Oral Histology

DEVELOPMENT OF ORAL CAVITY

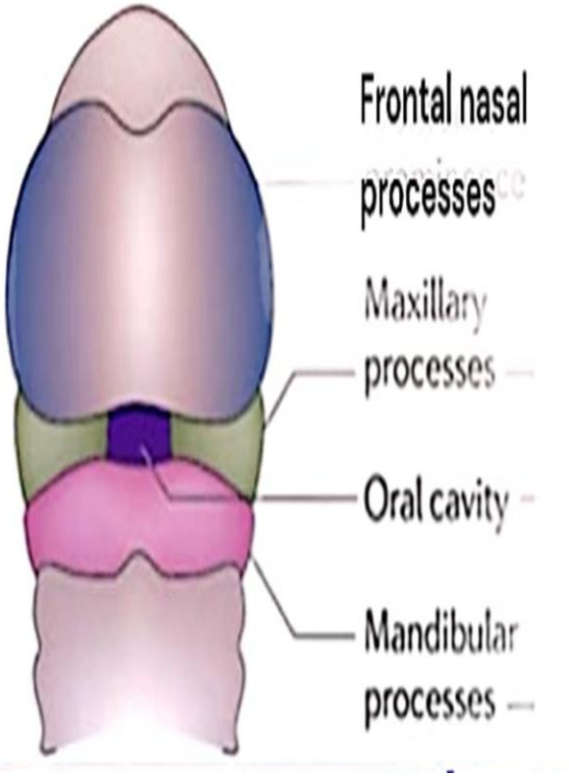
Lecture 3

Quiz

- **Q1/Fourth week events :**
- Endoderm tissue buds begin developing------
- Ectoderm tissue buds develop----------

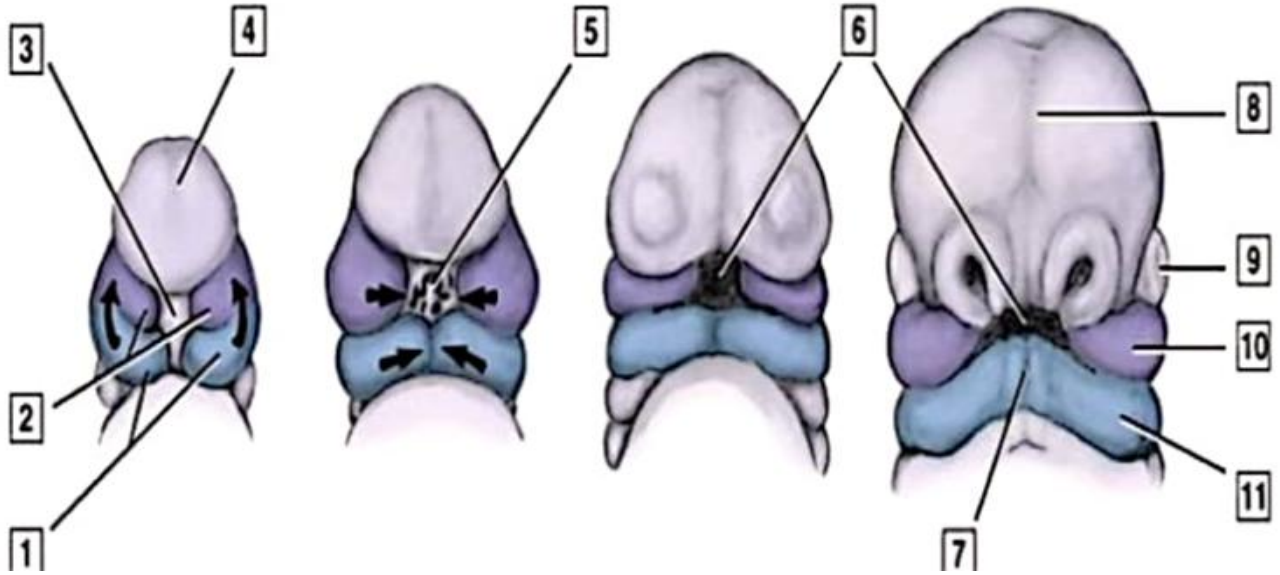
- **Q2/ Enumerate Main event occurs in the Fifth week of pregnancy ?**

