

Phonetics and Phonology

Lecture 4 Organs of speech

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Organs of speech production

Articulation

• **Three functions**

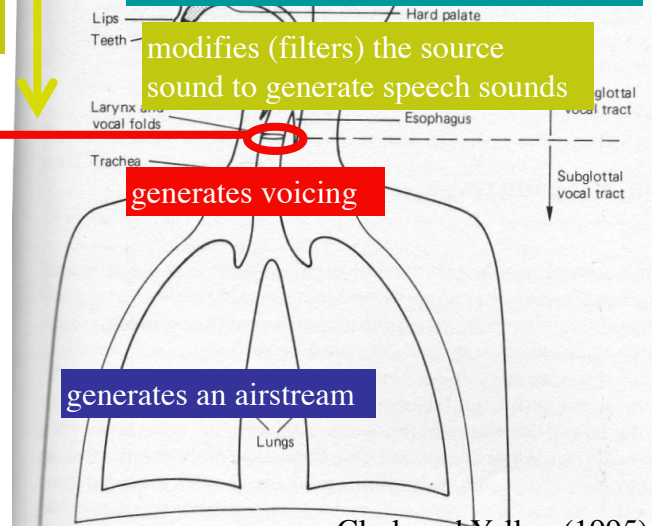
modifies (filters) the source sound to generate speech sounds

Phonation

generates voicing

Initiation

generates an airstream



Clark and Yallop (1995)

FIGURE 2.3.1 The organs of speech (greatly simplified and not to scale)

Organs of speech production

Articulation

Phonation

Trachea

Initiation

Lungs

generate an (outward) airstream

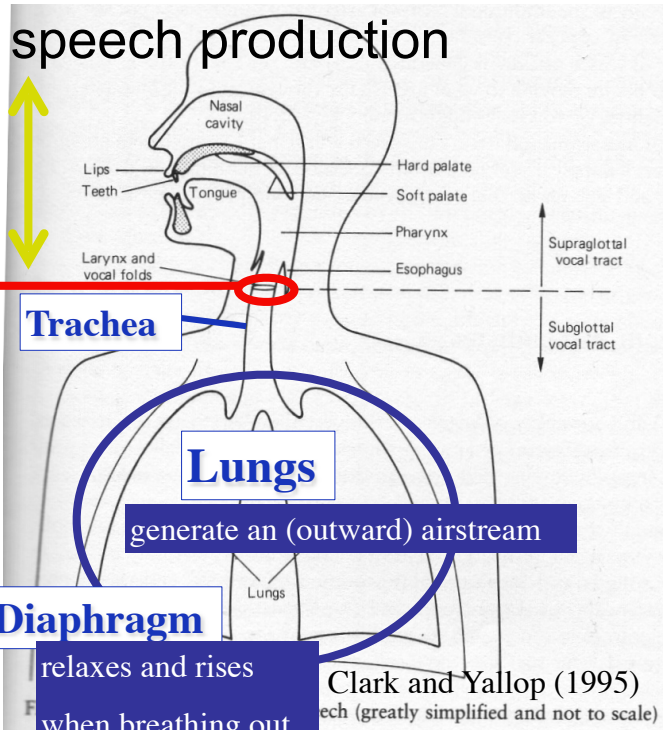
Diaphragm

relaxes and rises

when breathing out

Except non-pulmonic consonants

Clark and Yallop (1995)



