Temporal and Infratemporal fossae

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Temporalis muscle

**Origin:** from the bony surfaces of the temporal fossa

**Insertion:** coronoid process
And anterior border of the ramus of the mandible

**Action:** Temporalis is a powerful elevator of the mandible, closing jaws
Retraction of the mandible

Temporalis is innervated by deep temporal nerves from the mandibular nerve [V3]

Note: The temporalis muscle is a large fan-shaped muscle that fills much of the temporal fossa
Masseter muscle

**Origin:** the zygomatic arch, maxillary process of zygomatic bone.

**Insertion:** into the lateral surface of the ramus of the mandible

**Action:** elevation of the mandible, **closing jaws**

The masseter is innervated by the masseteric nerve from the mandibular nerve [V3]

The masseter muscle is quadrangular in shape

Note: The masseter overlies the lateral surface of the ramus of the mandible
Medial pterygoid

**Origin:** medial surface of the lateral pterygoid plate

**Insertion:** medial surface of the ramus of mandible near the angle

**Action:** The medial pterygoid mainly elevates the mandible, **closing jaws**

The medial pterygoid is innervated by the nerve to medial pterygoid from the mandibular nerve [V3].

The medial pterygoid muscle is quadrangular in shape and has deep and superficial heads.

Note: the fibers of the medial pterygoid are oriented almost vertically.
**Lateral pterygoid**

The upper head originates from the roof of the infratemporal fossa (inferior surface of the greater wing of the sphenoid and the infratemporal crest)

The lower head is larger and originates from the lateral surface of the lateral pterygoid plate

**Insertion:** into the neck of mandible (pterygoid fovea), into the capsule of the Temporomandibular joint (TMJ)

**Action:** The lateral pterygoid is the major protruder of the lower jaw

The lateral pterygoid is innervated by the nerve to lateral pterygoid from the mandibular nerve [V3].

The lateral pterygoid is a thick triangular muscle and has two heads.

Note: the fibers of the lateral pterygoid are oriented almost horizontally.

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Infratemporal crest

lateral pterygoid plate

Infratemporal surface of sphenoid

Greater wing of sphenoid bone

Lateral

Pterygoid fovea

lateral pterygoid plate
Lateral pterygoid

The upper head

The lower head
Lateral pterygoid

The upper head

The lower head
Medial pterygoid
Masseter/ Superficial part
Masseter/ deep part
Temporal and infratemporal fossae are interconnected spaces on the lateral side of the head.

Temporal fossa is superior to the infratemporal fossa above the zygomatic arch.

Pterygo-palatine fossa
Lies below the apex of the orbit.
Of the four muscles of mastication (masseter, temporalis, medial pterygoid, and lateral pterygoid) that move the lower jaw at the TMJ:

- One (masseter) is lateral to the infratemporal fossa.
- Two (medial and lateral pterygoid) are in the infratemporal fossa.
- One fills the temporal fossa (temporalis).

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**Temporal fossa** is a narrow fan shaped space that covers the lateral surface of the skull.

Floor is formed by 4 bones: frontal, parietal, temporal, and sphenoid.

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**Contents**
- Temporalsis muscle
- Temporal fascia
- Deep temporal arteries
- Deep temporal nerves
- Zygomaticotemporal nerve
- Superficial temporal vessels
- Auriculotemporal nerve
- Temporal branch of facial nerve
- Middle temporal artery
Auriculotemporal nerve

Superficial temporal artery

Superficial temporal vein
Deep temporal nerves

Deep temporal arteries

Mandibular nerve

Maxillary artery
Middle temporal artery

Superficial temporal artery

Zygomaticotemporal nerve
The infratemporal fossa is an irregularly shaped cavity (almost wedge in shape), situated below the zygomatic arch, deep to the ramus of the mandible.

The infratemporal fossa acts as a pathway for neurovascular structures passing to and from the cranial cavity, pterygopalatine fossa and temporal fossa.

It also contains some of the muscles of mastication.

The **medial** and **lateral pterygoids** are located within the fossa itself, whilst the masseter and temporalis muscles insert and originate into the borders of the fossa.

It is closely associated with both the temporal and pterygopalatine fossae.
Infra temporal fossa
Anterior wall: back of the maxilla
Medial wall: lateral pterygoid plate
Roof: greater wing of sphenoid bone
Lateral wall: ramus of mandible

Communications
Temporal fossa: through the gap deep to the zygomatic arch
Orbit: through the inferior orbital fissure
Pterygo-palatine fossa: through the pterygo-maxillary fissure
Middle cranial fossa: through foramen ovale and spinosum

Note: the infratemporal fossa lies between the ramus of the mandible laterally and the wall of pharynx medially
Greater wing of sphenoid bone

Back of the maxilla

lateral pterygoid plate
Infratemporal fossa
Note:
The foramen ovale and foramen spinosum open on its roof.
The medial and anterior walls of Infratemporal fossa

