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## Need for interceptive intervention for malocclusion in handicapped children in Lagos, Nigeria

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### Summary

Orthodontic care for handicapped children in Nigeria has generally been neglected. There is a need for baseline data for effective planning of orthodontic services for this population group. The purpose of this study was to determine the need for interceptive orthodontic intervention in handicapped children in Lagos, Nigeria. The sample consisted of 106 handicapped children, 60 boys and 46 girls who were 7-10 years old, selected from 5 special schools in Lagos. Overall, forty-nine (46.2%) of the children had a need for interceptive orthodontic treatment. Orthodontic intervention was needed in 20.7% of the children due to crossbite of the anterior and lateral segments. Extraction was indicated in 4.7% of the children with retained primary teeth and in 1.9% of children with erupted supernumerary teeth. Orthodontic treatment or education was needed in 16.1% of the children due to oral habits. Three (2.8%) of the children presented with proclination of the maxillary anterior teeth with moderate spacing. In 10.4% of the children, there was a need for further inspection in order to follow-up the development of the occlusion. This study has revealed a significant need for interceptive orthodontic treatment among handicapped children in Lagos, Nigeria. Appropriate policy action and strategies to improve oral health education and provide publicly funded programmes will be required.

**Keywords:** *Handicapped children, malocclusion, treatment need, orthodontics*

### Resume

Les traitements d'orthodontie des enfants handicapés au Nigeria a été d'une manière générale négligée. Le besoin d'avoir une ligne directrice de données pour la planification effective des services d'orthodontie pour ce groupe-témoin. Le but de cette étude était de déterminer le besoin d'une intervention d'orthodontie chez les enfants handicapés de Lagos, Nigeria. L'échantillon consiste de 106 enfants : 60 garçons et 46 filles qui étaient âgés de 7-10 ans, sélectionnés à partir de 5 écoles spéciales de Lagos. Au total, 49 (46,2%) des enfants ont eu besoin du traitement d'orthodontie interceptive. L'intervention d'ortho-

dontie était requise chez 20,7% des enfants à cause débordement des segments antérieurs et latéraux. L'extraction a été indiquée chez 4,7% des enfants avec des dents primaires et 1,9% des enfants avec des dents surnuméraires. Le traitement ou l'éducation d'orthodontie a été requis chez 16,1% des enfants à cause des habitudes buccales. Trois (2,8%) des enfants avaient une proclination des dents du maxillaire antérieur. Avec un espace modéré, chez 10,4% des enfants, le besoin d'une inspection profonde pour le suivi du développement de la conclusion. Cette étude a montré un besoin important pour le traitement d'orthodontie interceptive parmi les enfants handicapés de Lagos au Nigeria. Une action politique appropriée et des stratégies pour améliorer l'éducation de la santé buccale et fournir des programmes publics financés sont requis.

### Introduction

Worldwide, there is increasing acknowledgement of the need for early recognition of conditions predisposing young children to malocclusion and the use of preventive and interceptive procedures [1-8]. In Nigeria, there have been several reports on malocclusion and orthodontic treatment need, which focused on the normal population [9-13]. However, unlike in industrialised countries, there is paucity of information on the handicapped children in Nigeria especially in relation to orthodontics.

Nigeria has a growing population of over 120 million people. As a result of modernisation and cultural interaction there is an increasing awareness of orthodontic problems that did not exist in our earlier population [14]. The percentage of the population in need of orthodontic services is expected to rise. The few number of orthodontists and the depressed economy in Nigeria may however make it difficult for these services to be available and affordable especially for the handicapped population.

Preventive and interceptive procedures constitute important aspects of modern orthodontics. They also form a group of therapies which are within the scope of a well-trained general practitioner. Orthodontic interception has the advantage of being simple and inexpensive. Risks of root resorption associated with orthodontic treatment are reduced. Furthermore it helps in preventing iatrogenic caries and periodontal disease. Teeth may move subsequent to orthodontic interception but will never relapse [1].

Children with disabilities need functional and aesthetic consideration comparable to that of "normal" persons [15]. This becomes more desirable due to the



increasing trend towards normalisation of such children in the home environment [16]. Apart from previous reports [9-13] on occlusal status and malocclusion in the normal population, only few studies [17,18] have quantified the need for treatment in a handicapped population in Nigeria.

