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MAXILLOFACIAL REHABILITATION OF A CASE OF LEFT TOTAL MAXILLECTOMY WITH SERIES OF OBTURATORS. --- A CASE REPORT.

Prosthodontics

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ABSTRACT

God has blessed all of us with beauty but for some, actions or fate can change it like having bad habits, post-surgical after being operated for cancer, some accidental injuries or developmental defects. The defects caused by surgical interventions in the head andneck region differ according to size, shape, and location. The rehabilitation of such defects is very vital in the patient's life which involves his speech, mastication, deglutition, and aesthetics which can be treated successfully by prosthetic rehabilitation.Thus, there was the rise of the branch of maxillofacial prosthodontics which pursues to re-create the missing or the lost anatomical structures.

The treatment is schematically divided into three phases, according to the surgery and the wound healing process. This article describes the different procedures involved in preparing the many types of obturators which the patient should be treated with, beginning with the surgical phase to the definitive obturator.

KEYWORDS

Maxillectomy, Osteogenic sarcoma, Obturator prosthesis, Heat cure acrylic resin

INTRODUCTION

The term maxillectomy is used by head and neck surgeons and prosthodontists to describe the partial or total removal of the maxillae in patients suffering from benign or malignant neoplasms. Maxillectomy defects can be categorized as limited, partial, medial, subtotal, total, radical, or extended.[1] Surgical defect often includes part of the hard and soft palates, which results in an oro-antral communication.[2] When these structures must be removed, partially or completely, because of malignancies, a team approach is critical.[1]

Successful obturation depends on the volume of the defect, and the positioning of remaining hard and soft tissues to be used to retain, stabilize, and support the prosthesis.[3]The weight of the prosthesis may act as a dislocating force; therefore, the prosthesis must be as light as possible. Obturator designs for partial and total maxillectomy defects have included open and closed hollow obturators, inflatable obturatorsand 2-piece hollow obturator prostheses.[1]

This clinicalreport describes an original indigenous technique of fabricating a hollow bulb obturator using the lost wax-salt technique, to fabricate the maxillary obturator as lightweight as possible providing adequate retention, stability, and patient comfort.

CASE REPORT:

A patient 21-year-old female was referred for fabrication of hollow bulb obturator prior to surgical intervention of left total maxillectomy.A review of the CT Scan of paranasal sinus was carried out with multislice axial and coronal enhanced scans were obtained for the paranasal sinuses after intravenous injection of non-ionic contrast as per requirement. A large lobulated expansile osseous lesion involving the left half of the maxillary sinus, nasal cavity and ethmoid sinuses is observed. Remodeling of the bone is noted with intra-oral and intraorbital extensions which are more pronounced on the left side. (Fig 1 and 2)

Fig 1: Extra-oral view

Fig 2: Intra-oral swelling of the lesion

Also a hard intra-oral swelling was observed on the left side of the maxilla characterizing an osseous lesion and so the case was taken up for fabrication all the three stages of obturator.

Technique of fabrication:

DEFINITIVE OBTURATOR 1:

HEATCURE ACRYLIC HOLLOW BULB OBTURATOR

Primary Impressions (Upper and lower) were made using Irreversible hydrocolloid impression material and diagnostic cast was poured and markings were done on the cast to mark the planned surgical line of resection.A Mock surgery was done on the cast in the defect area and a surgical obturator for immediate post-surgical insertion was fabricated. (Fig 3 and 4) Surgical resection of left total maxilla was carried out and the surgical obturator was secured on the remaining teeth and added retention achieved by sutures placed in the mucosa.

Fig 3: Mock surgery of the cast in the defect area

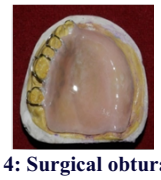

Fig 4: Surgical obturator

Post One month of healing of the defect was analyzed and a primary impression of the defect made with impression compound with Irreversible hydrocolloid wash impression made of the anatomical structures on the primary impression of the defect. Primary cast of the defect was poured and an interim obturator was fabricated with wax incorporated in the defect space for making the interim obturator light and then the interim obturator was delivered for period of 3 months. (fig 5 and 6)

