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Speech Enhancing Prosthesis for Acquired Cleft Palate

Authors
Khurshid Mattoo[1], Krati Jain[2]
[1]Department of Prosthodontics, College of Dentistry, Jazan University, (KSA)
[2]Department of Prosthodontics, Subharti Dental College, Subharti University, Meerut, India
Corresponding Author
Khurshid Mattoo
College of Dentistry, Jazan University (KSA)
Mobile – +966595086078
Email – *drkamattoo@rediffmail.com*
Work attributed to: Subharti Dental College and Hospital, Subharti University, India.

Abstract
Cleft of the hard palate that is acquired secondary to surgical correction of a carcinoma renders the patient handicapped relative to phonetics. Obturation of such defects, temporarily or permanently are essential initiators for rehabilitation. Impaired phonetics superimposed on a psychologically disturbed individual affect an individual's confidence and can exaggerate the level of already existing depression. Speech correction in such patients is the second step after obturation of the defect and both procedures when carried in synergism allow patients to improve psychologically. This article describes the speech enhancement of a cleft palate patient using an acrylic plate (obturator).

Keywords- *carcinoma, depression, speech therapy, self-confidence, obturator*

Introduction

Excavation of a carcinomatous lesion in the oral cavity affects the individual more psychologically as compared to any other associated disfigurement in the body. The mere fact that surgical removal of the lesion leaves a cleft that affects the patient's speech besides other functions does not comprehend the psychological impact that such lesion can have on an individual. Impairment in speech is the first physical sign which the patient experiences as to the effects of such dreaded handicap. Inability to communicate with others imparts low self-confidence which should be anticipated by the multidisciplinary team that usually is associated with such patients. Prosthetic rehabilitation through the use of obturator since earliest scripted attempts [1-3] has now been recognized as the first step towards primary rehabilitation, especially since the establishment of the recognized organization like American academy of maxillofacial prosthetics. [4-7] Interim obturator in the form of an obturator is an essential component of functional rehabilitation like

prevention of regurgitation, enhancement of swallowing, drooling of nasal mucous in the oral cavity and enhancing communication by improving three aspects of speech, namely nasality, articulation and resonance. [8] This article in the form of a clinical case report presents a patient with an acquired cleft palate who was successfully rehabilitated with an interim obturator and discusses the role such prosthesis play in enhancement of phonetics

Clinical Case Report

An elderly male patient in his late sixties was referred to the department of Prosthodontics with chief complaint of abnormally altered phonetics compounded with dysphonia due to a large cleft in the hard palate. The cleft was acquired after undergoing a surgery for removal of a squamous cell carcinoma. Medical history was non-contributory and dental history did not disclose any abnormal pattern except the tumor and its treatment. The patients' concern was that whenever he would talk for a long period of time it would exhaust him and needed more effort in breathing. Extra oral examination revealed bilaterally symmetric face. Intra oral examination disclosed normal, natural dentition with severe accumulation of plaque, calculus and stains (Fig 1A). In the maxilla there was an opening about the size of a one and a half inch rolled gauze (Fig. 1B). The posterior part of the nasal septum and the nasal conchae were clearly visible (Fig 1C).

Treatment plan included oral prophylaxis, followed by the fabrication of a definitive obturator which would be preceded by an interim obturator retained by an Adams clasp and a pin head clasp. Preliminary impressions using irreversible hydrocolloid (CA 37; Cavex, Haarlem, Holland) (Fig 1D) were made on the day of the first appointment from which diagnostic casts were fabricated (fig 2A). Diagnostic casts were surveyed for the presence of undercuts and an Adams clasp and a pin head clasp was fabricated from an 18 gauge stainless steel wire. A hollow bulb obturator was designed at the stage of processing (lost salt technique) by applying a layer of self-cure denture base acrylic over the cast in the area of the defect followed by placement of salt crystals over which the rest of the acrylic plate was designed (Fig 2B and C). The interim obturator carrying a hollow bulb (Fig 2D) was then inserted into the patient's mouth closing the defect (Fig 2E). The patient was put on a regular follow up protocol for a period of one month during which he reported improvement in the level of dysphonia and speech.

