POSSIBLE FACTORS OF SUCCESS IN TEACHING ESOPHAGEAL SPEECH

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Summary

Introduction. Well-established esophageal voice and speech is the most human-like form of communication of laryngectomized patients. Material and Methods. The study sample consisted of 28 patients of the Department of Ear, Nose and Throat, Clinical Center of Vojvodina in Novi Sad. All patients underwent total laryngectomy because of laryngeal cancer previously confirmed. The patients were divided into two groups based on the success of mastering esophageal voice and speech, group 1 being successful and group 2 being unsuccessful. Results. All patients were subjected to total laryngectomy and had their hyoid bone removed (100%). Esophageal speech was rated excellent and good in 71% and 29% of patients from group 1, respectively. There was no significant difference between the successful (group 1) and unsuccessful group (group 2) in time when teaching began (\(\chi^2 = 5.14, p=0.023\)). Neither was there a statistically significant difference between these two groups regarding the methods applied in teaching esophageal speech (\(\chi^2 = 2.02, p=0.155\), which is greater than 0.05). Conclusion. The effectiveness of teaching esophageal speech depends significantly on the motivation of the patients. It was found that the patients who mastered esophageal speech successfully had been learning it longer than those who did not master it. The success in mastering esophageal speech did not depend on whether the patients were trained individually or collectively, whereas neither method of training was successful in group 2. Key words: Speech, Esophageal; Laryngectomy; Laryngeal Neoplasms; Treatment Outcome; Education; Motivation; Rehabilitation

Introduction

As stated by Mitrović, total laryngectomy is a radical surgery on the larynx, which favors radiocality in the treatment of malignant tumors of the larynx in relation to other functions of the larynx, primarily respiratory and phonation. It is also a proof that man can live without the larynx [1]. Well-established esophageal voice and speech is the most human-like form of communication in laryngectomized patients. The success rate in teaching esophageal voice and speech ranges from 30% to 91% [2]. Đukić et al. [3] have reported that teaching is successful in 84% of cases. According to Dragičević [4], the overall effectiveness of teaching esophageal voice and speech is 66.7%. Multidisciplinary approach to the rehabilitation of the laryngectomized patient is the basic prerequisite for successful mastering of esophageal voice and speech. Well-trained and dedicated team of experts is the motivational support to discouraged patients. Not infrequently, the patient seeks help for the first time only after the first oncological check-up, or upon the completion of postoperative

Sažetak

Uvod. Kvalitetno uspostavljen ezofagusni glas i govor je najhumaniji vid komunikacije bolesnika kojima je urađena laringektomija. Materijal i metode. Uzorak je činio 28 pacijenata Klinike za bolesti uva, grla i nosa Kliničkog centra Vojvodine u Novom Sadu. Kod svih je bila urađena totalna laringektomija zbog prethodno potvrđenog karcinoma larinksa. Podela na dve grupe izvršena je prema uspešnosti u svaživanju ezofagusnog glasa i govora, pacijenti grupe I bili su uspešni, a iz grupe II, neuspešni. Rezultati. Kod svih pacijenata u obe grupe uspešna je totalna laringektomija i odstranjena je hioidna kost (100%). Ezofagusni govor pacijenata iz I grupe (uspešnih) je u 71% slučajeva ocenjen kao odličan, a kod preostalih 29% iz te grupe kao dobar. Ne postoji statistički značajna razlika u vremenu započinjanja edukacije između pacijenata grupe I i grupe II (\(\chi^2 = 5.14, p = 0.023\)). Ne postoji statistički značajna razlika između grupe uspešnih i neuspešnih pacijenata u primenjivoj metodi učenja ezofagusnog govor (\(\chi^2 = 2.02, p = 0.155\), što je veće od 0.05). Zaključak. Na uspešnost edukacije ezofagusnog govor značajno utiče motivacija pacijenta a oni koji su uspešno naučili ezofagusni govor duže su edukovani od onih koji ga nisu naučili. Pacijenti uspešni u edukaciji ezofagusnog govor su uspešni bez obzira da li su edukovani individualno ili u grupi, dok kod neuspešnih nijedan način edukacije nije dao rezultat. Ključne reči: Ezofagualni govor; Laringektomija; Laringealne neoplazme; Ishod lečenja; Edukacija; Motivacija; Rehabilitacija
radiotherapy, and sometimes several years after the completion of oncological treatment. It is undoubtedly ideal if the active part of rehabilitation begins as soon as possible, preferably 1.5 to 2 months after treatment (operative or combined with radiotherapy), but it should be said that it is never too late to start exercise [3]. Petrović Lazić [5] suggests to start rehabilitation as soon as the local and general condition of the patient allows it, 2 to 4 months after surgery on average. Mumović [6] suggests to begin with training 6 weeks after surgery and 2 months after completion of radiation therapy. However, teaching may be discontinued temporarily in case of more severe radiation therapy side effects. The same author also believes that teaching esophageal speech should begin within 6 months after surgery.

