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 CASE REPORT  
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# KORIŠĆENJE NOĆNIH PROTEZA U PROTETIČKOM TRETMANU PACIJENTA SA BRUKSIZMOM - STUDIJA SLUČAJA -

## APPLICATION OF NIGHT DENTURES DURING PROSTHETIC REHABILITATION IN A PATIENT WITH BRUXISM - A CASE STUDY

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### Sažetak

**Uvod:** Bruksizam je okluzalna parafunkcija koja se relativno često sreće. Rana dijagnoza i rana terapija blagovremeno bi prevenirale veća oštećenja stomatognatnog sistema koja su posledica ove parafunkcije.

**Cilj:** Prezentacija izrade i primene individualno dizajniranih proteza – noćnih proteza kod pacijenta sa stanjem delimične bezubosti sa dijagnostifikovanim bruksizmom.

**Studija slučaja:** Kod pacijentkinje stare 63 godine sa bolnom simptomatologijom primenjene su ekstraoralne i intraoralne kliničke metode za dijagnostifikovanje bruksizma. Pojedinačno dizajnirana proteza - noćna proteza izgrađena je pre i posle protetske rehabilitacije upotrebom dve vrste materijala.

**Rezultati :** Izradom fiksno-mobilne konstrukcije, zaštićeni su zubi i parodontalni kompleks. Odgovarajući na individualno dizajnirane proteze, pacijentkinja je osetila smanjenje intenziteta bolova koji potiču od mastikatornih mišića i temporomandibularnog zgloba. Materijali za izradu ovih proteza dozvoljavaju jednostavnu izradu i primenu u kliničkoj praksi.

**Zaključak:** Upotrebom noćnih proteza kod pacijentkinje sa bruksizmom postignut je uspeh u smislu očuvanja protetičke konstrukcije i poboljšanja zdravlja stomatognatnog sistema.

**Ključne reči:** noćne proteze, bruksizam

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### Abstract

**Introduction:** Bruxism is an occlusal parafunction that is globally quite common. Early diagnosis would lead to early therapy and hence early prevention from damage to the stomatognathic system caused by this parafunctional.

**Aim:** Demonstration of using individually designed dentures - night dentures in a patient with a condition of partial edentulousness with diagnosed bruxism.

**A case study:** In a patient aged 63 with painful symptomatology, we performed extraoral and intraoral clinical examination. An individually designed denture - night denture was constructed of two types of material before and after the prosthetic rehabilitation.

**Results and Discussion:** After making the fixed-mobile construction, the teeth and the periodontal complex were protected. After wearing the individually designed dentures, the patient felt a reduction of pain deriving from the masticatory muscles and the temporomandibular joint. The materials for creating these dentures allow their easy production and application in clinical practice.

**Conclusion:** The success was achieved in preserving the prosthetic construction and improving the health of the stomatognathic system of the patient, thus achieving the goal of justifying the use of this new type of designed denture.

**Key words:** night denture, bruxism

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## Uvod

Bruksizam je okluzalna parafunkcija koja se može definisati kroz nekoliko kategorija različitih poremećaja. To je veoma rasprostranjen, globalni problem koji najverovatnije postoji od početka čovečanstva<sup>1</sup>.

Prema De-La-Hoz<sup>2</sup>, najstarije reference u vezi sa bruksizmom su zapisane u Bibliji, u kojima je škripanje zubima opisano kao prva Božja kazna.

U većini slučajeva, parafunkcija se detektuje kada pacijent dođe u prvu posetu stomatologu. Jedan od najistaknutijih kliničkih znakova je abnormalno trošenje zuba, uzrokovano škripanjem i stiskanjem zuba. Međutim, to ipak nije odlučujući znak prisustva bruksizma, pošto abnormalno trošenje zuba može nastati posle česte konzumacije kisele hrane ili zbog nepravilnog pranja zuba (erozija i/ili dantalna abrazija). Zato treba uvek uzeti u obzir zub antagonistu, koji je takođe istrošen, oštećen ili umanjen<sup>3</sup>.

