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Effect of educational and self-care therapies on masticatory performance of women with painful temporomandibular disorder

Efeito das terapias educacionais e do autocuidado sobre o desempenho mastigatório de mulheres com disfunção temporomandibular dolorosa

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Resumo

Introdução: As disfunções temporomandibulares (DTM) podem comprometer a capacidade mastigatória devido à presença de dor, disfunção muscular e limitação dos movimentos mandibulares. Melhorias substanciais da dor relacionada à DTM podem ser alcançadas através de abordagens terapêuticas incluindo a educação e os autocuidados. Objetivo: O objetivo do presente estudo foi investigar o impacto dessas modalidades de tratamento no desempenho mastigatório de mulheres com DTM dolorosa. Material e método: Cinquenta e duas mulheres foram divididas aleatoriamente em três grupos: Grupo Controle (CG); Grupo Educação (receberam instruções sobre DTM) (EG); Grupo de Autocuidado e Educação (receberam instruções sobre DTM e instruções sobre terapias de autocuidado) (SEG). As instruções de educação sobre DTM e terapias de autocuidado foram transmitidas através de vídeo e material ilustrativo impresso. O desempenho mastigatório foi avaliado através do método dos tamises com alimentos testes naturais nos períodos de avaliação: atendimento inicial, 30 dias após e ao fim de 60 dias de acompanhamento. Os dados obtidos, em porcentagem, foram analisados e foi utilizado o teste paramétrico ANOVA one-way para comparação das médias dos grupos CG, EG e SEG (α= 0,05). Resultado: O desempenho mastigatório dos participantes foi semelhante, independentemente dos tratamentos, no atendimento inicial (p=0,604), após 30 dias (p=0,450) e após 60 dias (p=0,669). Conclusão: Os resultados indicam que o tratamento com terapias educativas e de autocuidado durante um período de 60 dias não teve impacto no desempenho mastigatório das mulheres com DTM dolorosa.

Descritores: Articulação temporomandibular; autocuidado; mastigação.

Abstract

Introduction: Temporomandibular disorders (TMD) can compromise masticatory performance due to the presence of pain, muscular dysfunction and limitation of mandibular movements. Substantial improvements in TMD pain can be achieved through therapeutic approaches including education and self-care. Objective: The aim of the present study was to investigate the impact of these treatment modalities in the masticatory performance of women with painful TMD. Material and method: Fifty-two women were randomly divided into three groups: Control Group (CG); Education Group (received education about TMD) (EG); Self-Care and Education Group (received education about TMD and instructions self-care therapies) (SEG). The education instructions about TMD and self-care therapies were transmitted through a video and printed illustrative material. The masticatory performance was evaluated through the sieves method with natural tested foods in the evaluation periods: baseline evaluation, 30 days after and 60 days of follow-up. Data were analyzed and used with a one-way ANOVA parametric test for mean comparison of CG, EG and SEG groups (α = 0.05). Result: The masticatory performance of the participants was similar, irrespective of the proposed treatments, at baseline (p=.604), 30 days (p=.450) and 60 days (p=.669). Conclusions: The results indicated that treatment with educational and self-care therapies over a period of 60 days had no impact on the masticatory performance of women with painful TMD.

Descriptors: Temporomandibular joint; self-care; mastication.

INTRODUCTION

Temporomandibular disorders (TMD) represent a cluster of clinical problems involving the masticatory muscles and/or the temporomandibular joint (TMJ), as well as associated structures[1]. They are characterized by musculoskeletal pain, joint sounds, muscle fatigue and impairment of mandibular moviment[2]. Therefore, individuals can experience functional limitations, such as difficulties in chewing, speaking, and other orofacial functions[3], and a negative impact on individual's quality of life[4]. Previous studies have been demonstrating that TMD are more prevalent in women, maybe due to the presence of estrogen receptors in the ATM or because they are more susceptible to psychosomatic stress then men[5].

The etiology of TMD has been considered complex and multifactorial, since several factors may contribute to its predisposition, initiation, and maintenance. Currently it is known that parafunctional habits and psychosocial factors (e.g., anxiety, depression and fatigue) play an important role in the development of TMD[6,7]. Thus, treatments approaching only biomedical factors are considered insufficient to promote long-term improvement of TMD[8] .

