SpeechPathology.com

Tech Support: 800.242.5183

Introduction to Tracheoesophageal Voice

Presenter: Julie Bishop-Leone, M.A., CCC-SLP

Moderated by:

Amy Natho, M.S., CCC-SLP, CEU Administrator, SpeechPathology.com

SpeechPathology.com

Tech Support: 800.242.5183

SpeechPathology.com Expert eSeminar

Need assistance or technical support during event?

Please contact SpeechPathology.com at

800-242-5183

SpeechPathology.com Tech Support: 800.242.5183

Earning CEUs

•Log in to your account and go to Pending Courses under the CEU Courses tab.

•Must pass 10-question multiple-choice exam with a score of 80% or higher

•Two opportunities to pass the exam

SpeechPathology.com Tech Support: 800.242.5183

Peer Review Process

Interested in Becoming a Peer Reviewer?

APPLY TODAY!

- **3+ years SLP Professional Experience Required**
- **Contact Amy Natho at anatho@speechpathology.com**

Introduction to Tracheoesophageal Voice Restoration

Julie K. Bishop-Leone, M.A., CCC-SLP
Co-Director & Senior Clinical Education Specialist
Atos Medical, Inc.

Disclosure Statements

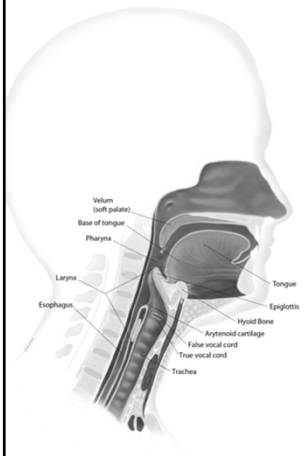
- Julie Bishop-Leone, MA, CCC-SLP is the Co-Director and Senior Clinical Education Specialist in the Educational Division of Atos Medical. She has the following financial relationship or relationship affiliations to disclose: She is employed by the Educational Division of Atos Medical. She does not have any relevant nonfinancial relationships to disclose.

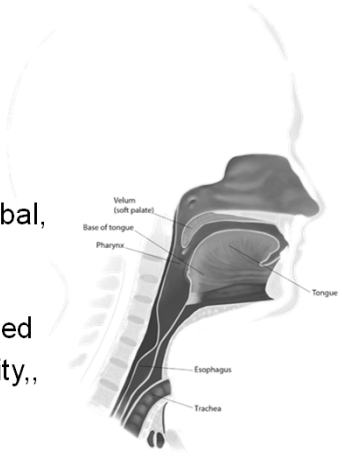
Purpose of the Course

- Describe what tracheoesophageal (TE) speech is and how it works
- Determine who is an appropriate candidate for a tracheoesophageal puncture
- How to size the tracheoesophageal puncture
- Identify the various types of voice prostheses and how they are placed
- Describe strategies of how to initiate TE voice

Anatomy Review

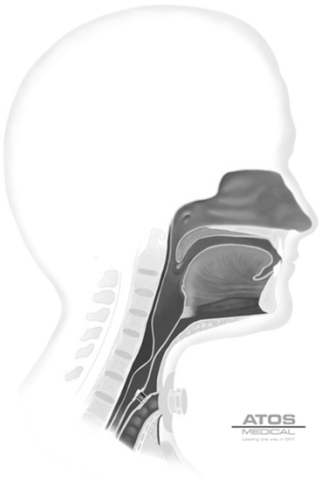
- Separate aerodigestive tract
- Stoma
- No aspiration
- Olfactory changes
- Loss of laryngeal communication (verbal, psychological and emotional)
- Articulation unaffected
- Affects vocal intensity,, pitch and duration





Tracheoesophageal (TE) Voice Restoration

- **Tracheoesophageal speech**
  - Sound source is pharyngoesophageal (PE) segment or neoglottis, **NOT** the voice prosthesis
  - Pulmonary air
  - One-way valve TE Voice Prosthesis (VP)
  - Pts without VP tend to have fewer social contacts (Brook et al, 2013)
  - Considered the "Gold Standard"



