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Revamping Your Voice Therapy Toolbox

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1

Learning Outcomes

- Review basic anatomy and physiology of voice production.
- Obtain a basic understanding of current, common voice therapy techniques.
- Determine why certain voice therapy techniques are more effective than others.

2

Semi-Occluded Vocal Tract Exercises

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3

Semi-Occluded Vocal Tract Exercises

- Long history of use (Titze, 2006)
  - Lip trills, tongue trills, bilabial fricatives, humming, phonation into tubes
- Goals
  - Make the voice more efficient and more economic
  - Produce normal vocal intensity with less mechanical trauma to the vocal folds
- Foundational
  - Many voice therapy techniques are built on semi-occlusion:
    - Vocal function exercises (VFEs)
    - Resonant voice therapy (RVT)

4

Semi-Occluded Vocal Tract Exercises

- Create a semi-occlusion at the front of the vocal tract (i.e. at the lips)
  - Heightens source-tract interactions
  - Raises supraglottic and intraglottic pressures
  - Uses less muscle activity, but results in a comparable acoustic source spectrum
  - Minimizes vocal fold collision
- Imagine a wide-narrow configuration
  - Inverted trumpet or inverted megaphone
- Transition through a variety of tasks
  - Sustained air flow
  - Sustained phonation
  - Ascending and descending glides
  - Humming a tune

5

Research on SOVT Exercises

- Improved perceived vocal quality (Sampaio et al., 2008; Enflo et al., 2013)
- Improved auditory-perceptual ratings
- Improved acoustic voice parameters
- Large effects in patients with functional dysphonia (Guzman et al., 2020)
- Small effects in patients with nodules, polyps, or other lesions (Menezes et al., 2011; de Vasconcelos et al., 2016)
- Regular use of SOVTE result in:
  - Lower position of the larynx
  - Wider pharynx
  - Less tension of the vocal folds (Guzman et al., 2013)

6

Vocal Function Exercises

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7

7

Vocal Function Exercises

- Goals:
  - Balance subsystems of voice production (respiration, phonation, resonance)
  - Produce a forward tone that lacks tension
  - Provide a concrete home exercises program
  - Plot and monitor progress over time
  - Improve laryngeal muscle strength, balance, coordination, and stamina (Stemple, 2006)

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8

Vocal Function Exercises

- Therapy protocol (Stemple, 2005)
  - Maximum sustained phonation of /i/ on F (above middle C)
  - Ascending glide over the pitch range on /o/ or 'OL'
  - Descending glide over the pitch range on /o/ or 'OL'
  - Maximum sustained phonation on pitches C, D, E, F, G using /noh/ or 'KNOLL'
- Focus on using a…
  - Barely audible, clear, and consistent voice
  - Frontal focus, inverted megaphone mouth shape
- Twice each, two times per day

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9

Research on VFEs

- Increased maximum phonation times at all pitch levels (Stemple, 2005)
- Decreased airflow rates
- Increased airflow volumes
- Improved frequency range (Sabol et al., 1995)
- Improved glottal efficiency
- Greater ease and clarity during vocal production (Roy et al., 2001)
- Proven to improve and enhance the vocal function of professional voices, normal voices, and disordered voices (Stemple, 2005)

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10

Resonant Voice Therapy (RVT)

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11

11

Resonant Voice Therapy

- Introduced by theater and singer trainers Drs. Arthur Lessac and Mark Madsen
- Further developed by Dr. Katherine Verdolini Abbott, PhD, ASHA-F
- Debunks old idea that to heal voice you must remain silent and speak less
- Overall Goal: Improve vocal quality and feel during phonation, protect from further damage to laryngeal mucosa, and possibly heal already damaged laryngeal mucosa

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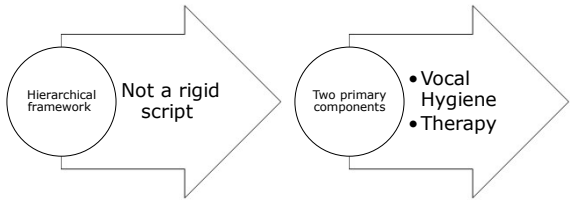
12

Resonant Voice Therapy



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13

13

Vocal Hygiene

- Vocal Hygiene education is NOT therapy
- Keep this portion brief and simple
- If you ask a patient to omit too much from their life, they will not be able to adhere to recommendations
- What factors are most contributing to patient's dysphonia? Target those.
  - Hydration
  - Inflammation
  - Behavior
- Handouts for home review, do not use session time for this

