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Relationship between myofascial pain and facial types: an observational study

Relação entre dor miofascial e tipos faciais: um estudo observacional

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ABSTRACT

Temporomandibular disorder (TMD) is a term that covers a number of clinical problems involving the masticatory muscles, TMJ and all associated structures leading to signs and symptoms such as jaw pain, otalgia, headaches and limitation of function. In this context, TMD has been related to facial type and there are three distinct facial types (euryprosopic, mesoprosopic, and leptoprosopic). **Objective:** The aim of this study was to investigate the correlation between myofascial pain and facial types classified by the RDC/TMD Axis I. **Material and Methods:** this study was composed of 64 women aged between 12 and 49 years, using data obtained from two institutions. We used the anthropometric methodology, which meets the criteria of simplicity and reliability. We also applied the Brugsh Facial Index. The individuals were classified as euryprosopic (51.56%), mesoprosopic (12.50%) and leptoprosopic (35.94%), without statistical significance among the groups (p=0,3492). **Results:** there is no statistical difference between the age groups (p=0.2976) and no association between facial type and age range. **Conclusion:** this study found that there was a correlation between myofascial pain and facial types, with the predominance of euryprosopic faced women aged between 20 and 29 years when compared with other facial types and other age groups.

KEYWORDS

Temporomandibular joint dysfunction syndrome; Anthropometric methodology; Mandibular disorders; Myofascial pain; Orofacial pain.

RESUMO

A Disfunção Temporomandibular é um termo que cobre uma série de problemas clínicos envolvendo os músculos mastigatórios, ATM e todas as estruturas associadas que levam a sinais e sintomas como dor na mandíbula, otalgia, dores de cabeça e limitação de função. Nesse contexto, a DTM tem sido relacionada ao tipo facial que são classificados em três tipos distintos (euryprosopo, mesoprosopo e leptoprosopo). **Objetivo:** O objetivo deste estudo foi investigar a correlação entre a dor miofascial e os tipos faciais classificados pelo RDC/TMD Eixo I. **Material e Métodos:** este estudo foi composto por 64 mulheres com idade entre 12 e 49 anos, utilizando dados obtidos em duas instituições. Utilizou-se a metodologia antropométrica, que atende aos critérios de simplicidade e de confiabilidade. Também foi utilizado o Índice Facial de Brugsh. Os indivíduos foram classificados em euriprosopo (51,56%), mesoprosopo (12,50%) e leptoprosopo (35, 94%), sem significância estatística entre os grupos (p = 0,3492). **Resultados:** não houve diferença estatística entre as faixas etárias (p = 0,2976) e nenhuma associação entre tipo facial e faixa etária. **Conclusão:** este estudo constatou que houve correlação entre dor miofascial e tipos faciais, com predomínio de mulheres euriprosopo com idade entre 20 a 29 anos quando comparadas com outros tipos faciais e outras faixas etárias.

PALAVRAS-CHAVE

Síndrome da disfunção da articulação temporomandibular; Metodologia antropométrica; Distúrbios mandibulares; Dor miofascial; Dor orofacial.

INTRODUCTION

According to the American Academy of Orofacial Pain (AAOP), temporomandibular disorder (TMD) is a term that covers a number of clinical problems involving the masticatory muscles, the temporomandibular joints (TMJ) and all associated structures that can lead to conditions such as jaw pain, otalgia, headaches and limitation of function [1].

TMD etiology has a multifactorial origin, which include different factors, such as neuromuscular, social, psychological and biological biomechanical aspects. In addition to these factors, the etiopathogenesis of TMD is not well understood, which makes its diagnosis and management difficult. Therefore, it is important to identify TMD at its beginning and associate it with possible etiological factors, thus aiming at the treatment [2,3].

TMD has been related to facial type [4-7]. There are three distinct facial types (euryprosopic, mesoprosopic, and leptoprosopic) and their variations (brachyfacial and dolichofacial). Individuals with a long facial type (leptoprosopic) usually have less chewing strength than those with a mesoprosopic type [6].

