An Inaugural Lecture Delivered at the University of Lagos Main Auditorium on Wednesday, 12th March, 2008

By

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PAEDIATRIC DENTISTRY: GIVING LASTING SMILE FROM BIRTH THROUGH CHILDHOOD TO ADOLESCENCE

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Introduction

Children are a distinct group of the population. They differ from the general population in many ways aside from their size. From the dental perspective, while adults are known to have only the permanent dentition, children go through the primary, mixed, and early permanent stages. The journey and experiences while going through these stages have great implications in the adult life. The seemingly tiny teeth of children are the instruments that pave way for nurturing the entire body physically and emotionally to ensure optimum physical growth and development of the personality.

The Department of Child Dental Health of the University of Lagos was established in 1980. It comprises two specialty units, namely Paediatric Dentistry and Orthodontics. Here at the University of Lagos several professors have been appointed in various specialties of dentistry including child dental health. Some of them have delivered inaugural lectures, but none was a Paediatric dentist. Paediatric dentists are very few in proportion to the child population in Nigeria, only about 30 in number. This situation has placed today’s lecturer in a privileged position, being the first inaugural lecture to be delivered in the specialty of Paediatric Dentistry. Therefore, while giving this lecture I aim to:

- create or enhance the oral health awareness of all present in a clear manner, and
- share with the audience the Lecturer’s research and clinical experience and contribution to the field of dentistry and the specialty of Paediatric Dentistry in particular.

Paediatric dentistry is the clinical discipline that provides oral health care for all children and adolescents. The proportion of this group is at least 45% of the Nigerian population. All children (except those with certain disorders) have full complements of the primary teeth. Under normal conditions the primary teeth (20 in number) erupt over a range of time, from the
age of six to thirty months. Unusual cases present as early eruption such as natal and neonatal teeth, delayed eruption, or outright failure to erupt (Sote and Egri-Okwaji, 1998). When the primary teeth fail to erupt and exfoliate within the normal range of time, guidance and monitoring by the Paediatric dentist is required to avert the undesirable consequences.

In the oral cavity, teeth may be subjected to hazards and attacks either during development in the jaw bones or after eruption. Inability of the host to have the upper hand results in various forms of oral diseases. Oral diseases are suffered to a greater or lesser degree by virtually all children (Petersen, 2000). While oral diseases may not be fatal always, it is famous for causing pain, anguish, sleepless nights, subnormal health, precious work- and school-time lost. The effects of painful teeth on a child's eating, sleeping, disposition and healthy development are well known (Low et al., 1999; Amin et al., 2006). For these reasons maintenance of sound oral health should be given the required attention, more so in children considering their dependence on adults be it parent or guardian. A visit to the hospital by a child entails at least two people, for the child must be accompanied!

Over the years of my practice of Paediatric Dentistry I have often been asked whether indeed children do have teeth! They often wondered why children's teeth should be cared for. This uncertainty arises perhaps because teeth in young children are temporary since they eventually exfoliate. The perception of a short life span of teeth in the child is common in the general populace and this perception tends to override their significance in the oral cavity. However, despite the temporary status of primary teeth they serve several functions which may have a lifelong effect on the child.

Functions of teeth in the child include:

- Mastication—ability to chew food with pleasure ensures nurturing of the child through his growth period through adolescent to adulthood.
- Aesthetics—a good appearance instills confidence in the child.
- Maintenance and promotion of alveolar bone growth
- Guidance of permanent teeth by the primary predecessors into correct positions in the dental arch
- Communication — such as in speaking and smiling
- As a weapon of defense or attack during fights. Some adults practice this as well. However, this function is by no means recommended for either the child or adult. This is clearly stated in the New Testament of the Holy Bible, "You have heard that it was said, an eye for an eye and a tooth for a tooth. But I say to you, do not resist an evildoer. But if anyone strikes you on the right cheek, turn the other also" (Matthew 5: 38-39). Thus the tooth is substituted by the fleshy cheeks which are more accommodating and tend to serve protective function.

For these functions to be performed effectively by the teeth the oral cavity has to be in a healthy state. Ensuring a healthy oral environment in the child population is the preoccupation of the Paediatric dentist. Now, let me sound a note of warning about some parafunctions such as habitual clenching, gnashing, or grinding of teeth. These habits are expressions of unpleasantness, anger, anguish, and aggression. They tend to have undesirable effects in humans. They are unkind to the teeth as well. These habits are better avoided. And, please note that it is an abuse to substitute the teeth for a bottle or can opener; for this act is a common cause of tooth fracture.

During the mixed dentition stage the succeedaneous permanent teeth gradually replace the exfoliating primary teeth. The jaw bones grow simultaneously to accommodate the growth changes in the dentition. Failure of jaws to grow commensurate with the teeth frequently results in malocclusion such as a crowded or excessively spaced dental arch (Onyeaso and Sote, 2002).
Common Oral Health Problems in Children

An individual below 16 years of age is a child in Paediatric Dentistry. A host of oral health problems is commonly found in this age group. Only the highlights are intended in this presentation.

