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Efficacy of Stabilization Splint in Management of Myogenous Temporomandibular Disorders

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Abstract: ***The aim of this review was to determine the effectiveness of stabilization splint therapy in reducing symptoms in patients with myofascial pain. This study involved 12 patients (4 males and 8 females) aged 22 to 49 years. The diagnosis of myofascial pain was made according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TDM). A hard occlusal splint (stabilization splint) which was fabricated to fit the upper arch. The patients were instructed to wear the stabilization splint at night for two months. A clinical stomatognathic examination, including registration of the ranges of movements of the mandible and masticatory muscle pain, according to the RDC/TMD criteria, was performed before and after treatment. There was a progressive decrease in pain scores, muscles tenderness and significant improvement in mouth opening in patients with stabilization splint during the follow-up period. Hard occlusal stabilization splints have a positive effect as a treatment option for patients with myogenous TMD.***

Keywords: temporomandibular disorders, myofascial pain, mandibular mobility, occlusal appliances

1. Introduction

Temporomandibular disorders (TMD) involve clinical problems in the masticatory muscles, the temporomandibular joints (TMJ) and associated structures.The American Academy of Orofacial Pain (AAOP) classification divides temporomandibular disorders broadly into muscle-related TMD (myogenous), and joint-related TMD (arthrogenous). Myofascial pain is the most common TMD and the etiology is multifactorial includes trauma, parafunctional habits, malocclusion and stress. TMD is clinically characterized by pain in the temporomandibular region or in the muscles of mastication, pain in the face, shoulder, neck, headaches, ear-ache or tinnitus, jaw clicking, locking or deviation, limited jaw opening and sensitivity of the teeth [23]. Pain is the most frequently taking place symptom for which patients seek medical attention.

Several treatment methods for TMD have been used, including occlusal splints, physiotherapy, relaxation therapy, pharmacological interventions as well as educational and behavioural counselling [14, 1]. Conservative treatment includes soft diet, physical therapy, occlusal adjustment, analgesia and medication (NSAIDs, painkillers, tranqulizers).

Oral appliances are commonly used in the treatment of patients suffering from TMD. Various types of occlusal splints described in the literature have different indications and functions. The stabilization splint (SS) is one such type of occlusal splint. The stabilization splint is a hard acrylic splint that provides a temporary and removable ideal occlusion (ideal contact between the teeth for the muscles and the temporomandibular joints) [19, 20, 6].

Occlusal splint have been advocated not only for the treatment of masticatory muscle disorders but also for treatment of neurovascular conditions such as migraine [21, 17, 18, 4, 8]. It is relatively simple, reversible, noninvasive and costs less than other treatments. Most of the patients who suffer from TMD problems of mainly muscular origin benefit from stabilisation splints, but there is not enough evidence that they are better than placebo splints, soft splints or other conservative treatment methods [20].

The aim of this review was to determine the effectiveness of stabilization splint therapy in reducing symptoms in patients with myofascial pain.

2. Material and Methods

This study involved 12 patients; 4 males and 8 females, who were referred to department of Prosthetic dental medicine, Faculty of Dental Medicine, Sofia University at the period from August 2013 till November 2014. Their ages were 22 to 49 years. Patients were instructed not to take any medications such as painkillers, tranquilizers or muscle relaxants during the period of splint therapy. The diagnosis of myofascial pain was made according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TDM).

A history and clinical stomatognathic examination, including registration of the ranges of movements of the mandible, masticatory muscle pain during palpation and movements of the mandible according to the RDC/TMD criteria, was performed [3]. An alginate impression of the maxillary and mandibular arch was performed by which a master cast was fabricated for each patient. A hard occlusal splint (stabilization type) was fabricated to fit the upper arch for each patient, over the occlusal and incisal surface of the teeth. (Figure 1).

Figure 1: Stabilization appliance, lateral view

The patients were reviewed at regular intervals. The patients were instructed to wear the stabilization splint at night for two months. Patients were recalled weekly for this whole period to rebalancing of the splint to the new position of the jaw by grinding some of its contacts.

The outcome variables in this research were visual analogue scale on facial pain intensity and clinical findings for TMD (maximal mouth opening, mandibular right laterotrusion, mandibular left laterotrusion, mandibular protrusion). Changes before treatment and 2 months after treatment were analyzed using paired samples t test.

Tenderness of the muscles of mastication was assessed by means of palpation, resistance testing and functional manipulation of the muscles [9]. Palpation was performed, bilaterally and separately, at the following regions: origin, body and insertion of the masseter muscle and anterior, medium and posterior portions of the temporalis muscle (Figure 2 a). The medial and lateral pterygoids were evaluated by functional manipulation (Figure 2 b, c).

