Materials & Methodology
The Study protocol and informed consent form (Refer to Appendix 3) were approved by the ethical committee (VMSDC /IEC/Approval No. 069) of the Vinayaka Mission’s Research Foundation.(Refer to Appendix 7)

Patient Selection

In the period between 2015 -2018, a grand total of eighty five (85) patients with maxillofacial defect were selected for this study. Of which fifty (50) maxillectomy patients on Okay Classification and thirty five (35) mandibulectomy patients On Brown Classification were designated.(Refer to Appendix 5)

For maxillectomy patients rehabilitated with Definitive Obturator and for mandibulectomy patients with Mandibular Resection Prosthesis or Resection Guidance Prosthesis respectively. Informed consent was obtained for all participating patients (Refer to Appendix 2). Definitive Obturator and Mandibular Resection Prostheses were fabricated in the Author’s Department.

Obturator prostheses is one of the most successful treatment option for hard and soft palate defects. Prostheses stability and retention is significantly improved in dentulous patients as the prostheses gets it support from the remaining natural teeth. Maxillary obturator prostheses tend to create rotational stress on the abutment teeth which are counteracted by occlusion and gravity

Degree of movement of prostheses during functional activities is mainly influenced by extent and Size of the Maxillary defects. Weight of the obturator prostheses is most important criteria in obturator retention in case of larger defects. Thus the weight of the
bulb section of the obturator (hollow bulb) should be as light as possible to improve retention.

Retention and lateral stability were enhanced by the superior lateral extension in to lateral scar band. This design re-established good facial contours and prevented the dislodging forces acting on the prostheses.

**Prosthetic procedures for Definitive Obturator Prosthesis:**

Patients were examined in seating comfortable position; special attention was given to the size and extent of the defect, surgical bed, lateral scar tissue band and remaining teeth. On thorough clinical examination, the patients’ were educated and psychological prepared to undergo fabrication of definitive obturator prostheses.

Primary impressions with irreversible hydrocolloid (alginate) impression material in modified stainless stock tray were made. It is necessary to capture the accurate size and extension of the defect site. In order to fabricate the maximum extension of the custom tray

Primary casts were fabricated with help of type III dental stone. Surveying and tripoding was done on the maxillary cast to evaluate the prosthesis design. Proximal and palatal Guide planes and occlusal and lingual rest seat preparation were done.

A maxillary custom impression tray is fabricated for making final impression. Border molding and final impression is made with polyvinyl siloxane impression material. Patient should performed a variety of neck –rotational and forward bending movements to record the periphery of the surgical site. Master cast is fabricated with type IV die stone. Master cast was positioned and adjusted in the surveying table with tripod mark reference.
Unfavourable undercuts were blocked out with dental plaster, and the frame work wax pattern was designed and fabricated with base metal alloys. Metal Framework try in and Jaw registration were recorded. Wax Try-in prosthesis was performed to verify the jaw relation records. Flasking, dewaxing, curing, Trimming, finishing and polishing of obturator prostheses was done sequentially. Final evaluation of the obturator prosthesis fit was done and insertion into the patient’s mouth for function. Post maintenance instructions and follow up was carried out at the scheduled time interval.

**Prosthetic Procedures for Mandibular Guidance Prosthesis:**

Masticatory muscle balance and mandibular movements were adversely affected by mandibulectomy, leading to altered masticatory movement and deviation of residual fragment towards the surgical side. Other observed dysfunction were mastication, speech and swallowing and Angular path of opening and closing mandibular pattern. Less precise envelope of motion occurs towards the surgical site during mastication.

Rehabilitation of mandibular defects after tumor resection is one of the most challenging problems facing maxillofacial Prosthodontist. Swallowing, mastication, speech, control of saliva and psychic functioning are adversely affected by Mandibulectomy patients.

