



ORIGINAL ARTICLE

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Prevalence of temporomandibular joint disorders in a Mexican elderly group.

Abstract: Aim: To determine frequency and distribution of temporomandibular disorders (TMD) by age and sex in a group of elderly adults in Mexico City. Material and methods: One hundred and fifty-four older adults in Mexico City were examined in a cross-sectional study. Subjects who had big edentulous gaps (absence of two or more teeth) or those who were fully edentulous, as well as those who refused to participate, were excluded from the study. For the epidemiological survey, diagnostic criteria for Temporomandibular Disorders (DC/TMD), after standardization by a dentist ($\kappa=0.892$), were considered. Results. A 33.1% had some type of TMD, being more common in people between 60 and 69 years old, variable with which it was related (Likelihood Ratio=21.553, $p=0.006$, $X^2_{MH}=08.389$, $p=0.021$). A 14.3% reported some type of facial trauma history, behavior that also was statistically significant ($X^2_{MH}=13.566$, $p=0.0001$). Disorders that occurred most frequently were: disc displacement with reduction (62.8%) and disc displacement without reduction (9.8%). Conclusions. TMD occurred in one of every three subjects examined, showing a relationship with age and trauma history.

Keywords: *Cross-sectional study, Temporomandibular disorders, The elderly, Temporomandibular joint, DC/TMD.*

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INTRODUCTION.

The temporomandibular joint (TMJ) is composed of the joint cavity, the mandibular condyle, articular disc, muscles and nerves, which interact with various structures such as the cervical spine and orofacial region. When the physiological patterns of some of these components are altered, functional and structural disorders can be generated resulting in a clinical impact^{1,2}. The etiology of TMD has spawned countless controversies and multiple hypotheses attempting to explain its occurrence^{3,4}. However, it is accepted that TMD has a multifactorial etiology, involving a strong biopsychosocial component² and other components

of non-specific nature^{5,6}.

The number of people affected by TMD varies considerably. Prevalence ranging from 22.3% to 55%^{4,7-14} have been reported. The highest prevalence of TMD in relation to age has been estimated between the ages of 20 and 40. However, this does not mean that other age groups may not be affected by the disorder; just its frequency is lower. Therefore, the study of TMD in other age groups, such as the elderly population, is also very relevant^{7,10,12,15-18}. In addition, many studies suggest that TMD has a higher prevalence in women^{1,2,5,7-10,13,14,16,19-25}, except in the study conducted by Dellanora *et al.*¹², in which

no differences between both sexes were observed.

Prevalence by type of TMD in each group, according to the diagnostic criteria for temporomandibular disorders (DC/TMD), is also very variable. Group I shows no difference with groups II and III^{1,9,20}. With respect to the type of TMD, displacement with disc reduction is the most frequent disorder^{1,11,14,18-20}, followed by muscle disorders^{16,19,20,21,26}, myofascial pain^{9,11,13-15,20} and arthralgia^{14,20,26}.

The aim of this study was to determine the frequency and distribution of temporomandibular disorders (TMD) by age and sex in a group of elderly adults in Mexico City.

MATERIALS AND METHODS.

A cross-sectional study was conducted between May and July 2015. One hundred and fifty-four elderly adults from a total of 237 who belonged to a civil organization in the eastern area of Mexico City participated in the study.

Subjects with large edentulous gaps (absence of two or more teeth), fully edentulous, with some kind of physical or mental disability that could affect clinical examination, and those who refused to participate, were excluded from the study.

Subjects who agreed to participate signed an informed consent authorizing their inclusion in the study. Project approval in relation to ethical and legal research aspects was requested from the Dental Occlusion Research Line LI-FESZ-230506 of the Committee on Bioethics and Biosafety at the Zaragoza Faculty of Higher Education, National Autonomous University of Mexico (UNAM).

Before the application of the epidemiological survey a dentist participated in the standardization of terms and diagnostic criteria through the direct method; a process that took place in two working sessions in which each participating elderly was examined at two different times. Cohen's kappa coefficient ($\kappa=0.892$) was calculated to verify that concordances were not obtained due to chance. The collection instrument was validated through

a pilot test during the standardization process.

Diagnostic criteria for temporomandibular disorders (DC/TMD)²⁷ were used. For the epidemiological survey each subject sat at an angle of approximately 90°. The examiner used disposable gloves, wooden tongue depressor, vernier and millimeter ruler. All measurements were performed with the masticatory muscles at rest, joints and muscles did not receive loads or excessive pressure at any time.

Statistical analysis was performed using SPSS v.20.0 (IBM, USA). To evaluate the frequency and distribution of TMD, frequencies and proportions were calculated by age and sex. In addition, to measure the possible association between the variables of interest, the value of Pearson's Chi square test for contingency tables larger than 2x2 was calculated. When any of the cell frequencies was less than or equal to five the Likelihood Ratio was calculated; and for tetrachoric tables, Mantel-Haenszel's Chi-square was calculated.

RESULTS.

