

Clinical and quality-of-life assessment among women with temporomandibular disorder

Avaliação clínica e da qualidade de vida de indivíduos com disfunção temporomandibular

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Abstract

Objectives: The aim of this study was to evaluate pain symptoms, teeth clenching, quality of sleep, sensitivity to pain in the main masticatory and stabilizer muscles, and quality of life among women with temporomandibular disorder (TMD). **Methods:** Forty-five women were evaluated and divided into two groups. Group I included 27 women (mean age 30.1±5.8 years) with a diagnosis of TMD and Group II (control) included 18 healthy women (mean age 23.4±2.3 years). The intensity of pain symptoms (headache, neck pain), teeth clenching and trouble sleeping was evaluated using a visual analog scale (VAS). The pain thresholds of the masseter, anterior temporalis, upper trapezius and sternocleidomastoid muscles were evaluated using a dolorimeter. Quality of life was evaluated using SF-36. Statistical analysis was performed and the significance level was $\alpha \leq 0.05$. **Results:** The results showed that the women with TMD presented more intense headache ($p < 0.001$), neck pain ($p < 0.001$), teeth clenching ($p < 0.001$) and trouble sleeping ($p < 0.001$). They also presented lower pain threshold in the masseter ($p < 0.001$), anterior temporalis ($p < 0.001$), upper trapezius ($p < 0.001$) and sternocleidomastoid ($p < 0.001$) muscles and lower quality of life in all evaluated domains ($p < 0.05$) when compared with the control group. **Conclusions:** Women with TMD had greater intensity of pain symptoms, teeth clenching, trouble sleeping, sensitivity to pain in the masticatory and neck muscles and lower quality of life, compared with women without TMD.

Key words: temporomandibular joint disorder; pain; masticatory muscles; quality of life.

Resumo

Objetivos: Este estudo teve como objetivo avaliar sintomas de dor, apertamento dos dentes, qualidade do sono e sensibilidade dolorosa nos principais músculos mastigatórios e estabilizadores cervicais e qualidade de vida de mulheres com Disfunção Temporomandibular (DTM). **Métodos:** Foram avaliadas 45 mulheres, divididas em dois grupos. O grupo I, composto por 27 mulheres (30,1±5,8 anos) com diagnóstico de DTM e o grupo II, controle, composto por 18 mulheres saudáveis (23,4±2,3 anos). A intensidade dos sintomas de dor, cefaleia, cervicalgia, de apertamento dos dentes e dificuldade de dormir foram avaliados por escala visual analógica (EVA), o limiar de dor dos músculos masseter, temporal anterior, trapézio superior e esternocleidomastoideo, com dolorímetro e a qualidade de vida, pelo SF-36. Foi realizada análise estatística e o nível de significância foi $\alpha = 0,05$. **Resultados:** Os resultados mostram que mulheres com DTM têm sintomas mais intensos de cefaleia ($p < 0,001$), cervicalgia ($p < 0,001$), intensidade de apertamento dos dentes ($p < 0,001$) e dificuldade de dormir ($p < 0,001$). Também apresentam limiar de dor mais baixo nos músculos masseter ($p < 0,001$), temporal anterior ($p < 0,001$), trapézio superior ($p < 0,001$), esternocleidomastoideo ($p < 0,001$) e pior qualidade de vida em todos os domínios avaliados ($p < 0,05$), quando comparados com o grupo controle. **Conclusões:** Mulheres com DTM têm maior intensidade dos sintomas de dor, apertamento dos dentes, dificuldade de dormir, maior sensibilidade dolorosa em músculos mastigatórios e cervicais e pior qualidade de vida quando comparadas com mulheres sem DTM.

Palavras-chave: disfunção da articulação temporomandibular; dor; músculos mastigatórios; qualidade de vida.

Received: 01/04/2008 – Revised: 10/10/2008 – Accepted: 21/01/2009

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Introduction

Temporomandibular Disorder (TMD) can be defined as a set of clinical manifestations of poor mandibular function, which may or may not be associated with pain. These manifestations are caused by agents that attack the morphological or functional integrity of the temporomandibular system¹. The American Academy of Temporomandibular Disorders characterizes its etiology as multifactorial, but the exact role of these agents in the pathophysiology of TMDs varies greatly, given the large number of asymptomatic individuals who clinically have one or more potentially triggering or perpetuating factors^{2,3}.

