Evaluation of Dentofacial Changes and Temporomandibular Joint Status of Mentally Challenged Individuals Attending Special Schools in Vadodara District, Gujarat, India

Sachin Chaware1 *, Vrushali Thakare2 and Ajith Krishnan CG3

1Department of Prosthodontics, MGV KBI Dental College and Hospital, Panchavati, Nasik, Maharashtra, India
2Department of Public Health Dentistry, MGV KBI Dental College and Hospital, Panchavati, Nasik, Maharashtra, India
3Department of Public Health Dentistry, K.M. Shah Dental College & Hospital, Piparia, Vadodara, Gujarat, India

Abstract

Objectives: A cross sectional study was conducted to investigate the Dentofacial changes and TMJ status and of mentally challenged individuals attending special schools in Vadodara District, Gujarat, India.

Materials & Methods: A total of 277 individuals were surveyed of which 205 were males and 72 were females. The data was collected by using the WHO 1997 methodology.

Results: Clicking was the only positive finding observed for TMJ and it was seen in 11.02% of the study subjects. Tenderness and reduced jaw mobility was not seen among any of the study subjects. Crowding and spacing of anterior teeth was seen in 47.95% and 33.91% of the study subjects respectively. Anterior open bite was seen in 8.18% of the study subjects Molar discrepancy of half a cusp mesial or distal to normal was seen in 25.73% of the study subjects and 24.56% of the study subjects had molar discrepancy of one cusp or more mesial or distal to that of normal. Definite malocclusion was seen in 19.29%, severe malocclusion in 24 (14.03%) study subjects and 33 (19.29%) subjects had very severe malocclusion.

Conclusions: Dentofacial changes and TMJ status of Mentally Challenged Individuals attending special school in Vadodara District, Gujarat, India is poor with a greater deficit between the needs and services availability.

Keywords: Dentofacial changes; Mentally challenged individuals; Temporomandibular joint

Introduction

Mentally challenged individuals have an intellectual ability significantly lower than average and limited ability to adapt to the environment. Mental disability is a general term used when an individual’s intellectual development is significantly lower than average and his or her ability to adapt to the environment is consequently limited [1]. According to American Association of Mental Retardation (AAMR), mental retardation is a disability that occurs before age 18. It is characterized by significant limitations in intellectual functioning and adaptive behaviour as expressed in conceptual, social and practical adaptive skills [2,3]. Mentally challenged subjects are found in all societies of the world. Globally, the prevalence is estimated to be 30 per thousand [4]. Data related to prevalence of mentally challenged subjects in India is very rare. According to the National Sample Survey Organization in India, in 1991, out of 1000 children in the rural areas, 31 had some developmental delayed, whereas in urban areas 9 out of every 1000 children were developmentally delayed [5]. Mentally challenged subjects may have impaired mobility, neuromuscular problems (drooling, gagging and swallowing problems), uncontrolled body movements, gastroesophageal reflux or seizures etc. They may also exhibit delay in language development, deficits in memory skills and are at a greater risk for health problems, require extra help and rely on others to achieve and maintain good health. Oral health is not an exception to this and may result into inadequate oral care and put them at higher risk for developing oral health problems [6-9].

Evaluation of occlusal dysfunction, several studies have reported that high prevalence of crowding, spacing, missing and irregularities associated with maxillary and mandibular teeth [9-11]. Significant prevalence of anterior open bite and cross bite was reported by Asokan et al. [12], whereas, Adenubi et al. [13] reported 15% of subjects with malocclusion of which 40% had anterior open bite, and 10% had anterior cross bite. Similar status was reported by Vigilid [14]. Oredugba and Akindayomi [9] reported highest prevalence of Angle’s class I malocclusion followed by Angle’s class II and Angle’s class III. Svatun and Heloe [15] reported Angles class III malocclusion in 16% of the mentally challenged. Oredugba [16] reported 51% of the study subjects with Down syndrome to have Class I malocclusion. Mestrovic et al. [17] reported class III malocclusion in 43.8% of the study subjects. Regarding temporomandibular joint dysfunction, significant prevalence temporomandibular joint click was reported by Asokan et al. [18]. The similar finding was reported by Bhowate and Dubey [19] and Desai et al. [20]. It has been observed from the available literature that Dentofacial changes and TMJ Status of mentally retarded individuals have received very little attention. Surprisingly scares information is available on the Dentofacial changes and TMJ Status of these individuals and no such information could be retrieved for Vadodara District. More studies are thus essential to facilitate the integration of dental preventive regimens into the treatment protocol in order to establish desirable preventive measures and oral health care. Hence the present study was carried out.

