 36 years and over was 1.5% with male to female ratio of 2:1. Dosumu (1992)[23] and this study showed that 68% exhibit total loss in both upper and lower arches while 19% and 13% of the patients lost all teeth in the upper and lower arches respectively (fig. 13, table 8).

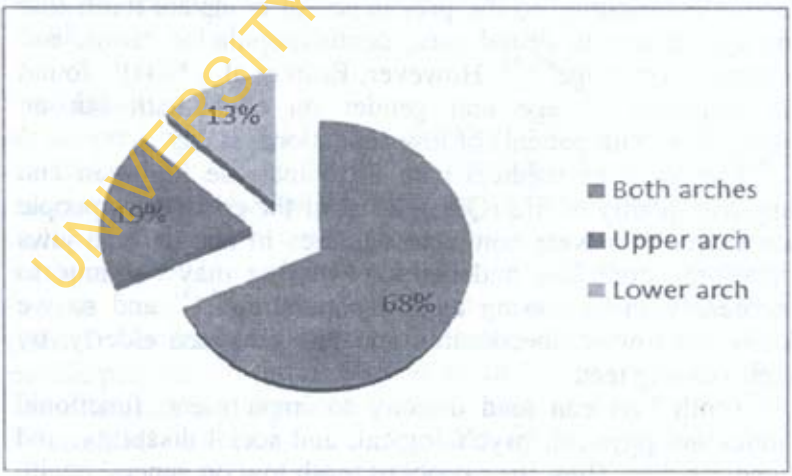

Fig. 13: Total edentulism by arches.

UNIVERSITY OF IBADAN LIBRARY

Table 8: Distribution of Totally Edentulous Patients by Age[23]

Age group (years)	Number of totally edentulous patients		
	Male	Female	Both
36 – 40	3	1	4
41 – 45	-	-	-
46 – 50	5	6	11
51 – 55	3	4	7
56 – 60	14	2	16
61 – 65	3	1	4
66 – 70	14	4	18
71 – 75	2	1	3
76 – 80	-	2	2
81 – 85	1	1	2
86 – 90	-	1	1
TOTAL	45	23	68

Studies show that edentulism is closely associated with socioeconomic-educational factors and it is more prevalent in poor populations (Dosumu 1992)[23] and in women[42, 48]. In 2003, the ratio of edentulism was 6 times higher in low-income than in higher income Canadian families[16]. Other factors contributing to the prevalence of complete tooth loss are age, access to dental care, dentist/population ratios, and insurance coverage[49, 50]. However, Esan et al. (2004)[51] found no influence of age and gender on edentulism but an association with patients of low educational status.

The focus of medical care is to increase life span and improve quality of life (QoL). Most of the edentulous people are elders who wear complete dentures in one or both jaws therefore, tooth loss and denture wearing may continue to increase with increasing ageing population[14, 41] and so we know the low socioeconomic and less educated elderly, by their missing teeth.

Tooth loss can lead directly to impairment, functional limitation, physical, psychological, and social disability, and handicap[41, 52]. Thus, the impact of tooth loss on general health is hereby examined by presentation of clinical outcome of consequences of tooth loss and analyzing the major

UNIVERSITY OF IBADAN LIBRARY

dimensions of health: physical symptoms and functional capacity, social functioning and perception of well-being[41]. It has become clear from review of literature that oral health in older people is an integral part of general health that contributes to, and is influenced by health-related QoL at the biologic, psychologic, and social levels[14,53]. Since general health is related to oral health and general health is related to QoL, tooth loss therefore, would have an impact on quality of life[14]. It can then be said that we know the person that is living a quality life by their teeth.

Mr. Vice-Chancellor, Sir, the concept of health was previously assessed as the mere absence of disease according to the bio-statistical theory (BST). The theory was based on the concept that the human body is designed by nature to function for some biologic norms such as survival, reproduction, ecological equilibrium etc. and it defines disease as a divergence from that of normality[54]. The World Health Organization (WHO) however gave a more holistic definition of health in 1948; describing it as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity [55]. Furthermore, Walter Suzan[56] suggested some other dimensions of well-being as spiritual and emotional in the holistic concept of health.

Oral Health

As adopted by the 2014 American Dental Association House of Delegates[57], Oral health is defined as a functional, structural, aesthetic, physiologic and psychosocial state of well-being as it is essential to an individual's general health and quality of life. It is a state of being free of chronic oral (mouth) and facial pain conditions, oral and pharyngeal (throat) cancers, oral ulcers, birth defects such as cleft lip and palate, periodontal (gum) disease, tooth decay, tooth loss and other diseases and disorders that affect the oral cavity and the craniofacial complex at large (WHO). It includes oral conditions with biological, behavioural and psychosocial consequences.[58]

UNIVERSITY OF IBADAN LIBRARY

Impact of Edentulism on Oral Health

Effect of Tooth Loss on Residual Dentition

Consequent to loss of tooth/teeth without replacement over a considerable length of time, the teeth abutting and opposing the empty gap/space drift, over-erupt, tilt and are mal-aligned. (fig. 14) Each of these irregularities present problems of malocclusion, premature contacts, increased inter-dental spacing, more food packing between the created space, more plaque accumulation, caries, gingival and periodontal infections and may further cause more loss of teeth resulting in aesthetic derangement. An over-erupted tooth leaves insufficient room between its borders and the abutment teeth of the gap, thereby sliding like scissor blades across each other. These contacts may cause postural adaptation of the mandible and if severe, may be associated with pain on the affected tooth and temporo-mandibular joints.[59]

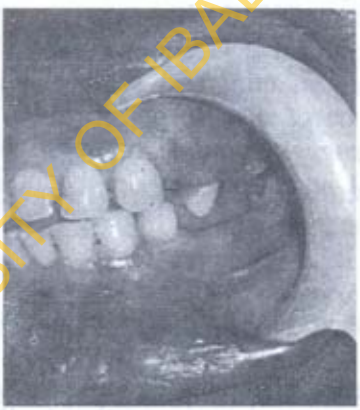

Fig. 14: Over-erupted upper left premolar.

Dosumu, Ogunrinde and Bamigboye (2014)[60] investigated the knowledge of partially edentulous patients in a teaching hospital on consequences of missing teeth and found that the respondents exhibited poor knowledge, and there was no statistically significant difference between the knowledge and gender or level of education. This study further revealed that

UNIVERSITY OF IBADAN LIBRARY

the media (0.5%) constituted the least source of information for these patients. It is easy to appreciate the very negative effects of loss, of an anterior tooth in terms of self confidence and aesthetics and the patients' changed expectations to see tooth loss as a very negative event. Preserving teeth in the maxilla allow people to communicate and participate in social life, though limited due to the reduced masticatory function. In comparison with different disease states, Mack et al (2005)[53] reported that the presence of nine or fewer remaining teeth has a greater impact on reducing quality of life (QoL) than suffering from cancer, hypertension, or allergy (Fig. 15).

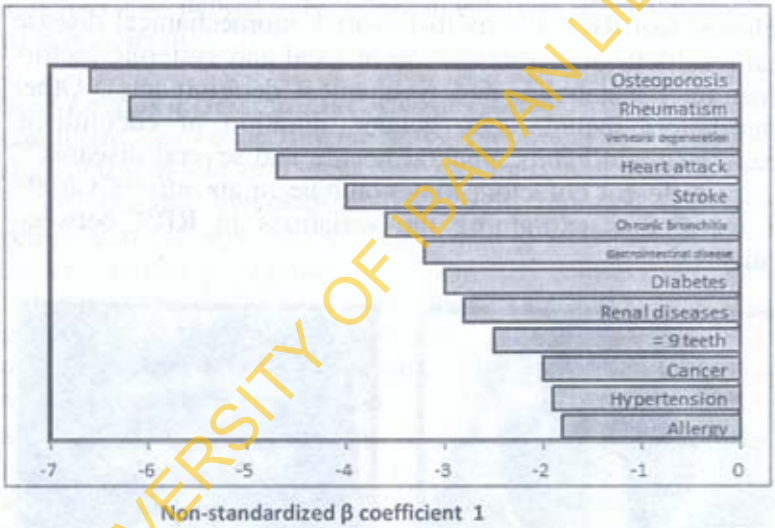

Fig. 15: Negative factors on the Physical Index in quality of life, computed by non-standardized β coefficient in various linear regression analyses. (Mack, F., Schwahn, C., Feine, J.S., et al. 2005)[53]

