



Case report

PROSTHETIC TREATMENT OF PATIENT WITH MANDIBLE RESECTION.

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ABSTRACT

Background: Literature findings indicate an increase in mandible resection cases. Retention and stability of dentures are the main issues in the prosthetic treatment of these defects.

Aim: The aim of the presented clinical case is to explore the possibility of prosthetic treatment of a patient with mandible resection of the frontal area.

Materials and methods: The clinical case monitors the prosthetic treatment of a 38-year-old patient with mandible cancer and resection in the frontal zone. The treatment plan was based on taking preliminary alginate impressions and developing gypsum models. It is planned to develop a partial acrylic denture sealed with silicone material. Additional preparation of the gypsum master model in the resection area took place in order to achieve the equal thickness of the special silicone material. The base of the alveolar bone was restored with hard plaster. In addition, the occlusal rim was fabricated with the purpose of establishing the centric relation and occlusal relationship. The denture was fabricated by acrylic resin with a low quantity of residual monomer and adjusted after adding silicone material over the resected part with functional tests to complete the design of the defect area.

Results: The accessed treatment results indicate good retention and stability of the denture. The application of silicone material provided a non-traumatic transition of the masticatory pressure without decubital ulcers in the resected zone.

Conclusion: The application of appropriate prosthetic treatment methods in patients with mandible resection leads to the successful restoration of feeding and speaking functions.

Keywords: oral tumor, oral rehabilitation, mandible resection, post-resection denture, cancer.

BACKGROUND

Literature review findings indicate a significant growth of oral cancer cases [1]. Alveolar bones are frequently affected, thereby justifying a surgical treatment by resection [2]. The latter often causes issues related to speaking, feeding and aesthetics [3]. The main prosthetic treatment issues are related to establishing prostheses' retention and stability [4]. In cases of maxillary resection, the created nasal defects could be used for retention, whereas prosthetic treatment options in the mandible mainly depend on the defect volume and localisation [5].

Most authors suggest that the presence of teeth facilitates the prosthetic treatment of the mandible, as it allows the application of different retentive devices for denture fixing [4, 6]. According to Petrovic et al. [7], patients with mandibulectomy in the area of premolars and molars can be rehabilitated only in the presence of stable teeth. A two-part acrylic resin denture with magnets and a saliva container for overcoming the xerostomia may be an option in cases of major mandible defects [8]. Alternatively, such cases should be treated by full arch implant dentures, which tend to deliver optimal restoration of the patient's outlook and masticatory function [9]. This approach is supported by Sato et al. [10], who report significant improvement in the feeding and life quality of these patients. Based on the positive treatment outcomes, Leinkram et al. [11] suggest that implant rehabilitation delivers the highest reconstruction standards.

Regardless of the applied treatment method, the consensus view suggests that the most optimal outcomes are achieved on the basis of accurate initial planning and denture construction in alignment with the individual specifics of every clinical case [4, 5]. Treatment specifics after resection are related to the lack of a stable base for the denture and the damaged tissue after radiation therapy [6]. The necessity for a non-traumatic transition of masticatory pressure sometimes requires the application of silicone material for direct or indirect sealing [12]. Their main advantages refer to the ability to quickly and easily execute alternations in the course of the healing process and achieve masticatory function improvements [13]. In addition to colour changing, disadvantages also stem from the difficulties of achieve stable and durable adhesion to the acrylic resin [14, 15, 16].

Some authors recommend the application of surgical methods for alveolar bone augmentation with bone graft

[17]. Others claim that optimal treatment results could be achieved through oral rehabilitation following fasciocutaneous free-flap reconstruction [18]. The application of combined surgical and prosthetic treatment methods requires multidisciplinary collaboration when rehabilitating resected patients [19].

AIM

The aim of the presented clinical case is to explore the possibility of prosthetic treatment of a patient with mandible resection of the frontal area.

