

CASE REPORT

Management of Oromaxillary Defect with a Definitive Obturator using Neutral Zone

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ABSTRACT

Maxillary defects can be very damaging in terms of the psychological impact on the patient; hence, it is imperative for the prosthodontist to take prompt measures to institute a definitive prosthesis for the patient. The present case report deals with the fabrication of a definitive obturator for a hemimaxillectomy patient utilizing a truly physiological prosthodontic concept like neutral zone.

Keywords: Aramany's Class 1 and recall, Definitive obturator, Hemimaxillectomy, Neutral zone.

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INTRODUCTION

Patients with acquired oromaxillofacial defects have either had an ablative cancer surgery or a severe trauma. These two groups are similar in that, in both situations, a person who had had a relatively normal anatomic and physiological function subsequently lost it overnight.¹ These defects impart significant physical and psychological damages to the patient.² Treatment modalities available include tooth-supported cast partial framework obturator, implant-supported obturator, and the latest being computer-aided design and computer-aided manufacturing (CAD/CAM) prosthesis.³⁻⁶ A team approach comprising of a psychologist, speech therapist, oncologist, and a prosthodontist yields the best result.³ Hence, the role of a prosthodontist is pertinent over here to communicate, understand the patient, and offer an effective treatment modality.

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CASE REPORT

A female patient aged 50 years reported to the Department of Prosthodontics, Bapuji Dental College and Hospital, Davangere, India, with a chief complaint of dissatisfaction with her current obturator prosthesis, with a change in voice, regurgitation of fluids into the nose, and burning sensation in the mouth and nose (Figs 1 and 2). On recording the medical history, it was revealed that the patient had undergone a left-sided maxillectomy for squamous cell carcinoma 10 years back after which an interim obturator was given. The interim obturator had broken clasps, attrited teeth, aged acrylic, and loss of retention, stability, and support (Fig. 3). The patient was referred to the Department of Oral Surgery to confirm any signs suggesting the recurrence of the carcinoma.



Fig. 1: Left-sided hemimaxillectomy defect extending into the nasal cavity



Fig. 2: Pretreatment frontal profile picture



Fig. 3: Existing obturator prosthesis, with broken clasps, aged acrylic, and attrited teeth



Fig. 4: Diagnostic irreversible hydrocolloid impression

On clinical examination, a hemimaxillectomy defect was seen on the left side. The tissues were assessed as healthy, and the defect was classified as Aramany's class 1 defect, which measured 2 cm mediolaterally and 3.5 cm superoinferiorly.⁷ Teeth present were 11, 12, 13, 15, 16, and 18. The periodontal condition for these teeth was assessed as good.⁸

Treatment Plan

An implant-supported obturator or a CAD/CAM-fabricated prosthesis was ruled out due to the poor socioeconomic status of the patient. A definitive obturator was planned with a full palatal major connector, I bar retentive clasp on 11 and 13, embrasure clasp between 15 and 16, circumferential clasp on 18, and multiple palatal guide planes on 11, 12, 13, 15, 16, and 18 for broader stress distribution.⁹

Treatment Procedure

Diagnostic impression of the defect area was made using irreversible hydrocolloid impression material (Fig. 4). The diagnostic cast was surveyed for the location of undercuts and selection of the path of insertion. The mouth preparation was done; a cingulum rest was made on 13, mesio-occlusal rest on 16 and 18, and disto-occlusal rest on 15.

After the mouth preparation was completed, a final impression was made using polyether elastomeric impression material. The impression was poured with type 4 dental stone to obtain the master cast. Block out of the master cast was done, and subsequent duplication was carried out with reversible hydrocolloid material. The mold was poured with an investment material to get a refractory cast. A wax pattern was fabricated and casted in base metal alloy to fabricate the cast partial framework. Conventional finishing and polishing techniques were followed except for the guide planes, which were kept as cast.¹ The cast metal framework was tried in the

patient's mouth to verify its complete seating, coverage of the defect, and the frictional fit. To reduce the bulk of the prosthesis, the bulb component of the obturator was omitted. Admixed compound and green stick was used to record the contour of the occlusal rim on the defect side (neutral zone). The patient was made to perform swallowing, sucking movements along with loud production of "ahh," "eee," and "oh" sounds.¹⁰ Simultaneously, assessment of the vertical dimension was made, and centric relation record was obtained (Fig. 5).

The wax try-in was carried out to check for the patient's chief complaint of phonation, nasal regurgitation, and irritation of the mucosa. Additionally, esthetics and occlusion were also evaluated (Fig. 6). The acrylic part of the prosthesis was hollowed to reduce the weight of the prosthesis.¹¹

Denture finishing and polishing was carried out in a conventional manner. The prosthesis was inserted; the functional aspect of the prosthesis was assessed by asking the patient to drink a glass of water; improvements in esthetics and phonation were also noted. The patient was instructed about maintenance of the prosthesis, insertion, removal, hygiene, and the importance of recall appointments (Figs 7 and 8). To evaluate the condition of the surgical site and prosthesis, a recall schedule was devised at 2 days, 1 week, 6 months, and on a yearly basis. The patient expressed contentment with the treatment, and reported no complaints regarding the dynamics of prosthesis, speech impairment, denture sores, burning sensation in the oral and nasal cavity, and regurgitation of fluids. She reported an overall improvement in general well-being and quality of life owing to her improved nutritional status.³

Manufacturer's Details

- Irreversible hydrocolloid impression material – DeTrey Zelgan 2002; Dentsply, York, PA.



Fig. 5: Neutral zone and centric relation record



Fig. 6: Trial prosthesis in place



Fig. 7: Definitive prosthesis after insertion



Fig. 8: Posttreatment frontal profile picture

- Polyether elastomeric impression material – Impregum Penta Soft Quick Step; 3M ESPE, St Paul, MN.
- Reversible hydrocolloid material – WiroGel M; Bego, Germany.
- Investment material – Wirovest; Bego, Germany.

DISCUSSION

An obturator (Latin: Obturare, to stop up) is a prosthesis, either natural or artificial, which closes an opening of the maxilla. For obturator prosthesis, retention must be defined as both resistance to displacement along the path of insertion and resistance to rotational displacement out of the defect, due to the force of gravity and function of the surrounding tissues acting against it.¹ The basic principles of removable partial denture designing should be reviewed when designing a framework for an obturator. Rigidity is pivotal for the major connector; support is derived from the occlusal rests and retention from both hard and soft tissues.^{1,2}

The number, position, health of the remaining teeth and the size, and location of the defect are important for determining the position and number of occlusal and incisal rests. Multiple occlusal rests improve support

and stability of the obturator prostheses and minimize the movement of the prosthesis toward the tissue.^{2,9} In order to locate the position of the teeth on the defect side, the use of neutral zone concept is validated, so that the forces exerted by muscles will stabilize the prosthesis rather than unseat it.¹⁰

In the present situation, maximum distribution of support known as the “snow shoe effect” was achieved by incorporating all of the remaining teeth into the design of the framework using maximum number of cingulum rests and guide planes and by using a full palatal major connector. In order to maintain equilibrium with the surrounding tissues, neutral zone concept was used to increase the stability of the prosthesis.

CONCLUSION

The clinical report discusses the fabrication of a cast partial obturator utilizing the concept of neutral zone for optimal function. Though it is difficult as well as challenging to improve the quality of life for hemimaxillectomy patients when compared with patients with conventional prostheses, success can be achieved with the skill, knowledge, and experience of a prosthodontist.

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