

# Subtypes of temporomandibular disorders in patients diagnosed with otalgia: observational study

## *Subtipos de desordem temporomandibular em pacientes diagnosticados com otalgia: estudo observacional*

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### ABSTRACT

**BACKGROUND AND OBJECTIVES:** Temporomandibular disorder (TMD) has complex symptoms that involve the orofacial region, such as otalgia. Considering the difficult differential diagnoses for associating otological symptoms with TMD. The aim of this study was to verify the diagnosis of TMD in patients with otalgia.

**METHODS:** This is a cross-sectional and descriptive study, where 75 patients diagnosed with otalgia were evaluated. The European Academy of Craniomandibular Disorders's (EACD) screening questionnaire was initially applied, and those who answered affirmatively to at least one question were evaluated by the Research Diagnostic Criteria for Temporomandibular Disorders (DC/TMD), with a final sample of 50 patients. Data were tabulated and ANOVA verified whether there was a statistical difference between TMD subtypes classified by DC/TMD, considering confidence intervals with 95% significance.

**RESULTS:** The mean age of the participants was 39.9±14.1 years, with a predominance of females (76%) ( $p<0.0001$ ). Among those diagnosed with TMD, females also predominated, with a higher percentage in all evaluated subtypes, with emphasis on arthralgia (82%) and myofascial pain with limited opening (81.8%), followed by myofascial pain (74%) and disc displacement with reduction (72.7%). When observing the distribution of TMD subtypes between genders, there was a predominance of myofascial pain in males (75%) and females (68%), but no statistical significance was observed in this variable and in the others studied.

**CONCLUSION:** Patients with otalgia had one or more TMD subtypes, and the myofascial subtype TMD was the most prevalent among study participants.

**Keywords:** Earache, Facial pain, Temporomandibular joint disorder.

### RESUMO

**JUSTIFICATIVA E OBJETIVOS:** A disfunção temporomandibular (DTM) possui sintomas complexos que envolvem a região orofacial, como a otalgia. Considerando os difíceis diagnósticos diferenciais para associar sintomas otológicos com DTM. O objetivo deste estudo foi verificar o diagnóstico de DTM em pacientes com otalgia.

**MÉTODOS:** Este é um estudo transversal e descritivo, com uma avaliação de 75 pacientes diagnosticados com otalgia. O questionário de triagem da Academia Europeia de Disfunções Cranio-mandibulares (EACD) foi aplicado inicialmente, e aqueles que responderam afirmativamente a pelo menos uma questão foram avaliados pelo Critério Diagnóstico de Pesquisa para Disfunções Temporomandibulares (DC/TMD), com amostra final de 50 pacientes. Os dados foram tabulados e por meio da ANOVA foi verificado se havia diferença estatística entre os subtipos de DTM classificados pelo DC/TMD, considerando intervalos de confiança com 95% de significância.

**RESULTADOS:** A idade média dos participantes foi de 39,9±14,1 anos. Além disso, predominou-se o sexo feminino (76%) ( $p<0,0001$ ), com maior percentual em todos os subtipos avaliados, destacando-se a artralgia (82%) e a dor miofascial com limitação de abertura (81,8%), seguida da dor miofascial (74%)

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### HIGHLIGHTS

- There are different types of TMD in patients diagnosed with otalgia;
- Arthralgia and myofascial pain were strongly related in patients with otalgia;
- Differential diagnosis of TMD is necessary for patients with otological symptoms.

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e deslocamento de disco com redução (72,7%). Quando observada a distribuição dos subtipos de DTM entre os sexos, notou-se predominância de dor miofascial no sexo masculino (75%) e feminino (68%), mas não foi observada significância estatística nessa variável e nas demais estudadas.

**CONCLUSÃO:** Os pacientes com otalgia manifestaram mais de um dos subtipos de DTM, sendo o subtipo de dor miofascial o mais prevalente entre os participantes do estudo.

