Pediatric Voice Therapy: Evidence Based Practice... and Everything Else

SHERRI K. ZELAZNY, MA RSLP, CCC-SLP
REGISTERED CLINICAL SPEECH LANGUAGE PATHOLOGIST
SURREY VOICE CLINIC AT ABILITIES NEUROLOGICAL REHABILITATION
SURREY, BC

Evidence Based Practice

“The term evidence-based practice refers to an approach in which current, high-quality research evidence is integrated with practitioner expertise and client preferences and values into the process of making clinical decisions.”


Establishing Scientific Evidence (Challenges of Clinical Research)

Prioritizing of clinical research questions,
Divide between clinical research and clinical practice,
The globalization of clinical trials,
Issues of paying for clinical trials,
Narrow incentives for practitioners to participate in clinical research,
Shrinking clinical research workforce,
Difficulties of navigating administrative and regulatory requirements,
Recruitment and retention of patients.

External Scientific Evidence

Randomized, double-blind, placebo controlled studies

Seeking out scientific evidence

- Systematic Reviews
  - ASHA’s Evidence Maps (http://ncepmaps.org)
  - ASHA/N-CEP’s Compendium of Guidelines and Systematic Reviews
- Cochrane Collaboration
- Campbell Collaboration
- What Works Clearinghouse (U.S. Department of Education)
- Psychological Database for Brain Impairment Treatment Efficacy
- speechBITE™ Speech Pathology Database for Best Interventions and Treatment Efficacy
- Evidence-based Communication Assessment and Intervention (EBCAI) Journal

Challenges of Clinical Research

We’re human...and so are our patients/clients/kids
ASHA Evidence Map
http://ncepmaps.org

Clinical decision making
Ability to make clinical judgement is what makes you a clinician.

What are the communication priorities?
What is medically important?
What is socially important?
What if we do nothing?

Seeking out scientific evidence

Individual studies
- Online bibliographic database
  - MEDLINE: the world's largest online bibliographic database of health related studies.
    - MEDLINE cites over 12 million articles from 4,000 peer-reviewed journals.
  - publication in a peer-reviewed journal is not a guarantee of scientific quality
  - CINAHL®: Cumulative Index to Nursing and Allied Health Literature, is valuable. Although
    - CINAHL® is more likely than MEDLINE to contain studies with negative findings
  - Gray literature: term given to the body of research that is not published in peer-reviewed
    - literature:
      - technical reports, conference proceedings, testimony and other unpublished evidence.
      - typically done through conversations with content experts, relevant professional
        groups/organizations, and internet search engines.

Client Preferences
Who is this kid/client/patient?

What is important to the individual/family?

What other concerns are present?
Communication disorder, behavioural issues, getting to therapy
sessions, siblings, attitude of parents, etc...

Clinical Expertise
Education: past, present, future

Experience
- Life experience
- Clinical experience
- Educational experience
- Role models
- Resources

EBP Summary
Recognize the needs, abilities, values, preferences, and interests of individuals and families
Integrate those factors along with best current research evidence and clinical expertise
Maintain the knowledge and skills that are necessary to provide high quality professional
services.
Evaluate prevention, screening, and diagnostic procedures, protocols, using recognized criteria
described in the evidence-based practice literature;
Evaluate the efficacy, effectiveness, and efficiency of clinical protocols for prevention, treatment,
and enhancement using criteria recognized in the evidence-based practice literature;
Evaluate the quality of evidence appearing in any source or format,
Monitor and incorporate new and high quality research evidence having implications for your
clinical practice.
EBP Summary (Montgomery, 2003)

“Statistically significant" is not synonymous with “clinically meaningful.”

“Clinical judgement is ALWAYS required,”

“Randomized controlled trials may either be impractical (if not impossible), or inappropriate for answering clinical questions,”

“No substitute for clinical experience in choosing what is appropriate for an individual patient.”

Any studies on effectiveness of pediatric voice therapy?

Yes

EBP Summary

EBP is a continuing process, it is a dynamic integration of ever-evolving clinical expertise and external evidence in day-to-day practice.

Voice Therapy efficacy

Lee and Son (2005) found improvements in perceptual analysis (GRBAS), pitch, and jitter, shimmer and noise-to-harmonic ratio in children with hyperfunctional voice disorders (mostly nodules)

Mori and Hirano retrospective of 179 children (reported in Hirschberg 1995) found that of these (mostly nodules, 12 with polyp):

- 6% improved with vocal hygiene alone (30 nodules, 1 polyp)
- 40% who had therapy improved (78 nodules, 2 polyps)
- At 7 month follow-up
- 89% of surgery patients improved (9 polyp, 2 nodules)
- After puberty
- 67% of vocal hygiene alone showed improvement
- 86% of Ramig showed improvement
- 91% of surgery showed improvement

Ramig and Verdolini (1998) reviewed the literature – at that time - In children, both vocal hygiene and direct therapy programs were found to improve voice quality.

