Zen and art of vocal mechanics: Key Factors That Influence Unilateral Vocal Fold Paralysis (UVP) Treatment Decisions

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Disclosures

- Financial
  - I am an employee of the University of Utah and serve as Clinic Director of the Voice Disorders Center
- Non-Financial
  - Research focus relevant to the presentation topic

Guiding principle with Treatment Planning

"Dad?"

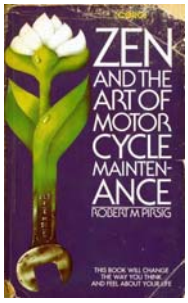
"What?" A small bird rises from a tree in front of us.

"What should I be when I grow up?"

The bird disappears over a far ridge. I don't know what to say.

"Honest," I finally say."

-Robert M Pirsig



Key Factors Influencing Treatment Planning

- **Etiology**
- **Time since onset**
- **Clinical presentation of UVP**
  - Bilateral vs Unilateral
  - Position of vocal folds and movement patterns
- **Health status**
  - Pulmonary status and airway sufficiency
  - Deglutition safety
  - Degenerative or terminal illness
- **Patient factors**
  - Age
  - Level of independence
  - Daily living activities
  - Current quality of life
  - Patient expectations and motivations

PROBLEM SOLVE THIS: You are diagnosed with left-sided vocal fold immobility after undergoing cardiothoracic surgery 1 month ago. Your voice is severely impaired, but eating or drinking is fine. Which treatment approach would you favor?

Speech therapy to prevent onset of secondary muscle tension dysphonia and to learn communication strategies to optimize occupational, family, and social daily living activities.

Undergo an in-office procedure to temporarily augment the immobile vocal fold to improve voice projection and function for the next 2-3 months and then decide whether I need a permanent procedure.

Undergo a surgical procedure to medialize the immobile vocal fold permanently to improve voice projection.

I would do whatever the otolaryngologist recommends.

I would wait and decide after a few months when I am more certain that my immobile vocal fold is not going to recover.

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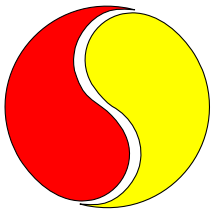
Primary Methods for Treating UVP

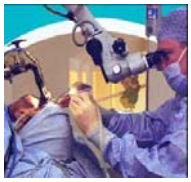
- Medical – Surgical
- Behavioral

MEDICAL MANAGEMENT



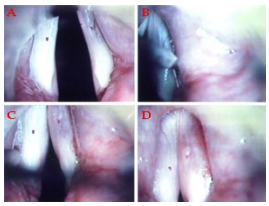
- May occur as the primary approach
- Often necessary to supplement with SLP management
  - Consider pre-surgery vs
  - Post-surgery voice therapy
- Important to work WITH physicians for the patient's best outcome

Surgical Options



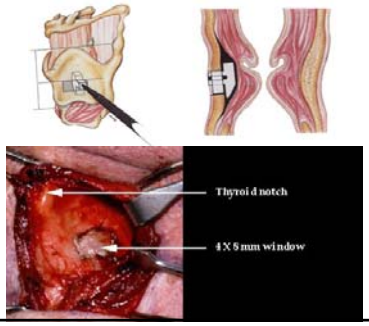
- **Medialization Procedures**
  - Injection of a substance
    - Autologous fat
    - Collagen
    - Synthetic materials
  - Laryngeal Framework Modifications
    - Thyroplasty Type I
  - Implant (Silastic, Hydroxyapetite, Gortex)
  - Posterior larynx modification
    - Arytenoid Adduction
- **Nerve-Muscle Pedicle Reinnervation**

Fat (and other substance) Injection



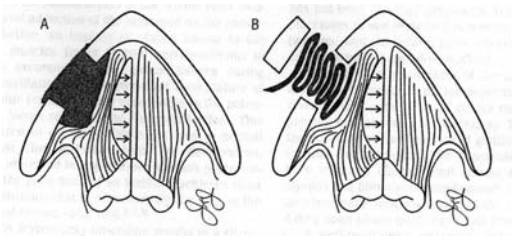
- Fat usually from abdomen
- Overinject
- Reabsorbs over time

Thyroplasty Type I



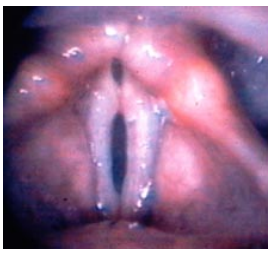
Thyroplasty Type I Implants

Silastic Implant **Gortex Implant**

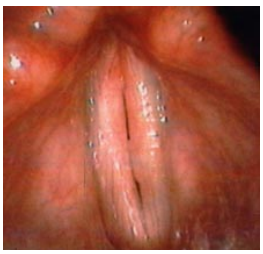


Zeitels & Franco, 2003

Thyroplasty (contin'd)

