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Inaugural Lecture Series 184

**THE TEETH, THE FACE AND THEIR
HARMONY IN THE EYE OF THE
BEHOLDER**

By

Olayinka Donald Otuyemi
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Introduction

Historically, science has tried to define dental and facial beauty in its own terms. By quantifying beauty, science and medicine have attempted to treat aesthetic shortfalls with some validity and reliability. The problem with many of these past (beauty analyses) approaches has been either subjective bias or oversight of influential factors.

Mr. Vice-Chancellor, Sir, the Registrar, Members of the Academia, distinguished guests, ladies and gentlemen. I thank the Almighty God for the ordination of this day, and for His enabling Grace to stand before this audience. Today's event is historic. It is so because, when in February 1985, I reported for duty as a Medical Training Fellow at the Faculty of Health Sciences (now College of Health Sciences), Obafemi Awolowo University, little did I realize that I would stand before you on an occasion such as this.

I consider it an honour and great privilege to deliver this one hundred and eighty-fourth (184th) inaugural lecture; the first in the newly created Department of Child Dental Health and the second in the Faculty of Dentistry of this University.

Having, by the special grace of God been elevated to the enviable position of Professor, it is a binding duty for me to defend the action of the University authorities and academic colleagues who adjudged my modest contributions to scholarship, worthy of recognition. To this end, I have the pleasant duty of having to speak on the genesis of the discipline I profess.

I have chosen the topic of my inaugural lecture to reflect and cover my entire vocational, clinical, and research interests in caring for the most prominent and striking part of the human body (the head region) to ensure its well being, particularly with regards to the arrangement, function and harmonious relationship of human dentition and facial appearance.

Physical attractiveness is an important social issue in our culture and the face is one of its key features. The concept of "ideal body image"

is very evident in our society today, though beauty involves more than being fat or thin. The media, through advertisement on billboards and television have done much to further this thinking. There is also a growing influence of advertising media on the perception of dento-facial appearance in the Nigerian society. In certain places in Africa particularly in South-Eastern Nigeria, prospective brides are shut up in "fattening farms," where they are fed large amount of rich food with the idea that they will become more attractive. In the Yoruba culture, the importance of good and pleasing dentofacial structures cannot be overemphasized. Certain expressions such as *eyin okankan obinrin ka, olori ewa wo* (when the front teeth of a woman are lost, her beauty is destroyed) and "*ti eyin ba ka, ile erin ti wo*" (when the teeth are lost, the beautiful smile is gone) are often used. Some are even called by nicknames based on their dental characteristics. *eyinafe* (one with a set of teeth that can be exhibited socially).

Let me hasten to state that the conception of this lecture was as a result of my contact with a fairy tale book belonging to my son **Oluwatobi** published by Peter Haddock Limited titled, "*Beauty and the Beast*". Little did he know that he was divinely directed to prepare my mind for what would be the foundation of my subject for today. One of the characters of the book, Beauty, the youngest of three daughters of a rich merchant was enslaved to a monstrous beast in a strange castle. In her captivity, she had always wished that one day a handsome young Prince would come along to her rescue. Unknown to her, the Beast was a bewitched handsome Prince who was looking for someone that would love him so that the spell on him could be cast off. By the instrumentality of that story, the body image in particular the facial appearance played an important psychosocial role in the interpersonal relationship between the two characters even though judgement of attractiveness was based on appearance, which was rather subjective. What was ugly on the outside was beautiful inside!

Collective versus Individual Aesthetic Judgements

Social psychologists have stressed the importance of facial attractiveness on the socialization process. Current Social Science research indicates that unacceptable dento-facial appearance, including visible dental characteristics that deviate from the norm, are phenomena that may stigmatize, impede career advancement and peer group acceptance, encourage negative stereotyping and may have a profound effect on self concept (Adams 1977, 1980; Jenny and Proshok 1986). All these may reduce one's life chances. For occupations where dental appearance is very important, those that are prestigious and those in which a person is visible to the public, an individual's dento-facial disorders may come between career aspirations and career opportunities (Jenny and Proshok 1986). There are two interrelated ways in which unacceptable dento-facial traits may affect psychosocial well-being of an individual negatively; unfavourable social response and poor self esteem (Shaw, Addy and Ray 1980).

Some studies on infant perception (Langlois *et al.* 1987; Samuels and Ewy, 1985) indicate that infants as young as three months of age are able to discriminate between faces previously judged by adults as either attractive or unattractive, with a high level of agreement. Maurer (1985) indicated that during the first year of life, infants show evidence of being able to make judgements about faces. Indeed, adults as well as children tend to look longer at faces judged as attractive (Dion, 1977; Hildebrandt and Cannan 1985). Langlois *et al.* (1987) also found this to be true of extremely young infants.

The question any inquisitive mind would therefore like to ask, is what are the criteria or yardsticks for judging a true or normal dento-facial appearance? It is often said that "perfect" or "ideal" dental occlusion and facial appearance does not exist in nature and it is merely a hypothetical concept based on the morphology of teeth and the surrounding structures. Whilst "normal" dento-facial appearance can be said to lie within an acceptable range, which may indeed vary,

any appreciable deviation in occlusal disharmony from the ideal that may be considered aesthetically or functionally unsatisfactory is referred to as **malocclusion** (meaning *bad alignment of teeth*). Fig. 1,2&3)

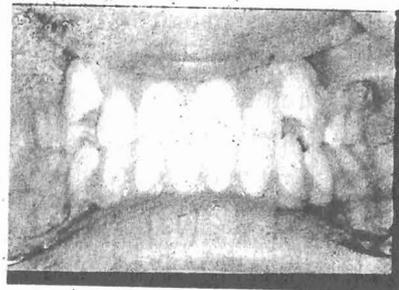


Figure 1: Normal dental appearance that is functionally and aesthetically satisfactory

Figure 1



Figure 2



Figures 2 & 3 Show bad alignment of teeth (malocclusion)

Clearly, when a clinician sets about improving someone's dentofacial appearance, it is important first to know whether his mental picture of the anticipated improvement will coincide with that of the patient, the patient's family and acquaintances, and indeed, the public at large. In other words, is it possible to make collective judgements about the quality of dentofacial appearance? Or is there truth in the adage that "beauty is altogether in the eye of the beholder", as pointed out by Margaret Hungerford in 1878.

In a recent publication by *Tell Magazine* on March 21, 2005, a beauty pageant was organized in Gaborone, Botswana, in which all the 12 competitors including the organizer of the programme, Kesego Basha-Mupell were living with HIV/AIDS. This brought to light the simple fact that aesthetic judgements are a matter of individual taste and collective assessments may vary according to the whims of prevailing circumstances.

Nature on its own part has continued to strike a harmonious balance between the face and teeth. We see beauty in humans and also perceive it everywhere in the world around us. Life is beautiful! Facial appearance is indeed based on the concept of divine proportions. Students of the *Bible* will easily appreciate that God made everything beautiful in His time (Ecclesiastes 3:11). Truly, the teeth and the face are a miracle of design! With every good reason the Psalmist wrote that he would praise God for he was fearfully and wonderfully designed (Psalm 139:14). I strongly suspect that he must have been reflecting on the teeth and the face!

What's in a Face? Art versus Reality

Since time immemorial the teeth, the mouth, and facial appearance have held a seemingly intrinsic fascination for mankind. The mouth and the teeth apart from being the "gateway" to the human body are a source of beauty and have also been a subject of many oral and written beliefs and superstitions. The Yoruba believe that the teeth

give the mouth its beautiful shape, hence the phrase “*eyin ...enu gun*”. (the teeth give the mouth its beautiful shape)

Guidelines for the ‘ideal’ in facial attractiveness have been presented in a number of ways, namely: artistic, cephalometric (including growth study materials), and anthropometric analyses.

