Videostroboscopy

WHY INSTRUMENTALS SHAPE OUR TREATMENT

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No pictures Black and White Version

Disclosures & Gratitude

Owner of a tempo Voice Center, LLC & Voice Diagnostix, LLC

I am being compensated to speak for you all today

Thank you so much ArSHA for allowing me to speak to you all today about my passion.

What I hope you take away

Videostroboscopy examinations are the most widely available and beneficial exams at this time for voice rehabilitation. They change diagnoses 50% of the time after a routine ENT examination (Cohen et al 2015). My hope is to further your knowledge of how this exam can benefit your practice as an SLP.

History

- Nize introduced the bladder telescope in 1879
- Harold Hopkins introduced rigid telescopic imaging in 1960's
- Karl Storz combined rod-lens with cold light and developed the cystoscope
- Stein and Czermak photographed the larynx first
- Farnsworth used high speed motion picture cameras to film the vocal folds in 1937
- Around the same time, stroboscopy developed to assess patterns of vocal fold vibration

Laryngeal Evaluation 2010Thieme Publishing

Videostroboscopy

WHAT IS IT?

- Simulates slow motion during sound production
  - "Virtual" slow motion 30 frames per second
  - Takes "still shots" at different points of vibratory cycle
- Most widely available, cost effective
- Two Options:
  - Rigid through mouth
  - Flexible through nose (distal chip option)
- Microphone on neck to gather
- Considered instrumental exam

Brands of STroboscopy

DIFFERENT TYPES AND PRICE RANGES ARE AVAILABLE

- Atmos
- Olympus
- JedMed
- KayPentax
- Wevosys

Materials you need

COMMON MATERIALS FOR EXAM COMPLETION

- The scope, light source and camera
  - Scope is rigid or flexible
  - The light source usually attaches
  - The camera also attaches and connects to the computer
- The microphone for the neck
  - This technology is better than ever, where you just need it close to the neck skin to pick up the pitch
- A chair that rises with a straight back
  - I can do this without them raised, but in the long term, it will be better on your back to have excellent posture

Materials you need…continued

COMMON MATERIALS FOR EXAM COMPLETION

- Gauze and paper towel
  - Sometimes they drool, paper towel will help them from getting it on their clothes
  - Gauze is to grab and hold on to the slippery tongue
- Benzocaine Spray (possibly)
  - Do you need this? Well, no, but sometimes it helps you get a rigid complete without having to switch to flex
- Warmer?
  - I literally no longer use a scope warmer. 10 seconds on their tongue after you hold the tip in your gloved hand while you prep them verbally, WORKS!
  - Plus you don't have to step out to heat up water in a cup.

Materials you need…3rd installment

COMMON MATERIALS

- For Flexible Scope, I usually only use lubricating jelly. (Singh et al 1997, Leder et al 1997) showed that there is no significant difference in patient's reactions to the scope when using lidocaine, vasoconstrictor vs none.
- Alcohol pads
  - I clean the mic pad after each use with one
  - I prep the eye lens on the rigid and both lenses on the flex scope with this
    - This will vary depending on which kind of system you use
- Materials to white balance if you need to
  - Depending on your system, cardboard or paper may be necessary to "white-balance" your light source

Before the exam

BEGIN WITH…

- Educating the patient about potential risks
  - Bleeding transnasal, not often though
- Explain how you will complete the exam
- Explain how it feels
  - Make sure they understand if it's flexible, that they may feel slight discomfort initially
  - If rigid, explain that you will not stick that scope all the way in their mouth or down their throat at all
- I usually show them how much of the scope will enter their body

Before the exam…

DEMONSTRATE FOR THEM…

- Posture they will be in
  - Butt to the back of the chair
  - Lean forward with a straight back
  - Jut your chin forward like a (Turtle, Chicken, etc I mix it up)
- Remember your posture.
  - Raise them where you do not bend over to achieve a view
  - Keep your shoulders relaxed
  - In the long run, this will benefit you because if you hunch over, it will cause you strain and discomfort

During The exam…

WHAT DOES YOUR PATIENT DO?

- Three complete breath cycles
- Diadochokinetic task for larynx /ʔiʔiʔiʔiʔiʔi/
- Sustained /i/ at typical intensity and pitch
- Sustained /i/ at varied pitches
- Sustained /i/ at varied loudness levels

- Make sure all this is happening to the best of your ability.
  - I was once told that if you feel you could present your exam as a case study at a conference, you've done a good job.

