CASE REPORT

FABRICATION OF A CLOSED HOLLOW BULB OBTURATOR USING A NOVEL TECHNIQUE - A CASE REPORT

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ABSTRACT

Aim: Fabrication of a hollow bulb closed obturator for partial maxillectomy patients.

Background: The unprecedented communication of the oral and nasal cavity post maxillectomy leads to decrease in intra oral air pressure and gross amount of articulatory deficiencies and nasal air emission. This constraint can be overcome (within limits) by expanding the oral cavity volume to absorb the accumulating air. Prosthetic intervention, with maxillary obturator prosthesis is necessary to restore the contours of the resected palate and to recreate the functional impairment from a meticulous standpoint.

Case Description: In this case report the use of a wax mould to duplicate the hollow space of the defect with a very less time consuming and uncomplicated process through a single flasking process has been described.

Conclusion: This case report gives an insight as to how the bulb portion of the obturator can be hollowed out with ease and less constraints.

Clinical significance: Light weight of the hollow obturator allows a near about absolute eradication of all articulatory deficiencies, improvement in speech intelligibility thereby reinstating back the physiologic and psychologic well-being of the patient without compromising on the retention and stability of the prosthesis.

KEY WORDS

Post maxillectomy, light weight, resonance, nasalance, articulatory errors.

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INTRODUCTION

Approximately 5 percent of all cancers involve structures of the mouth, tongue, oropharynx, nasopharynx, and larynx.[1] Following post resection, patients often suffer from a plethora of functional problems related to mastication, deglutition and speech. Even changes in appearance and psychosocial status affects the quality of an individual's life. The undesirable communication between the oral and nasal cavities reduces intraoral air pressure during speech leading to articulatory imperfection, hyper nasal speech, nasal air emission and reduced vocal loudness.[2] An important consideration in designing the obturator is the bulb portion of the prosthesis which can be either solid, open hollow or closed hollow, each having its own advantages and disadvantages. The increased weight is another concern, so an attempt to reduce the bulk, a hollow closed bulb obturator with modifications from the conventional methods was undertaken to contemplate the improvements on a subjective manner.

CASE REPORT

A 46 year old male patient reported to the Department of Prosthodontics and Crown & Bridge, Guru Nanak Institute of Dental Sciences & Research, Kolkata with the chief complaint of inability to articulate properly and difficulty in eating. After a thorough corroboration of history, it was found that the patient had undergone partial maxillectomy for squamous cell carcinoma of the right maxilla 6 months ago. Intra oral examination revealed a well healed surgical defect, class II (Aramany classification)[3], an acceptable mouth opening, and the teeth present on the defect as well as on the non- defect side were found to have no significant findings and full set of mandibular dentition intact (Fig 1,2). After explaining the treatment modalities and obtaining the patient's consent, a closed hollow bulb definitive obturator with specific modifications was planned.

TECHNIQUE

A maxillary primary impression was made with irreversible hydrocolloid impression material (Algitex; The Bombay Trading Corporation, Mumbai) using a stock metal tray (Ruby dental Pvt.Ltd, Delhi, India) modified to fit the contours of the vestibular areas after necessary blocking out of the undesirable undercuts on the defect with gauge coated with petrolatum jelly.


Fig 1, 2: Intra oral view showing the defect and the adjacent and opposing dentition.

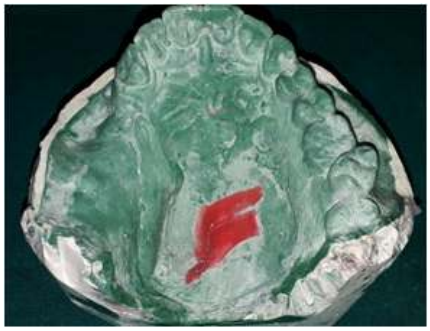


Fig 3, 4: Preliminary cast and custom tray

The impression was poured in type III gypsum product (B. N. Stone; B.N.Chemicals, Kolkata) and the primary casts were obtained. After necessary blocking out, the custom tray was fabricated using auto polymerizing acrylic resin (DPI Rr Cold Cure, Mumbai, India) (Fig 3,4) and the border molded tray was used to make the final impression after relining the defect portion with low fusing impression compound (DPI Pinnacle tracing Sticks, India). After verification of the proper extensions a wash impression was made with medium body viscosity VPS elastomeric impression material (Reprosil, DENTSPLY, Germany). (Fig 5)

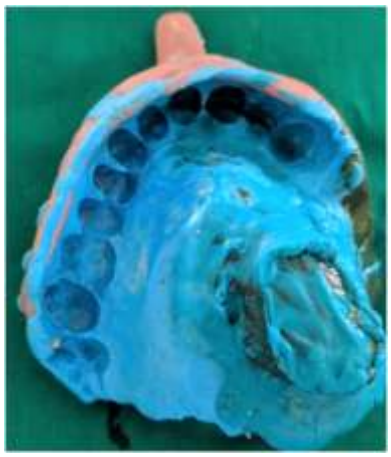

Fig5: Final impression

- Subsequently the impression was poured with type III gypsum product(B. N. Stone; B.N. Chemicals, Kolkata), and the master cast was obtained.

