ORAL CAVITY

I. **SUBMANDIBULAR REGION** - area between mandible and hyoid bone - REVIEW MUSCLES IN SUBMANDIBULAR REGION - Digastric, Mylohyoid and Geniohyoid; on bisected head see (inferior to superior): **Mylohyoid, Geniohyoid and Genioglossus.**

Clinical: Ludwig's Angina - (Angina = condition with intense pain: from L. strangling) - infection of floor of mouth (Submandibular space), often due to spread from abscessed mandibular tooth; Infection may obstruct airway, push up tongue.

II. **TONGUE** - mobile muscular organ involved in speech, swallowing and taste; attached to hyoid, mandible and skull by muscles.

A. Superficial Structures

1. **Sulcus terminalis** – V-shaped groove dividing anterior 2/3 and posterior 1/3 of tongue.

2. **Foramen caecum** - pit in middle of sulcus terminalis; marks site of invagination of thyroid diverticulum.

3. **Lingual frenulum** (= L. bridle) - midline fold extending from floor of mouth to tongue on inferior surface; has swelling at floor of mouth called **Sublingual Papilla**; Submandibular salivary glands open to Sublingual papilla (see below).

4. **Fimbriated folds (Plica fimbriata)** - small folds lateral to lingual frenulum; mark location of lingual veins (fimbriated = L. having a fringe)

5. **Sublingual folds (Plicae sublingualis**) - overlie Sublingual salivary glands and have openings for ducts of glands.

B. Muscles of Tongue - **all innervated by Hypoglossal nerve (CN XII)**.

1. Extrinsic muscles - attach to bones; move tongue

MUSCLE	ORIGIN	INSERTION	ACTION
Genioglossus	**Mandible** - genial tubercle on inner side	**Tongue** - up to dorsal surface	Protrudes Tongue
Hyoglossus	**Hyoid bone** - greater and lesser horns	**Lateral side of Tongue**	Depresses Tongue
Styloglossus	**Temporal bone** - styloid process	**Lateral side of Tongue**	Draws Tongue superiorly and posteriorly

Note: Palatoglossus is muscle of soft palate - innervated by CNX (Vagus)

2. Intrinsic muscles - have no bony attachment; change shape of tongue.

MUSCLE	FIBER ORIENTATION	ACTION
Longitudinal muscle	Anterior-posterior	Shorten Tongue
Transverse muscle	Horizontal	Narrow Tongue
Vertical muscle	Superior-inferior	Flatten and Broaden Tongue

Clinical Note: In **damage to XII (Lower Motor Neuron) on one side**, there is atrophy of the tongue on the side of the lesion and the **protruded tongue deviates toward the side of the lesion** (due to unopposed action of the **Genioglossus** muscle); **Upper Motor Neuron Lesion** - Tongue control is bilateral by cortex **(EXCEPT GENIOGLOSSUS)** - **protrude tongue deviates away from side of cortical lesion**.

C. Arteries - Lingual artery - arises from External Carotid artery and courses deep to Hyoglossus muscle; turns upward to supply tongue; branches: a) Dorsal Lingual branches to dorsum of tongue; b) Sublingual artery to sublingual salivary gland.

D. Lymphatic drainage - **tip of tongue** drains to **Submental lymph nodes**; remainder of **anterior two thirds** drains to **Submandibular and Deep cervical** lymph nodes; **posterior third** drains to **Deep cervical lymph nodes**.

Important Clinical Note: Lymph vessels **cross over midline** of tongue; **cancer on one side may spread to opposite side** via crossing lymphatics.

E. Sensory Innervation

1. **General sensation** (touch, pain, etc.) - 1) **Somatic Sensory to anterior 2/3 of tongue - Lingual nerve (V3); 2) Visceral Sensory to posterior 1/3 of tongue and area anterior to epiglottis** - **Glossopharyngeal nerve (IX**) to posterior 1/3 of tongue, **Vagus (X) nerve** to area anterior to epiglottis.

2. **Chemical Sense** (**Taste)** - **Chorda tympani (VII) to anterior 2/3** of tongue, **Glossopharyngeal (IX)** to taste buds of **posterior 1/3 of tongue**, **Vagus (X)** to taste buds **anterior to epiglottis**.

REGION	GENERAL SENSATION (TOUCH, PAIN, ETC.)	TASTE
Anterior 2/3 of tongue	Lingual Nerve (V3) - Somatic Sensory	Chorda Tympani (VII) - hitchhike with Lingual N.
Posterior 1/3 of tongue	Glossopharyngeal Nerve (IX) - VIsceral Sensory	Glossopharyngeal Nerve (IX)
Anterior to Epiglottis	Vagus Nerve (X) - Visceral Sensory	Vagus Nerve (X)

III. PATHWAYS OF NERVES TO TONGUE - Nerve branches from VII (Facial Nerve) hitchhike with branches of V (Trigeminal Nerve)

1. Lingual nerve (from V3) - arises from mandibular division (V3) of trigeminal nerve; courses medial to ramus of mandible; joined by chorda tympani (see below); enters floor of mouth medial to root of third mandibular molar tooth; courses upward on **lateral surface of Hyoglossus muscle** to terminate in dorsum of tongue; provides general sensation (Somatic Sensory) to anterior two thirds of tongue.

2. Chorda tympani (from VII) - arises from Facial nerve in facial canal (inside petrous part of temporal bone); passes across tympanic membrane medial to malleus; passes out of tympanic cavity into Infratemporal fossa by Petrotympanic Fissure (see Skull Session);

Anatomical Note: Chorda tympani carries 1) **taste fibers to anterior two thirds of tongue** and 2) **parasympathetic preganglionic fibers to submandibular ganglion that supply submandibular and sublingual salivary glands**; submandibular ganglion is suspended from lingual nerve superior to submandibular salivary gland.

Clinical Note: **Damage to Lingual Nerve** - Lingual nerve courses immediately below mucosa in floor of mouth; can readily be damaged during dental extraction of impacted molar tooth or. in fall with glass pop bottle in mouth (children)**; severing nerve in mouth, lose touch and taste to anterior 2/3 of tongue** (damage fibers from chorda tympani).

Clinical/Diagnostic Note about damage to VII - Facial nerve is complex; many branches arise inside cranial cavity; however, **when Facial nerve courses out of skull (stylomastoid foramen) it only contains Branchiomotor fibers** to muscles of facial expression. **Damage to VII outside the skull only causes facial paralysis (no lost of taste, hyperacousia, etc.)**

IV. **SALIVARY GLANDS** - both innervated by parasympathetics from VII Chorda Tympani:

1. Submandibular salivary glands
   a. Location - C shaped gland wraps around posterior border of Mylohyoid adjacent to body of mandible.
   b. Submandibular duct - arises from gland between Mylohyoid and Hyoglossus muscles; opens by one to three orifices on sublingual papilla (adjacent to lingual frenulum).
2. Sublingual salivary glands
   a. Location - in floor of mouth between mandible and Genioglossus muscle; horseshoe-shaped glandular masses around lingual frenulum.
   b. Ducts - numerous (10 to 12) small ducts that open into mouth on plicae sublingualis.

Clinical/Entertaining Note: **Saliva can be ejected out Submandibular duct** by compression (contract Mylohyoid); this occurs in gleeking (spritzing, entertaining for

children, not adults) but also **involuntary in some individuals (clinical condition)**.