DENTAL ANATOMY AND MASTICATION- AN OVERVIEW

DR MATHEW AKAMA
CONSULTANT MAXILLOFACIAL SURGEON
MBChB VI
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- Having a good knowledge of normal head, neck, dental and oral anatomy is essential in providing quality health care to patients.
- In order to recognize abnormal or disease states, one must be able to compare what is considered normal to what they are seeing in the patient during examination.
- This knowledge also provides a basis for effective communication with the dental team and other health care providers in discussing oral conditions of the patient both past and present.

Dentition

Three types

1. Primary dentition- 6 months to 6 years
2. Secondary dentition- 6 to entire adulthood
3. Mixed dentition- 6 to12 years

PRIMARY DENTITION

- First teeth to erupt into the oral cavity.
- Comprised of 20 teeth.
- Often these teeth are referred to as deciduous teeth.
- Are exfoliated as the permanent teeth erupt.
- In each arch of the mouth, there are two central incisors, two lateral incisors, two canines, and four molars.
- There are no premolars or third molars in the primary dentition.

PRIMARY DENTITION

ERUPTION SEQUENCE OF PRIMARY DENTITION

Tooth	Eruption Date (Avg.)	Exfoliation Date (Avg.)
Maxillary		
Central Incisor	8-12 Months	6-7 Years
Lateral Incisor	9-13 Months	7-8 Years
Canine	16-22 Months	10-12 Years
1st Molar	13-19 Months	9-11 Years
2nd Molar	25-33 Months	10-12 Years

Mandibular

Central Incisor	6-10 Months	6-7 Years
Lateral Incisor	10-16 Months	7-8 Years
Canine	17-23 Months	9-12 Years
1st Molar	14-18 Months	9-11 Years
2nd Molar	22-31 Months	10-12 Years

