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RESEARCH ARTICLE

PROSTHODONTIC MANAGEMENT OF THE MAXILLARY DEFECT SECONDARY TO MUCORMYCOSIS : A CASE REPORT

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Abstract

Mucormycosis is an opportunistic fungal infection that invades rapidly and is usually seen in the immunocompromised patients. Rhinocerebral and pulmonary are the main two forms.Rhinocerebral form starts in the maxillary antrum and invades rapidly to cause necrotizing ulceration of palate with a blackish slough and subsequent exposure of bone.Initial finding that is usually found is sinus opening or palatal perforation and subsequent mobility of teeth. Surgical resection of the necrosed area results in a defect that may vary from a small opening to extensive defect.So the prosthodontic management becomes important to aid the patient with basic functions that is mastication , speech and esthetics.This case report presents a case of the prosthodontic management of the acquired maxillary defect that occurred secondary to mucormycosis in a known diabetic male patient.

Introduction:-

Mucormycosis is an opportunistic deep fungal infection caused by "bread mold fungi" called Phycomycetes or Zygomycetes and is one of the most fulminant and fatal infection[1]. PALTAUF first noticed this infection in 1885 and termed it as “mycosis mucorina” which is presently known as “Mucormycosis[2]. There are 6 major clinical forms based on clinical sites involved. These are Rhinocerebral, Pulmonary, Gastrointestinal, Central nervous system, Cutaneous and Disseminated, but the two main forms of mucormycosis are Pulmonary and Rhinocerebral.[3]Rhinocerebral mucormycosis usually starts in the maxillary antrum which infects uncontrolled diabetic patients.[4]It begins soon after the inhalation of the fungal spores and may involve nasal mucosa, turbinate bones, paranasal sinuses and orbit. It can also spread into intracranial tissues. It causes thrombosis and necrosis of hard and soft tissue by penetrating blood vessels and arteries[5].Occurrence of necrosis in maxilla is rare as it is highly vascular. Maxillary necrosis is a severe and late occurrence.Once it is involved, Invasion of surrounding tissues causes necrotizing ulceration of palate leading to oro-antral/ oronasal communication that causes regurgitation of foods and fluids and may be associated with acute and chronic sinusitis. Surgical resection of the necrosed part results in formation of the defect that may range from a small size to extensive one.These acquired defects in turn results in hypernasal speech ,difficulty in mastication and esthetic concerns to the patient. Maxillofacial defects may be associated with the cosmetic deformities, such as collapse of the middle third of face,[6] and this may be accompanied by dental and temporomandibular joint problems.[7]

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Prosthodontic rehabilitation with maxillofacial prosthesis is necessary to obturate these defects so as to aid the patient with improved oral functions such as mastication , deglutition , speech and esthetics. Prosthodontic intervention with a maxillary obturator prosthesis , is necessary to restore the contours of the resected palate and to recreate the functional separation of the oral cavity and sinus and nasal cavities.Prosthodontic intervention is essential even prior to the surgery in which prosthodontist examines the patient thoroughly, radiographic assessment such as CBCT and OPG are done and diagnostic impression is taken.CBCT helps in diagnosis the extent of the lesion and condition of the remaining teeth..After patient's clinical and radiological examination ,case should be discussed with the surgeon regarding the preservation of as much palatal bone and teeth as possible without compromising surgical resection to improve the prognosis of prosthodontic rehabilitation. The prosthodontic rehabilitation has many challenges as it involves the replacement of not only the missing teeth but also the lost soft and hard tissues . And the presence of the post surgical soft tissues scars and microstomia makes rehabilitation more challenging.

The partially edentulous maxillectomy dental arches are classified into six groups based on the relationship of the defect area to the remaining abutment teeth as per aramany's classification.[8]

This case report presents a case of prosthodontic management of the acquired maxillary defect secondary to post-covid mucormycosis in an uncontrolled diabetic patient.

Case Report 1:

A 45 years old male diabetic patient was referred from Department of ENT at Medical College and Hospital to the Department of prosthodontic and crown and bridge at Dr. R Ahmed Dental college and hospital for the fabrication of the surgical obturator before his planned surgery that is right total maxillectomy. Intraoral examination revealed grade 3 mobile 14,15 ,16, 17 and associated gingival recession(fig-1). Necrosed bone and palatal perforation was also evident in upper right quadrant. All teeth were intact in left upper quadrant and lower arch.On taking medical history, It was found that patient was known diabetic and was under medication for the same and a diagnosed case of post covid mucormycosis.

