TREATMENT OF LARYNGEAL HYPERFUNCTION WITH AIRFLOW EXERCISES

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Disclosures

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Introduction

- Reduced airflow
- Constriction in the vestibule
- Imbalanced peri-laryngeal activity.
- Hyperfunction

Muscle Tension Dysphonia
Therapy methods

- Indirect
  - Vocal hygiene

- Direct
  - Therapy methods improving laryngeal function
# Indirect Voice Therapy

<table>
<thead>
<tr>
<th>Authors</th>
<th>Methods</th>
<th>Results</th>
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</thead>
<tbody>
<tr>
<td>Chan (1994)</td>
<td>Vocal hygiene program on Kinder garden teachers without vocal lesions</td>
<td>Experimental group showed improved vocal measures.</td>
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<tr>
<td>Fletcher, Drinnan, &amp; Carding, (2007)</td>
<td>Subject knowledge of voice care in individuals with dysphonia and healthy individuals.</td>
<td>Individuals with dysphonia scored poor on knowledge about vocal care.</td>
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<tr>
<td>Broaddus-Lawrence, Treole, McCabe, Allen, and Toppin (2000)</td>
<td>Vocal hygiene education on singers</td>
<td>No significant improvement in voice quality.</td>
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<tr>
<td>Therapy method</td>
<td>Procedural aspect</td>
<td>Support</td>
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<tr>
<td>Circum-laryngeal massage</td>
<td>Manual pressure is applied over the greater horns of the thyroid cartilage and the larynx is pulled downward with a firm, circumferential motion</td>
<td>Van Lierde, De Ley, Clement, De Bodt, &amp; Van Cauwenberge, 2004; Mathieson, Hirani, Epstein, Baken, Wood &amp; Rubin, 2009; Roy, Nissen, Dromey &amp; Sapir, 2008</td>
</tr>
<tr>
<td>Resonant Voice therapy</td>
<td>Produce a voice with a forward tone focus that involves vibratory sensations on the alveolar ridge and other facial bones in easy phonation</td>
<td>Verdolini-Martson et al, 1995; Roy et al, 2003</td>
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<tr>
<td>Forward laryngeal tone</td>
<td>Produce voice with a forward focus feeling sensation in the oral/nasal cavities</td>
<td>Lee, 2010</td>
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<td>Accent Method</td>
<td>Rhythmic play of accentuated relaxed vowels with progressive carryover to connected speech</td>
<td>Kotby, 1995; Bassiouny, 1998</td>
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Use of airflow exercises

- Stone & Casteel (1982) proposed the flow phonation method which is the idea of proper channeling of air stream achieved using a relaxed laryngeal position which eventually facilitates clear vocal quality.

- Subsequent work by Gardner-Schmidt (2010), McCullough et al. (in press) supports the use of these exercises.

- Pilot data by McCullough et al. (in press) supports improvement in airflow and voice quality in patients with vocal hyperfunction.
GOALS

- Long term:
  - Clear voice quality and reduced perception of handicap

- Short term:
  - Reduce tension in the extra-laryngeal musculature.
  - Improve airflow
ACTIVITIES

- Cup-bubble blowing
- Gargling
- Stretch and flow
  - Voiceless
  - Voiced
  - Manipulate the voice (pitch gliding)
  - Remove the feedback
Once clear voice is achieved at the phonation level, move up to syllables, words, phrases and sentences.

- Reduced tension - RELAX
- Easy onset of sounds
- Forward focus
WHY SHOULD THESE WORK?

- Built-in feedback. Patient gets a clear feedback of what is right and what is not.

- Controlled airflow can easily be transferred to conversational voice.

- Physiologically, during the gargling, while the head is tilted back, further raising of the larynx is inhibited.

- Forward focus is a key instruction.
Research Evidence

- Gardner-Schmidt (2010): Case report of an individual with dysphonia who improved in voice quality with the use of airflow exercises.

- McCullough et al. (in press):
  - Voice Handicap Index: 80.5 to 40.83.
  - CAPE-V Severity, $t=3.367$, $p=.02$
  - NHR, $t=4.163$, $p=.053$
  - VHI, $t=4.787$, $p=.005$. 
<table>
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<tr>
<th>Measure</th>
<th>Mean</th>
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<tr>
<td>Mean Expiratory Airflow</td>
<td>Pre 0.156</td>
</tr>
<tr>
<td>Comfortable Phonation</td>
<td>Post 0.436</td>
</tr>
<tr>
<td>Mean Airflow</td>
<td>Pre 0.164</td>
</tr>
<tr>
<td>Voicing “pa-pa-pa”</td>
<td>Post 0.450</td>
</tr>
<tr>
<td>Aerodynamic Resistance</td>
<td>Pre 289.641</td>
</tr>
<tr>
<td>Voicing “pa-pa-pa”</td>
<td>Post 69.571</td>
</tr>
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Current research

- Data from 4 patients who underwent voice therapy for 12 sessions.

- Laryngoscopy indicated two different patterns of laryngeal configuration:
  - Pattern 1: Anterior-Posterior and lateral-medial constriction: High laryngeal resistance and low airflow.
  - Pattern 2: Phonatory gap: Low laryngeal resistance and high airflow.
Results: Pattern 1

Peak airflow during maximum sustained phonation

Graph showing the peak expiratory airflow for MSP pre and post, comparing TVS001 and TVS005.
Results – Pattern 1

- Laryngeal Resistance
Results – Pattern 2

Peak airflow during maximum sustained phonation

![Graph showing peak expiratory airflow for MSP pre and post for patients TVS006 and TVS011.]
Results – Pattern 2

- Laryngeal Resistance

![Graph showing Laryngeal Resistance]

- TVS006
- TVS011
Results – Patient perception of the handicap
Three patients improved and one patient showed no improvement.

More data to be analyzed to ascertain success of the therapy and specific populations it works for.

Although originally believed to work for increased laryngeal resistance only, our data shows promising results where there is a normalization of the airflow and general improvement in perception of the handicap.

Other factors such as compliance to home program, practice of vocal hygiene will be analyzed when we have larger number of data.
QUESTIONS AND DISCUSSION