Artistic Guidelines

It was only as recently as the mid-1970s that ‘true’ evidence in the form of data derived from growth studies became available for clinical use. Until then, those interested in improving an individual’s facial appearance had to rely on guidelines based on the experience of representational artists over the ages, notably the Renaissance artists during the fifteenth and sixteenth centuries. Whilst the ancient Egyptians were possibly amongst the first to try to describe facial and bodily proportions in mathematical or grid form, the main contribution seemed to have developed during the ancient Greek civilization, particularly during the fourth and fifth centuries BC. The head of Aphrodite symbolized the ideal facial proportions as envisaged by Greek sculptures in the fourth century BC. The concept of the so-called ‘golden’ or ‘divine’ proportion (Ricketts, 1982) was also developed in the same period. Sculptures of the human form produced during that period invariably showed proportions that conform to certain established rules or ‘canon’. Guidelines were laid down by a number of artists, one of the most famous, Polykleitos in the fifth century BC, whose statue and accompanied written work (Pollitt, 1965) displayed a number of recommended ratios for the human figure. One of his sculptures called ‘The Lance Bearer’ conforms to certain carefully laid down proportions, for example, the head and face together comprises two of fifteen equal vertical segments into which the human form could be divided, a principle which holds true today. Whilst the ‘canon’ itself no longer exists, many of Polykleitos’ recommendations remained and were later modified and copied by the Romans. The second century Roman Physician and Philosopher,

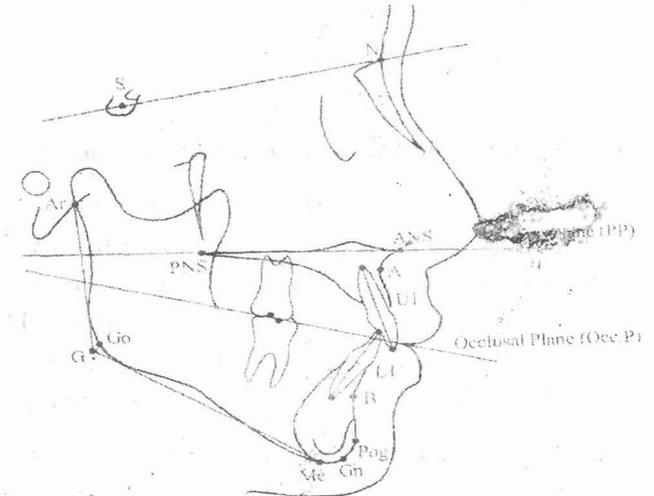
Galen, noted that the earlier Greek sculptors had been very much aware of ‘averageness’ in aesthetics.

Cephalometric Evidence

Cephalometry (specialized lateral skull radiograph) has played an important role in the analysis of facial attractiveness as it has been used to provide a vast array of data useful for the representation of ideal facial proportions. However, to those interested in finding a dataset that could accurately describe an ideal model for facial attractiveness, there are areas of deficiency in cephalometrics that need to be addressed. First, in many cephalometric analyses, the population detail from which mean data was derived is not always clear. Secondly, most of the data presented are two-dimensional in nature and thus incomplete. (Fig. 4)

Figure 4:

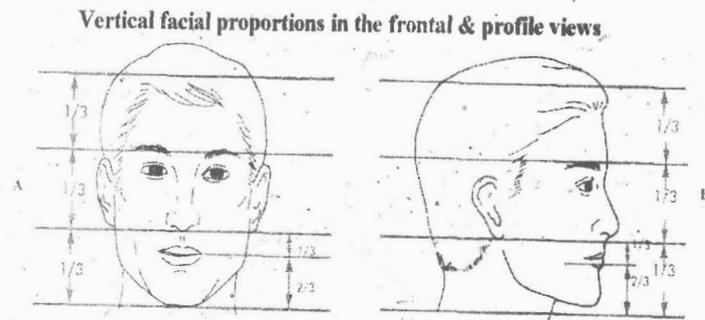
Cephalometric landmarks recorded in orthodontic assessment



Anthropometric Evidence

Direct measurements taken from living subjects would seem an obvious source of valuable data. As pointed out by Ward (1989) and Rogers (1974), the advantages of this approach include its non-invasiveness, simplicity, and cheapness and, above all, the fact that there is a comprehensive dataset of age- and sex-matched standards to which patients' measurement can be compared. (Fig. 5)

Figure 5



The Definition and Evolution of Orthodontics

Before delving into the main theme of this inaugural lecture, it seems most appropriate at this preliminary stage to explain to the majority of my listening audience who are probably not conversant with *orthodontics* (first specialty of Dentistry). The definition of Orthodontics was coined from the two Greek words: *Ortho* and *dontics* which means, "the straightening of teeth."

Ordinarily, it is the branch of dentistry concerned with growth of the face, development of the occlusion, the prevention and correction of occlusal disharmonies. To a layman, it is about the movement of teeth around the mouth without losing them. Orthodontists achieve this by the application of 'light' forces to produce about one millimetre of movement in a month.

Historical Perspective

Mr. Vice-Chancellor, Sir, distinguished ladies and gentlemen, one inherent error in disregarding the importance of history to evolution of orthodontics is, as Cicero, a senator of ancient Rome put it, "Not to know what has been transacted in former times is to continue always as a child". Also, Akinrinade (2005) while delivering his inaugural lecture remarked that a nation or people that do not know where they are coming from are unlikely to have a clear idea of their destination. All these sentiments are shared in this lecture.

As far as records go, attempts to correct irregular, crowded, and protruded teeth date back to 1000 BC. However, the pioneer in using extra-oral force to correct alignment of teeth was Dr. Norman Kingsley. He also wrote *Oral Deformities*, one of the first texts that systematically described orthodontics in 1850. Dr. Kingsley concentrated on dental alignment of teeth but paid little attention to dental occlusion. It was Dr. Edward Hartley Angle, a prosthodontist, who extended the concepts of prosthetic occlusion to natural occlusion (1890s). Dr. Angle was one of the first to emphasize occlusion in the natural dentition. His interest in creating proper occlusion in natural teeth created the specialty of Orthodontics. The publication of **Angle's Classification of Malocclusion** not only subdivided major types of malocclusion into three classes; it also included the first clear concept of normal occlusion in the natural dentition.

Dr. Angle's concepts of occlusion led to the evolution of orthodontics from the alignment of irregular teeth into the treatment of malocclusion. He also developed many appliance techniques that could be used to correct malocclusion. The introduction of these techniques led to the development of three-dimensional braces. Perhaps there is no other specialty of dentistry that has benefited from technological advancement than orthodontics. Facial proportions and aesthetics did not receive much attention at that time until the 1930s.

The introduction of cephalometric radiography in the 1940s after World War II allowed orthodontists to see how the bones of the face contributed to malocclusion. With this technology, it was discovered that one could alter the growth of bones in growing individuals and prevent malocclusion by redirecting growth.

As improvements in surgical techniques occurred in the 1970s, far more complex types of malocclusions were combined with surgical correction (orthognathic surgery) in order to produce some excellent results.

The increasing demand for treatment led to the development of other ways of moving teeth, particularly with fixed lingual orthodontic techniques, functional and removable appliances (Otuyemi 1997).

A more recent addition to the orthodontist's armamentarium is the aesthetically oriented Invisalign used to treat simple to moderate mal-aligned cases.

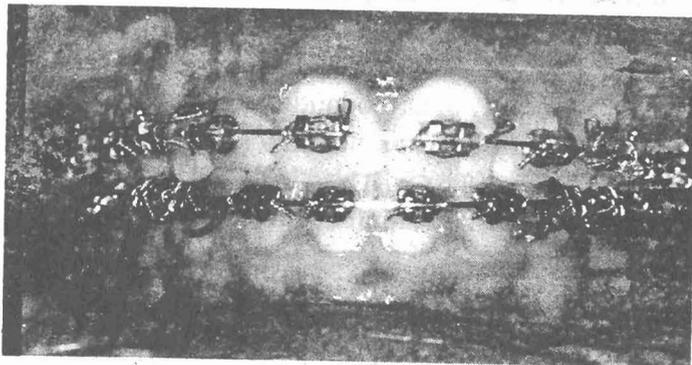


Figure 6: A patient wearing fixed orthodontic appliance

The Practice of Orthodontics in Nigeria

Unlike our nationhood, Orthodontics in Nigeria has a much shorter history. Modern Orthodontic practice coincided with the establishment of the first dental school in Lagos, Nigeria in September 1966. The

practice was initially limited to the first four-generation dental schools (Lagos, Ibadan, Ife and Benin) but has witnessed a gradual but steady development since its introduction about 3 decades ago. In the early and late 1970s, undergraduate orthodontic training in Nigeria involved a concentrated course of lectures for a period of one month with little or no practical demonstration for the final year students (Isiekwe, 1987; Otuyemi, 2000). These instructions were given by a number of visiting British and American orthodontists.