*Corresponding author: Dr. Sachin Chaware, Mango 602, Dream City, Takli Road, Nasik Road, Nasik, Maharashtra, India, Tel: 919405310342; E-mail: sac32in@yahoo.in

Received July 22, 2014; Accepted September 23, 2014; Published September 26, 2014


Copyright: © 2014 Chaware S, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.
to investigate the Dentofacial changes and TMJ status and of mentally challenged individuals attending special schools in Vadodara District.

Materials and Method

A cross sectional study was conducted to assess Dentofacial changes and TMJ Status of mentally challenged individuals attending special schools in Vadodara city. Prior to the start of the study, permission was taken from the concerned authorities after explaining purpose and procedure of the study. A voluntary informed verbal consent was taken from each study subject before examination. The oral examination of the study subjects was carried out using Basic Oral Health Surveys, WHO 1997 criteria [21]. WHO Oral Health Assessment forms were used to record the data. The examination was carried out by a single examiner, trained and calibrated prior to the study and recorded by a trained recording clerk.

Inclusion criteria

1) All the mentally challenged individuals attending special schools in Vadodara City.
2) Sex: Both the genders males as well as females were included.

Exclusion criteria

1) Study subjects who are contraindicated for examination.
2) Study subjects with previous history of obnoxious behaviour as informed by the school authority.
3) Study subjects for whom permission was not granted by the authorities.

Examination Procedure

The demographic data of the study subjects was recorded by the trained personal. The study subject was then made to sit on a comfortable chair. The oral examination was carried out by the single examiner and the data was recorded by the recorder. Clinical findings were reported to the authorities of special schools at the end of the examination procedure. A health talk was given to the study subjects, teachers of respective special schools after completion of data collection.

Observations and Results

There are a total of nine special schools for mentally challenged individuals in Vadodara District, of which eight were included in our study as one of the institutions was not willing to participate in the study. Out of total 294 study subjects in the eight institutions, oral examinations of 277 study subjects were carried out using WHO 1997 criteria. Remaining 17 subjects could not be examined because of severe uncooperative behaviour or not being present on the day of examination and hence were excluded from the analysis.

Distribution of the study subjects

Table 1, Figures 1 and 2: Distribution of total sample by age and sex

<table>
<thead>
<tr>
<th>Age Group (Yrs)</th>
<th>Male (%)</th>
<th>Female (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 6 yrs</td>
<td>4 (80.00%)</td>
<td>1 (20.00%)</td>
<td>5 (1.80%)</td>
</tr>
<tr>
<td>6-12 yrs</td>
<td>72 (71.28%)</td>
<td>29 (28.71%)</td>
<td>101 (36.46%)</td>
</tr>
<tr>
<td>12-18 yrs</td>
<td>85 (76.57%)</td>
<td>26 (23.42%)</td>
<td>111 (40.07%)</td>
</tr>
<tr>
<td>18 yrs and above</td>
<td>44 (73.33%)</td>
<td>16 (26.66%)</td>
<td>60 (21.66%)</td>
</tr>
<tr>
<td>Total</td>
<td>205 (74.00%)</td>
<td>72 (26.00%)</td>
<td>277 (100.00%)</td>
</tr>
</tbody>
</table>

