

# Temporomandibular disorders in fibromyalgia patients: are there different pain onset?

Disfunção termomandibuar em doentes com fibromialgia: há diferença no início das dores?

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## ABSTRACT

**Objective:** To identify temporomandibular disorders (TMD) symptoms in two groups of fibromyalgia patients according to the temporal relation between the onset of facial pain (FP) and generalized body pain (GBP). **Cross-sectional study design:** Fifty-three consecutive women with fibromyalgia and FP were stratified according to the onset of orofacial pain: *Group-A* (mean age 47.30 ± 14.20 years old), onset of FP preceded GBP; *Group-B* (mean age 51.33 ± 11.03 years old), the FP started concomitant or after GBP. **Clinical assessment:** Research Diagnostic Criteria for Temporomandibular Disorders and the Visual Analogue Scale. **Results:** Myofascial pain with mouth opening limitation ( $p = 0.038$ ); right disc displacement with reduction ( $p = 0.012$ ) and jaw stiffness ( $p = 0.004$ ) were predominant in *Group A*. Myofascial pain without mouth opening limitation ( $p = 0.038$ ) and numbness/burning were more common in *Group B*. **Conclusion:** All patients had temporomandibular joint symptoms, mainly muscle disorders. The prevalence of myofascial pain with limited mouth opening and right TMJ disc displacement with reduction were higher in *Group A*.

**Keywords:** fibromyalgia, orofacial pain, facial pain, temporomandibular disorders.

## RESUMO

**Objetivo:** Identificar sintomas de disfunção temporomandibular (DTM) em dois grupos de pacientes fibromiálgicas, segundo a relação temporal entre o início da dor facial (DF) e das dores generalizadas no corpo (DGC). **Estudo transversal:** 53 pacientes consecutivas com fibromialgia e DF foram divididas de acordo com o início da dor orofacial: Grupo A (média de idade 47,30 ± 14,20anos), o início da DF precedeu o da DGC; Grupo-B (idade média 51,33 ± 11,03anos), a DF iniciou concomitantemente ou após a DGC. **Avaliação clínica:** Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) e escala visual analógica (EVA). **Resultados:** Dor miofascial com limitação de abertura bucal ( $p = 0,038$ ); deslocamento de disco à direita com redução ( $p = 0,012$ ) e rigidez mandibular ( $p = 0,004$ ) foram predominantes no Grupo A. Dor miofascial sem limitação de abertura bucal ( $p = 0,038$ ) e dormência/queimação foram mais comuns no Grupo-B. **Conclusão:** Todos os pacientes tiveram sintomas de DTM, principalmente disfunção muscular. A prevalência de dor miofascial com limitação de abertura bucal e deslocamento de disco à direita com redução foi maior no Grupo A.

**Palavras-chave:** fibromialgia, dor orofacial, dor facial, desordens temporomandibulares.

Fibromyalgia is characterized by generalized pain, decreased pain threshold, sleep disturbance, fatigue, psychological distress and chronic headache<sup>1</sup>. Mechanisms of temporal and spatial pain summation also play an important role on central sensitization of these patients<sup>2,3</sup>. The original diagnostic criteria of fibromyalgia does not include the evaluation of the craniofacial area<sup>4,5</sup>, however fibromyalgia patients often present orofacial pain including temporomandibular disorders (TMD) disorders<sup>6,7,8,9</sup>.

The *American Academy of Orofacial Pain*<sup>10</sup> defines TMD as “a collective term that embraces a number of clinical problems that involve the masticatory muscles, the temporomandibular joints (TMJ), and the associated structures” and they are considered as a musculoskeletal disorder subclass<sup>10</sup>. Epidemiological studies describing heterogeneous patient groups have provided a general insight into the role of some local and systemic factors (as rheumatoid arthritis and fibromyalgia), in the onset and perpetuation of TMD<sup>7,11,12</sup>.

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Despite the evidence that TMD and fibromyalgia could have similar pathophysiological mechanisms<sup>13,14</sup>, there are just a few studies analyzing the temporal relationship between the onset of TMD symptoms and the onset of widespread pain<sup>15</sup>.

Thus, the purpose of this study was to identify TMD symptoms in two groups of fibromyalgia patients, according to the temporal relation of onset between facial pain (FP) and generalized body pain (GBP).

