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Malocclusion and Orthodontic Treatment Need of Mentally Handicapped Children in Lagos, Nigeria

Malocclusão e Necessidade de Tratamento Ortodôntico em Crianças com Necessidades Especiais, Lagos, Nigéria

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RESUMO

Objetivo: Determinar a prevalência de malocclusão e necessidade de tratamento ortodôntico em crianças e adolescentes nigerianos com necessidades especiais através do Dental Aesthetic Index (DAI); e avaliar se a malocclusão sofre influência da idade e do sexo da criança.

Método: A amostra foi composta por 102 crianças e adolescentes com idades entre 6 a 18 anos atendidos em 5 escolas/centros para pessoas com necessidades especiais. Um questionário pré-estruturado foi utilizado para coletar dados sócio-demográficos. Os pacientes foram examinados no ambiente escolar, sob luz natural, sendo utilizado o Índice DAI. O teste t-student foi usado para a comparação da média dos escores DAI entre os grupos. Fez-se uso ainda da correção de Bonferroni.

Resultados: Não se verificou diferenças significativas nos escores dos DAI entre o sexo e a idade ($p > 0,05$). Malocclusão severa com tratamento altamente desejável foi observada em 18,0% da amostra. Malocclusão muito severa foi encontrada em 19%, sendo o tratamento fundamental. A perda de uma ou mais dentes estava presente em 8,8%, enquanto o apinhamento incisal foi visto em 28,4% e o espaçamento em 58,8%. Alterações no segmento anterior da maxila e da mandíbula foram encontradas em 38,2% e 47,1%, respectivamente. A mordida aberta foi diagnosticada em 25,5% da amostra. Relação molar de classe I foi observada em 68,6%.

Conclusão: Uma grande proporção da população apresenta malocclusão severa, onde o tratamento é considerado fundamental. A amostra apresentou altas frequências de todas os tipos de malocclusão quando comparadas às crianças nigerianas normais, com exceção do apinhamento.

ABSTRACT

Objective: To determine the prevalence of malocclusion and orthodontic treatment need in mentally handicapped children in Lagos, Nigeria using the DAI; and to assess whether the observed malocclusion is affected by age and sex.

Method: The study population consisted of 102 non-Down syndrome mentally handicapped children between 6-18 years of age from 5 special schools/centres for people with special needs in Lagos. A pre-structured questionnaire was used to record the findings and socio-demographic information. The handicapped children were examined in their respective schools under natural light, using the Dental Aesthetic Index (DAI) assessments. The independent student's t-test was used for the comparison of mean DAI score between any two groups. The Bonferroni correction was applied to minimize the likelihood of type one error while undertaking multiple t-tests.

Results: There were no statistically significant differences ($p < 0.05$) in the mean DAI scores between gender and among the age groups. Severe malocclusion with treatment 'highly desirable' was found in 18%. Handicapping malocclusion where treatment was 'mandatory' was observed in 19%. One or more missing teeth were observed in 8.8%, while incisal crowding was seen in 28.4% and spacing in 58.8%. Irregularities in the maxillary and mandibular anterior segments were noted in 38.2% and 47.1%, respectively. Open bite was seen in about 25.5% of the study population. Class 1 molar relationship was found in 68.6% and 31.4% presented with half cusp and full cusp relationship.

Conclusion: A large proportion of the population had very severe malocclusion where treatment is considered mandatory. The mentally disabled had higher frequencies of all the malocclusion traits than normal Nigerian children with the exception of crowding.

DESCRIPTORES

Epidemiologia; Malocclusão; Portadores de Necessidades Especiais;

DESCRIPTORS

Epidemiology; Malocclusion; Disabled Persons.

INTRODUCTION

Previous investigations into the challenge of providing dental care for the handicapped indicate that care remains grossly inadequate¹⁻⁴. The inequitable distribution of health care services to the handicapped is obviously contrary to several clauses in the Declaration of the Rights of the child and also of the Rights of the Mentally Retarded Persons adopted by the United Nations General Assembly in 1971⁵.

In the early years of the 20th century, individuals with mental retardation were generally isolated rather than encouraged to lead fulfilling and healthy lives^{6,7}. The insensitivity towards individuals with mental retardation has ranged from abject treatment less than human, to recognition as rightful members of society but with practices that continue to restrict integration into the mainstream of society⁸. The inappropriate stigma and stereotype images of children with mental retardation impact on their daily lives and may affect the implementation of needed health services including orthodontic care⁹. The fact, however, is that children with disabilities need functional and aesthetic considerations comparable to that of normal persons¹⁰. Previous studies indicate that the main benefit of orthodontic treatment to the patient may be improved dental aesthetics and psychosocial well-being^{11,12}.

The continuing deinstitutionalization process of persons with mental retardation is bringing the orthodontist into contact with those in need of special health services¹⁰. Trends of deinstitutionalization are also evident in Nigeria, where most of the special schools for the handicapped are non-residential¹³. Such trends in Nigeria suggest a possible increase in demand for dental services including orthodontic care by handicapped persons. These special needs population would most likely benefit from publicly financed programmes. However, the provision of orthodontic services in publicly funded programmes is becoming a concern with increasing number of orthodontic treatment needs vis-à-vis the inadequate financial and human (orthodontic specialists) resources¹⁴. Therefore, within the limits of the resources available there is a need to objectively quantify the proportion of the population that requires orthodontic treatment according to priority. The Dental Aesthetic Index (DAI) satisfies this need as well as being a simple and universally acceptable index, which can be used in epidemiological surveys to assess unmet treatment need¹⁵.

