DEVELOPMENT OF PALATE AND TONGUE

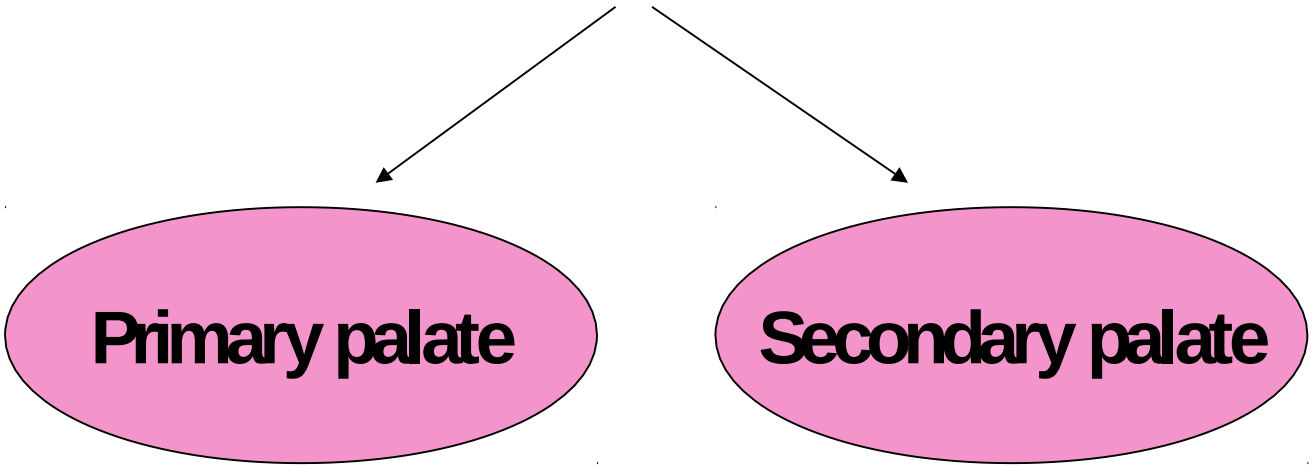
DR SHAHAB

- Central face begins to develop by 4^{th} week, when olfactory placodes appear on both sides of the frontonasal process.
- Gradually both placodes develop to form the median and lateral nasal process.
- Upper lip is formed by 6^{th} week by fusion of two median nasal processes in midline and the maxilllary process of the 1^{st} branchial arch.

PRE-NATAL GROWTH AND DEVELOPMENT OF PALATE

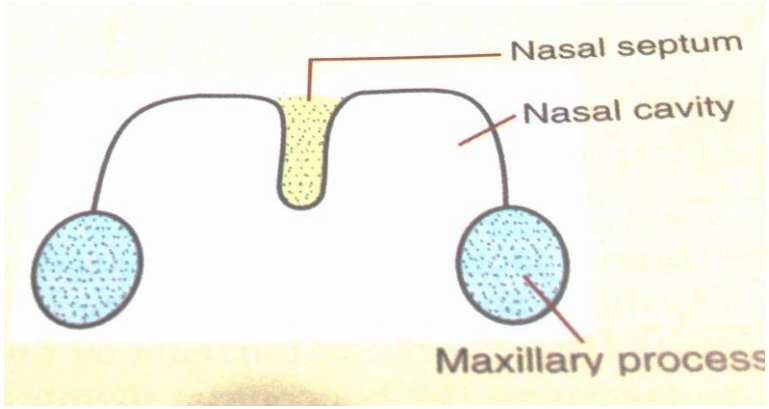
- Formation of primary and secondary palate
- Elevation of palatal shelves
- Fusion of palatal shelves

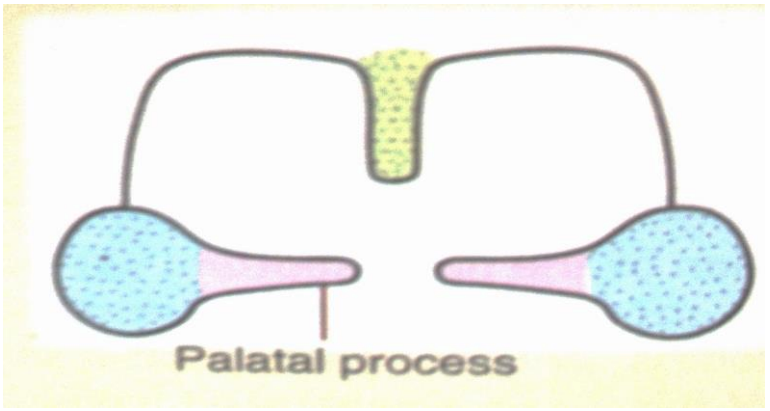
STRUCTURE OF PALATE



PALATE FORMATION

From each maxillary process 2 plate- like shelf grow medially called palatal process.

