



EFFECTIVENESS OF MAXILLARY OBTURATOR PROSTHESIS IN MAXILECTOMEE- A CASE REPORT

Irfana, M.

Lecturer in Speech Sciences, BASLP unit, ENT department, Netaji Subhash Chandra Bose Medical College, Jabalpur, Madhya Pradesh - Corresponding Author

Dollin, J

Student of BASLP BASLP unit, ENT department, Netaji Subhash Chandra Bose Medical College, Jabalpur, Madhya Pradesh

Himani, B.

Student of BASLP BASLP unit, ENT department, Netaji Subhash Chandra Bose Medical College, Jabalpur, Madhya Pradesh

ABSTRACT Maxillectomy is the surgical resection of part or the entire maxillary bone to remove tumors. One of the major rehabilitation methods after the surgery includes prosthesis fitting to avoid complication during swallowing and speech. Present study aimed to report the effectiveness of prosthesis by comparing the characteristics of swallowing and speech in two conditions including pre and post prosthesis fitting. A 45 years old female who had undergone maxillectomy surgery was considered for the study. Client was reported with unclear speech and swallowing difficulties. She had a history of recurrent/ relapse of cancer on left maxilla (T2 N0 Mx) and underwent total maxillectomy. After surgical removal of cancer, the client was recommended for prosthodontic rehabilitation. Swallowing and speech were evaluated clinically both in pre and post prosthesis fitting conditions. In pre-condition, there was evident nasal regurgitation while swallowing and it was noticed for all consistency of food. Speech was unintelligible and hypernasal. However, there was a good improvement in the post prosthesis fitting condition specifically for swallowing, but speech was stayed unintelligible with moderate nasality. Hence there is a need of speech and swallowing rehabilitation after prosthesis fitting.

KEYWORDS : Maxillectomy, Swallowing, Speech rehabilitation, Palatal obturator

INTRODUCTION

Maxillectomy is the surgical removal of part or the entire maxillary bone. It is indicated for tumors of the hard palate, nose, maxillary sinus or other tumors that have grown to involve the maxilla. Speech intelligibility and swallowing difficulties are the major concerns after maxillectomy surgery. These are the after effects of inappropriate coupling between the oral and nasal cavities which results in inadequate intraoral air pressure. This leads to poor speech production including imprecise articulation, hypernasality, nasal air emission and reduced loudness of voice (Plank, Weinberg, Chalian, 1981). Prosthetic obturation is one of available surgical rehabilitation methods due to its immediate accomplishment, low cost, and the possibility of modification according to the patient needs (Carvalho-Teles, Pegoraro-Krook & Lauris, 2006) The intention of using obturator prosthesis is to eliminate the undesired connection between the oral and nasal cavities which can be an automatic as a consequence of maxillectomy. Consequently, there can be a automatic reduction of speech intelligibility and result in swallowing difficulties. However, there is a dearth in the literature for studies focusing on functional aspects of swallowing and perceptual and acoustical basis of speech after maxillary obturator prosthesis fitting. Yoshida, et al. (1990) studied eight maxillectomees' and reported of improvement in speech intelligibility in four patients after prosthetic fitting based on perceptual measures. In another study, Sullivan, et al (2002), considered patients who had undergone partial surgical resection of the maxilla. As per the reports there was 33% improvement in sentence intelligibility, speaking rate increased upto 26-word-per-minute, nasality scored as 4.2 point in a 0-7 scale of hyper nasality. But, both of these studies have not focused regarding the swallowing difficulties which is quite evidently present in maxillectomees. Hence, the present study is aimed to identify the efficacy of palatal obturator prosthesis in swallowing and speech intelligibility using both perceptual and acoustical methods after total maxillectomy.

Case Report

A 45 years old female who had undergone maxillectomy surgery was considered for the study. Client was reported of unclear speech and swallowing difficulties. She had history of recurrent/ relapse of cancer on left maxilla (T2 N0 Mx) and underwent total maxillectomy. After surgical removal of cancer, the client was recommended for prosthodontic rehabilitation. Figure 1 depicts image of patient showing oro-nasal communication and maxillary obturator prosthesis.

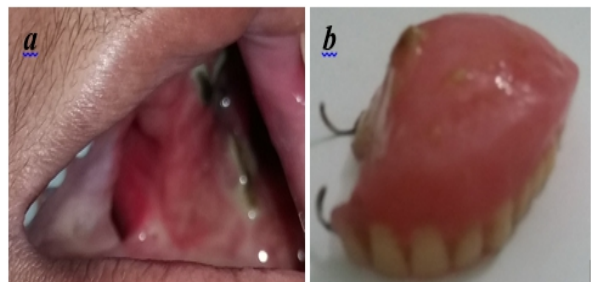


Figure 1. a) Images of the patient with oral-nasal communication, **b)** Acrylic maxillary obturator prosthesis with orthodontic staples.

