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Additional effect of occlusal splints on the improvement of psychological aspects in temporomandibular disorder subjects: A randomized controlled trial

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ABSTRACT

Objective: To measure the effect of occlusal splints as an additional treatment on psychological aspects in temporomandibular disorder patients.
Design: A randomized controlled trial was performed comprising 60 adults diagnosed with masticatory myofascial pain according the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD). The participants were divided equally into 2 treatment groups, which received only counselling (Group 1) or occlusal splints in addition to counselling (Group 2). The assessments occurred at baseline and at 2 and 5 months after treatment. The outcomes were symptoms of anxiety and depression, as well as pain catastrophizing. Two-way ANOVA, Friedman and Mann–Whitney tests were used to perform the statistical analysis, considering a significance level of 5%.
Results: In relation to the baseline assessment, 60% of the subjects had at least mild anxiety and 25% had at least mild depression, and the mean and standard deviation (SD) of pain catastrophizing was 2.41 (1.33) for Group 1 and 2.06 (1.04) for Group 2. Comparisons between baseline and the fifth-month evaluation showed an improvement in anxiety and depression symptoms only in Group 2 ($p < 0.05$). Otherwise, there was a significant reduction in pain catastrophizing in both groups ($p < 0.05$), with a mean (SD) of 1.14 (1.28) for Group 1 and 0.76 (0.82) for Group 2.
Conclusion: Minimally invasive strategies could provide an improvement in the psychological aspects of temporomandibular disorder patients, and the use of an occlusal splint seems to hasten the manifestation of these effects.

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1. Introduction

The definition of pain according to the International Association for the Study of Pain (IASP) emphasizes the importance of emotional and psychological constituents. Hence, rather than a purely physiological and sensorial response, pain is understood as a personal experience involving more than just biological aspects.[1] Understanding the influence of these emotional and psychological aspects of pain perception entails a conceptual change from the biomedical to the biopsychosocial model, which embraces the multidimensionality of the pain experience and highlights the role of emotional and behavioural aspects.[2]

Among the pain-related conditions associated with psychological factors, temporomandibular disorder (TMD) stands out in particular and is defined as an umbrella of clinical conditions affecting the masticatory muscles, the temporomandibular joint (TMJ) and associated structures.[3] There is evidence of muscle pain associated with stress, as well as higher anxiety and depression levels when comparing TMD subjects with asymptomatic controls.[4–6] Furthermore, TMD diagnosis can be associated with psychological distress and with higher levels of pain catastrophizing (negative and amplified thoughts involving a noxious stimulus).[7,8] All of these factors endorse the relevance of the biopsychosocial model of pain.

It is known that some psychosocial characteristics or psychological profiles can predispose people to TMD development.[9,10] This possible causal relationship is borne out by the analysis of exclusively psychological management strategies that reduce pain intensity in this population.[11] Otherwise, in a chronic state, pain itself could aggravate or contribute to psychosocial or psychological distress, generating a vicious cycle.[12]

Thus, it can be expected that management approaches to control TMD pain could have some benefit on psychological factors. Minimally invasive strategies, like an occlusal splint or patient counselling, are well established and show strong evidence of a reduction in pain intensity and muscle sensitivity.[13] Nonetheless, little is known about their effect on psychological factors, like anxiety, depression and catastrophizing. It is also well accepted that there are other explanations related to central mechanisms that enhance the efficacy of occlusal splints, apart from the peripheral and so-called ''occlusal effects'' of these splints, e.g. cognitive awareness and placebo.[14] This influence on higher-order central processing could be related to the improvement of psychological aspects. Furthermore, in a recent systematic review, de Freitas et al.[15] stated that counselling and self-management-based therapies could improve psychological aspects and reduce harmful behaviour in TMD subjects. In this scenario, an interesting question arises: considering the potential psychological effects of the occlusal splint, does it have an additional benefit on improving psychological aspects beyond counselling and a self-management strategy?

Based on this question, the aims of this study were: (1) to measure and (2) compare the effect of two minimally invasive strategies on symptoms of anxiety and depression and pain catastrophizing levels in subjects with masticatory myofascial pain. The null hypotheses were: (1) there is no improvement in certain psychological factors after 5 months of treatment and (2) there is no difference between the two strategies/treatments.

2. Material and methods

2.1. Sample

This study consisted of a randomized controlled trial conducted in Brazil, performed in accordance with the ethical standards of the Declaration of Helsinki and its later amendments, and approved by the Human Research Ethics Committee of the Bauru School of Dentistry, University of Sao Paulo.

The study was conducted at the Orofacial Pain Clinic of the Bauru School of Dentistry from August 2011 to April 2013, and the participants were recruited from the local community through advertisements. Eligible subjects included adults 18–50 years of age, who met the criteria for myofascial pain according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD),[16] with pain duration of at least 3 months. Exclusion criteria included: occlusal risk factors for temporomandibular disorders[17]; history of head trauma, intracranial disorders, vascular disorders and other major causes of headache, other than temporomandibular joint disorders, listed in the International Classification of Headache Disorders (ICDH II)[18]; use of medications like muscle relaxants, anticonvulsants, antidepressants and anxiolytics; other causes of orofacial pain, like caries, periodontal disease or atypical odontalgia, fibromyalgia, chief complaint of headache, temporomandibular joint pain and TMD management performed in the last 3 months. The sample size was determined by considering a dropout rate of 25% and a mean (SD) difference of 2 (1.5) on the pain catastrophizing scale, with a power of 90% and a two-sided significance level of 5%.

2.2. Treatment

All subjects selected ($n = 60$) gave their informed consent and were randomly assigned, by a computer-generated list, to receive counselling alone (Group 1) or counselling together with an occlusal splint (Group 2). The allocation of groups was concealed and designated according to sequentially numbered, opaque, sealed envelopes given to a person who did not know the allocation sequence. Counselling involved verbal and written information about TMD aetiology and prognostics, diet modification in the sense of avoiding hard foods, use of reminders to avoid parafunctional habits, relaxation techniques of the jaw, application of a heating pad on painful muscles, followed by stretching and self-massage, as well as sleep hygiene and encouragement to practice social and aerobic activities. In addition to the counselling cited above, Group 2 also received a full-coverage hard acrylic upper stabilization appliance. This appliance was fabricated in a dental lab and adjusted at chairside. The occlusal surface was smooth and flat, 2–2.5 mm thick in the posterior region, with an anterior guidance occlusal scheme. Patients were instructed to wear their splints only at night, while sleeping. The follow-up interval was 5 months with three evaluation periods: baseline and after