

# **MUSCLES OF MASTICATION**

# INTRODUCTION:

- **Mastication** is defined as the process of chewing food in preparation for swallowing and digestion.
- Four pairs of the muscles in the mandible make chewing movement possible.
- These muscles along with accessory ones together are termed as “**MUSCLES OF MASTICATION**”.



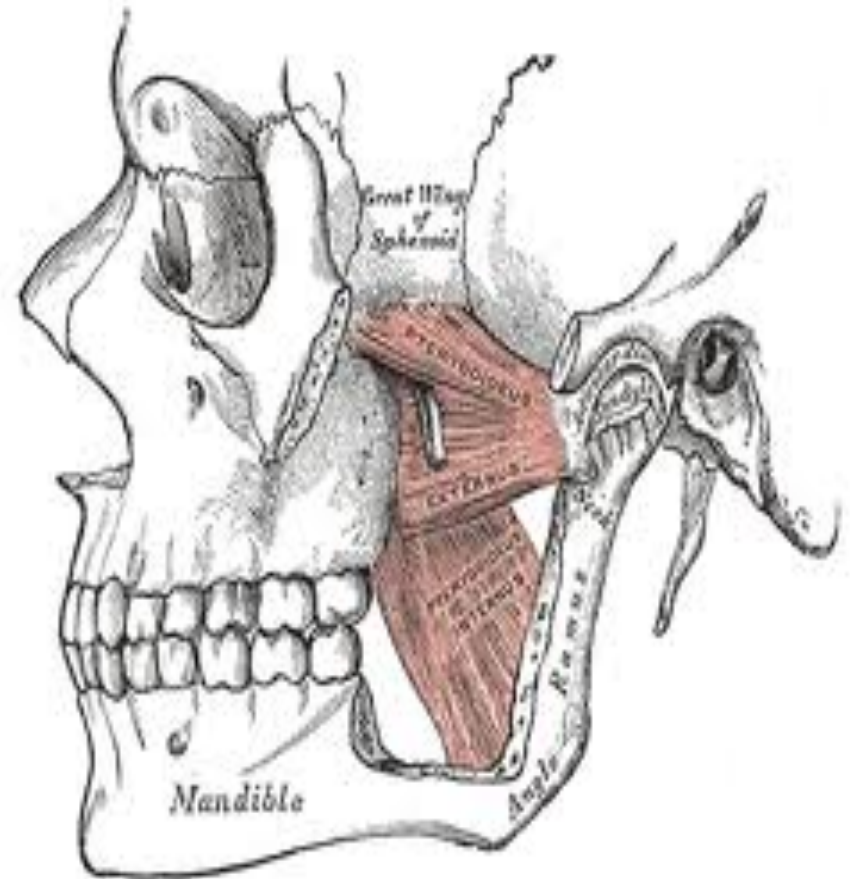
*These muscles can be divided into:*

## **BASIC MUSCLES:**

- Temporalis
- Masseter
- Medial pterygoid
- Lateral pterygoid

## **Accessory Muscles:**

- Buccinator
- Digastric muscle (anterior belly)
- Geniohyoid
- Mylohyoid
- Orbicularis Oculi






## MOVEMENTS OF THE MANDIBLE:

Movements that mandible can undergo are:

- **Depression:** as in opening the mouth.
- **Elevation :** as in closing the mouth.
- **Protraction:** horizontal movement of the mandible anteriorly.
- **Retraction:** horizontal movement of the mandible posteriorly.
- **Rotation:** the anterior tip of the mandible is “slewed” from side to side.



These movements of mandible are performed by various muscles involved in it. So functionally, the muscles of mastication are classified as :

### **Jaw elevators:**

- Masseter
- Temporalis
- Medial pterygoid
- Upper head of lateral pterygoid

### **Jaw depressors:**

- Lower head of lateral pterygoid
- Anterior digastric
- Geniohyoid
- Mylohyoid

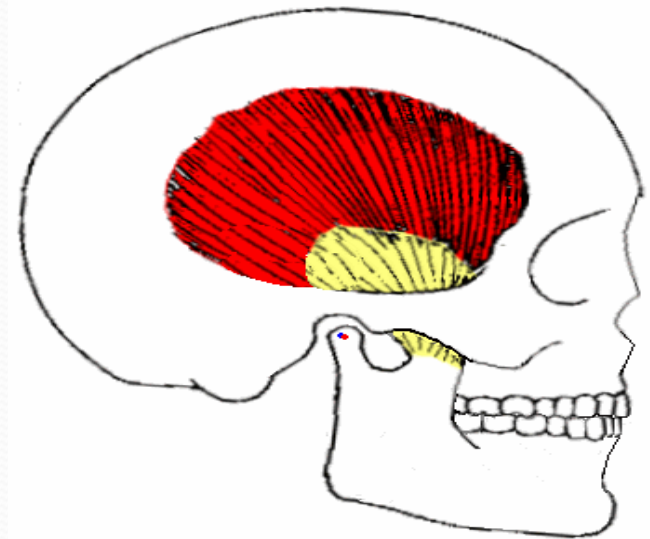
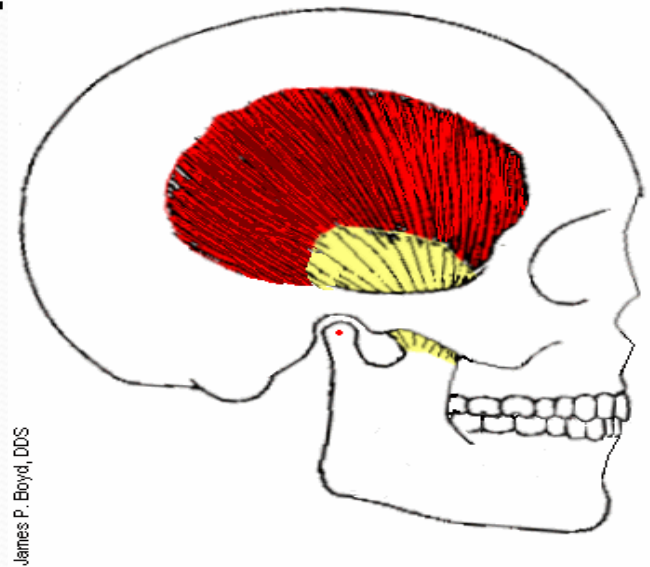