Effect of Tooth Loss on Residual Ridge Resorption (RRR)

After teeth extraction, the alveolar bone previously supporting the teeth becomes lost rapidly and gradually continues as an ongoing process[61], affecting the mean ratio of anterior mandibular RRR four times more than the anterior

UNIVERSITY OF IBADAN LIBRARY

maxillary RRR[62, 63]. A frequent lay expression for RRR process is "my gums have shrunk". The RRR is a localized pathologic loss of bone that is not built back by simply removing the causative factors. It is characterized by an ongoing physiologic process of internal bone remodelling in the presence of pathologic external osteoclastic activity that is responsible for loss of bone substance[64] (figs. 16a & 16b). The effect consequently, affects occlusal vertical face height and facial appearance, which are further altered following total tooth loss. The loss of alveolar bone height and width also leads to substantial changes in the soft-tissue profile, such as protrusion of the mandibular lip and chin[65]. It is believed that RRR is a multi-factorial, biomechanical disease that results from a combination of local and systemic factors (anatomic, metabolic, and mechanical determinants). Other contributors include age, gender, duration of edentulism, para-functional habits, general health, and several diseases[66]. These different cofactors may combine in an infinite variety of ways, thus explaining the variations in RRR between patients.

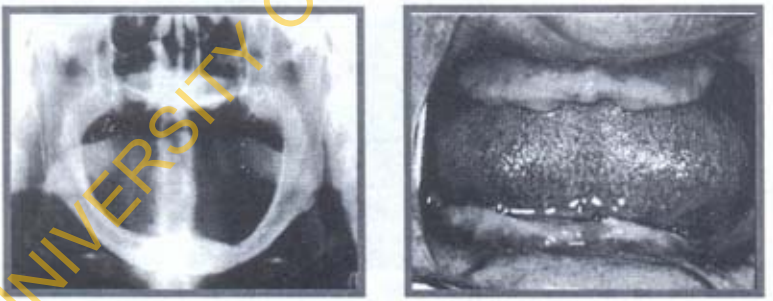

Fig. 16: Residual ridge resorption: (a) Panoramic radiograph of resorbed upper and lower edentulous jaws; (b) Moderately resorbed upper and grossly resorbed lower jaws. (Courtesy Dr. T.A. Esan, O.A.U., Ile-Ife)

Tooth Loss as Risk Factor for Impaired Mastication[14]

Most studies agree that complete denture wearers have only about one fifth to one-fourth the bite strength and masticatory force of dentate individuals and require 7 times more chewing

UNIVERSITY OF IBADAN LIBRARY

strokes than those with natural dentitions to be able to cut food into half of its original size[67, 68]. Hence a pointer for masticatory efficiency is the number of functional tooth units in the mouth as demonstrated by these studies. Furthermore, the thickness of the masseter muscle was found to decrease in edentulous patients, thereby decreasing the bite force[69] which may partly explain why individuals wearing complete dentures have difficulty chewing hard foods. This disability could substantially influence the desire to bite, chew, and swallow and it could lead to a modification of food choices[70,71]. Research has consistently demonstrated that tooth loss and dental status have a negative impact on diet and food selection[72, 73].

Tooth Loss as a Determinant of Oral Health[74]

Edentulism can be accompanied by functional and sensory deficiencies of the oral mucosa, oral musculature, and the salivary glands. Associations have been reported between ageing, denture use and oral mucosal disorders, such as denture stomatitis, angular cheilitis, oral candidosis, and traumatic ulcers[74, 75, 76] and such disorders could expose the individual to internal and external pathogens, and their prevalence is an important parameter in evaluating the oral health of an elderly population[77, 78]. Edentulism may induce an oral dyskinesia, defined as abnormal, involuntary, patterned or stereotyped, and purposeless orofacial movements[79]. It is also associated with tardive dyskinesia, a type of dyskinesia occurring among patients chronically treated with antipsychotic drugs[80].

Impact of Edentulism on General Health

Tooth loss can affect general health in several ways as indicated below:

Emotional Effects of Tooth Loss

The impact that tooth loss can have on some people and their lives should not be under-estimated[81] not even in those who are apparently coping well with dentures. Studies on emotional effects of total tooth loss carried out by Davis et al.

UNIVERSITY OF IBADAN LIBRARY

(2000)[81] and Fiske et al. (2001)[82] reported that 45% and 49% of edentulous subjects studied felt they had difficulties in coming to terms with total and partial tooth loss respectively. They reported loss of confidence, limitation of food choice, reduction in enjoyment of food, avoidance of laughing in public, inability to accept change in facial shape and reluctance to form close relationships as psychological consequences of toothless. In one of our studies (Okoje, Dosumu et al. 2012)[83] we set out to find out the existence of, if any, and how wide spread is the emotional effect of tooth loss in our environment. Our study revealed immediate acceptance of tooth loss in 69.3% cases, but 4.7% accepted the loss only after 1 year, while 6.3% of the cases found it difficult to accept losing their teeth and incidentally, all of them were 30 years and above. Only 40.9% of the patients were prepared for the emotional effects of losing their teeth. A feeling of relief immediately following tooth extraction was expressed by 43.9% cases. We found emotional effects following tooth loss as sadness 12.9% cases, depression in 6.4%, feeling of losing body part in 14%, feeling of ageing in 2.3%, while 7.6% respondents felt unconcerned. Our patients also experienced a range of emotions quite similar to those observed from the developed world. The number of patients that failed to come to terms with their tooth loss indicates that the effect of tooth loss on self-esteem and self image is not as short lived as it has been assumed, it is therefore necessary to prepare our patients for tooth loss[81,83]. The knowledge of individuals to consequences of tooth loss is reported to be poor, which again may explain their non-preparedness for these consequences. The prosthodontist perceives and knows this group of individuals by their difficult denture tolerance as a result of the emotional effects of tooth loss rather than problems from the denture itself.

Other Systemic Effects of Tooth Loss[14]

(a) Desire for modification of food choices, lower intake of fruits and vegetables, fibre and carotene and increased cholesterol and saturated fats, in addition to

UNIVERSITY OF IBADAN LIBRARY

a higher prevalence of obesity, and eventually increases risk of cardiovascular diseases[84, 85];

(b) Increased rates of chronic inflammatory changes of the gastric mucosa, upper gastrointestinal and pancreatic cancer, and higher rates of peptic or duodenal ulcers[86, 87, 88];

(c) Increased risk of non-insulin-dependent diabetes mellitus[89, 90];

(d) Increased risk of hypertension, heart failure, ischemic heart disease, stroke, and aortic valve sclerosis[86, 91, 92,93]. A large prospective study concluded that the number of teeth was a dose-dependent predictor to cardiovascular mortality[94];

(e) Decreased daily function, physical activity, and physical domains of health-related quality of life[95, 96];

(f) Increased risk of chronic kidney disease[97];

(g) Sleep-disordered breathing, including obstructive sleep apnea[98].

Tooth Loss and Nutrition

Although there are data supporting a reciprocal relationship between oral and general health[76, 99], the mechanisms linking poor general health and tooth loss are not yet clear. A suggested pathway for this association involves adverse effects of tooth loss on nutrition that, in turn, impacts systemic health[100]. Nutritional factors, especially anti-oxidants, may decrease following tooth loss and modulate systemic disease by interfering with the inflammatory cascade and carcinogenesis[100].

Furthermore, excessive intake of highly processed high fat and high-carbohydrate foods contribute to obesity and obesity-related diseases[101]. However, it should be understood that the nutritional consequences of edentulism are complex due to a plethora of factors that influence food intake and nutritional status, including acute and chronic disease, alterations in the gastrointestinal tract, functional disabilities,

UNIVERSITY OF IBADAN LIBRARY

chewing problems, psychological and social factors, and lowered socioeconomic status[102, 103].