The significant number of patients with TMD and the diversity of symptoms require adequate knowledge of the disease and careful study for classification. It is difficult to classify the symptoms not only for statistical and didactic purposes, but also for monitoring in outpatient clinics, where the number of patients is high. Therefore, classification indices were created, including the Helkimo Index⁴.

Tension-type headaches and migraines are the most common causes of complaint of pain, which affects the adult population⁵. The correlation between headache and TMD has been shown in various epidemiological and clinical studies^{6,7}, but its relationship with bruxism is inconclusive⁸. Parafunctional habits such as bruxism and teeth clenching are considered important factors in the etiology of TMD, but should be studied separately for a better understanding of their role in the manifestation of symptoms⁹. A common consequence of these conditions is the increase in tension in the masticatory muscles, associated with the increase in muscle tonus. Neck disorders are also present in large numbers of patients with TMD, but these conditions also affect the general population¹⁰. Therefore, controlled studies are important for a better understanding of the role of neck disorders in patients with TMD.

Besides pain, patients with headaches or TMD often have difficulty sleeping. Studies suggest that the mentioned conditions can be also consequences of sleep disorders¹¹. Due to the physical and mental impairment caused by TMD, evaluation of the impact on quality of life of these people deserves special attention. TMD patients have clinical characteristics in common with other chronic disease patients, such as high-intensity pain, behavioral and psychological disorders¹². The aim of the present study was to evaluate symptoms of pain, teeth clenching, quality of sleep and pain sensitivity in the main masticatory and stabilizer muscles and the quality of life of women suffering from TMD.

Methods

Forty-five women took part in this cross-sectional study. They were divided into two groups: group I and group II. Group I was

composed of 27 women aged between 19 and 40 years (30.1 ± 5.8) with a diagnosis of TMD, referred by the Department of Surgery, Prosthetics and Maxillofacial Traumatology, Faculty of Dentistry, Universidade de São Paulo. The inclusion criteria for this group were: Helkimo Index III and parafunctional habit of teeth clenching. Patients who had more than two dental flaws, direct or surgical trauma in the orofacial region, systemic or degenerative disease and ongoing dental, psychological or physical therapy treatment were excluded. Group II was composed of 18 healthy, female volunteers aged between 19 and 28 years (23.4 ± 2.3) with no complaints of musculoskeletal pain. Participants were selected among the staff and students of the university where all of the evaluation procedure took place. Women who had any other musculoskeletal disease, history of TMD symptoms, or who were undergoing any kind of treatment were excluded. One of the patients in group I was excluded due to a fracture in the first two cervical vertebrae. All participants signed a consent form, and the research project was approved by CAPPesq of Universidade de São Paulo, protocol number 103/04.

Variables

Pain, headache, neck pain, teeth clenching and trouble sleeping were evaluated by visual analog scale (VAS) which consists of a 10cm horizontal line in which the left end represents no pain and the right end, the worst pain imaginable. The participants were instructed to place a vertical line at the point on the line to indicate the pain intensity. The VAS is a simple and reliable instrument to evaluate pain in both clinical and research situations¹³.

Pain threshold

This reflects the lowest intensity of stimulation in which the individual perceives pain. Fischer dolorimeter¹⁴ was used and, in this procedure, perpendicular pressure to the skin's surface was applied at a velocity of 1cm/s over the muscle motor points. The participants were in the supine position with the head slightly turned away from the evaluated side until they reported that the feeling of pressure became pain, while a manometer recorded the pressure level. Lower values indicate a lower pain threshold. The motor point was used as reference to ensure reproducibility and also with the advantage of always evaluating the same place. In group I, dolorimetry was performed on the side of the reported symptoms, and in Group II, the left side was standardized.

