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PRODUCING SPECIALLY DESIGNED DENTURES IN PATIENTS WITH CONDITIONS OF OCCLUSAL PARAFUNCTIONS

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ABSTRACT

Introduction: The occlusal parafunctions do not belong to the group of physiological functions such as speech, breathing, chewing and swallowing. The parafunction associated with clenching of the teeth is known as bruxism. In this state as therapeutic measurements success can be achieved using specially designed dentures.

Objective: is producing specially designed dentures in patients with occlusal parafunction - bruxism.

Material and methods: As a material for work 22 patients with nocturnal bruxism and partial edentulousness were diagnosed, monitored, analyzed and treated. They were divided into 2 groups: 11 patients treated with prosthetic constructions and specially designed dentures and 11 patients that were not treated (control group).

Results and Discussion: The results obtained from studies in patients with occlusal parafunctions, recognize the need of producing specially designed dentures. In terms of bruxism and partial edentulousness, they help in keeping the health of the remaining teeth and periodontal complex, as well as in prevention of the fixed constructions. They have positive effect in decreasing the symptoms felt by patients located on the teeth, muscles and temporomandibular joint (TMJ).

Conclusion: By making the appropriate prosthetic plan for taking care of patients in state of nocturnal bruxism, specially designed dentures support the treatment of patients, resulting in improved quality of life.

Keywords

Occlusal parafunctions, bruxism, partial edentulousness, specially designed dentures.

Academic Discipline And Sub-Disciplines

Dentistry, Dental Prosthetics

SUBJECT CLASSIFICATION

Bruxism management, Removable dental prosthetics

TYPE (METHOD/APPROACH)

Clinical practical approach by use of specially designed dentures and questionnaires for the symptomatology of bruxism

INTRODUCTION

Occlusal parafunctions associated with the stomatognatic system do not belong to the group of physiological functions such as speech, breathing, chewing and swallowing. Examples of non-physiological parafunctions can be biting the lips, cheeks and various objects. The parafunction associated with clenching of the teeth is known as bruxism. In most cases the parafunction is discovered when the patient goes for the first time to the dentist. One of the most prominent clinical signs is abnormal wearing of the teeth, when the antagonist should always be considered, which due to bruxism is also worn, damaged or reduced[(1).]

The term bruxism is derived from the French word "la bruxomanie," originally used by Marie and Pietkiewicz in 1907[(2)]. Frohman in 1931, describes the term "bruxomania" as a psychological condition and describes that bruxism does not necessarily need to be loud[(3)]. This is when for the first time in the literature the term "bruxism" was introduced. According to De-La-Hoz JL. the earliest references for bruxism were written in the Bible, in which the clenching of the teeth was described as the first sentence of God[(4)].

Bruxism is common in our population, which is manifested by gnashing and clenching of the teeth. However this parafunctional habit is characterized by different intensity and periodic repetition. This condition tends to decrease with age, while generally its large representation is perceived when the population is observed as a whole[(5,6)].

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The etiology of bruxism is not entirely known[7]. Little morphological factors such as dental occlusion and anatomy of the bone structure of the stomatognatic system can be connected to bruxism[8,9]. 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 to eliminate or reduce its occurence[10].

According to Kapusevska bruxism, depending on the circadian rhythm of his appearance, divides into awake, nocturnal (sleep) and combined type of bruxism. Depending on the form in which it manifests. a division of horizontal and vertical form of bruxism is described. According to the author objective diagnosis of the horizontal type of bruxism is performed with the device – bruxchecker, while diagnosis of the vertical type bruxism is performed with the device bruxcore [11,12].

Early prevention and treatment of bruxism according to Kapusevska using occlusal appliances is part of the protocol for treatment of patients in everyday clinical practice[13].

Kazuyoshi Baba et al. were making dentures specially designed for management of the complications caused by bruxism. They were produced in patients with nocturnal bruxism and were worn at night[14].

Spilpa Spetty et al., show the types of works of intaorally shaped occlusal splints, night guards or occlusal appliances. They explain the limiting use of oral splints in handling of the bruxism to prevent dental damage[15].

Kapusevska et al., suggest that in patients treated with prosthetic devices, the masticatory muscles more quickly respond to application of conservative devices such as splints for reposition and stabilization in the modern treatment of temporomandibular dysfunction (TMD) in patients with bruxism compared with the reactions of the jaw bones and the temporomandibular joint (TMJ)[16].

Michael J. Thorpy, Giuseppe Plazzi, in their book describe the success in patients with nocturnal bruxism and partial edentulousness, that during sleep wore specially designed dentures made with the principles of occlusal splints[17]. Panagiotis Zoidis, Gregory Polyzois, made occlusal appliances in patients who have implants and carry removable prosthetic dentures. They wore them at night for protection from the parafunctional forces that develop in nocturnal bruxism.

PURPOSE

The purpose of this paper is producing specially designed dentures in patients with occlusal parafunction - bruxism in conditions of partial edentulousness. They are made to prevent the consequences that can be manifested in patients with nocturnal bruxism.

