IJIRR

International Journal of Information Research and Review
Vol. 10, Issue, 06, pp.7547-7550, June, 2023

RESEARCH ARTICLE

MAXILLARY DEFECT REHABILITATION USING A HOLLOW BULB OBTURATOR: A CASE REPORT

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ARTICLE INFO

Article History:
Received xxxxxxxxxx
Received in revised form
xxxxxxxxxxxxxxxx
Accepted xxxxxxxx
Published xxxxxxxxxx

Keywords:

Rehabilitation,
Obturator,
Prosthesis,
Hollow Bulb.

ABSTRACT

Maxillary substance loss can be defined as an interruption in the continuity of the osseous and/or fibrous tissues of the maxillary arch. It can be caused by various factors such as trauma, infectious factors or resection of tumour processes. This loss of tissue often results in bucco-sinusal or bucco-naso-sinusal communication, which can have a number of disabling consequences. Functional problems are often observed as the communication created between these natural cavities results in leakage of air, food and fluids, making eating difficult or impossible and communication unintelligible. Reconstructive surgery is the treatment of choice to restore the integrity or continuity of affected structures after resection. However, surgeons may be limited by many parameters (tissue availability, risk of recurrence, physical condition of the patient, etc.) that may contraindicate this option. In this situation, the loss of substance can be restored with a maxillofacial prosthesis, which requires a case study and careful design to ensure its integration (1). The purpose of our work is to review the maxillofacial prosthesis with hollow obturator: This device will increase prosthetic stability, thus improving integration, but its construction presents a number of particularities that we have tried to clarify in this article.

INTRODUCTION

Loss of jaw substance, whether congenital or acquired, caused by trauma, infection, benign or malignant tumours, often leads to functional and aesthetic problems. Patients often report difficulty eating, which can be explained by the lack of a watertight seal between the oral and nasal compartments, as well as the loss of teeth in the resection site (1). This oral-nasal-sinus communication also causes problems with phonation. Similarly, the aesthetic appearance is altered by sagging soft tissue, reduced cheek and lip volume and altered facial symmetry. This can have a psychological impact on patients, affecting their confidence and self-esteem. Rehabilitation of these defects is a real challenge and requires a multidisciplinary approach with collaboration between the surgical team and the maxillofacial prosthodontist. A standardised treatment plan cannot be applied, as each case has its own characteristics and therefore requires individual, personalised care. In addition to this variety of clinical situations, the difficulty of prosthetic rehabilitation of maxillary substance loss is increased in the case of a totally edentulous patient. The absence of retention by clasps placed on the residual teeth compromises the prosthetic prognosis. The solution of choice in this case is the supra-implant prosthesis.

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Osseointegrated implants with retention devices (attachment, connecting bar, etc.) play an important mechanical role in ensuring optimal retention and stability. However, their indications are limited in patients with oral cancer. Radiation therapy is a major cause of implant failure. The dose of radiation and the time between radiation and implant placement appear to have a direct effect on implant success (2). If an implant solution is contraindicated, a conventional obturator maxillofacial prosthesis remains the only alternative. The success of this type of rehabilitation depends on a number of factors, such as the impression techniques and materials used, and the accuracy with which occlusal parameters are recorded. The type of obturator also plays an important role in prosthetic stability and there are two types in terms of materials used: rigid acrylic obturators and flexible elastomeric obturators. In our clinical case we chose a hollow rigid obturator. The use of resins offers superior structural stability and durability. However, their weight can affect the stability of the prosthesis. Therefore, we designed a hollow obturator, whose light weight improves retention of the prosthesis, but whose fabrication remains complex and requires clever methods. In this article, using a clinical case, we will follow the steps of a technique to design a closed rigid hollow obturator.

CLINICAL CASE

Mrs R.S., aged 60 years, presented to the dental consultation and treatment department with a large lesion occupying half of the hard palate.