The growth and the development of the facial shape is part of human physiology, being something of craniofacial clinical interest. Then, the facial shape is associated with genetic influences and local environmental factors, such as the chewing muscle activity. Knowing and analyzing these characteristics profile better enables correct diagnoses and finding strategies for the treatment, with methods available for handling TMD [8,9].

Some studies on the literature about muscle activity and facial morphology have revealed that individuals with euryprosopic faces display a tendency to apply more forces into tightening and chewing, when compared with narrow and broad face individuals (leptoprosopic), which may result in orofacial pain and TMD [9,10].

Due to the lack of evidence and clinical importance, the goal of this study was to investigate the correlation between myofascial pain and facial types classified by the RDC/TMD Axis I.

MATERIAL AND METHODS

This is a transversal study approved under protocol number 2.333.460. Written informed consent was obtained from all the individuals participating in the study.

The sample consisted of 64 randomly selected women, aged 12 to 49 years (S.D. = 8 years), classified with myofascial pain according to the RDC/TMD Axis I, "Research Diagnostic Criteria". Women with any condition that could influence the size of the head circumference, such as microcephaly and a history of facial trauma, were excluded from this study.

This sample was recruited at two different dental institutions (Brazilian Association of Dentistry and Menino Jesus Medical Clinic, both in the state of Piauí, Brazil). The individuals were randomized by Microsoft Excel Program and submitted to anthropometric measurements in order to calculate the facial index (Table I), which was obtained from the association between the morphological height of the face (Nasio-Gnation, Na-gn) and the morphological width of the face (Zigion-Zigion, Zy-Zy). In this procedure, the curved compass was used, shown in Figures 1 and 2. In calculating the Brugsh facial index, the facial height was divided by the width and multiplied by 100.

$$IF = \frac{(Na - gn) \times 100}{(Zy - Zy)} \quad (1)$$

in which,

IF less than or equal to 84.9 = (Euryprosopic);

IF greater than 84 and less than 90 = (Mesoprosopic);

IF equal to or greater than 90 = (Leptoprosopic).

A confidence interval of 95% ($z\alpha = 1.96$) was adopted in the estimation of confidence and an error margin (B) of 5% was determined in the parameters to be estimated. The trend Chi-square test was used to measure the degree of association between the outcome and the individuals' characteristics in their respective contexts. When the expected frequency in the Chi-Square test was less than five, Yates correction was used. All analyses considered a confidence interval of 95% (95% CI) and statistical significance of $p < 0.05$. Statistical Package for Social Sciences (SPSS) 19.0 (IBM Corp., Armonk, United States) and R version 3.4.3 were used for the data analysis.

Table I - Facial types determined by the morphological index of the face, calculated from the centesimal ratio between height and width of the face