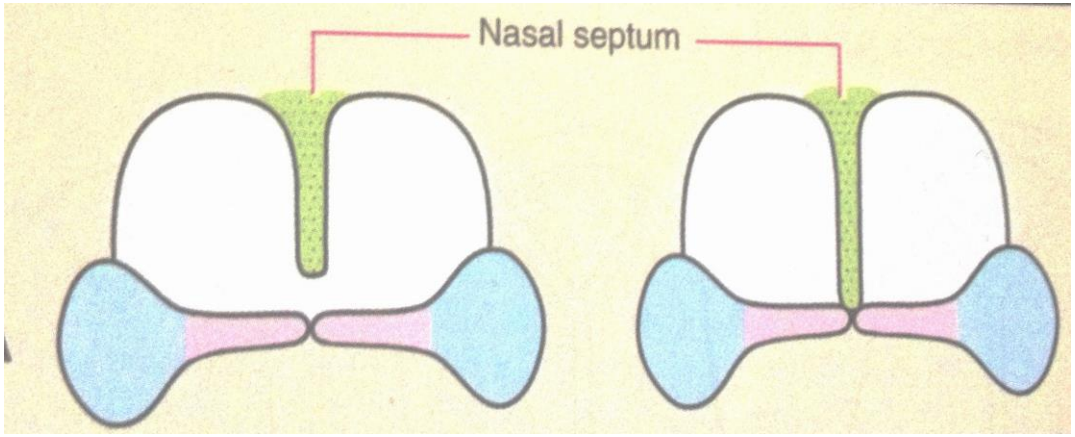




3 components contribute to the palate formation

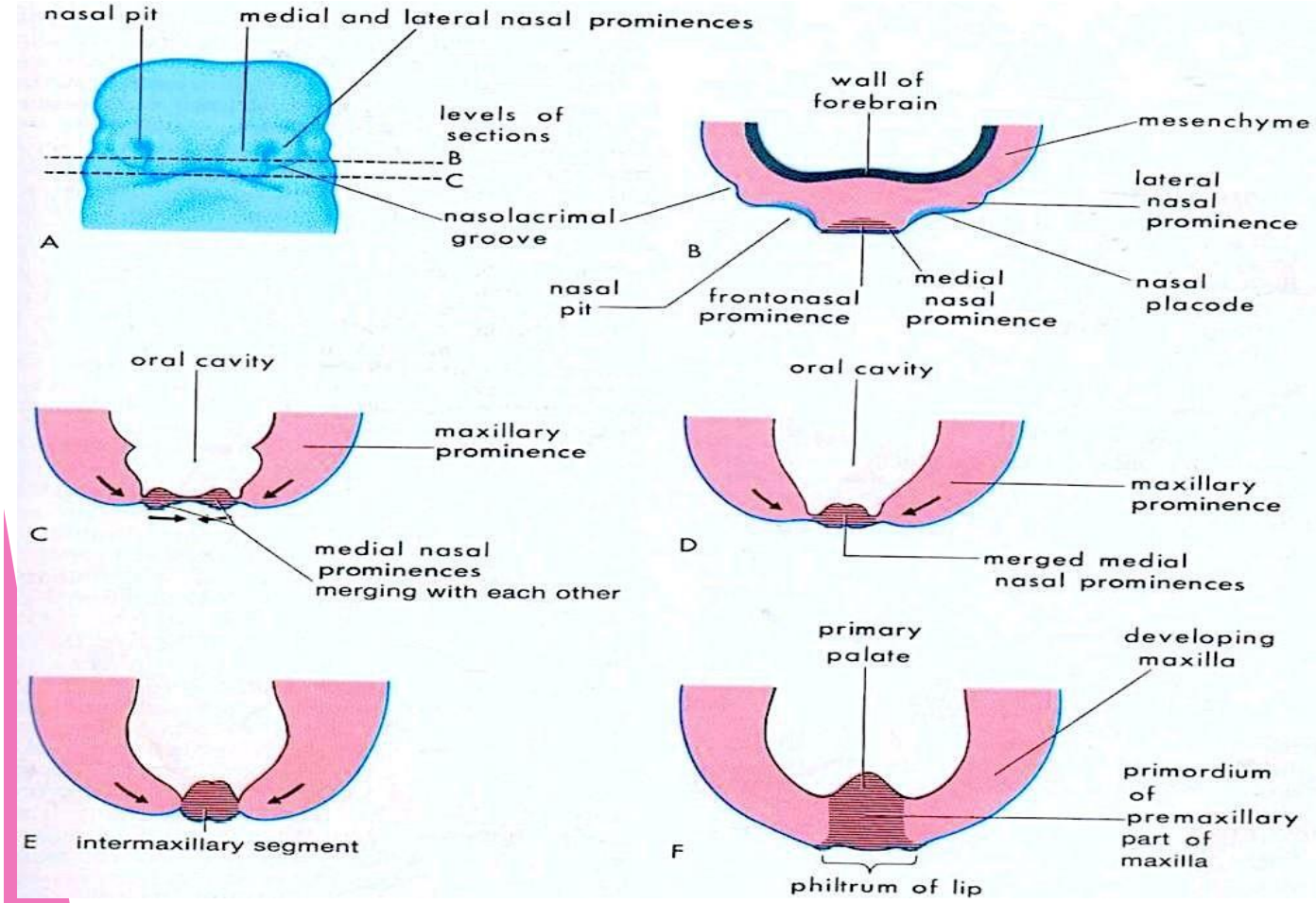
- 2 palatal process
- primitive palate from the frontonasal process

Definitive palate is formed by fusion of these 3 parts.



