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

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

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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.

DESCRIPTORS

Epidemiology; Malocclusion; Disabled Persons.
INTRODUCTION

Previous investigations into the challenge of providing dental care for the handicapped indicate that care remains grossly inadequate\(^8\). 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 1971\(^8\).

In the early years of the 20\(^{th}\) 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 society\(^6\). 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 care\(^9\). The fact, however, is that children with disabilities need functional and aesthetic considerations comparable to that of normal persons\(^10\).

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 services\(^10\). Trends of deinstitutionalization are also evident in Nigeria, where most of the special schools for the handicapped are non-residential\(^13\). 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) resources\(^14\). 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 need\(^15\).

There are several reports on occlusion and malocclusion among Nigerian children which had focused on the normal population\(^16-22\). 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 syndrome\(^25\). Previous study noted that except for Down’s syndrome and severe cerebral palsy, there was no clear evidence that malocclusion was common amongst the handicapped\(^26\). 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 guidelines\(^27\) 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 opercible in millimetres | 4 |
| 10. Antero-posterior molar relation: Largest deviation from 3 normal either left or right: 0 = normal, 1 =½ cusps either mesial or distal, 2 = one full cusp or more either mesial or distal | 3 |
| 11. Constant | 13 |
| **Total** | **DAI score** |

To assess the reproducibility of the measurement by the author, 30 subjects were re-examined three weeks
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.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N (%)</th>
<th>Mean ± SD</th>
<th>95% CI</th>
<th>DF</th>
<th>F -statistic</th>
<th>F prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-11</td>
<td>21</td>
<td>27.6±8.8</td>
<td>23-31</td>
<td>0</td>
<td>0.73</td>
<td>0.48 (NS)</td>
</tr>
<tr>
<td>12-15</td>
<td>47</td>
<td>27.5±9.3</td>
<td>24-30</td>
<td>1</td>
<td>1,101</td>
<td></td>
</tr>
<tr>
<td>16-18</td>
<td>34</td>
<td>29.9±9.0</td>
<td>26-32</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>62</td>
<td>27.1±8.2</td>
<td>25-29</td>
<td>1</td>
<td>1,101</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>40</td>
<td>30.3±10.1</td>
<td>27-33</td>
<td>3</td>
<td>0.08 (NS)</td>
<td></td>
</tr>
</tbody>
</table>

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 mean DAI score between any two groups.

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 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 traits based on the DAI components is shown in Table 4. One or more missing teeth were observed in 8.8% of the 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 3 mm was seen in 25.5%. Reversed overjet accounted for 4.9%. Open bite was seen in about 25.5% of the study population. Class I 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.

<table>
<thead>
<tr>
<th>DAI Score Severity Levels</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 25 Normal or minor malocclusion no treatment</td>
<td>42</td>
</tr>
<tr>
<td>need or slight need</td>
<td>41.2</td>
</tr>
<tr>
<td>26-30 Definite malocclusion treatment elective</td>
<td>23</td>
</tr>
<tr>
<td>31-35 Severe malocclusion treatment highly desirable</td>
<td>18</td>
</tr>
<tr>
<td>&gt; 35 Very severe handicapping malocclusion</td>
<td>19</td>
</tr>
<tr>
<td>treatment mandatory</td>
<td>18.6</td>
</tr>
</tbody>
</table>

Table 4. DAI component scores for mentally handicapped children.

<table>
<thead>
<tr>
<th>DAI Components</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing teeth</td>
<td>&gt; 1</td>
</tr>
<tr>
<td>Crowding</td>
<td>1-2</td>
</tr>
<tr>
<td>Spacing</td>
<td>1-2</td>
</tr>
<tr>
<td>Diastema (mm)</td>
<td>&gt; 0</td>
</tr>
<tr>
<td>Anterior maxillary irregularity (mm)</td>
<td>&gt; 0</td>
</tr>
<tr>
<td>Anterior maxillary irregularity (mm)</td>
<td>&gt; 0</td>
</tr>
<tr>
<td>Maxillary overjet (mm)</td>
<td>0</td>
</tr>
<tr>
<td>Mandibular overjet (mm)</td>
<td>&gt; 0</td>
</tr>
<tr>
<td>Open bite (mm)</td>
<td>&gt; 0</td>
</tr>
<tr>
<td>Molar relationship</td>
<td>&gt; ½ unit cusp</td>
</tr>
</tbody>
</table>

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 Onyeaso\textsuperscript{25} for mentally handicapped children in Ibadan, Nigeria which reported about 42% not requiring treatment. This result is, however, lower than that reported by other authors\textsuperscript{19} 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 children\textsuperscript{19}. This suggests that the mentally handicapped children have a worse dental appearance and hence more
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
care29. 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 care29. 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 available29.
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 studies19,25.
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 population17,18,22-25. The higher
prevalence of spacing in the mentally handicapped was a
reflection of the higher frequency of missing teeth noted in
such subjects24, 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 population19. It is also higher than that (19%)
reported by Onyeaso25. This is of orthodontic concern as
such subjects25, which our present study confirms.
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,
Nigeria25. It is, however, comparable to that (23%) reported
by Vigild23 for non-Down syndrome mentally handicapped
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 development1.
Previous studies have shown that mental retardation is often
associated with oral dysfunction22,34. Oral dysfunctions and
paraffunctions of the masticatory system has been suggested as being responsible for the increased
prevalence of malocclusion in mentally handicapped
children24.

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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