

March 6, 2024 - Dr. Vogl (wayne.vogl@ubc.ca)

Objectives:

1. Identify the four 'muscles of mastication'.
2. Describe the relationship of medial and lateral pterygoid muscles to V₃.
3. Identify the lingual, inferior alveolar and auriculotemporal nerves in the infratemporal fossa.
4. Identify the chorda tympani nerve in the infratemporal fossa and indicate the nerve modalities that it carries.
5. Describe the course of parasympathetics in the infratemporal fossa that supply the parotid gland and all glands below the level of the oral fissure.
6. Identify the middle meningeal artery in the infratemporal fossa.

Videos:

(requires CWL login)

Volume 4 - The Head & Neck

4.8.8 Mandibular nerve (4:27 min)

3D Specimens:

Modules:

- relates to lecture -

All cadaver images are courtesy of:

B. Kathleen Alsup & Glenn M. Fox, University of Michigan Medical School, [BlueLink](#)

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Be able to identify:

Bones

- Mandible
 - Body
 - Ramus
 - Coronoid process
 - Condylar process
 - Mandibular foramen
- Base of skull
 - Foramen ovale
 - Foramen spinosum

Muscles of Mastication

(innervated by V₃)

- Masseter
- Temporalis
- Lateral pterygoid
- Medial pterygoid

Joints

- Temporomandibular joint

Skin and superficial fascia removed

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Parotid gland and temporal fascia removed

*Masseter muscle cut away from zygomatic arch
and reflected*

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Nerves

Mandibular Division (V₃) of Trigeminal Nerve

- Inferior alveolar nerve
- Lingual nerve
- Auriculotemporal nerve

Branch of Facial Nerve (VII)

- Chorda tympani
 - taste to anterior 2/3 of the tongue and para-sympathetic to glands below the level of oral fissure
 - joins with lingual nerve (branch of V₃) in infratemporal fossa
 - ganglion for parasympathetic nerves carried in chorda tympani nerve is submandibular ganglion

Vessels

- Maxillary artery
- Middle meningeal artery
- Superficial temporal artery

Note:

Know about, but do not identify, the branch coming ultimately from CN IX called the **lesser petrosal nerve**. It carries parasympathetics to the parotid gland by hopping onto the auriculotemporal nerve - the ganglion for these parasympathetic nerves of IX is the otic ganglion, associated with the auriculotemporal nerve of V₃.

Zygomatic arch removed to reveal temporalis muscles attachment to the coronoid process of the mandible

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*Ramus of mandible cut away and
temporalis reflected upwards to
expose the infratemporal fossa*

Pterygoid muscles

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Lateral pterygoid and the condylar process of the mandible removed to expose V3 and its branches

Lateral pterygoid muscle removed

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Summary of Parasympathetics and CN V

- Parasympathetic fibers carried by CN III, VII and IX hop onto branches of CN V to get to their target tissues.
- There are only 4 parasympathetic ganglia in the head and they are all associated with branches of V:
 - ciliary ganglion (of III) associated with V₁
 - pterygopalatine ganglion (of VII) associated with V₂ - not covered in this course
 - submandibular ganglion (of VII) associated with V₃
 - otic ganglion (of IX) associated with V₃
- Parasympathetic innervation to all glands above the level of the oral fissure is via the greater petrosal nerve of VII. - not covered in this course
- All glands below the level of the oral fissure are innervated by the chorda tympani branch of VII.
- The parotid gland is innervated by IX, and parasympathetic innervation to the ciliary body and sphincter pupillae muscle is via III.
- All sympathetic innervation in the head is by T₁ of the sympathetic trunk.

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Questions for the Lab

What would be lost if there was a lesion to the lingual nerve where it branches from V₃ in the infratemporal fossa?

What would be lost if there was a lesion to the lingual nerve as it entered the oral cavity medial to the mandible just inferior to the last molar tooth?

What specific muscles could be tested for branchial motor function of the V₃ component of the trigeminal nerve? How could you test them?

When asking a patient to open their mouth, the chin deviates to the left side. Which muscle is likely not functioning properly?