According to Vekić [7], patients who train from 1 to 3 months have better quality of articulation of esophageal voice and speech. Calcaterra and Zwitman [8] point out that despite adequate training in esophageal voice and speech, only 50% of people can master this type of speech. Training usually lasts 3 to 6 months.

Training can be conducted individually and in groups, that is collectively. In his study, Veselinović [9] states that the individual approach to rehabilitation is convenient at first while getting to know the patients and providing them necessary information on training at the very beginning when the patient needs to master the act of burping. Later, the patient should join the group where treatment will be encouraged by the progress made by people with the same problems.

The aim of this study is to identify possible reasons which are important for success in teaching esophageal voice and speech.

Material and Methods

The sample consisted of 28 patients treated at the Department of Ear, Nose and Throat, Clinical Center of Vojvodina in Novi Sad. All patients underwent total laryngectomy for laryngeal cancer previously confirmed and they were divided into two groups based on the success of mastering esophageal voice and speech, group 1 being successful and group 2 being unsuccessful.

Data on the patients’ gender, age, education, occupation, extent of surgical resection, time when rehabilitation started and duration of rehabilitation were collected through the questionnaire and interviews with patients.

Data about motivation are subjective experiences of each patient and they were obtained through interviews. All data collected were processed by software package Microsoft Excel 2007 and statistical package Statistica 5.5. All the results are presented in tables and graphs. The whole text has been processed in Word 2007.

Results

Group 1 consisted of 14 patients (13 men and 1 woman, that being 93% and 7%, respectively), who had successfully mastered esophageal voice and speech and group 2 included 14 patients (11 men and 3 women, i.e. 79% and 21%, respectively) who had failed at it. There was no correlation between the genders regarding the success rate ($\chi^2$ test = 1.93; p = 0.164).

The age ranged from 61 to 70 and 41 to 50 in 50% and 56% of patients from group 1, respectively and 7% of patients were over 70 years old. The age distribution in group 2 was as follows: 43% of patients were between 61 and 70 years of age, 29% of them were over 70 years of age and 14% were in the age group from 41 to 50 and 51 to 60 years, each. No statistically significant difference was found among the age groups regarding the success rate ($\chi^2$ = 2.19; p = 0.139).

As for the educational structure, the highest percentage of subjects in both group 1 and group 2 had secondary vocational education (64% and 57%, respectively), whereas 28% and 29% of the patients from group 1 and group 2, respectively, finished primary education and 14% of subjects from group 1 had only incomplete primary education and only 8% of patients from group 2 had university degree. There were no statistically significant differences in the educational structure between group 1 and 2 ($\chi^2$=1.03; p=0.308).

As for the employment status, the percentage of retired, employed and unemployed patients was 57%, 29% and 14% for group 1, respectively; whereas 86% and 14% of the patients from group 2, were retired and employed, respectively.

Employees from both groups belong to the group of non-vocal non-professionals. There was no statistically significant difference between group 1 and 2 regarding occupation ($\chi^2$ = 2.15; p = 0.142).

All patients from both groups were subjected to total laryngectomy (100%). None of the patients underwent total laryngectomy with partial pharyngectomy or total laryngectomy with partial pharyngectomy along with resection of the base of the tongue. All patients from both groups had their hyoid bone removed.

Rehabilitation began 2 to 4 months after surgery in 57% of the patients from group 1, 1 month after surgery in 14% and more than 6 months after surgery in 29% of these patients.