PATIENTS	BRUGSH FACIAL INDEX	FACIAL TYPE	AGE
1	93.33	Leptoprosopic	37 years
2	89.62	Mesoprosopic	22 years
3	86.95	Mesoprosopic	43 years
4.	78.26	Euryprosopic	40 years
5	91.10	Leptoprosopic	19 years
6	83.60	Euryprosopic	22 years
7	91.83	Leptoprosopic	38 years
8	83.73	Euryprosopic	29 years
9	89.90	Mesoprosopic	45 years
10	89.07	Mesoprosopic	47 years
11	108.33	Leptoprosopic	38 years
12	88.28	Mesoprosopic	26 years
13	84.12	Mesoprosopic	27 years
14	91.05	Leptoprosopic	40 years
15.	78.51	Euryprosopic	37 years
16	83.59	Euryprosopic	28 years
17	84.82	Mesoprosopic	38 years
18	85.03	Mesoprosopic	25 years
19	81.74	Leptoprosopic	19 years
20	83.62	Euryprosopic	23 years
21	82.75	Euryprosopic	19 years
22	92.68	Leptoprosopic	46 years
23	79.67	Euryprosopic	29 years
24	83.87	Euryprosopic	41 years
25	82.96	Euryprosopic	25 years
26	86.60	Mesoprosopic	32 years
27	87.70	Mesoprosopic	39 years
28	88.13	Euryprosopic	19 years
29	79.10	Euryprosopic	23 years
30	78.87	Euryprosopic	29 years
31	90.51	Leptoprosopic	20 years
32	86.99	Mesoprosopic	37 years
33	81.48	Euryprosopic	24 years
34	89.07	Mesoprosopic	46 years
35	84.42	Mesoprosopic	43 years
36	76.86	Euryprosopic	29 years
37	78.86	Euryprosopic	28 years
38	87.39	Mesoprosopic	48 years
39	81.81	Euryprosopic	33 years
40	80.71	Euryprosopic	38 years
41	84.48	Mesoprosopic	32 years
42	83.05	Euryprosopic	23 years
43	89.83	Mesoprosopic	21 years
44	80.46	Euryprosopic	40 years
45	79.54	Euryprosopic	18 years
46	89.65	Mesoprosopic	30 years
47	81.81	Euryprosopic	28 years
48	81.88	Euryprosopic	22 years
49	83.92	Euryprosopic	39 years
50	79.68	Euryprosopic	22 years
51	89.14	Mesoprosopic	40 years
52	86.61	Mesoprosopic	38 years
53	82.81	Euryprosopic	27 years
54	78.04	Euryprosopic	48 years
55	81.14	Euryprosopic	35 years
56	88.88	Mesoprosopic	21 years
57	78.33	Euryprosopic	26 years
58	82.17	Euryprosopic	34 years
59	88.28	Mesoprosopic	23 years
60	79.50	Euryprosopic	23 years
61	80.32	Euryprosopic	31 years
62	83.37	Euryprosopic	35 years
63	87.28	Mesoprosopic	29 years
64	78.03	Euryprosopic	30 years

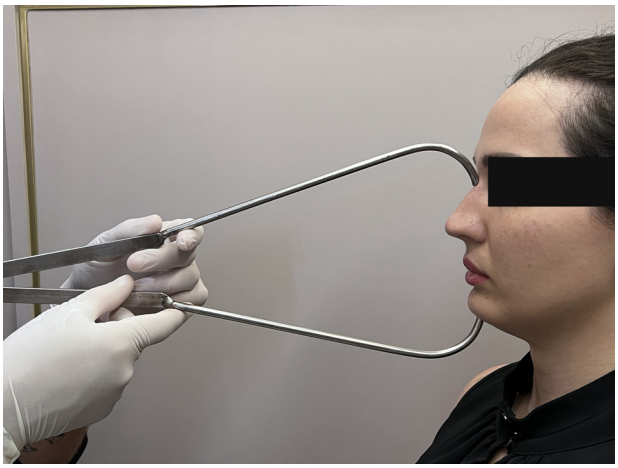

Figure 1 - Facial height.

Figure 2 - Facial width.

RESULTS

Analysis of the obtained results began by describing the age profile of the 64 patients diagnosed with myofascial pain. Table II shows that most patients are aged between 20 and 29 years (42.19%). Next, the patients between 30 and 39 years, (29.69%); then it shows those between 40 and 49 years old (20.31%) and finally the smallest part (7.81%), corresponding to those under 20 years of age. There was no statistical difference between age groups ($p = 0.2976$).

Table II - Age range frequency of patients diagnosed with myofascial pain

Age	n (n%)	P-value*
< 20 years	n (7.81%)	0.2976
20-29 years	n (42.19%)	
30-39 years	n (29.69%)	
40-49 years	n (20.31%)	

*Kruskal-Wallis test.