TE Speech Success Factors

- Candidate selection
- Patient education
- Knowledge, skill and experience level of the head & neck surgeon and speech pathologist

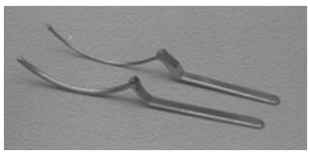
Candidacy for TE Voice Restoration: Surgical/Non-Surgical Factors

- Will the patient be overwhelmed?
- Cognitive & psychological status?
- Manual dexterity?
- Visual acuity?
- Support system?
- Financial status?
- Proximity to SLP familiar with TE voice?
- Type of reconstruction?
- Can patient tolerate a second surgery for secondary puncture?
- If secondary, is their PE segment capable of vibration?
- GOOD CANDIDATE ≠ GOOD VOICE

Timing of the Tracheoesophageal Puncture (TEP)

- **Primary TEP**
  - TEP tract created at the time of the total laryngectomy (TL)

- **Secondary TEP**
  - TEP created as a separate procedure after the TL (second surgery)



Primary vs. Secondary TEP Considerations

Primary TEP

- No need for additional surgery
- Immediate, more "normal" voice rehabilitation
- May be overwhelming
- Unable to predict fluency
- Can place prosthesis at the time of surgery
- If postop XRT, may interfere with TE voice
- May have means of feeding if use RR catheter

Secondary TEP

- Need additional surgery/procedure
- Delayed voicing
- Patient may be better prepared
- Able to determine if PE segment capable of vibration pre-op
- Can place prosthesis at the time of surgery/procedure
- Pt. may be voicing in recovery
- Able to complete botox or myotomy, if indicated

Primary TEP with Provox Vega Puncture Set

- Video 1

How to Create Secondary TEP: New Provox Vega Puncture Set

- Video 2

Timing of Voice Prosthesis (VP) Placement

- **Primary VP Placement**
  - Placement of the voice prosthesis into the puncture at the time it is created

- **Delayed VP Placement**
  - TEP maintained with catheter or feeding tube
  - VP fitting completed approximately 5-10 days post op in the clinic

Primary Placement vs. Delayed Placement of VP

Delayed Placement of VP

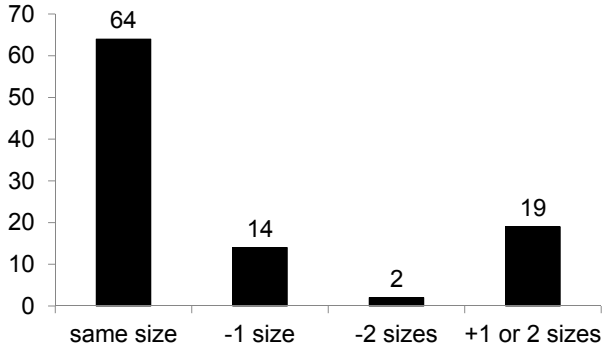
- Requires RR catheter to stent
- Discomfort at puncture site
- Delayed voicing
- Frequent Replacements due to size fluctuations
- RR catheter can easily dislodge
- If primary TEP, can feed through RR catheter

Primary Placement of VP

- Eliminate "initial fitting" trauma & concentrate on voicing, not fitting
- Less pain at stomal site (Burkey, 2011)
- Earlier & more optimal voicing (Gultekin et all, 2010; Deschler et al, 2011; Burkey et al, 2011)
- Eliminate need for frequent resizing = ↓ cost (OpdeCoul B et al, 2000)
- Less likely to dislodge (Gultekin *et al*., 2010 ; Burkey et al, 2011)
- **Potential for more efficient rehabilitation & decreased cost**

Results of 318 Pts with Primary Placement

Two-thirds of replaced indwelling Provox prostheses had the same size (N=2396)*



* OpdeCoul B, Hilgers FJM, Balm AJM, Tan IB, van Tinteren H, van den Hoogen FJA. A decade of postlaryngectomy vocal rehabilitation in 318 patients: a single institution's experience with consistent application of indwelling voice prostheses (Provox). Arch Otolaryngol Head Neck Surg 2000; 126: 1320-1328.