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14

14

Resonant Voice Therapy Explained

- Sound: Focus is on patient achieving sensation of vibration at the mask of the face when phonating in an easy manner
  - Buzzy feeling of the lips, tongue, teeth, nasal bridge, etc.
  - Absence of strain or pressure in the throat
  - Clear sound
- What's happening at the level of the larynx?
  - Phonating with as little adduction of the vocal folds as possible, while minimally involving surrounding musculature
  - Least amount of effort or pressure possible to achieve consistent vibration of the vocal folds

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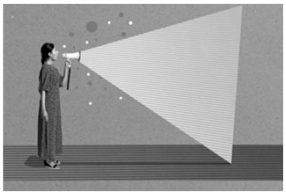
15

15

Basic Training Gesture

- Resonant, voiced sound that is sustained in patient's modal pitch
  - Hum and /m/ do not always work for everyone
  - Frequently use "who," "bzzz," /v/, /w/, /n/
- Play around!
  - Use lip and tongue trills
  - Ascending and descending glides
  - Hum along to different songs
- Clinician cueing is paramount to bring awareness to the sound and feel of patient's voice:
  - "Where do you feel that sound coming from?"
  - "How does your voice sound when you hold out that hum?"
  - "Do you feel any vibration in your body right now?"



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16

16

Resonant Voice Therapy

- Once consistently resonant at sound level, expand on target by using a chanting voice across the hierarchy
- Once consistently resonant, play with varying loudness and pitch while cueing patient to focus on sound and feel of voice

Voiced + voiceless sounds	• Mama papa, moo shoo, etc.
Word-Level	• Many, masters, zebra, vivo • Whoooo...we
Phrase-Level	• My mama makes • We went
Sentence-Level	• My mama makes lemon muffins • We went to the zoo

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17

17

Resonant Voice Therapy

- Once patient has "chanted" the sentences in a resonant manner, transition to saying resonant sentences in a more conversational manner
- Reading
  - Passages
  - Paragraphs
  - Children's books are great for intonation variation and pacing
- Question and Answer
  - Use resonant facilitator, if needed
  - Clinician: "What did you have for breakfast?" Patient: "Mmmm, I had cereal for breakfast."

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18

18

Resonant Voice Therapy

- Conversation (the most amount of time should be spent at this stage)
  - Quiet room
  - Loud area
  - Patient should be taught to self-identify instance of dysphonia and self-correct in-the-moment

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19

19

Downside of RVT (or other hierarchy-based voice therapy interventions)

- Poor buy-in (attrition rates for voice therapy estimated between 16% and 65%)
  - Difficult for the patient to see how starting at sound manipulation (such as humming or trilling) could translate to a clear voice within conversation
  - Can take time to get into conversational voice practice, thus delaying functional application of techniques outside of the therapy room
  - Carry over into conversation outside of therapy room can be difficult
- Violates principles of motor learning
  - Part versus whole practice
  - Contextual relevance

Gartner-Schmidt et al., 2016

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20

20

Conversation Training Therapy (CTT)

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21

21

Conversational Training Therapy (CTT)

- Developed by Jackie Gartner-Schmidt, Ph.D., CCC-SLP, ASHA Fellow and colleagues
  - "Focuses exclusively on voice awareness and efficient voice production in patient-driven conversational narrative, without use of a traditional therapeutic hierarchy."(Gartner-Schmidt et al., 2016)
- Created in part to solve some of the downsides we previously discussed about more hierarchical voice therapy approaches such as RVT
- Allows for the immediate application of voice and speech enhancing techniques into spontaneous conversation, making therapy more functional from the start (i.e., faster carryover)
  - Better buy-in because patients can see how this can be used in their everyday lives

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22

22

Six Interchangeable Tenets of CTT

Clear Speech

- Cue patient to "speak clearly" or "use crisp and clear speech"
- Immediately results in aerodynamic, auditory- and patient-perceptual voice improvements (Gartner-Schmidt et al., 2016; Gillespie & Gartner-Schmidt, 2016)
- Think about why...slower rate, more precise consonants, etc.

Auditory/Kinesthetic Awareness

- How does the voice sound (auditory) and feel (kinesthetic)?
- Clinician's language is key here:
  - "Notice how that sound felt in your throat? Couldn't tell? Let's do it again and pay attention to how your throat feels when you talk."
  - NOT: "Add more breath support."
- Ideally, the patient will self-initiate change over time:
  - "Oh! I felt my throat tighten and get hoarse when I said that. Let me try again."

