**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 MUSCLES (and all other Muscles 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 and 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
* **Mental** – out mental foramen to innervate labial gingiva and lip. A branch of IA so anesthetized with IA
* **Buccal** – innervates cheek and buccal gingiva
* **Auriculotemporal** – Innervates temple & anterior ea**r.**
* **Lingual** –Innervates tongue, lingual gingiva and floor of mouth.

**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 Peterygoid is only muscle of mastication that opens mandible.