

PREVALENCE OF SIGNS AND SYMPTOMS OF TEMPOROMANDIBULAR DISORDERS IN CHILDREN IN THE STATE OF PUEBLA, MEXICO, EVALUATED WITH THE RESEARCH DIAGNOSTIC CRITERIA FOR TEMPOROMANDIBULAR DISORDERS (RDC/TMD)

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ABSTRACT

The aim of this work was to describe the prevalence of signs and symptoms of temporomandibular disorders (TMD) in children of the State of Puebla, Mexico.

A descriptive observational study was performed. After calculating sample size, children who met the following selection criteria were included: registered at an official elementary school, either sex, ages between 8 and 12 years, who accept to participate in the study and whose parents have signed the informed consent forms. The Research Diagnostic Criteria for Temporomandibular Disorders were used by calibrated researchers (Kappa .90) under the same conditions. Descriptive statistics were applied by using SPSSv15 software. The study included 235 children, 129 (54.9%) female

and 106 (45.1%) male, of average age 9.31±1.2 years. Prevalence of signs and symptoms was 33.2%, and predominately muscular (82%), 48.1% showed signs of muscular pain and 19.1% joint pain. 63.4% showed signs of alteration in the mouth opening pattern, 39.1% presented joint sounds on opening or closing the mouth and 20.4% on mandibular excursions.

The high prevalence of signs and symptoms related to temporomandibular disorders, in particular in children with mixed dentition, shows the importance of TMD evaluation during this period, when morphological changes associated to growth and craniofacial development prevail.

Key words: temporomandibular disorders, children, prevalence.

PREVALENCIA DE SIGNOS Y SÍNTOMAS DE TRASTORNOS TEMPOROMANDIBULARES EN NIÑOS DE PUEBLA, MÉXICO, EVALUADOS CON LOS CRITERIOS DE INVESTIGACIÓN DIAGNÓSTICA PARA TRASTORNOS TEMPOROMANDIBULARES (CDI/TTM)

RESUMEN

El objetivo del presente trabajo fue describir la prevalencia de signos y síntomas de los trastornos temporomandibulares (TTM) en niños del estado de Puebla, México.

Se realizó un estudio observacional descriptivo. Previo cálculo de tamaño de muestra, se incluyeron niños que cumplieron con criterios previos de selección: inscriptos en escuela primaria oficial, de cualquier sexo, en edades de 8 a 12 años, que aceptaron participar en el estudio y cuyos padres firmaron el consentimiento informado. Se utilizaron los Criterios de Investigación Diagnóstica para los TTM, aplicados por investigador estandarizado (Kappa .90) bajo las mismas condiciones. Se calculó estadística descriptiva con el programa SPSS v15. Se incluyeron 235 niños, 129 (54.9%) mujeres y 106 (45.1%) varones con promedio de edad de 9.31±1.2 años.

La prevalencia de signos y síntomas de TTM fue del 33.2% predominantemente musculares (82%), 48.1% presentaron dolor muscular y 19.1% articular. El 63.4% presentó alteraciones en el patrón de apertura bucal, 39.1% presentó ruidos articulares en apertura o cierre y 20.4% a las excursiones mandibulares.

Las altas prevalencias de los signos y síntomas relacionadas con los Trastornos Temporomandibulares, particularmente en niños con dentición mixta, demuestran la importancia de la evaluación de los TTM durante este periodo, donde prevalecen los cambios morfológicos asociados al crecimiento y al desarrollo craneofacial.

Palabras clave: trastornos temporomandibulares, niños, prevalencia.

INTRODUCTION

Temporomandibular disorders (TMD) are painful joint skeletal conditions that affect the temporomandibular joints (TMJ) and/or the chewing muscles, and soft and hard tissues of the cranial-cervical

region. They are characterized by pain, sounds in temporomandibular joints, and limited or deviated jaw movement.

These problems are of multifaceted origin. The principal causes are occlusal interferences or alterations,

parafunctions and incompatible temporomandibular joint structures, plus an aggravating or triggering social-psychological factor.

TMD is clinically characterized by pain in the chewing muscles, in the area around the ear and/or in the temporomandibular joints, usually aggravated by manipulation and the alteration of mandibular (jawbone) movements (limited range of movement, asymmetric movements), and/or joint sounds such as crepitus and pops¹.

