Diagnosis of temporomandibular dysfunction subtypes in a population seeking specialized care

Diagnóstico dos subtipos de disfunção temporomandibular em uma população que busca atendimento especializado.

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ABSTRACT

BACKGROUND AND OBJECTIVES: The goal of the present study was to assess the frequency of temporomandibular disorders (TMD) subtypes in individuals that search for specialized care, identifying the subtypes of TMD, muscular and/or articular, in addition to relating each subtype with variables such as gender and age.
METHODS: In this context, after a screening, 270 individuals, aged between 18 and 70 years, were selected. All data were acquired using the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) instrument.
RESULTS: Among the 267 patients, 88.7% (n = 237) were female and 11.3% (n = 30) were male, with a mean age of 42±11.8 years. In this study, the predominance of joint/muscle TMD was evidenced (51.7%; n = 138), followed by only muscle TMD (47.5%; n = 127) and lastly, joint TMD (0.8%; n = 2). Important correlations (p>0.05) were not identified when comparing TMD subtypes with the variables gender and age, according to chi-square test. By relating the diagnosis to the TMD subtype, it was evidenced that bilateral myalgia was the most prevalent in muscle TMD (n = 100; 37.4%) and articular/muscular (n = 112; 41.9%). The other variables did not show significant statistics, neither moderate nor strong correlation.

CONCLUSION: In this research, all TMD subtypes were found, with a clear predominance of joint/muscle type of TMD, followed by muscle only, especially in females aged between 39 and 48 years.
Keywords: Diagnosis, Prevalence, Temporomandibular joint disorders.

RESUMO

JUSTIFICATIVA E OBJETIVOS: O objetivo do presente estudo foi avaliar a frequência dos subtipos de disfunção temporomandibular (DTM) em indivíduos que buscaram atendimento especializado, identificando os subtipos da DTM, se muscular e/ou articular, além de relacionar cada subtipo com variáveis como sexo e faixa etária.
MÉTODOS: Neste contexto, após uma triagem, foram selecionados 270 indivíduos na cidade de Fortaleza/CE, com faixa etária entre 18 anos e 70 anos de idade. Todos os indivíduos foram avaliados por meio do instrumento *Diagnostic Criteria for Temporomandibular Disorders* (DC/TMD).
RESULTADOS: Entre os 267 pacientes, 88,7% (n = 237) foram do sexo feminino e 11,3% (n=30) do masculino, com média de idade de 42 ± 11,8 anos. Neste estudo evidenciou-se a predominância de DTM articular/muscular (51,7%; n = 138), seguida de indivíduos com DTM somente muscular (47,5%; n = 127) e por último a articular (0,8%; n = 2). Não foram identificadas correlações importantes (p > 0,05), segundo o teste qui-quadrado, quando comparados os subtipos de DTM com as variáveis gênero e idade. Ao relacionar o diagnóstico com o subtipo de DTM, evidenciou-se que a mialgia bilateral foi a mais prevalente na DTM muscular (n = 100; 37,4%) e articular/muscular (n = 112; 41,9%). As demais variáveis não apontaram significância estatística nem correlação moderada ou forte.
CONCLUSÃO: Nesta pesquisa, foram encontrados todos os tipos de DTM, havendo um claro predomínio da DTM do tipo articular/muscular, seguida da somente muscular, especialmente em indivíduos do gênero feminino e de idade entre 39 e 48 anos.
Descritores: Diagnóstico, Disfunção temporomandibular, Frequência.

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HIGHLIGHTS
• The predominant type of TMD was joint/muscular.
• More frequent in female individuals.
• Individuals between the ages of 39 and 48 were more affected.

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INTRODUCTION

Temporomandibular disorders (TMD) constitute a broad group of clinical problems involving the muscles of mastication, the temporomandibular joint (TMJ) and associated orofacial struc-

tures[1-5]. These disorders includes several neuromuscular and musculoskeletal conditions in TMJ and associated structures[6-10]. It is known that the etiology of TMD reveals a multi-factorial origin, including neuromuscular, social, psychological, biological and biomechanical factors. In addition, the etiopathogenesis of TMD is not sufficiently elucidated, making diagnosis and management difficult, hence the importance of identifying the problem at its beginning and associating possible etiological factors, thus aiming at better treatment[3,9,11].