- Face and structures of the oral cavity begin development early in the embryonic period.
- ALL three embryonic layers are involved in facial development . Depending on five facial processes (prominences) that form during fourth week and surround stomodeum (primitive mouth):
- 1) single frontonasal process.
- (2 and 3) paired maxillary processes.
- (4 and 5) paired mandibular processes.
- In the future, the stomodeum will form the oral cavity.

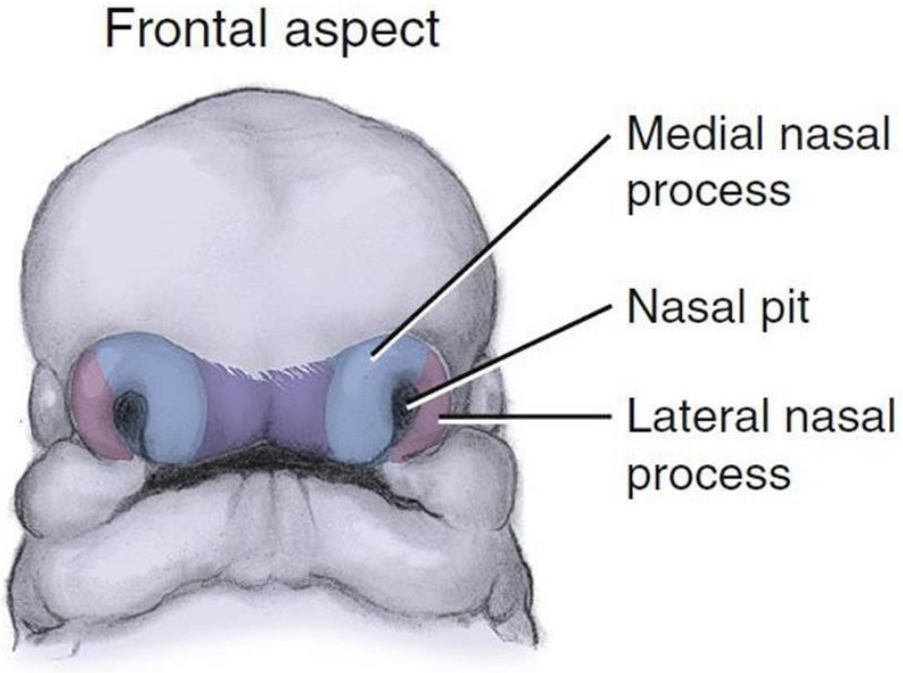


- Facial processes are centers of growth for the face, If an adult's face is divided into thirds, these portions roughly correspond to centers of facial growth:
- a. Upper face: from the frontonasal process.
- b. Middle face (midface): from maxillary processes.
- c. Lower face: from mandibular processes
- Stomodeum and Oral Cavity Formation Before fourth week, stomodeum initially appears as a shallow depression in embryonic surface ectoderm at cephalic end, limited depth. Stomodeum is increased in depth, enlarging it to become oral cavity and lined by oral epithelium, which is derived from ectoderm, as a result of embryonic folding