PRIMARY PALATE

Frontonasal process → **Medial nasal**

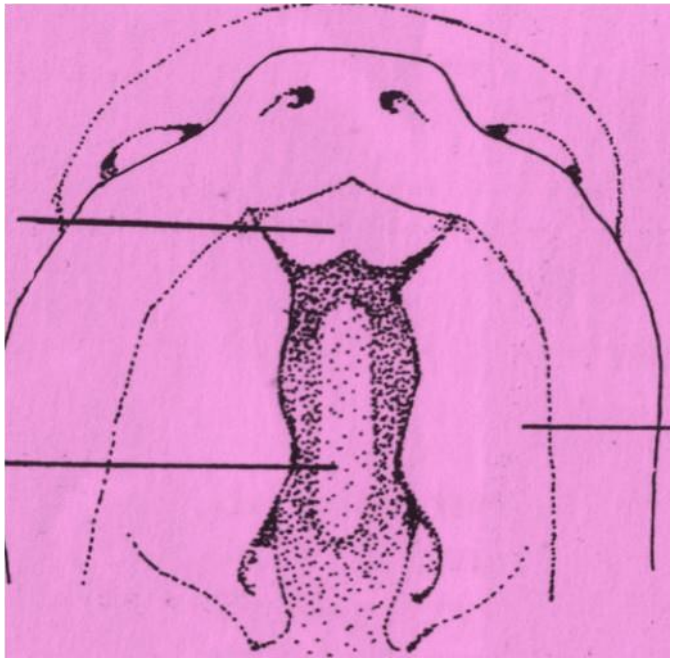


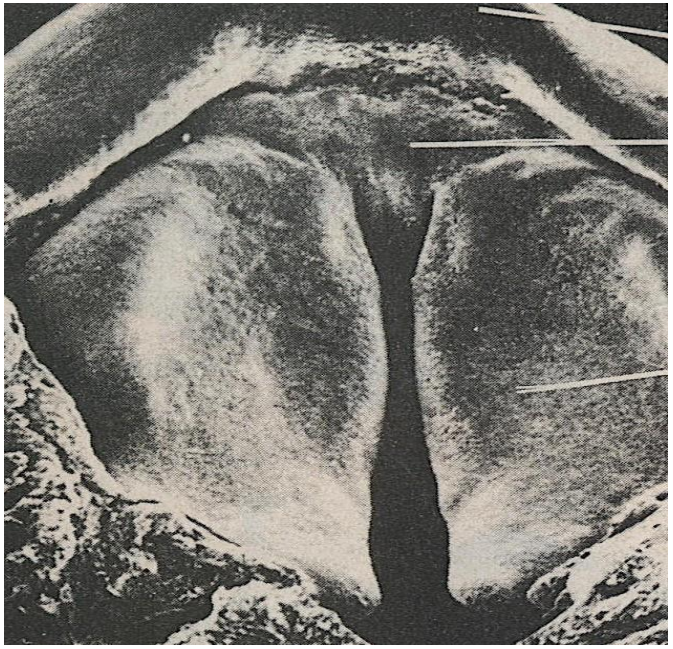
Mesenchyme

Wedge shaped mass between internal surface of maxillary prominence

Primary palate ← **Pre-maxilla**

PRIMARY PALATE





Secondary palate

Maxillary prominence

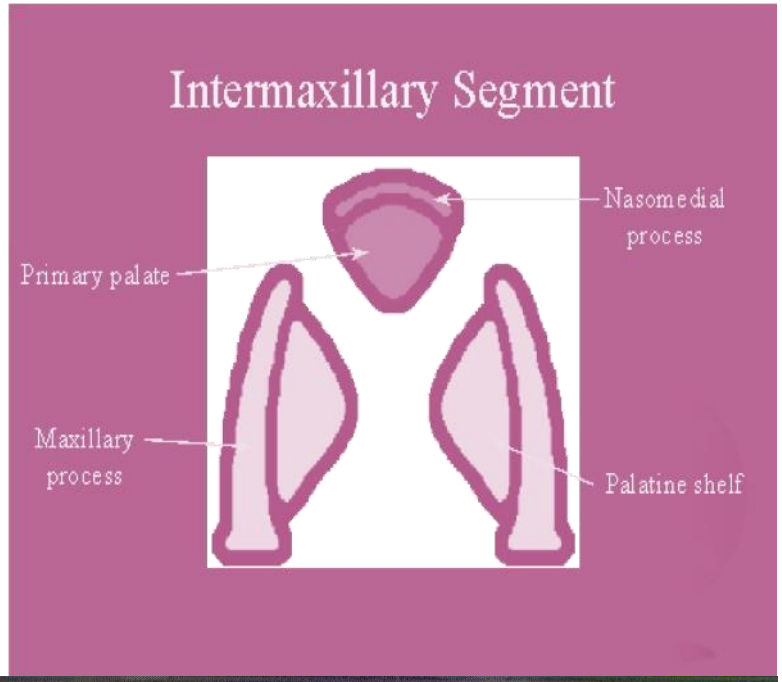
2 horizontal mesenchymal projections

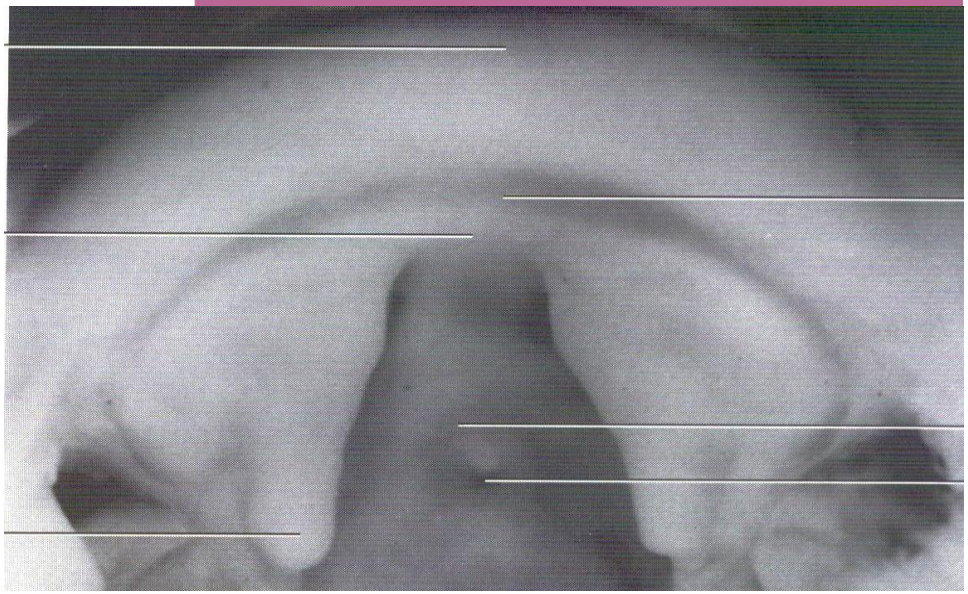
Lateral palatine process

Fuse-

- **With each other**
- **Primary palate**
- **Nasal septum**

Secondary palate





ELEVATION OF PALATAL SHELVES

At 6 weeks

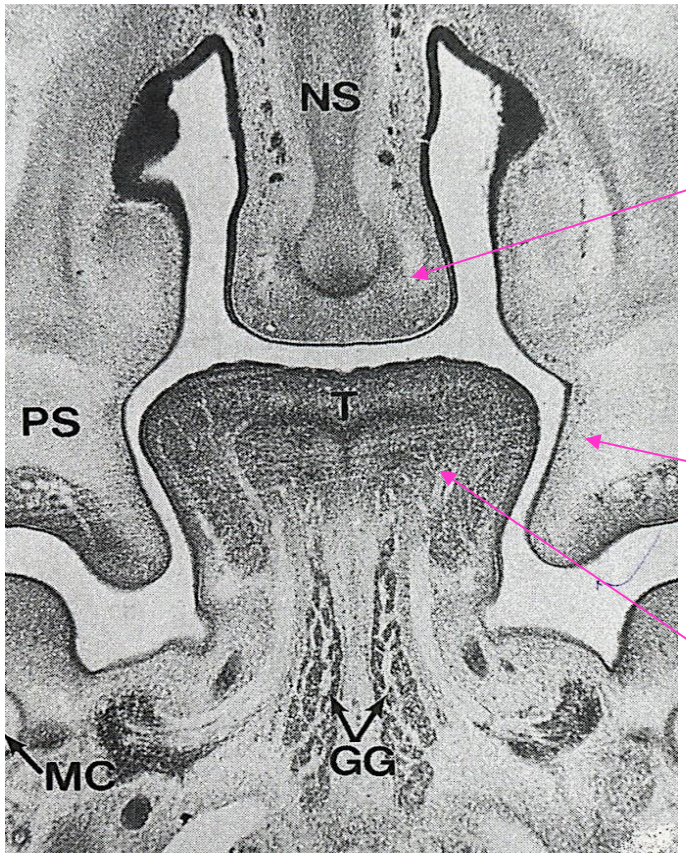
- Tongue (undifferentiated tissue)

  pushes dorsally

- Palatal shelves become vertical
- Elevation occurs from vertical to horizontal position