Previous studies have shown that a biopsychosocial approach, that offers equal emphasis to the treatment of physiologic, psychological and social factors can result in substantial improvements in TMD pain[8,9]. Therefore, approaches involving self-care and behavioral therapies, including education about the condition, associated with self-care as heat packs, jaw exercises, and strategies aiming to reduce the parafunctional jaw activities and muscular relaxation[10].

In addition, it has been suggested that counseling and self-care therapies help to relieve musculoskeletal pain and to restore mandibular functions by reducing inflammation, improve or eliminate the suffering and psychosocial chances[11]. A recent systematic review concluded that these treatment approaches represent a conservative low-cost treatment and can be beneficial for relief and control of TMD signs and symptoms by improving psychological domains and reducing harmful behaviors, however, more controlled and randomized clinical trials are needed to validate the effectiveness of this treatment modality[10].

The presence of TMD can influence the masticatory capacity, due to pain, muscle dysfunction and limitations of mandibular movements[12]. Considering that the mastication is one of the main functions of the stomatognathic system, it is relevant the assessment of the effect of counselling and self-care approaches in the masticatory performance of patients with painful TMD.

The literature is still inconclusive regarding this topic, the aim of the present study was to investigate the impact of these treatment modalities in the masticatory performance of women with painful TMD. The null hypothesis was that such treatment modalities would not influence masticatory performance of the participants during the proposed period.

MATERIAL AND METHOD

Study Sample

Two hundred forty-nine women seeking treatment for orofacial pain in the TMD/Occlusion Clinic of the School of Dentistry Araraquara (São Paulo State University), Brazil, over a 24-month period, were subjected to a preliminary interview to determine the main complaint, pain characteristics (quality, installation time, duration, aggravating and mitigating factors, frequency and intensity) and medical history. In addition, calibrated researcher dentist performed the clinical and functional examinations necessary to make the TMD diagnosis and classification according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC-TMD)[13,14], which classifies DTM using a dual-axis system. The Axis I allow to classify individuals according to their physical condition, presenting on or more of the following groups: Group I (masticatory muscle pain with/without limitation of mouth opening), Group II (individuals with joint disorders), and Group III (arthralgia, arthritis or arthrosis). Thorugh the Axis II allow the psychosocial assessment including the grade of chronic pain and incapacity related to pain, non-specific physical symptoms, depression and mandibular function.

During the period of study, 249 women sought treatment for TMD/orofacial pain as mentioned were screened and invited to participating in the present study. The inclusion criteria were: (1) being woman with age ranging between 18 and 65 years; (2) presenting a diagnosis of muscle TMD according to the RDC-TMD/Axis I Groups I, associated or not with any articular TMD (Groups II or III). The TMD pain should be recurrent or constant for more than 3 months; (3) a self-report of an average jaw pain intensity in the past week of at least 3 on a visual analog scale (VAS) from 0 (no pain) to 10 (worst pain imaginable); (4) the grade of chronic pain as defined for RDC-TMD, axis II.1 of 2 or 3; (5) not under treatment for this painful condition; (6) not be starting any treatment for other painful condition such as fibromyalgia or rheumatoid arthritis; (7) presence of natural dentition or fixed prostheses with posterior occlusal stability. Individuals who had severe malocclusions or debilitating systemic diseases were excluded.

In total, 52 women fulfilled the inclusion and exclusion criteria and agreed to participate in our study. This study was approved by the institutional ethics committee (protocol nº10/11) and registered in the http://www.ensaiosclinicos.gov.br/database (trial: RBR-45yn9v). A written informed consent was obtained before enrollment.

Study Design

It was a double-blind, short-term randomized clinical trial to evaluate the masticatory performance of women with chronic painful TMD after the treatment including educational and self-care therapies. Participants (mean age (SD): 36.4 ± 8.8 years old) were randomly divided into three independent groups, according to the sequence of treatment received, as described below:

- Control Group (CG, n=16, mean age (SD): 37.4 ± 7.3 years):

1st. Visit: outcome variable was recorded (T0-baseline evaluation) and women were informed that they would receive treatment in the next visit.

2nd. Visit: outcome variable was recorded (T1-30-day evaluation) and women received education about TMD and instructions for conducting self-care procedures at home.

3rd. Visit: outcome variable was recorded (T2-60-day evaluation) and education and self-care instructions were reviewed.