Postoji više prepoznatljivih etioloških faktora koji dovode do bruksizma. Psihosocijalni faktori kao što su stres i određene lične osobine, kao i patofiziološki faktori (bolesti, traumatologija, genetika, pušenje, kofein, droge i nedozvoljeni lekovi), poremećaji spavanja (apneja i hrkanje pri spavanju) i uključivanje dopaminergičkog sistema često su prisutni u etiologiji bruksizma<sup>4,5</sup>. Sigurno je da ne postoji samo jedan faktor koji je odgovoran za pojavu bruksizma. Ali, takođe je evidentno da ne postoji jedinstveni tretman koji je efikasan za njegovo eliminisanje ili smanjenje<sup>6</sup>.

Rana prevencija i lečenje bruksizma uz pomoć okluzalnih aparata deo su protokola za tretman u svakodnevnoj stomatološkoj kliničkoj praksi<sup>7-12</sup>.

**Cilj** ovog rada je da demonstrira prednosti nošenja individualno dizajniranih proteza - noćnih proteza, pre i posle protetičke rehabilitacije pacijenta u uslovima delimične bezubosti i dijagnostifikovanog bruksizma.

## Introduction

Bruxism is an occlusal parafunction that can be difficult for definition in several categories of different parafunctions. It also presents a disturbance in the parafunctional movements of the teeth clenching and grinding. It is a very widespread, global problem that most probably exists from the beginning of mankind<sup>1</sup>.

According to De-La-Hoz<sup>2</sup>, the oldest references regarding bruxism are reported in the Bible, in which the gnashing of the teeth is described as the first punishment from God<sup>2</sup>.

In most cases, the parafunction is detected when the patient goes to the dentist for the first time. One of the most prominent clinical signs is abnormal tooth wear, caused by teeth grinding and clenching. However, this is also not a decisive sign of the presence of bruxism, since teeth wear can occur when eating sour foods or by incorrect tooth brushing (erosion and/or dental abrasion). For this reason, the antagonist should always be considered because it is also worn out, damaged or diminished during bruxism<sup>3</sup>.

There are more recognizable etiological factors leading to the diagnosis of bruxism. Psychosocial factors such as stress and certain personal characteristics, as well as pathophysiological factors (diseases, trauma, genetics, smoking, caffeine intake, drugs and illicit drugs), sleep disorders (sleep apnea and snoring), and involvement of the dopaminergic system are often present in the etiology of bruxism<sup>4,5</sup>. One thing is certain - there is not only one factor responsible for the occurrence of bruxism. But it is also evident that there is no single treatment that is effective for its elimination or reduction<sup>6</sup>.

Early prevention and treatment of bruxism with the help of occlusal appliances are part of the treatment protocol in everyday dental clinical practice<sup>7-12</sup>.

**The aim** of this paper is to demonstrate the justification of wearing individually designed dentures – night dentures, before and after the prosthetic rehabilitation of patients with condition of partial edentulousness and diagnosed bruxism.

## ***Studija slučaja***

Istraživanje je obavljeno u Ustanovi za javno zdravlje, Univerzitetskog stomatološkog kliničkog centra "Sveti Pantelejmon", na Klinici za stomatološku protetiku u Skoplju. Za istraživanje je dobijena saglasnost Etičkog komiteta Stomatološkog fakulteta "Sveti Ćirilo i Metodije" Univerziteta u Skoplju. Pre početka lečenja, pacijentkinja je dala pisanu saglasnost za učešće u ovoj studiji.

Metodologija rada podrazumevala je: pregled pacijenta, dijagnozu bruksizma pomoću brukso analizatora, procenu stepena abrazije preostalih zuba (indeksima po Smight-u i Knignht-u), procenu stanja parodontalnih džepova Ramfjord indeksom za dubinu parodontalnih džepova, izradu individualnog plana za estetsko-funkcionalnu rehabilitaciju kod pacijenta sa dijagnostikovanim bruksizmom Metodologija rada prikazana je na slikama 1-12.



***Slika 1.*** Ekstraoralni pregled pacijenta  
***Figure 1.*** Extraoral examination of the patient

## ***A case study***

The research was performed at the Public Health Organization, University Dental Clinical Center "St. Panteleimon", at the Clinic for Dental Prosthetics in Skopje. For this, there was an agreement from the Ethics Committee of the Faculty of Dentistry at the University "Ss. Cyril and Methodius University in Skopje". Before the start of the treatment, the patient signed a consent form for the interventions.

