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Brief communication

Temporomandibular disorders in fibromyalgia syndrome: a short-communication

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ABSTRACT

Fibromyalgia syndrome (FMS) is a chronic painful syndrome and the coexistence of a painful condition caused by Temporomandibular Disorders (TMD) and FMS has been frequently raised for several studies; however, a more likely hypothesis is that a set of FMS characteristics may lead to the onset of TMD symptoms and they are not merely coexisting conditions. Therefore, our aim is presenting a review of literature about the relation between fibromyalgia and the signs and symptoms of temporomandibular disorders. For this purpose, a bibliographic search was performed for the period of 1990–2013, in the Medline, Pubmed, Lilacs and Scielo databases, using the keywords fibromyalgia, temporomandibular disorders and facial pain. Here we present a set of findings in the literature showing that fibromyalgia can lead to TMD symptoms. These studies demonstrated greater involvement of the stomatognathic system in FMS and myogenic disorders of masticatory system are most commonly found in those patients. FMS appears to have a series of characteristics that constitute predisposing and triggering factors for TMD.

Disfunção temporomandibular na síndrome da fibromialgia: comunicação breve

Palavras-chave:
Fibromialgia
Dor facial
Síndrome da disfunção da articulação temporomandibular

RESUMO

A síndrome da fibromialgia (SFM) é uma síndrome dolorosa crônica. A coexistência de uma condição dolorosa causada pela disfunção temporomandibular (DTM) e pela SFM tem sido frequentemente descrita por vários estudos. No entanto, a hipótese mais provável é que um conjunto de características da SFM pode levar ao aparecimento de sintomas de DTM e elas não são apenas condições coexistentes. Por isso, o objetivo deste estudo é apresentar uma revisão da literatura sobre a relação entre a fibromialgia e os sinais e

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sintomas da disfunção temporomandibular. Para este fim, fez-se uma pesquisa bibliográfica que envolveu o período de 1990 a 2013 nas bases de dados Medline, Pubmed, Lilacs e Scielo. Foram usadas as palavras-chave fibromialgia, disfunção temporomandibular e dor facial. Neste trabalho, apresenta-se um conjunto de achados da literatura que mostram que a fibromialgia pode levar a sintomas de DTM. Estes estudos mostraram um maior envolvimento do sistema estomatognático na SFM e que os distúrbios miogênicos do sistema mastigatório são os mais comumente encontrados nesses pacientes. A SFM parece ter uma série de características que constituem fatores predisponentes e desencadeantes para a DTM.

Introduction

Fibromyalgia syndrome (FMS) is a chronic painful syndrome of unknown etiology that affects predominantly women.[1] New criteria for clinical diagnosis of fibromyalgia have been proposed by the American College of Rheumatology (ACR) due to recognition of the importance of cognitive problems and somatic symptoms.[2]

They identified two variables that best defined fibromyalgia and its symptom spectrum: the widespread pain index (WPI) and the symptom severity (SS) scale. The SS scale score is the sum of the severity of the 3 symptoms (fatigue, waking unrefreshed, cognitive symptoms) plus the extent (severity) of somatic symptoms in general. According to this study,[2] a patient satisfies diagnostic criteria for fibromyalgia if the following 3 conditions are met: WPI $\geq$ 7 and SS scale score $\geq$ 5 or WPI 3–6 and SS scale score $\geq$ 9; furthermore, symptoms have been present at a similar level for at least 3 months and the patient does not have a disorder that would otherwise explain the pain.

Other symptoms such as sleep disturbances, depression and fatigue are also associated with this disease. In addition, the coexistence of a painful condition caused by temporomandibular disorders (TMD) and fibromyalgia has been frequently raised for several studies. TMD are a set of conditions affecting the masticatory muscles or joints and exhibiting pain as their primary characteristic.[3]

Hedenberg-Magnusson et al.[4] found that FMS patients have frequent and severe symptoms of TMD and 94% reported local pain from the temporomandibular system with a mean duration of 12 years. General body pain had a significantly longer duration than TMD, which indicates that fibromyalgia starts in other parts of the body and later extends to the temporomandibular region. Therefore, a more likely hypothesis is that a set of FMS symptoms may lead to the onset of TMD symptoms, while there is a TMD subgroup of patients that could present widespread pain, but do not meet the criteria for fibromyalgia.

