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Voice Therapy: A Basics Course for SLPs, presented in partnership with Cincinnati Children's

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Learner Outcomes

- Describe at least 3 semi-occluded exercises for their voice patients.
- Describe, identify and provide alternatives to phonotraumatic behaviors.
- Distinguish normal from disordered voice and severity levels when rating the CAPE-V.
- Describe 2-3 vocal hygiene recommendations.

What is a "Voice Disorder"

"When the voice does not work, perform or sound as it normally should, so that it interferes with communication" (Roy, Merrill, Thibeault, Parsa, et al 2004)

"A **voice disorder** is characterized by the abnormal production and/or absences of vocal quality, pitch, loudness, resonance, and/or duration, which is inappropriate for an individual's age and/or sex.

A voice disorder is *present* when an individual expresses concern about having an abnormal voice that does not meet daily needs- regardless if others do not perceive it as different or deviant" (ASHA Ad Hoc Committee on service delivery in the schools)

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Prevalence of Voice Disorders

Pediatrics

- Prevalence of a voice disorder ranges from 1.4% to 6%.
- Vocal Nodules are the most frequently diagnosed voice disorder.
  - More likely to occur in males than females

(NCHS Data Brief; No. 205 June 2015)

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Prevalence of Voice Disorders

Adults

- 3-10% in general population
- More prevalent in elderly adults
- More common in adult females than males

Occupational risks:

- Teachers
- Factory workers
- Singers

(Voice Disorders- Practice Portal; ASHA website)

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Anatomy and Physiology of Voice

- Spaces in the Larynx
  - Glottis- space between the True Vocal Folds (TVF) when they are abducted
  - Supraglottis- space above the level of the TVF
  - Subglottis- space below the level of the TFV

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Anatomy and Physiology of Voice

- Cartilages of the Larynx
  - Three paired and three unpaired
  - Paired
    - Arytenoid Cartilages
    - Corniculate Cartilages
    - Cuneiform Cartilages
  - Unpaired
    - Epiglottis
    - Thyroid Cartilage
    - Cricoid Cartilage

Anatomy and Physiology of Voice

- Muscles of the Larynx
  - Extrinsic Muscles
    - Anterior/Posterior Belly of the Digasticus
    - Mylohyoid
    - Stylohyoid
    - Geniohyoid
    - Hyoglossus
    - Thryohyoid
    - Sternothyroid
    - Sternohyoid
    - Omohyoid

Anatomy and Physiology of Voice

- Muscles of the Larynx
  - Intrinsic Muscles
    - Cricothyroid
    - Posterior Cricothyroid
    - Lateral Cricothyroid
    - Thyroarytenoids
    - Interarytenoids
  - The cricothyroid, thyroarytenoids and interarytenoids have additional components with important functions.

Anatomy and Physiology of Voice

- Layers of the Vocal Folds
  - Epithelium (Outer covering)
  - Superficial Layer of the Lamina Propria
  - Intermediate Layer of the Lamina Propria
  - Deep Layer of the Lamina Propria
  - Vocalis Muscle

Anatomy and Physiology of Voice

- Neural Controls- peripheral
  - Vagus- two branches
    - Superior Laryngeal Nerve
    - Recurrent Laryngeal Nerve

Features of normal voice

- Ability of vocal folds to adduct (close)
- Ability of vocal folds to abduct (open)
- Consistent air flow and air pressure
- Pliable vocal folds (mucosa covering)
- Barely adducted or abducted vocal folds
- Adequate “focus” of the voice
- Appropriate volume and pitch
- Good vocal hygiene

Normal Voice Production

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Normal Mucosal Wave

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Features of Disordered Voice

- Dysfunction with adduction and abduction of vocal folds
- Inconsistent airflow or breath support
- Increased and/or decreased air pressure
- Abnormality of vocal folds (mucosa covering)
- Back focus and glottal fry
- Inappropriate volume and/or pitch for age and gender
- Poor vocal hygiene

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Features of Disordered Voice

Vocal Nodules

Characteristics
- Usually bilateral
- Fairly symmetric
- Medial between anterior 1/3 and posterior 2/3 of TVF
- Hourglass closure configuration
- Reactive lesion at the site of the contact of the vocal folds
- Usually respond well to therapy

Etiology
- Phonotraumatic Behaviors
- Laryngeal hyperfunction
- Poor vocal hygiene

(Stemple, Glaze, Klaben; 2000)

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Features of Disordered Voice

- Vocal Nodules sample

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Mucosal Wave with nodules

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Features of Disordered Voice