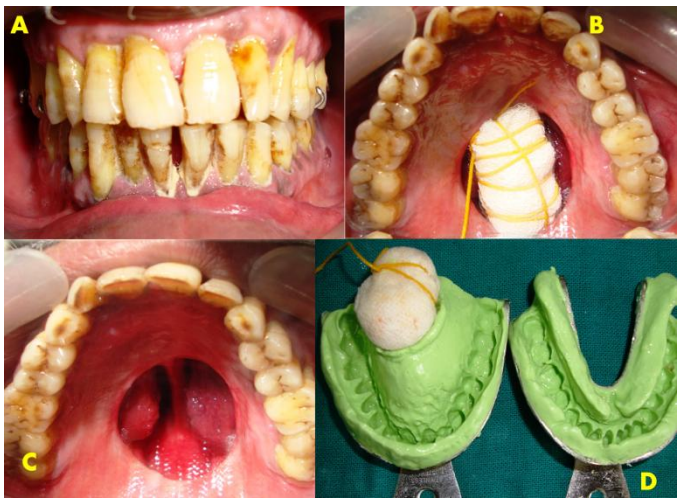

Figure 1: (A) Intra oral view showing poor oral hygiene (B) Roll of gauze depicting the size of the defect while closing the defect before impression making (C) Actual defect showing oro nasal communication (D) Completed alginate impression

Discussion

Production of speech is a complex process and involves respiratory, neurosensory and neuromotor pathways, musculoskeletal and components of the stomatognathic system including nasal and paranasal air sinus. Modulation of air flow through the vocal cords together with the incorporation of resonance, followed by articulating breakup produces what is termed as a sound. For precise production of various sounds, there is effective feedback and control which requires and auditory and neuromotor system. [9,10]

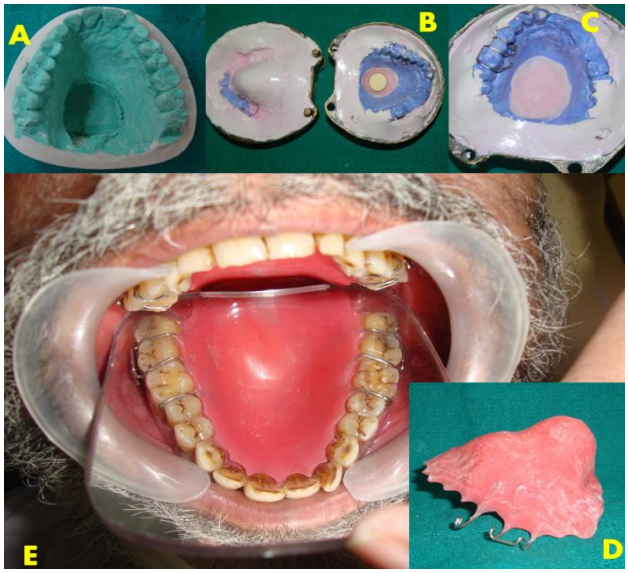

Figure 2: (A) Primary cast with defect (B) Invested flask with first layer of resin in the defect (C) Cast with resin and salt placed within the defect (D) Interim hollow obturator (E) Intraoral view of obturator in place closing the defect completely.

In a patient with a cleft in the palate of such magnitude as presented in this case, all pressure consonants (fricatives, stops and affricates) were affected than other sounds. Stop consonants were produced as a stop (/p/ produced as a/k/ or /t/), with abnormal speech sound production across a word or sentence or even a simple conversation, abnormality in nasal resonance in the form of hyper nasality and hypo nasality for specific words and /or a sentence. In addition the patient also exhibited severe dysphonia that was characterized by breathiness, hoarseness and the low intensity of voice during speech tasks. With such a huge cleft that almost covered three fourths of horizontal part of the hard palate, the patient required to put a substantial respiratory and muscular effort when a speech task was performed. With repeated tasks, the dysphonia often masked the nasality and it was difficult to evaluate the disturbance in sounds clinically. Placement of interim prosthesis immediately reduced dysphonia and highlighted other problems in speech like the nasality and resonance problems which are corrected through speech therapy.

Conclusions

Interim hollow obturator provides patients with a large cleft palate an immediate solution to the problem of dysphonia and enhances speech by blocking the oronasal communication besides

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