



REHABILITATION OF A HEMI-MANDIBULECTOMY PATIENT WITH AN OVERDENTURE USING PRECISION ATTACHMENTS- A CASE REPORT.

Prosthodontics

Dr. Nikita Kandi	BDS,MDS Prosthodontics Lecturer in Dept.Prosthodontics in CSMSS Dental College and Hospital, Aurangabad
Dr. Ajay Sabane	BDS, MDS Prosthodontics Professor and Hod in Dept.prosthodontics in Bharati Vidyapeeth Dental college and Hospital, Pune
Dr.Vishakha Patil	BDS, MDS Prosthodontics Lecturer in Dept.Prosthodontics in CSMSS Dental College and Hospital, Aurangabad
Dr. Pooja Mundada	BDS, MDS Prosthodontics Lecturer in Dept.Prosthodontics in CSMSS Dental College and Hospital, Aurangabad

ABSTRACT

Mandible is the most common site for intraoral tumors, which often requires the resection of large portions of the mandible. Segmental mandibular resection commonly results in the mandibular deviation and its severity is based on the extent of osseous and soft tissue involvement. Prosthodontic treatment along with physical therapy may be helpful in reducing mandibular deviation and improving masticatory efficiency. This case report describes the prosthodontic management of a patient following segmental mandibular resection on the right side for surgical management of squamous cell carcinoma of right buccal mucosa invading into the mandible (Class III Cantor and Curtis hemimandibulectomy defect). The patient exhibited an asymmetrical face, reduced lower facial height and a severe deviation to the defect side. A palatal ramp prosthesis was used for 6 months to improve the deviation of the mandible followed by the definitive prosthetic phase. An overdenture supported by ball attachments on the natural teeth to improve the retention and stability was used as final prosthesis.

KEYWORDS

Hemimandibulectomy, Attachments , Overdenture , Deviation

INTRODUCTION

Maxillofacial prosthetics is the branch of prosthodontics concerned with the restoration and/or replacement of stomatognathic and craniofacial structures with prostheses that may or may not be removed on a regular or elective basis (GPT 9).

Since every human has the divine right to look human one has to struggle hard for getting an acceptable function and natural appearance of the prosthesis. Neoplastic lesions of the oral cavity often require surgical resection involving mandible, floor of the mouth, tongue and also palate as per assessment of the extension of the lesion.¹ The extent of surgical resection of the mandible, amount of remaining structures, amount of mouth opening and tolerance of the tissues determines the postoperative care and prosthodontic rehabilitation required in such patients.² A discontinuity in the mandible causes various adverse effects like imbalance in the muscles of the lower face, decreased mandibular movements and function by deviation of the residual segment toward the surgical side, facial disfigurement, impaired speech and masticatory function.³ Due to unavailability of attached keratinized supporting tissues on the denture bearing areas denture fabrication for such patients becomes extremely difficult and also it greatly influences the retention and stability of dentures. A prosthodontist plays a major and significant role to provide service to such patients at every step in their treatment.

Various types of treatment modalities may be indicated for completely edentulous hemi-mandibulectomy patient including conventional complete denture and both tooth-supported and implant-supported overdenture depending on whether the patient is partially or completely edentulous. The use of an Overdenture increases the retention, stability, support, improves the masticatory function, preserves the alveolar bone and preserves the sensory receptors within periodontal ligament which increases manipulative skills in handling the denture. This could prove to be a significant advantage in a hemi-mandibulectomy patient where the quality of tissue support is already compromised. The presence of few teeth or root stumps in edentulous ridges may effectively act as abutments for a tooth supported overdenture. Overdentures may be fabricated with different types of attachments which adds up to the retention and stability of the denture. Precision attachments can be classified into four main groups^{4,5}: 1. Intracoronary attachments, 2. Extra coronal attachments, 3. Stud attachments and 4. Bar attachments. Among the attachments, the ball attachment system is considered an appropriate resilient mechanical attachment.

The following case report describes the prosthetic rehabilitation of

hemi-mandibulectomy patient with tooth supported overdentures using ball attachments.