Impaired dentition imposes dietary restriction and affects food taste, food selection, food preparation and food eating patterns.[73, 104, 105, 106] Results of a study by Locker (1992)[107] indicated that 39% of edentulous elders were prevented from eating foods they would like to eat, 29% reported a decline in their enjoyment of food, and 14% avoided eating with others. Suboptimal diets may prevent edentulous individuals from meeting recommended dietary allowances and lead to compromised nutritional states, especially in edentulous subjects without dentures.[102,108,109] Low non-starch polysaccharides intakes greater than10 g/dl and low fruit and vegetable intakes greater than160 g/dl have been reported in edentulous people[110]. Joshipura et al. (1996)[111] collected dietary intake data from male health professionals and demonstrated that, compared to dentate individuals, edentulous respondents consumed fewer vegetables, less fibre, and less carotene, while consuming more cholesterol and saturated fats. These differences were independent of socio-demographic and health behaviour characteristics. Lowe et al. (2003)[112] established that total tooth loss was associated with low citrus fruit consumption, low plasma vitamin C levels, and increased amounts of inflammatory reactants, such as plasma C-reactive protein. They also demonstrated increased levels of plasma interleukin-6, fibrinogen, and factor VIII in women which are factors associated with an increased risk of coronary heart diseases and stroke.

In relation to weight gain, the results of a study carried out by Lee et al. (2004)[113] demonstrated that edentulism was associated with weight gain greater than 5% in one year and an association between edentulism and obesity was found in several other studies[84, 114]. When edentulism was not rehabilitated with complete dentures it was associated with both underweight and overweight/obesity in an elderly population[115].

UNIVERSITY OF IBADAN LIBRARY

Despite this evidence, some findings contradicted the association between dentition and nutrition[116, 117]. In a cross-sectional study, Shinkai et al. (2001)[116] found no association between dentition status and quality of diet but found an association between masticatory variables and intakes of specific dietary components, such as vitamin C and fibre. Although, diet has been shown to be poorer in edentulous populations, there is still a need for more research about the association between tooth loss and specific changes in nutrient intake. The association between tooth loss and ageing[49] may become even more important with the growth of the older population worldwide.

Tooth Loss and Life Expectancy

Tooth loss was found to be associated with the onset of disability and mortality, even after adjusting to confounding factors such as socioeconomic and health behaviour factors.[118] A study demonstrated that each tooth that remains in the oral cavity after the age of 70 decreased the risk of mortality over 7 years by 4%[119]. Several studies however established an association between edentulism before the age of 65 and an increased risk of earlier death[120] and according to Shimazaki et al. (2001)[121], the mortality rate of edentulous elders without dentures was significantly higher than those with 20 or more teeth. In a large cohort study, an association was found between tooth loss and mortality, in addition to death resulting from gastrointestinal cancer, heart disease and stroke[86].

Impact of Edentulism on the Quality of Life

The term "quality of life" (QoL) is often used as an umbrella term that covers various concepts, such as health status, function, and life conditions. In general, QoL is defined as an individual's perception of his or her position in life, in the context of the culture and value systems in which they live, and in relation to their goals, expectations, and concerns[122]. Perception of QoL varies among individuals and fluctuates over time for the same person as a result of changes in any of

UNIVERSITY OF IBADAN LIBRARY

its component parts[123] and QoL is partly affected by a person's oral health. Perceptions of how oral conditions affect daily function and well-being are referred to as oral health-related quality of life (OHQoL)[124, 125, 126]. OHQoL has been widely used in clinical studies as an outcome to assess the quality, effectiveness, and efficacy of oral health care[124, 127].

It is also recognized that patients' perceptions of their oral health are important in evaluating well-being and determining health care outcomes[128]. The exclusive use of clinical measures has been generally criticized because they provide little insight into the psychosocial aspects of health and do not adequately reflect the health status, functioning, and perceived needs of edentulous and elderly individuals[70, 129, 130]. Edentulism may lead to changes in most of the domains leading to poorer QoL (e.g., impaired mastication, denture trauma, aesthetic concerns, or negative self perception). Teeth have an important role in facial appearance, speech and eating ability. There is overwhelming evidence showing the negative effect of edentulism on OHQoL[131, 132] as it negatively influences not only oral function, but also social life and day-to-day activities[133].

Compromised oral function has been linked to decreased self-esteem and a decline in psychosocial well-being[134]. Edentulous people may avoid participation in social activities because they are embarrassed to speak, smile, or eat in the presence of others, leading to isolation[135]. Fiske et al. (1998)[136] demonstrated that denture wearers have decreased self-confidence, premature ageing, altered self-image, and altered behaviour in socializing and forming close relationships. On the other hand, dentures could improve oral appearance and social interactions of individuals, which might enhance self-esteem and thus contribute to psychological well-being[127, 137]. This statement is supported by our studies on the managements of aggressive periodontitis patients (Dosumu, Dosumu, Arowojolu & Babalola 2005)[29] and ectodermal dysplasia patient (Dosumu & Ogunrinde 2008)[39] in which dentures were fabricated for them with subsequent improvement in their quality of life. The edentulous patient is therefore known by the arrangement

UNIVERSITY OF IBADAN LIBRARY

of the residual dentition, level of residual ridge resorption (RRR), emotional stability, choice of food, oral health status, general well being and quality of life.

Current Treatment Options for Replacement
Tooth loss being irreversible may be treated by:

(1) Shortened Dental Arch (SDA) Concept
Most patients can function with a shortened dental arch (SDA) which requires anterior teeth + 4 occlusal units (symmetric loss) or 6 occlusal units (asymmetric loss) for acceptable function.

(2) Removable Partial Denture (RPD)
The various types available are:

(a) *Acrylic denture* - This is a temporary substitute but commonly provided due to cost consideration.
(b) *Flexible denture* - This is a recent addition but more expensive than acrylic denture.
(c) *Metal base* (Chrome Cobalt, Gold alloys) – more durable and expensive than acrylic and flexible RPD.

(3) Bridges (Fixed Partial denture)
These require grinding of abutments at opposite ends of space and it is more expensive than Acrylic RPD. It is affordable by the high socioeconomic group of people.

(4) Implant Supported Prosthesis
It is the closest replacement to natural dentition, most costly but less costly over long term. It is affordable by the high socioeconomic group of people.

(5) Complete Denture
Provided for totally edentulous patients either in the upper, lower, or both jaws.

(6) Obturator Denture
Provided for persons with surgical defect in the palate and missing teeth.

UNIVERSITY OF IBADAN LIBRARY

Mr. Vice-Chancellor, Sir, Mack et al. (2005) concluded in their study that "Reduced dentition without replacement of missing teeth by removable or fixed prosthodontics reduces the physical index of quality of life to the same extent as cancer or renal diseases". It is quite obvious that the state of oral conditions; diseased tooth/teeth, magnitude of tooth loss, duration of tooth loss, attitude to dental care and the replacement opted for, expressly describes who you are. We know them by their teeth and this forms the framework for the treatment plan for our patients.

Conclusion

Edentulism has a series of deleterious consequences for oral and general health. Oral health consequences vary from over-eruption, tilted, and misplaced teeth, residual ridge resorption to an impaired aesthetic and masticatory function. The general health consequences are unhealthy diet, social disability, negative emotional effects, quality of life, greater risk of different systemic diseases and an increase in mortality rate.

Recommendation

In order to produce balanced dental personnel for a sound oral health policy in Nigeria, every stakeholder should play their role, we[4,5] suggested the following:

- Dental students should be given adequate insight and career counselling in dentistry and its specialties during the pre-clinical years.
- Universities should provide adequate materials for laboratory and clinical training of undergraduates.
- Training Institutions should increase their quota for this specialty and
- Postgraduate Training Colleges should provide grants for dental graduates interested in the less favoured specialties.

UNIVERSITY OF IBADAN LIBRARY

Oral health care providers should maintain an intact dental arch; prevent tooth loss with proper dental education, oral health promotion, and a high level of dental care in an attempt to ensure the existence of a physiologic dentition. Missing or lost teeth should be replaced to reduce the consequences of tooth loss as highlighted in the lecture, except in cases where the prosthodontist prescribes the Shortened Dental Arch Option.

Finally, distinguished ladies and gentlemen show me your teeth and as a prosthodontist I will tell you who you are.

Acknowledgements

Mr. Vice-Chancellor, Sir, I will conclude this lecture by expressing my gratitude to people who have contributed to my growth and development. First and foremost I thank the Almighty God, the author and finisher of my faith, the Ancient of Days, the Alpha and the Omega for granting me His mercy and grace to see glorious days even today. He has been forever faithful, His love does not fail and so I give Him all the glory, honour and adoration. Of a truth He rules in the affairs of all men.

