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Prosthetic management of mandibulectomy patient: A case report

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Abstract
Maxillofacial defects hampers function, form and esthetics. Cantor and Curtis classified the mandibulectomy defects. This is a case of prosthetic rehabilitation of Class 1 radical mandibulectomy where continuity of mandible was preserved. The patient has been rehabilitated with a definitive treatment of cast partial denture which provides better cross arch stabilization and does not subject already debilitated patient to more of surgeries.

Keywords: Mandibulectomy, cast partial denture, definitive, maxillofacial, prosthetic rehabilitation

Introduction
Maxillofacial defects have become increasingly common and result in functional, Esthetic and psychological disturbances [1]. Traumas and accidents are a daily news along with carcinomas which are commonly reported also, we saw mucormycosis patients in pandemic resulting in maxillofacial defects. Hence, it becomes important for us to revisit the basics of maxillofacial prosthetic rehabilitation.
Mandibular defects can be classified into continuity defects or discontinuity defects [2]. Mandible being a single bone forming the floor of mouth any discontinuity defects of mandible cause deficits in facial form, affect mandibular movement and speech [3]. The results of rehabilitation of mandible are less gratifying when compared to that of rehabilitation of a maxillofacial defect of maxilla [4]. With advancements coming up implants have been employed to make rehabilitation and retention in such cases easier. Many cases where anatomic and systemic limitations does not permit such treatment plans, cast partial denture should be considered.
This article presents a case of mandibular defect of Cantor and Curtis Class 1 and management of this case using a removable cast partial denture. A classification of mandibular defects has been described by Cantor and Curtis. Although the classification system is suggested primarily for edentulous patients, it is also applicable to partially edentulous patients. This system classifies defects based on remaining structures [5].

Case report
A 64 years old man reported to the Department of Prosthodontics with a chief complaint of difficulty in chewing food. The patient was an operated case of squamous cell carcinoma involving mandible. The patient had undergone surgery which involved surgical resection of mandibular alveolus and mandibular teeth 1 year ago. Patient gave history of an episode of Myocardial Infarction 6 months ago. Due to resection of intraoral structures patient was having difficulty in chewing food and was also unable to speak clearly.

- Extra-oral Examination revealed no gross facial asymmetry, no abnormality detected with respect to temporomandibular joint.
- Intra-Oral Examination of Maxilla:
- Teeth Present: 11,12,13,14,15,16,17,21,22,23,24,25,26,27.
- Spacings could be seen in anteriors, 26 was carious, generalised attrition and stains were present.

- Intra-Oral Examination of Mandible.

Teeth Present: 37, 38, 46, 47, 48, resected mandibular alveolus from 36 region to 45 region, Grade I mobile 37, 38, 46, 47, 48, decreased mobility of tongue, alveo-lingual sulcus compromised in 36 to 45 region, the tissue present over the edentulous area was flabby.

Diagnosis: Class 1 mandibular defect that is radical alveolectomy with preservation of mandibular continuity. [Cantor and Curtis classification 1971].

Treatment Options that were available are; Acrylic Removable Partial Denture, Cast Partial Denture, Implant assisted cast partial denture.

A cast partial denture was chosen as treatment because it provides better cross arch stabilisation. Also, with a history of Myocardial infarction the patient was unfit to undergo any further surgical intervention.

Procedure

The day on which patient presented, a thorough examination was conducted and scaling and root planning was done to reduce the mobility and stains of remaining teeth. [Fig. 4, 5] Then after 15 days when mobility was reduced to some extent, diagnostic impressions were made using alginate [Vignette, Dentsply Sirona]. [Fig. 7, 9] The primary impressions were poured using Type 3 dental stone [Kalstone, Kalabhai]. [Fig. 8, 10] After obtaining a primary cast, it was surveyed to analyse the location and extent of undercuts and design the components for cast partial denture. [Fig. 11] The cast partial denture had a lingual plate type of major connector extending on 37,38,46,47 and 47 to provide a bracing effect on these mobile teeth. Multiple circlet clasp was designed for 37, 38, embrasure clasp for 46, 47 and circumferential for 48. Mouth preparations were done in accordance with the proposed design and a special tray was fabricated using self-cure acylic resin [AcryJet RR, Chromadent, India] on the primary cast. Border moulding was done using type 1 low fusing impression compound [DPI, India] intraorally to record the extent of alveo-lingual sulcus and final impression was made using medium body A-silicone [Aquasil, Dentsply Sirona]. [Fig. 12, 13] After the master cast was obtained [Fig. 14] it was scanned to design the framework. The master cast was again surveyed digitally, undercuts were blocked and the framework designing was done using ExoCad software. [Fig. 15] A 3-D print of this digital design was obtained in castable pattern resin. Master cast was duplicated, pattern resin was fitted on it, sprued, invested and metal frame casting was done. This framework was assessed in patient's mouth for fit, comfort and retention. [Fig. 16] Neutral Zone was recorded to decide the final position of teeth and a jaw relation record was made. [Fig. 17] In the same appointment, the fibrous soft tissue present at the operated site was again recorded using green stick beneath the minor connecter. An altered cast was poured and this soft tissue area was replaced on the master cast by altered cast technique [6]. [Fig. 18] The jaw relation with the altered cast was mounted on three-point articulator and teeth arrangement was done. Try-in was done intraorally to assess for phonetics and esthetics. [Fig. 19] After patient approved of the same, acrylisation was done to fabricate the final prosthesis. On the day of denture delivery any discomfort due to acrylic was removed and patient was given post-operative instructions. [Fig. 20, 21, 22] The patient was recalled on next day, after 7 days and after 6 months.