These alterations usually begin at very young ages, which is why it is important to identify those elements that form temporomandibular joints which may become disorders, as the continual process of growth that these structures undergo in children afford great potential in biological adaptation that in an adult that can trigger a functional alteration or pathological process.

Little attention has been paid to the prevalence of TMD in children because of the difficulty in evaluating joint dysfunction in infants. It is necessary to stress the importance of evaluating these disorders during childhood and teen years.

The variation of the prevalence reported in temporomandibular disorders is the result of the variety of diagnostic criteria and evaluation procedures used; the populations evaluated and definitions used².

It is important to note that the incidence of signs and symptoms generally increases with age. Some studies suggest that the prevalence of symptoms related to TMD range from 20% to 74%, while the prevalence of signs is between 22% and 68%³.

Other epidemiological studies of TMD have revealed high prevalence and great variability – 6% to 68% among teenagers and children and 20% to 70% in the general population³.

It has been demonstrated that women of adult age suffer more frequently from TMD than men on a three to one basis, without determining an age interval^{1,4}, although this has not been reported in the pediatric community.

Therefore, it is important to use criteria that are valid and specific to the pediatric population, and thus obtain a reliable clinical diagnosis including clinical measurements, the use of standardized examination measures and criteria for identifying temporomandibular disorders in children and teenagers⁵.

In addition to the wide variability of prevalence, the diagnosis of TMD has been a complex subject and it was not until 1992 that Dworkin proposed the

Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD), which are validated in different languages, including Spanish, and also in the pediatric community⁵.

These criteria include two axes, one physical and the other psycho-social behavioural. The present study includes only axis I and part of axis II, which includes the evaluation of pain, incapacity, disability and mandibular dysfunctions, without evaluating the emotional aspect, because the evaluation of said aspect uses the (SCL90) instrument, which is not suited to being applied to children below the age of 12.

The aim of this work was to describe the prevalence of signs and symptoms of temporomandibular disorders by sex in children in the state of Puebla, Mexico, evaluated with the RDC/TMD.

MATERIALS AND METHODS

An observational, descriptive, homodemic, unicentric study was performed. Prior to the definitive procedure, we conducted a pilot study on 20 children aged 6 to 7 years, with the objective of evaluating the feasibility of the application of RDC/TMD and the interpretation of scales of pain. The results were analyzed and pertinent adjustments made to obtain the final instrument.

The definitive sample was calculated on an expected prevalence basis of 20% with a confidence level of 95%, and defined as 235 girls and boys aged 8 to 12 years, who attended an official elementary school, accepted to participate in the study and whose parents signed consent forms.

Diagnostic Research Criteria (RDC/TMD) were applied to all children. They included a questionnaire regarding past medical history for the subject to answer about the signs and symptoms detected in relation to their temporomandibular joints, bruxism, blows or accidents and previous treatment during the past six months.

Individually, the subjects received clear instructions on how to answer the questions in the presence of a researcher and later a clinical examination was conducted, which evaluated TMD signs and symptoms, as indicated in the RDC/TMD, which registered: the presence and location of pain related to TMD, the limitations, and/or the deviated movements in opening and closing the mouth, and right and laterotrusion, joint sounds, muscle and joint pain. Said instrument was applied by the previously calibrated researcher (Kappa.90) under the same environmental conditions.

During the clinical examination the examiner used gloves, (two pairs for each subject). All measurements were taken with chewing muscles in the rest position. Mouth aperture patterns were checked: comfortable aperture, unassisted maximum aperture, assisted maximum aperture, as well as vertical and horizontal overbite. Joint sounds were palpated, mandibular excursive movements, right and left lateral movements, protrusion and deviation from the average line were checked. Joint sounds during

mouth opening and closing as well as lateral and protrusion movements were checked, and finally researchers measured the intensity of joint and muscular pain to the medium palpation numerical scale. In the final phase, researchers classified the subjects with and without signs and symptoms of temporomandibular disorders according to RDC/TMD⁶.

Data were analysed with SPSSv15 statistical software. The proportional descriptive statistics of all the variables were calculated with dichotomous scales and categories.

