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ORIGINAL ARTICLE

Speech perception in noise in unilateral hearing loss☆

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KEYWORDS
Speech perception;
Unilateral hearing loss;
Noise

Abstract
Introduction: Unilateral hearing loss is characterized by a decrease of hearing in one ear only. In the presence of ambient noise, individuals with unilateral hearing loss are faced with greater difficulties understanding speech than normal listeners.
Objective: To evaluate the speech perception of individuals with unilateral hearing loss in speech perception with and without competitive noise, before and after the hearing aid fitting process.
Methods: The study included 30 adults of both genders diagnosed with moderate or severe sensorineural unilateral hearing loss using the Hearing In Noise Test – Hearing In Noise Test-Brazil, in the following scenarios: silence, frontal noise, noise to the right, and noise to the left, before and after the hearing aid fitting process.
Results: The study participants had a mean age of 41.9 years and most of them presented right unilateral hearing loss. In all cases evaluated with Hearing In Noise Test, a better performance in speech perception was observed with the use of hearing aids.
Conclusion: Using the Hearing In Noise Test-Brazil test evaluation, individuals with unilateral hearing loss demonstrated better performance in speech perception when using hearing aids, both in silence and in situations with a competing noise, with use of hearing aids.

PALAVRAS-CHAVE
Percepção da fala;
Perda auditiva unilateral;
Ruído

Percepção da fala no ruído em perda auditiva unilateral

Resumo
Introdução: A perda auditiva unilateral (PAUn) é caracterizada pela diminuição da audição em apenas uma orelha. Em presença de ruído ambiental, indivíduos com PAUn encontram maiores dificuldades que os ouvintes normais para compreender a fala.

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Objetivo: Avaliar o desempenho de indivíduos com perda auditiva unilateral, na percepção da fala sem e com ruído competidor, antes a após adaptação do AASI.
Método: Estudo com 30 adultos, e de ambos os sexos, com diagnóstico de perda auditiva unilateral sensorioneural, de graus moderado e severo, utilizando o *Hearing In Noise Test* – HINT – Brasil, nas seguintes situações: silêncio, ruído à frente, ruído a direita e ruído a esquerda. Antes e após adaptação do AASI.
Resultados: Os participantes da pesquisa apresentavam média de idade de 41,9 anos e PAUn predominante à direita. Em todas as situações propostas pelo HINT foi constatado melhor desempenho na percepção da fala com o uso do AASI.
Conclusão: No teste HINT – Brasil, indivíduos com PAUn demonstraram melhor desempenho na percepção da fala, em tanto no silêncio quanto nas situações com ruído competidor, com uso do AASI.

Introduction

Individuals with unilateral hearing loss (UHL) have limitations of communicative activities, especially in noisy environments,[1] as well as possible deficits in auditory processing that potentially affect the development of language and communication.[2]

Binaural hearing provides sound localization, binaural summation, a shadow effect of the head and release from masking. The interaction of these factors favors speech recognition in noise, due to the ability to perform figure-background.[3]

As a whole, UHL can cause difficulties in communication.[4] This problem can be minimized with the use of individual sound amplification devices (hearing aids), which allows rescuing the perception of speech sounds, as well as of environmental sounds, helping to improve conversational ability.[5]

Sound amplification is an option for individuals with hearing loss, but in isolation such devices may have limited effectiveness in assisting speech understanding in noisy environments, or in the presence of reverberation. People with UHL experience difficulties in the discrimination of unusual signals, an automatic ability in subjects with normal hearing.[6] This component requires special attention on the part of the speech therapist when selecting and verifying hearing aid devices.

In Brazil, tests of speech perception that use a competing noise are not yet part of the conventional audiological evaluation protocol, and based on protocols the comparison of performances in quiet and in noisy environments is not often made.[7]

In order to best represent everyday listening situations, over time the use of sentences in speech perception tests, with and without the presence of a competing noise was introduced.[7,8]

When reaching 50% of intelligibility, speech perception tests that measure the speech signal recognition threshold in a quiet environment detect only small differences between individuals with normal hearing and those with hearing loss, in contrast to when these people are exposed to noise and intelligibility declines.[9]

The Hearing In Noise Test (HINT) was developed in 1994,[10] to measure the difficulty to recognize speech, and to compare the findings with the results of individuals with normal hearing, both in quiet and in noisy environments. The methodology proposed by HINT enables the use of thresholds in signal/noise (*S*/*R*) ratio to evaluate speech recognition in noise, instead of using the percentage of correct answers.[7]

There are many factors that negatively impact the ability to understand speech during evaluation, including the characteristics of the subject evaluated, together with his/her experiences on language and hearing, the type and level of presentation of the material, and the answers produced.[11] Thus, the importance of studying speech perception in tests that simulate the perception of the speech signal in the presence of a competitive noise is evident.

Therefore, this study aimed to assess speech perception of individuals with unilateral hearing loss in conditions with and without a competitive noise, with and without the use of hearing aids.

Methods

The study was approved by the Ethics in Research Committee of the institution where it was conducted (Protocol No. 095/2010).

To be included in the study, participants had to meet the following inclusion criteria: adults aged 18–50 years, diagnosed with moderate to severe sensorineural UHL, and with contralateral hearing within normal limits who did not use hearing aids.

The hearing loss classification was based on the mean of audiometric thresholds at frequencies of 500; 1000; 2000; and 4000 Hz, characterized as mild (mean 26–40 dB HL), moderate (average 41–60 dB HL), severe (average 61–80 dB HL), and profound (average above 81 dB HL) hearing loss according to the World Health Organization (WHO).[12]