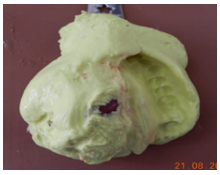

Fig 5: Primary impressionofdefect

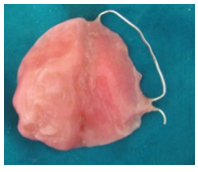

Fig 6: Interim obturator fabricated

Follow up was done regularly and the defect completely healed after 4 months of recall and final impression of the defect was made in addition silicone elastomeric impression materials. Temporary denture base with wax-rim was fabricated on the final cast and the jaw relation was recorded, try-in was done and final treatment module planned was a definitive obturator with hollow bulb. Flasking was done in the maxillofacial flask and dewaxing was doneby placing the clamp and flask containing the cast in boiling water (100 degrees) for 5minutes. (fig 7 and 8)

Fig 7: Elastomeric final wash impression of the defect post 5 months

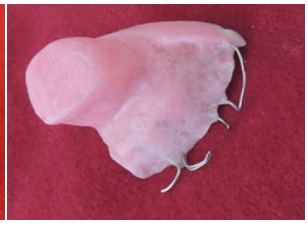

Fig 8: Hollow bulb obturator fabricated

First Layer of Heat-cure Acrylic In The Defect was done by Sprinkle-on Method then the Lost wax-salt technique was used by placement of a wax ball enveloped in salt followed by acrylization was done using heat cure acrylic resin. 4 holes prepared to remove wax and salt with removal of salt by injecting hot water and Removal of wax layer by steam-jet.

The holes were then Sealed with cold-cure acrylic resin, finishing and polishing of prosthesis done fabricating a Hollow bulb makes the Obturator that is light weighted and will float in water. The prosthesis was delivered to patient, all post insertion instructions were given. The weight of the hollow-bulb heatcure acrylic obturator was 50 gm.

DEFINITIVE OBTURATOR 2:
ACETYL FRAMEWORK BASED HEATCURE ACRYLIC HOLLOW BULB OBTURATOR

Follow up was done post one year of patient using the heatcure acrylic hollow bulb obturator delivered and it was decided to fabricate a new obturator for the patient based on an acetyl framework to reduce the weight of the obturator still more.

A final impression of the defect was made on which an acetyl framework was fabricated and the fit was checked, the total weight of the acetyl framework was only 04 gm. (fig 9)

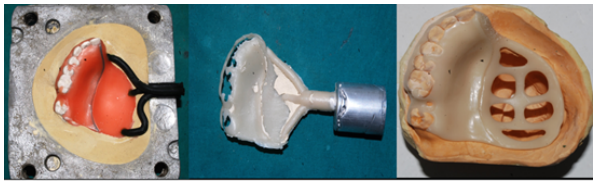

Fig 9: Steps in Fabrication of acetyl Framework

Later using the acetyl framework with addition silicone elastomeric impression material a final impression of the defect was recorded and using the altered cast technique the new final cast was poured. Wax rims were fabricated on the acetyl framework and the jaw relation was recorded, try-in was done and using the lost wax technique the hollow bulb obturator was fabricated on the acetyl framework weighing 36 gm.

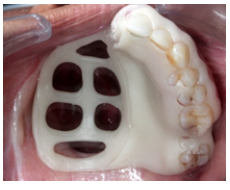

Fig 10: Intra-oral acetyl framework trial

The fit was good and the weight was 14 gm less than the heatcure acrylic hollow bulb obturator. (fig 10)

DEFINITIVE OBTURATOR 3:
CAST PARTIAL DENTURE FRAMEWORKED HEATCURE ACRYLIC HOLLOW BULB OBTURATOR

Follow up was done post one year and two months of patient using the acetyl framework based heatcure acrylic hollow bulb obturator and it was decided to fabricate a new obturator for the patient based on a cast partial denture framework as the esthetic value of the acetyl framework was very bad and the acetyl framework had completely turned yellowish in colour. The retention was also compromised and so it was decided to go ahead wit a cast partial denture framework based hollow bulb heat cure acrylic denture.

Fig 11: Elastomeric final wash impression of the defect recorded

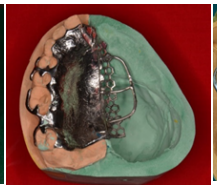

Fig 12: Final cast poured for fabrication hollow-bulb obturator

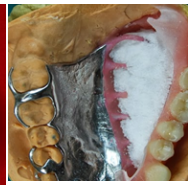

Fig 13: Lost salt technique for fabrication ofhollow bulb obturator

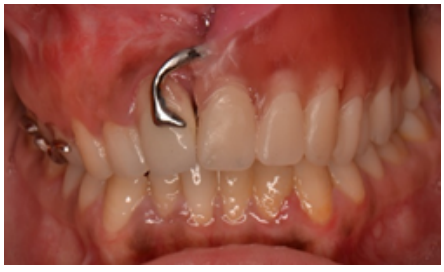

Fig 14: Denture delivery of Cast partial denture framework based hollow bulb obturator

