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RESEARCH ARTICLE

REHABILITATION OF A POST COVID MAXILLECTOMY DEFECT WITH DEFINITIVE OBTURATOR: A CASE REPORT

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Abstract

In the course of the second wave of COVID-19 in India,the nation witnessed a rapid surge of a deadly fungal infection leading to increased morbidity and mortality. The treatment of the mycosis necessitates timely and often invasive surgical debridement leading to the creation of acquired defects. With the maxillofacial region being a highly common area for the mycosis to occur the role of maxillofacial prosthodontists and surgeons becomes significant. This article elaborates on one such case of maxillary defect treated, restored and rehabilitated to almost life-like functionality (speech, mastication), appearance and efficiency by means of a definitive prosthesis. Through this article we highlight that the prosthodontic treatment does not end with the provision of a temporary solution but to continue with the maintenance to aid in substantial tissue healing and to meet demands of function and aesthetics.

Introduction:-

The angioinvasiveopportunistic fungal infection earlier identified as Phycomycosis or zygomycosis and later known as mucormycosisthe pathogenic fungi belongs to the order: Mucorales and Class: Zygomycetes(Eucker et al., 2001)**.** A recent systematic review of reported cases concluded that triad of hyperglycemia, extensive dispensation of steroids,to patients with SARS-CoV-2 augments the probability of mucormycosis(Singh et al., 2021).The fungal infection is categorized into different types on the basis of the structural involvement as rhino-orbito-cerebral (ROCM), pulmonary, gastrointestinal, cutaneous, renal, disseminated and other miscellaneous forms, which include infection of bones, heart, ear, parotid gland, uterus, urinary bladder and lymph nodes(Jeong et al., 2019). Of these Rhino-orbito- cerebral is the widely prevalentsort especially in patients with diabetes(Prakash and Chakrabarti, 2019).

Recent epidemiological data from two systematic reviews of case reports have stated that over hundred cases are reported in the earlier part of second wave of COVID with a male predominance and a strong association with high blood glucose levels, immunosuppression secondary to steroid therapy and COVID infection itself(John et al., 2021),(Singh et al., 2021). Of the several cases reported from India, Karnataka contributed to nearly 49% of the cases with majority from Bangalore and Mangalore(Singh et al., 2021).

Microscopic documentation of the hyphal structure on the basis of parameters likewidth, transversely septate or non-septate,angle of branching (right or acute branching), and coloration, distinguishesmucormycosisversus infections by other fungi. Smith and Krichnerprinciplesgiven in 1950 for the clinical diagnosis of mucormycosis are

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nevertheless regarded as the gold standard(SMITH and KIRCHNER, 1958). Immediate and radical operative treatment is recommended for mucormycosis whenever possible owing to the high fatality rates(Maartens and Wood, 1991). Further, antifungal medications and improvement of principalrisk elements should be carried out in a timely fashion.

Professionals in dentistry also need to be more aware of the morbidity linked to this illness since orofacial region is frequently involved and a maxillofacial prosthetic rehabilitation is of importance to improve the standard of living of the patient.The treatment strategy and fabrication of a definitive obturator for the rehabilitation of a patient following maxillectomy of the left maxilla after post-covidmucormycosis are described in this paper. Since the disease has a higher relapse rate, the literature on case reports where definitive prosthesis is provided is scanty and hence this report also throws light on the need for careful post-operative management and meticulous follow up.

Case Report:
A 38-year-old male patient reported to the Department of Prosthodontics and Crown and Bridge, Bapuji Dental college and Hospital,Davangere, Karnataka,with the chief complaint of difficulty in eating, chewing food and speech. The medical history revealed that almost one and a half years ago patient was covid-19 positive and got admitted in KIMShospital, Hubli and the duration of hospital stay was for over 15days. After he tested positive for COVID-19 he was diagnosed with diabetes mellitus during his hospital stay and was on steroid therapy for covid.Later acquired mucormycosis and had underwent partial maxillectomy for the treatment of the same in KIMS hospital Hubli and for surgery the hospitalization period was over 10 days. This was followed by regular scheduled follow up visits.