Primary Dentition

upper right - 5 upper left - 6

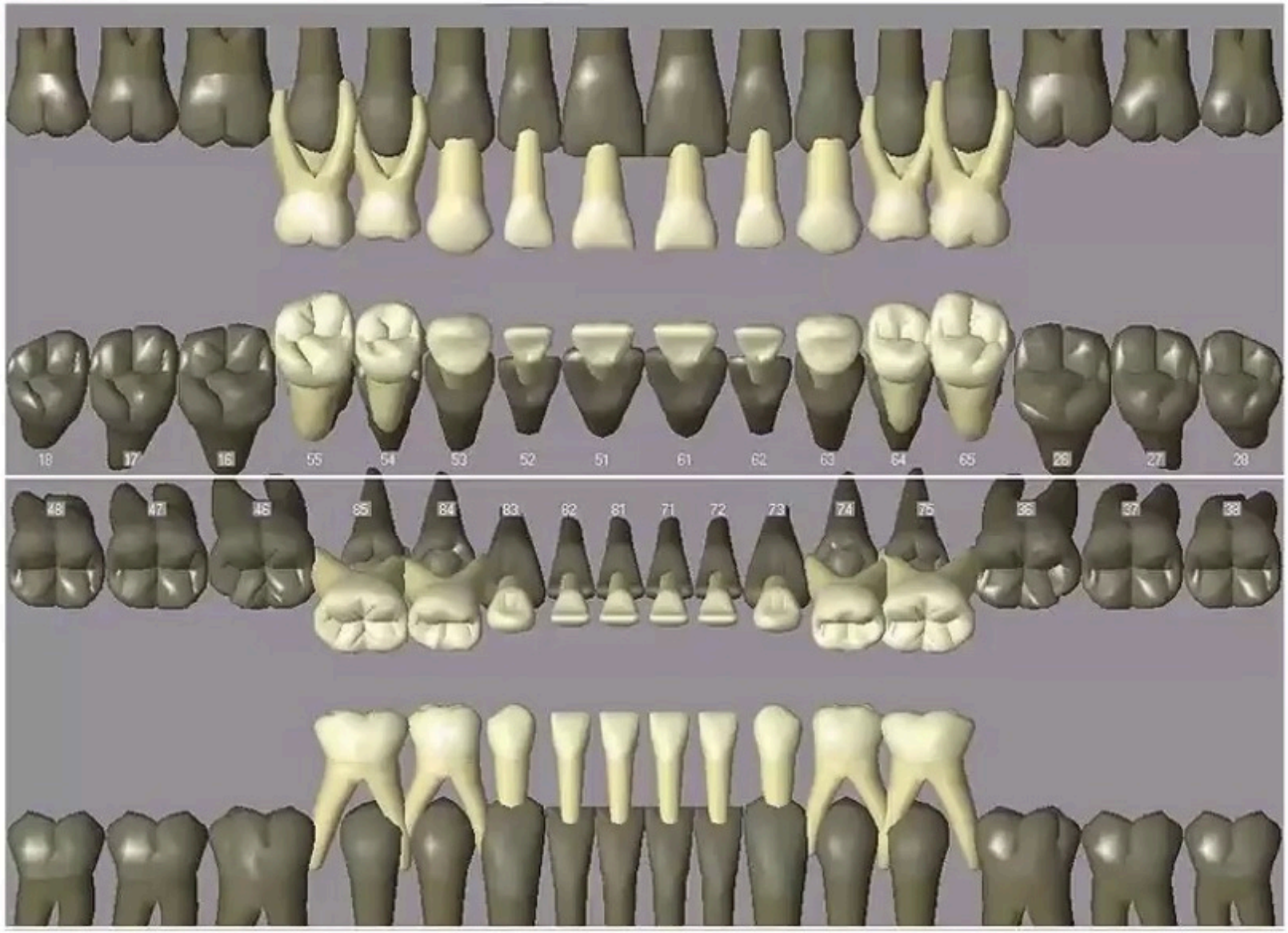
55 54 53 52 51 | 61 62 63 64 65

R ---------- L

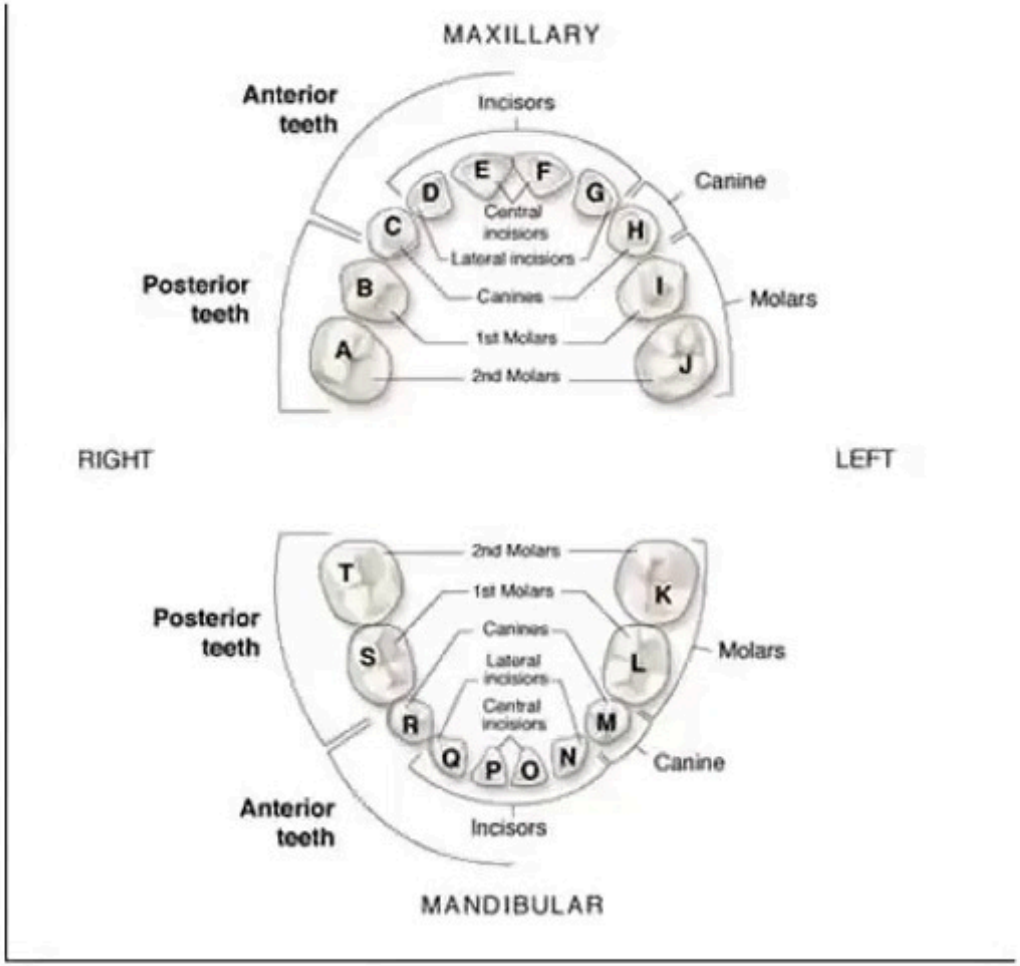
85 84 83 82 81 | 71 72 73 74 75

lower right - 8 lower left - 7

ISO NOTATION OF PRIMARY DENTITION



AMERICAN NOTATION OF PRIMARY DENTITION



PERMANENT DEMTITION

- Comprised of 32 teeth.
- There are 16 teeth in the maxilla and 16 in the mandible.
- In each arch there are two central incisors, two lateral incisors, two canines, four premolars, and six molars.
- The permanent central incisors, lateral incisors, first and second premolars replace the primary dentition.
