

MAXILLARY ARTERY (SE)

Maxillary artery is the larger terminal branch of external carotid artery.

It arises within the substance of parotid gland, behind the neck of mandible.

Course:

Course of the artery is divided into 3 parts by the lateral pterygoid muscle.

1st part - (mandibular part) : From its origin upto lateral pterygoid muscle

2nd part - (pterygoid part) : lies on lateral pterygoid muscle

3rd part- (pterygopalatine part) : lies in pterygopalatine fossa.

Branches:

From the first part:

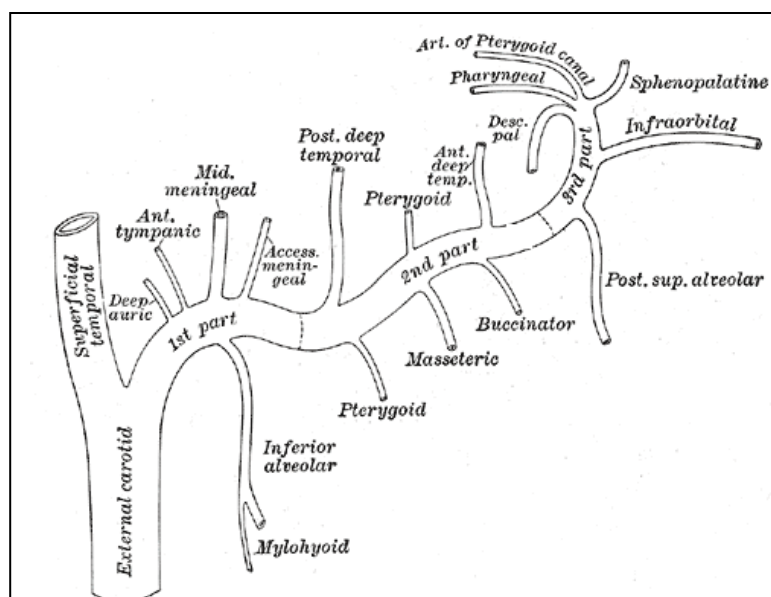
- Deep auricular artery
- Anterior tympanic artery
- Middle meningeal artery
- Accessory meningeal artery
- Inferior alveolar artery

From the second part:

- Masseteric artery
- Deep temporal artery
- Pterygoid artery
- Buccal artery

From the third part:

- Posterior superior alveolar artery
- Infra orbital artery
- Greater palatine artery
- Pharyngeal artery
- Artery of the pterygoid canal
- Sphenopalatine artery



Sphenopalatine artery is considered to be the continuation of maxillary artery.

OTIC GANGLION AND ITS CONNECTIONS (SE)

Otic ganglion is a peripheral parasympathetic ganglion .

Topographically it is connected with mandibular nerve, functionally it is associated with glossopharyngeal nerve.

Situation:

In the Infratemporal fossa

Immediately below the foramen ovale, medial to the trunk of mandibular nerve.

Connections:

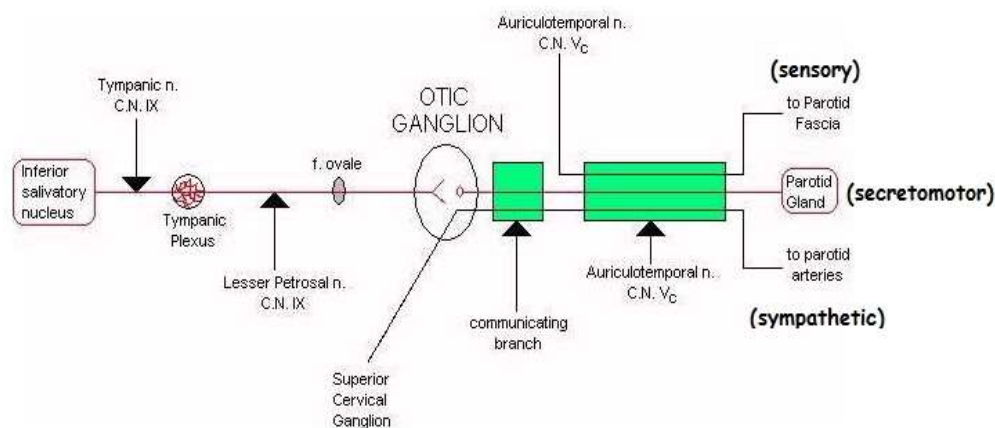
Roots:

- Parasympathetic (motor) root
- Sympathetic root

Parasympathetic root is derived from lesser petrosal nerve.
 Carries preganglionic secretomotor fibers for parotid gland.
 Preganglionic fibers originate from inferior salivatory nucleus.

