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Change of pain threshold in patients with muscle disorder subjected to conservative treatment

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ABSTRACT

Temporomandibular Disorder (TMD) is a clinical syndrome that mainly affects the masticatory muscles and temporomandibular joints (TMJ). The manual palpation is the most used clinical method to evaluate the muscle pain and is considered an important part of the clinical examination. The pressure algometry is used to verify the initial threshold of myofascial pain perception in the temporomandibular disorder. The purpose of this research was to evaluate the pain threshold change in patients with muscle-type TMD before and after the conservative treatment. Twenty seven volunteers were screened according to the Research Diagnostic Criteria (RDC/TMD), and 14 had muscle TMD and 13 with absence of TMD (control group). Measurements were taken with the pressure algometer in every patient in temporal and masseter muscles in order to quantify the response to the patient painful stimulus. After the proposed treatment the patient was scheduled to return in 7,14, 28 and 56 days. Therefore, it resulted in 18 patients for the study. The algometer comparison between the groups treated before and after the care, showed an initial value (in KgF) of 0.827 ± 0.405 and final of 1.416 ± 0.745, $p<0.001$ (significant level of 5%). With this research, it can be concluded that patients with muscle-type TMD treated conservatively tolerate a greater load of pressure after the treatment.

Keywords: Temporomandibular joint disorders; pain; palpation

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Introduction

Temporomandibular disorder (TMD) is a term used to assemble a group of joints clinical problems and of masticatory muscles and surrounding structures. They are mainly characterized by pain, sounds in the joints and irregular function or limitation of the mandible[1]. It can be classified in muscular, articular or other joints problems.

The triggering factor and perpetuation of TMD are conditioned to the interaction of factors such as trauma, ligamentous laxity, parafunctional habits, systemic changes, internal and external changes in the temporomandibular joint structure (TMJ), among others[2].

The main complaint of muscle-type TMD is the pain, but it can also include muscle fatigue, tensional cephalalgia, and mandibular opening limitation [1,2]. TMD is the most common cause of chronic pain in the orofacial region. Approximately 12% of the general population is affected, and 5% has symptoms severe enough to search for treatment[3].

For the diagnosis and classification of patients with TMD signs and symptoms there are different methods. For this paper the *Research Diagnostic Criteria* (RDC/TMD) was used, since it is considered the *"gold standard*" for researches. The RDC/TMD maximizes the reproducibility among researchers, making the researches adaptation and results comparison easier by using the same criteria[4].

Manual palpation is the most used clinical method to evaluate the muscle pain and is considered an important part of the clinical examination. Pressure algometry is used to verify the initial threshold of myofascial pain perception in the temporomandibular disorder, i.e. it is the smallest pressure received that induces pain, and with it, the muscle sensitivity is evaluated in the presence of triggering points or taut band[5,6]. Another indication is the easy handing and good replication offered for the clinical evaluation [7,8].

The purpose of this research was to evaluate the pain threshold change in patients with muscle-type TMD before and after the conservative treatment.

Material and method

Seventy patients were screened from the Orofacial Pain Care of the College of Dentistry Professor Albino Coimbra Filho of Universidade Federal de Mato Grosso do Sul (FAODO-UFMS). The exclusion criteria were patients with joint TMD and systemic diseases that could be confused with TMD diagnosis (arthritis, fibromyalgia, sclerosis, inflammatory myopathies) or any kind of systemic disease that affects the osteoarticular system; patients using inti-inflammatory drugs, anticonvulsants, antidepressants or psychotropic painkillers and; history of facial or cervical trauma.

Medical records were filled according to the RDC by a single researcher. In addition to the palpation recommended by the RDC, for the patient pain general analysis and his perception of pain, measurements were conducted with the pressure algometer in all patients posterior, meddle and anterior temporal muscles and superior, middle and inferior masseter aiming to quantify the response to the patient painful stimulus.

For this research, patients who were diagnosed with joint TMD were excluded and sent to the Orofacial Pain Care of FAODO.

The proposed treatment was conservative, limited to reversible measures[9]:

- Behavioral guidance and advice: avoid hard foods, do not chew gum, posture while sleeping and in daily activities etc.; observe the habit of clenching or bruxism, and reduce the parafunctional habit;
- Thermotherapy: use hot wet compress three times a day for 20 minutes in the affected muscle;
- Local massage: massage after the compress with diethylammonium diclofenac, with circularly and rippling movement;

Table 1 - Values related to (mean ± standard deviation) painful stimulus (in Kgf/cm^2), of patients with muscle TMD before and after the treatment (n=18).

GROUPS	Before treatment	After treatment
Treatment	0.827 ± 0.405 [a]	1.416 ± 0.745 [b]

Different letters in rows indicate statistically significant difference (p<0.05). t-Student test. Nature of sample distribution:Kolmogorov-Smirnov.