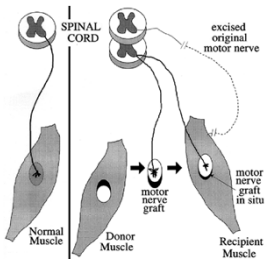


Phonation pre-surgery



Phonation, post-surgery

Nerve-Muscle Pedicle Reinnervation



- Attach a nerve to TA muscle
- Attach a pedicle of a strap muscle with innervation to PCA or adductors
- Reduces muscle atrophy
- Usually combined with Thyroplasty

Speech-Language Pathology (SLP) Approaches to Management

- **Dysphagia management**
  - Address risks for aspiration due to impaired laryngeal closure
  - Address impaired pharyngeal transit, if identified
- **Voice Management**
  - Vocal Hygiene
  - Facilitative/compensatory postures
  - "Unload" excessive upper airway tension
  - Re-engage phonatory-respiratory coordination
  - Improve voice resonance
  - Engage respiratory-phonatory musculature to promote activation across pitch and loudness levels
- **Breathing Management**
  - Breathing strategies for dyspnea due to inadequate airway, or spasms.

Case Example #1

- 50-year-old female, part-time lunchroom worker
- Referred by general ENT to multidisciplinary clinic
- 4-month history of a weak, breathy voice that often deteriorates to a whisper
- Complete voice loss on weekends, particularly Sundays
- Vocal fatigue
- Dysphagia on liquids

Courtesy of Kristine Tanner, PhD, CCC-SLP, Brigham Young University

Auditory-Perceptual and Patient-based Measures

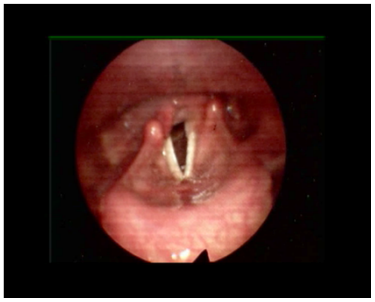
- Breathy, high-pitched, intermittently aphonic voice quality
- Voice Handicap Index (VHI) = 52 (moderately impacted)
- GRBAS: Grade = 1-2, Roughness = 0, Breathiness = 2, Asthenia = 1, Strain = 1-2
- Extralaryngeal pain and tenderness during palpation; improved with laryngeal reposturing techniques
- Maximum Phonation Time (MPT) = 10 seconds
- Pitch range restricted (lower)
- Oral mechanism examination: tongue deviation to right side

Courtesy of Kristine Tanner, PhD, CCC-SLP, Brigham Young University

Auditory-Perceptual Sample

Courtesy of Kristine Tanner, PhD, CCC-SLP, Brigham Young University

Nasoendoscopic Exam



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Impressions

- Right vocal fold paralysis
- Dysphagia, particularly on thin liquids
- Refer for CT scan, revealed right parathyroid adenoma

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Medical/Surgical and SLP Treatment

- Right parathyroidectomy
- Subsequent improvement in vocal fold mobility
- Follow up voice therapy to improve vocal outcome (3 50 min sessions)
  - Manual circumlaryngeal techniques
  - Resonance therapy
  - Vocal function exercises

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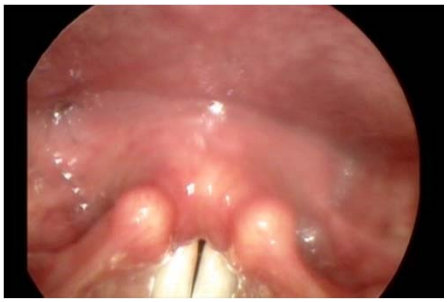
Follow up Nasoendoscopic Exam



Case Example #2: Unilateral Vocal Fold Paralysis & MTD

- 46 year old female
- 3 thyroid surgery 15 and 16 years prior.
- Following 3rd thyroid surgery had voice loss for several months – voice gradually improved and returned grossly to normal.
- Episodic dyspnea/apnea progressively worsened in frequency and duration for last 5-6 months
- Throat tightness, stridor, difficulty breathing in/out – attacks last 30 second to 1-2 minutes
- Various triggers: strong odors, aspiration of spices, awaken her at night
- Dysphonia after breathing attacks – vary in severity but frequency and severity of dysphonia has gradually worsened
- Referring ENT saw a paralyzed VF and referred to our center

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Case Example #2

Courtesy of Kristine Tanner, PhD, CCC-SLP, Brigham Young University

Case Example #3: Unilateral Vocal Fold Paralysis + Dyspnea

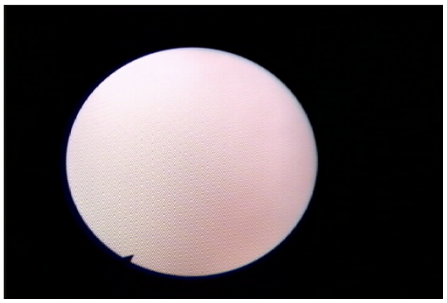
- 65 year old male
- Sudden onset of hearing loss, dysphonia, and periodic dyspnea episodes after herpes zoster 1 year prior
- Reported throat closed off and he could not breathe
- Inspiration was more difficult than expiration
- 5-6 episodes over the last year lasting between 5-15 minutes
- Tend to occur when eating spicy food
- Hoarse voice → throat irritation → throat clear/cough → coughing attacks
- pH probe monitoring - normal limits for reflux but "increased sensitivity during reflux episodes"