Methodology of study implied: the appearance of patient, establishing a diagnosis of bruxism with a using a bruxchecker that was made from a special foil, analysis of the degree of abrasion of the remaining natural teeth (with an index for dental abrasion by Smith and Knight), periodontal pockets depth (with Ramfjord index for depth of periodontal pockets), making an individual plan for aesthetic - functional prosthetic rehabilitation, Methodology of study is shown on the figures 1-12.



***Slika 2.*** Intraoralni pregled pacijenta - donja vilica  
***Figure 2.*** Intraoral examination of the patient - the lower jaw



***Slika 3.*** Intraoralni pregled pacijenta - gornja vilica  
***Figure 3.*** Intraoral examination of the patient - the upper jaw



***Slika 4.*** Studijski modeli  
***Figure 4.*** Study models



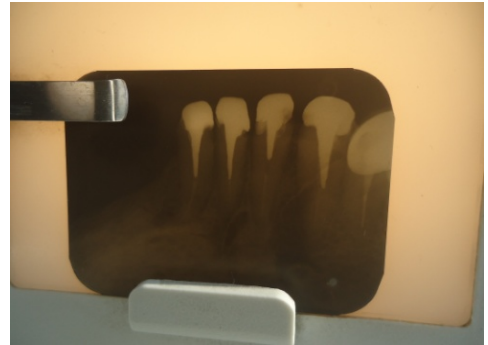
**Slika 5.** Intraoralni izgled individualno dizajnirane proteze  
**Figure 5.** An intraoral view of the individually designed denture



**Slika 6.** Okluzalni izgled individualne dizajnirane proteze  
**Figure 6.** An occlusal look at the individually designed denture



**Slika 7.** Završen tretman preostalih zuba  
**Figure 7.** Finished treatment of the remaining teeth



**Slika 8.** Retroalveolarna slika endodontski tretiranih zuba  
**Figure 8.** Retroalveolar picture of the endodontically treated teeth



**Slika 9.** Intraoralni dentalni most sa Lecodent prečkama  
**Figure 9.** Intraoral dental bridge with Lecodent bars



**Slika 10.** Završena estetsko-funkcionalna rehabilitacija pacijenta  
**Figure 10.** Completed aesthetic - functional rehabilitation of the patient



**Slika 11.** Folija prilagođena modelu tehnikom vakuum-presovanja  
**Figure 11.** Foil adapted to the model using a vacuum-press technique



**Slika 12.** Ministar - Scheu uređaj za promenu toplote u radnoj fazi  
**Figure 12.** Ministar-Scheu heat exchanger

### **Prikaz slučaja**

Pacijentkinja stara 63 godine javila se na Kliniku za Stomatologiju, Ustanove za javno zdravlje, Univerzitetskog Stomatološkog centra u Skoplju, zbog bolova u zubima, u predelu mastikatornih mišića, temporomandibularnom zglobo kao i izrazite glavobolje. Pacijentkinja je je bila svesna navike škripanja zubima, što je dovelo do oštećenja postojećih mostova i abrazije njenih prirodnih zuba.

Ekstraoralnim pregledom utvrđeno je da je donja trećina lica smanjena kao posledica abrazije zuba, što je istaklo nazolabijalni i mentolabijalni sulkus i pacijentkinji dalo starački izgled.

Klinički pregled izveden je metodama palpacije, perkusije i auskultacije, pri čemu je utvrđeno prisustvo bolova u predelu mastikatornih mišića i temporomandibularnog zgloba. Mastikatorni mišići bili su osetljivi i topli na dodir i mekše konzistencije<sup>7</sup>.

Intraoralni pregled pokazao je vidljivo oštećenje prirodnih zuba, čija je vrednost prema indeksu Smith i Knight, bila 4 - što ukazuje na afekciju zubne pulpe. Tretman je podrazumevao endodontsku sanaciju i livenu nadogradnju, kao i izradu metalokeramičkog mosta sa lekodontovim prečkama.