# Temporalis:

- It is the largest among all the mastication muscles and is fan shaped muscle.
- **Origin:** from inferior temporal line , floor of the temporal fossa and from the overlying temporal fascia.
- **Insertion:** anterior and medial tip of the coronoid process.
- **It has been divided into two heads:**
  1. Deep head (anterior, middle and posterior fibers)
  2. Superficial head (much smaller)

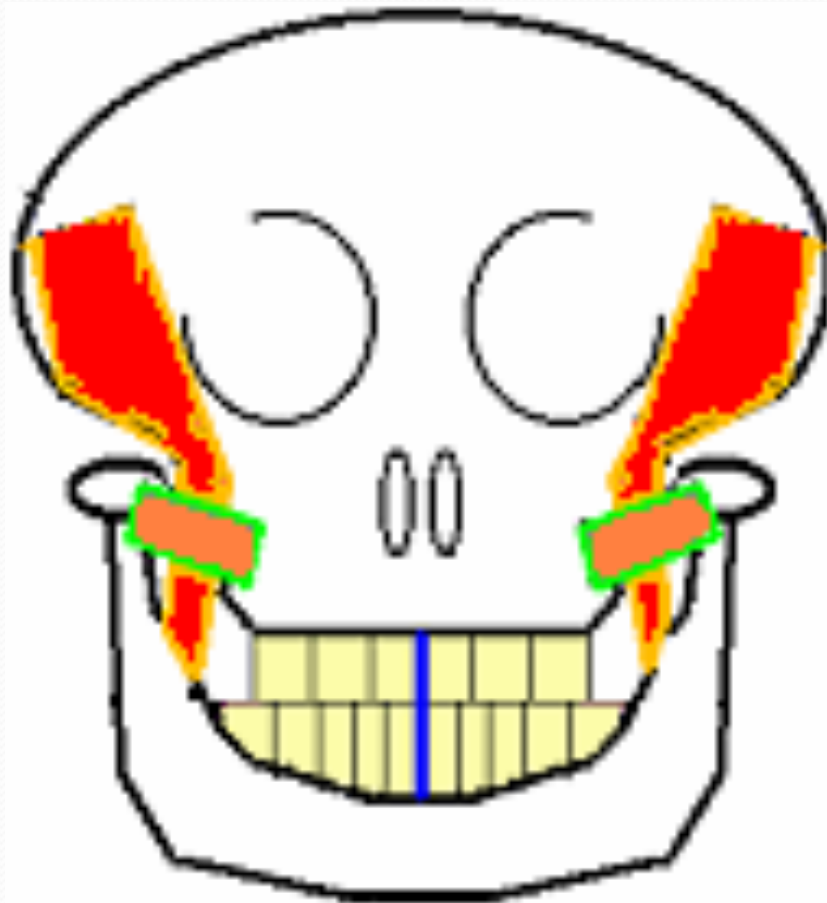
# ACTIONS OF TEMPORALIS

- Elevates the mandible, this movement requires both the upward pull of anterior fibers and backward pull of the posterior fibers.
- Posterior fibers draw the mandible backwards after it has been protruded.
- It is also a contributory to side to side grinding movement.



James P. Boyd, DDS

## SIDE TO SIDE GRINDING MOVEMENT





## Action:

- Elevation( anterior fibers)
- Retraction( posterior fibers)

## Nerve supply:

- Anterior division of the mandibular nerve(by 2 deep temporal nerves).

Temporalis



Elevates, retracts, and assists in side-to-side movement of mandible



## **Its action is done by the:**

- The anterior fibers during function act vertically and elevate the mandible.
- The posterior fibers diverge and become horizontal and retract the mandible.

## **Blood Supply:**

- From the maxillary artery



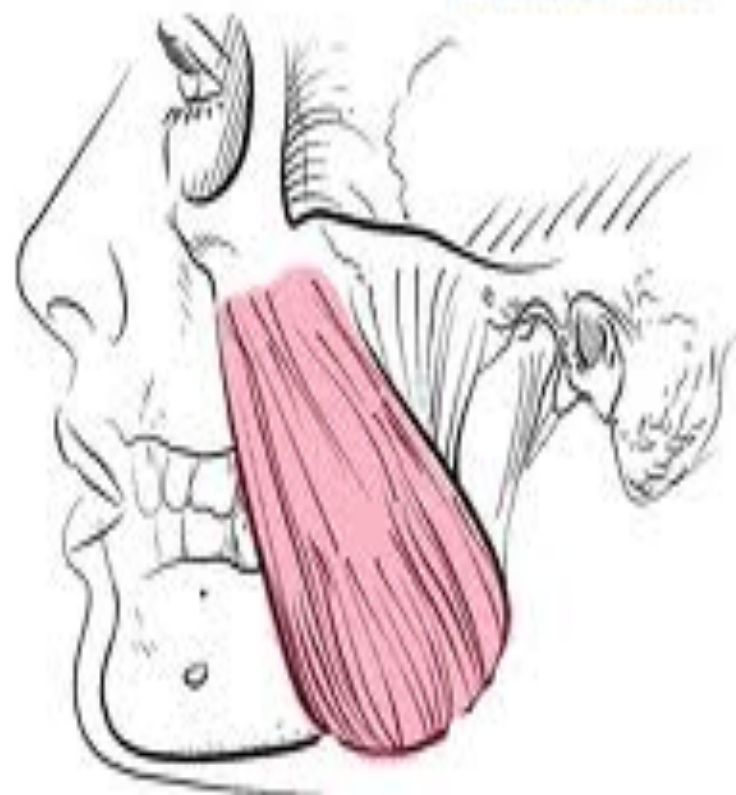
## MASSETER:

