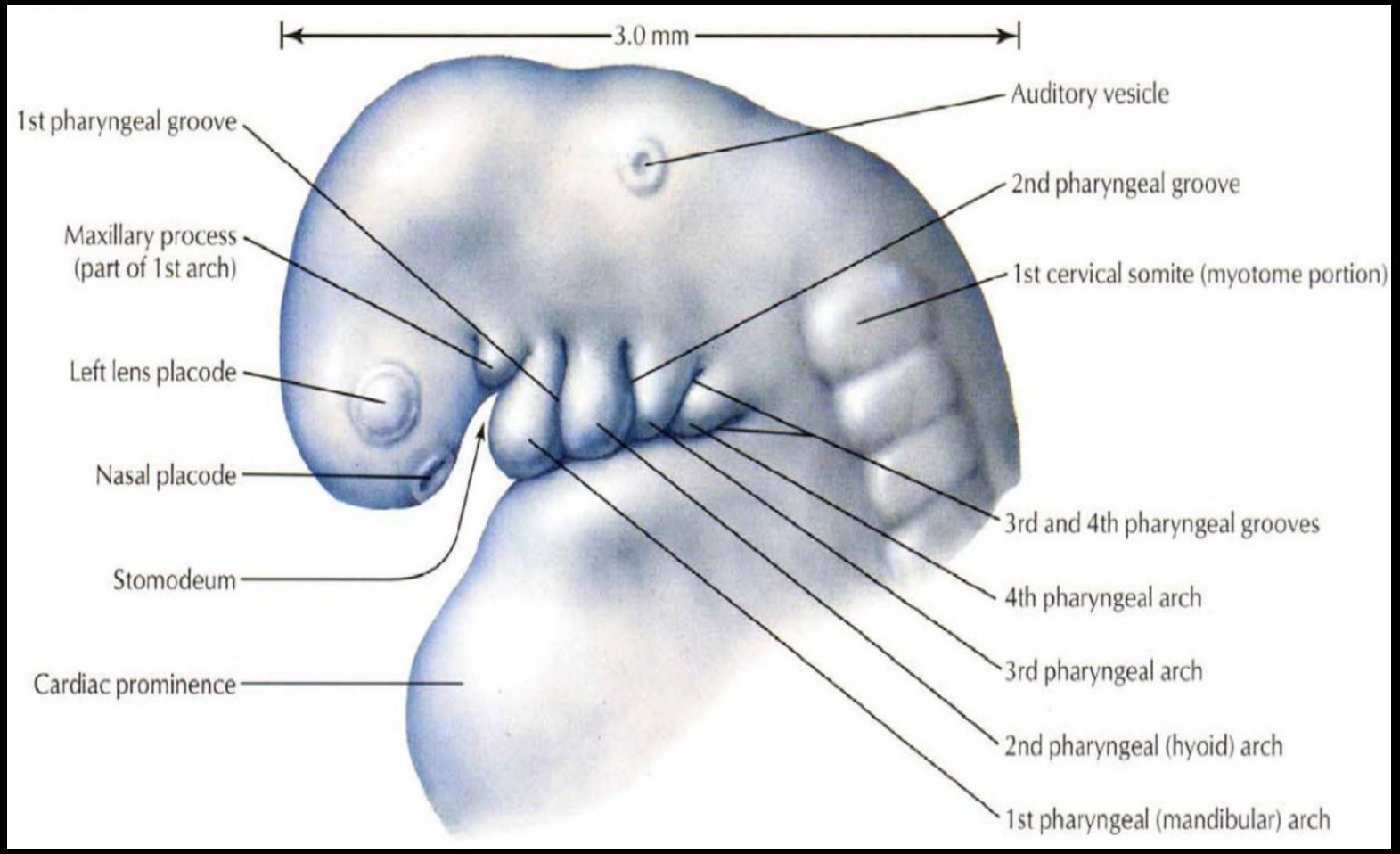
Embryology Neuroscience 1 B

DR SHAHAB

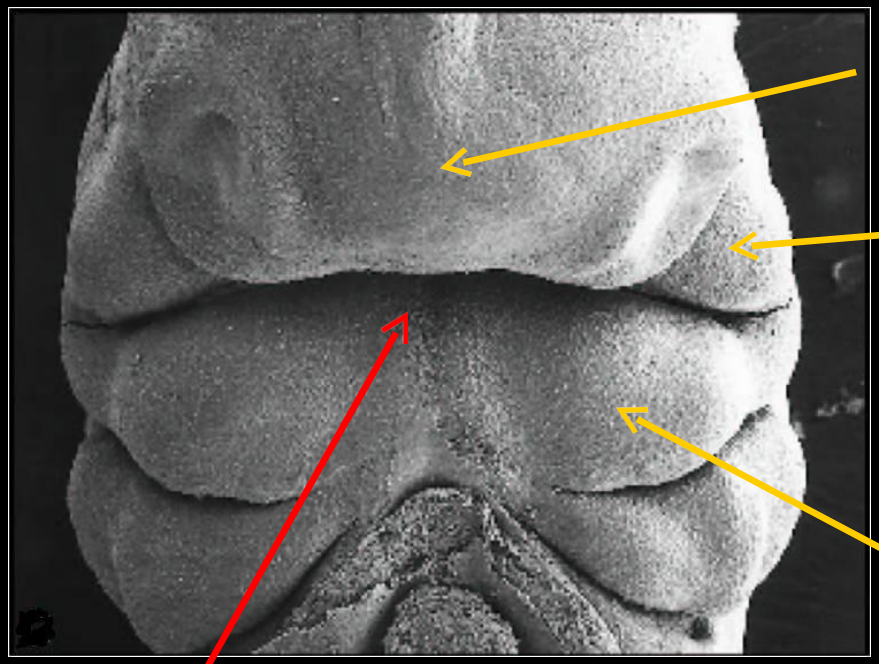
Development of the Face

- The development of the face occurs mainly between 4 – 8 weeks
- The lower jaw (mandible) is the first to form (4th week)
- The facial proportions develop during the fetal period (9th week to birth)
- During infancy & childhood, following the development of teeth and paranasal sinuses, the facial skeleton increases in size and contribute to the definitive shape of the face



Embryo at 4 - 5 weeks (Lateral view)

Early in the 4th week, five primordial swellings consisting primarily of neural crest-derived mesenchyme appear around the stomodeum and play an important role in the development of face