In 1979, the first Nigerian trained orthodontist, Dr Michael Isiekwe (now Professor at Lagos Dental School) returned from Belfast to assume the responsibility of teaching orthodontics to dental students in the four dental schools. The dearth of specialist orthodontists continued until early 1980s when other foreign trained Nigerian orthodontists returned to the country.

The Causes of Orthodontic Problems

Mr Vice-Chancellor, Sir, it is very difficult to come up with precise definitions of normal occlusion and malocclusion because of a thin line between them. However, there is a general agreement that individual's occlusal status is described by two important characteristics: the relationship of teeth within each arch to a smoothly curving line of occlusion, and the pattern of occlusal contacts between the upper and lower arches.

Unlike many medical and dental problems, malocclusion is a developmental condition, which is not due to pathologic process, but by moderate disturbances of normal development. Malocclusion develops slowly as a child grows, and there is ample opportunity for many influences to have an effect. It is not surprising that it has proved difficult to implicate a single major cause.

Orthodontists have held quite different views at various times and their relative importance about the causes of malocclusion. These views range from genetically determined dental and facial proportions to environmental influences. In some instances (about 5% of cases),

it is possible to specify rather precisely the cause of a particular malocclusion, the remainder are results of a complex and poorly understood combination of hereditary and environmental influences.



Figure 7: Orthodontic treatment of a mal-aligned upper right central incisor



Figure 8: Malocclusion in a cleft lip and palate patient

Specific Causes of Malocclusion

A variety of causes exist that lead to disturbances in embryologic development. Dental and facial malformation can occur as a result of problems in normal development at very early stage. These range

from genetic disturbances to specific environmental insults. Clefting of the lip and palate is one excellent example (Fig. 8), but it now appears that several other facial conditions may arise because of intrauterine conditions (Ugboko *et al* 1997). Chemical agents capable of producing embryonic defects if given at the critical time are called teratogens. These teratogens are known to produce dentofacial developmental defects (Poswillo, 1973).

Disturbances of dental development may accompany major congenital defects. Such disturbances include congenitally missing teeth, which occur during the initial stages (initiation and proliferation) of tooth formation (Adekoya-Sofowora *et.al.* 2000).

One of the major contributory factors towards malocclusion in children is the premature loss of deciduous teeth (Otuyemi and Adetunji 1991; Otuyemi and Ndukwe 1997).

In addition, trauma to the primary dentition has been reported to be a contributory factor affecting the alignment of the permanent incisors (Brin *et.al.*, 1987; Otuyemi and Oluyadi 1997). This causes malocclusion in three ways: (1) damage to permanent tooth buds from injury to the primary teeth (2) drift of permanent teeth after premature loss of primary teeth (3) direct injury to permanent teeth (Profitt and Fields, 1993).

Functional shifts of the mandible while permanent teeth are erupting can produce both transverse and antero-posterior deviations in tooth position. These displacements are usually seen in two circumstances: posterior crossbite after prolonged thumb sucking, and anterior crossbite in mild prognathic children. Prolonged sucking habits often produce a mildly narrowed maxillary arch and a tendency toward bilateral crossbite (Otuyemi and Noar 1997). Children with this condition usually shift the mandible to one side on closure to gain better function.

This non-nutritive sucking habit affects almost 45% of young population in the world, from birth through adolescence (Profitt and

Fields 1993). Over 80% of children in the western world have a varying degree of sucking habits (Levine 1998). Otuyemi *et al* (1997) showed that 4.6% of a Nigerian population sucked their digit whilst 0.6% indulged in lip sucking habit. The Nigerian study also established a strong relationship between anterior open-bite (gap in the front teeth) and digit sucking which corroborates the earlier studies on the subject (Johnson and Larson 1993; Profitt and Fields 1993). These habits are not universal across the world, for example they are non-existent in Eskimos (probably due to the strapping of young ones on the back).

Genetic Causes of Malocclusion

There is a strong influence of inheritance on facial features. It is apparent that certain types of malocclusions run in families. Harris and Kowalski (1976) reported a particular type of prognathic mandible called "Hapsburg jaw" often seen in parents and offspring of the German Royal family. The pertinent question for the aetiologic process of malocclusion is not whether there are inherited influences on the jaws and teeth, because obviously there are, but whether malocclusion is often caused by inherited characteristics. Malocclusion could be produced by inherited characteristics in two major possible ways. The first would be an inherited disproportion between the size of the teeth and the size of the jaws, which would produce crowding or spacing. The second possibility would be an inherited disproportion between size and shape of the upper and lower jaws, which would cause improper occlusal relationship. For instance, if the jaw and tooth sizes were inherited independently, it would be quite possible for a child to inherit large teeth but small jaw or large upper jaw and a small lower one.

Another possible explanation for the development of both components of malocclusion would be the inheritance of discordant dental and facial characteristics, as a result of cross-breeding between genetically different human subgroups. There is dental anthropological evidence that population groups that are genetically homogenous tend to have

normal occlusion. In pure racial stocks, such as the Melanesians of the Philippines islands, malocclusion is almost non-existent.

Only within the last few hundred years has human mobility increased to the point that significant cross-breeding between different groups could occur. The United States, with its extremely heterogeneous population, is often referred to as a genetic melting pot, but population migrations have produced similar mixtures in many areas. The suggestion that one of the prices for this genetic diversity leading to increase in malocclusion is note-worthy. This view of malocclusion as primarily a problem of genetic crosses was greatly strengthened by animal experiments carried out by Stockard and co-workers in the 1930s (Stockard and Johnson 1941), which demonstrated that particularly in dogs, crossbreeding gives rise to all the types of malocclusion as seen in humans. However, a careful study of the results of out-breeding in human populations casts doubts on the hypothesis that independently inherited tooth and jaw characteristics are a major cause of malocclusion (Chung *et al* 1971).

Another significant contribution to malocclusion is an evolutionary reduction in jaw and tooth size. The fossil record makes it clear that there has been a reduction in the size of the jaws, the number and sizes of the teeth as humans have evolved (Wolpoff, 1980). The traditional mammalian dental pattern has three incisors, four premolars and four molars. The present human pattern has two incisors, two premolars and three molars, and the relatively high incidence of missing lateral incisors, second premolars and third molars suggest a trend toward the elimination of these teeth as well. The size of the individual teeth has also decreased by about 15-20 per cent from early man to the present (Profitt 1986). At the same time, there has been a decrease in the size of the jaws and a general decline in the sturdiness of the jaw and facial bones. There would be a tendency for crowding and mal-alignment to develop if the rate of reduction of jaw size were faster than the reduction of tooth size or number, and this is a classic theory to explain the increase in mal-alignment

(Otuyemi and N. ar 1996a). The difficulty with this theory is that the increase has occurred much too rapidly to be accounted for on this basis. Most of the increase in mal-alignment occurred in the last few hundred years, while an evolutionary drift takes place on a very much longer time scale.

Environmental Causes of Malocclusion

Environmental factors play a leading role in the establishment of malocclusion, which is reflected, in the final facial proportions and dental relationships. Environmental influences manifest during growth and development of the face, jaws and teeth by exerting pressures and forces on physiologic activity. Function must adapt to the environment. For example, how you chew and swallow will be determined in part by what you have to eat; pressures against the jaws and teeth will occur during both activities, and could affect how jaws grow and teeth erupt. There is an established relationship between anatomic form and physiologic function in all animals. For instance, an individual who does heavy physical work has both heavier and stronger muscles and a sturdier skeletal system than one who is sedentary. If function could affect the growth of the jaws, altered function could be a major cause of malocclusion.

Masticatory function is potentially significant in dento-facial development. Corrucini (1984) advanced that malocclusion is more prevalent now than a few hundred years ago because of the large changes in diet and jaw function that have occurred over only a few generations. The implicit assumption is that a relative underdevelopment of the dental arches often occurs now, and this is the reason for frequent crowding and mal-alignment of the teeth. The major problem with this theory is that there are no plausible hypotheses to explain how the stimulus of increased chewing activity might be translated into larger dental arches, and only indirect evidence that diet consistency is related to arch size.