Table 2 and Figure 3: Number and percentage of subjects with TMJ findings like clicking, tenderness (on palpation) or reduced jaw mobility (opening less than 30mm)

Temporomandibular joint finding

Temporomandibular joint was examined for clicking, tenderness (on palpation) or reduced jaw mobility (opening less than 30 mm). Number and percentage of subjects with TMJ findings have been presented in Table 2 and Figure 3. Clicking was the only positive finding recorded in all the age groups except those below 6 years. It was seen in 30 (11.02%) study subjects had clicking at the time of examination. Percentage of clicking increased with age and was highest in the age group above 18 years. This difference was significant statistically. (P=0.002)

Table 3 : Number and percentage of subjects with crowding, spacing, diastema, anterior maxillary and mandibular irregularity

Crowding was seen in 82 (47.95%) and 58 (33.91%) subjects had...
spacing of anterior teeth. 28 (16.37%) study subjects had midline diastema. Anterior maxillary and mandibular irregularity was present respectively in 70 (40.93%) and 68 (39.76%) study subjects.

Table 4: Number and percentage of subjects with maxillary and mandibular overjet, open bite and antero-posterior molar relationship.

Maxillary over jet was present in 135 (78.94%) study subjects, mandibular over jet (cross bite) in 13 (7.60%) and open bite in 14 (8.18%) study subjects. Remaining 9 (5.28%) study subjects had edge to edge bite. 85 (49.70%) subjects had normal anterio-posterior molar relation. 44 (25.73%) study subjects had lower first molar that is half to edge bite. 85 (49.70%) subjects had normal anterio-posterior molar relationship. 70 (40.93%) and 68 (39.76) study subjects. Anterior maxillary and mandibular irregularity was present respectively in 70 (40.93%) and 68 (39.76) study subjects.

Figure 3: Number and percentage of subjects with TMJ findings like clicking, tenderness (on palpation) or reduced jaw mobility (opening less than 30mm).

Figure 4: Number of subjects with dentofacial anomalies by level of severity.

As shown in Table 4 and Figure 3, 81 (47.36%) subjects had no or minor malocclusion. Definite malocclusion was seen in 33 (19.29%), severe malocclusion in 24 (14.03%) study subjects and 33 (19.29%) subjects had very severe malocclusion. No statistically significant difference was seen in the prevalence of malocclusion as per age or gender (P>0.05).

Discussion

Mentally challenged individuals have an intellectual ability significantly lower than average and limited ability to adapt to the environment. They have impaired physical coordination and cognitive sequencing skill that limit independence in task completion and may result in an inability to maintain proper oral hygiene. These individuals are particularly vulnerable to having unmet health care needs as they are faced with many challenges in understanding and maintaining their health. Maintenance of oral health in these subjects is further complicated by systematic problems [22], unwillingness by dentist to treat these subjects [23], operating loss of dentist in treating these subjects, higher costs of treatment [24], severe behavioural problems, assistance or support needed from caretakers to maintain their oral health, adverse habits like lip biting, tongue thrusting etc.

Table 3: Number and percentage of subjects with crowding, spacing, diastema, anterior maxillary and mandibular irregularity.

Table 5 and Figure 4: Percentage of subjects with dentofacial anomalies by level of severity.

There were total 277 study subjects with age range of 4yrs to 30 years which were divided as below 6 years, 6-12yrs, 12-18 years and 18years and above. Out of 277 study subjects, 74.00% were males and 26.00% were females. Percentage of males was higher than females in all the three age groups (Table 1 and Figure 1,2).

TMJ clicking was seen in 11.02% study subjects. It was highest in the age group 18 years and above (21.66%) and more in males than females (Table 2 and Figure 3). This finding was in contradiction to the study conducted by Asokan et al. [18] in which none of the study subject had clicking.