1. **Dental caries:** This is the commonest of oral diseases and it may affect individuals at any stage of their lives. In our recent study of children aged six months to five years in Lagos State, the prevalence of caries was 10.5% (Sowole and Sote, 2006). Children in this age group are in the primary dentition stage. It is well established that caries status in the young permanent dentition is related to the corresponding status in the primary dentition (Powel, 1998; Skeie et al, 2006). These findings underscore the need to keep the primary teeth in a healthy state just as the permanent teeth. Dental caries can be primarily prevented by diet and plaque control through good oral hygiene practices, use of fluoride, and by regular visit to the dental practitioner. Caries can be treated conservatively and controlled when diagnosed early. Most frequently, untreated caries progress from the dentino-enamel junction into the pulp resulting in dento-alveolar abscess. Extensive dental decay in children is a troubling health problem whereby the whole dentition may be entirely ravaged in the child as seen in severe early childhood caries (nursing caries) (Sote, 1998; Sowole and Sote, 2007). A retrospective, clinical study in our clinics at the Lagos University Teaching Hospital covering the period 1992-1994 found a prevalence of nursing caries to be 6.7% while an upward trend in the incidence was observed between 1995 and 1998 (Sote, 1996; 1998). In 2007, we reported a prevalence of 10.5% among children in Lagos State (out of which 4.8% was severe childhood caries) (Sowole and Sote, 2007).

2. **Gingivitis:** Another common condition featuring in children is chronic marginal gingivitis (bleeding gum). Globally, most children have signs of gingivitis (Petersen, 2004). The gums are inflamed and bleed readily with or without irritation as a result of poor oral hygiene. Gingivitis can be prevented by maintaining a good oral hygiene.

3. **Trauma:** Trauma to the oral cavity is a common event. Accidents do happen in children as toddlers, unsteady on their legs. Just starting to walk and run they frequently fall over toys, bump into chairs, tables, and walls. Accidents also do happen when the child is older, such as falls during play, fights, bicycle accidents, swimming pool accidents, and rough football play. Teeth and the supporting structures frequently sustain injury during such accidents. Some children and adolescents also experience various forms of abuses leading to trauma to the head and neck and the oral cavity. The frequency of dental trauma in five year-old children is approximately 33%, while in 12 year-olds it is 20-30% (Andreasen and Andreasen, 2002; Adekoya-Sofowora and Sote et al 2000; Petersen, 2004). As a result of trauma, the tooth may fracture, become mobile, knocked in (intruded) or pushed out (extruded) or completely knocked out of the socket (avulsed). The alveolar bone may fracture and be displaced as well. In Nigeria, prevalence of trauma to anterior teeth in children is between 6.5% and 19.5% (Adekoya-Sofowora and Sote et al, 2000) depending on how urban the locality is. In our study at Ile-Ife, the prevalence was 10.4% (Adekoya-Sofowora and Sote et al, 2000). Intrusion is the commonest injury in the primary dentition while crown fracture in varying complexities is more frequent in the permanent dentition. Prompt management of these conditions is important whether they occur in the primary or permanent dentition in order to prevent pain, infection, complications, permanent impairment and loss of function. And, of course to prevent the child losing that precious smile among his peers. Permit me at this point to emphasize the importance of preventing dental trauma in children; because the demand for an invasive procedure called root canal treatment in
children and adolescents generally follow the pattern for traumatized anterior teeth (Sote, 1999).

4. **Discoloured teeth**: Children’s teeth do manifest in colours or shades other than white as a result of staining agents which could be introduced into the tooth structure during tooth development or after tooth eruption. Tooth discoloration may be genetic in origin or environmentally acquired. It is classified as extrinsic and intrinsic depending on the source of the staining agent and the location of the stains. Teeth other than white in colour can result in persistent frowning and loss of confidence in the child. Moreover discoloured teeth may be a result of defects in the tooth structure. Such defects tend to cause early tooth wear resulting in tooth sensitivity in the individual. Examples of genetic causes of discoloured teeth are amelogenesis imperfecta, and dentinogenesis imperfecta while tetracycline stains and dental fluorosis (mottled enamel) are environmentally acquired from tetracycline and excessive fluoride ingestion respectively (McDonald and Avery, 1994; Sote, 1998). Trauma is another cause of discoloured teeth. These stains are examples of the intrinsic type. The extrinsic tooth discoloration results from food stains such as tea, coffee, kola, tobacco and poor oral hygiene. The extrinsic type can be removed by professional oral prophylaxis (scale and polish), while the intrinsic type requires extensive aesthetic restoration and bleaching.

5. **Disorders of Developing Dentition and Craniofacial anomalies**: Developing teeth in the jaw bones may suffer various assaults which may result in abnormal shapes (such as talon cusps, fused or double teeth, dilaceration), structure, (e.g. enamel hypoplasia), size (macrodontia, microdontia) and numbers of teeth (hypodontia, or hyperdontia, simply known as supernumerary teeth) (Sote, 2000). There may also be irregularities during tooth eruption and tooth exchange as teeth move from the jawbones through the alveolar bones into occlusion. Early diagnosis, intervention, guidance and monitoring of teeth into functional occlusion require consulting the Paediatric dentist so as to alleviate impending severe malocclusion (Onyeaso, Sote and Arowojolu, 2002). In cases of craniofacial anomalies such as cleft lip or/cleft palate, a multidisciplinary approach which includes the Paediatric dentist, oral and maxillofacial surgeon, orthodontist, prosthodontist, speech therapist etc is employed in the comprehensive management (Sote, 1991; 2000).

