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Vocal Fold Dysfunction (VCD): Evidenced Based Assessment & Treatment

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Overview

- Vocal cord dysfunction (VCD)
  - Defined
  - Etiology
  - Symptoms
- Speech language pathologist role
  - Assessment
  - Treatment

Vocal Cord Dysfunction

- Inappropriate adduction or closure of the true vocal folds during inspiration and/or expiration.
- May result in upper airway obstruction and laryngeal stridor.
- Often misdiagnosed as asthma

Differential Diagnosis

- Asthma
  - Multiple triggers
  - Chest tightness
  - Wheezing with expiration
  - Response to bronchodilators
  - Nocturnal awakening common
  - Unlikely to return after resuming to activity
- VCD
  - Typically one trigger
  - Throat tightness
  - Stridor with inhalation
  - No response to bronchodilators
  - Rare nocturnal events
    - *Pediatric exceptions*
  - Likely to return after resuming activity

Demographics

- Males and females of all ages
- More frequently female
- Patients fall between 10-40 years of age
- Documented in infants as young as four months
- Affects athletes
  - 5% prevalence of inspiratory stridor in elite Olympic athletes (*Rundell & Spiering, 2003*)
- Average of 4 years from onset to point of accurate diagnosis

Clinical Presentation

- Treated unsuccessfully for asthma
- Possibly treated in ER multiple times
- Possibly passed out from VCD event
- Skeptical SLP can help
- GERD/LPR not identified or treated prior to SLP assessment
- Patients and caregivers frustrated with medical process

Symptoms

- Hyperfunctional Laryngeal Behaviors
- Acute Upper Airway Obstruction
- Dysphonia/Aphonia
- Dyspnea
- Dysphagia
- Cough
- Laryngeal Stridor
- Laryngeal Muscle Tension

Common VCD Symptoms	VCD Triggers
Throat or chest tightness	Aerobic exercise
Difficulty getting air "in"	Gastroesophageal Reflux Disease (GERD)
Feeling of throat closing	Sinusitis
Feeling of being "strangled"	Allergies & Postnasal Drip
Intermittent shortness of breath	Stress
Noisy inhalation (Stridor)	Environmental triggers: • Noxious odors • Smoke • Chemicals • Perfumes • Cold air
Chronic cough	

Primary Etiologies

1. Upper airway sensitivity to laryngeal irritants
   - GERD/LPR
   - Allergens/inhaled irritants
     - Excitation of chemoreceptors in the olfactory passages and pharynx due to irritation (Morrison et al, 1999)
   - Post nasal drip
2. Psychological conditions
   - Conversion disorders (Martin, Blager, Gay & Wood, 1987 as cited by Goldman & Muers, 1991; Andrianopoulos, Gallivan & Gallivan, 2000)
3. Laryngeal dystonia
   - Neurological basis (Morrison et al, 1999; Treole, Trudeau & Forrest, 1999)
4. Viral infection (Andrianopoulos et al, 2000; Altman, Mirza, Ruiz & Sataloff, 2000)

Scope of Practice

- Do we have a role in treating VCD given that they are not impairments of communication?
- YES!
  - SLPs are most knowledgeable about the anatomy and physiology of larynx
  - SLPs trained to plan and establish behavior modification programs

Role of the Speech Language Pathologist

- Medical History
- Behavioral and Environmental History
- Endoscopy
  - *Confirmation of patent airway*
  - *Visual feedback for training breathing exercises*
- Behavioral Education
- Follow-up

Diagnosis of VCD

- **ENT ASSESSMENT**

  - Optimally with laryngeal videostroboscopy while triggering symptoms.

  - Observe paradoxical movement
  - Observe signs of LPR
  - Observe excessive mucous
  - Observe concomitant laryngeal muscle tension
  - Identify structural/functional abnormalities

Video #1- patient with VCD

Video #2- Patient with VCD

SLP Assessment of VCD

- **Detailed history of:**
  - Onset of symptoms
  - Severity of symptoms
  - Known triggers
  - Self-initiated controls
  - Contributing medical history/diagnostic tests
  - Treatment trials, current/previous medications

SLP Assessment of VCD

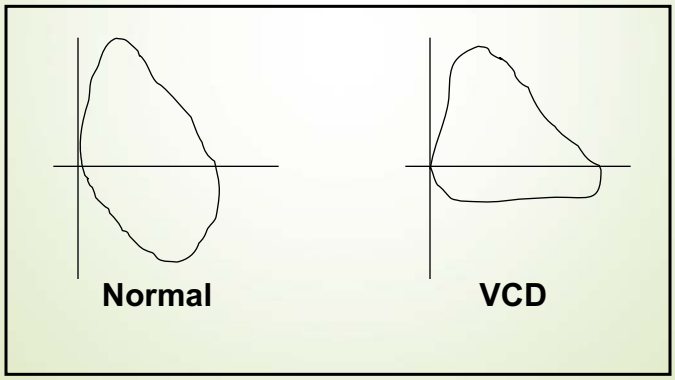
- **Review Consultation Information From:**
  - ENT
  - Gastroenterology
  - Allergy/Asthma
  - Coaches/Athletic Trainers
  - Pulmonologist
- **Referrals to one or more if warranted**