TMJ problems recorded in the these subjects may be due the presence of malocclusion, occlusal discrepancy, parafunctional habits like bruxism, masticatory dysfunction, hypotonia and hyperextensibility of joints, uncoordinated and uncontrolled movements of jaw etc. Similar justifications were given by Bhowate R and Dubey [19] and Desai et al. [20]. TMJ clicking in the present study was found to increase with increase in age (P<0.05). This may be because age acts as a risk factor.
for TMJ disorders (although not very serious) and TMJ disorders tend to affect people between the ages of 20 and 50 years [25].

Dentofacial anomalies were measured for the study subjects from the age of 12 years and above. 4.09% and 2.92% of the study subjects had missing teeth in maxillary and mandibular arch respectively. Oredugba [16], Rao et al. [26] reported slightly higher prevalence of missing anterior teeth compared to present study. Crowding and spacing of anterior teeth was seen in 47.95% and 33.91% of the subjects respectively. 16.37% of the study subjects had midline diastema. Anterior maxillary and mandibular irregularity was present respectively in 40.93% and 39.76% of the subjects respectively (Table 3). Kawaguchi and Nakashima [10] reported similar prevalence of crowding as seen in the present study. Rao et al. [26], Oredugba and Akindayomi [9], Mestrovic et al. [17] recorded lower prevalence of crowding. Slightly higher prevalence of crowding compared to present study was reported by Oredugba [16]. Higher prevalence of spacing, midline diastema and lower prevalence of anterior maxillary irregularity and anterior mandibular irregularity compared to the present study was reported by Rao et al. [26]. Mandibular overjet was present in 78.94% of the study subjects, maxillary overjet was present in 7.60% of the study subjects and openbite in 8.18% of the study subjects (Table 4). Similar prevalence of openbite was reported by Rao et al. [26], Oredugba and Akindayomi [9], Adenubi et al. [13] and Nakashima [10] reported similar prevalence of no minor malocclusion and severe malocclusion as seen in the present study. Rao et al. [26], Oredugba and Akindayomi [9], Adenubi et al. [13] and Nakashima [10] reported similar prevalence of severe malocclusion as seen in the present study. Rao et al. [26], Oredugba and Akindayomi [9], Adenubi et al. [13] and Nakashima [10] reported similar prevalence of crowding as seen in the present study. Rao et al. [26], Oredugba and Akindayomi [9], Adenubi et al. [13] and Nakashima [10] reported similar prevalence of crowding as seen in the present study.

Normal anteriorposterior molar relation was seen in majority of the study subjects (49.70%) followed by subjects with half cusp (25.73%) or full cusp (24.56%) discrepancy (Table 4).

Normal anterioposterior molar relation was seen in majority of the study subjects (49.70%) followed by subjects with half cusp (25.73%) or full cusp (24.56%) discrepancy (Table 4). Similar findings about molar relation were recorded by Rao et al. [26] and Vigilid [14] reported similar prevalence of malocclusion of which 40% had anterior overjet and 10% had anterior crossbite. Vigilid [14] reported similar prevalence of mandibular overjet in mentally retarded and higher prevalence of anterior open bite compared to the present study. Normal anterioposterior molar relation was seen in majority of the study subjects (49.70%) followed by subjects with half cusp (25.73%) or full cusp (24.56%) discrepancy (Table 4).

Higher prevalence of spacing, midline diastema and lower prevalence of anterior maxillary irregularity and anterior mandibular irregularity compared to the present study was reported by Rao et al. [26]. Mandibular overjet was present in 78.94% of the study subjects, maxillary overjet was present in 7.60% of the study subjects and openbite in 8.18% of the study subjects (Table 4). Similar prevalence of openbite was reported by Rao et al. [26], Oredugba and Akindayomi [9], Adenubi et al. [13], and Nakashima [10] reported similar prevalence of anterior maxillary irregularity and anterior mandibular irregularity compared to the present study. Rao et al. [26], Oredugba and Akindayomi [9], Adenubi et al. [13] and Nakashima [10] reported similar prevalence of crowding as seen in the present study. Rao et al. [26], Oredugba and Akindayomi [9], Adenubi et al. [13] and Nakashima [10] reported similar prevalence of crowding as seen in the present study. Rao et al. [26], Oredugba and Akindayomi [9], Adenubi et al. [13] and Nakashima [10] reported similar prevalence of crowding as seen in the present study.

