

Speech intelligibility after gingivectomy of excess palatal tissue

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Abstract

To appreciate any enhancement in speech following gingivectomy of enlarged anterior palatal gingiva. Periodontal literature has documented various conditions, pathophysiology, and treatment modalities of gingival enlargement. Relationship between gingival maladies and speech alteration has received scant attention. This case report describes on altered speech pattern enhancement secondary to the gingivectomy procedure. A systemically healthy 24-year- female patient reported with bilateral anterior gingival enlargement who was provisionally diagnosed as “gingival abscess with inflammatory enlargement” in relation to palatal aspect of the right maxillary canine to left maxillary canine. Bilateral gingivectomy procedure was performed by external bevel incision in relation to anterior palatal gingiva and a large wedge of epithelium and connective tissue was removed. Patient and her close acquaintances noticed a great improvement in her pronunciation and enunciation of sounds like “t”, “d”, “n”, “l”, “th”, following removal of excess gingival palatal tissue and was also appreciated with visual analog scale score. Exploration of linguistic research documented the significance of tongue-palate contact during speech. Any excess gingival tissue in palatal region brings about disruption in speech by altering tongue-palate contact. Periodontal surgery like gingivectomy may improve disrupted phonetics. Excess gingival palatal tissue impedes on tongue-palate contact and interferes speech. Pronunciation of consonants like “t”, “d”, “n”, “l”, “th”, are altered with anterior enlarged palatal gingiva. Excision of the enlarged palatal tissue results in improvement of speech.

Keywords: Alveolar plosive, gingival enlargement, gingivectomy, palate, speech

Introduction

Speech is produced by an execution of complex, co-ordinated, co-articulated maneuver involving oro-laryngeal complex of lips, tongue, palate, velum, larynx, which enhances human linguistic potentiality. Any developmental or acquired malformation of oro-laryngeal complex results in speech alteration. An assortment of studies and case reports in literature highlights on etiology of speech disorder in relation to developmental defects such as velopharyngeal inadequacy,^[1] dentofacial deformities (cleft lip and palate),^[2,3] and acquired defects such as neurolomuscular,^[4] oral cavity lesions (oral cancer, ankyloglossia,^[5] gingival enlargement^[6,7]) and oral habits (tongue thrusting).^[8]

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One among the acquired defects of speech alteration is gingival enlargement, which has a limited captivation in periodontal literature. Gingival enlargement is engendered due to genetic predisposition,^[9,10] hormonal interferences,^[11,12] drug induced,^[13] orthodontic therapy,^[14] and inflammatory response to bacterial plaque.^[15-17] It poses difficulty in plaque control, can impinge with mastication, alters tooth eruption, causes esthetic concern and do interfere with speech. Majority of articles regarding gingival enlargement were case reports based on its observable facts, pathophysiology and treatment modalities, but very few had focused on speech disruption in relation to gingival enlargement.

Tongue-palate contact plays a major role in pronunciation and enunciation of vowels and consonants during phonation. Alteration in palato gingival anatomy leads to disruption in normal speech pattern. This article reports a case on improved speech pattern that developed following anterior bilateral palatal gingivectomy procedure.

Case Report

In 2012, a 24-year-old systemically healthy female patient presented to Department of Periodontics, SRM Dental College, Chennai, India with the chief complaint of pain for past one day and swelling in relation to gums of the inner aspect of upper front teeth region, associated with impaired pronunciation of words for past the 2 weeks.

Detailed history of the patient revealed that she was undergoing orthodontic treatment for past one year. Patient

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noticed swelling 2 weeks back, which slowly started increasing in size in her anterior palatal region associated with disturbance in her speech. Presence of pain for past one day was elicited.