CASE REPORT

A 60 year old male patient reported to the Department of Prosthodontics in Bharati Vidyapeeth Deemed university Dental College and Hospital, Pune with a chief complaint of difficulty in mastication. His past medical and dental history revealed that hemi-mandibulectomy was done 1 year back for surgical management of squamous cell carcinoma of right buccal mucosa invading into the mandible.

Extraoral examination revealed asymmetrical face, reduced lower facial height and deviation of mandible towards the defect side. Maxillary palatal ramp prosthesis was provided to correct the deviation (Figure.1a) and (Figure 1b) for six months after which there was a considerable improvement in the deviation and patient was able to voluntarily guide the mandible in maximum intercuspal position (Figure.2).

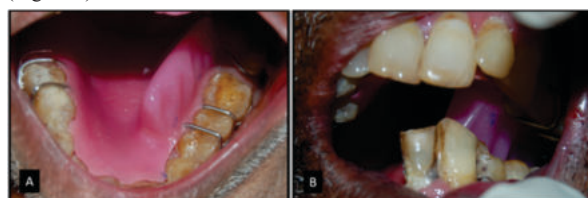


Figure.1a Maxillary Palatal Ramp Prosthesis (occlusal view)

Figure.1b Maxillary palatal ramp Prosthesis(Buccal view)



Figure.2 Improvement after six Months.

However after the termination of six months some teeth with poor prognosis had to be extracted. On palpation, mandible was palpable until midline and absent on right side. The teeth present were 32,33,34 and 35.(Figure.3)



Figure.3 Preoperative intraoral photograph

After evaluating the patient's history, clinical findings, and investigations, it was diagnosed as partially edentulous maxillary arch (Kennedy's class I) and mandibular arch (class III Cantor and Curtis class III hemimandibulectomy defect—right). The treatment was aimed to establish oral function, appearance, and psychological reassurance to the patient. After diagnostic jaw relation was recorded rehabilitation was planned with fabrication of a mandibular overdenture with ball attachments (Bredent VKS-OC attachment) using the remaining teeth as overdenture abutments. Thus tooth no 32 and 35 were selected for overdenture attachments and 33 and 34 were selected for conventional overdenture copings.

Elective endodontics was carried out with teeth 32, 33, 34 and 35. They were prepared in a dome-shaped contour with approximately 3–4 mm projecting just above the gingival level. Post space preparation was done for optimum post length (Figure.4).



Figure.4 Prepared Mandibular Abutment Teeth.

The impression of the prepared teeth was made for indirect method of post fabrication using putty light body elastomeric impression material and poured in type III dental stone (Kalrock, Kalabhai Karson, Mumbai, Maharashtra, India). Wax copings with radicular extensions were fabricated on 32,33,34 and 35. The surveyor was used to place the attachments on the wax copings to ensure parallelism between both attachments. The surveying arm was used to pick up the sphere - male part (VKS-OC universal patrx) of the precision attachment (Bredent VKS-OC attachment) and surveyor was locked at this position above the diaphragm of the wax pattern for 32 and 35 (Figure.5).

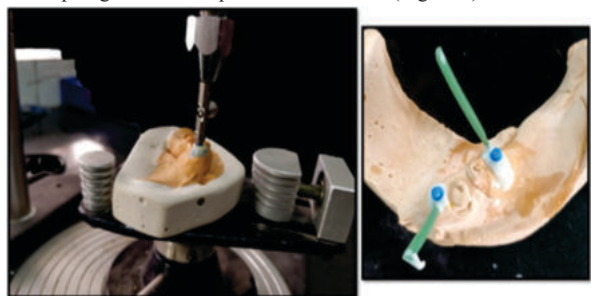


Figure.5 Attachments Placed Using A Surveying Arm

Sticky wax was used to secure the male part on the top of the diaphragm. Investment and casting procedure was carried out for the fabrication of the conventional overdenture copings and copings with

attachment.