Normal anterioposterior molar relation was seen in majority of the study subjects (49.70%) followed by subjects with half cusp (25.73%) or full cusp (24.56%) discrepancy (Table 4). Similar findings about molar relation were recorded by Rao et al. [26] and Vigilid [14]. Oredugba and Akindayomi [9] reported highest prevalence of Angle’s class I malocclusion followed by Angle’s class II and Angle’s class III. Svatun and Heloe [15] reported Angles class III malocclusion in 16% of the mentally challenged. Oredugba [16] reported 51% of the study subjects with Down syndrome to have Class I malocclusion which can be correlated with normal molar relation in our study and 47% had class III malocclusion. Amajji et al. [27] reported majority of mentally challenged study subjects with Angle’s Class I malocclusion.

Mestrovic et al. [17] reported class III malocclusion in 43.8% of the study subjects. Variation in findings in different studies may be attributed to difference in indices used to record malocclusion, variation in severity of mental subnormality, types of mental subnormality included in different studies etc.

There was no significant association between percentage of subject with various dentofacial anomalies among age groups except for diastema and open bite (P<0.05). No statistically significant gender difference was observed for various dentofacial anomalies. The percentage of subjects with no or minor malocclusion was 47.36%. Definite, severe and very severe malocclusion was seen in 19.29%, 14.03% and 19.29% subjects respectively (Table 5 and Figure 4). This finding was in accordance with that reported by Rao et al. [26]. Onyeaso [28] has reported similar prevalence of no minor malocclusion and severe malocclusion but higher prevalence of very severe malocclusion compared to the present study.

Higher prevalence of malocclusion in the present study can be attributed to various etiological factors like deficient maxillary growth, abnormal tongue size and various harmful habits [22]. Disharmonious relationship between intraoral and perioral movements, uncoordinated and uncontrolled movements of jaws, lips and tongue, retardation of growth of jaws and their placement anterior to the cranial base may be some of the factors responsible for higher prevalence of malocclusion.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>No abnormality / Minor malocclusion (%)</th>
<th>Definite malocclusion (%)</th>
<th>Severe Malocclusion (%)</th>
<th>Very severe Malocclusion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-17yrs (n=111)</td>
<td>51 (45.94)</td>
<td>x2= 0.257 df=1 P=0.612 NS</td>
<td>21 (18.91)</td>
<td>x2 = 0.029 df=1 P=0.864 NS</td>
</tr>
<tr>
<td>18-30yrs (n=60)</td>
<td>30 (50.00)</td>
<td>12 (20.00)</td>
<td>6 (10.00)</td>
<td>12 (20.00)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>Male (M=129)</th>
<th>Female (F=42)</th>
<th>Total (n=171)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male (M=129)</td>
<td>64 (49.61)</td>
<td>17 (40.47)</td>
<td>81 (47.36)</td>
</tr>
<tr>
<td>Female (F=42)</td>
<td>17 (40.47)</td>
<td>22 (47.62)</td>
<td>39 (22.92)</td>
</tr>
</tbody>
</table>

| Table 4: Number and percentage of subjects with maxillary and mandibular overjet, open bite and antero-posterior molar relationship. |