Table III - Classification of Facial Types from the sample

FACIAL TYPES	Number of individuals	% of individuals	value-p*
Euryprosopic	33	51.56%	
Leptoprosopic	8	12.50%	0.3492
Mesoprosopic	23	35.94%	

*Kruskall-Wallis test

Table IV - Representation of ages and facial types

Facial Type/ Age	Eury	Meso	Lepto	Total (%)
<20	2	1	2	5 (7.81%)
20-29	18	8	1	27(42.19%)
30-39	9	7	3	19(29.69%)
40-49	4	7	2	13(20.31%)
Total (%)	33 (51.56%)	23 (35.94%)	8 (12.5%)	64 (100%)

Table III shows the frequency of facial types found in the sample of individuals with myofascial pain. The individuals were classified according to the euryprosopic (51.56%), mesoprosopic (12.50%) and leptoprosopic (3.594%) facial types, without statistical significance among the groups (p=0.3492).

In order to verify the association between the facial type and the age range, a chi-square test of independence was performed (Table IV) and no statistically significant association was observed (p=0.1604).

DISCUSSION

This study investigated the association between myofascial pain occurrence and facial types in women diagnosed with myofascial pain by the RDC/TMD Axis I. The results showed that in the sample of women diagnosed with myofascial pain, the age group of 20 to 29 years stood out.

Although it is the first technique used in craniofacial measurements and other methods have emerged with new technology, anthropometry is still an efficient method for describing craniofacial morphology, since it is simple, minimally invasive, and low cost. It also provides reliable measurements, when conducted by a trained professional [11-14].

In this study, craniofacial anthropometry was used because it is considered a simple, economical, noninvasive and reliable method. In order to determine the variations of skull patterns, craniometric reference points were used to measure dimensions such as width, length and height of the skull or the head. The indexes of facial types classification are obtained from those measures [13].

Epidemiological aspects, such as gender and age, were considered for sample selection due to the highest frequency of myofascial pain in females of reproductive age [15,16]. However, no consensus was found in the literature regarding the correlation between facial types and subtypes of temporomandibular disorders.

The euryprosopic type showed the highest values of facial types. The literature pointed that individuals with closed or low angles (euryprosopic) tend to apply more force during tightening and chewing, which may influence craniofacial morphology, agreeing with Nebbe et al. [17] and Ingervall and Thilander [18], and disagreeing with Stringert and Worms [19], who observed in their studies a higher prevalence of myofascial pain in hyperdivergent individuals (leptoprosopic) when compared to hypodivergent individuals (euryprosopic).

The present study observed a higher prevalence of myofascial pain in young adults, coinciding with the period when the individual's functional activities are more intense and psychological factors (stress, anxiety and depression) are more present, agreeing with other studies such as Bove et al. [20], Araujo [21], and Tosato and Caria [22]. It was also found that the average age of the individuals surveyed was 31 years, similar to the literature [23]. It is important to point out that in the analysis of the association between facial type and age range, no statistically significant association was observed.

As there is no consensus in the literature that there is an association between myofascial pain and facial types, the present study suggests more research in this field, aiming at more conclusive results.

CONCLUSION

This study found that there was a correlation between myofascial pain and facial types, with the predominance of euryprosopic-faced women aged from 20 to 29 years when compared with other facial types and other age groups.

Author's Contributions

FFS: Conceptualization, Methodology, Investigation,, Writing – Original Draft Preparation. MSFB: Validation, Formal Analysis, Data Curation. ASG: Resources, Writing – Original Draft Preparation, Visualization. LARV: Data Curation, Writing – Original Draft Preparation, Writing – Review & Editing. LLFRR: Conceptualization, Methodology, Writing – Review & Editing, Visualization, Supervision, Project Administration.

Conflict of Interest

The authors declare no conflicts of interest.

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None.

Regulatory Statement

This study was conducted in accordance with all the provisions of the local human subjects oversight committee guidelines and policies of São Leopoldo Mandic College of Dentistry. The approval code for this study is: 2.333.460.

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