Voice changes in real speaking situations during a day with and without vocal loading

Employment in the modern world is characterized by an increasing number of employees working in professions that require continuous and intense vocal usage. Among these vocally demanding professions (in which voice is a main professional tool) one can find teachers, receptionists, physicians, clergy, singers and actors. Not surprisingly, they are at risk of *occupational voice disorders*, an increasing global problem with adverse personal and economic implications. The risks associated with voice professions are mainly related to *vocal loading,* defined as prolonged and intense use of voice. The longer and louder a person uses his or her voice (talks, sings), the greater the strain on the voice mechanism, and the greater the risk for vocal symptoms (and pathologies).

Call center operators (CCOs) is a unique subgroup of professional voice users because their ability to work depends solely on their voice, in the absence of body language (gestures, facial expressions) or written language. CCOs continuously attend to calls with few breaks, coupled with excessive work-related stress. The loss of vocal abilities has a major impact on the livelihood of those employees.

In the present study, we examined voice changes that occur during a single day, investigating the effect of vocal loading on CCOs' voice in real speaking situations. Mainly, we wanted to identify an objective acoustic index for vocal load over a day that can be used by ENT specialists and by Speech-Language Pathologists evaluating and treating people with vocal symptoms.

We recorded a group of CCOs at the beginning and at the end of a day of vocal load, and compared these recordings to voice samples of age- and gender-matched students, without vocal load. Using a special equipment, we analyzed several voice characteristics, e.g. fundamental frequency (F_0), and sound pressure level (SPL). The impact of lifestyle habits such as water consumption and smoking on voice changes was also estimated.

The main findings revealed an interaction, with F_0 rise (higher voice pitch) at the end of the day for the students but not for the CCOs. We suggest that F_0 rise is a typical phenomenon of a day of normal vocal use, whereas vocal loading interferes with this mechanism. In addition, different lifestyle profiles of CCOs and students were observed, as the CCOs reported higher incidence of dehydrating behaviors (e.g., smoking, caffeine consumption). Yet, this profile was not linked with voice changes. In sum, we suggest that F_0 rise over a day can potentially serve as an index for typical voice use. Its lack thereof can hint on consequent voice symptoms and complaints.

Publication

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