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Assessment of the respiratory control and esophageal speech ability in Thai laryngectomees after esophageal speech training

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- Objective** : *To study the respiratory control and esophageal speech ability in Thai laryngectomees who were trained by speech pathologists with the Thai esophageal voice and speech training manual.*
- Setting** : *- Speech Pathology Department, Department of Otolaryngology, Rajavithi Hospital.*
- Department of Otolaryngology, Faculty of Medicine, Chulalongkorn University.
- Speech and Language Pathology Unit, King Chulalongkorn Memorial Hospital, Thai Red Cross Society.
- Design** : *Retrospective study*
- Materials and Methods** : *All 48 subjects had been trained by speech pathologists following the Thai esophageal voice and speech training manual during January 2000 - December 2002. They were also adviced how to live with good quality after the laryngectomy according to the booklet " What you should know about laryngectomy for the Thai laryngectomees". They also filled up the questionnaires for Thai laryngectomees. The data were collected from June 2002- May 2003.*

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- Results** : *The 48 laryngectomees were 43 males and 5 females (age range 23 - 80 years; average 59.06 years). The duration for esophageal speech training was 3 - 24 months; average 8.02 months. The esophageal speakers' breathing had closely related to the ability of the esophageal speech. Thirty- four cases (81.25 %) could speak and control the breathe very well. They could speak clearly more than stoma noise (83.33 %). Most of them could communicate with 1-3 syllable words and have no difficulty in finishing the phrases or sentences within one air-intake.*
- Conclusion** : *The speech therapy with the specific technique for each language is very necessary for the laryngectomees. The esophageal speech training by using the Thai esophageal voice and speech training manual is significantly effective in the control of respiration and the ability of the esophageal speech. These results come from the right speech training at the beginning by speech pathologists.*
- Keywords** : *Laryngectomees, Esophageal speech, Thai esophageal voice and speech training manual, Speech pathologist.*

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สิริกัญญา เลิศศรีณยพงศ์, นันทนา ประชาอุทธิภักดี, ศิริพรชัย ศุภนคร. การประเมินการควบคุมการหายใจกับความสามารถในการพูดด้วยลมจากหลอดอาหารของผู้ไร้กล่องเสียงไทย หลังจากการฝึกเสียงและฝึกพูดด้วยลมจากหลอดอาหารตามหลักภาษาไทย. จุฬาลงกรณ์-เวชสาร 2548 ม.ค; 49(1): 27 - 36