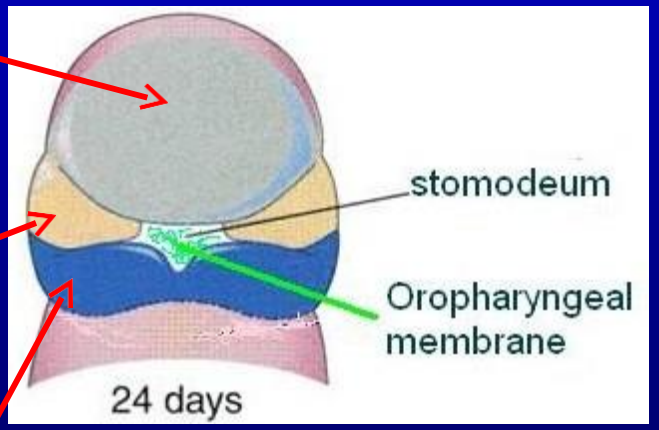
1 Frontonasal prominence

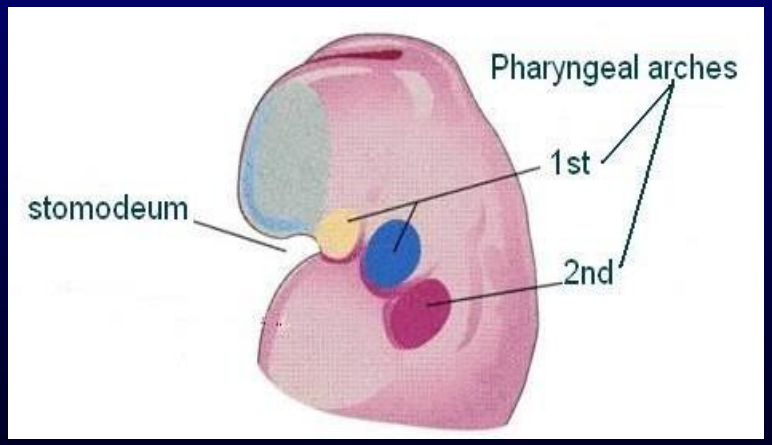
2 Maxillary prominences

2 Mandibular prominences

Stomodeum

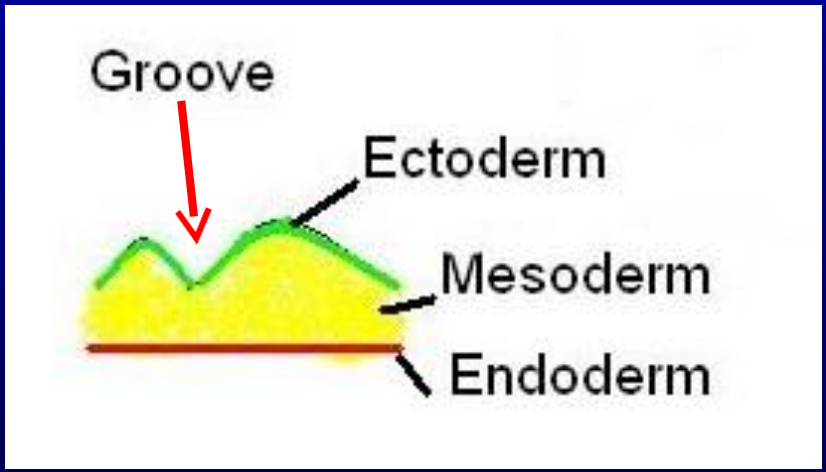
- The single frontonasal prominence ventral to the forebrain
- The paired maxillary prominences develop from the cranial part of first pharyngeal arch
- The paired mandibular prominences develop from the caudal part of first pharyngeal arch





Lateral view

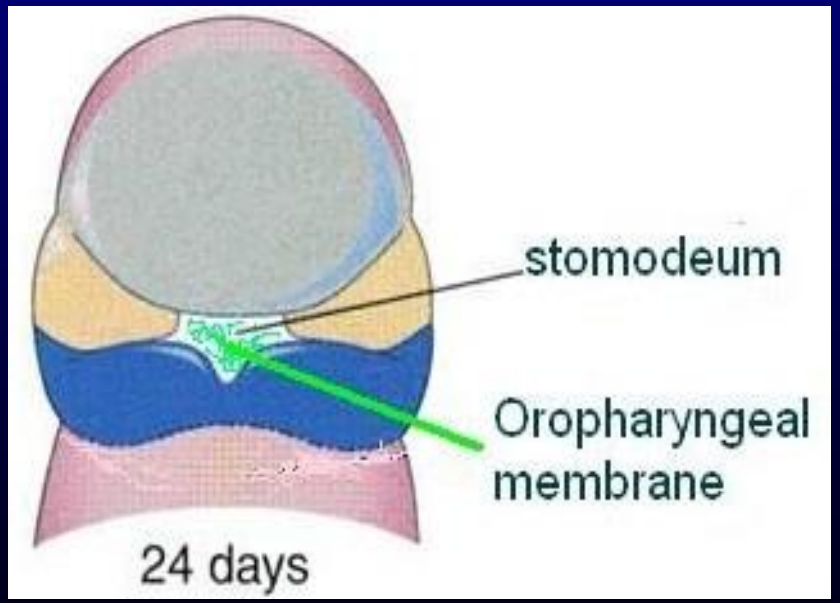
- The mesoderm of the five prominences is continuous with each other
- There is no internal division corresponding to the grooves demarcating the prominences externally



