

# REHABILITATION OF GLOSSECTOMY PATIENT WITH HOLLOW TONGUE PROSTHESIS ATTACHED TO MANDIBULAR REMOVAL PARTIAL DENTURE: A CASE REPORT

## Case Report

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**ABSTRACT:** Aims and objectives : Glossectomy is an extremely debilitating surgical procedure that affects the neuromuscular coordination of the tongue. Glossectomy can be partial or total. Partial glossectomy is the removal of any part of the tongue, from small part of the side or tip, an entire half of the tongue or even more. Total glossectomy creates a large oral cavity, loss of speech and pooling of saliva and liquid. Patient with total glossectomy require glossal prosthesis. In edentulous patients, the glossal prosthesis can be attached to the mandibular teeth through a lower partial or complete denture

**Materials and methods :** Treatment was done in two phases. First phase comprised of fabrication of maxillary complete denture and mandibular partial denture. Second phase comprised of fabrication of hollow tongue prosthesis.

**Results and Conclusion :** This case report outlines the rehabilitation of a total glossectomy patient with a hollow tongue prosthesis. The tongue prosthesis was a substitute for natural tongue, though this prosthesis was rigid, not mobile as the natural tongue, it helped to improve deglutition.

**Keywords:**

Glossectomy,  
partial denture, complete  
denture, Mandibulectomy,  
hollow tongue prosthesis.

**Conflict of interest:** Nil

**No conflicts of interest :** Nil

**INTRODUCTION :** Glossectomy is an extremely debilitating surgical procedure that affects the neuromuscular coordination of the tongue. Glossectomy can be partial or total. Partial glossectomy is the removal of any part of the tongue, from small part of the side or tip, an entire half of the tongue or even more. Partial glossectomy can be described as surgical removal of 1/3 or less of the tongue; Hemi-glossectomy is surgical removal of 1/3 to 1/2 of tongue; near total glossectomy is 1/2 to 3/4 surgical removal of tongue. Total glossectomy is the removal of entire tongue, including the base of the tongue.

Factors influencing the prognosis of restoring the tongue with prosthesis depend upon the presence or absence of teeth and type of procedure that is combined with glossectomy (mandibulectomy, palatotomy, radiation therapy). Patients with partial glossectomy (i.e. <50 % of tongue removed) suffer

minimal functional impairment and require no prosthesis. Removal of more than 50% of the tongue requires rehabilitation with either palatal or lingual augmentation prosthesis. Total glossectomy creates a large oral cavity, loss of speech and pooling of saliva and liquid. Patient with total glossectomy require Glossal prosthesis. In edentulous patients, the glossal prosthesis can be attached to the mandibular teeth through a lower partial or complete denture [1].

**CASE REPORT :** A 65 years old male patient reported to the Out Patient Department of Prosthodontics, crown and bridge, SPPGIDMS, Lucknow with a chief complaint of resected tongue due to carcinoma of tongue (Grade IV) which was resected few days back and was referred by oncosurgeon for the rehabilitation of the same. The patient had a history of chewing pan masala since 20 years. The main purpose of

referral to prosthodontics department was to enhance swallowing pattern, oral communication and also phonation and aesthetics.

Patient current situation was completely edentulous maxilla and partially edentulous mandible with totally resected tongue. The plan of treatment was to fabricate maxillary complete denture using conventional complete denture protocol and mandibular removable partial denture with hollow tongue prosthesis.

### Phase - I

For the preliminary impression, the patient was seated in an upright position and properly draped so that the impression material (alginate) doesnot flow into hypopharynx. Plastic stock trays (maxillary trays) were selected for both maxilla and mandible, so that floor of the mouth could be registered well.

Utility wax was also added to the posterior edge and the vault to confine the hydrocolloid material and to prevent it from flowing towards the patient throat.



Figure Pre-Op View of Patients Oral Cavity



Figure Diagnostic Casts

The diagnostic cast were obtained, custom trays were fabricated on the maxillary edentulous primary cast. For mandibular special tray two layers of wax sheet spacer was adapted. Border moulding and final impression in maxillary arch was obtained using conventional method. For mandibular arch, custom tray were fabricated with multiple vent holes, loaded with addition silicon (monophase) and recorded well with the floor of the mouth.