Inferior orbital fissure
Communication with the orbit

Pterygo-maxillary fissure
Communication with Pterygo-palatine fossa

Alveolar foramina (leading to alveolar canals)
Lateral wall is formed by the medial surface of the ramus of mandible Which contains the **mandibular foramen**

**The lateral wall of Infratemporal fossa**

The infratemporal fossa can be said to have a *wedge* shape

**Greater wing of sphenoid**

**Mandibular foramen**: an opening to the mandibular canal
Transmits inferior alveolar nerve (a branch from mandibular nerve) and blood vessels
Contents of infratemporal fossa

Lateral pterygoid muscle
Medial pterygoid muscle
Sphenomandibular ligament
Maxillary artery (and its branches:)
  Middle meningeal artery
  Deep temporal arteries
  Buccal artery
  Inferior alveolar artery
  Pterygoid branches
Mandibular nerve (and its branches:)
  Auriculotemporal nerve
  Buccal nerve
  Lingual nerve
  Inferior alveolar nerve
  Chorda tympani
Pterygoid venous plexus
Maxillary vein
Middle meningeal vein
Otic ganglion
Maxillary artery
the terminal branch of the external carotid artery.
It travels through the infratemporal fossa.

Within the fossa, it gives rise to the middle meningeal artery, which passes through the foramen spinosum.
Deep temporal arteries

Pterygoid branches

Infraorbital artery

Posterior superior alveolar artery

Buccal artery

Masseteric artery

Middle meningeal artery

Superficial temporal artery

Mylohyoid artery

Inferior alveolar artery

External carotid artery

Temporals

Maxillary artery

Buccinator

Masseter
The maxillary artery

- The larger of the two terminal branches of the external carotid artery
- Originates in the substance of the parotid gland
- Passes forward between the neck of the mandible and the sphenomandibular ligament into the infratemporal fossa
- Ascends obliquely in the infratemporal fossa to enter the pterygopalatine fossa by passing through the pterygomaxillary fissure
- Runs either superficial or deep to the lower head of lateral pterygoid muscle
- It supplies the deep structures of the face, maxilla, mandible, all teeth, nasal cavity and cerebral dura mater
The main trunk of the maxillary artery is divided into three parts, which are named according to related structures along the artery’s course.

- **Mandibular part** (1st part)
- **Pterygoid part** (2nd part)
- **Pterygopalatine part** (3rd part)
Mandibular part (1st part)
- Middle meningeal artery
- Inferior alveolar artery
- Deep auricular artery
- Anterior tympanic artery
- Accessory meningeal artery

Pterygoid part (2nd part)
- (its branches course with branches of mandibular nerve)
- Deep temporal arteries
- Masseteric artery
- Buccal artery
- Pterygoid branches

Pterygopalatine part (3rd part)
- (its branches course with branches of maxillary nerve and pterygopalatine ganglion)
- Sphenopalatine artery
- Descending palatine artery
- Infraorbital artery (gives off Middle and Anterior superior alveolar arteries)
- Posterior superior alveolar artery
- Pharyngeal artery
- Artery of the pterygoid canal
Third part of maxillary artery (Pterygopalatine part)

- Sphenopalatine artery
- Descending palatine artery
- Posterior superior alveolar artery
- Infraorbital artery
- Artery of pterygoid canal
- Pharyngeal artery
- Anterior superior alveolar artery
- Middle superior alveolar artery
- Read only 😊
Mandibular Nerve (V3)

The mandibular nerve is both motor and sensory.

The sensory root leaves the trigeminal ganglion and passes out of the skull through the foramen ovale to enter the infratemporal fossa.

The motor root of the trigeminal nerve also leaves the skull through the foramen ovale and joins the sensory root to form the trunk of the mandibular nerve.

Then divides into a small anterior and a large posterior division.
Branches From the Main Trunk of the Mandibular Nerve:

1- Meningeal branch
2- Nerve to the medial pterygoid muscle

Branches From the Anterior Division of the Mandibular Nerve

1- Masseteric nerve (to masseter muscle)
2- Deep temporal nerves (to temporalis muscle)
3- Nerve to the lateral pterygoid muscle
4- Buccal nerve

Branches From the Posterior Division of the Mandibular Nerve

1- Auriculotemporal nerve
2- Lingual nerve
3- Inferior alveolar nerve

Note: Mandibular nerve lies in-between the two pterygoid muscles
The **inferior alveolar nerve** (inferior dental nerve) is a branch of the mandibular nerve.

It supplies sensation to the lower teeth, lower lip and chin.

Before entering the canal, it gives off **nerve to mylohyoid**, which supplies the mylohyoid muscle and the anterior belly of the digastric muscle.

**Mental nerve** is a branch of inferior alveolar nerve to supply the skin and mucous membrane of the lower lip and chin **(Passes through mental foramen)**.
Note
As the inferior alveolar nerve enters the mandibular foramen, it gives off nerve to *mylohyoid* which runs in the mylohyoid groove (along with mylohyoid blood vessels), and supplies the mylohyoid muscle and the anterior belly of the digastric muscle.
**Buccal nerve** is the only sensory branch of the anterior division of mandibular nerve.