ELEVATION OF PALATE

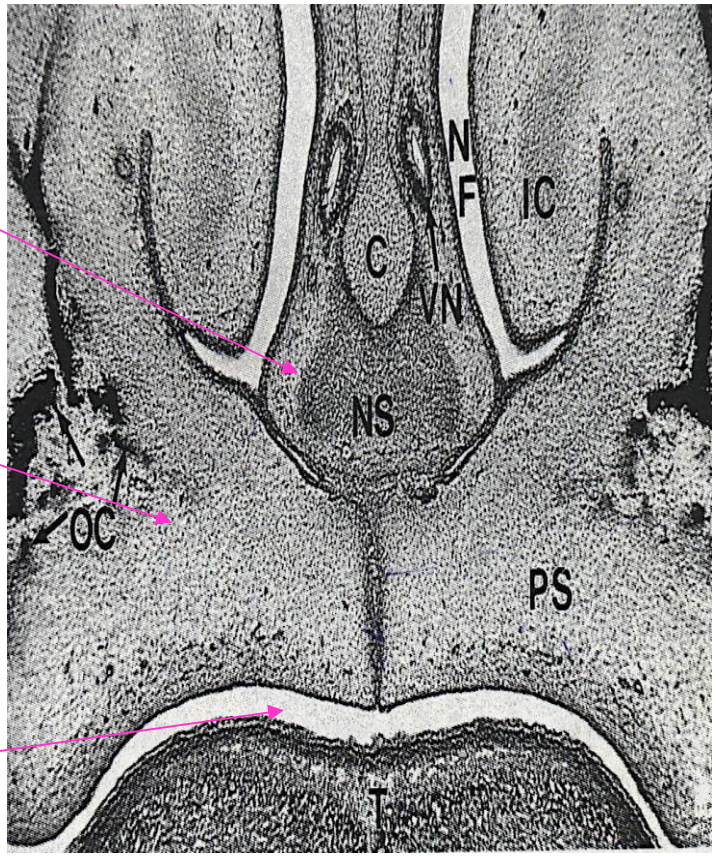
HISTOLOGICAL SECTION



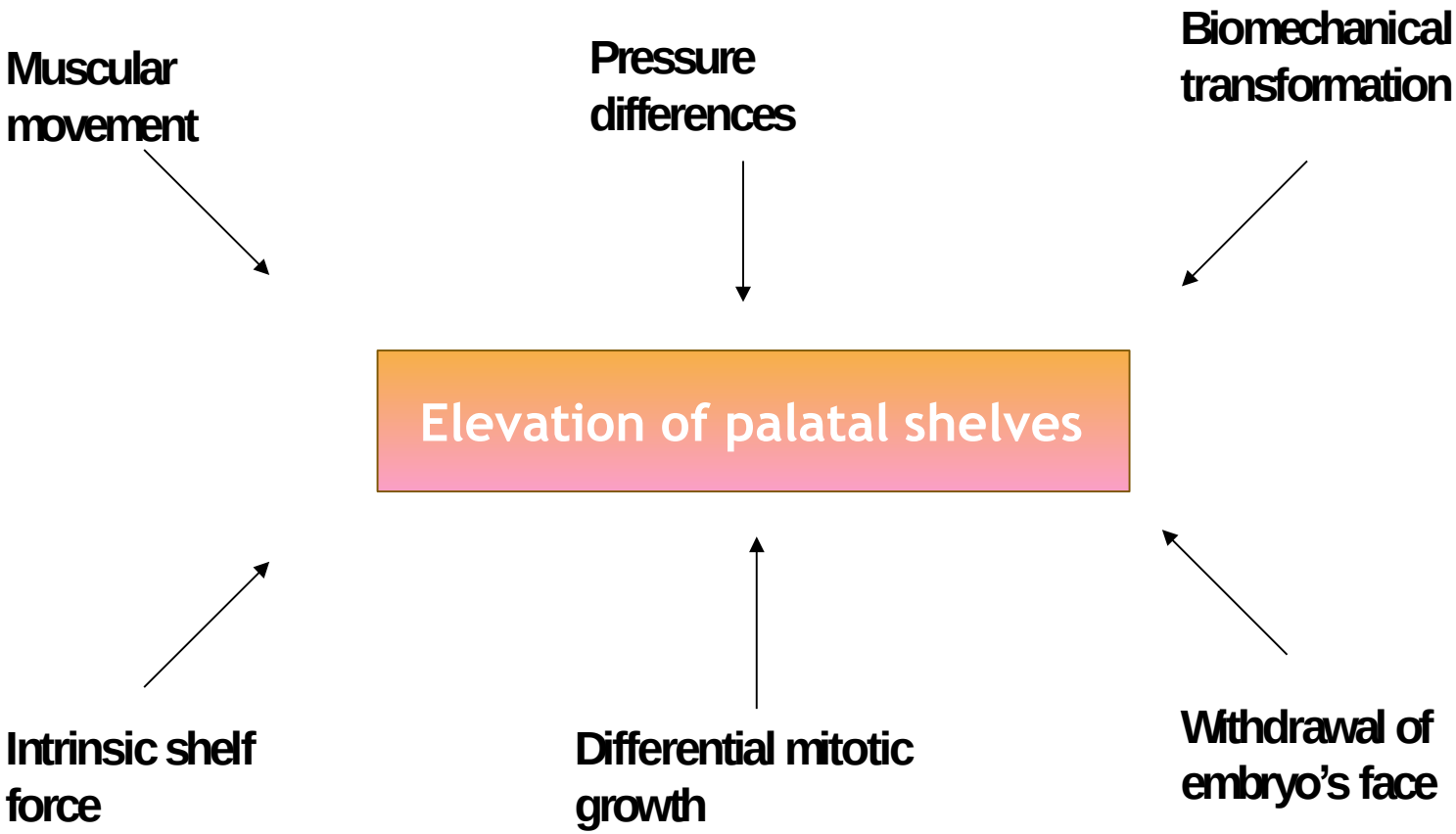
Nasal septum

Palatal shelves

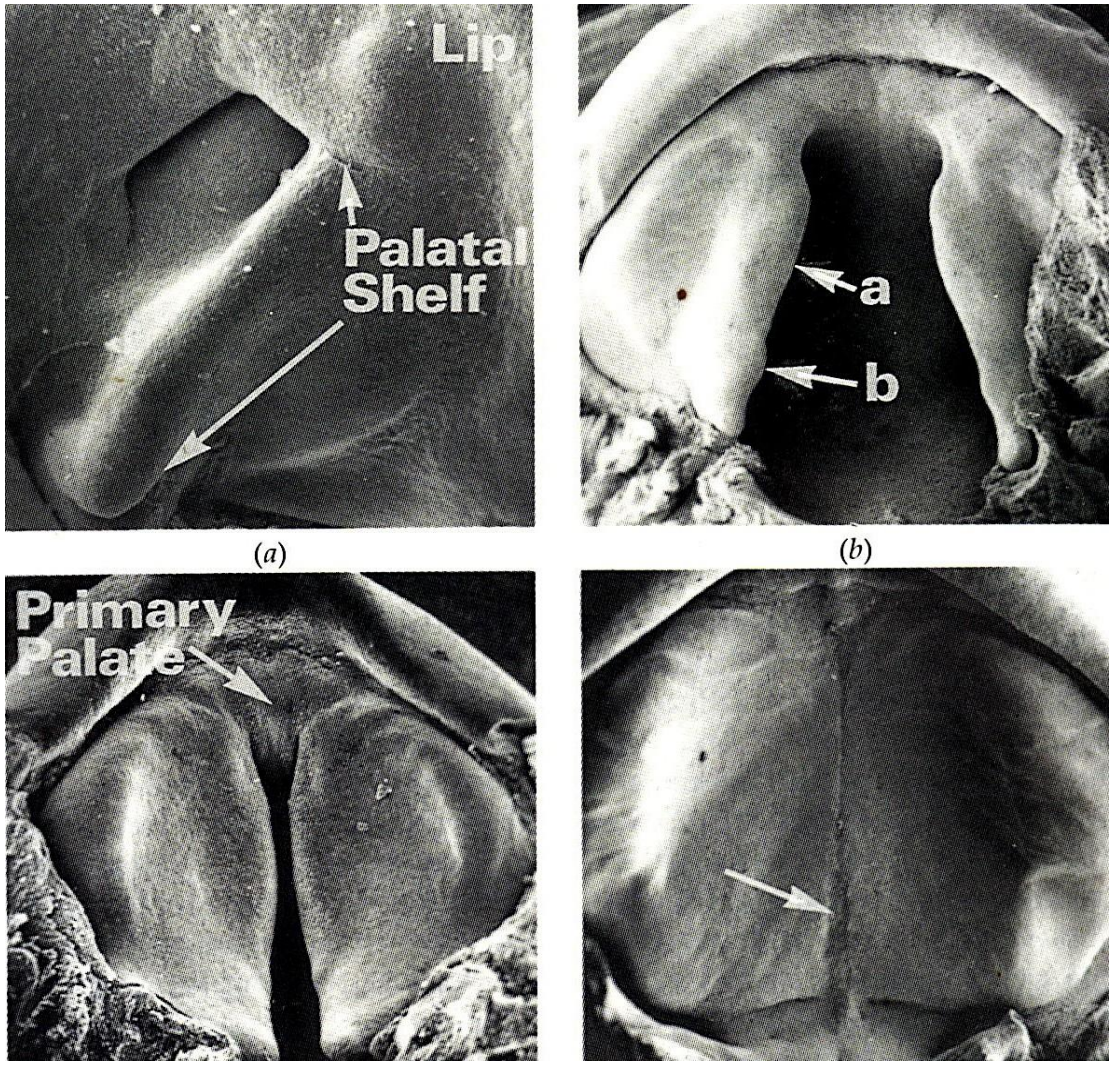
tongue



- At 8 weeks


Muscular movement
Pressure differences
Biomechanical transformation
Elevation of palatal shelves
Intrinsic shelf force
Differential mitotic growth
Withdrawal of embryo's face

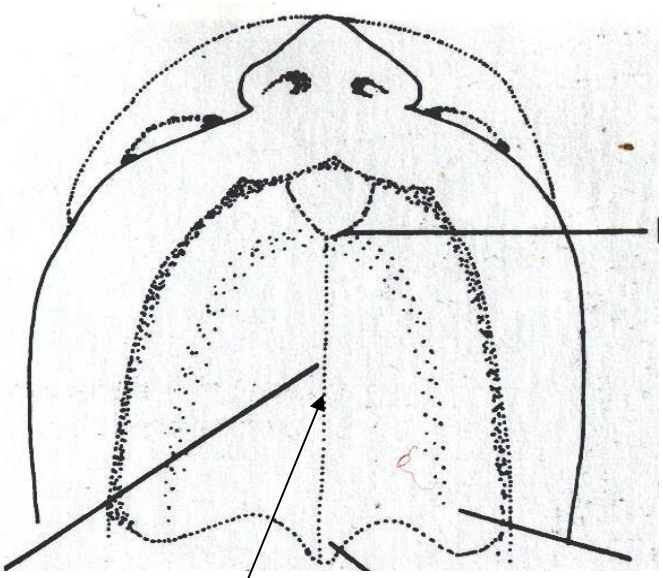
FUSION OF PALATAL SHELVES



