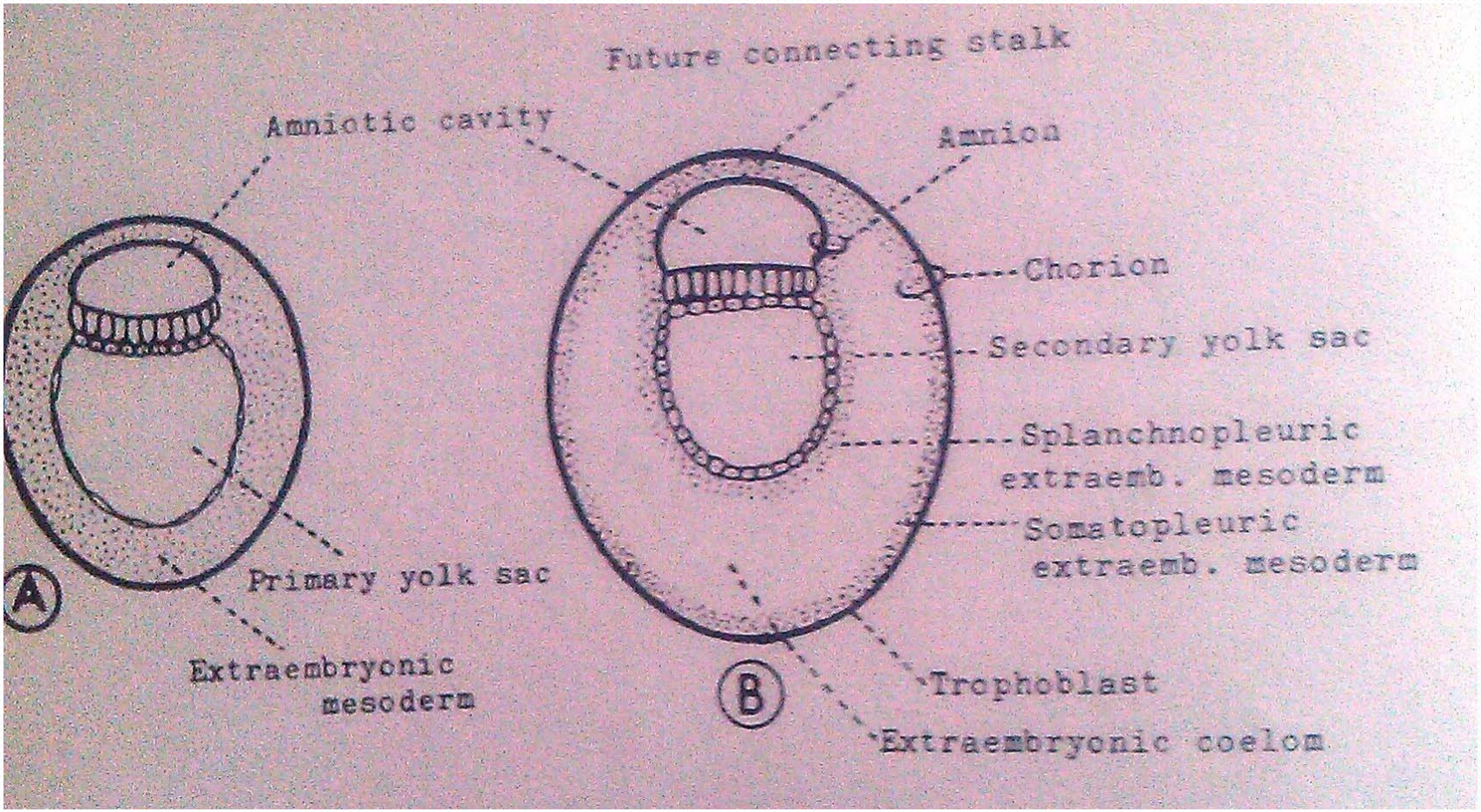
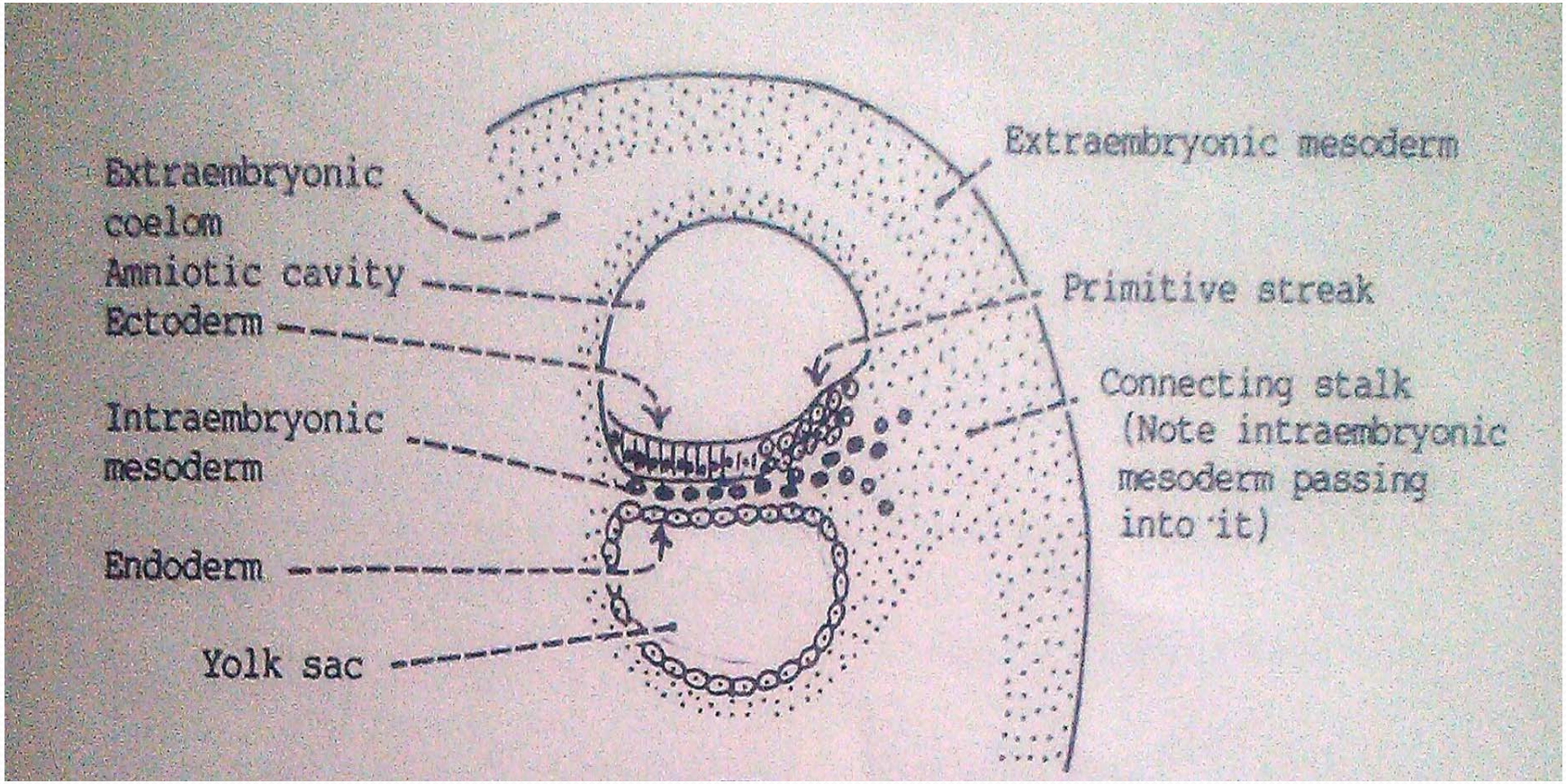
