



**EMERALD**  
CHORAL ACADEMY

# VOCAL ANATOMY 104: THE PHARYNX

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Studio

Saturday, May 21, 2022

11:00am

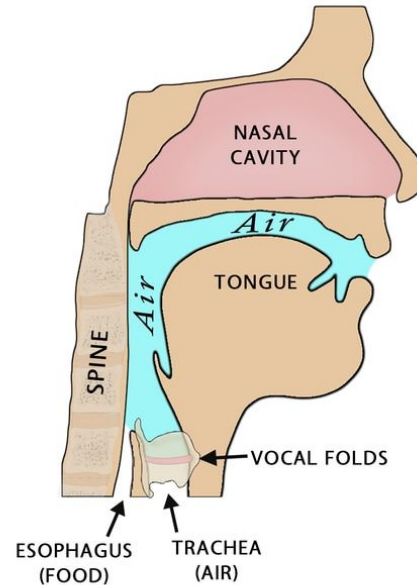
# INTRODUCTION - Voice “Systems”

- ▶ RESPIRATION - lungs, muscles of inhalation and exhalation
  - ▶ Generator (power source)
- ▶ PHONATION - the larynx
  - ▶ Vibrator (source of sound)
- ▶ *REGISTRATION - thyroarytenoid (Mode 1/chest) or cricothyroid (Mode 2/head) \*unique to the voice\**
- ▶ **RESONANCE - the vocal tract**
  - ▶ **Resonator (filter for sound created by the vocal folds)**
- ▶ ARTICULATION - the lips, tongue, teeth, and palate
  - ▶ Articulator - interrupts vowel sounds with consonants to form sung/spoken text

# THE VOCAL TRACT

- extends from the top of the vocal folds to the edge of the lips
- average length of the vocal tract
  - Male: 17 cm
  - Female: 14 cm
- sounds created by the vocal folds pass through the vocal tract before we hear them
  - RESONATE = “re-sound”
- this passageway can feed either into the esophagus (toward stomach; digestive system) or into the trachea (past the epiglottis toward the lungs)

## THE VOCAL TRACT



[www.voicescienceworks.org](http://www.voicescienceworks.org)

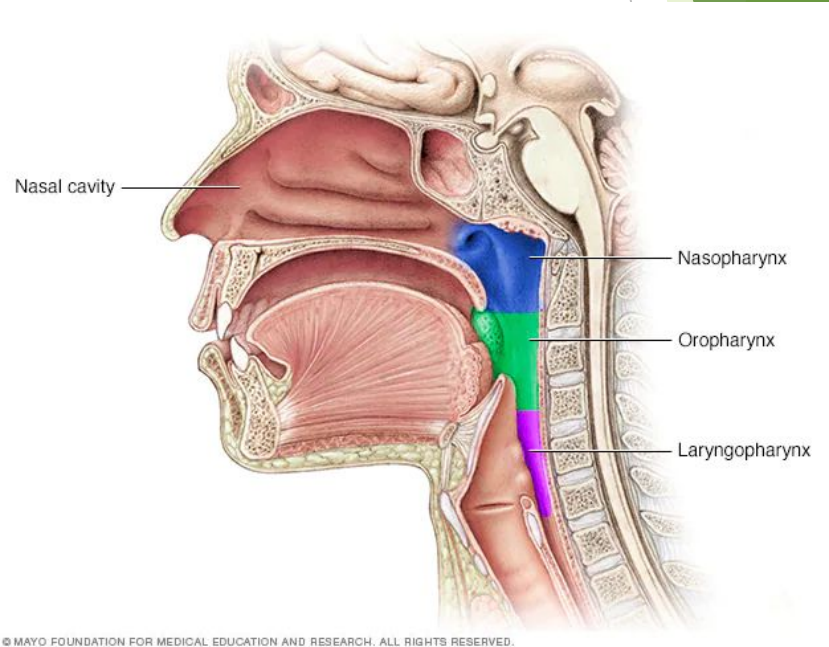
# PHARYNX FACTS

- part of both the respiratory and digestive systems
- muscular tube posterior to the nasal and oral cavities and anterior to the cervical vertebrae
- divided into three parts

Nasopharynx

Oropharynx

Laryngopharynx



# THE “SOURCE” AND THE “FILTER”

- the larynx is responsible for phonation and registration of both speaking and singing sounds
- without resonance and articulation systems, sound would be only a fundamental tone (lacking richness, appeal, and intelligibility)
  - “Manipulations of the vocal tract provide beauty, definition, and stylistic versatility in singing sound.” (Wicklund 28)*
- the well-trained singer can use the vocal tract to create classical, MT, commercial sounds
- registration changes enabled by vowel modification
- shaping the vocal tract to produce more “ringing” tone at various pitches

# FUNDAMENTAL FREQ. & HARMONICS

- frequency as produced by the vocal folds (ex. A4 = 440 Hz)
  - length/tension of folds and air pressure provided
- sound wave travels above and below folds in spaces we call RESONATORS
  - seven vocal resonators
  - forced vs. free resonance
- harmonics are equally-spaced multiples of fundamental frequency
  - strengthened when near formants