Of the 154 elderly adults examined, 116 were women and 38 were men, 55.8% belonged to the age group of 60-69 years. The group of 60-69 years showed a higher frequency of TMD with 40.7% versus 23.6% in the group of 70 years or older. Prevalence of TMD by sex was similar, 32.8% in women and 34.3% in men.

According to DC/TMD, muscular disorder was observed in 3.9%, articular disc disorders in 26%, and joint disorders in 3.2%. The group of 60-69 years had a higher prevalence than the group of 70 or older (likelihood ratio=21.553, $p<0.01$). Women and men had a similar prevalence ($X^2_{MH}=08.389$, $p=0.221$). Results by diagnostic group, sex and age are shown in Table 1.

The most frequent temporomandibular disorder was disc displacement with reduction in 20.8% of the cases, followed by: disc displacement without reduction without limited opening (3.3%), myofascial pain (2.6%), disc displacement without reduction with limited opening (1.9%), arthralgia (1.9%), myofascial pain with limitation in mouth opening

Table 1. Distribution of cases with TMD, according to the DC/ TMD, by age and sex.

		Without disorder		Group I		Group II		Group III		Total	
		f	%	f	%	f	%	f	%	f	%
Age	60-69	51	33.1	6	3.9	25	16.2	4	2.6	86	55.8
	70 or older	52	33.8	0	0.0	15	9.8	1	0.6	68	44.2
Sex	Women	78	50.7	6	3.9	27	17.5	5	3.2	116	75.3
	Men	25	16.2	0	0.0	13	8.5	0	0.0	38	24.7
Total		103	66.9	6	3.9	40	26.0	5	3.2	154	100.0

Table 2. Percentage distribution of cases of click, crepitus and history of joint locking according to age and sex.

		Click			Crepitus			History of joint locking		
		absent	present	p	absent	present	p	absent	present	p
Age	60-69	33.1	22.7	0.371	48.1	7.8	0.174	46.8	9.1	0.403
	70 or older	29.9	14.3		41.6	2.6		39.6	4.5	
Sex	Women	49.4	26.0	0.347	64.9	10.4	0.235	64.3	11.0	0.711
	Men	13.6	11.0		24.7	0.0		22.1	2.6	

Table 3. Percentage distribution of cases of myofascial pain and pterygoid pain according to age and sex.

		Myofascial pain			Pterygoid pain		
		absent	present	p	absent	present	p
Age	60-69	39.0	16.9	0.022	42.9	13.0	0.015
	70 or older	38.3	5.8		40.9	3.	
Sex	Women	57.1	18.2	0.613	60.4	14.9	0.064
	Men	20.1	4.5		23.4	1.3	

(1.3%), osteoarthritis (0.65%) and osteoarthrosis (0.65%).

Limitation of jaw movement was present in 50.0% of the cases, altered overjet in 52.6%, altered overbite in 41.6%, impaired mouth opening in 38.3%, and bilateral mastication in 53.9%. The prevalence of crick, crepitus and joint locking is shown in Table 2. Prevalence of myofascial and pterygoid pain is shown in Table 3.

Of the 13.6% of subjects with a history of joint locking, a 6.5% reported some type of facial trauma history, which was statistically significant ($X^2_{MH}=4.663$, $p= .031$). Of the 22.7% of patients diagnosed with myofascial pain, a 9.1% reported facial trauma history, a relationship that was not statistically significant ($X^2_{MH}=3.714$, $p=0.054$). In the TMD groups it was observed that of the 33.1%

of diagnosed cases, a 14.3% reported some type of facial trauma history, which was statistically significant (likelihood ratio= 20.807, $p=0.008$).

Finally, unilateral mastication was not found to be associated with impaired mouth opening ($X^2_{MH}=1.155$, $p=0.282$), crepitus ($X^2_{MH}=0.004$, $p= 0.948$), history of joint locking ($X^2_{MH}=0.007$, $p=0.932$), myofascial pain ($X^2_{MH}= 0.396$, $p=0.529$) and TMD groups (likelihood ratio=14,986, $p=0.059$).

DISCUSSION.

According to what was observed in the study population, the prevalence of TMD was higher than that reported by Doyle *et al.*⁸ for African Americans,

similar to that observed by Kohler *et al.*⁷ in Swedish population and lower than that reported by Almagro *et al.*²⁵ in Spanish population, Yu *et al.*³, Miranda *et al.*⁴ and Schulz *et al.*¹⁴ in Chileans, Zwiri *et al.*¹⁰ in Saudi population, Dallanora *et al.*¹² in Brazilians, and Criado *et al.*¹³ in Cubans.

These differences may be due to the composition of the age groups of the subjects studied. The age of the subjects of this study ranged between 20 and 40 years, which may increase the chances of finding cases of TMD, showing a higher prevalence of the condition. This is confirmed when we consider the study conducted by Köhler *et al.*⁷, in which the population studied belonged to the age group of 60 or older; consequently, results between Swedes and Mexicans were similar.