- It consists of two overlapping heads.
- **The origin** of the whole muscle is mainly from the **zygomatic process**.
- 1. **The superficial head** arises from the lower border of the **zygomatic arch**.
- 2. **The deep head** arises from the inner surface of the **zygomatic arch**.
- **The insertion** of both the heads is into the outer surface of the ramus of the mandible.

**masSETER**

o: ZYGOMATIC ARCH

↓  
i: ramus of mandible





## **ACTION:**

- Action of masseter muscle is mainly to elevate the mandible(antigravity action) and also helps in protrusive movements.
- It is the main muscle involved in the elevation of the mandible.

## **NERVE SUPPLY:**

- By the mandibular branch of the trigeminal nerve , from the anterior division (masseteric nerve)



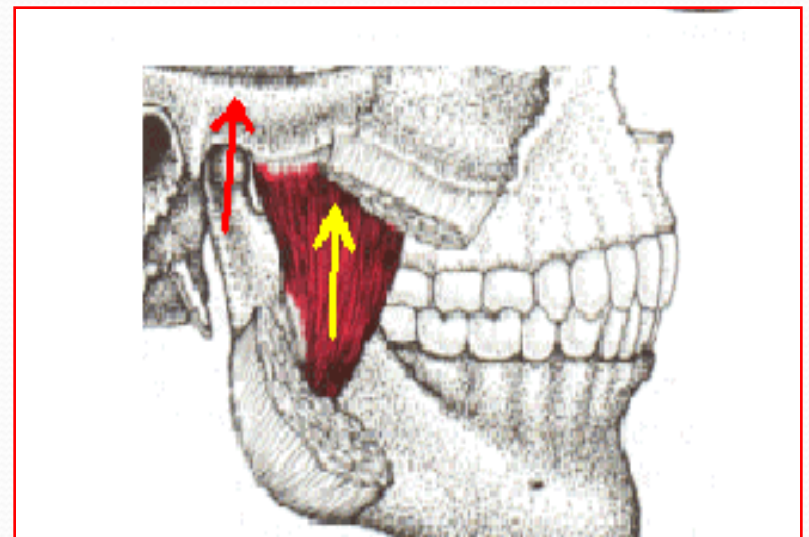
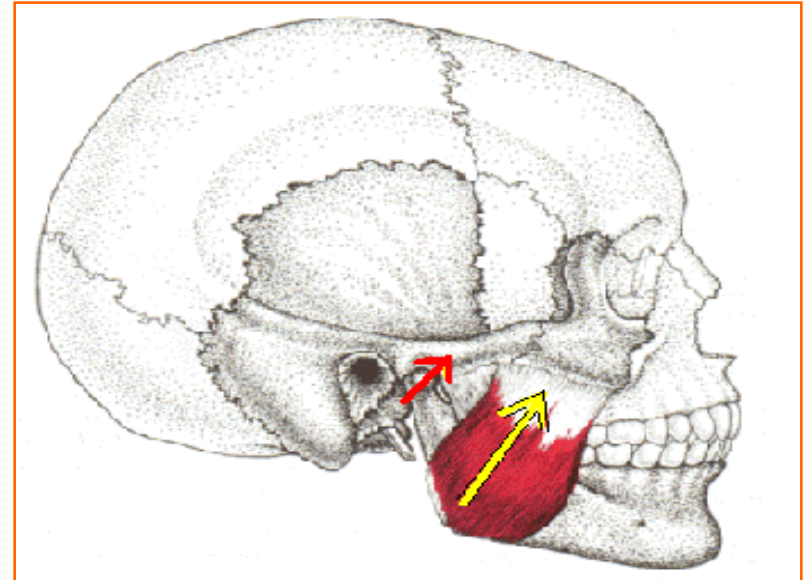
## **BLOOD SUPPLY:**

- Blood supply is from the **maxillary artery** which is the terminal branch from the **external carotid artery**.
- One of the interesting property of this muscle is that, internally, the muscle has many **tendinous septa** that greatly increases the **area for muscle attachment** and so **increases its power**.

## ACTIONS OF MASSETER

### **Actions:**

- Elevates the mandible to close the mouth and to occlude the teeth in mastication.
- Its activity in the resting position is minimal.
- It has a small effect in side-to-side movement, protraction and retraction.