6. **Infections of oral soft tissues**: Acute bacterial, viral, and mycotic(fungal) gingival infections do affect children. Commonest of these infections are acute necrotizing ulcerative gingivitis, (ANUG), acute herpetic gingivostomatitis (AHGS), and candidiasis respectively. These infections may affect the lip, gingiva, palate, tongue and buccal mucosa and can be very devastating in the child. This is particularly so in HIV/AIDS child dental patients. If not managed effectively ANUG may progress to cancrum oris (noma) particularly among those of low socio-economic status.

7. **Tooth wear**: Tooth wear is increasingly becoming a problem in patients of all ages. Of particular concern is tooth wear due to erosion. Dental erosion is the irreversible loss of dental hard tissue due to a chemical process involving acids and not bacteria (Imfeld, 1996). The acids involved in the erosive process derive from extrinsic and intrinsic sources. Excessive consumption of acidic foods and drinks is the main culprit in the child. All acids, whether from within the body or from external sources, are capable of demineralizing tooth tissue and therefore of causing erosion. Examples of extrinsic sources include carbonated soft drinks popularly called “minerals”, some fresh fruit juices, alcohol, some medications (such as aspirin and vitamin preparations in chewable tablets and lozenges) and some proprietary mouthwashes (WHO, 2003; Auad and Moynihan, 2007). It is not just the total consumption of acidic dietary sources that is important but also the periodicity and relationship to toothbrushing practices.
Intrinsic acid sources are essentially of gastric origin and enter the mouth from gastric reflux, vomiting and ruminating. Medical or habitual conditions that cause vomiting and regurgitation of gastric contents from the stomach would cause dental erosion. The WHO in 2003 declared that prevalence of dental erosion has increased especially among children and adolescents.

Abrasion due to faulty use of the tooth brush and the chewing stick is another common cause of tooth wear. Tooth wear is a leading cause of tooth sensitivity, leading to pain, and discomfort.

8. Teething: This is probably the most frequently expressed problem by young mothers. Most other people describe any difficulty experienced during take-off of an event as teething problems. In Paediatric Dentistry teething is not a problem but a physiological process that results in eruption of teeth. Teething is not the cause of diarrhoea, respiratory infections, malaria and other sicknesses frequently experienced by young children while teething (Mcdonald and Avery, 1994). Most of these conditions result from a coincidence with unsanitary environment that the child is exposed to and the immature immune status of the child.

COMMON ORAL HEALTH PROBLEMS

- Dento-alveolar Abscess
- Severe Early Childhood Caries
- Oral Infection – Candidiasis
- Trauma-Tooth Fracture
- Tooth Discolouration
- Trauma-Intrusion

RESEARCH HIGHLIGHTS OF THE AUTHOR

The commonest oral diseases (dental caries and periodontal diseases) are preventable. Most other oral health problems can either be treated and/or alleviated in order to enhance good quality of life in the individual. My main research objective since the
beginning of my academic and professional career is to develop methods and strategies that would promote these principles, that is to enhance good quality of life in all children. My research activities started in 1980 as a postdoctoral graduate student in Oral Biology at the University of California, Los Angeles (UCLA), in the USA. This background in basic dental science proved to be an asset throughout my academic career. My postgraduate specialty training in Paediatric Dentistry which started in 1986 was challenged following the brain-drain of most Paediatric dentists (a Professor included) in the University of Lagos Dental School to greener pasture by 1990. Leaving only today's inaugural lecturer in the department it became necessary for me to devise a strategy that would sustain clinical services, enhance research and ensure quality training of our students. Every aspect of Paediatric Dentistry then became my area of interest. My background in Oral Biology enabled me to diversify my areas of research in Paediatric Dentistry thus providing templates and reference data for future researchers in the specialty. My research activities covered in today's lecture are categorized as follows:

1. Preventive oral health care in children
2. Attitude and behaviour of children in dental practice
3. Special Care Dentistry.

In my quest for affordable oral hygiene implements and in order to achieve my research objectives I have investigated available local materials for maintenance of good oral hygiene and consequently for prevention of oral diseases. I have also instituted research and oral health services for persons with special needs (disabilities/handicapping conditions). These services are still being provided in the Department of Child Dental Health.