## METHOD

This study included 53 consecutive women diagnosed with fibromyalgia, according to the American College of Rheumatology Classification criteria<sup>4</sup>, whom were evaluated at the Physical Medicine Division of Trauma and Orthopedic Institute of Hospital das Clínicas of the Medical School of University of São Paulo (USP). They had facial pain and were referred to the Orofacial Pain Clinic of the same hospital. They were divided into 2 groups, according to the temporal relation between the onset of FP and GBP:

- *Group A*: the onset of FP complaint preceded GBP (Mean ages:  $47.30 \pm 14.20$  years old, ranging from 27 to 81 years old).
- *Group B*: the onset of FP complaint was concomitant or after GBP (Mean ages  $51.33 \pm 11.03$  years old, ranging from 23 to 78 years old).

### Pain assessment

All patients underwent a standardized clinical protocol applied by a trained orofacial pain dentist<sup>16,17</sup>, which consisted in:

- 1) An interview and systematic evaluation of cervical, cranial, facial, dental and other oral structures to detail: a) chief complaint; b) general pain characteristics (location, intensity, quality, duration, pain relief, worsening); c) the patient's medical history, including co-morbidities,

headache and pain complaints in other regions of the body and d) physical examination of the cervical, cranial, facial and intraoral regions. The aim of this first evaluation was to make a differential diagnosis according to the orofacial pain criteria<sup>10,18</sup>;

2) Orthopantomography of the jaw to exclude structural disease of the teeth and the jaw bone;

3) Visual Analogical Scale (VAS) for pain intensity. The patient was asked to report the average of her pain intensity in three distinct moments: 1 – during the exam, 2 – average of the last 6 months, 3 – maximum of pain experienced in the last 6 months;

4) The validated Portuguese version of the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) questionnaire<sup>19,20</sup>. The final classification of masticatory musculoskeletal disorder was based on this questionnaire.

The research project was approved by the Medical School Ethics Committee and the patients signed the informed consent.

### Statistical analysis

Data were analyzed by parametric and non-parametric tests. Initially, descriptive analysis of variables was performed. The Fisher's Exact and Chi-square tests were used for qualitative variables and the Student's T and Mann-Whitney tests were used for quantitative variables<sup>21</sup>. All statistical calculations were performed using SPSS 17.0 (SPSS Inc., Illinois, USA). Level of significance was 5%.

## RESULTS

The ages of the groups did not differ by the T Student test ( $p = 0.253$ ). There was a significant difference between them about the FP onset: in *Group A*, FP preceded GBP with a mean of 7.43 years and in *Group B* FP occurred after GPB with a mean of 5.6 years. The results are outlined in Table 1.

**Table 1.** General characteristics of orofacial pain in the fibromyalgia patients (n = 53).

	Group A (n = 20)	Group B (n = 33)	p
FP complaints	12 (60%)	22 (66.7%)	0.624 <sup>1</sup>
Facial and intra-oral pain complaints	8 (40%)	11 (33.3%)	-
Headache complaints	17 (85%)	29 (87.9%)	1.000 <sup>2</sup>
FP in the morning	14 (70%)	26 (78.8%)	0.522 <sup>2</sup>
Morning fatigue/stiffness	13 (65%)	26 (78.8%)	0.270 <sup>1</sup>
Uncomfortable bite	13 (65%)	28 (84.8%)	0.174 <sup>2</sup>
Mean FP VAS at the exam	5.45 ± 2.50 (0-10)	5.39 ± 3.13 (0-10)	0.753 <sup>3</sup>
Mean FP VAS at the crises	8.55 ± 1.73 (4-10)	8.79 ± 1.41 (5-10)	0.706 <sup>3</sup>
Mean FP VAS at the last 6 months	6.60 ± 2.21 (3-10)	6.55 ± 1.84 (3-10)	0.926 <sup>3</sup>
FP onset (years)	13.21 ± 11.39 (1.2-45)	7.13 ± 7.45 (0.25-36)	0.021 <sup>3</sup>
Body pain onset (years)	5.78 ± 4.05 (1-15)	12.76 ± 10.53 (1.25-36)	0.014 <sup>3</sup>

VAS: visual analogical scale; FP: facial pain; <sup>1</sup>Chi-square test; <sup>2</sup>Fisher's exact test; <sup>3</sup>Mann-Whitney non-parametric test.