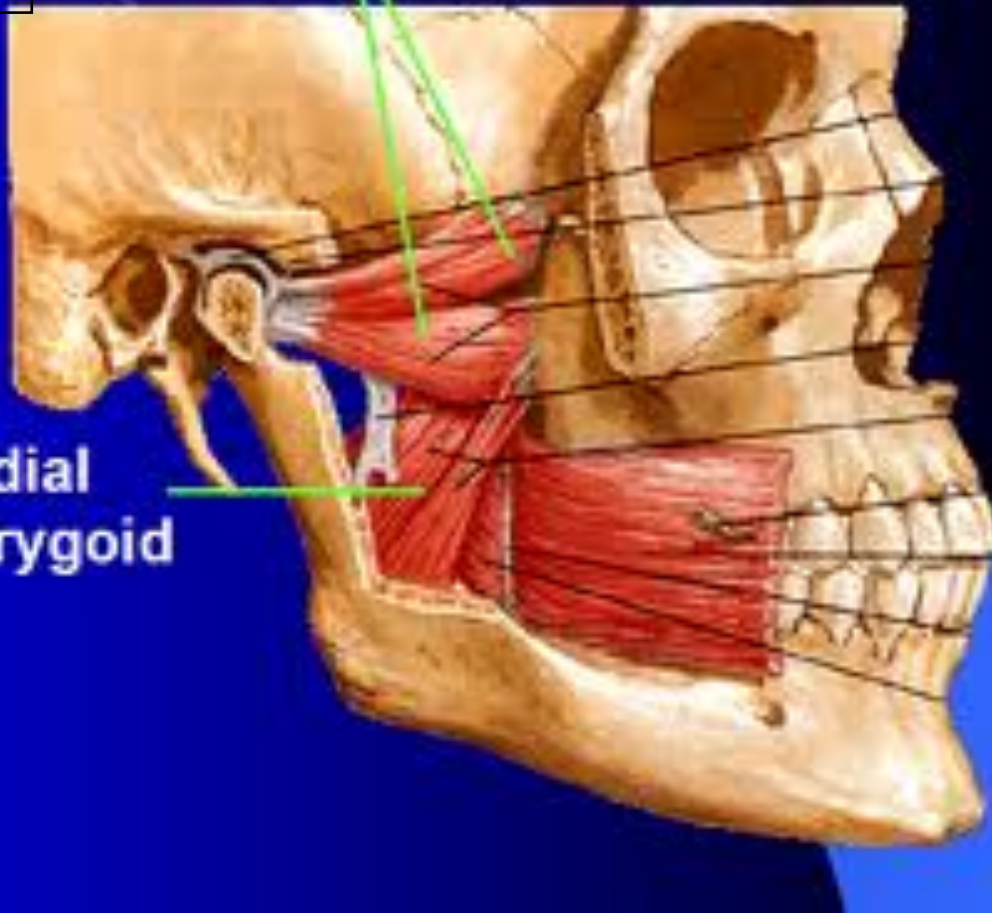
## MEDIAL PTERYGOID:

- It is also called as the **pterygoideus internus**(internal pterygoid muscle).
- It consist of two heads which differ in origin:
- **ORIGIN:**
  1. The deep head originates from the medial surface of the lateral pterygoid plate of the sphenoid bone.
  1. The superficial head originates from the maxillary tuberosity.



**lateral pterygoid**

**medial  
pterygoid**





### **Insertion:**

- The muscle inserts into the inner surface of the angle of the mandible .

### **Nerve Supply:**

- Nerve supply of the muscle comes from the main trunk of the mandibular division of trigeminal nerve .

### **Blood Supply:**

- Blood supply is chiefly from the maxillary artery.

## Action:

- **Elevate the mandible.**
- **Protrusion of mandible**(lateral and medial pterygoid on one side protrude the mandible on opposite side).
- **Side to side movement**(these lateral movements are achieved by lateral and medial pterygoid on both side acting together to produce side to side movements).



## LATERAL PTRYGOID:

- Also called as pterygoideus externus(external pterygoid muscle).
- It is a short conical muscle having two heads upper and lower:
- **Upper Head:**

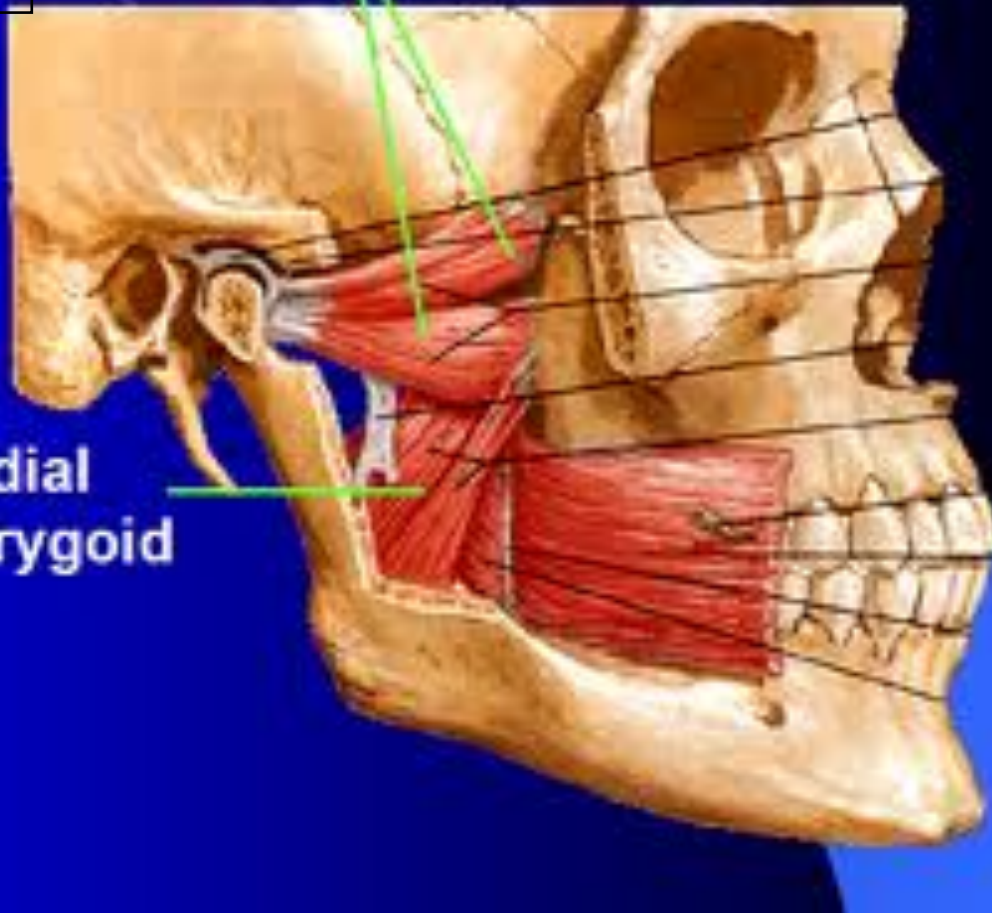
**Origin:** infra temporal surface and crest of the greater wing of the sphenoid bone.