Mandibular guidance therapy should be initiated earliest in the course of treatment for better occlusal relationship and masticatory efficiency. A corrective device known as 'guide flange prosthesis' is indicated as mandibular guidance therapy. It can be applied either immediate postoperatively as inter-maxillary fixation or within 7 - 10 days after the resection as removable device, for restoring mandibular function.
Any delays in the initiation of mandibular guidance appliance therapy, due to problems such as extensive tissue loss, radiation therapy, radical neck dissection, and other postsurgical morbidities, may result in an inability to achieve correct Maxillomandibular relationships. Inter maxillary fixation, Mandibular- based guidance restorations, and palatal based guidance restorations will reduce or minimize this mandibular deviation.

Utilization of Provisional Mandibular Based Guide Plane along with organised mandibular exercise programme enables the easy fabrication of final definitive restorations. Uncoordinated masticatory movements due to deviated path of closure may result in eccentric occlusion, a disoriented masticatory cycle, facial disfigurement, distorted speech, dental or soft tissue trauma.

Various methods have been considered to reduce mandibular deviation by retraining the patient’s neuromuscular system. These include mandibular guidance or mandibular resection prostheses for partially edentulous patients, and mandibular resection prostheses for edentulous patients with modification in the occlusal scheme to compensate for the deviation.

A primary objective of the prostheses is provision of an acceptable occlusal relationship. If the patient has remaining teeth in the Maxillo-mandibular segment facilitate preparation to attain repeatable and recordable inter occlusal position which can be achieved by the use of guidance prosthesis. Patients who can achieve the proper mediolateral position but cannot maintain the mastication, require a lateral guide flange prosthesis is used. The prosthesis mechanically maintains the vertical chewing strokes, but little or no lateral movements should be anticipated. In many patients the guidance flange prosthesis used as training prosthesis, and its continued use can lead to eventual mandibular control without prosthesis.
The basic objective in rehabilitation in discontinuity defect is retraining masticatory muscles to provide an acceptable Maxillomandibular relationship of the remaining portion of the mandible. Mandibular guidance therapy serve as an interim basis to allow for neuro muscular adaptation of the mandible for correcting the existing deranged occlusion and it also allowed to proceed with further definitive management.

Since a considerable period of time had elapsed after the resection, guidance appliance was much more difficult for the patient. The earlier the mandibular guidance therapy is introduced in the course of treatment the more successful the patient’s definitive restoration.

Prosthodontic management of patients with mandibulectomy defects can enhance function, speech and aesthetics. The unilateral loss of mandibular continuity due to trauma or surgery results in mandibular deviation toward the affected side.

A guidance appliance with a palatal acrylic flange was useful in guiding the mandible to a correct occlusal relationship. Majority of the mandibulectomy patients the prime determinant usually is related to occlusion relationship. It was noted that the patient’s mandible could be manipulated manually into the centric occlusion without excessive force. A mandibular resection prosthesis with a buccal guiding flange was planned. Definitive restorations are advised only after acceptable Maxillomandibular relationship.
Prosthetic procedures for Mandibular Resection Guidance Prosthesis:

A preliminary maxillary and mandibular alginate impression were made. Diagnostic casts were fabricated with Type III dental stone. Diagnostic cast was surveyed for partial denture framework design and cast is then tripoded. Mouth preparation was done according to the proposed framework design. Elastomeric impression was made by using polyvinylsiloxane (Putty –Wash) impression technique. Master cast was fabricated with type IV die stone. Master cast was positioned and adjusted in the surveying table with tripod mark reference for transfer of Framework design. Unfavourable undercuts were blocked out and cast was duplicated. Wax pattern was fabricated on the refractory cast which was then casted with base metal alloys. Finally trimmed and polishing was done. Metal Framework try in and Maxillomandibular record was made by manually assisting the mandible into Intercuspal position. Casts were mounted on a Hanau wide - vue semi adjustable articulator with face bow transfer.

The mandibular resection prosthesis was fabricated on the non-defect side. The design which includes mandibular guidance flange on the buccal side and the supporting flange on the lingual side. The guide flange provided a mechanical system which prevented the mandible from turning towards the resected side. The patient was advised to use the guide flange device throughout the day, except at night and during meal.

