

Speech disorder in Rhinolalia Aperta: a case study

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ABSTRACT

Resonance disorders refer to too much or too little nasal/oral sound energy in the speech signal resulting from structural and neurological dysfunctions. Rhinolalia Aperta is a form of resonance disorder characterized by excessive airflow through nasal cavity during speech. Velopharyngeal dysfunction is the most common cause of Rhinolalia Aperta. The present case study illustrates a 35-year-old female with hypernasality due to the velopharyngeal insufficiency. Detailed evaluations were carried out to assess different parameters of speech, voice and language. The aims of the present study are to document nature and characteristics of speech, voice and language in those individual with Rhinolalia Aperta and illustrate importance of speech and language intervention in bringing better prognosis.

Rhinolalia Aperta or hypernasal speech results with difficulty in articulation of the oral consonants especially sibilants thereby resulting in reduced speech intelligibility and various other sleeping and swallowing disorders. The present case illustrates a typical example of hypernasal speech and the role of speech and language pathologists in reduction of the hypernasality.

Keywords: Rhinolalia Aperta, velopharyngeal insufficiency, speech disorder, hypernasality, voice disorder

ÖZ

Rhinolalia Aperta'da konuşma bozukluğu: olgu raporu

Rezonans bozuklukları, yapısal ve nörolojik işlev bozukluklarından kaynaklanan konuşma sinyalinde çok fazla veya çok az nazal/oral ses enerjisine işaret eder. Rhinolalia Aperta, konuşma sırasında burun boşluğundan aşırı hava akışı ile karakterize bir rezonans bozukluğu türüdür. Velofarengeal yetmezlik, Rhinolalia Aperta'nın en yaygın nedenidir. Bu çalışmada, velofarengeal yetmezliğe bağlı hipernasalitesi olan 35 yaşında kadın hastanın sonuçları paylaşılmıştır. Farklı konuşma, ses ve dil parametrelerini değerlendirmek için detaylı değerlendirmeler yapılmıştır. Bu çalışmanın amacı, Rhinolalia Aperta'lı bireylerde konuşma, ses ve dilin doğasını ve özelliklerini belirlemek ve daha iyi prognoz sağlamak için konuşma ve dil müdahalesinin önemini göstermektir.

Rinolalia Aperta veya hiper nazal konuşma özellikle sibilant oral konsonantların artikülasyonunun zorluğu ile sonuçlanır, bu durum konuşmanın anlaşılabilirliğinin azaltır ve uyku ve yutma problemlerine neden olur. Bu vaka, hiper nazal konuşmaya tipik bir örnektir ve konuşma ve dil patolojilerinin hiper nazaliteyi azaltmalarındaki rolünü ortaya koymaktadır.

Anahtar Kelimeler: Rhinolalia Aperta, velofarengeal yetmezlik, konuşma bozukluğu, hiper nazalite, ses bozukluğu

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INTRODUCTION

Resonance disorders refers to obstruction in airflow through oral and nasal cavities leading to too much or too little nasal/oral sounds energy in the speech signal. It is one of the most common speech impairment found in individuals with structural and neurological disorders. Resonance disorders are named with different types such as hyponasality, denasality, hypernasality (Rhinolalia Aperta), Cul-de-sac- resonance and mixed nasality¹. Rhinolalia Aperta involves increased nasal airflow through the nose primarily during speech. Other synonyms include hyperrhinolalia, open nasality and hypernasal speech. Synchronized movement of velum, posterior pharyngeal wall and lateral pharyngeal wall results in opening and closing of velopharyngeal passageway between oral vocal tract and nasal vocal tract, thus facilitating normal speech

(Wermker, K., et al., 2012; Mishima, K., et al., 2012). Any impairments in movement of oral pharyngeal structures results in velopharyngeal dysfunctions. It is frequently associated with the presence of the cleft palate and some neurological disorder. Velopharyngeal dysfunction impairs potable closure between the nasal and oral cavity leading to incomplete closure of soft palate or velopharyngeal sphincter resulting in excessive escape of air through the nose for all types of sound. Its incidence and prevalence rates were found to be variable among adult and teen populations (Lewis, K. E., et al., 2003). Some of the significant characteristics include hypernasality prominently on sibilants, nasal emissions, slurred speech, and short length of utterances, nasal regurgitation, shallow breathing and frequent pauses in conversation.

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CASE PRESENTATION

A 35-year-old female reported to department with the chief complaints of inability to communicate clearly and difficulty in swallowing. Frequent nasal regurgitation with intermittent aspiration was present in liquid as well as in semisolid diet. Repeated on and off obstructions in breathing with excessive snoring (sleep apnea) leading to insomnia was described by the subject. Moreover, history of throbbing pain in and around the canthus of eye with prickling sensation at the temporal region of head was present.

Speech Assessment

Detailed subjective and objective assessments were administered to determine the qualitative and quantitative aspects of the voice and speech. Oral peripheral examinations revealed all structures normal in appearance but inadequate in functions. Range of movement, strength and lateralization of the tongue were reduced. In addition, tongue fasciculation's and groping behavior was observed during lateralization. Drooped face with facial grimaces was present during prolonged opening of mouth. Bite and jaw reflexes were present while gag reflexes were absent. The coordination between the respiration and swallowing was slow.

On perceptual analysis of voice, maximum phonation duration (MPD) was reduced with audible nasal emissions. Dynamic range of pitch and loudness was significantly reduced. Oral transient time was elevated from 1.2 to 2.5 seconds on dry swallowing. Speech was intelligible up to level 4 on speech intelligibility rating scale which indicates that the speech of the patient could be understood without difficulty but with need to ask for frequent repetitions. A thoracic breathing pattern was exhibited which led to shallow breathing. Overall findings on Grade, Roughness, Breathiness, Aesthetic, Strain (GRBAS) scale revealed moderate voice disorder (Koichi, O., 2011). Further reduced oral intake resulted in tremendous weight loss in the present case.