- วัตถุประสงค์** : เพื่อศึกษาความสัมพันธ์ระหว่างการควบคุมการหายใจ กับความสามารถในการพูดหลังจากผ่านการฝึกเปล่งเสียงและพูดด้วยลมจากหลอดอาหารเสียงตามหลักภาษาไทย จนสามารถสื่อสารด้วยการพูดได้
- สถานที่ศึกษา** : 1. งานแก้ไขการพูด กลุ่มงานโสต ศอ นาสิก โรงพยาบาลราชวิถี กรมการแพทย์ กระทรวงสาธารณสุข
2. ภาควิชาโสต ศอ นาสิกวิทยา คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
3. หน่วยอรรถบำบัด โรงพยาบาลจุฬาลงกรณ์ สภากาชาดไทย
- รูปแบบการวิจัย** : เป็นการศึกษาย้อนหลัง
- วัสดุและวิธีการศึกษา** : ผู้ไร้กล่องเสียงของโรงพยาบาลราชวิถี และโรงพยาบาลจุฬาลงกรณ์ จำนวน 48 ราย ในช่วงเวลาตั้งแต่ 1 มกราคม 2543 - 31 ธันวาคม 2545 ได้รับการฝึกพูด ด้วยโดยใช้คู่มือระบบการฝึกเสียง และพูดด้วยลมจากหลอดอาหารสำหรับผู้ไร้กล่องเสียงไทย และได้รับคำแนะนำการปฏิบัติตนหลังจากผ่าตัดกล่องเสียงด้วยคู่มือ สิ่งควรรู้สำหรับผู้ไร้กล่องเสียงไทย โดยนักแก้ไขการพูดเป็นผู้ฝึกและให้คำแนะนำ จนสามารถเปล่งเสียงพูดสื่อสารได้ และหลังจากนั้นผู้ป่วยทั้งหมดได้ตอบแบบสอบถามการประเมินเสียงพูดจากหลอดอาหารด้วยตนเองของผู้ไร้กล่องเสียงระหว่างเดือนมิถุนายน 2545 - เดือนพฤษภาคม 2546
- ผลการศึกษา** : ผู้ไร้กล่องเสียงจำนวน 48 ราย เป็นหญิง 5 ราย ชาย 43 ราย อายุระหว่าง 23 - 80 ปี (อายุเฉลี่ย 59.06 ปี) มีระยะเวลาของการฝึกพูดด้วยระบบเสียงและการพูดด้วยลมจากหลอดอาหาร อยู่ระหว่าง 3 - 24 เดือน (ระยะเวลาเฉลี่ย 8.02 เดือน) พบว่าการควบคุมการหายใจของผู้ไร้กล่องเสียงไทยกลุ่มนี้มีความสัมพันธ์กับความสามารถในการพูดด้วยลมจากหลอดอาหาร กล่าวคือผู้ไร้กล่องเสียง 34 ราย สามารถควบคุมการหายใจได้ดี (81.25 %) ประชากรกลุ่มนี้สามารถพูดได้ชัดเจนกว่าเสียงลมจากช่องหายใจ (83.33 %) และสามารถพูดสื่อสารได้ด้วยคำ 1 - 3 พยางค์ได้ นอกจากนี้ประชากรกลุ่มนี้ยังไม่มีปัญหาในการพูดถ้อยคำ และประโยคให้จบได้ภายในหนึ่งช่วงการหายใจ

- สรุป** : วิธีการฝึกพูดเฉพาะของแต่ละภาษาเป็นสิ่งจำเป็นอย่างยิ่ง สำหรับผู้ไร้กล่องเสียงการฝึกเปล่งเสียงและพูดด้วยลมจากหลอดอาหาร โดยใช้คู่มือการฝึกเสียง และพูดตามหลักภาษาไทย ทำให้ผู้ไร้กล่องเสียงสามารถควบคุมลมหายใจได้ดี และมีความสามารถในการพูดได้อย่างมีประสิทธิภาพ ดังนั้นการเริ่มต้นการฝึกเปล่งเสียง และการฝึกพูดตามหลักภาษาเฉพาะของแต่ละภาษา โดยนักแก้ไขการพูดจึงเป็นระบบที่ถูกต้องเหมาะสม
- คำสำคัญ** : ผู้ไร้กล่องเสียง, การพูดด้วยลมจากหลอดอาหาร, คู่มือการฝึกเสียง และฝึกพูดด้วยลมจากหลอดอาหารตามหลักภาษาไทย, นักแก้ไขการพูด

The basic structures and functions necessary for production of normal speech include are three primary components : respiration, phonation, and resonance. These three components are highly interdependent on one another. ⁽¹⁾ For successful communication, articulation is needed for to modify the outgoing breath stream and voice through alterations of sizes and shapes of resonators. ⁽²⁾ The articulation, however, plays also an important role in the process of producing speech sounds of a language. ⁽³⁾

Regarding the relationship between phonation and resonance, the larynx is the generator of voice that is modified into meaningful speech. Loss of the larynx, which occurs rather frequently, usually as a result of surgical treatment for cancer, means loss of voice and speech. After a total laryngectomy, the patient has three alternatives for developing laryngeal communication. ⁽⁴⁾ There are three methods, namely: first is the artificial larynx (electronic voice device), of which there are two types: the intraoral artificial larynx and the neck vibration device; second is the tracheoesophageal voice (the speech production procedure for communication between the tracheostoma and the esophagus), which according to the surgery there are two types : the tracheoesophageal shunt ⁽⁵⁻⁷⁾ and the tracheoesophageal prosthesis. ^(8,9) Lastly, esophageal voice, it is so far the best form of speech after a laryngectomy because it requires no equipment and is "hand free " ⁽⁴⁾

This study focuses only on the esophageal speech, which it is considered by speech pathologists as the appropriated method for the Thai laryngectomees. Because this compensated speech

can get along very well with the Thai habit and speech characteristics : the Thai people are shy to show their abnormal appearances in public: using artificial larynx, using the finger to close the stoma in tracheoesophageal speech. The laryngectomees can develop their own esophageal speech. The more they are skillful, the more fluently and intelligibly, they can speak. Most of all the esophageal speech is the most inexpensive of the three methods.