A. Preventive Oral Health Care in Children

(i) Traditional oral hygiene methods (in-vitro studies):
My debut research into the traditional oral hygiene implement, the common, cheap, readily available chewing sticks constituted my MS thesis in Oral Biology at the University of California Los Angeles (UCLA) in 1980. The scientific understanding of the mechanism of actions of plants used for traditional oral hygiene in Nigeria was investigated in-vitro and fully documented in my MS thesis in 1982 (Sote, 1982). The plants investigated include Massularia acuminata (Pako Jebu), Fagara zanthoxyloides (Orin Ata), Garcinia kola (Orogbo), Sorindeia waerneckei (Meyinro), Prosopsis africana (Orin Ayan), Terminalia glaucescens (Orin Ida), Anoigessus schimperi (Ain), and Pseudocedrela kotschyi (Emigbegi). Aqueous extracts of these plants commonly used as chewing sticks were tested on the growth and adherence of Streptococcus mutans, (the principal bacteria implicated in cariogenesis). Extracts of most of the plants significantly reduced adherence of Streptococcus mutans to glass or saliva-coated hydroxyapatite beads at 1% concentration (see Tables 1, 2, & 3) (Sote, 1982; Wolinsky and Sote, 1983; 1984). Extracts of S. warneckei (Meyinro) inhibited the growth and adherence of S. mutans most comparably to that of 10^-4 M chlorhexidene while extracts of F. xanthoxyloides (Orin Ata) had no significant effect.

In order to identify the active constituents of this plant extract, we carried out chemical and spectral analysis. The active constituent from the plant S. warneckei was found to have the characteristics of a high molecular weight polyphenolic tannin. Findings of these studies constituted a breakthrough then and were published in Caries Research (Wolinsky and Sote, 1983; 1984).
Table 1: Effect of 1% aqueous plant extracts on sucrose-mediated growth and adherence of S. mutans 6715-wt13 to glass (mean ± SEM) Sote, 1982; Wolinsky & Sote, 1983

<table>
<thead>
<tr>
<th>Test Agent</th>
<th>pH of Culture</th>
<th>Adherent Radioactive Bacteria (tubes + rods) % of control</th>
<th>Total Radioactive Bacteria for Culture % of Control</th>
<th>Mean pH of Culture</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>4.49±0.03</td>
<td>102±1.1</td>
<td>100±2.1</td>
<td>4.49±0.03</td>
</tr>
<tr>
<td>F. xanthoxyloides</td>
<td>4.36±0.04</td>
<td>83.5±2.1</td>
<td>94.5±2.1</td>
<td>4.36±0.04</td>
</tr>
<tr>
<td>P. africana</td>
<td>4.36±0.05</td>
<td>24.0±0.0</td>
<td>86.0±6.5</td>
<td>4.36±0.05</td>
</tr>
<tr>
<td>T. glaucescens</td>
<td>4.65±0.13</td>
<td>36.5±9.2</td>
<td>53.0±12.7</td>
<td>4.65±0.13</td>
</tr>
<tr>
<td>G. kola</td>
<td>4.66±0.02</td>
<td>22.5±3.1</td>
<td>63.0±5.7</td>
<td>4.66±0.02</td>
</tr>
<tr>
<td>A. schimperi</td>
<td>6.21±0.97</td>
<td>11.3±7.5</td>
<td>21.9±2.4</td>
<td>6.21±0.97</td>
</tr>
<tr>
<td>M. accuminata</td>
<td>5.18±0.08</td>
<td>49.4±3.5</td>
<td>88.5±2.1</td>
<td>5.18±0.08</td>
</tr>
<tr>
<td>S. warnecki</td>
<td>5.29±0.07</td>
<td>1.0±0.3</td>
<td>1.3±3.9</td>
<td>5.29±0.07</td>
</tr>
<tr>
<td>P. kotschyi</td>
<td>4.37±0.01</td>
<td>12.8±3.5</td>
<td>49.9±13.1</td>
<td>4.37±0.01</td>
</tr>
<tr>
<td>Chlorhexidine</td>
<td>7.42±0.07</td>
<td>0.8±0.11</td>
<td>0.97±0.06</td>
<td>7.42±0.07</td>
</tr>
</tbody>
</table>

Growth was determined from the percent of the total radioactive bacteria recovered and/or the mean pH of the actual media determined after a 24-hour growth. Chlorhexidine concentration was 1.0x10^{-4} M.

Table 2. Effect of 1% aqueous chewing stick extracts upon the absorption of S. mutans 6715-wt13 to saliva-treated hydroxyapatite (means ± SEM) Sote, 1982; Wolinsky & Sote, 1984.

<table>
<thead>
<tr>
<th>Test agent added</th>
<th>Number of S. mutans adsorbed (x10^5)/20 mg</th>
<th>% adsorption relative to buffer control</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>2.43 ± 0.12</td>
<td>100</td>
</tr>
<tr>
<td>1% tannic acid</td>
<td>0.34 ± 0.07</td>
<td>14</td>
</tr>
<tr>
<td>1% G.kola</td>
<td>1.84 ± 0.12</td>
<td>76</td>
</tr>
<tr>
<td>1% S.warnecki</td>
<td>0.38 ± 0.14</td>
<td>15</td>
</tr>
<tr>
<td>1% P.africana</td>
<td>0.36 ± 0.21</td>
<td>16</td>
</tr>
<tr>
<td>1% M.acuminata</td>
<td>2.09 ± 0.70</td>
<td>86</td>
</tr>
<tr>
<td>1% F.xanthoxyloides</td>
<td>2.50 ± 0.75</td>
<td>103</td>
</tr>
<tr>
<td>1% T.glaucescens</td>
<td>0.95 ± 0.15</td>
<td>39</td>
</tr>
<tr>
<td>1% P.kotschyi</td>
<td>0.34 ± 0.10</td>
<td>14</td>
</tr>
<tr>
<td>1% A.schimperi</td>
<td>0.36 ± 0.04</td>
<td>15</td>
</tr>
</tbody>
</table>

