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EVALUATION OF THE SIGNS AND SYMPTOMS OF TEMPOROMANDIBULAR DISORDERS IN CHILDREN WITH HEADACHES

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ABSTRACT - *Purpose:* The purpose of this study was to evaluate the presence of signs and symptoms of temporomandibular disorders (TMD) in children with headaches in a neuropediatric ambulatory. *Method:* Fifty patients between 4 and 18 years of age were examined: 31 had headaches (24 migraine, 4 tension type and 3 unspecific headache) and 19 formed the control group. The data collection was comprised of a structured questionnaire answered by the children´s parents, and a subjective evaluation about the children's emotional state. A specific questionnaire for TMD was applied, followed by a clinical dental examination of the children. As signs of TMD, mouth opening limitation, mandibular trajectory deviation in opening mouth, and joint noise were considered. As symptoms, pain on palpation of masseter and temporal muscles and on the poromandibular joint. *Results:* A significant increase in signs and symptoms of TMD was found in patients with headaches when compared to the control group. There was also a significant difference in signs and symptoms of TMD according to age (increased with age) and emotional state (tense> calm). *Conclusion:* There is a higher frequency of TMD in pediatric patients with headaches; thus, it is important to look for TMD signs and symptoms in this population.

KEY WORDS: headaches, emotional state, temporomandibular dysfunctions, children.

Avaliação dos sinais e sintomas de disfunções temporomandibulares em crianças com cefaléias

RESUMO - *Objetivo:* Avaliar a presença de sinais e sintomas de disfunção temporomandibular (DTM) em crianças com cefaléias em um ambulatório de neuropediatria. *Método:* Foram examinados 50 pacientes com idade entre 4 e 18 anos, 31 com cefaléias (24 com enxaqueca, 4 com cefaléia tensional e 3 com cefaléia inespecífica) e 19 do grupo controle. Os dados compreenderam um questionário estruturado respondido pelos pais e uma avaliação subjetiva sobre o estado emocional das crianças. Foi aplicado um questionário específico para DTM e realizado um exame clínico dental. Foram considerados como sinais de DTM: limitação da abertura bucal, desvio da trajetória ao abrir a boca e ruído articular. Quanto aos sintomas, foram considerados: dor à palpação dos músculos masseter e temporal e na articulação temporomandibular. *Resultados:* Foi encontrado um aumento significante de sinais e sintomas de DTM em pacientes com cefaléias quando comparados com o grupo controle. Houve, também, uma diferença significante de sinais e sintomas de DTM de acordo com a idade (aumento com a idade) e estado emocional (tenso>calmo). *Conclusão:* Há maior freqüência de sinais e sintomas de DTM no grupo de pacientes pediátricos com cefaléias, sendo importante avaliar essa patologia nessa população.

PALAVRAS-CHAVE: cefaléias, estado emocional, disfunção temporomandibular, crianças.

The temporomandibular disorders (TMD) or craniomandibular disorders (CMD) are considered a set of joint and muscular dysfunctions in the cranio-orofacial area, and are mostly characterized by joint and/or muscular pain, noise in the temporomandibular joints (TMJ) and limited or irregular mandibular function[1]. Recently, the study of this syndrome has intensified in pediatric populations that require special attention because they are in a stage of growth and development of the craniofacial complex[2,3]. In children, symptoms of this syndrome, such as pain in the pre-auricular area, pain during masticatory movements, headaches[4], restricted masticatory movements and presence of joint noises are noted, although less

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frequently than in adult populations[5,6]. The etiology of TMD is multifactorial and, in children, embraces oral parafunctions[4], trauma[7], and occlusal, systemic and psychological factors[8-10].