The intensity of pain symptoms and pain during palpation was evaluated with aid of a visual analogue scale from "0" to "10", in which "0" represented no pain and "10" the worst pain ever felt by the patient.

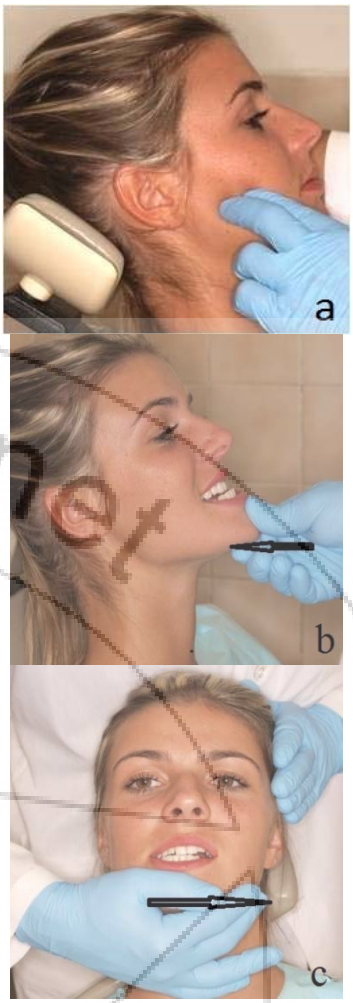

Figure 2: Demonstration of the static test for pain in: **a)** Palpation; **b)** Resistive Protrusion; **c)** Resistive Laterotrusion

After 2 months, the pain symptomatology was reevaluated by the same method, for evaluation of the percentage of reduction in intensity of pain symptoms. Differences before treatment and 2 months after treatment were analyzed using independent samples t-test. The level of significance was set at $p<0.05$.

3. Results and Discussion

Myofascial pain and functional limitation of the jaw movements showed statistically significant reduction in VAS pain scores ($P<0.05$) for m. temporalis, lateral pterygoid muscle and medial pterygoid muscle at 2-month follow-up (Table 1 and Table 2). There were no statistically significant differences ($p>0.05$) in pain for m. masseter.

Table 1: Pain intensity in temporalis and masseter muscles before and after treatment of patients

Pain Intensity VAS	*Palpation Functional manipulation*			
	Masseter	*Temporalis*	*LPM*	*MPM*
Before treatment	2.08	2.67	7.08	5.17
After treatment 2 nd month	1.25	2.08	5.67	3.67
p	0.059	0.041*	0.002*	0.011*

VAS- visual analogue scale; MPL- lateral pterygoid muscle;
MPM- medial pterygoid muscle

Mouth opening showed a reduction in mean pain scores throughout all follow-up periods, and a statistically significant increase in mean MMO. The unassisted opening capacity without pain (the mean), increased from 43.58 mm at baseline to 46.42 mm at 2 months. Protrusion increased from 7.25 to 8.42, right lateral movement from 6.83 to 7.83. Left lateral movement showed not statistically significant differences.

Table 2: Amplitude of mandibular movements before and after treatment of patients

Limitation of movements	*MMO*	*Protrusion*	*RLM*	*LLM*
Before treatment	mean 43.58	mean 7.25	mean 6.83	mean 7.25
After treatment 2 ŋd month	mean 46.42	mean 8.42	mean 7.83	mean 7.83
p	0.002*	0.011*	0.002*	0.065

MMO- maximum mouth opening; RLM- right lateral movement;
LLM- left lateral movement

The stabilisation splint allows a muscle to function more efficiently during contact and be less active during postural functions. Providing an ideal occlusion SS reduces abnormal muscle activity and produces neuromuscular balance. The hard stabilization splint was selected in this study for its superior benefit than the soft appliance in management of TMD [10].

Our results are in agreement with the conclusions of Raphael et al [16], who found that occlusal splints had decreased the VAS pain scores and the number of painful muscles in patients with myofascial pain. The results of the present study clear indicate that a hard occlusal splint therapy is useful in the reduction of pain and tenderness in the muscles and also in an improvement in mouth movements. This is in agreement with various studies supporting the usefulness of occlusal SS in the management of Myofascial Pain [2, 7, 22, 1, 12]. Many studies [5, 6, 10, 13, 16] suggest that stabilization splints can reduce facial pain, and our results are consistent with these studies.

4. Conclusions

The use of occlusal SS has significantly reduced the pain intensity in patients suffering from myogenous TMD. Occlusal splints and stabilization splints, in this case, have a positive effect as a treatment option for patients with TMD. The results of this short-term evaluation suggest that the stabilization appliance is effective in alleviating symptoms and signs in patients with myogenous TMD. The stabilization splint therapy may be beneficial for reducing pain severity at rest and on palpation. This appliance can be recommended for noninvasive therapy of these patients.

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