

# DENTAL TREATMENT OF PATIENTS WITH MASTICATORY DISEASES

## СТОМАТОЛОШКИ ТРЕТМАН НА ПАЦИЕНТИ СО МАСТИКАТОРНИ ЗАБОЛУВАЊА

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### Abstract

**INTRODUCTION.** Dental treatment of patients with masticatory diseases is a challenge for the dental prosthetist. Masticatory diseases have different etiological causes, among which a special emphasis is given to bruxism. **Purpose:** Presentation of dental treatment of patients with masticatory diseases in diagnosed night bruxism. **Material and Method:** As material, we examined 40 patients divided in two groups. The first group of 20 patients had diagnosed night bruxism with accompanying masticatory diseases. The second group of 20 patients did not have bruxism and present masticatory diseases. Clinical, paraclinical and digital methods were used for the diagnosis of bruxism. Appropriate prosthetic rehabilitation of patients was applied. An anterior deprogrammer was developed to alleviate symptomatology. This was followed by the development of splints. Physiotherapy, pharmacotherapy, laser therapy and psychotherapy were applied. **Results and discussion:** In patients with bruxism due to the nature of their condition and hyperactivity of the masticatory system, there is a pronounced pain originating from the masticatory muscles that can sometimes irradiate in other areas of the head and neck. Masticatory diseases develop, requiring specific treatment. Patients treated with prosthetic restorations, with an anterior deprogrammer and splints, have positive results from the aspect of reducing or eliminating the symptom of pain. **Conclusion:** With an early diagnosis, a timely treatment is started that relieves the patient of the symptomatology given from the masticatory diseases and improves the quality of life. **Key words:** masticatory diseases, bruxism, anterior deprogrammer, splint.

### Апстракт

**Вовед:** Стоматолошкиот третман на пациенти со мастикаторни заболувања претставува предизвик за стоматологот протетичар. Мастикаторните заболувања имаат различни етиолошки причинители меѓу кои посебно акцент е даден на бруксизмот. **Цел:** Приказ на стоматолошки третман на пациенти со мастикаторни заболувања кај дијагностициран ноќен бруксизам. **Материјал и метод:** Како материјал беа испитувани 40 пациенти кои беа поделени во две групи. Првата група од 20 пациенти имаа дијагностициран ноќен бруксизам со пропратни мастикаторни заболувања. Втората група од 20 пациенти немаа бруксизам и присутни мастикаторни заболувања. За дијагноза на бруксизмот беа применети клинички, параклинички и дигитални методи. Беше применета соодветна протетичка рехабилитација на пациентите. Се изработуваше антериорен депрограмер за олеснување на симптоматологијата. По тоа следеше изработка на сплнтови. Се примени физиотерапија, фармакотерапија, ласертерапија и психотерапија. **Резултати и дискусија:** Кај пациенти со бруксизам заради природата на нивната состојба и хиперреактивност на мастикаторниот систем доаѓа до појава на изразена болка со потекло од мастикаторните мускули која некогаш може да ирадира и во други предели на главата и вратот. Се развиваат мастикаторни заболувања, кои изискуваат специфичен третман. Пациентите кои се третираат со протетички реставрации, со антериорен депрограмер и со сплнтови имаат позитивни резултати од аспект на редуцирање или елиминирање на симптомот на болка. **Заклучок:** Со рана дијагноза, се започнува со навремена терапија која го ослободува пациентот од симптоматологијата која ја даваат мастикаторните заболувања и се подобрува квалитетот на живот. **Клучни зборови:** мастикаторни заболувања, бруксизам, антериорен депрограмер, сплнт.

### Introduction

Masticatory diseases represent a challenge for the treatment by the dental prosthetist. The most common etiological causes of masticatory diseases are the parafunctions. The term parafunction was first introduced by Drum, which suggests the difference between occlusal

stress occurring during mastication or swallowing and occlusal stress beyond the limits of normal functions<sup>1</sup>. An occlusal parafunction that differs from normal functions such as chewing, swallowing, breathing and speech, requiring specific dental treatment is bruxism<sup>2</sup>.

