

EFFECTS OF MESSAGE THERAPY AND OCCLUSAL SPLINT THERAPY ON MANDIBULAR RANGE OF MOTION IN INDIVIDUALS WITH TEMPOROMANDIBULAR DISORDER: A RANDOMIZED CLINICAL TRIAL

Cid André Fidelis de Paula Gomes, PT,^a Fabiano Politti, PT, PhD,^b Daniel Ventura Andrade, PT,^c Dowglas Fernando Magalhães de Sousa, DDS,^d Carolina Marciela Herpich, PT,^d Almir Vieira Dibai-Filho, PT,^e Tabajara de Oliveira Gonzalez, PT, PhD,^b and Daniela Aparecida Biasotto-Gonzalez, PT, PhD^f

ABSTRACT

Objective: The purpose of this study was to investigate the effects of massage therapy compared with occlusal splint therapy on mandibular range of motion (ROM) in individuals with temporomandibular disorder (TMD) and compare the results with ROM obtained in a group of individuals without this disorder.

Methods: A blinded randomized clinical trial was conducted. Twenty-eight volunteers with TMD were randomly distributed into either a massage therapy group or an occlusal splint group. Both treatments were provided for 4 weeks. Fourteen individuals without TMD were consecutively allocated to a comparison group. Fonseca anamnestic index was used to characterize TMD and allocate the volunteers to either of the intervention groups or asymptomatic comparison group. Mandibular ROM was evaluated before and after treatment using a digital caliper. Two-way repeated-measures analysis of variance with a post hoc Bonferroni testing was used for intergroup and intragroup comparisons (level of significance was set to 5%). Cohen *d* was used to calculate the effect size.

Results: In the intragroup analysis, significant increases in ROM were found for all measures in both the massage and occlusal splint groups ($P < .05$). A small to moderate clinical effect of treatment with the occlusal splint was found regarding right and left lateral excursion in comparison with the massage therapy and asymptomatic comparison groups ($0.2 < d < 0.5$).

Conclusion: Massage therapy on the masticatory muscles and the use of an occlusal splint lead to an increase in mandibular ROM similar to that of the asymptomatic comparison group with regard to maximum active mouth opening and both right and left excursion in individuals with TMD. (J Manipulative Physiol Ther 2014;37:164-169)

Key Indexing Terms: *Physical Therapy Modalities; Facial Pain; Orthodontic Appliances*

Temporomandibular disorder (TMD) is a blanket term for a set of clinical conditions that affect the stomatognathic system and has a multifactor etiology.^{1,2} Thus, a multidisciplinary approach is recommended, which may include the involvement of a dentist and a manual therapist.³

Physical therapy offers a range of treatment options for the management of signs and symptoms of TMD, such as high-voltage electrical stimulation,^{4,5} transcutaneous electrical nervous stimulation,^{6,7} acupuncture,⁸⁻¹⁰ laser therapy,^{11,12} and massage therapy.^{13,14} Another option is treatment with an occlusal splint, which is a muscle-relaxing appliance used in dentistry.¹⁵

^a Doctoral Student, Postgraduate Program in Biophotonics Applied to Health Sciences, Nove de Julho University, São Paulo, Brazil.

^b Professor, Physical Therapy Program, Nove de Julho University, São Paulo, Brazil.

^c Doctoral Student, Postgraduate Program in Rehabilitation Sciences, Nove de Julho University, São Paulo, Brazil.

^d Master's Student, Postgraduate Program in Rehabilitation Sciences, Nove de Julho University, São Paulo, Brazil.

^e Doctoral Student, Postgraduate Program in Rehabilitation and Functional Performance, University of São Paulo, Ribeirão Preto, Brazil.

^f Professor, Postgraduate Program in Rehabilitation Sciences, Nove de Julho University, São Paulo, Brazil.

Submit requests for reprints to: Almir Vieira Dibai-Filho, PT, Doctoral Student, Avenida do Café, 2361, Apto 518, Vila Amélia, Ribeirão Preto, São Paulo 14050-230, Brazil (e-mail: dibai Filho@gmail.com).