- Education Group (EG, n=18, mean age (SD): 34.8 ± 6.7 years old):

1st.Visit: outcome variable was recorded (T0-baseline evaluation) and women received TMD education instructions.

2nd.Visit: outcome variable was recorded (T1-30-day evaluation) and women received education about TMD and instructions for conducting self-care procedures at home.

3rd.Visit: outcome variable was recorded (T2-60-day evaluation) and education and self-care instructions were reviewed.

- Self-care and Education Group (SEG, n=18, mean age (SD): 36.6 ± 10.6 years old):

1st. Visit: outcome variable was recorded (T0-baseline evaluation) and women received education about TMD and instructions for conducting self-care procedures at home.

2nd. Visit: outcome variable was recorded (T1-30-day evaluation) and education and self-care instructions were reviewed.

3rd. Visit: outcome variable was recorded (T2-60-day evaluation) and education and self-care instructions were reviewed.

The sample randomization was performed by one researcher dentist stratified by age, using computer-generated numbers (BioEstat, Universidade Federal do Pará, Belém, PA, Brasil).The outcome variable was the masticatory performance by means of the sieve method. This evaluation was performed at T0, T1 and T2, and conducted by the same examiner, who was blind to the treatment group assignment. The interval between visits was 30 days, and at the end of 60 days follow-up, all participants had received full approach, including education about TMD and self-care therapies. A flow diagram of the participants throughout the course of the research is shown in Figure 1.

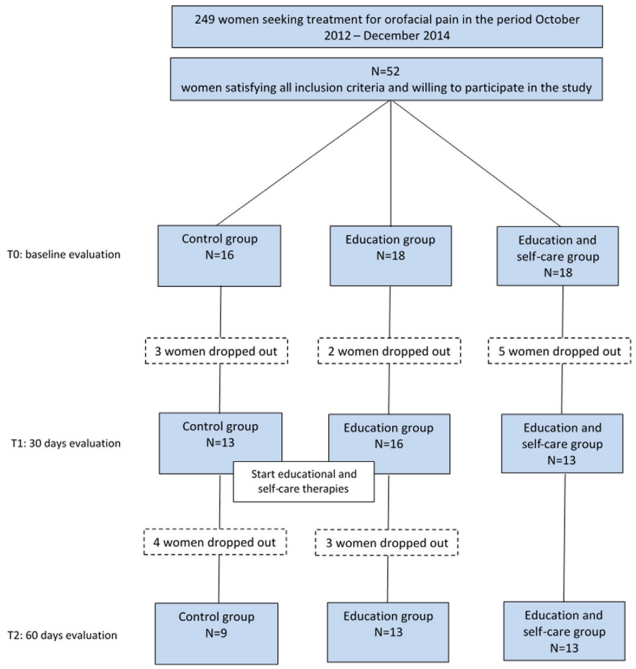

Figure 1. Flow diagram on women recruitment and dropouts during the study.

Treatment

The education instructions about TMD and self-care therapies were transmitted through a video recording, ensuring that all participants received the same information. A researcher trained on TMD/Orofacial pain accompanied all the sessions and was able to clarifying any questions that arose. In addition, women received printed illustrative material containing the information passed in the video on TMD education and the sequence of self-care procedures that should be made daily at home, until the end of the study.

The education instruction video addressed general information about TMD, such as structures involved, etiologic factors (the factors that may contribute to predisposition, initiation and maintenance of TMD) and prognosis of this disorder. Furthermore, the video explained about self-care of masticatory muscles, and emphasized that overuse of these muscles could worsen the TMD signs and symptoms. The women were instructed to pay attention to their jaw muscle activity, to keep the jaw muscles relaxed with the mandible in its postural rest position (no contact between the teeth), and to avoid oral harmful habits and excessive mandibular movement.

The self-care video taught procedures considered effective for the control of pain and dysfunction related to DTM. These procedures are recommended by the American Academy of Orofacial Pain[1] and include:

a) Thermotherapy: Participants were advised to apply moist heat pads on the painful muscle for 15 minutes, 3 times a day;
b) Mandibular exercises: In order to stretch the muscle, the women were instructed to perform maximum mouth opening movement with the aid of the thumb and index fingers, to keep for 10 seconds and then slowly close the mouth. In addition, they should open and close the mouth keeping the tongue on the palate. Women were also instructed to do mouth opening with resistance, where they should place one hand under his chin and force jaw up, hindering the opening movement. Coordination exercises consisted of opening and closing the mouth in front of the mirror, trying to make the jaw move straight. Thereafter, women should make movement of laterality and protrusion, without opening his mouth. These exercises should be repeated 6 times and performed 3 times a day;
c) Self-massage: Participants were carefully instructed to massage the masseter and temporal muscles, using circular movements for 20 seconds, 3 times a day.