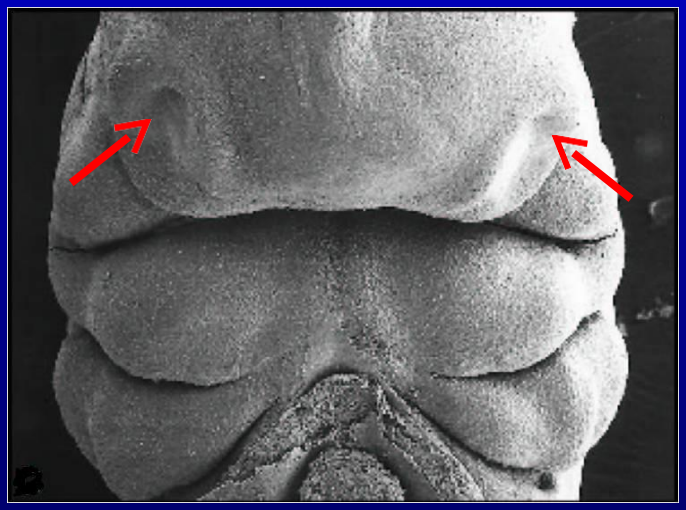
Stomodeum

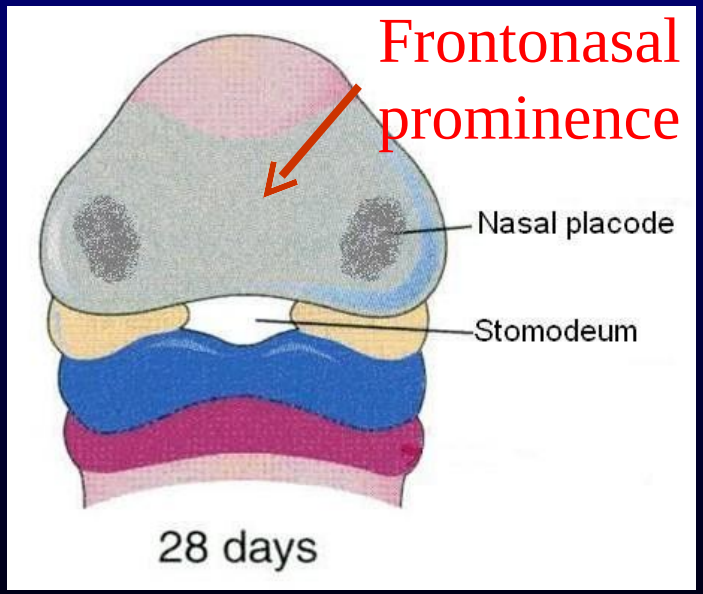
- An ectoderm lined depression
- Separated from the primitive pharynx by the buccopharyngeal (oropharyngeal) membrane
- The membrane later breaks down and stomodeum opens into the pharynx

Forms the vestibule of the oral cavity

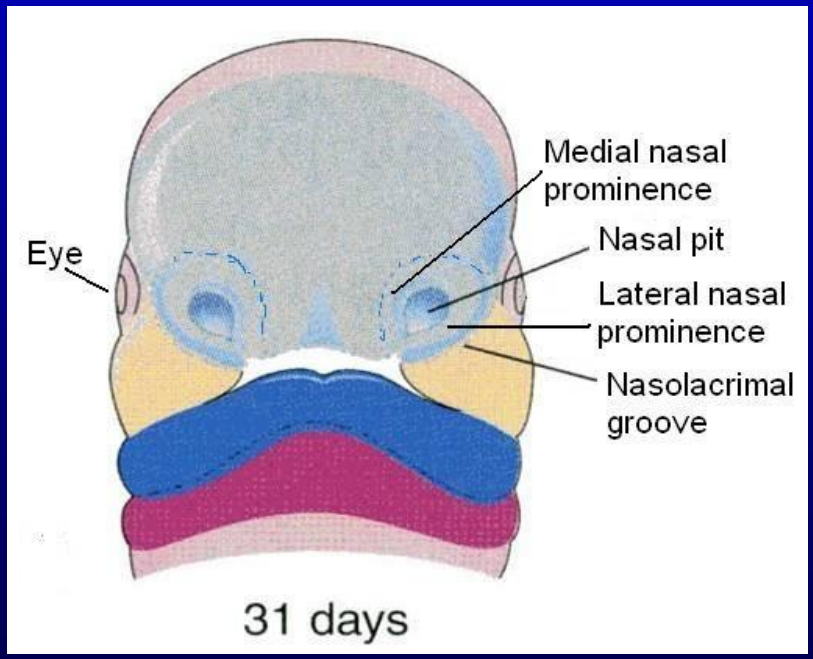


- By the end of 4th week, bilateral oval-shaped ectodermal thickenings called 'nasal placodes' appear on each side of the lower part of the frontonasal prominence
- Nasal placodes are primordia of the nose and nasal cavities.