Tezcaner et al. (2009) found post-therapy improvements in jitter, shimmer, noise-to-harmonic ratio and perceptual (GRBAS) assessment in a study of 39 children with nodules age 7-14. Therapy consisted of both indirect (vocal hygiene, reduce vocal abuse) and direct (relaxation, resonant voice, accent method) – but therapy strategies not consistent.

Trani et al. (2006) in 16 patients age 6-11, with different pathologies (nodules, cyst, scar) noted improvement in perceptual assessment (GRBAS), no statistically significant changes in objective assessments, but a trend toward improvement. Type of therapy was not described.
Voice
When a child's vocal anatomy and physiology are normal, and they are not under some kind of threat, they will talk and sing if they have heard other people do so.

Campbell 1998; Duchan, 1994

Pediatric Dysphonia
1-23% of children have a voice problem

General acceptance of research numbers – 6-9%

Issues in measurement of pediatric dysphonia:
- Lack of consistency of measurement
- Variability in listener judgment

The prevalence of pediatric voice and swallowing problems in the United States.

An estimated 839 ± 89 thousand children (1.4% ± 0.1%) reported a voice problem.
Overall, 53.5% ± 1.9% were given a diagnosis for the voice problem and 22.8% ± 4.6% received voice services.
Laryngitis (16.6% ± 5.5%) and allergies (10.4% ± 4.0%) were the most common diagnoses.
A total of 16.4% graded the voice problem as a "big" or "very big" problem.


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Effects of voice therapy in school age children.

Akin Şenkal O, Çiyiltepe M.


OBJECTIVES:
To assess the overall efficacy of voice therapy for dysphonia in school-age children in two different cities in Turkey.

STUDY DESIGN:
Retrospective cohort study.

METHODS:
Ninety-nine outpatients aged 7-15 years with persistent hoarseness for at least 2 months as a primary symptom. Ratings of the Grade, Roughness, Breathiness, Asthenia, and Strain (GRBAS) scale, s/z ratio, and maximum phonation time (MPT). Voice therapy outcome data collected on three types of voice therapy (physiological, hygienic, and symptomatic).

SETTING:
Outpatient clinics in university hospitals in two different cities in Turkey.

CONCLUSIONS:
Vocal nodules were the main cause of the school-age children’s voice problems, accounting for 62.6% of the cases. Different types of therapy techniques could be used in conjunction with general recommendations for voice care. Subjective voice ratings such as GRBAS, s/z ratio, and maximum phonation time (MPT) voice therapy outcome data collected on three types of voice therapy (physiological, hygienic, and symptomatic).

Perceptions of Dysphonia

Sick
Sad
Unpleasant
Ugly
Dirty
Cruel
Bad
Worthless
Dishonest

Vocal Fold Anatomy
Gross Anatomy of the Larynx
- Cartilaginous structures
- Muscles
- Bone (1)

Layer Structure of Vocal Folds

Cover
- Epithelium and superficial layer of lamina propria
- Least stiffness
- Most movement – vibrates most markedly during phonation
- Source of visible mucosal wave/upheaval
- Pliability of this layer is largely responsible for clear voice production

Transition
- Intermediate and deep layers of lamina propria
- Intermediate stiffness
- Intermediate movement
- Contributes to maintenance of longitudinal stability during phonation
Layer Structure of Vocal Folds

Body
- Vocalis/thyroarytenoid muscle
- Most stiffness
- Least movement
- Responsible for maintenance of oscillation and vertical stability during phonation

Disruption in the relationship of these layers will result in a voice disorder.

Vocal Fold Development

Infant larynx
- Layer structure is absent
- No vocal ligament is found [intermediate layer of the lamina propria, which is made up primarily of elastic fibers and the deep layer of the lamina propria, which is made up primarily of collagenous fibers.]
- 51% of collagen found in the adult larynx

Layer Structure of Vocal Folds

Each layer must maintain these independent properties for clear voice production

Disruption in the relationship of these layers will result in a voice disorder.

Vocal Fold Development

Young child:
- Structure of superficial vs. deep layers appeared in children > 10 years
- Absence of superficial layer/layer structure for children < 10 years may result in severe mechanical stress with increased voice use.
- May correspond to period of so-called "pediatric hoarseness."
- Vulnerability may also be attributed to vascular immaturity

Vocal Fold Development

Teenage years:
- Differentiation of superficial and deep layers (vocal ligament)
- Emergence of mucosal wave
- Increased ability to tolerate impact stress during phonation
- Layer structure
- Increased % of collagen
- Prepubertal female laryngeal dimensions are closer to adult size than male counterparts, suggesting less growth per unit time during puberty
**Vocal Fold Development**

