

AESTHETICALLY - FUNCTIONAL REHABILITATION IN PATIENTS WITH BRUXISM BY DESIGNING NIGHT DENTURES

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ABSTRACT

Introduction: Patients with bruxism and partial edentulosity are a challenge for multidisciplinary treatment in every day clinical praxis. **Purpose:** Creating individually designed night dentures for aesthetic-functional rehabilitation of patients with bruxism is the purpose of the research of this paper. **Material and method:** Patients with partial edentulosity and diagnosed night bruxism were classified into 2 subgroups depending on the type of prosthetic devices that were rehabilitated with: 15 patients rehabilitated with fixed constructions and 15 patients rehabilitated with complex fixed-mobile constructions. The treatment was supplemented with individually designed night dentures. Also for the purpose of the research control group of patients with bruxism were examined who were divided in two groups: 15 patients treated with older fixed prosthetic constructions and 15 patients treated before coming to the dental office with older removable dental appliances. **Results and discussion:** From the results obtained from the prosthetically rehabilitated patients, also treated with night dentures, it can be observed that there are not changes in the indexes by Smith and Knight, and Ramfjord, indicating no statistical significance and thus approving the manufacturing of individually designed night dentures. The control group of patients have different consequences from the destructive forces that develop in night bruxism. **Conclusions:** The improvement of the quality of life of patients justifies the production and usage of individually designed night dentures, to the mutual pleasure and success of the patient and the prosthetic team.

KEYWORDS: bruxism, partial edentulosity, individually designed night dentures.

1. INTRODUCTION

Bruxism is an occlusal parafunction, presenting a very widespread, global problem that most probably exists from the beginning of mankind.^[1] According to the illustrated medical dictionary of Dorland, the word bruxism comes from the Greek word *brihein* (βρῦκειν) which signifies clenching of the teeth.^[2]

The word bruxism is also derived from the French word "la bruxomanie", originally used by Marie and Pietkiewicz in 1907.^[3] Frohman in 1931 describes the term "bruxomania" as a psychical state and describes that bruxism does not have to be loud.^[4] In this way, for the first time in the literature, the term "bruxism" is introduced.

In the vocabulary of prosthetic terms, bruxism is defined as a non-conscious oral habit of rhythmic dysfunctional pressing, clenching and grinding of the teeth in performing movements that are not part of the

masticatory function and lead to occlusal trauma. It is an oral parafunctional activity, which is not related to normal physiological functions, such as speech, breathing, chewing and swallowing.^[5]

The etiology of bruxism is not entirely clear.^[6] Slight morphological factors such as dental occlusion and anatomy of the bone structure of the stomatognathic system may be associated with bruxism.^[7, 8]

There are more recognizable etiological factors leading to bruxism. Psychosocial factors such as stress, certain personal characteristics, pathophysiological factors, genetics, sleep disorders and the inclusion of the dopaminergic system is often present in the etiology of bruxism.^[9] One thing is certain - there is not only one factor responsible for the occurrence of bruxism. But it is evident that there is no single treatment that is effective for its elimination or reduction.^[7]

According to Kapusevska, bruxism, depending on the circadian rhythm of its appearance, is divided into daily, night and combined type. Depending on the shape in which it is manifested, there is a division of the horizontal and vertical form of bruxism.

Kazuyoshi Baba et al. designed specially produced dentures for the management of the complications caused from bruxism. They are made in patients with night bruxism, which is why they are worn overnight.^[10]

2. PURPOSE

Creating individually designed night dentures for aesthetic-functional rehabilitation of patients with bruxism is the purpose of the research of this paper. After the complete rehabilitation of the stomatognathic system, the therapist's aspiration is the long-term usage of the prosthetic construction.

3. MATERIAL AND METHOD

The clinical diagnosis allows determining the existence of bruxism. An extra oral and intraoral clinical examination was performed. The extra oral examination should adequately examine the facial symmetry. The lower third of the face when reduced is a sure indication that there have been pathological changes that should be further examined.

The masticatory muscles that are sensitive, warm, and soft in consistency may show signs of present pain. The temporomandibular joint (TMJ) must be checked by clinical palpation, which should be examined bilaterally. This involves detecting changes in the left from the right joint because sometimes only one joint is affected by changes.

Intraoral diagnosis helps us to assess the condition of the occlusion. Articulation paper may also be applied in red on one side and dark blue-indigo color on the other side. There are a number of methods for the paraclinical determination of the condition of TMJ. Among them is panoramic radiography-orthopantomography as a method of radiographic research that is widely used in modern conditions. The bruxchecker is a paraclinical mean for the diagnosis of bruxism.