I quote from the Holy Scripture in Matthew 16:26 (KJV) which reads "For what is a man profited, if he shall gain the whole world, and lose his own soul? Or what shall a man give in exchange for his soul?". My sincere gratitude goes to my spiritual parents Pastor Olubi Johnson and mummy Sarah Olubi Johnson of Scripture Pasture Christian Centre, Sango Ibadan for their immense contribution to my balanced spiritual diet, growth and development. I thank God for their lives for allowing them to see the fruits of their labour in me. I express my gratitude to the two great institutions; the University of Ibadan, Ibadan and the University College Hospital for their support and the great privilege given to me to contribute my quota of expertise and experience. Mr. Vice-Chancellor, Sir, Professor Isaac Folorunso Adewole, you are a good friend and you have indeed shown great and inspirational leadership, the God of heaven and the earth will reward you abundantly.

UNIVERSITY OF IBADAN LIBRARY

I have the greatest pleasure of honouring my biological parents Pa Michael Oyenekan Dosumu of blessed memory and my mother Mabel Olufunmilola Dosumu who is present here today to witness this joyous occasion. I sincerely appreciate all your prayers and efforts for making me what I am today. Mama I pray that your love shall abound yet more and more in the present complete knowledge of God in all judgement, in all things (*Philippians 1:9*) and so grow into the perfection and fullness of Christ (*Ephesians 4:13-16*). To my siblings and cousin; Mrs. Funmilayo Ogundipe, Folake, Muyiwa, Bolaji, Bukola and Pastor Biyi Dosumu, I remember your labour of love and you are well appreciated. I thank my in-laws, (the Thomas-Fatudimus) for their love, acceptance and support. Pastor Ayodele Thomas, you transcend beyond an in-law to a friend and a big brother. I thank Dr. Abayomi Baruwa for his invaluable time, skills and competences that he put into the compilation of this book. You are indeed a friend and a son and I pray that God will reward your labour of love.

I am highly indebted to my teachers at both undergraduate and postgraduate levels, especially Professor J.O. Daramola, Professor H.A. Ajagbe, Dr. Moronke Noah, Dr. S.P. Luthra (blessed memory), Dr. S. Kulasekara, Dr. Bode Falomo, Dr. Tokunbo Abiose, Dr. Adewunmi, Dr. M.O. Olaniyan (blessed memory) and Dr. I.E.E. Bassey (blessed memory). Time and space will not allow me to highlight your specific contributions to my training. Thank you. I cannot but pay a special gratitude to Professor J.O. Lawoyin and Professor D.O. Lawoyin who came on board the services of University College Hospital, Ibadan, to preach, teach and profess our dental faith and ignite the spirit of clinical dental practice.

I will be unjust if I do not specially acknowledge my very senior colleagues Professor Gbemisola Oke, the current Deputy Vice-Chancellor Academic and Professor Obiechina now at University of Port-Harcourt. They provided the necessary leadership and a good role model for us when there was an imminent collapse of the dental programme

UNIVERSITY OF IBADAN LIBRARY

consequent to the "brain drain" phenomenon which enabled us to weather the storm.

I thank all my esteemed older and younger colleagues, within and outside the Department of Restorative Dentistry for the various roles they played in my life; Professors J.T. Arotiba (current Dean FD), M.O. Arowojolu, A.O. Fasola, Drs. Obafunke Denloye, Juliana Taiwo, Olubunmi Bankole, Bamidele Kolude, Abigail Adeyemi, Olanrewaju Opeodu, Orighoye Temisanre, Olusola Ibiyemi, Victoria Okoje-Adesomoju, Victor Akinmoladun, Adeola Olusanya, Oluwatoyin Lawal, Akin Adisa, Bukola Adeyemi, Olubukola Popoola, Olalere Gbolahan, Timothy Aladelusi, Taiye Lasisi, Folake Lawal, Dayo Akinyamoju, Joy Ifesanya, and Ope Sigbeku. I salute my sisters and brothers in my department; Drs. Deborah Ajayi, Omotayo Sulaiman, Tunde Ogunrinde, Funmilayo Abiodun-Solanke, Shakeerah Gbadebo and Sunday Bamigboye. I also appreciate all the dental technologists, dental laboratory assistants, dental surgery technicians/nurses, dental administrative staff and medical records staff. You are all wonderful people.

Professor J.T. Arotiba, my friend, our best man and my brother, you stood with me during my National Youth Service Corps in Kwara State and residency training, it has been a long journey. In the thick of the crowd I know you, my brother when you smile. Professor Olubayo Fasola and Dr. Obafunke Denloye, I cannot forget your labour of love and service to my department when you taught our undergraduate students Science of Dental Materials and Conservative Dentistry respectively. I am grateful and indebted to my professional colleagues from sister dental schools and Nigerian Society for Restorative Dentistry (NISORD) for their support, especially my research collaborators in particular Professors A.O. Olusile, A.O. Oginni, Dr. O.P. Shaba (blessed memory), Dr. Patricia Akeredolu, Dr. T.A. Esan, Dr. C.T. Bamise, Dr. Matthew Sede and Dr. Abiodun Arigbede. I acknowledge all my past and present students and resident doctors in training at the Dental Schools of Ibadan, Benin, Kano, Ife, Port-Harcourt and Ghana, for encouraging

UNIVERSITY OF IBADAN LIBRARY

and allowing me play positive roles in their lives. I thank my numerous patients for their immense cooperation without whom I would not have been able to practice and show my expertise.

Finally, I pay a special tribute to my darling wife, my best friend, my lover, my sister, my confidant, my partner in Christ, Elizabeth Bosede Ajike Dosumu who through her immense support, prayers and love kept the "home front". We shall rejoice with you very soon at His time. To my children, OtitoOluwa, Oluwabanke, and OreOluwa, I am grateful for your patience and understanding. You are indeed a source of inspiration to me. I thank you all for your endurance during my periodic absence from home in service to humanity. The Lord Most High will reward your labour of love. Mr. Vice-Chancellor, Sir, distinguished ladies and gentlemen, I sincerely thank you all for listening so patiently and for the honour and privilege given to me to deliver this lecture.

Thank you all.

Notes

[1] Fasola, A.O. (2013) The Tripod of Maxillofacial Trauma: The Injury, The Injured and The Injury carer. Ibadan University Press Publishing House, 2013. Pg. 3.

[2] Adenubi, J.O. (2013) The Dental Profession in Nigeria: What Future? All Fellows' Day, September 4, 2013 at the Premier Hotel, Ibadan, Oyo State.

[3] Adeyemo, W.L. (2015) Secretary, Faculty of Dental Surgery National Postgraduate Medical College of Nigeria.

[4] Arowojolu, M.O., Aderinokun, G.A., Arotiba, J.T. and Dosumu O.O. (1997) Choice of specialty training among Nigerian Dental Graduates. *Odonto stomatologie tropicale.* 77: 21-25.

[5] Dosumu, O.O., Arigbede, A.O. and Owoaje, E.T. (2006) Acceptability and Interest of Nigerian Dental Resident Doctors in Prosthetic dentistry: Problems and Suggestion for a positive change. *Nig. Qt J Hosp*; 16(4): 109-113.

