



## **CORRELACIÓN BETWEEN CEPHALALGIA AND DISABILITIES IN THE TEMPOROMANDIBULAR JOINT**

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Cephalalgias, migraine, temporomandibular joint, disability atskull vertebral mandibularlevel.

### **ABSTRACT**

**Introduction:** The disabilities in the temporomandibular joint, the same as cephalalgias, occur very often in people. There is a remarkable connection of the deep temporal nerves and the external pterygoid muscle.

**Materials and methods:** 332 patients were protocolized with disability in vertebral mandibular skull; out of this amount there were 267 females and 65 males. Two- hundred twenty-six had cephalalgias. In the analysis of such dysfunction, all patients went through studies of cranial pairs Romberg; an X ray in lateral cervicalskull and orthopantomography wererequested.

**Results:** It is a retrospective study, analytical-inductive. There is an overrepresentation of women on these pathologies (80,4%); the average age was  $43,6 \pm 16,8$  years. 100% of them had backgrounds in the temporomandibular joint.

Two-hundred twenty-six patients had cephalalgias, 194 were females (85%), 32 males (15%). **Discussion:** The percent between cephalalgia and disability in the temporomandibular joint is crucial, and the pathological problems were seldom the reason (12%). It is important considering these alterations in symptoms of cephalalgias.

**Conclusions:** Such disabilities are to be considered as another possible reason for cephalalgias.

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## **INTRODUCTION**

Focusing on health problems nowadays, cephalalgias are present in the most common medical appointments, scored in first place. It is considered that over seventeen million of mexican citizens go through cephalalgias, along with a high percent among the children population, with around 33% percent among them. This amount might increase because of a lack of communication among parents and children, as well as the ignorance of symptoms involved.<sup>1</sup>

Most of the patients with disabilities in the temporomandibular joint (ATM), show cephalalgia symptoms, also linked to earaches, buzz, dizziness, and vertigo among some patients.<sup>2</sup> The temporomandibular joint makes part of a functional unit, it keeps a connection with the skull and the cervical spine through the atlas and the axis bones.

The migraines enter in the domain of cephalalgias. People usually say: "I have no headache, I have migraine", which is a wrong concept, since it is a subdivision within the international domain of headaches.<sup>3</sup>

From two to three quarters among adults between 18 to 65 years old, have suffered a cephalalgia in the last year; over 10% out of them have also showed migraine.<sup>3</sup> In the analysis of Worldwide Burden in Morbidity, updated in 2004, the migraine on its own reached a 1, 3% in years missed for impairment.<sup>4</sup>

There are studies which have worked out the costs of such lack of productivity. For example, in a research made by the OIT (Organization of International labor), it was found that this expenditure reached 55.800 million dollars, the equivalent to 7,7% of internal brute product in Canada in 1993, which were lost that year in relation to the disability of people involved.

Tumors are not the most common reason of headaches; epilepsy may appear as one of the issues of them, just in 29% of the patients implicated.

Recent studies have showed that people who suffer migraine regularly, trigger the production of iron in the peri-acueductual substance; they bring about more oxidation of cells, or cell apoptosis

The dilatation of large veins and arteries in the brain during migrains, is justified because they are incited by the trigemino nerve from the external carotid.<sup>5</sup>

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The international Headache society HIS (The International Classification of Headache Disorders) publishes a classification which is periodically updated).<sup>6</sup>

In this classification the main subjects are:

- Primary headaches. Headaches and migraines with different symptoms.
- Secondary headaches. These are the ones caused by external factors; the disabilities of ATM - temporomandibular joint-(appendix H), are found into this classification.

The major pathologies flourish in head and neck; the anatomy and physiology of these areas are meaningful.<sup>7</sup>

It is important to make an anatomical difference; the relation that might appear among the innervations in some of these elements, which could result in a symptomatology in the areas of head and neck in case they are altered, as the subject is focused on headaches.

