Prevalence of malocclusion among 12 year-old school children in Lagos State

D C Umesi Koleoso[1], I L Utomi[2] and K O Savage[3]

[1]Department of Restorative Dentistry, [2]Department of Child Dental Health, [3]Department of Preventive Dentistry, College of Medicine, University of Lagos, Lagos.

KEY WORDS:

Malocclusion

12 year-old children

Ethnic groups

Lagos State

Abstract

Objectives: To determine the prevalence of dentofacial anomalies presenting as malocclusion in 12 year-old Nigerian school children in the Mainland Local Government Area of Lagos State, Nigeria.

Methodology: The study, which involved a sample of 200 children, was carried out employing the World Health Organization Pathfinder Methodology for oral health surveys. Malocclusion was recorded as being absent, slight or moderate/severe based on the WHO criteria as outlined in the methodology.

Results: Sixty-eight per cent (68%) of the children had normal occlusion i.e. absence of malocclusion. Slight malocclusion was present in 22%, while 10% had moderate to severe malocclusion. There was no sex predilection for malocclusion. Among the ethnic groups, there was no significant difference in prevalence of malocclusion.

Conclusion: In view of the handicapping effects of dentofacial anomalies, which tend to affect a person's aesthetics, masticatory function, speech and indeed social acceptability, there is a need to institute measures, which would help in the prevention of some of the malocclusion types seen in the study. The establishment of school oral healthcare programme, which would also provide preventive orthodontic care, is advocated. However, the small number seen among some ethnic groups precludes the extrapolation of this finding to the larger population. There is a need to carry out national surveys.

Introduction

Malocclusion has been defined as an irregularity of teeth or a malrelationship of the dental arches beyond the acceptable range of normal.[1] The World Health Organization, however, defines malocclusion as handicapping dentofacial anomalies which affect a person's aesthetics, masticatory functions or speech.[2] Malocclusions are for the most part variations around the normal and are representative of biological variability. The majority of malocclusions are primarily of hereditary causation though some environmental factors are of importance. There are numerous methods for recording the prevalence and severity of malocclusion. The commonest classification of orthodontic anomalies is that devised by Edward Angle in 1899.[1] This is, however, more appropriate in clinical orthodontics or morphological research than in public health surveys. The World Health

Organization comments that there is at present no universally accepted method for the recording of dentofacial anomalies that are of public health significance and requires treatment.[3] The anomaly should be recorded as present if, in the judgment of the examiner one or more of the following criteria are met:-

- it has a significant and unaccepted effect on the facial appearance,
- it causes a significant impairment of speech or reduction in masticatory function,
- It constitutes an occlusion predisposing to tissue destruction in the form of periodontal disease or caries.

The prevalence of malocclusion has been studied in many western societies at different ages.[4-7] Evidence from previous studies indicate a large variation in the reported prevalence, with a range of 10 to 76%.[4-7] This large variation most likely reflects the inherent subjectivity of the evaluation systems used, their questionable validity and reliability.[8, 9]

Correspondence to: Dr. D. C. Umesi Koleoso, Restorative Dentistry Department, College of Medicine of the University of Lagos.Lagos, Nigeria.

The prevalence of malocclusion among Nigerian children and young adults have also been documented. [10-12] There is a wide variation in reported works on malocclusion in the Nigerian population. In an investigation of 300 residents of Lagos, Richardson and Ana observed a prevalence of 9.6% for normal occlusion, with Angle's class I and III malocclusions accounting for 71% and 12.3% respectively.[10] In a related study, Aggrawal and Odusanya found normal occlusion in 50.8% of their study population while Angle's class I and II malocclusions were observed in 44.9% and 4.3% respectively.[11] Isiekwe examined 1,152 students aged 10 to 16 years in Lagos, Nigeria and observed that 24% had normal occlusion while 61.5% had Angle's class I malocclusion. Angle's class II malocclusion occurred in 10.3%.[12]

In the World Health Organization's Pathfinder oral survey methodology, two levels of anomaly are recognized; slight and moderate/severe.[2] The Pathfinder methodology is a practical, economic survey sampling methodology in which a stratified cluster sampling technique is used. Pathfinder surveys are classified as either pilot or national depending on the number of sampling sites and the index ages or age groups included. A pilot survey is one that includes only the most important subgroups and only one or two index ages. The age 12 years has been chosen by the World Health Organization as an index age for monitoring oral health.[13] This is so because it is an age which can be well sampled in schools and there are no longer any primary teeth normally present so that the results obtained can be compared to adult populations. This study was a pilot study, which included only school children of index age 12 years. It is hoped that this study will provide baseline data, which could be used for the planning of orthodontic care as part of a school oral healthcare programme for the benefit of the school children as well as the community at large.