↓
 Glossopharyngeal nerve
 ↓
 Tympanic branch
 ↓
 Tympanic plexus
 ↓
 Lesser petrosal nerve
 ↓
 Relays into the otic ganglion.

Sympathetic root is derived from plexus around Middle meningeal artery. Carries post ganglionic sympathetic Fibers from superior cervical ganglion.



Branches:

Post ganglionic parasympathetic Fibers join auriculotemporal nerve and supply secretomotor Fibers to parotid gland

Post ganglionic sympathetic Fibers join auriculotemporal nerve and supply vasomotor supply to parotid gland

Nerve to the medial pterygoid passes through the otic ganglion without any relay and supplied tensor tympani and tensor veil palatini muscles.

LINGUAL NERVE: ORIGIN, COURSE & DISTRIBUTION (SE)

Branch of the mandibular division of Trigeminal nerve

Course & relations :

Begins 1 cm below the foramen ovale .

Joined by Chorda tympani nerve at acute angle

Comes in direct contact with mandible, medial to 3rd molar tooth

Lies on hyoglossus muscle to reach the tongue.

lingual nerve winds around submandibular duct and divides into terminal branches to the tongue.

Distribution of Lingual Nerve:

Carries general sensation from Anterior 2/3rd of tongue Floor of mouth and Mandibular gum

Conveys secretomotor fibers to submandibular gland and sublingual gland

Applied anatomy:

During extraction of third molar tooth lingual nerve may be damaged resulting in loss of sensation in anterior 2/3rd of the tongue.

BRANCHES OF FIRST PART OF MAXILLARY ARTERY (SA)

- Deep auricular artery
- Anterior tympanic artery
- Middle meningeal artery
- Accessory meningeal artery
- Inferior alveolar artery

BRANCHES OF THIRD PART OF MAXILLARY ARTERY (SA)

- Posterior superior alveolar artery
- Infra orbital artery
- Greater palatine artery
- Pharyngeal artery
- Artery of the pterygoid canal
- Sphenopalatine artery

BRANCHES OF MANDIBULAR NERVE (SA)

From the trunk of mandibular nerve:

- Meningeal branch
- Nerve to the medial pterygoid muscle

From the anterior division of mandibular nerve:

- Masseteric branch
- Deep temporal nerves
- Nerve to the lateral pterygoid muscle
- Buccal nerve

From the posterior division of mandibular nerve:

- Auriculo-temporal nerve
- Lingual nerve
- Inferior alveolar nerve
- Nerve to mylohyoid

ENUMERATE THE MUSCLES SUPPLIED BY MANDIBULAR NERVE: (SA)

- Masseter muscle
- Temporalis muscle
- Lateral pterygoid muscle
- Medial pterygoid muscle
- Mylohyoid muscle
- Anterior belly of Digastric muscle
- Tensor tympani muscle
- Tensor vel palatini muscle

GANGLIA ASSOCIATED WITH MANDIBULAR NERVE :(SA)

Otic ganglion

Submandibular ganglion

Otic ganglion:

Situated in the Infratemporal fossa

Associated with the trunk of mandibular nerve

It is the relay station for secretomotor parasympathetic fibers for the parotid gland

Submandibular ganglion:

Situated in the submandibular nerve

Associated with the lingual nerve.

It is the relay station for secretomotor parasympathetic fibers for the submandibular gland and sublingual gland.

Temporal and Infratemporal regions

NAME THE MUSCLES OF MASTICATION. DESCRIBE THEM UNDER THE FOLLOWING HEADINGS A) ORIGIN B) INSERTION C) NERVE SUPPLY D)ACTIONS .ADD A NOTE ON ITS DEVELOPMENT? (LE)

The muscles of mastication move the mandible during mastication and speech

The muscles are

Masseter

Temporalis

Lateral pterygoid

Medial pterygoid.

