

Postural alterations as a risk factor for temporomandibular disorders

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ABSTRACT

The aims of this study were to estimate frequency and assess postural alterations as a risk factor for temporomandibular disorders (TMD).

Patients aged 10 to 15 years ($N=243$, mean age 12.6) seeking comprehensive dental care were analyzed according to RDC/TMD. For static postural assessment, photographs were taken and analyzed by a physiotherapist following Kendall's model. Patients were divided into: A: without TMD ($n=133$); B: with muscle disorders ($n=61$); C: with disk displacement ($N=49$).

No difference in age was observed between groups ($p=0.95$). Significant association was observed between muscular TMD

and alterations in spinal curves, head posture, and lower limbs: OR: 3.40, 2.44 and 2.22 respectively. The most frequent types were hyperlordosis 23.30 and 32.78%; forward head posture 39.85 and 52.45%; and genu valgum 33.08 and 45.90% in A and B respectively.

Alterations in head posture, vertebral curves and lower limbs could be considered risk factors for muscular TMD. The most frequent postural alterations were lumbar hyperlordosis, forward head posture and genu valgus.

Key words: Temporomandibular Joint Disorders, posture, child.

Alteraciones posturales como factor de riesgo para trastornos temporomandibulares

RESUMEN

Los objetivos de este estudio fueron estimar la frecuencia y evaluar las alteraciones posturales como factor de riesgo para trastornos temporomandibulares (TTM).

Se evaluaron pacientes de 10 a 15 años ($N=243$, edad media 12.6) que concurren para atención odontológica integral utilizando los protocolos CDI/TTM años. La evaluación postural estática, se realizó mediante fotografías analizadas por un fisioterapeuta siguiendo el modelo de Kendall. Los pacientes se dividieron en diferentes grupos según el diagnóstico: A: sin TTM ($n=133$); B: con trastornos musculares ($n=61$) y C: con desplazamiento del disco ($n=49$).

No se observaron diferencias entre los grupos en la edad ($p=0,95$). Se observó asociación significativa entre TTM

muscular y alteraciones en las curvas espinales, la postura de la cabeza y los miembros inferiores: OR: 3,40, 2,44 y 2,22 respectivamente. Los tipos más frecuentes fueron hiperlordosis lumbar 23,30 y 32,78%; anteversión cefálica 39,85 y 52,45%; y genu valgum 33,08 y 45,90% en A y B, respectivamente.

Las alteraciones en la postura de la cabeza, las curvas vertebrales y los miembros inferiores podrían considerarse factores de riesgo para los TTM musculares. Las alteraciones posturales más frecuentes fueron hiperlordosis lumbar, anteversión cefálica y genu valgo.

Palabras clave: Trastornos de la Articulación Temporomandibular, postura, niño.

INTRODUCTION

The American Academy of Pediatric Dentistry (AAPD) has recognized the multifactorial aetiology of Temporomandibular Joint Disorders (TMJD), given the scant correlation between any given etiological factor and the onset of signs and symptoms¹. The posture of the head and of the body as a whole plays an important role in the development of temporomandibular disorders as a result of a chronically altered craniocervical posture that leads to mandibular postural changes through mechanical/biomechanical and neuromuscular mechanisms^{2,3}.

Findings reported by Ishii et al. in adult patients with TMD suggest a "close relationship between stomatognathic function and the center of gravity of the body"⁴. Several studies have shown patients with TMD to have a greater forward head posture, associated with shortening of extensor muscles in the back of the neck³. Although a review published in 2006 suggests association between the cervical spine, the stomatognathic system, and craniofacial pain, the work was based on data from poor quality studies with low levels of evidence (3b, 4 and 5). Better studies are therefore necessary to clarify the

influence of the cervical spine on the stomatognathic system and craniofacial pain⁵.

Cuccia and Caradonna recommend an interdisciplinary approach to TMD diagnosis and treatment, also involving experts in posture rehabilitation². As shown by our literature review, there are reports suggesting an association between posture and TMD. Interestingly, the review also showed that there are no interdisciplinary studies in children using the diagnostic criteria for TMD recommended by the IADR for epidemiological studies⁶.