Headaches are common in children and teenagers. Recurring headaches occur with prevalence between 16% and 68% in school age children[11], and their frequency is greater in young adults. Migraine is responsible for 75% of the headaches in children referred for neurological evaluation. It can be described as an intermittent headache, frequently associated with nausea. Besides migraine, there are also other types of headache: non-migraine vascular headaches (vasculitis, by vasodilation), post-traumatic headaches, mixed chronic headaches and other painful syndromes, among which the TMD syndrome is included. However, the association between this syndrome and headaches is not clearly understood[12]. Ingerslev[10] reported that the pain that accompanies most disturbances of the mastigatory system comprises headaches and facial pain. In adults, headache is one of the symptoms most frequently found in TMD patients[13,14], and both can begin during childhood. However, there are few studies correlating them. Liljeström et al.[15] investigated the association between different kinds of headache and TMD and found that migraine has a tendency to be associated with TMD.

The objective of this work was to evaluate the presence of signs and symptoms of TMD in children with headaches.

METHOD

The sample studied consisted of 50 children aged between 4 and 18 years of both sexes. The experimental group (headache sufferers) comprised 31 children (22 girls and 9 boys) who sought treatment for headache in the pediatric neurology sector of the Hospital de Clínicas de Curitiba, Paraná. The control group consisted of 19 children (9 girls and 10 boys) undergoing routine dental treatment and without any kind of headache. The investigation was previously approved by the Ethics Committee for Clinical Research of the Hospital de Clínicas de Curitiba, Universidade Federal do Paraná.

All patients were submitted to neuropediatric evaluation for headache diagnosis. The criterion of the International Headache Society was used to classify the patients into 3 groups: migraine, tension-type headache and unspecific headache[16].

The odontological evaluation was composed of an anamnestic structured questionnaire answered by the child and by the parents (or guardian), with questions related to occurrence of trauma, orthodontic treatment and use of other medicines besides that used to treat the headache. The presence of oral parafunctions (such as grinding and clenching) and other habits (such as sucking the fingers or a dummy, nail biting, biting of the lips and objects) were considered. The parents were also asked to classify their children as tense or calm. An intra-buccal clinical exam was accomplished to evaluate the child's occlusion and present teeth, and a physical exam to identify signs of TMD, both performed on the same day, by the same operator. All procedures were carried out only after the authorization of the parent (or guardian) and with the freely-given signature of the informed consent term.

The signs of TMD were examined through the passive total opening, and children with measurements lower than 36 mm were considered to have mouth opening limitation. The mandibular trajectory deviation in opening was examined visually by asking the child to open and close the mouth several times at different speeds. The following masticatory muscles were palpated: masseter (origin, body and insertion) and temporal (anterior, medial, and posterior) on both sides. The lateral joint was palpated with the mouth closed, and the dorsal joint with the mouth open, in the posterior area of the mandibular condyles. The presence of joint noise was verified through palpation, listening and auscultation with a stethoscope, being classified as clicking (the sound of a "click" during mouth opening), reciprocal clicking ("click" during closing), and crepitation (sound of contact between two bony surfaces in attrition).

The symptoms were measured on a visual analog scale that contained numbers (1-5) and drawings with different moods and colors, which varied from yellow (without pain - 1) to red (the sorest - 5). The child was asked to indicate on the scale what was felt during the clinical exam, which included: muscle palpation and temporomandibular joint palpation (with open and closed mouth). There is no consensus among authors on classifying children as sufferers of TMD. Quayle et al.[13] considered those patients who presented two or more signs or symptoms, while in the study by Vanderas and Papagiannoulis[17], children with at least one sign or symptom were considered TMD sufferers. Therefore, in the present study, we reported the number of criteria (signs and symptoms) of TMD, considering signals of TMD: mouth opening limitation, mandibular trajectory deviation in opening mouth, and joint noise. The symptoms of TMD were: pain on palpation of masseter and temporal muscles and on temporomandibular joint.

Statistical analysis – The raw data were analyzed through nonparametric statistics. The Mann-Whitney U test was employed in the comparison among groups. Spearman's rank correlation was used to determine if the number of signs and symptoms (number of criteria) was correlated to age. Chi-square test or Fisher's exact test were used to evaluate differences in the frequency of signs and symptoms in the control and experimental groups. $p<0.05$ was considered to be statistically significant.