**Puberty**
- Laryngeal cartilages grow faster in males than females
  - 3x faster in males than females
  - Absolute growth in height, width and length of thyroid and cricoid cartilages greater in males than females
  - Male membranous vocal fold undergoes over twice the growth of the female VF

**Geriatric larynx**
- Decrease in lamina propria thickness
- Increased collagenous fibers
- Increased F0 in males with aging
- Decrease in F0 for females with aging
  - May be due to estrogen changes with menopause
- Vocal muscle thins as does other skeletal muscle

**Male voice change with puberty:**
- Decreased stability with larger changes in growth (vs. females) of cartilages and muscle
- Fluctuations in pitch may be due to diminished control of longitudinal tension in vocalis.
- Fundamental frequency drops
- Increased density of collagen, which changes mass of the vocalis
- Layer structure becomes more defined and adult-like
- Growth of resonating chambers of pharynx, nose and face

**Gender differences**
- Males have longer vocal folds
- Males have higher % of collagen
  - Infers that males can take more impact stress
- Males have larger cartilages

**Normal pediatric larynx**
- The larynx is higher in children than in adults, with the hyoid bone found at the C2-3 level in the youngest children (newborn to 2 years).

  The subglottic airway is narrowest in the youngest children.

  The hyoid bone was the only laryngeal structure ossified in any of the children. A thin line of high density was seen in the expected location of the thyroid cartilage in some children.

  Hudgins et al, 1997

- Uncalcified laryngeal cartilaginous structures.
  - The supraglottic airway contour is triangular or oval, the glottis was shaped like a teardrop, and the subglottic contour was oval.

  Hudgins et al., 1997

- The subglottic airway increases considerably in size during the first 2 years of life (from 13 to 28 mm). Further growth seems to follow a linear mode.
Normal pediatric larynx

The cartilaginous glottis accounts for 60 to 75% of the vocal folds' length in children under two years of age.

The anterior ligamentous part of the glottis outsizes its posterior cartilaginous portion during the third year of life.

Eckel et al, 2000

Summary of differences in pediatric larynx

<table>
<thead>
<tr>
<th>Size</th>
<th>Position</th>
<th>Consistency</th>
<th>Shape</th>
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Voice Disorder

Change in:
- Quality
- Resonance
- Pitch
- Loudness
- Effort

Negative impact on:
- Communicative effectiveness
- Social development
- Scholastic performance
- Self-esteem

Production of Sound

Subglottic pressure
Supraglottic pressure
Glottic closure
Glottic tension
Mucosal wave
Shaping of sound

Onset of Pediatric Dysphonia

Since Birth
- Congenital
- Neurologic

After Birth
- Anatomic
- Neurologic
- Neoplastic
- Inflammatory
- Infectious
- Iatrogenic

Pediatric Dysphonia

Kids are susceptible to the same voice disorders as adults
- Nodules (bilateral)
- Cysts
- Polyps
- Edema
- RRP
- Irritable larynx
- Chronic Cough
- Paradoxical Vocal Fold Motion

- Subglottic Stenosis
- Muscle tension dysphonia
- Vocal fold paralysis
- Laryngoal web
- Laryngomalacia
Typical pediatric laryngeal pathology

Subglottic stenosis
Nodules
Laryngomalacia
Dysphonia without pathology
Vocal fold paralysis

Dobres, et al. 1990

History

Complete case history
- Pregnancy and birth
- Developmental
- Other medical issues
Date of onset
- Since birth
- New onset
Associated difficulty
- Swallowing
- Breathing

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Pediatric Voice Team

Pediatric ENT
PCP/Pediatrician
Speech Language Pathologist

Pediatric Asthma/Allergy Specialist
Pediatric Pulmonary Specialist
Pediatric Gastroenterologist
Pediatric Neurologist

Vocal hygiene questions

Evidence of:
- Yelling
- Screaming
- Making odd noises with voice
- Extreme emotions

Behaviour patterns:
- Activity level
- Sleeping
- Eating
- Siblings

Evaluation of Pediatric Dysphonia

History
Baseline data
Visualization
Diagnosis

History

Signs/Symptoms of reflux
- burning in throat
- Burping
- "owie" burps
- lump in throat
- MTU’s (Mini throw ups)
- coughing
- throat clearing
- worse at night or morning
Laryngopharyngeal Refux and Children

http://www.entnet.org/?q=node/1455

Chronic cough
Hoarseness
Noisy breathing (stridor)
Croup
Reactive airway disease (asthma)
Sleep disordered breathing (SDB)
Spit up

Feeding difficulty
Turning blue (cyanosis)
Aspiration
Pauses in breathing (apnea)
Apparent life threatening event (ALTE)
Failure to thrive (a severe deficiency in growth such that an infant or child is less than five percentile compared to the expected norm)

10/15/2014
10

BCASLPA 2014

Various studies

- 62% of hoarse children
- 72% of children with otolaryngologic symptoms
- 70.5% of children with hoarseness for more than 6 months.