Experiments with human subjects have shown that a change in posture does accompany nasal obstruction (Vig *et al* 1980). Altered respiratory pattern, such as breathing through the mouth rather than the nose, could change the posture of the head, jaw and tongue and cause malocclusion if the postural changes were maintained.

Experiments with growing monkeys show that totally obstructing the nostrils for a prolonged period in this species leads to the development of malocclusion, but not of the type commonly associated with mouth breathing in humans (Harvold *et.al.* 1981). There are well-documented studies of allergic children with increased anterior face height (Trask *et.al.* 1987) and children who presented for adenoidectomy had significantly longer anterior face height than control group (Linder-Aronson, 1970).

Genetic versus Environmental Influences on Malocclusion

The relative contribution of genes and the environment to the aetiology of malocclusion was a matter of controversy throughout the twentieth century. The question of whether environment or genetics exerts the greater influence in the aetiology of malocclusion has been a matter of debate since the origin of orthodontics. As far back as 1891, Kingsley was unequivocal in his views in describing inheritance as a major factor in producing malocclusion. Edward H. Angle (1907), in one of his many papers, was equally adamant in his belief that malocclusions arise from local causes.

Contemporary analysis of malocclusion indicates that neither genetic nor environmental causes can confidently be blamed; yet the presence of malocclusion in a majority of the population is a fact and must have an origin. Genetic mechanisms are clearly predominant during embryonic craniofacial morphogenesis, but environment is also thought to influence dento-facial morphology postnatally, particularly facial growth.

From the review of evidence, it seems likely that in most people, crowding and mal-alignment are due primarily to inherited tendencies that determine facial proportions and soft tissue contours as well as tooth and jaw size. This concept suggests that moderate degrees of mal-alignment might be present even in the absence of habits or other posture-influencing environmental factors. However, extremely severe crowding probably has additional environmental component.

Mr. Vice-Chancellor sir, the cause of malocclusion is obscure, and no simple cause can be cited or should be expected. On the genetic side the advent of diagnostic techniques in the field of molecular genetics makes it possible to identify relevant morphogenes or genetic markers such as those for *mandibular prognathism*, or to influence the development of malocclusion. The complexity of the situation is discouraging, yet if that is how it is in the real world, this simply must be expected. Albert Einstein responding to comments about his complex theories, said it well: "Things should be as simple as they are, but not simpler".

Long-term Effects of Malocclusion and its Impact on Quality of Life

The impact of malocclusion on quality of life is a multidimensional concept that is based on subjectively perceived physical, psychological and social function, as well as the subjective sense of well being of an individual. Since the majority of dental care is about conditions that are seldom life threatening, there is a need to evaluate the impact of oral health care on quality of life. Oral health related quality of life measures (OHRQoL) can and should therefore be used in the assessment of need and outcomes of orthodontic care. At present, there is no single standard condition-specific OHRQoL measure used in orthodontics.

Risk of damage to the teeth and surrounding tissues

While it might be reasonable to suppose that poorly aligned teeth may complicate oral hygiene procedures and lead to increased plaque

accumulation and subsequent gingival inflammation (gum disease) and dental caries (tooth decay), these associations have not been unequivocally established by research (Shaw, Addy and Ray 1980; Davis *et.al.* 1991).

Severe crowding of teeth does not directly cause dental caries and periodontal disease (gum disease), but it makes it more difficult to access the teeth for oral hygiene purpose. Mechanical removal of bacterial plaque (food debris), the major cause of chronic gingivitis from mal-aligned teeth demands greater patient dexterity, which may not be achieved under normal circumstances. Furthermore, excessive occlusal force placed on maloccluded teeth may result in accelerated periodontal breakdown (Stallard, 1968).

In a number of patients, periodontal trauma (soft tissue injury) may also be found in association with a very deep overbite, particularly where posterior tooth support has been lost. If plaque control (oral hygiene) is excellent, periodontal damage may not occur, even if the lower incisors occlude on the gingiva palatal to the upper incisors. However, this cannot be guaranteed. There is also evidence that lip incompetence in association with incisal prominence hastens periodontal destruction.

It is also well documented that prominent incisors are more liable to sustain accidental injury (O'Mullane 1973; Otuyemi 1993). This risk was almost three times greater where the *overjet* (horizontal distance between upper and lower incisors) was 6mm, or more (Jarvinen 1977).

Risk of functional disorders

Cranio-mandibular disorders (CMD) involve pain or tenderness in the muscles of mastication and temporomandibular joints. Even though these disorders are multifactorial, they may result from occlusal interferences due to malocclusion which hinder occlusal contacts, hampering or hindering smooth gliding harmonious jaw movements with the teeth in contact (Ramfjord and Ash, 1971). Reports have

revealed that signs and symptoms may be as high as 88 per cent and 57 per cent respectively (Rugh and Solbergh 1985; Okeson 1989). An Analysis of the signs of CMD showed, impaired range of mandibular movements as the most frequently recorded sign (58 per cent) in Nigerians (Table 1). Furthermore, the clinical dysfunction scores showed that 62.8 per cent presented with one or more clinical signs of dysfunction (Otuyemi et al 2000).

TABLE 1. Distribution of Nigerians with recorded signs of temporomandibular disorders

	No. (%)
Impaired range of mandibular movement	179 (88.1)
TMJ sound/deviation	25 (8.1)
Masticatory muscle pain (on palpation)	10 (3.2)
TMJ pain (on palpation)	8 (2.6)
TMJ pain on movement	9 (2.9)

Risk of psychosocial stress

McLain and Proffit (1985) stated that the occlusal problems could not be judged solely in physical terms. The impact of dental and facial characteristics on an individual's social well-being is important, perhaps more important, than the impact on physical health.

The emotional handicap imposed by an unaesthetic dental appearance may have a significant impact on individual well-being, particularly for children who are stigmatized or ridiculed by their peers and come to view themselves as inadequate. Facial appearance can be very important to an individual's self-image, well-being and success in society. The social acceptability of a particular occlusion depends not only on the arrangement of the teeth but on other facial features such as nose, lips and cheeks, on the personality of the patient, and on the attitudes of the society in which they live.

Children with malocclusions are more susceptible to teasing by their peers (Shaw, Meek and Jones 1980), and attractive children are often considered by adults to be more intelligent (Shaw, 1981). Baldwin and Barnes (1965) reported that one-tenth of children reporting for orthodontic treatments were frequently teased about their teeth. In an investigation on nicknames and teasing amongst a group of British school children aged 9-13 years, Shaw, Meek and Jones (1980) reported that 67 per cent had nicknames, most of which (63%) were derived from their names. Only in three children were dental characteristics the clear origin of the nickname. About 7 per cent of the pupils expressed strong dislike for the nicknames. When teasing was considered, two-thirds of them were teased about one or more characteristics including height, weight and dental features, with 7 per cent of the pupils being teased about their teeth once per week or more. Importantly, negative comments about their teeth appeared to be more hurtful than those of other features. More than 60 per cent of the group teased about teeth admitted that they disliked or were upset by it.

Reports have consistently shown that teachers have less favourable academic expectations of unattractive children and rate their general behaviour and personality less favourably (Clifford 1975; Aloia 1976; Rich 1975). Also, there is abundant evidence that unattractive children achieve less educationally (Salvia *et.al.* 1977). These prejudices against the unattractive child would determine not only the approval they receive from teachers and peers, but also their eventual behaviour.

The Quest for Improved Dental and Facial Appearance among Different Cultures

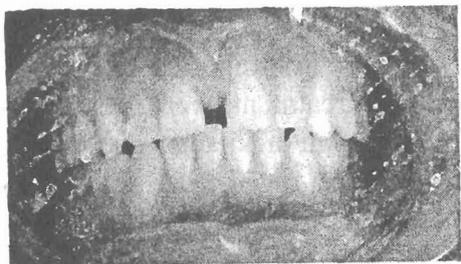
Man, perhaps subconsciously, has been aware of dento-facial function including aesthetics for a long time. Unfortunately, early man had little time to contemplate seriously on natural beauty.

