



ORIGINAL ARTICLE

Speech nasality and nasometry in cleft lip and palate[☆]



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KEYWORDS

Cleft palate;
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Speech production
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Abstract

Introduction: Perceptual evaluation is considered the gold standard to evaluate speech nasality. Several procedures are used to collect and analyze perceptual data, which makes it susceptible to errors. Therefore, there has been an increasing desire to find methods that can improve the assessment.

Objective: To describe and compare the results of speech nasality obtained by assessments of live speech, the Test of Hypernasality (THYPER), assessments of audio recorded speech, and nasometry.

Methods: A retrospective study consisting of 331 patients with operated unilateral cleft lip and palate. Speech nasality was assessed by four methods of assessment: live perceptual judgement, THYPER, audio-recorded speech sample judgement by multiple judges, and nasometry. All data were collected from medical records of patients, with the exception of the speech sample recording assessment, which was carried out by multiple judges.

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Results: The results showed that the highest percentages of absence of hypernasality were obtained from judgements performed live and from the THYPER, with equal results between them (79%). Lower percentages were obtained from the recordings by judges (66%) and from nasometry (57%).

Conclusion: The best results among the four speech nasality evaluation methods were obtained for the ones performed live (live nasality judgement by a speech pathologist and THYPER).

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PALAVRAS-CHAVE

Fissura palatina;
Fala;
Medida da produção da fala;
Diagnóstico;
Insuficiência velofaríngea

Nasalidade de fala e nasometria nas fissuras labiopalatinas

Resumen

Introdução: A avaliação perceptiva é considerada padrão-ouro para avaliar a nasalidade de fala. Vários procedimentos são utilizados para coletar e analisar os dados percebidos, o que a torna suscetível a erros. Por isso, há uma preocupação crescente na procura de métodos que possam aperfeiçoá-la.

Objetivo: Descrever e comparar os resultados da nasalidade de fala obtidos por meio de julgamento ao vivo, Teste de Hipernasalidade (THYPER), julgamento de gravações por juízes e nasometria.

Método: Estudo retrospectivo de 331 pacientes com fissura labiopalatina unilateral operada. Foi realizada a análise dos resultados do julgamento da nasalidade ao vivo e por meio de gravações por juízes, do THYPER e da nasometria. Os dados foram coletados do prontuário dos pacientes, com exceção do julgamento das gravações das amostras de fala, que foi realizado por juízes múltiplos.

Resultados: Foram obtidas porcentagens mais altas de ausência de hipernasalidade no julgamento ao vivo e no THYPER, com resultados iguais entre ambas (79%). Porcentagens menores de ausência de hipernasalidade foram obtidas no julgamento das gravações por juízes (66%) e para a nasometria (57%).

Conclusão: Os melhores resultados entre as quatro modalidades de avaliação da nasalidade de fala foram obtidos para as realizadas ao vivo (julgamento por um fonoaudiólogo e THYPER).

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Introduction

One of the great challenges for a child born with cleft lip and palate is to develop the resonance and articulation for normal speech production. A cleft palate is the most common cause of velopharyngeal dysfunction (VPD), and primary palatoplasty should aim to establish the anatomical and functional conditions for proper closure of the velopharyngeal mechanism during speech.^{1,2} In general, speech disorders related to VPD are hypernasality, air emission and compensatory articulation.³

The diagnosis of speech disorders resulting from VPD should be carried out through clinical and instrumental assessment. The auditory-perceptual assessment is considered the gold standard to assess speech disorders related to VPD and cleft palate. It is the method that allows the identification of these alterations, the assessment of their severity as well as the evaluation of the effectiveness of performed treatments.^{4,5} However, several procedures are used to collect and analyze data of the perceptual assessment, making it difficult to compare different studies,^{1,6}

in addition to the fact that this assessment is subjective.⁷ As the auditory-perceptual assessment is susceptible to errors due to its subjectivity, there has been an increasing desire to seek methods that could improve this evaluation.

For instance, the instrumental acoustic analysis of the speech signal, such as the nasometry, was developed as a means of corroborating the perceptual tests of speech resonance. The nasometer provides the degree of "nasalance", which is the average ratio of nasal/total (nasal plus oral) acoustic energy converted to a percentage value.⁸ The nasalance value reflects the relative amount of nasal acoustic energy in an individual's speech. The validity of the nasometer to measure hypernasality has been demonstrated by many researchers,^{9,10} resulting in acceptance and use of nasometry in both clinical and research settings.^{11,12} However, some variables may hinder the judgment of nasality and interfere with the obtained results.

This study aimed to describe and compare the speech nasality results among four assessment modalities: (1) the auditory-perceptual judgment performed live; (2) the

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