Forced Spirometry

Video #3: Forced Spirometry

Pulmonary Function Tests

- *Trunkated inspiratory loop* suggesting extrathoracic obstruction
- Cannot differentiate between behavioral laryngeal obstruction and laryngeal mass/anomaly
- Failure with empiric treatment for asthma



SLP Assessment of VCD

- **Direct Assessment of:**
  - Laryngeal/oral muscle tension
  - Respiratory support & control
  - Phonatory control & acoustic analysis
  - Body mechanics
  - Education
  - Teach/practice “Rescue Strategies”
  - Observation while triggering symptoms (if possible)

Laryngeal/Oral Muscle Tension

- **Rate:**
  - **Tenderness/discomfort upon palpation**
  - **Awareness of tension**
- **Look at rest/speech/triggering activities**
  - **Performance “mode” and/or volume demands may increase specific tension**

Laryngeal/Oral Muscle Tension

- Observe:
  - Facial grimacing
  - Clenching
  - Lingual retraction; at rest/During activity
  - Submandibular fullness
  - Neck cording

Respiratory Support & Control

- Observe:
  - Placement of support at rest/in speech /in trigger activities
  - Cyclical breathing vs. breath holding
  - Symptoms of vocal strain related to poor airflow

Phonatory Control

- Vocal Quality Assessment with particular attention to:
  - Laryngeal or cul de sac resonance
  - Hoarseness
  - Glottal fry
  - Hard glottal attack
  - Pitch variability
  - Volume Control

Phonatory Control

- Conversational vs. projected speech
- Acoustic assessment
  - Objective measures correlate with observations
  - Useful as a teaching tool for patient

Body Mechanics

- Seated/standing
  - Upright vs. slouched
  - Base of support
- Increase awareness of negative posture, if unable to correct may refer for physical therapy or massage therapy

Body Mechanics

- Posture
  - At rest /in speech/ in trigger activities
- Head extension /retraction
- Shoulder elevation – bilateral/unilateral
- Arm Positioning (esp. for runners)
  - Clenched vs. free movement
  - Raised vs. relaxed

Education

- Anatomy & Physiology
  - Acknowledge stridor symptoms are real

  "It's not in your head it's in your throat"
- Build self-assessment skills
  - View videostrobe
  - Correlate with swallow function
  - Convert Pain Scale (1 to 10)
  - Discomfort Scale
  - Interference with breathing/function

Education

- Tracking Episodes
  - **Severity and Frequency**
  - **Potential Triggers:**

    activity/smells/temperature/food/reflux
  - **Identify:**
    - **"*Just noticeable onset*" of physical or respirator changes**
    - **"Where does the change *start* and what does it *feel like?"***
    - **Early symptoms, "polite symptoms"**
    - **"Red flag" symptoms while the symptoms are still "pink"**

Change Current Response

- **Teach/Trigger/Apply**
- **Rescue Strategies**
  - Release and control techniques that provide behavioral techniques that generate a mechanical response
- Nasal Inspiration with pursed lip expiration
- Panting
- Lip Trills – steady tone, glides

Change Current Response

- Lingual extension/stretches
  - To release tension
  - Forward carriage facilitates airflow over the base of tongue
- Say “Duh” to drop jaw and tongue
- Monitor Posture/Tension

  Jaw/Tongue/Neck/Shoulders/Arms/Base of Support

Change Current Response

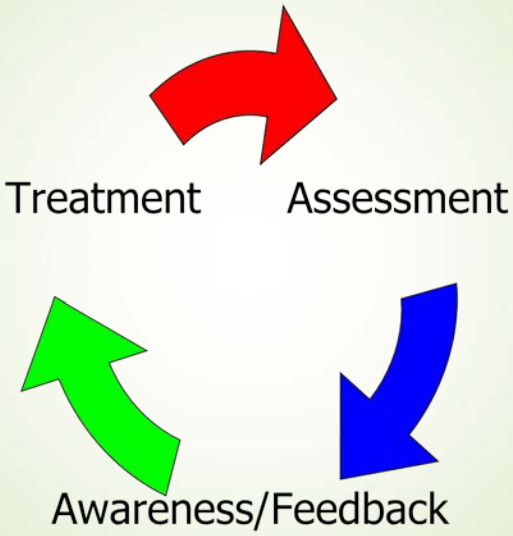
- Attempt to trigger the symptoms
- Apply the strategies
  - Will need to cue to apply and continue to use rescue strategies as needed
  - Maneuver patient through tasks/strategies based on symptoms noted during the triggering of the VCD