The lesion had been present for approximately 6 months. She reported significant discomfort, difficulty eating and communicating, and pain in the affected area. On clinical examination, a large lesion was clearly visible on the mucosa of the hard palate, occupying more than half of the surface area. The lesion is a purplish pigmented growth, exophytic, proliferating and bleeding on contact with an irregular ulcerated surface (Figure 1). Pathological examination showed malignant melanoma proliferation invading the mucosa and extending into the superficial chorion, confirming the diagnosis of melanoma. The treatment plan consisted of surgical resection combined with adjuvant radiotherapy. The patient was seen 2 weeks after surgery. Endobuccal examination revealed a total bilateral maxillectomy with only a portion of the right maxillary tuberosity preserved (Figure 2). A nasogastric tube was inserted during surgery to provide enteral nutrition (liquid food) and to facilitate the administration of medication. However, it was a source of discomfort and sometimes pain, so it had to be replaced with a palatal plate to facilitate feeding through the oral cavity.

After cleaning the wound and filling the undercuts with compresses, an initial impression is taken with alginates using a suitable impression tray. The resulting model is used to fabricate a transparent resin plate. Once the plate has been adjusted by eliminating any over-extension, it is relined with conditioning resin. This plate will improve the post-operative course throughout the healing period. The flexible resin should be renewed every week to monitor changes in the residual tissue (Figure 3). Over the course of the surveillance sessions, an improvement in function was observed. In fact, the obturator plate has created a physical barrier that prevents food from entering the substance loss, contributing to more efficient eating and reducing swallowing problems. It also helps to improve voice quality and pronunciation by reducing air leakage. After 2 months of postoperative follow-up, clinical examination showed a non-bleeding wound, firm mucosal tissue with no signs of infection or necrosis, and a reduction in postoperative pain (Figure 4). Given the extent of substance loss and the absence of dental structures, we ruled out a conventional full obturator as its weight would compromise prosthetic retention and stability. Our treatment decision was to fabricate a maxillofacial prosthesis with a closed hollow obturator. An alginate impression was taken to fabricate an individual impression tray. Surgery and radiotherapy had left a sensitive and fragile mucosa, which necessitated the choice of a flexible material for the secondary impression: remargining and the central impression were made with polyether after filling the undercuts with compresses (Figure 5).

Figure 1. Endo-buccal view

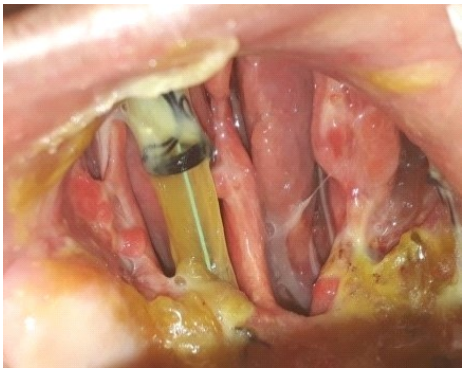

Figure 2. Endo-buccal view after surgery

Figure 3: Palatal plate with conditioning resin

Figure 4. Endo-buccal view after 2 months of healing

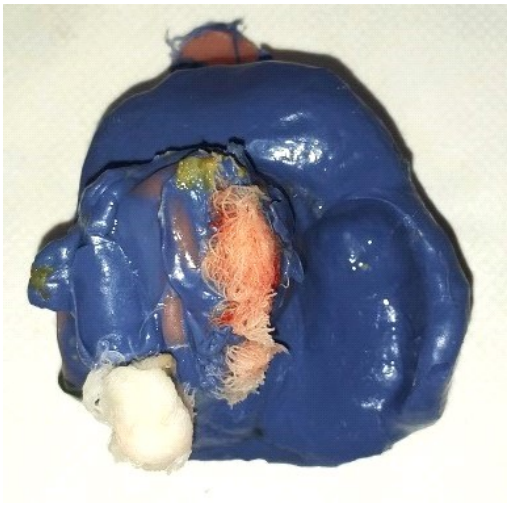

Figure 5. Maxillary secondary impression

the occlusion was adjusted and recorded according to the rules of conventional total prosthetics. Once the prosthetic teeth had been fitted and validated, the wax cast was repositioned on the model, with a recess made opposite the loss of substance in order to remove as much wax as possible, leaving a 2 mm layer to line the walls of the loss of substance. A wax lid was made to close the cavity (Figure 6).

Figure 6. Hollow wax model + lid

After polymerisation and finishing of the 2 prosthetic parts (model with prosthetic teeth and obturator) (Figure 7). A self-polymerising acrylic is prepared to seal the operculum and close the obturator. Polishing is then done in the conventional way (Figure 8).