Past dental history revealed that the patient was using feeding plate for the past year which was fabricated in KIMS hospital, Hubli. On intraoral examination, adefect of 20mm anterioposteriorly and 15mm mediolaterally was noted on left side of maxilla with oronasal communication. The patient's masticatory and phonological functions were impaired. Following a thorough analysis, the problem was identified Aramany's Class I maxillary deformity. According to maxillectomy classification proposed by Durrani et al., established based on the clinician's assistance for the rehabilitative andrecuperationchoices (Durrani et al., 2013), the patient presented with Type 2: Sub-total Maxillectomy, the surgical defect with oro-nasal or oro-antral fistula and without involvement of roof of the Maxilla. An obturator or a local flap can be used to treat these flaws. Utilizing an obturator has advantages such as better chance of monitoring for recurrence and the patient's capacity to periodically clean it(Alqarni et al., 2023). In our patient apart from the maxillary defect, the remaining teeth present were periodontally sound and patient had fair oral hygiene, optimal healing of the surgical defect and satisfactory overall health, fabrication of definitive obturator was planned. This was then explained to the patient and his consent to treatment was obtained before the start of the procedure.

Clinical steps:
A gauze piece soaked in betadine (Povidone iodine) solution with dental floss tied over the gauze, to prevent aspiration while making a primary impression of the maxillary defect which had been picked up with alginate (Tropicalgin, Zhermack) loaded on a stock tray. The primary cast was used for planning of the cast partial denture design and also to fabricate a special tray with chemically-cured acrylic resin (DPI RR Cold Cure). After that, mouth preparation was done and the deformity was occluded with a strip of moistened gauze tied with floss before an impression was recorded (Fig 1).

Fig 1:- Mouth preparation prior to impression making.

Greenstick material (DPI Pinnacle tracing sticks) was used for border molding, putty impression (GC Flexceed) was used to record the entirety of the defect, and a light body silicone elastomer final impression was recorded. This captures the undercuts that help retain the denture (Fig 2). Beading and boxing was done (Fig 3) and the master cast was then made using Die stone (type IV dental stone).

Fig 2:- Final impression.

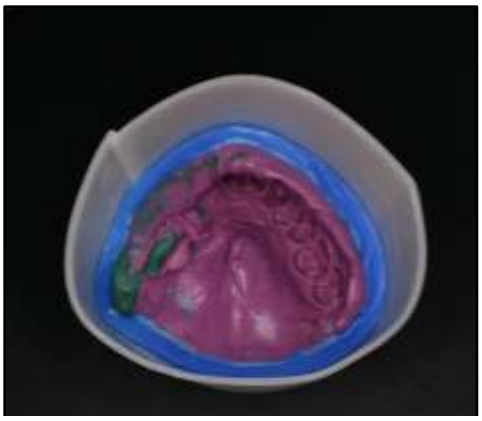

Fig 3:- Beading and boxing of final impression.

Block out of master cast was done and it was then duplicated (Fig 4).The designing of wax pattern for cast partial denture framework was then carried out (Fig 5A, 5A, 5C). The cast partial denture framework was constructed and framework trial was done (Fig 6).

Fig 4:- Blocked out Mastercast.

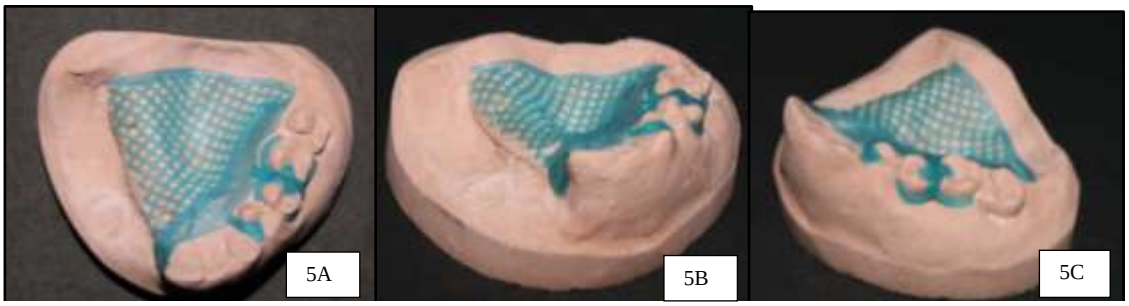

Fig 5A, 5B, 5C:- Wax pattern design on duplicated mastercast.

Fig 6:- Metal framework try-in.

Aself cure temporary denture base was attached to it. In order to record bite registration, a modeling wax occlusal rim was created.Teeth setting and try-in were then completed (Fig 7.).