In the modern world, dento-facial decoration and mutilation is universal in its occurrence and is observed among peoples in all regions of the world. (Fig. 9).

Figure 9



Figure 10



Figures 9 and 10 show dento-facial decoration of teeth and median diastema respectively

While some people perform ritual tooth and soft tissues mutilations for reportedly spiritual reasons, others may submit to the ordeal for many pragmatic reasons, including dentofacial aesthetics or in order to “keep up with the fashion”. In many parts of Africa, the median diastema often referred to as *aji* amongst the Yoruba is well admired and is seen as a sign of personal and natural beauty (Fig. 10). Hence the Yoruba expression ‘*ejiwumi*’ meaning median diastema is attractive. Sometimes, orthodontic patients may specifically make a professional request for the creation of this malocclusion trait.

In present day Central and South America, reference is occasionally found to certain geographically isolated peoples filing their teeth to sharp points so as to resemble those of a swordfish or piranha fish. Other references to a variety of peoples filing teeth to sharp points for animistic/totemic reasons are relatively common. For example, it has been reported that a particular tribe in Sumatra sharpen their teeth so as to resemble the mouse. In North Borneo, some people deliberately sharpened their teeth to resemble the shark (Ward and Rosov 1971). However, whether these customs are still performed by these people for these reasons is not substantiated. According to Ring (1985) the Montagnards of Vietnam mutilate their teeth so as not to resemble a dog. Animal-associated totemic reasons for tooth mutilations such as chipping and filing have also been recorded for some groups of African people.

The use of dental inlays and crowns for adornment purposes is a form of non-therapeutic tooth mutilation occasionally encountered among contemporary people within and outside the tropics. In general, these practices are usually carried out for purposes of beautification, to signify wealth, or to signify some event.

The use of gold as a restorative material in many cultures is determined by a number of factors including its physical and chemical properties, its aesthetic compatibility, and the fact that it is a precious metal and therefore has inherent value. The properties of aesthetic compatibility and intrinsic value may themselves lead to the use of gold on teeth for entirely non-therapeutic reasons. For example, among Muslims the presence of gold crown (cap) on a front tooth is used to signify that the wearer has visited Mecca, the spiritual centre of that religion. Ward and Rosov (1971) reported that the use of gold jacket crowns and open-faced crowns is favoured by some people in the Caribbean and by some groups of urban Blacks in the USA as a status symbol. In the Caribbean, the jacket crowns may be inlaid with precious stones or be decorated by cutout carvings of various symbols and shapes.

My Modest Contributions to the Development of Orthodontics

Mr. Vice-Chancellor Sir, when I joined the Department of Preventive Dentistry, Oral Medicine and Periodontology (now Departments of Child Dental Health and Preventive/Community Dentistry) as Medical Training Fellow in 1985, I was privileged to work under a lecturer/Consultant Orthodontist, Dr. O.A.O. Awofala, a mentor and encourager who later left the university system for a very lucrative private practice. After his exit, I was the only full-time academic staff on ground in the department for many years with very little administrative, teaching and research experience. I was the first dentist to embark on the residency-training programme in the Department of Dental and Oral Health (now Faculty of Dentistry) at the National and West African Postgraduate Medical Colleges. This was a trying period, as I had to do most of my postings outside Ile-Ife in addition to other administrative and teaching responsibilities. I have always

had this notion that the highest reward for man's toil is not really what he gets for it but what he becomes by it and this has been the driving force in my academic pursuit. The Orthodontic unit of the Department of Child Dental Health that I laboured for can now boast of three additional clinical Staff; Dr (Mrs) Kolawole, Dr Adesina and Dr. Fadeju.

My introduction to Oral Health research dates back to April 1989 when I was privileged to attend a Training Course in Tropical Epidemiology and Statistics in West Berlin under the aegis of German Foundation for International Development (DSE). This programme was an eye opener for me as it strengthened my capability and upgraded my knowledge of epidemiological principles and relevant statistics in oral health problems.

My research focus in orthodontics has been mainly in the area of orthodontic treatment needs and standards in clinical audits as well as defining standard occlusal norms for our population. With other researchers, I have contributed significantly to knowledge by establishing relationship between dental occlusion and dental injuries. In my research endeavours, I have attempted to advance the frontiers of knowledge and practice of orthodontics in the way malocclusions are assessed and graded.

This information is much needed in oral health planning, diagnosis, and prevention and in providing therapeutic measures.

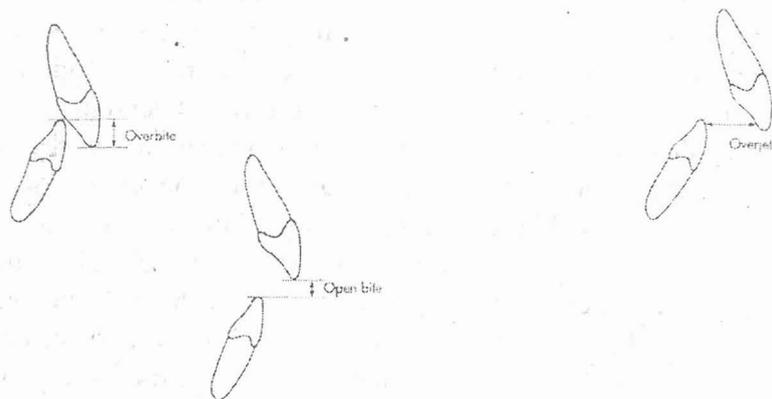
Epidemiology of Malocclusion

It was the general assumption in the past that Nigerians, indeed Africans had perfect oral health and therefore required no special attention. Recent studies (Otuyemi and Adetunji 1991; Otuyemi *et.al.* 2000, Ogunyinka *et.al.* 2000) have shown that oral health problems including malocclusion are of growing concern in Nigeria. However, there is considerable evidence to show that most of the dental diseases are preventable (Sheiham and Jeboda 1981, Sheiham and Plamping 1988). Since malocclusion affects a large segment of the population, it is by definition a public health problem. It is therefore essential to

have accurate epidemiological information on the condition. One important aspect of occlusal development is the early recognition of incipient occlusal disharmonies, which may necessitate orthodontic intervention. I have focused my research interest on occlusal development, spacing and crowding in child and adult dentitions using reliable epidemiological tools. In this regard, the studies carried out with others in this environment are worthy of mention. Otuyemi *et.al* (1997a), reported that bilateral straight terminal planes of molars and class I canine relationships were the most prevalent occlusal features in pre-school children. Children with either contact between the teeth or crowding in the anterior segment of the mandible were reported in 26 per cent. It was also established that by age of 3 years, there should be a minimum of 6 millimetres of space between the lower anterior teeth for there to be no chance of developing incisor crowding in the adult dentition. The significance of this study is that one can easily predict with certainty those children that are likely to develop dental and skeletal malocclusions later in life. Similarly, we reported that approximately one-fifth of the children were estimated to be in need of orthodontic intervention while 7.1% needed further inspection in order to follow up their occlusal development (Otuyemi *et.al* 1997b).

Earlier in 1991, we carried out a study on malocclusion traits amongst 12 year olds in suburban and rural communities of Ile-Ife and Imesi-Ile respectively. One significant finding of the study was the consistent reduction in incisor *overbite* (vertical overlap of upper and lower incisors) and *overjet* (horizontal distance between upper and lower incisors) values as well as high prevalence of *anterior openbite* (failure of upper and lower incisors to meet) in these populations when compared with Caucasians. This pattern was attributed to high prevalence of *bimaxillary proclination* seen in African populations, which is characterized by reduced *interincisal angle* with attendant *alveolar prognathism*.

Figure II: Occlusal relationships of incisor teeth



Traumatic Anterior Dental Injuries

My earliest work in this area involved the identification and establishment of the relationship between dental injuries and malocclusions in our population using epidemiological methods.

Our studies (Otuyemi 1990; Otuyemi and Sofowora 1991; Otuyemi, Segun-Ojo and Adegboye 1996) on traumatic anterior dental injuries clearly showed that its prevalence varied widely from 6.5 to 31 per cent with the highest occurrence in pre-school age. We were able to establish that luxation (slight displacement) was the commonest type of injury in deciduous teeth, whilst enamel/dentine fracture was commonly found in the permanent teeth. We also found that trauma appeared to be the most responsible cause of tooth loss in deciduous and permanent anterior teeth in Nigerians (Otuyemi and Buluro 1989; Otuyemi and Ndukwe 1997, Folayan *et.al* 2005).

