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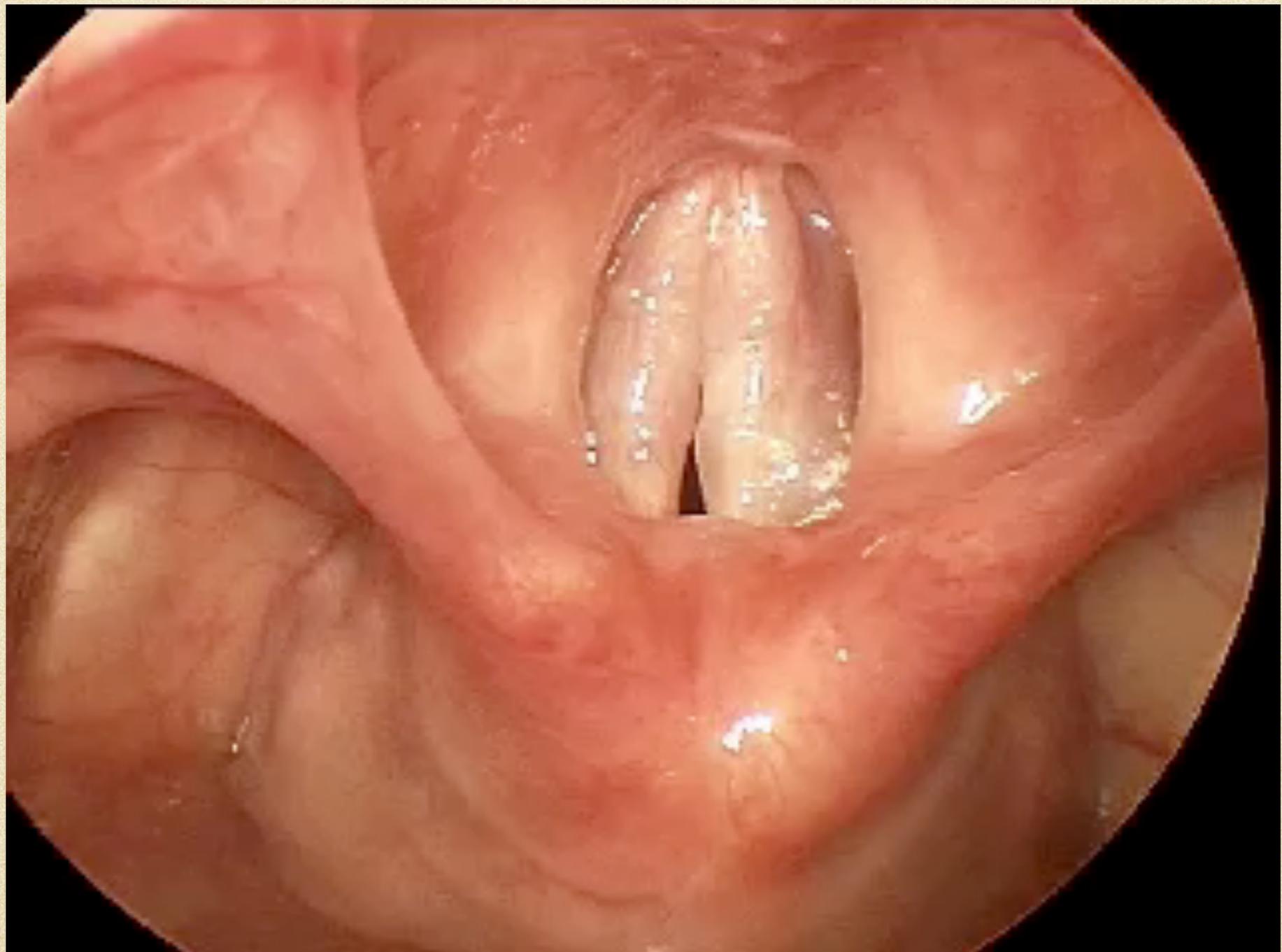
*Wellness*  
*for the Vocal Athlete*