Outcome Variable

The masticatory performance was evaluated by means of the sieve method, using almonds as the natural test food. Participants were instructed to chew 5 almonds in a natural way for 20 chewing strokes[15]. Then, the operator collected the chewed content in a container. Immediately after, 50 ml of water was given to the

participants to rinse the mouth. The remaining particles also were collected in the container. The chewed content were poured into a sieve 1-7 cm; ref. 1188, size 175×78×40 mm (Plasútil, Bauru, SP, Brazil) adapted on a filter paper no. 2 (Melitta do Brasil Indústria e Comércio Ltda, São Paulo, SP, Brazil) to separate liquid and chewed material. Then, 500 mL of water was poured over the sieve in order to eliminate any saliva present in the almonds and to reduce particle clumping.

The crushed almonds were desiccated in an electric oven (Fanem Indústria e Comércio Ltda, São Paulo, SP, Brazil) at 130 °C for 40 minutes. The content was subjected to a 4-sieve system under constant vibration for 60 seconds in a gypsum vibrator (VH Produtos Odontológicos, São Paulo, SP, Brazil). The sieves used (Granutest, Telastem Peneiras para Análise Ltda., São Paulo, SP, Brazil) were approved by the Brazilian Association of Technical Standards (ABNT) and had different hole sizes: 4.0 mm (ABNT 5), 2.8 mm (ABNT 7), 2.0 mm (ABNT 10), and 1.0 mm (ABNT 18). They were placed on top of each other, with the largest hole screen at the top and the smallest hole screen at the bottom, followed by a background collector to collect material that passed through the 4 sieves.

The particles retained in the sieves, including those that remained in the background collector, were weighed on a precision scale (Indústria e Comércio Eletro-Eletrônica Gehaka Ltda., São Paulo, SP, Brazil), and the values were recorded. Masticatory performance was calculated as the weight of comminuted material that passed through the 2.8-mm sieve. From these values, the masticatory performance was calculated based on the index proposed by Kapur, Soman[15]: MP=W1x100/Wt, where MP was the masticatory performance (in percentage); W1 was the material weight sum in sieves 3, 4, and the background collector; and Wt the total material weight subjected to sieving.

Statistical Analysis

All data collected were preliminarily analyzed by Shapiro-Wilk test for evaluate normal distribution. The masticatory performance before (T0) and after 30 days of follow-up (T1), for each group, was evaluated by parametric paired sample t-test, for verify impact of each treatment. Moreover, a comparison among the groups CG, EG and SEG was performed using the parametric test 1-way ANOVA. Statistical tests were conducted with statistics software (PASW v 19; SPSS Inc), considering a significance level set at α=0.05.

RESULT

During the follow-up, seventeen women (33%) dropped out of the study, 7 (13%) from the control group, 5 (10%) from the education group and 5 (10%) from the self-care and education group. Therefore, fifty-two women were evaluated at baseline (T0) forty-two women were evaluated after 30 days of follow-up (T1) and thirty-five women were evaluated after 60 days follow-up (T2). The reasons for dropouts included illness, changing professional activity, lack of time and improvement of symptoms, while the percentage of dropouts this study is similar to other clinical study[16].

The results showed that the masticatory performance of the participants was not influenced by the proposed treatments (Table 1). At baseline (T0), no significant differences were found among the groups (P=0.604), which demonstrates that the groups were homogeneous. No significant differences were also found among the groups after 30 days of treatment (T1), indicating that the masticatory performance of participants who did not receive treatment (control group) was similar to masticatory performance of participants who received educational and self-care therapies (education group and self-care and education group).

Considering that in the second visit all participants received full treatment approaches, including education and self-care therapies, the third visit aimed to evaluate the impact of the treatment time. No significant differences were found between the women who received educational and self-care for 30 days, and the women treated for 60 days (Table 1). Furthermore, as illustrated in Figure 2, the results were similar among the periods (T0-T1) for all groups (p>.05).