During the scientific and research work to determine the degree of damage to the hard substance of the teeth the index by Smith and Knight was applied.^[11]

It is used in daily clinical practice 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.

During the patient's diagnosis, the periodontal Ramfjord index (PIR) was used. This index determines the state of gingival inflammation as well as the depth of the periodontal pockets. Gradation levels for determining the state of gingival inflammation are.

- 0 - absence of signs of inflammation of the gum tissue;
- 1- mild to moderate inflammation, the gum tissue around the tooth is not affected;
- 2- mild to moderate inflammation and gum tissue around the entire tooth is affected;
- 3- strong inflammation, redness, swelling, bleeding;

The depth of the periodontal pockets is determined using a graduated periodontal probe, and is expressed as follows.

- 4- the distance from the enamel-cement boundary to the bottom of the periodontal pocket is 3 mm;
- 5- the distance from the enamel-cement boundary to the bottom of the periodontal pocket is 3-6 mm;
- 6- the distance from the enamel-cement boundary to the bottom of the periodontal pocket is more than 6 mm.

Patients with partial edentulosity and diagnosed night bruxism were classified into 2 subgroups depending on the type of prosthetic devices that were rehabilitated with.

- 15 patients rehabilitated with fixed constructions;
- 15 patients rehabilitated with complex fixed-mobile constructions.

The treatment was supplemented with individually designed night dentures.

Also for the purposes of the research control group of patients with bruxism were examined who were divided in two groups.

- 15 patients treated with older fixed prosthetic constructions;
- 15 patients treated before coming to the dental office with older removable dental appliances.

The prosthetically rehabilitated patients aesthetically and functionally, treated with individually designed night dentures were monitored over a period of time: 1 month after wearing the night denture, after 3 months, 6 months, 12 months, and after 18 months.

At each arrival, measurements were made of the Smith and Knight indexes following Ramfjord, measurements of the lower third of the face as well as the night dentures using an electronic digital shabler.

4. RESULTS

In table no.1, the sum of the total value of all separately calculated indexes per tooth was divided by the total number of teeth and thus was obtained mean value, which on the day of the first review for the Smith and Knight index was 3 - indicating the existence of significantly exposed dentin in the patients from the first group. After the therapy with producing metal ceramic crowns, the index was not determined on the following

controls, since it is only applied when damaging the hard tooth substance. The Ramfjord index for gingival inflammation in the first group of patients showed us unchanged values, while $p > 0.05$ indicates that there is no statistical significance. The Ramfjord index for the depth of periodontal pockets showed us identical results with the previous index (Table 1).

The second group of patients treated with fixed-mobile constructions gave us the results that the Smith and Knight index has no statistical significance at $p > 0.05$. The statistical analysis for the Ramfjord index for gingival inflammation speaks of its consistency in all control examinations of patients treated. There is no statistical significance between studies at the onset of treatment of patients and their control examinations. The Ramfjord index for the depth of the periodontal pockets does not show the statistical significance of the control checks of patients (Table 2).

The results of the control group of patients, who were not prosthetically rehabilitated and diagnosed with the applied indexes of the study, indicate that the Smith and Knight score of the control after 6 months is increased by one unit. Statistically analyzed this is non-significant, but from a clinical aspect diagnosed, the greater damage to the hard tooth substance requires more treatment from the aspect of inclusion of teeth under a bridge construction. The Ramfjord index for gingival inflammation and depth of parodontal pockets of controls starting from 6 months increases by one unit, indicating the progression of parodontal disease. Statistically, there is no significance between the measured values obtained at the patient's examinations due to an increase in one unit of measurement (Table 3).

From the performed measurements, it is seen that there is a greater degree of damage to the night dentures made of the material Vertex and Triplex compared with the material of the company Sheu Dental Technology (durasoft @ pd) (Table 4).

Tables

Table 1: Examined parameters of the first group of treated patients.

Examined parameters of the first group of treated patients	First visit to the dentist	Control after 1 month	Control after 3 months	Control after 6 months	Control after 12 months	Control after 18 months	χ^2	p
Index by Smith and Knight	3	/	/	/	/	/	15	0.45
Index by Ramfjord for gingival inflammation	1	1	1	1	1	1	5	0.99
Index by Ramfjord for depth of parodontal pockets	4	4	4	4	4	4	1,66	0.99

Table 2: Examined parameters of the second group of treated patients.

Examined parameters of the second group of treated patients	First visit to the dentist	Control after 1 month	Control after 3 months	Control after 6 months	Control after 12 months	Control after 18 months	χ^2	p
Index by Smith and Knight	3	/	/	/	/	/	15	0.45
Index by Ramfjord for gingival inflammation	1	1	1	1	1	1	5	0.99
Index by Ramfjord for depth of parodontal pockets	4	4	4	4	4	4	1,66	0.99

Table 3: Examination parameters of the control group of patients.

