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# Prosthetic Treatment Methodology of Edentulous Patients with Maxillary Resection

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Prosthetic treatment methods are main treatment techniques for rehabilitation of speech and feeding in patients with maxillary resection. The presented clinical case introduces a hollow-bulb obturator treatment methodology of a patient with a unilateral defect and complete edentulism. The preliminary impressions have been taken with alginate and the defect has been tamponaded with gauze. The final impression of the mandible has been taken with a custom tray and creamy-consistency silicon impression material. After the trial denture, the maxillary occlusal rim has been used for taking functional impression to ensure good retention and stability. A hollow-bulb obturator for upper jaw and complete denture for lower jaw have been fabricated and then adjusted into the patient's mouth. Treatment results have demonstrated good retention and stability of the obturator and mandible denture. The examination with the "Oronasopneumotest" device has registered good defect hermetization, which contributed to successful speaking rehabilitation.

*Key words:* denture, maxillary resection, maxillary defect, obturator.

## Introduction

Nowadays, there is a significant increasing in the number of oncological diseases in the maxillo-facial area, which leads to growth in the cases of maxillary resection [3]. Treatment options of these cases include defect coverage by tissue transplantation or obturating prostheses. There isn't a consensus view regarding the method for the most optimal restoration of the damaged functions [2]. In most cases, the size and localization of the defect, as well as the presence of teeth, determine the stage of speaking and feeding rehabilitation [4, 5]. Previous studies suggest that treatment results are significantly better among patients with small defects [16].

Research findings indicate the highest prevalence of the resection of the half maxilla [20]. In rare instances, it is combined with a complete teeth loss which makes the treatment extremely difficult. The main issues, which exist in the cases of total edentulism, are related to the achievement of retention and stability of the obturator [6]. This necessitates the application of specific techniques and materials for taking impressions and fabricating dentures [18]. Most researchers consider acrylic resins as

appropriate for achieving stable support and retention of the obturator [1, 15]. Obturator's type and shape remain important factors for determining the quality of speaking and feeding processes. It is suggested that the light construction of the open obturators delivers improved phonetic and speech intelligibility properties [13]. This is shown by examining patients with I and II class defects of Armani. They have experienced insignificant changes in articulation and nasal speech six weeks after treatment with such types of obturators [8].

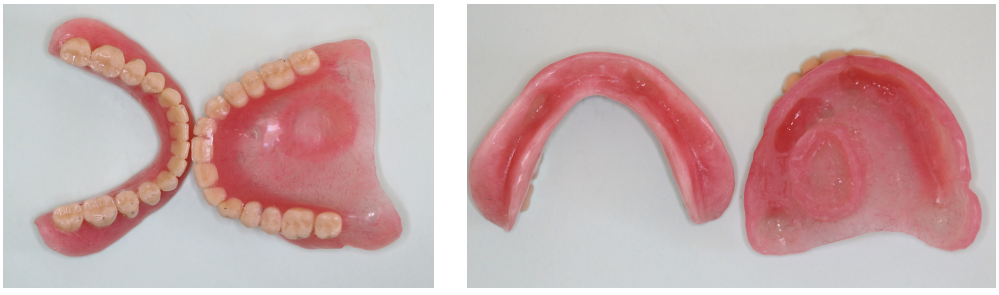
Research findings indicate the height of the obturating part and the right placement of the defect as factors affecting treatment result, as well. Some researchers suggest that high lateral and short medial sides provide optimal speech recovery, whereas others recommend maximum height of the lateral sides for reduction of nasal speaking [9, 12]. Some studies however, suggest that speaking and feeding normalization is possible only when the obturator has short walls [7, 11]. In a comparative study, Turkaslan et al. [17] report 94.24% speech intelligibility in 10 mm wall's height, 91.2% in 5 mm and 90.5% in 15 mm. These similar results and the comparison with the pre-treatment values of 45.04% ± 5.86% demonstrate the efficiency of open obturators regardless of their height.

There is a prevailing opinion that obturators provide a successful recovery of the damaged functions, despite the mixed evidence regarding most optimal treatment method after maxillary resection [14]. This is confirmed from a study with 188 patients, who have been treated with different types of obturators and successful rehabilitation of speaking and feeding has been achieved [10]. There is an interesting positive relationship between the rate of speaking recovery and patient's individual intellectual level and will. These findings coincide with the concept that treatment methods should align not only with the main prosthetic principles, but also with the individual specifics of each case [19].