UNIVERSITY OF IBADAN LIBRARY

[6] MacGregor, A.R. (1989) *Fenn, Liddelow and Gimson's Clinical Dental Prosthetics* 3rd ed. Wright Butterworth & Co. (Publishers) Ltd. pg1-2.
[7] Richard, M.E (2001) By their teeth shall ye know them. *British Dental Journal*, 191(8): 459-464.
[8] Trollope, A. (1906) *Framley Parsonage*. London: JM Dent and Sons.
[9] Maurios, A. A. (1924) London: Bodley Head.
[10] Barzinni, L. (1964) The Italians, London Hamish Hamilton.
[11] Leigh, F.P. (1977) A Time of gifts, London: John Murray.
[12] Veeraiyan, D.N., Ramalingam, K. and Bhat, V. (2003) *Textbook of Prosthodontics*. First Edition Jaypee Brothers Medical Publishers (P) Ltd. New Delhi, pg 774.
[13] Cunha-Cruz, J. Hujoel, P.P. and Nadanovsky, P. (2007) Secular trends in socio-economic disparities in edentulism: USA, 1972–2001. *Journal of Dental Research*. 86 (2):131–136.
[14] Emami, E., Freitas de Souza, R., Kabawat, M. and Feine, J.S. (2013) The impact of edentulism on oral and general health. *International Journal of Dentistry*, Vol. 2013, ID 498305, 7pages. http://dx.doi.org/10.1155/2013/498305.
[15] Supplee, H. in Boucher, C.O. (1970) *Swenson's Complete Dentures*, Sixth Edition, The C.V. Mosby Co. 1970 pg. 562, 608.
[16] Fenn, H.R.B., Liddelow, K.P. and Gimson, A.P. (1961) *Clinical Dental Prosthetics*, Second Revised Edition. Staple Printers Ltd. London Pg. 2.
[17] Okamot, O.Y., Tsuboi, S., Suzuki, S., Nakagaki, H., Ogura, Y., Maeda, K. and Tokudome, S. (2006) Effects of smoking and drinking habits on the incidence of periodontal disease and tooth loss among Japanese males: A 4-yr longitudinal study. *J Periodontal Res*. 41(6):560-6.
[18] Swallow, J.N. and Adams, D. (1967) Survey of Dental Diseases in Adults in the Rhonda Fawr. *Br Dent J*. 123:137-144.
[19] Mathur, M.N. and Nath, S. (1968) Tooth mortality. An analysis of extraction cases. *J. All. Ind. Dent Ass*. 40: 213-215.
[20] Abramowsky, Z.L. and Buchner, A. (1967) Causes of tooth extractions. Part II. A statistical study. *NY. Dent. J*. 37:16-19.

UNIVERSITY OF IBADAN LIBRARY

[21] Johansen, S.B. and Johansen, J.R. (1977) A survey of causes of permanent tooth extraction in South Australia. *Aust. Dent. J.* 22(4): 238-242.

[22] Ong, G., Yeo, J.F. and Bhole, S. (1996) A survey of reasons for extraction of permanent teeth in Singapore. *Comm. Dent. Oral Epidemol.* 12: 124-127.

[23] Dosumu, O.O. (1992) Edentulousness in adult patients seen at the dental centre, University College Hospital, Ibadan. Dissertation submitted to *National Postgraduate Medical College Nigeria.*

[24] Aderinokun, G.A. and Dosumu, O.O. (1997) Causes of tooth mortality in Nigerian urban centre. *Odonto-Stomatologie Tropicale.*79: 6-8.

[25] Oginni, F.O. (2005) Tooth loss in a sub-urban Nigerian population: Causes and pattern of mortality revisited. *Int Dent J.* 55: 17-23

[26] Esan, T.A., Olusile, A.O., Ojo, M.A., Udoye, C.I., Ozeigbe, E.O. and Olasoji, H.O. (2010) Tooth loss among Nigerians treated in teaching hospitals: A National Pilot study. *Contemp. Dent. Prac.* 11(5):17-24

[27] Carranza, F.A. (1990) Glickman's: Clinical Periodontology, WB Saunders Co., 1990; 7th ed. 203-204.

[28] Dosumu, O.O., Dosumu, E.B. and Arowojolu, M.O. (2003) Pattern of Tooth Loss in Nigerian juvenile and Plaque-induced Chronic Periodontitis patients. *African Journal of Medicine and medical Sciences.* 32:361-365.

[29] Dosumu, O.O., Dosumu, E.B., Arowojolu, M.O. and Babalola, S.S. (2005) Rehabilitative management offered Nigerian localized and generalized Aggressive Periodontitis *patients. Journal of Contemporary Dental Practice.* 6(3): 40-52.

[30] Winter, G.B., Hamilton, M.C. and James P.M.C. (1966) Role of the comforter as an aetiologic factor in rampant caries of the deciduous dentition. *Arch Dis Chil.;* 41:207-212.

[31] Denloye, O.O. and Dosumu, O.O. (1998) Childhood rampant caries: the role of the pediatrician. *Oral and Dental Health in Africa.* 2(2):3-5.

[32] Dosumu, O.O. and Denloye, O.O. (1999) Pattern of permanent tooth loss in Nigerian children and their prosthetic replacement. *African Journal of Medicine and medical Sciences.* 28:31-33.

UNIVERSITY OF IBADAN LIBRARY

[33] Denloye, O.O., Dosumu, O.O. and Arotiba J.T. (1999) Causes and pattern of tooth extraction in children treated at the University College Hospital, Ibadan. *West African Journal medicine.* 18(4): 261-264.

[34] Arigbede, A.O., Dosumu, O.O., Shaba, O.P. and Esan, T.A. (2006) Evaluation of speech in patients with partial surgically acquired defects: Pre and Post Prosthetic Obturation. *Journal of Contemporary Dental Practice.* 7(1):89-96.

[35] Arigbede, A.O., Dosumu, O.O. and Shaba, O.P. (2006) A self-assessment pilot study of facial aesthetics following prosthetic obturation in patients with surgically acquired partial maxillary defect. *Port-Harcourt Medical Journal.*1: 9-11.

[36] Dosumu, O.O., Arigbede, A.O. and Ogunrinde, T.J. (2007) Sectional removable partial denture design for the treatment of partial mandibulectomy patient: A case report. *African Journal of Biomedical Research.*10: 197-201.

[37] Pavarina, A.C., Machado, A.L., Vargain, C.E. and Giampaolo E.T. (2001) Overlay removable partial dentures for a patient with ectodermal dysplasia: A clinical report. *J Prosthet Dent.* 86: 374-377.

[38] Denloye, O.O., Dosumu O.O., Aderinokun, G.A. and Onadeko, M.O. (1996) Ectodermal dysplasia with hypodontia in a set of Nigerian twins- A case report. *African Journal of Medicine and medical sciences.* 25:299-301.

[39] Dosumu, O.O. and Ogunrinde, T.J. (2008) Selective impression technique for conventional denture rehabilitation in ectodermal dysplasia patient: A case report. *West African Journal of Medicine.* 27(3): 171-174.

[40] Bankole, O.O., Iyun, O.I. and Dosumu, O.O. (2010) Non-syndromic Oligodontia: A case report. *West African Journal of Medicine.* 29(5):356-358.

[41] Douglass, C.W., Shih, A. and Ostry, L. (2002) Will there be a need for complete dentures in the United States in 2020?" *Journal of Prosthetic Dentistry.* 87(1): 5–8.

[42] Millar, W.J. and Locker, D. (2005) Edentulism and denture use," *Health Reports.* 17(1): 55–58.

[43] Arigbede, A.O. and Dosumu, O.O. (2007) Decline in Complete dentures Patient's Turn-Out in Dental Schools: Experience at UCH, Ibadan, Nigeria. *Nig Med Pract.* 52(3): 60-64.

UNIVERSITY OF IBADAN LIBRARY

[44] M¨uller, F., Naharro, M. and Carlsson, G.E. (2007) What are the prevalence and incidence of tooth loss in the adult and elderly population in Europe? *Clinical Oral Implants Research*. 18(3): 2–14.

[45] Beltr´an-Aguilar, E.D., Barker, L.K. and Canto, M.T. (2005) Surveillance for dental caries, dental sealants, tooth retention, edentulism, and enamel fluorosis—United States, 1988–1994 and 1999–2002. *Morbidity and Mortality Weekly Report. Surveillance Summaries*. 54(3): 1–43.

[46] Health Canada, *Report on the Findings of the Oral Health Component of the Canadian Health Measures Survey 2007–2009*, Ministry of Health, Ottawa, Ontario, 2010.

[47] R. Moreira (2009) *Tooth-loss in adults and the elderly in Brazil: the influence of individual, contextual and geographical features [Ph.D. thesis]*. Faculdade de Sa´ude P´ublica,Universidade de Sao Paulo, Sao Paulo, Brazil.

[48] Bedos, C., Brodeur, J.M., Boucheron L., Benigeri M., Oliver M. and Hadad, S. (2003) The dental care pathway of welfare recipients in Quebec." *Social Science & Medicine*, 57(11): 2089–2099.

[49] Elani, H.W., Harper, S., Allison, P.J., Bedos, C. and Kaufman, J.S. (2012) Socio-economic inequalities and oral health in Canada and the United States," *Journal of Dental Research*. 91(9): 865–70.

[50] Brodeur, J.M., Benigeri, M., Olivier, M. and Payette, M. (1996) Use of dental services and the percentage of persons possessing private dental insurance in Qu´ebec," *Journal of the Canadian Dental Association*. 62(1): 83–90.