Vocal Cyst

- Characteristics
  - Occur anywhere in the membranous portion of the TVF, ventricular fold or the laryngeal ventrical
  - Uni- or Bi-lateral
  - Interfere with vibratory function
  - Surgical intervention required
- Etiology
  - Congenital or Acquired
  - No clear etiological factors

(Stemple, Glaze, Klaben 2000)

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Features of Disordered Voice

- Functional Voice Disorders
  - VCD
  - Ventricular Phonation
  - Puberphonia
  - Functional aphonia
- Vocal Fold Paralysis/Immobility
  - Unilateral
    - breathy
  - Bilateral
    - Adductor: severe breathiness
    - Abductor: airways concerns

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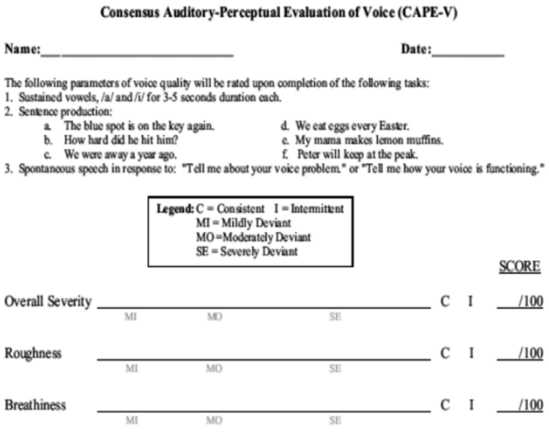
Prior to Voice Therapy

- Assessment by ENT and speech-language pathologist
- Laryngeal assessment
  - Endoscopic/rigid exam
    - Rule (confirm) out laryngeal pathology
- Acoustic assessment
- Aerodynamic assessment
- Perceptual assessment

CAPE-V



Consensus Auditory-Perceptual Evaluation of Voice (CAPE-V)

Name:_____ **Date:**_____

The following parameters of voice quality will be rated upon completion of the following tasks:
1. Sustained vowels, /a/ and /i/ for 3-5 seconds duration each.
2. Sentence production:
   a. The blue spot is on the key again.
   b. How hard did he hit him?
   c. We were away a year ago.
   d. We eat eggs every Easter.
   e. My mama makes lemon muffins.
   f. Peter will keep at the peak.
3. Spontaneous speech in response to: "Tell me about your voice problem." or "Tell me how your voice is functioning."

Legend: C = Consistent I = Intermittent
MI = Mildly Deviant
MO=Moderately Deviant
SE = Severely Deviant

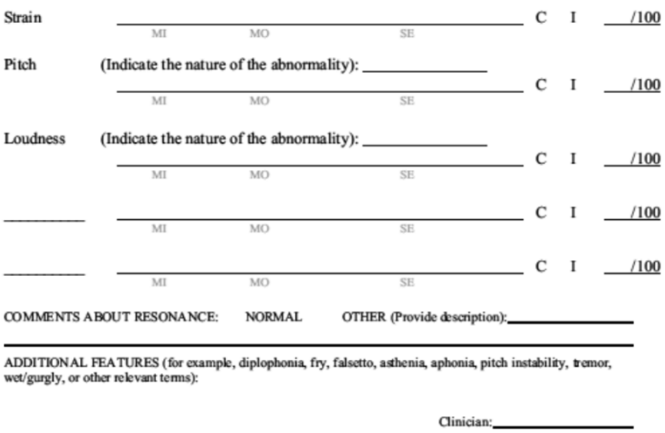
SCORE

Overall Severity _____ C I ___/100
MI MO SE

Roughness _____ C I ___/100
MI MO SE

Breathiness _____ C I ___/100
MI MO SE

CAPE-V



Strain _____ C I ___/100
MI MO SE

Pitch (Indicate the nature of the abnormality): _____
_____ C I ___/100
MI MO SE

Loudness (Indicate the nature of the abnormality): _____
_____ C I ___/100
MI MO SE

_____ _____ C I ___/100
MI MO SE

_____ _____ C I ___/100
MI MO SE

COMMENTS ABOUT RESONANCE: NORMAL OTHER (Provide description):_____

_____

ADDITIONAL FEATURES (for example, diplophonia, fry, falsetto, asthenia, aphonia, pitch instability, tremor, wet/gurgly, or other relevant terms):

Clinician:_____

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VHI and pVHI

- Voice Handicap Index
- Questionnaire that allows a patient (VHI), parent and older children (pVHI) an opportunity to reflect on voice
- How does it impact their quality of life with relation to the following domains (e.g., social emotional, physical, general)
- Provides treating therapist with insight into readiness for therapy.

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Listening Exercise

What does it sound like to you?

Voice Therapy

Voice Therapy

- Purpose

  To restore the best possible voice that is functional for overall communication.

