

MAXILLARY LANDMARKS

Middle Cranial Fossa

- Foramen Rotundum
- Foramen Ovalae

Inferior Orbital Fissure

- Infraorbital Canal
- Infraorbital Foramen

Bones - 3 Amigos of Maxillary Innervation

- Maxillary
 - Alveolar process
 - Palatine process
- Palatine
- Sphenoid
 - Pterygoid Process
 - Medial Pterygoid Plate
 - Lateral Pterygoid Plate

PterygoMAXILLARY fissure leads to the

PterygoPALATINE fossa Where all of the Maxillary innervation comes from.

MAXILLARY INNERVATION

- **V2** - passes through the foramen rotundum into the Pterygopalatine fossa where it branches.
- **PSA** – from Pterygopalatine fossa, enters bone to **innervate teeth, bone and gingiva.**
- **MSA** – from Infraorbital canal to **innervate teeth bone and gingiva.**
- **ASA** – from Infraorbital canal to **innervate teeth bone and gingiva.**
- **Superior labial** – out Infraorbital foramen to **innervate upper lip - SENSORY.**
- **Facial Nerve** – out Stylomastoid foramen, through the Parotid to **innervate upper lip and cheek MUSCLES and other m. of facial expression.**
- **Greater and Lesser Palatine** - pass down to exit the Greater and Lesser Palatine foramen to **innervate palatal gingiva and bone.**
- **Nasopalatine** – exits the Pterygopalatine fossa into nose and out incisive foramen to **innervate palatal gingiva and bone.**

MAXILLARY INJECTION ANATOMY

PSA, MSA, ASA

- Placed in vestibule and diffuses through thinner bone of maxilla to **teeth bone and gingiva** as well as into lip and cheek. **Superior Labial (lip sensory) and Facial Nerve (muscles) anesthetized also.**
- PSA blocked before it goes into bone.

GREATER PALATINE AND INCISIVE

- Placed at foramen.
- Tightly adhered palatal gingiva makes painless injections a challenge.

V2 BLOCK

- Anesthetize entire maxilla with single injection through Greater Palatine Canal into Pterygopalatine fossa.

MANDIBULAR LANDMARKS

- Mandible
 - Mandibular Foramen
 - Mental Foramen
 - Mylohyoid Line
 - Coronoid Process
 - Condyle and Neck
 - Pterygoid Fovea

MANDIBULAR INNERVATION

Infratemporal Fossa is where all of the Mandibular innervation comes from.

- **V3** - passes through the Foramen Ovalae into the Infratemporal fossa.
- **Inferior Alveolar** – into mandibular foramen and canal to **innervate teeth & bone. No gingiva**
- **N. to Mylohyoid** – branches from IA to **innervate floor of mouth muscles and potentially 3rd molars**
- **Mental** – out mental foramen to **innervate labial gingiva and lip.** A branch of IA so anesthetized with IA
- **Lingual** – **Innervates tongue, lingual gingiva and floor of mouth.**
- **Buccal** – **innervates cheek and buccal gingiva**
- **Auriculotemporal** – **Innervates temple & anterior ear.**
- **Facial Nerve** – out Stylomastoid foramen, through the Parotid to **innervate lower lip and cheek MUSCLES and other m. of facial expression.**

MANDIBULAR INJECTION ANATOMY

- **IA artery most posterior, IA nerve next, Lingual nerve most anterior**
- **Sphenomandibular ligament can shield mandibular foramen.**
- **Tongue and lip anesthesia but no facial muscle paralysis because injected in Infratemporal Fossa and not vestibule.**

IA

- Anesthetizes **IA, Lingual and Mental nerves.**
- Anesthetizes **teeth, bone, labial gingiva, lip, tongue, lingual gingiva and floor of mouth.**
- Pierces buccinator but anterior to Medial Pterygoid.