In 1993-94, as a Commonwealth Research Fellow at the Microbiology laboratory at the Eastman Dental Institute, University of London, we tested aqueous extracts of the same plants on the growth of five periodontopathic microorganisms namely, Pophyromonas gingivalis, Prevotella intermedia, Fusobacterium nucleatum, Eikenella corrodens and Campylobacter rectus. The inhibitory properties of the plants at minimum inhibitory concentrations (MIC) of 10mg/ml is shown in Table 4 (Sote and Wilson, 1995). Aqueous extracts of all the plants tested except that of M. acuminata exhibited varying growth inhibitory potentials on the bacteria. Extract of T. glaucescens showed the widest spectrum of activity, inhibiting four bacteria except P. gingivalis (Sote and Wilson, 1995). See Table 4.
Table 6: Total plaque score in the two groups; P > 0.05 not statistically significant Sote, 1987

<table>
<thead>
<tr>
<th>Group</th>
<th>Total Plaque Score</th>
<th>Mean</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toothbrush &amp; Paste</td>
<td>187</td>
<td>12.46</td>
<td>± 1.35</td>
</tr>
<tr>
<td>Chewing stick</td>
<td>182</td>
<td>12.13</td>
<td>± 1.41</td>
</tr>
</tbody>
</table>

\[ t = 0.3581; \text{df} = 14; \ P > 0.05 \]

In our assessment, only oral health education and oral hygiene knowledge were found to be inadequate in effecting positive change in the oral hygiene habits of the children. It also became apparent from our studies that there is inherent danger in introducing unfamiliar oral hygiene procedures to children without monitoring them closely. Interestingly, 50% of the children in the toothbrush group had gingivitis because they were more familiar with the use of chewing stick (see Figures 2 - 4,) (Sote, 1991; 1991). Higher proportion of males than females had gingivitis confirming better oral hygiene in females (see Figure 2). Findings of these studies underscore the need for adequate supervision by knowledgeable parents and teachers and close monitoring by oral health personnel in order to ensure effective use of the implements by children. The correct technique of using the sticks was devised and the merits and demerits of the use of chewing sticks were presented. Suggestions on how to minimize the shortcomings were offered and a more appropriate term “tooth-cleaning stick” was proffered to serve as a reminder for the purpose of using the stick (Sote, 1994). This documentation is widely used in oral health education programmes nationwide, and the new term is preferred by some researchers who now use it in both local and international dental literature.

In summary, our studies established the following:

- The chewing stick can be as effective as the toothbrush in maintaining good oral hygiene provided the correct technique is used.

- Many chewing sticks possess potent anti-plaque agents which can prevent dental caries and periodontal diseases.

- Chewing stick constituents play an important role in inhibiting plaque accumulation, and consequently reduces incidence of caries and periodontal diseases among users. Thus the effective use of the sticks provides both mechanical cleansing and anti-plaque benefits to the user.

These findings confirmed further the anti-plaque properties of the sticks and suggest their possible usefulness in preventive dentistry. Our studies and findings constituted a breakthrough in the understanding of the mode of action of the chewing/tooth cleaning sticks.

![Figure 2: Frequency of Gingivitis Incidence within the Four Groups by Sex Type at Final Examination Sote, 1991](image-url)
(iii) Use of fluoride
In child dental practice other caries preventive methods frequently used include fluoride in various forms, and clinical application of fissure sealants. Systemically ingested fluoride gets incorporated into developing enamel to produce fluorapatite which is more resistant to acid dissolution by bacteria. Topical fluoride exerts its cariostatic effect through the dynamic de- and re-mineralization processes. Fluoride also inhibits metabolism of plaque bacteria in various ways thereby inhibiting cariogenesis. Fluoride containing toothpastes are common sources of topical fluoride and are therefore recommended for everyday oral hygiene maintenance. However, toothpastes containing reduced fluoride content are recommended for children to prevent the inherent risks associated with excess fluoride ingestion such as enamel opacities and fluorosis (Andlaw and Rock, 1993; Sote, 1998). To date, no toothpaste formulated and packaged solely for children is produced in Nigeria.

Other caries preventive method used in the clinic is the application of fissure sealants.

B. Attitude and Behavioural Studies of Children in Dental Practice
Our ultimate goal as Paediatric dentist is to impact and promote positive attitudes in the child while providing oral health care. By so doing the child would be encouraged to keep subsequent appointments with the dentist without unnecessary fear. This positive attitude towards dental practice would be carried to adult life.