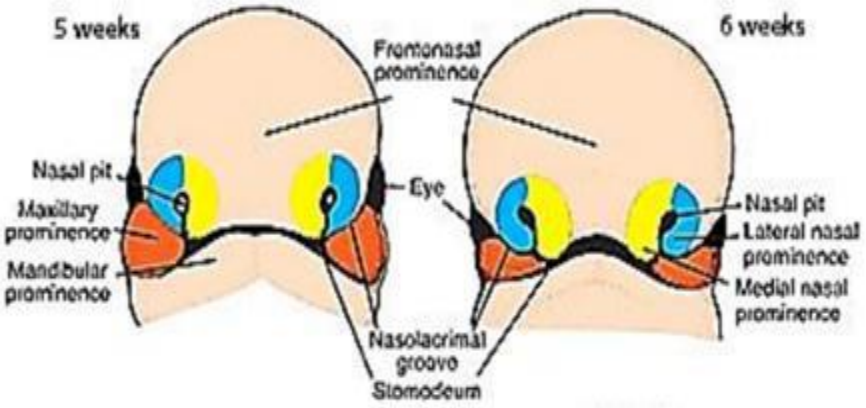
1 Mandibular processes
2 Maxillary processes
3 Oropharyngeal membrane
4 Frontonasal process
5 Oropharyngeal membrane disintegrating
6 Stomodeum
7 Mandibular symphysis
8 Frontonasal process
9 Lens placode
10 Maxillary process
11 Mandibular arch



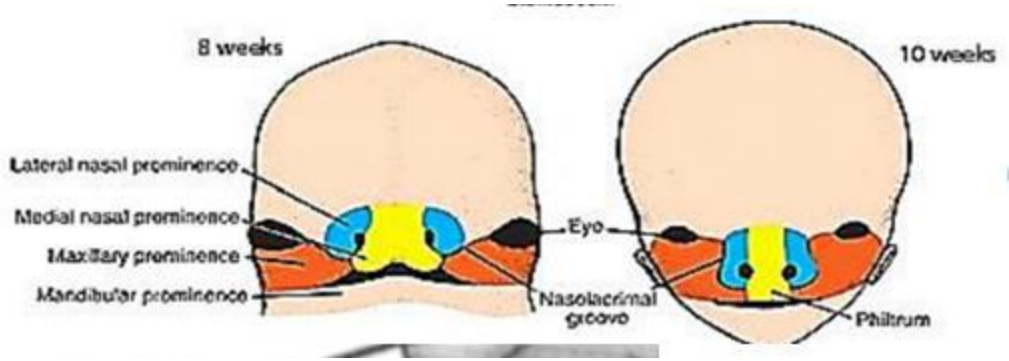
- In the **sixth week**, mesodermal cells proliferate around the nasal pits, and form the **medial and lateral**nasal prominences.