- Maxillomandibular relationship records were made and mounted on the articulator and teeth setting was done accordingly, and trial verification was performed.

The waxed-up obturator was sealed with the master cast and invested in the base part of the utility flask (local make) with the help of type II gypsum product. Flasking procedure was completed in usual manner by pouring a type II gypsum material in the counterpart. The flask was kept under a mechanical clamp for few hours. The flask-clamp assembly was immersed in a de-waxing unit for 10 minutes and de-waxing procedure was carried out in a conventional fashion to ensure complete wax elimination. (Fig 6).

- A single sheet of wax (Modeling wax; Deepti Dental Products, Ratnagiri, India) was adapted on both the de-waxed cast surface (invested in the base flask) and the de-waxed teeth-surfaces and the investing plaster surface (in the counterpart) (Fig 7). The wax-sheets were properly adapted on areas corresponding to the future hollow space of the obturator prosthesis. Wax-sheet adapted on the dewaxed surface was cut to create 3 tissue stops viz one at the base and two at the lateral walls of the defect. Petrolatum jelly was applied to both adapted wax sheets as a separating medium. A wax mould was formed by softening the wax in hot water sufficient

Fig 6: Flasking and dewaxed flasks

Fig 7, 8: Adapted waxes and wax mould for the hollow bulb

Fig 9: Finished closed bulb hollow obturator

Fig 10: Post op intra oral view

enough to accommodate the space between the two adapted wax-sheets after closing the flasks (Fig 8). The softened wax moulds were placed on to the adapted wax-sheet in either flask and both flasks were closed in close approximation. The base and the counter parts were separated, excess wax flash was removed and the flasks were closed again to ensure complete closure. The softened wax, meanwhile, completely occupied the hollow space between two adapted wax sheets. The wax-mould was removed and examined for precise relocation. A second dewaxing was carried out to eliminate the adapted waxes.

- The wax mould was first oriented according to the stops and then pressed on the packed-acrylic-resin (DPI Rr Heat Cure, Mumbai, India) till all the stops rested in previously confirmed position on the investing-plaster surface. The mixed acrylic resin was also placed on the base flask and closed with the counterpart in close approximation under the mechanical clamp. Curing cycle was carried out as per the manufacturer's instructions. The flask-clamp assembly was again kept at room temperature for bench cooling. After deflasking, the obturator was retrieved. Upon removal, there were 3 openings created, through which hot water was flushed in to

Fig 11: Hollow nature of the obturator demonstrating light weight and buoyancy

eliminate any residual wax remaining, the holes were filled up with auto polymerizing acrylic resin (DPI Rr Cold Cure, Mumbai, India), finished and polished in a conventional fashion. (Fig 9,10).

DISCUSSION

A closed hollow bulb obturator fabricated in a single flask and lost wax technique provides aneasier and less time consuming procedure than other conventional methods. The weight of the bulb is significant as it exerts dislodging and rotational forces on the abutment teeth. Hollow type of obturators show significant reduction in weight up to 6.55% to 33.06% depending on the size of the defect.[4] On follow up of the patient post 4 weeks, it was found out that the articulatory deficiencies were markedly eliminated, supported by supplemental video (1, 2) supported by the evidence that oro nasal separation improves resonance and the nasalance can be almost eliminated and can be as low as in normal individuals.[5,6] The patient had no difficulty in chewing food and there was no complaint of regurgitation, air leakage or food accumulation beneath the prosthesis. Maintaining the desired principles of obturator fabrication to obtain maximum retention and stability were obtained through proper impression of the defect area, recording the lateral boundary and the postero medial extension more than 1 cm in dimension. The precise determination of acceptable internal hollow space is well deciphered through this technique (Fig 11). This technique is a modification of some other mentioned ones.

LIMITATIONS

The above mentioned method for fabricating a closed hollow bulb obturator saves time for lengthy, elongated and complicated process for hollowing out the bulb portion but utmost care must be taken in precise relocation of the wax mould into the polymerizing resin during packing procedure and sufficient amount of cooling must be initiated to prevent its distortion, as wax is susceptible to distortion due to release of internal stresses.

CONCLUSION

Apart from providing a water tight seal to the maxillary obturator prosthesis and sticking to the three main principles of success vizretention, stability and support, closed hollow bulb with its light weight helps in early adaptation to the prosthesis. Marked improvement in intelligibility of speech encourages the fabrication of a hollow bulb along with a technique which is less time consuming and uncomplicated, helps to restore back both the physiologic and psychologic well-being of the patient.

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