Thus, the aims of the present work were to estimate the frequency of postural alterations, and assess their presence as risk factor for TMD in patients aged 10 to 15 years seeking dental care at the Comprehensive Dental Clinic for Children of the Department of Dentistry for Children of the School of Dentistry, University of Buenos Aires (FOUBA).

MATERIALS AND METHODS

A descriptive, prospective, cross-sectional interdisciplinary study was conducted; the study was approved by the Ethics Committee of the FOUBA (260912-27).

Subjects

The study sample comprised boys and girls aged 10 to 15 years seeking dental care at the Comprehensive Dental Clinic for Children of the Department of Dentistry for Children in the 2012-2013 period. The participants' caregivers provided informed consent. Children with developmental disorders, medical condition, and/or neurological or psychiatric disorders were excluded.

Diagnosis of TMD

Was performed by 4 paediatric dentists who were previously calibrated in the application of the

protocol for Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD). The kappa index was 0.88.

Static Postural assessment

Photographs (front, back and both sides) were taken of the patients standing in a relaxed upright position in front of a grid, and analysed by the team physiotherapist following Kendall's postural types considering head position, spinal curves, lower limbs, and anterior, lateral and posterior planes⁷. The camera was placed on a height-adjustable tripod with a standard distance of 1.5 m between the camera and the subjects.

The results were recorded and analyzed using mean, standard deviation, ANOVA, OR, percentages and 95% confidence intervals.

RESULTS

The subjects were divided into three groups: A: without TMD (n=133; 12.56 ± 1.69 years); B: with muscle disorders (n=61; 12.57 ± 1.90 years); and C: with disk displacement (n=49; 12.65 ± 1.82 years). There were no differences in age among groups (p= 0.95).

The frequency of postural alterations in the 3 groups, expressed as a percentage, is shown in Fig.1, which shows that the frequency of disorders was higher in the group with muscle disorders and that the most frequent disorder was head position.

Alterations in spinal curves, head and lower limbs were significantly associated with muscular TMD: OR: 3.40 (1.73-6.69), 2.44 (1.20-4.94), and 2.22 (1.19-4.15) respectively.

No significant association was observed among the anterior, posterior and lateral planes: OR: 1.37 (0.74- 2.53), 1.97 (0.80-4.86), 1.10 (0.58-2.07) (Table 1).

All variables had an OR <1 in group C, i.e. patients with disk displacement.

The most frequent variations in groups A and B were lumbar hyperlordosis [23.30% (16.40-31.44) and 32.78% (21.27-46.03)] in spinal curves, forward head posture [39.85% (31.44-48.71) and 52.45% (39.23-65.43)] in head posture, and genu valgus [33.08% (25.15-41.78) and 45.90% (33.03-59.18)] in lower limbs respectively (Figs.2 and 3).

DISCUSSION

To the best of our knowledge, there are no similar studies in paediatric patients in the literature. The

Table 1: Odds Ratio with confidence intervals.

	OR B vs A	OR C vs A
Spinal curves	3.40 (1.73-6.69)	0.83 (0.43-1.61)
Head	2.44 (1.20-4.94)	0.88 (0.45-1.71)
Lowerlimbs	2.22 (1.19-4.15)	0.66 (0.33-1.31)
Anterior plane	1.37 (0.74- 2.53)	0.84 (0.43-1.64)
Lateral plane	1.10 (0.58-2.07)	0.78 (0.38-1.60)
Posterior plane	1.97 (0.80-4.86)	0.65 (0.17-2.43)

A: without TMD, B: with muscle disorders and C: with disk displacement.