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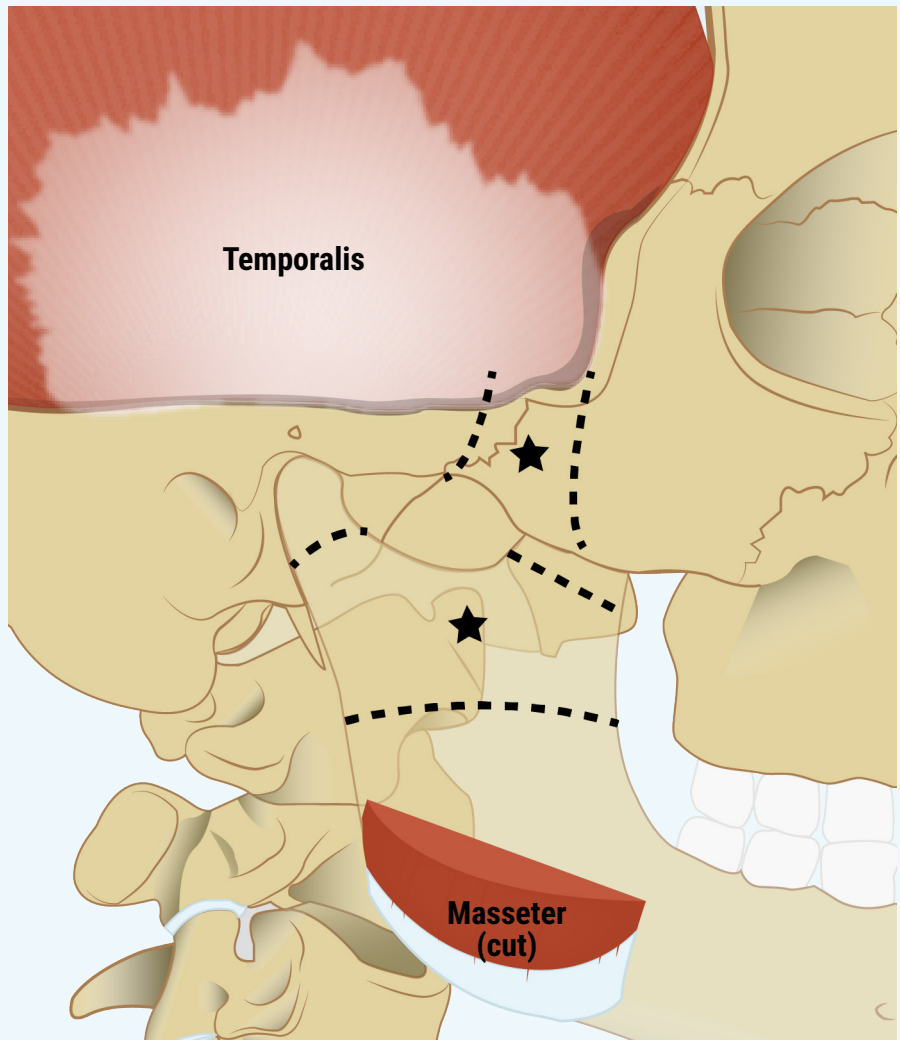
1. The staff will have reflected the masseter muscle and the part of the zygomatic arch to which the muscle attaches. Note the attachment of the temporalis muscle to the coronoid process. Three bone cuts also will have been made through the mandible as indicated in the figure below.

2. Carefully detach and remove the part of the ramus of the mandible (indicated by the bottom star in the figure) between the bone cuts.

3. Also remove the part of the zygomatic arch (indicated by the top star) to which masseter originates.

4. Once this is done, identify the lingual nerve and inferior alveolar nerve that emerge inferiorly from between the lateral pterygoid and medial pterygoid muscles.

- The lingual nerve is the most anterior branch and passes into the oral cavity. The inferior alveolar nerve is more posterior and passes into the mandibular foramen on the medial side of the ramus of the mandible.

