Introduction
Tracheoesophageal speech is currently the best method of ala-
ryngeal communication. A successful speech outcome
requires a consolidated team approach. Surgical Prosthetic
Voice Restoration has been our preferred treatment for
speech rehabilitation since 1993. Over the past five years, 162
laryngectomies were performed in the Otolaryngology Unit
at Groote Schuur Hospital in Cape Town (almost all had a
primary Tracheoesophageal ‘Puncture’), predominantly for
T3 and T4 cancers of the larynx and hypopharynx, but also
for post-radiation recurrence, and occasionally in combina-
tion with total glossectomy. As Blom has stated, “successful
treatment cannot be measured by survival rate alone”.
Effective restoration of voice and speech is essential to psy-
chological well-being and positive social adjustment.
Oesophageal speech has had a history of limited success, often
takes a long time to learn and is labour intensive. In our coun-
try, the use of the electro-larynx has never been a viable
option due to the extremely high cost.

The average African lives on less than the European
Economic Community’s agricultural subsidy per head of cat-
tle. Groote Schuur Hospital in Cape Town serves predomi-
nantly a lower socioeconomic population with a catchment
area extending 800km from Cape Town. Many of our patients
live at or below the breadline, are illiterate and unemployed,
live in unserviced shacks in informal settlements (Fig 1) or
low-income homes, and travel great distances to obtain spe-
cialist medical services. Some do not speak the language of the
health professionals. All these factors create special challenges
for speech rehabilitation of our laryngectomees.

Speech rehabilitation program
Our speech rehabilitation program comprises pre-operative
speech counselling (family members are encouraged to
attend), Primary Tracheoesophageal Puncture and
Pharyngoesophageal Myotomy. Open-tract Voicing is
attempted about 10 days post surgery once the patient is
drinking and eating. If fluent voice is demonstrated, the
speech therapist sizes, selects and inserts a voice prosthesis,
followed by short-term intensive speech therapy with a focus
on maintenance and use of the prosthesis. Patients are encour-
aged to return should any complications arise.

Surgical technique
Following laryngectomy, a Pharyngeal Myotomy is done down
to the level of the Tracheoesophageal Puncture. We do not do
a Pharyngeal Neurectomy. A Tracheoesophageal Puncture is
done 1cm below the tracheal margin. A size 12 Foley catheter
is inserted into the puncture, and serves both as a stent and as
a feeding tube. The pharynx is closed in a horizontal or T-
shaped configuration in order to maximise the capacity of the
pharyngo-esophageal segment. Should the residual mucosa be
insufficient, the pharynx is augmented with a pectoralis major
flap.
Speech Results
We previously reported that 81% of our patients, followed up for four to 38 months, acquired fluent, intelligible speech, used habitually as a primary means of communication. This means that the results in a Developing World Community such as ours equate those in the Developed World. We attribute this favourable outcome to attention to surgical detail and a committed speech therapy service.

Challenges and solutions
Severe budgetary constraints impact on the purchase and supply of voice prostheses. This is our approach to some of the problems we encounter in a Third World setting.

Choice of prosthesis
Our choice of prosthesis has been determined principally by budgetary constraints. We use removable Duckbill and Low-pressure Blom-Singer prostheses. Despite the benefits of indwelling prostheses such as reduced extrusion, the cost of indwelling prostheses has precluded its routine use. Consequently we reserve indwelling prostheses for the elderly or for those that live far from specialist services.

Valve extrusion and tract closure
In the past, our speech failures were attributable primarily to valve extrusion, failure to successfully re-insert the prosthesis timely, and hence tract closure. Therefore, our current practice, prior to initial prosthesis placement, is to teach the patient to manipulate and insert a Foley catheter into the fistula tract to maintain patency of the fistula should the prosthesis become dislodged. This is an easier and less traumatic practice than trying to reinsert the valve (since the gel-gap insertion system is not available to the patient), and is preferred by many that opt for prosthesis reinsertion by the speech therapist. Independent valve placement is taught only once the tract is stable, the ‘puncture’ is well visualized and easily accessible, and the patient’s level of confidence has increased. In addition, removable prostheses are employed as ‘indwelling’ prostheses – the prosthesis is cleaned in situ with a cytobrush, and is removed only when it malfunctions. These practices have greatly reduced the rate of closure of the fistula tract and need for secondary Tracheoesophageal Puncture.