MATERIAL AND METHOD

As material for the research 11 patients with nocturnal bruxism and partial edentulousness were used. They were diagnosed, monitored, analyzed and treated with prosthetic constructions. Also they were treated with specially designed dentures. As a control group 11 patients with nocturnal bruxism were used, who were not treated. Patients ranged in age groups from 38 to 63 years of both sexes.

Before the dental prosthetic procedures every patient received a consent form and a questionnaire for the observed changes in the mouth, caused by bruxism. Answers given directed us to the diagnosis of the form of bruxism and the proceeding treatment of the temporomandibular dysfunction (TMD).

The methodology of the research consisted of several consecutive steps:

1. Setting the diagnosis of bruxism with individually made bruxchecker. The bruxchecker is made of a film with thickness of 0.1 mm with chemical composition - polyvinyl and is stained in the red color on the outer side (Fig. 1a, b);


a


b

Fig.1a. Film for making the bruxchecker

Fig.1 b. The bruxchecker in the patient's mouth

2. Extraoral clinical examination of the lower third of the face, muscles and TMJ by methods of inspection, palpation, percussion and auscultation;

3. Intraoral clinical examination, on the teeth, analysis of the oral mucosa and tongue;

4. Grading of the degree of abrasion of the remaining natural teeth with the help of the index by Smith and Knight;

5. Grading the index by Ramfjord changes in the parodontium (gingival inflammation and depth of periodontal pockets);

6. Setting a plan for prosthetic therapy in patients with bruxism;

7. Producing specially designed dentures.

Specially designed dentures are made in the form of occlusal splints or as a classic denture with an occlusal inserter. Patients wore them according to given written instructions.

At 4 patients in the lower jaw fixed structures were manufactured, prepared with Lecodent bars with complex skeletal dentures. For them indication was made for producing specially designed dentures before the prosthetic treatment. As an extension of the rehabilitation specially designed dentures were also developed after the prosthetic rehabilitation of the patient.

In 5 patients partial skeletal dentures were constructed in the lower jaw, which patients wore during the day, while at night they were replaced with specially designed dentures.

In 2 patients classical partial acrylic dentures were made and was indicated for specially designed dentures (fig.2 a, b, c, d) to be produced.

Specially designed dentures are made of two kinds of acrylic material (from the acrylic Triplex and Vertex), with which followed our procedure for their producing.

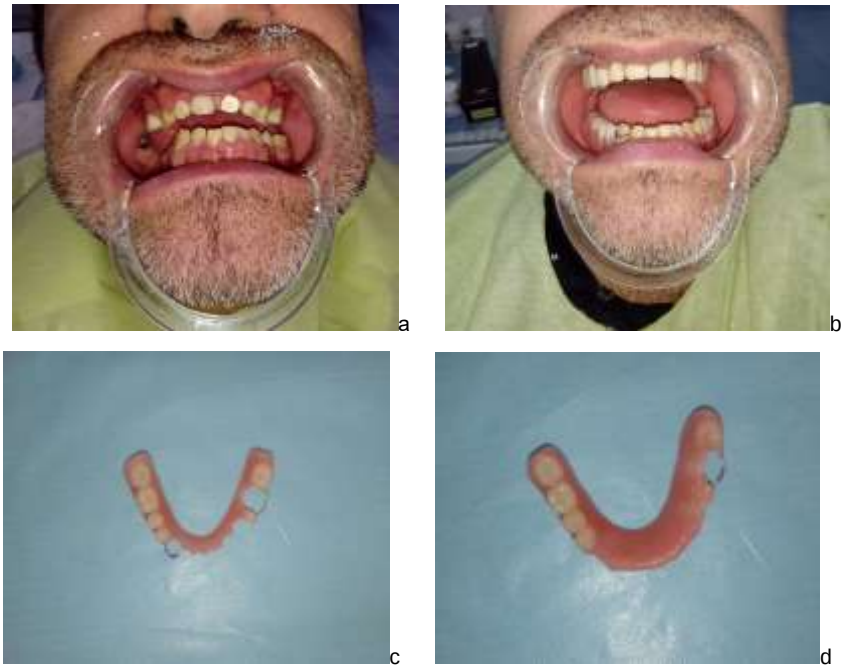

Fig. 2a. A patient before the prosthetic treatment

Fig. 2b. Image of the prosthetically rehabilitated patient

Fig. 2c. Occlusal view of a lower classical partial denture

Fig. 2d. Occlusal view of a specially designed denture

The control group of patients was not treated with prosthetic devices and specially designed dentures. But they were diagnosed with nocturnal bruxism by the help of individually designed bruxcheckers and respectfully with the same indexes as those patients who were treated.

The treated patients were followed for a period of time: 1 day after receiving the denture from the therapist, 8, 15, 30 days and six months after wearing the specially designed denture.

Alternative therapies were applied such as physiotherapy associated with pharmacotherapy and psychotherapy.