Triggering VCD Episode

Integration between Assessment & Treatment

- Continual diagnostic and trial treatment process to generate the most effective set of strategies and self-awareness
- Often need to revisit areas that had previously been eliminated

Relationship of Elements of Patient Care



SLP TREATMENT OF VCD

- Education
- Change Current Response to Symptoms teach "Rescue Strategies"
- Relaxation Strategies
- Teach Respiratory Control
- Improve Phonatory Control/Function

SLP Treatment of VCD

- Build Task Intensity with Strategy use
- Interdisciplinary Coordination
- Discharge Planning

Relaxation

Use prior to activity during the "red flag moments" and or when triggered:

- Laryngeal Massage (Aronson, 1990)
- Hyoid Release (Roy, 1993)
- Lingual Stretch/Massage
- Attention to Oral Posture

Laryngeal Massage

Relaxation

- Progressive Relaxation
- Surface EMG as biofeedback tool

Respiratory Control

- Focus is more on:
  - Exhalation than inhalation
  - Cyclical breathing
  - Timing, pacing, rhythm
  - Ability to change rhythm with activity (ie. Walk vs. jog vs. sprint)
  - General awareness of abdominal support, helpful to work supine

Respiratory Control

- Identify breath holding
- Teach cyclical breathing
- Increase awareness of airflow over base of tongue (“h” words may help)
- Amount of direct instruction is case dependent: age, self-awareness, level athletic ability, willingness

Respiratory Control

- Increase level of difficulty incrementally
- Provide distraction training
- Provide home exercise program
- Simulate tasks and activities*
- Use of gate belt or abdominal binder helpful to feel exhalation

Environmental Considerations

- Need space to tax the patient
- Helpful to have access to exercise equipment, treadmill, arm bike, bike
- Use pool for swimmers, exposure to “smells” also helpful for those who trigger because of odors
- Appropriate tools and space to simulate/re-create as best as possible

Improve Phonatory Control

- Flexibility exercises
  - Phonatory Function (Stemple, 1995)
  - Intensity Swells
  - Stair steps
  - Lip & tongue trills
  - Resonant humming

Improve Phonatory Control

- Hygienic Projection Tasks
  - Watch for tension “on the field”
- If necessary:
  - Easy Onset
  - Tone Focus
  - Pitch Control

Increase Task Intensity with use of Strategies

- Increase:
  - Rate of activity
  - Length of activity
  - Complexity of activity
- Vary the time of day
- Simulate suboptimal conditions
  - Heat, cold, fatigue, odors

Interdisciplinary Coordination

- ENT
- GI
- Pulmonary
- Allergy
- Cardiac
- Psychology
- Coaches
- Trainers
- Family

Discharge Planning

- Strive for mastery in clinic
- Vary follow-up session:
  - Three to four weeks
  - Hold therapy until “sport season”
  - Consider insurance limitations, “save visits”
- If plateau..consider you may be missing interdisciplinary link(s)

Discharge Planning

- Not a failure if they have to come back after discharge
- May return due to
  - Change in activity intensity
  - Maturity
  - Self-discrimination
  - Loss of diligence to strategies

Discharge Planning

- New factors develop
- May have missed part of problem the first time
- Tend to correct faster the second time
- Prepare family that “tweaking” may be necessary
- Encourage to seek follow-up sooner rather than later

Therapy for PVFD: History

- Therapy adapted from functional voice disorder protocol (Brugman & Newman, 1993)
- Relaxation (Martin et al, 1987)
- Inhalation of helium-oxygen mixture (Martin et al, 1987; Christopher, Wood, Eckert, Blager, Raney,Southrada, 1983 as cited by Gallivan & Andrianopoulis, 2004)
- Injection of botulinum toxin (Brin, Blitzer, Braun, Stewart & Fahn, 1991 as cited by Altman et al, 2000)
- Respiratory retraining:
  - Diaphragmatic breathing (Martin et al, 1987)
  - "Wide-open-throat" breathing (Martin et al, 1987)
  - Concentration on exhalation on fricative /s/ (Sandage, personal communication, June 15, 2006; Martin et al, 1987)
  - Using sniff, blow or pant techniques (Sandage, personal communication, June 15, 2006; Sandage & Zelazny, 2004; Pitchenik, 1991 as cited by Gallivan & Andrianopoulis, 2004; Andrianopoulos et al, 2000)

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