Ramfjord indeks za gingivalnu inflamaciju pri prvom pregledu pacijentkinje je bio 1 (srednja vrednost), što ukazuje na blagu upalu gingive, a gingiva oko zuba nije bila pogođena.

Ramfjord indeks za dubinu parodontalnih džepova na prvom ispitivanju pacijentkinje bio je 4 (srednja vrednost), što ukazuje na postojanje parodontalnih džepova do 3 mm.

### **Case report**

A 63-year-old patient with a painful symptomatology reported the presence of pain in her natural teeth, in the area of the masticatory muscles, in the temporomandibular joint as well as headaches. The patient pointed out that she was aware of the existence of grinding of her teeth in which she damaged her existing dental bridges and abraded her natural teeth.

The extraoral examination of the patient revealed that the lower third of the face was reduced as a result of abrasion of the teeth, which further emphasized sulcus nasolabialis and mentolabialis, thus making the patient look prematurely aged.

The clinical examination complemented by using the methods of palpation, percussion and auscultation performed at their respective locations suggested the existence of a painful symptomatology originating from the masticatory muscles and the temporomandibular joint.

Masticatory muscles which were sensitive and warm to touch as well as soft in consistency pointed out to the presence of pain<sup>7</sup>.

The intraoral examination indicated a visible damage to the natural teeth, according to the Smith and Knight Index, the value of which was 4 - which means that there is an affection of the dental pulp. For these teeth, complex treatment was taken from the aspect of their endodontic sanitation and build up by one-piece cast in metal. This was followed by making a bridge construction of the type of metal-ceramic bridge with Lecodent bars.

The Ramfjord index for gingival inflammation at the first dental examination of the patient was 1 (median value) indicating a mild inflammation of the gingiva, and the gingiva around the tooth was not affected.

Za objektivnu dijagnozu bruksizma konstruisan je bruksoanalizator. Bruksoanalizator služi za očitavanje površina zuba kod kojih je došlo do oštećenja zbog trenja izazvanih bruksizmom<sup>13</sup>.

U našem istraživanju uz pomoć bruksoanalizatora dijagnostifikovali smo okluzalne šeme trenja zuba i vizualizovali smer bruksizma. Otkrivene su oštećene površine zuba aktivne u toku bruksizma. Kod pacijentkinje je postavljena dijagnoza horizontalnog oblika bruksizma.

Na početku estetsko-funkcionalne rehabilitacije, postojala je indikacija za izradu individualno dizajnirane proteze, koju bi pacijentkinja nosila tokom noći.

Proteza se koristi da bi pacijentkinju oslobodila bolova koji potiču od zuba, mastikatornih mišića, temporomandibularnog zgloba i glavobolje. Osim toga, cilj je i da se pacijentkinja navikne na novu vertikalnu dimenziju koja je postignuta fiksno-mobilnom konstrukcijom.

U gornjoj vilici napravljen je polucirkularni most, a u donjoj kompleksna fiksno-mobilna konstrukcija.

## Rezultati

Kod naše pacijentkinje je dijagnostifikovan težak oblik bruksizma. Smatra se da za ovaj tip bruksizma je potreban kompleksan tretman, sa ciljem da se postigne i održi uspešna protetska rehabilitacija.

Bruksizam kod ove pacijentkinje nije potpuno eliminisan, što je potvrđeno i kontrolom bruksoanalizatora i nakon protetske rehabilitacije. Sledilo je postavljanje indikatora za izradu nove proteze, koja bi se nosila tokom noći, da bismo održali postignuti protetički uspeh. Nova proteza napravljena je u obliku parcijalne proteze sa okluzalnim inserterom. Korišćene su folije iz kompanije Scheu Dental technology - Durasoft pd @ 3 mm<sup>14</sup>.

Nakon crtanja oblika individualno dizajnirane proteze na modelu, oblikovana je folija u mašini za vakuum za toplotno presovanje na uređaju Ministar @ Scheu (Slika 13).

Hladni polimerizacijski akrilat je dodat kako bi se dobila definitivna konstrukcija proteze, na modelima fiksiranim u individualnom ili polujediničnom artikulatu<sup>15</sup>.