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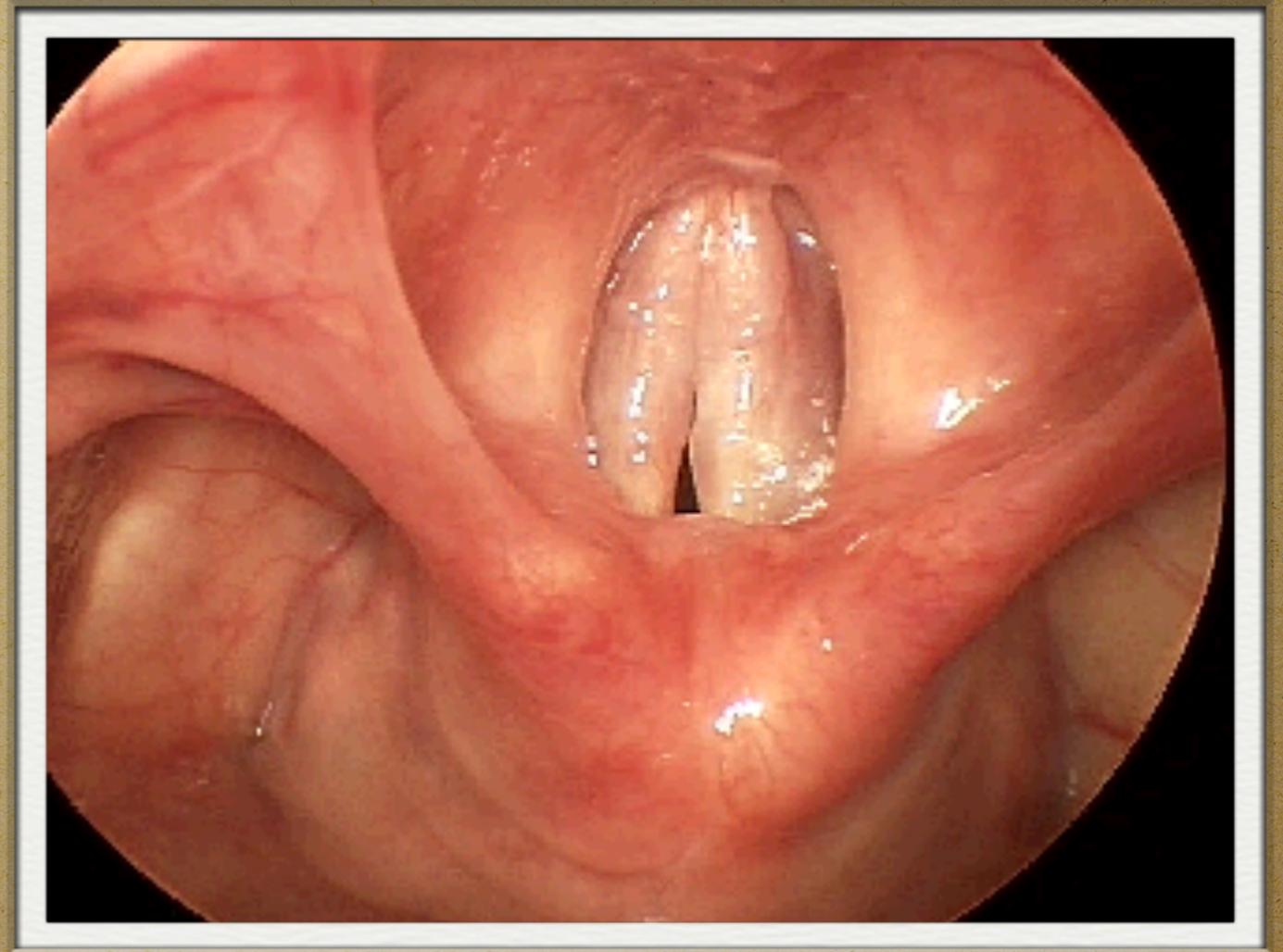
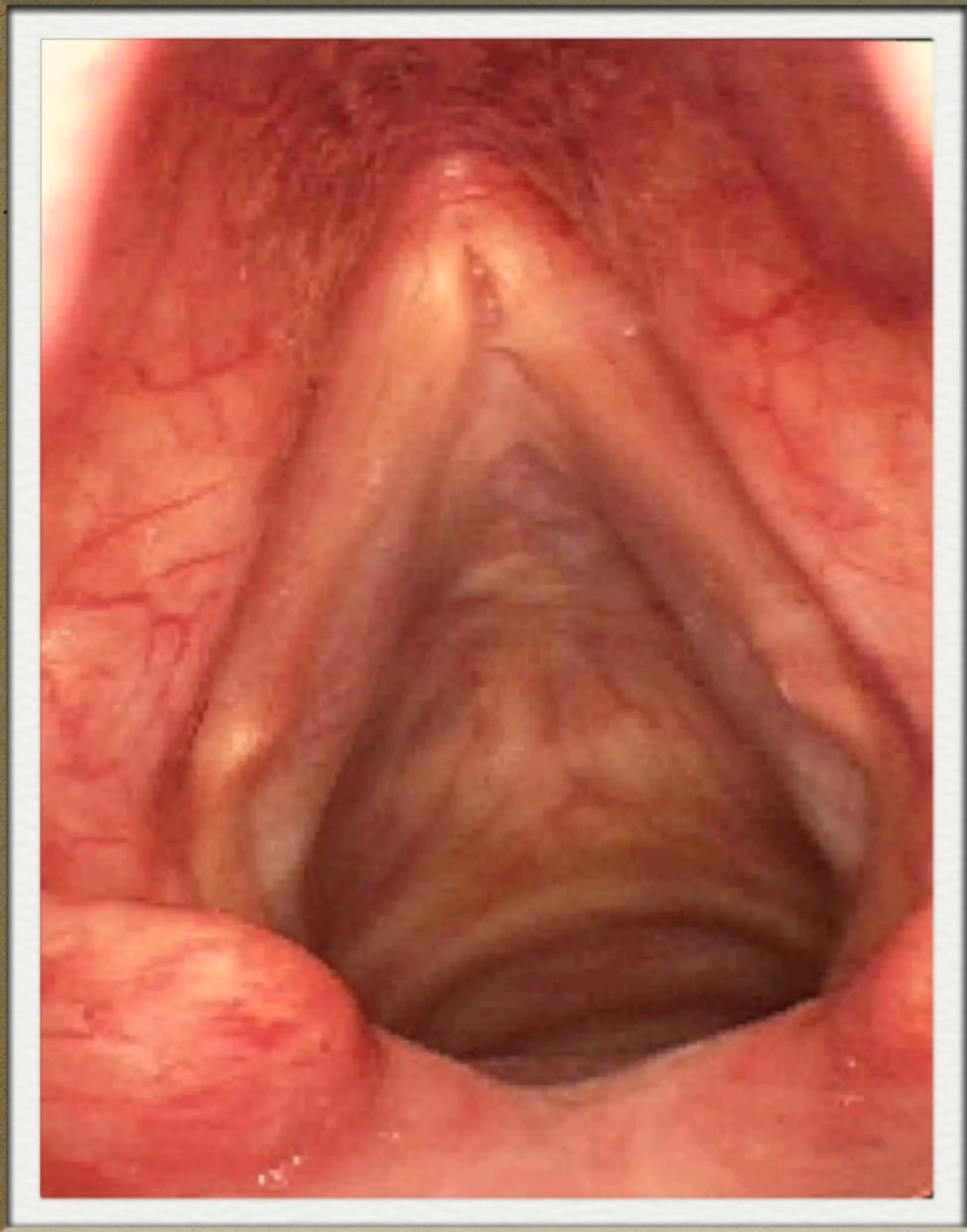
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Department of Communication Disorders

# Goals

- The Human Instrument: Anatomy & Physiology
- Vocal Wellness
- Issues of Illness and Vocal Pathology
- The Role of the Speech-Language Pathologist
- Questions

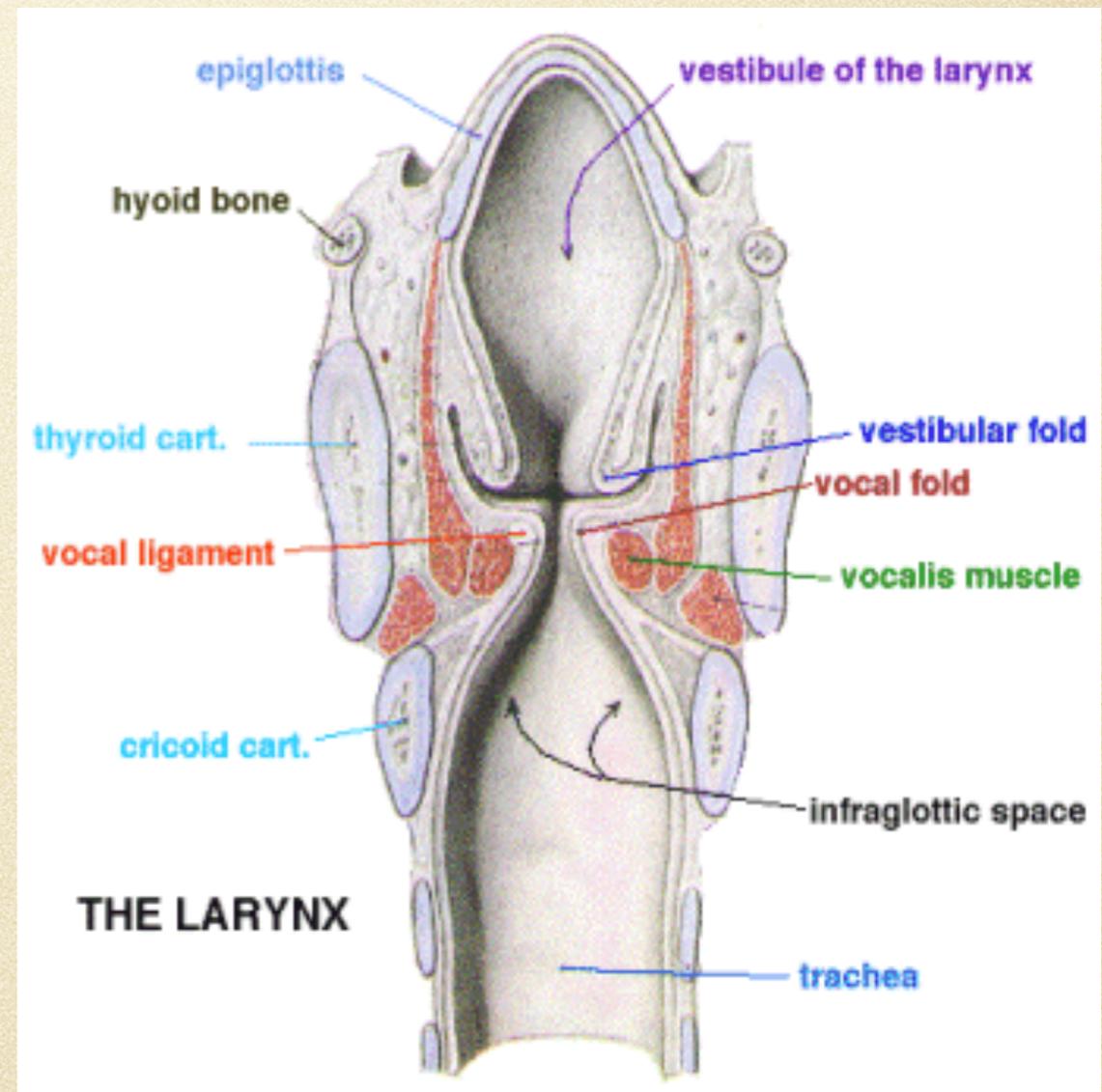


# THE HUMAN INSTRUMENT



# The Larynx

- The larynx (“lair-inks”)
- True vocal  folds
- False vocal folds (ventricular folds)
- 13 muscles controlling movement
- Joints that allow for amazing motion