Tracheoesophageal Puncture (TEP) Fitting: A Comparison of Voice Restoration and Complications

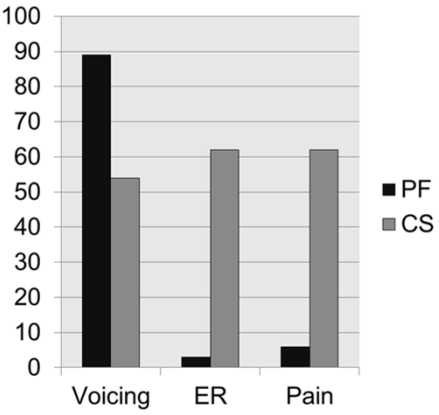
April 2011-August 2013; Joann Kmiecik-Brian Burkey

Information presented at the 2013 Medical College of Wisconsin Head & Neck Symposium for the Advanced Practitioner updating the Cleveland Clinic's Head & Neck Institute 2011 Outcomes Speech Pathology by Joann Kmiecik, SLP and Brian Burkey, MD. Used by permission.

Cleveland Clinic

The Cleveland Clinic Experience - UPDATE

Years	Primary Fit (PF)	Catheter Stent (CS)
2011	9	11
2012	17	2
2013	10	0
N	36	13



Parameters

- Voicing at first SLP visit
- ER visits (catheter reinsertion)
- Pain/discomfort at stoma site

Tracheoesophageal Voice Prostheses

Types of Voice Prostheses

- **Indwelling:** Placed by a professional only
- **Non-indwelling:** Patient and/or professionally managed

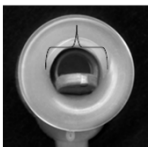
Voice Prosthesis Sizes

Diameter:

Measured in French = 1 Fr= 1/3 mm

- Standard diameter options:
  - 16 Fr = 5.3 mm
  - 17 Fr = 5.6 mm
  - 20 Fr = 6.6 mm
  - 22.5 Fr = 7.4 mm
- Standard industry length options:
  - 4-28 mm

diameter



length

Non-indwelling Voice Prostheses

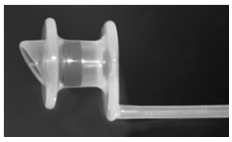
- **Provox® NiD™**: 17, 20 Fr
  - Non-sterile

- **Blom-Singer® Low Pressure**: 16, 20 Fr
  - Increased resistance, standard
  - Non-sterile

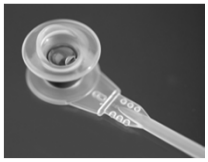
- **Blom-Singer® Duckbill:** 16 Fr
  - Non-Sterile

Provox® Indwelling Voice Prostheses

- **Provox®(1)**
  - Original Provox voice prosthesis
  - Retrograde insertion/removal
  - Used in OR as well as in the clinic
  - Sterile



- **Provox®2**
  - Second generation Provox
  - Bi-directional (anterograde or retrograde) insertion
  - Used in OR and in clinic
  - Sterile



Provox® Indwelling Voice Prostheses (continued)

- **Provox® ActiValve®**
  - Designed for pts. with short device lifetime
  - Short device lifetime = 5 consecutive changes where device life is ≤ 6 wks
  - Bi-directional insertion
  - Non-sterile

- **Provox® Vega™**
  - Third generation Provox product
  - Bi-directional insertion
  - Sterile

InHealth Indwelling Voice Prostheses

- **Blom-Singer Classic™ Indwelling**
  - Anterograde insertion only
  - Comes in std & increased resistance
  - Non-sterile

- **Blom-Singer Classic™ Indwelling Sterile**
  - Bi-directional insertion
  - Sterile

