THE OCCURRENCE OF TEMPOROMANDIBULAR DISORDERS IN SUBJECTS PRESENTED WITH DENTOFACIAL DEFORMITIES

Ocorrência de disfunção temporomandibular em indivíduos com deformidade dentofacial

Dannyelle Christinny Bezerra de Oliveira Freitas Passos (1), Paulo César Rodrigues Conti (2), Hugo Nary Filho (3), Giédre Berretin-Felix (2)

INTRODUCTION

Dentofacial deformity (DFD) is the result of alterations in the growth and development of facial bones, leading to changes in the position of the teeth and the occlusion, as well as in facial aesthetics, oral functions and function of other structures such as articulations, muscles, teeth and periodontal ligament (1). The pre-surgical orthodontic treatment promotes alignment and leveling of the teeth within their bone bases, correcting all possible dental compensation, aiming at the future balance between the mandible and maxilla (2,3), as well as facial and dental harmony, with functional occlusion and stability of the orofacial structures, following the orthognathic surgery (4).

Cases of temporomandibular dysfunction (TMD) can be found, associated with the presence of dental occlusal imbalance (5-7), corresponding to the generic term of a clinical set of signs and symptoms involving the masticatory muscles, the temporomandibular joint (TMJ) and associated structures (8-10). The etiology of this dysfunction is multifactorial, however, the literature has stated that the presence or absence of occlusal changes, necessarily, does not cause signs and symptoms of TMD (11-14).

ABSTRACT

Purpose: to investigate the occurrence of temporomandibular dysfunction in subjects with dentofacial deformity. Methods: 60 subjects of both sexes and aged between 18 and 40 years (mean = 27 years) and formed two groups, one composed of 30 subjects with dentofacial deformity undergoing presurgical orthodontic treatment were evaluated and a control group consisted of 30 individuals with dentofacial balance, paired to dentofacial group, according to gender and age. Anamnestic questionnaire of temporomandibular dysfunction and Axis 1 of Research Diagnostic Criteria for Temporomandibular Disorders were applied, respectively, so as to verify and rate the degree and type of temporomandibular disorders. Results: the results of the questionnaire demonstrated that dentofacial group presented a greater dysfunction degree and score than control group (p <0.01). From the Research Diagnostic Criteria for Temporomandibular Disorders, a greater occurrence of diagnoses involving disc displacement (p = 0.02) and arthritis, arthrosis and arthralgia (p <0.01) for dentofacial group, in relation to control group, was verified. Conclusion: individuals with dentofacial deformity had increased incidence of temporomandibular dysfunction, compared with individuals with dentofacial equilibrium, in the sample studied.

KEYWORDS: Temporomandibular Joint Disorders; Maxillofacial Development; Malocclusion
The presence of TMD has been largely discussed in all stages of DFD treatment, and the literature shows that subjects present a high rate of TMD signs and symptoms in the pre-surgical orthodontic treatment phase as compared to post-surgical one15-22. Nevertheless, although some authors have verified a reduction in the occurrence of TMD in individuals, following the orthognathic surgery, they report no relationship between dentofacial deformities and TMD23,24.

Studies relating TMD and DFD abound in the literature, however, most compare their findings between preoperative and postoperative periods, some being contradictory, therefore, impairing the understanding of professionals regarding the treatment of TMD in subjects with or without occlusal changes. Thus, this study aimed at verifying the occurrence of temporomandibular dysfunction in individuals presented with dentofacial deformity.

■ METHODS

This observational cross-sectional study was approved by the research ethics committee of the Bauru School of Dentistry, University of São Paulo (process 049/2009) and all participants signed the informed consent.