On clinical examination, palatal gingiva was edematous, presence of small pustule with fluctuant gingival enlargement extending from right maxillary canine to left maxillary canine on the palatal aspect involving interdental papillae, marginal gingiva, covering up to two-third of palatal surface, with 7 mm of pseudo pocket, along with the presence of bleeding on probing [Figures 1 and 2]. Subjective evaluation was done with visual analogue scale (VAS) score to analyze the degree of speech disturbance (VAS score: Good pronunciation – 0, poor pronunciation – 10) VAS score before treatment was 7.

Based on history and clinical examination, patient was provisionally diagnosed as “gingival abscess with inflammatory enlargement in relation to right maxillary canine to left maxillary canine on the palatal region.”

Patient was treated nonsurgically by scaling and root surface debridement to facilitate abscess drainage and to reduce inflammation. Antibiotic coverage for 5 days was prescribed. On recall of patient after 7 days anterior palatal gingiva appeared fibrotic with resolved inflammation.



Figure 1: Indirect occlusal view of enlarged palatal gingiva

Gingivectomy was done under 2% lignocaine with 1:80,000 adrenaline with no. 15 blade. External bevel incisions were placed from 12 to 22, and a large wedge of epithelium with connective tissue was excised [Figure 3] and periodontal dressing was given and analgesics and chlorhexidine mouth was prescribed.

One month following the surgery, wound healing was uneventful, improved gingival contour was achieved [Figure 4]. VAS score was 2 after treatment, there was an improvement when compared with the baseline value.

Strict oral hygiene instructions were given to patient for plaque control on brushing habits and usage of mouthwash.

Patients' closest associates also revealed that her enunciation of sounds such as “t”, “th”, “d”, “l”, “n”, “nth” were improved following gingivectomy procedure.

Discussion

Although literature has documented various reasons pertaining to speech pattern alteration, relationship between gingival enlargement affecting speech has received scant attention. Ong *et al.*^[6] reported speech disruption in patient with recurrent pyogenic granuloma. Holtzclaw and Toscano^[7] have reported a case of posterior bilateral palatal gingival



Figure 2: Direct occlusal view of enlarged palatal gingiva



Figure 3: After gingivectomy procedure



Figure 4: One month follow-up

enlargement causing the pronunciation disturbance of sounds like “s”, “sh”, “z”, “k”, which was improved following gingivectomy technique.

Exploration of linguistic research has revealed documentation on tongue-palate contact importance for phonation. Eslamian and Leilazpour^[8] analyzed the importance of tongue-palate contact in subjects with and without tongue thrusting during speech, and confirmed that contact between the tongue-palate was mostly at the anterior and lateral parts of the palate and least at mid palatal area. Fiona *et al.*^[17] compared tongue-palate contact patterns for alveolar plosives (alveolar plosives are the type of consonantal sound, made with the tongue in contact with the alveolar ridge located just behind the teeth) (/t, /d/) with those for the nasal stop/n/using electropalatography (EPG) and found “t” “d” “n” was under anterior constriction EPG frames. EPG is a technique used to monitor contacts between the tongue and hard palate, particularly during articulation and speech. A custom-made artificial palate is molded to fit against a speaker’s hard palate. The artificial palate contains electrodes exposed to the lingual surface. When contact occurs between the tongue surface and any of the electrodes, particularly between the lateral margins of the tongue and the borders of the hard palate, electronic signals are sent to an external processing unit. EPG provides dynamic real-time visual feedback of the location and timing of tongue contacts with the hard palate.

This procedure can record details of tongue activity during speech.

Kent and Moll^[18] showed that the location of the point of contact between the tongue tip and the palate or alveolar ridge is influenced by phonetic context.

To assess tongue-palatal contacts during speech production, speech pathologists often use palatometric tools such as EPG,^[19] electromagnetic articulography,^[20] computerized tomography (CT),^[21] magnetic resonance imaging,^[22] and X-ray microbeams,^[23] among which EPG [Figure 5] is widely used. EPG is a visual feedback system that records the location and timing of tongue contacts with the hard palate during speech through the use of a grid of sensing electrodes. EPG research exists for a variety of spoken sound from phonemes and vowel/consonant sounds of normal speakers to abnormal articulations. EPG frames for “t”, “d”, “l”, “n” are depicted in Figures 6 and 7.