| Muscle | Origin | Insertion | Nerve supply | Action |
|-------------------|---|--|---|--|
| Masseter | Superficial layer: Anterior 2/3 of lower border of zygomatic arch and zygomatic process of maxilla. Deep layer-Deep surface of zygomatic arch. | Lateral surface- of ramus of mandible | Masseteric nerve branch of mandibular nerve | Elevates & protrudes mandible |
| Temporalis | Temporal fossa Temporal fascia | Coronoid process. Anterior border of ramus of mandible. | 2 deep temporal branches | Elevates mandible, Side to side grinding movements |
| Lateral pterygoid | Upper head- Infratemporal surface of greater wing of sphenoid Lower head- lateral surface of lateral pterygoid plate | pterygoid fovea on neck of mandible. Articular disc and capsule of temporomandibular joint. | Branch from anterior division of mandibular nerve | Depress mandible. Protrude the mandible. Grinding movements. |
| Medial pterygoid. | Superficial head- tuberosity of maxilla Deep head- medial surface of lateral pterygoid plate | medial surface of angle and ramus of mandible | Nerve to medial pterygoid | Elevates mandible Protrudes mandible |

Development

The muscles of mastication develop from the mesoderm of first branchial arch and are supplied by the mandibular nerve which is the nerve of that arch.

DESCRIBE TEMPOROMANDIBULAR JOINT. ADD A NOTE ON ITS APPLIED ANATOMY (LE)

It is a Synovial joint of condylar variety

Articular surfaces-

Upper articular surfaces formed by - articular tubercle and anterior part of mandibular fossa

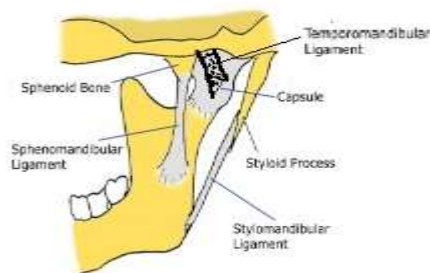
Lower surface is formed by - head of mandible

Articular Surfaces Covered by fibrocartilage

Joint cavity is separated by intra-articular disc into upper and lower parts

Ligaments

- a) Fibrous capsule
- b) Temporomandibular ligament
- c) Sphenomandibular ligament
- d) Stylomandibular ligament



Fibrous capsule

Attached above- articular tubercle, mandibular fossa

Below- neck of mandible

Temporomandibular ligament

Strengthens the lateral part.

Attachments-

Above to articular tubercle

Below to posterolateral aspect of neck of mandible

Sphenomandibular ligament

Lies at a deeper plane

Attached above to spine of sphenoid

Below to lingula of mandibular foramen.

Stylomandibular ligament

Thickening of investing layer of deep cervical fascia

Separates parotid from submandibular glands

Attached above- styloid process

Below -angle and posterior border of ramus of mandible

Articular disc

Oval fibrocartilage

Degenerated primitive insertion of Lateral Pterygoid muscle

Upper surface - concavo convex

Lower surface - concave

Periphery of disc is attached to inner aspect of fibrous capsule

anteriorly -blends with the Lateral Pterygoid muscle

Posteriorly - disc splits into upper & lower lamellae

Relations of temporomandibular joint

Infront : Lateral Pterygoid , Temporalis , Masseteric vessels, nerves

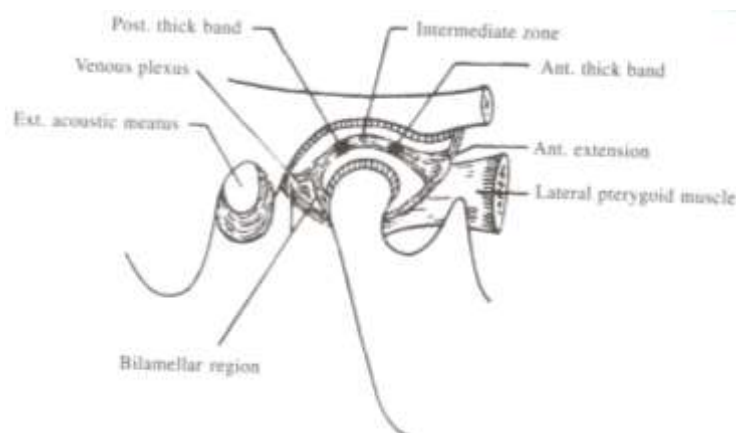
Behind : Parotid , Superficial temporal vessels, Auriculo temporal nerve,

External acoustic meatus

Lateral : Subcutaneous

Medial : Lateral Pterygoid, Auriculotemporal nerve, Spine of sphenoid, Spheno
mandibular ligament, Chordatympani nerve

