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Subject: cardiovascular diseases / cancer / autism / other

Alternative voice after laryngectomy using a sound-producing voice prosthesis.

OBJECTIVE To improve the voice quality of female laryngectomees and/or laryngectomees with a hypotonic pharyngoesophageal (PE) segment by means of a pneumatic artificial source of voice incorporated in a regular tracheoesophageal (TE) shunt valve.

STUDY DESIGN Experimental, randomized, crossover trial.

METHODS The new sound source consists of a single silicone lip, which performs an oscillatory movement driven by expired pulmonary air flowing along the outward-striking lip through the TE shunt valve. A prototype of this pneumatic sound source is evaluated in vitro and in six laryngectomees. In vivo evaluation includes speech, rate, maximal phonation time, perceptual voice evaluation of read-aloud prose by a panel listener, speech intelligibility measurements with 12 listeners, and self-assessment by the patients. Moreover, extensive acoustical and aerodynamic in vivo registrations are performed using a newly developed data acquisition system.

RESULTS The current prototype seems beneficial in female laryngectomees with a hypotonic PE segment only. For them the sound-producing voice improves voice quality and increases the average pitch of voice, without decreasing intelligibility or necessitating other physical and airflow rates than regular TE shunt speech. Pitch regulation of this prosthetic voice is possible, yet limited.

CONCLUSIONS The mechanism is feasible and does not result in unacceptable airflow resistance. For this new mechanism of alaryngeal voice to become an established technique for postlaryngectomy voice restoration, a voice suitably pitched for male laryngectomees has to be generated and a large part of the melodic and dynamic range of the sound source has to be attainable within physiological airflow rates.