Attendance at the dentist’s place is very important in the prevention of oral diseases. That was why today’s lecturer investigated attendance pattern of child dental patients and their presenting oral health problems in our Paediatric dental clinics at the Lagos University Teaching Hospital (Sote, 1996). As many as 16% of children of school-age are afraid of dentists and may consequently avoid attending for dental care. When children do present in the clinic their cooperative ability determines to a great extent the
success of their dental care. Negative attitudes frequently result in lack of cooperation. In our studies, fear, ignorance, and beliefs based on socio-cultural backgrounds were identified as causes of negative attitudes of children to dental treatment in Lagos (Sote and Sote, 1985; 1988). Again, our studies were the first documented behavioural studies on dental patients in our environment. Parents and teachers were found to be children's main sources of information about dentistry while news media were found to be inadequate (see Figure 5).

Our recent study showed that the knowledge about dentistry and the dental environment by children has improved over a period of 16 years as a result of improved information dissemination. Thus, our previous reports appeared to have had positive impact on all stake holders involved in information dissemination about dentistry. However, dental visits by the children in Lagos had not changed much during the period (Idiakhoa and Sote, 2005). Reasons proffered by the children for not being eager for a dental visit include specific fears of injections, extractions, pain while undergoing treatment, scary dental equipment and disruption of their school programmes (Idiakhoa and Sote, 2005).

C. Clinical Paediatric Dental Care
Treatment and alleviation of oral health problems in children is a major preoccupation of Paediatric dentists. All the aforementioned oral health problems can be very tormenting and agonizing to sufferers, be it a child or an adult. In order to enhance good quality of life in children and adolescents, today's inaugural lecturer engaged in several clinical studies as well as treating the problems. Dental treatment in children is very rewarding. Expectedly, treatment procedure varies a great deal depending on the type and severity of the problems. The group of children affected also influences treatment plan and strategy. A retrospective study on trends of dental treatment of children over 11-year period in our clinics at the Lagos University Teaching Hospital shows the diversity of the procedures (Sote, 2003). May I crave the indulgence of this great audience to make myself clearer using few illustrations.

The photographs on the left are the presenting problems (before treatment) while on the right are problems solved (after treatment).
Before Treatment

After Treatment

Special Care Dentistry
This subspecialty deals with oral health care of persons with disability and the medically compromised. Medically compromised persons (such as those with sickle-cell disease, blood coagulation disorders, and respiratory problems), and those with disability (people with special care needs) in our community often present with oral health problems similar to those of the normal population. Individuals in this group include those with physical, mental, medical, and emotional/social disabilities. Usually, little attention is given to their oral health problems by the parents, guardians, or care-givers because of their primary concern for the medical problem, disability, or handicapping condition itself. This is often compounded by the low oral health awareness of these people. Consequently, this group of people tends to suffer unduly from severe oral diseases and their oral health care is frequently jeopardized. The child with handicapping conditions has special oral health care needs. In our study of 93 institutionalized female juvenile delinquents aged 8–20 years 91% of them had very poor oral hygiene, 48.4% had gingivitis, while 40.8% had discoloured teeth. Dental caries was found in 25.8%, malocclusion was 14% and fractured anterior teeth in 7.5% (Sote, 1993). Some of them were actually in pain of varying degrees and had dento-alveolar abscess with no help until we discovered them during the study and have them treated.

Among the physically challenged school children aged 2-16 years the highest caries prevalence of 18.9% was found among the mentally disabled. (Oredugba and Sote, 1996; 1999). A large proportion of them (99.2%) had never received any form of dental treatment while only 10.4% of the children did not need any form of periodontal treatment.

In a prospective study between January 1991 and December 1998, only forty disabled persons presented in our Paedodontic clinic for various oral health problems (Sote, 1999). Dental caries was the commonest oral disease (30.4%). Scaling and polishing and tooth extraction were the most frequently carried out procedures among them (28.3%; 21.7% respectively). Oral health care delivery to this special group poses varying challenges depending on the type of disability. Oral health care can be facilitated by adequate funding and updating of skills of clinicians. Our recent findings whereby many child patients with medically compromising conditions were unable to complete their dental treatment for lack of fund is a case for concern (Sote et al., 2007). A special group of persons with special care needs worth mentioning are children with HIV/AIDS and those orphaned for the same reason. The first documentation on infection control...
and attitudes of dentists in Nigeria towards HIV/AIDS patients was that reported by today’s lecturer in (Sote, 1992 ;1993). In the study 78.5% of Nigerian dentists expressed fear of having to treat HIV/AIDS patients. HIV infection was the most dreaded occupational hazard because of the fatal prognosis. It probably still is today. However, with increasing knowledge and awareness more dentists are now better prepared for the challenges of providing them optimum oral health care. I am pleased and proud to say that dentists in our clinics now readily attend to persons infected with HIV/AIDS.

Treatment of patients with disabilities (otherwise referred to as patients with special needs) is very challenging. While the treatment procedure itself may be similar to that of the normal population, the severity of the oral condition, management of their behaviour and mobility to stabilize them while carrying out the treatment procedures without inflicting more pain and discomfort require special skills and is quite tasking. Some of the skills required are documented by today’s lecturer to serve as a guide to other dentists (Sote, 1999).