Although some individuals are considered to be accident prone, there are certain contributory factors, which make them more susceptible to traumatic anterior dental injuries. In a large study involving 1016 12-year-old Nigerian children to determine the relationship between anterior dental injuries, incisor prominence (overjet) and lip competence, I provided strong evidence that increased incisor overjet of more than 3mm

and incompetent lips were significant predisposing factors to anterior dental injuries (Otuyemi, 1994).

Such individuals with incisor prominence should either protect their teeth with mouth-guards during contact sport or undergo orthodontic treatment. These methods have been found to be very effective. Where neither is available, dental personnel should be able to counsel parents of children with incisor prominence of the risk of dental injuries and, in the event that they occur, of the measures to be taken.

Methods of Assessing and Grading Malocclusion

With increasing accountability of health care services, a reproducible and valid malocclusion index holds the key to uniformity in treatment prescription, safeguards for patients, counseling, monitoring and promotion of standards (Shaw *et.al* 1991). Although many indices have been developed for characterization of dento-facial anomalies, none has been universally accepted. This is partly due to considerable variability in socio-culturally determined perceptions and reactions to dento-facial appearance (Baldwin 1980).

I have studied extensively different malocclusion (occlusal) indices based on diagnostic, epidemiological, treatment need, treatment success and treatment complexity (Otuyemi and Jones 1995). The historic and current usage, together with an appraisal of some of their advantages and weaknesses had been presented. The multifactorial and multivariate nature of malocclusion makes any single classification not only difficult but also of limited value in dento-facial assessment.

One of my major contributions is the determination of applicability of such indices in recording malocclusions in terms of recording time, reliability and validity. We undertook an interesting study to assess the reliability of and the correlation between two aesthetic indices, the Dental Aesthetic Index (DAI) and the Standardized Continuum of Aesthetic Need (SCAN) (Otuyemi and Noar 1996b). We found the DAI to be more reliable, although the simplicity of the SCAN put it at an advantage

over the DAI in terms of clerical time. In a related study, Otuyemi and Noar (1996c) found that the Dental aesthetic Index (DAI), Handicapping Malocclusion Assessment Rating (HMAR) and Occlusal Index (OI) showed high degree of reliability and none could be selected over the other with regards to intra-examiner differences. The DAI, however, was more time-saving and simple to use. The highest correlation was between HMAR and OI, which is a reflection of the similarity in their design.

Orthodontic Treatment Needs and Treatment Standards

In 1977, the WHO recommended that there was a need for consistent standardized quantitative diagnosis for dental conditions in oral health surveys. Until recently, malocclusions have focused on descriptive characteristics, with very little done to determine the proportion of the population that would benefit from orthodontic treatment (Baume 1970; Jago 1974).

Through our research works on occlusal indices, we were able to establish the proportion of our population that would likely benefit from orthodontic treatment on the basis of significance of various occlusal traits in terms of dental health and aesthetic impairment (Otuyemi *et.al* 1997; Otuyemi *et.al* 1999).

Long-term Evaluation of Occlusal Changes Following Orthodontic Treatment

Evaluation of treatment results and long-term post-retention assessment of orthodontically treated malocclusions has been of interest for several decades. Follow-up of such treated cases has shown that although improvement in the dentition can obviously be achieved, there is a tendency to return towards the original malocclusion, many years post-retention (Little *et.al* 1981; 1988), (Fig. 12, 13 and 14)

Figure 12: Pre-treatment and long term occlusal changes following orthodontic treatment

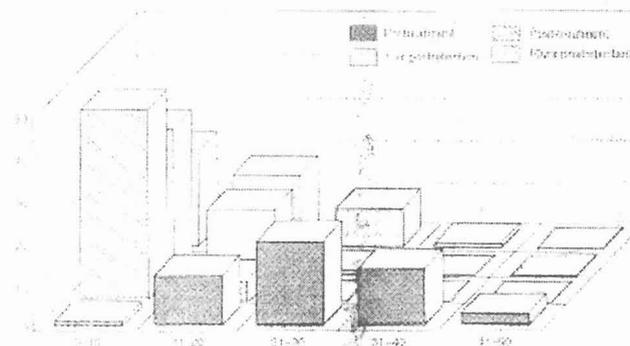
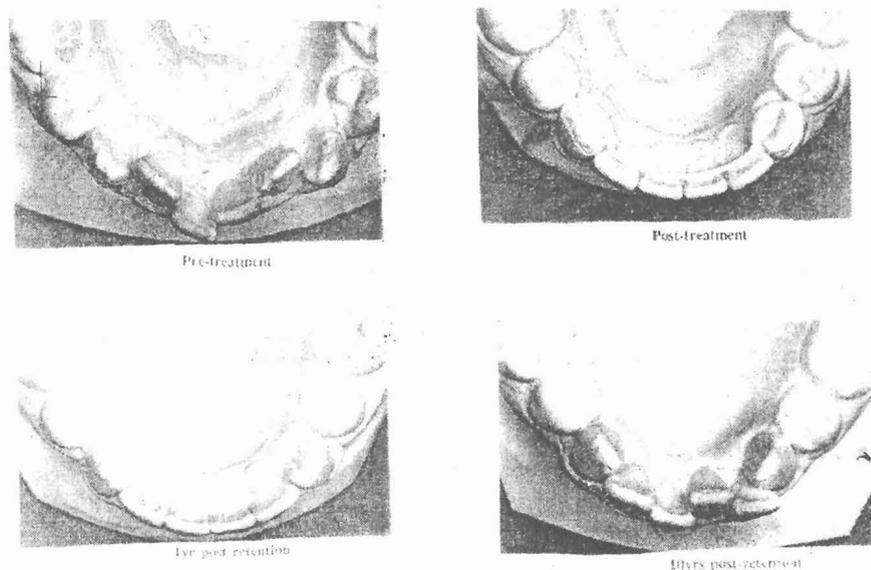


Figure 13: Histogram showing pre-treatment, post-treatment and post-retention PAR scores

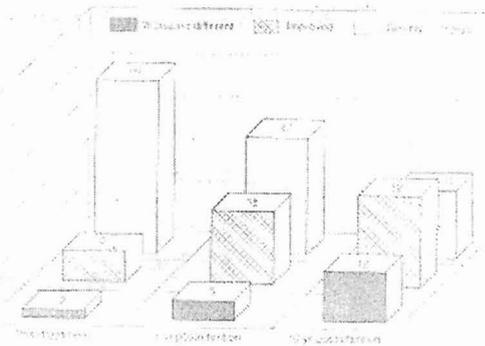


Figure 14: Categorization of improvement or deterioration post-treatment, 1 and 10 years post-retention

Table 2. Mean PAR score (weighted) post retention changes

PAR score	Mean	S.D.	Min	Max
Pretreatment (T1)	26.6	8.5	8	42
1 year post-retention (T3)	7.4	6.1	0	37
PAR score change (T1- T3)	19.2	9.1	-4*	100
Percentage PAR score change	69.9**	29.3	-50*	100
10 years post-retention (T4)	12.2	8.3	0	39
PAR score change (T1- T4)	14.3	11.2	-7*	37
Percentage PAR score change	48.6**	41.0	-87.5*	100

*Indicate a higher post-retention score over treatment value.