Three methods of esophageal speech training are employed : injection, inhalation and swallowing. All the three, having the same basic principle for voice, bring compressed air into the esophagus, Once the air is in the esophagus, external forces compress the air within it and expel it. The esophageal expulsion sets up a vibration of the pharyngeal - esophageal segment with the laryngectomized person experiencing on eructation or " voice ". The voice can be used in speaking if it is prolonged and available whenever desired.

The most important factor in learning to produce esophageal voice is the ability to make the first correct sound. ⁽¹⁰⁾ The correct sound does not come from the stomach. The esophageal speech is made by inhaling air into the upper esophagus to produce a belch-like sound, which could be used for speech. Inhalation is a respiratory activated method of air intake. The air inside the open mouth down to the esophagus has the same atmospheric air pressure as that air outside the body. Now the air in the esophagus below the cricopharyngeal sphincter normally has less pressure than the outside atmospheric air, (negative pressure) When the sound is produced in this manner. The laryngectomees will learn to use it to enunciate words and phrases by using

the lips, teeth, tongue and cheeks to form words and phrases exactly as they did when they had their larynx.

Materials and Methods

Subjects : 48 laryngectomees, 43 males, and 5 females (age 23 - 80 years old; average 59.06 years), who had undergone total laryngectomy at the Department of Otolaryngology, Rajavithi Hospital, and at the Department of Otolaryngology, King Chulalongkorn Memorial Hospital. These subjects had esophageal speech training between 1 January 2000– 31 December 2002 by the speech pathologists following the Thai esophageal voice and speech training manual. ⁽¹¹⁾ and they got the advice to behave after laryngectomy with the booklet “ What you should know about laryngectomy for Thai laryngectomees ”⁽¹²⁾ for 1 - 12 months until they can communicate with esophageal speech in their daily living.

Material : A questionnaire was developed, based on speech mechanism, voice production and Thai linguistics.

Method : The subjects responded to the questionnaires after they were assessed by the speech pathologists that they could communicate with esophageal speech. The data were corrected from June 2002 - May 2003.

Results

From this study, the 48 laryngectomees, received esophageal speech training, on various training durations time 3 – 24 months as shown in the table 1. Therefore, most laryngectomees (52.08 %) succeed to communicate within 3 - 6 months. The average duration of esophageal speech training was 8.02 months.

The results of the breathing control are shown in table 2. The laryngectomees could speak and control their breathing; 81.25 % of them spoke very well. No forceful to produce esophageal was required 72.91 %. They succeed to control the stoma noise as quiet as they could in 70.83 %, and they could speak loudly by deep breathing without stoma noise in 60.41 %.

Table 1. Demography and the esophageal speech training duration time.

Characteristic factors	N (48)	%	Range	X-	±SD
Gender					
Male	43	89.58			
Female	5	10.42			
Age (years)			23 - 80	59.06	12.18
Duration of esophageal speech training (months)				8.02	0.73
	3 - 6	25	52.08		
	7 - 12	18	37.5	3 - 24	
	13 - 15	2	4.16		
	> 16	3	6.25		

The ability of the esophageal speech in Thai laryngectomees showed in table 3. This group could speak clearly more than stoma and breathy noise.

Most esophageal speakers could communicate with 1 to 3 syllable word length, and they also continue speaking shortly after the last utterances.

Table 2. Control of the esophageal speakers' breathing.

Control of Thai esophageal speakers' breathing	Yes (%)	No (%)
1. You needn't breath in heavily while you are speaking	81.25	18.75
2. You mustn't take deep breathe to speak	72.91	27.08
3. You can control the stoma noise well while you are speaking	70.83	29.16
4. Although you take a deep breathe, your voice is louder than the stoma noise	60.41	39.58

Table 3. The ability of the esophageal speech in Thai laryngectomees.