#### *Analysed elements are*

- Temporal mandibular joint.<sup>8</sup>
- Neurological connections with the stomatognathic system, more specifically the temporal mandibular joint, connection with the pterygoid lateral or external muscle.<sup>9</sup>
- Innervation of temporal muscle.

The temporal muscle is innervated by the deep temporal nerves in the front, mid-deep temporal nerve and deep temporal nerve in the rearside; extensions of the inferior maxilar nerve, one of the three terminals which emerge from the Gasser ganglion.<sup>10</sup>

In picture 1, it is observed the close connection of the temporo mandibular joint to the deep temporal nerves in the front, mid-deep temporal nerves and the deep temporal nerve in the rearside, coming out of endings of V3, which is a sensitive and motor nerve.

In picture 2, it is observed the mandibular nerve and some nerve endings that reach directly to temporomandibular joint.

The external pterygoid muscle is shown in picture 3, with its upper fibers and lower fiber, where the upper fiber of pterygoid lateral muscle is inserted in the articulate capsule of lower jaw, is detailed: DA (articular disk; NTPp: deep temporal nerve in the rearside; NTPm: mid-deep temporal nerve; MPL: lateral pterygoid muscle.

Along with the depiction of several anatomists, the temporomandibular joint and the lateral pterygoid muscle are related to the deep temporal nerves in the exit of branch in V3, to carry out the innervation of temporal muscle. If this slot is compressed because of a disability in the temporomandibular joint, this will bring pain in this area (cephalalgia).

The slot made out of these fibers of the muscle, is to be decreased, because the upper fiber is inserted in the disk, by pulling it forward, and the lower fiber is inserted in the neck of the condyl, which is moved backwards upon dysfunction; the brakes in the front are more powerful than the one behind in the temporomandibular joint.

In picture 4, from a corpse dissection, it is found the articulate meniscus in direct contact with the temporomandibular joint; it is also shown the upper fiber of the lateral pterygoid muscle

close to the meniscus, where it is shown how the lower fiber of lateral pterygoid muscle is inserted in the neck of the condyl in the lower jaw.

More than a fiber of the pterygoid muscle or intermediate fiber, has been found in the dissections made in the Medicine faculty in Montevideo (Uruguay), but in most of the events the pterygoid muscle appeared with two fibers.

## **MATERIALS AND METHODOLOGIES**

The sample was taken at the clinic for facial pain treatment in Hospital universitario in Puebla (Mexico).

This was among patients with medical insurance in this hospital, with about the same middle social-financial status among most of them.

332 patients were taken as subjects; these are the ones who attended this clinic, from October 2010 until October 2013, both males and females.

#### *Criterion for inclusion*

- Patients who attend this clinic from October 2010 until October 2013.
- Patients both males and females.
- From seventoninety years old.
- Patients with a disability in temporomandibular joint.

#### *Criteria for exclusion*

- Patients with a pervasive disease.
- Patients who did not finish the treatment
- Patients with a tumoral progress.
- Patients who do not suffer alterations in temporomandibular joint.

For a diagnostic of a disability at skull vertebral mandibular level<sup>11</sup> the following quantitative items were taken:

- Study of cranial nerves, to discard some disturbance in the afferent nerves, visual system, and vestibule cochlear nerve.
- Romberg study, being able to discard either some vestibule problem (neurinoma) or in the motor neuron at secondary rank.
- Inspection in temporomandibular joint upon opening, closing as well as right and left laterality
- X rays of cervical lateral skull.
- Orthopantomography.

## **RESULTS**

Out of 332 patients, 226 females (80,4%) and 65 males (19,6%), as shown in graphic 1.

Patients were from 7 to 90 years old, represented in graphic 2.

The average age was 44 years.

Out of three-hundred thirty two patients who attended the clinic mentioned above, two-hundred twenty-six patients suffered headaches (69%); and one hundred six patients had no headaches (31%), graphic 3. The females who suffered headaches were 194 patients (85%); whereas males were 32 (15%). Females are more likely to suffer headaches than males. In the statistical analysis epi info 7, collected database was assessed.

Upper view of temporomandibular joint, in a corpse dissection.