- The primary molars are replaced with the permanent premolars, and the permanent molars erupt posterior to those.

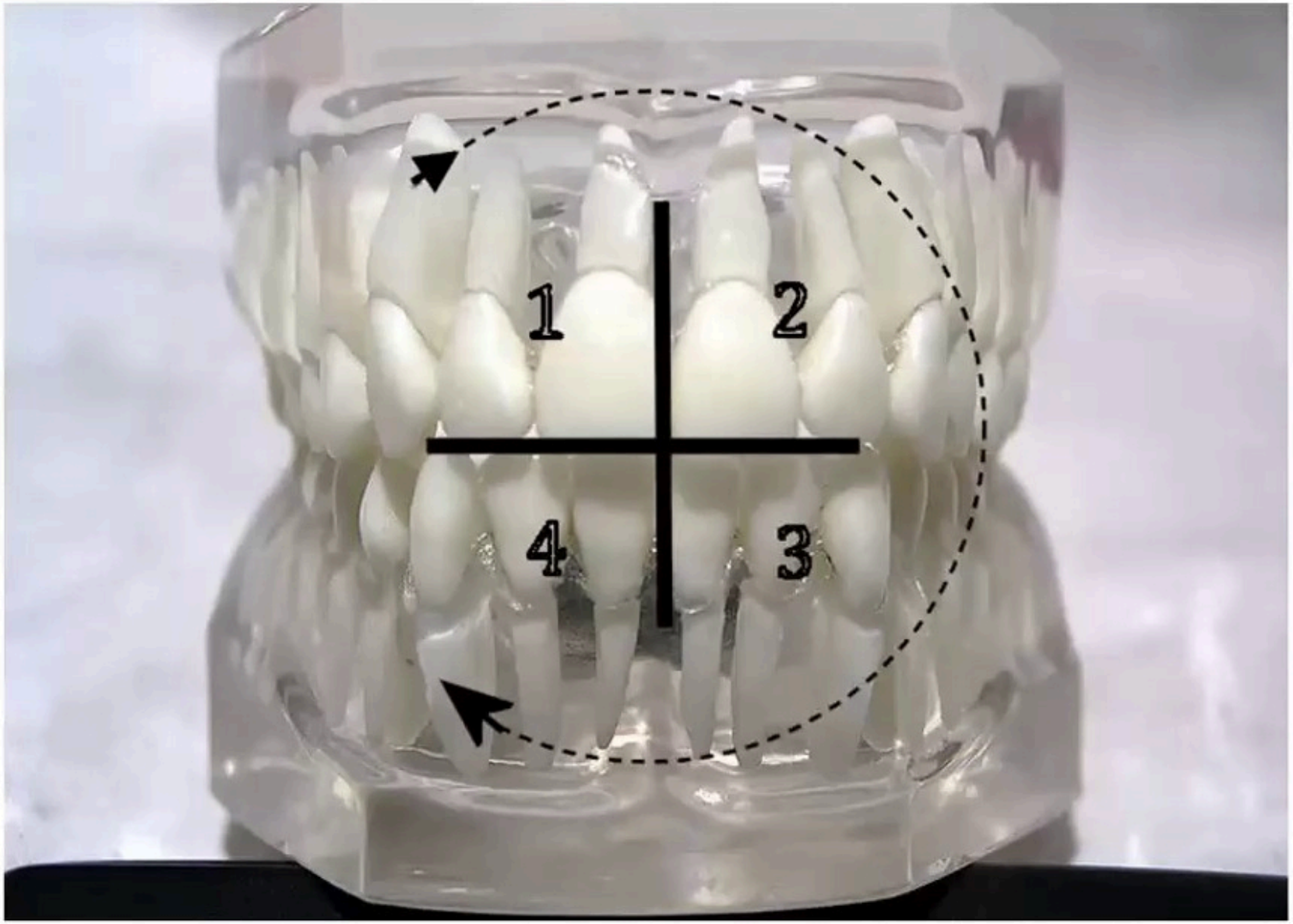
SECONDARY DENTITION

ERURTION SEQUENCE OF PERMANENT TEETH

Tooth	Eruption Date (Avg.)
Maxillary	
Central Incisor	7-8 Years
Lateral Incisor	8-9 Years
Canine	11-12 Years
1st Premolar	10-11 Years
2nd Premolar	10-12 Years
1st Molar	6-7 Years
2nd Molar	11-13 Years
3rd Molar	17-21 Years

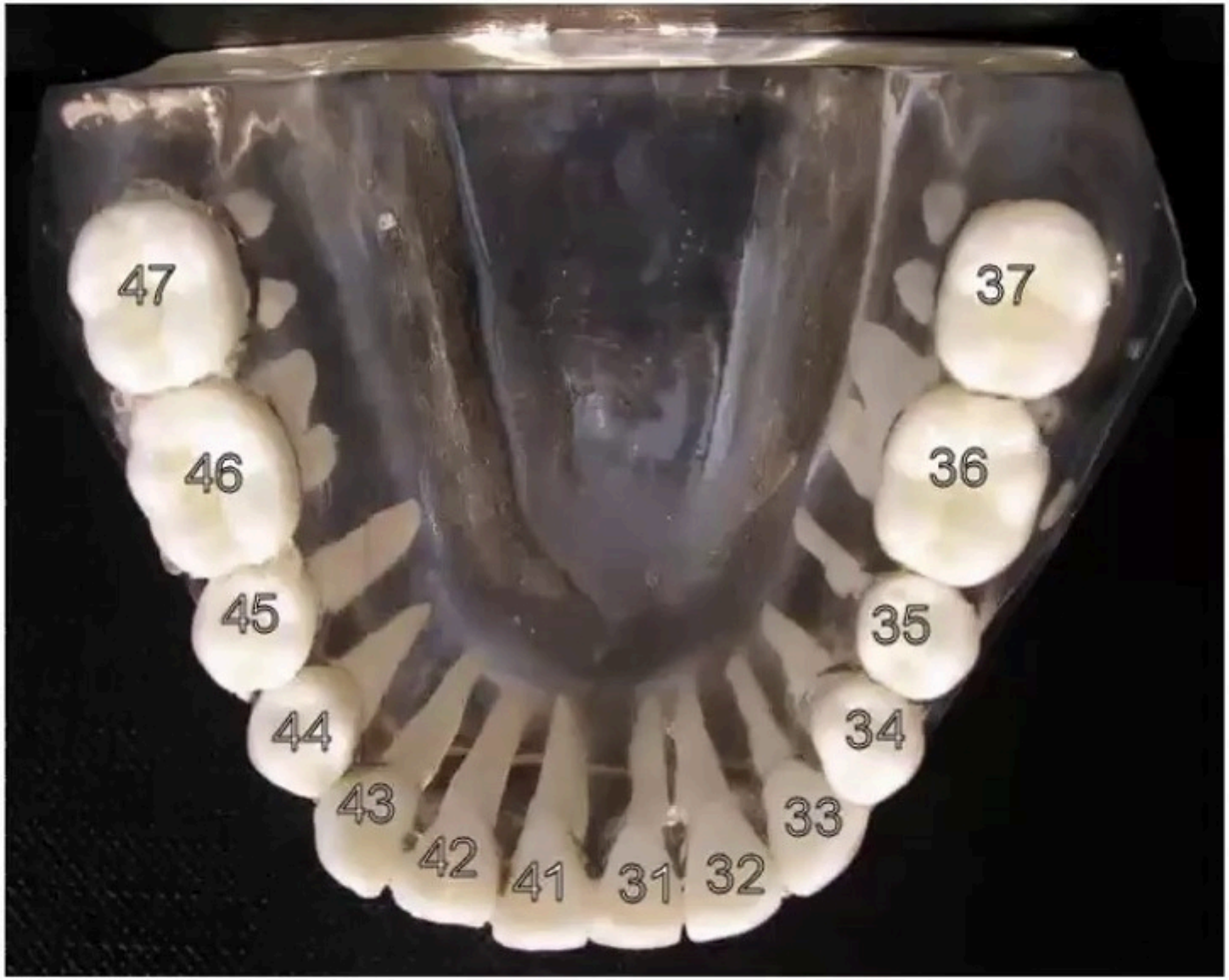
Mandibular	
Central Incisor	7-8 Years
Lateral Incisor	8-9 Years
Canine	9-10 Years
1st Premolar	10-12 Years
2nd Premolar	11-12 Years
1st Molar	6-7 Years
2nd Molar	11-13 Years
3rd Molar	17-21 Years