Above : Floor of middle cranial fossa



Blood supply

Superficial temporal & maxillary arteries

Veins follow the arteries

Lymphatic drainage

Parotid group of lymph nodes

Upper deep cervical group

Nerve supply

Auriculo temporal nerve

Masseteric nerve

Nerve to lateral pterygoid

Movements of the joint

Protraction, Retraction

Depression, Elevation

Side to side movements

MUSCLES CAUSING DEPRESSION

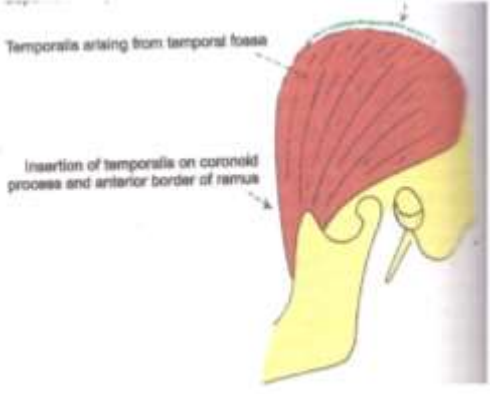
Lateral pterygoid

Geniohyoid

Mylohyoid

Digastric

MUSCLES CAUSING ELEVATION

| Origin | Insertion | Nerve supply | Action |  |
|-------------------------------------|---|-------------------------------|---|---|
| Temporal fossa. Temporal fascia. | Coronoid process. Anterior border of ramus of mandible. - | 2 deep temporal branches - | Elevates mandible. Side to side grinding movements. - | |

Masseter

Temporalis

Medial pterygoid

MUSCLES CAUSING PROTRUSION

Medial Pterygoid

Lateral Pterygoid

MUSCLES CAUSING RETRACTION

Posterior fibres of Temporalis

Deep & middle fibres of Masseter

Digastric and geniohyoid

SIDE TO SIDE MOVEMENT

Contraction of lateral, medial pterygoid muscles of one side acting alternately with other side

APPLIED ASPECTS

DISLOCATION:

Forward dislocation of mandible

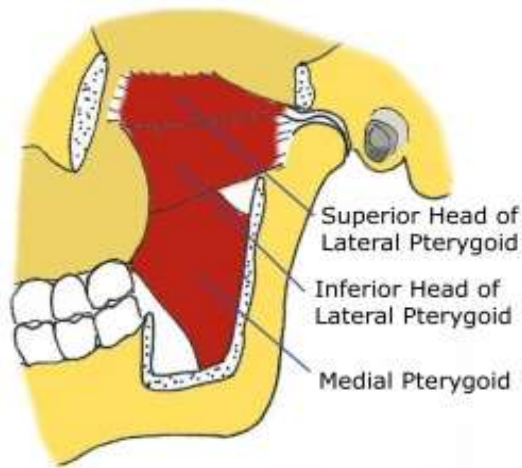
During excessive opening of the mouth head of the mandible slips anteriorly into infratemporal fossa

Sudden spasm of lateral pterygoid and inability to close the mouth.

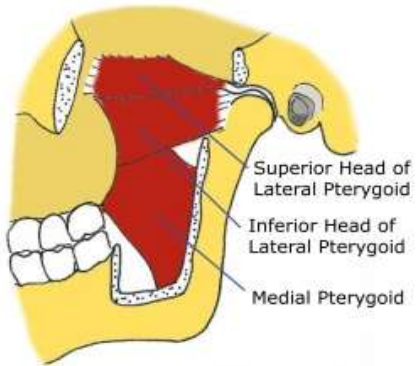
TEMPORALIS - ATTACHMENT, NERVE SUPPLY, ACTION (SE)

LATERAL PTERYGOID MUSCLE (SE)

