

Early Labial Compensation for Lingual Sounds Post Partial Glossectomy

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Abstract

Speech errors are commonly reported in the literature for postsurgical treatment in lingual carcinomas. The degree of errors relate to the extent of resection and reconstruction. Residual organ compensation is reported in partial glossectomy, while adjacent articulator compensation in total glossectomy. This case report describes an early atypical labial compensation for lingual sounds in a young female postpartial glossectomy and free flap reconstruction. Speech articulation errors were specific to distortion of tongue tip stops, laterals, and liquids. Bilabial flicker like movements were noted during the production of alveolar stops which subsequently developed into a bilabial compensatory articulation. This error indicates that compensation for the affected articulator function may begin at a very early postsurgical stage. The compensation needs to be identified and intervened at an early stage where facilitation must be sought as a modality for speech correction in smaller surgeries to achieve new or near normal speech.

Keywords: Glossectomy, labial stops, lingual stops, speech production, labial compensation

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INTRODUCTION

Glossectomy has a severe adverse effect on speech intelligibility.^[1] Frequently, distorted speech sounds after a glossectomy are /i/, /t/, /d/, /l/, /v/, /k/, /g/, /θ/, /s/, /z/, /ʃ/, /tʃ/, /dz/, /r/, and /b/. Some substitution errors are also noted for consonants /k/ and /f/.^[2] Postsurgical speech is better when there is greater motility of tongue.^[3]

Engagement of other articulatory structures such as jaw, lips for compensation of lingual sounds is reported in total glossectomy. Such errors are not observed in partial glossectomies.^[2] We present a case report of a partial glossectomy with an early labial compensation which is not yet reported in the literature.

CASE REPORT

A 23-year-old female underwent a partial glossectomy for the carcinoma at the lateral border of the tongue extending to the left floor of the mouth. The patient had no history of prior speech and language disorders. Reconstruction of tongue defect was done with a free radial artery forearm flap.

Bedside screening on postoperative day (POD) 3 using AYJNIIHHH Speech Intelligibility rating scale (SIRS)^[4]

indicated that speech could be understood with little effort, but occasionally needed repetition (Score 3). The patient demonstrated distortions of /ə/, /ɔ/, /t/, /d/, /s/, /ʃ/, /z/, /r/, and /l/ sounds on an informal articulation screening at word level. Perceptually, mild hyper-nasality was noted, which may be attributed to the presence of Naso-gastric (NG) feeding tube. On POD 12, NG tube was removed which resulted in improved nasality. AYJNISHD (D) SIRS score improved to 2 (speech could be understood with minimal difficulty. However, the speech was not normal).

During the first postsurgical speech evaluation, the patient showed a flicker like motion of upper and lower lips during the production of tongue tip sounds associated with restricted tongue tip elevation. Over the next 2 days, the patient developed bilabial stop substitution for alveolar stops at all the

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word positions. Other speech errors continued to be distorted. These bilabial stops substitution errors were consistent in word as well as sentence level [substituted/b/for/δ/and/p/for/θ/as shown in Figure 1]. Alveolar stop and palatal stop clusters also showed bilabial substitutions as in nonclusters.

On POD 14, Kannada Articulation Test^[5] and a Kannada reading passage (*/namma bengaluru/*) analysis indicated that the substitution of labial stops for tongue tip stops persisted with other distortion errors as mentioned above (percentage of consonant correct [PCC] –47.2% and Relative Distortion Index [RDI] –0.77) with no perceptual hyper-nasality. AYJNHH SIRS score was unchanged from the previous evaluation.

Speech rehabilitation was planned subsequently to correct the compensatory errors and to facilitate the correct place and manner of articulation of speech sounds. Tongue range of motion exercises for tongue tip, anterior tongue strengthening isometric exercises, tongue tip speech sound drills using articulator placement therapy for the sounds in combination with vowels, in word context and in clusters was given. The production learning was facilitated by minimal pair contrasts (*/p/-t/, /b/-d/, /t/-θ/, /d/-δ/, /s/-ʃ/* and */r/-l/*) with visual monitoring and feedback to reduce the compensations of lips during lingua-dental (*/θ/* and */δ/*) and alveolar stop (*/t/* and */d/*) production. The speech training was carried out for five sessions spanning for about 20 min for 5 days. Postspeech training (POD 21), the patient did not show any compensation of labial stops for lingua-dental and lingua-alveolar stops (PCC – 44.8%,

RDI – 1.00). The other speech sounds did not show a considerable decrease in distortion as the manner correction would take longer sessions to show significant improvement in contrast to place corrections. There was no change in speech intelligibility score either.

DISCUSSION

The early atypical labial compensation described in the current study is not reported earlier in the literature related to partial glossectomy. These labial or adjacent articulator compensations are reported for larger resections such as total glossectomy. The errors in partial glossectomy are restricted to distortions.^[2]

The two major types of compensations are residual tissue compensation and adjacent organ (mandibular, labial, buccal, and palatal adjustment and control) compensation. Proximal organ compensatory errors are seen in total glossectomy. In contrary, individuals with partial glossectomy compensate using residual stump for lingual sound production.^[3] The compensation by adjacent organ may occur due to engagement of adjacent muscles.

The labial compensation errors, labial stops for alveolar and palatal stops, qualify as a place substitution error. The error starts very early postsurgery as an associated lip movement during tongue tip sound production and evolves as a labial movement.

The change in speech behavior may be due to restricted tongue movement, surgical site pain, edema, or discomfort while speaking.^[6] To compensate for the restricted movement of the tongue, the patient may inculcate an anticipatory behavior for the compensated continuity of speech production. The lip, being a primary articulator, tends to compensate for the closely positioned tongue tip sounds. This compensation may be learnt as a part of a coping mechanism for the sounds that are difficult to produce due to restricted movement of the tongue at an early stage. These errors can be identified and corrected early. Further studies need to be carried out to see the factors that may lead to early labial compensations of tongue tip sounds as it is not demonstrated in all early lingual carcinomas.

CONCLUSION AND CLINICAL IMPLICATION

Atypical compensatory errors in speech occur postpartial glossectomy for small lesions of tongue. These errors may surface as early as 2nd day postsurgery. Such errors, if not corrected, may become habitual and pose a challenge to speech correction at a later stage. It is important to monitor speech sound productions early postsurgery and to intervene early to reduce speech errors and improve speech intelligibility. Early and regular screening by a Speech Language Pathologist for such compensatory errors is warranted.

Patient consent

Informed consent was obtained from the patient by the medical faculty with an understanding that her clinical data images will

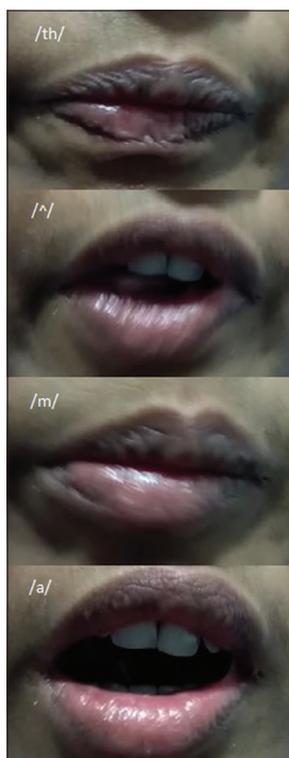


Figure 1: Labial movement sequence during the production of the word/ *th ^ ma/*

be utilized for research activities and publications in journals/conferences.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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