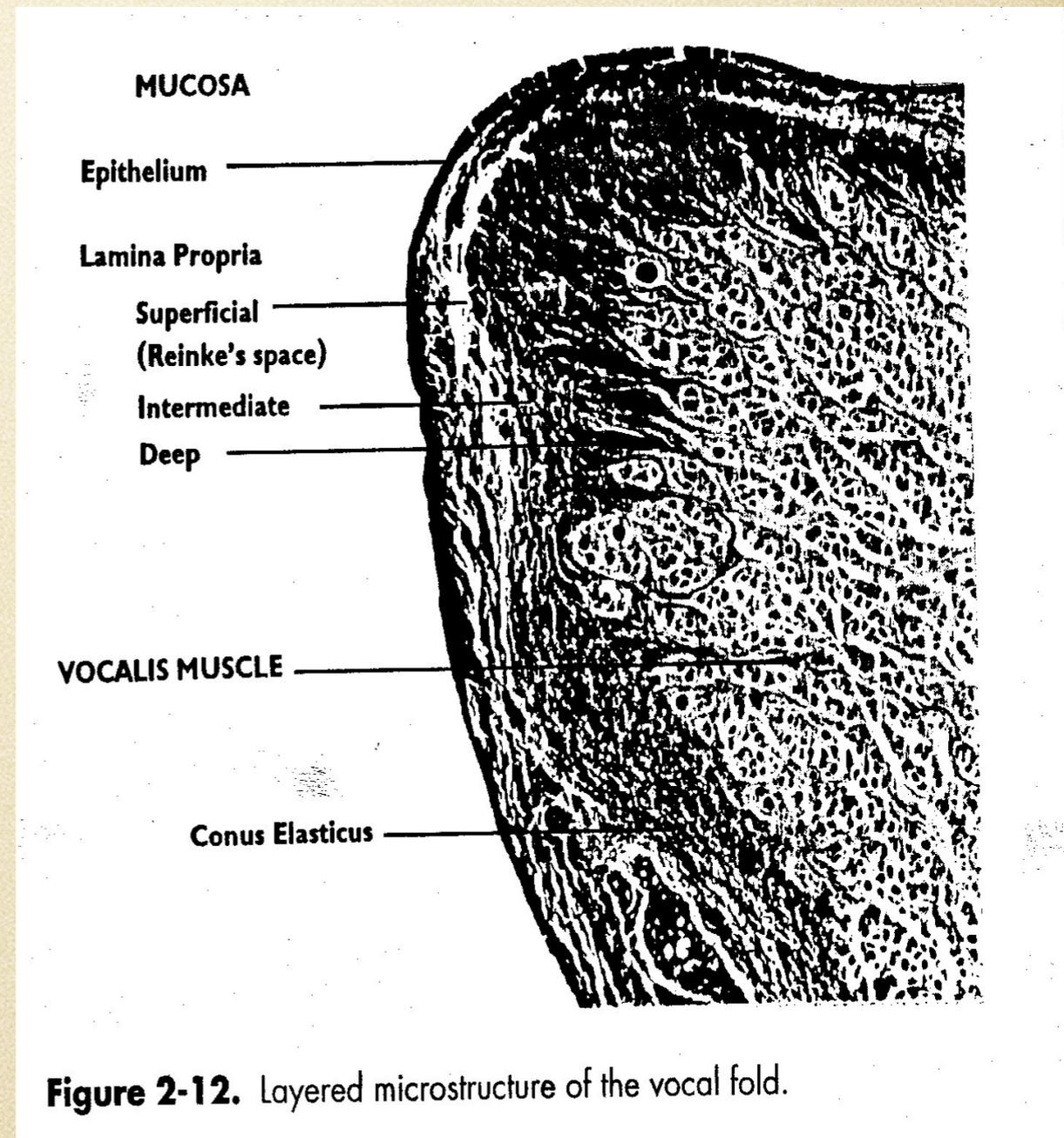
## PHONATION - SUSTAINED VOWEL



- VF move apart from one another for breathing and come together for voicing, swallowing, etc
- VF vibrate rapidly
  - Female - 180 - 250 X per second for speech
  - Male - 100-150 X per second for speech

# Layered Nature of the VF's

- Epithelial layer
  - Very Thin
- Reinke's Space
  - A gelatinous-like layer
  - A rippling, wavelike motion in this layer during voicing
  - Where many vocal pathologies form
- Muscle Layer



