ABSTRACT:

Aim: The aim of the described method is to present the main stages in the prosthetic treatment with hollow bulb obturators, which provides optimum defect hermetization and restoration of the damaged functions.

Materials and methods: The clinical case, described is on a 70-years-old patient with edentulous jaws and maxillary defect in the right half of the upper jaw. The preliminary impressions were taken with irreversible hydrocolloid impression material, and the final impressions were taken with additive silicone material. The occlusion height and the centric relations were registered as the classical technique. After the successful trial denture appointment, the surface of the plaster master model was covered by isolation polish. After this procedure, the master model was covered by even wax layer with 5mm thickness. It was designed to be thinner in the area of the resection line. The designed cavity was filled in with silicone impression material and covered with the folio. The baseplate with the arranged teeth was fixed to the model, packed in the cuvette and finished from heat-cured acrylic resin. The obturator’s cap was fixed to the denture’s baseplate with cold cured acrylic resin. The obturator and the complete denture of the mandible were adjusted and articulated in patient’s mouth in the final clinical stage.

Results: The applied prosthetic method allowed successful defect hermetization and helped for the restoration of the speech, feeding and patient’s self-esteem.

Conclusion: Prosthetic rehabilitation of patients with maxillary resection is possible only with the application of specific treatment methods.

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

INTRODUCTION

Surgical treatment of cancer in the oral cavity causes severe damages of patients’ feeding, speech and swallowing [1]. The main aim of the prosthetic rehabilitation is the restoration of the functions and improvement of the life quality [2]. Different methods and materials are applied, despite the defect’s size, location and the presence of preserved teeth [3]. The treatment plan should be pursuant to the main prosthetic principles and individual characteristics, as well [4, 5]. It is necessary to take into account all the factors, which affect denture’s retention and stability [6].

According to Devlin et Barker [7], the specificity of maxillofacial disorders needs the application of special treatment methods. This is correlated with the usage of new impression techniques [8, 9] and occlusal closure registration [10]. Despite that, Zaki et Aramany [11] suggest classical impression techniques, used in the fabrication of complete dentures.

Numerous of methods, with different materials and technologies, for fabrication of definitive obturators are described [12, 13, 14, 15, 16, 17]. Some authors consider, that complete hermetization can be achieved only with closed hollow bulb obturators [18, 19]. The obturation part is formed by a gypsum core, fixed to the cast model before flasking [20]. An alternative method exists, in which the hollow part is formed from silicone material [21], ice [22], sugar [23], asbestos [19], pumice [24] and plate from pure acetate [25].

Many authors [24, 26] claim that optimal defect hermetization could be reached only with the step-by-step fabrication of the obturation part and the baseplate, but others [27, 28] suggest the application of shortened methods. Specific methods are applied too, in which the temporary obturator turns in permanent [14].

According to most authors [17, 29, 30], the treatment with hollow bulb obturators is connected with many difficulties, which had their substitute with opened bulb obturators. Their main advantage is the reduction of the weight- from 6,55% to 35,06% less than the solid obturators [30]. Electromyographic examinations revealed better clinical results in the application of opened bulb obturator with substitute part [29]. This is explained with the reduced weight and volume, which facilitates the insertion in the defect and provides better comfort for the patient [17]. The main disadvantage of the opened obturators is the difficult cleaning [31].

AIM

The aim of the described technique is to present the main stages in the prosthetic treatment of patients with partial maxillectomy and a method of fabrication of closed hollow bulb obturator, which can provide optimal
defect hermetization and restoration of the damaged functions.

MATERIALS AND METHODS

The clinical case reports the prosthetic treatment of a 70-years-old patient with a maxillary defect as a result of a cancer operation. The intraoral examination revealed a unilateral defect in the right side of the upper jaw, which reach the midline and the soft palate [Fig.1]. There are no preserved teeth in both jaws. Facial asymmetry and right cheek sagging are visible [Fig.2].

