Case report

TREATMENT OPTIONS WITH COMBINED DENTURES IN PATIENTS WITH MAXILLARY RESECTION

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ABSTRACT

Background: Resection of upper jaw violates the border between oral and nasal cavity; thereby leading to the impossibility of feeding, speaking and breathing. The prosthetic treatment methods are the main tool for restoration of the damaged functions.

Aim: The aim of this publication is to investigate the options for the application of combined dentures, made from acrylic resin and silicone, in the treatment of patients with maxillary resection and total edentulism.

Materials and methods: The prosthetic treatment of a 70-year-old female patient with resection of the frontal area of the upper jaw and total edentulism is studied. The preliminary impressions were taken with alginate and the definitive ones – with custom trays and silicone impression material. An obturator and complete denture of the lower jaw were fabricated from heat cured acrylic resin after fixing the occlusion closure and trial denture. Silicone material for direct relining is used to provide retention and stability to the obturator.

Results: Patient's feeding, speaking and breathing functions were successfully restored. The silicone substitution part provided a non-traumatic distribution of the masticatory pressure and tightly insertion in the retentive areas of the defect. The created border between oral and nasal cavity fostered breathing and fluid intake.

Conclusion: The performed treatment shows that prosthetic treatment methods continue to be an important method for improving patients' life quality after maxillary resection, despite the progress in modern surgical procedures

Keywords: maxillary resection, maxillary defect, obturator, post resection denture,

BACKGROUND

Studies reveal a trend for a constant increase in the frequency of tumors in the maxillofacial area; thereby, causing a higher number of patients with maxillary resection [1]. The involvement of the oro-facial complex leads to a serious deterioration in feeding, speaking and breathing functions [2]. In addition to maxillary resection, prosthetic treatment methods are commonly used as a treatment option by including the fabrication of different types of pros-

thetic constructions [3]. Each one is characterized by specific features that require the application of different materials [4]. There is no universal treatment protocol and methodology. It is accepted that the type of denture depends on the patient's individual characteristics [5].

The prosthetic treatment is most likely to be conducted by fabrication of closed and buccal flange obturators [6, 7]. There are different data regarding their advantages and drawbacks. Heat cured acrylic resin is mostly used in order to ensure their retention and stability [8]. Combined obturators with acrylic resin and silicone material are commonly used, as well [9]. Their application is particularly appropriate in the stage-by-stage fabrication of denture's base and obturating part, including the cases with trismus [10].

Most authors [11,12] suggest that the use of silicone materials provides optimal retention and stability to the obturator. The main advantages refer to their biocompatibility, non-toxicity and possibility for non-traumatic distribution of the masticatory pressure [13, 14]. The silicone materials provide easy obturator's insertion into the defect and a chance for quick correction or replacement, if necessary [15]. According to some studies, their application is possible to the cases with small defects; however, some research publications show that defect size has an insignificant role [16].

Evidence shows that the prosthetic treatment significantly improves patient's life quality after maxillary resection irrespectively of the chosen treatment method or the type of materials [17]. Advances in modern technologies together with the application of new materials facilitate the choice of optimal treatment method according to the individual characteristics of a patient [18, 19].

AIM

The aim of this publication is to investigate the options for the application of combined dentures, made from acrylic resin and silicone, in the treatment of patients with maxillary resection and total edentulism.

MATERIALS AND METHODS

The prosthetic treatment of a 70-year-old female patient, who is operated from an oncologic disease of the upper jaw, is studied. The examination results showed that

approximately 2/3 from the upper jaw were removed. The defect, involved the frontal area, had been causing a huge communication with the nasal cavity (40mm wide and 50 mm high) (Figure 1). Four month after the surgery, the patient went after radiation therapy. The defect volume and the presence of numerous retentions and pits inhibited the treatment process. The lack of teeth worsened the treatment prognosis, as well. A treatment plan was developed by including fabrication of combined obturator from acrylic resin and silicone material and a complete denture of the lower jaw. The A-silicone material Reviver (MEDICEPT UK LTD) is used, due to the retention structure of the defect. The material is resistant, biocompatible, has strong bond to the acrylic resin and allows easy designing and correcting. This material has been chosen due to the retentive structure of the defect and its ability to provide obturators's retention and non-traumatic distribution of the masticatory pressure over the damaged tissues after the radiotherapy. This treatment plan is used as an alternative of the classical acrylic resin obturator, which cannot provide the insertion of this retentive area and could cause tissue trauma.

