Appoggio: Leaning on the Breath of Richard Miller in 21st Century Voice Training

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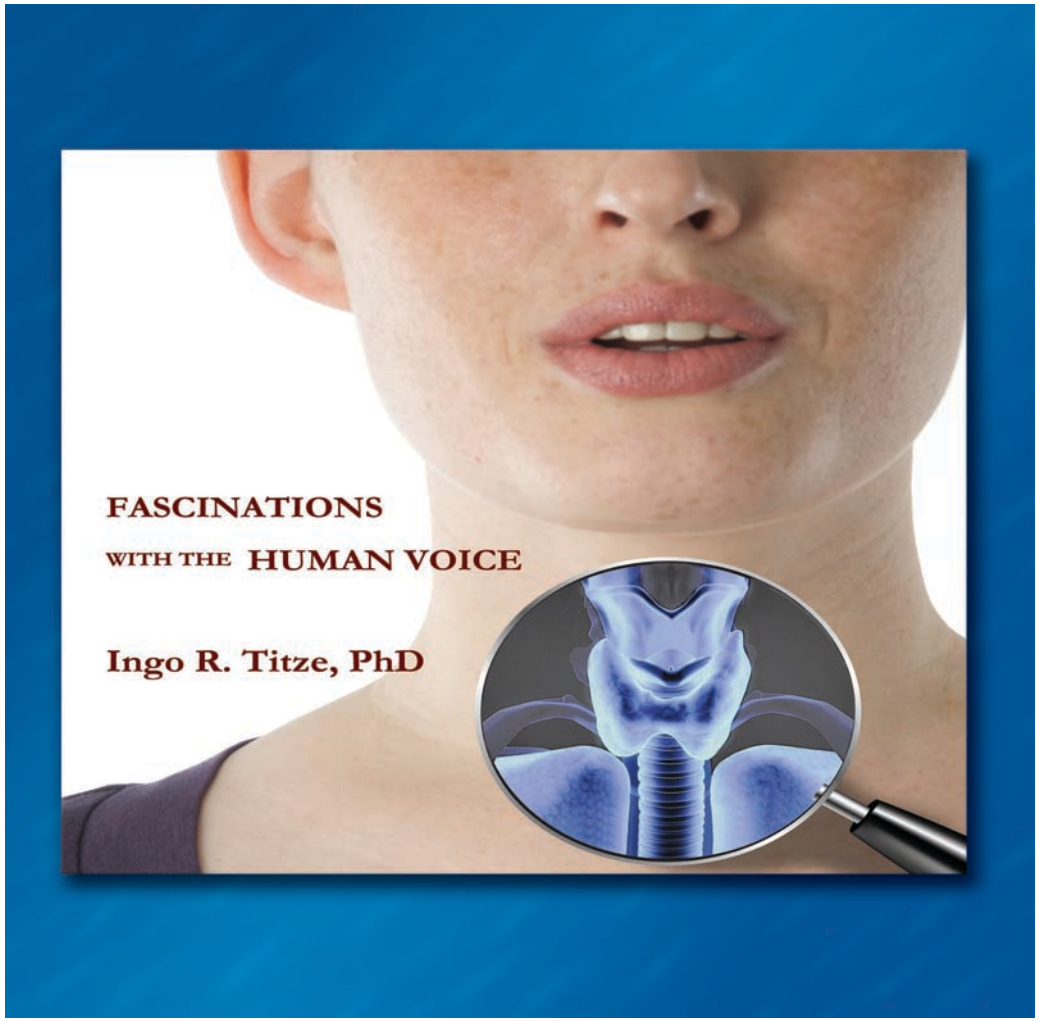
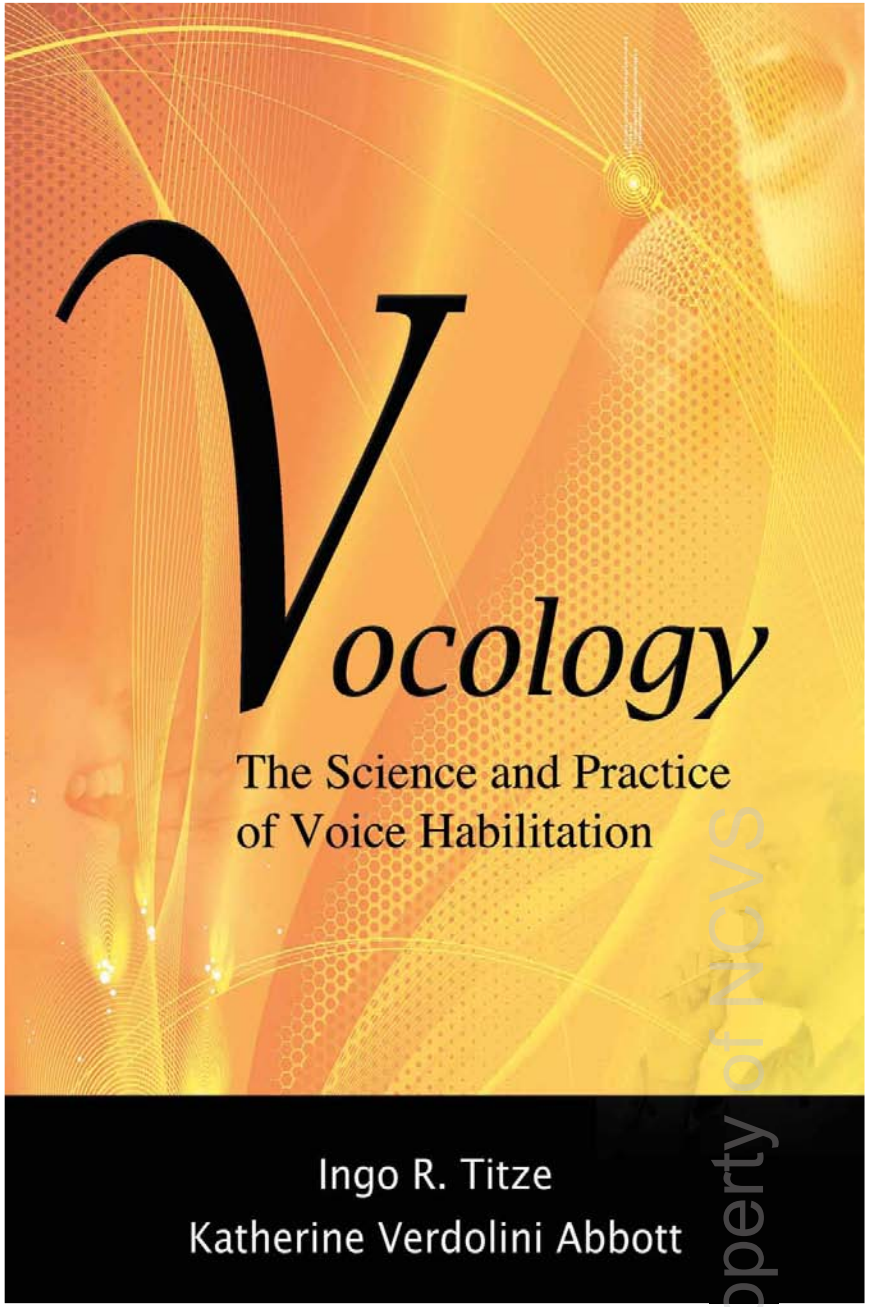
OUTLINE

- Fascinations with the Human Voice
  - Animal and human vocalization
  - Man-made vs. biological instruments
  - Vocalization and body health
  - The importance of mixed registration

- 21st Century Technological Studio Aids
  - Simulation
  - Dosimetry
  - Displays of vocal tract outlines





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Photographer: NCVS


Syrinx
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What's wrong with human vocalization today?

- Too much dull speaking (vocal texting)

- Not enough primal sound-making (messages sent by melody, rhythm, timbre, roughness)


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Samples of

Georgia Brown's

Whistle voice


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Diamanda Galas

“OK”

from

Schrei


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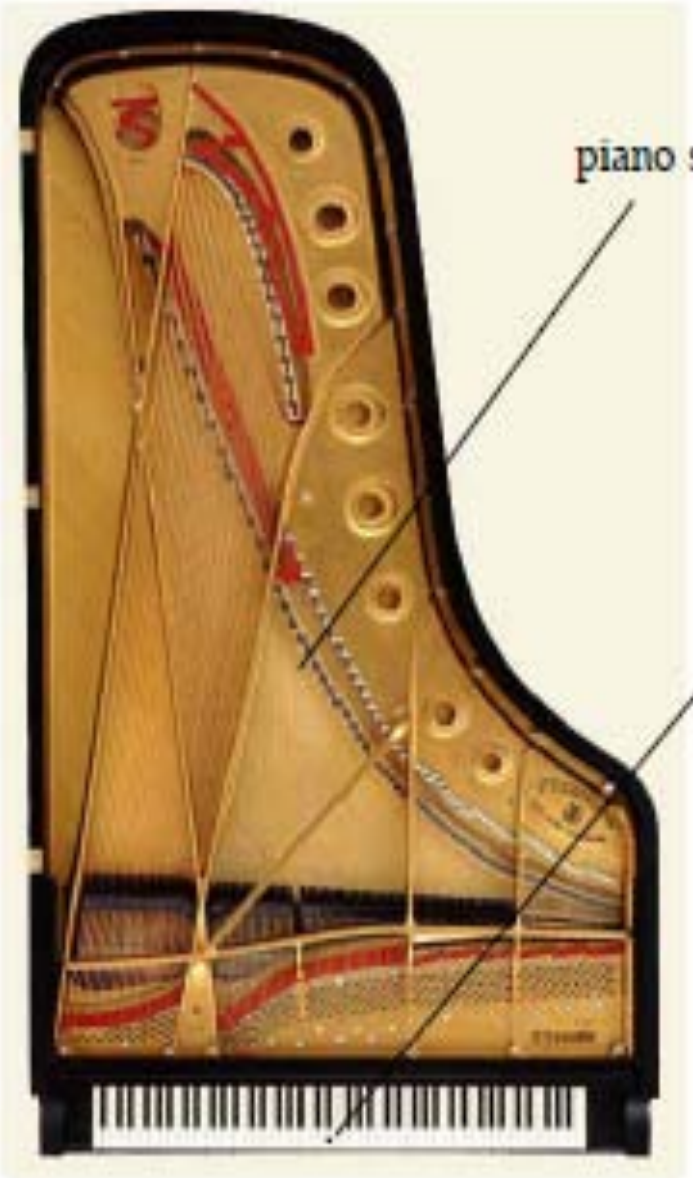
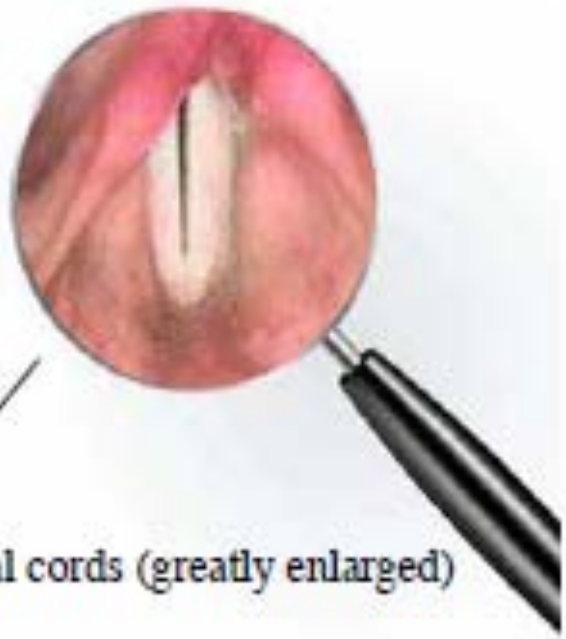
Compared to man-made musical instruments, biological instruments are woefully undersized