**Wilcoxon signed rank test $Z = 5.22$, $P < 0.001$.

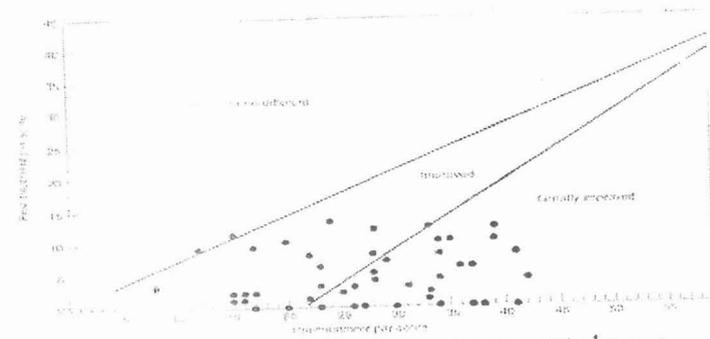


Figure 15: Nomogram showing post-treatment changes

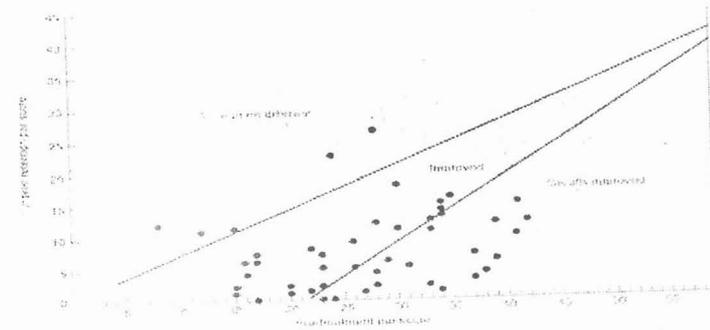


Figure 16: Nomogram showing 1 year post-treatment changes

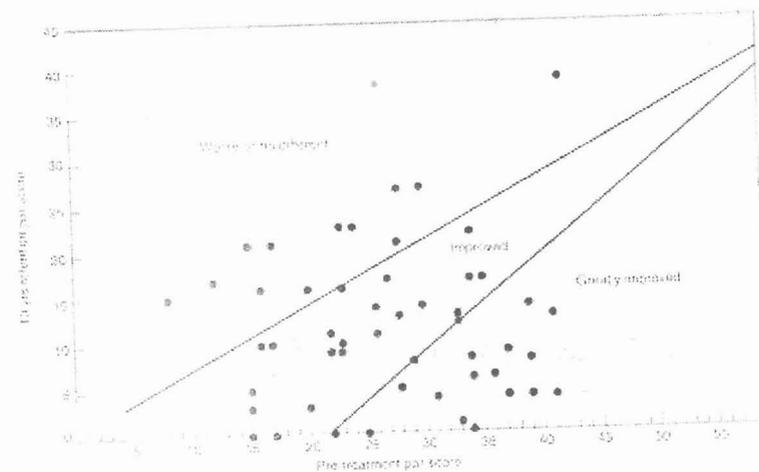


Figure 17: Nomogram showing 10 years post-retention changes

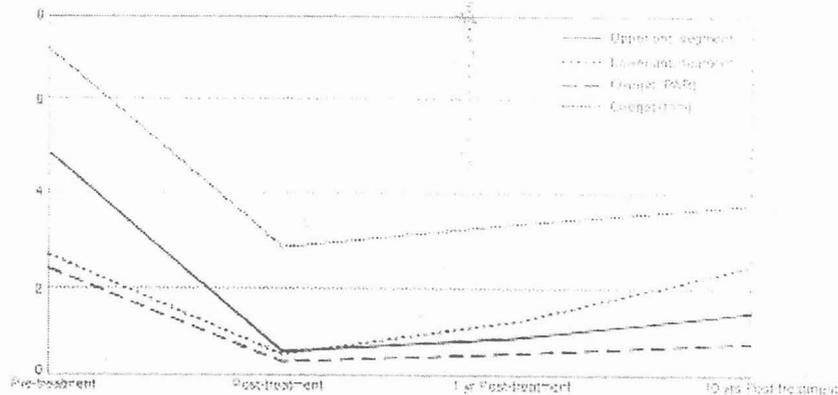


Figure 18: PAR score changes in anterior segments and overjet during the observation period

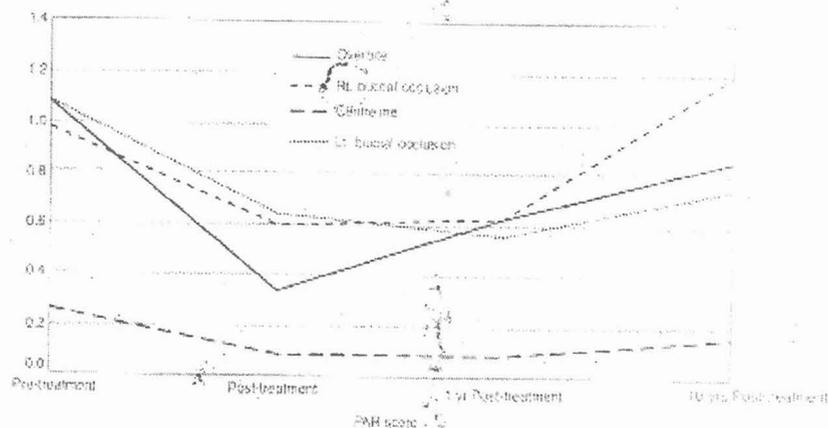


Figure 19: PAR score changes in right and left buccal occlusions, center line, and overbite during the observation period

As part of my research endeavour, I investigated the relationship of lower lip to the upper incisors with reference to orthodontic relapse in an attempt to determine the position of stability after retraction of upper incisors. The result of that study showed that lower lip might not provide adequate lip coverage for the upper incisors when the overjet is greater than 7mm (Otuyemi, 1993). The report also showed insignificant change in the relationship between variations of overjet at different upper lip positions (Otuyemi, 1996).

It is probably unrealistic to expect that all malocclusions can be corrected to an 'ideal'. However, it is important to establish whether a worthwhile improvement has been achieved for an individual case and the proportion of cases overall, that show improvement (Otuyemi, 1995). One remarkable contribution of our work in this area was the long-term evaluation of occlusal changes following orthodontic treatment. We prospectively followed up a group of 326 patients who fulfilled our stated criteria for a minimum of 10 years after treatment using Peer Assessment Rating (PAR) index. A high standard of treatment result was demonstrated with a mean reduction in PAR score of 82.5%. However, maintenance of post-treatment results 1 and 10 years post-retention was only achieved in 60 and 38 per cent of cases, respectively (Otuyemi and Jones 1995) (Table 2). The main contributory factor involved in this deterioration appeared to be lower labial segment alignment. (Fig. 18 & 19)

Other findings of this study showed that mandibular arch width typically reduces post-treatment whether the cases were expanded during treatment or not (Otuyemi and Jones 1998). The gradual constriction of arch width was a normal physiological process routinely occurring following orthodontic treatment, and also in untreated cases. This constriction is said to continue well after cessation of active growth and can be quite active during the third decade of life (Little 1990). However, the process seems to slow down after 30 years of age. One can therefore suggest that the normal process of constriction in the canine region was temporarily interrupted by

orthodontic treatment, which resulted in arch expansion. The molar region in contrast showed continuous decrease in inter-molar width throughout the 10-year period. It is therefore imperative that orthodontists be aware of occlusal changes many years after treatment. This should also be taken into account when counseling patients on the potential benefit of orthodontic treatment.

Perceptions and Attitudes Toward Dento-Facial Appearance and Orthodontic Care

Perception of dento-facial appearance is rather a complex phenomenon and lies solely in the "eye" of the beholder. Technically, perception is a single, unified awareness derived from sensory processes while a stimulus is present. Layman's opinion of the human profile is often as good as the orthodontist's and perhaps even better since it is not conditioned by orthodontic propaganda. According to our report in 1997 (Otuyemi *et.al.* 1997f), persons with orthodontic training are less critical when rating aesthetic aspects of the teeth and face when compared with those without training. Otuyemi and Noar (1996), found that because of professional training, orthodontists may respond so strongly to the physical, or functional characteristics of malocclusion that influences their response to dental aesthetics. Lay judges on the other hand seem to be more sensitive than orthodontists to dental aesthetic impairment. This difference was attributed to selective conditioning. Orthodontists may learn to be less critical in the overall perception of attractiveness because of the frequency with which they see patients with even more extreme facial handicaps but be more critical in their assessment of treatment need because of their increased knowledge of occlusion and experience with treatment and its potential.

Early in the year 2005, I examined the portrayal of malocclusion in advertising billboards that is directed at the Nigerian public using a representative selection of 100 advertising models on billboards from three major Nigerian cities. The study clearly showed that the portrayal of dental appearance of models on billboards was not representative of the general population (Otuyemi, 2005).