### Self-reported orofacial pain complaints

Nineteen women (35.84%) reported intra-oral pain complaints with no statistical difference between *Groups A* and *B* ( $p = 0.624$ ). Forty-six (86%) patients complained of headache, facial pain was diffuse in 50.94% ( $n = 27$ ), and pain was bilateral in 77% ( $n = 4$ ); none of these findings were different between groups. Stiffness was reported by 35.84% of the patients ( $n = 19$ ) and it was more prevalent in *Group A* ( $p = 0.004$ ); numbness/burning occurred in 43.39% ( $n = 23$ ) and more prevalent in *Group B* ( $p = 0.035$ ).

Four patients of *Group A* reported that their fibromyalgia symptoms initiated simultaneously with a persistent dental pain episode. The results are outlined in Table 2.

### Relief and worsening factors of facial pain complaints in fibromyalgia patients

There were no differences between both groups on relief and worsening factors of the facial pain complaint. Relief factors were: a) *Group A*, physical therapy (25%), non-steroidal anti-inflammatory drugs (NSAIDs) (10%), tricyclic antidepressants (5%), reducing mandibular function (10%), more than 1 item mentioned before (40%); 2 (10%) reported no relief with any measure; b) *Group B*, physical therapy (15.2%), NSAIDs (21.2%), tricyclic antidepressants (6.1%), reducing mandibular function (18.2%), more than 1 of item mentioned before (27.3%). Four (12.1%) reported no relief with any measure.

Worsening factors were: a) *Group A*, mandibular function (35%), emotional stress (10%), environmental factors such as weather changes (hot and cold temperatures) (5%), more than 1 of the above items (50%); b) *Group B*, mandibular function (39.4%), emotional stress (18.2%), environmental factors such as weather changes (hot and cold temperatures) (6.1%), more than the above items (12.1%); 4 (12.1%) reported no worsening factor.

### RDC/TMD Axis I diagnosis

Masticatory muscle pain was present in all patients with fibromyalgia but statistically different between groups. There was a predominance of myofascial pain with no limited mouth opening in *Group B* ( $p = 0.038$ ) versus predominance of myofascial pain with limited mouth opening in *Group A* ( $p = 0.038$ ). The masseter muscle tenderness levels were superior in *Group A* ( $p = 0.010$ ).

Intrinsic temporomandibular joint (TMJ) diagnosis were similar in both groups, but disc displacement with reduction on the right TMJ was 2 times more common in *Group A* than in *Group B* ( $p = 0.012$ ). The results are outlined in Table 3.

### RDC/TMD Axis II diagnosis

There were no statistical differences of depression levels ( $p = 0.633$ ), somatization ( $p = 1.000$ ), facial pain chronification ( $p = 0.397$ ) (Table 4) and levels of chronic pain and incapacitation (Table 5).

### Comorbidities of fibromyalgia patients

All patients had comorbidities as following: a) *Group A*, thyroid deficiency ( $n = 1$ ), hypertension ( $n = 5$ ), hepatic disease ( $n = 3$ ); b) *Group B*, thyroid deficiency ( $n = 3$ ), hypertension ( $n = 16$ ), psychiatric disease ( $n = 17$ ), lupus erythematosus ( $n = 1$ ), anemia ( $n = 4$ ), rheumatoid arthritis ( $n = 8$ ), hepatic disease ( $n = 4$ ) and kidney disease ( $n = 1$ ).

### Visual Analogical Scale (VAS)

The results of the VAS are outlined in Table 1.

### Ortopantomography of the jaw

Within normal limits.