**Descritores:** Dor orofacial, Disfunção temporomandibular, Otalgia.

## INTRODUCTION

Orofacial pain is a frequent complaint in dental and medical offices, with an emphasis on temporomandibular disorder (TMD)<sup>1</sup>. It involves several clinical problems in the temporomandibular joint (TMJ) and associated structures. There are several factors related to the etiology of TMD, including those of biological, behavioral, social and cognitive origin. These alone or in association can result in pain, joint noises, and functional problems<sup>2-5</sup>. Because it is a condition in which its etiopathogenesis is not well understood, consequently its diagnosis and management become difficult. In addition, it is essential to identify a potential association with possible etiological factors and conditions that need treatment<sup>6-8</sup>.

TMD can be classified as muscular, articular, or both. It is important to point out that the most reported symptom of TMD is pain, which is usually located in the masticatory muscles, in the TMJ and/or in the preauricular area<sup>2,9,10</sup>. In this context, TMD is considered the most common cause of orofacial pain of non-dental origin<sup>5,11</sup>. In addition to the classical symptoms that are strongly associated because of anatomic relations, TMD is related to other conditions such as earache, headache, neuralgia, and toothache<sup>12,13</sup>. However, when one of these symptoms is present, a differential diagnosis is necessary, which often does not occur<sup>1,3</sup>.

Otalgia has been strongly associated with TMD. The explanation for this is that otalgia results from TMD triggered by reflex pain, which originates in tension band formation and masticatory muscles trigger points. Therefore, knowing the pathophysiology involving the stomatognathic system is essential for the differential diagnoses of otalgia and TMD<sup>14-17</sup>.

It is important to highlight that many of the symptoms of TMD can have other differential diagnoses, as patients often cannot differentiate an earache from TMJ pain, or other conditions that can cause tinnitus<sup>16,18</sup>.

The relationship between TMD and auricular symptoms has been studied for a long time, however there is little evidence to classify otalgia and TMD. The literature notes a high frequency of otalgia in patients with TMD, but little research has been done on the inverse relationship, about the types of TMD in patients diagnosed with otalgia. Considering the difficult differential diagnoses to associate otological symptoms with TMD, the objective of this study was to report the frequency of TMD in patients with otalgia, classifying the most frequent subtypes in these individuals and correlating them to gender and age.

## METHODS

This research is a cross-sectional, descriptive-exploratory and quantitative study. It was carried out following the ethical resolutions, respecting the principles of beneficence, non-maleficence, autonomy, and justice. It was approved by the Ethics and Research Committee of São Leopoldo Mandic College (Campinas, Brazil) under opinion number number 2010/0404.

### Study population

The sample included patients of at least 18 years old with otological symptoms, seeking medical care in a Brazilian reference clinic in Otorhinolaryngology. The patients included have been diagnosed with otalgia by an otolaryngologist. The sample size was determined by the annual number of patients with symptoms of otalgia that looked for otorhinolaryngological care at the clinic, considering a power of 90% ( $\beta=0.10$ ) and a significance level of 5% ( $\alpha=0.05$ ).

### Data collection

During the period of this study 114 patients complained of otalgia, 39 of whom were medicated, as they had a clinical presentation of the symptoms. Of the total number of patients, 75 were included and answered the questionnaire from the European Academy of Craniomandibular Disorders (EACD) and were then referred to the clinic's researcher. Among those who answered the questionnaire, only 50 were considered to be included, after fulfilling the RDC/TMD Axis I criteria and being diagnosed with TMD.

The RDC/TMD classifies TMD as: 1. Myofascial pain; 2. Myofascial pain with opening limitation; 3. Disc displacement with reduction and 4. Arthralgia. In 2014, a new diagnostic criterion was published by the Research Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) based on changes to the previous edition, named RDC/TMD. This new version can be used in clinical and research settings, being a validated instrument to identify patients with simple or complex TMD. The subtypes of TMD that can be diagnosed using DC/TMD include arthralgia, myalgia, local myalgia, myofascial pain, myofascial pain with reference, four-disc displacement, degenerative joint diseases, subluxation and headaches attributed to TMD<sup>2</sup>.

