

Methods of Speech Mastering After Total Laryngectomy

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Abstract

Total laryngectomy disrupts the most basic functions of life, speech, breathing and swallowing of food. This intervention may have a negative impact on the physical, functional and emotional state of the patient, which impairs their quality of life. Initially, when all of the laryngectomies began to work, quality of life was not given any significance, and they were implemented as the ultimate solution in the patients. The last 30-35 years have seen great progress in the rehabilitation of laryngectomized patients and an increase in awareness of the quality of life of patients in oncology, which is of great importance for both patients and doctors. There are three models of speech mastering: esophageal, electro-androidal and tracheo-esophageal speech. Mastering some of the speech models is strongly associated with improving the quality of life and returning faster to the social and working environment.

Introduction

Head and neck tumors represent a group of malignant diseases located in the oral cavity and fingers, nasal cavity and paranasal sinuses, salivary glands and larynx. Cough, difficulty swallowing or breathing, enlargement of the lymph nodes of the neck, pain in the ear, head or neck can indicate the presence of tumors. Head and neck tumors can affect and damage important anatomical and functional structures related to the physical appearance of a person, the ability to speak and communicate, impair social interaction and lead to a decline in quality of life. About 30% to 50% of patients with head and neck tumors lose 10% of body weight before healing with air therapy or chemotherapy [1]. Patients who undergo chemotherapy or air therapy experience a serious problem of eating food up to 35% as well as a change in taste senses. The use of chemotherapy may be associated with hearing loss / or vestibular disorders in some patients. Cough, mucositis, serotomy, dry mouth, fibrosis in the dry duct, breathing problem, tooth caries, limited head and neck movements, fatigue, and pain are some of the problems that occur during treatment [2].

Total laryngectomy is a radical intervention that disturbs speech, breathing, social interaction and causes pain and difficulty swallowing, which negatively affects the quality of life of patients. This intervention interrupts the connection between the lower and upper respiratory tract and forms a permanent tracheostomy. Apart from mechanically conducting air to the lungs, it does not adequately perform respiratory function. Nose loses breathing and protective function, but also olfaction function and no more nazororic reflexes. Removal of larynx also loses its function in the fixation and stabilization of the chest during sagging and lifting of the load, as well as the protection of the lower airways from the penetration of foreign bodies [3].

It is the result of physical and functional changes that can affect emotional well-being and some of the most basic functions of life, including breathing, swallowing and communication [4]. Many authors emphasize the negative effects of smoking when it comes to the development of larynx carcinoma [5,6,7], but they also talk about the combined effects of smoking and alcohol consumption [8], human papillomavirus (HPV type 16), and poor socioeconomic conditions [2].

Vocal Rehabilitation

Rehabilitation of voice and voice of laryngectomized patients is a very important type of rehabilitation that enables patients with severe speech disabilities to easier resocialize and thereby maximally alleviate severe psychological, social and professional problems [8,9]. Rehabilitation starts practically from the moment when the patient declares that he/she has to be surgically removed from the larynx, is carried out according to a certain plan that includes pre-developed methods and adapted to each patient. It also integrates elements of psychological and social rehabilitation. It is desirable that one or more well-spoken rehabilitated laryngectomy patients appear in the preoperative preparation of the patient, which will demonstrate their speech abilities, emotional and social stability. In the postoperative course of the disease, speech rehabilitation begins as soon as the local and general condition of the patient permits. It is believed that from the operation to the beginning of the rehabilitation, the average duration is two to four months. There are three models of speech for patients after total laryngectomy: esophageal, electro-arterial, and trahoezopharyngeal speech.

Esophageal Speech

Esophageal speech is the best and most optimal solution after total laryngectomy. To form an esophageal voice, air is used in the upper third of the esophagus (esophagus). In order for the esophagus to be used to form a voice, it is necessary to adjust and strengthen the physiological movements of the esophagus. The most important is the functional training of a new air reservoir, and it is the best to create a new reservoir in the upper part of the esophagus and the lowest parts of the hypopharynx. This is an uncertain process that often requires a longer period of vocal rehabilitation. The esophageal voice is deep, narrowed flat, the volume of air consumed for one style is less than normal and the frequency of speech is less. Patients are able to speak short phrases [10]. The basis of a well-learned speech is automation, which is a reflex action acquired by frequent repetition. The patient needs a certain period of adaptation to a newly formed voice.