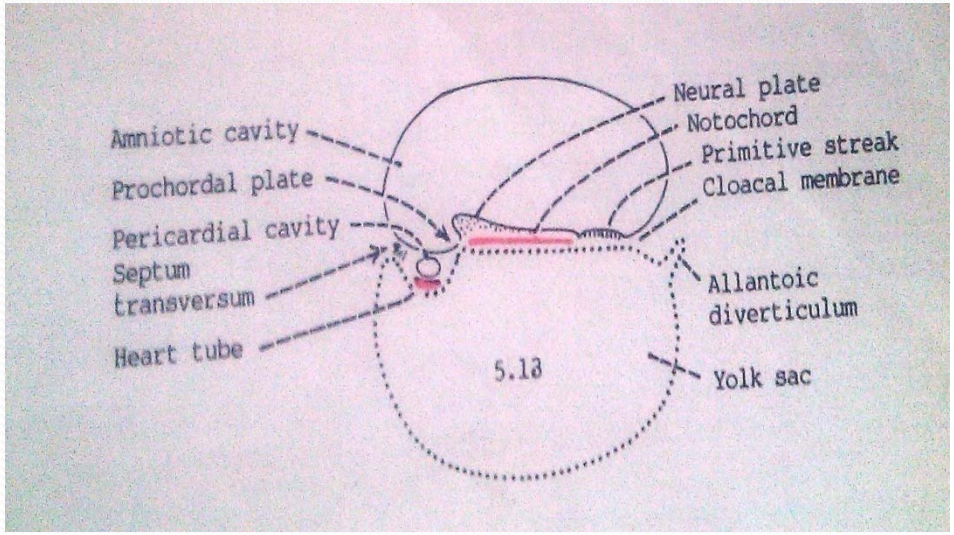
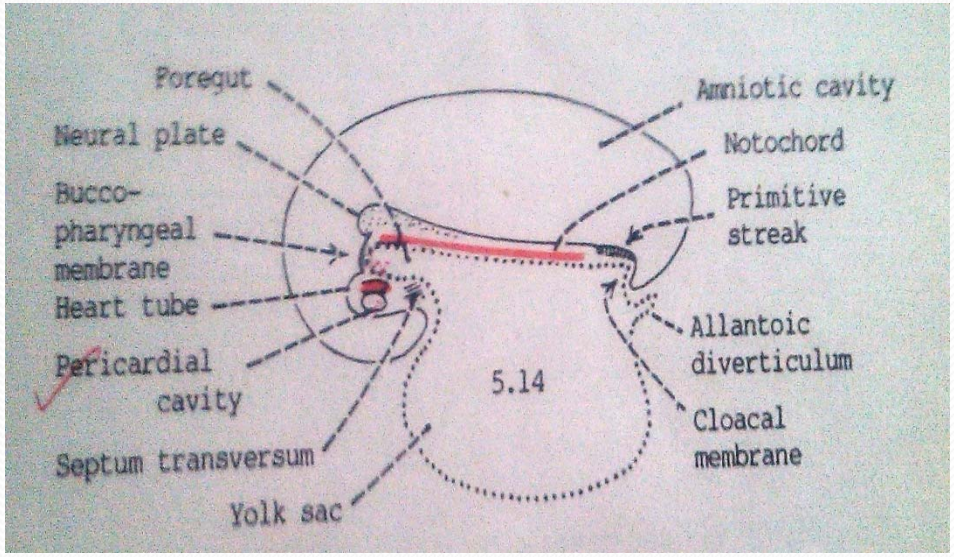