The occurrence of bruxism can be seen in 6-20% of the population, at any age, starting from the eruption of

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the deciduous teeth<sup>2</sup>. Bruxism is common in our population, which is manifested by clenching and grinding of the teeth and is characterized by varying intensity and periodic repetition. This condition tends to decrease with age, while generally a large representation in the general population is observed<sup>3</sup>.

The major lesions caused by the present bruxism can be seen as: changes in the teeth, periodontium, masticatory diseases, changes in the temporomandibular joint (TMJ), behavioral and psychological effects<sup>4</sup>.

There are several different indices for determining tooth damage in patients. Among them, the index by Smith and Knight should be highlighted. This index determines the degree of teeth abrasion caused by damage from the destructive forces of bruxism. It is graded with appropriate scales made by the authors<sup>5</sup>.

Masticatory diseases are accompanied by muscle symptoms that include fatigue, muscular dysfunction, constant pain, muscular pressure sensation, palpable sensitivity to m. masseter, m. temporalis, m. pterygoideus medialis<sup>2</sup>.

Kapusevska et al. suggest that in patients with bruxism treated with prosthetic devices, masticatory muscles quickly respond to the use of conservative methods of the type of repositioning and stabilisation splints<sup>6</sup>.

## Purpose

The purpose of this paper is to present dental treatment for masticatory diseases in patients with diagnosed night bruxism. After complete rehabilitation of the dental system, the therapist's aspiration is to eliminate the present symptomatology originating from masticatory diseases in patients with night bruxism, as well as to preserve the achieved prosthetic success by applying contemporary methods and devices for this purpose.

## Material and methods

For the purposes of this paper, a study over 40 patients who were divided into two groups was conducted.

The first group of 20 patients was diagnosed with night bruxism. In them, masticatory diseases with accompanying symptoms such as muscle fatigue, pain, pressure, restricted mouth opening were observed. This group consists of two subgroups of 10 patients depending on the type of treatment (10 treated with fixed structures and 10 with skeletal dentures).

The second group of 20 patients does not have the etiological factor bruxism and accompanying masticatory diseases, they have a normal function of the dental system and represent the control group.

The research was performed at the Public Health Institute University Dental Clinical Center "St. Panteleimon", at the Clinic for Dental Prosthetics.

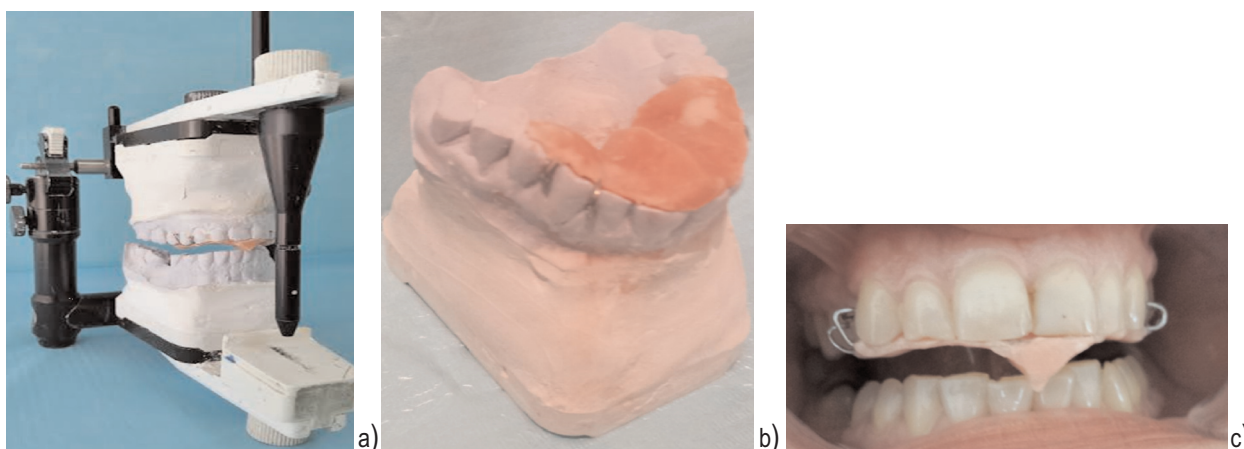
Before the start of the treatment, each patient was given a form of consent for work and interventions. Also, patients answered a questionnaire on the way they feel the pain and changes caused by bruxism. From the analysis of the given answers, significant data were obtained related to the subjective symptoms that patients with bruxism feel.