A final impression of the defect was made on which a cast partial denture framework was fabricated and the fit was checked, the total weight of the cast partial denture framework was 40 gram. Using the cast partial denture framework with addition silicone elastomeric impression material a final impression of the defect was recorded and using the altered cast technique the new final cast was poured. (fig.11 and 12) Wax rims were fabricated on the cast partial denture framework and the jaw relation was recorded, try-in was done and using the lost wax technique the hollow bulb obturator was fabricated on the acetyl framework weighing 40 gm. (fig.13)

The fit was good and the weight was only 4 gm more than the acetyl framework and10 gm less than the heatcure acrylic hollow bulb obturator. (fig.14)

DISCUSSION:

Successful prosthetic reconstruction of a subtotal bilateral maxillectomy defect is a challenging procedure that requires multidisciplinary expertise to achieve acceptable functional speech and swallowing outcomes.[4,3] The objectives of maxillofacial prosthetics are restoration of esthetics, function, protection of tissues, therapeutic / healing effect and psychologic therapy.[5]

Stage 1: A surgical obturator is prepared in cooperation with the surgeon and all other relevant diagnostic means, to determine the extent of the tumor. The surgical obturator has four basic functions:Used as a bandage holder and hemostasis, provides mastication and deglutition ability, so that a feeding tube won't be needed, Speech and Aesthetic appearance.

Retention of the present teeth, especially on the side of the resection, can be used to provide retention and stability for a prosthesis.

Stage 2: INTERMEDIATE OBTURATOR PROSTHESIS

The objective of an intermediate obturator prosthesis is to provide the patient with immediate functional, postsurgical rehabilitation. The design of the prosthesis should be conducive to modification as healing progresses. So, the prosthesis is fabricated in acrylic resin and soft relining materials which enables speech and deglutition.[4]

Stage 3: DEFINITIVE OBTURATOR (Hollow bulb Heatcure acrylic denture)

A definitive obturator prosthesis can be constructed 3 to 4 months after surgery. Prosthesis should be contoured to achieve optimal sealing during function of the palatopharyngeal musculature. There is a need to fabricate the obturator hollow to reduce the weight, improve the voice resonance and to improve the patient compliance.The methods described in this procedure for fabricating this hollow obturator can be applied to complete or partially edentulous situations. This technique allows for the complete processing of the prosthesis from the wax-try-in stage, saving clinical and laboratory time while providing the patient with a lightweight, seamless obturator.[6,7]

Stage 4: DEFINITIVE OBTURATOR (Acetyl framework based hollowbulbheatcure acrylic obturator)

An acetyl framework-based obturator prosthesis was fabricated post 12 months of delivery of the heat cure acrylic hollow bulb obturator as the weight of the obturator was more. The need to fabricate the this acetyl framework-based obturator was to reduce the weight and improve the esthetic outcome of the treatment as the clasps compromised the esthetics in the heatcure acrylic hollow bulb obturator improving the patients appearance and social acceptance.

Stage 5: DEFINITIVE OBTURATOR (Cast partial denture framework based hollowbulbheatcure acrylic obturator)

A cast partial dentureframework-based obturator prosthesis was fabricated post 14 months of delivery of the acetyl framework based heatcure acrylic hollowbulb obturator as post 14 months of using this obturator, the entire framework had become yellowish and the retention of the framework was quite compromised.

Thus, need arised to fabricate the cast partial denture framework based hollow bulb heatcure acrylic obturator to improve the retention and functionality of the patient.[8,6]

SUMMARY

A modification of an earlier procedure allows for complete processing of a closed hollow obturator from the wax try-in stage.[9,10]In this clinical report, preoperative treatment planning involving the head and neck surgeon, the maxillofacial prosthodontist, and the speech pathologist resulted in a delayed/ interim obturator that enabled the patient to speak and swallow successfully. This report describes successful prosthetic rehabilitation of left hemi-maxillectomy patient with a surgical obturator, interim obturator and definitive obturator prosthesis which were fabricated as hollow bulb obturators in direct heat cure acrylic, acetyl framework based and cast partial denture framework.

The weight of the heat-cure acrylic hollow bulb obturator was 50 gm, acetyl framework-based heat-cure acrylic hollow bulb obturator was 36 gm and the cast partial denture framework based heat-cure acrylic hollow bulb obturator was 40 gm.

Concluding that the cast partial denture framework-based heatcure acrylic hollow bulb obturator served the best purpose for the patient as her definitive obturator.

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