Treatment of severe functional voice disorders

CURRENT EVIDENCE WITH A HISTORIC PERSPECTIVE

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There are no financial interests, relationships or benefits for the presenters associated with this talk and its content in any fashion. The purpose of this presentation is for purposes of clinical education.
Overview

Definitions

A place in the history of medicine

Pathophysiology

Diagnosis and clinical features

Treatment approaches from then to now

Case Presentations
Definitions, Background and Basics
Normal Anatomy

Pictures courtesy of Bluetree publishing
Terminology

• Classification Manual of Voice Disorders – I (Verdolini, Rosen, & Branski, 2006)
  – Primary muscle tension dysphonia
  – Secondary muscle tension dysphonia

• “Clinical differentiation of specific psychogenic versus muscular indicators is rarely pursued and there are no empirical data to substantiate presumed muscular or functional adaptations that underlie dysphonia produced in the absence of organic etiology.” (CMVD-I)
Normal Voice
videostroboscopy
Normal Voice

High speed imaging, 2000fps

• Videos removed
Functional Dysphonia

• The presence of voice disturbance in the absence of structural, neurologic, or mucosal impairment

• Herrington-Hall et al. (1988) out of 1262 voice patients, 7.9% had functional dysphonia.

• Coyle, Weinrich, Stemple (2001) noted this to be higher in incidence, 12.2% of their sample termed “functional”

• Common early treatments include URI medication, reflux medication, voice rest (but seldom resolve the issue)
What is Functional Dysphonia?
Frequently quoted authors

• Aronson’s criteria (1964)
  – There is no apparent alteration in structure
  – Normal laryngoscopy but abnormal stroboscopy
  – Disproportionately severe voice quality to laryngeal inflammation
  – Disorder of nervous origin*
  – Reversible
  – Motor utilization is incorrect
  – Desire exists in patient to be ignorant to the cause

• Morrison and Rammage (1993)
  – Patients with structurally normal larynges with muscle misuse in the larynx, with several interacting causes including habituated muscle tension

• Roy (2003)
  – Voice disturbance in the absence of structural or neurologic pathology
  – Caused by poorly regulated activity of the intrinsic and extrinsic laryngeal musculature
An archival approach

RETREATING TO MOVE FORWARD
<table>
<thead>
<tr>
<th>Term</th>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;The hysterical larynx&quot;</td>
<td>1877</td>
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<tr>
<td>Hysterical aphonia</td>
<td>1930</td>
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<tr>
<td>Psychophonasthenia (abnormal vocalization with normal verbalization, a deviant of stuttering)</td>
<td>1938</td>
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<tr>
<td>Hyperphonia</td>
<td>1944</td>
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<tr>
<td>War aphonia (seen in both soldiers and civilians after WWII)</td>
<td>1944</td>
<td></td>
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<tr>
<td>Psychosomatic aphonia</td>
<td>1949</td>
<td></td>
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<tr>
<td>Vocal cord neurosis</td>
<td>1953</td>
<td></td>
</tr>
<tr>
<td>Psychogenic/Conversion aphonia (Aronson, 1964)</td>
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<td></td>
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<tr>
<td>Functional dysphonia</td>
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<tr>
<td>Psychogenic dysphonia</td>
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<tr>
<td>Vocal abuse/misuse syndrome</td>
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<tr>
<td>Hyperfunctional dysphonia</td>
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<tr>
<td>Hyperkinetic dysphonia</td>
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<tr>
<td>Mechanical voice disorder</td>
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<tr>
<td>Laryngeal isometric dysphonia</td>
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<tr>
<td>Muscle tension dysphonia &quot;MTD&quot;</td>
<td>1983</td>
<td></td>
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<tr>
<td>Laryngeal tension-fatigue syndrome (Koufman/Blalock)</td>
<td>1998</td>
<td></td>
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</tbody>
</table>
Historic Reports

• Whitefield Ward (1877)
  – ENT, former clinical assistant to London Throat Hospital
  – “the disease takes women as it finds them: blondes, brunettes, stout, thin, weak, ruddy, or pale, there is no choice”
  – “Hysterical aphonia is most liable to occur in the single female”

• Cortlandt MacMahon, MD (1932)
  – Instructor for Voice Production in the ENT Department of St Bartholomew's Hospital in 1911. Instructor for Speech Defects in 1913, and retired in 1938
  – “It is remarkable how some persons possessed of high intelligence and wonderful fluency are content to use a voice which is distressing to hear”
Further reports