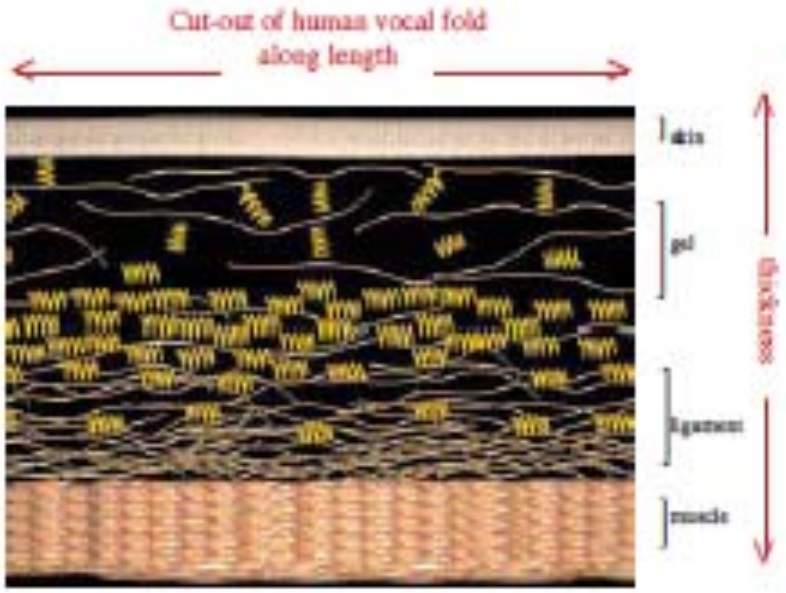
piano strings



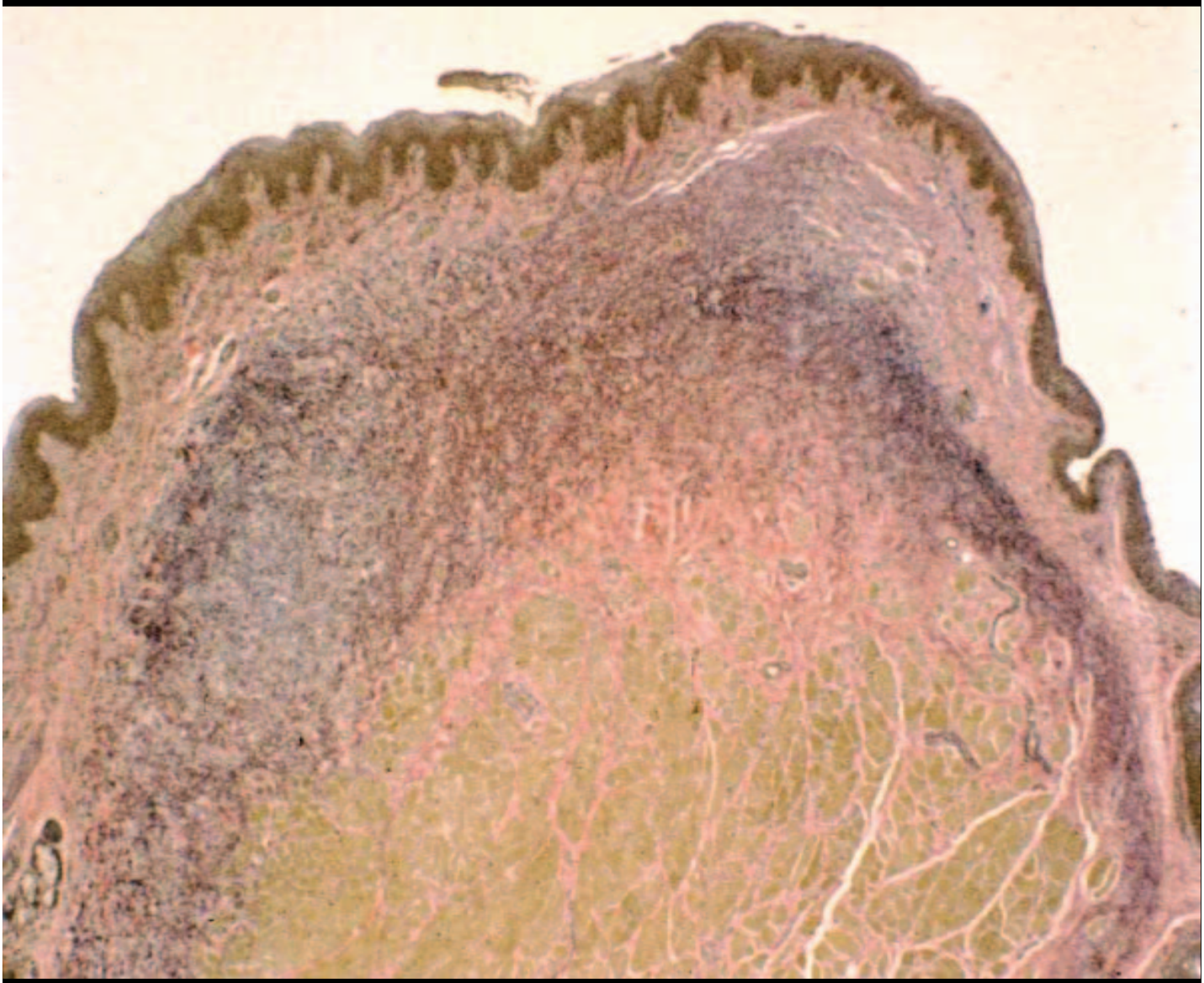
vocal cords (greatly enlarged)

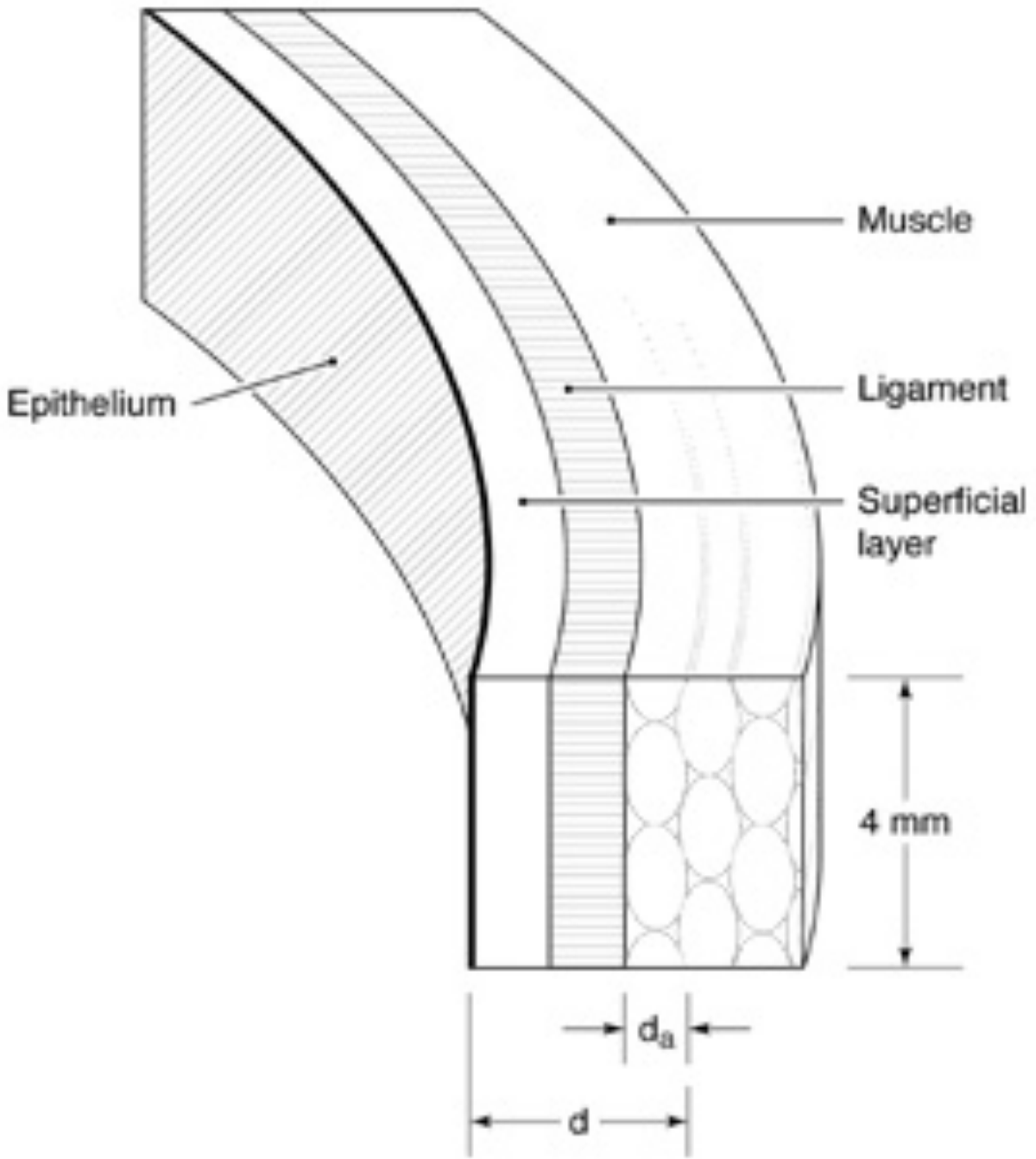
Compare the size of a musical instrument – the grand piano – to the human music-maker, the larynx. Your vocal cords (vocal folds), shown as white bands above, are about the length of your trimmed fingernail, one-hundredth the size of an average piano string. So how does the singer compete musically with a piano?

Instead of multiple long strings, we have one pair of short vocal cords – a lamination of "strings" glued together"