Videostroboscopy

How to train for this exam?

- Observe many exams
- Take a hands-on course
- Find a mentor for passes
- Find a mentor for analysis
- Practice, Practice, Practice!

ASHA SIG 3 has a great list of courses to train for this, popular ones include:

Vanderbilt
Emory
USC

My Tips…

From my clinic to you…

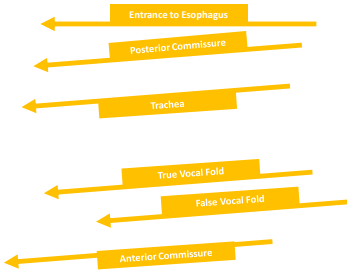
- Don't offer the spray if you don't feel they truly need it
  - The power of suggestion is so strong. I truly use the topical anesthetic less now that I'm out of a physician office
- Use it if you need to!
  - These patients will only get 2-3 times before they start to freak out if it's uncomfortable. The calmer you are, the calmer they'll be, but the less times you have to go in, the better
- Brace your scope between your fingers as you hold the tongue
  - Used to try the Vanderbilt Roll, above my tongue held fingers, but this seems to get it done.

My Tips…

From my clinic to you…

- Go with the patient
  - If you feel they will gag, hang out mid-tongue until they "eeee" again, then shoot back to capture.
- Try both sides if you're having issues with an oddly shaped epiglottis or extremely long uvula.

What's Normal?



What's within Normal Limits?

But this is a funky looking larynx…

- Epiglottis can be shaped strangely
- Arytenoid cartilages may look lopsided or asymmetrical, but the vocal folds can still close symmetrically
- You might even see the cornua of the hyoid bones into the larynx

What's within Normal Limits?

Normal:

- White, shiny straight edges on TVF tissue
- Vocal processes barely visible
- Color is subjective, but not red
- Tissue in interarytenoid area should be non pachydermic
- Symmetrical opening
- Complete closure

What's within Normal Limits?

NORMAL:

- Vibratory dynamics should be symmetrical, normal amplitude, periodic, with mucosal wave moving freely and in the absence of pathology and complete closure

Terminology for SLP's

WHAT CAN WE ACTUALLY SAY IN A REPORT?

- We cannot diagnose, but we can describe lesions. Here are some tips I learned from Edie Hapner, Brian Petty and the Emory Voice Center team.

Terminology for SLP's

WHAT CAN WE ACTUALLY SAY IN A REPORT?

- Hemorrhage-
  - *color is suggestive of recent/resolving hemorrhage in the vocal fold.*
  - *Prominent varices which should be further evaluated as a potential source of the hemorrhage*
- Granuloma- *lesion noted on vocal process(es)*
- Papilloma-
  - *clusters of small, cauliflower-like growths observed on _____.*
  - *Vibratory and mucosal wave?*

Terminology for SLP's

WHAT CAN WE ACTUALLY SAY IN A REPORT?

- Muscle Tension Dysphonia-
  - Is there hyperfunctional underclosure?
- *Nodules-*
  - *lesions appear to be fibrovascular (organized & mature) resulting from long-term Phonotrauma OR soft and pliable?*
  - *Does mucoasal wave travel over lesions?*
  - *Hourglass closure pattern throughtout vocal registers or limited to upper?*
  - *Bilateral swellings/fullness or lesions on the anterior 1/3 of the TVF's are consistent in appearance with bilateral vocal fold nodules*

WHAT'S AN EXCRESCENCE?

Terminology for SLP's

WHAT CAN WE ACTUALLY SAY IN A REPORT?

- Cysts-
  - *Spherical lesion noted on the right/left mid-membranous vocal fold*
    - *Fluid filled?*
    - *Intracordal? Ligamentous? Mucus retention?*
    - *Mucosal wave ABSENT or PRESENT?*
- *Reactive lesion*
  - *I call this reactionary edema sometimes*
  - *Indention from contra-lateral contact (cup and saucer?)*
- *Paralysis or Paresis*
  - *Reduced adduction or abduction of left/right vocal fold is observed*
  - *Right fold appears fixed in (midline,parmedian, lateral) position*
  - *Movement is absent or sluggish*

Terminology for SLP's

WHAT CAN WE ACTUALLY SAY IN A REPORT?