Entire palate does not fuse at the same time

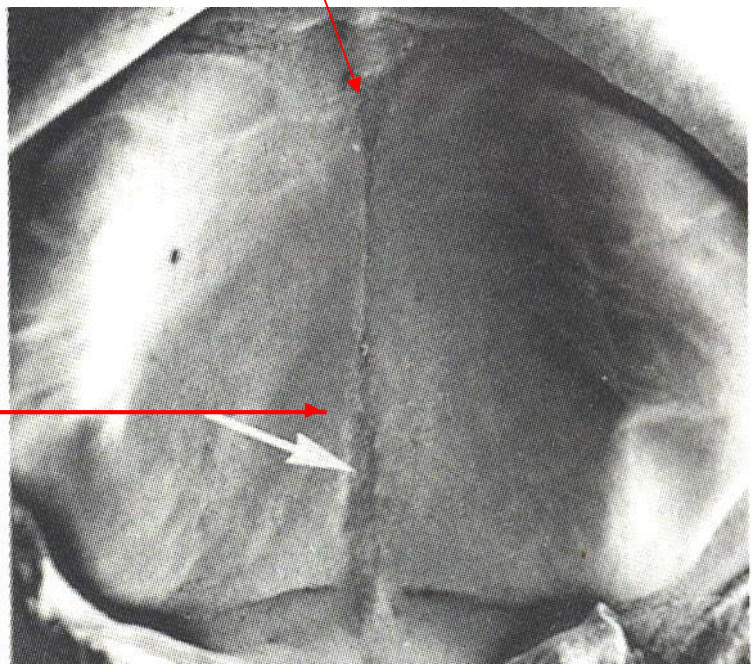
Initially contact occur In the central region of 2ndary palate post. to premaxilla.

Extended anteriorly and posteriorly



Incisive foramen

Mid palatine raphe

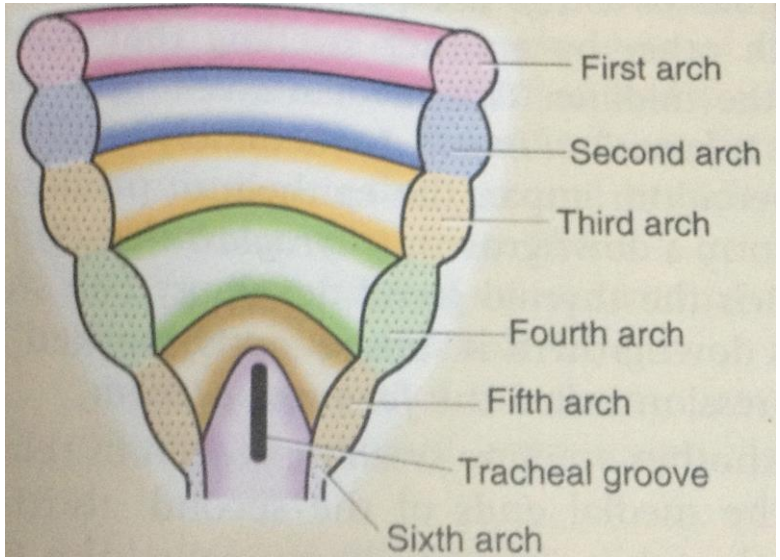


TONGUE

- Largest single muscular organ inside the oral cavity.
- Originates from the muscle of occipital myotomes.
- Innervates by 5^{th},7^{th},9^{th}&10^{th} cranial nerves.