Methodology

The Pathfinder methodology for basic oral surveys as described by the World Health Organisation was used for this study.[2] The sampling frame for the study was the list of secondary schools in the LGA obtained from the Education Department. The schools were divided into two strata, those in the rural Maroko-Iwaya and the rest in the urban part of the LGA. Seven schools constituting the study settings, proportionate to the number of schoolsin the two areas. This stratification was done in line with the WHO methodology, but no attempt was made at separating the strata during analysis.[2] Selection of the subjects at the schools was by cluster sampling. The 12 year-olds in the junior secondary class 1 and 2 comprised the clusters. A cluster size of at least 20 to 50 subjects was seen at each school.

At the schools, the subjects were examined seated on a straight back chair using daylight as source of light. Information on ethnic group of each subject was obtained. Each subject's occlusion was examined and the absence or presence of malocclusion ascertained and this was recorded in the survey form. Two levels of malocclusion were recorded," slight" malocclusion and "moderate/severe" malocclusion. The presence of one or more rotated or tilted teeth, slight crowding or spacing which disturbed the regular alignment of the teeth was recorded as slight malocclusion. The presence of maxillary overjet equal to or greater than 9mm, mandibular overjet, anterior cross bite equal or greater than a full tooth depth, open bite, midline shift more than 4mm or generalized crowding or spacing was recorded as moderate/severe malocclusion. Adequate sterile, disposable instruments were used and aseptic conditions observed. Only the first author carried out all examinations to eliminate inter-examiner bias and calibration was done before going to the schools.

Results

The results of the oral survey on malocclusion in the 12 year-olds examined in schools in Mainland Local Government Areas of Lagos State are presented in Tables 1 and 2. Two hundred subjects comprised of equal number of boys and girls were examined in seven schools. One hundred and twenty-seven (63.5%) subjects were Yorubas, forty (20%) subjects were Ibo and three (1.5%) subjects were of Hausa/Fulani ethnic groups. Thirty (15%) subjects were of other tribes such as Auchi, Efik, Bini, Egun, Evra, Ibibio, Igala, Ijaw and Ishan.

The presence of malocclusion was recorded in sixty-four (32%) subjects. Forty-four (22%) subjects had slight malocclusion while twenty (10%) subjects had moderate/severe malocclusion (Table 1). There was sex predilection for malocclusion among the subjects (p < 0.05). Malocclusion was present 35%, 33.3%, 32.3% and 26.7% of the subjects from Ibo, Hausa/Fulani, Yoruba, and other ethnic groups respectively (Table 2). The difference in prevalence of malocclusion among the ethnic groups was not significant (p > 0.5).

Discussion

The results of this study indicate that over two thirds of the children examined were found to have a dental appearance that required no orthodontic treatment. This is comparable to an earlier report on Nigerian children which found about 62% not requiring treatment using the Index of Orthodontic

Table 1: Distribution of subjects by degree of malocclusion

Malocclusion	Male	Female	Total	%
None	71	65	136	68.0
Slight	15	29	44	22.0
Moderate/Severe	14	6	20	10.0
Total	**100**	**100**	**200**	**100.0**

$$X^2 = 7.92 \qquad df = 2 \qquad p < 0.05$$

Treatment need (IOTN).[14] It is also similar to a report on urban Zambian black children which observed 83 per cent as not requiring orthodontic treatment using the Occlusal Index of Summers (1966).[15] This result is, however, higher when compared with American [16] and British studies [17] which found normal occlusion in 17% and 23.7% respectively. This affirms a previous report that Africans generally have better dental appearance and less orthodontic treatment need than Caucasions.[18]

In this study, there were significant sex differences in the prevalence of malocclusion. This is at variance with earlier reports on Nigerian children.[14, 18] There was no significant difference in the prevalence of malocclusion among the ethnic groups in this study. However, significant differences have been noted in more broadly categorized ethnic populations such as Africans, Americans and Japanese.[16-18]The findings of this study indicate that 22% of the children had slight malocclusion. Some of these children may not have noticed the malocclusion and even if they did, may not desire orthodontic treatment. This suggests a need for subjective evaluation of malocclusion and orthodontic treatment need. Subjective need of treatment or desire for treatment should be differentiated from objective need of treatment. The individual's perception of his/her own malocclusion is an important factor in determining treatment need.[19] This report indicates a mandatory need for orthodontic treatment in 10% of the subjects who presented with moderate/severe malocclusion. The physiological impact of malocclusion may manifest as problems related to speech, masticatory function, mandibular dysfunction and periodontal health. Evidence from literature indicates that children with dentofacial anomalies are perceived to be less socially acceptable than their peers with normal dental appearance and may experience emotional and psychological trauma.[20] Considering the physiological and psychological impact of malocclusion on children; it is needful that orthodontic care be provided for this population. Presently, the possibility of these children having access to such care seems low. This is partly due to the low priority given to oral healthcare in general as there is no government-run dental facility in the area, neither is there a school oral healthcare programme. Furthermore, there is a general unawareness that orthodontic treatment can take care of these anomalies. There is the need therefore, to increase dental education and promotional activities in the community. The establishment of a school oral healthcare programme, which would in addition to other dental services offer orthodontic preventive measures such as interceptive orthodontics, would go a long way in solving some of the dentofacial anomalies.