TEETH QUADRANTS

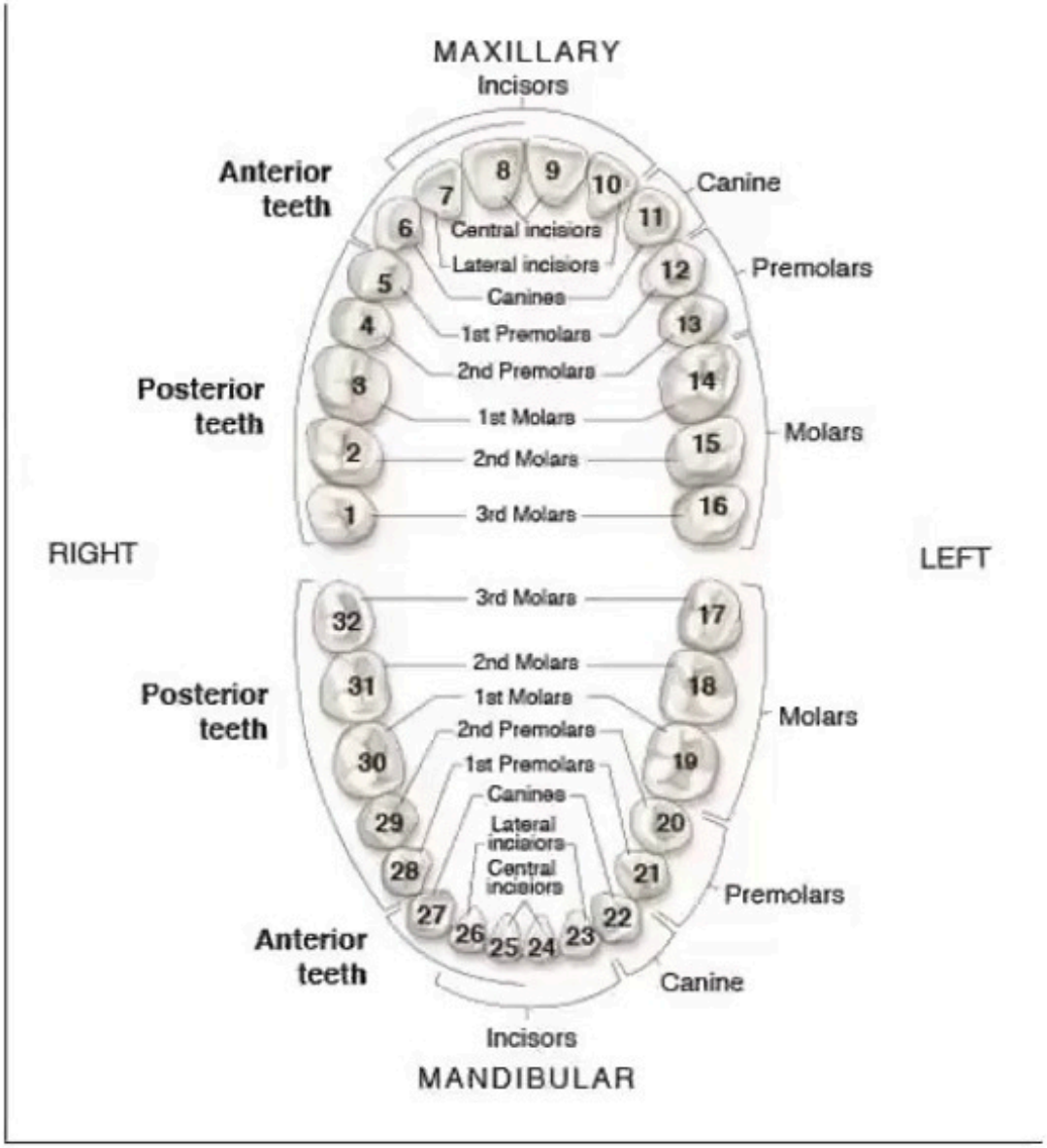


ISO NOTATION MAXILLA

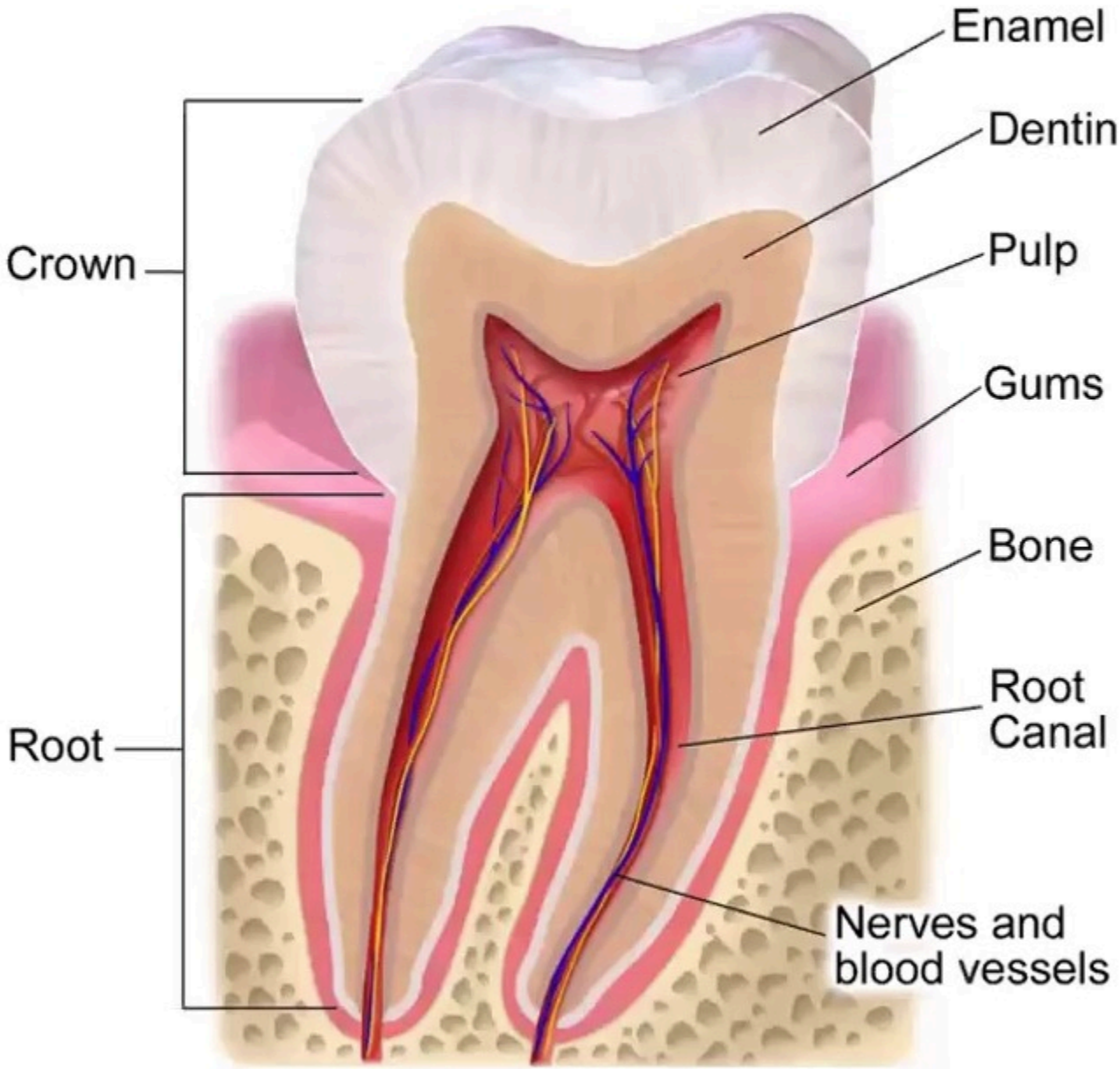
ISO NOTATION MANDIBLE



AMERICAN NOTATION OF PERMANENT DENTITION



TOOTH ANATOMY



GINGIVA AND ATTACHMENT APPARATUS

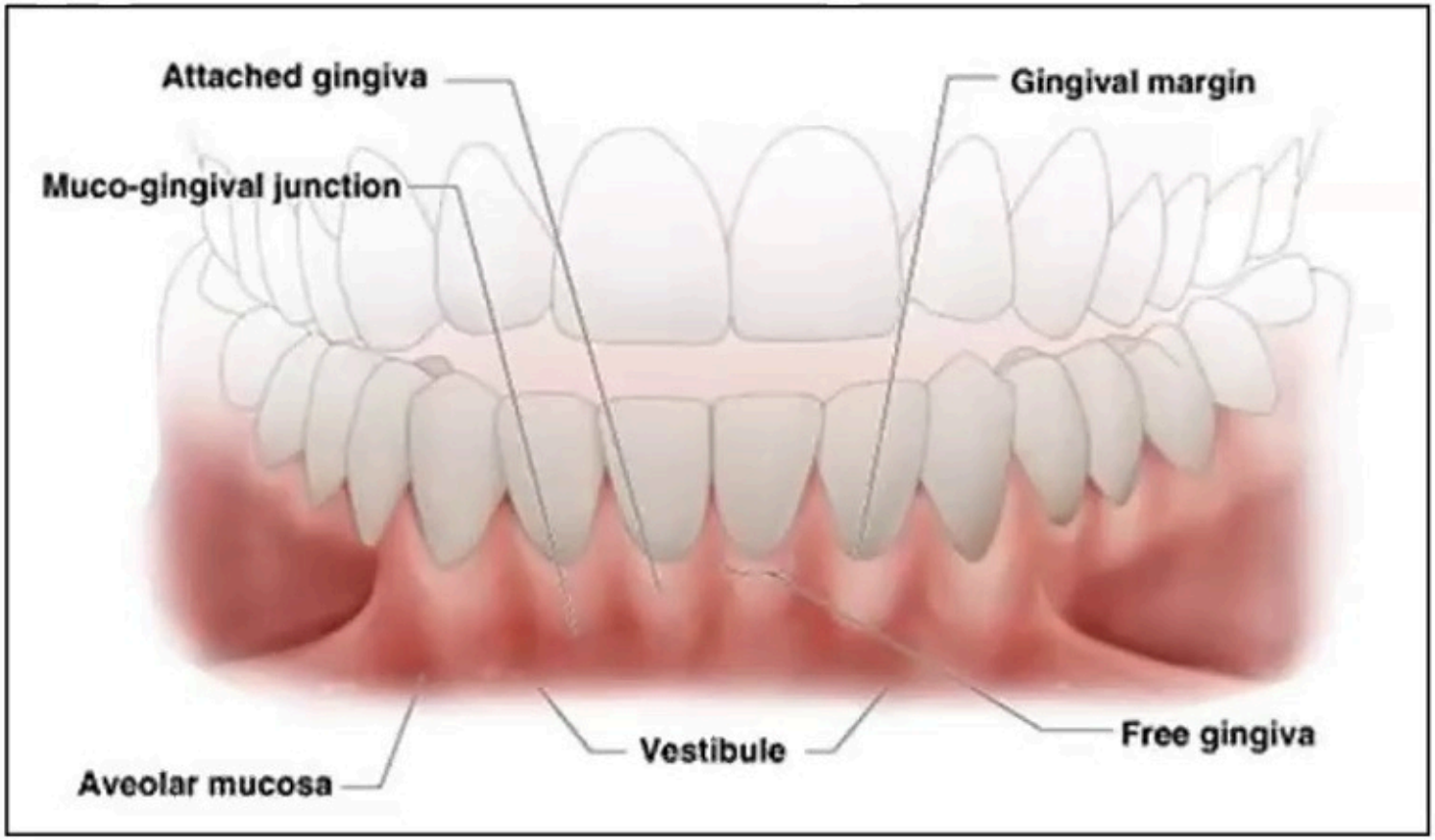
Normal gingiva may range in color from light pink to heavily pigmented.

It is normally stippled in appearance (resembling an orange peel).

The makeup of the gingival tissue varies according to its location and function.

GINGIVA AND ATTACHMENT APPARATUS

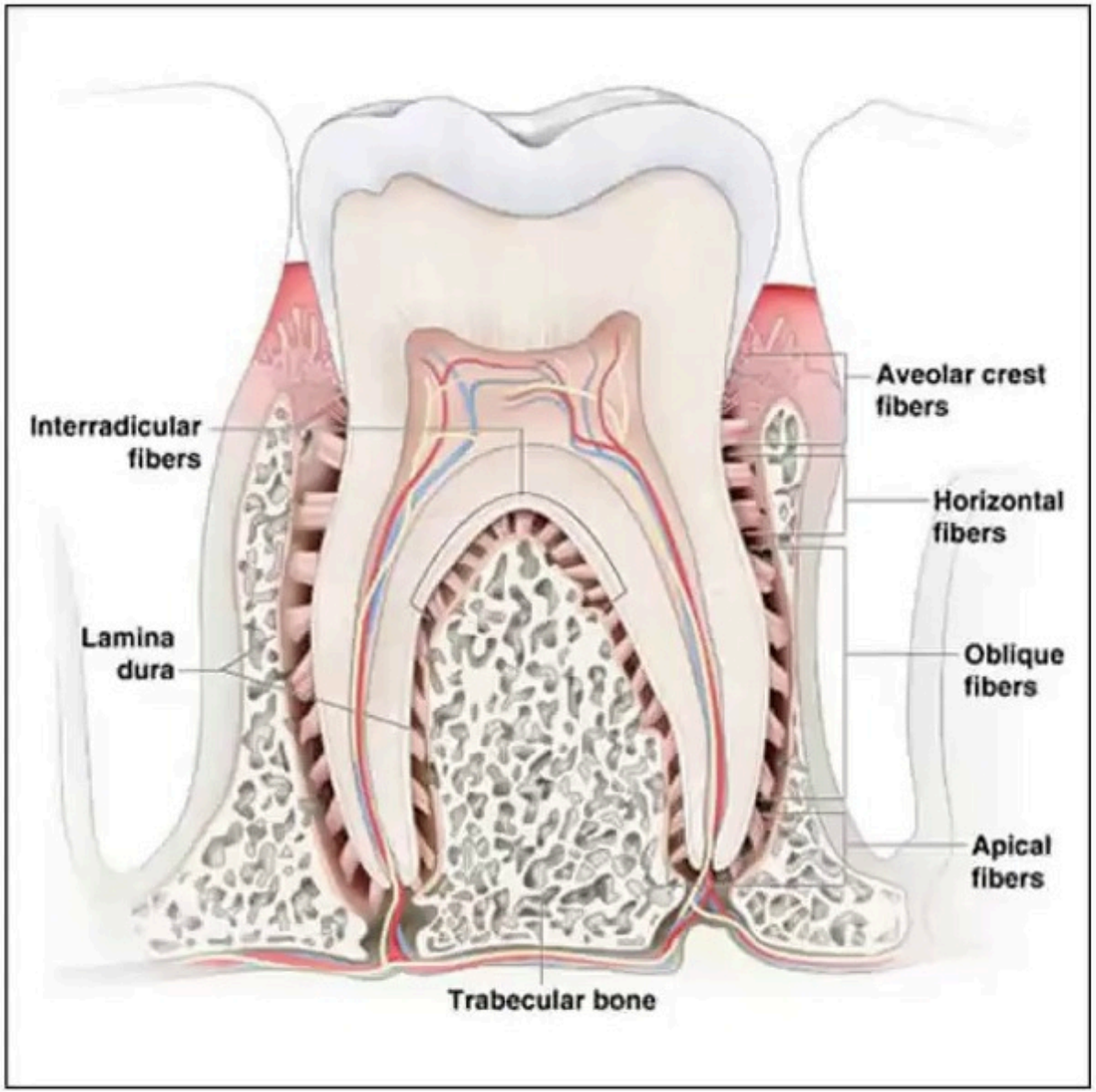
There are two types of gingiva and several important anatomic regions