Factors to Consider:

- Goals for therapy are developed with family
- Commitment to attending sessions
- Keeping family engaged at therapy session and at home
- Challenges amongst pediatric population
- Fatigue and frustration
- Colton, R.H., Casper, J.K., Leonard, R (2006) Understanding Voice Problems.

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Voice Therapy

- Semi Occluded Vocal Tract Exercises (SOVTE)
- Vocal Function Exercises (VFE)
- Resonant Voice Therapy (RVT)

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Common Materials Needed

- Straws varying in diameter
- Water bottles
- Kazoo
- Cups
- Pitch pipe/piano keyboard

Semi-occluded Vocal Tract Exercises (SOVTE)

- Create constriction of the vocal tract.
- Less mechanical trauma placed on vocal folds and heighten interaction between glottis and supraglottal tract (source and filter)
- Intraoral pressure increases with occlusion towards front of mouth.
- Improve the relationship between the supraglottal and intraglottal pressure.
- Examples include: Lip trills, Lip buzzes,Tongue trills, Bilabial fricatives, phonation into straw

- Titze, Ingo. Voice Training and Therapy with a Semi-Occluded Vocal Tract: Rationale and Scientific Underpinnings, Journal of Speech, Language, and Hearing Research, 49, 448-459.

SOVTE Examples

Voice Therapy with Play

- 5 year old male, nodules, has history of various phonotraumatic behaviors, vocal abuses (grunting, superhero voices), seasonal allergies and post nasal drip
- Demonstration of lip buzzes and glides with cartoon activity embedded

Voice Therapy with Play

Lip Buzzes and Glides

Glides Through Play

Tongue Trills

Semi-occluded Vocal Tract Exercises

- From greatest to least occlusion
- Small stirring straw →, regular drinking straw → bilabial voiced fricatives →lip or tongue trills →nasal consonants → vowels /u/ and /i/.

SOVTE Demonstration: small stirring straw

SOVTE Demonstration: wider drinking straw

SOVTE Demonstration: wide milkshake straw

Front Focus Voicing

Voice therapy with SOVTE

- Etiology of patient
- Phonotraumatic behaviors (shouting during baseball game)
- Demonstration of front focus voicing into cup
- Demonstration of lip buzzes with cup removed from mouth and sustained voicing
- Use of second vibration source → lowers ratio between fundamental and first formant frequency and facilitating easy phonation.

- Andrade, P.A., Wood, G., Ratcliffe, P., Epstein, R., Pijper, A., Svec, J.G. (2014). Electroglottographic Study of Seven Semi-Occluded Exercises: LaxVox, Straw, Lip-Trill, Tongue-Trill, Humming, Hand-Over-Mouth, and Tongue-Trill Combined with Hand-Over-Mouth. Journal of Voice, 28, 589-595.

Combined SOVTE

Combined SOVTE

Combined Lip Buzz and Glide

Vocal Function Exercises

Purpose: To improve the three subsystems of voice production (breath support, phonation, resonance)

- Sustaining /i/ with nasal focus- warm up, targets maximum phonation time (MPT)
- Whoops (glide up) can use “whoop or knoll” or tongue/lip trill- stretching VF
- Booms (glide down) can use “boom or knoll” or tongue/lip trill- contracting without pitch breaks
- Sustain musical notes (male/female) on word ‘ol’ - Power building and adductory power

• Guzman, M., Angulo, M., Munoz, D., Mayerhoff., R (2013). Effect on long-term average spectrum of pop singers’ vocal warm up with vocal function exercises. International Journal of Speech-Language Pathology, 15, 127-135.

Vocal Function Exercises

- Case study amongst pop singers.
- Improvement reported with singing power ratio and spectral slope. Less observed difference between energy of lower harmonics and higher harmonics.

Sustaining /i/ on note D

Whoop

Boom

VFE: Power Building

VFE: Note B

- Add clips of child holding an A, B, C

Targeting MPT through play

Resonant Voice Therapy (RVT)

- Designed for patients with hyper or hypo-adducted voice disorders
- Emphasis on forward placement and voicing sensation in palate, tongue and lips.
- Reduces force of vocal folds during adduction
- Consists of 8 steps
- Demonstration of steps 1-6

- Colton, R.H, Casper, J.K, Leonard, R. (2006) Understanding Voice Problems: A Physiological Perspective for Diagnosis and Treatment.

Step 1

- Say the word ‘home’ starting with higher pitch going to lower pitch then maintain a monotone voice with a comfortable pitch
- Use of extra breath support to maintain
- Have patient practice chanting hum and attempt to identify where they feel tickle

Demonstration Step 1

Step 2

- Saying the word “moam” or “molm” varying the rate.
- Saying the word “moam” or “molm” varying the intensity/volume.