Rapport Building

- Self-explanatory
- Refers to the bond between a patient and provider
- Not unique to voice therapy
- May help build rapport faster because you're diving straight into patient-drive conversation

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23

23

Six Interchangeable Tenets of CTT

Negative Practice

- Have patients label their voices "new," v. "old," or "correct," v. "wrong"
- Purposefully cue the patient to use the voice they initially used
- Draw their awareness to how the two voices differ in sound and feel- ask, "What did you change to get from your old voice to the new voice?"
- "Empowers patients to realize that they are in control of their voice." (Gartner-Schmidt et al., 2016)

Basic Training Gestures

- Reviewed this in RVT section
- Easy, forward-focused and vibratory voice
- By combining the six tenets, patient should achieve resonant voice within conversation

Prosody

- Ensure patients' prosody is appropriate for the message they are conveying
- Decrease pitch at the end of statements w/o presence of glottal fry; increase pitch at end of a question
- Rate of speech
- Vocal intensity- make sure it matches the environment

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24

24

Conversational Training Therapy (CTT)

- Gartner-Schmidt et al., 2016
  - Number of sessions required when using CTT ranged from 2-4, average of 3
  - VHI-10 scores changes pre- and post-CTT were consistent with changes seen pre- and post-traditional voice therapy methods such as RVT

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25

25

The Development of Conversation Training Therapy: A Concept Paper

*Jackie Gartner-Schmidt, †Shirley Gherson, ‡Edie R. Hapner, §Jennifer Muckala, ||Douglas Roth, ¶Sarah Schneider, and *Amanda I. Gillespie, *Pittsburgh, Pennsylvania, †New York, New York, ‡Atlanta, Georgia, §Nashville, Tennessee, ||Boston, Massachusetts, and ¶San Francisco, California

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26

26

High Intensity Voice Programs

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27

27

Phonation Resistance Training Exercises (PhoRTE)

- Voice therapy program for pathologic age-related voice changes (Ziegler et al., 2014)
- Features of presbyphonia include:
  - Reduced vocal intensity in speech
  - Inability to project
  - Decreased F0 in females, increased F0 in males
  - Breathiness
  - Vocal tremor
- Goal
  - Increase muscular workload on vocal mechanism
  - Encourage overload of muscles involved in respiration and phonation (Belsky et al., 2021)
  - Improve glottic insufficiency

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28

28

Phonation Resistance Training Exercises (PhoRTE)

- Therapy protocol (Ziegler et al., 2014)
  - Loud maximum sustained phonation on /a/
  - Loud ascending and descending pitch glides over the entire pitch range on /a/
  - Patient-specific functional phrases using a loud and high-pitched voice
  - Patient-specific functional phrases using a loud and low-pitched voice
  - Conversation using a strong, energized voice

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29

29

Lee Silverman Program (LSVT LOUD®)

- An exercise-based behavioral voice treatment that improves function and slows progression of speech motor symptoms in individuals of Parkinson disease (Fox et al., 2012)
- Characteristics of hypokinetic dysarthria
  - Reduced pitch range and monotone voice
  - Reduced loudness
  - Increased breathiness
  - Reduced articulatory movements
  - Rapid, rushed rate of speech
- Goal
  - Train vocal loudness that is healthy and good in quality with minimal cognitive-loading
  - Use vocal loudness as a trigger for distributed effects (articulation, intonation, rate of speech, voice quality)

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30

30

Lee Silverman Program (LSVT LOUD®)

- Therapy protocol (Fox et al., 2012)
  - Maximum sustained movements
    - Sustain /a/ in loud, good quality voice for as long as possible
  - Directional movements
    - Say /a/ in loud, good quality voice going high in pitch
    - Say /a/ in loud, good quality voice going low in pitch
  - Functional phrases
  - Context specific and variable speaking activities
    - Words, phrases, sentences, paragraph reading, conversation

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31

31

SPEAK OUT! & LOUD Crowd

- Voice therapy program that addresses vocal intensity in individuals with Parkinson disease using individual and group therapy components
- Goal
  - Emphasize speaking with intent
  - Provide a structured setting to increase conversational opportunities
  - Increase overall vocal intensity of voice
  - Improve perception of voice

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32

32

SPEAK OUT! & LOUD Crowd

- Therapy protocol (Behrman et al., 2020)
  - Warm-up: Produce connected vocalizations using nasal-phoneme initial words.
  - Vocal: Sustain /a/ with good quality voice for maximum of 10 seconds.
  - Glides: Sustain /a/ and glide up the scale (starting and ending with modal pitch).
  - Numerical sequences
  - Reading: Start with phrases and progress to paragraphs.
  - Cognitive-linguistic exercises
  - Conversational speech
  - LOUD Crowd

