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Possibilities of Silicone Rebasing Materials for Increasing the Hermetization of Maxillary Obturators. Case Report.

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The main problem in treatment with maxillary obturators is defect's hermetization and creation of stable border between oral and nasal cavity. This requires the application of specific methods and appropriate materials for prosthetic treatment. A methodology of prosthetic treatment with silicone relining materials is presented in patient with unilateral defect of the maxilla after oncological operation. A buccal flange obturator was fabricated, due to defect's size and localisation. The obturator was finished by heat cured acrylic resin with low quantity of residual monomer and the substitution part was designed as a hollow part for better retention and stability. Direct relining with silicone material was performed for improvement of defect's hermetization. The conducted treatment provided the necessary retention and stability of the obturator. Patient's chewing, feeding and speaking have been successfully restored. The silicone relining material facilitated the insertion of the denture and protected the tissues from damages.

Key words: maxillary resection, maxillary defect, obturator, silicone relining materials.

Introduction

Prosthetic treatment methods take main role in rehabilitation of patients with maxillary resection [18]. Silicone materials are used in fabrication of the obturator or some of its parts [11, 20, 24]. Clinical studies reveal that their application provides optimal retention and stability of the denture [8, 12]. Silicone materials make the insertion in the defect easier and can be corrected or replaced quickly if it is needed [29]. The investigations show that they are non-toxic, bio compatible materials, which do not cause trauma or irritation of soft tissue [2, 15]. This makes them very useful in the treatment of patients with retentive tubers and alveolar bone atrophy [19]. Electromyographic researches report, that their application increases masseters and temporal muscles activity, such as chewing efficiency [25, 28].

The main problem, which limits the application of silicone materials, is the stability of the connection with the acrylic resin, which needs preliminary preparation of the surface [33]. For this purpose, some authors [10, 13] use phosphoric acid for etching denture's borders and others create micro retentions with lasers [9]. Studies

show that application of monomer on denture's surface stabilizes the adhesion to the silicone material, but sandblasting weakens it [16]. Adhesion increase is observed when heat cured silicone materials are used, especially if their polymerization is performed at the same time as the acrylic resin [3, 17].

Essential disadvantage of silicone relining materials is their porous surface, which creates a prerequisite for growth of Candida [4, 14]. The studies by Wieckiewicz et al. [35] prove the presence of Candida in 90% of the prosthetic treatments with silicone obturators. According to other data, polysiloxane base of the silicone materials allows preserving of the soft smooth surface, which prevent plaque accumulation and facilitates denture's cleaning [1, 22]. The application of disinfectants is recommended, despite the risk of denture's coloring and breaking the connection with the acrylic resin [6]. Studies show, that the right choice of silicone and cleaning material prolongs dentures' life [23, 27]. The application of silicone relining materials is very appropriate in two-stage prosthetic treatment in patients with maxillary resection, when the obturator's base is fabricated at first, and then its substitution part [30, 34]. In this case, the base is fabricated by heat cured acrylic resin and substitution part- from silicone material, which provides retention and stability of the denture [12, 20, 24]. This type of prosthetic treatment is used for fabrication of two-part obturators in patients with trismus [32, 34]. Very often the substitution silicone part is connected to the base through cobalt-samarium magnets [12, 21, 24]. Acrylic locks and system type "interlock" are used as well [7, 20].

The indications and contraindications for application of silicone materials in patients with maxillary resection are controversial. Most authors [5, 31] claim, that their application is possible only in small palate defects. In cases with large defects it is recommended stabilization of the silicone obturation part with methyl methacrylate pin [26].

Materials and methods

A case of 58-years-old female patient with defect of the upper jaw after cancer operation is presented as an example for evaluation of silicones' relining properties. The intraoral examination revealed a defect in the right side of the jaw, which reach the midline and involves soft and hard palate. The alveolar bone in the left side was very much resorbed, without any teeth left and the lower jaw had all the teeth. Due to the recently conducted radiotherapy, the patient had very severe trismus and pain in the masticatory muscles. That fact and the defect's size lead to treatment plan with buccal flange obturator. For this purpose, impression was taken with standard metal tray and additive silicone material (**Fig. 1**). The defect was tamped with gauze in advance. The occlusion height and centric relations were fixed by occlusal wax rims in the next clinical stage. The trial denture did not show any mistakes or deviations and the obturator was fabricated from heat cured acrylic resin with low quantity of residual monomer. The substitution part was formed as open hollow part for better retention and stability (**Fig. 2**). The adjustment showed unsatisfactory hermetization, which required additional rebasing. A silicone material Reviler **(**Kulzer GmbH) for direct rebasing was shaped functionally in the mouth (**Fig. 3**).

Fig. 1. An impression from the defect

Fig. 2. Buccal flange obturator

Fig. 3. The obturator, rebased with silicone

Results

The initial results revealed unsatisfactory retention and stability of the obturator. The hollow bulb substitution part did not provide optimum defect hermetization, especially in the area of soft palate. This didn't provide successful restoration of feeding, speaking and swallowing. Additional rebasing procedure was needed and silicone material was used

for this purpose. The silicone material was functionally designed on the defect's borders and denture bearing area after preliminary preparation of the acrylic surface, according to manufacturer's instructions. This provided the necessary retention and stability of the denture. The successful hermetization provided restoration of the damaged functions. The creation of stable border between the oral and nasal cavity helped for normalization of speaking and facilitated liquids reception. The occlusal closure was restored, which improved patient's chewing and feeding. The usage of silicone material provided non traumatic transmission of masticatory pressure and facilitated denture's insertion. The occurred positive changes improved significantly patient's life quality and restored her self-esteem and social activity.

Discussion

The prosthetic treatment of patients after maxillary resection is accompanied by many difficulties and problems. The main problems were connected with taking functional impressions, as most of the cases. The impression registration was very tough, due to trismuss, occurred after radiotherapy, and defect's localization. Very limited mouth opening required treatment plan for fabrication of open obturator, which could be easily inserted by the patient. The fabrication of hollow bulb substitution part has been creating a precondition for better retention of the obturator, especially when all the teeth were missing. Despite the described advantages, a satisfactory hermetization was not achieved. The main reason for this was defect's localization, which involved part of the soft palate and did not allow obturator's stability during feeding and swallowing. To resolve this problem we rebased directly the obturator with silicone material, which allowed maximum use of the defect's retentive areas and complete hermetization in the area of A-line. The achieved results confirmed the state, that silicone materials improve dentures' retention and stability [8, 12]. Their application allowed easy and non traumatic insertion of the denture in the defect that is their main advantage, according to many authors [2, 15]. The successful treatment suggested that silicone materials are really appropriate in the prosthetic treatment of patients with retentive tubers and alveolar bone atrophy [19]. The advantages of the two-stage technique, which provides optimum obturator's retention and stability, was confirmed, as well [12, 20, 24]. It was suggested that the described method could be used as an alternative technique of two-part obturators, which are the only devices for trismuss treatment, as some authors reported [32, 34]. The clinical results did not confirm, the thesis, that silicone relining materials can be used only in small defects [5, 31]. The described clinical report is not very common in daily dental practice. Despite the achieved positive results obtained, more research is needed to investigate the durability between the acrylic resin and silicone material, such as microbiological studies of obturator's surface.

Conclusions

The application of silicone rebasing materials improves stability and increases hermetization of the maxillary obturators and it is very appropriate in patients with large defects and complete edentulism.

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