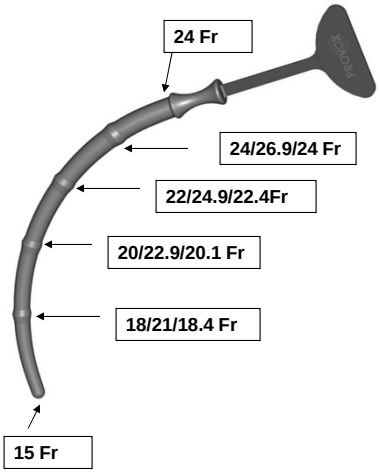
- **Blom-Singer Advantage®**
  - Anterograde insertion only
  - Soft & hard valve assembly
  - Non-sterile
- **Dual Valve**
  - Anterograde insertion
  - Designed for pts. with short device life
  - Non-sterile

- **Rapid Response Indwelling**
  - Non-sterile
  - Large Tracheal and/or Esophageal Flange
  - Increased resistance or special length

Sizing & Dilation Of The TE Tract

Tract Dilation

- **Provox® Dilator**
  - Maintains puncture size during placement
  - Orients one to tract direction
  - Upsizing of punctures
  - 15 Fr at the tip increases to 24 Fr
  - Retention collars at the end of each section
  - Steps 18, 20, 22, 24 Fr
  - Silicone, autoclavable



Tract Dilation

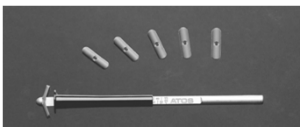
- **InHealth® Dilator**
  - Maintains puncture size during placement
  - Acquaints clinician to puncture tract
  - Upsizing of puncture
  - 14 Fr at the tip increases to 18fr or 22 Fr
  - Must advance fully to obtain the 18 and 22 diameter
  - Silicone, autoclavable

- **Blom-Singer® Dilator-Sizer**
  - Maintains puncture size during placement
  - Dilates and sizes with one instrument
  - Upsizing of puncture
  - 18 or 22 Fr sizes
  - Must fully advance to obtain the 18 or 22 diameter
  - Silicone, autoclavable

Sizing the TEP

Measure devices

- Provox® Measure
  20 Fr and 22.5 Fr



- Blom-Singer Voice Prosthesis Sizers:
  16 Fr and 20 Fr

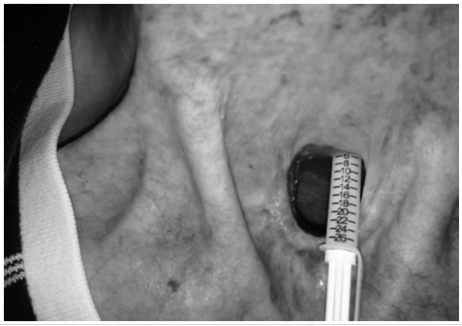
- Blom-Singer Dilator-Sizers:
  18 Fr and 22 Fr

Sizing Tips

- **Prior to sizing:**
  - Use the proper sizer:
    - 16 or 17Fr, use the 16Fr sizer
    - 20 or 22.5Fr, use the 20Fr sizer
  - Obtain adequate TE tract patency
  - Dilate the TE tract as needed (general rule)
    - 16 or 17Fr, dilate to 18Fr
    - 20Fr, dilate to 22Fr
    - 22.5Fr, dilate to 24Fr
  - Orient yourself to TE tract direction w/ tip of dilator or RR catheter!
- **Sizing steps:**
  - Insert tip of the sizer & position in direction of TEP;
  - Push until feel it “pop;”
  - Once you feel a “pop”, make sure to push the **sizer flush against the tracheal side** of the puncture before pulling back and reading the size.
  - If you are in between sizes, **ALWAYS PLACE A LONGER PROSTHESIS!**

Inserting the Sizing Device

Video 3 & 4



Checking the Fit of the Current Prosthesis:

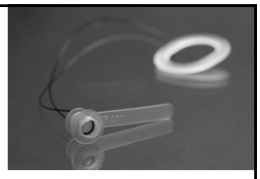
Using actual sizing device provides optimal results