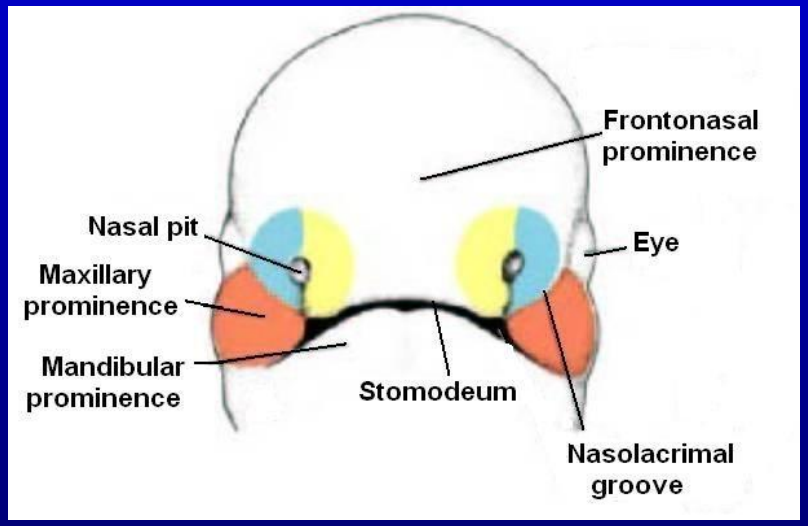


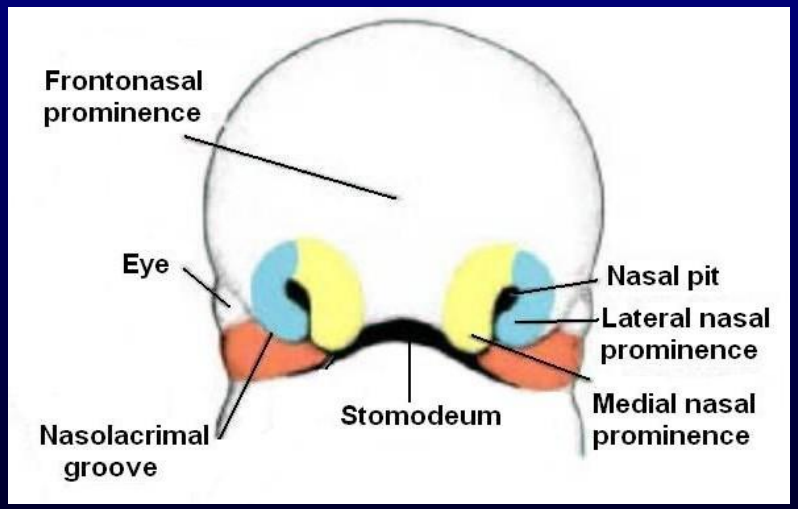
- Mesenchymal cells proliferate at the margin of the placodes and produce horse-shoe shaped swellings around these.
- The sides of these swellings are called 'medial' and 'lateral' nasal prominences
- The placodes now lie in the floor of a depression called 'nasal pits'



Each lateral nasal prominence is separated from the maxillary swelling by nasolacrimal groove

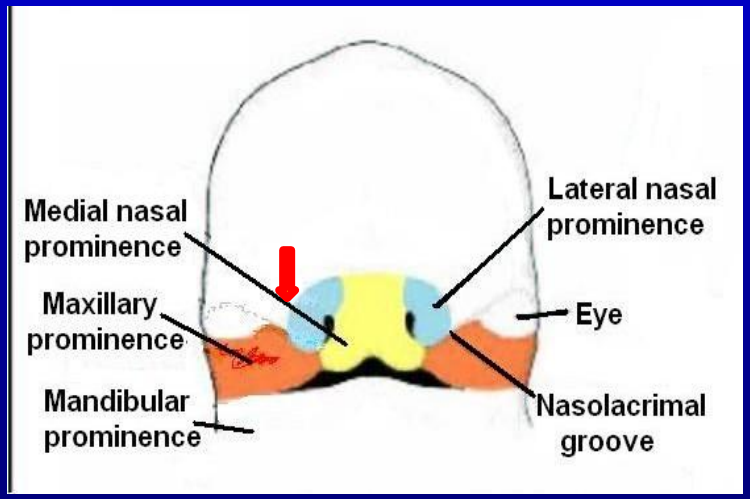
- The maxillary prominences continue to increase in size and:
- Laterally, merge with the mandibular prominences to form the cheek
- Medially, compress the medial nasal prominences toward the midline and finally fuses with these to form the upper lip.