Fig 1:- Intraoral View Before Surgery.

Fig 2:- OPG before surgery.

Patient was referred for the fabrication of the surgical obturator only after completion of his medical treatment for the mucormycosis so as to ensure disease free period to prevent cross contamination.Throughout the entire procedure (both clinical and laboratory work),all the protocols of sterilization and disinfection were followed.

To begin with the procedure, CBCT and OPG were done. Radiological extent of the lesion was determined after consulting radiologist.Diagnostic impressions were made with irreversible hydrocolloid impression material. The diagnostic maxillary cast obtained was duplicated, and a working cast was made in Plaster of Paris or Type II gypsum product.Then surgeon was consulted and Margins of the proposed surgical resection outlined in a presurgical maxillary cast as per surgeon's advice (fig-3). The maxillary cast was altered to conform to the proposed surgical resection. Teeth in the outlined area were removed from the cast and alveolar height was reduced (fig-4)and then surgical obturator was fabricated in a conventional method using clear autopolumerizing acrylic resin (fig-5).Circumferential Clasp was given on upper left 1st premolar and adams clasp was placed on upper left 1st molar for increasing retention.Clasps were fabricated using 21 gauge orthodontic stainless steel. Surgical obturator was fitted (fig-6) and secured at the time of surgery that aided the patient through the immediate post operative period.Follow up was done and patient was satisfied with the functions of surgical obturator.

Fig 3

Fig 4

Fig 5

Fig 6

Case Report 2

The same patient reported to the Department of Prosthodontics and Crown and Bridge at Dr. R. Ahmed Dental College And Hospital after two months of right total maxillectomy. This time, patient reported with the chief complaint of difficulty in mastication and regurgitation of fluid from the nose ,hypernasal speech and esthetically non pleasing apperance.On intraoral examination,findings were presence of the acquired maxillary defect in upper right quadrant extended from the right upper central incisor upto upper right 2nd molar(fig-7), scar in right buccal mucosa with reduced mouth opening, both of which made the clinical procedures more challenging.This was class 1 maxillary defect according to aramany's classification(1978) of partially edentulous maxillectomy defects.Approximate size of the defect was 4.6 × 2.1 × 2.8cm.Treatment planning was done and it was decided to do prosthodontic rehabilitation with the interim obturator in place of definitive prosthesis as tissues were still in healing period.

Fig 7:- Intraoral View After Surgery.

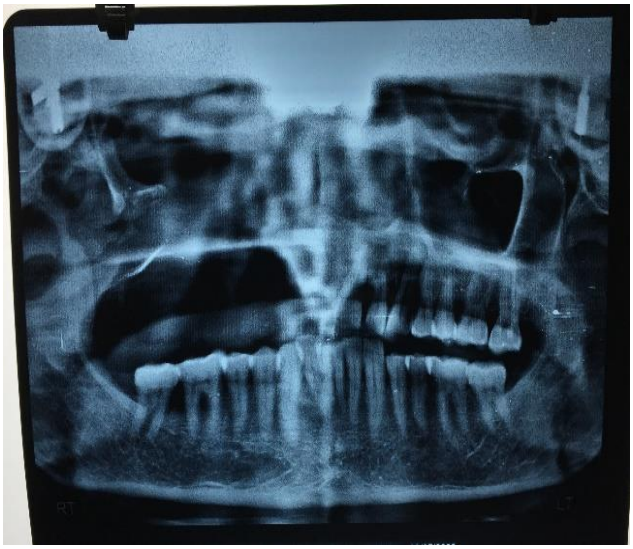

Fig 8:- OPG after surgery.

Necessary mouth preparations were done.To begin with the procedure, defect was packed with sterile piece of gauge impregenated with petroleum jelly. Primary impression was taken with alginate impression material in a selected stock tray (fig-9) and primary cast was made(fig-10).Double layer of wax sheet(modelling wax) was adapted over the teeth to act as spacer and single layer of wax sheet was used in other region followed by fabrication of the special tray with cold cure acrylic resin (fig-11).Special tray was adjusted in patient' mouth and border moulding was done using low fusing compound that is green stick.

