

# EFFECTS OF RESPIRATORY TRAINING AND HUMIDIFICATION OF THE VOCAL TRACT WITH WELLO<sub>2</sub> DEVICE ON NORMAL VOICED FEMALE SUBJECTS. PRELIMINARY FINDINGS.

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Respiratory training with airflow resistance has resulted in positive findings in patients with respiratory defects and voice problems related to them. After humidification, positive changes of voice have been reported both in healthy participants and patients. This study tested the immediate effects of a new WellO<sub>2</sub> device on normal voiced female participants. WellO<sub>2</sub> offers airflow resistance during inspiration and expiration and warms and humidifies the inhaled air. Twelve non-smoking females (mean age 34.8 years, min 20, max 57) with no known pathology of the larynx, hearing or respiratory organ volunteered as participants. The following tests were carried out before, immediately after and half an hour after training with WellO<sub>2</sub>: peak expiratory flow, second capacity, forced vital capacity, and mean airflow during sustained phonation. The participants also produced sustained vowel [a:] three times (each  $\geq 5$  secs), and read a standard text. Then they repeated syllable [pa:] as softly as possible, in conversational loudness, loudly, and in maximal loudness. Subglottic pressure (P<sub>sub</sub>) was estimated from oral pressure during [p]; F<sub>0</sub>, SPL and contact quotient from the electroglottogram were calculated from the syllables. Sustained vowel and the first sentence in text reading (12 words) were analyzed for Acoustic Voice Quality Index (AVQI, version 02.02) with Praat. The vowel and text samples were perceptually evaluated by five voice experts. The participants rated the ease of phonation and respiration before and after the training session, and marked down their experiences of the training, which consisted of 15 inhalations and 15 exhalations with resistance level 2 out of 0-3. Spectral tilt increased (p 0.03) immediately after, and P<sub>sub</sub> in soft phonation increased both immediately and half an hour after training (RM ANOVA p 0.049 and p 0.009, respectively), CQ in soft phonation increased and FVC and P<sub>sub</sub> in loud phonation decreased, all reaching significance half an hour after (p 0.027, p 0.007, p 0.017). On average, the participants reported more ease of phonation and respiration after training. However, some reported a sensation of increased laryngeal activity during training and tiredness of voice after it. In seven subjects, AVQI impaired slightly. No substantial changes were perceived in voice quality. A short respiratory training seems to induce some respiratory muscle fatigue. Long-term training with WellO<sub>2</sub> is supposed to strengthen the respiratory muscles. When using respiratory resistance training, attention should be paid to avoidance of increased laryngeal adduction. Long-term effects of the method need to be studied.