The overdenture copings were luted using Relyx U200 resin cement (3M ESPE) (Figure.6)

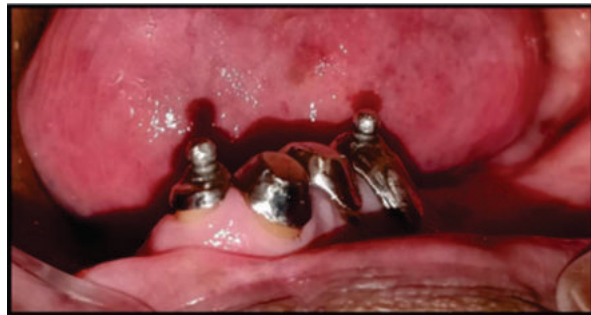


Figure.6 Overdenture Copings Luted

Following the cementation primary impression was made with elastomeric impression material and custom tray was fabricated. Border moulding was carried out using low fusing impression compound (DPI Pinnacle). Final impressions were made in medium body polyether (Impregum, 3M ESPE) impression material (Figure.7) and the impression was poured using the combination of die stone (Kalstone; Kalabhai Karson Pvt. Ltd., Mumbai, India) and pattern resin (GC America Pattern Resin) (Figure.8).



Figure.7 Mandibular Final Impression

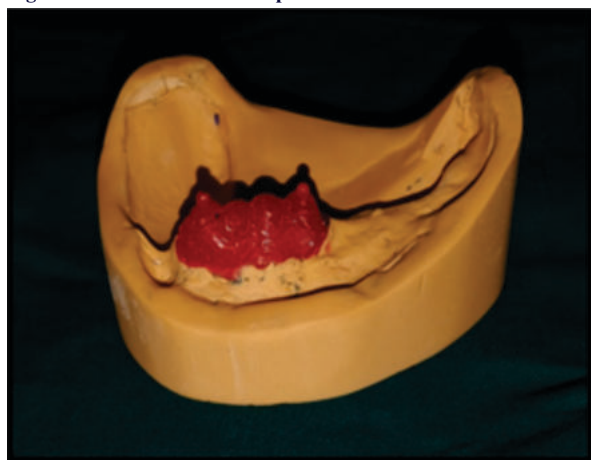


Figure.8 Master Cast Poured

Record base was fabricated and wax occlusal rims were made. Jaw relation was recorded following the facebow transfer. Teeth setting and try in was done and the lower complete denture and upper removable denture were acrylicised and finished.

At the day of insertion using direct technique the housings were picked up in the intaglio surface of the denture. The housings were seated on

the sphere of the cemented attachments (Figure.9).



Figure.9 Housings Seated On The Attachments

The denture was relieved sufficiently and the acrylic resin (DPI-RR Cold Cure, Dental Products of India, Mumbai, India) was used in 1:1 ratio and mixed. At the dough stage it was loaded on the denture and was positioned in the maximum intercuspal position. After complete polymerisation the denture was removed, the housings now being a part of the denture (Figure.10). The overdenture was then finished and polished.



Figure.10 Housings Picked Up In The Denture

The overdentures were finally placed in the patient's mouth and rechecked for stability, retention and comfort (Figure.11).



Figure.11 Postoperative View After Denture Insertion

The patient was taught to place and remove the dentures and given postoperative instructions on maintaining the hygiene of the retained teeth, attachments and dentures.

Recall check up was done after 24 hours, 1 week, 1 month and 6 months.

DISCUSSION

The hemi-mandibulectomy patient is a difficult patient to manage because the prosthodontist is limited in their ability to provide a desired occlusal scheme. It is difficult to provide retention and stability to the prosthesis in such patients. The presence of irradiated bone, poor tissue quality and moderate to poor general health of the patient may render the recent options of dental implants and bone grafting unviable. Therefore complete denture treatment for these patients improve the esthetic appearance and the function without much

complication in insertion and removal.

The reasons for surgical resection of mandible are multifactorial with several problems like Scarreds of tissue, freely movable tissue, deficient veolar ridge, high attachments of freni and loss of buccal and lingual sulcus in the mandibular region which makes the prosthetic treatment very difficult.⁶

Re-training the remaining mandibular muscles to stabilize the mandibular denture by providing an acceptable maxilla-mandibular relationship is the basic objective of rehabilitation. Greater the loss of tissue, greater will be the deviation of the mandible to the resected side, thus compromising the prognosis of the treatment⁷. The earlier the mandibular guidance therapy is initiated in the course of treatment the more successfully the patient's definitive occlusal relationship is restored⁸. So in this case, the deviation was controlled by providing the patient with a palatal ramp prosthesis in the maxillary arch to improve the patient acceptance and denture stability. After few months patient was able to bring his mandible voluntarily in the maximum intercuspation and provided proper occlusal contacts after which definitive treatment was planned with an attachment supported overdenture. Instead of extracting the remaining teeth they were used as abutments for overdenture. Mechanical stabilization, retention, stress distribution and esthetics can be greatly improved by incorporating the use of precision attachments.