Embryological development of face

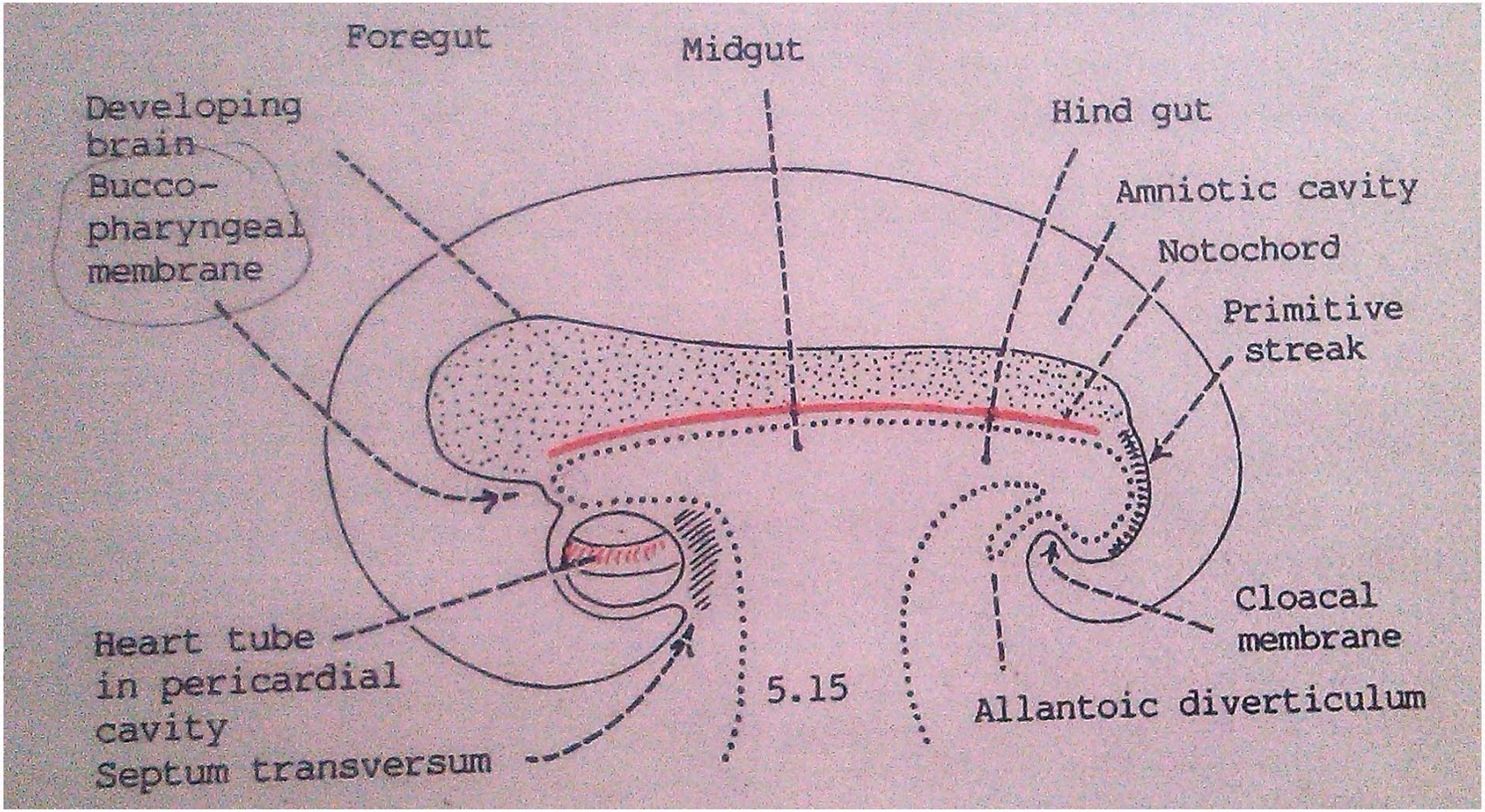
