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A definitive cast partial denture post partial maxillectomy defect due to mucormycosis: A case report

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Abstract
Maxillectomy performed in acquired lesions is often very extensive or bilateral, sparing very less hard and soft tissue in the oral cavity. These defects need both surgical and prosthetic rehabilitation. A definitive prosthesis is inserted after complete healing, when the patient is accustomed to the interim prosthesis. Definitive obturator warrants better retention and stability and needs a meticulous planning in design for long-term use. This article explains about cast partial denture as a definitive obturator for a post surgical defect due to mucormycosis.

Keywords: Cast partial denture, post partial, maxillectomy, mucormycosis

Introduction
Maxillofacial rehabilitation after accidents, surgical resection due to malignancy or congenital deformity is challenging, since it not only affects the patient function and aesthetics but also impairs the patient confidence in the society. Prosthodontic rehabilitation restores patient confidence, comfort along with function and aesthetics. Various prosthodontic treatment options are available. Selection of adequate prosthesis that fulfils the patient's need is of utmost importance. Rehabilitation of maxillofacial defect to an acceptable manner is challenging as it is related with psychological factors apart from function and aesthetics. A proper selection of prosthesis is utmost important to achieve this goal. The basic principles of any prosthetic design include preservation of the remaining natural tissues along with retention, stability, support, and aesthetics. Prosthodontic rehabilitation can be done either fixed or removable based on the supporting structures. If the hard tissue support is not adequate to withstand forces for fixed restoration, removable prosthesis are recommended. This clinical report describes maxillary rehabilitation with removable prosthesis in a compromised hard tissue support. Aramany's Class II design principles are followed for fabrication of a definitive cast partial denture using tooth and tissue support [1, 2].

Fixed or removable prosthesis are selected based on the supporting structures. If the teeth or underlying bone are of poor quality or quantity, removable prosthesis is advised. Conventional complete denture therapy results in inadequate denture retention, stability & patient satisfaction [3]. The patient's confidence & comfort in such cases would be compromised. However, the hybrid dentures could overcome the shortcomings of conventional complete dentures. Problems like loose dentures, loss of proprioception & bone resorption can be resolved with hybrid dentures & hence it is the last line of defence that successfully keeps patients from becoming edentulous. Studies indicate that there is inevitable resorption of residual ridge, following the loss of teeth. Ridges treated with hybrid dentures showed significant less vertical alveolar bone resorption than ridges with conventional complete maxillary and mandibular dentures [4].

Presentation of Case
A 76 year old female patient reported to department of Prosthodontics with a chief complaint of difficulty in chewing food due to loss of multiple teeth and nasal regurgitation of food due

to post-surgical defect (figure:1, 2). Past medical history revealed that patient had undergone maxillectomy for post COVID 19 mucormycosis a year ago. Patient was referred by department of Plastic Surgery 8 months after maxillectomy for prosthodontic rehabilitation.

No history of any previous prosthodontic intervention was found. On clinical examination, teeth present in maxillary arch were 11, 21, 22, 25, 27. Mandibular arch was completely dentulous including a FPD with 35, 36, 37 (figure:4). Generalised periodontitis and grade 1 mobility was present with 11, 21, 22. Soft tissue examination revealed a contained defect in maxillary right posterior region (figure:3).

Patient was explained both; fixed rehabilitation using implants and rehabilitation using removable prosthesis for which patient decided to go with the later option.

A removable prosthesis with a cast partial denture was planned with porcelain fused to metal surveyed crowns with 25 and 27. Diagnostic impressions were made using alginate (Dentsply Vignette Chromatic) (figure:5), A sterile gauze was packed in the defect site to prevent entrapment of material during impression making and primary casts were obtained (figure:6). Model analysis, surveying and designing according to Aramany's principles was done[2] (figure:7). The Cast partial denture had the following Design; A simple circlet clasp on 27 and 25, an RPI clasp on 22, an I bar clasp on 11 for direct retention was planned. Cingulum rest on 11, 21 and 22, mesial rest on 27 and 25 and an additional distal rest on 25 was planned. An antero posterior palatal strap was extended above the cingulum of present anteriors to provide them a bracing effect due to their compromised periodontal status and simultaneously to aid in indirect retention (figure:8, 9). A special tray was fabricated after blocking undercuts with 2mm spacer and 2 mm space on borders for border molding (figure:10). Abutment tooth 25 and 27 were prepared to receive surveyed crowns (figure:11).