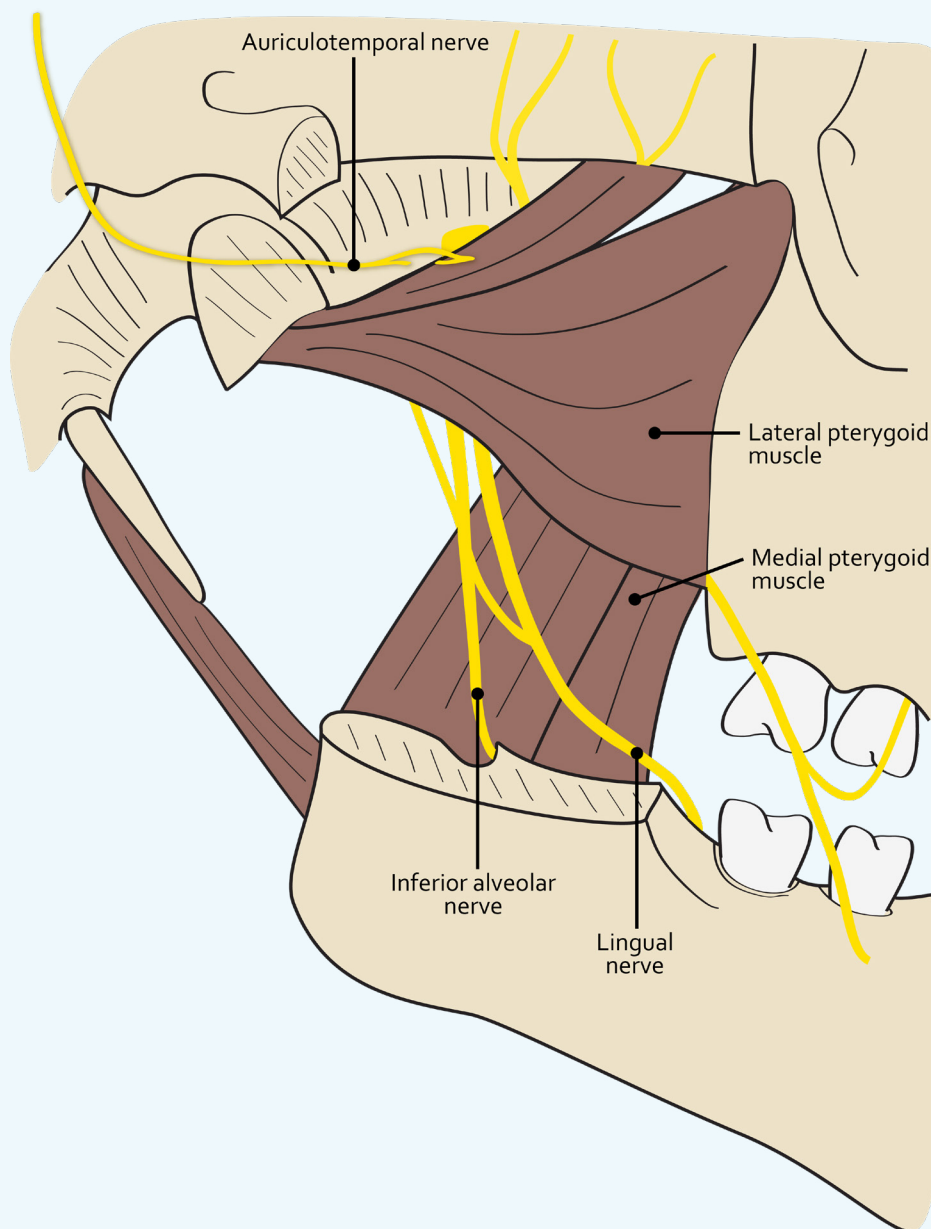


5. Also identify the maxillary artery that can either pass superficial or deep to the lateral pterygoid muscle.

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6. *After these two nerves have been identified, remove the lateral pterygoid muscle to fully expose the branches of V₃.*
7. *Once removed, identify the middle meningeal artery that branches off the maxillary artery and passes superiorly through the foramen spinosum and into the cranial cavity.*
 - High in the infratemporal fossa, the roots of the auriculotemporal nerve as it branches from V₃ surround the middle meningeal artery.
 - Note the association of the auriculotemporal nerve with the parotid gland.



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8. Importantly, also identify the chorda tympani nerve that joins the lingual nerve in the infratemporal fossa.

- This nerve emerges from the skull medial to the temporomandibular joint and passes anteriorly and inferiorly across the infratemporal fossa to join the posterior aspect of the lingual nerve.