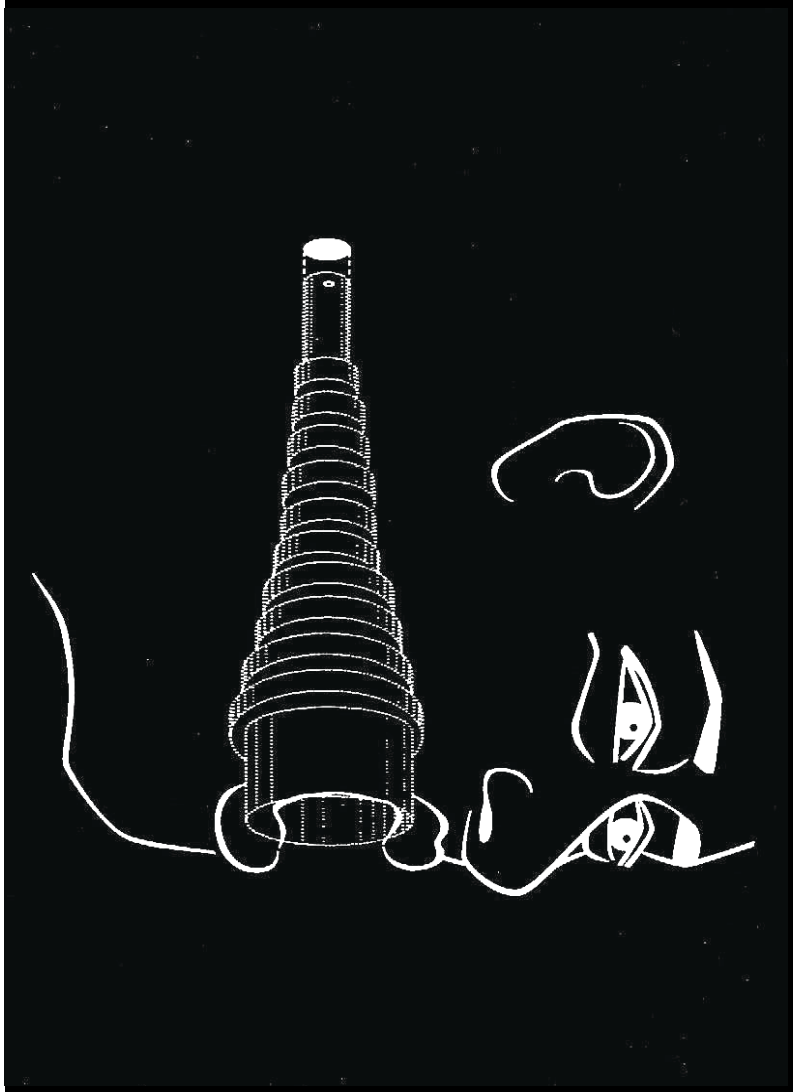


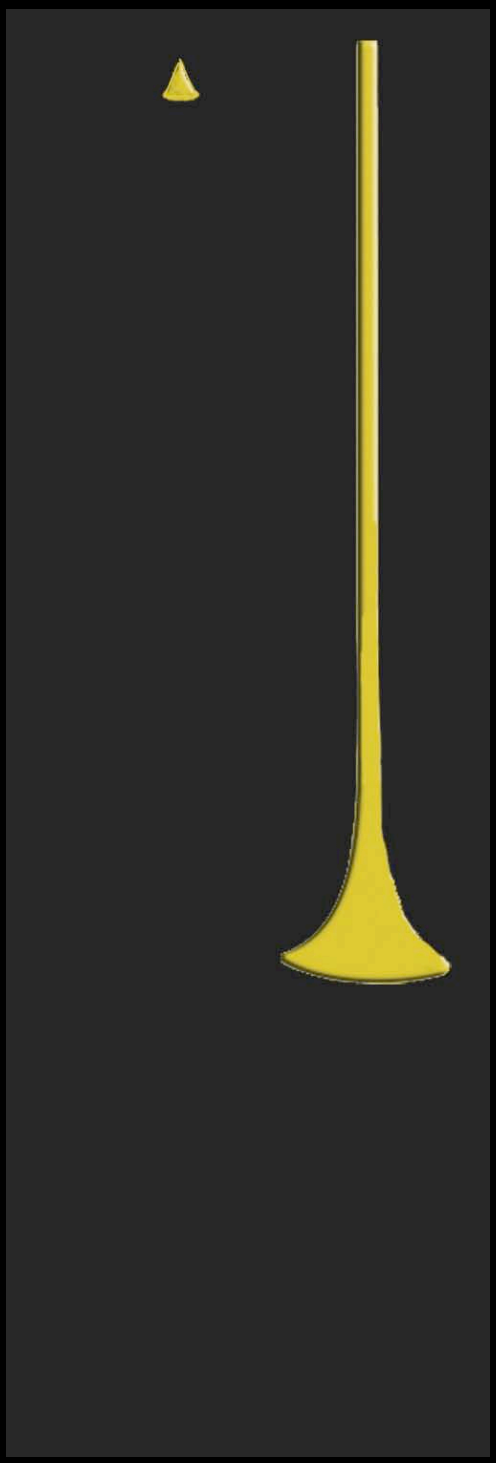
Raising pitch in a guitar is as simple as tightening its strings or shortening them with finger placement. In the human voice, however, biomechanically amazing strands of tissue allow us to increase pitch by lengthening a variety of layers of molecules. The coils, strings, and braids in the schematic symbolize the different tension-bearing molecules, in particular the vocal ligament. These layers allow a pitch range that rivals the pitch range of all six strings of the guitar combined.



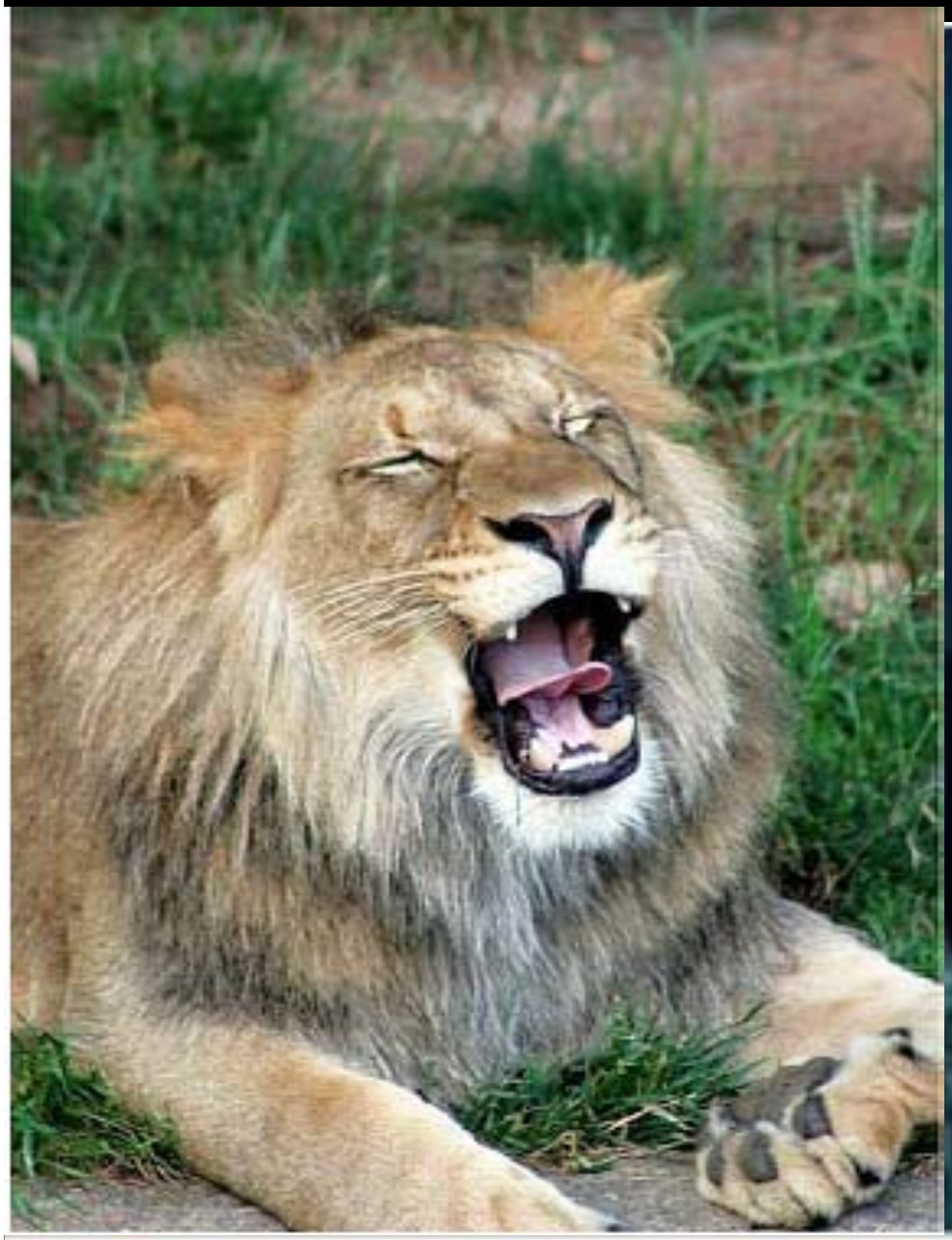


Compared to man-made musical instruments, the vocal tract is extremely short as a resonator of sound

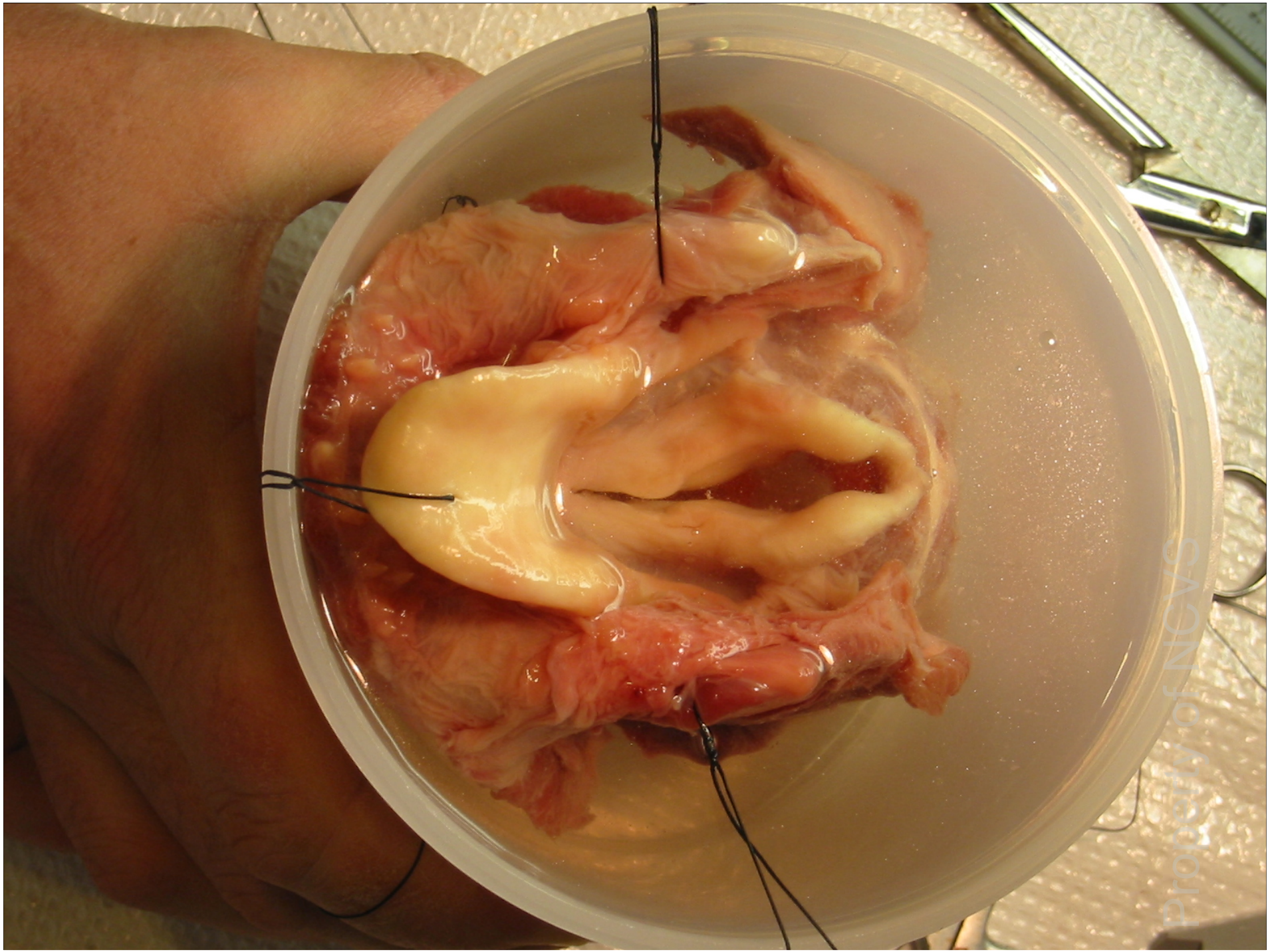




What does a baby cry have in common with a lion roar?