DISCUSSION

The null hypothesis of this study was accepted since the treatment with only educational therapy (EG) or with association of educational and self-care therapies (ESG) had no impact on masticatory performance of chronic TMD women during the proposed period. The masticatory performance of women remained unaltered after 30 days of treatment, in both groups. Furthermore, there was also no improvement in masticatory performance after 60 days of proposed treatment.

Individuals diagnosed with TMD, generally, exhibit a reduced masticatory performance compared with healthy individuals[17].

Table 1. Mean values (± SD) of the masticatory performance at T0 (baseline), T1 (30 days) and T2 (60 days)

	Control group (%)	Education group (%)	Education and self-care groups (%)	p-Value (1-way ANOVA)
T0 (n=42)	46.6 ± 24.8 A	50.4 ± 25.2 A	57.8 ± 17.9 A	0.604
T1 (n=42)	55.0 ± 19.9 A	50.8 ± 24.2 A	61.1 ± 19.1 A	0.450
T2 (n=35)	52.4 ± 19.4 A	52.7 ± 26.7 A	56.9 ± 18.9 A	0.669
ΔT1T0*	5.34 ± 17.0 A	0.4 ± 9.9 A	3.3 ± 17.5 A	0.676

*ΔT1T0, difference between the mean values of the masticatory performance recorded at T1 and T0; similar capital letters denotes no significant differences among the groups (p>.05).

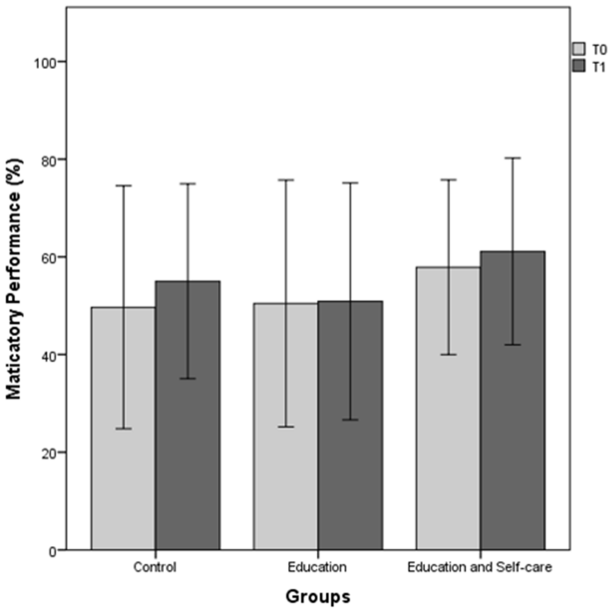

Figure 2. Comparison of the masticatory performance before (T0) and after 30 days of treatment (T1) among the groups. Similar capital letters demonstrate no significant differences among periods (p> .05).

According to Campos et al.[18], the presence of pain and the limitation of mandibular movements directly impacts in the masticatory function, whereas, the greater the severity of these symptoms, the greater the masticatory difficulty.

Currently, educational and self-care therapies have been used as initial treatment of almost all types of TMD, especially when pain is present[19]. The literature regarding these therapies shows that enforcing patient responsibilities, reducing harmful behaviors and the balance between physiological, psychological and social factors are a powerful tool for control and relief of TMD signals and symptoms[10,20]. Additionally, Craane et al.[21] found significant improvement for quality of life ratings in patients treated with educational and self-care therapies.

Studies regarding the effect of educational and self-care therapies on masticatory performance of individuals with chronic TMD are relatively scarce in the literature. Michelotti et al.[19,22] reported significant improvement of pain, impairment of mandibular movements and masticatory capacity after treatment with these therapies, however, different methodologies were carried out, as the use of subjective measures obtained from questionnaires and visual analogue scale, over a 3-month treatment period.

In a recently published study, Giro et al.[23] demonstrated that the treatment with educational and self-care therapies during a 30-day period resulted in improvements on the pattern of mandibular movements in women with chronic muscular and articular TMDs. This finding could be useful to discuss the results of masticatory performance obtained in our study. It is reasonable to assume that the treatment with educational and self-care therapies could be adequate to improve the pattern of mandibular movements, but has no impact on the masticatory performance of the TMD women, irrespective of the chronicity of the signs and symptoms. In respect to the masticatory performance, it was established that all the volunteers had the same occlusal pattern, presence of natural dentition or fixed prostheses with posterior occlusal stability.

