Conference Presentation Abstracts

A low-cost portable vocal analyser for long-term monitoring and clinical investigation

Anna Rosa Accornero[1], Astolfi Arianna[2], Carullo Alessio[2], Castellana Antonella[2], Pavese Lorenzo[2], Pecorari Giancarlo[1], Puglisi Giuseppina Emma[2]

[1]Università degli Studi di Torino, Torino (Italy), [2]Politecnico di Torino, Torino (Italy)

ABSTRACT

A low-cost portable device has been developed at Politecnico di Torino to provide traceable measurements of vocal parameters during long-term monitoring as well as short ambulatory tests. The device, named Voice Care, is based on a contact microphone that is attached to the jugular notch of the subject under monitoring and on a wearable data acquisition unit that stores the raw samples of the signal generated by the vocal folds' vibration. Post processing algorithms have been assessed to evaluate the vocal effort and the vocal load that voice professionals are subjected to during their daily activity, estimating the parameters sound pressure level, fundamental frequency and phonation time percentage. Other investigations are related to the length of voiced and unvoiced frames, whose distribution are dependent on the acoustic characteristics of the environment where the voice monitoring takes place.

Another application of the Voice Care is related to short-term ambulatory tests, which allows the cooperation with physicians to make the device a reliable diagnostic tool. Processing algorithms have been extended to estimate other parameters, such as jitter, shimmer and voice quality indexes, that allow the phonatory status of the subject under monitoring to be evaluated.

An experimental campaign has been performed involving thirty teachers in four primary schools who have been monitored for two to four days across one week of teaching. The effectiveness of the proposed device has been shown by the obtained results, which were in good agreement with the subjective impression and the classroom acoustics. Other specific tests have been performed in very different acoustic environments (anechoic, reverberant and semi-reverberant chambers) to highlight the device capability in evaluating the environment effects on the vocal production. Ambulatory tests for the optimization of the Voice Care as a diagnostic tool are planned to be carried out soon.

alessio.carullo@polito.it

The flow and pressure relationships in different tubes commonly used for semi-occluded vocal tract exercises

*†Pedro Amarante Andrade, *Greta Wistbacka, ‡Hans Larsson, ‡Maria Södersten, ‡Britta Hammarberg, *Susanna Simberg, †Jan G. Švec, ‡,§Svante Granqvist*

† Voice Research Lab, Department of Biophysics, Palacký University Olomouc , 17. Listopadu 12, CZ 771 46 Olomouc, the Czech Republic * Department of Psychology and Logopedics, Åbo Akademi University, Turku, Finland ‡ Division of Speech and Language Pathology, Department of Clinical Science, Intervention and Technology (CLINTEC), Karolinska Institutet (KI), Stockholm, Sweden § Basic Science and Biomedicine, School of Technology and Health (STH), Royal Institute of Technology (KTH), Stockholm, Sweden

ABSTRACT

This experimental study investigated the back pressure (p-back) versus flow (Q) relationship for 10 different tubes commonly used for semi-occluded vocal tract exercises (SOVTE), i.e., 8 straws of different lengths and diameters, a resonance tube and a LaxVox tube. All tubes were assessed with the free end in air. The resonance tube and LaxVox tube were further assessed with the free end under water at a depth of 1-7 cm. The results showed that relative changes in the diameter of straws affects p-back considerably more compared to the same amount of relative change in length. Additionally, once resonance tubes and LaxVox tubes are submerged into water, p-back needs to overcome the