In this case, the use of attachments played a very important and valuable role due to their stress breaking effect and also the retention of the denture on the unilateral un-resected mandibular segment would have been inadequate without the use of attachments.

In this case report extracoronal castable ball attachment (Bredent VKS-OC attachment) were used. Elaborate and complicated procedures like welding a metal attachment after casting of crowns can be avoided as the castable male component can be easily casted as a single unit with the crowns during wax-up procedure. The male component design is sphere with a flat head and female component is retentive silicon cap which is colour coded according to different retentive properties. In this case, the yellow colour coded silicon cap with medium retention (6 pounds of retention) was selected. Also the retention provided by the attachment can be increased with the various retentive caps as per the patients comfort.

To obtain stable occlusal intercuspation, the mandibular teeth on the unresected side were arranged buccal to the crest of the ridge and teeth on the resected side more lingually. The final prosthesis was retentive and stable and it helped the patient in improved mastication and esthetics due to replacement of missing teeth and restoration of lip support in mandibular anterior region.

Periodic recalls after one week, one month and six months were made and the patient reported with an increase in masticatory efficiency. Also a remarkable improvement in facial profile of the patient was observed posttreatment.

CONCLUSION

A well formulated treatment plan is very essential for the management of hemimandibulectomy patient due to the deviation of the mandible, loss of oral masticatory function, physical as well as psychological trauma. The principal objective of the treatment should be restoration of function and appearance. This case report gives a detailed explanation about rehabilitation procedure of a patient following segmental mandibular resection with attachment supported overdenture using ball attachments. To provide a functional, retentive and a stable prosthesis, patient was rehabilitated with mandibular overdenture with ball attachment (VKS-OC Bredent) on natural teeth. This treatment option is a simple, appropriate and cost effective method to increase denture retention and stability. Thus the early initiation of guidance therapy, precision attachments, proper oral hygiene instructions, regular check ups and motivation helped the patient to adapt to new dentures.

REFERENCES

1. Lara Jain, Himanshu Aeran, Neeraj Sharma. Prosthetic management of hemimandibulectomy patient. International Journal of Oral Health Dentistry. July-September 2017;3(3):195-198.
2. Cantor R, Curtis TA. Prosthetic management of edentulous mandibulectomy patients. Part I. Anatomic, physiologic, and psychologic considerations. J Prosthet Dent. 1971;25:446-457.
3. Chandavarkar SM, Ram SM, Gurav S, Nadgere JB, Shah N. Attachments: A Boon for

- Hemimandi- bulectomy Patients. *J Contemp Dent*.2013;3(3):159-164.
4. Jain R, Aggarwal S. Precision attachments-An overview. *Ann ProsthodontRestor Dent*. 2017;1:6-9.
 5. Prasad DK, Swaminathan AA, Prasad DA. A Simplified approach to semi-precision attachment. *NitteUniv J Health Sci*. 2016;6:51-7.
 6. Moore DJ, Mitchell DL. Rehabilitating dentulous hemimandi- bulectomypatients. *J ProsthetDent* .1976;35:202-206.
 7. Shetty P, Baliga M, Rodrigues S, Dixit S. Prosthetic management following mandibular resection:Clinical report. *J Nepal Dent Asso*.2009;10:57-60.
 8. Arti, Gupta A, Khanna G, Bhatnagar M, Markose GM, Singh S. Precision Attachments in Prosthodontics: A Review. *Int J PrevClin Dent Res* .2018;5(2):S34-39.
 9. Schuyler CH. An analysis of the use and relative value of the precision attachment and the clasp partial denture planning. *J Prosthet Dent* 1953; 3:711-4.