The 7-10 year old children are in the second special vigilance age group where early screening, detection and intervention of abnormal developments will assist in their occlusal development. Data that can be useful in estimating the proportion of the population that needs interceptive orthodontic intervention will be relevant in planning orthodontic services for this population as part of an overall oral health care programme. The purpose of this study was to determine the need for interceptive orthodontic intervention in a population sample of 7-10 year-old handicapped Nigerian children.

### Materials and methods

This study was carried out in Lagos the capital city of Lagos, Nigeria in 2004. The author visited 5 special schools for the handicapped children and examined all the handicapped children between the ages of 7 and 10 years. The study sample consisted of 106 handicapped children (60 males; 46 females) who cooperated with the examination procedure. The handicapped children included the mentally subnormal, the physically disabled and those with hearing impairment. Permission to carry out the study was sought and obtained from the school authorities in charge of the schools and also from the parents.

The author used pre-structured questionnaires to record the findings and information including name, age and sex. The teachers of the handicapped children and in some cases their parents assisted in getting the cooperation of the children and other necessary information about them. None of the children had received any orthodontic treatment. All the children were examined by the author in the school premises under natural lighting.

The need for interceptive orthodontic treatment was based on the pathogenic potential of the occlusion according to Jarvinen [23]. Anterior and lateral cross bites with and without mandibular displacement were recorded for immediate orthodontic intervention. Retained primary teeth, which were deflecting their successors were scored when the successors had erupted or were erupting with the primary predecessors still firmly in place. Supernumerary teeth were scored present when the normal complement of the teeth were present in exclusion of the extra teeth/tooth. They may be normal or abnormal in form. Oral habits were diagnosed when the child or parent confirmed such habits in addition to clinical findings. Proclination of the upper incisors were diagnosed when there were increased labial inclinations of the upper incisors in relation to the Frankfort and or maxillary plane with or without

potentially competent lips usually resulting in increased overjet. Spacing was scored when there was no approximal contact between the teeth.

Children who required further inspection in order to follow-up development of the dentition were assessed for severe crowding and early loss of primary canines.

### Reproducibility test

To assess the reproducibility of the measurements by the author, 30 subjects were re-examined during data collection. The intra-examiner agreement was tested using the Spearman rank correlation coefficient. The result of the reproducibility test ( $r = 0.98; P < 0.01$ ) showed good agreement.

### Statistical analysis

The collected data was analysed using EPI INFO version 6 software statistical package (Centres for Disease Control and Prevention, USA). The Fisher's exact test was used to determine the level of statistical significance for observed relationships.

### Results

Table 1 shows the age and gender distribution of the study sample. The total proportion of children with some need for interceptive treatment for malocclusion was 49(46.2%). The need for orthodontic treatment of crossbite malocclusion was 20.7% (17.9% in the anterior segment and 2.8% laterally). Children having proclination of the maxillary anterior teeth with moderate spacing were 3(2.8%) and supernumerary teeth 2(1.9%). The overall prevalence of oral habits was 17 (16.1%) with digit sucking accounting for 2(1.9%), tongue thrusting 13(12.3%) and lip sucking 2(1.9%). Retained primary incisors with the permanent successors erupting palatally and lingually in the maxillary and mandibular arches were seen in 5(4.7%) of children (Table 2). There were no significant differences between gender and the malocclusions recorded ( $p > 0.05$ ). The total number of children needing further inspection in order to follow-up development of the dentition was 10.4% (Table 3). The relationship between oral habits and anterior open bite was statistically significant ( $P < 0.001$ ) (Table 4).

Table 1: Age and sex distribution of the subjects.

Age (yrs)	Male		Female		Total	
	n	%	n	%	n	%
7	16	15.1	14	13.2	30	28.3
8	14	13.2	9	8.5	23	21.7
9	18	17.0	9	8.5	27	25.5
10	12	11.3	14	13.2	26	24.5
Total	60	56.6	46	43.4	106	100



**Table 2:** Need for interceptive intervention for malocclusion in handicapped children aged 7 – 10 years.

Type of Intervention	Indication	No of children	
		n	%
Interceptive treatment	Cross bite of anterior segment	19	17.9
	Cross bite of lateral segment	3	2.8
	Proclination of maxillary anterior teeth with moderate spacing	3	2.8
	Digit sucking	2	1.9
Education / Interceptive treatment	Lip sucking	2	1.9
	Tongue thrusting	13	12.3
Extraction	Retained primary incisors	5	4.7
	Supernumerary teeth	2	1.9
Total no. of children		49	46.2