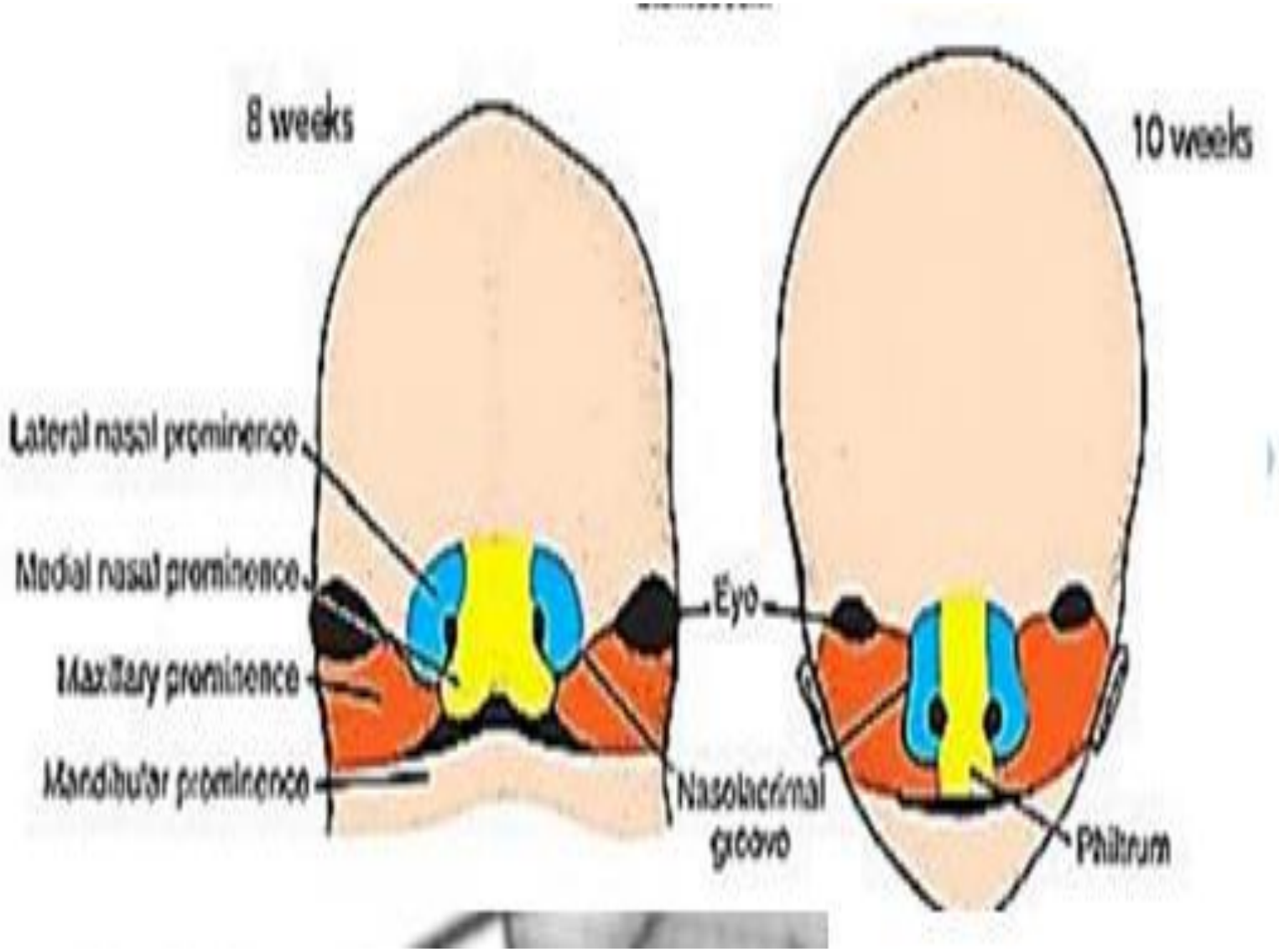


- When the **mandibular prominences** merge, they will form the beginnings of lower lip, chin and mandible.