PARTS OF THE TONGUE

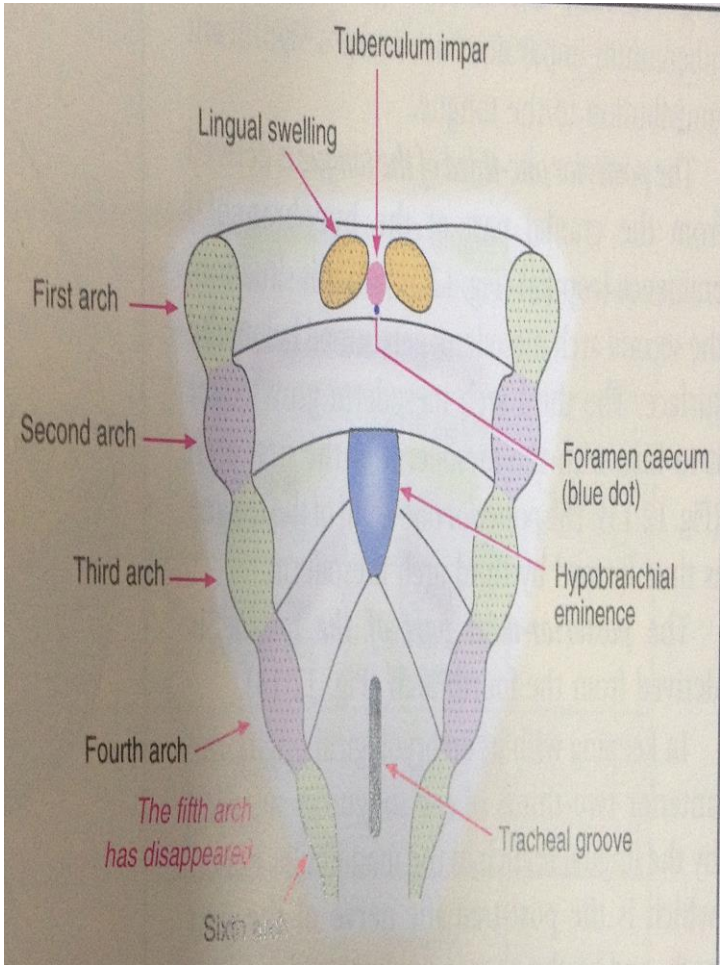
- The first pharyngeal arch forms the anterior(movable) body of the tongue
- The second & third arches form the posterior (immovable)
- Body & base.



- Tissues of the tongue has 3 parts:

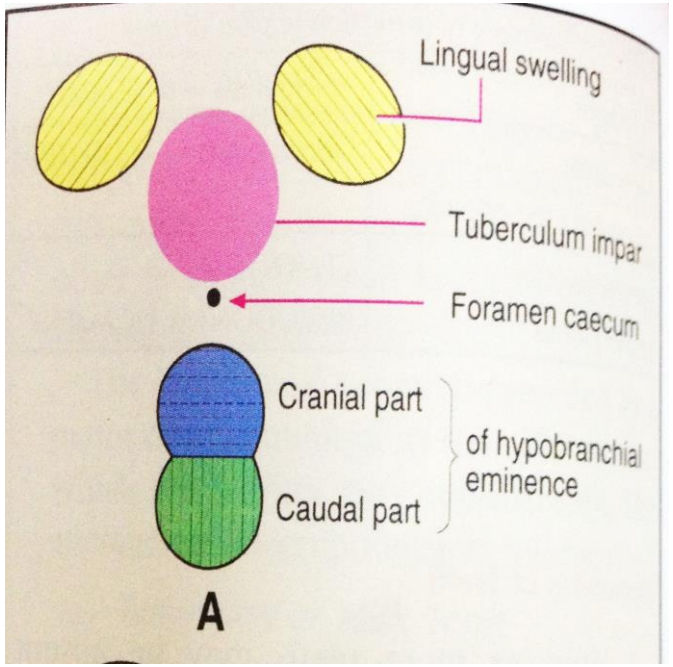
- Two lateral lingual swellings
- The central tuberculum impar.

- A large midline swelling arises from medial ends of 2nd,3rd& 4th arches called hypobranchial eminences.

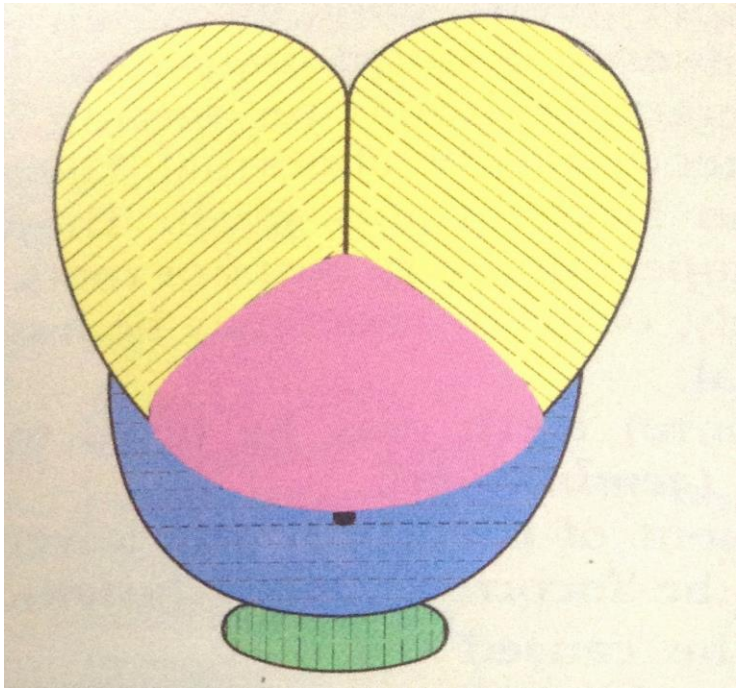


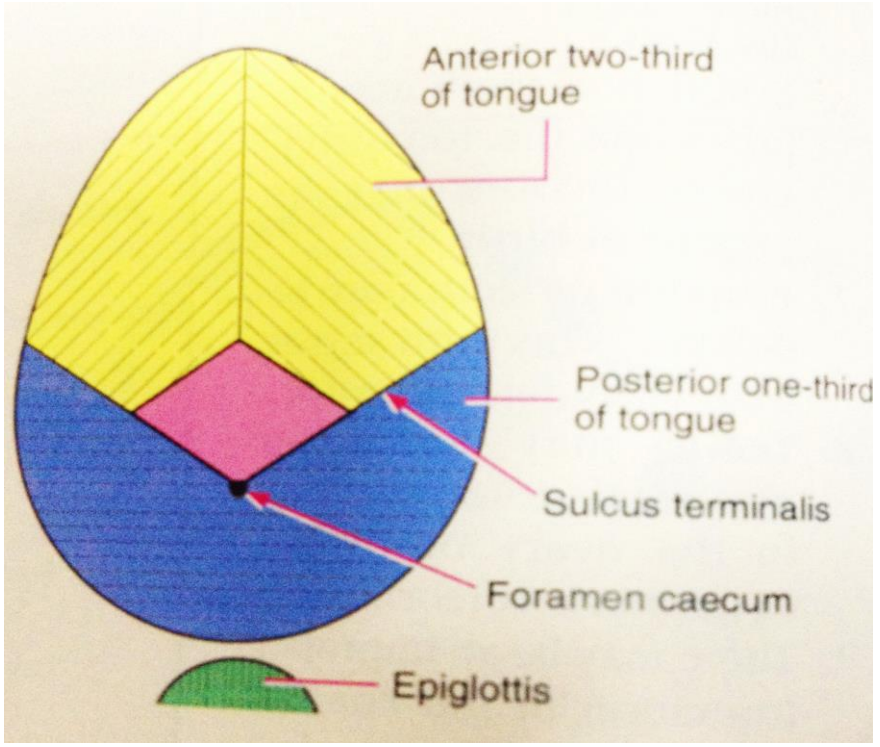
The eminence soon subdivide into:

