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Case Report

Phonetic implications of Oro-nasal fistula- Case Report

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ABSTRACT:
Oroantral fistulas represent a clinically viable communication between the nasal and the oral cavity. Depending upon the size of the opening one may experience difficulties in mastication, swallowing, speech and phonation. While it is generally believed that the impairment of phonetics does not occur unless the size of the opening is large, we present a case of a young male who, despite a small lesion mesiodistally had a relatively increased depth in relation to the vault of the palate thus impairing his phonetic ability significantly. The mere closure of the opening using an interim prosthesis resulted in speech improvement. The patient was satisfied with the outcome of the prosthesis and was motivated to undergo surgical correction based on the results.
Key words: Oro antral communication, phonetics, speech therapy, resonance, consonants.

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INTRODUCTION

A fistula is a communication between two epithelial surfaces, which may be present either externally (between hollow viscus and skin) or internally (between two hollow viscera).[1] Oronasal fistula, is an internal fistula that represents an abnormal epitheliazed track communicating between oral and nasal cavity. [2] It has multifactorial etiology and may be either congenital or acquired. [3,4] Congenital type results either developmentally due to incomplete interfusion of premaxilla, maxilla and horizontal plate of palatine bone or genetic defects. [5] The acquired form of oronasal fistula are as a result of trauma, [6] infections, [7] iatrogenic (post-surgical complication), [8] poor patient compliance, tumors and cyst resection and less commonly drug habits like cocaine sniffing. [9] While a large fistula can be seen with the naked eye, the smaller ones might escape casual inspection. Clinically they may not pose difficulties to the patient that is very obvious in nature. Abnormal tone of speech (nasal twang) however, is a straight indicator even in minute cases, while other indicators include air escape while nasal blowing, unobstructed penetration of diagnostic probes and symptoms that alter deglutition and mastication are revealed from case history. The signs and symptoms depend on the size, location, associated surface anatomical alterations and progressive surface anatomy of the fistula from oral to nasal cavity. [3,5] Depending upon the size, the oronasal fistula impacts speech articulation, resonance and production and many authors support the view that only when an area of the defect is either medium (4.5 mm^2) or large (5mm^2 or more), oronasal fistula interferes with speech causing hypernasality, audible nasal escape and weak pressure consonant production. We, however, present a case of a young male boy whose size of the fistula qualifies to be only small, despite which his speech showed clinical impairment. Discussion of affected speech form is also presented.

CASE REPORT

A young male patient aged 30 years was referred to the department of prosthetic dentistry, with a chief complaint of a disturbance in speech, in the clinical form of hypernasality and unclear pronunciation of several phonemes. The patient was previously diagnosed with an oronasal fistula by the department of oral medicine and diagnosis along with recently fabricated fixed partial denture in relation to

maxillary anteriors and collapsed posterior arch **(Fig 1)**. A thorough medical history revealed the speech problem since birth and patient had not sought any correction till now, but since he was getting married, he wanted to correct the problem through non surgical means first. Since obturating such defect with a palatal plate is a temporary solution, the patient was advised to go for permanent correction through surgery. Dental history revealed two anterior teeth missing (lateral incisors on either side) along with maxillary right first premolar **(Fig 1)**. The patient had a fixed partial denture (porcelain fused to metal), that was recently done at a private clinic in relation to maxillary anterior teeth. Social history revealed a long history of getting bullied by his friends and relatives at school, college and at other personal levels. The patient also revealed some other psychosexual implications at family level. Drug history was non relevant. The patient did not show any other medical abnormality and had never felt any mental symptoms.

Figure 1: Intra oral view of the fistula. Note the absence of horizontal part of the palatine bone.