[51] Esan, T.A., Olusile, A.O., Akeredolu, P.A. and Esan, A.O. (2004) Socio-demographic factors and edentulism; the Nigerian Experience. *BMC Oral Health*. 4(1): 3-9.

[52] Locker, D. (1988) Measuring oral health: A conceptual framework," *Community Dental Health*. 5(1); 3–18.

[53] Mack, F., Schwahn, C., Feine, J.S., Mundt, T., Bemhardt, O., John U., Kocher, T. and Biffar, R. (2005) The impact of tooth loss on general health Related to Quality of life among Elderly Pomeranians: Results from the study of Health in Pomeranians (SHIP-O). *Int J Prosthodont*. 18(5): 414-419.

[54] Boorse, C. (1977) Health as a theoretical concept. Philos Sci; 44:542-573.

UNIVERSITY OF IBADAN LIBRARY

[55] WHO Definition of health, preamble to the constitution of the WHO as adopted by the International Health Conference, New York 19 - 22nd June, 1946.
[56] Walter Suzan, Holistic Health. Retrieved from *http://ahha.org/articles.asp?Id=85* on 8-4-2015.
[57] Dental Association policy-definition of health. Retrieved from *www.ada.org/en/about-the-ada/-policy-definition-of-oral-health* on 10th April, 2015.
[58] Surgeon General's Report (2011) The Meaning of Oral Health. *National Institute of Dental and Craniofacial Research (NIDCR).*
[59] Watt, D.M. and MacGregor, A.R. (1984) Designing Partial Dentures. *John Wright & Sons Ltd pg 1-9.*
[60] Dosumu, O.O., Ogunrinde, T.J. and Bamigboye, S.A. (2014) Knowledge of Consequences of Missing Teeth in Patients attending Prosthetic Clinic in UCH Ibadan. *Annals of Ibadan Postgraduate Medicine*. 12(1): 42-48.
[61] Atwood, D.A. (1971) The reduction of residual ridges. A major oral disease entity. *J Prosthet Dent*. 26: 266-279.
[62] Atwood, D.A. and Coy, W.A. (1971) Clinical, cephalometric and densitometric study of reduction of residual ridges. *J Prosthet Dent*. 26: 280-295.
[63] Tallgren, A. (1972) The continuing reduction of the residual alveolar ridges in complete denture wearers: A mixed-longitudinal study covering 25 years. *The Journal of Prosthetic Dentistry*. 27(2): 120-132.
[64] Divaris, K., Ntounis, A., Marinis, A., Polyzois, G. and Polychronopoulou, A. (2012) Loss of natural dentition: multi-level effects among a geriatric population. *Gerodontology*. 29(2): 192-199.
[65] Tallgren, A., Lang, B.R. and Miller, R.L. (1991) Longitudinal study of soft-tissue profile changes in patients receiving immediate complete dentures, *The International Journal of Prosthodontics*. 4(1): 9-16.
[66] Carlsson, G.E. (1998) Clinical morbidity and sequelae of treatment with complete dentures. *Journal of Prosthetic Dentistry*. 79(1): 17-23.
[67] Michael, C.G., Javid, N.S., Colaizzi, F.A. and Gibbs, C.H. (1990) Biting strength and chewing forces in complete denture wearers," *The Journal of Prosthetic Dentistry*. 63(5): 549-553.

UNIVERSITY OF IBADAN LIBRARY

[68] van Kampen, F.M.C., van der Bilt, A., Cune, M. S., Fontijn-Tekamp, F.A. and Bosman, F. (2004) Masticatory function with implant supported overdentures. *Journal of Dental Research*. 83(9): 708–711, 2004.

[69] Bhoyar, P.S., Godbole, S.R., Thombare, R.U. and Pakhan, A.J. (2012) Effect of complete edentulism on masseter muscle thickness and changes after complete denture rehabilitation: An ultrasonographic study. *Journal of Investigative and Clinical Dentistry*. 3(1): 45–50.

[70] Feine, J.S. and Lund, J.P. (2006) Measuring chewing ability in randomized controlled trials with edentulous populations wearing implant prostheses. *Journal of Oral Rehabilitation*. 33(4): 301–308, 2006.

[71] Walls, A.W.G., Steele, J.G., Sheiham, A., Marcenes, W. and Moynihan, P.J. (2000) Oral health and nutrition in older people. *Journal of Public Health Dentistry*. 60(40): 304–307.

[72] Allen, P.F. and McMillan, A.S. (2003) A review of the functional and psychosocial outcomes of edentulousness treated with complete replacement dentures," *Journal of the Canadian Dental Association*. 69(10): 662.

[73] Tsakos, G., Herrick, K., Sheiham, A. and Watt, R.G. (2010) Edentulism and fruit and vegetable intake in low-income adults. *Journal of Dental Research*. 89(5): 462–467.

[74] MacEntee, M.I., Glick, N. and Stolar, E. (1998) Age, gender, dentures and oral mucosal disorders. *Oral Diseases*. 4(1): 32–36.

[75] Jainkittivong, A., Aneksuk, V. and Langlais, R.P. (2010) Oral mucosal lesions in denture wearers. *Gerodontology*. 27(1): 26–32.

[76] Felton, D., Cooper, L. and Duqum, I. (2011) Evidence-based guidelines for the care and maintenance of complete dentures: A publication of the American College of Prosthodontists. *Journal of the American Dental Association*. 142(1): 1S–20S.

[77] Jainkittivong, A., Aneksuk, V. and Langlais, R.P. (2002) Oral mucosal conditions in elderly dental patients. *Oral Diseases*. 8(4): 218–223.

[78] MacEntee, M.I., Stolar, E. and Glick, N. (1993) Influence of age and gender on oral health and related behaviour in an independent elderly population. *Community Dentistry and Oral Epidemiology*. 21(4): 234–239.

UNIVERSITY OF IBADAN LIBRARY

[79] Blanchet, P.J., Rompre, P.H., Lavigne, G.J. and Lamarche, C. (2005) Oral dyskinesia: A clinical overview. *The International Journal of Prosthodontics*. 18(1): 10–19.

[80] Girard, P., Monette, C. and Normandeau, L. (2012) Contribution of orodental status to the intensity of orofacial tardive dyskinesia: An interdisciplinary and video-based assessment. *Journal of Psychiatric Research*. 46(5): 684–687.

[81] Davis, D.M., Fiske, J., Scott, B. and Radford, D.R. (2000) The emotional effects of tooth loss: A preliminary quantitative study. Br *Dent J*. 188: 503–506.

[82] Fiske, J., Davis, D.M., Leung, K.C.M., McMillan, A.S. and Scott, B.J. (2001) The emotional effects of tooth loss in partially dentate people attending prosthodontic clinics in dental schools in England, Scotland and Hong Kong: A preliminary investigation. *Int Dent. J*. 51: 457–461

[83] Okoje, V.N., Dosumu, O.O., Alonge, T.O. and Onyeaso, C. (2012) Tooth loss –are the patients prepared? *Nigerian Journal of Clinical Practice*. 15(2):172–175.

[84] Osterberg, D., Dey, K., Sundh, V., Carlsson, G.E., Jansson, J.O. and Mellstr¨om, D. (2010) Edentulism associated with obesity: A study of four national surveys of 16 416 Swedes aged 55-84 years. *Acta Odontologica Scandinavica*. 68(6): 360–367.

[85] Hung, H.C., Colditz, G. and Joshipura, K.J. (2005) The association between tooth loss and the self-reported intake of selected CVD-related nutrients and foods among US women. *Community Dentistry and Oral Epidemiology*. 33(3): 167–173.

[86] Abnet, C.C., Qiao, Y.L., Dawsey, S.M., Dong, Z.W., Taylor, P.R. and Mark, S.D. (2005) Tooth loss is associated with increased risk of total death and death from upper gastrointestinal cancer, heart disease, and stroke in a Chinese population-based cohort. *International Journal of Epidemiology*. 34(2): 467–474.

[87] Sierpinska, T., Golebiewska, M., Dlugosz, J.W., Kemona, A. and Laszewicz, W. (2007) Connection between masticatory efficiency and pathomorphologic changes in gastric mucosa," *Quintessence International*. 38(1): 31–37.

[88] Stolzenberg-Solomon, R.Z., Dodd, K.W., Blaser, M.J., Virtamo, J., Taylor, P.R. and Albanes, D. (2003) Tooth loss, pancreatic cancer, and Helicobacter pylori. *The American Journal of Clinical Nutrition*. 78(1): 176–181.

