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

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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

Primary Methods for Treating UVP

• Medical – Surgical
• Behavioral

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
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, Hydroxyapatite, 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

- Implants
  - Silastic Implant
  - Gortex Implant

Thyroplasty (contin’d)

- Phonation pre-surgery
- Phonation, post-surgery
Nerve-Muscle Pedicle Reinnervation

- Attach a nearby 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

Auditory-Perceptual and Patient-based Measures

- Breathy, high-pitched, intermittently aphoniac 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

Auditory-Perceptual Sample

Nasoendoscopic Exam
Impressions

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

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

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

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”

Follow up Voice Therapy
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

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

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)
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
  - valsala & push-pull
- Resonant voice therapy
- Accent Therapy
- Vocal Function Exercises
- Biofeedback
  - auditory
  - Visual