Quality of life

Quality of life was evaluated by the Medical Outcomes Study Short-Form 36 Health Survey (SF-36) validated for the

Portuguese language by Ciconelli¹⁵. This questionnaire consists of 36 items, stratified into eight domains: physical function (10 items), role physical (4 items), pain (2 items), general health status (5 items), vitality (4 items), social function (2 items), role emotional (3 items), mental health (5 items) and a question concerning a comparative evaluation between the current health and the previous year's health. The values range from 0 to 100, and the higher the score, the better the quality of life.

Statistical analysis

Descriptive statistical analysis was initially performed to calculate the mean and standard deviation for each measured variable for both groups. Subsequently, the non-parametric Mann-Whitney test was performed; it is indicated for comparison of two sample groups, when the samples show different patterns of variation¹⁶. The sample size calculation was done using 80% of statistical power to detect a difference of 20% between groups, considering a confidence interval of 95%.

Table 1. Visual Analog Scale (VAS) for each analyzed symptom presented as mean (SD).

| Variables (cm) | Group I N=26 | Group II N=18 | Mann-Whitney test |
|------------------|-----------------|------------------|----------------------|
| TMD Pain | | | p<0.001 * |
| Mean (SD) | 7.7 (1.5) | 0.1 (0.3) | |
| Headache | | | p<0.001 * |
| Mean (SD) | 6.8 (2.5) | 3.7 (2.5) | |
| Neck Pain | | | p<0.001 * |
| Mean (SD) | 6.4 (2.7) | 2.7 (2.3) | |
| Teeth clenching | | | p<0.001 * |
| Mean (SD) | 6.5 (2.8) | 0.5 (0.6) | |
| Trouble sleeping | | | p<0.001 * |
| Mean (SD) | 5.2 (1.0) | 0.4 (0.1) | |

* statistically significant values.

Table 2. Dolorimetry of the anterior temporal, masseter, superior trapezoid, sternocleidomastoid muscles presented as mean (SD).

| Dolorimetry (Kg/cm ²) | Group I N=26 | Group II N=18 | Mann-Whitney test |
|-----------------------------------|-----------------|------------------|----------------------|
| Temporalis | | | p<0.001 * |
| Mean (SD) | 2.4 (0.7) | 3.8 (0.9) | |
| Masseter | | | p<0.001 * |
| Mean (SD) | 2.0 (0.6) | 3.3 (0.4) | |
| Trapezius | | | p<0.001 * |
| Mean (SD) | 2.1 (0.6) | 3.0 (0.3) | |
| Sternocleidomastoid | | | p<0.001 * |
| Mean (SD) | 1.6 (0.4) | 2.6 (0.3) | |

*statistically significant values.

Results

The intensity of symptoms in both groups can be seen in Table 1. These are more pronounced in group I with a statistically significant difference (p<0.001), but group II also had complaints of neck pain and headaches. Table 2 presents the dolorimetry values of the anterior temporalis, masseter, upper trapezius and sternocleidomastoid muscles in groups I and II. The pain threshold was considered positive if values were below 2.6 kg/cm² (Marques et al.¹⁵). The sternocleidomastoid muscle showed the lowest values in both groups but all muscles presented a statistically significant difference (p<0.001). The quality of life of both groups is described in Table 3. Group I shows lower values indicating lower quality of life, with a statistically significant difference in the eight domains evaluated (p<0.05), drawing attention to the pain and role physical domains in which the difference was more pronounced.

Discussion

The aim of this study was to evaluate pain symptoms, teeth clenching, quality of sleep, sensitivity to pain and quality of life of women suffering from TMD, and the results indicate more intense symptoms, more intense pain and worse quality of life in women with TMD. The results indicate that pain levels and pain sensitivity in patients with TMD were significantly higher. Studies have shown that this population has less neck mobility, painful points elicited by palpation in the shoulder and neck muscles, lower pain tolerance¹⁷ and more reports of stress and depression than people without TMD¹⁸.

Studies on headaches suggest a strong connection between signs of TMD and tension-type headache¹⁹. The same authors argue that the headache associated with TMD may represent changes in pain sensitivity. Studies also indicate a significant association of neck disorders and temporomandibular joint disorders and suggest that individuals with TMD have less mobility and more intense pain elicited by palpation of the neck muscles than people without DTM¹⁰.