**Insertion:** enters the TMJ and inserted into:

- a) Pterygoid fovea of the neck of the mandible.
- b) Articular disc
- c) Capsule of the TMJ(anterior aspect).

**lateral pterygoid**

**medial  
pterygoid**

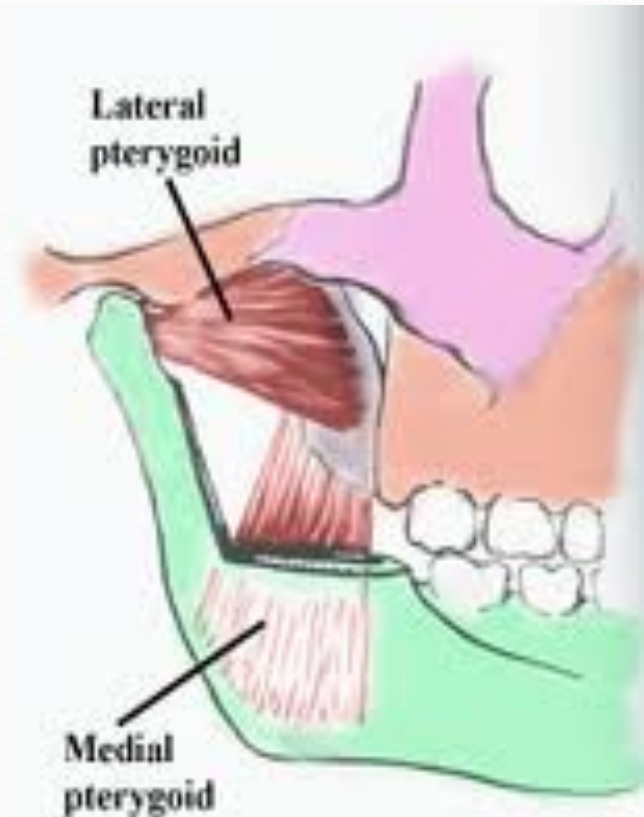


- **Lower head:**

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

**Insertion:** its insertion is same as that of the upper head, it enters the TMJ and gets inserted into:

- a) Pterygoid Fovea of the neck
- b) Articular disc
- c) Capsule of TMJ(anterior aspect).





### **Nerve Supply:**

- Anterior division of the mandibular branch of trigeminal nerve (nerve to lateral pterygoid)

### **Blood Supply:**

- Maxillary artery

### **Action:**

- Depression of the mandible
- Side to side movement
- Protrusion of mandible

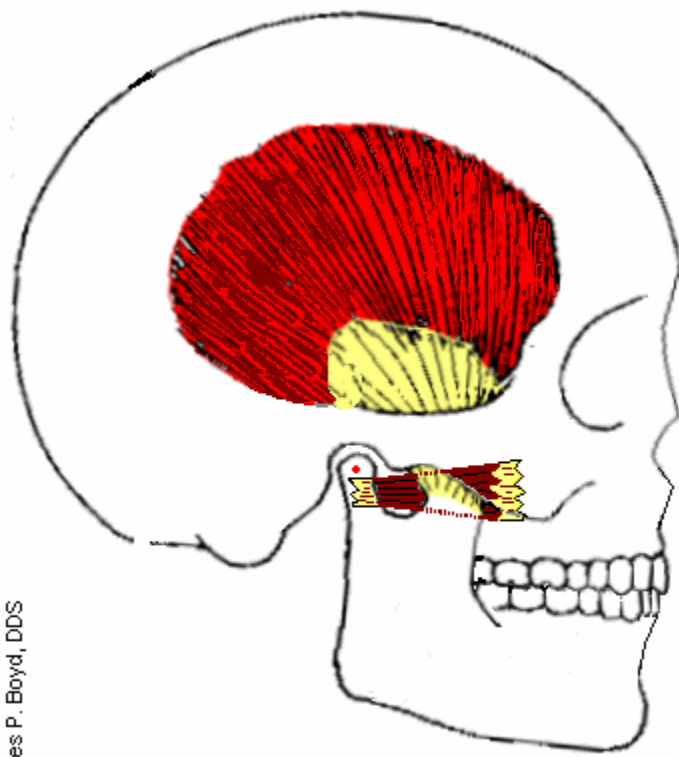
# Summary of the Anatomy and of Muscle of mastication