After all, our objective is presenting a review of literature about the relation between fibromyalgia and the signs and symptoms of temporomandibular disorders.

Methods

Bibliographic search of electronic bibliographic databases (Medline, Pubmed, Lilacs and Scielo) for the period from January1990 to December2013 was performed utilizing the keywords:

"Temporomandibular Disorders" or "Facial Pain" combined with "Fibromyalgia".

Initially, 122 pages of results were found. Then, two independent reviewers read the abstracts and those that were selected by consensus to the following inclusion criteria: Patients with fibromyalgia and TMD diagnosis. We excluded articles, which did not address only these two pathologies and those that did not aim to relate the symptoms of both syndromes.

We selected 158 articles with cross-sectional design, which were then read and evaluated for inclusion into the literature review. Considering the heterogeneity of the studies, additional inclusion criteria for research articles were: Investigations of the relationship and differences between fibromyalgia and TMD (n = 13 papers selected), prevalence (n = 7 papers selected), and investigations about facial pain symptoms in FMS (n = 8 papers selected).

Results

TMD prevalence in FMS

FMS patients are 31 times more likely to have a diagnosis of facial muscle pain than patients without the condition.[5] Moreover, the literature points to a high prevalence of TMD in these patients (Table 1).

Only two studies used clinical examination for TMD diagnoses and five studies used the Research Diagnostic Criteria for Temporomandibular Disorder (RDC/TMD) that is a gold standard tool for TMD detection. Regardless of the evaluating methods, these studies show a prevalence range between 59.37% and 93.7%, which can be explained by many factors. One of them are the different populations studied (e.g. Italy,[6] United States,[7–9] Turkey[10] and Brazil[5,11]).

Moreover, whether fibromyalgia starts in other parts of the body and later extends to the temporomandibular region,[4] the time of diagnosis of fibromyalgia could influence on prevalence results. Therefore, chronic FMS patient might present a greater number of symptoms of TMD.

TMD signs and symptoms in FMS

According to the American Dental Association (ADA), TMD were defined as cases where you have pain in the pre-auricular

Table 1 – Prevalence of TMD in fibromyalgia syndrome.

Authors	n	Age range	Evaluation method for TMD	Prevalence
Plesh et al. (1996)[7]	60	>18 years	RDC/TMD	75%
Rhodus et at. (2003)[8]	67	47.6 ± 2.3	Clinical Examination	67.6%
Salvetti et al. (2007)[6]	93	50.1 ± 9.8	RDC/TMD	79.56%
Balasubramanian et al. (2007)[9]	32	>18 years	RDC/TMD	59.37%
Leblebici et al. (2007)[10]	31	35.15 ± 10.19	Clinical Examination, Questionnaire and Magnetic Resonance	80.64%
Fujarra et al. (2008)[11]	48	46.3 ± 8.7	RDC/TMD	93.7%
Pimentel et al. (2013)[5]	40	53.5 ± 9.2	RDC/TMD	77.5%

RDC/TMD, Research Diagnostic Criteria for Temporomandibular Disorder.

region, the temporomandibular joint or masticatory muscles, limitation or deviation of mandibular movement, temporomandibular joint noise during the functioning of mandibular and palpation and abnormal relation of static and dynamic oclusal.[12]

Just recently, psychological and behavioral factors have become well-established influences upon a wide range of pain conditions including TMD pain. Genetics and sensory processing also contribute to TMD etiology.[3]

Individuals with these conditions (e.g. FMS and TMD) display diffuse hyperalgesia (increased pain to normally painful stimuli) and/or allodynia (pain to normally nonpainful stimuli). This abnormality across conditions suggests that these individuals have a fundamental problem with pain or sensory processing rather than an abnormality confined to a specific region of the body where pain is perceived to originate.[13]

Plesh et al.[7] reported that a small proportion of patients with TMD (18.4%) also had FMS, but most of those with FMS (75.0%) satisfied criteria for muscular (myofascial) TMD. Patients with FMS had lower pain thresholds and more severe manifestations of all disease measures (e.g., pain, fatigue and sleep) compared to those with TMD. They also had more painful body regions. Patients with FMS also differed significantly from those with TMD in self-reported work ability and health assessment. The features that best differentiated FMS from TMD are functional disability, reports of work difficulty, and general dissatisfaction with health.