Dolorimetry is often used in the evaluation of individuals with chronic pain, including patients with fibromyalgia²⁰. In the present study, the dolorimetry was used to evaluate the pain threshold of the masticatory and neck muscles. Of the muscles evaluated, the sternocleidomastoid showed the greatest pain sensitivity, i.e. the lowest pain threshold in both groups. Furthermore, both the TMD patients and the participants from the control group reported neck pain and headaches. Because the sternocleidomastoid muscle is one of the muscles responsible for neck mobility, it can be assumed that

there is a relationship between these symptoms. Jensen²¹ states that cervicogenic headache has a much higher prevalence than reported by some epidemiological studies; the same author attributes this to the medical community's lack of skill to evaluate the musculoskeletal system.

Parafunctional habits are pointed out as important etiological factors in TMD. They also contribute to the appearance of neck injuries^{22,23}. Moderate teeth clenching force is strongly related to signs and symptoms of the temporomandibular joint²⁴. This further suggests that it can compromise the quality of sleep of TMD patients.

The present study indicates that headache and neck pain were also present in the control group but with significantly lower intensity than in the TMD group, therefore supporting the clinical evidence of other studies that suggest a lower pain threshold in this population^{13,25}. Studies suggest that a hyperexcitability in the central nociceptive system may contribute to the development or maintenance of chronic pain in TMD²⁶. It is also possible to infer that the increased sensitivity of the masticatory and neck muscles can be directly related to neck symptoms, headache and to the intensity of teeth clenching.

Although there is evidence that TMDs or any other painful facial condition have some impact on quality of life, few studies document the use of specific tools or even multidimensional tools to measure this impact²⁷. Studies described a significant reduction in the quality of life of patients with facial pain^{28,29}. Bernhardt et al.³⁰ reported a lower quality of life in women when compared to men with TMD. This difference was associated with the increase in pain sensation during palpation of the masticatory muscles and with a greater impact related to the limitations imposed more by physical than emotional aspects. The present study found no significant difference between the physical and emotional aspects, but it did find similar results to those previously described, indicating a lower quality of life in patients with TMD in all evaluated domains. Although the questionnaire used here is not specific to TMD, it presents the advantage of being easy

Table 3. Quality of life evaluated by SF-36. Mean (SD).

| Variables | Group I N=26 | Group II N=18 | Mann-Whitney significance |
|--------------------------------|-----------------|------------------|------------------------------|
| Physical function Mean (SD) | 83.5 (18.4) | 94.2 (8.1) | p=0.024 * |
| Role Physical Mean (SD) | 43.5 (33) | 93.1 (16.7) | p<0.001 * |
| Pain Mean (SD) | 32.9 (18.9) | 71.8 (15.7) | p<0.001 * |
| General Health Mean (SD) | 59.2 (23.4) | 87.0 (10) | p<0.001 ** |
| Vitality Mean (SD) | 41.5 (14.2) | 61.7 (15.2) | p<0.001 * |
| Social function Mean (SD) | 51.4 (25.8) | 81.9 (22.4) | p<0.001 * |
| Role emotional Mean (SD) | 40.7 (44.7) | 68.5 (40.4) | p=0.031 * |
| Mental Health Mean (SD) | 50.5 (19.3) | 74.4 (11.7) | p<0.001 * |

* statistically significant values.

to administer and understand and not as extensive as other questionnaires created for the same purpose¹⁵.

Another important aspect to be considered is the relationship between TMD and emotional disorders. Pallegama et al.²⁵ found a high rate of anxiety in patients with TMD and neck pain when compared to a group without TMD. The authors concluded that anxiety could directly influence the onset of neck pain.

Conclusion

The results of the present study indicate that women with TMD, classified as Helkimo III, have stronger symptoms of pain, headache, neck pain, teeth clenching and trouble sleeping when compared to women without TMD. They also had more painful sensitivity in the masseter, anterior temporalis, upper trapezius and sternocleidomastoid muscles and lower quality of life than women without TMD.

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