Figure 3: Mandibular Custom Tray

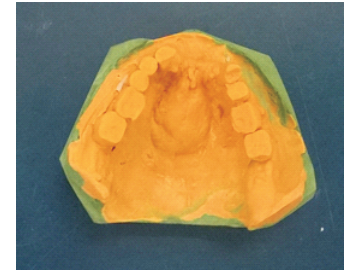


Figure 4: Mandibular Master Cast

Master casts were obtained, upon that temporary record base and occlusal rims were made. Maxillo-mandibular relationship were recoded and teeth arrangement trial was done.

After securing the proper teeth position, acrylization of maxillary and mandibular denture was done. The dentures were inserted and patient was recalled after 24 hrs.



### Phase - II

Wax-up was done on the mandibular removable denture which was contoured in the shape of a tongue that conforms the oral cavity dimensions with rounded edges. The tongue tip was arched inferiorly to approximately 15 degree angle and entire pattern was then arched slightly to form the highest point at anterior one third. Wax pattern was then folded to form a wide central v-shaped trough (approximately 160 degree) the wax was reduced to 4 to 5mm thickness at the base and the posterior two third [2]. The wax pattern was finally sealed to the mandibular partial denture.

The prosthetic tongue for swallowing was waxed up in the form of sloping trough like base in the posterior aspect to help guide the food bolus into the oropharynx.

The waxed up prosthesis was tried in patient mouth & speech articulation was evaluated with waxed up tongue for maximum contact of the dorsum with palate for optimum articulation.

The prosthetic tongue for speech should have an anterior elevation to facilitate articulation of the anterior linguloalveolar sound “t” and “d”.

A posterior elevation was also given to aid in articulation of glottal stops or posterior linguloalveolar sounds “g & k”

Both the elevations helped to shape the oral cavity thus improving vowel production in general. For this purpose modelling wax was used. Then wax pattern was layered with self-cure acrylic resin and at the base it was kept as acrylic free zone and was then kept in hot water bath so that excess of monomer from polymethyl methacrylate will leach out and also from the acrylic free zone all the wax comes out so as to obtain hollow tongue pattern.

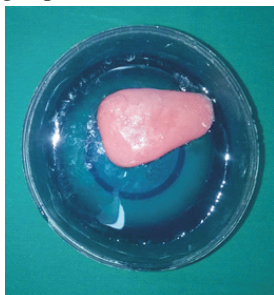


Figure 6: Hollow Tongue Shell

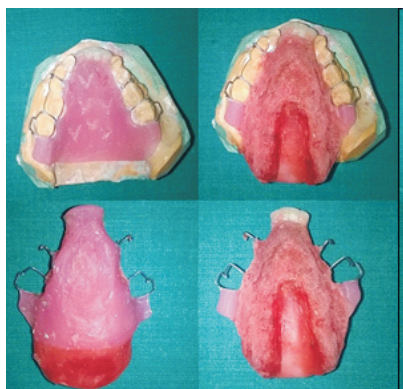


Figure 7: Mandibular Cured Denture, Waxed Up Tongue Prosthesis (Occlusal and Tissue Surface)

The hollow tongue pattern was then attached to the anterior portion of the framework and the patient was asked to occlude teeth. Simultaneously wax was added to the posterior portion of framework and the patient was asked to occlude the teeth. The patient was asked to confirm regarding the contact with the palate in both areas of the modelling wax.

After this anterior and posterior elevations was reduced 2 to 3mm and again layer of modelling wax was flowed on to the

surface. The patient was asked to repeat T,D,K, and G. and attempt swallowing.

On examination, the wax surface was dull, indicating positive contact with the palatal tissues. After satisfactory production of these sound (T,D,K,G), the tongue prosthesis was processed in heat cure acrylic resin and highly polished.