GINGIVA AND ATTACHMENT APPARATUS

- The attachment of the tooth to the surrounding and supporting bone is accomplished through the cementum of the tooth, periodontal ligaments and the alveolar bone.
- The root of the tooth is attached to the underlying bone by a series of periodontal fibers that make up the periodontal ligament and allow for minor movement of the tooth in the socket without damage to the tooth or the underlying structures.

ATTACHMENT APPARATUS

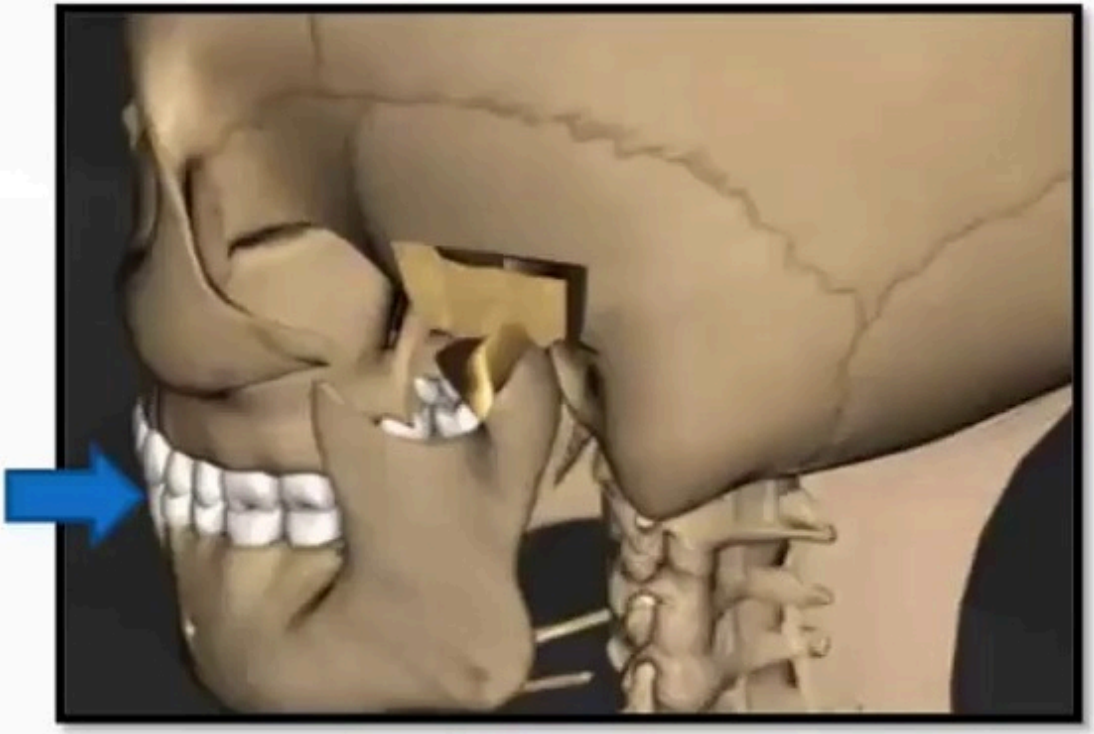


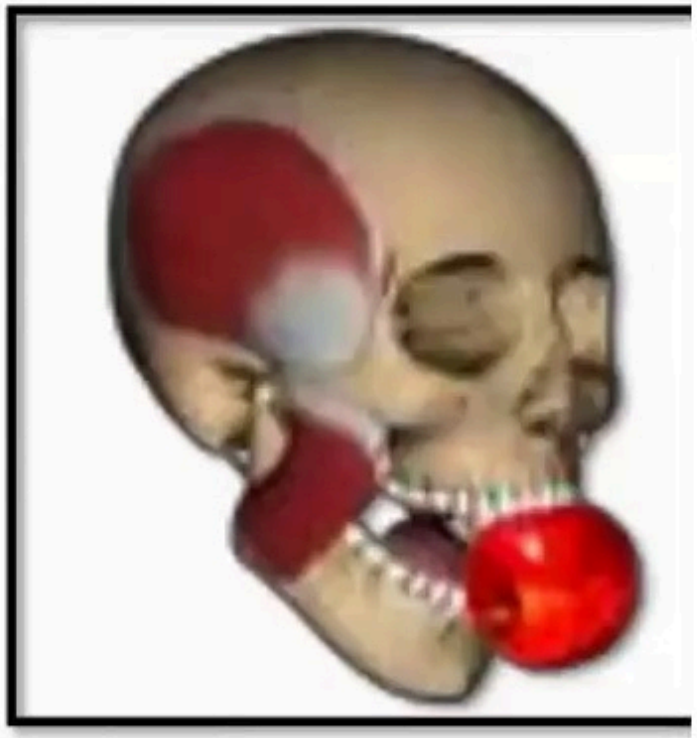
BONE

- The alveolar bone supports the teeth and is covered by gingival tissue.
- It contains several different types of bone.
- The inner and outer surfaces of the bone are made up of dense cortical plates.
- The portion between the cortical plates is called trabecular or cancellous bone.
- It resembles a sponge in appearance and has many irregular spaces within.
- The wall of the tooth socket is made of lamina dura, which is a thin, dense bone where the periodontal ligament is attached.