Behavioural management

Medical management

- H2Blockers
- PPI
- Typical recommendation
  - 5 month prescription, 1-2x daily, 10-20mg [dependent on weight] 30 minutes before dinner, or, 30 minutes before competition/physical exercise.

Laryngopharyngeal Reflux and Hoarseness

Instrumental/Non-instrumental Voice Assessment

Perceptual assessment

- Pediatric Voice Handicap Index
- Pediatric Voice Outcomes
- Pediatric Voice Related Quality of Life
- GRBAS
- CAPE-V

Other acoustic parameters if you have the equipment/software

- Fundamental frequency
- Frequency range
- Intensity range
- Jitter

Free Acoustic Software:
http://www.fon.hum.uva.nl/praat/

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Geriatric Voice Handicap Index (PVHI)

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Pediatric Voice Handicap Index

Pediatric Voice Outcomes Survey

S/Z ratio
Audio recording
Video recording

GERD and Asthma

Allergy/Asthma history

- 50-60% incidence of GERD in children with asthma
- May cause, aggravate or trigger bronchial obstruction

Symptoms

- Hoarseness
- Sore throat
- Thoracic pain
- Cough
- Wheezing

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Pediatric Quality of Life

“The PVRQOL is a more comprehensive survey than the previously validated Pediatric Voice Outcomes Survey and is another valid instrument to examine the health-related quality-of-life issues in pediatric voice disorders.”

GRBAS scale

Hirano, 1981

“Simple, reliable measure for clinical use.”

- Grade
- Roughness
- Breathiness
- Asthenicity
- Strain

Scale of 0–3

Example: G3R2B3A3S2

The rating is made by assessing current conversational speech or when reading a passage.

Laryngeal Visualization

DO NOT TREAT WITHOUT IT

Assessment of Structure

Halogen light
- Gross assessment of laryngeal structure
- Color of laryngeal tissue
- Symmetry of arytenoid complex
- Signs of LPR
- Edema – particularly of the infraglottic edge
- Described in literature as “pseudosulcus”

Assessment of Function

Xenon/Stroboscopic light
- Arytenoid movement
- Pliability of vocal fold mucosa
- Edge pliability
- Mucosal wave/mucosal upheaval
- Adynamic segments
- Glottic closure pattern
- Symmetry
- Open/Closed Quotient
- Hyperfunction
Flexible Fiberoptic Nasendoscopy

Important to have right equipment - infant and pediatric flexible endoscope

Important to have knowledge and skills necessary for airway evaluation

Flexible Endoscopy

- Allows view of the infant and pediatric larynx
- Allows view of entire larynx and nasopharynx
- Images during connected speech

Smaller overall laryngeal image
- Cannot always see stroboscopic assessment
- May miss small pathologies
- About 40% of laryngeal pathologies are missed with flexible endoscopy when stroboscopic light is not used

Clinical Assessment Questions

1. Is the child’s vocal quality what you would expect given how the laryngeal tissue functions?
2. Is the child using more effort than needed to produce
3. Is there a role for the SLP when the laryngeal tissue appears severely-profoundly permanently damaged?

Flexible vs Rigid

Flexible
- Birth to 8
- Complete upper airway exam
- Velopharynx
- Optics not as good

Kids will surprise you! And so will the teenagers!

Rigid
- 8 and up
- Depends on anatomy
- Great optics
- Larynx Hypopharynx
- Not tolerated by some

Endoscopic Assessment

Rigid endoscopy
- Allows increased magnification of the larynx
- Better able to see mucosal wave if light is adequate
- Better able to see laryngeal detail for more accurate diagnosis of disease (MD) and laryngeal function (SLP)
- Can only assess phonation on sustained /i/

Is the child’s vocal quality what you would expect given how the laryngeal tissue functions?

Yes - your therapy goals may target:
- Reducing effort
- Reducing phonotrauma
- Improvement of laryngeal tissue, e.g., nodules, cyst, edema
- Preservation of laryngeal tissue, e.g., hemorrhage
Is the child's vocal quality what you would expect given how the laryngeal tissue functions?

No, the voice is worse than it should be.
- Presence of muscle tension, or, something you can't see. Your therapy goals should reflect the physiological change targeted in therapy that will bring about clearer voice.

No, the voice is actually better than expected given the condition of the vocal folds.
- Is there medical concern about what is there? You may be able to build on established functional compensatory behavior.

Is the child using more effort than needed to produce voice?

This may be a second therapy goal, or

This may be just as important as clearer vocal quality.

The perception of effort is a sensitive measure of improvement in therapy.

Can you differentiate effort vs. strain?

Options for treatment

Do nothing
- Vocal hygiene alone
- Medico-surgical management
- Behavioural Voice therapy

Is there a role for the SLP when the laryngeal tissue appears severely/profoundly permanently damaged?