Long-term follow-up of TMD patients shows that 50% to 90% of the patients have few or no symptoms, after conservative treatments[19,24], thus a follow-up period of only 60 days can be considered a limitation of this study. Another important factor is that, in this study, the women were instructed to perform the physical therapy daily at home, without any supervision. It was observed by Craane et al.[21] and De Laat et al.[25] that TMD patients who performed the physical therapy with the supervision of a physiotherapist, showed a significant improvement in the mandibular movement and masticatory ability.

This study investigated masticatory performance (objective measure obtained from chewing tests) of women treated with educational and self-care therapies, considering that in the literature the most studies addressing this modality of treatment evaluated subjective masticatory function, obtained by questionnaires or visual analog scale. The limitations of the present study include the high dropout rate during the follow-up period and the follow-up of only 60 days. Thus, future studies should be conducted to extend the existing evidence in the literature aiming to clarify the long-term effects of treatment with educational and self-care therapies for chronic TMD, and the re-establishment of satisfactory masticatory function of individuals who present these disorders.

CONCLUSION

Our findings indicate that the treatment with educational and self-care therapies during a 60-day period had no impact on masticatory performance of women presenting chronic TMD. The clinical relevance of this research is that the conservative treatments over a short-term period has no influence on masticatory performance of chronic TMD women.

REFERENCES

1. Leeuw R. American Academy of Orofacial Pain guidelines for assessment, diagnosis, and management. 4th ed. Carol Stream: Quintessence Publishing Company; 2008.
2. Manfredini D, Favero L, Michieli M, Salmaso L, Cocilovo F, Guarda-Nardini L. An assessment of the usefulness of jaw kinesiography in monitoring temporomandibular disorders. J Am Dent Assoc. 2013 Apr;144(4):397-405. http://dx.doi.org/10.14219/jada.archive.2013.0133. PMid:23543694.
3. Ferreira CL, Machado BC, Borges CG, Rodrigues Da Silva MA, Sforza C, Felício CM. Impaired orofacial motor functions on chronic temporomandibular disorders. J Electromyogr Kinesiol. 2014 Aug;24(4):565-71. http://dx.doi.org/10.1016/j.jelekin.2014.04.005. PMid:24816190.
4. Barros VM, Seraidarian PI, Côrtes MI, de Paula LV. The impact of orofacial pain on the quality of life of patients with temporomandibular disorder. J Orofac Pain. 2009;23(1):28-37. PMid:19264033.