**Buccal nerve** supplies the skin and the mucous membrane of the cheek.

**Lingual nerve**

- It supplies the mucous membrane of the anterior two thirds of the tongue and the floor of the mouth *(general sensations)*
- It is joined by the chorda tympani nerve
- It gives off preganglionic parasympathetic secretomotor fibers to the submandibular ganglion, *(the chorda tympani !!)*
- It carries taste sensations from the anterior two thirds of the tongue *(the chorda tympani !!)*

**Auriculotemporal nerve** conveys postganglionic parasympathetic secretomotor fibers from the otic ganglion to the parotid salivary gland.

Remember: Auriculotemporal nerve brings sensations from the skin of the auricle, the external auditory meatus, outer surface of tympanic membrane, the temporomandibular joint, parotid gland and the scalp.
Sphenomandibular ligament is an extra-capsular ligament of TMJ.

It runs between the spine of sphenoid and the lingula of the mandible.
Spine of sphenoid

Foramen spinosum

Greater wing

Spine of sphenoid
It is the primary passive support of the mandible, along with the muscles of mastication.
Pterygoid venous plexus

It is a valveless venous plexus of considerable size, and is situated on the lateral aspect of medial pterygoid within the infratemporal fossa.

It drains the eye and is directly connected to the cavernous sinus. It provides a potential route by which infections of the face can spread intracranially.

It receives tributaries corresponding with the branches of the maxillary artery.

It forms the maxillary vein.
The **maxillary vein** consists of a short trunk.

It is formed by a confluence of the veins of the pterygoid plexus.

It unites with the superficial temporal vein to form the retromandibular vein.
Note:
Pterygoid venous plexus lies around lateral pterygoid muscle
The **otic ganglion** is a small parasympathetic ganglion located immediately below the foramen ovale in the infratemporal fossa and on the medial surface of the mandibular nerve.

It is functionally associated with the glossopharyngeal nerve and innervates the parotid gland for salivation.

The preganglionic parasympathetic fibers originate in the glossopharyngeal nerve, and they reach the ganglion via the **lesser petrosal nerve**

The postganglionic parasympathetic (secretomotor) fibers reach the parotid salivary gland via the **auriculotemporal nerve**.
Tympanic Nerve
➢ The tympanic nerve arises from the glossopharyngeal nerve, just below the jugular foramen
➢ It passes through the floor of the middle ear and onto the promontory
➢ Here it splits into branches, which form the tympanic plexus.
➢ The tympanic plexus supplies the lining of the middle ear and gives off: Lesser petrosal nerve

It leaves the skull through the foramen ovale

Carries preganglionic parasympathetic fibers to the parotid gland via the otic ganglion

The lesser petrosal nerve is a branch from glossopharyngeal nerve (CN IX), carrying parasympathetic preganglionic fibers from the tympanic plexus to the parotid gland. It synapses in the otic ganglion, from where the postganglionic fibers emerge.
Medial wall

Glossopharyngeal nerve

IJV

Tympanic nerve

Lesser petrosal nerve

Post. wall

Ant. wall

Greater petrosal nerve

Glossopharyngeal nerve

IJV

Tympanic nerve
Note:
The two roots of auriculotemporal nerve encircle the middle meningeal artery.
Anatomically, it's connected to the mandibular nerve.

Functionally, it's associated with the glossopharyngeal nerve.

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Foramen ovale transmits:

- Mandibular nerve
- Accessory meningeal artery
- Lesser petrosal nerve
- Emissary vein

MALE
The chorda tympani
✓ It arises from the facial nerve just above the stylomastoid foramen
✓ It enters the middle ear close to the posterior border of the tympanic membrane.
✓ It then runs forward over the tympanic membrane and crosses the root of the handle of the malleus

✓ It leaves the middle ear through the petrotympanic fissure and enters the infratemporal fossa, where it joins the lingual nerve

The chorda tympani contains:
1. Taste fibers from the mucous membrane covering the anterior two thirds of the tongue and the floor of the mouth.
2. Carries preganglionic parasympathetic fibers to the submandibular and sublingual glands via the submandibular ganglion
The **petrotympanic fissure** is a fissure in the temporal bone.

The chorda tympani runs through the fissure to join with the lingual nerve in the infratemporal fossa. It provides taste innervation to the anterior 2/3 of the tongue.

The **chorda tympani** is a branch of the facial nerve.

The **chorda tympani** passes medial to the tympanic membrane and the handle of the malleus, and again enters the temporal bone. It exits the skull through the petrotympanic fissure and descends in the infratemporal fossa.
To sublingual and submandibular glands

Anatomically, it's connected to lingual nerve
Functionally, it's associated with the facial nerve (chorda tympani)

Sensory root
Chorda tympani
Parasympathetic root
Sympathetic plexus
Around facial artery

Submandibular ganglion