PERCEPTUAL AND ACOUSTIC ANALYSIS OF VOCAL DYSFUNCTION

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There is a great need in phoniatric-logopedic diagnosis and treatment for objective criteria of vocal dysfunction. Today voice analysis relies mainly on subjective visual and auditory observations. To make research methods for acoustical voice analysis clinically applicable, a project has been carried out in cooperation between the Institute of logopedics and phoniatrics at Huddinge University Hospital and the Speech Transmission Laboratories at the Royal Institute of Technology, Stockholm. Clinically experienced logopedists and phoniatricians evaluate 32 pathological and normal voices in respect to 26 perceptual variables on a 5 point scale concerning voice quality and pitch. A standard text (about 40 sec) is being read by the subjects and the signal is recorded on a two channel tape recorder. The signal comes from a spectacles-worn microphone with a constant mouth-to-microphone distance on one channel and on the other channel from a contact microphone put on the throat below the thyroid cartilage.

The evaluations of the voices are analyzed by factor analysis (Principal Component Analysis). The resulting factors are compared with acoustic measures from mainly three types of analysis: long time average spectrum analysis (LTAS), and distribution analysis of the fundamental frequency, which is performed on the signal from the contact microphone. In order to analyze time bound characteristics of the voice signal a frequency-perturbation measure is also being used.

The results of the perceptual evaluation and of the acoustic measures are being compared by means of multiple regression analysis.

Reference

Fritzell, B., B. Hammarberg, L. Wedin, J. Gauffin and J. Sundberg (1977): "Clinical applications of acoustic voice analysis", Speech Transm. Lab. - Quart. Progr. and Status Rep., Royal Inst. of Techn., Stockholm 2-3, 31-43.