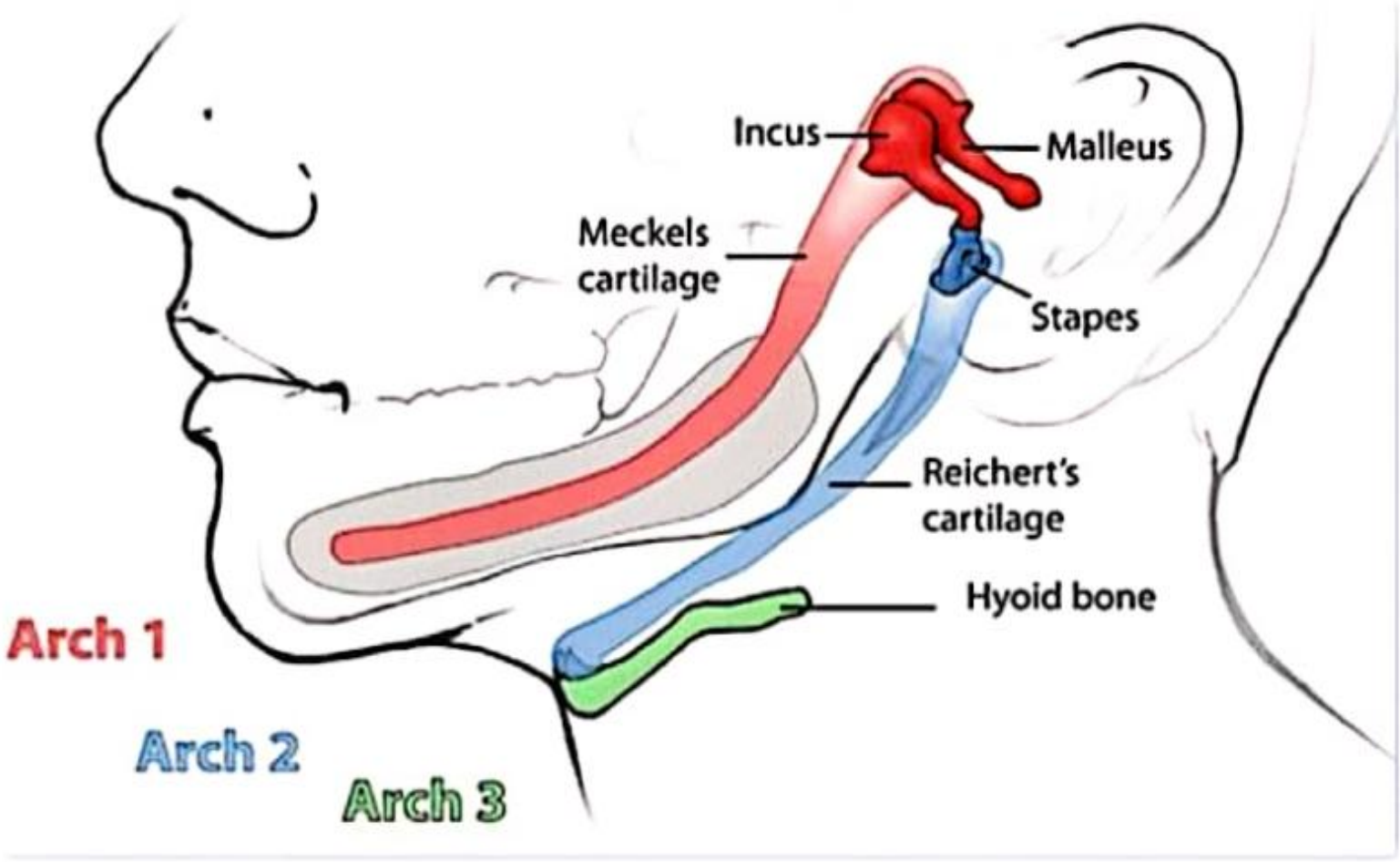
- The **maxillary prominences** grow to ward the midline and fuse with the **lateral nasal prominences**




8 weeks
10 weeks
Lateral nasal prominence
Medial nasal prominence
Maxillary prominence
Mandibular prominence
Eye
Nasolacrimal groove
Philtrum

- Mandibular Arch and Lower Face Formation During fourth week, two bulges of tissue appear inferior to stomodeum; these paired mandibular processes are formed in part by neural crest cells that migrated to the facial region, covered externally by ectoderm and internally by endoderm, Paired mandibular processes BOTH fuse at midline to form the mandibular arch.