Examined parameters of the control group of patients	First visit to the dentist	Control after 1 month	Control after 3 months	Control after 6 months	Control after 12 month	Control after 18 month	χ^2	p
Index by Smith and Knight	2	2	2	3	3	3	2,06	0.99
Index by Ramfjord for gingival inflammation	2	2	2	3	3	3	1,76	0.99
Index by Ramfjord depth of parodontal pockets	4	4	4	5	5	5	1,16	0,99

Table 4: Display of measured damage to the night dentures.

Measurements with digital shabler	Control after 3 months	Control after 6 months	Control after 12 months	Control after 18 months	χ^2	p
Night dentures with Vertex Triplex	0 MM	0,21 MM	0,28 MM	1,2 MM	12,06	0.39
Night dentures with Durasoft @ pd	0 MM	0,02 MM	0,15 MM	0,41 MM	16,76	0.29

Figures**3.1 Clinical presentation of patients in groups****3.1.1 Clinical presentation of the first group of patients treated with fixed prosthetic constructions and night denture**

Fig. 1 a. Extraoral examination of the patient
 b. Intraoral examination in the lower jaw
 c. Intraoral examination in the upper jaw
 d. Studio models
 e. Bruxchecker
 f. Intraoral view of the night denture
 g. Intraoral view in centric relation of the night denture
 h. Measuring the night denture

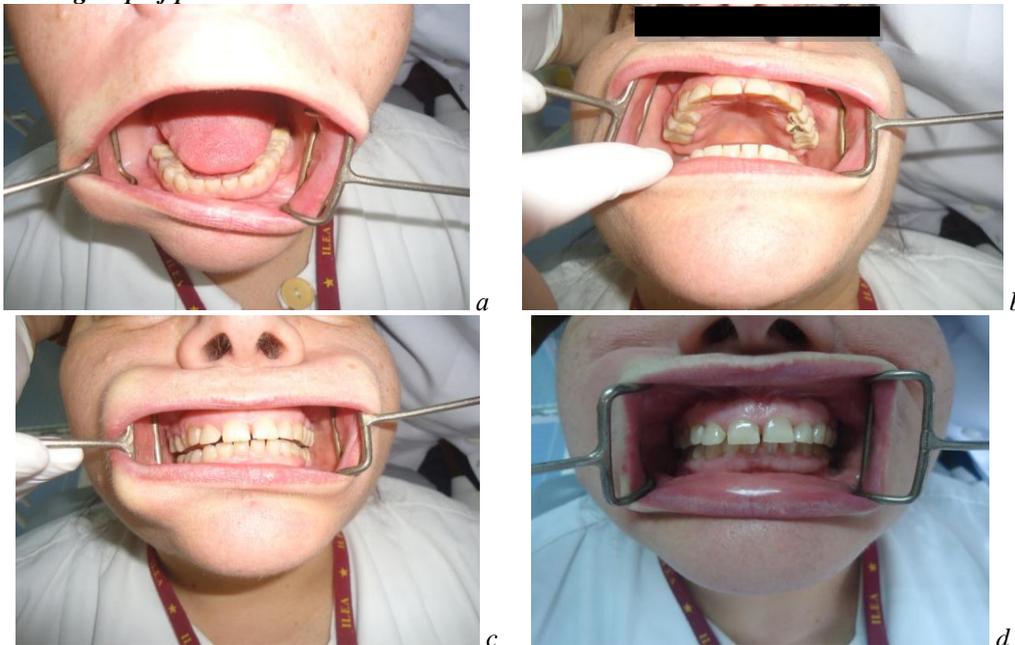
3.1.2 Clinical presentation of a patient from the second group treated with fixed – mobile prosthetic constructions and night dentures





*Fig. 2 a. Extraoral view of the patient
 b. Intraoral view of the lower jaw
 c. Intraoral view of the upper jaw
 d. Studio models
 e. Night denture intraoral view before prosthetic rehabilitation
 f. Occlusal view of the night denture
 g. Treated teeth with posts and cores
 h. Fixed prosthetic construction
 i. Aesthetic-functional rehabilitation
 j. Night denture intraorally
 k. Extraoral examination of the night denture*

3.2 Control group of patients
3.2.1 First control group of patients



*Fig. 3 a. Intraoral examination of lower jaw
 b. Intraoral view of upper jaw
 c,d Patient with lowered third of the face*