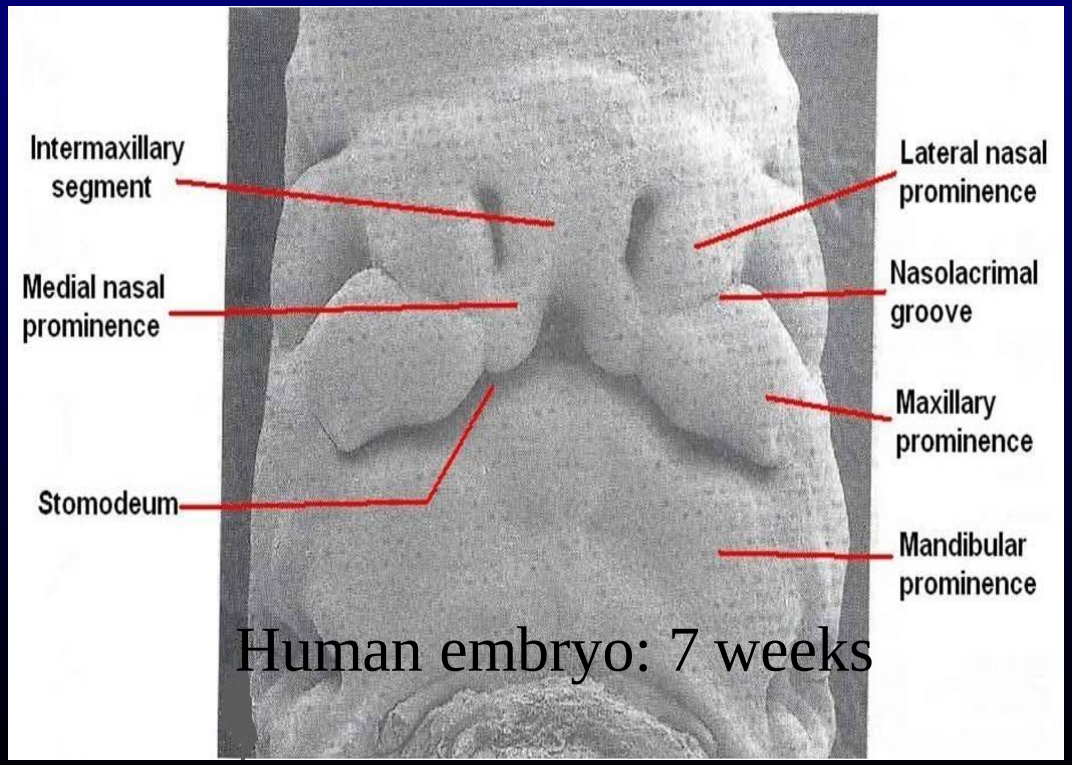




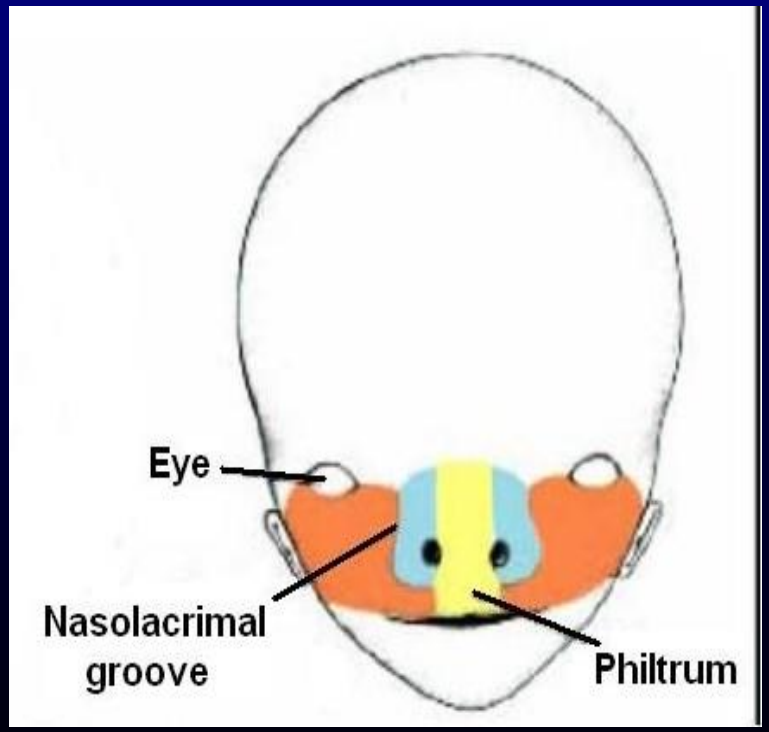
The upper lip is formed by the two medial nasal prominences & the two maxillary prominences

The medial nasal swellings enlarge, grow medially and merge with each other in the midline to form the intermaxillary segment