UNIVERSITY OF IBADAN LIBRARY

[89] Cleary, T.J. and Hutton, J.E (1995) An assessment of the association between functional edentulism, obesity, and NIDDM. *Diabetes Care*. 18(7): 1007–1009.

[90] Medina-Solis, C.E., Perez-Nunez, R., Maupome, G. and Casanova-Rosado, J.F. (2006) Edentulism amongMexican adults aged 35 years and older and associated factors. *American Journal of Public Health*. 96(9): 1578–1581.

[91] V¨olzke, H., Schwahn, C. and Hummel, A. (2005) Tooth loss is independently associated with the risk of acquired aortic valve sclerosis. *American Heart Journal*. 150(6): 1198–1203.

[92] Takata, Y., Ansai, T. and Matsumura, K. (2001) Relationship between tooth loss and electrocardiographic abnormalities in octogenarians. *Journal of Dental Research*. 80(7): 1648–1652, 2001.

[93] Okoro, C.A., Balluz, L.S. and Eke, P.I. (2005) Tooth loss and heart disease: Findings from the Behavioural Risk Factor Surveillance System. *American Journal of Preventive Medicine*. 29: 50–56.

[94] Holmlund, A., Holm, G. and Lind, L. (2010) Number of teeth as a predictor of cardiovascular mortality in a cohort of 7,674 subjects followed for 12 years. *Journal of Periodontology*. 81(6): 870–876.

[95] Mollaoglu, M.N. and Alpar, R. (2005) The effect of dental profile on daily functions of the elderly. *Clinical Oral Investigations*. 9(3): 137–140.

[96] Mack, F., Schwahn, C. and Feine, J.S. (2005) The impact of tooth loss on general health related to quality of life among elderly Pomeranians: Results from the study of health in Pomerania (SHIP-0). *International Journal of Prosthodontics*. 18(5): 414–419.

[97] Fisher, M.A., Taylor, G.W. and Shelton, B.J. (2008) Periodontal disease and other nontraditional risk factors for CKD. *American Journal of Kidney Diseases*. 51(1): 45–52.

[98] Bucca, C., Cicolin, A. and Brussino, L. (2006) Tooth loss and obstructive sleep apnoea," *Respiratory Research*. 7, p. 8.

[99] Kandelman, D., Petersen, P.E. and Ueda, H. (2008) Oral health, general health, and quality of life in older people. *Special Care in Dentistry*. 28(6): 224–236.

UNIVERSITY OF IBADAN LIBRARY

[100] Ritchie, C.S., Joshipura, K., Hung, H.C. and Douglass, C.W. (2002) Nutrition as a mediator in the relation between oral and systemic disease: Associations between specific measures of adult oral health and nutrition outcomes. *Critical Reviews in Oral Biology and Medicine*. 13(3): 291–300.

[101] Touger-Decker, R., Sirois, D. and Mobley, C.C. (2005) Eds., *Nutrition and Oral Medicine*, Humana Press, Totowa, NJ, USA.

[102] Walls, A.W. and Steele, J.G. (2004) The relationship between oral health and nutrition in older people. *Mechanisms of Ageing and Development*. 125(12): 853–857.

[103] Nieuwenhuizen, W.F., Weenen, H., Rigby, H. and Hetherington, M.M. (2010) Older adults and patients in need of nutritional support: Review of current treatment options and factors influencing nutritional intake. *Clinical Nutrition*. 29(2): 160–169.

[104] Sheiham, A., Steele, J.G. and Marcenes, W. (2001) The relationship among dental status, nutrient intake, and nutritional status in older people. *Journal of Dental Research*. 80(2): 408–413.

[105] Nowjack-Raymer, R.E. and Sheiham, A. (2007) Numbers of natural teeth, diet, and nutritional status in US adults. *Journal of Dental Research*. 86(12): 1171–1175.

[106] deMarchi, R.J., Hugo, F.N. and Padilha, D.M.P. (2011) Edentulism, use of dentures and consumption of fruit and vegetables in south Brazilian community-dwelling elderly. *Journal of Oral Rehabilitation*. 38(7): 533–540.

[107] Locker, D. (1992) The burden of oral disorders in a population of older adults. *Community Dental Health*. 9(2): 109–124.

[108] Hutton, B., Feine, J. and Morais, J. (2002) Is there an association between edentulism and nutritional state?. *Journal of the Canadian Dental Association*. 68(3): 182–187.

[109] Prakash, N., Kalavathy, N., Sridevi, J. and Premnath, K., (2012) Nutritional status assessment in complete denture wearers. *Gerodontology*. 29: 224–230.

UNIVERSITY OF IBADAN LIBRARY

[110] Moynihan, P. and Petersen, P.E. (2004) Diet, nutrition and the prevention of dental diseases. *Public Health Nutritional*. 7: 201–226.

[111] Joshipura, K.J., Willett, W.C. and Douglass, C.W. (1996) The impact of edentulousness on food and nutrient intake. *The Journal of the American Dental Association*. 127: 459–467.

[112] Lowe, G., Woodward, M., Rumley, A., Morrison, C., Tunstall-Pedoe, H. and Stephen, K. (2003) Total tooth loss and prevalent cardiovascular disease inmen andwomen: Possible roles of citrus fruit consumption, vitamin C, and inflammatory and thrombotic variables. *Journal of Clinical Epidemiology*. 56(7): 694–700.

[113] Lee, J.S., Weyant, R.J. and Corby, P. (2004) Edentulism and nutritional status in a biracial sample of well-functioning, community-dwelling elderly: the health, aging, and body composition study. *American Journal of Clinical Nutrition*. 79(2): 295–302.

[114] Hilgert, J.B., Hugo, F.N., de Sousa Mda, L. and Bozzetti, M.C. (2009) Oral status and its association with obesity in Southern Brazilian older people. *Gerodontology*. 26(1): 46–52.

[115] do Nascimento, T.L., da Silva, D.D., Liberalesso, N.A., Balbinot, H.J., Neves, H.F. and de Sousa Mda, L. (2013) Association between underweight and overweight/obesity with oral health among independently living Brazilian elderly. *Nutrition*. 29: 152–157.

[116] Shinkai, R.S., Hatch, J.P., Sakai, S., Mobley, C.C., Saunders, M.J. and Rugh, J.D. (2001) Oral function and diet quality in a community based sample. *Journal of Dental Research*. 80(7): 1625–1630.

[117] Sebring, N.G., Guckes, A.D., Li, S.H. and McCarthy, G.R. (1995) Nutritional adequacy of reported intake of edentulous subjects treated with new conventional or implant-supported mandibular dentures. *The Journal of Prosthetic Dentistry*. 74(4): 358–363.

[118] Holm-Pedersen, P., Schultz-Larsen, K., Christiansen, N. and Avlund, K. (2008) Tooth loss and subsequent disability and mortality in old age. *Journal of the American Geriatrics Society*. 56(3): 429–435.

UNIVERSITY OF IBADAN LIBRARY

[119] Osterberg, T., Carlsson, G.E., Sundh, V. and Mellstrom. D. (2008) Number of teeth—a predictor of mortality in 0-year-old subjects. *Community Dentistry and Oral Epidemiology*. 36(3): 258–268.

[120] Brown, D.W. (2009) Complete edentulism prior to the age of 65 years is associated with all-cause mortality. *Journal of Public Health Dentistry*. 69(4):260–266.

[121] Shimazaki, Y., Soh, I. and Saito, T. (2001) Influence of dentition status on physical disability, mental impairment, and mortality in institutionalized elderly people. *Journal of Dental Research*. 80(1): 340–345.

[122] Calman, K.C. (1984) Quality of life in cancer patients—an hypothesis. *Journal of Medical Ethics*. 10: 124–127.

[123] Allison, P.J., Locker, D. and Feine, J.S. (1997) Quality of life: A dynamic construct. *Social Science & Medicine*. 45 (2): 221–230.

[124] Heydecke, G., Tedesco, L.A., Kowalski, C. and Inglehart, M.R. (2004) Complete dentures and oral health-related quality of life—do coping styles matter? *Community Dentistry and Oral Epidemiology*. 32 (4): 297–306.