Fig-9

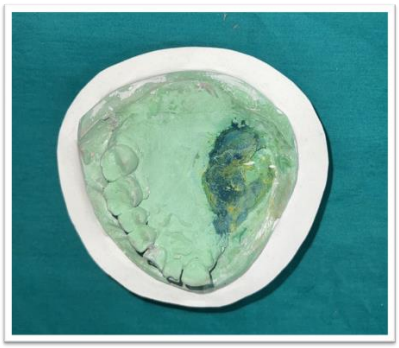

Fig-10

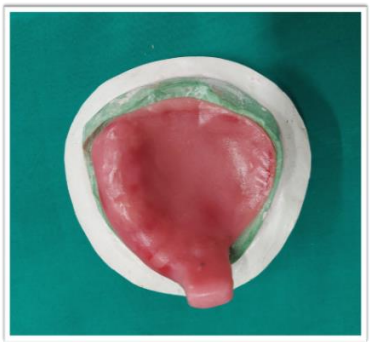

Fig-11

Then , defective portion was recorded with the admix (mixture of impression compound and green stick in 3:7 ratio)(fig-12). Tray adhesive was applied (fig-12). then final impression was taken with medium body addition silicon impression material (fig-13,14).

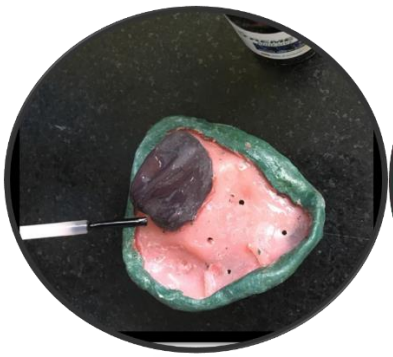

Fig 12

Fig 13

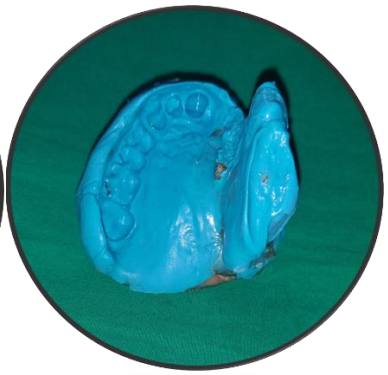

Fig 14

After that, occlusal rim was fabricated on master cast and jaw relation was taken (fig-15) and mounting was done. After teeth setting, try in (fig-16) was done. Adams clasp was placed in upper left 1st molar and circumferential clasp was placed in upper left canine.This was followed by conventional laboratory procedures that is flasking (fig-17) , dewaxing (fig-18) , packing (fig-19,20) and acrylization. After deflasking ,prosthesis was finished and polished and was deliverd to the patient.

Fig 15

Fig 16

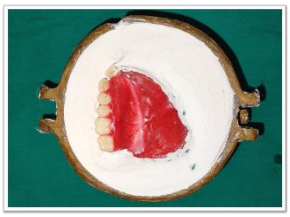

Fig. 17

Fig 18

Fig 19

Fig 20

Fig 21

Fig 22

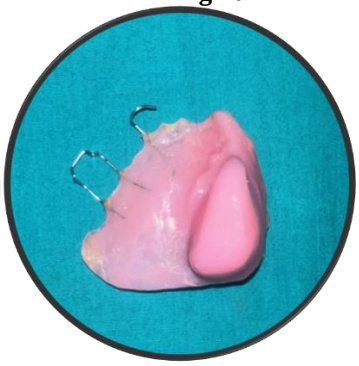

Fig 23

fig-21,22,23:- Interim Obturator After Finishing And Polishing.

On delivery of the finished prosthesis or interim obturator, occlusal adjustments were done. The extension of the prosthesis into the defect was kept as minimum as possible to ensure both retention and reduction in weight of the prosthesis.Pressure indicating paste was used to detect pressure spots and were reduced accordingly.Patient's speech was evaluated. Patient was asked to drink a glass of water to check nasal regurgiatation of the fluid. The patient was trained regarding the removal and insertion of prosthesis and post insertion instructions were given.