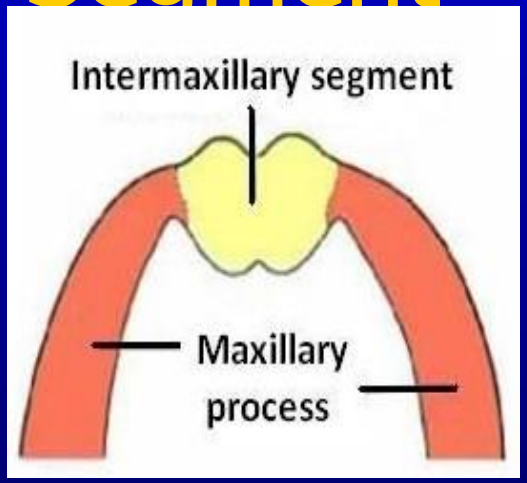
Human embryo: 7 weeks

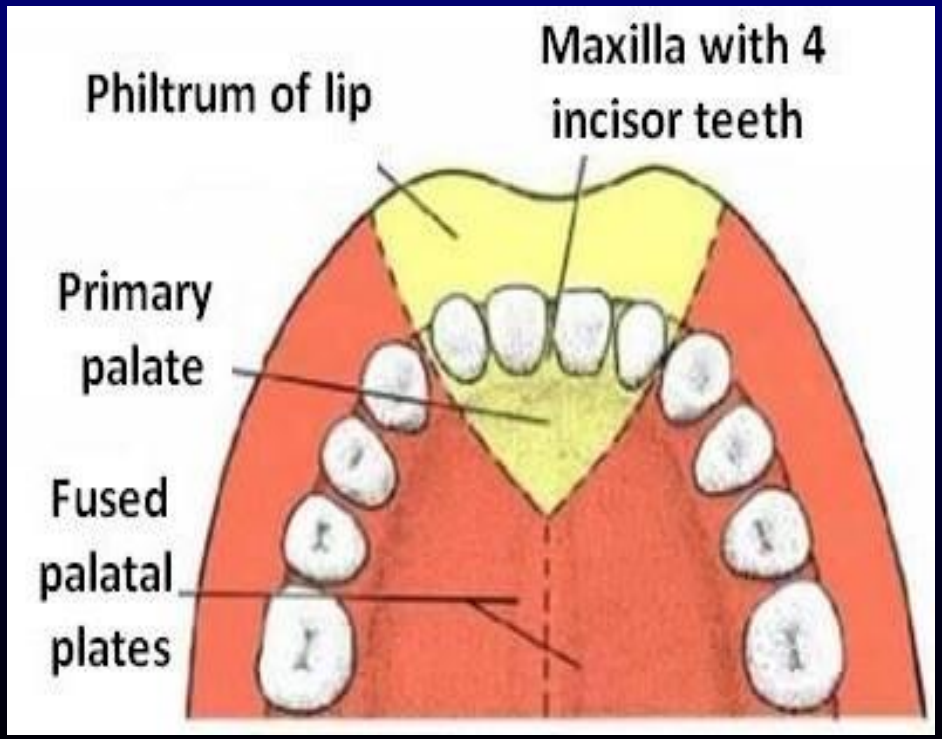


Intermaxillary Segment

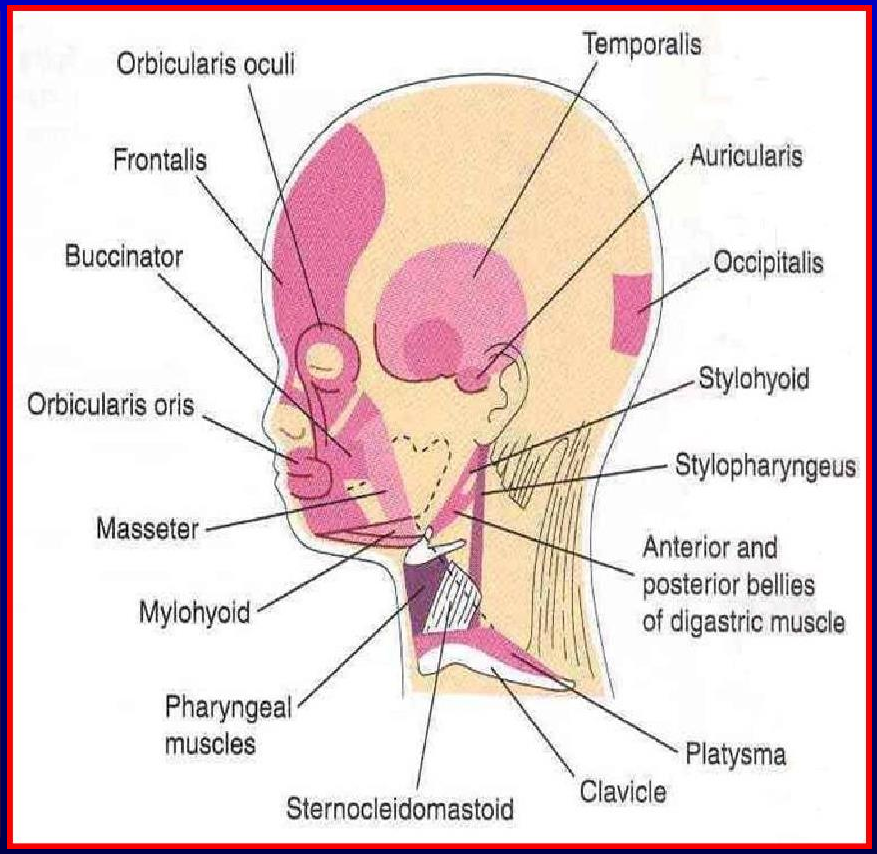
Gives rise to the:

- Philtrum of lip
- Premaxillary part of the maxilla, that bears the upper 4 incisors and the associated gums
- Primary palate (region of hard palate just posterior to the upper incisors)





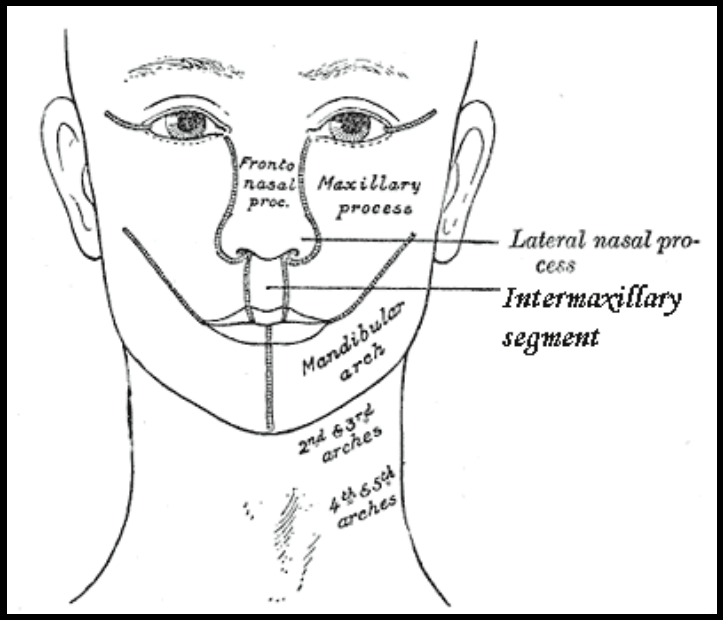
The mesenchyme from the 1st & 2nd pairs of pharyngeal arches invade the facial prominences and give rise to the muscles of mastication and muscles of facial expression respectively



Besides the fleshy derivatives, the facial prominences also give rise to bones of the facial skeleton

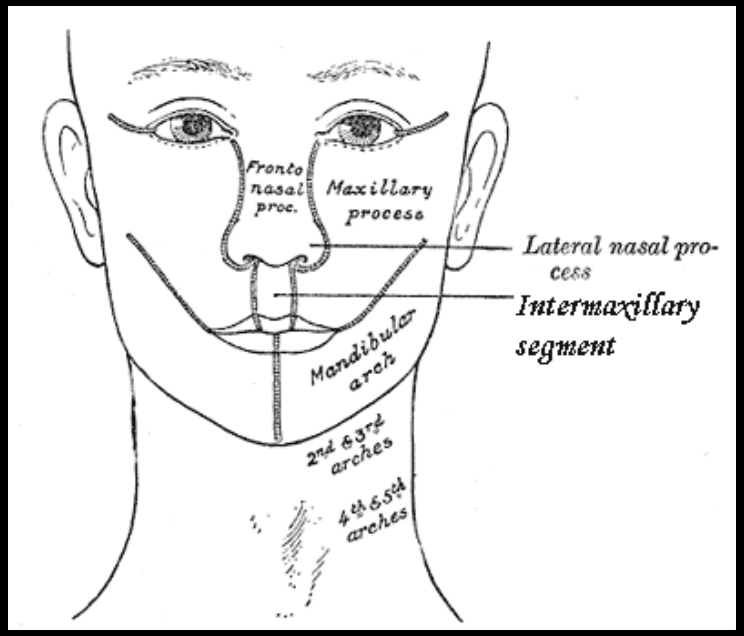
Derivatives of Facial Components

- The frontonasal prominence forms the:
  - Forehead and the bridge of the nose
  - Frontal and nasal bones



- The maxillary prominences form the:
  - Upper cheek regions and most of the upper lip
  - Maxilla, zygomatic bone, secondary palate

- The mandibular prominences fuse and form the:
  - Chin, lower lip, and lower cheek regions
  - Mandible



- The lateral nasal prominences form the alae of the nose

- The medial nasal prominences fuse and form the intermaxillary segment


Thank
You!