**Fig. 1. Intraoral view**

The treatment plan included the fabrication of closed hollow bulb obturator and a complete denture for the lower jaw. The prosthetic rehabilitation was conducted in 5 clinical stages. The preliminary impressions from irresistible hydrocolloid material were taken with standard metal trays in the first clinical stage. The defect of the upper jaw was tamped with gauze in advance. Individual trays from light-cured acrylic resin were made in the dental laboratory, with which the final impressions were taken with additive silicone in the second clinical stage. The occlusion height and the centric relations were fixed in the third appointment. The denture was sent to the laboratory for final completion after the successful trial denture in the fourth appointment. In this laboratory stage, preparation of the gypsum model for flasking was made. The surface in the defect area was covered with isolation polish, and the cavity was covered with an equal layer of wax with a thickness of 5mm, which was thinner in the area of the resection line. The substitution part was filled in with silicone impression material and covered with foil [Fig. 3]. The baseplate with the arranged teeth was fixed carefully to the model, flasked into a cuvette and completed by heat-cured acrylic resin with low quantity of residual monomer. After the polymerization process, the silicone material was removed, and the obturator’s cap was fixed to the denture’s baseplate with cold cured acrylic resin [Fig. 4]. The obturator and the complete denture of the mandible were adjusted and articulated in patient’s mouth in the final clinical stage [Fig. 5].

**Fig. 2. Extraoral view**

**Fig. 3. Substitution part, ready for flasking**

**Fig. 4. Completed obturator**
DISCUSSION

The prosthetic treatment of patients with maxillary resection is accompanied by numerous difficulties, as a result of violation of the septum between the oral and nasal cavity. This imposes the use of specific methods and technologies for fabrication of appropriate prosthetic constructions. The described technique shows that the classical impression methods are relevant in the cases of maxillary resection, as Zaki et Aramany claim [11]. The thesis of some authors [8] that taking functional impressions could be possible only with special techniques was rejected. We established, that the application of classical methods, for fixing the occlusion closure and centric relations could be used, which coincides with the statement of many authors [21, 22, 23]. The idea that the clinical stages could be possible for implementation only with specific material and methods was not confirmed [10]. Despite the controversial opinions, it was unanimously accepted, that prosthetic rehabilitation is the optimal treatment method for patients with maxillary resection.

The described clinical case revealed that despite the defect size and the lack of teeth well planned prosthetic construction allows successful restoration of the damaged functions. The prosthetic treatment method and the technology of the obturator were in the foundation of the achieved results. The preparation of the gypsum model before flasking provided easy and atraumatic adjustment. The hollow bulb part improved denture’s retention and stability. This confirmed the claims of some authors [18, 19] for the advantages of the closed hollow bulb obturators and rejected the views of others, that defect hermetizations is possible only with opened obturators [17, 29, 30]. The examinations confirmed the advantages of the closed obturators, as the follow up appointments showed very good oral hygiene and patient’s information, that there are no difficulties in cleaning the denture [31].

The successful prosthetic rehabilitation retrieved patient’s self-esteem and his social activity, which according to many types of research has the main role for life quality improvement [2, 4, 5].

RESULTS

The results from the treatment revealed successful defect hermetization and creating a barrier between the oral and nasal cavity, which was the main aim of the prosthetic treatment. The tightly defect obturation allows the ability for fully speaking restoration and patient’s social life. The complex prosthetic rehabilitation, included an obturator and complete denture in the lower jaw, normalized patient’s chewing, feeding and swallowing. The successful restoration of the damage functions improved his self-esteem and life quality significantly [Fig. 6]. The applied method for obturator fabrication allowed easy insertion in the defect and shortened the adaptation period. The design of the closed substitution part of the denture allowed good oral hygiene and easy cleaning.

Fig. 5. Restored occlusion

Fig. 6. Extraoral patient’s view
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