The novice clinician should always resize and not guess

Video 5

Courtesy of Saint Louis University Cancer Center – Dennis Fuller

Non-Indwelling Voice Prostheses



Pros

- User independence
- Ideal for patients living far from care facilities
- Cleaned in situ or externally
- Smaller flange diameter and thickness relative to indwelling

Cons

- Less consistent follow-up with SLP
- Requires retention strap to be taped to the neck
- May have shorter durability than indwelling
- High risk of dislodgement (Hancock et al., 2005)
- Frequent changes over time may result in increased risk of party wall separation and granulation

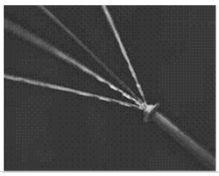
Hancock, K, Houghton, B. & VanAs-Brooks, C.J (2005). First Clinical Experience with a New Non-Indwelling Voice Prosthesis. Acta Oto-Laryngologica, 125: 981-990.

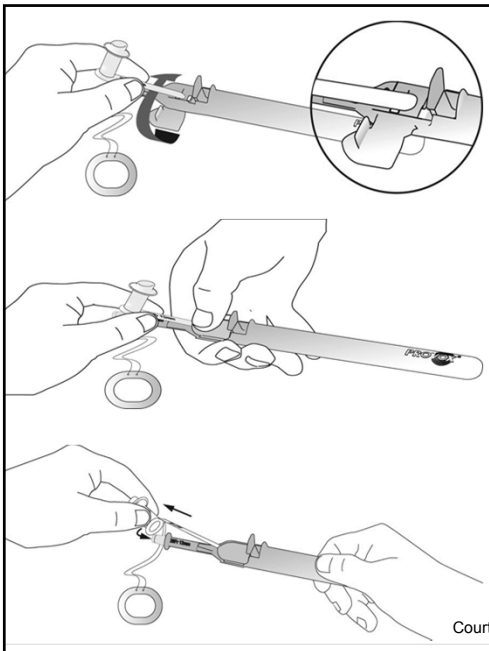
InHealth® Non-Indwelling Voice Prosthesis

- Sizes: 16 or 20 Fr diameter
- 4-28mm lengths
- Low Pressure
  (std or increased resistance)
- Duckbill
- Accessories:
  - Dilator 18 or 20
  - Flushing Device
  - Gel Cap

Provox® NiD™ Voice Prosthesis

- Sizes: 17 or 20 Fr diameter
- 6, 8, 10, 12, 14, 18 mm lengths
- Accessories:
- Provox® Dilator 17 or 20
- Provox® Flush
- Provox® Brush





Loading the Provox NiD

Video 6

Courtesy of Saint Louis University Cancer Center – Dennis Fuller

Provox NiD™ Insertion

Video 7

Courtesy of Saint Louis University Cancer Center – Dennis Fuller

Indwelling Voice Prosthesis

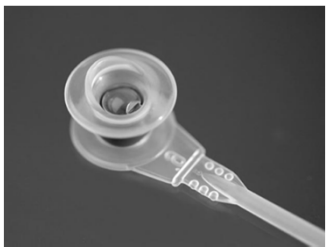
PROS

- Less demands on user
- Long term cost may be same as non-indwelling over time
  - May require reduced therapy time
  - May have longer durability than non-indwelling
- More regular f/u
- Insertion at time of TEP is possible
- Cleaned in situ
- Good for pts. with poor visual acuity and/or manual dexterity
- Eliminate need for a strap

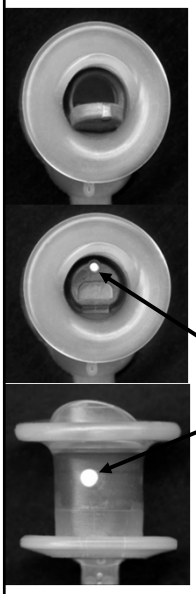
CONS

- Dependent on clinician
- Higher initial cost

Provox®2



- Hinged pre-tensioned valve
- Low resistance
- Blue fluoroplastic ring
  - Radiopaque
- Esophageal flange stronger than tracheal flange
- 22.5 Fr diameter



Provox ActiValve®* Features

- Valve and valve seat made of fluoroplastic
- Nonsterile
- Magnets counteract increased esophageal pressure and provide 'active' valve closure
- Magnet strengths: Light, Strong & Extra Strong

* A problem-solving indwelling voice prosthesis, eliminating frequent candida and 'under-pressure'- related replacements: Provox ActiValve.