MASTICATION

- **Mastication:** term for process of biting or chewing of food





Structures involved in masticatory process are;

Teeth

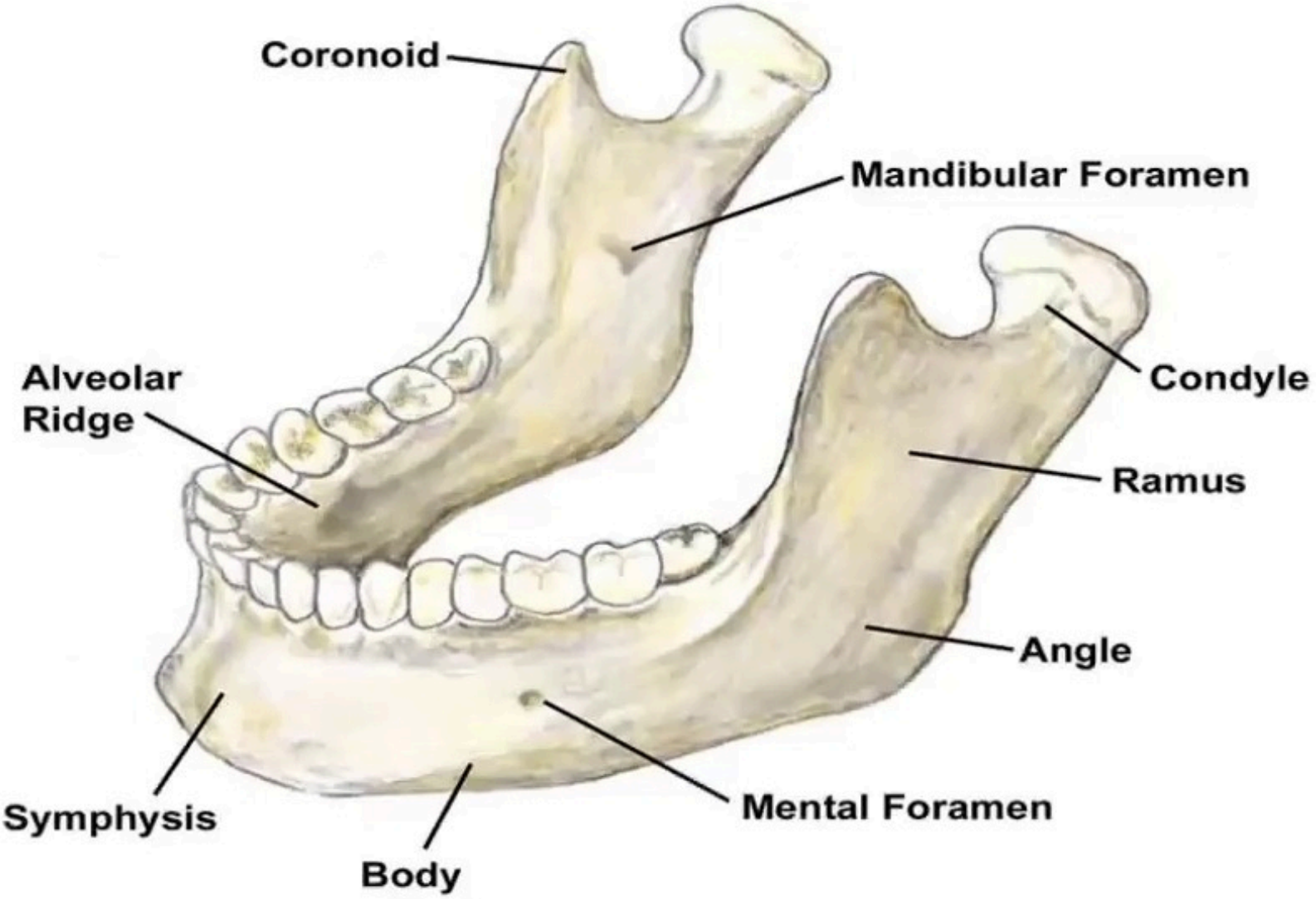
Jaws

Muscles of mastication

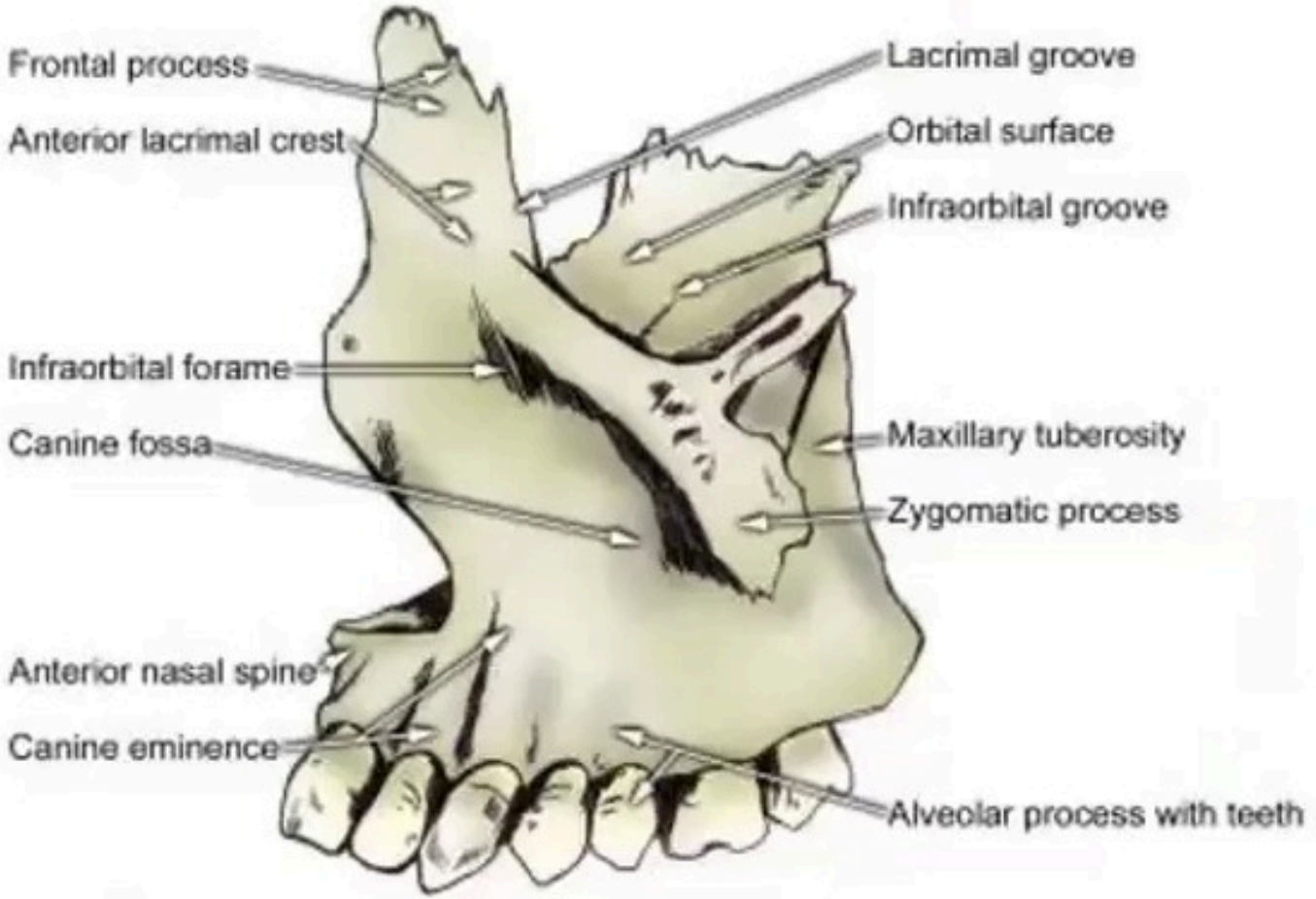
MANDIBLE

- Only mobile bone in the craniofacial skeleten
- Articulates with the base of the skull at the temporal bone forming the temporomandibular joint (TMJ)
- It bears teeth and muscles of mastication are attached to it

Basic Anatomy of the Mandible



MAXILLA


Frontal process
Anterior lacrimal crest
Infraorbital forame
Canine fossa
Anterior nasal spine
Canine eminence
Lacrimal groove
Orbital surface
Infraorbital groove
Maxillary tuberosity
Zygomatic process
Alveolar process with teeth