- Chevalier Jackson, MD (1949)
  - (1865-1958) Laryngologist from Pennsylvania, spent time in London. Responsible for poison control labeling on bottles. Referred to as the “greatest laryngologist of all time”
  - Described “ephemeral adductor paralysis” where patients are “struck dumb”
Making the Diagnosis

Integrating the 5 domains of voice assessment

• Acoustic
• Aerodynamic
• Visualization
• Perceptual
• Patient Perception
Clinical Questions

– Nature of Onset
  • Sudden vs progressive
  • Associated with change in voice use or demand

– Describe what the voice presently can do
  • Intermittent voice loss vs total aphonia
  • Pain with palpation or phonation

– Premorbid medical conditions
  • Medications
  • Surgeries
  • Medical conditions

Case History

– Social History
  • Caffeine, carbonation, ETOH, tobacco, Dietary factors

– History of psychosocial stressors or environmental change

– Typical for multiple medical appointments prior to clinic visit

– Patients often unaware of improvements in voice quality
It’s all about perception

• Completion of the VHI
  – Psychosocial measure of the impact of quality of life based on the presence of a voice disorder

• Perceptual Assessment
  – CAPE-V (Barkmeier, Verdolini, & Kempster, 2002)
    • CAPE-V: general dysphonia, roughness, breathiness, strain, pitch, and loudness, secondary features including glottal fry, spasm, issues of rate, etc
  – GRBAS Scale (Hirano, 1981)
    • general dysphonia, roughness, breathiness, asthenia, strain, list secondary features

– Importance Differentiating MTD from SD (Morrison et al, 1986; Roy, 2005)
– Incorporate trial therapies for stimulability
Laryngeal Function Studies

• Acoustic Assessment
  – ADSV (Kay Pentax) cepstral peak analysis
    • Analysis of dysphonia in speech and voice - able to analyze severely dysphonic voices
    • Analyses during running speech
  – MDVP will give irregular values for sustained /a/
    • Will see elevated jitter, pitch perturbation quotient, shimmer, variations in peak-peak amplitude
  – Often reduced MPT and pitch range
### Laryngeal Function Studies: Aerodynamic analysis

<table>
<thead>
<tr>
<th>Aerodynamic parameters</th>
<th>Hyperfunction: Excessive medial compression</th>
<th>Hyperfunctional under-closure</th>
<th>Hypofunctional underclosure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laryngeal airway resistance (LAR) 30-60 cmH2O (L/s)</td>
<td>Increased (&gt;60)</td>
<td>Decreased (&lt;30)</td>
<td>Decreased (&lt;30)</td>
</tr>
<tr>
<td>Mean Peak Air Pressure 5-8 cmH2O</td>
<td>Increased (&gt;8)</td>
<td>Increased (&lt;5)</td>
<td>Decreased (&lt;5)</td>
</tr>
<tr>
<td>Mean Airflow during voicing 80-200 ml/sec</td>
<td>Decreased (&lt;80)</td>
<td>Increased (&gt;200)</td>
<td>Increased (&gt;200)</td>
</tr>
<tr>
<td>Phonation Threshold Pressure 3-5 cmH2O</td>
<td>Increased (&gt;5)</td>
<td>Decreased/ Increased *</td>
<td>Decreased/Increased*</td>
</tr>
</tbody>
</table>

*variable depending upon patient’s compensatory pattern*
Laryngeal Imaging

- Normal laryngoscopic assessment with abnormal stroboscopy
- Tight mediolateral glottic/supraglottic contraction
- Incomplete glottic closure/hyperfunctional underclosure
- Enlarged posterior glottic gap
- Ventricular phonation
  - (Roy 2008)

Images courtesy of Roy, 2008
Manual Palpation

- Aronson (1990) Theories include chronic superior larynx posture leads cramping and stiffness of hyolaryngeal complex
- Roy (2008)- used to assess laryngeal mobility
- Lowell et al (2012)- patients with MTD elevate the hyolaryngeal complex with phonation more so than age matched peers

Images courtesy of Roy, 2008
Treatment
Interventions
Historic approaches

• Cortlandt MacMahon (1940)
  – Humming or producing /m/ sounds
  – nasal breathing exercises
  – placing the middle finger of the right hand on the back of the tongue and placing resistance while placing the left hand on the thyroid cartilage, and asking the patient to cough
  – Progress strong cough to /ah/
  – Patient asked to depress the tongue 100/x’s for maintenance