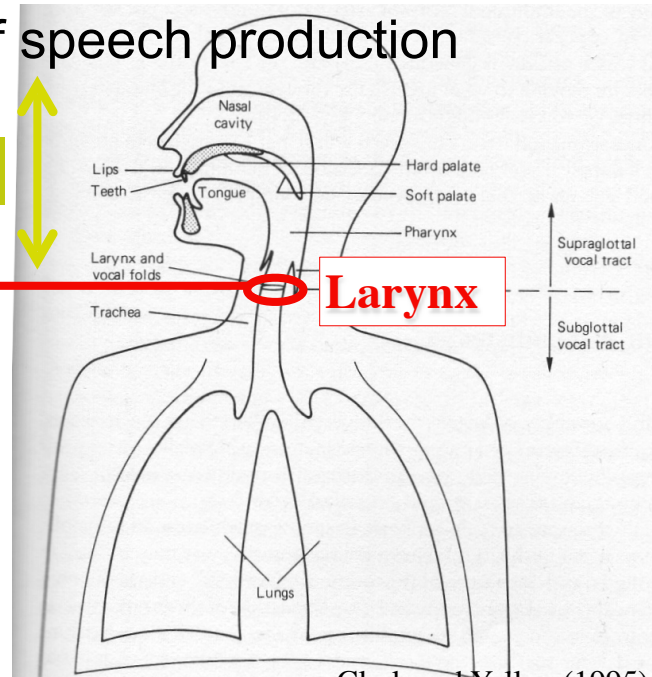
Organs of speech production

Articulation

Phonation

Larynx

Initiation



Clark and Yallop (1995)

FIGURE 2.3.1 The organs of speech (greatly simplified and not to scale)

Larynx

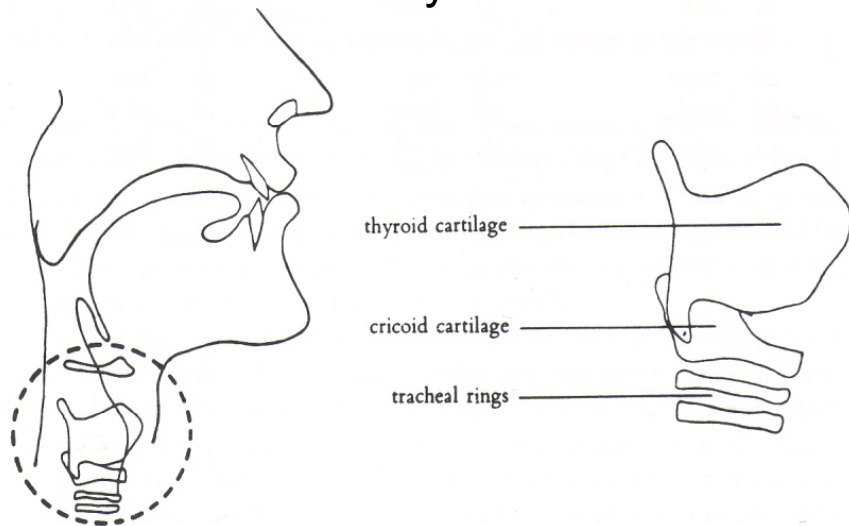


Fig. 6 The larynx

Roach (1991)

Larynx

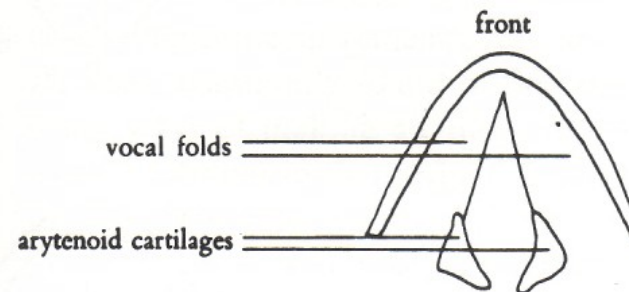


Fig. 7 The inside of the larynx seen from above

Roach (1991)