**Table 2.** Characteristics of orofacial pain complaints ( $n = 53$ ).

	Group A ( $n = 20$ )	Group B ( $n = 33$ )	p
Location			
Masseter	6 (30%)	5 (15.2%)	-
Pre-auricular	1 (5%)	9 (27.3%)	0.130 <sup>1</sup>
Angle of mandible	1 (5%)	3 (9.1%)	-
Temporal area	1 (5%)	0 (0%)	-
More than 1 area	11 (55%)	16 (48.5%)	-
Side of facial pain			
Right	1 (5.0%)	4 (12.1%)	-
Left	2 (10.0%)	5 (15.2%)	0.694 <sup>1</sup>
Bilateral	17 (85%)	24 (72.7%)	-
Descriptor for facial pain			
Fatigue	6 (30%)	13 (39.4%)	0.489 <sup>2</sup>
Stiffness	12 (60%)	7 (21.2%)	0.004 <sup>2</sup>
Throbbing	6 (30%)	6 (18.2%)	0.335 <sup>1</sup>
Shock-like	4 (20%)	6 (18.2%)	1.0001
Numbness/Burning	5 (25%)	18 (54.5%)	0.035 <sup>2</sup>
Others	5 (25%)	17 (51.5%)	0.058 <sup>2</sup>

<sup>1</sup>Fisher's exact test; <sup>2</sup>Chi-square test.

**Table 3.** TMD symptoms (RDC/TMD Axis I questionnaire).

	Group A (n = 20)	Group B (n = 33)	p
Myofascial pain without limited mouth opening	4 (20%)	16 (48.5%)	0.038 <sup>1</sup>
Myofascial pain with limited mouth opening	16 (80%)	17 (51.5%)	0.038 <sup>1</sup>
Right TMJ Arthralgia	10 (50%)	21 (63.6%)	0.329 <sup>1</sup>
Left TMJ Arthralgia	10 (50%)	20 (60.6%)	0.450 <sup>1</sup>
Right TMJ Osteoarthritis	2 (10%)	2 (6.1%)	0.627 <sup>2</sup>
Left TMJ Osteoarthritis	2 (10%)	4 (12.1%)	10.002
Right TMJ Osteoarthritis	5 (25%)	6 (18.2%)	0.728 <sup>2</sup>
Left TMJ Osteoarthritis	4 (20%)	3 (9.1%)	0.405 <sup>2</sup>
Right disc displacement with reduction	11 (55%)	7 (21.2%)	0.012 <sup>1</sup>
Right disc displacement without reduction	0 (0.0%)	0 (0.0%)	-
Left disc displacement with reduction	6 (30%)	9 (27.3%)	0.831 <sup>1</sup>
Left disc displacement without reduction	0 (0.0%)	0 (0.0%)	-

TMD: temporomandibular disorders; TMJ: temporomandibular joint; <sup>1</sup>Chi-square Test; <sup>2</sup>Fisher's Exact Test.

**Table 4.** RDC/TMD Axis II levels of depression and non-specific physical symptoms.

	Depression			Non-specific physical symptoms		
	Group A (n = 20)	Group B (n = 33)	p*	Group A (n = 20)	Group B (n = 33)	p*
Normal	1 (5%)	5 (15.2%)	-	0	1 (3%)	-
Moderate	5 (25%)	7 (21.2%)	0.633	2(10%)	3 (9.1%)	1.000
Severe	14 (70%)	21 (63.6%)	-	18 (90%)	29 (87.9%)	-

\*Fisher's exact test.

**Table 5.** RDC/TMD levels of chronic pain and incapacitation (n = 53).

	Group A (n = 20)	Group B (n = 33)	p*
Low pain and incapacitation	2 (10%)	5 (15.2%)	-
High pain, low incapacitation	11 (55%)	13 (39.4%)	0.397
High incapacitation, moderate limitation	6 (30%)	8 (24.2%)	-
High incapacitation and limitation.	1 (5%)	7 (21.2%)	-

\*Fisher's exact test.

## DISCUSSION

In this study, all fibromyalgia patients had TMD symptoms; however there were some differences between the groups depending on the onset of facial pain indicating that it is important to identify which one came first in the evaluation and treatment of the patients (FP or GBP). Masticatory muscle disorders had a high prevalence according to the RDC/TMD Axis I questionnaire, however with higher limited mouth opening in *Group A* ( $p = 0.038$ ). On the other hand, TMJ disc displacements occurred in both groups with lower prevalence than muscles disorders, except for the right TMJ disc displacement with reduction, that was twice superior in *Group A* ( $p = 0.0012$ ). Myofascial pain, including masticatory muscles, is a common finding in fibromyalgia patients<sup>7,8,22</sup> and it is known that intra-articular TMJ disorders are not a symptom of fibromyalgia. A possible explanation for the higher prevalence of TMJ symptoms in *Group A* could be the presence of TMD disorders previous to the fibromyalgia onset. It would also justify the earlier onset of facial pain complaint than generalized body pain in these patients and also for higher prevalence of limited mouth opening in this group.