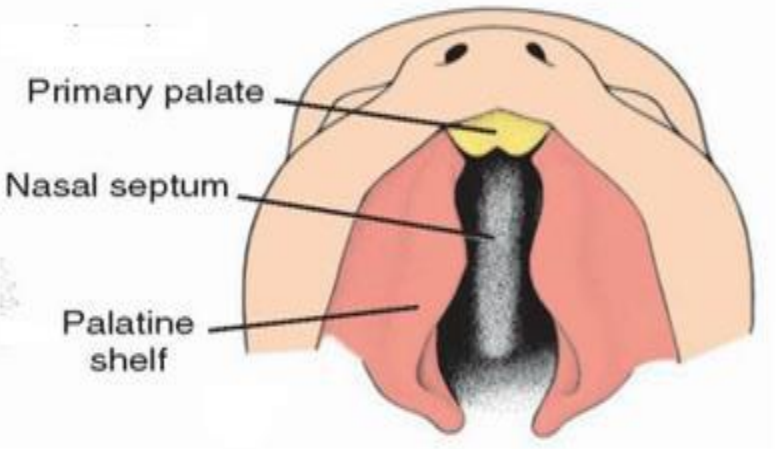
- Mandibular arch and related tissues are first portions of the face to form after creation of stomodeum and directly forms lower face, including lower lip and will also form mandible, mandibular teeth, tissues, as well as tongue.
- Meckel's cartilage forms within each side of mandibular arch, IMPORTANT in:
- Alveolar bone development.
- Makes contribution to the mandible, and a portion of cartilage participates in formation of middle ear bones.
- Part of the perichondrium surrounding Meckel's cartilage becomes ligaments of the jaws and middle ear.

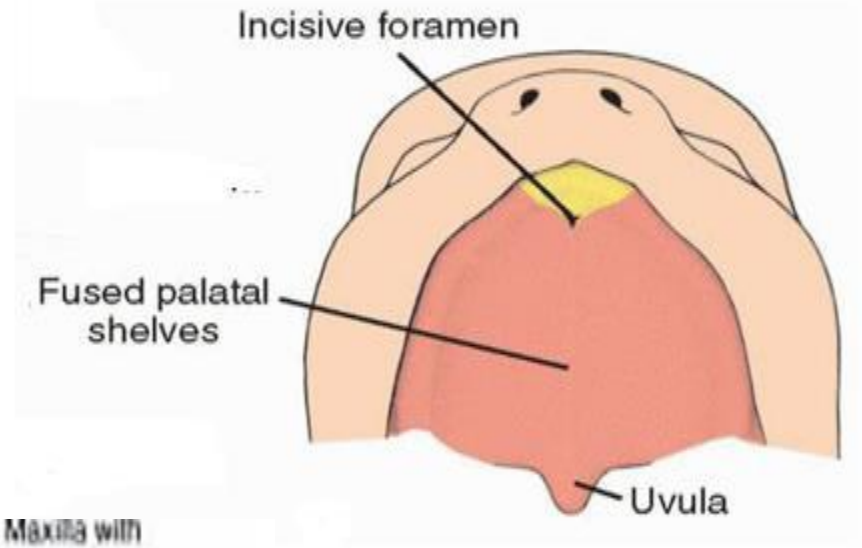

Incus
Malleus
Meckels cartilage
Stapes
Reichert's cartilage
Hyoid bone
Arch 1
Arch 2
Arch 3

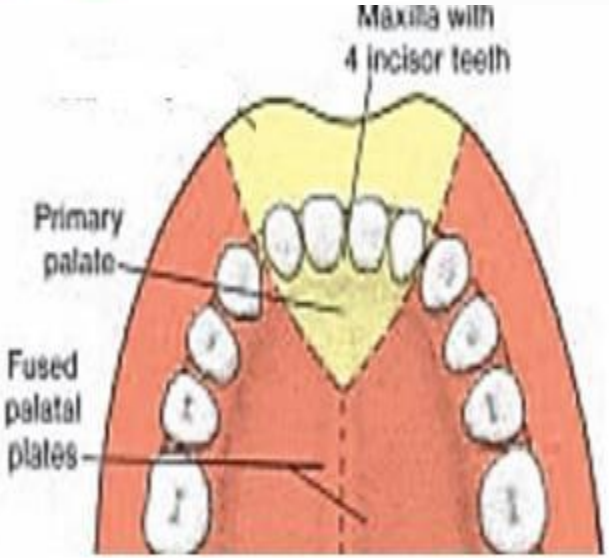
- Mesoderm of the mandibular arch forms muscles of mastication, as well as some palatal muscles and suprahyoid muscles. Because these muscles are derived from mandibular arch, they are innervated by nerve of the first arch, fifth (V) cranial nerve (trigeminal nerve)