Figures of the case presented

Fig 1, 2: Pre-operative extra-oral images [front, lateral]


Fig 3, 4: Pre-operative intra-oral images of maxilla [front, occlusal]

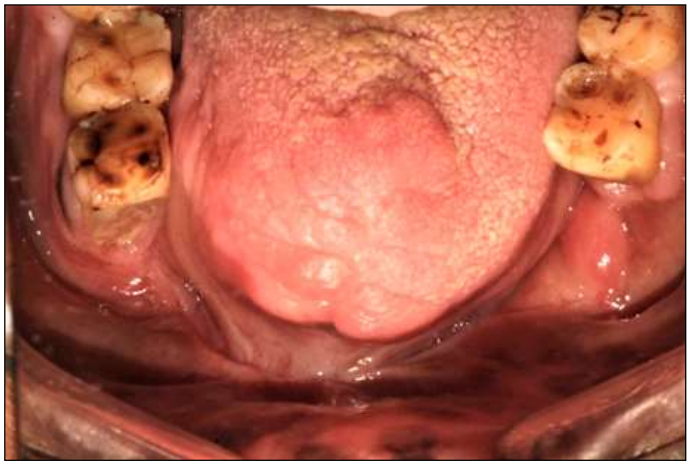

Fig 5: Pre-operative intra-oral image of mandible [occlusal]

Fig 6: Orthopantomogram of the resected mandibular alveolus


Fig 7: Primary impression of maxilla **Fig 8:** Primary cast of maxilla

Fig 9: Primary impression of mandible

Fig 10: Primary cast of mandible

Fig 11: Surveying of primary cast

Fig 12: Border moulding to record alveo-lingual sulcus

Fig 13: Final impression of mandible

Fig 14: Final cast of mandible

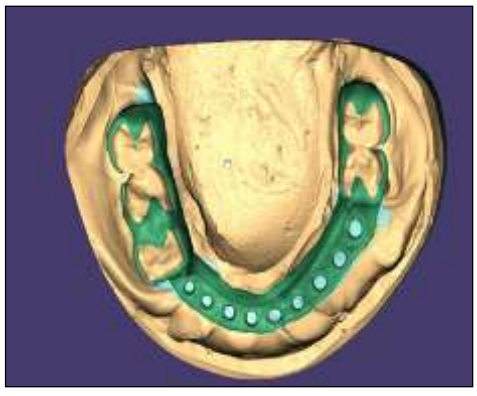

Fig 15: Exo Cad designing of framework

Fig 16: Intra-oral framework fit

Fig 17: Neutral Zone recording

Fig 18: Altered cast for the flabby tissue.

Fig 19: Try-in intraorally

Fig 20, 21: Final prosthesis intra-orally. [Occlusal, frontal view]

Fig 22: Final prosthesis delivery, extra-oral view

Discussion

According to Cantor and Curtis swallowing, speech, mandibular movements, mastication, control of saliva, respiration, and psychic functioning are adversely affected by radical mandibular surgery patient and all these factors should be considered when planning treatment [2]. The mandibular surgical resection also significantly alters the maximum occlusal force and masticatory performance seems to improve with prosthodontic rehabilitation [7, 8].

When planning treatment for patients with mandibulectomy, location and extent of the defect is one of the most important factor to be considered. In cases where mandibular continuity is not lost, it is the vertical component of the defect that guides the prognosis [3]. Presence of remaining natural teeth and their restorative and periodontal condition further helps us decide to choose what is best in interest of the patient. According to the afore mentioned information, since no more surgical

intervention was possible due to recent myocardial infarction episode implant supported prosthesis, grafting alveolus, deepening vestibule or surgical resection of flabby tissue was not possible. In fact a conservative approach was taken up and cast partial denture was designed accordingly. The cast partial denture restores the form and shape of the missing structures such as alveolar bone with teeth and gives the necessary labial support to the lower lip [9]. The linguo plate type of major connector provides a bracing effect to the mobile posterior teeth and embrasure type of clasp design in 46, 47 region and multiple circlet clasp in 37, 38 region adds up to retention and stability of the prosthesis.

Conclusion

Fabrication of cast partial denture is a good treatment option in rehabilitation of patients who have undergone hemi mandibulectomy due to various reasons. It appears to be the less expensive and takes no toll of added surgical intervention on general health of already debilitated patient. It provides cross arch stabilisation and a splinting affect to the remaining natural teeth.

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Author's Contribution

Not available

Conflict of Interest

Not available

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