RESULTS

Table 1 shows the distribution of the diagnosis among sufferers (migraines, tension-type headache and unspecific headache).

Table 1. Diagnosis and gender distribution of study participants.

	Male	Female	Total
Control	10	9	19
Migraine	5	19	24
Tension-type headache	1	3	4
Unspecific headache	3	0	3

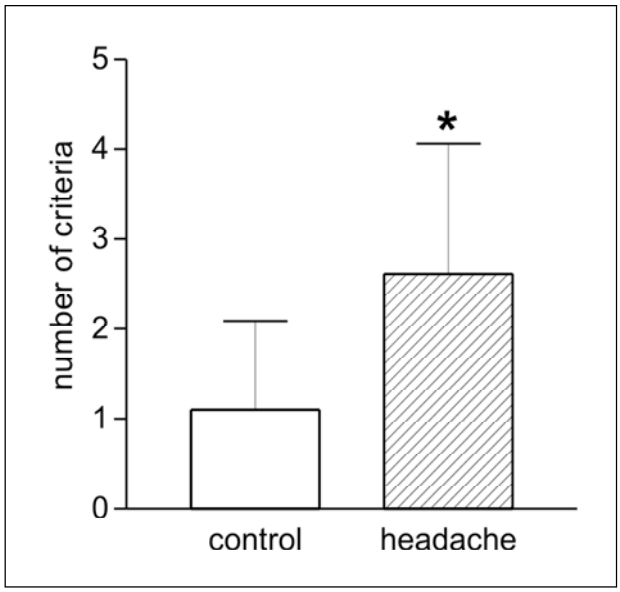

*Fig 1. Number of criteria for TMD (signs and symptoms) of the control group (n=19) and of the headache bearing patients (n=31). Data represent mean ±SD. *p<0.005 in comparison to the control group.*

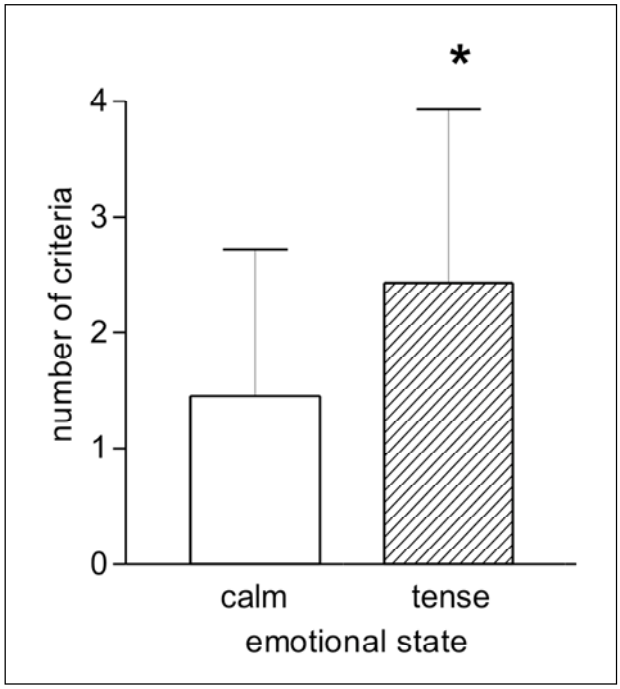

*Fig 2. Number of criteria according to the emotional state (calm group n=20; tense group n=30). Data represent mean ±SD. *p<0.05 with regard to the calm group.*

Table 2. Presence of signs and symptoms in the control group and in the group with headache.

Criterion	Control (n=19)	Migraine (n=31)
Limitation of mouth opening	0	0
Trajectory deviation	0	13*
Muscular pain on palpation	6	16
Joint pain on palpation	11	21
Joint noise	4	11

*significant (Fisher's exact test).