In group 2, rehabilitation started in the largest number of patients more than 6 months after surgery (57%), 2 to 4 months after surgery in 29% and 4-6 months after surgery in 14% of these patients. There was no statistically significant difference in the time of commencement of training between the successful and unsuccessful group ($\chi^2$ = 5.14; p=0.023).
The reasons for the motivation of patients in both groups are shown in Graph 1. All patients from group 1 were motivated.

In both groups, the majority of patients (64%) were motivated by the personal reasons. It is interesting to note that none of the patients from both groups were motivated by occupational reasons, although there were employed subjects in both groups. In group 1 and group 2, there were 34% and 14% of the patients who were motivated by social reasons. In group 2, 22% of patients were not motivated. Patients who have been successful in training in a number of cases were motivated by patients who have been unsuccessful ($\chi^2=24.72$, p=0.000).

Graph 2 shows the duration of training in both groups. Training lasted up to a month in 57% and 86% of patients from group 1 and 2, respectively. There are differences in the number of respondents who had training from 1 to 3 months. Training lasted over 6 months only in 7% of patients in both groups. There was a statistically significant difference in the length of training of patients from successful and unsuccessful group. Training was much longer in those who mastered esophageal voice and speech successfully. This is supported by the value of chi - square test $\chi^2=25.44$, p=0.000.

Aspiration method was applied in 50% of the patients from the successful group and 60% of those from the unsuccessful group, whereas deglutition method was applied in 50% and 40% of the patients from the successful and unsuccessful group, respectively.

Graph 3 shows the duration of training in both groups. Training lasted up to a month in 57% and 86% of patients from group 1 and 2, respectively. There are differences in the number of respondents who had training from 1 to 3 months. Training lasted over 6 months only in 7% of patients in both groups. There was a statistically significant difference in the length of training of patients from successful and unsuccessful group. Training was much longer in those who mastered esophageal voice and speech successfully. This is supported by the value of chi - square test $\chi^2=25.44$, p=0.000.

Aspiration method was applied in 50% of the patients from the successful group and 60% of those from the unsuccessful group, whereas deglutition method was applied in 50% and 40% of the patients from the successful and unsuccessful group, respectively.

Injection method was not applied et al. There was no statistically significant difference between these two groups regarding the method of learning esophageal speech ($\chi^2=2.02$, p=0.155, which is greater than 0.05). Esophageal speech of patients was rated excellent and good in 71% and 29% of the patients from group 1, respectively.

Discussion

Men suffer from cancer of the larynx 4-5 times more often than women [5]. Rosso et al. [10] state that laryngeal carcinoma occurs more frequently in men than in women, the ratio being 91.5% : 8.5%. Studies done by Stanković et al. [11] as well as Tićac et al. [12] also confirm that men are more often affected than women are. Mumović [13] found

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**Graph 1:** Motivation

**Graph 2:** Methods in teaching esophageal voice and speech

**Graph 3:** Duration of training
the ratio to be 90.9% of men and 9.1% of women. In Dragičević's research [4], the percentage of male patients was also higher. As for the present study, there was only one woman in the successful group and three women in the unsuccessful group. These results suggest that men are more likely to suffer from malignant tumors of the larynx than women do, which is similar to the results of previous research.

The results of this research show that the majority of patients are aged between 61–70 years. Dragičević [4] and Stanković [11] have also concluded that the majority of patients with malignant tumors of the larynx are aged 61 to 70 years. Woodard et al. [14] reported an average age of 63 years. According to Tićac et al. [12], cancer of the larynx occurs mainly in people aged 50 to 60 years, whereas Igissinov et al. [15] have reported that the disease is most common in the seventh decade of life. According to Mumović [13], 80% of patients are aged between 50 and 70 years.