Occasionally, there is little hope of improving vocal quality, e.g., scarring, repeated DMLs for RRP.

Decreasing effort in spite of this may dramatically improve the child's quality of life even if vocal quality does not improve.

Do nothing
- No medical complications
- Not having an impact on life
- Family or child does not wish to pursue
- Anticipate limited compliance (very hard to judge)
Vocal hygiene alone

- At least one session with parents/caregivers
- Provide written material
  - Pleasing to the eye
  - Easy to read
- Bring back for re-evaluation in 12 weeks
- May have phone contact with family
- Always leave open option for treatment

Behavioural voice therapy

**Ages 1-4**
- Behavioral management of communication environments by parents, caregivers
- Education of parents regarding
  - Voice use and vocal hygiene
  - Level of emotions while speaking (parent and child)
  - Encouraging quiet time
  - Education of siblings for support
  - Importance of communication

**Age 4 and older**
- (some exceptions to this guideline)
- 6-8 sessions
- 50 minutes each
- Weekly at first, then spaced out further
- Begin with basic exercises, gradually build to conversation
- Home practice is important!
- Collaboration with any other speech pathologists involved

Medico-surgical management

- Extremely rare,
- Airway compromise,
- Recommend complete course of voice therapy prior to any phonosurgery,
- Requires at least 24 hours of voice rest and 1-2 weeks of voice conservation,
- Risk for scar tissue
- Risk for recurrence.

Physiologic-Based Treatment

Developing treatment plans that state the targeted physiologic changes needed to improve voice quality distinguishes SLP expertise from physicians.

Behavioural voice therapy

The child, the family and the speech language pathologist must:

- Understand the diagnosis
- Understand the impact of the voice disorder on communication
- Be Motivated, Cooperative and Reliable
- Be COMPLIANT!

Physiologic goal

- Improve glottic closure pattern from persistently (or inconsistently) incomplete to complete during sustained /l/ as assessed with videostroboscopy.
Hourglass Glottic Closure

Physiologic goal:

- Patient will improve glottic closure pattern by closing the membranous vocal fold edges completely during phonation as assessed during phonation with videostroboscopy.

Include goals specific to the child

Decrease/eliminate
- Shouting
- Animal noises
- Muscle tension
- Throat clearing

Improve shouting technique
- Lessac “Call”

High Closed Quotient-Pressed Voice

Physiologic goal:

- Restore open/closed quotient to expected ratio (70/30) during phonation as assessed with videostroboscopy

Laryngeal Edema

Physiologic goal:

- Restore straight glottic margins and discrete edge pliability and mucosal wave as assessed during phonation with videostroboscopy.

Visual biofeedback

Review examination with the child and parents.
Explain why laryngeal findings cause hoarseness.
Explain risks of lesions.
Reassure it is not cancer or other life threatening problem.
Help child and parent understand short and long term benefits of behavioral therapy and empiric treatment for reflux.

Treatment

Include goals specific to the child

Decrease/eliminate
- Shouting
- Animal noises
- Muscle tension
- Throat clearing

Improve shouting technique
- Lessac “Call”
Challenge with kids

Some children may not ever have had normal (not hoarse) voice production.

Hydration

WHAT WE KNOW

- Dehydration of the vocal folds increases phonation threshold pressures
- Some evidence for increased systemic and superficial hydration in promoting laryngeal health
- In bench models, hydration treatments may optimize vocal fold biomechanical properties
- In human subjects, investigations on the beneficial phonatory outcomes of current hydration treatments (e.g., increasing water intake, humidifying ambient air, nebulizing solutions into the airway) have revealed positive trends of varying degree.

WHAT WE DON'T KNOW

- What clinical recommendation is the best?
- Is there an optimal treatment that has sustained, beneficial effects on voice?
- Is hydration, systemic or superficial, prophylactic or therapeutic?

Hydration

SYSTEMIC HYDRATION

- Internal hydration of the entire body that keeps the skin, eyes, and all other mucosal tissue healthy.

Important:

- 6-8 glasses of water per day

SUPERFICIAL HYDRATION

- The moisture that keeps the epithelial surface of the vocal folds slippery enough to vibrate easily

Hydration Recommendations

Combination of systemic and superficial hydration methods

- Systemic hydration is good for all bodily systems
- Superficial hydration
  - Increase ambient humidity
  - Get mouth to water to activate mucus secreting system
  - Hard candies
  - Wet snacks
  - Mucolytic
  - Steam inhalation
  - Nebulizer

Superficial Hydration

- Evaluated the effects of three laryngeal lubricants on phonation threshold pressures
  - Mannitol, Nebulized water, and Entertainer’s Secret Throat Relief
  - Mannitol, which encourages osmotic water flux superficially, decreased PTPs