There are several reports on occlusion and malocclusion among Nigerian children which had focused on the normal population¹⁶⁻²². However, there are relatively few studies on the handicapped in Nigeria especially in relation to orthodontics^{13,23-25}. The most specific study in orthodontics in Nigeria regarding the mentally handicapped included children with Down's syndrome²⁵. Previous study

common amongst the handicapped²⁶. This suggests a need for this additional work on the subject excluding Down's syndrome cases.

Therefore, the aims of this study were: (1) to determine the prevalence of malocclusion and orthodontic treatment need in mentally handicapped children in Lagos, Nigeria using the DAI; and (2) to assess whether the observed malocclusion is affected by age and sex.

METHODOLOGY

This study was carried out in Lagos, the capital of Lagos State, and the commercial nerve centre of Nigeria with an estimated population of close to 12 million people. The study population consisted of 102 non-Down syndrome mentally handicapped children between 6 - 18 years of age from 5 special schools / centres for people with special needs in Lagos. There were 62(%) males and 40(%) females with a mean age of 13.8±2.9 years.

Prior consent to conduct the study was obtained from the respective school authorities and from the parents or guardians of the children/wards. A pre-structured questionnaire was used by the author to record the findings and socio-demographic information which included name, age, school/centre and gender. The handicapped children were examined in their respective schools under natural light. One of the authors examined their occlusions according to the WHO guidelines²⁷ on the use of the Dental Aesthetic Index (DAI). All 10 components of the DAI malocclusion traits were measured (Table 1).

Table 1. Dental Aesthetic Index (DAI).

DAI Components	Weights
1. Number of missing visible teeth (incisors, canine and premolar teeth in the maxillary and mandibular arches)	6
2. Crowding in the incisal segments: 0 = no segment crowded, 1 = 1 segment crowded, 2 = 2 segments crowded	1
3. Spacing in the incisal segments: 0 = no spacing, 1 = 1 segment spaced, 2 = 2 segments spaced	1
4. Midline diastema in millimeters	3
5. Largest anterior irregularity in the maxilla in millimetres	1
6. Largest anterior irregularity in the mandible in millimetres	1
7. Anterior maxillary overjet in millimetres	2
8. Anterior mandibular overjet in millimetres	4
9. Vertical anterior openbite in millimetres	4
10. Antero-posterior molar relation: Largest deviation from 3 normal either left or right: 0 = normal, 1 = ½ cusp either mesial or distal, 2 = one full cusp or more either mesial or distal	3
11. Constant	13
Total	DAI score

after their initial examination. Associations between the DAI scores on the two occasions were determined with the Spearman rank correlation coefficient. The rank order correlation ($r = 0.96$, $p < .001$) showed a high level of reliability for the DAI assessments.

The Epi Info Statistical software was used for data entry and analysis. Measures of central tendency and of dispersion were computed for all quantitative variables. For categorical variables, frequency distributions were generated. The independent student's t-test was used for the comparison of mean DAI score between any two groups. The Bonferroni correction was applied to minimize the likelihood of type one error while undertaking multiple t-tests. Therefore, difference in any two means was not considered statistically significant unless the p-value was consistent with the Bonferroni critical value. For the comparison of more than two means, this was evaluated by the analysis of variance (ANOVA), with the corresponding F-test and p-value used. Statistical significance was accepted at $P < 0.05$.

RESULTS

The distribution of the mean DAI scores of the subjects according to age and gender is shown in Table 2. There were no statistically significant differences ($P < 0.05$) in the mean DAI scores between gender and among the age groups.

Table 2. Mean, standard deviations and statistical correlation of DAI scores of mentally handicapped children..

Variable	N (%)	Mean + SD	95% CI	DF	F- statistic	F prob
Age (year)						
6-11	21	27.6±8.8	23-31			
12-15	47	27.5±9.3	24-30	1,101	0.73	0.48 (NS)
16-18	34	29.9±9.0	26-32			
Sex						
Male	62	27.1±8.2	25-29	1,101		
Female	40	30.3±10.1	27-33		3.01	0.08 (NS)

(NS = not significant).

The distribution of the treatment need in the entire population sample according to the DAI is shown in Table 3. About 41% of the children had a dental appearance where orthodontic treatment need is slight or not indicated. Children who had definite malocclusion with treatment considered elective accounted for about 23% of the study population. However, severe malocclusion with treatment highly desirable was found in 18%. Handicapping malocclusion where treatment was 'mandatory' was observed in 19%.