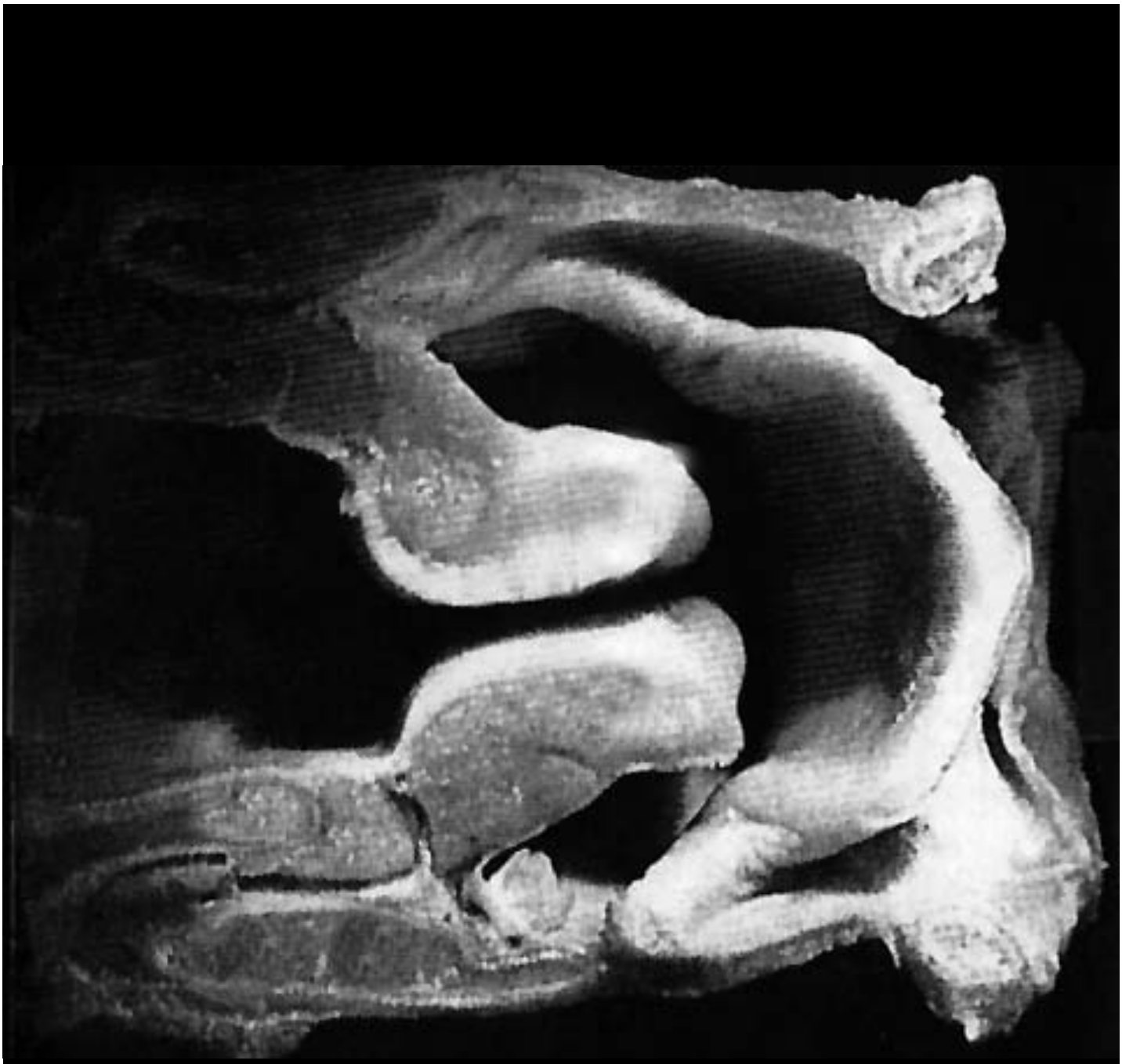


Computer simulation can answer this question

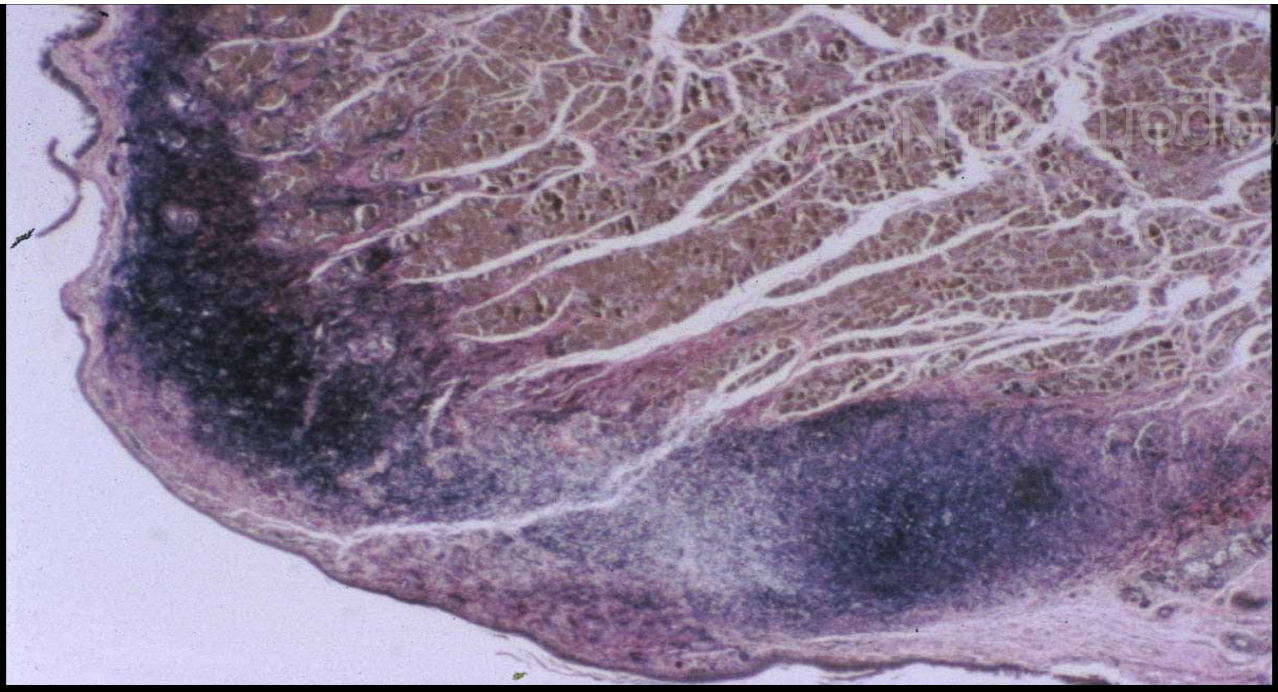

Property of NCVS

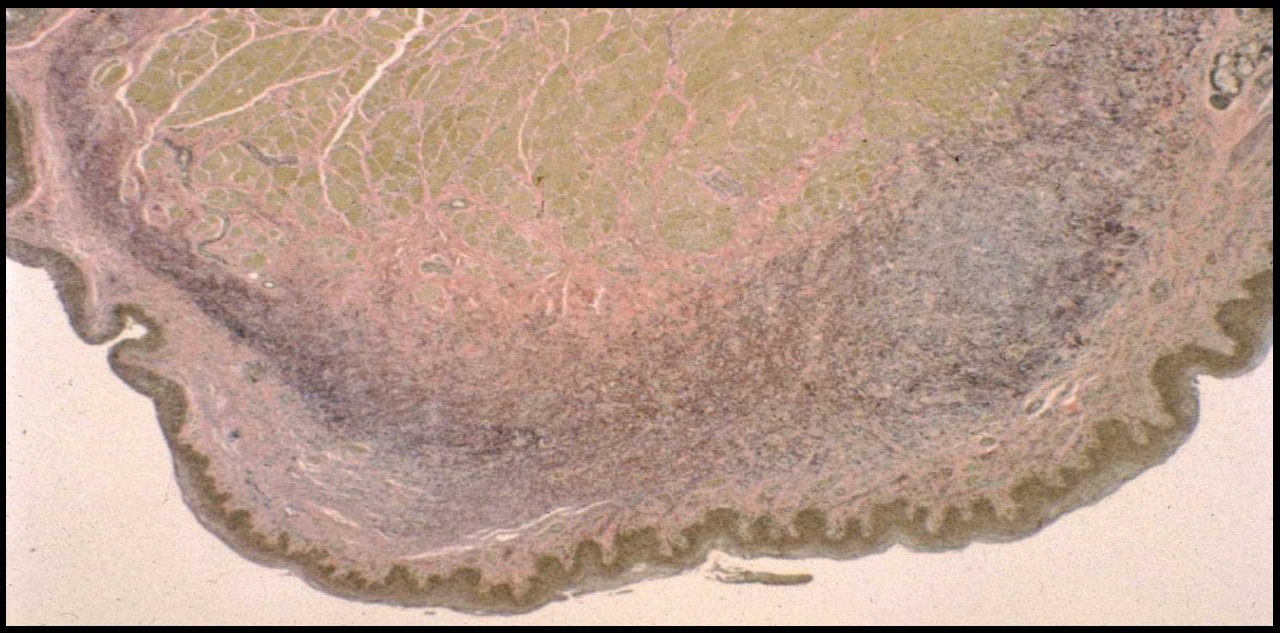
Vocal fold motion

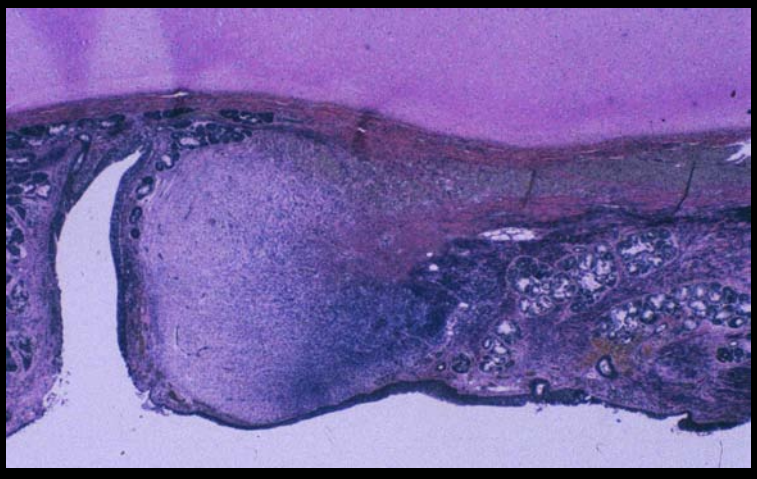
Growl



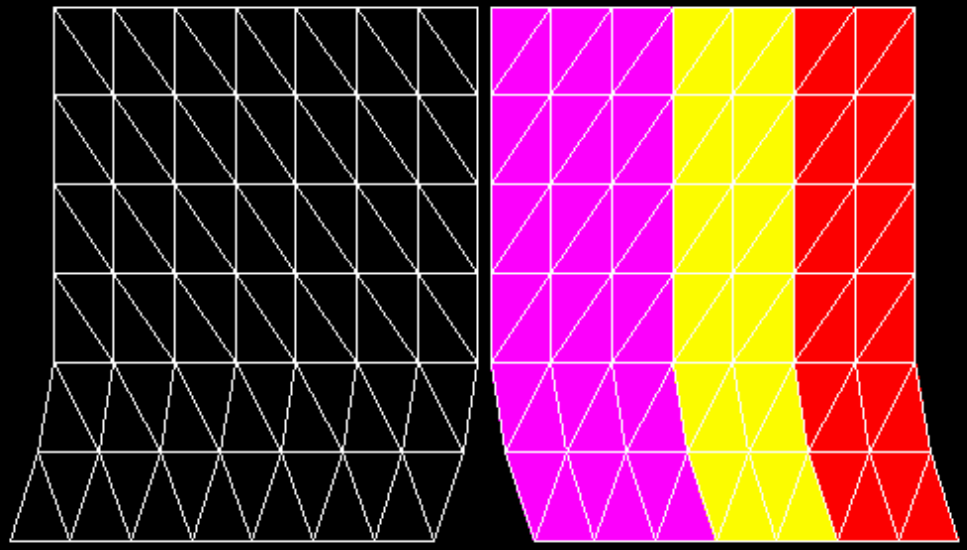
Infant morphology from Hirano's Histological Atlas