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33

33

High Intensity Voice Programs

	PhoRTE	LSVT LOUD	Speak Out! & LOUD Crowd
Population	Vocal fold bowing; Presbyphonia	Hypokinetic dysarthria; Parkinson disease	Hypokinetic dysarthria; Parkinson disease
Dosage	45-minute tx sessions, 1x/week (or every other week), 4 sessions total (3 hours)	60-min tx sessions, 4x/week, 4 weeks total (16 hours)	40-min tx sessions, 3x/week, 4 weeks total (8 hours); Followed by 1x/week group tx
Focus	Use a strong, energized voice.	Speak loudly.	Speak with intent.
Home Exercise Plan	Five PhoRTE vocal exercises 1x/day, 6 days/week	Daily assignments 1x/day on therapy days, 2x/day on non-therapy days	15 minutes, 1x/day on therapy days, 2x/day on non-therapy day

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34

34

Direct Muscle Tension Relief

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35

35

Direct Muscle Tension Relief Techniques

- Continuous tension of the laryngeal muscles can result in "elevation of the larynx and hyoid bone, with associated pain and discomfort when the circumlaryngeal region is palpated" (Roy & Bless, 1998)
- I call this the "Spinning Wheel of Pain"
  - Poor vocal technique can cause muscle tension dysphonia (MTD) and laryngeal discomfort, but discomfort can further perpetuate the use of poor vocal technique to compensate for pain
- So, which do you target first? The chicken or the egg?
  - Whichever one the patient is more likely to response to
  - Important to palpate and make laryngeal massage a part of your trial therapy

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36

36

Spinning Wheel of Pain

- It is not always just the larynx that is tense and contributing to the pain/dysphonia...
  - Tongue, jaw, head/neck can all contribute to deficits
  - Stretching of affected muscles is effective in targeting discomfort and MTD (Emerich, 2003)
- Circumlaryngeal massage "is believed to stretch muscle tissue and fascia, promote local cir culation with removal of metabolic waste,relax tense muscles and relieve pain and discomfo rt associated with muscle spasms " (Roy & Bless, 1998; Peifang,1991)
  - Excellent research to support use of circumlaryngeal massage as an effective treatment of dysphonia in addition to or in absence of traditional voice therapy (Roy et al., 1997; Roy & Leeper, 1993; Van Lierde et al., 2010)

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37

37

When Should You Use These Techniques

- Confirmed MTD diagnosis (but not required)
- Muscle Tension Dysphagia (MTDg)
- Functional/Psychogenic dysphonia
- Puberphonia
- Globus Sensation (in some cases)
- Severity of dysphonia is worse than what you would expect it to be based on imaging
- Discomfort/pain at level of the larynx and/or a strangled sensation/tightness at the level of the larynx (at rest or with use)
- When traditional voice therapy has not helped (but doesn't need to be a last resort)

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38

38

Contraindications and/or Considerations

- Literature is vague about contradictions
- Our own survey suggests:
  - Patients who are immediately post-op
  - Significant surgical scarring
  - Fibromyalgia/Pain Syndromes
  - Anxiety
- Consider victims of trauma...CONSENT IS KEY (will touch on this later on)
- Be cautious with patients who have irritable larynx syndrome or chronic cough, could trigger
- If questioning appropriateness for whatever reason, ask referring provider for clearance

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39

39

Laryngeal Palpation

- CONSENT!
- Provide explanation (i.e., knots in your back analogy)
- Brace (with your non-dominant hand on the nape of neck)
- Palpate each point (bilaterally):
  - Thyrohyoid space
  - Base of tongue (BOT)
  - Lateralization of larynx (thyroid cartilage)
  - Laryngeal pulldown (compress and lower thyroid cartilage)
- Begin palpation with superficial pressure and progress to deep pressure
  - Have patient give you feedback about pressure- "Do you need more or less pressure here?"