Literature has revealed that tongue and palate contact is required for pronunciation of words. These pronounced words can be classified as consonants, clusters, and vowels.

Among these consonants are produced by alveolar plosive mechanism. This involves the tip of the tongue, or/and the blade of the tongue, which makes a firm contact with the anterior alveolar ridge and the side rims (=edges) of the

tongue touches the upper molars (=side teeth), making a complete closure of the air passage. The outgoing air stops behind the closure for a while, so air pressure builds up,

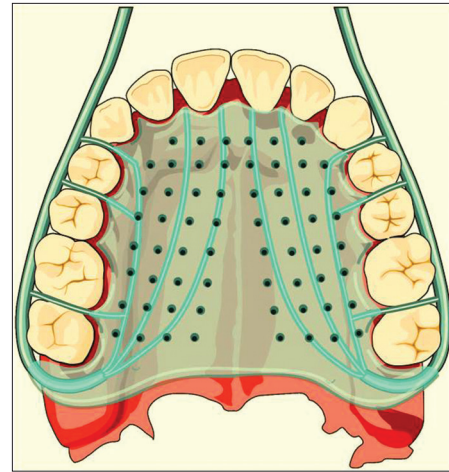


Figure 5: Electropalatography

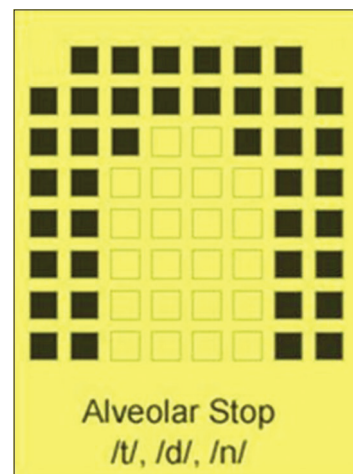


Figure 6: Electropalatography frames of alveolar stops “t,” “d,” “n”

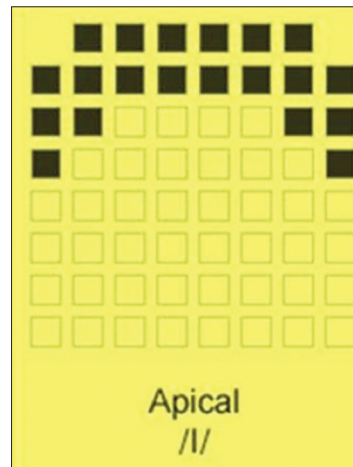


Figure 7: Electropalatography frames of “l”

when articulators come apart the air stream will be released in small burst of sounds like consonants (“t”, “d”, “n”, “l”).^[24]

This report explored alveolar plosive maneuver alteration due to anterior palatal gingival enlargement. One plausible reason for altered speech may be that tongue tip could not make a firm contact with anterior alveolar ridge due to enlarged palatal gingiva, thereby failure to build up oral air pressure in producing sounds with “t”, “d”, “th”, “n”, “l”.

In this case report, pronunciation and enunciation were improved following gingivectomy procedure, which was well appreciated with VAS score.

In order to gain focus on the relationship between periodontium and speech, this case report emphasizes on enhancement of altered speech following gingivectomy procedure performed on the anterior palatal gingiva.

Conclusion

This case report appreciates the improvement of speech configuration following gingivectomy of excess anterior palatal gingiva, with literature joist evidence. Very few case reports^[6,7] are documented in the literature regarding the speech alteration in relation to gingival enlargement. To achieve and accomplish sound scientific comprehension of the magnitude between periodontium and speech, case control studies are warranted.

Clinical Significance

Excess gingival palatal tissue impedes on tongue-palate contact and interferes with speech. Pronunciation of consonants like “t”, “d”, “n”, “l”, “th” are altered with anterior enlarged palatal gingiva. Excision of the enlarged palatal tissue results in improvement of speech.

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