Table 1: Demographic description of subjects.

Sex	n	%	
Girls	129	54.9	
Boys	106	45.1	
Age	mean	medium	SD
	9.31	9.00	1.2

RESULTS

The study included 235 boys and girls between the ages of 8 and 12 years, the majority female (54.9%), average age was 9.3 years (Table 1).

According to the past medical history questionnaire related to the RDC/TMD, researchers found

Table 2: Signs and symptoms of temporomandibular disorders.

Reported signs and symptoms	General		Girls		Boys		*p
	n	%	n	%	n	%	
Mandibular block	41	17.4	22	17.1	19	17.9	.861
Pop	84	35.7	43	33.3	41	38.7	.395
crepitus	41	17.4	22	17.1	19	17.9	.861
Daytime bruxism	43	18.3	24	18.6	19	17.9	.289
Nighttime bruxism	40	17.0	25	19.4	15	14.2	.893
Mandibular rigidity	35	14.9	18	14.0	17	16.0	.655
Ear humming	113	48.1	61	47.3	52	49.1	.787
Different bite	56	23	36	27.9	20	18.9	.106
Headache	106	45	64	49.6	42	39.6	.126
Mandibular dysfunction							
Chewing	23	9.8	14	10.9	9	8.5	.544
Drinking	8	3.4	1	.8	7	6.6	.014
Exercising	29	12.3	12	9.3	17	16.0	.118
Chewing hard foods	104	44.3	58	45.0	46	43.4	.810
Chewing soft foods	6	2.6	1	.8	5	4.7	.057
Laughing	18	7.7	8	6.2	10	9.4	.354
Washing face or brushing teeth	18	7.7	11	8.5	7	6.6	.581
Yawning	26	11.1	16	12.4	10	9.4	.470
Swallowing	21	8.9	11	8.5	10	9.4	.808
Chatting	8	3.4	3	2.3	5	4.7	.314
Changing facial expressions	13	5.5	8	6.2	5	4.7	.620
	Mean	SD	Med.	SD	Mean	SD	**p
Percentage of mandibular dysfunction	10.46	13.56	9.84	12.19	11.21	15.10	.737
Pain on a numeric scale	12.68	25.26	12.81	24.84	12.51	25.89	.927
Days of incapacity	.55	2.13	.42	1.74	.72	2.51	.303
Average disability	6.25	16.49	6.69	17.48	5.72	15.26	.654

*Chi squared **Student test

that the symptom perceived with the greatest frequency was a humming sound in the ears, followed by headaches, as well as the feeling of a blocked jaw, morning mandibular rigidity and recent changes in the bite.

The greatest mandibular activity limited by TMD was the breaking up of hard food. In relation to incapacity and disability, the results were as follows: the days of referred incapacity was minus one, the average for disability was a five on the visual analog scale, and the median percentage of mandibular dysfunction was over nine (Table 2).

In the clinical examination, the results indicated that pain was present in a very low percentage, and was predominately muscular rather than joint pain, or

both. The open mouth pattern was found to be altered in over 50% of the boys and girls. Popping was the most frequent sound, the horizontal overbite was $2.92 + 1.57$, and the vertical overbite was $3.16 + 1.67$, with significant statistical differences according to sex. The number of muscular pain sites was not more than four, and the number of joint pain sites was less than one (Table 3).

The summary prevalence of the signs and symptoms of temporomandibular disorders according to RDC/TMD found in 235 schoolchildren in the city of Puebla, Mexico, was 33.2%, slightly higher in girls, without significant statistical difference. The kind of temporomandibular disorder was predominately muscular (Table 4).

Table 3: Signs and symptoms from clinical examination according to RDC/TMD.