The ability of the esophageal speech	Yes (%)	No (%)
1. You can speak clearly more than other noise (stoma noise, breathing noise, buccal noise, pharyngeal noise)	83.33	16.66
2. You can speak 1 - 2 syllable words	91.66	8.33
3. You can speak 2 - 3 syllable words	75	25
4. You can speak more than 5 syllable words	45.83	54.17
5. You can continue your speech shortly after your last utterances.	56.25	43.75
6. You have no difficulty in finishing your phrases or sentences and your voice doesn't change at the end of your phonation.	56.25	43.75
7. You have no difficulty in taking enough air for phonation.	54.16	45.83

Discussion

This study found that the number of male laryngectomized outnumbered women 8 to 1 which is similar to the study conducted by Edmund Lauder.⁽¹⁰⁾ It also correlates to many previous studies on laryngectomees, males are found more than females in Thailand.⁽¹³⁾ as well as other countries.⁽¹⁴⁻¹⁶⁾ This may be due to the fact that more men are cigarette smokers and they inhale more deeply than women. Smoking is one of the known primary causes of cancer of the larynx. A research in Thailand showed that the ratio of the between cigarette smokers who caused had laryngeal cancer to that of the non-smoker was 6 : 1; it was also found that the way of smoking: deep inhalation while smoking was another cause.⁽¹³⁾ It has been claimed that excessive drinking of alcoholic beverages and the eating of exceptionally hot or highly spiced foods are also contributed to the condition.⁽¹⁰⁾

The most important result from total laryngectomy is the loss of phonation. Therefore, after laryngectomy, a laryngectomees needs to learn a new compensated speech in order that they can communicate with others. This study is concerned only with esophageal speakers, who are the largest group of laryngectomees in Thailand. Although this requires practice and time: a few weeks to a few months, the laryngectomees can learn. Esophageal therapy typically lasts between 3 to 9 months.⁽⁴⁾ Speech pathologists therefore play an important role in voice and speech training after total laryngectomy. The principle of training is based on anatomy, physiology and linguistics.

The right respiration system is the power source for the voice. Oswald, M. emphasized that

the preliminary relaxation and breathing technique should be trained first.⁽¹⁷⁾ Therefore, reducing respiratory tensions and assuring a continuous flow from inspiration, through expiration assists in reducing laryngeal tension. These techniques bring a certain amount of air volume, flow, and pressure for speech. On the other hand, the laryngectomees have a tendency to get wrong speech learning habit, if they are not intensively trained by keen speech pathologists at the beginning of esophageal speech course. This habit of faulty speech causes the voice, to lacking the flexibility to alter the pitch or loudness. Hence, it will obstruct the development of a good voice and esophageal speech. Moreover, the fault voice quality will call attention to itself as an unpleasant manner. Regarding the patients in this study, they got the right and suitable techniques of Thai esophageal speech and the result was effective. The esophageal speakers can control their respiratory system well, while they are speaking rarely that they used compensatory sounds such as buccal and pharyngeal.

The reason most patients could speak 1 - 3 syllable words at a time in one breath, is that the Thai language is syllabic. When one can speak 1 - 3 syllable words, they can communicate in their daily life. Esophageal speakers of Thai language are pleased with this speech level. Besides the esophageal speech does not become more fluent because many speakers remain shy of using esophageal voice outside the clinics. Because of the unconscious tension influenced by embarrassment or anger, they tried to raise the voice to overcome the noise, which consequently made them voiceless. The patients should, therefore, get more training and find a chance to talk in daily

living. The esophageal speech can be developed, the more skillful they are, the more fluently and longer utterances they can speak.

Conclusion

This study it showed that the esophageal speech training for Thai speaker is significantly effective in many aspects: the ability of the esophageal speakers to control breathing, the quality of the esophageal itself. The proper speech training at the beginning is very important, especially the specific techniques for each language are necessary for esophageal speech development the Thai language, which is tonal, with short and long vowels. It requires a different way of training from the western language.

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