[125] Locker, D. (2004) Oral health and quality of life. *Oral Health & Preventive Dentistry*. 2(1): 247–253.

[126] Brennan, D.S. and Spencer, A.J. (2004) Dimensions of oral health related quality of life measured by EQ-5D+ and OHIP-14. *Health and Quality of Life Outcomes*. 2, article 35.

[127] Awad, M.A., Locker, D., Korner-Bitensky, N. and Feine, J.S. (2000) Measuring the effect of intra-oral implant rehabilitation on health-related quality of life in a randomized controlled clinical trial. *Journal of Dental Research*.79 (9): 1659–1663.

[128] Buck, D. and Newton, J.T. (2001) Non-clinical outcome measures in dentistry: Publishing trends 1988–98. *Community Dentistry and Oral Epidemiology*. 29(1) 2–8.

[129] Heydecke, G., Klemetti, E., Awad, M.A., Lund, J.P. and Feine, J.S. (2003) Relationship between prosthodontic evaluation and patient ratings of mandibular conventional and implant prostheses. *International Journal of Prosthodontics*. 16(3) 307–312.

UNIVERSITY OF IBADAN LIBRARY

[130] Locker, D. and Slade, G. (1994) Association between clinical and subjective indicators of oral health status in an older adult population. *Gerodontology*. 11(2): 108–114.

[131] Hugo, F.N., Hilgert, J.B., de Sousa Mda, L. and Cury, J.A. (2009) Oral status and its association with general quality of life in older independent-living south-Brazilians. *Community Dentistry and Oral Epidemiology*. 37 (3): 231–240.

[132] Nitschke, I. and M¨uller, F. (2004) The impact of oral health on the quality of life in the elderly. *Oral Health & Preventive Dentistry*. 2 (1): 271–275.

[133] Heydecke, G., Thomason, J.M., Lund, J.P. and Feine J.S. (2005) The impact of conventional and implant supported prostheses on social and sexual activities in edentulous adults: Results from a randomized trial 2months after treatment. *Journal of Dentistry*. 33(8): 649–657.

[134] Naik, A.V. and Pai, R.C. (2011) Study of emotional effects of tooth loss in an aging north Indian community. *ISRN Dentistry*, Vol. 2011, Article ID 395498, 4 pages, 2011.

[135] Rodrigues, S.M., Oliveira, A.C., Vargas, A.M., Moreira, A.N. and Ferreira, E.F.E. (2012) Implications of edentulism on quality of life among elderly. *International Journal of Environmental Research and Public Health*. 9 (1): 100–109.

[136] Fiske, J., Davis, D.M., Frances, C. and Gelbier. S. (1998) The emotional effects of tooth loss in edentulous people. *British Dental Journal*. 184 (2): 90–93.

[137] Jones, J.A., Orner, M.B., Spiro III, A. and Kressin, N.R. (2003) Tooth loss and dentures: Patients' perspectives. *International Journal of Dentistry*. 53: 327–334.

Photographs Credits

Figure 3b, Professor Peter Berthold, School of Dental Medicine, University of Pennsylvania.

Figures 7a & 7b, Ring, M.E. Dentistry an illustrated history (1985). Abradale press, Harry N. Abrams, Inc., Publishers New York.

Figures 16a & 16b, Dr. T.A. Esan, Department of Restorative Dentistry, Obafemi Awolowo University, Ile-Ife.

UNIVERSITY OF IBADAN LIBRARY

BIODATA OF
PROFESSOR OLUWOLE OYEKUNLE DOSUMU

Professor Oluwole Oyekunle Dosumu was born on the 17th of May, 1959 in Ibadan. He attended Abadina Primary School, University of Ibadan from 1965-1970 and Olivet Baptist High School, Oyo from 1971-1975. Thereafter, he went to Federal Government College, Ilorin for his Higher School Certificate from 1975-1977. He gained admission into the University of Ibadan, Ibadan in 1977 to study Dentistry and graduated with a Bachelor of Dental Surgery Degree in 1982. He had his internship at the Dental Headquarter, Ogun State Health Management Board, Abeokuta from 1982-1983 and had his National Youth Service Corps at 22, Armoured Brigade, Sobi, Ilorin from 1983-1984.

In his pursuit for specialized skill in Prosthetic Dentistry, he commenced his residency programme in the University College Hospital, Ibadan in 1984 and obtained the Fellowships of the National Postgraduate Medical College (FMCDS) in 1992 and West African College of Surgeons (FWACS) in 1997. He obtained the Master of Science (M.Sc.) in Fixed and Removable Prosthodontics from the University of London in 2011. He was awarded Fellowship of the International College of Dentists in 2014. Professor Dosumu has supervised eleven postgraduate dissertations and mentored five prosthodontists till date.

Professor Dosumu was engaged as a part time lecturer in the Department of Restorative Dentistry, College of Medicine, University of Ibadan from March, 1990 – December, 1992. He was appointed a Lecturer 1 in January 1993, and promoted Senior Lecturer in 1998, a Reader in 2008 and a full Professor in 2012. Professor Dosumu is the first Professor in the Department of Restorative Dentistry, University of Ibadan since its inception in 1975 and the first Professor of Prosthodontics in Nigeria.

In the year 2004, Professor Dosumu was a recipient of Mac Arthur Fellowship to the School of Dental Medicine, University of Pennsylvania, Philadelphia, United States of

UNIVERSITY OF IBADAN LIBRARY

America. He served the University Community in various capacities as Departmental Coordinator in 1993-1994 and 1995, Acting Head of Department for 2000-2012. He was at various times a member of Academic Board, College of Medicine and member of the UI/UCH Ethical Committee. Professor Dosumu is a seasoned teacher and experienced examiner at both undergraduate and postgraduate levels and has contributed immensely to other Universities. He has served as external examiner to University of Lagos, Obafemi Awolowo University, University of Benin, University of Port-Harcourt and currently University of Nairobi and University of Ghana. He was a visiting Associate Professor to the University of Port-Harcourt in 2014. He is a member of the Faculty Board of Dental Surgery, National Postgraduate Medical College of Nigeria from 2001-2003, 2005-2012 and West African College of Surgeons from 2013-2014.

Professor Dosumu belongs to many professional bodies. He was the Assistant Secretary-General of the Nigerian Dental Association from 1989-1990. He is a member of the Nigerian Dental Association (NDA), Nigerian Osseointegration and Dental Implantology Society (NODIS), Nigerian Medical Association (NMA), Medical and Dental Consultant Association of Nigeria (MDCAN), Immediate Past President of Nigerian Society for Restorative Dentistry (NISORD). Professor Dosumu had award for special recognition builder from Ibadan College of Medicine Alumni Association (ICOMAA) in 2011 and with other members of the department was awarded the most committed group of Nigerian Society for Restorative Dentistry (NISORD) in 2011. He has to his credit 68 publications and is happily married to Dr. Elizabeth Bosede Dosumu (nee Thomas), a Senior Lecturer in the Department of Periodontology and Community Dentistry of this great University and they are blessed with lovely children.

Professor Oluwole Dosumu is delivering the tenth in the series of Inaugural Lectures for the 2014/2015 Session on behalf of the Faculty of Dentistry. The title of his lecture is **"By their teeth you shall know them: The Prosthodontist's perception of the contribution of tooth loss to health."**

UNIVERSITY OF IBADAN LIBRARY

NATIONAL ANTHEM

Arise, O compatriots
Nigeria's call obey
To serve our fatherland
With love and strength and faith
The labour of our heroes' past
Shall never be in vain
To serve with heart and might
One nation bound in freedom
Peace and unity

O God of creation
Direct our noble cause
Guide thou our leaders right
Help our youths the truth to know
In love and honesty to grow
And living just and true
Great lofty heights attain
To build a nation where peace
And justice shall reign

UNIVERSITY OF IBADAN ANTHEM

Unibadan, Fountainhead
Of true learning, deep and sound
Soothing spring for all who thirst
Bounds of knowledge to advance
Pledge to serve our cherished goals!
Self-reliance, unity
That our nation may with pride
Help to build a world that is truly free

Unibadan, first and best
Raise true minds for a noble cause
Social justice, equal chance
Greatness won with honest toil
Guide our people this to know
Wisdom's best to service turned
Help enshrine the right to learn
For a mind that knows is a mind that's free

UNIVERSITY OF IBADAN LIBRARY

UNIVERSITY OF IBADAN LIBRARY