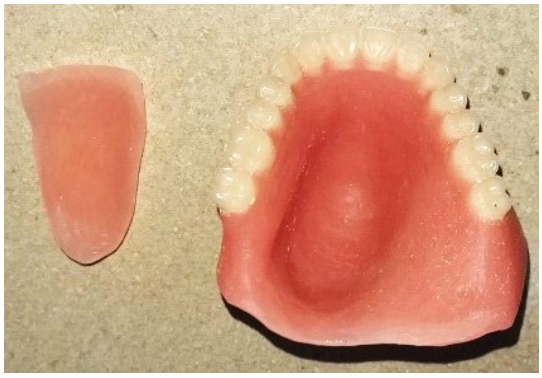

Figure 7. Maxillary prosthesis with lid

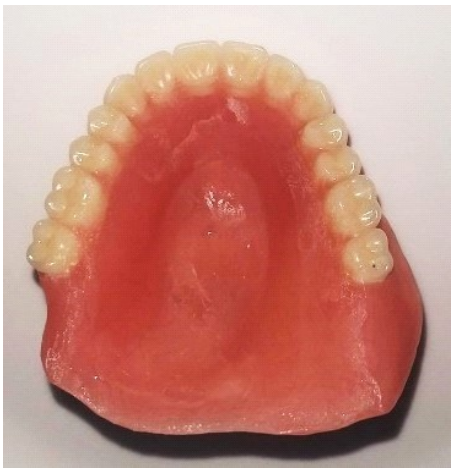

Figure 8. Prosthesis after finishing

Figure 9. Smile view of patient after wearing prosthesis.

DISCUSSION

The Hollow Obturator is a non-resin filled hollow obturator indicated for large areas of substance loss to improve patient comfort. It can be either open or closed. The open hollow obturator is easy to fabricate and adjust, but has the disadvantage that nasal secretions can accumulate in the hollow, resulting in unpleasant odour and the need for frequent cleaning. In contrast to the hollow closed obturator, it facilitates oral hygiene measures and offers reduced weight and maximum expansion, but its manufacture remains complex and requires sophisticated techniques to design it successfully.

A number of design schemes have been described in the literature, Habib and Driscoll described a simple method of a closed hollow obturator in which the upper part of the obturator is removed after polymerisation and as much resin as possible is removed before the operculum is resealed (3). The aim of simple techniques is to create a hollow obturator after polymerisation and then seal it with a resin lid. However, despite the simplicity of this manoeuvre, the risk of an unsuitable cover can be a source of leakage of water and secretions (4). Other techniques use a material which maintains the hollow shape of the obturator during fabrication but which can be evacuated afterwards through small orifices (5,6).

A number of materials can be used for this purpose. These include

- Powdered or caster sugar (7).
- Salt, but this has the disadvantage of not being uniform in thickness and of being porous due to cross-reaction with the acrylic resin (8).
- Ice or water, which is later frozen (9).
- Clay (10).
- Alum stone covered with cellophane paper, also known as el chab in Arabic. The disadvantage of this technique is that the cellophane cannot be removed after polymerisation (11).
- Tanaka et al have suggested incorporating polyurethane foam into the defective area of the prosthesis to create the cavity (12).

In this article, we have suggested a two-part technique where the obturator recess and the preparation of the operculum are done at the wax-up stage. Working at this stage is easier and quicker and gives us greater precision and flexibility. Once the two parts have been polymerised separately, the lid is attached to the obturator using a self-polymerising resin (13,14). The seal must be checked for leaks before the dentures are placed in the mouth. If the seal is incomplete, water and oral secretions may leak out, leading to bacterial proliferation, discolouration, bad breath and an increase in the weight of the denture (15).

The techniques are varied, but the aim is the same: to rehabilitate the patient with a stable, lightweight, retentive obturator prosthesis. The choice must be made after analysing the case and carefully considering the substance loss and its characteristics. Given the diversity of clinical situations, the management of patients with a maxillofacial deficit should not follow a common procedure, but each case should benefit from personalised and individualised management. Close coordination between the maxillofacial prosthodontist and the prosthodontic laboratory technician is desirable to find the most appropriate solution for each case.

CONCLUSION

The maxillofacial prosthesis with hollow obturator is a promising solution for patients with maxillofacial defects. With its functional and aesthetic advantages, this approach significantly improves the quality of life of patients, allowing them to regain social integration and self-confidence. With continued advances in technology and research, it is foreseeable that this method will continue to evolve towards simpler and faster techniques.

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