D. My Contributions to Development of Paediatric Dentistry in Nigeria

With the exit of most of our Paediatric Dentists to foreign lands by 1990 I suddenly found myself alone in the specialty. A very challenging situation of administration, research, self-training, teaching of both undergraduates and postgraduates, and provision of services to our child population confronted me all at once. I give thanks to God for His grace that sustains at all times. I appreciate very much the Commonwealth Medical Fellowship Award offer through God’s messenger in 1993-1994. During the Fellowship I was privileged to train with up-to-date facilities under renowned Paediatric dentists namely Professor G. B. Winter, Dr. Ruth Holt, Dr. Gelbier, and Dr. Jane Goodman in the Department of Paediatric Dentistry, Eastman Dental Institute, University of London, UK. My entire experience there toughened and prepared me towards these challenges and made me what I am today in the specialty of Paediatric Dentistry. My solid foundation in research however, I do owe to my teachers at the University of California, Los Angeles during my postdoctoral M.S. programme in Oral Biology in 1980-1982. Professors Wolinsky, Junge, and Goldberg were great teachers who were very generous with their research grants and were endowed with knowledge, experience, goodwill and well-equipped laboratories. The central research laboratory of the University of California, Los Angeles was made easily accessible to me as well. My knowledge and experience in dental research was further strengthened at the Eastman Dental Institute Microbiology Department.

From 1990 to 1993, today’s lecturer was the only academic staff on ground in the Department of Child Dental Health discharging the duties and responsibilities of the four Paediatric Dentists that had exited to greener pasture. No doubt I have made my modest contribution to undergraduate dental programme of the University of Lagos since 1986 when I was first appointed as a Research Fellow Grade One. This committed long academic career I believe, resulted in my being honoured with the Long and Distinguished Service Award of the University of Lagos in April 2007.

Today, my department (Department of Child Dental Health) and specialty that was depleted and drained has grown both in number and strength. I have made my modest contribution towards the training of Paediatric dental specialists both in the University of Lagos and in most other Institutions of Dentistry in Nigeria, including the Armed Forces. The Fellowship Programmes of the National Postgraduate Medical College of Nigeria and the West African College of Surgeons are the main postgraduate programmes required for dental professionals. The programme is full time and takes a minimum of five years for the very brilliant. With all modesty, today’s lecturer can boast of successfully.
supervising at least 22, all of whom are in high posts in different parts of Nigeria and abroad. In addition, I have served as Visiting Professor of Paediatric Dentistry to the University of Benin, and as External Examiner to the Universities of Benin and Ibadan. I also serve as Examiner at the National Postgraduate Medical College and the West African College of Surgeons. As a Consultant Paediatric Dentist to the Lagos University Teaching Hospital for almost two decades some of today's patients in my clinic are children of my old patients who are now grown up into adults with confidence in themselves and positive attitude towards dentistry. This gives me a feeling of satisfaction and fulfillment.

Why a lasting smile?
A smile is an expression of happiness, joy, satisfaction and fulfillment. It is recognized even by babies. Human beings need smiles. Smiling is not just a way of life it can be a necessity in life. Sometimes one smile means more than a dozen roses. A smile adds impetus to life, and the type of smile says a lot about the personality of the individual. It is hard not to respond positively to someone who is smiling regardless of the type of smile. A full-on radiant, Duchenne, genuine smile is a beautiful thing and can reveal the innermost personality while a fake, Pan-American smile simply stretches the mouth but never reaches the eyes (Hoggard, 2005). Most times when smiling the lips move, spread sideways with the upper and lower lips separating to a varying extent revealing the front teeth which hitherto had been concealed. The tendency to cover the mouth and to conceal the lips, either with the hand or in some other fashion is common practice. Some adolescents are reluctant to smile for fear their smile will reveal something they feel lies behind the protective barrier of the mouth and the sealed lips.

Mr. Vice-Chancellor sir, please permit me to pose few questions and answers all by me. Do persons with fractured, discoloured, malaligned, or missing teeth not tend to have closed-lips, and a half-hearted smile? Their smile automatically changes and in some cases it may stop forthwith. Can an individual having a
Conclusion

Mr. Vice-Chancellor, sir, and my great audience, I have spent the past hour or so trying to present my contribution to the field of Dentistry in general and Paediatric Dentistry in particular. Children are not small adults, they are a distinct group in the population. The role of the Paediatric Dentist encompasses the whole of oral health care of children. All children need adequate oral health care. The aim of oral health care is to ensure that all children are free from pain, sepsis and the destruction of tooth tissues, to monitor the developing dentition and to support children and their families in forming good oral health habits, practices and positive attitudinal behaviour which can be carried forward into adulthood. The ultimate goal is to provide good quality of life both in the immediate and in the future. This care should be provided for both those children who are able-bodied and those who have special needs be they physical, mental, medical, social or emotional.