TMD has a higher prevalence in adults, especially in people aged between 20 and 45 years. When manifested until the age of 40, it is usually of the myogenic or muscular type; from this age group onwards, the main cause of TMD is joint degeneration, which, in turn indicates joint TMD. Medical Literature consider the female gender as the most affected, and anatomical factors such as ligament laxity and hormonal changes are associated[5,12,13]. TMD symptoms include decreased jaw range of motion, pain in the masticatory muscles, TMJ pain, joint sounds associated with function, generalized myofascial pain, and functional limitation or deviation in jaw opening. The most reported symptom of TMD is pain, which is usually located in the muscles of mastication, in the TMJ and/or in the preauricular area[4,14-15].

Diagnosing the correct TMD subtype is essential for treatment, so that it can be tailored according to the patient's needs. For this, it is very important to observe some factors to ensure the validity of the diagnosis and propose the correct therapy. Some examples are physical examination, consisting of muscle and TMJ palpation, verification of active mandibular movement and evaluation of joint noises[16-18].

Most studies relate TMD to the associated symptoms in a generalized way, but each subtype has its particularities. That is why the present's study objective was to assess the frequency of TMD subtypes in individuals who sought specialized care and to relate each subtype with DC/TMD variables.

METHODS

This research is cross-sectional, observational and quantitative in nature. The sample consisted of individuals of both genders, aged over 18 years, who attended the TMD clinic of the Specialized Center of Dentistry of the State of Ceará (*Centro Especializado de Odontologia do Estado do Ceará* - CEO/CENTRO), located in Fortaleza, CE, Brazil, along the year of 2020. This research was submitted to the Research Ethics Committee Involving Human Beings, from the São Leopoldo Mandic Dental Research Center (*Centro de Pesquisas Odontológicas São Leopoldo Mandic*), Campinas-SP and approved under Opinion Number 4.909.807.

The following inclusion criteria were selected: patients of both genders, aged between 18 and 70 years, who sought the TMD clinic at the CEO/Center and who were diagnosed with TMD. As exclusion criteria, were discarded patients who had any inability to fill out the forms and answer the questions asked during the interview.

Participants were evaluated using the DC/TMD instrument (Axis I) to diagnose the presence and define TMD subtypes. For data collection, the Demographic Data Questionnaire, the Symptom Questionnaire were used and finally, the clinical examination was carried out following the Examination Form. The application of the questionnaire and the physical examination were carried out by a professional specialist in temporomandibular disorders and data was calibrated for DC/TMD application. The results obtained were tabulated and submitted to a descriptive statistical analysis, in which the prevalence of TMD subtypes and the relationship between some variables, such as the profile (gender and age group by decades) and data obtained with the application of DC/TMD were evaluated.

Initially, the Free and Informed Consent Term (FICT) was given to patients seen at the TMD-CEO clinic, aged over 18 years of both genders, who agreed to participate in the research. Then, the examiner evaluated the patient according to the DC/TMD (Axis I); diagnosing the TMD subtype(s) present.

Based on the average of 300 individuals seen per month and the period of three months of care, a population of 900 individuals was estimated, of which it would be necessary to evaluate 267 in order to obtain a representative sample with 95% confidence.

Statistical analysis

Data were tabulated in Microsoft Office Excel® software and exported to SigmaPlot software, version 11.0. Clinical-demographic data were expressed as absolute and percentage frequency, and quantitative data as mean and standard deviation. The value of $p \leq 0.05$ was adopted as statistically significant.

RESULTS

In table 1, it can be observed that the sample had a total of 267 participants, of which 88.7% (n = 237) were female and 11.3% (n = 30) were male (Table 1), with a mean age of 42 ± 11.8 years (p > 0.05). When the age group was coded by decades, the most prevalent age was between 39 and 48 years (27%; n = 72), followed by 49 to 58 years (25.1%; n = 67), and 29 to 38 years (19.1%; n = 51). A significant difference (p<0.05) was found when age was compared by age group.