*Correlación Between cephalalgia And Disabilities in the Temporomandibular Joint*

Lateral pterygoid muscle, upper fascicle  
 Temporal muscle  
 Deep temporal nerves  
 Meningea artery 1/2  
 Auricular temporal nerve  
 Temporomandibular joint

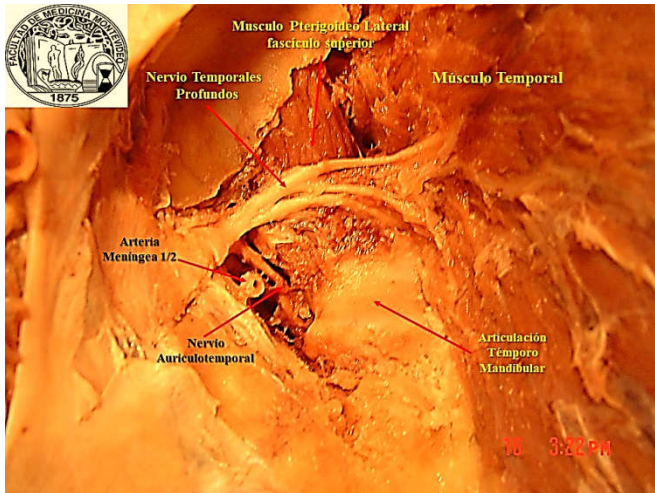


Photo 1

Right side of sagittal cut in a corpse; it is seen the external auditive ductand the temporomandibular joint.  
 Meniscus  
 Articular surface temporal bone  
 Articular surface bone of lower jaw

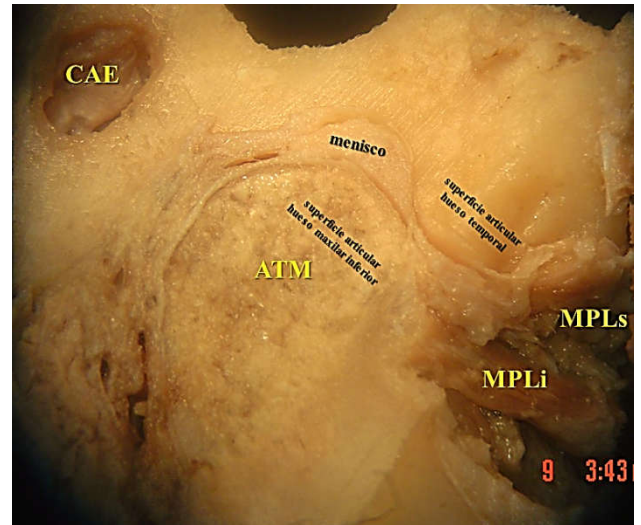


Photo 4

Innervation of temporomandibular joint, internal upper view, in a corpse.

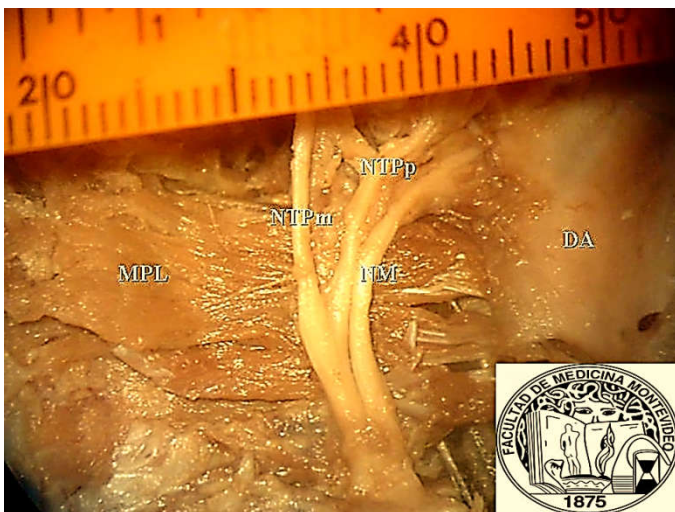


Photo 2

Internal upper view of temporal muscle and external pterygoid muscle, along with their upper and lower fascicles; the mandibular nerve is also seen, with its branches from deep temporal nerves.