Development of Palates

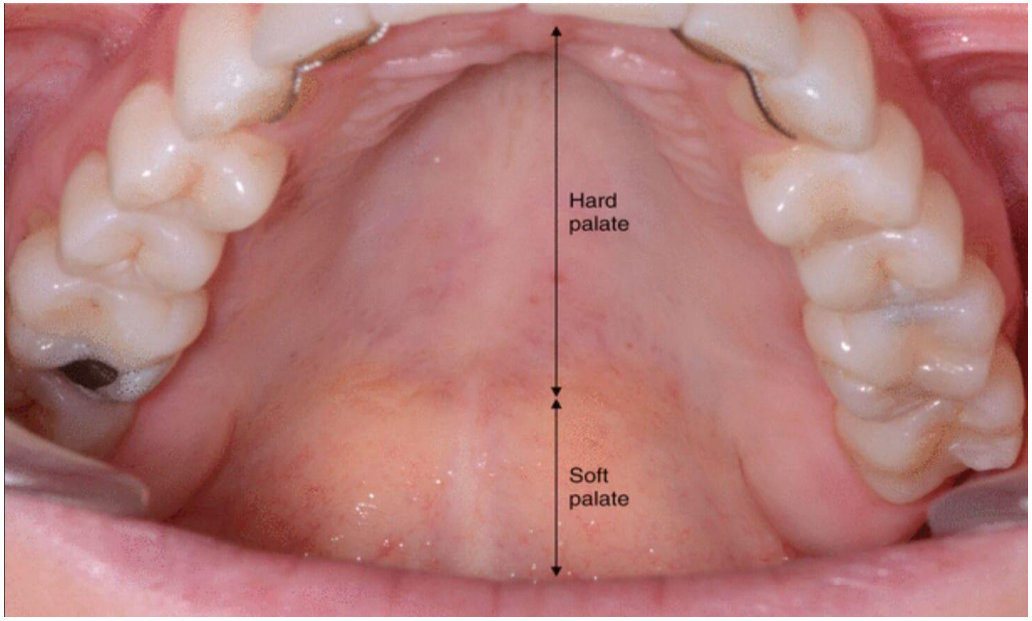
- **Primary palate:** At around the **sixth** week of development the primary palate begins to take shape, arising from the **medial nasal processes** which contains the four incisors and the incisive canal.
- **Secondary palate:** Two palatine shelves from the **maxillary prominences**, appear in the **sixth** week of development. After **7th** week of development, they fuse with each other and with primary palate above the tongue which drop down. Fusion is completed around the **twelfth** week