Table 1. Sociodemographic data of the studied sample

Variables	n	%	p-value
Gender			< 0.05
Female	237	88.7	
Male	30	11.3	
Age (years)			
Up to 28	41	15.3%	< 0.05
29 to 38	51	19.1%	
39 to 48	72	27.0%	
49 to 58	67	25.1%	
59 to 58	31	11.6%	
69 to 78	5	1.9%	

Regarding the type of TMD of the sample, it was observed that the most prevalent was joint/muscular (51.7%; n = 138), followed by muscular (47.5%; n = 127) and lastly by joint (0.8%; n = 2) (Figure 1). There was no statistical difference between the muscular and joint/muscular groups, however both had a difference when compared to the joint TMD group (p < 0.01).
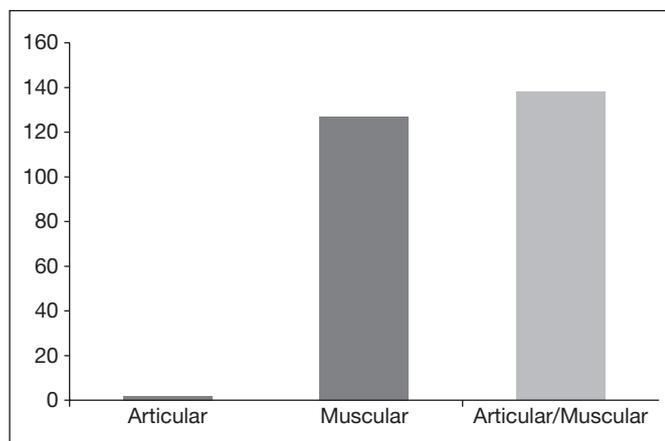
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Figure 1. Temporomandibular disorders classification in the studied sample

In the correlation of the diagnosis with the TMD subtype (Table 2), it is evident that bilateral myalgia was more prevalent in muscular TMD (n = 100; 37.4%) and joint/muscular TMD (n = 112; 41.9%).

Table 3 shows the correlation between myofascial pain and different types of TMD, myofascial pain with spreading was more common on the left side and in joint/muscular TMD (23.9%), followed by bilateral pain in muscular TMD (21.7%) and bilateral in joint/muscular TMD.

Table 4 shows the correlation between headache and different types of TMD, which was most often bilateral in muscular TMD (23.6%) and joint/muscular TMD (29.5%). Table 5 shows the correlation between disc displacement with reduction (DDwR) and the different types of TMD, with none predominating, and between bilateral DDwR and joint/muscular TMD.

Table 6 shows the correlation between the disc displacement without reduction (DDwoR) and the different types of TMD, none being predominant. In the correlation between degenerative diseases and different types of TMD, once again, none predominated (Table 7).

Table 2. Correlation between the presence of myalgia and the different types of temporomandibular disorders of the DC/TMD.

Variables	Type of TMD			rr	p-value
	Muscular	Articular	Articular/ Muscular		
Myalgia					
Right	6 (2.2%)	0	3 (1.1%)		
Left	6 (2.2%)	0	5 (1.8%)		
Bilateral	100 (37.4%)	0	112 (41.9%)	-0.02	0.77
None	14 (5.2%)	1 (0.3%)	22 (8.2%)		
Local myalgia					
Right	1 (0.3%)	0	0		
Left	3 (1.1%)	0	3 (1.1%)		
Bilateral	120 (45%)	1 (0.3%)	138 (51.6%)	-0.03	0.58
None					

TMD = temporomandibular disorder; r = Spearman Correlation, p = Chi-squared test. Number of participants accompanied by the relative frequency in percentage (%)

Table 3. Correlation between myofascial pain and different types of DC/TMDD temporomandibular disorders.

Variables	Type of TMD			r	p-value
	Muscular	Articular	Articular/ Muscular		
Myofascial pain with spreading					
Right	10 (37%)	0	18 (6.7%)		
Left	14 (5.2%)	0	14 (5.2%)		
Bilateral	40 (15.0%)	0	64 (23.9%)	0.14	0.02
None	58 (21.7%)	1 (0.3%)	47 (17.6%)		
Myofascial pain with referral					
Right	11 (4.1%)	0	15 (5.6%)		
Left	3 (1.1%)	0	9 (3.3%)		
Bilateral	5 (1.8%)	0	6 (2.2%)	0.07	0.28
None	104 (39%)	1 (0.4%)	112 (42%)		

TMD = temporomandibular disorder; r = Spearman Correlation, p = Chi-squared test. Number of participants accompanied by the relative frequency in percentage (%)

Table 4. Correlation between headache attributed to TMD and the different types of temporomandibular disorders of the DC/TMD.