After gingival displacement using 000 cord, one step Impression for prepared teeth was made with addition silicone putty and light body (Avue) (figure:12). After cementation of crowns with GIC (GC) (figure:13), final impression for metal framework was made using Regular body Addition silicone (Dentsply Reprosil) with special tray (figure:14). After Finishing and polishing, metal framework trial was done. Retention and passivity of framework was checked. After framework trial, Jaw relation was recorded (Figure: 17). Teeth selection was carried out in the same appointment using SPA factor. Further, mounting was done on a mean value articulator. Teeth arrangement and try in was verified in patient's mouth (figure:18). Occlusion and phonetics evaluation was done. As the defect was small and contained, it didn't require any futher molding, after approval of the try in, acrylization was done using heat cure acylic (DPI). The border extensions of the prostheses, function, aesthetics, and occlusion with the prostheses on patient were evaluated. The final prosthesis demonstrated satisfactory retention, stability, support and patient satisfaction. Patient complained about slight nasal regurgitation while drinking water, posterior most extention of defect was relined using soft liner (Monosil), after which the problem was resolved (figure:21).

Instructions regarding maintenance of oral hygiene and prostheses were given. Patient was recalled for routine check- up after three months and six months durations to evaluate abutment teeth condition as well as general and oral health. No signs of secondary caries in abutment teeth and other relevant signs or symptoms observed. Patient was completely satisfied with the prosthesis.

Fig 1: Preoperative Extraoral

Fig 2: Preoperative Frontal

Fig 3: Preoperative Occlusal Maxillary

Fig 4: Preoperative Occlusal Mandibular

Fig 5: Diagnostic Impression

Fig 6: Diagostic Cast

Fig 7: Surveying and model analysis

Fig 8: Surveyed Cast (Occlusal)

Fig 9: Surveyed Cast (Left Side)

Fig 10: Custom Tray

Fig 11: Tooth Preparation

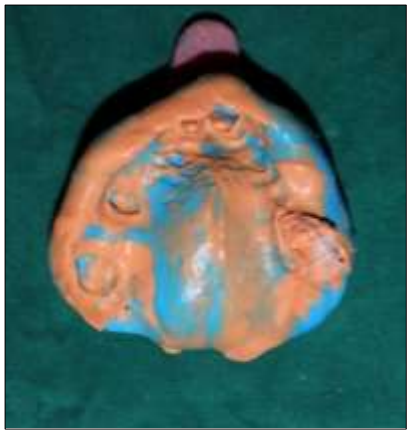

Fig 12: Final Impression for Crowns

Fig 13: Cementation of Surveyed Crowns

Fig 14: Final Impression for CPD

Fig 15: Final Cast

Fig 16: Framework and occlusal rim

Fig 17: Jaw Relation

Fig 18: Try in

Fig 19: Final Prosthesis (Top)

Fig 20: Final Prosthesis (Left side)

Fig 21: Final Prosthesis after relining

Fig 22: Final Prosthesis (Frontal)

Fig 23: Post Operative (Occlusal)

Fig 24: Post Operative (Right side)

Fig 25: Post Operative (Left Side)

Fig 26: Post Operative Extraoral

Discussion

As Devan stated, Perpetual preservation of what remains is more important than the meticulous replacement of what is missing, we used a modified approach to preserve the remaining periodontally compromised anterior teeth simultaneously using them as abutment for Cast partial design. Bone supports the soft tissue. If the natural teeth is lost, alveolar bone resorption takes place that results in reduced soft tissue support that may cause psychological trauma to the patient. Retaining the remaining natural teeth not only reduces the alveolar bone resorption but also gives retention, stability and support to the prosthesis.

Rehabilitation with prosthesis take support form soft tissue structures or hard tissue structures. Hard tissue structures include, bone and teeth. Implants can retain or support the prosthesis if adequate bone is present, If the bone quality and quantity is poor, implants cannot be placed, tooth supported prosthesis will be the best option since it gives proprioception.

However, proper oral hygiene maintenance and use of fluoride mouth rinses will preclude the chances of gingivitis and dental caries on abutment teeth. Louis and associates reported that patients can masticate food more efficiently with over dentures than with complete dentures which justify the increased cost and time involved in their construction [5, 6, 7]. Moreover prosthesis retained by prefabricated intra-radicular retainers offer greater flexibility with regard to extension of base of prosthesis and the coverage of alveolar ridge in areas of missing teeth [7, 8]. In the present case, clasps engaging the abutment teeth offer additional prosthetic retention.

Conclusion

Facial look and teeth are important from an aesthetic point. If teeth and supporting structures are lost, rehabilitating the patient with the prosthesis to an acceptable manner is challenging. A good prosthesis not only rehabilitates the patient's lost function and aesthetics but also gives confidence and comfort in society.

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