$2f_0$  of 440 Hz = 880 Hz (A5)

# FORMANTS

- a formant is a resonance of the vocal tract
  - F1 - throat/pharynx
  - F2 - mouth (inferior tongue position)
  - F3 - tip of tongue
- increased vocal tract length = decreases formants
- decreased vocal tract length = increases formants
- lip spreading/rounding effect
- pharynx/mouth constriction effect

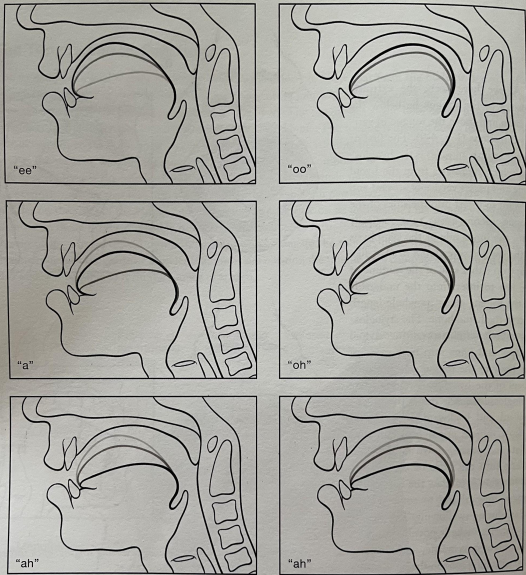


Figure 4-11. The position of the tongue determines the kind of vowel that is produced. In the column on the left, the tongue is positioned forward, producing the so-called "front" vowels (ee, a as in "bay," ah); in the column on the right, the tongue is positioned toward the back of the throat, producing the "back" vowels (oo, oh, ah).

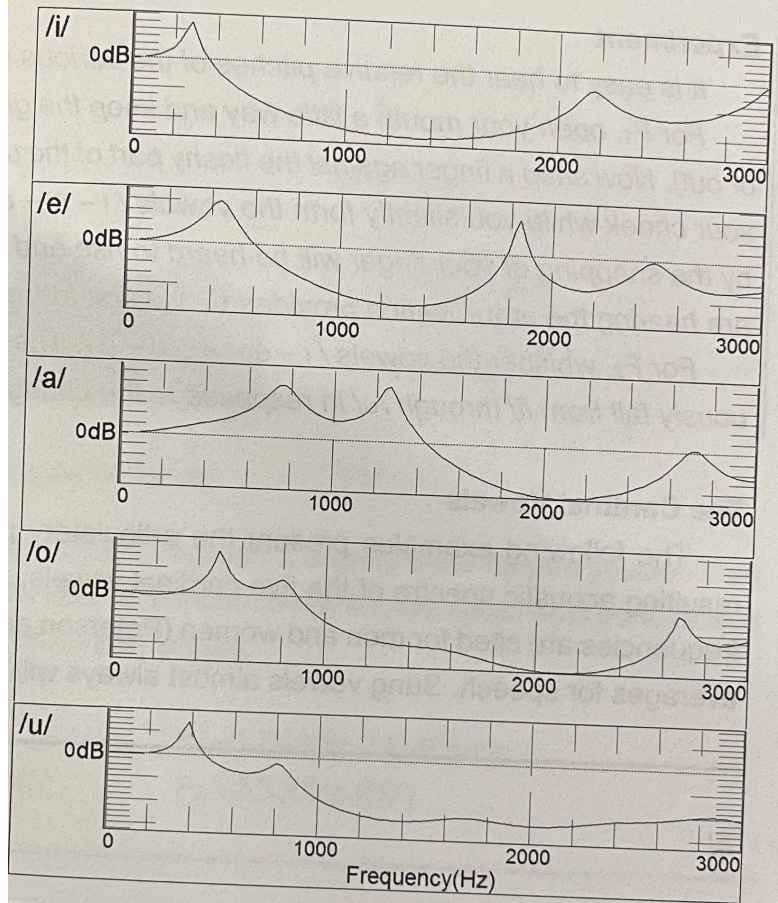


Figure 4-7: Typical formant locations of cardinal vowels



# CONCLUSION/SUGGESTED RESOURCES

Bunch Dayme, Meribeth. *Dynamics of the Singing Voice* (5<sup>th</sup> Edition). Vienna, Austria: Springer-Verlag, 2009

Dimon, Theodore. *Anatomy of the Voice: An Illustrated Guide for Singers, Vocal Coaches, and Speech Therapists*. Berkley, CA: North Atlantic, 2018

McCoy, Scott. *Your Voice: An Inside View 3, Voice Science & Pedagogy*. Gahanna, OH: Inside View Press, 2019

Ragan, Kari. *A Systematic Approach to Voice: The Art of Studio Application*. San Diego, CA: Plural, 2020

Wicklund, Karen. *Singing Voice Rehabilitation*.