**Table 3:** Need for further inspection in order to follow up the development of the dentition.

Indication	No. of children	
	n	%
Severe crowding (> breadth of an incisor)	11	10.4
Early loss of primary mandibular canines	0	0
Total	11	10.4

**Table 4:** Relationship between oral habits and anterior open bite (A.O.B) in the handicapped children.

	No of children with A.O.B		No of children without A.O.B	
	no	%	no	%
Children without oral habit	4	3.8	85	80.2
Children with oral habit	15	14.2	2	1.9

Fisher's exact test

 $P < 0.001$  (highly significant)

## Discussion

Perspectives on the effective time to commence orthodontic treatment have generally pitched proponents of early orthodontic treatment like Moyers [19], Viazis [20], Dugoni and Lee [21] against the school [22-24] that argued for later treatment. However, there is now a consensus that early treatment in the primary or mixed dentition following thorough assessment restores normal function and con-

sequently normal occlusal development [1,5,7,8,19-21,24].

In this study, quite a high proportion of children showed a need for one form of interceptive orthodontics or the other. The prevalence of cross bite was 20.7% (17.9% for anterior segment and 2.8% laterally). In a study of 6-year-old Finnish children by Jarvinen<sup>3</sup> the need for orthodontic treatment caused by cross bite of the permanent central incisors was estimated to be 0.7%. In a related study of Finnish children Heikenheimo [25] indicated that treatment was needed for 4% of children due to cross bite in the anterior segment. The need for treatment was lower in that of Jarvinen [3] because some of the subjects had received preventive and interceptive orthodontic treatment at the age of 3-5 years.

In a study of 3-8 year old Tanzanian children, Kerosuo [26] reported cross bite malocclusion to be 9% (8% for the anterior segment and 1% laterally). In an earlier Nigerian study, Otuyemi *et al* [27] reported this malocclusion to be 17.9%. The higher prevalence of cross bite in the handicapped may be due to the relatively low dental awareness and financial constraints.

If cross bite of the permanent incisors is left untreated, the malocclusion may cause erosion of the maxillary and mandibular incisors, inflammation and damage to the periodontal tissues and even malposition of other teeth [28,29]. In addition, the malocclusion can lead to hindered growth of the maxilla or to asymmetry between the jaws [30,31]. In a developing economy like Nigeria, with a low number of qualified orthodontic specialists, the recognition of conditions that are known to interfere with growth and development of a child should be familiar to any primary care practitioner [7,8]. In this respect, the general practitioner and the paediatric dentist are well placed to carry out early screening in the ages of special vigilance so as to identify and treat developing malocclusions.

The prevalence of oral habits was 16.1% with digit sucking accounting for 1.9%, tongue thrusting 12.3% and lip sucking 1.9%. The prevalence of digit sucking in this study is lower than the 18% reported by Holm [32] in 3-



5 year old Finnish children. It is also less than the 48% reported by Modeer *et al* [33] in 4 year-old children. In an earlier study of 3-4 year old Nigerian children, Otuyemi *et al* [27] reported a prevalence of 4.6% for digit sucking which is higher than the 2.1% of Isiekwe [34] for 10-15 year old Nigerian children. The report of Isiekwe compares very well with that of this study and may be explained by the fact that prevalence of sucking habits tends to decrease with age.

In this study, tongue thrusting was found to be the predominant habit. This may be related to the general poor muscle development found in persons with mental retardation/developmental disabilities [17]. There was a significant relationship between oral habits and anterior openbite. This is consistent with previous reports [27,35,36]. Overall, however, the prevalence of oral habits in this study (16.1%) is much higher than that (9.9%) reported by Onyeaso [35] in "normal" 7-10 year old Nigerian children. The children presenting with oral habits are in need of interceptive orthodontic treatment or education to break the habit.

Retained primary incisors were found in 4.7% of children with the permanent successors displaced from the line of the arch. This seems to confirm the findings of Isiekwe [37] that Nigerian children erupt their teeth earlier than Caucasian children. Early extraction of the primary incisors would allow the permanent successors to align properly.