Na ovaj način, proizvedene proteze od fabričkih folija dobijaju individualni karakter, sa različitim mogućnostima modifikacije. Ako postoje indikacije za promene u vertikalnoj dimenziji, opet postoji mogućnost dodavanja hladnog polimerizirajućeg bezbojnog akrila, koji je hemijski kompatibilan sa noćnom protezom kompanije Durasoft@ pd (Slika 14).

The Ramfjord index for the depth at the first patient examination was 4 (median value), indicating the existence of periodontal pockets of up to 3 mm.

For the objective diagnosis of bruxism, a device was constructed for the patient. A bruxchecker is a paraclinical apparatus for the diagnosis of bruxism. There is an interpretation in the literature that its practical application is simple, by reading surfaces without color at places of friction caused by bruxism movements<sup>13</sup>.

In our research, with the aid of a bruxchecker, we came to the realization of the diagnosis of occlusal patterns of the teeth, visualization of the direction of the bruxism patterns in patients who carried it in the evening. Active surfaces from the squeezing and dental clinging were discovered, and also the control of bruxism was established after the prosthetic rehabilitation if there was an indication. A particular diagnosis of the existence of a horizontal form of bruxism was established in the patient.

This denture was to be worn during the night, so it was called a night denture. It was made to reduce painful symptomatology originating from the teeth, masticatory muscles, temporomandibular joint and headaches. The next justification for its design is to accustom the patient to a new vertical dimension which will be reconstructed with the fixed-mobile construction.

A semi-circular bridge was made in the upper jaw, and complex fixed-mobile construction in the lower.

## The results

The patient was diagnosed with a severe form of bruxism. It is considered that this type of bruxism requires a complex treatment, with the idea that once the prosthetic rehabilitation is performed, simultaneously the very same should be preserved.

Bruxism as a condition in this patient was not completely eliminated even after the prosthetic rehabilitation, which was confirmed at the follow-up using a bruxchecker. Setting up indication for making a new designed denture that would be worn in the evening followed in order to protect the achieved prosthetic success.

A plan of therapy was developed. Before the start of the aesthetic-functional rehabilitation, the patient was diagnosed and indicated for making an individually designed denture to protect the achieved prosthetic success. The new designed denture was made in the form of a partial denture with an occlusal

## Diskusija

U ovom radu utvrđeno je da su snage bruksizma bile najizraženije u večernjim satima, tj. u toku spavanja kada su na nesvesnom nivou, zbog čega smo izabrali upravo period za nošenje preventivnih proteza. Upotrebom noćnih proteza, pacijentkinji su smanjeni bolovi, očuvan je parodontalni status i fiksne konstrukcije.



**Slika 13.** Pregled individualno dizajnirane proteze  
**Figure 13.** An overview of the individually designed denture

Ovakav nalaz je u korelaciji sa nalazom Baba i sar<sup>8</sup> koji su takođe napravili noćnu protezu i dobili zadovoljavajuće rezultate.

U svom članku Pipa i Shetty<sup>9</sup> imali su interesantnu prezentaciju uspešne upotrebe intraoralnih splintova kod pacijenata sa bruksizmom. Sličan uspeh postigli su i Michael J. i sar<sup>11</sup> sa specijalnim protezama za bruksizam. Korišćeni materijali su laki za rukovanje i obradu. Oni se hemijski vezuju, što olakšava modifikaciju i prevenira prelome proteza, što je vrlo značajno kod ovakvih stanja stomatognatog sistema.

Komplikacije koje bruksizam ostavlja na ljudsko zdravlje mogu biti u paleti od najlakših do teških.

Nekontrolisani bruksizam može uzrokovati prelome krunice zuba, frakture korena zuba, prelome fiksnih restauracija i resorpciju koštanih struktura vilica.

## Zaključak

Kod pacijentkinje sa dijagnostifikovanim bruksizmom, sprovedena je protetička rehabilitacija i izrađene su individualno dizajnirane proteze, čija upotreba ima više prednosti:

inserter. Foils from the company Scheu Dental technology were used - Durasoft pd @ 3 mm<sup>14</sup>.

After drawing the shape of the individually designed denture on the model, the molding of the foil in the heat vacuum press machine Ministar @ Scheu followed. (Figure 13)

Cold polymerization acrylate was added to obtain the definitive construction of the dentures, on models fixed in an individual or semi-individual articulator<sup>15</sup>.