HENRY FORD HEALTH Roy & Bless, 1998; Samlan, 2017

40

40

Signs of Muscle Tension Upon Palpation

- Patient report of tenderness/discomfort/pain upon palpation or at rest
  - Usually, unilateral
  - If bilaterally, one side is typically worse than the other
  - Literature suggests left-sided discomfort is more common than right, but this hasn't been the case in our practice
- Clinician can feel that the musculature is taut/tight and that there is perhaps a rounding/bulging of the musculature upon palpation (mainly at the thyrohyoid space)
  - The more tension present, the less of a "space" or "pocket" you might feel at thyrohyoid space
  - When explaining to patient- equate this to a "knot" in their throat, just like in your back
- Resistance to lateralization of thyroid cartilage

HENRY FORD HEALTH Samlan, 2017

41

41

Techniques

1. Circumlaryngeal Massage
2. Base of Tongue Stretches
3. Stretches for Voice Therapy by Dr. Katherine Verdolini

- Always coordinate the above with breathing cues
- Every clinician does the above differently, within reason

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42

42

- Once consent has been obtained and explanation of technique has been provided:
  - Get into appropriate position, brace nape with non-dominant hand
  - Gently place pointer finger and thumb into the thyrohyoid space, cupping the neck, start applying light pressure inward and moving fingers in circular motion
  - Grasp thyroid cartilage bilaterally with same two fingers and begin to gently lateralize, moving in a side-to-side motion

Samlan, 2017

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Circumlaryngeal Massage

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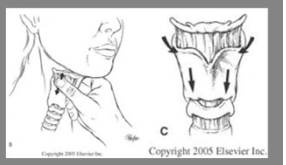
43

Circumlaryngeal Massage



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- Complete laryngeal pulldown by gently compressing and lowering thyroid cartilage using the same two fingers
- Repeat, as warranted and tolerated

- **Patient is in COMPLETE control- they dictate which spots to work on more/less, depth of pressure applied, when to STOP- it is your job to check in verbally and to read body cues**

Samlan, 2017

44

Circumlaryngeal Massage

- The benefit of this work is that patient can and should do it on themselves
  - Use a mirror when teaching the technique
  - Have patient place their hands on top of yours to feel accurate placement, movements, and pressure application
  - Model on yourself if patient does not wish for you to touch them, practice together
- Have patient record your hand motions or their hand motions completing the exercise in-session, that way they have an accurate model to practice alongside of at home
- Improvement is generally seen after one session, but home practice is necessary

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45

Base of Tongue Stretches

1. Protrude the tongue as forward as possible, count to 10 aloud with tongue continuing to protrude outward, taking a breath between counts
2. Protrude tongue and yawn-sigh
3. Manually pull the tongue base using gauze, first at midline, then gently move and pull tongue side to side

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46

Is It Working?

- The patient will tell you:
  - "Wow, my throat feels so much looser."
  - "I really felt my tongue being stretched during that."
  - "My throat feels more open."
  - Reports pain reduction/discomfort
- Voice is improving
- Musculature is less taut to the touch, easier to lateralize than pre-manipulation

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47

Tips and Tricks

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48

Use Audio and Video Recordings

- Patients often forget how far they've coming
  - Comparing pre- and post- treatment recordings can boost their confidence
- Use audio recordings in the moment too
  - "Let's record you reading this paragraph."
  - "Now listen to your voice. How does it sound to you?"
    - Specific, guided questioning, "Did your voice sound rough there?"
  - Helps build awareness of voice
- Use audio/video recordings to assist with home practice
  - Send your patients recordings of yourself or themselves completing the exercises correctly
  - Provides them with a model to practice alongside
    - "It's like you're right there with me!"

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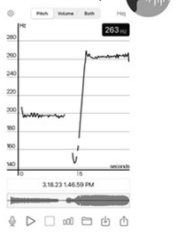
49

49

There's an APP for Everything...

- The Voice Analyst



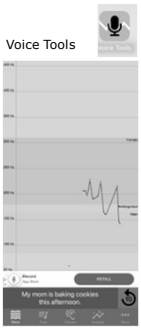
The Piano

Praat

Tuner Lite

Decibel X

Voice Tools



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50

50

Final Thoughts

- Don't go in blind! Ensure patient's vocal folds have been visualized (at minimum, flexible laryngoscopy)
- It is important to remember that we are not magicians
- Sometimes a patient does not improve with therapy, know when to refer them back to Laryngology
- The goal of voice therapy is not complete restoration of patient's baseline vocal quality
- The goal is to help the patient identify:
  1. Get them to a point where they can independently bring themselves out of the "old" voice and into their new, target voice using techniques you've taught them
  2. Eliminate pain
  3. Reduce presence of or avoid recurrence of benign lesions (if possible)

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51

51

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52

52

Henry Ford Hospital - Voice Team

Fellowship-Trained Laryngologists

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53

53

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54

54

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