In this study, the prevalence of supernumerary teeth was 1.9%. The existence of supernumerary teeth in the incisor region often affects a disturbance in dental development [38] Dacosta [39] reported a prevalence of 0.7% for children in the Northern part of Nigeria. The prevalence of maxillary supernumerary and congenitally missing permanent incisors have previously been reported as 3.5% in Finnish children aged 7 years [38]. Jarvinen [3] reported the prevalence of numerical variation of the permanent incisors as 0.4%. The low prevalence was attributed to non-radiographic examination of the total material. In the present study, radiographic examination of the children was not done and as such the results obtained may not reflect the true situation. A more realistic estimate of numerical variation of the permanent incisors will require radiographic examination of all the children.

The prevalence of extreme incisal over jet was 2.8%. Proclination of maxillary anterior teeth leading to increased or extreme incisal over jet of over 6mm is associated with an increased risk of traumatic injuries to the teeth [40] and requires early interceptive intervention. The fact that in Nigeria the prevalence of traumatic injuries to the maxillary permanent incisors ranges from 6.5% to 19.1% [41-43] brings to the fore the need for interceptive intervention in our environment.

The proportion children needing further inspection in order to follow up the development of the dentition

was 10.4% due to severe crowding of the teeth. Early loss of primary mandibular canines can lead to lingual inclination of the permanent mandibular incisors and to crowding [44]. However, no early loss of primary mandibular canine was observed in this study. Initial crowding of the teeth in this stage of dental development can be reliably diagnosed only in extreme cases [30]. In these cases, later orthodontic treatment will usually be needed.

The foregoing indicates a high level of potential demand for interceptive orthodontic care for the handicapped children. The reality is that very few of them are likely to have access to care. This calls for policy action in which public health policy and the activities of non-governmental organisations deliberately target subsidized or free dental care for the handicapped population. In addition, these conclusions should help practitioners and planners of oral health to evolve strategies that will cover needs both in development of manpower and provision of orthodontic care for the handicapped at the primary level where they are more likely to have access.

## References

1. Richardson A. Interceptive orthodontics 4<sup>th</sup> ed. London 1999 (British dental Association).
2. Jarvinen S. Need for preventive and interceptive intervention for Malocclusion in 6 year old Finnish children. *Community Dent Oral Epidemiol* 1981; 9:285-288.
3. Jarvinen S. Need for preventive and interceptive intervention for malocclusion in 3-5 year old Finnish Children. *Community Dent Oral Epidemiol* 1981; 9:1-4.
4. Waugh LM. Care of the deciduous teeth as the basis of occlusion of the permanent dentition. *Am J Orthod* 1955; 55:90-106.
5. Bishara SE, Justus R, Graber TM. Proceedings of the Workshop Discussions on Early Treatment. *Am J Orthod Dentofacial Orthop* 1988; 113:5-6.
6. Ackerman JL, Proffit WR. Preventive and interceptive orthodontics. Strong in philosophy, weak in practice. *Angle Orthod* 1980; 50:75-77.
7. Ngan P, Wei SHY. Orthodontics for the primary dentition. *JADA* 1988; 116:336-340.
8. Ngan, P, Fields H. Orthodontic diagnosis and treatment planning in the primary dentition. *J Dent Child* 1995; 95:25-33.
9. Richardson A, Ana JR. Occlusion and malocclusion in Lagos. *J Dent* 1973; 1:134-139.
10. Isiekwe MC. Malocclusion in Lagos. Nigeria. *Community Dent Oral Epidemiol* 1983; 11:59-62.
11. Aggrawal S.P. Odusanya SA. Orthodontic status of school children in Ile - Ife, Nigeria. *Acta odontol pediatri* 1985; 6:9-12.
12. Isiekwe MC. Classified occlusal problems in young Nigerians: A clinical study. *Odontostomatol Trop* 1987; 2:67-71.