A higher prevalence was observed in the group of 60-69 years, agreeing with the results of Yekkalam *et al.*², Swiri *et al.*¹⁰, Guarda-Nardini *et al.*¹⁵, Peñón *et al.*¹⁶, and Shet *et al.*²¹. Each organism has the capacity to adapt itself to events that affect orthopedic stability. Adaptation can occur even when signs and symptoms of TMD are evident. This may happen throughout the subject's life, in many cases through the generation of an articular pseudodisc that tries to restore the joint function that was eventually lost. Patients over 60 years may have TMD, however, they are so well adapted to it, that they do not report symptoms, as younger patients usually do.

It is important to have in mind that the behavior and distribution of these disorders varies considerably because a large number of factors are involved in their onset and development. There are anatomical factors (occlusal interference, lack of teeth, unilateral mastication) that cause orthopedic joint instability. There are also systemic factors such as rheumatic diseases (associated with a decreased function in the

presence of joint noises caused by a decrease of synovial fluid resulting in condylar wear), psychological factors (anxiety and stress mainly), postural, traumatic, and parafunctional oral habits, among others. All this makes the development of TMD different in each subject.

Prevalence was similar among men and women, results that differs with most other studies^{1,2,5,7-10,13,14,16,19-25}, except with the findings reported by Dallanora *et al.*¹² in the Brazilian population.

TMD distribution per group according to DC/TMD varies between studies: Manfredini¹ observed a higher prevalence of group I TMD, Caselín *et al.*⁹ of group II, and Guarda-Nardini¹⁵ of group III. In this study, group II was most prevalent in all groups.

Disc displacement with reduction was the most frequently observed disorder, similar to the findings reported by Manfredini *et al.*^{1,19}, Sandoval *et al.*¹¹ Schultz *et al.*¹⁴, Guarda-Nardini *et al.*¹⁵, and Rojas *et al.*²⁰. This is relevant from the clinical standpoint, since orthopedic joint instability affects the normal movements of the condyle resulting in the displacement of the disc and a click in the TMJ. The latter will cause disc displacement without reduction with limited opening or closing limitation.

Myofascial pain was the most prevalent muscular disorder. It was located in the jaw muscle, in the preauricular area and in the TMJ. This pain usually can be aggravated by mastication and other jaw functions. This is important because instability produces hard movements, leading to occlusal instability, resulting in signs and symptoms of TMD²⁸.

Joint disorders were found to have the lowest prevalence. They were observed only in women. Several studies^{4,21,25} show that these disorders are more prevalent in females probably because of hormonal factors, morphological characteristics and emotional influences. Systemic conditions such as rheumatic diseases are also involved,

but the main reason seems to be that the physical constitution of women makes them more elastic, resulting in hypermobility, which in turn makes them more vulnerable to TMD²⁹.

A relationship between TMD and trauma history was observed, most of the cases with joint disorders reported some kind of trauma history. This was expected, considering that trauma may predispose to TMD, for example, a trauma on the cheek can cause pain, swelling and limitation of mandibular movement. TMD diagnosis is criti-

cal since a patient with trauma history may have a better prognosis than one with arthritis, due to the chronic degeneration cause by that condition.

CONCLUSION.

TMD affected one out of three elderly adults, and showed a relationship with age and trauma history of the patient. The most common disorders were disc displacement with reduction and disc displacement without reduction.

Prevalencia de trastornos temporomandibulares en un grupo de adultos mayores mexicanos.

Resumen: Objetivo. Determinar la frecuencia y distribución de los trastornos temporomandibulares (TTM) por edad y sexo en un grupo de adultos mayores de la Ciudad de México. Material y métodos. Estudio de corte transversal. Se examinaron 154 adultos mayores de la Ciudad de México. Fueron excluidos del estudio a todos aquellos que presentaron brechas edéntulas amplias (ausencia de dos ó más dientes) o edentulismo total, así como aquellos que no aceptaron participar en el estudio. Para la encuesta epidemiológica se tomaron en cuenta los Criterios Diagnósticos de los Trastornos Temporomandibulares (CD/TTM), previa estandarización de una Cirujana Dentista ($\kappa=0.892$). Resultados. El 33.1% presentó

algún tipo de TTM, siendo más frecuente en personas entre 60 y 69 años variable con la cual estuvo relacionada (Razón de verosimilitud=21,553, $p=0,006$, $X^2_{MH}=08,389$, $p=0,021$). El 14,3% refirió algún tipo de antecedente traumático facial, comportamiento que también resultó ser estadísticamente significativo ($X^2_{MH}=13,566$, $p=0,0001$). Los trastornos que se presentaron con mayor frecuencia fueron: el desplazamiento del disco con reducción (62,8%) y el desplazamiento del disco sin reducción (9,8%). Conclusiones. Los TTM se presentaron en uno de cada tres adultos mayores examinados, existiendo una relación con la edad y los antecedentes traumáticos.

Palabras clave: Estudio de corte transversal, Trastornos temporomandibulares, Adultos mayores, Articulación temporomandibular, CD/TTM.

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