Oral Mucosa

Part 1

Oral Mucosa

• Posterior aspect
  – Palatopharyngeal folds (opening of the oropharynx)
  – Palatoglossal folds

Functions of the Oral Mucosa

1. Protection: Barrier for mechanical trauma and microbiological insults
2. Sensation: Temperature (heat and cold), touch, pain, taste buds, thirst; reflexes such as swallowing, retching, gagging and salivating
3. Secretion: Salivary secretion
4. Thermal regulation: Important in dogs not in humans; panting dogs

Organization of the Oral Mucosa

3 types according to FUNCTION:
1. Masticatory Mucosa: 26% of total mucosa. Gingiva (free, attached and interdental) and hard palate. Primary mucosa to be in contact with food during mastication. MASTICATORY MUCOSA IS USUALLY KERATINIZED.
2. Lining Mucosa: 60% of total mucosa. Covers the floor of mouth, ventral (underside) tongue, alveolar mucosa, cheeks, lips and soft palate. Does not function in mastication and therefore has minimal attrition. Non-keratinized; soft and pliable.
General Features of Oral Mucosa

1. Separated from the skin by vermilion zone of the lips which is more deeply colored than rest of the oral mucosa

2. Factors affecting color of the oral mucosa:
   a. Concentration and state of dilation of the blood vessels in underlying connective tissue
   b. Thickness of the epithelium
   c. Degree of keratinization
   d. Amount of melanin pigmentation

Clinically, color of oral mucosa is very important. For example, inflamed oral tissues appear red rather than the normal pale pink

How is the oral mucosa different from skin?

1. Color
2. Moist surface
3. Absence of adnexal skin structures such as hair follicles, sweat glands and sebaceous glands (exception in Fordyce's disease)
   Fordyce's disease: Sebaceous glands in oral cavity predominantly in upper lip, buccal mucosa and alveolar mucosa
4. Presence of minor salivary glands in oral mucosa
5. Texture of surface: Oral mucosa is smoother than the skin (few exceptions like dorsal tongue – due to papillae; hard palate – rugae; gingiva – stippling)
6. Firmness: Oral mucosa varies in its firmness. For example buccal mucosa and lips are loose and pliable whereas the gingiva and hard palate are firm so critical clinically while giving injections
Fordyce's Spots

- Pale yellow spots
- Normal variation
- Lips, buccal mucosa, alveolar mucosa and tonsillar pillar

Structure of Oral Mucosa

1. Overlying oral epithelium
2. Underlying connective tissue (lamina propria and submucosa)

In skin called epidermis and dermis

- Salivary glands
- Sebaceous glands
- Lymphoid tissue (tonsil)

Connective tissue in oral cavity is comprised of salivary glands, sebaceous glands (Fordyce's disease) and lymphoid tissue (tonsiliferous tissue)

Junction between oral epithelium and lamina propria is more obvious than that between lamina propria and submucosa

No muscularis mucosae layer seen in oral mucosa

Loose fat and glandular tissue with blood vessels and nerves seen underneath oral mucosa from underneath bone or muscle layer - this layer is termed SUBMUCOSA -- provides flexibility

In gingiva and hard palate, no submucosa is seen and the lamina propria is directly attached to the periosteum of the underlying bone which provides firm, inelastic attachment, this is called ORAL MUCOPERIOSTEUM
**Oral Epithelium**

Progenitor population: Divide and provide new cells (Proliferation)
Maturing population: Undergo differentiation (maturation)

Estimated time necessary to replace all the cells in the epithelium: turnover time
Skin: 52 to 75 days
Gut: 4 to 14 days
Gingiva: 41 to 57 days
Cheek: 25 days

Nonkeratinized epithelium turns over faster than keratinized epithelium
Clinical correlation: Oral ulcers during cancer chemotherapeutic treatment

**Components of Oral Epithelium**

Lining Mucosa:

Stratum Basale: Basal cell layer comprised of cuboidal cells. Progenitor cells that divide and provide new cells by mitotic division that migrate to the surface to replace cells that are shed.

Stratum Spinosum (or intermedium): Cells are oval and represent bulk of the epithelium.

Stratum Superficiale: Cells are flat and contain small oval nuclei that are continuously shed.

**Histology of Lip**

Skin: keratinized stratified squamous epithelium with adnexal skin structures

Oral Mucosa: Moist, surface, covered by nonkeratinized stratified squamous epithelium associated with small round seromucous glands of the lamina propria. In the submucosa fibers of orbicularis oris muscle is noted.

Vermillion zone: Very thin keratinized epithelium that contains no adnexal skin structures (can contain sebaceous glands)

What gives the vermillion zone the red color?
1. Epithelium is thin
2. Epithelium contains eleidin, which is transparent
3. Blood vessels are present near the surface

Eleidin is a semi-fluid clear substance present in the stratum lucidum of the skin epithelium

**Soft palate**

1. Nonkeratinized
2. Highly vascularized so more pink than hard palate
3. Lamina propria and submucosa present (unlike hard palate when only lamina propria is noted – mucoperiosteum)
4. Submucosa contains salivary glands and muscle soft palate
**Cheeks (Buccal Mucosa)**

Similar to lips and soft palate
Nonkeratinized stratified squamous epithelium, lamina propria and submucosa
Submucosa of cheeks contain fat cells along with lobules of minor salivary glands and muscle fibers

**Ventral surface of tongue**

Nonkeratinized stratified squamous epithelium, lamina propria and submucosa
Extremely dense muscle fibers interlacing connective tissue fibers in submucosa

**Floor of mouth**

Nonkeratinized stratified squamous epithelium, lamina propria and submucosa
Epithelium is loosely attached to lamina propria
No muscle

**Masticatory Mucosa**

Epithelium that covers gingiva and hard palate
Mucosa is thicker than nonkeratinized because of the keratin layer

- **Stratum basale**
  - Same as nonkeratinized epithelium

- **Stratum spinosum**

- **Stratum granulosum**: Cells contain keratohyaline granules

- **Stratum corneum**: Contains thin, flat and nonnucleated cells which are filled with keratin. In contrast to the hard keratin seen in nails and hair, keratin overlying normal masticatory oral mucosa is soft. Keratin is tough, nonliving material that is resistant to friction and impervious to bacterial invasion

**Types of Keratinized Epithelium**

The superficial cells are dead but retain the nucleus in parakeratinized epithelium but the nuclei are lost in orthokeratinized epithelium

The rete pegs are long and slender in keratinized epithelium