## Function

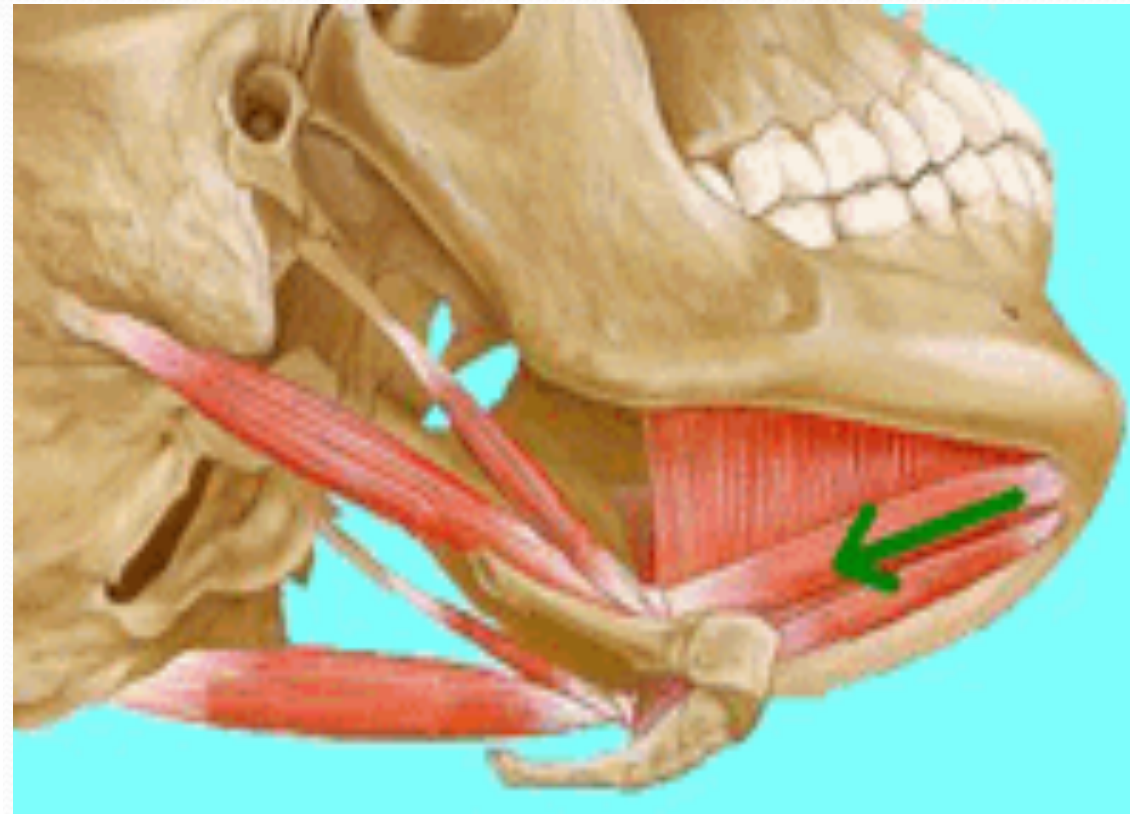
MUSCLE	ORIGIN	INSERTION	DESCRIPTION
Masseter	Zygomatic arch	Mandible(external surface)	Closes jaw; falt thick muscle
Temporalis	Temporal bone	Coronoid process at the anterior border of the ramus of mandible	Closes jaw; fan - shaped
Medial pterygoid	Sphenoid,palatine,& maxillary bones	Inner surface of the ramus of mandible	Closes jaw; parallels masseter muscle
Lateral pterygoid	Sphenoid bone	Anterior surface of mandibular condyle	Open jaw; Allows grinding action side to side



The combined efforts of the Digastrics and Lateral Pterygoids provide for natural jaw opening.



James P. Boyd, DDS



# Accessory Muscles of Mastication

## BUCCINATOR:

- It is an accessory muscle of mastication.
- **Origin:** it originates from the buccal plate of bone of the sockets of upper and lower three molars and pterygomandibular ligament.

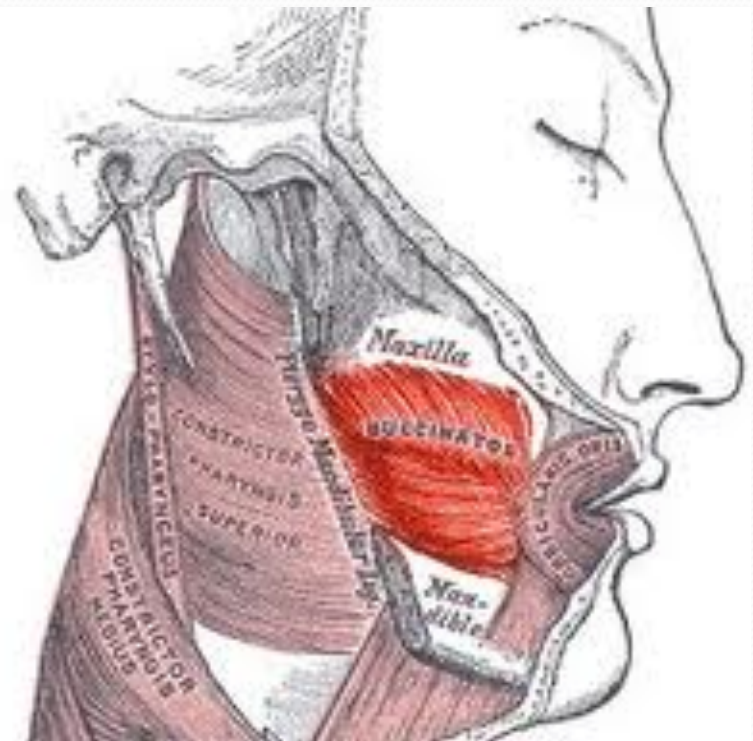
- **Insertion:**

Upper fibers are inserted into upper lip.