Figure 1 – Chart of initial and final algometry of control and treatment groups.

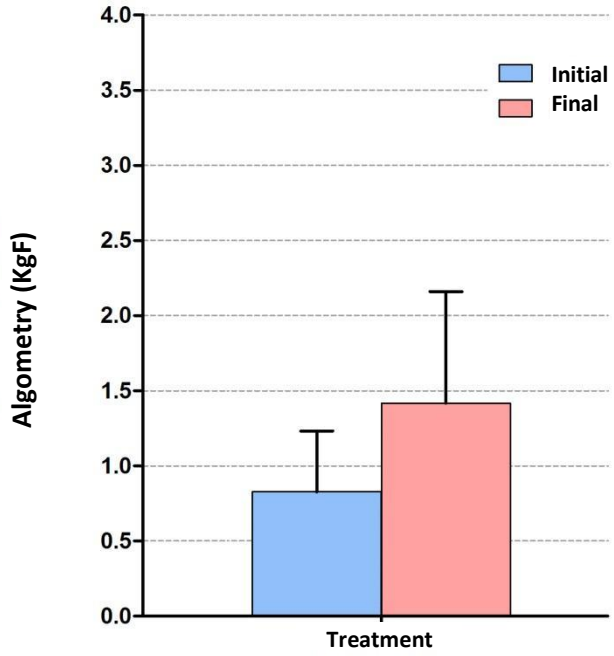
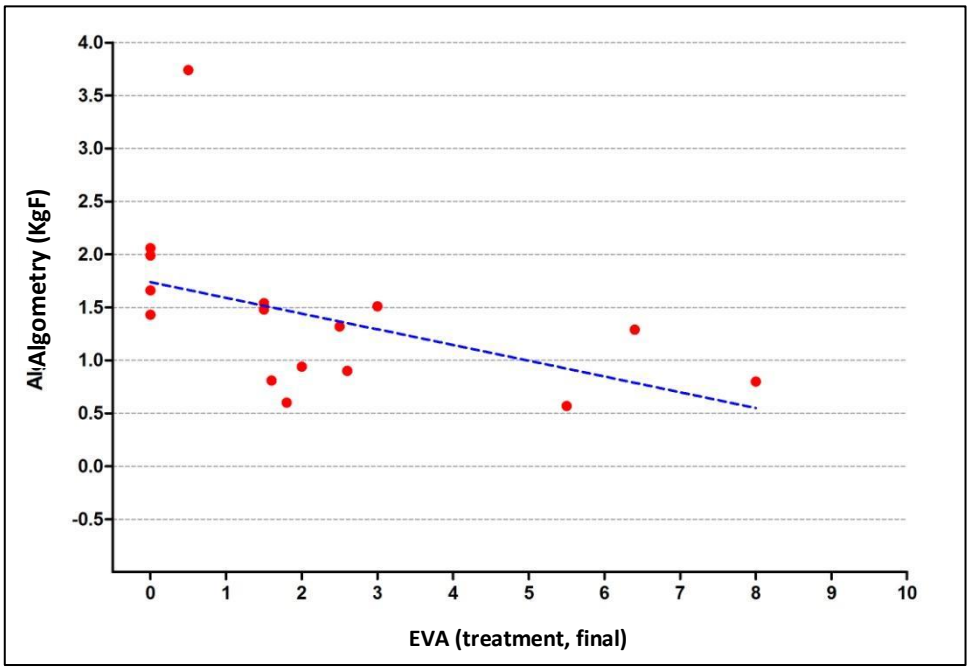


Figure 2 Chart of dispersion showing the correlation between EVA and algometry.



- Interocclusal device: the anterior interocclusal device was made in self-curing acrylic resin to reduce the parafunctional activity and change the proprioception of the patient. The patient was instructed to use the device every night during the treatment.

After the guidance, the patient was scheduled to return in 7,14, 28 and 56 days. In every return, the test with the algometer and the patient pain report were conducted.

From the 70 screened patients, 29 patients were excluded:13 patients because they had joint TMD and 16 patients were not diagnosed with TMD, and 41 patients were joined to the study group. For the results analysis, 27 patients were excluded by abandonment (Have not performed all returns) or due to incomplete data. Therefore, it resulted in 18 patients for the study. This study was approved by the Ethics Committee of Universidade Federal de Mato Grosso do Sul, through Brazil Platform under the No. 179.921. All patients signed the Free and Informed Consent Statement. The statistical tests used for this research were Kolmogorov-Smirnov test and Test “t” of Student was applied for the paired data.