### Statistical analysis

Data obtained by this study was tabulated and analyzed using the SPSS version 17, Minitab 16, and Excel Office 2010 software. The frequency distribution of all study variables was analyzed and presented in tables for data description. The ANOVA parametric statistical test was used to verify if there were significant differences between DC/TMD subtypes. The confidence interval had a significance level of 95% ( $p<0.05$ ).

## RESULTS

The participants were between 18 and 80 years old, with an average of  $39.9\pm 14.1$ . The sample had 76% ( $n=38$ ) of female pa-

tients, being statistically significant ( $p < 0.0001$ ) when compared to the male patient's 24% ( $n = 12$ ) (Table 1).

When classified by its subtypes and by the participants' gender, TMD was predominant in females, with a higher percentage in all subtypes evaluated in this study, especially with arthralgia (82%) and myofascial pain with opening limitation (81.8%), followed by myofascial pain (74%) and disc displacement with reduction (72.7%) (Table 2).

When the distribution of TMD subtypes between genders was observed, a predominance of myofascial pain in males (75%) and females (68%) was noticed, but no statistical significance was observed on this variable and in the others variables studied (Table 3).

**Table 1.** Demographic profile of the sample

Gender	n	%	p-value
Female	38	76	<0.0001
Male	12	24	
Age (years)	Male	Female	n (% of population)
18 to 28	2 (16.7%)	10 (83.3%)	12 (24)
28 to 38	3 (23.1%)	10 (76.9%)	13 (26)
38 to 48	2 (20.0%)	8 (80.0%)	10 (20)
48 to 58	3 (30.0%)	7 (70.0%)	10 (20)
58 to 68	1 (33.3%)	2 (66.7%)	3 (6)
68 to 80	1 (50.0%)	1 (50.0%)	2 (4)

**Table 2.** Patients classified by TMD subtype according to the RDC/TMD

Gender	n (%)	Yes (%)
<b>Myofascial pain</b>		
Female	13 (81.2)	25 (73.5)
Male	3 (18.8)	9 (26.5)
<b>Myofascial pain with opening limitation</b>		
Female	29 (74.3)	9 (81.8)
Male	10 (25.7)	2 (18.2)
<b>Disc displacement with reduction</b>		
Female	30 (76.9)	8 (72.7)
Male	9 (23.1)	3 (27.3)
<b>Arthralgia</b>		
Female	29 (74.3)	9 (81.8)
Male	10 (25.7)	2 (18.2)

**Table 3.** Temporomandibular disorder subtypes distribution by gender

TMD types	Male n (%)	Female n (%)	Total n (%)	p-value
Not classified	1 (8)	4 (10)	5 (10)	0.816
Myofascial pain	9 (75)	25 (66)	34 (68)	0.530
Myofascial pain with opening limitation	2 (16)	9 (24)	11 (22)	0.583
Disc displacement with reduction	3 (25)	8 (21)	11 (22)	0.780
Arthralgia	2 (16)	9 (24)	11 (22)	0.583

## DISCUSSION

This study sought to identify a possible diagnosis of TMD in adult patients reporting otalgia. The objective of this study was to report the frequency of TMD in patients with otalgia, classifying the most frequent subtypes in these individuals and correlating them to gender and age. This study also classified the TMD subtypes and their relationship with age and gender. This research was motivated by the large number of patients seeking treatment for pain and dysfunction, being referred by otorhinolaryngologists to the clinic that served as the field for this research, and by previous studies<sup>19-21</sup>.

The frequency of ear pain in patients with TMD has been pointed out by evidence for some decades, and some studies have evaluated otological symptoms in TMD patients, but the opposite, verifying the diagnosis of TMD in patients with otalgia, is not frequent<sup>14,22</sup>. A study<sup>14</sup>, analyzing otological symptoms in TMD patients, noted that 53% of the sample was consulted or referred by an otolaryngologist. This research reported that symptoms such as earache, clog or pressure in the ears, tinnitus, and hearing loss could easily mask a TMD by being considered only as ear, nose, or maxillary sinus diseases and therefore not being appropriately treated.