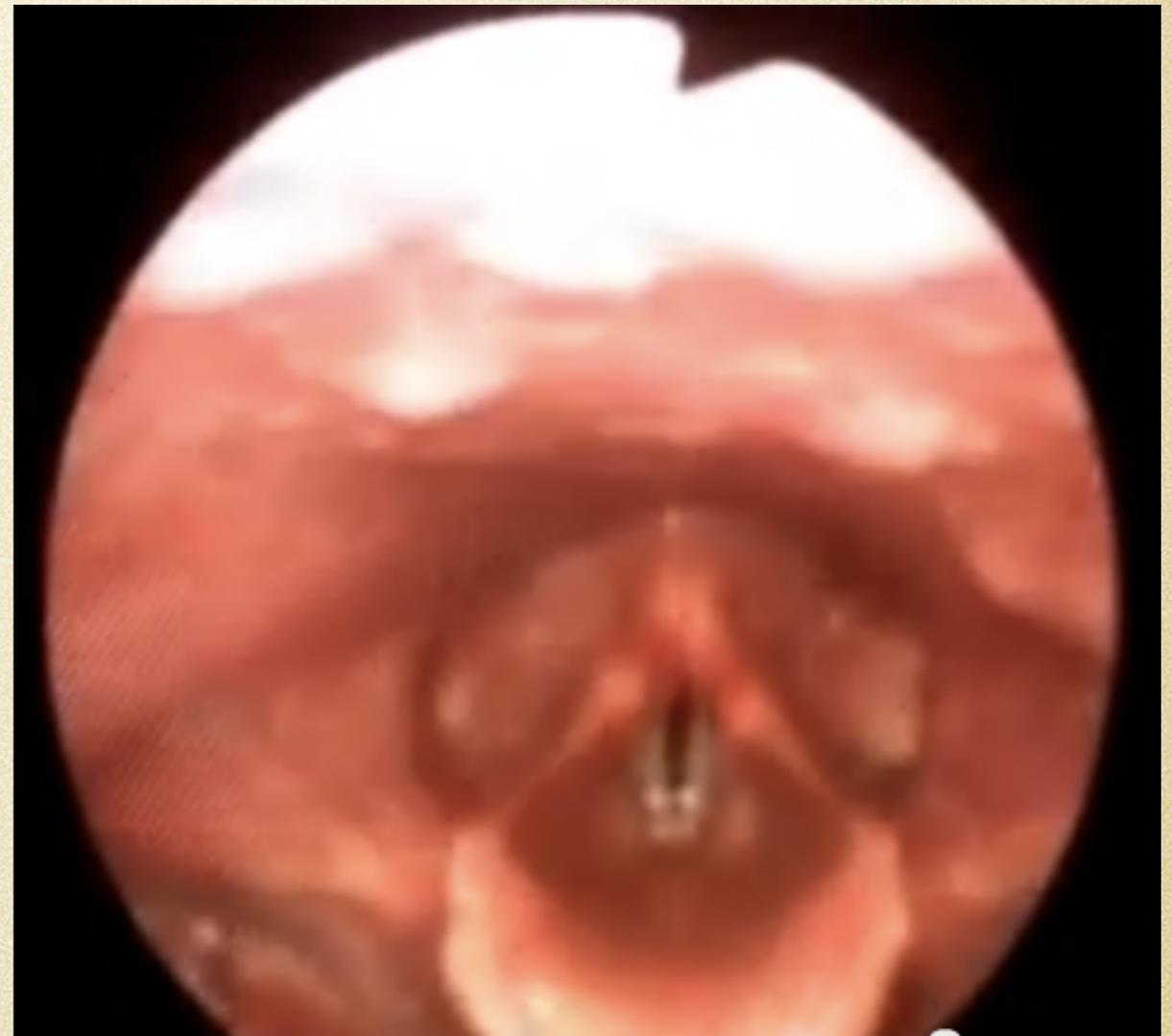
# Vocal Folds

## Bottom Line for Performers

- Larynx and vocal folds are highly sophisticated in their design
  - Joints that allow amazing movement
  - Layered nature allows pliable movement atop a solid “platform”
  - Muscle type allows for rapid muscle contractions that can be sustained over a long period

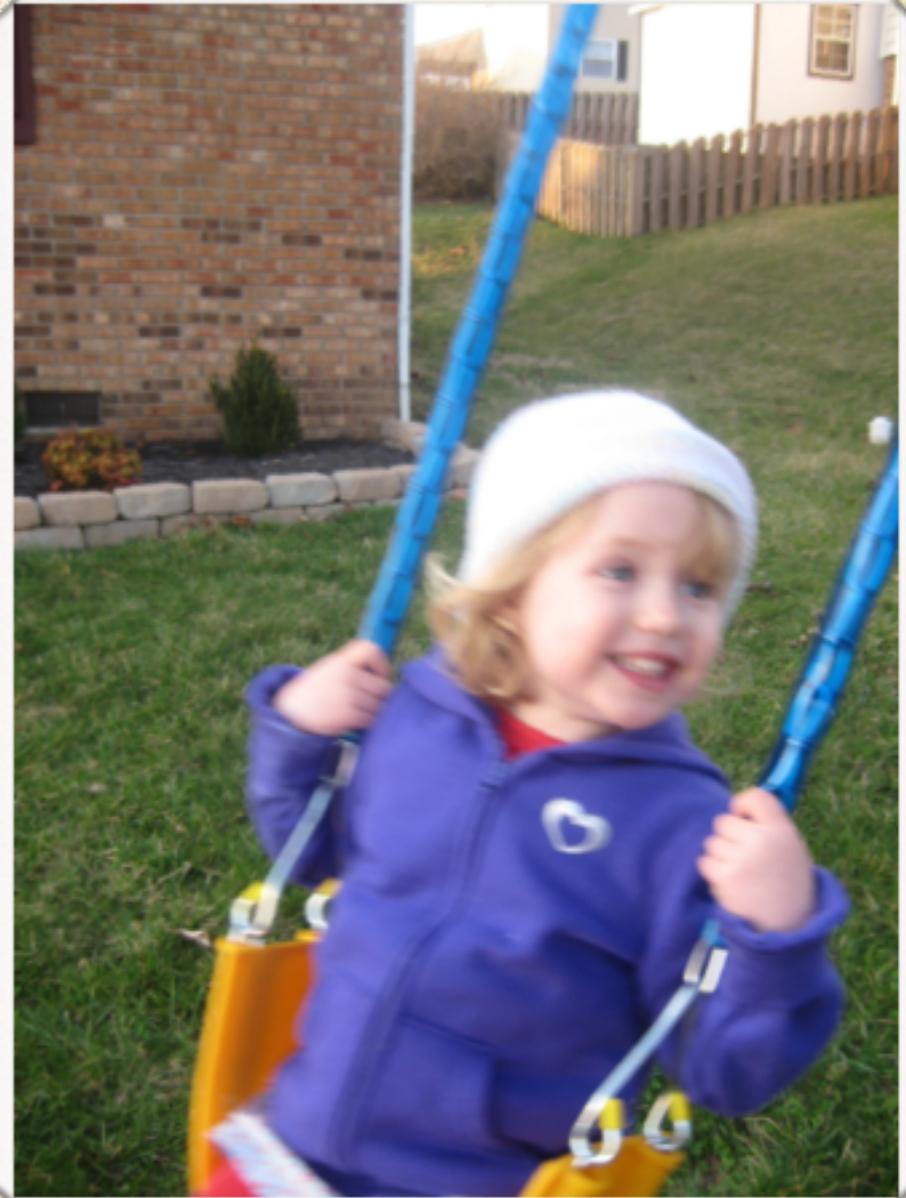
# The Vocal Tract

- Includes area just above vocal folds to the lips
- Can be modified (shape, length, etc)
- An interplay between the vocal tract and the larynx



# The Vocal Tract Can Provide a “Kick”

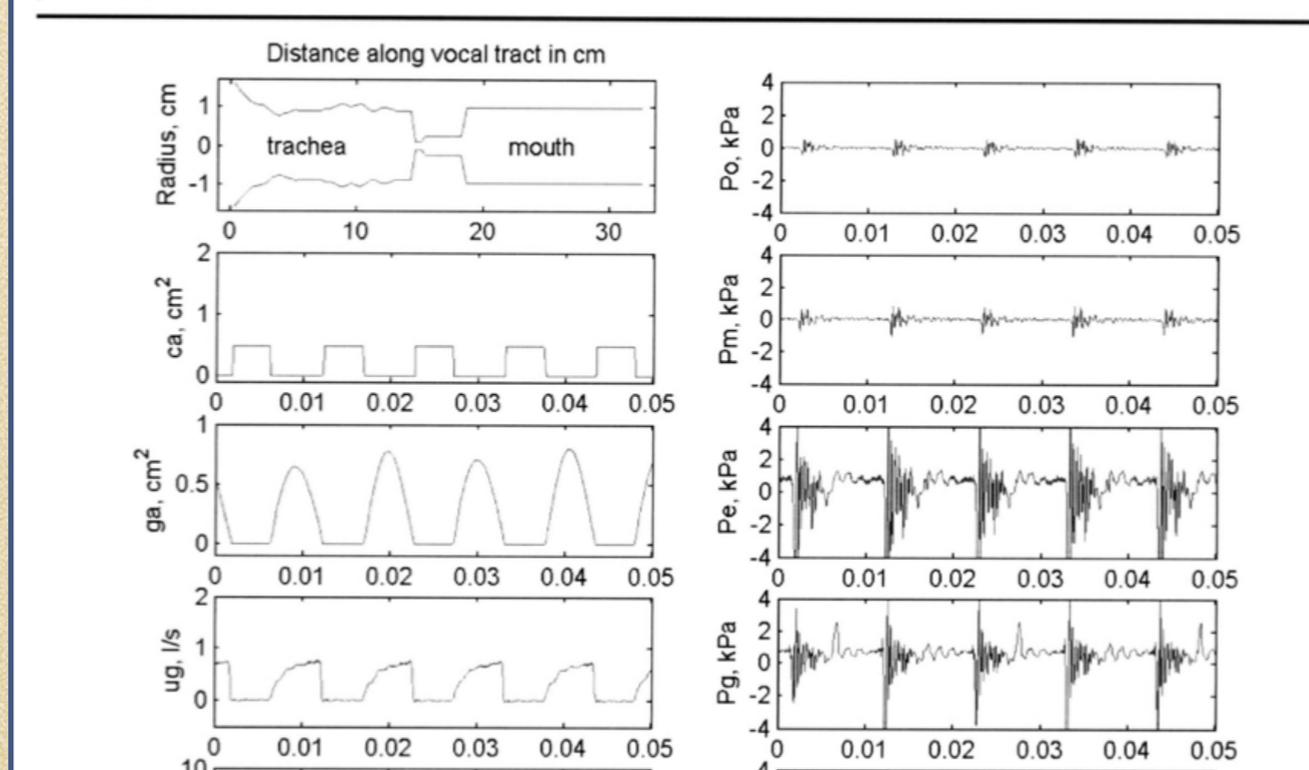
- The vocal tract reacts to the air coming up from the larynx
- Used properly, the vocal tract can augment the laryngeal tone (can “kick” it, as a well-timed push applied to a swing).
- Singers must be trained to shape the tract (favorable vowels, etc) to get this “kick.”
- Easier for classical forms than other non-classical (contemporary) forms