- Oral breathing increases the vocal fold thickness by superficial drying of the vocal fold mucosa
  - Results – subjects demonstrated increased PTPs after 15 minutes of oral breathing

Verdolini-Morton, Titze, & Drucker (1999)

Verdolini, Titze, and Fennell (1994)

Verdolini, Sandage, and Titze (1994)

New summary articles:

- The role of hydration in vocal fold physiology
Therapy Approaches

• Depends on pathology (structure)
• THINK PHYSIOLOGY (function)
• Often a combination of strategies
  - Stretching/relaxation
  - Diaphragmatic Breathing - Belly breathing
  - Forward focus/resonant “buzzy” voice/Flow mode
  - Semi-occluded vocal tract exercises
  - Vocal function exercises
  - Voice building/LSVT (hypofunction)

Relaxation and breathing exercises

• Teach parents and recommend daily practice.
  - Blow up chest like a balloon then let the air out of the balloon, s-l-o-w-l-y-y-y-y-y-y-y-y
  - Hiss like a snake to let the air out
  - Rag doll relaxation
  - Feathers/Paper blowing contests
  - Physical stretching-head and neck release
  - Yawn-sigh

Resonant Voice: Hierarchy of Targets

Lip trills— a good warm-up
Mmm
Sustained, pitch glides
M+ vowels, repeated
/mamama/, /numumum/, /nimimim/
Chanted and exaggerated prosody can help bridge to natural production
M+ initial words, phrases

/u, /v/ vowels and additional nasals will facilitate
moon, noon, mean, mom, money, mine
Single syllables will be easier
Careful of glottal fry at ends of words/phrases
Prolong /m/ to feel “buzzy voice”
Use nasals at end of word to sustain forward focus

Resonant Voice: Hierarchy of Targets

Voiced continuants (/v, z, n, c, /-ng/)
Sustained, pitch glides
Positive/negative practice helps with these
Voiced continuant loaded words, phrases
/u/ vowels and /m, n/ will be facilitators room, vacuum, lion, zoom, lemon, etc.

Resonant Voice

Immediate need for real world applications of “buzzy voice”
Begin addressing carry-over ASAP
Ideas for this:
  - Imagination—find a name for the forward voice
  - Start pointing out spontaneous use of clear/scratchy, buzzy/not buzzy in conversation
  - Family member names
  - Functional sentences
  - Embedding targets in session activities (i.e., memory with /m/ cards, Guess Who, reading, 20 questions)

Resonant Voice

Child as clinician
  - Immediately begin training self-judgment skills
  - Improve sensory awareness, imagery
  - Children will require more direct feedback than adults
  - Identification of clinician productions
  - Positive/negative practice
  - Self-judgments of productions
  - Rating scales
SOVT (semi-occluded vocal tract)

- Lip trills
- Tongue trills
- Straw phonation
- Lax Vix
- Kazoo buzz
- Card buzz
- Cup buzz
- Cave buzz
- Straw bubbles
- "Buzzy" humming

Vocal Function Exercises (Stemple)

"A series of direct, systematic voice manipulations (exercises), similar in theory to physical therapy for the vocal folds, designed to strengthen and balance the laryngeal musculature, and to improve the efficiency of the relationship among airflow, vocal fold vibration, and supraglottic treatment of phonation."

Increasing motivation (and compliance)

Physical motivators
- Less tired
- Less pain
- Feels good

Social/communicative motivators
- Ability to be heard
- Ability to be understood
- Sound like other kids
- Not teased

Increasing motivation

The COOL factor
- Princess voice, Superman voice, Motorboats

Functional reminders throughout the day
- Turkey baster
- Post-it notes

Limit parent criticism
- Assure them they don’t have to be the “Voice Police”
Childhood Singers

Singers may be significantly impaired by subtle laryngeal changes that may be considered within the normal range of variability in the general population.

Singers as athletes
- Using a higher percentage of total vocal ability

Adolescent Voice

Type of training
- Classical
- Musical theatre

The “Annie Syndrome”
- Belted
- Stressful laryngeal muscle use
- High collision
- Shearing forces on the vocal folds

Parental dynamics and expectations
- Enjoying singing vs. meeting parental hopes

Director dynamic and expectation
- Enjoying singing vs. meeting director wants/needs

Childhood singers

Motivation and compliance
- Willingness to explore
- More attuned to subtle changes?

Emotional concerns
- Consequences of dysphonia
- The connection of the voice to self-concept

Assessing the Singer

Adult vs. adolescent singers
- Fully developed vs. developing larynx

“Trained” vs. “untrained” singers
- Training varies widely
- Classical training or voice coaching?

Professional vs. avocational singers
- Demand on vocal mechanism
- Different stress levels (money, career, etc)
- Commitment is high in both groups

Childhood singers

If you have a child who is serious about singing:

Get a good voice teacher
- 1:1 training for technique and vocal hygiene

My Voice Book

EASILY ADAPTED FOR ANY AGE
My Voice Book

Anatomy and physiology
Vocal awareness
Vocal hygiene
Sensory awareness
Exercises

My lungs are like two sacks in my chest.