RESULTS AND DISCUSSION

Table 1 Indexes of the examined patients (mean value)

Indexes of the examined patients	Description of prosthetic devices to patients n = 11 (100%)	Before the therapy with specially designed dentures	After the therapy with specially designed dentures
Index by Smith and Knight*	4 (36.3%) patients with fixed-mobile constructions	3	/
	5 (45.4%) patients with partial skeletal dentures	2	2
	2 (18.3%) patients with classic acrylic dentures	2	2
Index by Ramfjord * on gingival inflammation	4 (36.3%) patients with fixed-mobile constructions	2	2
	5 (45.4%) patients with partial skeletal dentures	2	2
	2 (18.3%) patients with classic acrylic dentures	2	2
Index by Ramfjord* depth of periodontal pockets	4 (36.3%) patients with fixed-mobile constructions	4	4
	5 (45.4%) patients with partial skeletal dentures	4	4
	2 (18.3%) patients with classic acrylic dentures	5	5

* Index by Smith and Knight

0- no loss of enamel
1- enamel loss
2-minimum exposure of dentin
3 -significant loss of dentin
4- exposure to pulp

* Index by Ramfjord for changes in the parodontium (gingival inflammation and depth of periodontal pockets)

0- absence of gingival inflamation
1-mild to moderate inflammation, not affecting the gums around the tooth
2 mild to moderate inflammation, gum around the tooth is affected
3-severe inflammation, redness, swelling, bleeding
4 depth of periodontal pockets with depths to 3 mm
5 depth of periodontal pockets up to 6mm
6 periodontal pockets deeper than 6mm

In table 1 unchanged indexes by Smith, Knight and Ramfjord can be seen in patients with prosthetic rehabilitation, before and after the treatment with specially designed dentures. Of the 11 treated patients, in 4 (36.3%) of which the remaining teeth were covered with artificial dental crowns by wearing a specially designed prosthesis, the abrasion disabled to occur overnight. If abrasion continues at night it is perceived as damaging of the specially designed dentures. While in 5 patients (45.4%) holders of partial skeletal dentures and in 2 patients (18.3%) carriers of the classical acrylic partial dentures, with natural teeth by measuring the index by Smith and Knight, the controls showed us that it remained the same as in previous periods of measurements.

The specially designed dentures in coordination with the technician were made with care and planning under conditions such as: the type of bruxism and the position of the remaining teeth. Depending on the assessment of the therapist sometimes a need is obtained for making this type of dentures before the prosthetic therapy, in manifested severe nocturnal bruxism. The primary importance of specially designed dentures is seen as protection of the remaining teeth and

the cemented fixed structures as well as the periodontal complex. They are produced and designed for adjusting the patient of raising the reduced occlusion, which will be reconstructed in the prosthetic construction.

Next justification is to improve the symptoms of the masseters and the temporomandibular joint (TMJ), and a reduction of a temporomandibular dysfunction (TMD). Specially designed dentures allow equal distribution of the chewing pressure forces along the dental arch in a manner allowing the concentration of the forces of mastication on the natural teeth to be avoided. This advantage derives from the soft acrylate which can easily be adapted on the teeth, whilst the hard acrylic allows solidity of the design. Another positive fact is that the two types of acrylate are chemically bonded to each other. By covering the incisal and occlusal surfaces of the remaining natural teeth, they are protected from further abrasion. Damage to the occlusal surfaces of the specially designed dentures caused by the night forces of mastication forces activated in nocturnal bruxism can easily be repaired.

Thus all of the above represents a practical approach in minimizing the negative effects which the nocturnal bruxism has in these patients.

The control group of patients not treated with prosthetic structures and specially designed dentures had different consequences of the destructive forces that develop at nocturnal bruxism. Damage to the teeth, periodontal complex, TMJ, and the occurrence of TMD have a different intensity in untreated patients, depending on the extent and severity of bruxism.

As in the work of Kazuyoshi Baba et al., and in this paper specially designed dentures have proved to be an effective tool in dealing with problems associated with nocturnal bruxism [14]. As in correlation with the labor of Shilpa Shetty et al. and in this paper improvements are perceived of the objective and subjective symptoms of TMJ, which is why the manufacture of a specially designed prosthesis is justified[15].

According to Kapusevska et al., there is an improvement in the functioning of the masticatory muscles in patients who are rehabilitated with prosthetic occlusal therapy, which is also proved in this study[16]. Of great importance are the statements of the patients that suggest eliminating further damage to their natural teeth, soothing of the soreness of the muscles and the TMJ.

CONCLUSION

The results of patients diagnosed with bruxism and partial edentulousness conducted involving prosthetic rehabilitation and application of specially designed dentures lead to the conclusion that their production is justified for several reasons:

1. Patients holders of specially designed dentures have reduced (or eliminated) clinical signs of damage to their natural teeth, fixed constructions and their periodontal complex;

2. During the sleep there is an even concentration of the forces of mastication on the natural teeth or at the artificial crowns;

3. The above stated leads to the conclusion that the specially designed dentures help to preserve the longevity of the fixed constructions, also in the prevention of natural teeth in the mouth, and the reduction of occurrence of temporomandibular dysfunction;

4. As an advantage of this product we conducted the simplicity in the possibility of repairing the specially designed dentures when they are abraded from the destructive masticatory forces developed in nocturnal bruxism.

5. This leads to satisfaction in patients who accept them, aware of the help that has been provided with.

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