Speech and swallowing skills were assessed in both pre and post prosthesis fitting conditions. Perceptual and acoustic evaluation of speech was administered in both conditions individually. Perceptual evaluation included intelligibility test consisted of both open and closed set methods explain by Gordon – Brannan (1994). CVCV syllable sample was used for intelligibility analysis. Three trained speech language pathologists who have more than three years of clinical experience were participated as judges for the intelligibility test. Formant centralization ratio (FCR) was considered as intelligibility measure. It is a quantitative measure of speech intelligibility (Sapir, Ramig, Spielman & Fox, 2010). Formants of cardinal vowels were measured individually and calculated FCR based on the equation $(F2u+F2a+F1i+F1u)/(F2i+F1a)$

Pre-prosthesis fitting: There was consistent nasal regurgitation including solid, semi solid and liquid food. Chewing was affected from the left side of the mouth. Speech intelligibility was poor, where two among 15 words were identified as intelligible in closed set (13.3%). 35% of intelligibility noticed in open set task. FCR was calculated and it scored as 1.38.

Post- prosthesis fitting: There was a noticeable difference in the swallowing pattern after fitting with prosthesis. Participant could chew different consistency of food items. Bolus preparation was reported to be time consuming. Speech intelligibility was gradually improved. Soon after fitting of prosthesis, it was scored as 33.3% in closed set and 58% in open set of intelligibility tasks. FCR was reduced in to 1.02 soon after fitting.

Discussion

A subject who had reported of reduced speech intelligibility and swallowing difficulties was considered for the study. Speech and swallowing skills were evaluated before and after prosthesis fitting. There was a gradual improvement of speech intelligibility noticed soon after prosthesis fitting and it was noticed in both perceptual and acoustical measures. There was a reduction of FCR from 1.38 to 1.02; it indicates improved intelligibility (Sapir et al., 2010). Progress noticed in open set from 13% to 33.3% and in closed set from 35% to 58% in pre and post prosthesis fitting respectively. Though intelligibility improved soon after prosthesis fitting there was an apparent nasality in continuous speech. Swallowing difficulties were reduced after prosthesis fitting.

It is possible to get immediate effect both in terms of speech and swallowing skills after prosthesis fitting. In fact this is the reason substitute why professionals opt for the prosthesis thereupon surgery. However, client had continued with certain difficulties both in speech and swallowing skills. Mostly, patient can be considered under liquid diet through nasogastric tube once fitted with prosthesis to avoid any further complication. Majority of the time, medical professionals are not aware about the requirements of further rehabilitation including speech and swallowing rehabilitation after prosthesis fitting. As a Speech Language Pathologist, there is a need of giving proper counseling regarding the necessity of speech and swallowing rehabilitation after maxillectomy.

The study highlights the need of speech and swallowing therapy, though the prosthesis covered anatomical deficiencies; however the appreciable level of intelligibility can be acquired after speech rehabilitation. Hygiene of the prosthesis also needs to be taken care and counseled as a part of rehabilitation after prosthesis fitting. The compensatory approach is the possible treatment option for both articulatory and swallowing deficits. Efficacy of compensatory approach will vary varied based on the extent of removal of anatomical structures.

References

1. Plank, D.M., Weinberg, B., & Chalian, V. A. (1981). Evaluation of speech following prosthetic obturation of surgically acquired maxillary defects. *Journal of Prosthetic Dentistry*, 45 (6), 626-38.
2. Carvalho-Teles, V., Pegoraro-Krook, M. I., & Lauris, J. R. (2006). Speech evaluation with and without palatal obturator in patients submitted to maxillectomy. *Journal Applied Oral Sciences*, 14 (6), 421-426.
3. Yoshida, H., Michi, K., Ohsawa, T. (1990). Prosthetic treatment for speech disorder due to surgically acquired maxillary defects. *Journal Oral Rehabilitation*, 17, 565-571.
4. Sullivan, M., Gaebler, C., Beukelman, D., Mahanna, G., Marshall, J., Lydiatt D, et al. (2002). Impact of palatal prosthodontic intervention on communication performance of patients maxillectomy defects: a multilevel outcome study. *Head and Neck*, 24 (6):530-538.
5. Gordon-Brannan, M. (1994). Assessment of speech intelligibility: A prerequisite for oral communicative competence. *Topics in Language Disorders*, 14, 18-27.
6. Sapir, S., Ramig, L.O., Spielman, J.L., Fox, C. (2010). Formant centralization ratio: a proposal for a new acoustic measure of dysarthric speech. *Journal of Speech, Language, and Hearing Research*, 53 (1):114-125.