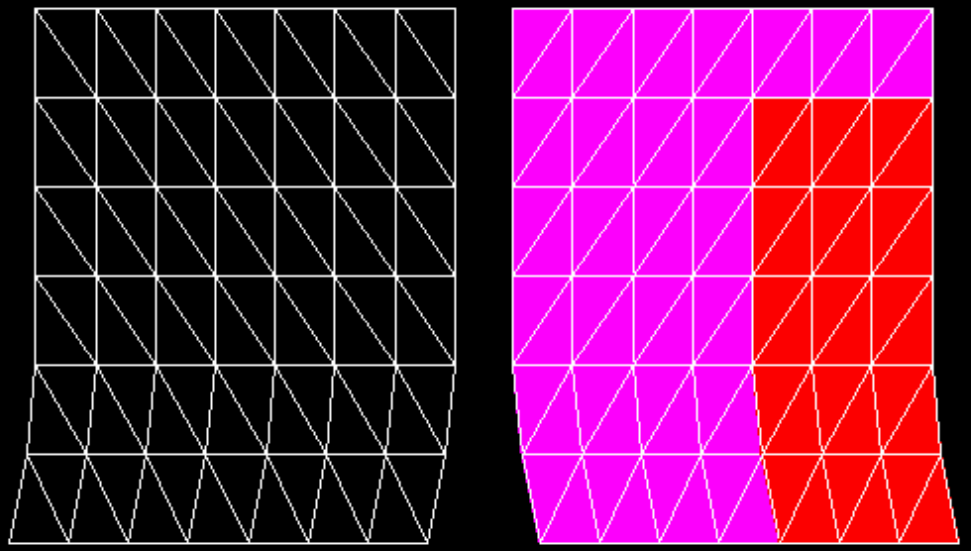


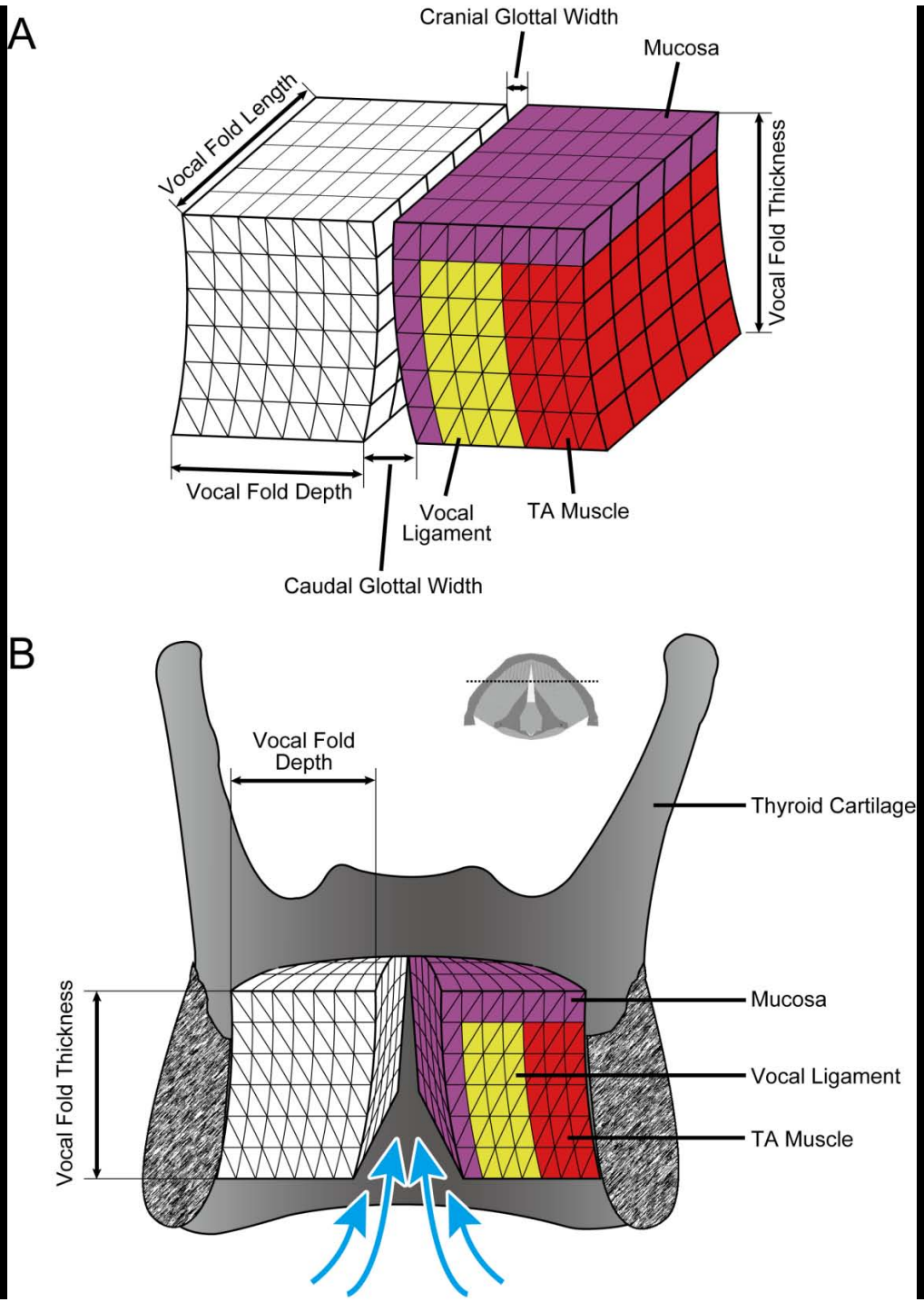


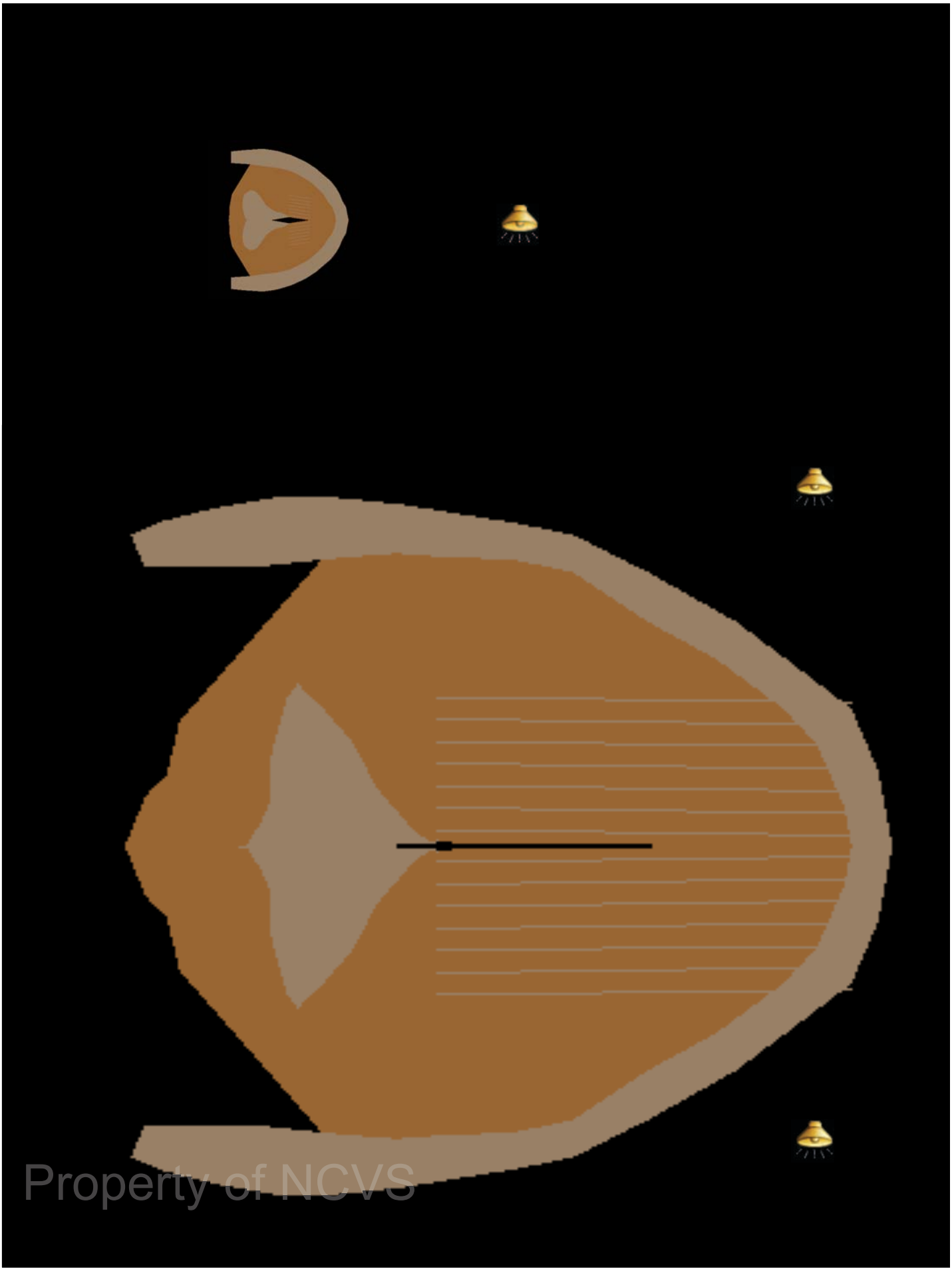
Great Cat



Human infant





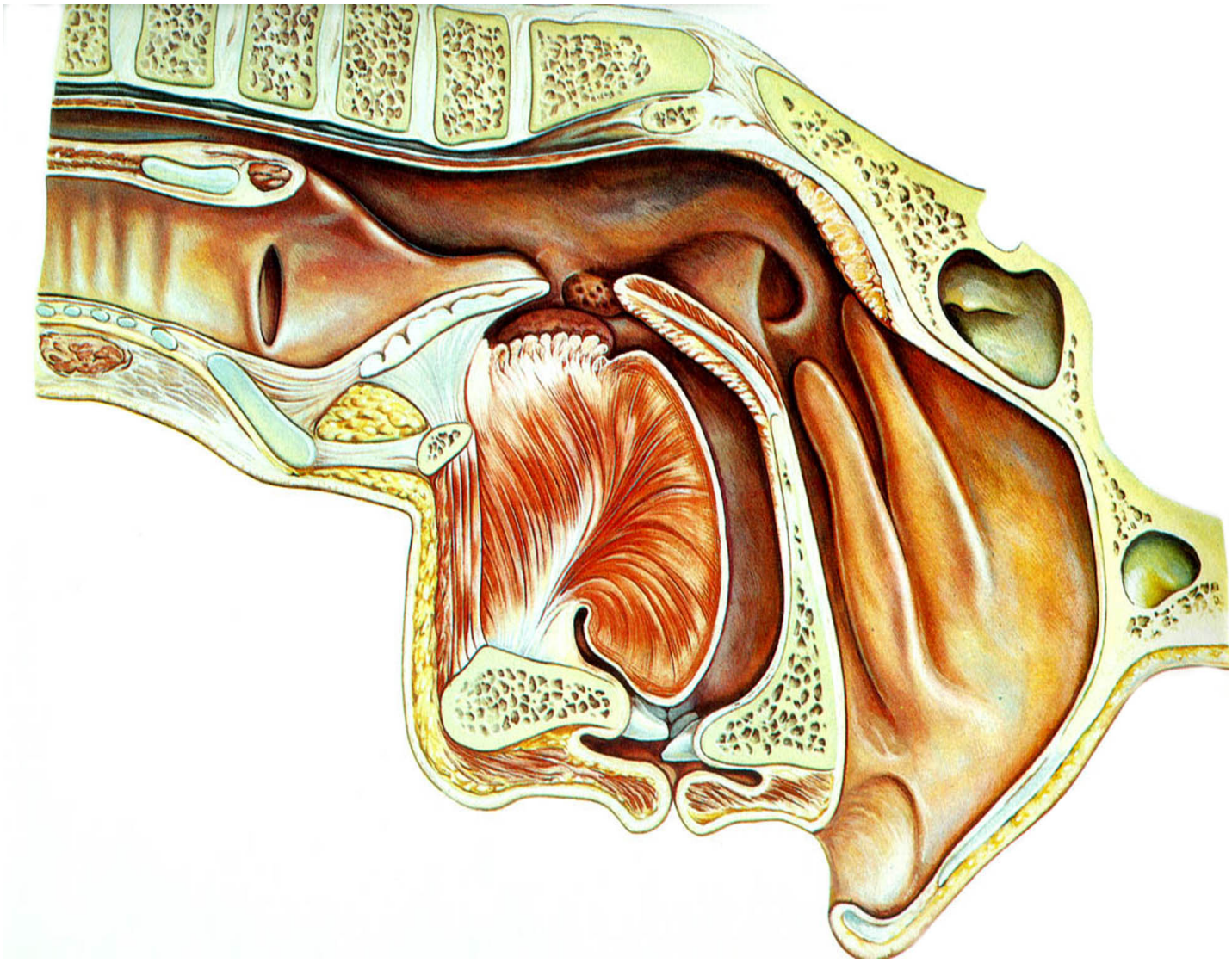


Baby cry versus lion roar

- The vocal fold tissue morphology of the great cats resembles that of human infants – no ligament, muscle is far lateral and not in vibration
- Both have low phonation pressure because medial surfaces of the vocal folds are quite parallel and vocal folds are thick
- Tonality (periodicity) is not important for loud cries or roars