• James Sonnet Green (1938)
  – Psychiatric treatment- hypnotherapy
  – “The effects of shock therapy are almost always transitory, because frightening a patient into vocalization does not counteract his neuroticism”
More historic approaches

• Gold et al (1940) Procedure to Treat Aphonía
  – Stimulation with electric vibrator to muscles of the neck coupled with hypnosis
  – Thorough coating of patient’s pharynx with oil of cloves
  – Injection of sodium pentathol (barbituates)
  – Scratch the soles of the patient’s feet with sharp stones

• William Lell (1941)
  – Falsetto voice to “reeducate” voice production
Chevalier Jackson’s Surprisingly Accurate Approach to Aphonia

• “The next step is to get the patient to make a sound in some way other than an effort to say a word.”

• “When the patient produces a phonatory grunt by bringing his elbows down with a thump against his sides, he can be easily convinced that he has started learning a new way of talking.”
Less has changed than you’d expect
Manual Reposturing

• Can be effective in patients who have phonation, as well as those that don’t


• “Bieber Fever”
  – Case of a 13 year old female with normal laryngoscopy, aphonic with sudden onset after a concert with screaming

• Video removed
If no phonation is achieved (dig into your bag of tricks)

- Vegetative sounds (cough, gargle, startle, laugh)
- White noise/auditory masking
- Kazoos
- Flow mode with PAS for biofeedback or a tissue
- Can use stroboscopy to elicit a gag response (last resort)
Pack a tool box (if the patient can vocalize...)

• Semioccluded vocal tract (Titze, 2006)
  – Straw phonation
  – Lip trills, lip + Tongue Trills
• Flow mode phonation (Titze, 2002)
• Yawn-Sigh Approach (Boone and McFarlane, 1988)
• Resonant Voice therapy (Verdolini, Burke, Lessac, et al, 1995)
• Falsetto phonation to break cycle (Stemple, 2009)
Holistic Approaches

• Myofascial Release (find a local practitioner, may be able to see same day)
• Lingual and mandibular stretches
• Neck and shoulder stretches
• Progressive relaxation

• Video removed
Thinking outside the box...

• At some point they may require psychologic assessment
  – Secondary gain; Stemple (2009)

• Intraoral muscle release

• Introduction of lidocaine or botulinum toxin transcricothyroid membrane if behavioral therapy fails (Dworkin et al, 2000)
  – In some cases, causes immediate change
  – Laryngeal “wash” of nebulized lidocaine has proven effective clinically
Case Study

• 50 year old woman with 35 year history of 2 pack/day smoking

• Complaint of voice loss and pain with speaking

• Referred to clinic for consideration of botox for questioned spasmodic dysphonia

• Stroboscopy positive for small right submucosal lesion, however hyperfunctional underclosure and supraglottic hyperfunction on exam

• Loud phonation

• Video removed
46 year old female

• Prior history of voice loss, functional, responsive to behavioral intervention
• Normal laryngoscopy, phonation achieved on vegetative sounds
• Voice to diplophonia after 1 hour
• 2 follow up sessions with limited generalization
• Now speaking normally after motivational interviewing session to discuss cost benefit ratio
Case Study

- 21 year old female, aphonic after upper respiratory infection
- Would not speak for face video, deferred to laryngeal exam and stimulability probes
- Voice restored in 1 hour using vegetative sounds shaped into /woo/
- Glottal fry addressed in later sessions

- Videos removed
Counseling after voice restoration

• Reassure and insure patients are familiar with the techniques to maintain and sustain good voice quality

• Insure patient recognizes their control over voice quality and are motivated to maintain voice

• Maintenance
  – Vocal Function Exercises

• Do not blame the patient, utilize terminology such as:
  – Reprogramming motor behaviors of voice production
  – Tension/Adverse event had a temporary muscle imbalance, which has been corrected
  – Patient should demonstrate with negative practice prior to d/c from clinic
Wisdom of the Ages

– Do not become angry with these patients.

– Do not dismiss these patients with some trite remark like “it is all in your head.” Do not tell them “to snap out of it.”

– Do not delve too deeply into their psychologic difficulties unless you are prepared to handle any eventuality which might arise. Superficial inquiries are desirable and are likewise perfectly safe.

• Louis H. Clerf, M.D. and Francis J. Braceland, M.D., 1942
Thank you!!! Questions?

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• Historical Articles and Paper dated prior to 1940 borrowed from the private library of Joseph Stemple, PhD.