**Slika 14.** Intraoralni pregled specijalno dizajnirane proteze  
**Figure 14.** An intraoral examination of the specially designed denture

In this way, the manufactured dentures from factory-purchased foils receive an individual character, with different modification options. If there are indications of changes in the vertical dimension there is again the possibility of adding a cold polymerizing colorless acrylate which is compatible chemically with the night denture made by Durasoft @ pd.(Figure 14)

## Discussion

The forces of bruxism in this patient are the most present in the evening, precisely during sleep, on an unconscious and subconscious level and that is the time interval when these new dentures act preventively.

This finding is in accordance with Baba et al.<sup>8</sup>, who made the night denture and had satisfying results.

Pipa and Shetty<sup>9</sup> had very interesting presentation of intraoral splints in patients with bruxism in their work. Michael J. et al. achieved similar success with specially designed dentures for bruxism. Materials that are used are comfortable and easy for handling and processing. They make chemical conduction that is enabling modification and preventing breaking of dentures so it is significant for this state of the stomatognathic system.

1. Nakon kliničkog ispitivanja simptomatologije koja potiče iz zuba, mastikatornih mišića, temporomandibularnog zgloba i glave, posle protetske rehabilitacije i nošenja preventivnih proteza, zaključuje se da su se bolovi u navedenim regijama smanjili ili čak prestali.

2. Protetske konstrukcije konstrukcija na svim kontrolnim pregledima bile su bez vidljivih oštećenja, što ide u prilog nošenju ove proteze.

3. Parodontalni kompleks pacijentkinje se nalazio u zadovoljavajućem stanju, što potvrđuju parodontalni indeksi po Ramfjordu za gingivalnu inflamaciju i dubinu parodontalnih džepova.

4. Postoji jednostavna mogućnost pripreme i izrade, kao i mogućnost jednostavne popravke preventivnih noćnih proteza u slučaju abrazije koja je posledica sila u bruksizmu, zahvaljujući osobinama korišćenih materijala - mekih i tvrdih materijala Durasoft@ pd i mekih i tvrdih akrilata, koji smanjuju rizik od preloma noćnih proteza.

5. S obzirom na uspeh u našem slučaju, pojedinačno dizajnirane proteze ili noćne proteze su savremena sredstva za prevenciju i terapiju pacijenata sa bruksizmom i mogu se preporučiti kao preventivna mera za ostale pacijente sa bruksizmom.

Complications which bruxism leaves on human health can range from mild in the easiest to moderate and catastrophic in severe form. The severe form of bruxism, if not placed under control, can cause fractures of the crowns of teeth, tooth root fractures, fractures of fixed restorations, and even resorption of the bone structure with prolonged trauma.

### **Conclusion**

After a comprehensive clinical treatment of the patient with partial edentulous condition and diagnosed bruxism in which prosthetic rehabilitation was carried out and night dentures were made, it is concluded that their preparation and production is justified for several reasons:

1. After the clinical examination of symptomatology originating from the teeth, masticatory muscles and the temporomandibular joint, the head, and after the overall prosthetic approach and wearing the designed dentures, the conclusion is that the symptoms are reduced, even some of them are disappeared;

2. The bridge structures of all control checks were with absence of any evident damage which is in favor of wearing this kind of denture;

3. The periodontal complex of the patient is cared for and preserved in a satisfactory condition, as confirmed by the Ramfjord indices for gingival inflammation and the depth of the periodontal pockets;

4. There is a simple possibility of preparation as well as for the repair of the night denture after abrasion from bruxism, resulting from the properties of the materials used - soft and hard material of durasoft @ pd, and soft and hard acrylate which the risk of fractures of night dentures;

5. The individually designed dentures or night dentures are modern means of prevention and therapy of patients with bruxism, as the treatment was well received by the patient in this study, and can be recommended as a method for other patients with bruxism.



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None

### ***Conflict of interest***

There is no conflict of interest

### ***Patient consent***

All involved patients gave their consent forms

### ***Ethics approval***

This study is in accordance with the Helsinki Declaration