Extra oral examination revealed normal features of temperomandibular joint, lymph nodes, facial aesthetic features and maxillary and mandibular lips. Intra oral examination revealed an existing anterior fixed partial denture in the maxillary dentulous arch with collapsed posterior arches towards the midline. Both palatal slopes were close together without any horizontal part of the hard palate being present and an opening in the form of fistula was placed at the end of the groove formed by these palatal slopes **(Fig 1)**. The groove was as a result of the superimposition of the vertical wall of palatine bone on the premaxilla. The grove started in the region of the canine and extended to the region between premolars where it terminated in a fistula which was less than 2 to 3 mm in diameter (measured using gutta percha cones of various thickness). Functional examination of speech was conducted and it was found that vowels, consonants (plosives, fricatives, affricatives, nasals and laterals) and articulatory phonemes (lingua palatal and lingual - velar was affected. The treatment plan presented to the patient included oral prophylaxis, interim obturator prosthesis, speech therapy and permanent closure through surgery. The patient consented to the treatment plan and obturator fabrication started with the making of impressions for both maxillary and mandibular dentulous arches using irreversible hydrocolloid impression material (CA 37; Cavex, Haarlem, Holland). From the impressions, diagnostic casts were fabricated on which outline of obturator prosthesis was fabricated. The maxillary cast was then mounted on a dental cast surveyor (Ney, Dentsply, Hanau-Wolfgang, Germany) to mark the survey lines and locate undercut areas on the buccal surface of maxillary posterior teeth. Location of wrought wire clasp tips was noted and marked on the casts following which wrought wire clasps were fabricated from 19 gauge orthodontic stainless steel wire (Pigeon Dental stainless steel, India). The obturator was retained by two clasps distal to maxillary first molar on both sides while one ball pin clasp was placed in the region between two left

Figure 2: Finished obturator prosthesis retained by clasps.

Figure 3: Final prosthesis inserted in patients mouth.

maxillary premolars. Self cure denture base acrylic resin (Fortex; Lucite Intl, Durham) was then poured using, sprinkle on technique within the confines of the outlined area and placed in a pressure pot for polymerization. The obturator prosthesis was finished, polished and verified for fit on the cast **(Fig**

2). On the next clinical appointment the interim obturator was tried in the patient's mouth for the fit and then delivered to the patient **(Fig 3)** following which the patient was referred to a speech therapist. The patient was put on a follow up after one day, 7 days and one month.

DISCUSSION

A case of a young male patient having problems with effective speech in terms of intelligent speech has been presented. Intra oral examination of the patient reveals underdeveloped hard palate in the mid region with little of no portion of the horizontal part of the hard palate. The palatal slopes of the alveolar ridge relatively large as a result of deficient hard palate. Kumar et al proposed using appliance therapy early in childhood that would expand the deficient structures and reposition other structures as a result of the cleft. [10] Presence of a oro-antral communication impairs speech significantly. The development of the vocal sound into meaningful speech is one of the major accomplishments that enabled human to reach the pinnacle of the animal kingdom, and speech as the basic and a fundamental means of communication became the cornerstone for the establishment and organization of society. Speech is a sophisticated, autonomous activity that functions at all levels of consciousness. In addition speech occurs alongside other means of communication like facial expressions, hand movements and some sort of body posture. The speech is actually exhaled air that is modified at the level of larynx, pharynx and nasal and oral cavity. Two significant modifications take place in the form of resonation and articulation by a combination of nasal and oral cavity. In cases of oronasal fistula, depending upon the size and location, these two aspects of speech production are affected. Since the size of the fistula in the present case was relatively small mesiodistally, it is apparent that speech was still affected. This case report therefore sheds light on another important aspect of dimensions which is the vertical length of a fistula. Evidence of long palatal slopes suggests the same hypothesis that the vertical length of the fistula is more that makes the fistula relatively large in terms of having an impact on the speech. Since vowels are modified by the resonance and have to be produced without interruption of air flow, patients with oral antral fistula cannot speak them properly since they are hypernasal in nature. On the other hand, consonants are also modified by resonance, but require air flow obstruction and in this case due to leakage of air through the oral nasal fistula, weak pressure consonants were observed. The mere lack of proper communication in such patients to the already psychosocial pressure that is associated and has been described in many forms for these patients. [11,12] Besides functional impairment in terms of speech, other functional impairments like sucking (thumb) has been shown to affect growth of the palate in early childhood. [13,14]

Prosthetic closure of oro antral fistula should be considered a temporary treatment, since wearing of prosthesis throughout life cannot be advised especially for a young patient. Proper fabrication of an interim obturator is mandatory, although the presence of the obturator in the mouth can itself be a source of speech disturbance initially even if the obturator has duplicate palatine rugae present on the palatal surface. [15] Surgical closure of the defect through bone grafts and mucoperiosteal flaps are simpler options that are less complicated, but should be planned early and should involve a multidisciplinary approach. [16]

CONCLUSION

Oral and nasal cavities play a significant role in phonetics. A dentist, especially a maxillofacial prosthodontist comes across through various cases of maxillary deficiencies for rehabilitation. While most of the examinations primarily focus on measuring the mesio distal diameter of the defect, we recommend that the vertical height of the defect should also be taken into consideration.

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