These diagnoses are supported by the fact that the stiffness descriptor was more common in *Group A* ( $p = 0.004$ ), while the numbness/burning descriptor was more common in *Group B* ( $p = 0.035$ ). According to the literature, stiffness is a common complaint of myofascial pain and numbness/burning is common for fibromyalgia<sup>23,24</sup>.

TMJ arthralgia was another common TMD symptom in half of patients of both groups (Table 3) and this symptom could represent sensitivity of TMJ structures, although there was low frequency of TMJ biomechanical disorders (osteoarthritis, osteoarthritis or disc displacement), except again for the right disc displacement with reduction in *Group A* ( $p = 0.012$ ). Thus, TMD symptoms can play different roles in each group.

Another interesting question that raised from this data is about the possible evolution of fibromyalgia from orofacial pain (TMD disorders or another type of pain). Several studies also demonstrated that there is a temporal and spatial summation phenomena in patients with or with no fibromyalgia<sup>3,4</sup>, including the trigeminal system<sup>25</sup>. The literature demonstrated that patients with trigeminal neuralgia had their headache or generalized body pain complaints reduced after

treatment of their primary pain<sup>26</sup>. Although fibromyalgia has been widely studied and several risk factors are already known, there are controversies about its pathophysiology and little is known about the role of the regional pain conditions in its development. Persistent pain conditions could be a risk factor in individuals susceptible to the disease. Thus, the control of the regional pain could be relevant for its prevention and control. It is noteworthy the fact that four patients of our study reported that their fibromyalgia started after a persistent toothache.

Several studies with patients with fibromyalgia have shown that TMD symptoms are more severe and determine more limitations in this group of patients<sup>6,13,27,28</sup>. On the other hand, other articles also reported that difficult TMD patients report more complaints about generalized body pain<sup>6,8,9,11,13</sup> and that patients with generalized body pain are susceptible to develop facial pain<sup>29</sup>. Although this study has some limitations as the size of the sample and collection of past data, the fact that *Group A* patients already presented a pain condition prior to the onset of the fibromyalgia could help to understand why they have more severe TMD symptoms. The objective of the present cross-sectional study was not solving the question if facial pain anteceded generalized pain, vice versa, or establishing a cause-and-effect relation, but to identify, describe and evaluate the symptoms in patients with fibromyalgia. The study will allow dentists and physicians to learn more about this matter and do not underestimate the co-existence of fibromyalgia and TMD, because patients with TMD may not report co-existent pain occurring outside the

face to their dental providers and, equally, patients with fibromyalgia may not report facial pain to their medical providers<sup>30</sup>. The treatment of these two conditions needs professionals with more extensive knowledge<sup>31</sup> and the literature about this issue is still scarce. Besides, there is none descriptive study in the literature focusing this matter in such way.

Our protocol included a clinical interview and the examination of patients and the RDC/TMD questionnaire; this last instrument was proposed for clinical and epidemiologic research purposes<sup>18,24</sup>, therefore, the history of the patient, collected with the clinical evaluation<sup>16</sup> is important for the diagnostic process, collecting pain characteristics and identifying other pain complaints and medical history, in order to obtain a more complete description of the clinical findings and to make a differential diagnosis in accordance with accepted criteria<sup>10,18</sup>. With these two assessment instruments it was possible to make a standardized examination with clinical and research objectives.

In conclusion, according to the methodology employed in this study, all the fibromyalgia patients had TMD symptoms, mainly muscle disorders, but the frequency of myofascial pain with limited mouth opening and right TMJ disc displacement with reduction were higher in *Group A*. About pain descriptors, the stiffness was more frequent in *Group A* while numbness/burning was more common in *Group B*. Prospective studies are necessary to clarify if the onset of facial pain in fibromyalgia patients could contribute to the clinical characteristics that allow to differentiate TMD from fibromyalgia symptoms more accurately.

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