The defect was carefully covered with gauzes, and the preliminary impressions were taken with alginate. Custom trays were developed by heat cured acrylic resin after the casting of the working gypsum models. The defect of the upper jaw was tamped with gauzes again in order to provide the insertion of the impression material in the depth of 7 mm. One-step impression with silicone material was taken from the upper jaw. Classic impression technique was used in the lower jaw. Base plates and wax rims were used for fixing the occlusion closure. The obturator and complete denture in lower jaw were made from heat cured acrylic resin after a successful trial denture (Figure 2).

The palate surface of the upper jaw was treated mechanically, bonded and covered with silicone relining material. After that, the obturator's substitution part was directly designed in the patient's mouth (Figure3). The material elasticity facilitated the easy and tightly insertion in the retentive areas of the defect. The carefully functional shaping of the obturator to the bottom of the nasal cavity provided the necessary retention and stability (Figure 4). The dentures were finally adjusted and articulated, whereas the silicone part was cleaned and polished (Figure 5).

After the prosthetic treatment, the patient has been asked to speak for assessment of the speech and achieved hermetization. The ability for swallowing has been evaluated by asking the patient to drink liquids, because this was major problem before the treatment.

Fig. 1. Intraoral patient's view

Fig. 2. Completed dentures

Fig. 3. Silicone obturator and lower denture

Fig. 4. Adjusted obturator

Fig. 5. Restored occlusal closure

RESULTS

The results from the prosthetic rehabilitation showed successful restoration of a patient's feeding and speaking function. Significant improvement in breathing, which was strongly inhibited because of damages in initial sections of the respiratory system, was registered. The main reason for the positive outcomes was related to the creation of a tight barrier between oral and nasal cavities. The built silicone barrier between the nostrils and the forming of spina nasalis anterior directed the air stream and did not allow dispersion while breathing. The ability for swallowing and liquid intake was also restored, which is the main issue in respect to these diseases. The checkup appointments indicated good durability of the silicone material and lack of decubitus ulcers. Easy and quick adaptation to the obturator was achieved, in spite of its large volume. The patient did not have any difficulties in the insertion of the obturator.

DISCUSSION

The application of combined prosthetic constructions from acrylic resin and silicone material constitutes a common treatment method for patients with maxillary resection. This is motivated by the fact that these materials have good

biological characteristics combining stability and good retention of the obturator. The tight insertion of the obturator delivers good hermetization, thereby improved feeding, swallowing and drinking functions. The chosen treatment method aimed at not only isolating the oral cavity from the nasal one but also restoring the nasal breathing by forming the nostrils and regulating the air flow. The opportunity for direct design and corrections of the material confirmed the view that silicone material could be used in patients with maxillary resection [9, 10]. This was shown by the achieved retention and stability of the obturator – an important characteristic of the material according to some authors [11, 12].

The combination between acrylic resin and silicone materials is chosen, because their advantages. The silicone provides good hermetization, non traumatic insertion into the defect and has friendly interaction with the damaged tissues. The resin provides stability of the silicone material and the obturator, as well. Such a combination allowed complete defect hermetization and solved the problem with liquid penetration to the nasal cavity.

The damaged functions were successfully restored, despite the size and volume of the defect. The outcomes were not in alignment with some opinions suggesting a lim-

ited use in the cases with small defects only [16]. Treatment results showed a quick adaptation to the obturator and easy placement in the mouth, which was confirmed by other publications [15]. The follow-up appointments demonstrated that the silicone materials were able to provide a non-traumatic distribution of masticatory pressure. This is considered as the main advantage of these materials by the majority of studies [13, 14].

CONCLUSION

The application of combined dentures, made from acrylic resin and silicone, in the treatment of patients with maxillary resection and total edentulism, allows successfully restoration of patients' feeding, speaking and swallowing.

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