Temporal muscle:  
 Deep temporal nerve, mid-deep temporal nerve.

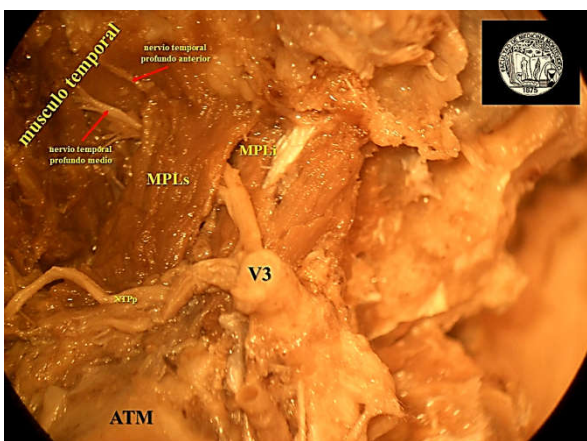
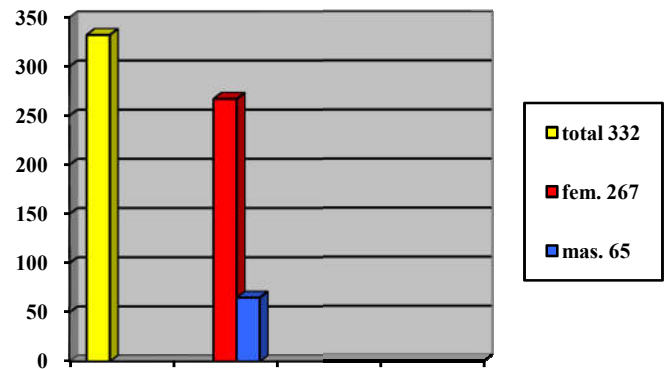
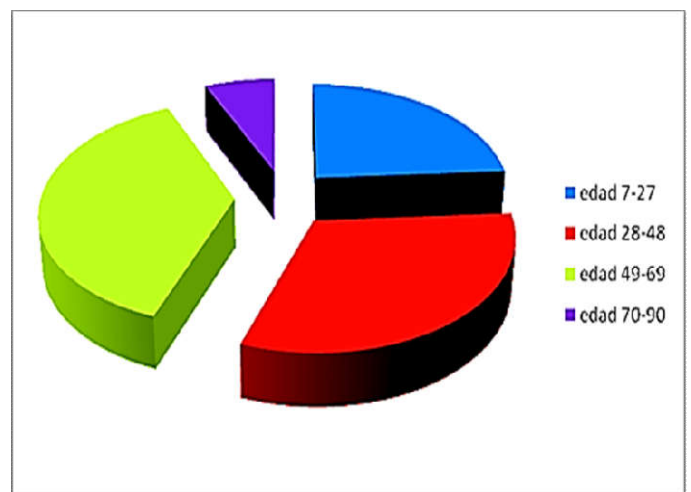


Photo 3

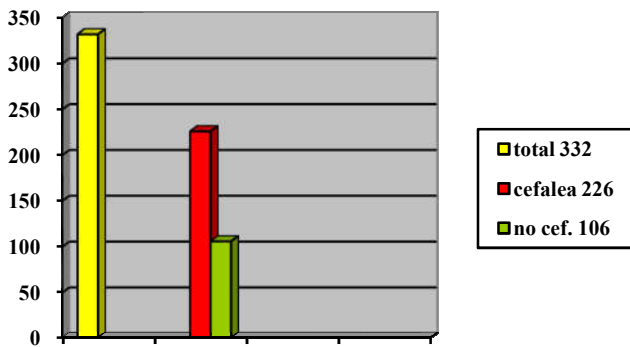


Graphic 1



Graphic 2





Graphic 3

Table 1

		Outcome		
		Yes	No	Total
Exposure	Yes	201	74	275
	Row %	73,09 %	26,91 %	100,00 %
	Col %	85,17 %	69,81 %	80,41 %
No	No	35	32	67
	Row %	52,24 %	47,76 %	100,00 %
	Col %	14,83 %	30,19 %	19,59 %
Total	Total	236	106	342
	Row %	69,01 %	30,99 %	100,00 %
	Col %	100,00 %	100,00 %	100,00 %