## Materials and Methods

The reported clinical case presents the prosthetic treatment of 65-year-old patient, who has been operated from maxillary cancer. There was a defect in the left half of the jaw as a result of maxillary resection. The examination has shown that the defect is localized in the region of the hard palate, on the border between the midline and soft palate. The alveolar bone has been partially preserved, but edentulous. The mandible has been edentulous, as well, and the alveolar bone had reduced height and volume, due to atrophy. The patient was able to open his mouth to a limited extent, because of the earlier conducted radiation therapy; hence, making the treatment process even more difficult. The treatment plan has included a fabrication of hollow-bulb obturator and complete denture of the mandible. The impressions of both jaws have been taken with standard metal trays and alginate, whereas the maxillary defect has been preliminary tamponaded with gauze. The mandible's final impression has been taken with custom tray and creamy-consistency silicone material. The occlusal height and the jaw relationships have been registered in the next appointment by using occlusal rims. After the trial denture, the maxillary occlusal rim has been used as a custom tray and the final impression has been taken with creamy-consistency silicone material. The primary gauze tamponde and the functional design of the impression facilitated the casting of

a precise master model, which is important to the fabrication of hollow-bulb obturator. Both dentures had been made of acrylic resin (Figs. 1, 2). The "Oronasopneumotest" device was used for assessing defect hermetization and treatment efficiency. This methodology has been developed by Prof. Trifon Mihailov and provides the opportunity to registrate the pressure in the oral and nasal cavity during expiration. Its application shows the luck or the present of prosthesis' hermetization, on which depends the state of chewing and swallowing rehabilitation. The application of this methodology allows precise and objective evaluation of the achieved defect hermetization after the treatment. The results from the control examinations have indicated some decubital ulcers, which required insignificant corrections.



a b

**Fig. 1.** Completed dentures – occlusal (a) and palate (b) point of view

## Results

Treatment results have demonstrated good retention and stability of the obturator and mandible complete denture. The designed hollow-bulb part of the obturator has provided easy denture insertion into the defect, which has significant importance, due to the occurred radial trismus. The examination with the "Oronasopneumotest" device has registered good defect hermetization, which contributed to successful speaking rehabilitation. The hollow-bulb design of the obturator provided the necessary retention, reduced the snuffle and normalized the occlusion relations (Fig. 3). Normalization of the feeding and drinking functions was achieved, as well. The results from the recalls have indicated easy adaptation to the dentures. Some typical corrections for such type of treatment, which were related to the decubital trauma of the soft tissue, were performed accordingly. Improvements in the patient's overall life quality, social activity and self-esteem were consequently reported.

## Discussion

The main difficulties, in treatment of patients with large maxillary defects and complete edentulism, are related to taking an accurate functional impression from the defect. Additional problems, due to radiotherapy-induced trismus, are common and required specific treatment methods. The presented methodology of taking a functional impression

**Fig. 2.** Finished obturator

**Fig. 3.** Restored occlusal relations

after the trial denture, facilitated the correct insertion of the obturator into the defect. The preliminary gauze tamponation and the application of creamy-consistency silicone material allow the design of the substitution part with the desired height and volume. The height of the obturator's walls was 10 mm according to the design specifications. It enhanced obturator's easy and effortless placement into the defect, despite the limited mouth opening. The application of acrylic resin provided good retention and stability, similarly to results from other studies [1, 15]. The design of open substitution part with mid-height walls facilitated successful speech rehabilitation; thereby, confirming previous findings by Turkaslan et al. [17]. The achieved correct articulation and luck of snuffle demonstrated the open obturators' actual ability to provide good phonetic and speech intelligibility [8, 13]. Findings did not confirm other hypothesis, suggesting that such results are possible only when high lateral and short medial walls or maximum obturator's height, are designed [9, 12]. Research outcomes suggest that speech and feeding restoration are possible even in instances of complete edentulism; hence, challenging the opinion that the presence of teeth is a main determinant for treatment [4, 5]. Thus, it was possible to confirm the general opinion regarding the effective role of specific prosthetic treatment methods for successfully rehabilitation of damaged functions [10, 14].

## Conclusions

Prosthetic treatment of patients with maxillary resection is accompanied by numerous difficulties and issues, especially in cases with complete edentulism. This requires the application of specific treatment methods reflecting the individual specific characteristics. The effective planning, designing and fabricating of prostheses determines the successful recovery of speaking and feeding functions; thereby, contributing to life quality improvement .

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