Problem: Leakage through voice prosthesis

<table>
<thead>
<tr>
<th>Cause</th>
<th>Solution</th>
</tr>
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<tbody>
<tr>
<td>&quot;Duckbill&quot; prosthesis contact against posterior esophageal wall</td>
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"If I had an hour to solve a problem I'd spend 55 minutes thinking about the problem and 5 minutes thinking about solutions."

-Albert Einstein

Disclosure Statement

- In compliance with the American Academy of Otolaryngology-Head and Neck Surgery Foundation and with the Accreditation Council for Continuing Medical Education’s “Standards for Commercial Support of Continuing Medical Education”, Byron J. Kubik, MS, CCC-SLP discloses his partnership with Eric D. Blom, Ph.D. and relationship with InHealth Technologies, Carpinteria, California, in the form of pay for instruction of the Blom tracheoesophageal puncture voice restoration course.
Problem: Leakage through voice prosthesis

**Cause**
1. “Duckbill” prosthesis contact against posterior esophageal wall
2. Valve deterioration
3. Esophageal stenosis
4. Fungal colonization of the valve

**Solution**
1. Replace with “low pressure type voice prosthesis”
2. Replace voice prosthesis
3. Esophageal dilation
Problem: Leakage through voice prosthesis

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2. Valve deterioration
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**Solution**
1. Replace with "low pressure type voice prosthesis"
2. Replace voice prosthesis
3. Esophageal dilation
4. a) Nystatin or Mycelex topical antifungal B.I.D.
   b) Voice prosthesis employing a material that may deter fungal colonization.

Problem: Leakage through voice prosthesis

**Cause**
5. Valve "Flutter" due to negative esophageal pressure
6. Inverted valve

**Solution**
5. Replace with an increased resistance valve
6. Reseat the valve with the stick end of a cotton tip applicator
Problem: Leakage Around Voice Prosthesis

**Cause**
1. Voice Prosthesis is too long resulting in piston movement/tract dilation
2. Dilated puncture caused by radiation, chemotherapy, uncontrolled diabetes, new primary cancer or recurrence.

**Solution**
1. Resize to a shorter voice prosthesis
2. a) Medical diagnosis
   b) Snug flange-to-flange voice prosthesis fit such that the esophageal flange provides a "seal".
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Problem: Small Tracheostoma

**Cause**
1. Stenosis

**Solution**
1. a) Fenestrated silicone laryngectomy tube.  
   b) Surgical revision of tracheostoma (enlargement)
Voice Restoration: Problems and Complications

Problem: Large Tracheostoma

Cause
1. Natural trachea size/tracheomalacia

Solution
1. a) Surgical revision of tracheostoma (reduction)
   b) Adapter attached in/over tracheostoma to reduce occlusion diameter i.e. tracheostoma valve housing with or without HME, Barton Button, silicone laryngectomy tube.
Problem: Flatulence

**Cause**
1. Increased negative pressure in the esophagus during inhalation opens the voice prosthesis valve
2. Pharyngeal constrictor muscle hypertonicity

**Solution**
1. "Increased resistance" style voice prosthesis.
2. Botulinum neurotoxin injection.

Problem: Granulation Tissue Formation

**Cause**
1. Irritation / inflammation / tissue thickness (circumferential "donut") associated with presence of foreign body i.e. voice prosthesis.

**Solution**
1. Surgical removal of granulation tissue i.e. circumferential "donut"
Voice Restoration: Problems and Complications

Problem: “Wet” Voice Quality

Cause
1. Accumulated secretions in the pharyngoesophagus.

Solution
1. “Clear the voice” using tracheoesophageal airflow.

Problem: Hypotonic Voice

Cause
1. Hypotonic P-E segment

Solution
1. a) Digital pressure
   b) Elastic neckband
Problem: Hypertonic Voice

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<tr>
<td>1. Excessive digital pressure against the tracheostoma</td>
<td>1. Patient education</td>
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<tr>
<td>2. Increased voice prosthesis flap valve resistance caused by fungal colonization.</td>
<td>2. Replace voice prosthesis and start antifungal strategies</td>
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<tr>
<td>3. Tracheoesophageal tract stenosis</td>
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Solution

1. Patient education
2. Replace voice prosthesis and start antifungal strategies
3. Carefully dilate and remeasure the tracheoesophageal tract length
4. Botulinum neurotoxin injection
## Problem: Aphonia

<table>
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<tr>
<td>1. Voice prosthesis occluded with mucus</td>
<td>1. Clean the voice prosthesis</td>
</tr>
<tr>
<td>2. Excessive digital pressure against the tracheostoma</td>
<td>2. Patient education</td>
</tr>
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**Botox Protocol**


**Problem: Aphonia**

**Cause**
1. Voice prosthesis occluded with mucus
2. Excessive digital pressure against the tracheostoma
3. Pharyngeal constrictor muscle spasm
4. Complete tracheoesophageal tract closure

**Solution**
1. Clean the voice prosthesis
2. Patient education
3. Botulinum neurotoxin injection
4. Re-puncture in 4-6 weeks

**Problem: Insufficient Tracheostoma Valve Adhesive Attachment Duration**

**Cause**
1. Hypertonicity
2. Hypotonicity
3. Deeply recessed tracheostoma
4. Excessive mucus discharge
5. Speaking too loudly
6. Excessive voice prosthesis resistance
7. Careless adhesive application
8. Failure to carefully remove tracheostoma valve prior to coughing

**Solution**
1. Botulinum neurotoxin injection
2. Elastic neckband
3. Finger pressure
4. Surgery
5. Barton Button
6. Custom mold
7. H.M.E.
8. Patient education/manometer assessment-feedback
9. New/different voice prosthesis
10. Patient education

**Problem: Excessive Tracheostoma Mucus Discharge**

**Cause**
1. Emphysema
2. Elimination of the upper limb of the airway resulting from total laryngectomy

**Solution**
1. Medical management
2. H.M.E.
Voice Restoration: Problems and Complications

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