- Cranial part (2nd & 3rd arch)
- Caudal part (4th arch)



- The anteroior two-third of the tongue is formed by fusion of the two lingual swellings the tuberculum impar
- The posterior one-third of the tongue is formed from cranial part of hypobrachial eminence.
- The posterior-most part from the caudal part





Formation of Posterior third of Tongue

- Pharyngeal mesenchyme forms the connective tissue and vasculature of the tongue
- Most of the tongue muscles are derived from myoblasts that migrate from the occipital myotomes
- The hypoglossal nerve (CN XII) accompanies the myoblast during their migration and innervates the tongue muscles as they develop
- The entire tongue is within the mouth at birth, its posterior third descends into the oropharynx by 4 years of age

Papillae and Taste Buds

- Lingual papillae appear towards the end of the eighth week
- The vallate and foliate papillae appear first, close to the terminal branches of the glossopharyngeal nerve (CN *IX*)
- The fungiform papillae appear later near termination of chorda tympani branch of the facial nerve

Developmental disturbances of tongue

- Microglossia
- Macroglossia
- Ankyloglossia
- Cleft tongue
- Fissured tongue

Microglossia

- It is a rare congenital anomaly manifested by the presence of Rudimentary or small tongue
- The condition when tongue being completely absent is known as aglossia
- Patient finds difficulties in eating and swallowing

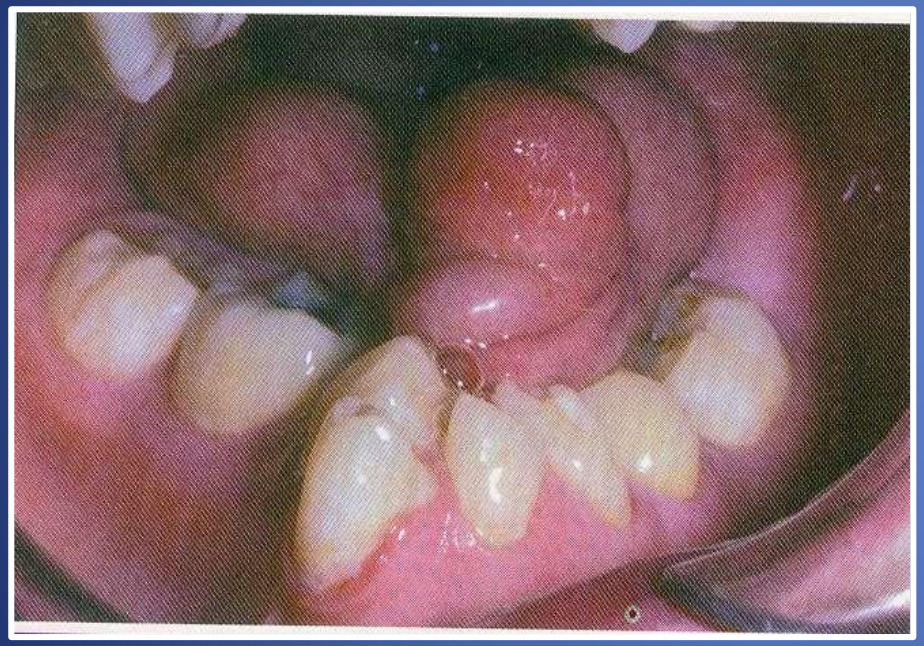
CLASSIFICATION

I. True Microglossia
II. Relative Microglossia

TREATMENT

I. Orthognathic correction
II. Speech & language development

Microglossia

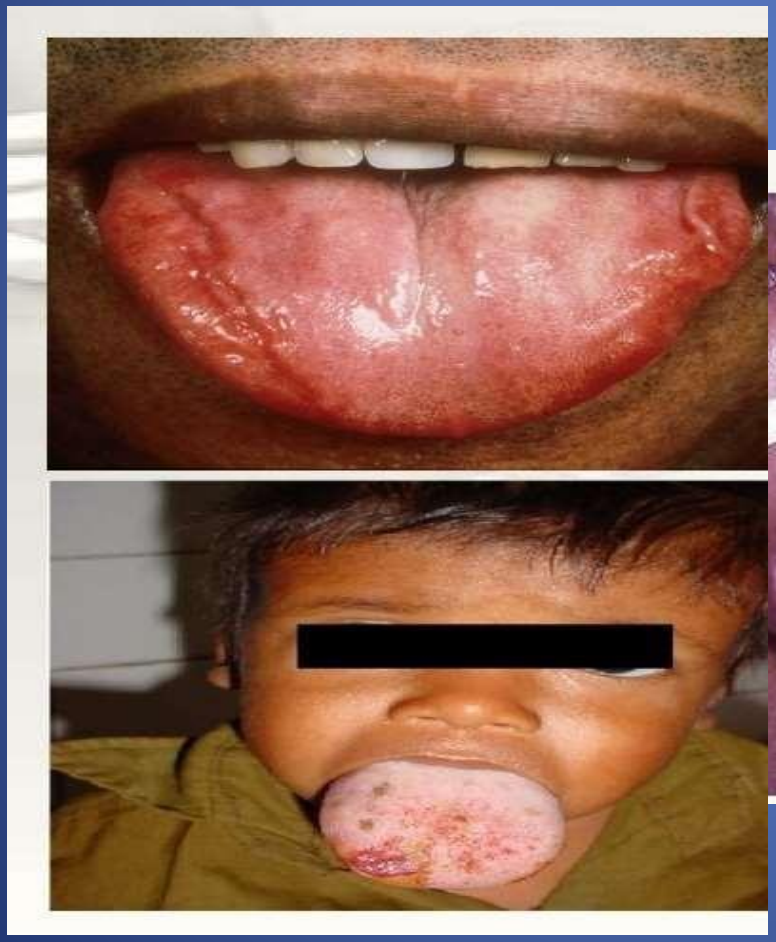


Macroglossia

- It is a condition when patient have an enlarged tongue
- May be congenital or acquired

ETIOLOGY FOR CONGENITAL MACROGLOSSIA

- Congenital Macroglossia is due to an over development of the musculature
- Down syndrome
- Beckwith-Wiedemann syndrome



Clinical features

- Noisy breathing
- Difficulty with chewing/swallowing
- Drooling
- Slurred speech
- Widened interdental space
- Scalloping/crenations
- Open bite/mandibular prognathism
- Dry/cracked tongue