The patient was advised to use the guidance appliance continuously for a period of 6 weeks with regular follow-up. The patient was recalled every week for a review to assess the patient’s mandibular closure with the guiding flange. The guiding flange helped to guide the mandible so as to achieve optimal occlusion on the unaffected side.
After the period of use of the guiding flange for about 1 month, the patient was able to close the mandible so as to bring occlusion on the left side. After 1 month, the duration of wearing the guiding flange was gradually reduced over a period of next 2 weeks. Henceforth the patient was able to maintain the position without the guiding flange.

Final evaluation of the mandibular resection prosthesis fit was done and insertion into the patient’s mouth for function. Post maintenance instructions and follow up was carried out at the scheduled time interval.

The OHRQol was evaluated by means of the Oral Health Impact Profile (OHIP-Edent-19), Obturator functioning scale (OFS-15) and Maxillofacial Prosthesis Performance Scale (MFPPS-10) with standardized questionnaire subsequently 2 weeks & 3 months of prosthesis function for all rehabilitated patients. (Refer to Appendix 3)

Patients were asked serious of questions by using all three scales. Answers were recorded by a single operator.

The OHIP-Edent comprises of 19 statements derived from the OHIP using an item impact method. Oral Health Impact Profile (OHIP-Edent) which includes seven subscales: Functional limitation, Physical pain, Psychological discomfort, Physical disability, Psychological disability, social disability & Handicap.

Obturator functioning scale comprises of 15 statements designed by kornblith et al to evaluate the Masticatory Ability, Speech, Communication Difficulties and Cosmetic Satisfaction.

To assess the oral health related quality of life for patients with maxillofacial defects Novel scale known as Maxillofacial Prosthesis Performance Scale (MFPPS) was developed. Validity and reliability was tested. (Refer to Appendix 6)

Impact Of Maxillofacial Prostheses On Oral Health Related Quality Of Life (OHRQol)
Maxillofacial Prosthesis Performance Scale comprises of 10 statements which includes Functional Discomfort, Retention/Stability, Phonetics, Esthetics, Oral Hygiene, Saliva, Taste Ability, Psychology and Satisfaction.

Internal consistency of the questions were assessed by Alpha Cronbach’s Test. (Refer to Appendix 4)

The answer to the OHIP-Edent has been entered as per question. The score for each domain would be calculated by multiplying each score by its weighing and adding the scores together to form the domain score. The summary score would be obtained by adding all domain scores together Summary score = FL + P1 + P2 + D1 + D2 + D3 + H

FL = functional limitation, P1 = physical pain, P2 = psychological discomfort, D1 = physical disability, D2 = psychological disability, D3 = social disability and H = handicap. Answers form the subjects would be recorded in the form of a five point Likert scale, and coded as Never/Don’t Know = 1, Hardly ever = 2, occasionally = 3, fairly often = 4, Very often = 5. The coded for these categories range from 1 for never to 5 for very often. The higher scores on the Likert scale indicated serious problem.

OHIP –Edent -19 and the OHIP –EDENT -19 subscales scores would be calculated by summing the scores of the responses to the 19 items & items corresponding to the subscales. Total OHIP –EDENT scores ranged from 1-95.

A five point Likert scale is used and the highest score indicates, function of the obturator prostheses with greater difficulties. Lower scores indicating Maxillo facial prosthesis enhance the oral health related quality of life.

Impact Of Maxillofacial Prostheses On Oral Health Related Quality Of Life (OHRQol)
Obturator Functioning Scale (OFS) and the subscales scores would be calculated by summing the scores of the responses to the 15 items & items corresponding to the subscales. Total Obturator Functioning Scale (OFS) scores ranged from 1-75. This scale suggests that lower scores indicate better Oral Health Related Quality Of Life with Maxillofacial Prosthesis in terms of their Psychological, Family & Social Functioning.

Maxillofacial Prosthesis Performance Scale (MFPPS) and the subscales would be calculated by summing the score of the responses to the 10 items and items corresponding to the subscales.

Total MFPPS scores range from 1-50. This scales suggest that lower scores indicates significant improvement of oral health related quality of life (OHRQol) with maxillofacial prostheses in terms of their functional, physical, psychosocial and esthetics parameters.