Electromechanical Speech

Electromechanical speech is the speech most commonly used by patients. It can be used immediately after the operation but also by those patients who are not able to master some other model of speech rehabilitation [11]. In 1942, Wright developed the first electron beam known as Sonovox [12]. The most commonly used transcervical and transoral larynx. Transcervical artificial larynx is an electronic vibrator that is placed externally on the neck, and the transmission of its vibrations activates the air in the oral and oral cavity. Transoral artificial larynx vibrations are transmitted through one tube from the vibrator to the oral cavity. They are mainly used by patients after air therapy, who due to neck changes can not use a transcervical device. The advantage of electrolysis is that it can be used immediately after surgery and an electro-mechanical speech can be easily learned. Its negative side is what produces tone or buzz that is perceived as a robot speech, mechanical speech, which diminishes its intelligibility, then one hand is always occupied because it is a handheld electronic device [11] and it is more difficult to achieve social contact of these patients.

Vocal Denture

Vocal prosthesis is a one-way valve that allows the stability of the airflow passage from the trachea to the pharyngo-esophageal segment. It is a more recent method of mastering the speech of laryngectomy patients, which is very similar to laryngeal voice. By installing vocal dentures, use of a physiological air reservoir is provided, which is much higher than for esophageal speech. This allows the tracheoesophageal speech to be much stronger and more sustainable than esophageal speech. The insertion of vocal prostheses can be primary and secondary. The primary implantation of the vocal prosthesis is performed after the surgical removal of the larynx during total laryngectomy. The tracheoesophageal puncture takes place, and then the vocal denture is inserted into the opening of the fistula. Secondary implantation of the vocal prosthesis can be done several months after surgery, performed in general anesthesia and requires repeated surgical intervention. The advantage of the primary implantation of the vocal prostheses in relation to the secondary is that it does not require additional exposure to the surgical procedure [13].

Conclusion

Mastering one of the speech methods positively affects the quality of life of patients who undergo total laryngectomy, in particular the promotion of new devices and surgical techniques. Vocal rehabilitation of laryngectomized patients is much better in developed countries, where the promotion of a healthy lifestyle and the avoidance of factors that affect the development of laryngeal carcinoma are well established.

Conflict of Interest

The authors argue that there are conflicts of interest in relation to this article.

Bibliography

1. Mc Grouther, D. A. (1997). Facial disfigurement. *British Medical Journal*, 314(7086), 991.
2. *Head and Neck Cancer: Multidisciplinary Management Guidelines* (4th edition) (2011).
3. Mitrović, S. (2008). Communication without larch. *Medicinski pregled*, (3-4), 121-122.
4. Doyle, P. C. & Keith, R. L. (2005). *Contemporary considerations in the treatment and rehabilitation of head and neck cancer: Voice, speech and swallowing*. Austin, TX: Pro-Ed (pp.76-77).
5. Duffy, S. A., Terrel, J. A., Valenstein, M., Ronis, D. L., Copeland, L. A. & Connors, M. (2002). Effect of smoking, alcohol and depression on the quality of life of head neck cancer patients. *General Hospital Psychiatry*, 24(3), 140-147.
6. Laccourreye, O., Ishoo, E., de Mones, E., Garcia, D., Kania, R. & Hans, S. (2005). Supracricoid hemilaryngopharyngectomy in patients with invasive squamous cell carcinoma of the pyriform sinus. Part I: Technique, complications, and long-term functional outcome. *The Annals otology, rhinology, and laryngology*, 114(1 Pt 1), 25-34.
7. Bunijevac, M. & Petrović-Lazić, M. (2016). Značaj rane vokalne rehabilitacije i kvalitet života laringektomiranih pacijenata. *Specijalna edukacija i rehabilitacija*, 15(4), 379-393.
8. Vartanian, J. G., Carvahlo, A. L., Toyota, J., Kowalski, I. S. & Kowalski, L. P. (2006). Socioeconomic effect of and risk factors for disability in long-term survivors of head and neck cancer. *Arch Otolaryngology Head Neck Surgery*, 132(1), 32-35.
9. Petrović-Lazić, M., Ivanković, Z. & Kosanović, R. (2004). Mogućnosti komunikacije laringektomiranih bolesnika. *Opšta medicina*, 10(1-2), 43-45.
10. Bunijevac, M., Petrović-Lazić, M. & Maksimović, S. (2017). *Quality of life of patients after total laryngectomy*. Saarbrücken, Germany: Lambert Academic Publishing.

11. Brouha, X., Tromp, D., Hordijk, G. J., Winnubst, J. & De Leeuw, R. (2005). Role of alcohol and smoking in diagnostic of head and neck cancer patients. *Acta Otolaryngology*, 125(5), 552-556.
12. Petrović-Lazić, M. (2001). *Fonopedija*. Beograd, Srbija: Naučna knjiga.
13. Salmon, S. J. (2005). Commonalities among alaryngeal speech methods. In: Doyle, P. C., Keith, R. L., editors. *Contemporary considerations in the treatment and rehabilitation of head and neck cancer: Voice, speech and swallowing*. Austin TX: Pro-ed; (pp. 59-74).