Demonstration Step 2

Step 3

- Use the word “moam” or “molm” to produce sentence-like intonation patterns.
- Vary pitch and rate

Demonstration Step 3

Step 4

- Recital of child friendly sentences with nasal phonemes embedded.
- Sentences demonstrated: 1) My monster munches muffins 2) Mom will you make me monster muffins.
- Nasal emphasis
- What's happening?
  - Occlusion at the lips and opening of velar port
  - ↑ supraglottal pressure and ↓ intraglottal pressure.

Demonstration Step 4

Monotone to inflected-puppets

Additional demonstration of Step 4 chanting phrases.

- 9 year old
- Laryngeal edema
- Cobblestoning in interarytenoid area
- History of excessive talking, singing loud, eats spicy food
- Medical management included reflux medication,
- Monitoring vocal hygiene, front focus voicing, RSVT therapy

Videostroboscopy of 9 year

Step 5 Mama Papa

- Say mamapapa- mamapapa with comfortable pitch
- Vary the rate
- Vary the intensity

Demonstration Step 5

Step 6: Chanting of phrases

- Say the following phrases with a comfortable pitch:
  1. Mom may put Paul on the Moon.
  2. Mom told Tom to copy my manner.
  3. My manner made Pete and Paul mad.
- Second, say with extra inflection
- Transition into a natural speech-like manner

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Demonstration Step 6

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Steps 7-8: Forward Focus- structured/unstructured

- Step 7- Say the following phrases with a forward focus tone of voice:
  - All the girls were laughing
  - Get there before they close
  - Did you hear what she said?
  - Come in and close the door
- Second, say with extra inflection
- Transition into a natural speech-like manner
- Step 8- Produce unstructured phrases with a forward focus tone of voice and natural speech-like manner

Factors leading to poor vocal Hygiene

- Phonotraumatic behaviors
  - (e.g., screaming, grunting, making superhero voices/animal sounds, squeaking, hard glottal attacks, frequent throat clearing and coughing, excessive talking)
- Reduced water intake, increase in caffeinated drinks
- ↓ hydration suggests ↑ tissue viscosity (resistance to flow), more subglottic pressure needed for voicing.
- Smoking and alcohol- dehydrating to vocal folds
- Environment- Pollutants (e.g., dust, smoke, pollen, ragweed)
- Verdolini, K., Min, Y, Titze, I.R., Lemke, J., Brown., K (2002). Biological Mechanisms Underlying Voice Changes Due to Dehydration. Journal of Speech, Language and Hearing Research, 45, 268-281.

Parent Education

- Emphasize importance of practice to see results
- Educate family and child on how voice is produced
- Reduce/eliminate phonotraumatic behaviors
- Taking turns to talk at dinner time, other settings
  - Talking stick
- Replace loud volume (screaming/yelling) with more appropriate volume
- Animal noises and grunting sounds- attempt to replace with lip buzzes, whistles, horns, hums.
- Humidifier

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Parent Education

- Counsel on importance of vocal hygiene
- Emphasize importance of hydration
- Monitor use of caffeinated drinks, medication that is dehydrating to vocal folds, foods which could result in irritation and reflux.
- Common medications include: antihistamines, stimulants for Central Nervous System (e.g. Adderall), anti-asthmatic/bronchodilator, anti-anxiety, antidepressant, steroid nasal sprays, nasal decongestants.
- Drink ½ of body weight in ounces (e.g., 50 lb child would drink 25 ounces)
- Research suggesting ↑ water suggests ↓ in phonation threshold pressure, subglottic pressure needed for voicing
- Monitor urine color

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Reading Sample recording

- LOS ANGELES –Clayton Kershaw dominated again Monday night at Dodger Stadium, firing a two-hit shutout in a 1-0 Dodgers win over the Reds, whose losing streak reached eight. With a third shutout (all this month), Kershaw is 7-1 with a 1.48 ERA, 5-0 in May, and the Dodgers have won nine of his 10 starts this season.
- Prior to therapy clip

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Parent Education- benefits of therapy

- Post therapy recording

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Cape V: Prior to Therapy

- 12 year old pt has bilateral vocal fold lesions
- Acute onset of hoarseness
- No prior history of hoarseness, allergies, reflux, etc

Cape V: Post 6 weeks of therapy

- Front Focus
- Resonant voice
- Good attendance

Consultation with other professionals

- Communication with ENT
- Communication with family and teacher about vocal hygiene and monitoring voice
- Discuss practice and attendance
- Would patient be good candidate for surgery (cysts, polyps, etc)?
- Vocal rest- factor age, personality, involvement in school
- Factor dedication to practice.

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Questions

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