Since most orthodontic patients are either children or adolescents, their parents/guardians are likely to play an important role in initiating orthodontic treatment and supporting compliance (Haynes, 1991). The desire for orthodontic treatment by children is greatly influenced by parental attitudes

Table 3. Facial features which are considered most important in determining facial beauty*

Facial feature	No. of children	(%)
Teeth (smile)	115	(54.8)
Face shape	69	(32.9)
Complexion	12	(5.7)
Jaws (maxilla and mandible)	7	(3.3)
Nose	5	(2.4)
Hair	2	(1.0)

* sex ($\chi^2=7.21$, $df=5$, $P=0.201$)

* social class ($\chi^2=5.94$, $df=10$, $P=0.82$)

Table 4. Most important motivating factor for adolescent seeking orthodontic treatment*

Reason for seeking treatment	No.	(%)
Enhance dental appearance	85	40.5
Enhance facial appearance	45	21.4
Improve dental health	38	18.1
Improve self-confidence	19	9.0
Improve speech	16	7.6
Improve mastication	7	3.3

* sex ($\chi^2=4.76$, $df=5$, $P=0.446$)

* social class ($\chi^2=11.02$, $df=10$, $P=0.63$)

and values (Espeland *et.al.* 1992). In the year 2000, I carried out a study with other researchers among Nigerian children and their parents to determine their attitudes and to investigate some of the factors influencing their desire for initiating orthodontic treatment (Otuyemi, Dacosta and Fatusi 2000). One important finding that emerged from this study was that the teeth were considered the most important facial feature in determining their facial beauty. About two-thirds of the children considered an improvement in dento-facial appearance the most important reason for seeking treatment. This was in agreement with the earlier work of Birkeland *et.al.* (1996), who found that seventy-five per cent of patients that seek orthodontic treatment do so for aesthetic reasons, and girls were more likely to recognize their dental irregularities and place more importance on treatment than boys. Our study also recognized that dentists and parents especially mothers, were the most important motivators in the quest for treatment among Nigerians.

Similarly, Kolawole (2005), in her Fellowship dissertation under my supervision came up with some interesting findings that showed there were no gender differences in perception of dento-facial appearance and desire for orthodontic treatment amongst two groups of Nigerian adolescents and their parents. There were however statistically significant differences between the adolescents and their parents on desire for orthodontic treatment in the two different population studied. Orthodontic concern was greater in the school population compared with their parents. In the hospital population however, more parents than their wards were motivated for treatment.

International, transcultural and racial aesthetic agreement has been reported by several investigators (Peck and Peck 1970; Otuyemi and Jones 1995), using an instrument developed by Jenny *et.al* (1980) for rating the public's perceptions of the social acceptability of a wide variety of occlusal configurations on children and adults in several developed countries. Their data indicated that the norms for social acceptability of dental appearance were essentially the same in those countries. In 1998, we used a similar instrument to compare the perceptions of dento-facial aesthetics in the USA and Nigeria Otuyemi *et.al* 1998). Our results showed that the perceptions of dental aesthetics of Nigerians were very similar to those of the US groups, strongly supporting the conclusion that the basic elements in perception of the aesthetics of dental appearance are essentially the same (Table 5). These findings tend to support those of McCullers and Staat (1974), who suggested that different racial and cultural groups share a common concept of beauty.

Table 5: Spearman rank-order correlations* between ranking of mean scores of 25 occlusal conditions by US parents, US students, US orthodontists and Nigerian students.

	Nigerian students
US Parents	0.81
US students	0.84
Us orthodontists	0.75

* $P<0.0001$ for all of the above correlations.

Future of Orthodontics in Nigeria and the Challenges Ahead

Mr. Vice-Chancellor, Sir, I want to say with all sense of humility that I have had the privilege of undergoing a Postgraduate Fellowship Training in Nigeria as well as a specialist Orthodontic training abroad. Also by virtue of my training as a Public Health Carer, I can say that I have a clear understanding of the oral health problems in this community. My view should more or less provide a balanced appraisal/assessment of the oral health needs as well as the educational training in the Nigeria.

We are living in times of extraordinary change. New knowledge, new discoveries and inventions are transforming the way we now live and the way our children will live tomorrow. New means of communication are enabling the people of the world to see and hear and read about these changes as they happen. The result is a world drawn closer than ever, a global village united by common dreams and aspirations for good and healthy life. It is our privilege and responsibility too as health science professionals to promote the good and healthy life by exchanging information and ideas based on the experience gathered over the years. Unfortunately, this dream is not easily realizable as we are poorly equipped and poorly funded.

Nigeria is a vast, diverse and rich country, at least, in terms of the quantum of its natural wealth. However, the mechanism for the distribution of wealth is so weak and faulty that majority of our citizens live in abject poverty within a system rife with corruption and mismanagement. According to Nigeria's 2005 Draft report on Millennium Development Goals, about 68.7million Nigerians, out of an estimated total of 126.3 million were poor in 2004. The report noted that Nigeria had steadily recorded an increase in poverty level since 1980. Our revenue had shot up drastically over the same period. This is an irony of fate. To these citizens, Nigeria runs an inefficient health care system. Unfortunately, not many have access to such care because of the overbearing cost of treatment. Again owing to

ignorance, many Nigerians do not know or appreciate the need to seek dental advice. One study (Otuyemi, Abidoye and Dada 1994), clearly showed that over 83 per cent of Nigerian children had never visited the dentist despite the fact that most of them believed it was necessary to visit the dentist for check-up.

Government and its agencies still behold the issue of Oral Health Care with contempt as low priority is given to it. There is a general misconception of Dentistry that it is all about "pulling of teeth" and therefore required no specialized equipment. At present, orthodontics has become a highly sophisticated health care service, that can provide excellent treatment of malocclusion and facial deformity, based on the premise that this treatment is given by well educated, skilled and experienced specialists. Therefore, adequately qualified manpower is the key to providing the best possible service to the population. For the country to make a definite impact in this area of oral health like other developed countries, the Federal, State and local governments' budgetary allocation needs to be improved substantially.

What does the future hold for research development in Craniofacial Biology, which is central to orthodontics? Research into the Biology of Craniofacial deformities has been neglected and is virtually non-existence. I feel obliged to make a strong recommendation for the creation of a multidisciplinary **Centre for Craniofacial Research and Development** in our institution. This centre will provide a mountain of information (data and records) that would not only aid the orthodontic community, but also medicine, genetics, human anatomy and anthropology. It will also provide integrated research into the management of congenital and non-congenital craniofacial deformities.

The dental undergraduate and postgraduate training also need to be restructured and strengthened in order to face the enormous challenges ahead. I must also quickly add that government alone cannot fund university education. The cost of training a dental surgeon is so

prohibitive that individuals must contribute adequately in order to have a meaningful education.

Conclusion

In the last sixty minutes, I have been able to share my thoughts and experience on this important part of human body in three dimensions *vis-à-vis* the way the lay-people, specialists in orthodontics and government behold the teeth and the face. We may have different perception, but the overall goals should definitely be the same. Our goals should be an improvement in the oral health care delivery, imparting and extending the proverbial frontier of knowledge.

All hope is not lost as our Faculty is still a beauty to behold as we pride ourselves for many years as one of the best Dental Schools in Nigeria if not the best in terms of facilities and personnel. Only recently, our Dental Faculty was one of the two in this university designated as **Centres of Excellence**. Also in the 2004 University Ranking by the National Universities Commission, we were ranked 3rd in the assessment category. But a lot still needs to be done in order to maintain our enviable position.

Mr. Vice-Chancellor Sir, permit me to end this lecture by making reference to the earlier story "*Beauty and the Beast*". As providence would have it, Beauty had a terrified dream far away from the castle where the Beast was lying dying. She quickly rushed to her horse and rode like the wind to the castle and eventually fell in love with him. Immediately, there was a blaze of light, the Beast disappeared and in his place was a handsome prince. "I was bewitched", explained the prince, "by a spell that could only be broken when someone loved me in spite of my ugliness!"

We cannot afford to throw up our arms in resignation, we must continue to trust and have faith just like the Beast, because one day our ugliness will disappear.

Mr. Vice-Chancellor Sir, distinguished audience. I thank you for your attention. May the beauty of the Lord God be upon you all.

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