Table 3. Correlation between the number of symptoms of TMD and age in the control group and in the group with headache.

Group	n	r_s	p
Control	19	0.50	<0.005
Headache	31	0.37	<0.005
All	50	0.57	<0.005

Due to the small sample size of the headache groups, they were combined with the migraine group. Figure 1 shows the number of criteria (signs and symptoms) for TMD of the control and headache sufferers groups. The statistical analysis showed a significant difference between those groups (U=122, p<0.005), with the migraine sufferer group showing a larger number of criteria.

Comparing the number of criteria in relation to gender did not show a statistically significant difference (Female=2.3±1.5; Male=1.5±1.3, mean±SD; U=208, N.S).

Figure 2 shows the number of criteria in relation to the children's emotional state, classified as calm or tense. The analysis revealed a statistically significant difference between the two groups (U=196, p<0.05), with the tense group presenting a larger number of criteria.

Figure 3 presents the number of criteria according to the presence or not of oral parafunctions. The statistical analysis did not reveal any significant difference among groups (U=253, N.S).

None of the children, either in the control group or among the headache sufferers, showed limitation of mouth opening. The control group did not show deviation in the mandibular trajectory in opening, while the migraine group showed 13 cases, this difference being statistically significant (Fisher's exact test p=0.0007). No significant difference was seen on muscular palpation evaluation (χ^2=1.92, NS), joint palpation (χ^2=0.50, NS) or joint noise (χ^2=1.17, NS) (Table 2).

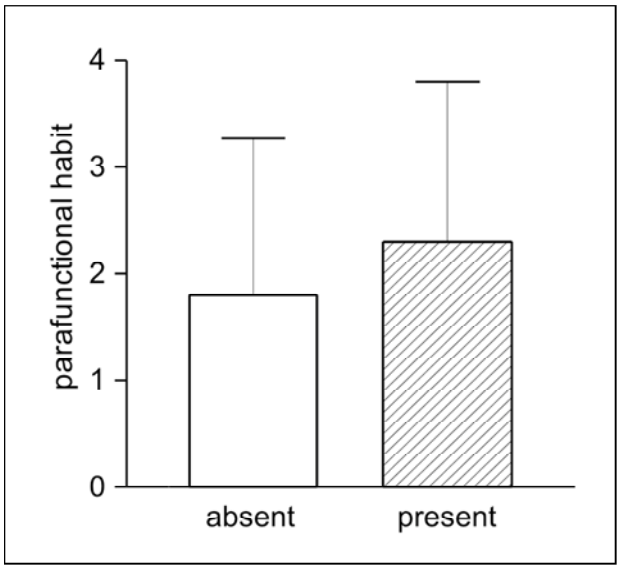

Fig 3. Number of criteria according to the presence (n=23) or absence (n=27) of oral parafunctions. Data represent mean ±SD.

There were significant correlations between the number of positive symptoms and age in each group of children (controls and headache suffers) and in the whole sample (all children analyzed together) (Table 3).

DISCUSSION

The main finding of the present study is that, compared to children without headaches, children with headaches present a significant increase in the number of criteria for TMD. It should be noted that, due to the small size of the sample for some headache subtypes, the analysis of the results was performed after the combination of those 3 groups (migraine, tension-type headache and unspecific headache) (Table 1). Liljeström et al.[15] reported that migraine showed a tendency to be associated with TMD. Capurso[18] stated that the comparison between TMD and recurring headaches suggests an association, but a relationship between these two clinical conditions could not be confirmed. Magnunson and Carlson[19] believed that, if the headache is considered a symptom of this complex syndrome, there is a very favorable prognosis for the reduction of the headache with the treatment of TMD. Meanwhile, Ingerslev[10] proposed that functional disturbances of the masticatory system should be included among diagnostic options when the child complains of headache.

In our study, we did not find differences in the number of criteria for TMD between the genders. Other studies also found no evidence for differences in the presence of joint noises between gender and age[3,9,20,21]. On the other hand, Liljeström et al.[15] observed that, before puberty, there is no difference in signs and symptoms of TMD between boys and girls, but after this period, there is an increase among girls.