This investigation showed that most of the children had no malocclusion and therefore, required no orthodontic treatment. However, the proportion of the population with moderate .to severe malocclusion may not have access to care due to socio-economic problems. This study further revealed no significant difference in prevalence of malocclusion between the sexes or among the ethnic groups studied. However, the study population was not large enough for extrapolation to the entire ethnic groups in Nigeria. This may suggest a need for larger population- based studies and national oral health surveys.

Table 2: Distribution of subjects by degree of malocclusion and ethnic group

Malocclusion	Ibo	Hausa/Fulani	Yoruba	Others	Total
None	26(65%)	2(66.7%)	86(67.7%)	22(73.3%)	136
Slight	10(25%)	1(33.3%)	27(21.3%)	6(20.0%)	44
Moderate/Severe	4(10%)	0(0.0%)	14(11.0%)	2(6.7%)	20
Total	**40(100%)**	**3(100%)**	**127(100%)**	**30(100%)**	**200**

$$X^2 = 1.34, \qquad df = 6 \qquad p > 0.5$$

References

1.   Houston WJB. Walter's orthodontic notes, 4th Ed, Wright, Bristol, 1983: 1, 27,46,94

2.   World Health Organization.   Oral health surveys: Basic Methods, 3rd Ed, WHO, Geneva, 1987: 1-53

3.   James PMC and Beal JF, Dental epidemiology and survey procedures. In: Dental Public Health – an introduction to community dentistry. Slack L. Geoffrey (Ed.), 2nd Ed, Wright, Bristol, 1981: 86 – 177.

4.   Burden DJ. Need for orthodontic treatment in Northern Ireland. Community Dent Oral Epidemiol, 1995; 23: 62 – 63.

5.   Salmen L, Molelin B, Gozlinger B and Heliden L. Need and demand for orthodontic treatment in an adult Swedish population. Eur. J. Orthod. 1992; 14: 359 –386.

6.   Ingervall B and Hedegard B. Awareness of malocclusion and desire for orthodontic treatment in 18 year-old Swedish men. Acta Odontol Scand. 1974; 32: 93 – 101.

7.   Ingerval B, Mololi B and Thilaider B. Prevalence and awareness of malocclusion in Swedish men. Community Dent and Oral Epidemiol. 1979; 6: 308 – 314.

8.   Doumer MC, Craniofacial anomalies – are they a public health problem. Int. Dent. J. 1987; 37: 1193 – 1196.

9.   Fosther TD. Orthodontic surveys – critical appraisal. Brit. J. Orthod. 1980; 7:59-63

10.   Richardson A, Ara J. Occlusion and malocclusion in Lagos. Journal of Dentistry 1973; 1: 134 – 139.

11.   Aggrawal SP and Odunsanya SA. Orthodontic status of school children in Ile-Ife, Nigeria. Acta. Odont. Paediatr. 1985; 6(9) 9 – 12.

12.   Isiekwe MC. Classified oclussal problems in young Nigerians: a clinical study. Odontostomatol Trop. 1987; S2: 67 – 77.

13.   Barmes David E. Oral health and the World Health Organization.   In: Dental Public Health – an introduction to community dentistry. Slack L Geoffrey (Ed.), 2nd Ed, Wright, Bristol 1981: 77 – 85.

14.   Otuyemi OD. Ugboko VI, Adekoya-Sofowora CA and Ndukwe KC. Unmet orthodontic treatment need in rural Nigerian adolescents. Community Dent. Oral Epidemiol. 1997; 25: 363 – 366.

15.   Ghabrial E, Wiltshire W, Zietsman ST and Viljeen E. The epidemiology of malocclusion in Zambian urban school children. SADJ 1998; 53: 405 – 408.

16.   Altemus L. Frequency of the incidence of malocclusion in American Negro children aged 12 – 16. Angle orthod. 1959; 29: 189 – 200.

17.   Gardinar JH. A survey of malocclusion and some aetiological factors in 1000 shelffield school children.   Dental Pract. 1956; 6: 187 – 198.

18.   Otuyemi OD, Ogunyinka A, Dosunmu O, Cons NC and Jenny J, Malocclusion and orthodontic treatment need of secondary school students in Nigeria according to the dental aesthetic index. In: Dent. J. 1999; 49: 203 – 210.