In addition, FMS patients present high prevalence of myofascial pain on palpation and during mandibular movements, as a high self-reported daytime clenching and grinding.[5]

TMD onset in FMS

In fibromyalgia, TMD has an insidious onset, and etiology is not fully known, in which biochemical abnormalities, neuroendocrine, and mechanisms of central sensitization may play an important etiological role.[14] According to Saltareli et al.[15] the complexity of factors involved in the frame of fibromyalgia, to the question of diagnosis and the proper approach by health professionals, shows the need for more studies that propose to expand the understanding of the issues experienced by these patients.

High frequency of headache (78%), facial pain and tiredness of the jaws were found in FMS and about fifty percent of the patients of Hedenberg-Magnusson et al.[4] study also complained about difficulties to open the mouth and to chew. This study shows that patients with fibromyalgia often suffer from symptoms of TMD, and that the intensity of the pain is correlated to general body pain. These findings indicate that fibromyalgia is one of the causes of TMD.

As well as FMS, in temporomandibular disorders, widespread pain is presented. Some studies have showed that patients with TMD frequently describe pain in multiple body parts[16] and overlap of tender and trigger points was found in both patient groups[17] which is inconsistent with the pathogenetic concept of myofascial trigger points and local disturbances of orofacial structures as the only ones causing TMD chronic pain.

However, arguing against any transition from TMD to FMS, Pfau et al. (2009)[18] described a sensitive TMD subgroup that resembles FMS patients, but they ranked in-between them and healthy controls. In addition, FMS patients reported the longest pain duration and the highest impairment in daily life compared to sensitive and insensitive TMD.

Widespread pain in TMD and FMS

Many possible factors (e.g. environmental, genetic, cognitive, behavior) related to widespread pain presence in TMD and FMS were found and discussed in the literature.

Among them, some findings showed that patients with FMS and TMD symptoms such as chronic pain and stress could increase sympathetic activity, which alters the cardiovascular responses and makes the pain worse. Light et al.[19] evaluated 10 fibromyalgia, 10 TMD patients and 16 healthy controls and their results support the hypothesis that both fibromyalgia and those with TMD often develop a dysregulation of beta-adrenergic activity that contributes to altered cardiovascular responses and catecholamines and severity of clinical pain.

Both FMS and TMD are classified in the family of central sensitivity syndromes and have several similar features in common, e.g., sleep disturbances.[20] Smith et al.[21] suggested that the association of primary insomnia and hyperalgesia at a nonorofacial site suggests that primary insomnia may be linked with central sensitivity and could play an etiologic role in idiopathic pain disorders, therefore, sleep disturbances are also considered an important risk indicator for the development of TMD.

Although FMS patients have greater sleep impairment and they are often described as no restorative sleep pathology (a

subjective experience of unrefreshing sleep),[22] patients with TMD also had higher impairments on sleep and depression scores[23] and excessive daytime sleepiness was frequent in patients with myofascial pain TMD.[24]

In patients with fibromyalgia syndrome and other generalized pain syndromes, stress also plays an important role and there is a close association between exacerbation of pain symptoms, increased anxiety, and exposure to stressors.[25]

As FMS, patients with TMD have reported higher levels of affective distress, somatic awareness, psychosocial stress, depression and pain catastrophizing.[26] Pain catastrophizing, or responses to pain that characterize it as being awful, horrible, and unbearable, is increasingly recognized as an extremely important contributor to the experience of pain. Although chronic pain and psychiatric conditions often co-occur, studies have found catastrophizing to be associated with pain and pain-related disability independent of the influence of depression.[13]

In addition, supporting the possible role of genetic factors in the etiology of fibromyalgia, one major locus for fibromyalgia on the chromosome 17p11.2–q11.2 region was detected and this chromosome region coincides with the map coordinate for 2 potential candidate genes for fibromyalgia: the serotonin transporter gene (SLC6A4) and the transient receptor potential vanilloid channel 2 gene (TRPV2).[27]