Hilgers FJM, Ackerstaff AH, Balm AJM, van den Brekel MWM, Tan IB, Persson JO. Acta Otolaryngol (Stockh) 2003; 123: 972-9

Loading the Provox®2 & ActiValve® VPs

- Use Provox Insertion Tool - no gel cap
- Insert & secure prosthesis tail in insertion tool
- Set tracheal end of prosthesis on end of inserter
- Pinch esophageal flange forward
- Introduce into insertion tube
- Depress top flange portion down and forward while inserting prosthesis into tube
- Advance prosthesis until #1 on stick is even with rim of loading tube.

Video 8

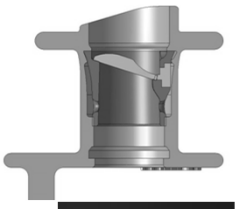
Provided by the Netherlands Cancer Institute

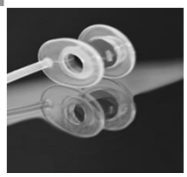
Inserting the Provox2 & ActiValve VPs

Video 9

Courtesy of Saint Louis University Cancer Center – Dennis Fuller

Provox® Vega™





- Preloaded and sterile
- Automatic folding of flanges
- Prevents unintentional overshooting
- Easier and more hygienic handling
- SmartInserter is replacement device only (not to be used in a fresh non-healed TEP)
- 3 Diameters: 17, 20, 22.5* Fr
- Lengths: 4,6,8,10, 12.5, 15 mm
- Accessories:
  - Provox Brush
  - Provox Flush
  - Provox Vega Plug
  - Provox Dilators

*Same Outer Diameter as Provox2

Provox® Smartinserter™

Video 10

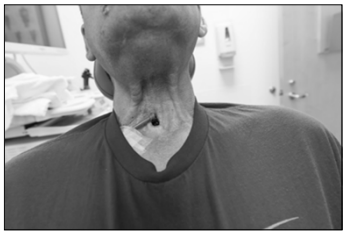
- **Key Points for insertion:**
  - Always preload and ensure correct position of voice prosthesis in loading tube prior to actual insertion
  - Use a two handed approach
  - Maintain a steady position during insertion to avoid undershoot
  - Dilate the puncture prior to insertion if the puncture is tight, angled, or 'difficult' for any reason

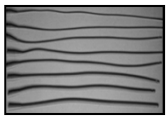
Provox Vega Placement

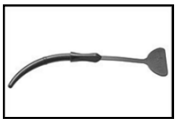
Video 11

Accidental Dislodgement

- Don't panic!
- Pt. should lean forward and cough to make sure that prosthesis is not lodged in airway
- Once Pt. is breathing easily, insert catheter or dilator in puncture
- Tie exposed end off so that gastric juices do not leak out
- Tape to neck
- If prosthesis wasn't located, go to hospital for chest xray to ensure that prosthesis is not in the lung
- **If there is not anything stenting TEP, can close up in minutes to hours and patient can aspirate!**





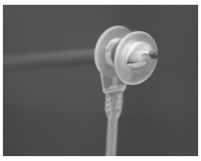


2014

Voice Prosthesis Care/Cleaning "Brush and Flush"

Step One: Clean with Provox® Brush

- Designed for use with Provox VPs only!
- Two sizes for all Provox® VPs:
  - Standard (lengths 4-10mm)
  - XL (lengths 12-18mm)
- Discard every 30
- VP should be cleaned with brush at least twice a day and after meals
- VP should also be brushed if leaking or malfunctioning
- Brush is designed for safety & to not:
  - harm the esophagus
  - inadvertently remove VP
  - damage the Provox VP valve
- Avoid vigorous brushing!