People with disabilities including the medically compromised do experience common oral diseases as other population. However, the conditions frequently present with increased severity. Another group of patients that require special care are the children with HIV/AIDS and those orphaned for the same reason. Providing essential oral health care for these patients with special care needs in developing countries like Nigeria is quite challenging but fulfilling. The facilities required for their comprehensive management and for their behavior and movement management while presenting for dental treatment are not readily available. This is in addition to inadequate general infrastructure such as electricity and water. Late presentation for dental treatment is another cause for concern. The society, parents and guardians owe it their responsibility to provide all children with the same care that they themselves do enjoy. A concerted effort by both governmental and non-governmental organizations is required to improve on the current state. Preventive oral health care and timely presentation for treatment are advocated for all children to avert damaging consequences so that they can smile into the future with confidence.

Recommendations

1. Free dental treatment for children up to the age of five years is advocated.
2. Compulsory, free, oral/dental check for pre-school aged children.
3. Children of all ages with any form of disability should be provided with ready access to free dental treatment in order to enhance/improve their quality of life. Such children usually require special needs dental care which demands more funding.
4. Oral health surveys for children should be conducted in every state of the Federation including the Federal Capital Territory to determine the prevalence and distribution pattern of their oral health problems.
5. A viable oral health policy particularly for children in every state of the Federation including the Federal Capital Territory should then be formulated to meet individual states' oral health needs as these needs may vary across the nation.
6. Manufacturers of dental products such as dentifrices in Nigeria should package dental products suitable for children. In particular, toothpastes with reduced fluoride content are recommended for the child population to prevent enamel opacities and fluorosis.
ACKNOWLEDGEMENTS

I give thanks to God Almighty, the only One who sees the beginning and the end in a single stretch. He alone has been my guide and defender all these years and has made today a reality. Today's lecture is the first to be delivered in this great institution by a female alumnus of the School of Dental Sciences, College of Medicine of this great university, the University of Lagos; the lecturer being the first female Professor of Dentistry in Nigeria, and in effect, the first Female Professor of Paediatric Dentistry. To God alone be the glory and honour.

I appreciate and thank my loving parents who brought me to this planet earth, Pastor and Deaconess (Mrs) Mobolaji, popularly called Baba and Momo respectively (both of blessed memory), for their prayers, support, and godly up-bringing. I pay tribute to them because of the good foundation they gave me which has served as my pillar throughout my academic career. I thank all my siblings, five in number, for their support.

I appreciate very much the cooperation and support of my husband, Professor Gbade Sote. We have been in the journey together. I thank all relatives as well.

I must express my heartfelt gratitude to His Excellency, Chief E.A.O. Shonekan CBE, GCFR for his encouragement and support at all times. My first experience at an international scientific conference outside the country was made possible by UAC (Nig.) Ltd under his Chairmanship. I cherish all the knowledge and experience I acquired during the tenure of Vision 2010 Committee and remember with appreciation the encouragement of Professor Grace Alele-Williams and Chief (Dr.) Mrs, Nike Akande.

I acknowledge with a grateful heart Bishop and Mrs. F.L.O. Menkiti, the founder and Proprietors of Radiance Primary and Secondary Schools, for their love and care right from my dental student days at the College of Medicine, University of Lagos till today.

I appreciate my teachers at the Queen Elizabeth School, Ilorin, my lecturers in the Dental School, Late Professors Fox-Taylor and Ana, Professor Akinosi, a former Provost of the College of Medicine, and His Royal Highness, the Obong of Calabar, Professor Henshaw, Professors Akpata and Okoisor. I remember the roles of Professors Mosadomi, and Adenubi and thank them. I appreciate the encouraging remarks of my teacher and a former Provost of the College of Medicine of this great university, Professor Deji Femi-Pearse. “How is Orin Ata?” was his characteristic way of following my progress on the “chewing stick” projects.

I express my sincere appreciation to Professor Wolinsky, Professor Goldberg, and Professor Junge, my teachers and supervisors and all others too numerous to mention at the University of California, Los Angeles, I thank you all. I acknowledge Professor Winter, (now retired) a renowned father of Paediatric Dentistry under whose tutelage I was, and all Consultants in the Department of Paediatric Dentistry, Eastman Dental Institute, University of London for the wonderful experience I had during my Commonwealth Medical Fellowship. Dr. Mike Wilson and the entire laboratory staff of the Department of Microbiology in that same Institute during my stay are also warmly acknowledged.

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My deep appreciation now goes to my divine blessings, my lovely children Yetunde (a Physician of International repute), Gbadeniyi (a Business and Finance expert) and Aderemi (a renowned Economist in the making) for the love, support, endurance and encouragement throughout this meandering journey of academia. I could not have made it without your prayers and the joy of having you. I am proud of you all and I love you. To all who are present today I say thank you and God bless.

Mr. Vice Chancellor, sir, I thank you for giving me this opportunity to present my Inaugural Lecture on this 12th day of March, 2008.


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TOPIC:

PAEDIATRIC DENTISTRY: GIVING LASTING SMILE FROM BIRTH THROUGH CHILDHOOD TO ADOLESCENCE

By PROFESSOR (MRS.) ELIZABETH OBALOWU SOTE