Fig 7:- Try in of waxed up denture.

Occlusion, appearance, and the phonetics were assessed; the patient deemed them to be satisfactory. Phonetic tests whichentailed the patient to articulate the consonants /s/, /f/, /v/, and /th/ were used to confirm the position of the teeth. The placement of the mandibular posterior teeth served as a guidance for the placement of the maxillary posterior teeth. The cast partial framework was designed with an occlusal rest on position 14 and an Embrasure clasp/ double Akers clasp on positions 15 and 16. The patient received the final, polished prosthesis(Fig 8A and 8B).

8A.

8B.

Fig 8A, 8B:- Finished and polished final prosthesis.

In order to avert dislocation during excursions, occlusal modifications were introduced. To avoid any impingement of soft tissues in the defect location, the outer boundaries of the prosthesis were examined and modified. The patient received training on prosthesis installation and removal, as well as advice on how to maintain the prosthesis after placement. After one week, three weeks, and two months, the patient was summoned back for a post-insertion maintenance appointment. The patient was pleased with the denture's effectiveness in speaking, mastication, and appearance(Fig. 9).

Fig. 9:- Satisfied patient

Discussion:-

The defect resulting from the surgical treatment of mucormycosis can affect the patients psychological and physical well-being. Theoutcome of the resultant deformity on articulation, mastication and aesthetics severely compromises the quality of life of the patient. Further as described in our case, the feeding plate provided was inadequate for masticatory function and can in turn compromise nutritional needs of the patient. Patients ought to consult their prosthodontist on a regular basis during the healing process to discuss any necessary changes to the temporary prosthesis(Ali et al., 2022). By 3 to 4 months, the majority of patients have mentally acclimated and are aware that their ability to chew and speak will not be drastically hampered. Following surgery, the operative area could not be entirely healthy without structural remodelling for months afterwards. Depending on the size of the wound, this could happen anywhere between six and twelve months after therapy is concluded(Brierley, 2012). In the case discussed in this article the definitive prosthesis was planned after a period of one and a half years post-surgery. Also, the systemic health and underlying disease conditions alters the pace of healing. The prosthodontic treatment should be planned systematically after careful consideration of all the parameters including number of remaining natural teeth, size of the defect, periodontal support and health of the remaining teeth, oral hygiene index of the patient, occlusal relation, jaw relation, bone support, patients phonetic and aesthetic demands. Preserving the hard palate, residual ridge, and healthy abutment teeth is the essence of prosthodontic treatment to ensure the prosthesis is supported, stabilized, and retained for as long as possible(Phasuk and Haug, 2018).Due to the substantial amount of functionality it restores, prosthetic obturation is the preferred course of treatment. The prosthetic obturators restored the structural defect, the roof of the mouth contours, the lingual space, the absent dentition, and the midfacial contour while providing retention, stability, and support while not endangering the integrity of the intact dentition and adjacent structures(Nayar, 2019).In accordance with the supporting structures, prosthodontic rehabilitation may be fixed or detachable. Removable prosthesis are advised if the hard tissue support is insufficient to endure stresses from fixed restoration(Satya et al., 2020).The other potential solutions for patients with such acquired deformity would be implant supported prosthesis, prosthesis with magnetic attachments and so on. But the provision of implant supported prosthesis in cases of maxillectomy defects with mucormycosis is not recommended because of the higher rate of recurrence. Hence, in our patient a definitive obturator was delivered taking support from the remaining periodontally sound natural teeth, palate and retention from undercuts and of the defect.

Conclusion:-

Maxillofacial prosthesis plays a very substantial role in the rehabilitation of patients who were immunocompromised and/or had underlying disease condition which was conducive to secondary mucormycosis post-covid. It improves the overall quality of life of these patients with acquired deformity. Further the recurrence of the fungal infection should be curbed by prompt and timely medical and surgical intervention. A multidisciplinary team with a

prosthodontist should be formed to better plan the treatment in advance. Regular recall and maintenance follow up visits should be scheduled to ensure adequate healing and to watch out for relapse. Ultimately, following satisfactory healing a definitive prosthesis should be planned delivered. Through this article we reported the successful management of acquired maxillary defect with a definitive obturator resulting in restoration of facial esthetics, function and confidence of the patient.

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