Variables	Type of TMD			r	p-value
	Muscular	Articular	Articular/ Muscular		
Headache attributed to TMD					
Right	12 (4.5%)	0	16 (6.0%)		
Left	11 (4.1%)	0	20 (7.5%)		
Bilateral	63 (23.6%)	0	79 (29.5%)	0.06	0.29
None	37 (13.8%)	1 (0.3%)	30 (11.2%)		

TMD = temporomandibular disorder; r = Spearman Correlation, p = Chi-squared test. Number of participants accompanied by the relative frequency in percentage (%)

Table 5. Correlation between DDwR and different types of disorders temporomandibular joint of DC/TMD.

Variables	Type of TMD			r	p-value
	Muscular	Articular	Articular/ Muscular		
DDwR					
Right	1 (0.3%)	0	25 (9.3%)	0.81	0.00
Left	2 (0.75%)	0	25 (9.3%)		
Bilateral	2 (0.75%)	1 (0.3%)	76 (28.4%)		
None	119 (44.5%)	0	16 (5.9%)		
DDwR with intermittent locking					
Right	0	0	1 (0.3%)	0.10	0.10
Bilateral	0	0	2 (0.75%)		
None	121 (45.3%)	1 (0.3%)	141 (52.8%)		

TMD = temporomandibular disorder; r = Spearman Correlation, p = Chi-squared test. Number of participants accompanied by the relative frequency in percentage (%)

Table 6. Correlation between DDwoR and different types of disorders temporomandibular joint of DC/TMD.

Variables	Type of TMD			r	p-value
	Muscular	Articular	Articular/ Muscular		
DDwoR with limited mouth opening					
Left	0	0	3 (1.1%)	0.01	0.10
None	121 (45.3%)	1(0.3%)	139 (52.0%)		
DDwoR without limited mouth opening					
Left	0	1 (0.3%)	0	0.01	0.89
None	127 (47.5%)	1 (0.3%)	139 (52.0%)		

TMD = temporomandibular disorder; r = Spearman Correlation, p = Chi-squared test. Number of participants accompanied by the relative frequency in percentage (%)

Table 7. Correlation between degenerative diseases and different types of temporomandibular disorders of the DC/TMD.

Variables	Type of TMD			r	p-value
	Muscular	Articular	Articular/Muscular		
Degenerative diseases					
Right	0	0	6 (2.2%)		
Left	0	0	3 (1.1%)	0.26	0.00
Bilateral	1 (0.3%)	1	14 (5.2%)		
None	122 (45.7%)	(0.43%)	120 (45.0%)		

TMD = temporomandibular disorder; r = Spearman Correlation, p = Chi-squared test. Number of participants accompanied by the relative frequency in percentage (%)

In the correlation between arthralgia and different types of TMD (Table 8), bilateral muscle TMD (18.3%), joint/muscular TMD (29.2%) and none (19.1%) predominated.

Table 8. Correlation between arthralgia and different types of disorders temporomandibular joint of DC/TMD.

Variables	Type of TMD			r	p-value
	Muscular	Articular	Articular/Muscular		
Arthralgia					
Right	7 (2.6%)	0	15 (5.6%)		
Left	15 (5.6%)	0	24 (8.9%)	0.18	0.00
Bilateral	49 (18.3%)	0	78 (29.2%)		
None	51 (19.1%)	1 (0.3%)	27 (10.1%)		

TMD = temporomandibular disorder; r = Spearman Correlation, p = Chi-squared test. Number of participants accompanied by the relative frequency in percentage (%)

DISCUSSION

In the present study, individuals of both genders and aged between 18 and 70 years participated, all diagnosed with TMD. In the sample, a total of 88.7% were female and 11.3% were male, with a mean age of 42 ± 11.8 years, thus predominating the age group between 39 and 48 years.

It is a consensus that TMD is a condition more associated with the female gender. In the present study, most participants were of this gender, however this did not influence the correlations. In addition, individuals aged between 39 and 58 years predominated the sample. A study[12] collected data from 236 patients with orofacial pain based on the RDC/TMD, observing a predominance of females (80%) and the age group from 41 to 60 years, followed by the age group from 21 to 40 years (37%). In another study[13] TMD has a higher prevalence in adulthood, in people aged between 20 and 45 years, where, when manifested until the age of 40, it is usually myogenic or muscular TMD and from this age group onwards, the main cause is joint degeneration, being arthrogenic or articular TMD. The study in question considered the female gender to be the most affected, as anatomical factors more related to this gender, such as ligament laxity and hormonal changes, are more associated.