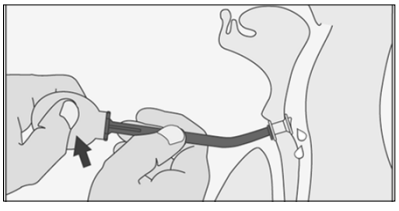


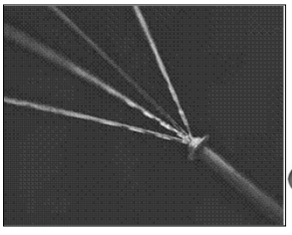
Video 12

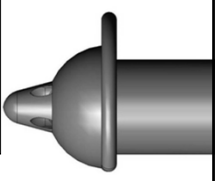
Courtesy of Saint Louis University Cancer Center – Dennis Fuller, PhD

Step 2: Use the Provox® Flush

- For cleaning of the inner lumen of the VP
- Removes debris which loosens after brushing
- Four jets for optimal cleaning – air or water
- Universal for all Provox® VP
- Free et al. (2003) found in vitro that daily airflow through VP with the Provox® Flush reduces biofilm formation & may increase VP device lifetime

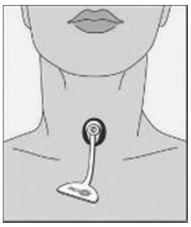






Using the Provox® Plug

- Every patient should have the appropriate plug to temporarily stop the leakage.
- All Provox® VP have plugs except NiD



Prosthesis Selection: Considerations

- Diameter of the TEP
- Clinical indicators
- Patient independence
- Quality of voicing
- Ease of use and cleaning
- Prosthetic design to accommodate pt's anatomic configurations
- Cost-effective prosthesis
  - Cheaper upfront cost ≠ cost effective
- Mean device lifetime

VP Device Lifetime

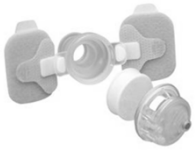
- Patient Dependent
- Presence of GERD/GPR
- Biofilm formation
- Oral flora
- XRT vs. no XRT
- Care and maintenance of device
- Diet
- Pressure in pharynx
- Valve opening during inhalation

Quality of Life with Hands-Free Speech

Benefits:

- Patient free to use hands while speaking
  - Can work more safely
  - Talk and hold telephone while writing a message
- Improved social acceptance
- More hygienic

Principle of Automatic Valves for Laryngectomees



- **Not everyone is a candidate!**
- **Two-way valve = bias open valve**
  - -Inhalation & exhalation through the stoma

- **Pressure sensitive valve**
  - Open while breathing
  - Closed when talking due to increased pressure
  - Application of “forced exhalation” closes the valve and allows for airflow through the voice prosthesis

Therapy

- Instruction on daily care and maintenance
- Ongoing troubleshooting
- Re-assessing factors affecting TE voice
- Pulmonary Rehabilitation with Heat Moisture Exchange (HME) system
- Free-Hands Communication
- Laryngectomee supplies
- Insurance coverage

Initial Outpatient Session

- Measure TE Tract Length (if indicated)
- Check VP length and cleanliness (if primary placement done)
- Teach what to do in case of prosthetic dislodgement
- Instruct on care/use/maintenance of TE voice prosthesis
- Focus on appropriate digital occlusion
- Re-assess heat & moisture exchange (HME) use
- Set up f/u visit in 7-10 days

Subsequent Outpatient Tx Sessions

- Resize TE tract if indicated
- Work on obtaining fluent TE voice, good digital occlusion, adequate care and HME use
- Re-instruct on proper care/use/maintenance of TE prosthesis
- Reassess HME attachment use and function
- Continuous follow up until patient is independent
- Fit with FreeHands valve if appropriate
- Total rehabilitation of these patients goes beyond just providing products and changing prostheses.

Final Outcomes

- Video 13

Conclusions

- Ultimately, functional success rests on the expertise and familiarity of the speech pathologist with head and neck cancer patients.
- Not every patient does it the same way!