Device life and leakage
Our experience with approximately 700 prostheses over the past five years has demonstrated an average device life of four months for removable prostheses (range 1-18 months), and an average of seven months for indwelling valves (range 3-15 months). Due to the limited supply of new prostheses, leaking valves in indigent patients are not replaced before a four month (removable type) or seven month (indwelling type) period has elapsed. The valve insertion stick is employed as a ‘plug’ to prevent leakage when drinking fluids (Fig 2). This is considered a minor inconvenience by the patient, since he/she continues to speak and usually eat well. We have also devised other plugs at a minimal cost using materials in hospital. The patient is informed of the possibility of leakage from the fistula tract, and is accordingly advised to swallow with care and avoid liquids as the plug is inserted.

Our experience concurs with others... that there is no single psychosocial factor that predicts successful speech rehabilitation
cost. Extending the device life by use of the plug reduces the personal costs of transport to the hospital, attendance billing and cost of a new prosthesis. Premature leakage is mostly attributable to presence of Candida. Antifungal Prophylaxis is however seldom employed because of the expense; however, patients are encouraged to eat natural antifungals such as yogurt, buttermilk and garlic.

Tracheal crusting and lack of humidification
Patients are very susceptible to crusting in our hot, dry climate. Patients are encouraged to wear stoma covers at all times and to keep them moist to promote humidification. The imported laryngectomy protectors are extremely costly. A sheltered employment work centre was approached and now sews stoma covers for the hospital at a nominal cost. The fabric is cheap, eyjet polyester cotton, doubled to avoid retrac-
tion into the stoma during inspiration and is washable. The
total cost per stoma cover is approximately 10 pence! Crusting is usually adequately managed by steam inhalations with apple cider vinegar (if available), followed by inhalation of 1ml of lukewarm water.

Post-operative radiotherapy
Many of our patients require post-operative Radiotherapy. This does not preclude primary Tracheoesophageal Puncture and placement of voice prosthesis. The prosthesis is fitted and patients are encouraged to speak before commencement of Radiotherapy. This has a very positive psychological effect. Voice quality may deteriorate during Radiotherapy and digital occlusion may be avoided due to skin desquamation but improvement is noted soon after completion of Radiotherapy.

Multi-lingual, cross-cultural environment
We do not consider language barriers or cultural factors to be a contra-indication to tracheoesophageal speech. The use of translators (including friends, family members and rehabilitated laryngectomees) and a sensitive, committed and insight-
ful approach generally overcomes these perceived obstacles.

Long-term speech success and complications
At initial fitting, fluent voice is almost always achieved, but long-term fluent and intelligible speech is the true indicator of success. Both the ENT surgeons and speech therapists have an open-door policy to deal with problems such as granulation tissue and valve extrusion. These complications are usually handled quite easily and successfully in the majority of cases. Patients are encouraged to visit the speech therapist whenever they attend their follow-up Oncology appointments. This provides an opportunity to socialise with other laryngectomees, increases motivation and morale, and reinforces education regarding care, maintenance and use of voice prostheses.

Speech failures
Patients are reassured of our commitment to address speech failures. Initial voice failures are assessed by Videofluoroscopy to exclude the presence of pharyngoesophageal segment stric-
ture or spasm. A ‘pharyngeal bar’ or spasm is addressed by a Secondary Pharyngeal Myotomy, at least three months following Radiotherapy or surgery. Over the past five years, 8/13 speech failures had a Secondary Pharyngeal Myotomy with subsequent successful speech outcome. The remaining five failed to return for follow-up.

Personal resource kit
On discharge from hospital, every patient is equipped with a ‘survival kit’ (aptly named by one laryngectomee). It contains five stoma covers, a pocket-size mirror, a Foley catheter corre-
sponding to the size of the fistula and a 5ml syringe to inflate the bulb, an insertion stick or other plug, three cytobrushes, educational diagrams and the name and contact telephone number of the speech therapist. An application form for a ‘Medic Alert’ bracelet is submitted (Laryngectomy – neck breather). All of this is supplied free of charge to indigent patients. This practice facilitates good prosthetic management and social acceptance.

In conclusion
Regardless of poverty, lack of adequate housing, sanitation, and electricity, great distances from the hospital, language and cultural barriers, and poor education, all laryngectomees deserve to be given the opportunity to acquire tracheo-
esophageal speech. By following standard surgical technique, and with a dedicated speech therapy service, wonderful results can be achieved, and laryngectomees can be given the oppor-
tunity to participate fully in society.

References

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