Regarding the TMD subtype of the sample under study, it was observed that the most prevalent was joint/muscular (51.7%), followed by muscular (47.5%) and finally joint (0.8%). In

this research, instruments such as the DC/TMD Axis I Diagnostic Criteria Questionnaire were used. The findings are in agreement with the literature, as a study[19] found a prevalence of 30.4% of muscle TMD, 67.4% joint/muscular TMD and 2.2% of joint TMD. Another study[20] reported a prevalence of 91.1% for joint/muscular TMD and one more study[21] reported a prevalence of 58.3%.

As can be observed, both the results of this research and several studies in the literature indicate a higher prevalence of joint/muscular and muscular TMD. In the findings of a research[22] another trend was indicated, where each muscular and joint types had 36.8% prevalence, and the joint/muscular type had 26.4%.

It is a fact that there is a clear importance in identifying the correct subtype in order to have a correct diagnosis and adequate planning. There are several inherent characteristics of the morphofunctional complexity of TMJ that consequently drive several studies on this topic. In this, the possible causes related to internal disorders of disc origin are highlighted, as they are reported as very frequent and related to the signs and symptoms of TMD[6-8,23].

It is known that TMD is a very heterogeneous condition and this directly impacts the findings, as well as the impossibility of comparing with other studies with different methodologies. Despite the various studies in the literature on the prevalence of TMD, there are few that classify them by subtypes and correlate with the findings of DC/TMD. This fact was what motivated the present study, given the lack of data in the specialized service, thus knowing better the clinical profile of the population served.

What the literature reports is that many of the symptoms for all subtypes can present a similar and diffuse way, including mainly arthralgia, masticatory myalgia, headache, otalgia, neck pain[6,16,17,24]. In the present study, a high prevalence of headache attributed to TMD was observed, especially bilateral, in individuals with muscular TMD, a high prevalence of myalgia was also in these individuals. In the correlation between arthralgia and different types of TMD, bilateral muscular TMD (18.3%) and joint/muscular TMD (29.2%) predominated, whereas degenerative diseases were neither expressive nor significant.

Internal disorders involve the joint components, especially the articular disc and the condyle, and are characterized by displacement of the articular disc, which in this case may present symptoms related to pain[25,26]. In the present study, DDwR was found in almost the entire population diagnosed with joint/muscular TMD, with a strong correlation. The DDwoR was practically absent, with no correlation with any of the variables.

In a systematic review and meta-analysis by study[27], the main findings in primary studies were arthralgia, disk displacement with reduction, disk displacement with reduction with intermittent locking, disk displacement without reduction with limited opening, disk displacement without reduction and no limited opening, degenerative joint disease, osteoarthritis, osteoarthrosis and subluxation. In this study, the prevalence of arthralgia was 10.1% and that of degenerative joint disease was 9.1%. It is important to note that osteoarthritis can be consi-

dered as an organ failure rather than an isolated disease state, thus compromising function.

Common TMJ diseases involve inflammation and degeneration in arthritic diseases, regardless of disc position and aberrations in growth disorders. These pathological changes may clinically manifest as pain and/or derangement. In addition, some conditions may occur independently of an underlying pathological process, for example because of a traumatic or congenital-related event or developmental ligament laxity[28]. Disc displacement with reduction was the most prevalent. It is noteworthy that the prevalence of DDwR is also quite common in the subclinical population, ranging from 18% to 35% of the population[29]. This agrees with the present study, since DDwR was much more common than DDwoR, as mentioned before.

As limitations of the current study, its important to note that it its not a multicenter study in a short period of time. Finally, it is necessary to emphasize that dentists are considered the primary care providers for TMD, as they are professionals with knowledge for the diagnosis and adequate treatment of these complex disorders. Studies like this reinforce the importance of a correct diagnosis to consequently have better symptom management. Thus, it is the duty of clinical professionals to perform the correct diagnosis and management considering the particularities of each case, and of researchers to improve the diagnostic criteria adopted in correlated investigations.

CONCLUSION

In this research, all types of TMD were found, with a clear predominance of articular/muscular TMD, followed by muscular TMD. There was a higher frequency especially in female individuals aged between 39 and 48 years.

ACKNOWLEDGMENTS

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