Larynx

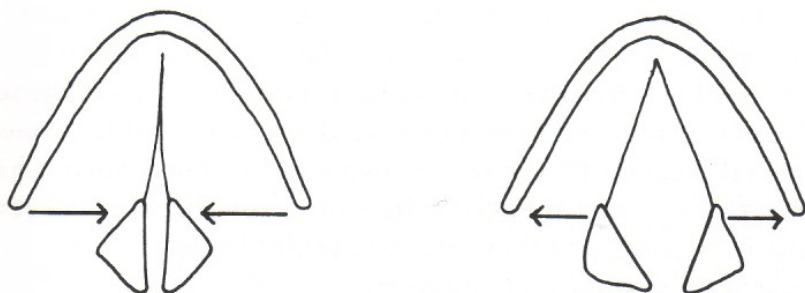
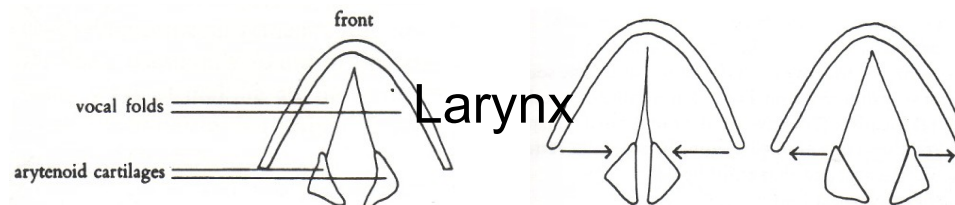
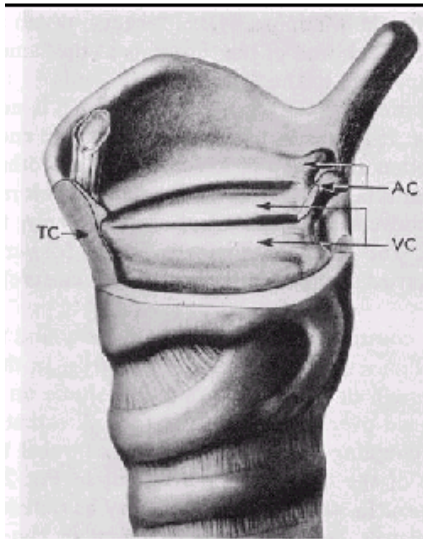


Fig. 8 Arytenoid cartilages causing closing and opening of the glottis

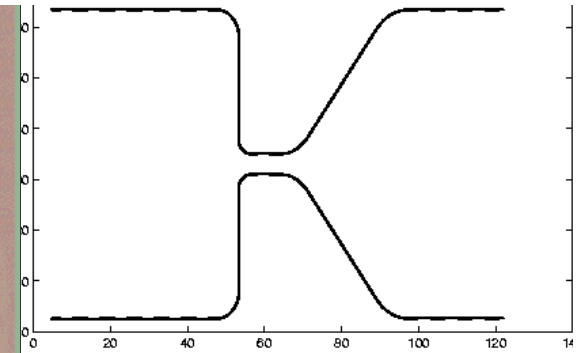
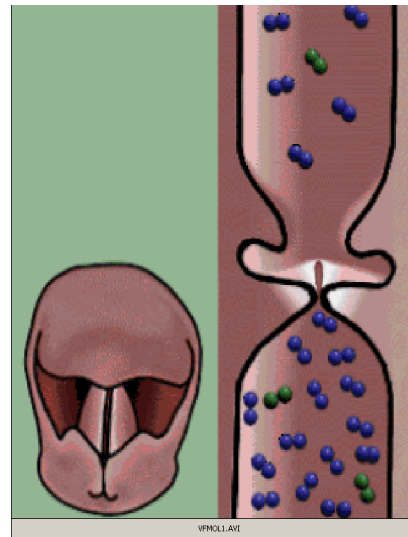
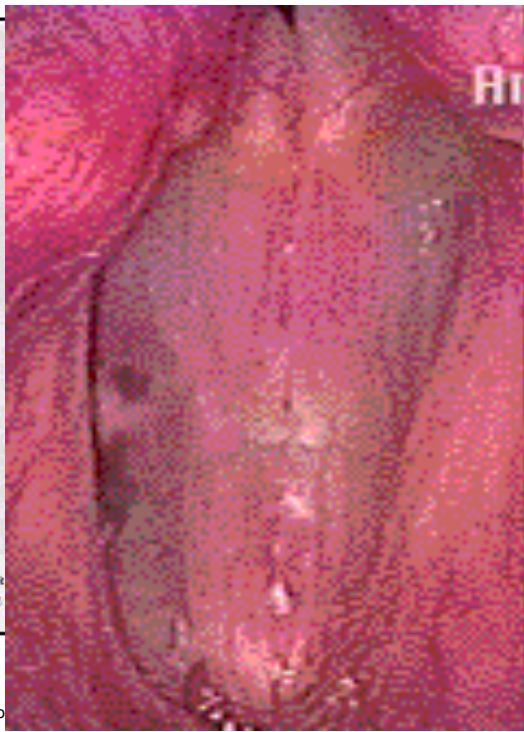
Roach (1991)



- The larynx contains a pair of **vocal folds**.
- The vocal folds are apart for normal breathing, voiceless consonants.
- They are brought close by arytenoid cartilages and vibrate (Bernoulli effect) for voicing.
- The opening between the two vocal folds is called the **glottis** (*adj.* glottal).