Patients who underwent total laryngectomy should start learning esophageal voice and speech as soon as possible, within six months after surgery, but not before the wound has healed and the swallowing function has been resumed [6, 16]. Petrović Lazić [5] states that rehabilitation should begin as soon as the local and general condition of the patient allows it, that is 2 to 4 months after surgery, on average. According to Dragičević [4], this period is 4.72 months on average, ranging from one to 13 months. Stanković [16] recommends beginning the rehabilitation of esophageal voice and speech as early as 3–4 weeks after surgery, while Mumović [6] suggests it 6 weeks after surgery. In this study, the majority of patients from the successful and unsuccessful group started rehabilitation from 2 to 4 months and 6 months after surgery, respectively. Veselinović [9] believes that individual approach to rehabilitation is appropriate at the beginning and the patients should join a group later where they will be encouraged by the progress made by people with the same problems. The results presented here show that the training in both groups was conducted mostly collectively. Calcaterra and Zwitman [8] state that training usually lasts 3 to 6 months. Sokal et al. [17] reported that the continuous speech rehabilitation had lasted 3 to 8 months.

Good [18] believes that training should last 6 to 12 months. Taptapova [19] reported that most patients master esophageal speech in 4 to 6 weeks.

The length of training depends on the pace of progress of each individual patient [9]. In this study, the majority of patients in both groups were trained for a period of one month. Training lasted up to a month in 57% of the patients from the successful group and 86% of those who failed in mastering esophageal voice and speech.

Those who were successful in mastering esophageal voice and speech had had intensive rehabilitation in hospital conditions for three weeks, twice a day, 30 exercises in total. Vocal prostheses was indicated to be implanted in those patients who had not mastered esophageal speech successfully during that period. Hospital phoniatric rehabilitation ensures complete implementation of the rehabilitation program, and the motivation for the rehabilitation and social reintegration is significantly higher in those rehabilitated in hospital compared to outpatients [2]. Veselinović [9] claims that continuous training should not last longer than 6 months because he believes that the patient and the therapist become surfeited after that time. In this study, training lasted over 6 months only in 7% of patients from both groups.

Esophageal voice and speech after speech rehabilitation were scored according to Stanković [16]. The present results indicate that 71% of the group who had mastered the esophageal voice and speech successfully were rated excellent, which means that they also had achieved full automaticity in the production of esophageal voice and speech. Esophageal speech in the remaining 29% of the patients was rated good since continuous esophageal voice and speech were established, but some syllables were periodically voiceless. In his research, Dragičević [4] reported 66.7% of patients to have mastered esophageal speech successfully, and were rated 5, 4, 3. Sokal et al. [17] found that 20% of patients mastered esophageal speech successfully, 46.67% of patients were rated good, 13.33% of patients were rated adequate, and 20% of patients used whisper. The results of these studies are considerably inferior to those presented here.

Sokal et al. [17] evaluated the time elapsed since surgery, duration of rehabilitation, extensiveness of surgery, and concluded that the success rate of training was not affected by any of them. In this study, there was a statistically significant difference in the duration of rehabilitation. Training was considerably longer in the patients from the successful group than in those from the unsuccessful one. The present results show that a large percentage of patients from the unsuccessful (86%) group completed training in less than a month, which may imply that intensive hospital treatment was not enough to master the technique of esophageal voice and speech. In addition, they were not sufficiently motivated to continue their training in an outpatient setting. It also shows that there are reasons for the failure in training.

Bohme [20] states that the success of training depends on general factors, such as psychological ones, motivation being one of the most important [21]. Đukić et al. [3] emphasize the importance of assessing the level of motivation during the first contact with the patient in order to give support adequate to that level. Patients are motivated by personal and social reasons, and a desire to return to their former environment as soon as possible. The results of this research show that there is a statistically significant difference in the motivation of the patients from the successful and unsuccessful group. The successful patients were much more motivated compared with the unsuccessful ones, as confirmed by other studies.
The subjects of this study particularly emphasized personal and social reasons for motivation. This study could not prove the importance of a method of training in terms of success, showing that the successful patients achieved good results regardless of the method applied whereas none of the methods gave desired results in unsuccessful patients. The values of $\chi^2$ tests confirm the statement that considerably more patients from this study sample were included in collective than individual training of esophageal voice and speech. Neither did teaching methods affect the success of esophageal speech.

**Conclusion**

The effectiveness of teaching esophageal speech depends significantly on the motivation of the patients, and those who mastered esophageal speech had been trained longer than those who failed. In addition, the patients who mastered esophageal speech were successful whether they were trained collectively or individually, whereas neither of the method gave results in the unsuccessful group. Consequently, the success of training depends more on other factors than on the choice of method between collective or individual training.

**References**


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