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Most studies on these resources have investigated the effects on muscle or joint pain, which is the most prevalent symptom of TMD.¹⁶ However, the evaluation of other aspects is also important to the rehabilitation of affected individuals. One such aspect is the range of motion (ROM) of the mandible because an adequate degree of movement is necessary for the proper functioning of the stomatognathic system.^{17,18}

Despite the large number of randomized clinical trials published, systematic reviews stress caution in the interpretation of scientific evidence regarding the treatment of TMD because of the low degree of methodological quality in a large portion of these studies.^{13,19} Thus, there is a need for further clinical trials that address aspects often overlooked in previous investigations, such as an adequate sample size, blinded examiners and the use of valid, reliable outcome measures.

The aim of the present study was to investigate the effects of massage therapy and occlusal splint therapy on mandibular ROM in individuals with TMD and compare the results with those obtained in a group of individuals without this disorder. The hypothesis tested was that massage therapy and the use of a muscle-relaxing oral appliance will lead to an increase in joint mobility in these individuals.

METHODS

Study Design

A blinded randomized clinical trial was conducted. Neither the examiner in charge of the measurement of mandibular ROM nor the researcher in charge of the data analysis was aware of the allocation of the volunteers to the different groups.

Population

One hundred four male and female volunteers aged 18 to 40 years were recruited from the university community of the city of Sao Paulo, Brazil, between June 2011 and December 2012. Fonseca anamnestic index was used to determine the presence or absence of TMD in the sample.^{20,21} The following were the exclusion criteria: occurrence of missing teeth (except third molars); current use of orthodontic appliance; history of neuromuscular disease; current use of analgesic, anti-inflammatory agent, or muscle relaxant; and currently undergoing physical therapy for TMD.

Volunteers were consecutively included until reaching the preestablished number of individuals with TMD and asymptomatic comparison participants. During this process, 62 of the original 104 volunteers were excluded. Thus, the final sample was made up of 42 volunteers (Fig 1).

The procedures of the present study received approval from the Human Research Ethics Committee of the Nove de Julho University, São Paulo, Brazil (protocol no. 133012). This study is registered in the ClinicalTrials.gov (NCT01874041). To participate, all volunteers signed a statement of informed consent form.

Experimental Design

Twenty-eight volunteers with TMD were randomly distributed into 2 treatment groups, one group received massage therapy and the other received treatment by use an occlusal splint (randomization ratio, 1:1). Block randomization was used and opaque envelopes were used to conceal the allocation. In addition, 14 individuals without TMD were consecutively allocated to an observation group.

The massage group ($n = 14$, 10 women and 4 men, mean age of 30.10 ± 5.80 years) was submitted to 3 weekly 30-minute sessions of massage of the masticatory muscles for 4 consecutive weeks. Massage therapy was performed by a physiotherapist who had undergone a training exercise for the administration of the protocol adapted from Biasotto-Gonzalez,²² involving sliding and kneading maneuvers on the masseter and temporal muscles. Sliding consisted of a unidirectional movement in which part of the therapist's hand (mainly the fingertips) was used, moving from the proximal to the distal portion of the face with constant, progressive pressure compatible with the status of each tissue. The degree of pressure varied depending on the level of pain, sensitivity, and tension of each individual. Kneading consisted of a gripping maneuver of a muscle group or portion of a muscle, with intermittent movements of compression and decompression. The therapist performed circular movements with the fingertips such that the skin and subcutaneous tissues were moved over the subjacent structures. A facial massage cream was used to facilitate the manual procedures.

The occlusal splint group ($n = 14$, 10 women and 4 men, mean age of 29.70 ± 3.10 years) was submitted to treatment with an occlusal splint for 4 weeks. This form of treatment aimed to promote greater stability of the joint components and may also be used to establish a more favorable occlusal status, with the reorganization of neuromuscular activity, reduced hyperactivity of the muscles, and the reestablishment of balanced muscle function.²³⁻²⁵ After the clinical examination by a dentist, the upper arch of each volunteer was molded with irreversible hydrocolloid for the fabrication of a Michigan-type occlusal splint with a flat occlusal surface, contact with the antagonist teeth, and the presence of canine and protrusive guides. The volunteers were instructed to wear the splint while sleeping. Adjustments were made after 2 weeks by the same dentist in charge of the evaluation and splint fabrication.

The asymptomatic comparison group ($n = 14$, 10 women and 4 men, mean age of 30.87 ± 6.20 years) was not submitted to any form of intervention and was evaluated on 2 occasions, with a 4-week interval between evaluations.

Fonseca Anamnestic Index

Fonseca anamnestic index was used to characterize TMD and allocate the volunteers to either the intervention groups or the asymptomatic comparison group. This

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