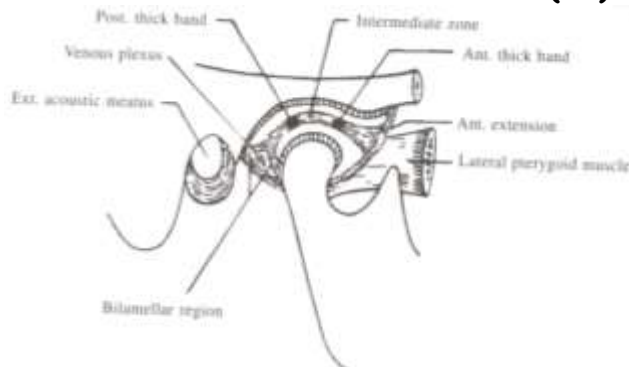
| ORIGIN | INSERTION | NERVE SUPPLY | ACTION |
|--|---|---|--|
| Upper head- Infratemporal surface of greater wing of sphenoid. | pterygoid fovea on neck of mandible. | Branch from anterior division of mandibular nerve | Depress mandible. Protrudes the mandible. |
| Lower head- lateral surface of lateral pterygoid plate. | Articular disc and capsule of temporomandibular joint | | Grinding movements |



MEDIAL PTERYGOID MUSCLE (SE)

| Origin | Insertion | Nerve supply | Action |  |
|--|---|---------------------------|--|--|
| <p>Superficial head - tuberosity of maxilla.</p> <p>Deep head - medial surface of lateral pterygoid plate.</p> | Medial surface of angle and ramus of mandible | Nerve to medial pterygoid | <p>Elevates Mandible.</p> <p>Protrudes mandible.</p> | |

ARTICULAR DISC OF TEMPOROMANDIBULAR JOINTS (SE)



Articular disc

It is made up of fibrocartilage

Degenerated primitive insertion of Lateral Pterygoid muscle

Upper surface - concavo convex before backwards

Lower surface - concave

Periphery of disc is attached to inner aspect of fibrous capsule

anteriorly -blends with the Lateral Pterygoid muscle
 Posteriorly - disc splits into upper & lower lamellae

MOVEMENTS OF TEMPOROMANDIBULAR JOINT (SE)

Movements of the joint

Protraction, Retraction
 Depression, Elevation
 Side to side movements

| MUSCLES CAUSING DEPRESSION | MUSCLES CAUSING ELEVATION | MUSCLES CAUSING PROTRUSION | MUSCLES CAUSING RETRACTION | SIDE TO SIDE MOVEMENT |
|---|--|---------------------------------------|--|---|
| Lateral pterygoid Geniohyoid Mylohyoid Digastric | Masseter Temporalis Medial pterygoid | Medial Pterygoid Lateral Pterygoid | Posterior fibres of Temporalis Deep & middle fibres of Masseter Digastric and geniohyoid | Contraction of lateral, medial pterygoid muscles of one side acting alternately with other side |

LATERAL PTERYGOID MUSCLE - NERVE SUPPLY AND ACTION (SA)

Nerve supply

Branch from anterior division of mandibular nerve

Action

Depress mandible
 Protrude the mandible
 Grinding movements

LIGAMENTS OF TEMPOROMANDIBULAR JOINT (SA)

Ligaments of the joint are

Fibrous capsule
 Lateral ligament
 Sphenomandibular ligament
 Stylomandibular ligament

SPHENOMANDIBULAR LIGAMENT ATTACHMENTS AND STRUCTURES PIERCING IT (SA)

Sphenomandibular ligament is a ligament of temporomandibular joint

Attached

Above it is thin and flat and attached to spine of sphenoid
 Below it becomes broader and is attached to lingula of mandibular foramen.

Structures piercing

It is pierced by mylohyoid nerve
 mylohyoid vessels

MOVEMENTS TAKING PLACE AT TEMPOROMANDIBULAR JOINT (SA)

Movements of the joint

Protrusion and Retraction

The upper part of the joint allows protrusion and retraction of the mandible - the anterior and posterior movements of the jaw.

The **lateral pterygoid** muscle is responsible for protrusion (assisted by the medial pterygoid), and the **geniohyoid** and **digastric** muscles perform retraction.

Elevation and Depression.

The lower part of the joint permits elevation and depression of the mandible; opening and closing the mouth.

Depression is mostly caused by **gravity**. However, if there is resistance, the digastric, geniohyoid, and mylohyoid muscles assist.

Elevation is very **strong** movement, caused by the contraction of the temporalis, masseter, and medial pterygoid muscles.

MOVEMENTS OF PROTRACTION AND RETRACTION (SA)

Protrusion and Retraction

The upper part of the joint allows protrusion and retraction of the mandible - the anterior and posterior movements of the jaw.

The **lateral pterygoid** muscle is responsible for protrusion (assisted by the medial pterygoid) and the **geniohyoid** and **digastric** muscles perform retraction.