When I breathe in, they blow up like a balloon.

My vocal folds are two muscles in my throat.

Air from my lungs moves my vocal folds.
When my vocal folds move, they make a sound I call my voice.

I use my mouth, lips teeth and tongue to talk to people.

I have two bumps on my vocal folds that make my voice sound hoarse.

Vocal awareness and hygiene

Ages 1-4

I like to play outside.

Ages 1-4

I use my voice to talk to mom and dad.
I CAN STRETCH TALL

Vocal awareness and hygiene
Things I can do to help my voice.
Things I do to hurt my voice.
I know the places where I use my voice correctly.
I know the places where I use my voice incorrectly.
Games I can play with a quiet voice.
Changes we can make at home to help my voice.

I CAN BE RAG DOLL

I like to talk to...

I CAN DO EXERCISES TO KEEP MY VOICE HEALTHY

MOTOR BOATS

HUMMINGBIRDS
**Words to describe voices.**

- Smooth
- Rough
- Soft
- Loud

**Sensory Awareness**

- Things that are rough.
- Things that are smooth.

My voice feels good when...

My voice doesn’t feel good when....

**Things I do to help my voice**

**Some other ideas**

- Fishing game
- Sensory awareness tasks
- Voice use chart
  - Have the child generate activities
- Reinforcement chart
  - Have parents help with positive reinforcement
- Quiet time chart
  - Have the child generate activities
  - Maintain involvement of parents
Fishing game

Pretend to call mom with a loud voice.

Pretend to call mom with a soft voice.

Close your eyes and say...
Where do you feel your voice?
Hum with your lips closed tight.
Hum with your lips loose.
Which one felt better?
Which felt tight?

Voices chart

<table>
<thead>
<tr>
<th>Sun</th>
<th>Mon</th>
<th>Tues</th>
<th>Wed</th>
<th>Thurs</th>
<th>Fri</th>
<th>Sat</th>
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</table>

Quiet time chart

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
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Journal

Dependant on age
- Reflux symptoms
- When
- After what meal

- Voice awareness
- Better/worse in morning
- Muscle tension (whole body)

Journal - Stressful situations

- Who
  - Coaches
  - Teachers
  - Parents
  - Peers
- What
  - Homework
  - Sports
  - Classes
  - SCHEDULE!
Case example
8 year old boy adopted from Chinese orphanage
Bilateral true vocal fold nodules
Flexible fiberoptic nasendoscopy

Stickers for classmates
You have no choice, use your voice!
PROPERLY!
I Scream!
You Scream!
Don’t Scream!

Help Us OUT-
Please Don’t Shout
Your voice is a gift
Don’t Wear it out.

Initial evaluation

Post treatment visualization –

Treatment
Initial findings/concerns
- Hourglass closure
- Significant extrinsic muscle tension
- Impaired conversational intelligibility
- Voice breaks
- Voice loss

10 tx visits, including prep for class presentation
- Voice book for kids
- Great parental support
- Classroom presentation
- Examination presentation
- Vocal hygiene poster
- Stickers
- Tuna can/rubber band demonstration

Was therapy successful if the lesions are still there post treatment?
YES!
- Goals met:
  - Improved glottic closure
  - Decreased musculoskeletal tension
  - Improved vocal hygiene
  - Improved quality and intelligibility
  - Decreased aphonic breaks
  - Eliminated episodes of voice loss
Successful treatment of pediatric hoarseness

Complete investment and support of parents, caregivers.
- Home follow through
- School support
- Compliant with medication
- Compliant with therapy appointments
- Compliant with supporting home exercises
- Good voice models

Successful Therapy

Older kids
- Hoarseness must be having an impact on their life.
- Healthy voice production must be meaningful to the child
- Feels better
- Sounds better

Successful treatment

How important is voice to the child?
- Can you help explain importance of voice?
  - Participation in sports
  - Communication with friends
  - Singing
  - Theater
  - Pain/soreness/discomfort

Don’t shy away from voice therapy

Plenty of resources.

Have a good understanding of WHY the exercises work.

Very rewarding therapy for child and clinician.

Successful Therapy

Child aged 2-4 should have some very simple degree of understanding
- Right/wrong way to call mom in the house
- Inside/Outside voice

Advice to the SLP performing pediatric voice therapy from Maia Braden, Manager Pediatric Voice Therapy UW -Madison

Go beyond vocal hygiene
- Teach children healthy voice exercises
- Teach children a healthy way to use their voice
- Replace (rather than eliminate) unhealthy vocal behaviors

Help them develop a voice that is functional and comfortable. Once it FEELS easier, generalization becomes easier

You don’t need fancy equipment – you can use your ears and eyes
Advice to the SLP performing pediatric voice therapy from Sarah Blakeslee, MA CCC-SLP

Focus on actual vocal technique for talking, not just DO's and DON'Ts.