Recently, cases with localized TMD differed from healthy controls in allelic frequency of single nucleotide polymorphisms (SNPs) that mapped to a serotonergic receptor pathway, while cases of TMD with widespread pain differed in allelic frequency of SNPs that mapped to a T-cell receptor pathway.[28]

Muscle impairment

Muscles as a possible source of pain in fibromyalgia have been studied extensively. Donaldson et al.[29] examined the electrical characteristics (by surface electromyography) of diffuse muscular coactivation associated with the tender points of FMS. It is defined as an increase from resting levels (tonus) in the electrical activity of any muscle during a movement, which does not involve that muscle and is not part of the agonist. The results show an increase in electrical activity in FMS patients as compared to controls. Coactivation was stronger proximal to the neck and decreased in intensity as the area recorded moved distally.

Pain and restricted movement in the neck area is connected to the limitation in the jaw opening[30] and an association between the function of the masticatory muscles and temporomandibular joints and the mobility of cervical spine and tenderness of the neck-shoulder muscles was found.[31] Trapezius muscle has an important FMS tender point and can be highlighted that upper trapezius muscle (innervated by cranial nerve XI) and masticatory muscles (e.g. masseter and temporalis) are striated muscles that arise embryologically from the branchial arches.[32]

The local and referred pain elicited from active trigger points in the masticatory and neck-shoulder muscles shared similar pain pattern as spontaneous TMD, which supports the concept of peripheral and central sensitization mechanisms in myofascial TMD.[33]

It was suggested that sensitization of muscle nociceptors is revealed by abnormal patterns of reflex motor neuron activation in patients with FMS.[34] A different pattern of muscle activation was observed in the FMS group when compared with the TMD group, it seems that muscles impaired by FMS could already present a condition of premature interruption of muscle contraction, contraction may have occurred, discharging the motor units at higher frequencies (tetanic contraction) in order to activate the required contraction, which is even more fatiguing, generating a cycle of muscle fatigue and pain.[35]

Elert et al.[36] also suggest that the FMS patients had an inability to relax the muscle throughout their bodies between tasks and an other study reported that FMS had significantly higher conduction velocity in trapezius muscle contractions of single motor units,[37] i.e. increasing the number of active motor units.

Discussion

The literature findings demonstrate greater involvement of the stomatognathic system in fibromyalgia and myogenic disorders of masticatory system are most commonly found in those patients. Fibromyalgia syndrome appears to have a series of characteristics that constitute predisposing and triggering factors for TMD.

On the other hand, widespread pain in TMD should not be confounded as fibromyalgia, but instead as suggested by Pfau et al. (2009)[18] there is a subgroup of TMD patients that have become more sensitive to pain.

Main similarities and differences between them are, respectively, widespread pain presence with psychological distress, and the prevalence and severity of symptoms, which are higher in FMS patients (e.g. sleep problems, depression, somatization, pain).

Although these two syndromes appear to overlap, the literature has shown that possibly the pathophysiology is different, mainly due to a strong genetic component of fibromyalgia,[27] also considering that environmental factors influence the occurrence of the phenotype. Our review of literature also presented many studies suggesting that fibromyalgia can lead to TMD symptoms, but they have cross-sectional designs that prevent temporal conclusions (cause and consequence) from being drawn.

Psychosocial factors like sleep problems, abnormal neuromuscular response and central sensitization, acting concomitantly in FMS, could easily exceed the limit of functional adaptation to stress in the temporomandibular system leading to its dysfunction and pain.[35]

TMD cases also reported higher levels of psychological and affective distress, greater perceived stress and catastrophizing, and increased somatic awareness compared to controls.[26] Similar findings supporting psychosocial variables as premorbid risk factors for development of chronic pain have been reported for other chronic pain conditions, including chronic widespread pain, i.e., fibromyalgia.[38]

Widespread pain, depression, and sleep disorders associated with FMS may play a significant role in the chronicity of

TMD in patients with FMS,[39] thereby, also acting as perpetuating factors for TMD.

Conclusion

Fibromyalgia syndrome presents a set of conditions that constitute predisposing and triggering factors for temporomandibular disorders and could explain the high prevalence of TMD signs and symptoms in these patients.

Conflicts of interest

The authors declare no conflicts of interest.

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