Sixty subjects in the age range 18-40 years (mean = 27 years), participated in the study, taking into account the following exclusion criteria: intellectual deficits, neurological, psychiatric disorders and / or syndromes, arthritis, history of facial trauma and prior orthognathic surgery. The participants were divided into two groups:

- The group with DFD (GDFD), which consisted of 30 subjects, 19 females and 11 males, in their final stage of the preparatory orthodontic treatment for the orthognathic surgery, 19 female and 11 male. Out of these individuals, 18 presented facial pattern III (12 females and six males) and 12, facial pattern II (seven females and five males). The inclusion criteria were: being in pre-surgical orthodontic treatment and present DFD, as diagnosed by clinical and radiographic exams.
- The group with no deformity, control group (CG), comprised 30 individuals paired according to gender and age with the DFDG. They underwent interviews and orofacial myofunctional assessment through the MBGR – orofacial myofunctional examination25, so as to see if they met the following inclusion criteria: to present good general health, absence of rheumatic diseases, no DFD, good relationship between dental arches, with vertical and horizontal overlap between 1 and 3 mm, natural teeth at least up the second molar, middle facial type, nasal breathing. An anamnesis questionnaire containing 10 questions asked by a single researcher, in order to rate TMD in terms of presence and degree, was applied. Three answers are offered to the questions: "yes", "no" or "sometimes", and a value is assigned. The sum of the values (scores) allows sample classification by TMD (TMD index). Values from 0 to 3 indicate the absence of TMD (0); values from 4 to 8, the presence of mild TMD; 9 to 14, moderate TMD; and severe TMD, when the sum of the values of the responses was between 15 and 2326. For the results of this questionnaire, the subjects in both groups were classified according to TMD index (no TMD, mild, moderate or severe TMD) and individual scores, i.e., the values obtained from the sum of the responses.

The subjects underwent clinical exam as well – Axis 1 of the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD), for classification based on the signs and symptoms of TMD, this examination being performed by a single researcher. Based on the specifications of the RDC / TMD, the clinical evaluation assessed the following aspects: opening pattern, extent of mandibular movement (opening, laterality, protrusion), overbite, noise and pain in the TMJs during mandibular extension movements, muscular and articular palpation. From the data collected, the individuals were diagnosed and classified according to the examination criteria, into: GI – muscular diagnoses, GII – disc displacement and GIII – arthralgia, arthritis, arthrosis. The data were tabulated in a database and analyzed, statistically, using Mann-Whitney and Chi-square. The Mann-Whitney test was used for comparison, between the two groups (DFDG and CG), of the procedure with ordinal qualitative variable (anamnesis questionnaire), using the TMD index rating (no TMD, mild, moderate or severe TMD) and the individual scores.

On the other hand, the Chi-square test was used for comparison, between the two groups (DFDG and CG), of items with nominal variable (RDC / TMD), using the classification, according to the diagnosis according to the examination criteria: GI – muscular diagnosis, GII – disc displacement, and GIII – arthralgia, arthritis, arthrosis. Data analysis was performed by using the Statistica V.5.3 software, Statsoft Inc., Tulsa, USA, with a significance level of 5% (p <0.05).

■ RESULTS

Figure 1 shows the results of using the anamnesis questionnaire, in which the predominance of the absence of TMD (66.67%) and the mild degree (20.00%) of this dysfunction when present for the CG, is observed. Mild (57.00%), moderate
significant difference (p = 0.00) was observed between the groups, based on the results, showing that the DFD group presented a higher degree and score of TMD than the CG.

Table 1 shows the average and median values of the results obtained with an anamnesis questionnaire, when comparing DFDG and CG. A statistically significant difference.* was found for the DFD group in relation to the controls, with a statistically significant difference between the groups only for articular diagnoses GII (p = 0.02) and GIII (p = 0.00).
Table 2 – Comparison between group of dentofacial deformity (DFDG) and control group (CG), in relation to the diagnosis of TMD, considering the classification of the clinical exam of Research Diagnostic Criteria for Temporomandibular Disorders