Make it simple and concrete – How does it sound? How does it feel? Be able to demonstrate (+ and -) in your own voice to help them learn.

Make it meaningful – use relevant stimuli (family member names, sentences they say often, conversation about favorite topics).

Make it fun! – play games, be silly, let them judge your productions, etc.

NCVS – www.ncvs.org

Information for Young Explorers

An incredible journey

About thirty years ago, there was a neat movie called Fantastic Voyage. In it, a group of scientists shrunk themselves (and their submarine) into tiny proportions and traveled through a human’s body to save his life. Well, we thought that idea was just too cool to ignore. So, take your own incredible journey inside the body’s vocal system.

Science Fair

The investigators at the National Center for Voice and Speech conduct experiments to learn more about how people talk and sing. But you won’t need to be a PhD to try some of the fascinating science explorations we’ll present here. [Hint: Some of the ideas would make great school projects.]

Beastly Babble

A set of explanations, quizzes and exercises to jumpstart your thinking: how do animals communicate differently than humans? do members of the same species always understand one another? is animal chatter understandable between different species?

What’s Your Vocal IQ?

How much do you know about how your voice works? Sure, there’s stuff about speaking and singing, but we didn’t forget the fascination about hiccupping, whispering, burping or giving someone the raspberry either. Immediate scoring lets us know how much vocal homework you may need to do...

KayPentax

www.kayelemetrics.com/

Software packages with the Computerized Speech Lab and the Visi-Pitch IV, offer customizable computer games that motivate with activities for voicing, timing, pitch level and control, and amplitude

Resources

- Net connections for communication disorders:
  - http://www.mnsu.edu/comdis/hunter2/aphotherapy.html#voice
  - Teachers Pay Teachers
  - A lot of speech material and a lot is free, or very low cost
  - http://www.teacherspayteachers.com/
  - Lax Vox
  - Titze Straw video link
    - https://www.youtube.com/watch?v=0x1Dwvm8lI4

Oldy but a goody

Boone Voice Therapy Program
proedinc.com

<table>
<thead>
<tr>
<th>Changing Horizontal Focus</th>
<th>Establish New Pitch</th>
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<tbody>
<tr>
<td>Changing Loudness</td>
<td>Explanation of Problem (Counseling)</td>
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<tr>
<td>Changing Vertical Focus</td>
<td>Masking</td>
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<tr>
<td>Chewing</td>
<td>Open Mouth</td>
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<tr>
<td>Ear Training</td>
<td>Pushing</td>
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<tr>
<td>Eliminate Hard Glottal Attack</td>
<td>Yawn-Sigh</td>
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TPT
Voice Monsters

Voice Monsters

<table>
<thead>
<tr>
<th>Tired Monsters “Yawn-Sigh”</th>
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<tbody>
<tr>
<td>Worn out?</td>
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<tr>
<td>Yawn-Sigh, then end it with an audible sigh. Practice each time you can do this easily.</td>
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</table>

Voice Monsters

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<tr>
<th>The Voice Monster Review</th>
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| 4 things that can hurt your voice:
| 1. |
| 2. |
| 3. |
| 4. |

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| 4 things that can help your voice:
| 1. |
| 2. |
| 3. |
| 4. |

Quick one way you will help your voice at home:

> Yawn-Sigh, then end it with an audible sigh. Practice each time you can do this easily.
**TPT Voice Volume and Tone of Voice**

Be a Voice Detective!

**Game Play:** Ask students to show the walk-through for an "easy" voice technique or habit. Can they identify good habits now?

**Objective:** Analyze the importance and function of various voice techniques and habits.

**Materials:**
- 1-2 large sheets of paper
- 1-2 small sheets of paper
- 1-2 pens
- 1-2 pencils

**Voice Thermometer:** Use paper to determine volume. Paper will be rolled up and held in hands to create an "easy" volume technique or habit.

References


**Voice Volume Scale**

0 = No Talking
1 = Whisper
2 = Soft Voice
3 = Regular Voice
4 = Loud Voice
5 = Yelling

**Making Kazoos**

**Materials:**
- Finger tip, nose, and mouth on 1 sheet of paper
- 1-2 small sheets of paper
- 2-3 pens

**Directions:**
- Create a "no-no" sound using a sheet of paper
- Create a "no-no" sound using a large sheet of paper
- Create a "no-no" sound using a small sheet of paper

**References**

After you leave....
Questions, comments, support....

Sherri K. Zelazny, MA, RSLP, CCC-SLP
Surrey Voice Clinic at Abilities Neurological Rehabilitation
surreyvoice@abilitiesrehabilitation.com
778.574.2747