The methodology of the research is composed of several successive procedures:

1. Performing extraoral clinical examination - on the lower third of the face, muscles and TMJ by methods of inspection, palpation, percussion and auscultation. The lower third of the face is measured with a digital shambler;
2. Performing an intraoral clinical examination - making an analysis of the present teeth, oral mucosa and the tongue;
3. Establishing diagnosis of bruxism with a paraclinical method using a bruxchecker;
4. Analysis of the degree of abrasion of the remaining natural teeth - with an index of damage to the hard tooth substance by Smith and Knight. This index in everyday clinical practice is used to determine the degree of abrasion of the destructed teeth from the forces of bruxism. It can be practiced with a simple scale for grading the degree of damage to hard tooth tissue:
  - 0 - no loss of enamel;
  - 1 - loss of enamel;
  - 2 - minimally exposed dentine;
  - 3 - significantly exposed dentin;
  - 4 - pulp exposure;
5. Development of an individual plan for esthetic-functional prosthetic rehabilitation in patients with diagnosed night bruxism;
6. Application of dental therapy in masticatory diseases for relieving the symptomatology;
7. Making an anterior deprogrammer for relief of painful symptomatology;
8. Making a splint from the material durasoft® from the company Scheu Dental Technology, Germany;
9. Application of low frequency therapy - using the Scorpion Dental Optima diagnostic and therapeutic complex (Optica Laser Sofia);
10. Application of alternative therapy - physiotherapy, pharmacotherapy and psychotherapy.

## Clinical presentation of a patient with masticatory disease and bruxism

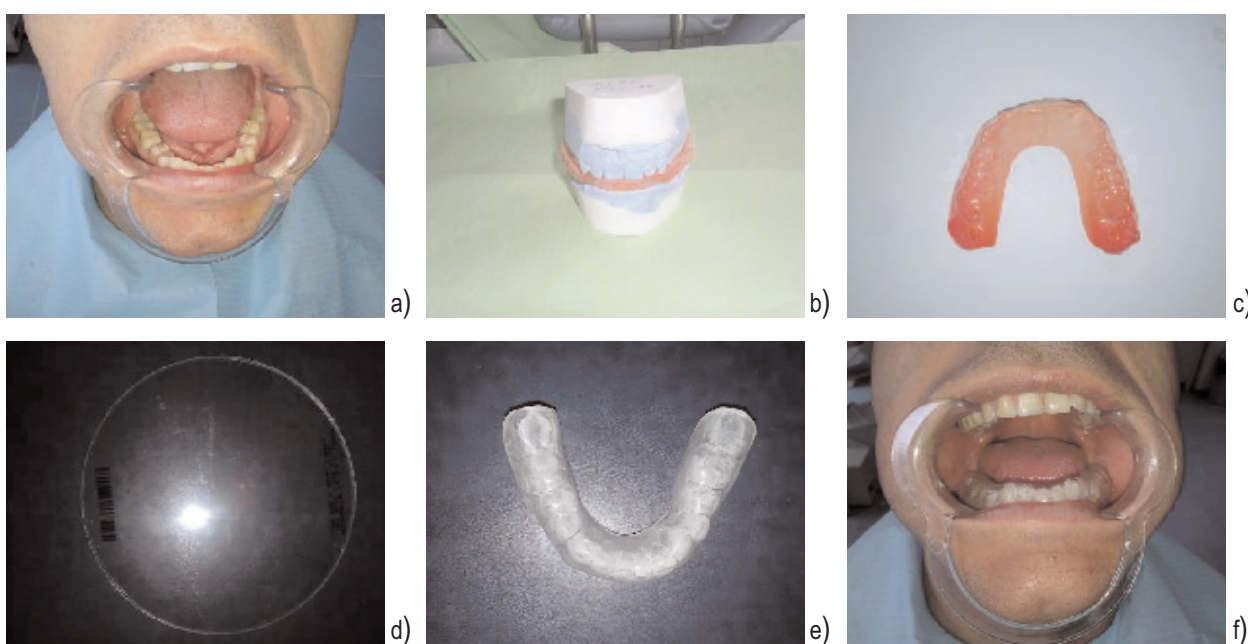
### Case study number 1



**Figura.1.** a), b), c) Clinical presentation of manufacturing and adaptation of anterior deprogrammer

## Clinical presentation of a patient with masticatory disease and bruxism

### Case study number 2



**Figura. 2.** a), b), c) Diagnosis of night bruxism with bruxchecker

**Figura. 2.** d), e), f) Presentation of a splint (durasoft@pd),

## Results and discussion

Table 1 presents the mean value for the index by Smith and Knight. At the first examination of the first subgroup within the treated group, the Smith and Knight index was