Courtesy of Dan Houtz, M.A., CCC-SLP, University of Utah Voice Disorders Center

Patient recording: Breathing episode while at home

Courtesy of Dan Houtz, M.A., CCC-SLP, University of Utah Voice Disorders Center

Case Example #3: Nasoendoscopic Exam



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Case Example #3: UVP + Vocal Cord Dysfunction (VCD)

- Left vocal fold immobility was observed
- Speech/voice therapy was recommended
  - Patient did not pursue SLP treatment
  - Returned one year later with continued symptoms
  - Speech/voice therapy recommended again- was seen for 1 session & was lost to follow up

Courtesy of Dan Houtz, M.A., CCC-SLP, University of Utah Voice Disorders Center

Case Example #4

- 54 year old female, hairstylist
- Left vocal fold paralysis s/p base of skull tumors
- High VHI scores (severe range), Emotional subscale
- Primary complaint was that others noticed and inquired about her voice problem
- Did not want attention drawn to her voice, but not particularly bothered by the quality
- Denied anxiety or depression symptoms

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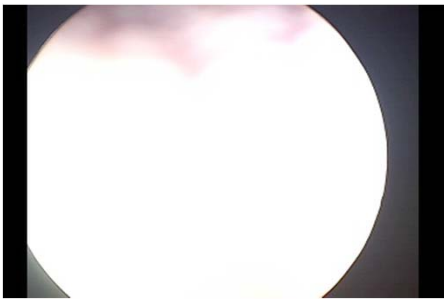
Nasoendoscopic Exam



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Clinical Impressions

- Left vocal fold paralysis, right vocal fold cyst
- Secondary muscle tension dysphonia
- Voice therapy
  - Manual circumlaryngeal techniques
  - Resonance therapy
  - Vocal function exercises
  - Amplification
  - Referred for counseling (life coach with expertise in voice disorders)

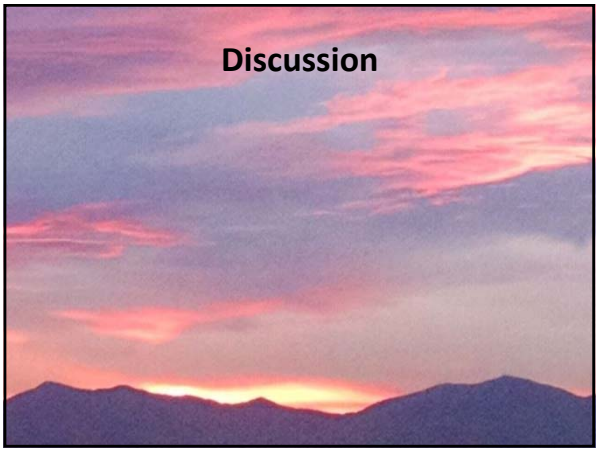
Courtesy of Kristine Tanner, PhD, CCC-SLP, Brigham Young University

Post-Treatment Nasoendoscopy Exam

Courtesy of Kristine Tanner, PhD, CCC-SLP, Brigham Young University

Summary of UVP Treatment Factors

- **Important UVP treatment factors** include considering the:
  - etiology,
  - duration,
  - clinical characteristics, and
  - patient age, health status, motivation and goals.
- **Medical-surgical management** is most common approach addressing:
  - Vocal fold medialization and tone for improved voice projection and airway protection during swallowing
  - Creating an airway, or increasing the size of an insufficient airway
- **SLP management** includes:
  - Patient education/counseling
  - Reduction of secondary upper airway muscle tension,
  - Techniques for improving breathing and deglutition problems, and
  - Optimizing voice resonance and speaking strategies.



Extra Slides Summarizing SLP Treatment Approaches with UVP

VOCAL HYGIENE EDUCATION/COUNSELING

- Hydration
- Throat clearing, coughing
- Excessive effort during speech
- Visual aides, physical proximity
- Background noise
- Whispering behaviors

Facilitative Techniques (Boone & McFarlane, 2000)

- Head positioning
- Digital manipulation/Circumlaryngeal massage
- Relaxation
- Yawn-sigh
- Higher pitch
- Visual feedback
- Trill (Semi-occluded vocal tract techniques)

Behavioral Treatment Approaches

- Adductory exercises
  - valsalva & push-pull
- Resonant voice therapy
- Accent Therapy
- Vocal Function Exercises
- Biofeedback
  - auditory
  - Visual