Vocalization for general body health

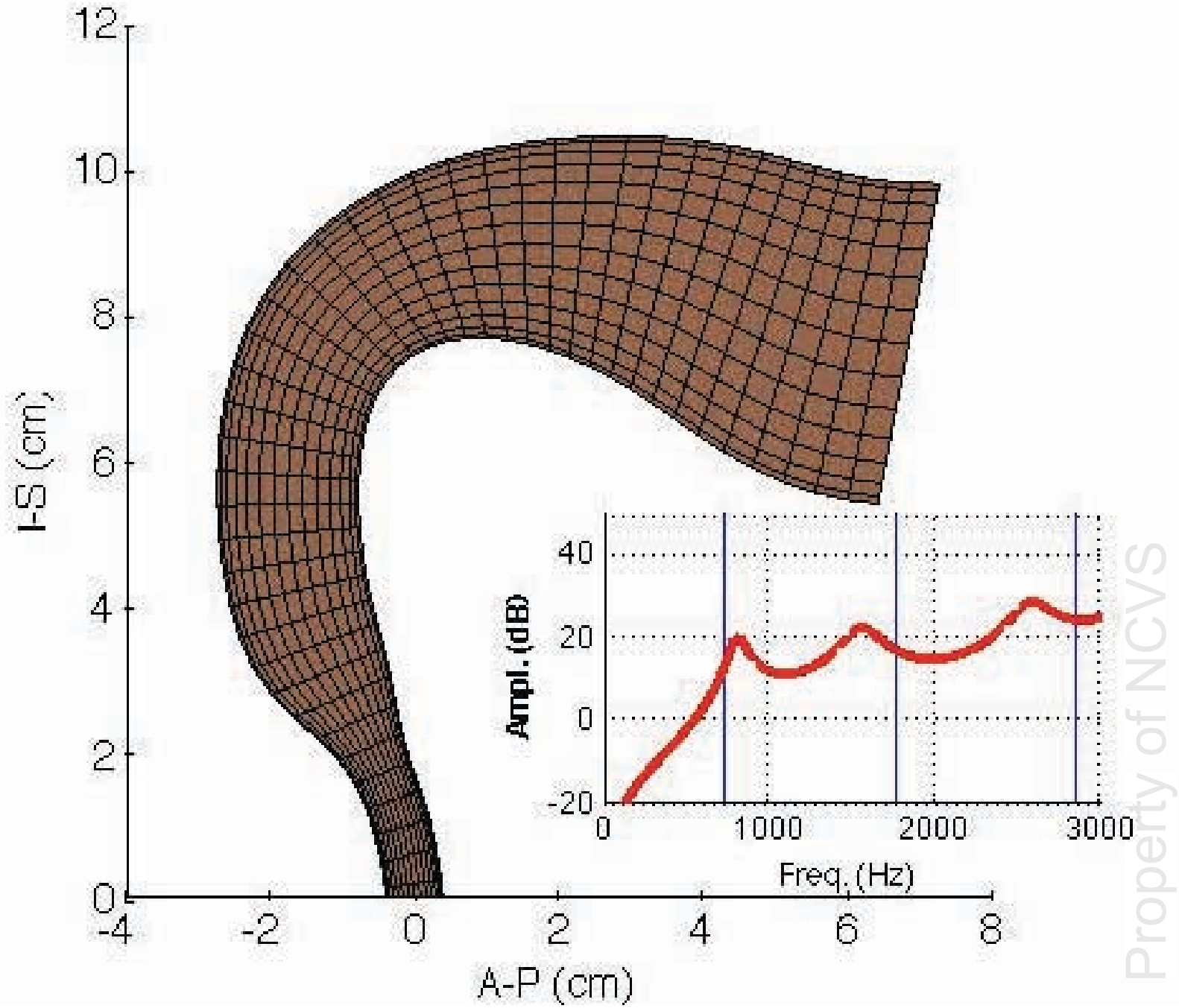
- Why is the thyroid gland on top of the larynx ?
- Why is the pituitary gland near the sphenoid cavity, very near the vocal tract ?
- Does self-induced vibration in our body promote healing and general health ?