13. Otuyemi OD, Abidoye RO. Malocclusion in 12 year old suburban and rural Nigerian Children. *Community Dent Helath* 1993; 10:375–380.
14. Onyeaso CO. Orthodontic treatment need of mentally handicapped children in Ibadan, Nigeria according to the Dental Aesthetic index. *J Dent Child* 2003;70: 159-163.
15. Onyeaso CO. Comparison of malocclusions and orthodontic treatment needs of handicapped and normal children in Ibadan using the Dental Aesthetic Index (DAI). *Nig Postgrad Med J* 2004; 11: 40–44.
16. Okoisor FE. Demand and need for dental care in Lagos. *Nigerian Dental Journal* 1984; 5:3–11.
17. Waldman HB, Perlman SP, Swerdloff M. Orthodontics and the population with special needs. *Am J Orthod Dentofacial Orthop* 2000; 118:14–17.
18. Waldman HB. Special paediatric population groups and their use of dental services. *J Dent Child* 1989; May/June: 211–215.
19. Moyers RE. *Handbook of orthodontics*, 4<sup>th</sup> ed. Chicago: Year book medical publishers, 1988; p.346-7,433-434.
20. Viazis AD. Efficient orthodontic treatment timing. *Am J Orthod Dentofacial Orthop* 1995; 108:560–561.
21. Dugoni SA, Lee JS. Mixed dentition case report. *Am J Orthod Dentofacial Orthop* 1995;107: 239–244.
22. Gianelly AA. Crowding: Timing of orthodontic treatment. *Angle Orthod* 1994;64:415–418.
23. Gianelly AA. One phase versus two phase treatment. *Am J Orthod Dentofacial Orthop* 1995;108:556–559.
24. Ghafari JG, Shofer FS, Laster LL, Markowitz DL, Silverton S, Katz SH. Monitoring growth during treatment. *Sem Orthod* 1995;1:165–175.
25. Heikenheimo K. Need of orthodontic treatment in 7-year-old Finnish children. *Community Dent Oral Epidemiol* 1978;6:129–134.
26. Kerosuo H. Occlusion in the primary and early mixed dentitions in a group of Tanzanian and Finnish children. *J Dent* 1990; 7: 293–298.
27. Otuyemi O, Isiekwe M, Sote E, Jones S. Need for interceptive orthodontic treatment in 3-4 year-old Nigerian children. *Pediatr Dent J* 1997; 7: 7–11.
28. Sim J. *Minor tooth movement in children*, ed. 2. St. Louis : C.V. Mosby Co 1997; 243–27.
29. McDonald RE, Avery DR. *Dentistry for the child and adolescent*; ed. 2. St. Louis C. V. Mosby Co 1983; 500–556.
30. Graber TM. *Orthodontic principles and practice*. 2<sup>nd</sup> ed, WB Saunders, Philadelphia, 1966.
31. Kutin G, Haves RR: Posterior crossbites in the deciduous and mixed dentitions. *Am J Orthod* 1969; 56: 491–504.
32. Holm AK. Longitudinal study of dental health in Swedish children aged 3–5 years. *Community Dent Oral Epidemiol* 1975; 3: 228–236.
33. Modeer T, Odenrick L, Lindner A. Sucking habits and their relation to posterior cross bite in 4-year-old children. *Scand J Dent Res* 1982; 90: 328.
34. Isiekwe MC. Thumbsucking school children in Lagos. *Nigerian Dental Journal (Supplementary)* 1984; 24–28.
35. Onyeaso CO. Oral habits among 7-10 year-old school children in Ibadan, Nigeria. *East Afr Med J*. 2004; 81: 16–21.
36. Gellin ME. Digital sucking and tongue-thrusting in children. *Dent Clin North Am* 1978; 22: 603–619.
37. Isiekwe MC. Eruption times of primary teeth in Nigerian children. *Nigerian Dental Journal* 1985; 5: 15–18.
38. Jarvinen S. Supernumerary and congenitally missing permanent upper anterior teeth in 7 year-old Finnish children. A radiographic study. *Proc Finn Dent Soc* 1976; 72: 99–102.
39. Dacosta OO. A survey of occlusal anomalies in 1,028 school children in Kaduna, Northern Nigeria. *Afri Dent J* 1998; 12: 8–12.
40. Jarvinen S. Incisal overjet and traumatic injuries to upper permanent incisors. A retrospective study. *Acta Odontol Scand* 1978; 36: 359–362.
41. Otuyemi OD, Sofowora CA. Traumatic anterior dental injuries in selected rural primary school children in Ile-Ife, Nigeria. *Nigerian Dental Journal* 1991; 10: 20–25.
42. Naqui A, Ogidan O. Traumatic injuries of anterior teeth in first year secondary school children in Benin-City, Nigeria. *Afr Dent J* 1990; 4: 11–15.
43. Falomo B. Fractured permanent incisors among Nigerian school children. *J Dent Child* 1986; 8: 119–120.
44. Mueller BH, L'Homme PR, Schoenbrot FA, Ayer WA. The effect of primary canine extraction on the IMPA. *J Dent Child* 1978; 66:461–464.

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