Acta Otorrinolaringol Esp. 2012;63(3):173–179

Acta Otorrinolaringológica Española

www.elsevier.es/otorrino

ORIGINAL ARTICLE

The Effect of Anchor Voices and Visible Speech in Training in the GRABS Scale of Perceptual Evaluation of Dysphonia☆

Faustino Núñez-Batalla,[a,*] Juan Pablo Díaz-Molina,[a] Isabel García-López,[b] Adriana Moreno-Méndez,[c] María Costales-Marcos,[a] Carla Moreno-Galindo,[a] Pablo Martínez-Camblor[d]

[a] *Servicio de ORL, Hospital Universitario Central de Asturias, Oviedo, Spain*
[b] *Servicio de ORL, Hospital Universitario La Paz, Madrid, Spain*
[c] *Universidad Manuela Beltrán, Bogotá, Colombia*
[d] *CAIBER, Oficina de Investigación Biosanitaria, Oviedo, Asturias, Spain*

Received 5 October 2011; accepted 6 October 2011

KEYWORDS
Voice disorders;
Voice analysis;
GRABS method

Abstract
Introduction: Perceptual evaluation of voice quality remains a key standard for judgement of vocal impairment. The GRABS method has become a commonly used scale for rating severity of dysphonia, but it has no published, standardised protocol to follow. Training is important for reaching good interrater agreement for its parameters; however, the references most often cited for the GRABS provide no guidelines for clinical administration, speech material or rating calibration. This study investigated the effect of anchors (standard reference voices) and visible speech (narrow band spectrogram) in training non-expert professionals in the GRABS method.
Material and methods: Four inexperienced listeners evaluated 107 recorded pathological voices using the GRABS scale in 2 separate sessions; at first, without a visible spectrogram and then, 6 months later, with anchors and a narrow band spectrogram as additional information.
Results: The results show that anchors and visible speech helped to improve the reliability of *G*, *B*, *A* and *S* parameters. Interrater agreement according to *k* statistics was significantly stronger with the addition of spectrographic information for rating breathiness and strain.
Discussion: This study found that non-expert listeners showed significant improvement after training with external anchors (standard reference voices) and a narrow band spectrogram.

☆ Please cite this article as: Núñez-Batalla F, et al. El espectrograma de banda estrecha como ayuda para el aprendizaje del método GRABS de análisis perceptual de la disfonía. Acta Otorrinolaringol Esp. 2012;63:173–9.

* Corresponding author.
E-mail address: fnunezb@telefonica.net (F. Núñez-Batalla).

2173-5735/$ – see front matter

PALABRAS CLAVE
Trastornos de la voz;
Análisis de la voz;
Método GRABS

El espectrograma de banda estrecha como ayuda para el aprendizaje del método GRABS de análisis perceptual de la disfonía

Resumen
Introducción: La evaluación perceptual de la calidad vocal sigue siendo un importante método para evaluar los trastornos vocales. El método GRABS se ha consolidado como una escala frecuentemente utilizada para puntuar la severidad de una disfonía, pero no se ha publicado un protocolo estándar para guiarse. El entrenamiento es importante para alcanzar una buena concordancia en la calificación de sus parámetros entre distintos observadores, sin embargo, las referencias bibliográficas más citadas no describen orientaciones para su uso clínico, muestras a analizar o calibración.
Material y método: Este estudio investigó el efecto de voces patrón y la espectrografía de banda estrecha en el entrenamiento del GRABS de profesionales no expertos. Las voces de 107 pacientes fueron evaluadas por 4 profesionales no expertos utilizando la escala GRABS en 2 sesiones, primero sin voces patrón ni espectrograma y 6 meses después con voces patrón y espectrograma de banda estrecha.
Resultados: Los resultados muestran que las voces patrón y el espectrograma ayudaron a mejorar la fiabilidad de los parámetros G, B, A y S. La concordancia entre los distintos observadores de acuerdo al estadístico k fue significativamente mayor con la adición de la información espectrográfica para los parámetros B y S.
Discusión: Este estudio demuestra que los profesionales no expertos mejoran significativamente sus puntuaciones tras el entrenamiento con voces patrón y la visualización del espectrograma de banda estrecha.

Introduction

The recommendation of the National Centre for Voice and Speech (www.ncvs.org) is that the evaluation of a pathological voice must begin with the performance of a spectrographic analysis to classify it, in order to determine the most appropriate method to study each particular case. Thus, a voice with sufficient periodicity (type 1) should be analysed using the parameters for short-term disruptions (jitter, shimmer, normalised noise energy [NNE] and harmonics to noise ratio [HNR]). A voice which presents aperiodicity, subharmonics and voice breaks (type 2) cannot be reliably analysed with the aforementioned parameters (a disruption greater than 5% indicates this type of voice) and should instead be studied by a perceptual classification method (GRABS) and a visual method such as a spectrogram. At present, as long as those dimensions studying chaotic phenomena (fractal dimension, Lyapunov exponent, etc.) are not applied in a practical manner, chaotic voices (type 3) can only be studied by perceptual methods. Therefore, the GRABS classification is an indispensable method for the assessment of voice pathology, since it must be employed on a significant number of patients in whom measurements of short-term disruption are not reliable or cannot be calculated.[1] Since a narrow-band spectrogram is a graphical representation of a sound, observing it simultaneously with the perception of dysphonia can improve both the learning process and the reliability of a subjective method for the classification of pathological voices such as the GRABS method. This study analyses the aid of narrow-band spectrograms in learning this method.

Materials and methods

We conducted a retrospective study of 107 voice samples corresponding to as many patients, 29 males and 78 females, diagnosed with Reinke's oedema through videostroboscopy.

The acoustic signal was recorded using the Voice Assessment application of the Dr. Speech 3.0 program for Windows 95. The computer used was a Pentium-100 compatible PC with 16 MB RAM. A Windows-compatible sound card with 16-bit resolution and recording frequency of 44,100 Hz (Sound Blaster 16) was installed for the digitisation of the voice signal. The microphone used was dynamic unidirectional. The sampling frequency was 44,100 Hz. The microphone used had a high-resolution frequency and was placed at 10 cm from the mouth of patients while they pronounced the vowel /e/ at a comfortable intensity and tone within a soundproofed chamber. The computer captured 3 s from each emission. We followed the recommendations of the National Centre for Voice and Speech.[2]

Spectrographic Analysis of Voices

Spectrographic analysis consisted of a narrow-band spectrogram created from digitised voices using the Praat[3] program and given to each observer. Each participant conducted the spectrographic analysis of voices on their own PC. The Praat program was configured to obtain a narrow-band spectrogram: after loading the voice to be studied the ''View and edit'' window was opened and the ''spectrum'' option was selected in the menu. In ''Spectrogram settings'', the