Typical speech characteristics incorporated marked degree of hypernasality primarily of vowels, approximants, and voiced consonants. Intraoral pressure was reduced and consonant productions were nasalized or replaced by their nasal equivalents (/m/, /n/) and /ng/ (e.g. 'daddy' would be perceived as 'nanny'). A finding of cranial nerves IX and X (glossopharyngeal and vagus) paralysis was obtained on detailed Cranial Nerve Examination which resulted in left soft palate palsy. Misarticulations on initial segments of sounds with abnormal plosive release and increased stop gap were apparent. Liquids and glides were omitted during connected speech (e.g. 'leaf' would be perceived as 'eaf' with the omission of /l/ phonetics). On spectral analysis of speech vowels, formant patterns were not synchronized. The tense-lax feature of vowel, height, stress, speaking rate and preceding or following consonants were markedly highlighted. The amplitude of vowels were perceived as low while fundamental frequency

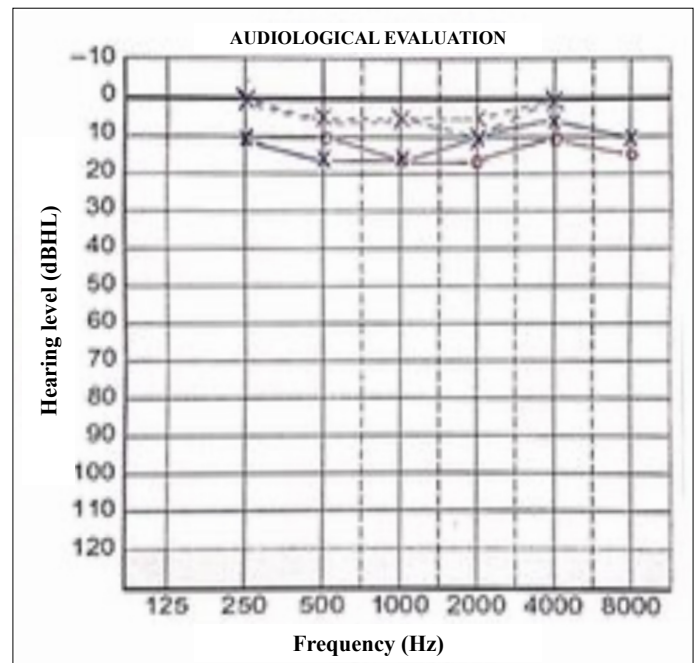


Figure 1. Audiogram.

(Fo) was lower than the normative value according to age and gender. Duration of vowel productions differed intensely. The production of consonant such as stops was deviated from normal pattern of production with the occlusion of oral cavity. The voice onset (it refers to the time between the releases of the articulatory blockage i.e. beginning of the burst to the beginning vocal fold vibration for the vowels) is extremely altered in production of different sounds.

Audiological Findings

Standard pure tone audiometry revealed bilateral normal hearing. Type 'A' tympanogram was obtained bilaterally. Ipsilateral and contralateral acoustic reflexes were absent in both ears. Moreover, otoacoustic emission was done to find out auditory integrity up to outer hair cells which displayed the presence of both Distortion Product OtoAcoustic Emission (DPOAE) and Transient Evoked OtoAcoustic Emission (TEOAE).

DISCUSSIONS AND CONCLUSIONS

Rhinolalia aperta or Hyperrhinolalia is an abnormality in resonance as a result of a velopharyngeal dysfunction. Velopharyngeal dysfunction implies to failure in approximation between the nasal cavity and oral cavity especially for the production of approximants (/w/, /l/) and sibilant of hindi sounds. It can be broadly classified into three types namely velopharyngeal incompetence, velopharyngeal insufficiency and velopharyngeal mislearning (Wermker, K., et al., 2012; Vogel, A. P., et al., 2009). The etiologies of each dysfunction differ from each other.

The present case study illustrates a typical example of velopharyngeal-insufficiency that is characterized by structural

defects of velum interfering with its mechanical closure. The impairment of the cranial nerves IX and X (Glossopharyngeal and Vagus) led to unsynchronized movements of velum with the provocation of the excessive airflow and nasal emissions through the nose for this case. The difficulty was prominently observed on non-nasal oral consonants (Van Demark, D. R., et al., 1980). The closure between nasopharynx and oropharynx during the act of deglutition has resulted into frequent nasal regurgitation which is associated with aspiration. Its diagnosis requires complete and systematic oral peripheral examination (OPM) examination, voice and speech assessments. Perceptual speech assessment is a standard supported as appropriate by other instrumental assessments like Dr Speech (Fletcher, S. G., 1970).

Management and treatment can be done in two ways: Medical/surgical intervention and speech therapy. Medical /Surgical intervention comprises of the medications and the surgeries such as pharyngeal flap surgery, pharyngoplasty, repairment of the fistula etc (Tim, B., 2012). For aforementioned case, medicines like proton pump inhibitors (antacids) and fexofenadine (antihistamins) 180 mg for 15 to 20 days was prescribed. Further proper maintenance of oral hygiene was recommended. Rehabilitation technique includes intervention by speech language pathologists which focuses primarily on restoring and adjusting the function of soft palate with open mouth technique, loudness increment method, and drill exercises. Auditory and visual feedbacks were provided to reduce the hypernasality in speech therapy sessions. Hence, the case study illustrates the major importance of speech language pathologist in diagnosing and managing those individuals with hypernasal speech.

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