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Maxillary overjet n (%)</th>
<th>Mandibular overjet n (%)</th>
<th>Openbite n (%)</th>
<th>Ant-post molar relation</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-17yrs (n=111)</td>
<td>87 (78.37)</td>
<td>x2=0.062 df=1 P=0.804 NS</td>
<td>10 (9.00)</td>
<td>x2 = 0.891 df=1 P=0.345 NS</td>
</tr>
<tr>
<td>18-30yrs (n=60)</td>
<td>48 (80)</td>
<td>3 (5.00)</td>
<td>9 (6.97)</td>
<td>5 (1.90)</td>
</tr>
<tr>
<td>Male (M=129)</td>
<td>99 (76.74)</td>
<td>x2 = 1.871 df=1 P=0.171 NS</td>
<td>12 (9.30)</td>
<td>x2 = 0.00 df=1 P=0.985 NS</td>
</tr>
<tr>
<td>Female (F=42)</td>
<td>36 (85.71)</td>
<td>1 (2.94)</td>
<td>9 (2.14)</td>
<td>5 (1.190)</td>
</tr>
<tr>
<td>Total (n=171)</td>
<td>135 (78.94)</td>
<td>13 (7.60)</td>
<td>24 (13.04)</td>
<td>14 (8.18)</td>
</tr>
</tbody>
</table>

| Table 5: Number and percentage of subjects with dentofacial anomalies by level of severity. |
seen in the present study. Functional anomalies of the tongue and perioral muscles, particular pattern of oral habits, incompetent lip among the mentally retarded may also play a vital role. Mentally subnormal child is sensitive and more vulnerable to stress because it has inadequate concept of its environment. This may result in emotional insecurity and forces the child to diversify into deleterious oral habits like thumb sucking, tongue thrusting etc. These habits bring about harmful unbalanced pressures to bear upon the immature, highly malleable alveolar processes and the potential changes in position of teeth in occlusion [29]. Similar interpretations were given by Nunn [30], Vigilid [14], Bhowate and Dubey [19], Winter et al. [31].

Higher prevalence of malocclusion as compared to the present study was reported by Desai et al. [20] and Vittek et al. [32], Mestrovic et al. [17]. Desai et al. [20] correlated the severity of malocclusion with level of dependency among study subjects. Studies conducted by Scott et al. [33], Adenubi et al. [13], Bhowate and Dubey [19], Asokan et al. [12] reported lower prevalence of malocclusion as compared to the present study. The variation in malocclusion may be due to diverse methodologies employed in assessment of malocclusion, dissimilar percentage of various types and degrees of mental subnormality, geographic and genetic disparities among study subjects etc. Similar observations were made by Onyeaso [28], Vittek et al. [32]. Although there is considerable information available about the occlusal pattern of normal children, there is a paucity of comparable information about mentally challenged there by making comparison of findings difficult. There was no statistically significant difference in level of severity between males and females (P>0.05) which was in agreement to that seen by Vigilid [14]. A contradictory finding was reported by Onyeaso [28] wherein a significant gender difference in the dental aesthetic index (DAI) scores was observed. No statistically significant difference in the severity of malocclusion as recorded by DAI was observed in age groups (P>0.05). The findings of the study indicate that there is a high prevalence of Dentofacial anomalies in mentally challenged study subjects in Vadodara District.

Conclusion

1. Clicking was the only positive finding observed for TMJ and it was seen in 11.02% of the study subjects. Tenderness and reduced jaw mobility was not seen among any of the study subjects.

2. Crowding and spacing of anterior teeth was seen in 47.95% and 33.91% of the study subjects respectively. Anterior open bite was seen in 8.18% of the study subjects.

3. Molar discrepancy of half a cusp mesial or distal to normal was seen in 25.73% of the study subjects and 24.56% of the study subjects had molar discrepancy of one cusp or more mesial or distal to that of normal.

4. Definite malocclusion was seen in 19.29%, severe malocclusion in 24 (14.03%) study subjects and 33 (19.29%) subjects had very severe malocclusion.

Thus it is concluded from the observations of the present study that the Dentofacial change and TMJ Status of mentally challenged study subjects attending special schools in Vadodara District is poor and there is a significant unmet need for dental preventive and treatment services.

References

2. Introduction to Mental Retardation.
6. Disorder Information Sheet.


25. Lim C. Temporal Solution - Temporil Disorders.