Lower fibers are inserted into lower lip.

- **Action:**

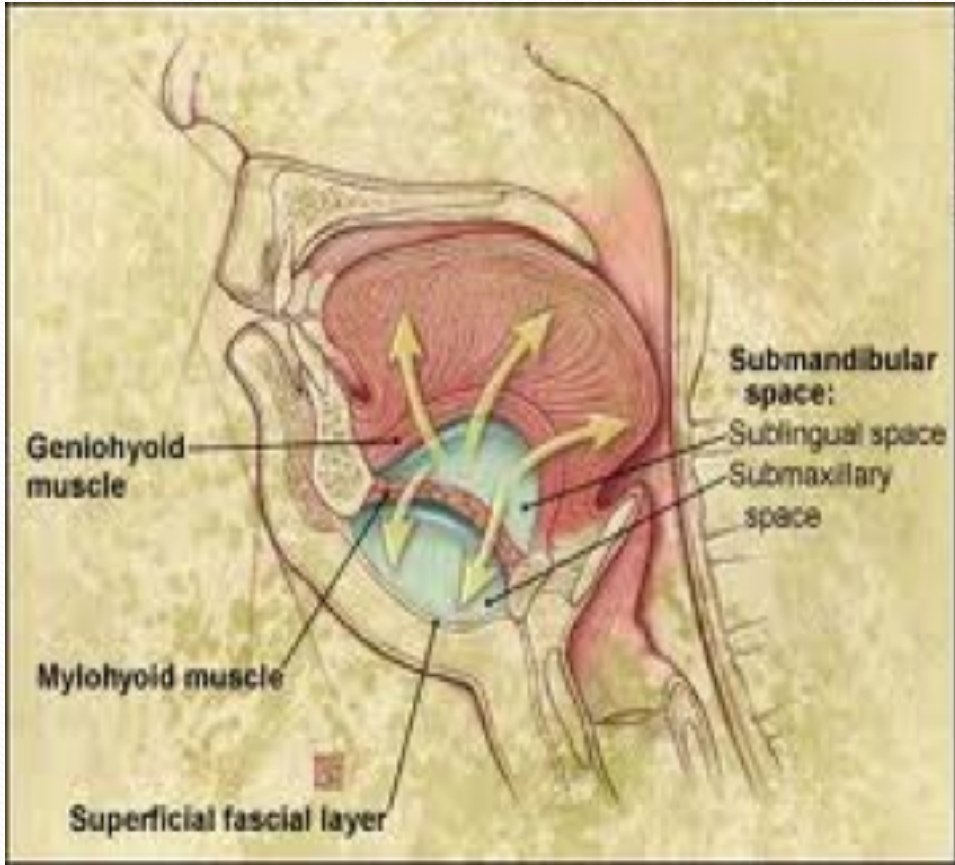
The main action of buccinator is to prevent the accumulation of food in the vestibule of mouth.





## MYLOHYOID:

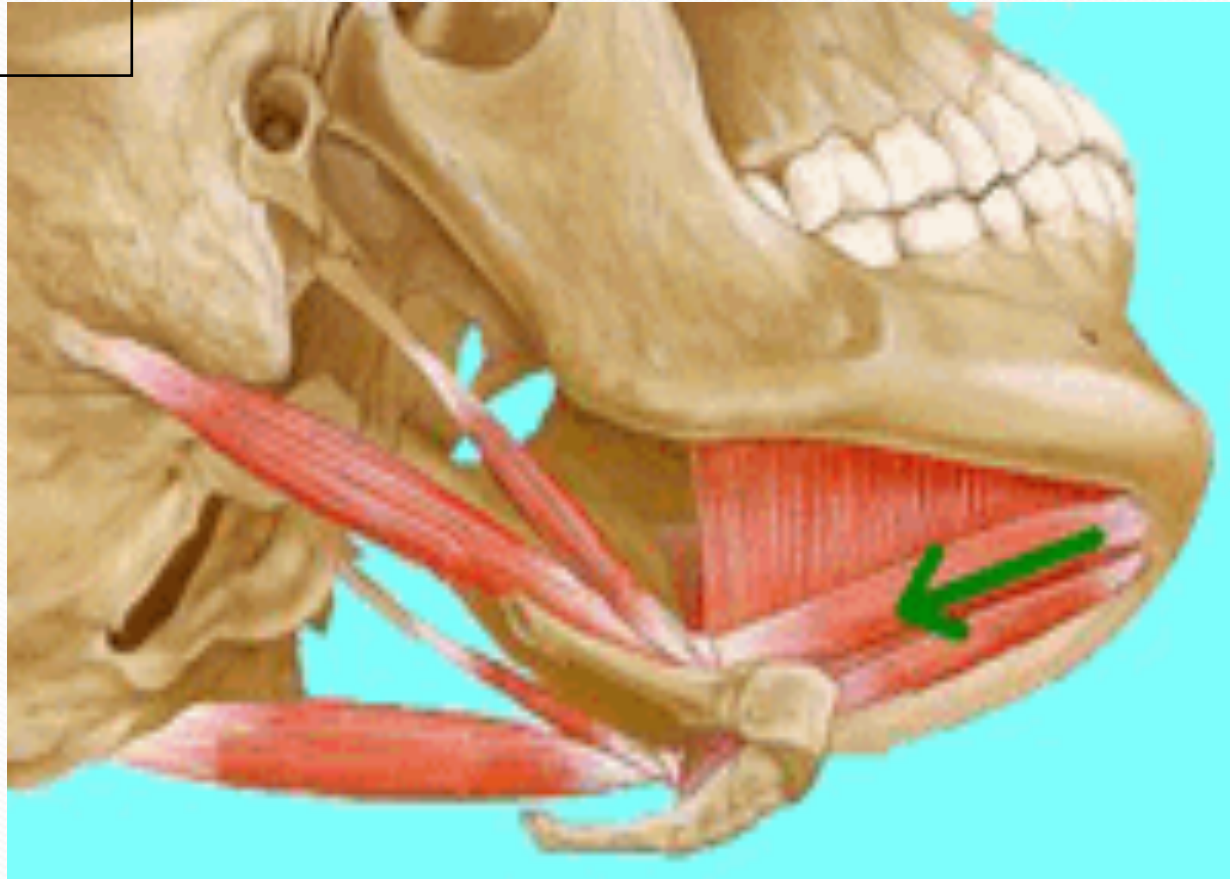
- It forms the floor of the mouth.
- **Origin:** its origin is from the mylohyoid line on the internal aspect of mandible.
- **Insertion:** The fibers slop downward and forward to interdigitate with the fibers of other side to form the median raphe .
- This median raphe is inserted in the chin from above and the hyoid bone from below.
- **Action:** elevates the hyoid bone, supports and raises floor of mouth which aids in early stages of swallowing ,depresses the mandible.