Results

The algometer comparison between treated groups before and after the care obtained an initial value (in KgF) of0.827 ± 0.405 and final of 1.416 ± 0.745 (Figure 1). In this context, the sampling distribution nature was parametric with paired data (Kolmogorov-Smirnov test). The “t” Test of Student was applied for the paired data, with the result: $p<0.001$ (significant level of 5%).This result confirms that, before starting the treatment, patients tolerated lower pressure loads than at the end.

Measured using the algometer, Table 1 shows the data regarding the painful stimulus in the treatment and control groups. These results are shown in Figure 1.

The correlation between pain perception (EVA scale) and the painful stimulus (measured by algometer) was significant (coefficient of Pearson:$r = - 0.478$; $p=0.026$). It was found that the lower the pain perception in digital manual palpation, the greater the resistance in the pain perception when measured with the algometer (Figure 2).

Discussion

With the proposed treatment, patients obtained statistically significant improvement in the painful remission. With the used protocol, which is widely used in non-invasive interventions[1], we can state that the measures taken were effective regarding the orofacial pain. The results match with the study of Wihelmensen *et al.*, 2006 evidencing that in general, with this treatment patients experience a symptoms decrease showingthe treatment efficiency, and thus improving the quality of life of a population that faces the distressing problem of the TMD.

The treatment modalities for the temporomandibular disorder are diverse. Proposals for using conservative methods and avoiding the overtreatment is what prevails among therapists[10].

Behavioral therapy is a great ally in the process, with the purpose of helping the patient to understand the process that developed the chronic pain, understand that it is possible to control it, develop habits that promote the pain relief[11], and improve the quality of life. De Freitas *et al.*(2013) consider that the conservative and low-cost therapy, and which promotes great benefit since it improves the patient psychological state, from the moment that he understands the pain process, he stops practicing behaviors that impair him, therefore controlling the TMD signs and symptoms.

In 2006, Júnior *et al.* found that both the advice and the use of interoccusal splints were statistically equal compared to the efficiency in TMDs treatment. Among patients treated with occlusal splints, most of them stopped using it at the treatment end, were not dependent on it, and had no pain. Conti *et al.*(2012), after a research evaluating the result of the treatment applied in patients with masticatory muscles

pain, found that the behavioral therapy is effective, but when associated with the use of the total or anterior interocclusal device, the response is faster.

Rigid interocclusal splints promote an inhibitory effect of the neuro-muscular activity of the mandible. Arima *et al.*(2012), investigated during the night, using the electromyography, that the amount of muscle contracture events during sleep decreased considerably, with the use of occlusal orthesis.

In this research we evidenced that the combination of the behavioral therapy with the anterior intraoral device shows a significant decrease in the painful state, although not always the patients fully complied with the proposed therapy.

The data obtained in this research with the pain perception match with Gomes *et al.*(2006) which, while analyzing the muscle sensitivity results, in the treatment effectiveness with myorelaxant splint, found that there has an increase in the muscle sensitivity threshold aftercare for the masseter and temporal muscles, when subjected to pressure algometry, and in the self-assessment 60% of the participants reported cure or a great pain relief; however, the manual palpation did not evidence statistically significant result in the evolution of the evaluated muscles sensitivity threshold.

Conclusion

With this research, it can be concluded that patients with muscle-type TMD treated conservatively tolerate a greater load of pressure after the treatment.

Resumo

A disfunção temporomandibular (DTM) é uma síndrome clínica que acomete principalmente músculos mastigatórios e articulações temporomandibulares (ATM). A palpação manual é o método clínico mais utilizado para avaliar a dor muscular e é considerada parte importante do exame clínico. A algometria de pressão é utilizada para verificar o limiar inicial da percepção da dor miofascial na disfunção temporomandibular. O objetivo desse trabalho foi avaliar a alteração do limiar de dor em pacientes com DTM do tipo muscular antes e depois do tratamento conservador. Foram triados de acordo com os critérios do *ResearchDiagnosticCriteria* (RDC/TMD) e 27 voluntários, sendo que 14 eram portadores de DTM muscular e 13 com ausência de DTM (grupo controle). Foram realizadas medidas com o algômetro de pressão em cada paciente nos músculos temporal e masseter com o objetivo de quantificar a resposta ao estímulo doloroso do paciente. Após proposto o tratamento o paciente foi agendado com retorno de 7,14, 28 e 56 dias. Portanto, resultou em 18 pacientes para o estudo. A comparação do algômetro entre grupos tratados antes e depois do atendimento, obteve-se um valor (em KgF) inicial de 0,827 ± 0,405 e final de 1,416 ± 0,745, $p<0,001$ (significante a nível de 5%). Com esse trabalho, pode-se concluir que em pacientes com DTM do tipo muscular tratados de forma conservadora suportam uma carga maior de pressão após o tratamento.

Palavras chave: Transtornos da articulação temporomandibular; dor; palpação

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