Sagittal view of the human larynx. (After FARNSWORTH)
AC-arytenoid cartilages; TC-thyroid cartilage



• Cycle of vibration of the vocal folds

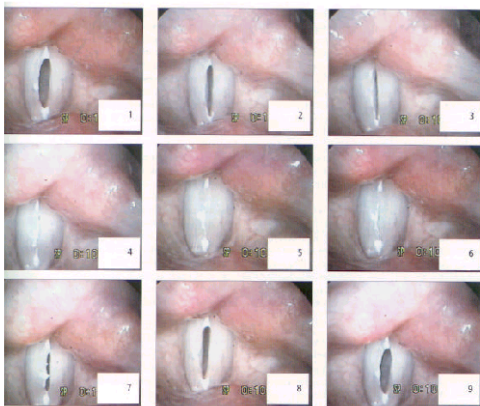
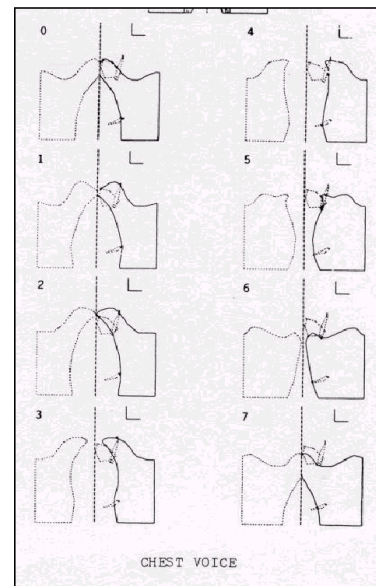
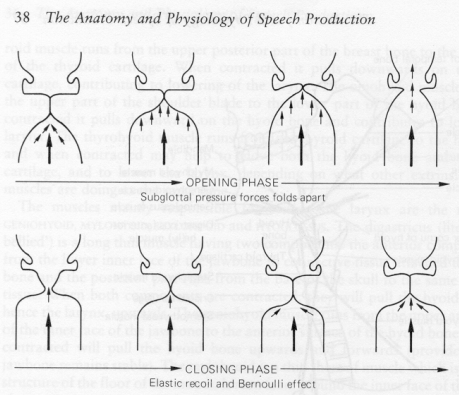
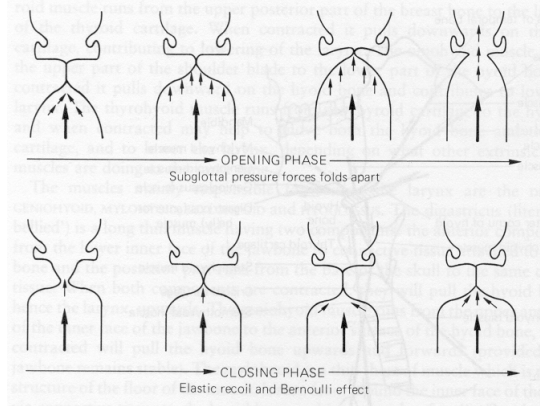


Figure 8 : Un cycle de vibration des cordes vocales, fibroscopie



38 The Anatomy and Physiology of Speech Production



Functions of the vocal folds in languages

- Phonation (voicing, vibration of vocal folds) and its timing.
- Generating different pitches.
- Generating different voice qualities (modal, creaky, breathy)

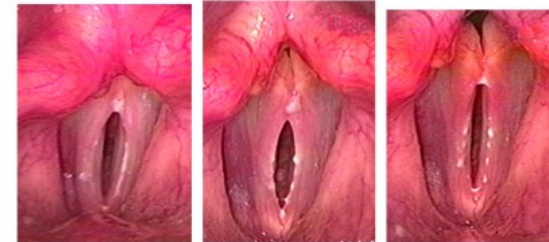
Peter Ladefoged Vowels and Consonants

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Photographs of the vocal folds producing a sound at three different pitches

(compare figure 2.16)