<table>
<thead>
<tr>
<th>Group</th>
<th>RDC/TMD</th>
<th>Value of “p”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GI</td>
<td>NO</td>
</tr>
<tr>
<td>CG</td>
<td>YES</td>
<td>09 (30.00%)</td>
</tr>
<tr>
<td>DFDG</td>
<td>15 (50.00%)</td>
<td>15 (50.00%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG</td>
<td>11 (36.67%)</td>
<td>19 (63.33%)</td>
</tr>
<tr>
<td>DFDG</td>
<td>20 (66.67%)</td>
<td>10 (33.33%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG</td>
<td>12 (40.00%)</td>
<td>18 (60.00%)</td>
</tr>
<tr>
<td>DFDG</td>
<td>24 (80.00%)</td>
<td>06 (20.00%)</td>
</tr>
</tbody>
</table>

Subtitles: control group; DFDG – group of dentofacial deformity; RDC/TMD – Research Diagnostic Criteria for Temporomandibular Disorders; GI: Muscular diagnoses; GII: Disc displacement; GIII: Arthralgia, arthritis, arthrosis. *Statistically significant difference. Chi-square test

DISCUSSION

The importance of occlusion and its relationship between the cause or maintenance of TMD cases, compared with other factors, specifically in individuals presented with DFD, has been widely discussed in the literature. The present study found that 97% of subjects with DFD showed some degree of TMD, while in the CG, the percentage of this disorder was 33%, which may be linked to the fact that TMD symptoms such as pain, are often the main complaint of patients presented with malocclusion.

According to the literature, individuals who have certain occlusal problems, mainly the most severe ones, as that studied here, have an expressively higher prevalence of TMD signs and symptoms than subjects with normal occlusion, owing to an interdependence between the conditions of the teeth and bones, since a normally functioning TMJ relies on good occlusion.

Furthermore, a statistically significant result has been observed, when comparing the severity of the dysfunction between DFDG and CG, for the degree of TMD and scores obtained by applying the anamnesis questionnaire, showing a greater occurrence of TMD, to some degree, in the DFDG, as compared to the CG. Thus, the findings of this study are consistent with the data in the literature, since different authors have observed a prevalence of TMD signs and symptoms in subjects presented with DFD, in the pre-surgical orthodontic period, as compared to controls. It is worth noting the methodological differences between the studies, as in the literature, other instruments have been used, different from the anamnesis questionnaire applied in this research, nevertheless, they used the clinical exam of TMJs, analogue visual scale, Helkimo’s anamnesis and dysfunction index or applied the RDC/TMD protocol. As for the diagnosis of TMD, held from the application of the clinical examination (axis I) of the RDC/TMD protocol, a higher occurrence of articular diagnoses GII (disc displacement) was revealed and GIII (arthralgia, arthritis, arthrosis), for the DFDG group, as compared to the control group. Corroborating the results of this study, Farella et al., found that 50% of the subjects presented articular diagnosis (GII). However, according to Abrahamsson et al., a different result was seen, using the same test protocol, with a prevalence of muscular TMD diagnosis (GI) in individuals presented with DFD, as compared to the control group with normal occlusion, with statistical significance among the three types of diagnoses (GI, GII and GIII), when the groups were compared. The differences in relation to the present study may be justified by the fact that, in the study by Abrahamsson et al., despite the larger sample, the control group was not matched by gender and age. The prevalence of articular diagnoses (GII and GIII) in subjects with DFD, in this study, can be attributed to the skeletal and dental imbalance in these individuals, which is not present in the controls, since internal changes in the TMJs of...
Thus, interdisciplinary assistance, in all phases of the orthodontic-surgical treatment is necessary, since the etiology of TMD has multi-factorial origins and needs continuous monitoring of all causal factors for a better prognosis, aiming at the best approach to treat these patients.

**CONCLUSION**

This study showed that individuals presented with dentofacial deformity had an increased incidence of temporomandibular dysfunction in relation to the degree and classification of the dysfunction, as compared to patients with dentofacial balance, in the sample.

**ACKNOWLEDGEMENT**

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