Odds-based Parameters				Statistical Tests	
	Estimate	Lower	Upper		
Odds Ratio	2,4834	1,4350	4,2578	Uncorrected	10,9525 3,0009347461
MLE Odds Ratio (Mid-P)	2,4761	1,4252	4,3011	Mantel-Haenszel	10,9206 3,0009510437
Fisher Exact		1,3775	4,4469	Corrected	9,9993 3,0015659991

Risk-based Parameters				1 Tailed P		2 Tailed P	
	Estimate	Lower	Upper				
Risk Ratio	1,3992	1,1007	1,7786	Mid-P Exact	0,0006852395		
Risk Difference	20,8521	7,7933	33,9109	Fisher Exact	0,0009982623	0,0017837390	

Graphing in table of 2 times 2 from the same program, table 1.

## CONCLUSIONS

In the conclusions of this accomplished study, the following items are highlighted:

- 100% of patients who suffer a disability at skull vertebral mandibular level, also show an alteration in the temporomandibular joint.
- Headaches are influenced by gender; the most affected is the female one.
- The most important symptom observed in patients with disabilities at skull vertebral mandibular level was the headache.
- The occlusion does not influence only on issues of the temporomandibular joint; other external elements, such as postural problems, routine habits, and accidents, may bring about alterations in the temporomandibular joint.
- There is a very close relation between the trigeminal system and the vascular system, causative of headaches in its alteration or stimulus.

- The afferent factors in head and neck have to do in the efferent repercussion (in the chew muscles) produced by these alterations.

The hypothesis is not null.

## DISCUSSION

The presentation of this work was focused on:

- Being able to connect the disabilities at skull vertebral mandibular level, to the headaches or cephalalgias, as another option for treatment in a very frequent symptomatology.
- Finding another possible reason for cephalalgias; statistics show that 47% of population (according to data from OMS, October 2012) go through headaches; out of this amount only a minority are eligible for suitable treatments.
- Being able to make a difference between patients with disabilities in temporomandibular joint and cephalalgias, from other systematical or tumoral pathologies.

It is relevant being able to come up with other symptomatology regardless the cephalalgias, in patients with disabilities at skull vertebral mandibular level.

Aiming to prevent such frequent symptomatology in the future, and treat it from the position angle of temporomandibular joint, without disregarding that it is located in a functional unit, and an alteration of this functional unit can be multifactorial, by discarding cephalalgias caused by other alterations, which are minor.

Recent researches show a relation of aches to what is defined as trigemino-vascular system<sup>9</sup>.

Any other afferent stimulus, initiated in head and neck, trigemino-cervical system<sup>10</sup>, will also disturb the painful track, due to stimulus in secondary neuron, third level neuron and cortex representation through trigeminal thalamic system and limbic system.

When a dilatation in vessels plus pain occur, the efferent response will appear by chew muscles which will be altered by giving a continuous contraction, commonly called bruxism.

In the retrospective study in the connection of cephalalgias and disability of temporomandibular joint, some subjects are to be considered:

- Out of all patients who attended the clinic for facial pain at Hospital universitario in Puebla city, and who have a disability at skull vertebral mandibular level, 85,8% were females, and 14,2% males. This ends up in a high percent of females over males, on the matter of disabilities at skull vertebral mandibular level.
- Out of three-hundred forty-two patients, who suffer a disability at skull vertebral mandibular level, two-hundred twenty-six go through cephalalgias, which translates to 68%; 80, 4% belongs to females, and 14,8% to males.
- Females prevailed over males in all events, both in patients with a disability at skull vertebral mandibular level, and the ones who had cephalalgias, showing a relation over 70% in some study cases.

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