The proximity of the structures and functional relationship between the TMJ and the ear hypothesize an association between joint and ear pathologies<sup>16,17</sup>. This is explained by the fact that muscles such as the masseter, tensor palate, tensor tympani and facial muscles have the same embryonic origin, in addition to sharing innervation with the TMJ, which causes pain in this region and explains why otological symptoms occur more frequently with myofascial pain. Thus, failure to establish the diagnosis usually results in persistent symptoms or inadequate treatment<sup>16,17</sup>.

In the present study's clinical evaluation, 90% of the patients obtained an established diagnosis and were classified into one of the TMD subtypes according to DC/TMD. These findings are in line with those of a study<sup>19</sup> which observed, in an otorhinolaryngology service, that 92.76% of the individuals had at least one TMD symptom. As already mentioned, the opposite is also true, and can be observed in another study<sup>20</sup>, showing that in an oral rehabilitation university service that attends TMD patients, approximately 54% of patients diagnosed with TMD had audiological changes, such as a sense of obstruction and otalgia. With a higher level of evidence, a case-control study<sup>21</sup> found that TMD influenced otalgia when compared to the control group.

Among the 50 patients in the sample of this study, 12 (24%) were males, and 38 (76%) females, where statistical tests demonstrated a significant difference between genders. These findings corroborate with a similar study<sup>19</sup>. The mean age found was also similar to other studies<sup>20,21</sup>, which can be explained by TMD being more frequent at this age.

As for patient distribution by TMD subtypes, and according to the diagnosis obtained following the established criteria, 90% of patients analyzed were diagnosed with one or more TMD

subtypes, showing a two-way relationship between otological problems and TMD. Among them, myofascial pain stands out, a fact that coincides with the wide scientific literature on TMD, being the subtype most related to other concomitant conditions<sup>23</sup>. Considering that the subtypes of disc displacement with reduction and arthralgia refer to joint dysfunctions and evaluating the general result of this study, muscle dysfunctions were approximately twice as prevalent as articular dysfunctions. The studies cited here have elucidated on otalgia symptoms in patients with TMD. This present study started specifically from the perception that many patients confuse TMD symptoms with ear problems. The pain they feel, in these cases, is a reflex pain originating from other structures and felt in the ear and is, therefore, mistaken for otalgia.

In this sense, it is important to have an interaction between dental surgeons and otorhinolaryngologists, so that, gradually, the patient can become aware that “earache” can be caused by structures close to the ears, and therefore need to be treated by the dental surgeon, and not only by the otorhinolaryngologist. Thus, a greater interaction between these specialties and more studies with a larger number of patients will benefit from the current findings. Finally, it was very common for patients to confuse TMD symptoms with otalgia because of reflex pain in the ear, which originates from tension bands in the masticatory muscles.

This study had some limitations, especially in relation to the sample, for not being a multicenter study and not having evaluated patients longitudinally.

## CONCLUSION

The present study showed that almost all patients with otalgia were affected by one or more subtypes of TMD, especially myofascial pain. However, this is a study with a limited population, thus suggesting the execution of future multicenter studies.

## AUTHORS' CONTRIBUTIONS

### Dilene Marques Henrique de Albuquerque

Conceptualization, Research, Writing - Preparation of the Original

### Luciane Lacerda Franco Rocha Rodrigues

Conceptualization, Writing - Review and Editing, Visualization

### Márcio Rogério Onofre Duarte

Resource Management, Project Management, Methodology

### Carlos Augusto Fernandes

Resource Management, Research, Methodology

### Expedito Nóbrega de Oliveira

Data collection, Writing - Preparation of the original

### Antônio Sérgio Guimarães

Conceptualization, Writing - Review and Editing, Supervision

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