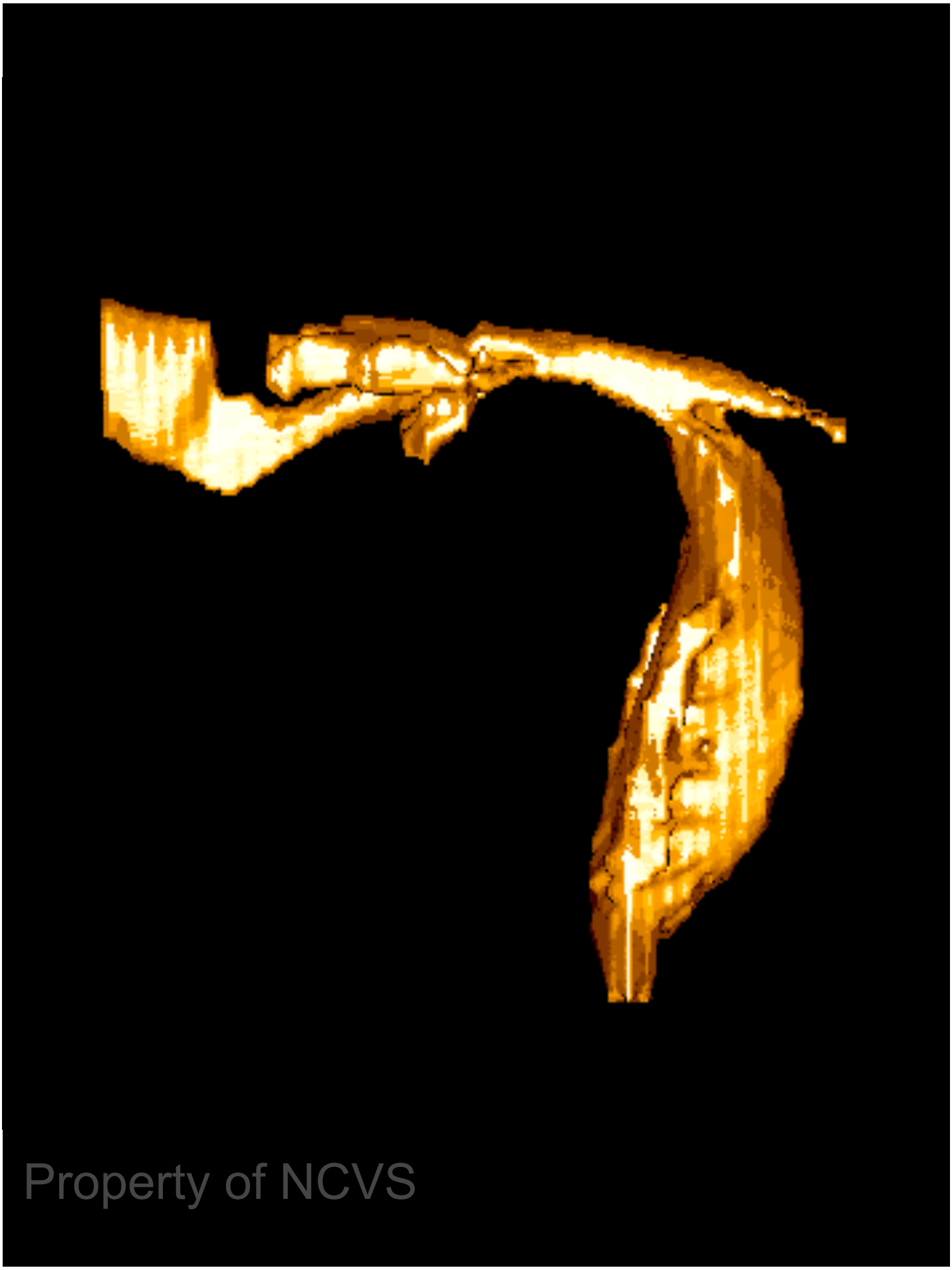


21st Centuru Technological Studio Aids

Seeing Our Vocal Tract

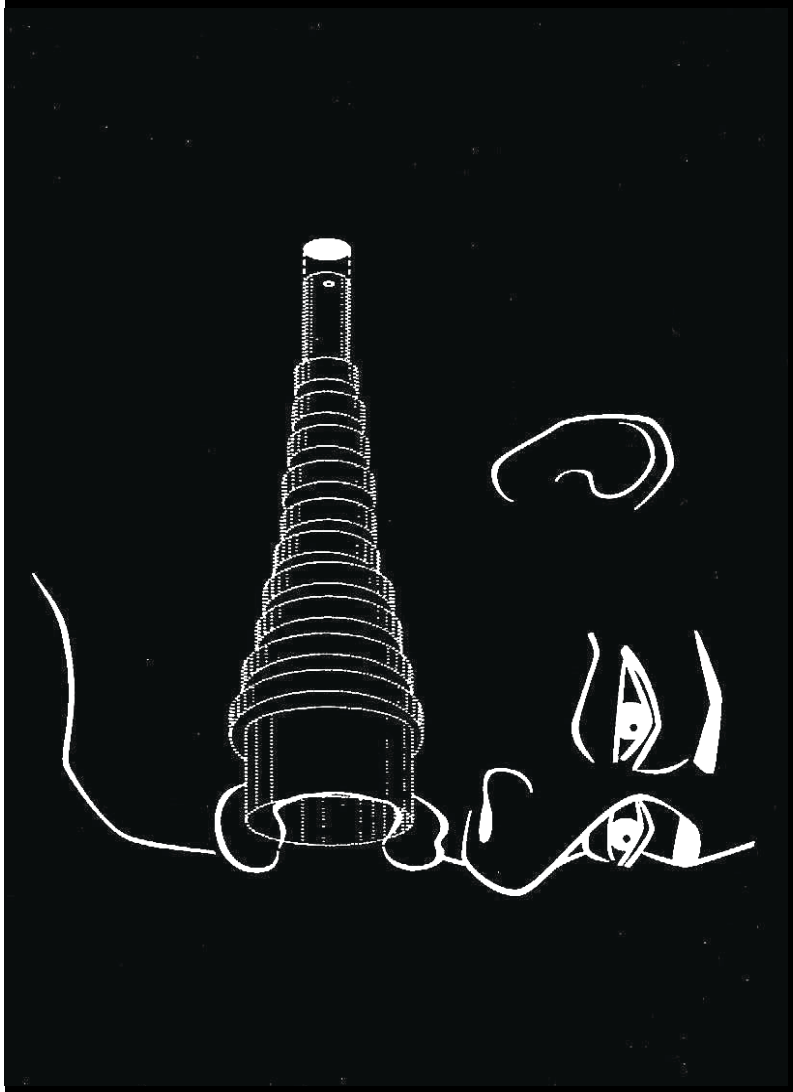
In Real Time

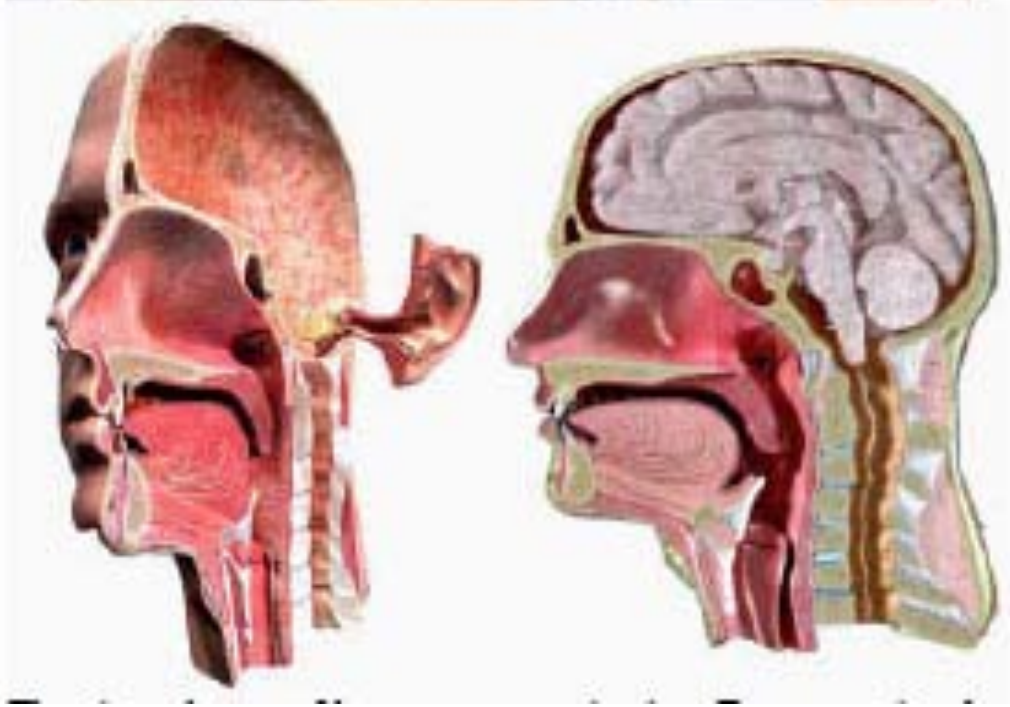


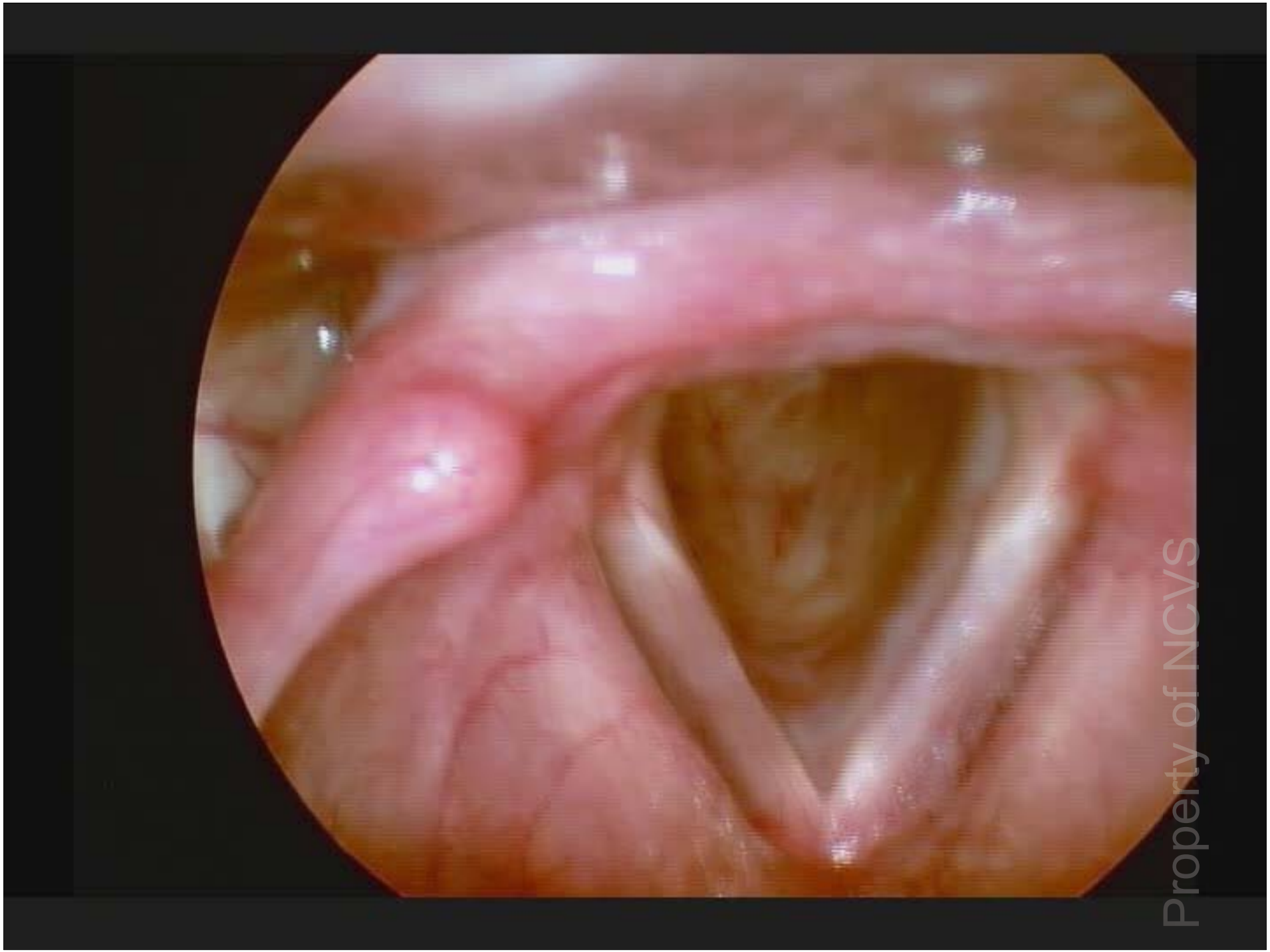


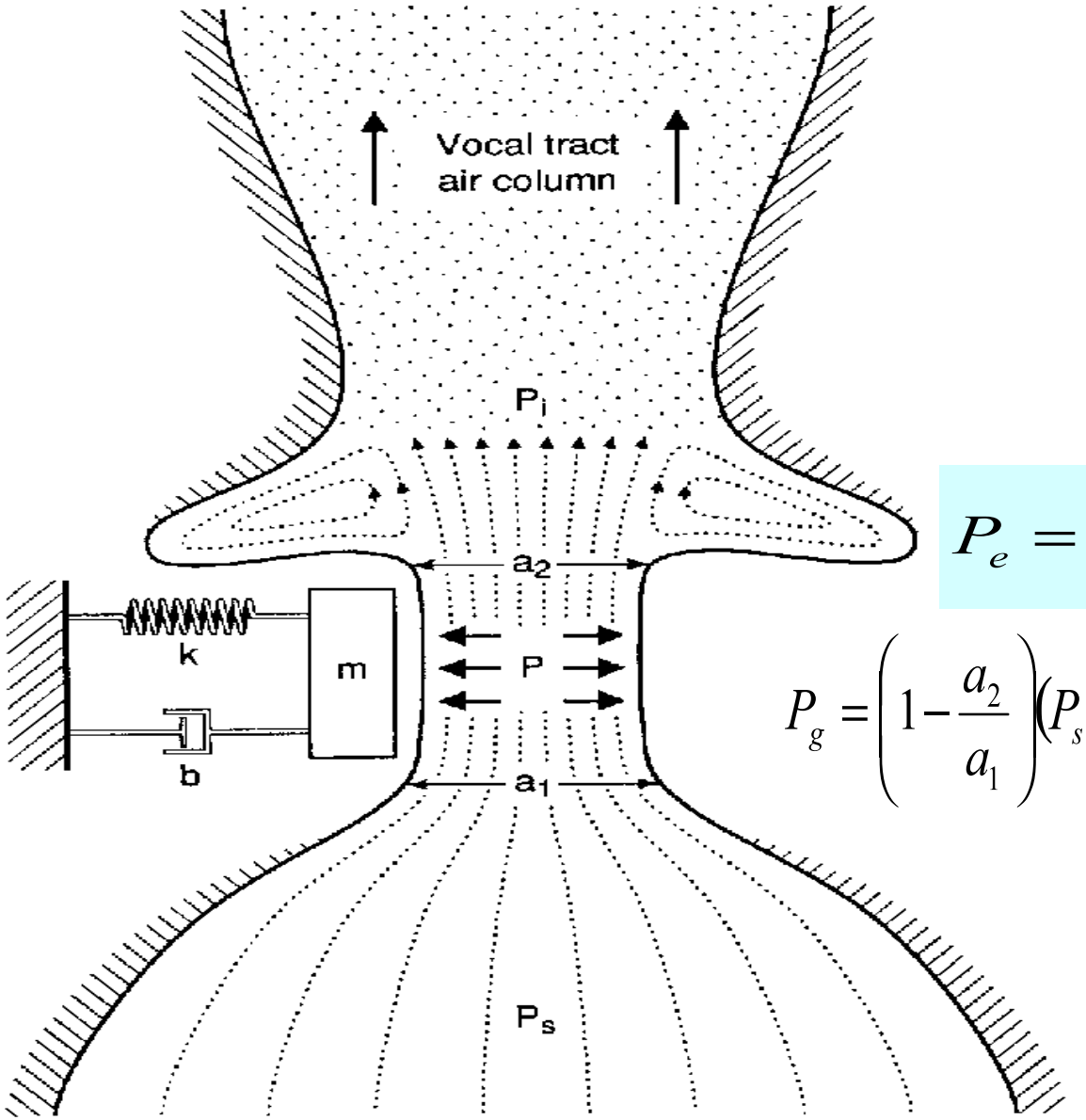
Inertograms

Inertance increases by narrowing (semi-occluding) some part of the vocal tract – it helps the vocal folds in vibration