Treatment

- Surgical reduction or trimming may be required when Macroglossia disturbs the oropharyngeal function

Ankyloglossia

- It can be defined as a developmental condition characterized by fixation of tongue to the floor of the mouth, causing restricted movement

- It can be either complete Ankyloglossia or partial Ankyloglossia (tongue tie)

Partial Ankyloglossia occurs as a result of short lingual frenum or due to a frenum which attaches too near to the tip of the tongue

Complete Ankyloglossia occurs as a result of fusion between the tongue and the floor of the mouth

CLINICAL FEATURES

- speech disorders
- deformities in dental occlusion
- Difficulties in swallowing

TREATMENT

- Partial Ankyloglossia are self corrective
- Complete Ankyloglossia can be surgically treated by frenulectomy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Cleft tongue

- A complete cleft tongue occurs due to lack of merging of lateral lingual swellings of this organ
- partially cleft tongue occurs more common and is manifested as deep groove in the midline of dorsal surface
- Partial cleft tongue occurs due to incomplete merging and failure of groove obliteration by underlying mesenchymal proliferation
- food debris and microorganisms collect in base of cleft and cause irritation

Fissured tongue

- Its a malformation manifested clinically by numerous small grooves on dorsal surface radiation out from central groove along the midline of tongue

ETIOLOGY

- It also occurs as a sequel to geographic tongue
- Hereditary factors

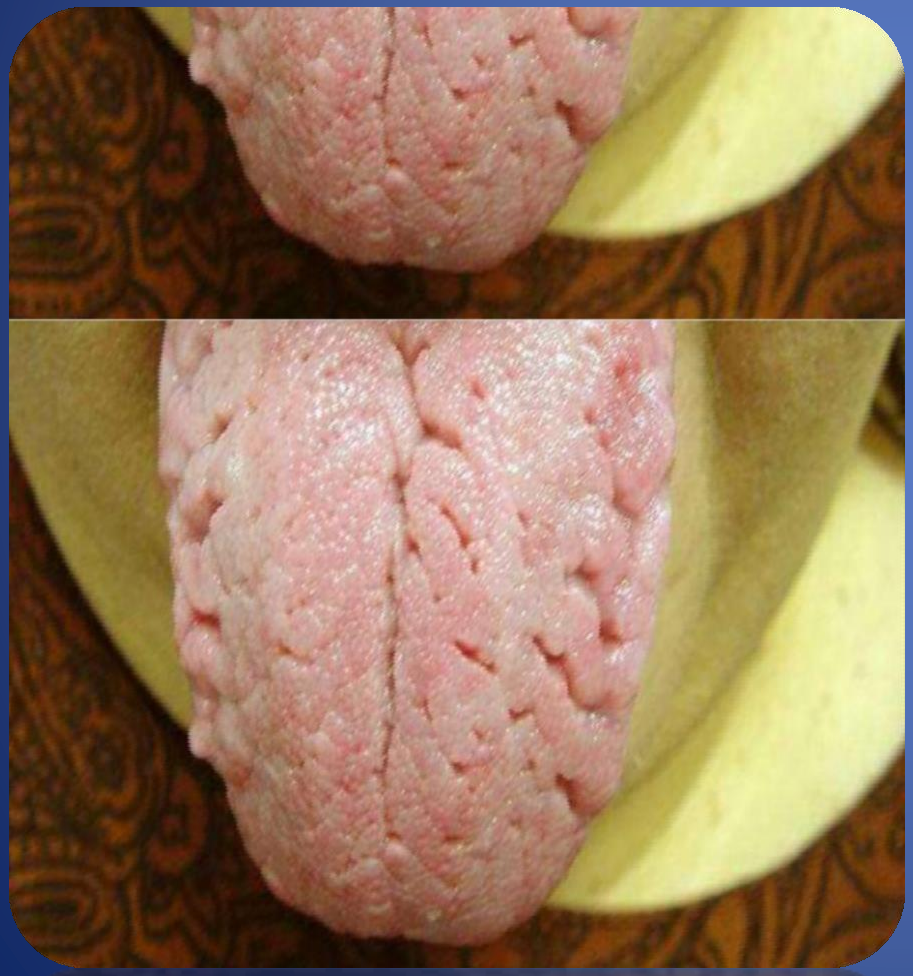
Clinical features

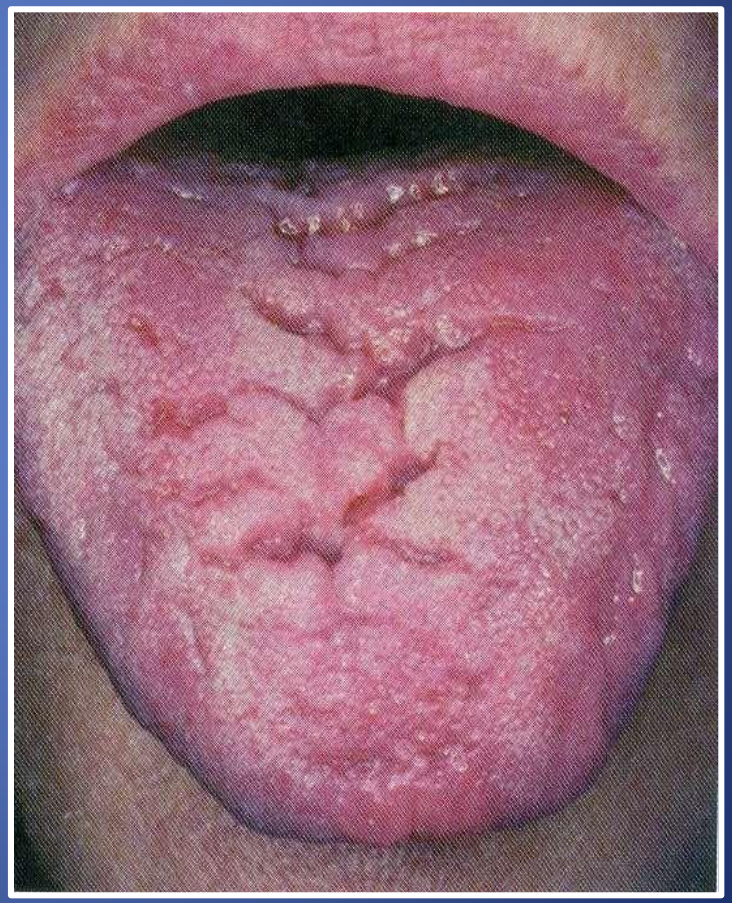
- Grooves / furrows – 2-6mm
- Asymptomatic / mild burning sensation rarely
- Melkerson Rosenthal syndrome

  Chelitis granulomatosa, facial paralysis, scrotal tongue

- The lesions are usually asymptomatic unless debris is entrapped within the fissure and causes irritation

- Fissured tongue affects the dorsum surface and often extends to the lateral borders of the tongue and form lobules





Thank you