# The Vocal Tract Can Protect the Vocal Folds

- Proper shaping of the tract can assist in VF vibration and, thereby, *protect the folds*
- *You can use the vocal tract to protect healthy folds and to potentially heal injured folds.*

**Figure 5.** Computer simulation results for the narrow-wide configuration. Top left is the vocal tract outline, followed by contact area ( $ca$ ), glottal area ( $ga$ ), glottal flow ( $ug$ ), and glottal flow derivative ( $dug$ ). On the right are (top to bottom) oral radiated pressure ( $P_o$ ), mouth pressure ( $P_m$ ; directly behind the lips), pressure at the input of the epilarynx tube ( $P_e$ ), pressure in the glottis ( $P_g$ ), and subglottal pressure ( $P_s$ ).



Titze, 2006 models the vocal tract posture that leads to the “most efficient” voice

# The Vocal Tract

- Role of vocal tract often ignored by my field
- Lessac - Brought SLPs attention to the vocal tract
- Now employ the vocal tract / resonance in therapy for laryngeal problems

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# Habits *and* Best Practices

*for the* Professional Voice User

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# General Vocal Abuses

- Yelling, screaming, loud talking, talking over noise
- Speaking or singing too loudly, too much, and out of range
- Overuse of the voice
- “The show must go on” syndrome
- Non-work vocal habits (weight lifting, little sleep, poor diet)
- Inappropriate speaking voice
- Throat clearing & coughing
- Poor hydration

# Vocal Hazards Specific to the Singer/Actor

- Emotional Scenes
- Working over background noise (storms, orchestra, stage combat, ventilation systems, sirens, etc.)
- Oversinging or speaking
- Theater size
- Smoking/Alcohol
- Fog machines/theater dust
- Talking too fast, too much, too loud

# Vocal Hazards Specific to the Music Teacher

- Talking for long periods
- Singing, talking over noise
- Talking, singing in acoustically poor settings
- Using voice to get attention of students

# Best Practices

- Warm-ups (*Gish, Kunduk, Sims, McWhorter, 2012*).
  - Prepare VFs to work without injury
  - May prevent or delay vocal fatigue
  - Duration between 5 and 10 minutes
  - Various options (vocal function exercises, straw phonation, etc)
- Vocal Rest (*Gish, Kunduk, Sims, McWhorter, 2012*).
  - Continual overuse can result in long term damage
  - Mix periods of *modified* rest into the schedule
  - Total voice rest rarely recommended (only in particular medical cases)

# Best Practices

- Hydration (*Timmermans et al., 2005*)
  - Dehydration yields thick mucous; can interfere with VF vibration
  - Drinking water
    - lowers the viscosity of the mucus
    - allows more limber and flexible VFs
    - may lower threshold of phonation (Verdonlini)
- Food / beverage (*Timmermans et al., 2005*)
  - Caffeinated drinks and alcohol may dry the laryngeal mucosa.
  - Be knowledgeable of reflux and reflux-triggering foods/habits

# Best Practices

- Use a good speaking voice
  - Frontal focused voice or high placed voice
  - If feel a back focused or pressed voice - Do exercises to reset
- Train the system physiologically
  - Train the muscles with specific exercises apart from vocalise
  - Physically train the muscles (respiration, phonation, resonance) and artistically train the system



Illness

# Illness

- Happens to all at some point
- Can't totally prevent the common cold
- Can do basic care to reduce risk
  - Hand washing
  - Eat well
  - Rest



# Illness: Precautions

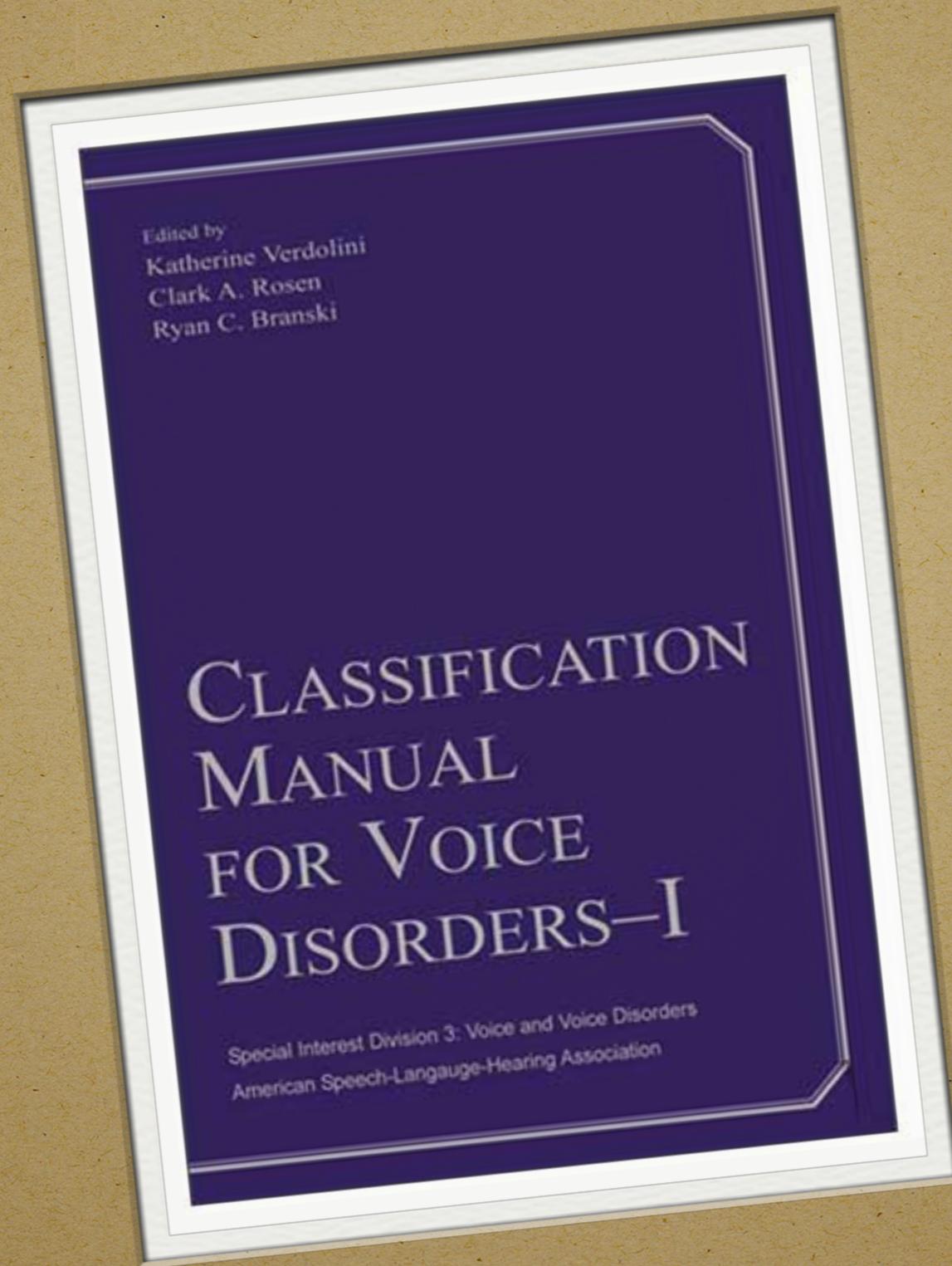
- Never “sing through” or “teach through” an illness
- Whispering and / or “backing off” to protect the voice not helpful and may create harmful patterns
- Be careful with medication choices
  - Visit <http://www.ncvs.org/rx.html>
  - Issues of drying, bleeding, etc
  - Danger with steroid shots to help “push through” - still damaging just unaware