3.2.2 Second control group of patients

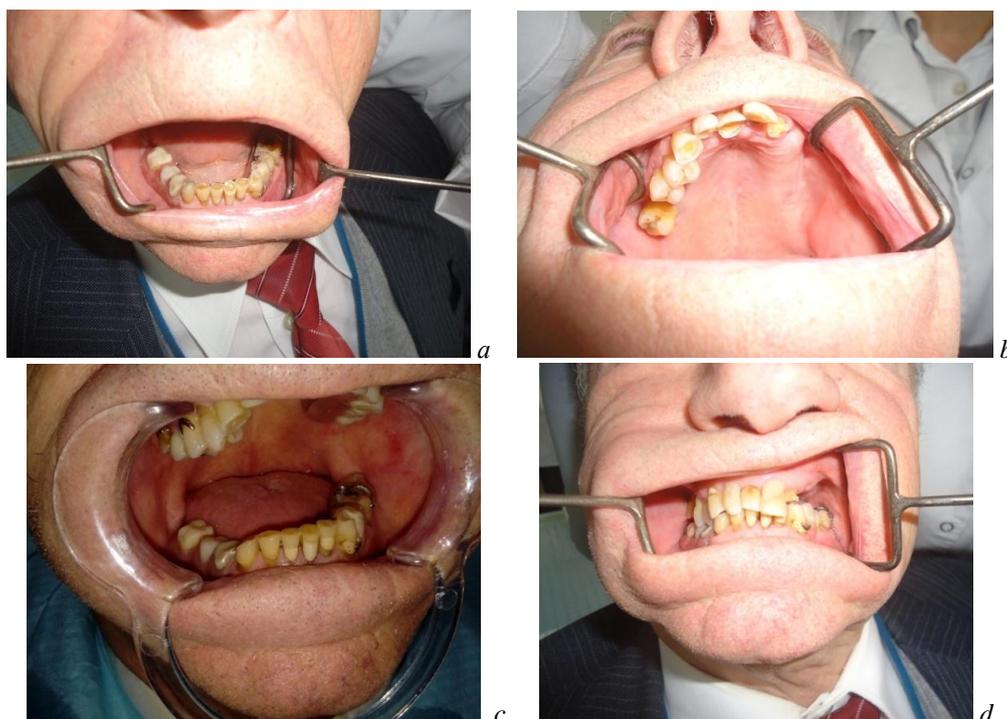


Fig. 4 a. Lower jaw- occlusal view
b. Upper jaw- a fixed construction was demolished on the left side
c,d Consequences of bruxism

4. DISCUSSION

From the very title comes the meaning of the individually designed night dentures. They help to preserve the achieved aesthetics, prevent further damage to the present teeth, prevent the gum and periodontal tissue, prevent from temporomandibular dysfunctions (TMD) and enable smooth painless functioning of the structures of the stomatognathic system.

From the results obtained from the tables of the controls of the prosthetically rehabilitated patients, also treated with night dentures, it can be observed that there are not changes in the indexes by Smith and Knight, as well as of Ramfjord, indicating no statistical significance and thus approving the manufacturing of individually designed night dentures.

The night dentures were measured with the help of a digital measuring instrument (digital shabler), on at least six pre-set points, after which the entered data was analyzed from the card of the patient. After a time period of 18 months, durasoft @ pd dentures made an abrasion of 0.41 mm. While in the dentures made of the material Vertex/Triplex, the combination measures an abrasion of 1.2 mm.

The control group of patients have different consequences from the destructive forces that develop in night bruxism. Impairment of the teeth, the supporting complex, TMJ, and the occurrence of TMD have a different intensity in untreated patients, depending on the degree and severity of bruxism.

As correlated with the work of Shilpa Shetty *et al.* as well as in this paper the improvement of the objective and subjective symptomatology of TMJ is also perceived, whereby the elaboration of specially designed dentures is justified.^[12] We check this with the clinical methods of inspection, palpation, percussion and auscultation, as well as paraclinically with control x-rays.

5. CONCLUSION

The obtained results from patients with diagnosed bruxism and partial edentulosity in which prosthetic rehabilitation was performed and application of individually designed night dentures, leads to the conclusion that their manufacturing is justified for several reasons.

1. Patients wearing individually designed night dentures are with reduced clinical signs of temporomandibular dysfunctions;
2. Pain in patients wearing night dentures was reduced or completely eliminated, which confirms the justification of its design;
3. Damage to the remaining teeth is eliminated regardless of whether they are treated or not with fixed structures shown by the Smith and Knight index.
4. In addition to this, the supporting apparatus of the remaining natural teeth is with unchanged values as can be seen with the Ramfjord index for gingival inflammation as well as for the depth of the periodontal pockets;

All the above mentioned aspects lead to improvement of the quality of life of patients wearing individually

designed night dentures to the mutual pleasure and success of the patient and the prosthetic team.

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