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Surgical voice restoration following total laryngectomy

Total laryngectomy or laryngopharyngectomy remains the procedure of choice for advanced laryngeal/hypopharyngeal carcinoma, either as a primary procedure or as salvage following irradiation alone or concurrent chemoradiation therapy. However, the procedure is not without consequences; over and above the loss of normal voice, there is loss of nasal function, poor cough, swallowing difficulties, lung function changes, tracheostomal complications and, of course, lifelong functional and psychological consequences. Functional rehabilitation of these patients has long been one of the major challenges facing otolaryngologists, speech therapists, and the patients themselves, but it is only in the last three decades that the emphasis on restoration of function and quality of life has become as important as cure and survival. The loss of natural voice is very often traumatic for the laryngectomee, presenting lifelong challenges for communication in a world that relies heavily on verbal communication. Over the past 25 years there has been significant improvement in the rehabilitation of these patients with speech restoration, which has dramatically altered and improved their quality of life. Patients are no longer condemned to live in silence while they await the results of their cancer treatments. They can face the challenge of life after cure of laryngeal cancer with the knowledge that a normal quality of life is possible.

Successful voice restoration for alaryngeal speakers can be attained with any one of three speech options, namely esophageal speech, electrolarynx, and now tracheoesophageal (TO) speech using a valve. Although, no single method can be considered the best for all patients, the TO puncture has become the preferred method in the past decade. The modern era of highly successful surgical voice restoration was due to a major conceptual development in the late 1970s, which was introduced by Eric Blom and Mark Singer and which transformed the expectation and quality of voice production after total laryngectomy.

The technique involved creating a simple TO puncture between the posterior wall of the tracheostome and the upper esophagus, into which was inserted a one-way silicone valve. The basis of TO speech is that tracheal air, during exhalation, is shunted into the pharynx through a small, silicone-valved prosthesis in a fistulous tract. Sound is produced by vibrating the mucosa of the pharyngoesophageal segment, and speech is then produced by articulation of this sound in the oral cavity.

Initially the puncture technique was used as a secondary procedure in patients with previous laryngectomy who had failed to achieve esophageal speech, but the consistently good results and superior quality of voice prompted Hamaker et al., in 1985, to incorporate the TO puncture at the time of laryngectomy as a primary procedure. The advantages of TO voice are many. The procedure is possible in patients who have had a laryngectomy, neck dissection, and/or radiotherapy. Moreover, the fistula is a convenient route for esophagogastric feeding in the immediate postoperative period. The procedure is also easily reversible if desired by the patient. In addition, TO speech is more quickly attained than esophageal speech. Since its air supply is pulmonary, TO speech is closer to laryngeal speech than esophageal speech on a range of voice parameters, such as fundamental frequency, jitter, shimmer, words per minute, and maximum phonation time.

Since the first description of a TO voice prosthesis in 1980, many new devices have been developed and several of the original devices have been modified. Today, the Blom-Singer and Provox prosthesis developed at the Netherlands Cancer Institute are the most widely-used voice prostheses around the world. The first voice prostheses (Blom-Singer, Panje) were designed as exdwelling devices, to be taken care of by the patient. This was soon followed by hands-free devices, low-pressure and, finally, the indwelling prosthesis that is maintained by the clinician. Not surprisingly, the success rate of

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Although problems and complications occur, infestation of the prostheses and leakage continue to remain. Despite new device designs in recent years, candidal PE segment integrity, valve selection, and troubleshooting. clinical experience. Careful attention must be directed to. is dependent on sufficient knowledge, training, and accrued. should recognize that, as with any surgical technique, success.

Communications is much more than just the physiologic process of producing speech and TO speech is not synonymous with prosthetic placement. Nor is it simply the physiologic production of sound shaped by the movement of the vocal tract. The variations in inflection and intonation, patterns of stress and intensity, prosody, and fluency, which are the hallmarks of laryngeal speech, do not ‘just happen’ as soon as the prosthesis is placed and the patient speaks; they require focused practice. As with any other skill, excellence in performance requires commitment and work. The superior TO speaker not only masters the fundamentals of the method but also refines it to maximize his or her potential to communicate in a new and socially acceptable way.

At first glance the TO puncture technique appears to be a straightforward method of alaryngeal voice restoration, requiring nothing more than ‘making a hole and sticking in a valve.’ However, nothing could be further from the truth, as any experienced clinician will testify. Surgeons and clinicians should recognize that, as with any surgical technique, success is dependent on sufficient knowledge, training, and accrued clinical experience. Careful attention must be directed to PE segment integrity, valve selection, and troubleshooting. Despite new device designs in recent years, candidal infestation of the prostheses and leakage continue to remain a problem. Although problems and complications occur, they are manageable when they are recognized early and a methodical treatment plan is formulated. High success rates can be achieved and large numbers of laryngectomized patients can be rehabilitated for relatively normal lives and social reintegration. Successful TO voice restoration in laryngectomy patients can be very rewarding, but the cost and other problems associated with maintaining the prosthesis are often prohibitive, especially in third-world countries. The great advance of this time is that laryngeal cancer is treatable and with voice preservation or restoration patients are no longer condemned to silence while they await the results of their cancer treatments. They can face the challenge of life after cure of laryngeal cancer with the knowledge that normal quality of life is possible.

Finally, it must be remembered that voice restoration is a process and not just implantation of prosthesis!

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