

Perceptual and Objective Assessment of Speech Intelligibility and Factors Affecting It After

Supracricoid Laryngectomy

Thesis

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Summary

Supracricoid partial laryngectomy (SCPL) is a key choice and a potential alternative to radiation therapy and total laryngectomy in the treatment of laryngeal carcinomas, and it has the advantage of offering a high oncologic control rate (>80%). It also allows for the maintenance of physiologic speech and swallowing without the need of permanent tracheostomy. SCPL is based on the concept that the functional anatomic unit of the larynx is the cricoarytenoid unit (arytenoid cartilages, intact cricoarytenoid joint, posterior cricoarytenoid muscles, and recurrent and superior laryngeal nerves), so the preservation of one intact cricoarytenoid unit and an intact cricoid cartilage is the absolute minimum necessary to perform the operation successfully.

Postsurgical voice quality after supracricoid partial laryngectomy (SCPL) is an important issue that can influence therapeutic decisions concerning patients with carcinoma of the vocal folds. The voice is always modified after SCPL surgery, and the extent of dysphonia can vary markedly between patients. The study of speech and voice after SCPL allows us to analyze how the patients manage to produce perceptually adequate phonation with the loss of the laryngeal vibrator and with shortened vocal tract. Most of acoustic studies after SCPL concern the analysis of the vibrator that is the main structure modified by SCPL. However, the shortening of the vocal tract can have an influence on the transfer function which would manifest itself on a modification of the values of speech and voice acoustic analysis.

Summary

It is currently hard to determine correlations between voice proficiency and the anatomic conformation and virtually impossible to predict how a patient's voice will perform after undergoing SCPL. Only a few studies have focused on vocal and speech characteristics in patients after SCPL.

This study was designed to evaluate the effect of surgery on the patients during daily life speech communication, the test material was chosen in a way resembling real life situations through testing conversational spontaneous speech and wasn't done through reading a standard passage or a word list as both of them don't reflect the real nature of the daily communication activities.

The phonatory ability of the residual larynx has to be completely re-estimated, due to the altered anatomo-physiology of the structure after surgery, in fact, the residual larynx determines a definitely reduced periodic acoustic signal, rich in noise. Good phonatory results of this treatment are basically due to preservation of intelligible speech which, by ensuring the subjects' speech ability, overcomes and has little influence on the disturbed quality of the vocal signal in these patients. However, the patient obtains a "new voice" as far as concerns acoustic features and this is very important for communication and social life. Moreover, the possibility of objectively estimating acoustic vocal function ability allows monitoring of the trend and results of possible speech therapy and/or phonosurgical rehabilitation treatment which should start from new anatomical and physiological bases, as well as from the new physical acoustic mechanism of signal production.