# Signs that the Voice Is in Danger of Injury

- Dryness
- Inability to sing softly
- Loss of vibrato
- Other perceptual changes (roughness, breathiness, lowering of pitch, etc)
- Vocal fatigue

# Vocal Fatigue

- Two Types of Vocal Fatigue
  - Muscle
  - Tissue

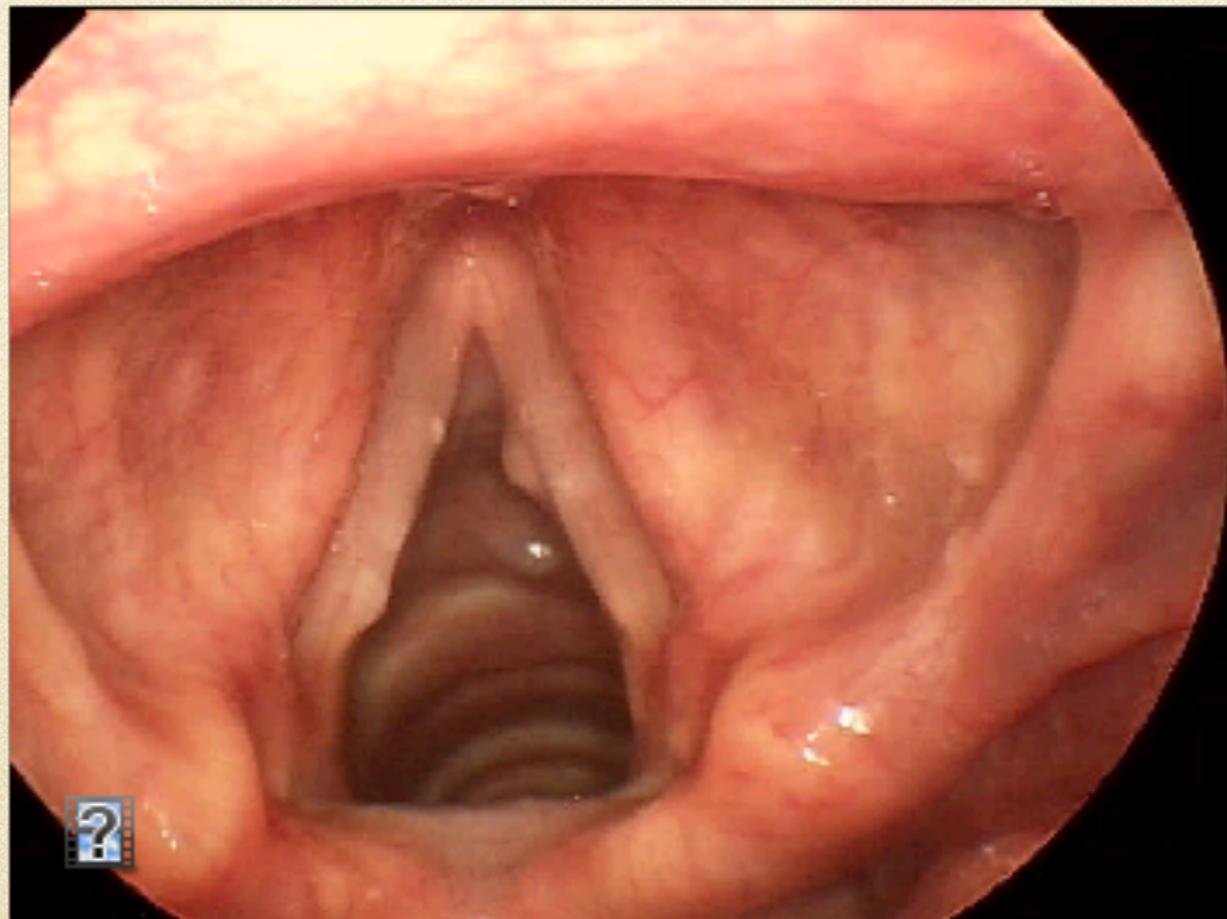


# Vocal Fold Pathology

# Common Pathologies

- Nodules
- Acute or Infectious Laryngitis
- Laryngeal Myasthenia (muscle fatigue)
- Polyps
- GERD / LPRD
- Contact Ulcers, Granuloma
- Hemorrhage (not common, but the potential exists, higher risk at some times)
- VF Paralysis / Paresis
- Muscle Tension Dysphonia