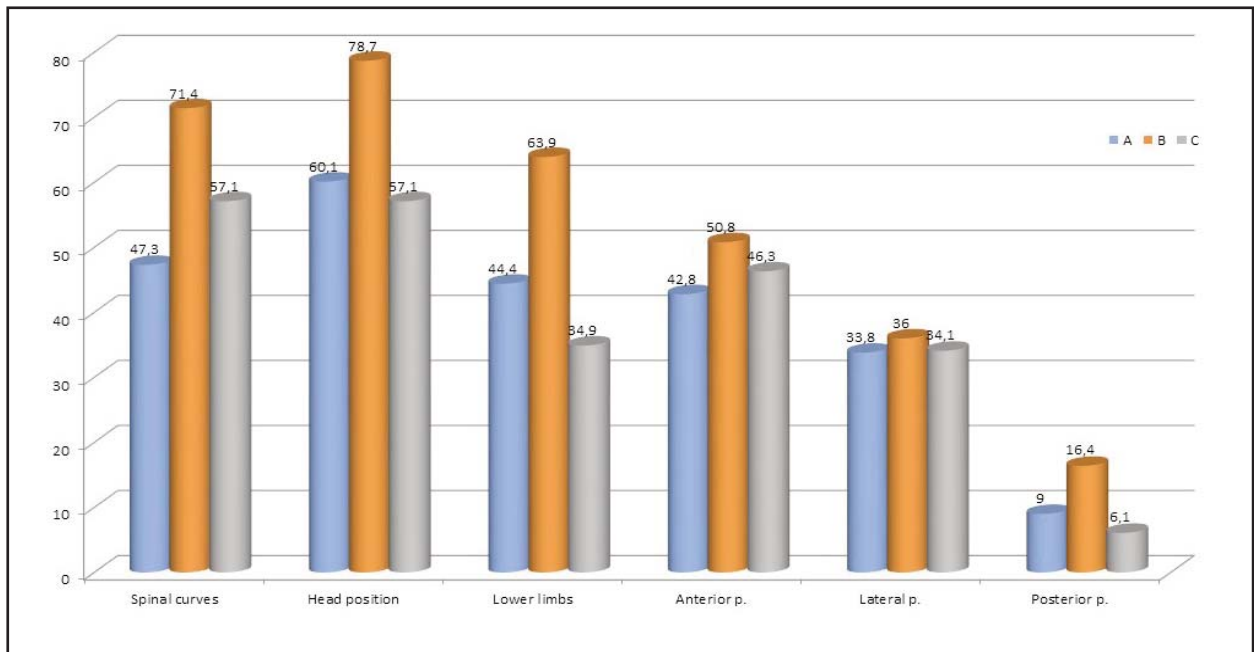


Fig. 1: Frequency of postural alterations in all groups. A: without TMD, B: with muscle disorders and C: with disk displacement.



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Fig. 3: Left knee tilted toward the midline (Genu Valgum).

methodology used to assess TMJ and posture in large samples is complex and requires the availability of adequate physical space and sufficient time to perform assessments on each child.

A similar study conducted in a sample of 30 adult patients with TMD and 20 adult patients without TMD, published in 2005, showed no significant results on account of the great dispersion of data resulting from the large number of variables used to assess posture and the small sample size⁸.

There are discrepancies among reports in the literature on postural alterations in children. A recent study on children aged 9 ± 1 reported a 25.4% frequency, whereas a study conducted on 11-year-old children in the Czech Republic showed 40.8% prevalence of postural disorders, with 32% corresponding to lumbar hyperlordosis^{9,10}.

A systematic review seeking to evaluate the contribution of posture and psychosocial factors to the development of musculoskeletal pain in children and adolescents concluded that the duration of sitting posture may influence the experience of musculoskeletal pain¹¹.

Saito et al. analysed posture in adult women with and without disk displacement. Their results suggest a close association between body posture and temporomandibular disorders, and that posture assessment could be an important component in an overall approach to the prevention of TMD and treatment of patients with TMD¹².

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A number of studies have used teleradiograph and/or photograph analysis¹³. A recent study conducted by Motta et al. showed alterations in head posture in adolescents with TMD, evaluated using the Helkimo Questionnaire and photogrammetry¹⁴.

The results of the present work are in agreement with a study by Matheus et al. showing no relationship between disk displacement and cervical curvature in adults, assessed using lateral cephalograms and following RDC/TMD recommended by the IADR¹⁵.

The present study shows a high frequency of postural alterations in children aged 10 to 15 years, in keeping with previous reported results showing an association between head posture and TMD, and with the conclusions of Saito with regard to the importance of an overall approach to the prevention and treatment of TMD. An original finding of the current study was the presence of muscular disorders and alterations in the lumbar spine and lower limbs in this age group.

CONCLUSIONS

In the present study, the most frequent types of postural alterations were lumbar hyperlordosis, forward head posture and genu valgus. In addition, our results suggest that the presence of alterations in head posture, spinal curves and lower limbs are risk factors for muscular temporomandibular disorders.

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