MATERIALS AND METHODS

The presented clinical case follows the prosthetic treatment of a 38-year-old patient with mandible cancer. As a result of the surgical treatment, the frontal area of the lower jaw, including teeth from 32 to 44, were resected [Fig. 1a]. The examination showed a wide defect with a complete absence of alveolar bone in a well-maintained caries-resistant dentition [Fig. 1b]. The tissue palpation technique indicated numerous bone unevenness in the defect area, especially in the areas bordering with the preserved teeth. Difficulties in eating and speaking were reported as the main issues of the patient. The resulting bone loss also caused lower lip depression – a condition worsening the appearance and aesthetic of the patient.

Fig. 1a. Intraoral view of the patient



Fig. 1b. The frontal area of the lower jaw



Preliminary alginate impressions were taken from both jaws in order to develop a treatment plan. The analysis of gypsum models indicated that some teeth had short clinical crowns and not well-expressed equators, which prevents the fabrication of metal cast denture. The problem did not exist in the posterior zone, which motivated the choice of planning treatment on the basis of partial acrylic removable prosthesis. The plan intended to seal the prosthetic saddle with silicone material in order to prevent the emergence of ulcers and cancer relapse. Additional preparation of the master model in the defect area was conducted in order to achieve an equal thickness of the special material. The alveolar bone base was restored by adding hard plaster. After that, an occlusal wax rim for fixing the occlusal height and centric relation was fabricated on the initially prepared model. After a successful trial denture, the prosthesis was finished by applying acrylic resin with a low quantity of residual monomer, whereas metal clasps were used as retentive elements attached to the neighbouring and posterior teeth. In the last clinical stage, the denture was adjusted in the patient's mouth after adding silicone material, which had been designed by functional tests, for direct relining in the defect area. The prosthesis' borders, which surrounded the defect, were polished with special bur and coated with antibacterial varnish [Fig. 2a, b]. Finally, the denture was adjusted and articulated in the patient's mouth [Fig. 3a, b].

Fig. 2a. Finished denture - frontal view



Fig. 2b. Finished denture - lingual view



Fig. 3a. Adjusted denture



Fig. 3b. Adjusted denture - frontal view



RESULTS

Treatment results demonstrated good retention and stability of the denture. The application of silicone material facilitated painless prosthesis insertion in the defect area. The adjusted denture restored the occlusal relationship, which in turn allowed for normal eating. The applied technique enhanced the non-traumatic loading of the masticatory pressure in the defect zone. The speaking function was successfully recovered, as well. Lip support was created, thereby improving the patient's appearance and aesthetics. The follow-up examinations showed stable results and satisfaction in relation to eating and speaking functions without any ulcers. Six months after the treatment, there were no color changes or adhesion problem with the relined silicone material.

DISCUSSION

There is consensus regarding the numerous problems and difficulties of prosthetic treatment after bone resection [5, 6, 7]. It is suggested that achieving good retention and stability continue to be the main issues. The problems in mandibular resection are exacerbated due to tongue mobility which creates prerequisites for impaired stability during feeding and speaking. This requires the usage of different prosthetic treatment methods depending on resection size and localisation. In this particular case, the lack of a frontal alveolar bone makes treatment more complicated. The uneven defect surface and soft tissue damage due to the radiation therapy were other serious issues. This necessitated the application of silicone material for load pressure reduction during chewing and ulcers prevention. The achieved positive results confirmed the initially proposed advantages of the applied materials [13]. The adhesion between the acrylic denture and silicone remained stable during the regular check-ups in contrast to some suggestions considering this bond as a weak point [14, 15]. The application of contemporary relining materials and quality adhesion system demonstrated good bond stability. The preliminary preparation of the master model contributed to the development of a good surface for the silicone material in the defect area. Direct functional shaping allowed for good retention and stability of the denture and non-traumatic masticatory loading – a key advantage of the materials [12]. There were no colour changes in the prosthesis in contrast to some opinions [16].

The successful prosthetic treatment suggests that the use of silicone materials for direct relining could be a reliable alternative to implant treatment or other surgical methods, as described by some researchers [9, 10, 11, 17]. Silicone materials may also be a good alternative to complicated two-part magnit dentures [8].

CONCLUSIONS

Prosthetic treatment after resection of the mandible frontal area facilitates the successful restoration of feeding and speaking. Precise treatment planning according to the patient's individuality, as well as the right choice of materials, are key factors for achieving optimal results.

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