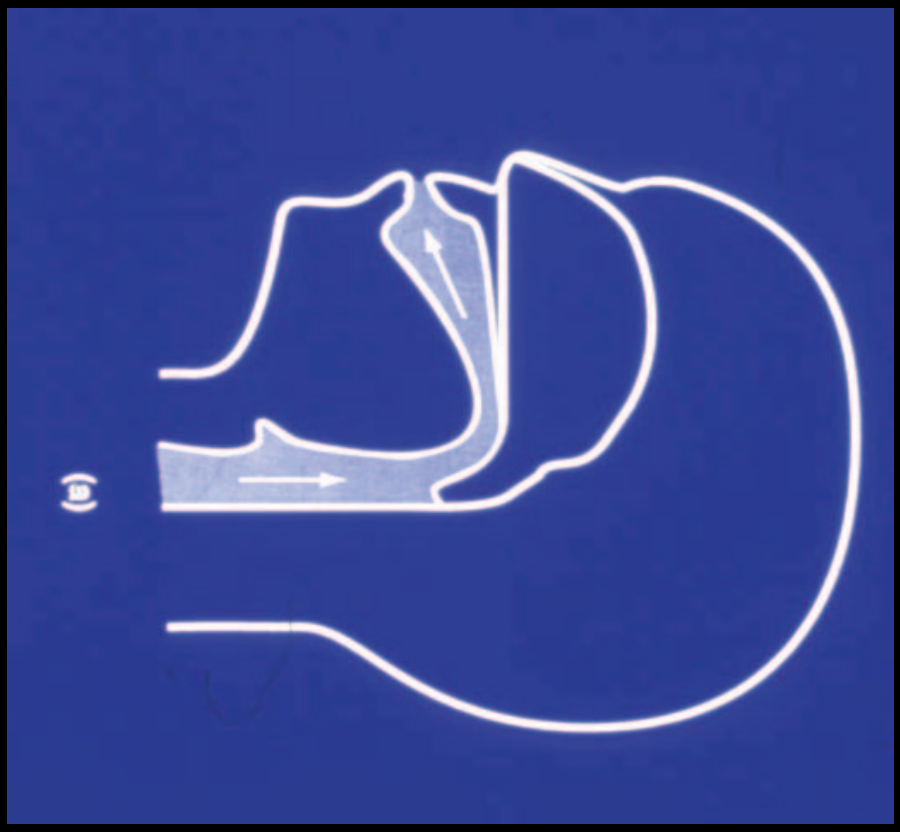

Property of NCVS

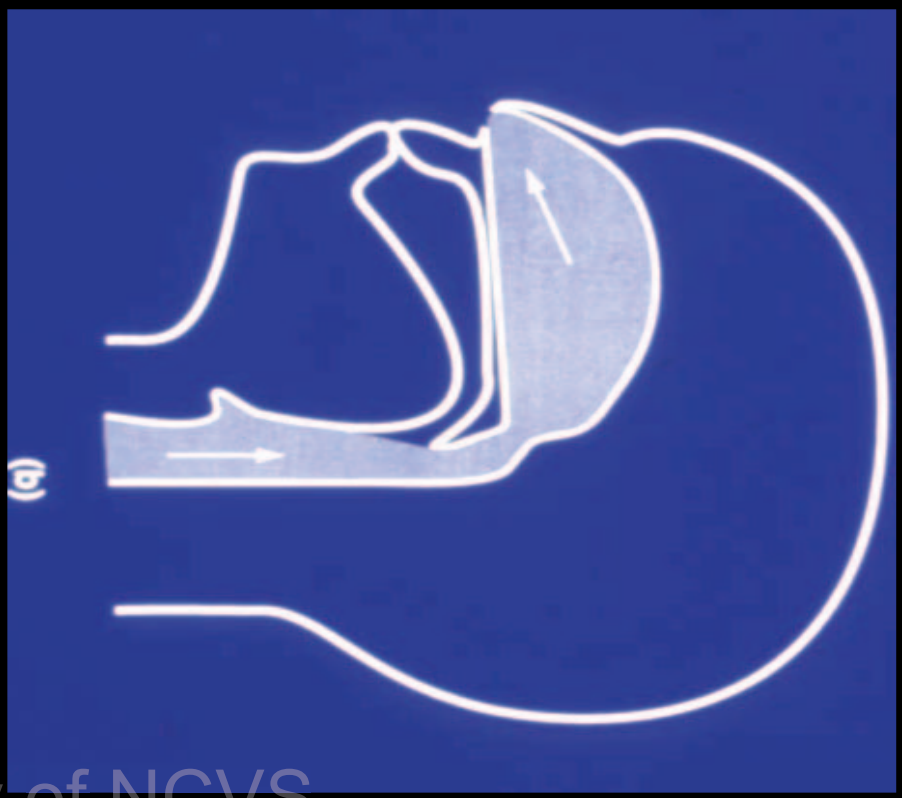


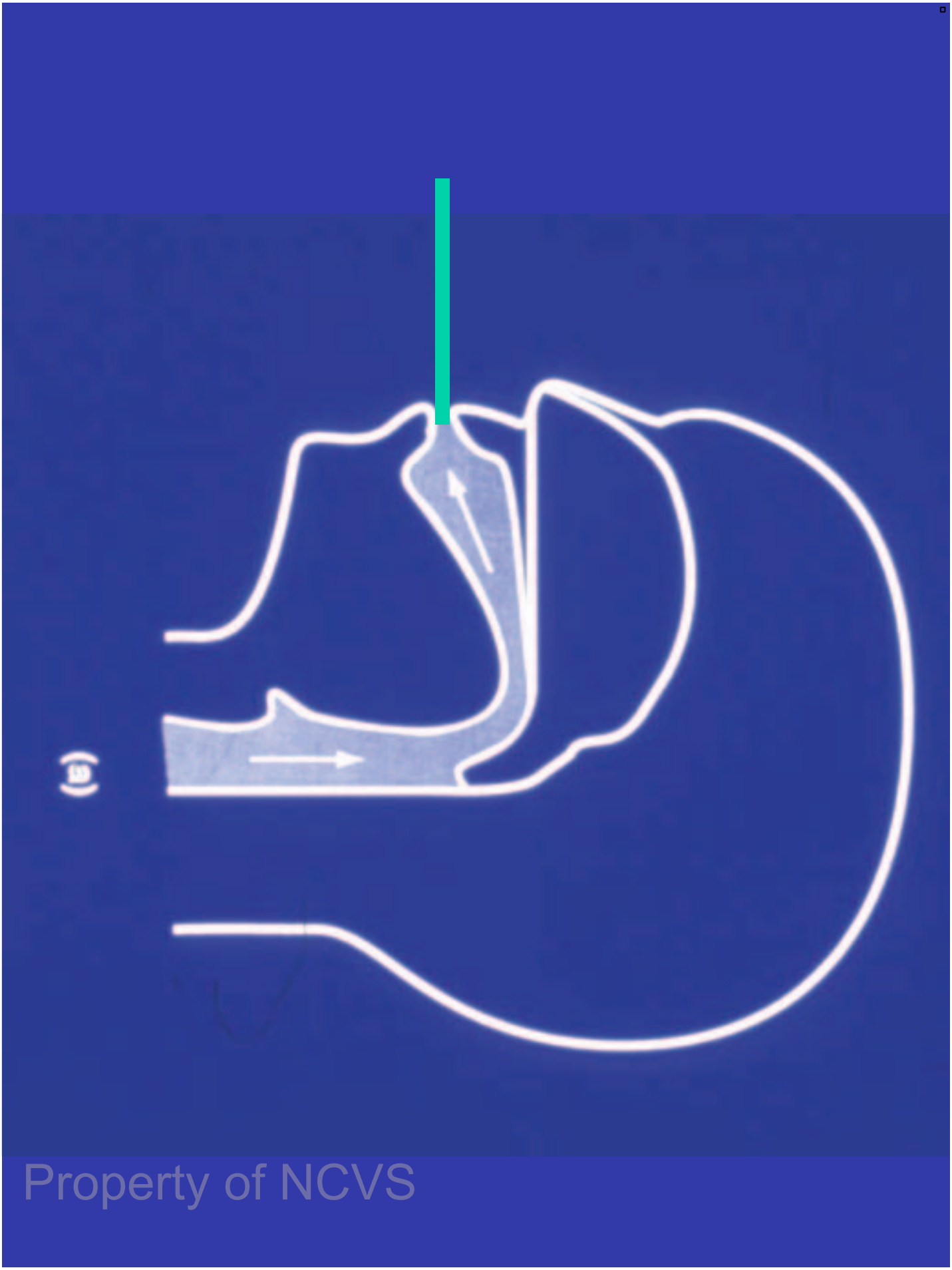
$$P_e = I\frac{dU}{dt}$$

$$P_g = \left(1 - \frac{a_2}{a_1}\right)\left(P_s - P_e\right) + P_e$$

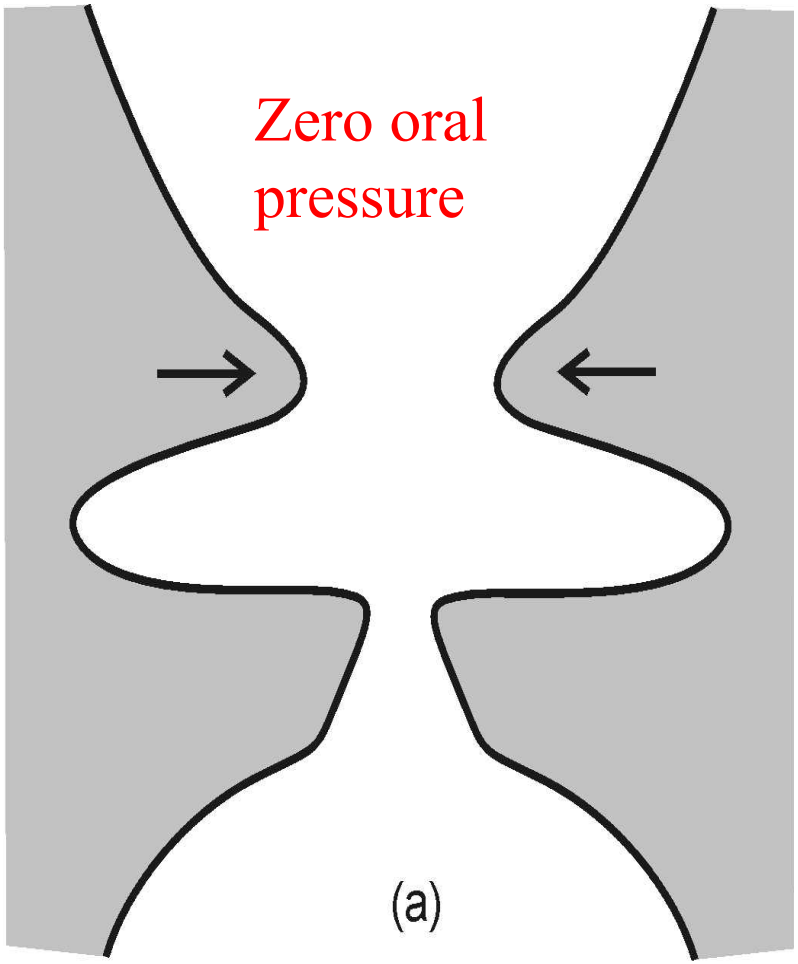
Phonation with a semi-occlusion in the vocal tract builds up an oral pressure that is felt all the way to the vocal folds

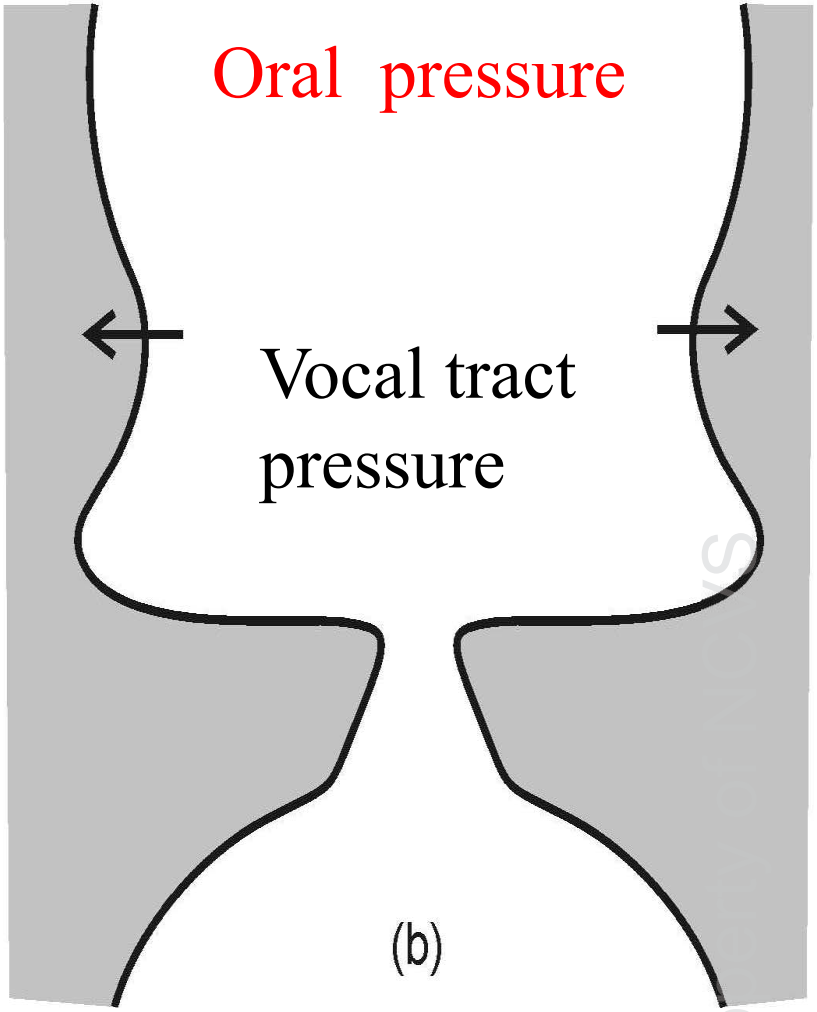




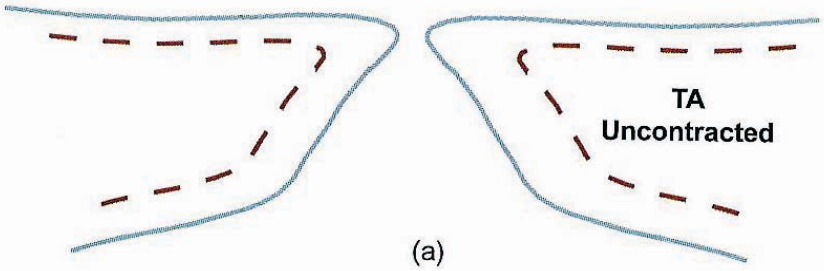


Phonation with a semi-occluded vocal tract separates the vocal folds automatically – greater lung pressure produces greater separation

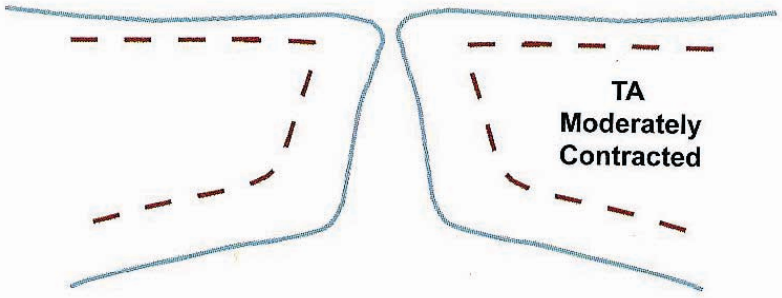

Zero oral
pressure
(a)
Lung pressure


Oral pressure
Vocal tract
pressure
(b)
Lung pressure

Falsetto



Mixed



Chest

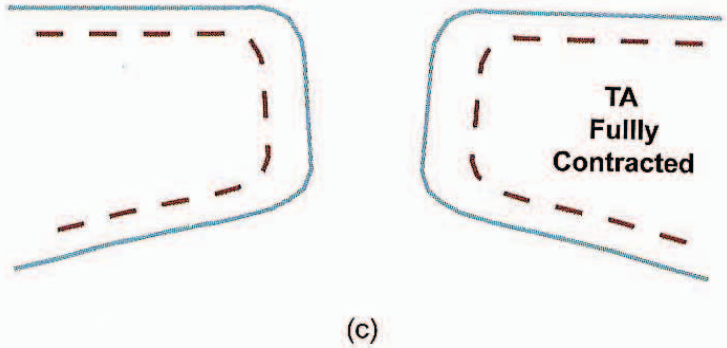


Figure 9.8 *Vertical adduction of the vocal folds in (a) falsetto register, (b) mixed register, and (c) TA-dominated register (after Hirano, 1980)*

The pressure helps you

Un-press!

My motto for healthy vocal folds

Stretch and unpress the vocal folds several times daily!

Some Iowa Corn

The Miller Limerick

- To explore voice with Richard Miller
- Was nothing short of a thriller
- He pushed us along
- In science and song
- But to keep up his pace was a killer

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The End

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