120 Hz

160 Hz

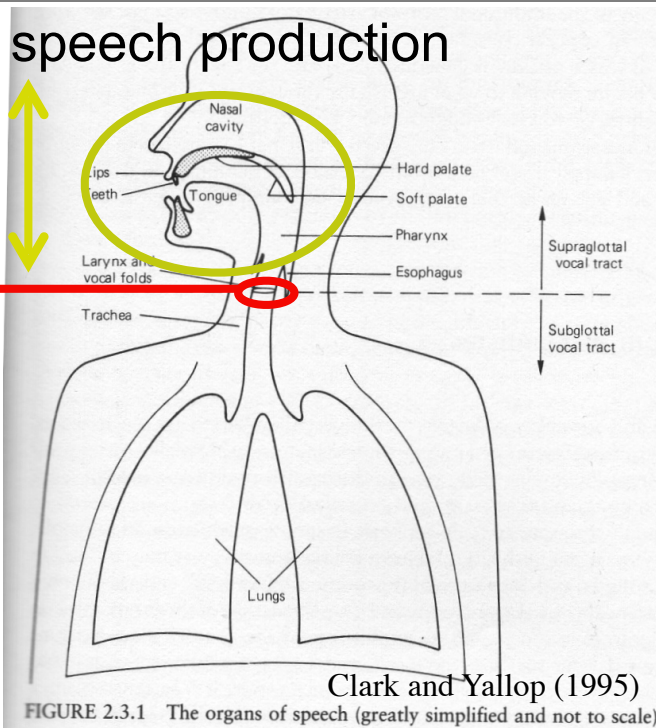
200 Hz

Organs of speech production

Articulation

Phonation

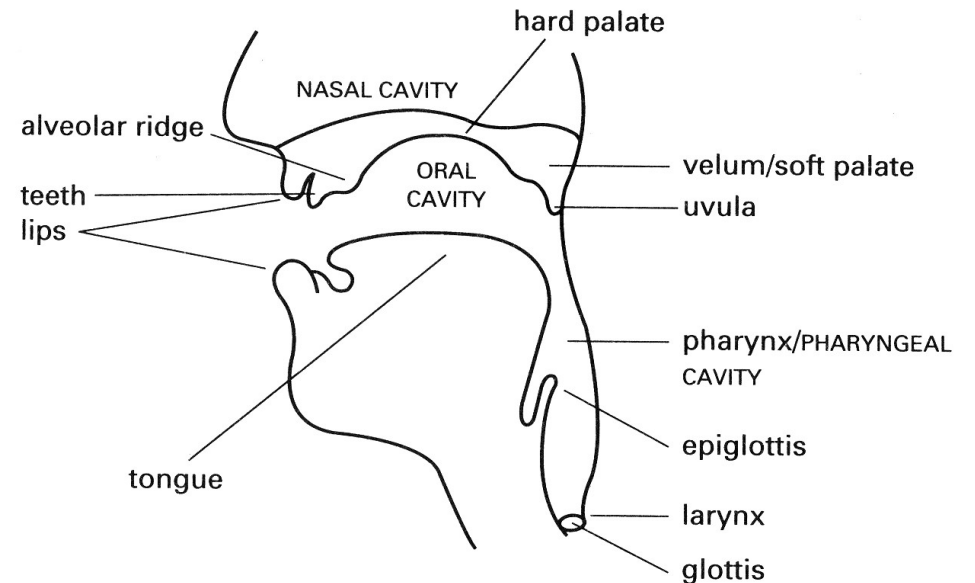
Initiation



Clark and Yallop (1995)

FIGURE 2.3.1 The organs of speech (greatly simplified and not to scale)

Articulators



5.1 The vocal tract
T. Kamiyama

P. Ashby (1995)

Articulators

- 1 Labial
- 2 Dental
- 3 Alveolar
- 4 Postalveolar
- 5 Palatal
- 6 Velar
- 7 Uvular
- 8 Pharyngeal
- 9 Sublaminal (retroflex)

