IV. Organs of the Oral Cavity, Mouth and Associated Organs

Mostly done in lab. Know also for lecture.

A) Oral or buccal cavity:
   1) Is bounded by lips, cheeks, palate, and tongue
   2) Has the oral orifice as its anterior opening
   3) Is continuous with the oropharynx posteriorly

- To withstand abrasions:
  * The mouth is lined with stratified squamous epithelium
  * The gums, hard palate, and dorsum of the tongue are slightly keratinized

B) Lips and Cheeks

- Have a core of skeletal muscles
  * Lips: orbicularis oris, Cheeks: buccinators
- Vestibule - bounded by the lips and cheeks externally, and teeth and gums internally
- Oral cavity proper - area that lies within the teeth and gums
- Labial frenulum - median fold that joins the internal aspect of each lip to the gum

C) Palate

- Hard palate - underlain by palatine bones and palatine processes of the maxillae
  * Assists the tongue in chewing
  * Slightly corrugated on either side of the raphe (midline ridge)
- Soft palate - mobile fold formed mostly of skeletal muscle
  * Closes off the nasopharynx during swallowing
  * Uvula projects downward from its free edge
D) Tongue
- Occupies the floor of the mouth and fills the oral cavity when mouth is closed
- Functions include:
  1) Gripping and repositioning food during chewing
  2) Mixing food with saliva and forming the bolus
  3) Initiation of swallowing, and speech
- Lingual frenulum secures the tongue to the floor of the mouth
- Sulcus terminalis - groove that separates the tongue into two areas:
  1) Anterior 2/3 residing in the oral cavity
  2) Posterior third residing in the oropharynx
- Superior surface bears three types of papillae
  1) Filiform - give the tongue roughness and provide friction. Most numerous, but no taste buds.
  2) Fungiform - scattered widely over the tongue and give it a reddish hue. Has buds.
- Lateral surface has one more type: Foliate papillae (no buds)
E) Salivary Glands
- Produce and secrete saliva that:
  1) Cleanses the mouth
  2) Moistens and dissolves food chemicals
  3) Aids in bolus formation
  4) Contains enzymes that break down starch
- Three pairs of extrinsic glands - parotid, submandibular, and sublingual.
  1) Parotid - lies anterior to the ear between the masseter muscle and skin
     * Parotid duct - opens into the vestibule next to the second upper molar
  2) Submandibular - lies along the medial aspect of the mandibular body
     * Its ducts open at the base of the lingual frenulum
  3) Sublingual - lies anterior to the submandibular gland under the tongue
     * It opens via 10-12 ducts into the floor of the mouth
- Also: Intrinsic salivary glands (buccal glands) - scattered throughout the oral mucosa

- Saliva: Source and Composition
  * Secreted from serous and mucous cells of salivary glands
  * A 97-99.5% water, slightly acidic solution containing:
    * Electrolytes – mostly Na+, K+, Cl-, PO₄²⁻, HCO₃⁻
    * 1 Digestive enzyme - salivary amylase
    * Proteins - mucin, lysozyme, defensins, and IgA
    * Metabolic wastes - urea and uric acid

- Control of Salivation
  * Intrinsic glands keep the mouth moist
  * Extrinsic salivary glands secrete serous, enzyme-rich saliva in response to:
    1) Ingested food which stimulates chemoreceptors and pressoreceptors
    2) The thought of food
  * Strong sympathetic stimulation inhibits salivation and results in dry mouth
F) Teeth

- Primary and permanent dentitions have formed by age 21
  1) Primary - 20 deciduous teeth that erupt at intervals between 6 and 24 months
  2) Permanent - enlarge and develop causing the root of deciduous teeth to be resorbed and fall out between the ages of 6 and 12 years
     * All but the third molars have erupted by the end of adolescence
     * There are usually 32 permanent teeth

- Tooth Tissues and Structure.
  - Gingiva = gum.
  - Cusp: raised area for biting (incisive) or “locking” (occlusal)
  - Two main regions - crown and the root.
    * Crown - exposed part of the tooth above the gingiva.
    * Enamel - acellular, brittle material composed of calcium salts and hydroxyapatite crystals is the hardest substance in the body. Encases the crown of the tooth.
      * Dentin - bonelike material deep to the enamel cap that forms the bulk of the tooth
      * Neck - constriction where the crown and root come together
      * Root - portion of the tooth embedded in the jawbone.
      * Cementum - calcified connective tissue
        ** Covers the root
        ** Attaches it to the periodontal ligament
    * Periodontal ligament
      ** Anchors the tooth in the alveolus of the jaw
      ** Forms the fibrous joint called a gomaphosis
    * Pulp cavity - cavity surrounded by dentin that contains pulp
    * Pulp - connective tissue, blood vessels, and nerves
    * Root canal - portion of the pulp cavity that extends into the root
    * Apical foramen - proximal opening to the root canal

- Classification of Teeth - Teeth are classified according to their shape and function:
  1) Incisors - chisel-shaped teeth adapted for cutting or nipping (gnawing)
  2) Canines - conical or fanglike teeth that tear or pierce
  3) Premolars (bicuspids) and molars - have broad crowns with rounded tips and are best suited for grinding or crushing
  4) During chewing, upper and lower molars lock together generating crushing force
- Dental Formula: Permanent Teeth

* A shorthand way of indicating the number and relative position of teeth
* Written as ratio of upper to lower teeth for the mouth. Humans are symmetrical left/right and upper/lower!
* Permanent Tooth Formula: 2I, 1C, 2Pn, 3M

<table>
<thead>
<tr>
<th>2I</th>
<th>1C</th>
<th>2Pn</th>
<th>3M</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>2I</td>
<td>1C</td>
<td>2Pn</td>
<td>3M</td>
<td>X</td>
</tr>
</tbody>
</table>

- Tooth and Gum Disease

* Dental caries - gradual demineralization of enamel and dentin by bacterial action
** Dental plaque, a film of sugar, bacteria, and mouth debris, adheres to teeth
** Acid produced by the bacteria in the plaque dissolves calcium salts
** Without these salts, organic matter is digested by proteolytic enzymes
** Daily flossing and brushing help prevent caries by removing forming plaque
* Gingivitis - as plaque accumulates, it calcifies and forms calculus, or tartar
** Disrupts the seal between the gingivae and the teeth
** Puts the gums at risk for infection
* Periodontitis - serious gum disease resulting from an immune response
  ** Immune system attacks intruders as well as body tissues, carving pockets around the teeth and dissolving bone

G) Pharynx
- From the mouth, the oro- and laryngopharynx allow passage of:
  1) Food and fluids to the esophagus
  2) Air to the trachea
- Lined with stratified squamous epithelium and mucus glands
- Has two skeletal muscle layers
  1) Inner longitudinal
  2) Outer pharyngeal constrictors

H) Esophagus
- Muscular tube going from the laryngopharynx to the stomach
- Travels through the mediastinum and pierces the diaphragm
- Joins the stomach at the cardiac orifice

- Esophageal Characteristics:
  * Esophageal mucosa – non-keratinized stratified squamous epithelium
  * The empty esophagus is folded longitudinally and flattens when food is not present
  * Glands secrete mucus as a bolus moves through the esophagus
  * Muscularis changes from skeletal (superiorly) to smooth muscle (inferiorly) – the last 2/3s of swallowing is not voluntary!