Primary palate
Nasal septum
Palatine shelf


Incisive foramen
Fused palatal shelves
Uvula


Maxilla with 4 incisor teeth
Primary palate
Fused palatal plates

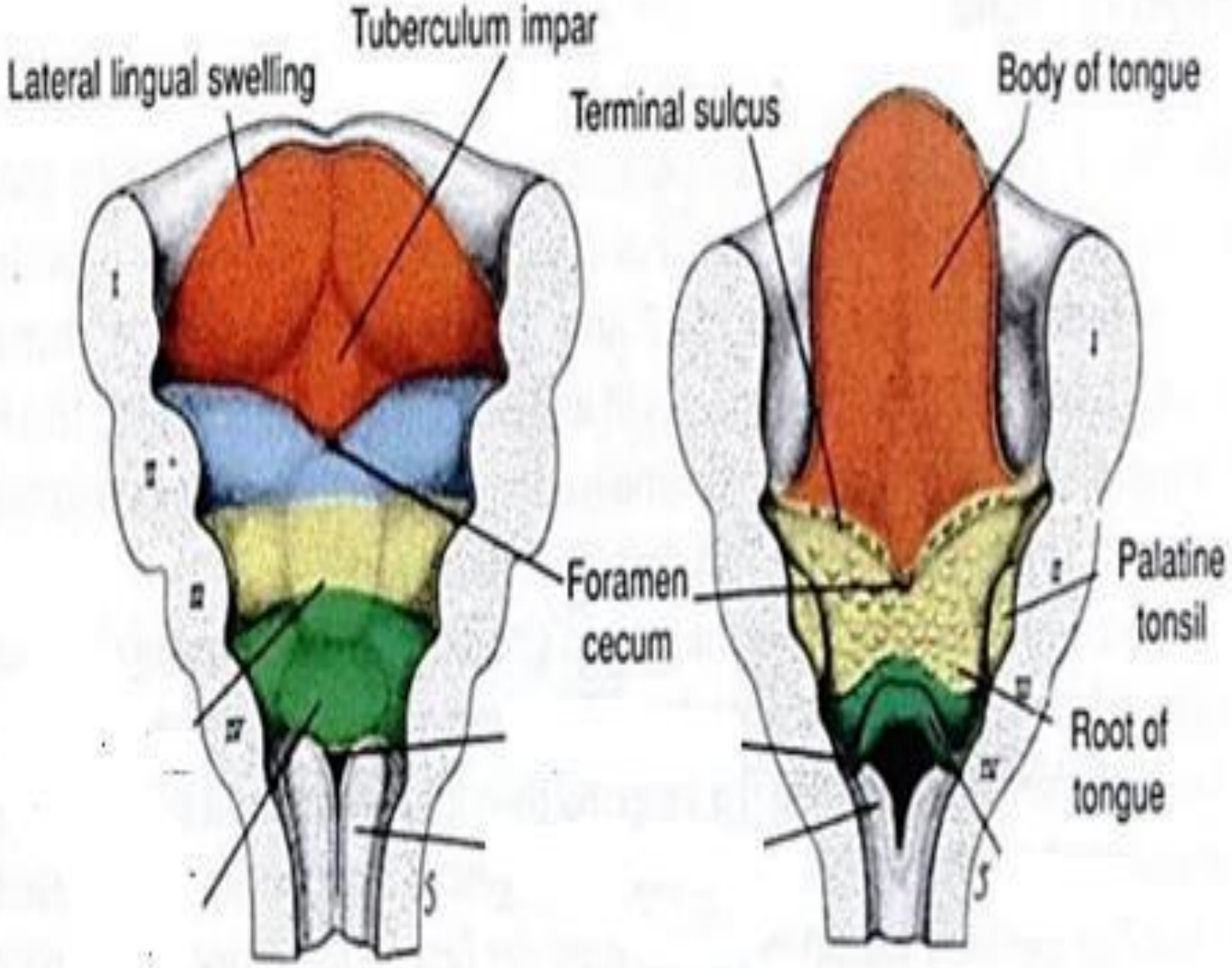
- The hard palate forms when “ossification occurs in the anterior two thirds of the palate” and the soft palate is formed because ossification does not occur in this area.



DEVELOPMENT of TONGUE

- The tongue begins to develop during the 4th week of embryogenesis from a median swelling, known as the **tuberculum impar** of the first pharyngeal arch At 5th week two lateral lingual swellings appear, which expand and cover the tuberculum impar and continue to develop forming the anterior 2/ 3 thirds of the tongue

- The posterior **1\3** of the tongue arises from mesenchyme of **3rd and 4th arches** and fuse with the anterior 2/ 3 of the tongue. The boundary between the two parts of the tongue, is marked by the V-shaped **terminal sulcus**. At the tip of the terminal sulcus is the **foramen cecum**, which is the point where the embryological **thyroid** begins to descend.


Tuberculum impar
Lateral lingual swelling
Terminal sulcus
Body of tongue
Foramen cecum
Palatine tonsil
Root of tongue