GOW GATES

- Placed higher to avoid ligament.
- Anesthetizes **IA, Lingual, Mental AND Buccal nerves.**
- **Anesthetizes teeth, bone, labial gingiva, lip, tongue, lingual gingiva, floor of mouth – AND cheek and buccal gingiva.**

AKINOSI

- **Same nerves and structures as IA.**
- Used in cases of limited opening or as an alternative to traditional IA.
- Thumb in deepest part of ant. ramus, finger on post ramus and needle halfway in between.

BUCCAL

- Pierces buccinator at ant. ramus of mandible.
- **Anesthetizes cheek and buccal gingiva.**

MENTAL

- **Anesthetizes lip and labial gingiva.**
- Usually only for soft tissue but can get pulpal anesthesia if pressure applied when injecting.
- **Facial muscles can be affected due to injection in vestibule.**

MYLOHYOID

- Most common secondary innervation for mandibular 3rd molars.
- Place in FOM near root of 2nd molar.

BLOOD SUPPLY

Maxillary, Facial and Lingual arteries–

- **Facial artery** - from Ext. Carotid in neck to supply face.
- **Lingual Artery** comes from External Carotid in neck, NOT infratemporal fossa like the nerve.
- **Maxillary artery** branches from External Carotid posterior to neck of condyle.
 - First distributes in Infratemporal fossa to all mandibular things, then to Pterygopalatine fossa to all maxillary things.

MUSCLES OF MASTICATION

- **Temporalis** –
 - **Attachments:** Coronoid process and anterior ramus of mandible.
 - **Actions:** Elevate and Retrude
- **Masseter** – Superficial and Deep heads.
 - **Attachments:** Zygomatic arch and ramus and angle of mandible.
 - **Actions:** Elevate, Protrude and Retrude from a protruded position.
- **Lateral Pterygoid** – Superior and Inferior heads
 - **Attachments:** from Lateral. Pterygoid plate (anterior and medial) to condyle and TMJ disc (posterior and lateral). Mandible is the movable part of the joint.
 - **Actions:** Protrude, Lateral Excursion to opposite side. Depress by sliding condyle down articular eminence during protrusion.
- **Medial Pterygoid** –
 - **Attachments:** From Lateral Pterygoid plate (superior and medial) to medial surface and angle of mandible (inferior and lateral). Mandible is the movable part of the joint.
 - **Actions:** Elevate, Protrude
 - Forms Masseteric “Sling” with Masseter.
- **Buccinator** – from Pterygomandibular raphe to maxillary. and mandibular. alveolar processes.

FLOOR OF MOUTH

Mylohyoid muscle forms the floor

- Attaches to mylohyoid line all along the mandible down to the hyoid bone.
- Tongue muscles originate from anterior mandible, hyoid and styloid processes.
- Lingual nerve runs close to 3rd molar but then moves medial to enter tongue. Not a factor in anterior FOM surgeries.
- Lingual artery branches from External Carotid in neck and enters deep into tongue immediately. Not a factor in FOM surgeries.
- Sublingual gland in FOM above mylohyoid and against the mandible. Empties via many small ducts into FOM. Moves with gingiva when separated from mandible.
- Submandibular gland begins in submandibular area and wraps around posterior edge of mylohyoid muscle. Duct runs anteriorly to empty in midline. Not a factor in perio surgery or tori removal.

PALATE

Two muscles that pull the palate up

- LevatorPalatini
- Tensor VeliPalatini

Two muscles that pull the palate down

- Palatoglossal
- Palatopharyngeus
 - These two form the arches seen posterior to the tongue

TMJ

- Temporal bone
 - Mandibular fossa
 - Articular Eminence
- Condyle articulates with disc in the mandibular fossa of the temporal bone.
- Lateral Pterygoid muscle attaches to neck of condyle and disc.
- Sphenomandibular and stylomandibular ligaments stabilize the joint.
- Joint surrounded by capsule.
- Disc attached to inside of capsule and separates joint into upper and lower compartments.
- Disc has an anterior and posterior thickening.
- Initial movement of condyle is rotation and occurs in lower compartment.
- Further movement of condyle is translation down the articular eminence and occurs in upper compartment.
- Translation down the articular eminence results in depression (opening) of mandible. Therefore, Lateral Pterygoid is only muscle of mastication that opens mandible.