3 (expressed dentine affection). After the therapy with the production of metal ceramic crowns, in the first subgroup of patients with night bruxism, the index was not determined on the following controls, since it is only applied when there is damage to the hard tooth substance.

**Table 1.** Index by Smith and Knight in patients with masticatory disease and night bruxism

Index by Smith and Knight	First visit at the prosthetist	Control after 1 month	Control after 3 months	Control after 6 months	Control after 12 months	Control after 18 months	$\chi^2$	p
Patients with fixed constructions	3	/	/	/	/	/	15	0.45
Patients with skeletal dentures	2	2	2	2	2	2	15	0.45

**Table 2.** Presence of symptoms from masticatory diseases before and after treatment in patients with night bruxism

Present symptoms anamnestically and clinically proven	Before therapy		After therapy	
	n	%	n	%
	20	100	2	11.1
<b>Total</b>	20	100	2	11.1

The second subgroup of patients treated with skeletal dentures indicated that the Smith and Knight index was 2 (damage to the hard tooth substance with dentine affection). The statistical analysis shows the inconsistency of this index, because it remains unchanged for the overall period of control of these patients.

From the point of extraoral examinations of patients, it is important to analyze each change, since the lower third of the face may be lowered as a result of teeth abrasion, whereby sulcus nasolabialis et mentolabialis can be significant, and thus the patients look prematurely aged. This can be measured with a digital shambler.

The diagnosis of masticatory diseases begins with their palpation. The palpation of the masticatory muscles is carried out at their respective locations. Authors emphasize that those masticatory muscles which are sensitive and warm on touching and soft in consistency show signs of present pain. Clinical observation detects that localized and solid nodules, sensitive on touch are detected in patients experiencing muscle pain. The activation of pain leads to information that is carried out to the brain and interpreted as an unpleasant sensation<sup>2</sup>. In this study, patients indicated tiredness, pressure of the masticatory muscles, occurrence of pain that sometimes irradiates in other regions such as head and neck.

Because of the muscle load, there is a difficulty in opening the mouth during mastication.

The bruxchecker is used as a paraclinical method for the diagnosis of bruxism. The special foil adapted to heat under pressure is a factory made product of polyvinyl with a thickness of 0.1 mm and is painted on one side with a color of plant origin. Once the bruxchecker is developed, the patient wears it during sleep. After a certain period of using it and subsequent analysis, the deleted points are read at the places where occlusal contacts were realized. There is an interpretation in the literature that its practical application is simple, by reading surfaces without color at places where there was friction due to movements caused by bruxism<sup>7</sup>.

In our research, with the aid of a bruxchecker, we came to realize the diagnosis of occlusal patterns of teeth grinding, visualizing the direction of the bruxism patterns in patients wearing it overnight. Detection of active surfaces for clenching and grinding with the teeth and control of bruxism even after prosthetic rehabilitation is also performed if there is an indication.

For acute reduction of symptoms of orofacial origin, deriving from occlusal parafunctions and temporomandibular dysfunction, besides other therapy, Kapusevska uses an anterior (butterfly) deprogrammer. In this study, it has proven to be an effective method in the treatment of patients to reduce symptomatology originating from masticatory diseases.

Durasoft@pd is a high quality material that is factory-shaped by two types of material. PETG - polyethylene terephthalate glycol modified with solid consistency and TPU - soft thermoplastic polyurethane. If used correctly according to the manufacturer's instructions, the material is resistant to abrasion even by applying strong forces<sup>8</sup>. Cold polymerizing acrylate can be added to splints fixed in an individual articulation depending on the patient's indications (such as canine lifting for designing stabilization splints).