© 1999 Steve Oh

# DIAGASTRIC MUSCLE

- Two bellies united by tendon
- **Origin** – Anterior belly from diagastric fossa of mandible. Posterior belly from mastoid notch of temporal bone.
- **Insertion** – Both meet at the intermediate tendon and held by the fibrous pulley.
- The muscle has secondary role in mastication as a depressor muscle adding to the action of lateral pterygoid muscle when mouth is to be opened against resistance. Elevation of hyoid bone

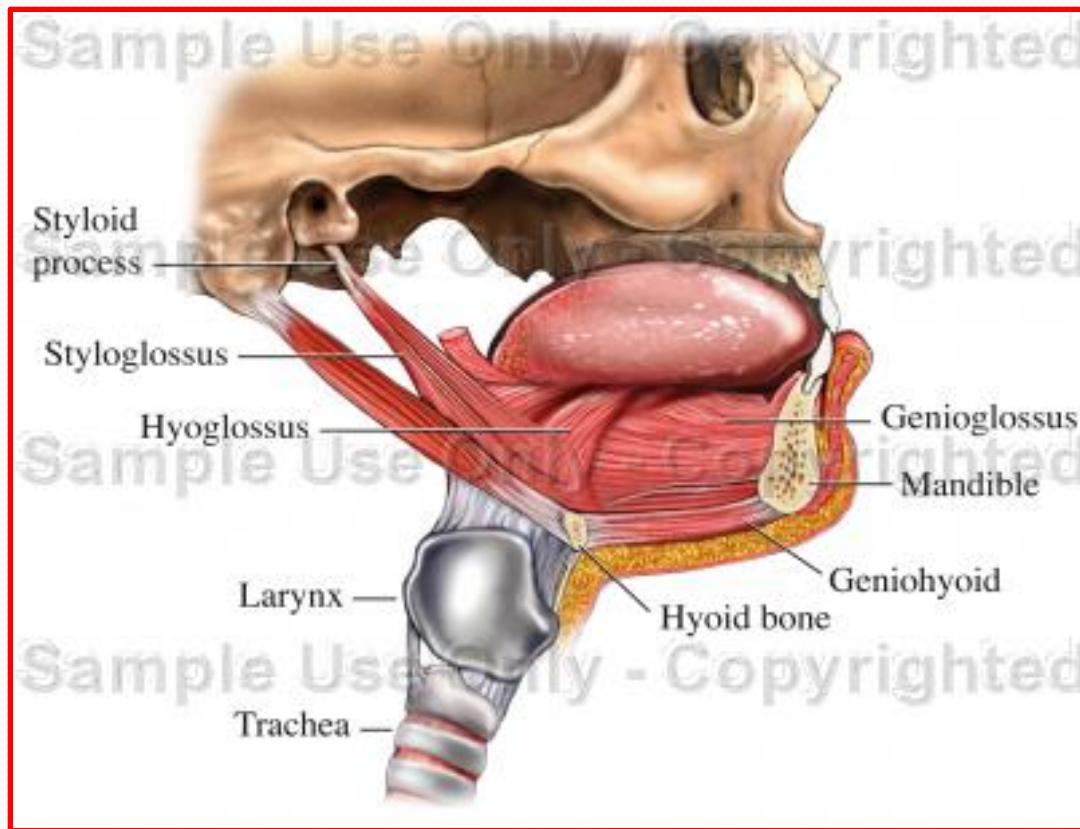




## GENIOHYOID:

- **Origin:** from inferior genial tubercle (in the midline of inner surface of mandible).
- **Insertion:** into the hyoid bone.
- **Action:** depresses the mandible.

# GENIOHYOID MUSCLE





# Chewing :-

- Two separate acts are recognized in chewing process .
  - 1- First is the combination in which food is secured by the lips and bitten by the front teeth.
  - 2- Second is mastication, the major activity during which the food is mashed between the back teeth.

- 
- **Chewing process results in the compression at TMJ.**

**Chewing in humans is unilateral and asymmetrical .**