5. Phillips JM, Gatchel RJ, Wesley AL, Ellis E 3rd. Clinical implications of sex in acute temporomandibular disorders. J Am Dent Assoc. 2001 Jan;132(1):49-57. http://dx.doi.org/10.14219/jada.archive.2001.0025. PMid:11194399.
6. Costa YM, Porporatti AL, Stuginski-Barbosa J, Bonjardim LR, Conti PC. Additional effect of occlusal splints on the improvement of psychological aspects in temporomandibular disorder subjects: a randomized controlled trial. Arch Oral Biol. 2015 May;60(5):738-44. http://dx.doi.org/10.1016/j.archoralbio.2015.02.005. PMid:25768709.
7. Mello VVC, Barbosa ACS, Morais MPLA, Gomes SGF, Vasconcelos MMVB, Caldas AF Jr. Temporomandibular disorders in a sample population of the Brazilian northeast. Braz Dent J. 2014 Sep-Oct;25(5):442-6. http://dx.doi.org/10.1590/0103-6440201302250. PMid:25517782.
8. Gui MS, Rizzatti-Barbosa CM. Chronicity factors of temporomandibular disorders: a critical review of the literature. Braz Oral Res. 2015;29(1):1-6. http://dx.doi.org/10.1590/1807-3107BOR-2015.vol29.0018. PMid:26398110.
9. Gatchel RJ, Peng YB, Peters ML, Fuchs PN, Turk DC. The biopsychosocial approach to chronic pain: scientific advances and future directions. Psychol Bull. 2007 Jul;133(4):581-624. http://dx.doi.org/10.1037/0033-2909.133.4.581. PMid:17592957.
10. de Freitas RF, Ferreira MA, Barbosa GA, Calderon PS. Counselling and self-management therapies for temporomandibular disorders: a systematic review. J Oral Rehabil. 2013 Nov;40(11):864-74. http://dx.doi.org/10.1111/joor.12098. PMid:24102692.
11. Alencar F Jr, Becker A. Evaluation of different occlusal splints and counselling in the management of myofascial pain dysfunction. J Oral Rehabil. 2009 Feb;36(2):79-85. http://dx.doi.org/10.1111/j.1365-2842.2008.01913.x. PMid:18976268.
12. Brandini DA, Benson J, Nicholas MK, Murray GM, Peck CC. Chewing in temporomandibular disorder patients: an exploratory study of an association with some psychological variables. J Orofac Pain. 2011;25(1):56-67. PMid:21359238.
13. Dworkin SF, LeResche L. Research diagnostic criteria for temporomandibular disorders: review, criteria, examinations and specifications, critique. J Craniomandib Disord. 1992;6(4):301-55. PMid:1298767.
14. Ohrbach R, List T, Goulet JP, Svensson P. Recommendations from the International Consensus Workshop: convergence on an orofacial pain taxonomy. J Oral Rehabil. 2010 Oct;37(10):807-12. http://dx.doi.org/10.1111/j.1365-2842.2010.02088.x. PMid:20374436.
15. Kapur KK, Soman SD. Masticatory performance and efficiency in denture wearers. 1964. J Prosthet Dent. 2006 Jun;95(6):407-11. http://dx.doi.org/10.1016/j.prosdent.2006.03.012. PMid:16765149.
16. De Boever JA, Van Wormhoudt K, De Boever EH. Reasons that patients do not return for appointments in the initial phase of treatment of temporomandibular disorders. J Orofac Pain. 1996;10(1):66-72. PMid:8995918.
17. Felício CM, Melchior MO, Silva MAMR, Celeghini RMS. Masticatory performance in adults related to temporomandibular disorder and dental occlusion. Pró-Fono R. Atual. Cient. 2007 June;19(2):151-8. PMid:17710341.
18. Campos JA, Carrascosa AC, Bonafé FS, Maroco J. Epidemiology of severity of temporomandibular disorders in Brazilian women. J Oral Facial Pain Headache. 2014;28(2):147-52. http://dx.doi.org/10.11607/ofph.1194. PMid:24822237.
19. Michelotti A, Steenks MH, Farella M, Parisini F, Cimino R, Martina R. The additional value of a home physical therapy regimen versus patient education only for the treatment of myofascial pain of the jaw muscles: short-term results of a randomized clinical trial. J Orofac Pain. 2004;18(2):114-25. PMid:15250431.
20. Feine JS, Lund JP. An assessment of the efficacy of physical therapy and physical modalities for the control of chronic musculoskeletal pain. Pain. 1997 May;71(1):5-23. http://dx.doi.org/10.1016/S0304-3959(96)03287-3. PMid:9200169.
21. Craane B, Dijkstra PU, Stappaerts K, De Laat A. One-year evaluation of the effect of physical therapy for masticatory muscle pain: a randomized controlled trial. Eur J Pain. 2012 May;16(5):737-47. http://dx.doi.org/10.1002/j.1532-2149.2011.00038.x. PMid:22337211.
22. Michelotti A, Iodice G, Vollaro S, Steenks MH, Farella M. Evaluation of the short-term effectiveness of education versus an occlusal splint for the treatment of myofascial pain of the jaw muscles. J Am Dent Assoc. 2012 Jan;143(1):47-53. http://dx.doi.org/10.14219/jada.archive.2012.0018. PMid:22207667.
23. Giro G, Policastro VB, Scavassin PM, Leite AR, Mendoza Marin DO, Gonçalves DA, et al. Mandibular kinesiographic pattern of women with chronic TMD after management with educational and self-care therapies: a double-blind, randomized clinical trial. J Prosthet Dent. 2016 Nov;116(5):749-55. http://dx.doi.org/10.1016/j.prosdent.2016.03.021. PMid:27236596.
24. Garefis P, Grigoriadou E, Zarifi A, Koidis PT. Effectiveness of conservative treatment for craniomandibular disorders: a 2-year longitudinal study. J Orofac Pain. 1994;8(3):309-14. PMid:7812229.
25. De Laat A, Stappaerts K, Papy S. Counseling and physical therapy as treatment for myofascial pain of the masticatory system. J Orofac Pain. 2003;17(1):42-9. PMid:12756930.

CONFLICTS OF INTERESTS

The authors declare no conflicts of interest.

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