With regard to the emotional state, reported by the parents on the questionnaire, it can be observed in the whole sample that there was greater prevalence of criteria for TMD in tense children than in calm children. This is in agreement with the studies of Vanderas[22] and Alamondi[23], who stated that a child's emotional state can influence the risk of developing signs of TMD, because an increase in anxiety might lead to an increase in the muscular tension, causing pain. The elevated pain level in the neck in patients who suffer from headaches can be a secondary cause of an increase in muscular tension, which will eventually spread to the pericranium muscles and cause headaches and, probably, TMD[24]. On the other hand, this can be also explained by the fact that children with headaches show more stress and psychological and somatic symptoms (besides the headaches) than children without headaches[15,23], leading to an increase in anxiety.

The presence of oral parafunctions, such as grinding and clenching, was not significantly different in relation to the presence of signs or symptoms of TMD. This confirms the findings of Bernal and Tsamtsouris[5]. Jones[25] proposed that grinding and headache are suggestive of TMD, but the presence of other signs and symptoms is needed to support the diagnosis.

Headaches are common during childhood and become more frequent in adolescence, as shown in the case of TMD[7]. Both headaches and TMD symptoms can occur in early life and they can become recurrent in adolescence[18]. Many of the problems observed in children and teenagers have a transitory nature and they are a reflection of growth and articular remodeling[2]. The presence of noises and altered mandibular function can be attributed to changes in the contour of the TMJ, which can occur at that age. However, it is still unknown if these alterations will manifest afterwards as pathological symptoms[5].

The criterion for restricted mouth opening for children 3 to 5 years of age was stated as less than 32 mm, while above 6 years of age, it was 32-56 mm[21,26]. No patient was found with mouth opening limitation in either studied group. This finding is reflected in the majority of studies[21,26]. Moreover, children rarely exhibit restriction in the capacity of mouth opening[3].

In our study, the commonest criterion for TMD found was joint pain (67.37%), followed by muscu-

lar pain (51.61%), joint noise (35.48%), and mandibular deviation (41.93%). Capurso et al.[18] noted that the commonest sign in young patients with headaches was muscular pain on palpation, followed by joint noise and deviation in the mandibular movements. Although the number of patients with joint pains was greater than the one with muscular pains, this last value was also notable. It is consistent with the statement of Capurso et al.[18] about the predominance of the muscular tension problem being evidenced by the pain in masticatory muscles in headache patients. Vanderas[22] found that the most frequent symptom of TMD was muscular pain on palpation followed by joint noise and pain in the TMJ.

Amongst all the patients examined, only two of the group with headache showed severe signs of TMD. It is believed that the signs and symptoms of TMD in children and teenagers are light to moderate and can be even imperceptible[3,21]. In that case, those signs and symptoms may reflect physiological and psychological changes rather than a pathological condition[26].

Alencar and Bonfante[4] suggest that headaches and earaches (related by the children's guardians) are not always symptoms of TMD, since they can be linked to other diseases. Thus, if there is a previous history of earache or headache, it is important that the patient be referred to an otorhinolaryngologist or a neurologist. The diagnosis of TMD can be only confirmed after a consultation with those professionals and the carrying out of an anamnesis compatible with this clinical problem. Bernal and Tsamtsouris[5] indicated that the opposite can also occur, as symptomatic cases of TMD might be mistakenly diagnosed as headaches or earaches by pediatricians and otorhinolaryngologists.

It can be concluded that children suffering from headaches showed more signs and/or symptoms of the temporomandibular disorders when compared with the control group, but there was no difference in relation to gender or to the presence of oral parafunctions. Moreover, there was a positive correlation between increased age and the increase in the presence of signs and symptoms of temporomandibular disorders, and the emotional state seemed to be a significant factor in the presence of those disorders.

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