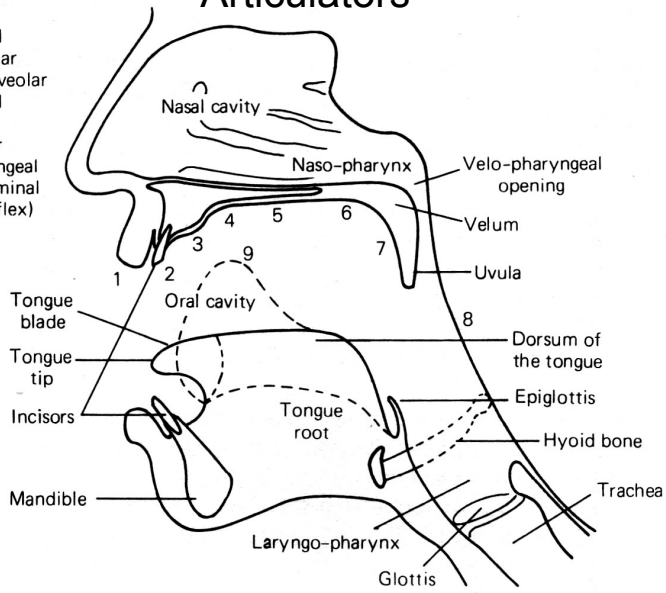
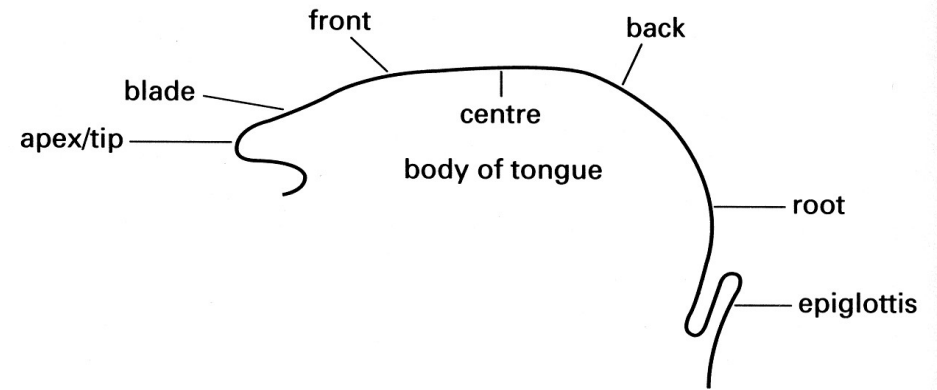


FIGURE 2.10.1 Mid-sagittal oral vocal tract showing major areas of articulation
 Adapted from: Minifie, Hixon and Williams 1973, p. 173. Clark & Yallop (1995)

Articulators: tongue

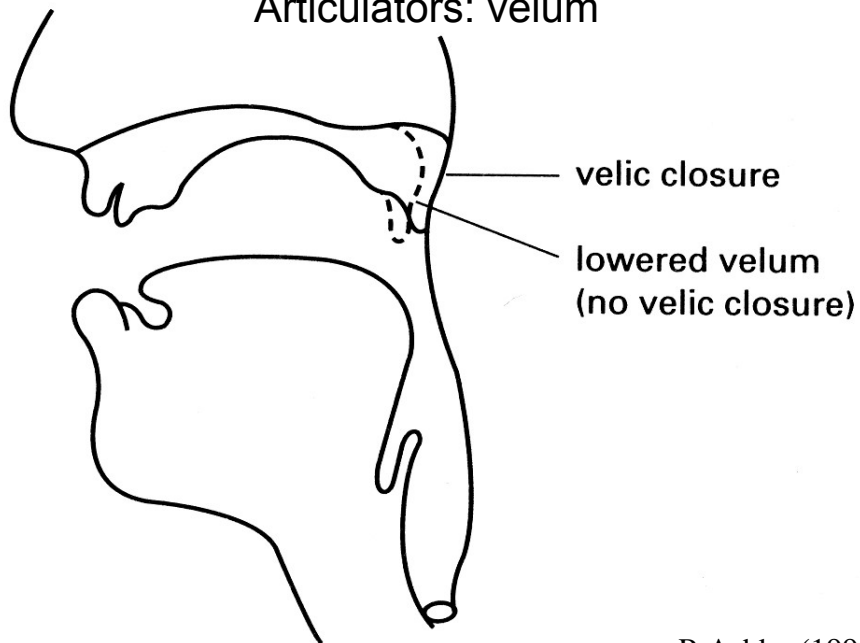
CLASSIFICATION



5.3 Parts of the tongue

P. Ashby (1995)

Articulators: velum



5.2 Velic closure

P. Ashby (1995)

End of Lecture 3

Lecture 4: Consonants (introduction)