The tongue prosthesis was attached to mandibular prosthesis component with various retentive grooves (by means of chemico-mechanical retention) to secure the proper position of tongue prosthesis. The prosthesis was delivered and instructions related to swallowing and speech modifications were advised.

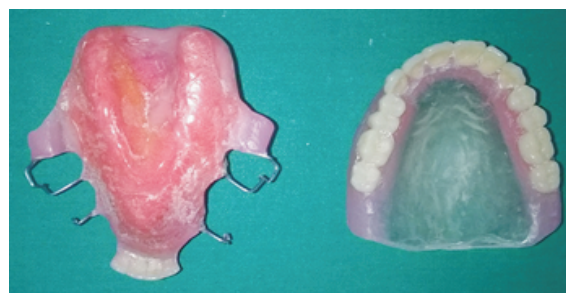


Figure 8: Mandibular Denture with Hollow Tongue Prosthesis (Occlusal Surface) and Maxillary Complete Denture

#### Discussion

The tongue is a muscular organ that manipulates food for mastication and is used in the act of swallowing. It is also a primary organ of taste in the gustatory system. The major function is the enabling of speech.

Trauma, neurological deficits or surgical interference such as tumour removal results in alternation of tongue functions. Older men are most at the risk of tongue cancer, most common in aged 50 years or more. Mc Connel et al (1988) stated swallowing as pressure generation mechanism [3]. When the total glossectomy is performed it creates a large oral cavity with loss of oral communication and pooling of saliva and liquid and there seeping around epiglottis may lead to aspiration. Mitrani and Krespi, 1988 performed the surgical closure of laryngeal opening so as to reduce the incidence of aspiration [4].

Canter et al. 1969, described major goals in prosthodontic rehabilitation of total glossectomy patients are [5]

- Reduce the size of the oral cavity, which improves resonance and minimizes the degree of pooling saliva.
- Direct the food bolus into the oropharynx with the aid of a trough carved into the dorsum of the tongue prosthesis.
- Protect the underlying fragile mucosa if skin flaps were not used.



- Develop surface contact with the surrounding structure during speech and swallowing.
- Improve appearance and physiological adjustment.

In cases of total glossectomy mandibular tongue prosthesis is treatment of choice, Moore 1972[6][7]. There are three types of tongue one for speech, one for swallowing and it can be combination which performs both functions i.e. speech and swallowing (Moore 1972) [7]. Myers and Sun in 1965 stated that certain design considerations have to be kept in mind while fabrication i.e. the anterior elevation and posterior elevation thereby facilitating articulation of anterior linguoalveolar sounds 't' and 'd' and articulation of glottal stops or posterior linguoalveolar sounds i.e. 'g' and 'k' hence improving vowel production [8]. Speech is produced by laryngeal vibrations modified by fixed and mobile articulators. Tongue plays a major role while producing all sounds except labiodentals and bilabial sounds (Luciello et al. 1980) [9]. Tongue alters size of oral cavity thereby reducing resonance and producing various vowels.

The prosthetic tongue for swallowing is waxed in form of sloping like base in posterior aspect to help guide the food bolus into the oropharynx. A wide buccolingual table, an occlusal table to that of the tongue body and a close adhering to the tongue and lingual flange are effective means of preventing the food from dropping to the oral and keeps food on occlusal table.

In this case interim prosthesis was given to patient just after surgical removal of carcinoma of tongue(SCC). The hollow tongue was light weight, restored the functions of tongue i.e swallowing and speech, without disturbing the healing procedure. Definitive treatment (cast partial denture with silicon tongue prosthesis) was planned after 6 month.

**SUMMARY :** This case report outlines the rehabilitation of a total glossectomy patient with a hollow tongue prosthesis. The tongue prosthesis was a substitute for natural tongue, though this prosthesis was rigid, not mobile as the natural tongue, it helped to improve deglutition. The therapy focus on facilitating swallowing water sip by sip gradually shifting to liquids with increased viscosity and density followed by semisolids. The prosthesis could be removed and washed easily. Drooling was controlled with the help of oral exercise.

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