LINGUISTICS 330 Lecture #2

THE THREE PHYSIOLOGICAL COMPONENTS OF SPEECH PRODUCTION

It is functionally appropriate to consider speech production in terms of three components:

1. **THE SUBGLOTTAL SYSTEM:**
   a. trachea (windpipe)
   b. lungs and associated respiratory muscles

2. **LARYNX**

3. **SUPRALARYNGEAL VOCAL TRACT**: Air passages above the larynx

   a. oral tract (= oral cavity)
      Latin os/oralis 'mouth'

   b. nasal tract (= nasal cavity)
      Latin nasus 'nose'

   c. pharynx (= pharyngeal cavity)
      Greek pharynx 'throat'

SUPRAGLOTTAL ORGANS

THE LIPS (prefix: labio-; suffix -labial) (Latin *labia* 'lip')

- The lips are a complex of muscles and other tissues (see below!)
- The lips have a great capacity for varied movement, and much of their range of movement is utilized in speech (e.g. lip spreading, lip rounding, lip closing, etc.)

THE TEETH (suffix: -dental) (Latin *dentes* 'teeth')

- They are set into the alveolar processes of the upper jaw (=maxillary bone) and the lower jaw (= mandible).

  (Alveolar processes: The inferior border of the maxillary bone or the superior border of the mandible; both contain sockets holding the teeth).

- The sides of the tongue pressed against the molars help to direct the air stream towards the front of the mouth, as in [ʃ] and [ʒ].

- The lower lip approximates the maxillary incisors to constrict the air stream for [f] and [v].

- The tongue tip approximates the maxillary incisors for the production of [θ] and [ð].

- The slightly opened maxillary and mandibular incisors provide friction surfaces for [s], [z], [ʃ] and [ʒ].

THE TONGUE (suffix: -lingual) (Latin *lingua* 'tongue')

- The floor of the oral cavity is largely formed by the *three-dimensional* muscle mass: the tongue.

- The tongue can be moved as a mass in three directions:

    a. up and back
    b. down and back
    c. up and forward

- The tongue can be narrowed and pointed as it is for [l].

- The tongue can present a broad front as when producing [ʃ] and [ʒ].

- It can close off the oral cavity and quickly release the compressed air as it does for [t], [k] etc.

- The tongue can form a central groove to direct the airflow as it does for [s].

- It can be drawn back (retroflex articulation!).

- The front and the back of the tongue can be raised and lowered in order to alter the oral cavity for vowel resonance.

The tongue can be divided into five regions:

tip or *apex* (Latin apex 'tip' : apical)

blade (Latin lamina 'blade': laminal)

front

back (Latin dorsum 'back': dorsal)

root (Latin radix 'root': radical)

NOTE: *dorsum*

anterodorsum (=front) posterodorsum

THE ALVEOLAR RIDGE (prefix: alveolo- or alveo-; suffix -alveolar) (Latin *alveolus* 'tray')

- The alveolar processes behind the maxillary incisors and canine teeth (=eye teeth) form a rather pronounced ridge (=alveolar ridge).
- It figures prominently in consonant articulation.

THE PALATE (prefix: palato-; suffix: -palatal) (Latin *palatum* 'the roof of mouth')

- It extends from the alveolar ridge to the velum.
- The palate is the arched bony structure that forms the forward part of the roof of the mouth.
- It is also called *bony* or *hard* palate.
- Its primary functions are to help contain food in the oral cavity and to provide a hard upper surface for the action of swallowing.

THE VELUM (suffix: -velar) (Latin *velum* [palati] 'veil' [of the palate])

- *soft palate*
- posterior to and adjoining the palate.
- Its primary function is to help keep food and fluids from entering the nasal cavity.
- The velum is very flexible and mobile:

it can be raised and lowered

velic port open: the airflow will pass through the nasal cavities nasal resonance is introduced

- The velum consists of muscle and connective tissues covered by a continuation of the mucous membrane of the palate.

THE UVULA (adjective: uvular) (Latin *uvula* 'little grape')

- The uvula is at the midline of the posterior border of the velum.
- It is a small fleshy mass; it possesses its own musculature and may add thickness to the velum in closure.

THE SUPRALARYNGEAL VOCAL TRACT

Oral cavity
Nasal cavity
Pharyngeal cavity
} resonant cavities!

The oral cavity extends:

- from the lips to the posterior wall of the pharynx;
- from the palate and the velum above to the base of the tongue;
- laterally between the teeth when the jaws are open.

The nasal cavity extends:

- from the nostrils to the posterior wall of the pharynx;
- from the base of the skull above the palate and the velum below.

TURBINATES: Each side of the nasal cavity contains curled membranes (=turbinates); their function is to increase olfactory sensitivity.
Significance: the nasal cavities form a poor resonator (the turbinates partially fill the nasal cavity!).

The pharyngeal cavity extends from the posterior portion of the nasal cavity downward through the back of the oral cavity to the larynx.

Three parts:

a. nasopharynx
b oropharynx
c. laryngopharynx

} p. 215

The biological functions of the pharynx (Greek *pharynx* 'throat') are:

a. to receive food from swallowing and move it toward the esophagus (=food pipe)
b. to channel air from respiration between *the nose and the mouth* and the *trachea*

For speech production the pharynx acts as a resonating chamber.

THE LARYNX is a structure of cartilages and muscles situated atop the trachea. (Greek *larynx)*

The hyoid bone:

- It plays a prominent role as attachment and foundation for muscles and ligaments involved in swallowing and phonation.
- It occupies an intermediate position at the back of the base of the *tongue* and directly at the top of the *larynx*.
- Their common attachment to this bone brings about a muscular interaction between the tongue and the larynx (e.g. when the tongue is high for [i], we can feel the thyroid cartilage rise simultaneously).

EPIGLOTTIS
THYROID CARTILAGE
SUPERIOR HORNS
THYROHYOID MEMBRANE
CRICOID CARTILAGE
ARYTENOID CARTILAGES
VOCAL FOLDS
CORNUS ELASTICUS
ADDUCT/ABDUCT
GLOTTIS
FALSE VOCAL FOLDS (=VENTRICULAR FOLDS)
VENTRICLES OF MORGAGNI

Study these terms from the book!
Study all figures!