The frequency distribution of other malocclusion

mentally retarded children. Incisal crowding was seen in 28.4% of the population and spacing in 58.8%. Midline diastema was observed in 33.3% of the sample population. Irregularities in the maxillary and mandibular anterior segments were noted in 38.2% and 47.1%, respectively. Increased overjet for more than 3mm was seen in 25.5%. Reversed overjet accounted for 4.9%. Open bite was seen in about 25.5% of the study population. Class 1 molar relationship was found in 68.6% and 31.4% presented with half cusp and full cusp relationship.

Table 3. Orthodontic treatment need of mentally handicapped children according to the DAI.

DAI	Score Severity Levels	Frequency n	%
< 25	Normal or minor malocclusion no treatment need or slight need	42	41.2
26-30	Definite malocclusion treatment elective	23	22.5
31-35	Severe malocclusion treatment highly desirable	18	17.6
> 35	Very severe handicapping malocclusion treatment mandatory	19	18.6

Table 4. DAI component scores for mentally handicapped children.

DAI Components		Frequency	
		n	%
Missing teeth	> 1	9	8.8
Crowding	1-2	29	28.4
Spacing	1-2	60	58.8
Diastema (mm)	> 1	34	33.3
Anterior maxillary irregularity (mm)	> 1	39	38.2
Anterior maxillary irregularity (mm)	> 1	48	47.1
Maxillary overjet (mm)	> 1	26	25.5
Mandibular overjet (mm)	> 0	5	4.9
Open bite (mm)	> 0	26	25.5
Molar relationship	> ½ unit cusp	32	31.4

DISCUSSION

The results of this study indicated that far less than half (41%) of the mentally handicapped children had a dental appearance that required no orthodontic treatment. This is comparable to that of Onyeaso²⁵ for mentally handicapped children in Ibadan, Nigeria which reported about 42% not requiring treatment. This result is, however, lower than that reported by other authors¹⁹ in a comparable mean age group of normal Nigerian children. In this latter study, over 77% of the children had DAI scores of 25 or less with slight / no treatment need. Furthermore, the results of this study indicated that the mentally handicapped children had a significantly higher mean DAI score than the normal Nigerian

need for orthodontic treatment than the normal Nigerian children.

A large proportion of the children had severe to very severe malocclusion with treatment considered mandatory based on the decision points on the DAI scale. Unfortunately, the orthodontic treatment needs of these children may not be met due to environmental factors and individual characteristics. Those with mental retardation often lack the ability to recognize health problems and when they do recognize the need for services, many environmental and individual barriers prevent them from receiving necessary care²⁸. Constraints in a developing country like Nigeria are such that access to dental services including orthodontic care is impeded by several factors. These include the relatively low dental awareness²⁹, low number of orthodontic specialists, high cost of treatment, socio economic status of the patients and the lean budgetary allocation to oral health care¹⁹. However, with the recently introduced National Health Insurance Scheme, it is hoped that these children will have improved access to care especially with publicly funded programmes becoming more available²⁵.

In this study, there was no significant difference in mean DAI scores between boys and girls. Although, this does not agree with the earlier report on mentally handicapped children in Ibadan²⁵, it is consistent with the report on the normal population¹⁹. The insignificant differences in mean DAI scores between the age groups is in agreement with the previous studies^{19,25}.

Concerning the different malocclusion traits, hypodontia was found to occur in 8.8% of the study population which is comparable to that (7%) previously reported²³. Spacing occurred quite frequently among the mentally handicapped children and this is consistent with the literature on the Nigerian population^{17,18,22-25}. The higher prevalence of spacing in the mentally handicapped was a reflection of the higher frequency of missing teeth noted in such subjects²⁵, which our present study confirms.

About one-quarter of the study population noted with increased overjet is high when compared to 14% observed in the normal population¹⁸. It is also higher than that (19%) reported by Onyeaso²⁵. This is of orthodontic concern as previous studies have shown a relationship between trauma to anterior teeth and increased overjet^{30,31}. In a previous report³², children with cerebral palsy have a significantly increased overjet when compared with normal children. Children with cerebral palsy formed a large proportion of the study population. This may, therefore, explain the higher percentage of malocclusion in this study population when compared with the normal population.

Anterior open bite was observed in 25.5% of the study population which was higher than that (10.2%) noted in the normal population¹⁹. It is also higher than that (16%) reported for mentally handicapped children in Ibadan,

subjects. Factors associated with high incidence of open bite in mentally handicapped children include untoward habit development (including finger sucking, mouth breathing, tongue thrusting) and general poor muscle development⁷. Previous studies have shown that mental retardation is often associated with oral dysfunction^{33,34}. Oral dysfunctions and parafunctions of the masticatory system has been suggested as being responsible for the increased prevalence of malocclusion in mentally handicapped children³⁴.

About 31% of the population had molar relationship discrepancies which is higher than that reported in the normal population (16%)⁸. It was, however, lower than that reported by previous study (37%)²⁵. The latter report²⁵, included Down syndrome cases, unlike this present report.

CONCLUSIONS

- 1) A large proportion (19%) of the population had very severe malocclusion where treatment is considered mandatory;
- 2) The mentally disabled had higher frequencies of all the malocclusion traits than normal Nigerian children with the exception of crowding;
- 3) The mentally handicapped children had a worse dental appearance and hence more orthodontic treatment need compared with the normal Nigerian children.

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