Journal of Plastic, Reconstructive & Aesthetic Surgery (2006) **59**, 1269–1275

JPRAS
An International Journal of Surgical Reconstruction
www.JPRASurg.com

Voice reconstruction using the free ileocolon flap versus the pneumatic artificial larynx: a comparison of patients' preference and experience following laryngectomy

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Received 8 January 2006; accepted 16 June 2006

KEYWORDS
Voice reconstruction;
Laryngectomy;
Voice tube shunt;
Ileocolon;
Free tissue transfer;
Tracheo-oesophageal fistula;
Speech rehabilitation;
Quality of life;
Social adjustment;
Body image

Summary This study compares the psychological adjustment and voice function of patients undergoing voice rehabilitation using the free ileocolon flap for creation of a voice tube shunt and patients undergoing voice rehabilitation using the pneumatic artificial larynx.

Twelve laryngectomy patients were included; six underwent free ileocolon transfer following a period of pneumatic artificial larynx use. Mean duration after laryngectomy was 5.2 years. Mean follow-up was 210 days. A chart review, questionnaires and a prospective evaluation were performed.

Voice tube shunt patients had better speech function and higher self-esteem. People's discrimination and appearance when speaking were important in the patients' choice of method for rehabilitation. There was a high preference for choosing the voice tube shunt and a higher motivation and willingness to use that voice mechanism in the voice tube shunt group.

Patients who undergo free flap reconstruction of voice have better speech function and self-esteem than patients who continue to use the external pneumatic device. Psychological assessments are important for surgical patients in order to evaluate a critical aspect of our perceived success — the patients' perception.

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doi:10.1016/j.bjps.2006.06.005

Laryngectomy has a major impact on the person undergoing it. Not only is there a significant impact on respiration, swallowing and speech function[1]; there is a notable change in the person's body image. Many of these patients suffer from depression and low self-esteem.[2,3] Many of these changes can be corrected or improved by restoring a mechanism of speech production. By doing so, the patients' quality of life, social interaction, and psychological adjustment are bettered.[4]

A wide variety of surgical and non-surgical methods of voice restoration have been developed. The non-surgical methods consist of oesophageal speech, or the use of external devices such as the external pneumatic device and the electrolarynx. Surgical techniques are more sophisticated; however, all have as their fundamental mechanism, the provision of a tracheo-oesophageal fistula and placement of a one-way device or flap that can maintain the fistula open while preventing regurgitation of food and liquid into the trachea. Air needs to be injected into the oesophagus or neo-oesophagus with enough volume and pressure, to reach the mouth and produce sound.

The most commonly used voice production and rehabilitation mechanisms in western countries are tracheo-oesophageal (TE) speech through a device with a one-way mechanism (i.e., Provox), oesophageal speech, and electrolaryngeal speech.[5] However, in countries where the language requires particular intonation in order to produce understandable dialogue, such as in the Mandarin, Taiwanese, and Cantonese languages, patients lacking a mechanism for voice production often use the pneumatic artificial larynx (PAL) for speech.[6,7] The PAL is inexpensive, requires a short learning period, and enables the user to change sound pitches by manipulating the amount of air pressure being sent through the tube.[8] This mechanism of voice restoration, although effective, has several disadvantages. Over the past several years, the authors have favoured the use of surgical techniques employing intestinal organs to create a mechanism for voice production. A TE fistula is created by placing an intestinal flap between the trachea and the oesophagus which is inset in a way to provide a one-way mechanism that prevents food and liquid regurgitation into the trachea. The airflow is resonated in the oesophagus and eventually reaches the mouth where articulation produces proper speech.[9,10] The ileocolic region has been the authors' favoured region for provision of flaps for patients requiring voice restoration with or without oesophagus reconstruction. By choosing different parts of the ileocolic flap, based on the ileocolic artery and vein, this flap can be used for oesophageal reconstruction along with voice reconstruction, or it can be used for voice reconstruction alone. Details of the operative procedure and speech function have been reported elsewhere.[9,10] Two of the most commonly used arrangements of the flap are the ascending colon used for oesophageal reconstruction and the ileum used for the voice tube, or a patch of caecum for the oesophageal reconstruction and the ileum for voice reconstruction (Fig. 1a and b). The advantages of the use of the voice tube include the fact that it provides a physiologic, self-cleansing mechanism without the use of a foreign body. Because of its tubed nature, with an inner mucosa lining, it is rarely obstructed or occluded, and it provides a mechanism to prevent aspiration. Nevertheless, the procedure requires skills in microsurgery, a laparotomy, sacrifice of the ileocolic region, and the need to use a finger to shunt the air from the trachea to the oesophagus.

There have been several studies comparing speech function, quality of life, experience of use, and preference of patients using different methods for speech following laryngectomy.[1,5,7,11,12] The patients' psychological condition, however, such as depression, anxiety, and self-esteem have rarely been measured. Our study was designed to identify the factors that influence the patients' decision to undergo surgery for voice reconstruction, assess the satisfaction level and experience of patients previously using the PAL and converting to a voice tube shunt, and compare the swallowing function, speech function, severity of depression, anxiety, and self-esteem level of patients using the VTS and the PAL for speech.

Ideally, a comparison would be obtained between various methods of voice reconstruction such as the PAL, the Provox device and the voice tube shunt technique, however, due to the limited number of patients receiving the Provox device prior to undergoing the voice tube shunt procedure (none in our patient population), a comparison was made between the PAL and voice tube shunt procedures.

Patients and methods

Patients

Twelve patients who received laryngectomy and had regular follow-up participated in this study. The criteria for inclusion in this study were use of the PAL device for a period of time before at least considering alternative options for reconstruction. All of the patients used the PAL for speech for