	General		Girls		Boys		*p
	n	%	n	%	n	%	
Presence and location of pain at time of examination							
Muscular	10	4.3	5	3.9	5	3.9	.462
Joint	1	.4	1	.8	0	0	
Both	2	.9	2	1.6	0	0	
<i>Altered pattern of mouth opening</i>	149	63.4	87	67.4	62	58.5	.156
<i>Joint sounds while opening and closing</i>	92	39.1	54	41.9	38	35.8	.347
Pop	78	33.2	47	36.4	31	29.2	.500
Crepitus	14	6.0	7	5.4	7	6.6	
<i>Lateral sounds</i>	48	20.4	30	23.3	18	17.0	.235
	Mean	SD	Mean	SD	Mean	SD	**p
Mouth opening	48.19	7.96	43.05	7.79	43.87	6.48	.387
Horizontal overbite	2.42	1.80	2.86	1.48	2.98	1.66	.208
Vertical overbite	2.64	1.92	2.97	1.58	3.38	1.74	.033
Number of muscular pain sites	2.54	3.14	2.54	2.98	2.53	3.33	.972
Number of joint pain sites	.32	.748	.33	.687	.31	.821	.885

*Chi squared **Student test

Table 4: Prevalence of temporomandibular disorders according to RDC/TMD.

	General		Girls		Boys		*p
	n	%	n	%	n	%	
With TTM	78	33.2	44	34.1	34	32.1	.742
Without TTM	157	66.8	85	65.9	72	67.9	
Type of TTM							
Muscular	10	4.3	5	3.9	5	3.9	.841
Joint	1	.4	1	.8	0	0	
Both	2	.9	2	1.6	0	0	

*Chi squared

DISCUSSION

The present study allowed us to describe the prevalence of signs and symptoms of temporomandibular disorders (33.2%) in children between the ages of 8 and 12 years who attend an official elementary school, through the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD). List et al.⁵ found prevalence of signs and symptoms of temporomandibular disorders ranging from 6% to 68% in different populations. Whalund et al.² mentioned that the variation in their prevalence could be the result of the different diagnostic criteria used and the examination procedure employed in the population evaluated.

The results of the current study showed that the signs and symptoms of temporomandibular disorders are common in Mexican boys and girls with mixed dentition, and were slightly higher in girls, with significant statistical differences, which is similar to what was reported by Espinosa-De Santillana et al.⁷, who reported in 500 students in the city of Puebla between the ages of 12 and 24 years prevalence of 37.2%, Bonjardim et al.⁸, reported, in boys and girls ages from 12 to 18 years, prevalence of 32.2%. Casanova-Rosado et al.⁹ found prevalence higher than 46.1%. In the three studies mentioned, no significant difference was found according to sex, despite the fact that the female population was seen as descriptively more affected. In the current study, the decision to apply the RDC/TMD was based on its high level of reliability, regarding both the past medical history questionnaire and the diagnosis in boys and girls.

The results of the current research show, according to the past medical history questionnaire related to temporomandibular disorders, that the sign perceived with greatest frequency was a humming sound in the ear (48.1%), followed by headaches (45%) and popping (35.7%). This coincides with

what was reported by Corsini et al.¹, who found that the symptom perceived with greatest frequency was popping (37.9%), followed by rigidity, mandibular blocking, headaches and pain around the ears.

Barone et al.¹⁰, reported popping as the most common sign in the population, which was similar to what Tuerlings et al.¹¹ reported, with popping perceived in 35.3% of the subjects evaluated, predominately in girls. With regard to the clinical examination, a pattern of altered mouth aperture was present in the majority of boys and girls, the average of the maximum mouth aperture was 43 mm in girls and 43.8 mm in boys, without significant statistical difference, which matches the findings reported by Mêlo de Sousa et al.¹³, who employed the RDC/TMD and found that the average maximum mouth aperture was 43.4 mm in girls and 43.9 in boys. These results were reinforced by Zanandrea et al.¹², who reported an average maximum mouth aperture of 44.5 mm without specifying sex.

Regarding pain, these results indicate that muscular pain (with four muscular pain sites on average) was greater than joint pain (with only one joint pain site on average).

A physical exploration confirmed the presence of popping (33.2%), a percentage similar to what was reported by boys in the past medical history questionnaire on opening and closing the jaw (35.7%) and 20.4% in sounds on the lateral signs, predominately with females.

In general, the high prevalence of signs and symptoms related to temporomandibular disorders can be explained by the stage of development of the children's dentition, appearing particularly in children with mixed dentition, which shows the importance of TMD evaluation during this period, during which there are morphological changes associated with growth and craniofacial development¹⁴.

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