MUSCLES OF MASTICATION

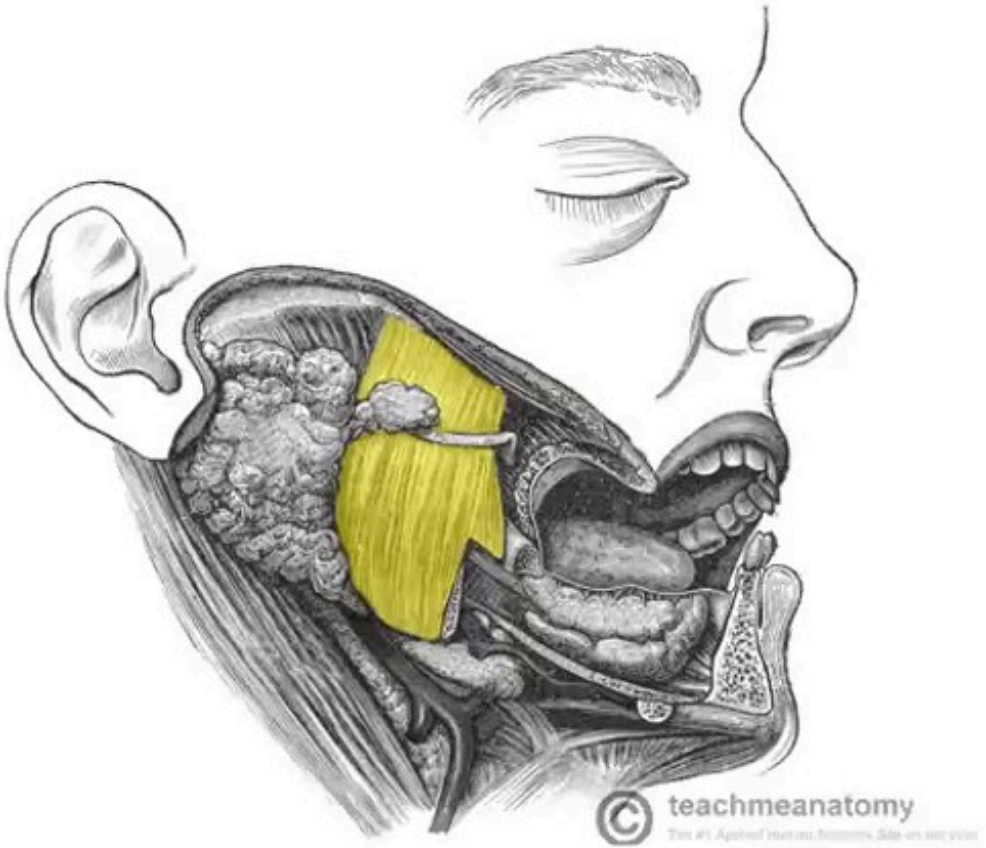
The **muscles of mastication** are associated with movements of the jaw. There are four muscles:

- Masseter
- Temporalis
- Medial pterygoid
- Lateral pterygoid

Embryologically, the muscles of mastication develop from the **first pharyngeal arch**. Consequently they are innervated by a branch of the trigeminal nerve (CN V), the mandibular nerve.

MASSETER

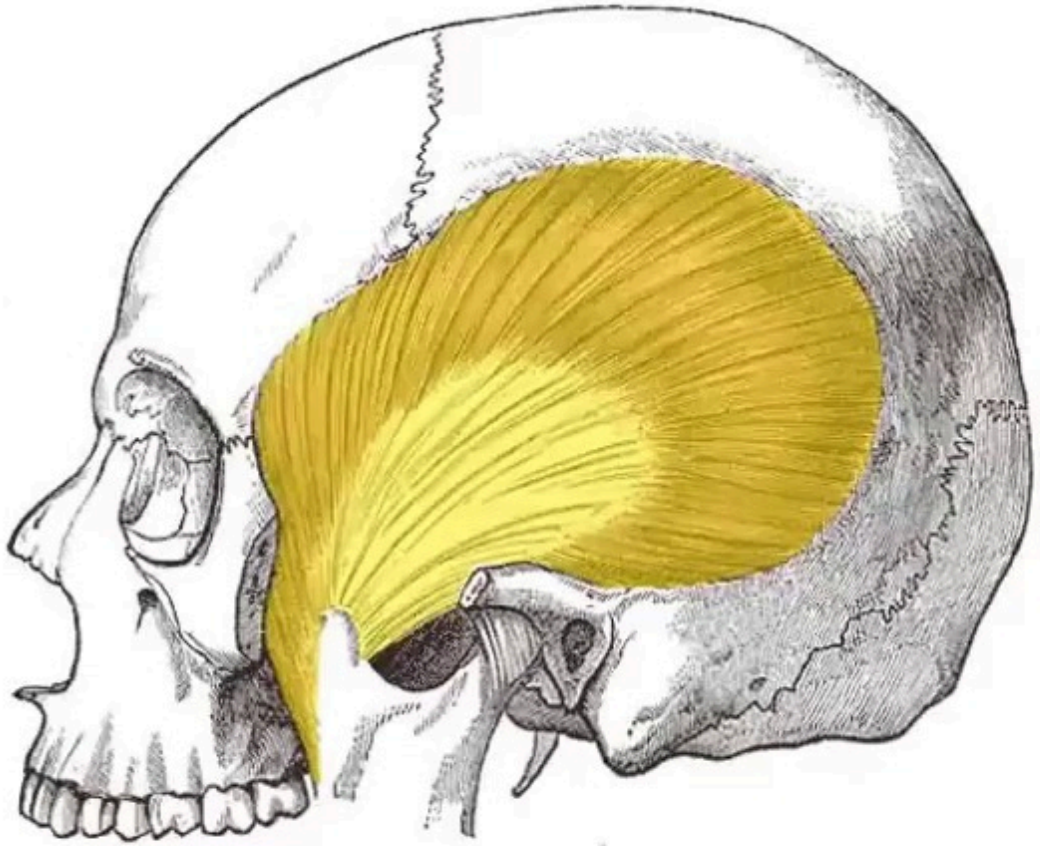
Attachments: The superficial part originates from maxillary process of the zygomatic bone. The deep part originates from the zygomatic arch of the temporal bone. Both parts attach to the ramus of the mandible.



- **Actions**: Elevates the mandible, closing the mouth.
- **Innervation**: Mandibular nerve (V_3).

TEMPORALIS

Attachments:
Originates from the temporal fossa. It condenses into a tendon, which inserts onto the coronoid process of the mandible.

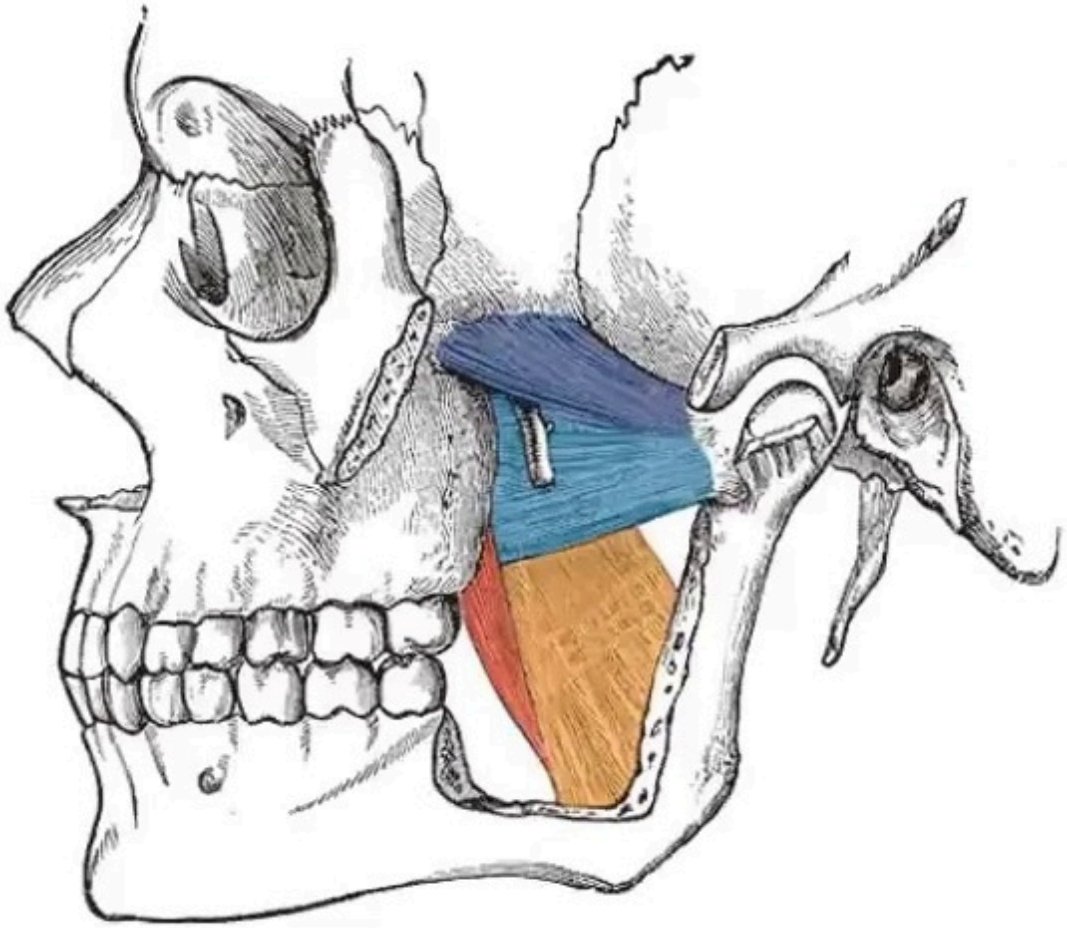


- **Actions**: Elevates the mandible, closing the mouth. Also retracts the mandible, pulling the jaw posteriorly.
- **Innervation**: Mandibular nerve (V_3).