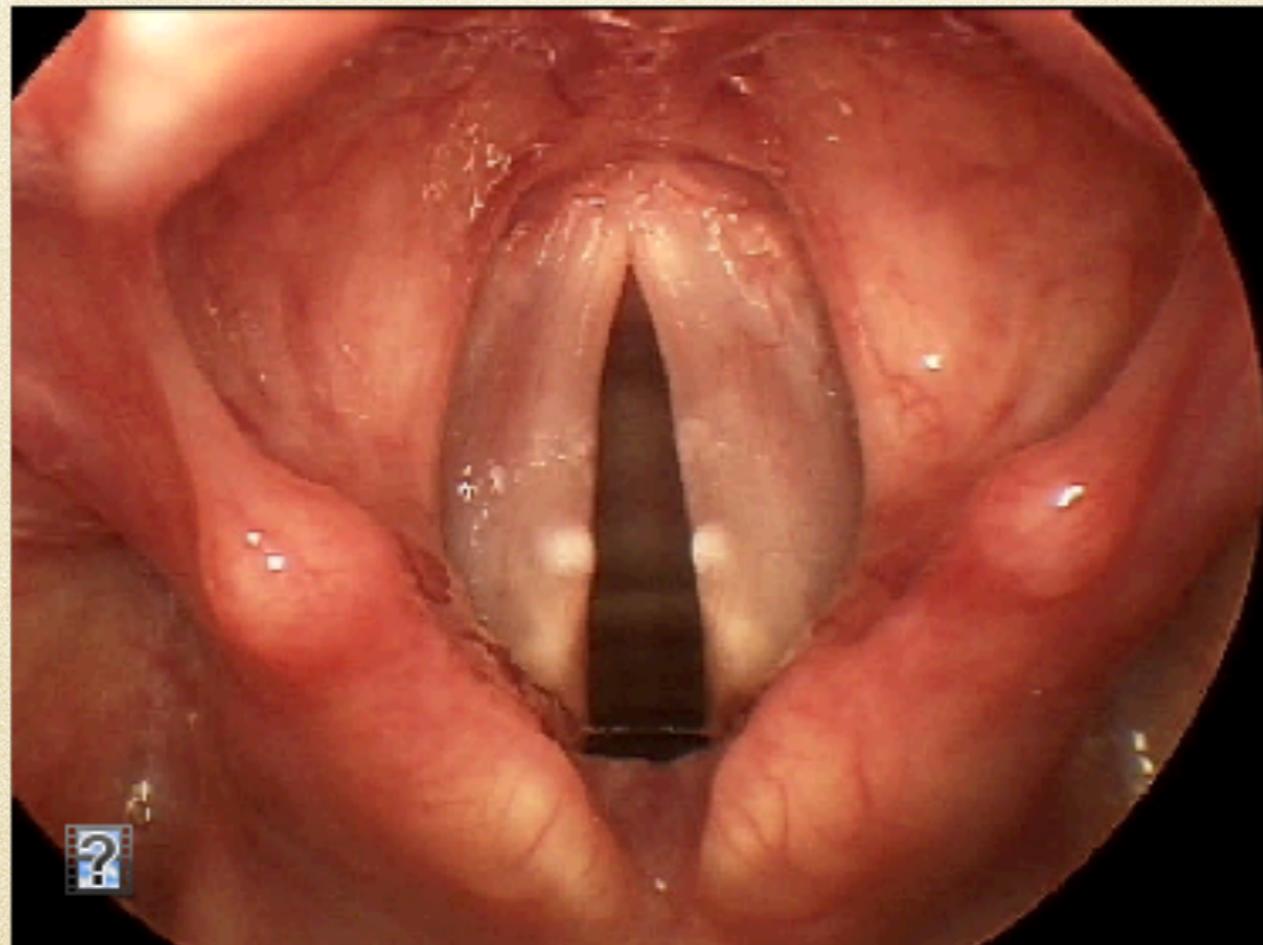
# Nodules



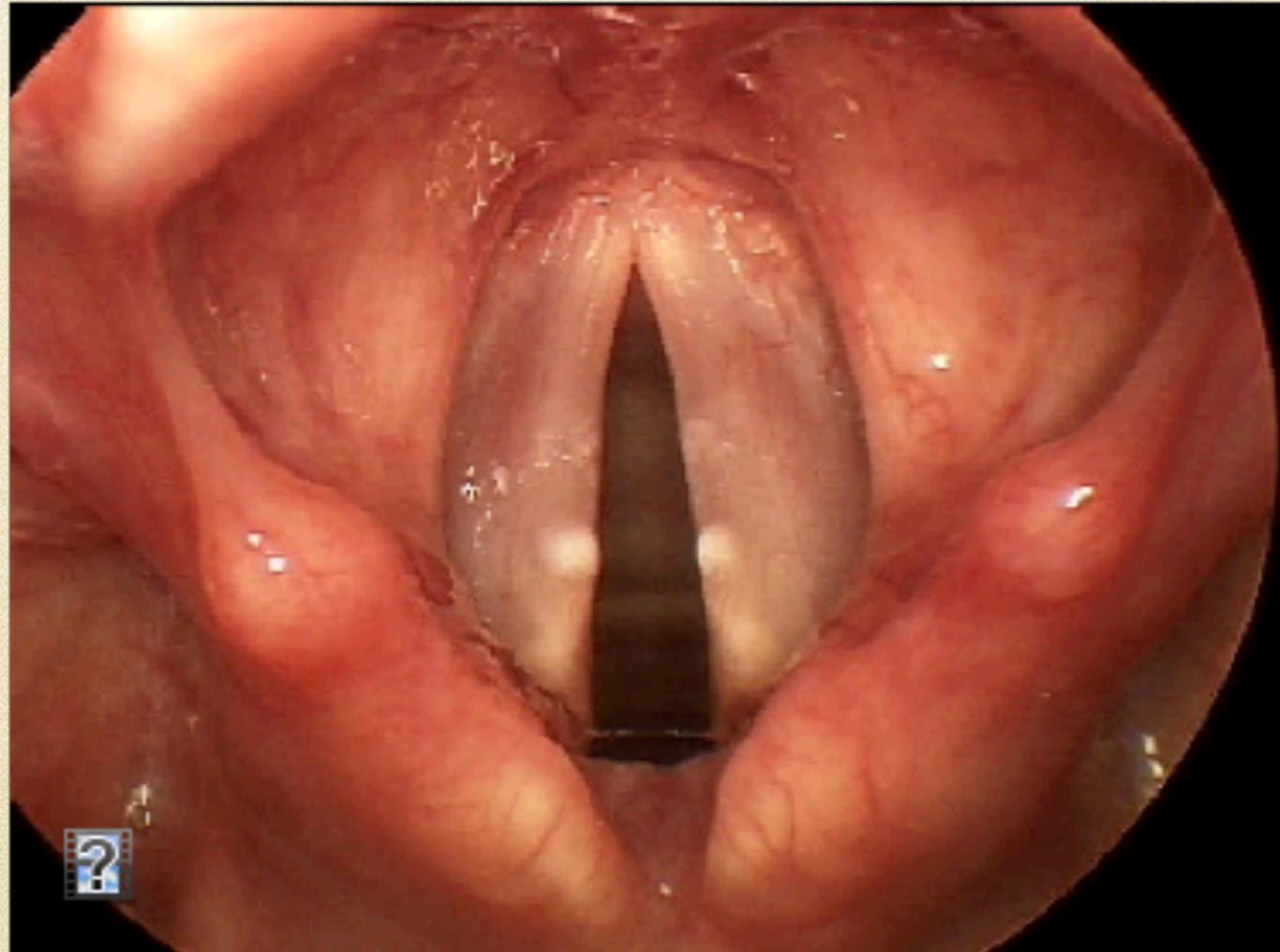
# Granuloma



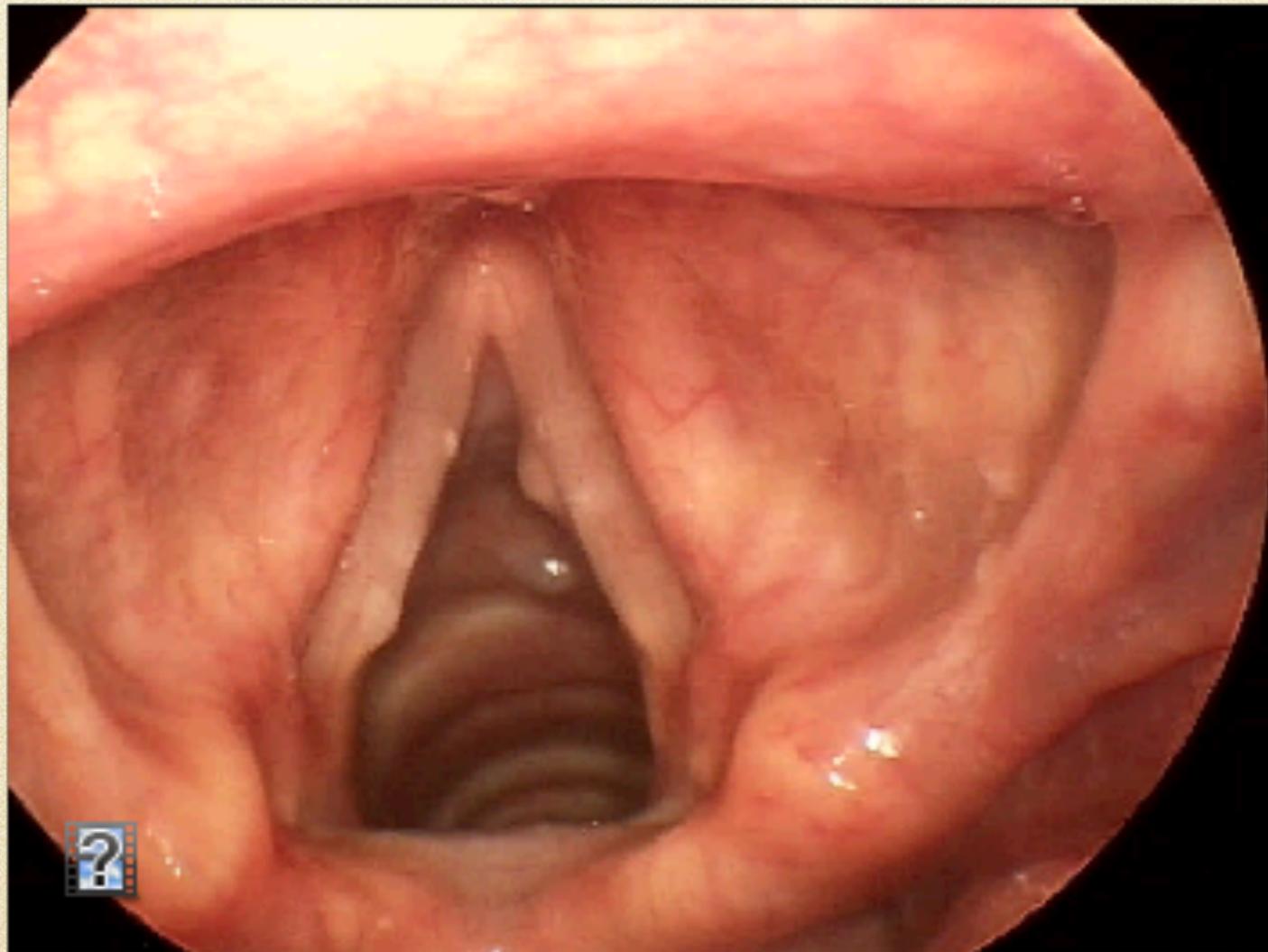
# Contact Ulcer / Reflux



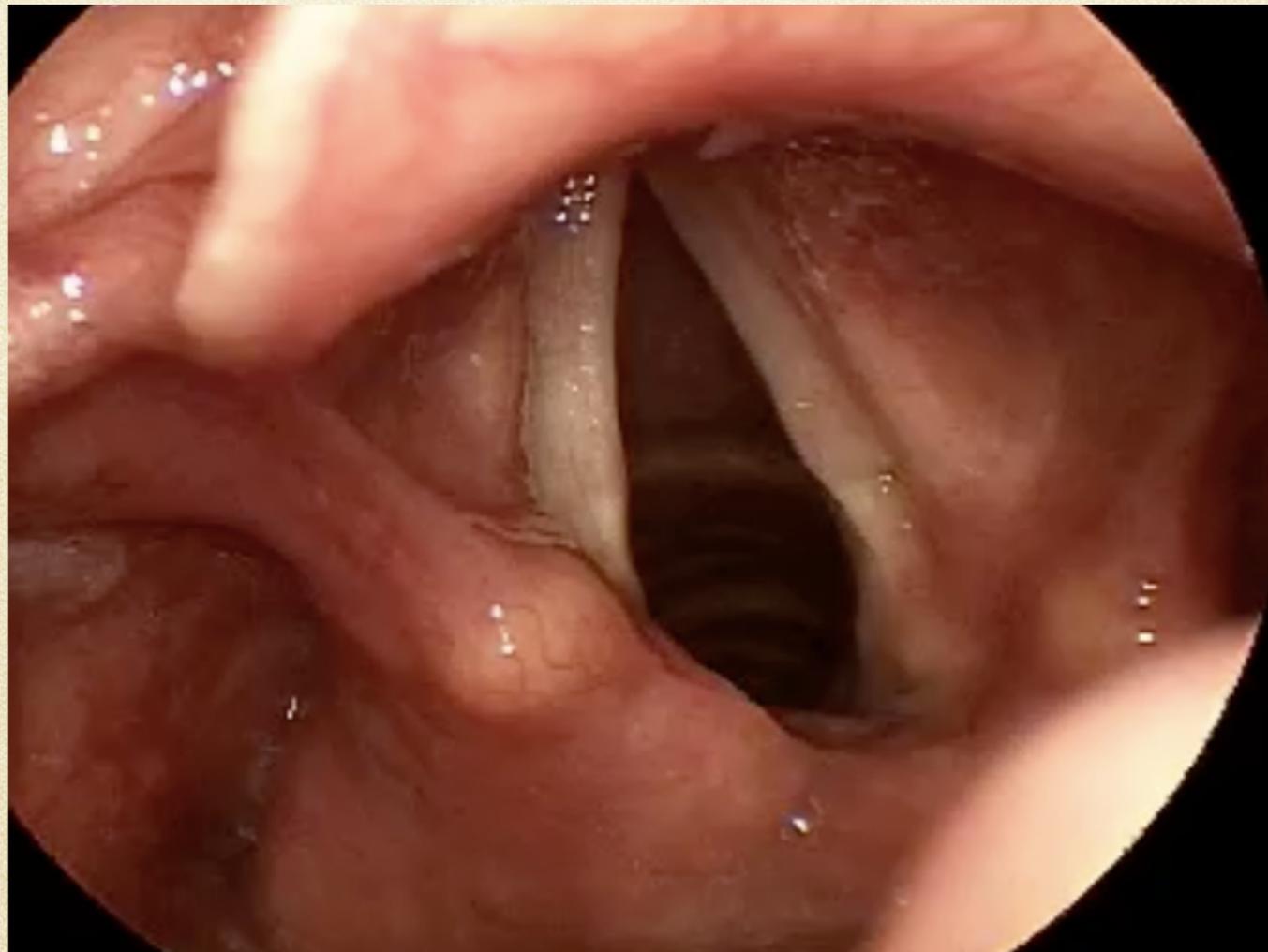
# Irritated Larynx



# Cyst



# Vocal Fold Paralysis



# Muscle Tension Dysphonia



# Lundy et al.

- Pathological findings in a high percentage of asymptomatic singing students
  - 8% early benign VF lesions
  - 73% irritation of posterior larynx - strong indicator of reflux

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# The Role of the Speech-Language Pathologist

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# Speech-Language Pathology

- Broad field
- Children through geriatrics
- Master's Degree and 9 months of Fellowship Training required
- Certificate of Clinical Competence (CCC)
- Some (but very few) specialize in voice

# Speech Therapy and the Voice

- Must have physician referral to see an SLP for a voice concern (preferably an ENT referral)
- Initial session - Evaluation
  - History - Extensive
  - Listening to and rating the voice
  - Acoustic and / or aerodynamic measures
  - Self-rating of voice
  - Visualization of the vocal folds during vibration

# Speech Therapy and the Voice

- Major advances in Voice Therapy in recent years
  - Our therapy is grounded in physiology and basic science
  - Yet, there is still an art to the therapy itself
  - Use methods that will position the larynx, vocal folds, and vocal tract for most safe and efficient voice production

# Speech Therapy: Some Examples

- Vocal Function Exercises

- *Stemple, 1993*

- Resonant Voice Therapy

- *Lessac, 1965; Verdolini, 2000)*

- Semi-Occluded Vocal Tract Exercises

- *(Titze, 2006; Kapsner-Smith et al., 2015)*

- <https://www.youtube.com/watch?v=asDg7T-WT-0>

# Speech Therapy: Practical Issues

- Process
  - ENT (otolaryngology) - Find one who specializes in care of the voice
  - Speech Therapy
- Insurance
  - If *medically* necessary covered by many insurances
  - Physician referral required
- Duration
  - Highly individual
  - Most voice experts appreciate the career needs of patients and work to limit the frequency and duration of Tx
  - Much home practice

# Speech-Language Pathology

- As a voice professional - Important to seek out an SLP with expertise in voice or the professional voice
- Major cities, universities
- Can search through [asha.org](http://asha.org) (not by specialty)