- Condition
  - *Bowing or atrophic*
  - *Is mucosal wave describable?*
  - *Is one fold forshortened?*
  - *Is there ifracordal fullness (where the lower lip is more visible?)*
- *Color*
  - *White*
  - *Red*
  - *Erythematous*
  - *Pink*
  - *Orange*
  - *Yellow*

Parameters we look for

SAPJMUC? THE THREE M'S?

- Symmetry
- Amplitude
- Periodicity
- Mucosal Wave
- Closure
- Mass
- Movement
- Mucosal Wave

Peak Woo discussed tension, stiffness and mass
Emory team discusses Mass, movement, mucosa, and mucosal wave

Symmetry

THIS IS HOW THE VOCAL FOLDS MOVE AWAY FROM THE MIDLINE.

- Movement of right and left vocal folds relative to each other
- Asymmetry can be observed in a variety of ways.
- Phase can be
  - Top down or bottom up (A-P)
  - Medial-Lateral
    - Like a hula dance

Amplitude

THIS IS THE DEGREE OF MOVEMENT THE FOLDS MAKE WHEN COMPARED TO THE WIDTH OF THEMSELVES.

- In other words, lateral movements within the fold
- Amplitude increases with an increase in subglottic pressure like when loud phonation occurs
- Amplitude increases as pitch decreases
- Amplitude can be reduced when there is edema (swelling) in the folds
- Amplitude can be increased when there is bowing in the vocal folds

Periodicity

THIS IS THE ABILITY FOR THE VOCAL FOLD VIBRATION TO BE "PICKED UP" BY THE VIDEOSTROBOSCOPY LIGHT

- Relative length of the glottal cycle and should be stable across cycles
- If there is a consistent movement of the folds, then the light will flash at certain points of the vibratory cycle
- If the microphone has trouble picking up the pitch, the light will flash at the wrong times, making the video look "jumpy" or "aperiodic"

Mucosal Wave

THIS IS VISIBILITY OF THE EPITHELIUM TO A CERTAIN DEGREE DURING PHONATION.

- Superficial tissues move across the fold as air moves through the glottis space
- The epithelium displaces because of the myoelastic aerodynamic theory of voice production during vibration
- If this mucosal wave is impaired, it is due to stiffness in the fold, the presence of a lesion, or paralysis or paresis.
- Lesions, edema, scarring all can contribute to impairments here

Myoelastic-Aerodynamic Bernoulli Effect

- Negative pressure causes vocal folds to be sucked together
- Closed airspace below folds
- Air pressure builds underneath, then via "single puffs of air," pressure is released
- Vocal folds are naturally elastic and they want to assume their original position
- This cycle causes tens or hundreds of these puffs being released every second a person is vocalizing

Bernoulli
Myoelastic-Aerodynamic

Closure

THIS IS HOW THE VOCAL FOLD CLOSE DURING ADDUCTION. IT CAN ALSO BE HOW THEY CLOSE DURING VIBRATORY CYCLES.

- Closure can be looked at regarding movement of the folds as the arytenoid cartilages rotate to bring them together
- Another closure can be visualized during phonation, as the folds oscillate

Common Closure Patterns

POBURKA SERF STROBOSCOPY RATING FORM

- Complete
- Hourglass
- Elliptical/Spindle Shaped
- Hyperfunctional Underclosure
- Incomplete

Limitations…It's not perfect

THIS EXAM CAN MISS THINGS LIKE…

- Sulcus vocalis
- Mucosal bridges
- Patients have to have periodic phonation for optimal recording
- Toleration must be present to get enough to pull data from
- Shape of the neck (ACDF, short neck, curved epiglottis)
  - Can limit the view

Why so necessary?

INSTRUMENTALS SHAPE OUR TREATMENT

- If we can't see what the vocal fold are doing…
  - We might provide unnecessary treatment with unnecessary costs
  - We might subject the patient to treatment that will not work
  - We might aggravate a lesion
  - We might recommend therapy instead of surgery first, putting the patient through more frustrating times

What do we see?

What do we see?

What do we see?

What do we see?

Questions?

- Email me: info@atempovoicecenter.com
- www.atempovoicecenter.com
- Thank you!

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