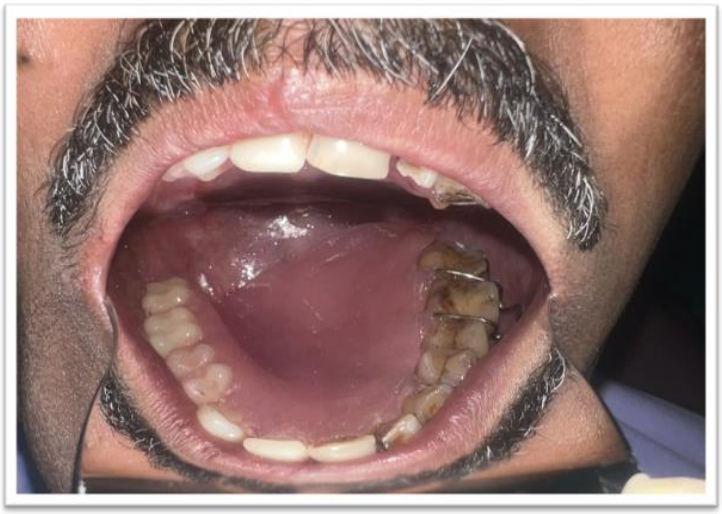

Fig 24:- Palatal View Of The Obturator.

Fig 25:- Front View Of The Obturator.

Fig 26:- Patient Smiling With Obturator

The patient was recalled after 24 hours for a follow-up and necessary adjustments were done. Next follow ups were done after 1 week , 2 week , 1 month and 3 months. Patient adapted well and was satisfied with the functions such as masticatory ability , speech and facial apperance .

Discussion:-

Acquired maxillary defects may occur as a result of different causes. The size and location of the defect determines the treatment approach.Small defects may be easily restored with surgery alone but larger defects needs prosthodontic rehabilitation to restore lost oral functions. Prosthodontic therapy for the acquired surgical defects of the maxilla are divided into three phases of treatment depending on the time of the rehabilitation ,each phase serves different objective[9,10].

Surgical obturator

1. Immediate surgical obturator (placed at the time of the surgery)
2. Delayed surgical obturator (given within 7-10 days post-op)

The first phase is surgical obturation.The primary objective of immediate surgical obturation is to restore and maintain oral functions at reasonable level during the intial post operative period.This acts as a matrix for securing the surgical pack,chances of post-surgical contamination of wound also reduces, nasogastric (NG) tube can be removed early and also reduces the time of hospital stay.

Interim obturator

The second phase is called interim obturation.The main objective of this phase is to provide a comfortable and functional prosthesis until tissues heals completely.In this phase , in subsequent follow ups relining of the prosthesis is done until tissue heals.Usually by 3 to 6 months post surgery ,the surgical site is well healed and stable dimensionally which permits the third phase of therapy that is definitive obturation.

Definitive obturator

The third phase is called Definitive obturation.Definitive obturator is constructed only after complete healing.Usually it can be fabricated approximately 6months post surgery .Further ,Timing of construction of definitive obturator varies that depends on various factors like :

1. Size of defect
2. Progress of healing
3. Prognosis of tumor
4. Effectiveness of present obturator
5. Dentate status of the patient (defect must be engaged more aggressively in case of edentulous subjects to maximize retention, stability, and support)

Principles of designing of the prosthesis in each phase varies and should be followed.In the present case report ,patient was rehabilitated first with the surgical obturator to aid the patient in immediate post surgery period followed by the interim obturator in place of definitive prosthesis because tissue healing was not complete..

Conclusion:-

The role of prosthodontists is crucial for rehabilitation of the maxillofacial defects to restore the lost oral functions along with improving the cosmetic appearance. The prognosis of the prosthesis can be improved if all the principles of designing are followed meticuliously and patient's speech can be further improved if prosthodontic rehabilitation is followed by speech therapy.

Surgical obturator is the treatment of choice for immediate closure of the defect followed by fabrication of interim obturator to restore lost oral functions until definitive prosthesis is fabricated.

Psychological support/counselling is also a major factor to aid the patient as patient with maxillofacial defects may suffer from a variety of pschyological impairments.

Conflict Of Interest:

None.

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