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According to Kapusevska et al., there is an improvement in the functioning of the masticatory muscles in patients who are rehabilitated with prosthetic and occlusal therapeutic restorations<sup>9</sup>. In this paper, patients who complained about pain that can be both muscular and of other origin, have been reported to have a decrease or complete elimination of painful symptomatology.

In their book, Michael JT and Giuseppe P describe the success of patients with night bruxism and partial edentulousness, who wear specially made occlusal splints during sleep<sup>10</sup>.

The studies conducted for the needs of this paper should provide a scientific contribution from the aspect of preventive and therapeutic functions of anterior deprogrammers and application of splints. If there is pain associated with inflammatory origin and with a strong manifestation, antibiotics and corticosteroids can be prescribed<sup>4</sup>. Sometimes patients may be advised to use tranquillizers from the group of benzodiazepines, which act to loosen the masticatory muscles, soothe the central nervous system, and thus reduce the symptomatology of bruxism.

In addition to diet recommendations, the use of B vitamin supplements, magnesium and relaxation measures should be considered. General recommendations cannot always be applied equally to all people.

Patients are pleased to accept additional therapy as physiotherapy because it relieves the symptoms of pain. Sometimes a complete opening of the mouth is disabled. Because of this, patients also perform exercises that comparatively with literature data have great importance in reducing the degree of pain<sup>4</sup>.

It is very important for these patients to be provided with appropriate therapy that would alleviate symptomatology with the origin of masticatory diseases. When there is an indication, a local anesthetic is injected into the painful muscle, i.e. in trigger points. Moreover, education of patients is an important aspect of how they can help themselves. Nonsteroidal anti-inflammatory drugs, usually Ibuprofen of 800mg are administered two to three times daily. Then, pharmacological therapy is continued, supplements and vitamins (B vitamin, magnesium) are added, and the patient is prosthetically rehabilitated (with fixed or mobile structures). After that, an anterior deprogrammer is manufactured and worn for a period of 6 months. The anterior deprogrammer is usually made of acrylic material. In this article we used the Triplex material from Ivoclar Vivadent, Liechtenstein. The anterior deprogrammer can be made with many methods, depending on the indication on the dental prosthodontist. If following this period it is noticeable that there

is still persisting pain and teeth grinding, splints from the material durasoft@ pd are made. We selected this material because it is simple to operate, with a soft component that allows the amortization of mastication forces that develop overnight. There is a possibility for its modification by applying a cold polymerizing colorless acrylate over the rigid component, to produce a stabilisation splint, which is expected to decrease to completely eliminate the symptomatology.

The masticatory muscles with their hyperactivity and tension create painful sensations that sometimes irradiate both towards the head and neck. Therefore, patients with masticatory diseases whose etiological cause was bruxism underwent laser treatment using the Laser Multifunctional Scorpion Dental Optima (Sofia Laser), which proved to be a useful tool in patients with moderate and severe bruxism and with proven subjective and objective symptomatology. Treatments are performed when there is a strict indication and can last approximately 6-7 sessions, and if necessary, longer, in time intervals strictly prescribed for the treatment of such dysfunctions. The positive effect of this type of therapy was determined, both in this paper and in some of the authors in their papers<sup>11</sup>.

The overall therapeutic protocol improves both the subjective and objective symptomatology during the dental treatment of patients with masticatory diseases (table 2). Patients also experience relief in opening the mouth if they previously had difficulty with it.

## Conclusion

The obtained results of this study confirm the effectiveness of dental treatment for patients with masticatory diseases in diagnosed night bruxism. A special emphasis is put on the production of an anterior deprogrammer designed from the acrylic Triplex, of Ivoclar Vivadent, Liechtenstein and a split of durasoft @ pd from Scheu Dental Technology, Germany.

The deprogrammer and the splint are a contemporary method and there are various possibilities for their design and manufacturing and they should be implemented in everyday dental practice. On arrival at the dentist, patients with masticatory diseases originating from diagnosed night bruxism are relieved of painful symptomatology at the first visit. Then, the therapy that follows improves the oral health by preventing damage to all structures of the stomatognathic system, thereby protecting the overall health of the patient. This would improve the patient's quality of life and increase the dental team's satisfaction.

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