LATERAL PTERYGOID

The superior head originates from the greater wing of the sphenoid. The inferior head originates from the lateral pterygoid plate of the sphenoid. The two heads converge into a tendon, which attaches to the neck of the mandible.

PTERYGOIDS



- Superior head of the lateral pterygoid
- Inferior head of the lateral pterygoid
- Deep head of the medial pterygoid
- Superficial head of the medial pterygoi

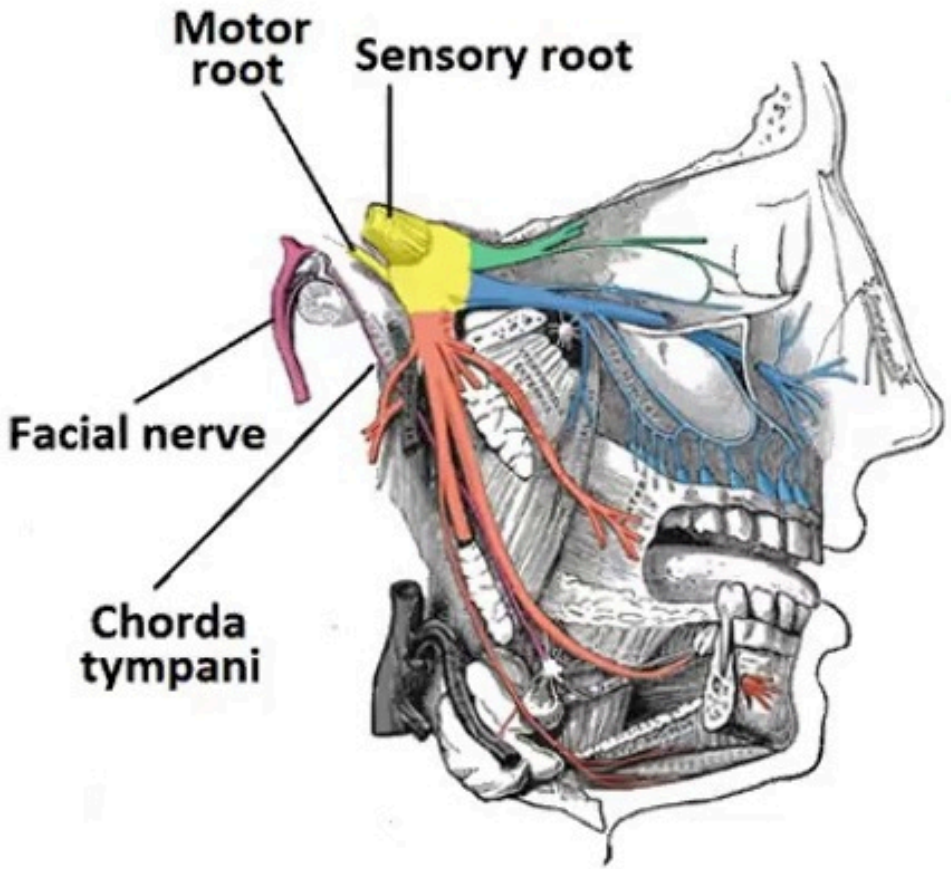
- **Actions**: Acting bilaterally, the lateral pterygoids protract the mandible, pushing the jaw forwards. Unilateral action produces the 'side to side' movement of the jaw.
- **Innervation**: Mandibular nerve (V_3).

MEDIAL PTERYGOIDS

Attachments: The superficial head originates from the maxillary tuberosity and the pyramidal process of palatine bone. The deep head originates from the lateral pterygoid plate of the sphenoid bone. Both parts attach to the ramus of the mandible, near the angle of mandible.

- **Actions**: Elevates the mandible, closing the mouth.
- **Innervation**: Mandibular nerve (V_3).

INNERVATION OF TEETH & MUSCLES OF MASTICATION



Opthalmic (V1)
Maxillary (V2)
Mandibular (V3)

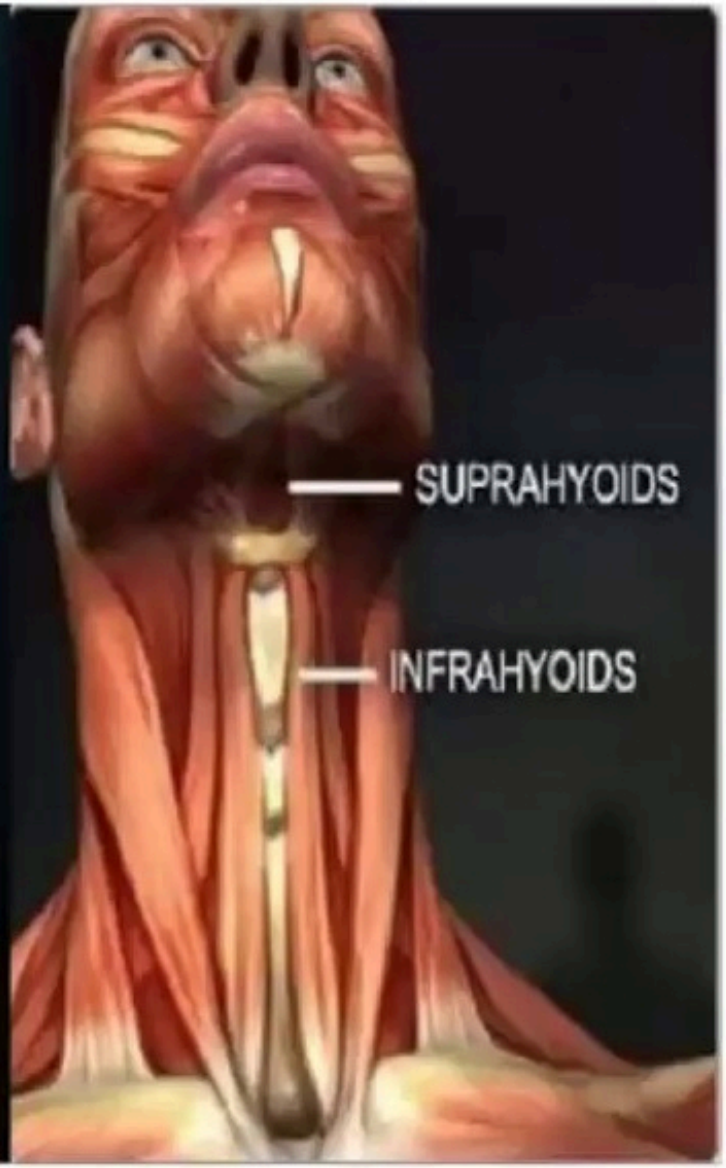
ACCESSORY MUSCLES OF MASTICATION

Suprahyoid muscles

- Mylohyoid
- Geniohyoid
- Stylohyoid
- Digastric

Infrahyoid Muscles

- Sternothyroid
- Omohyoid
- Thyrohyoid
- Sternohyoid



Clinical relevancy

- Administration of local anesthesia