Formation of germ layers

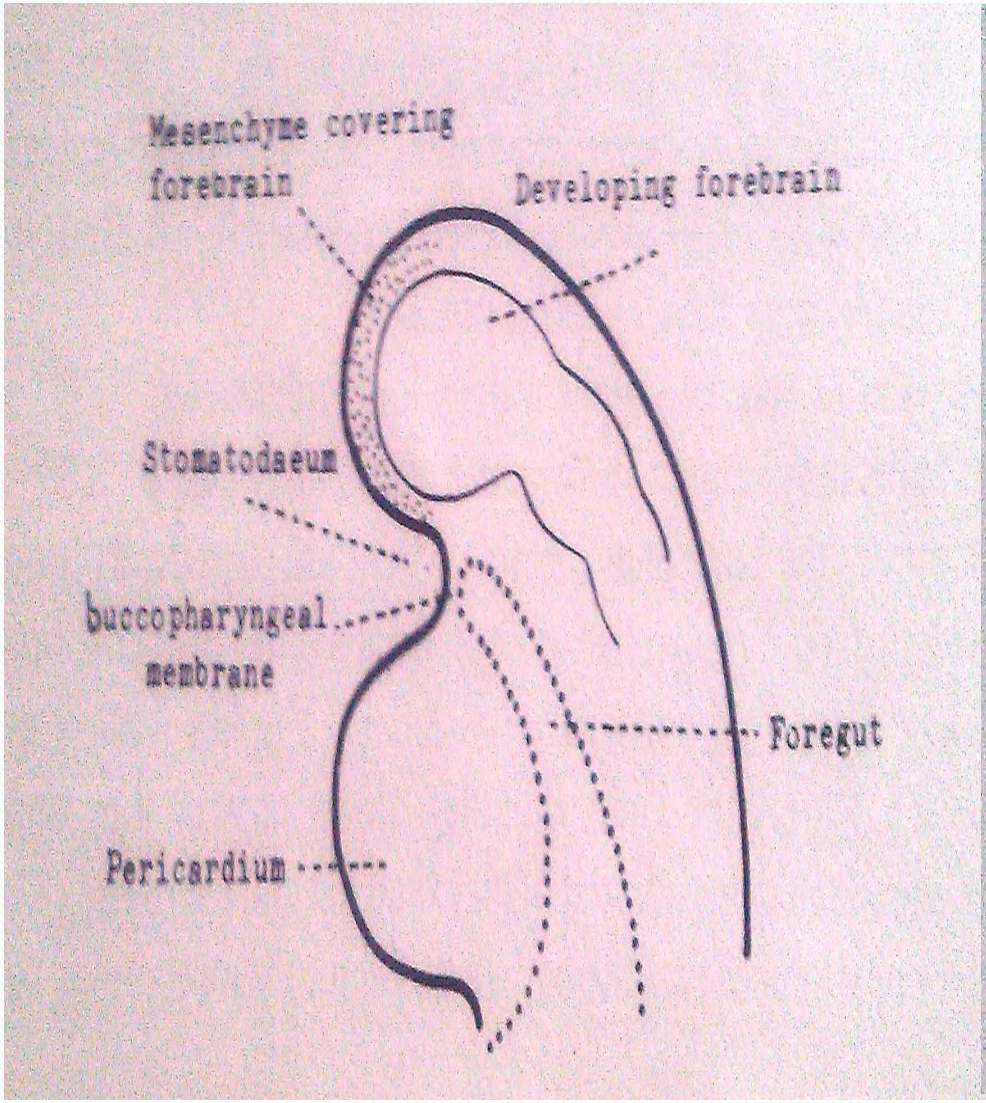


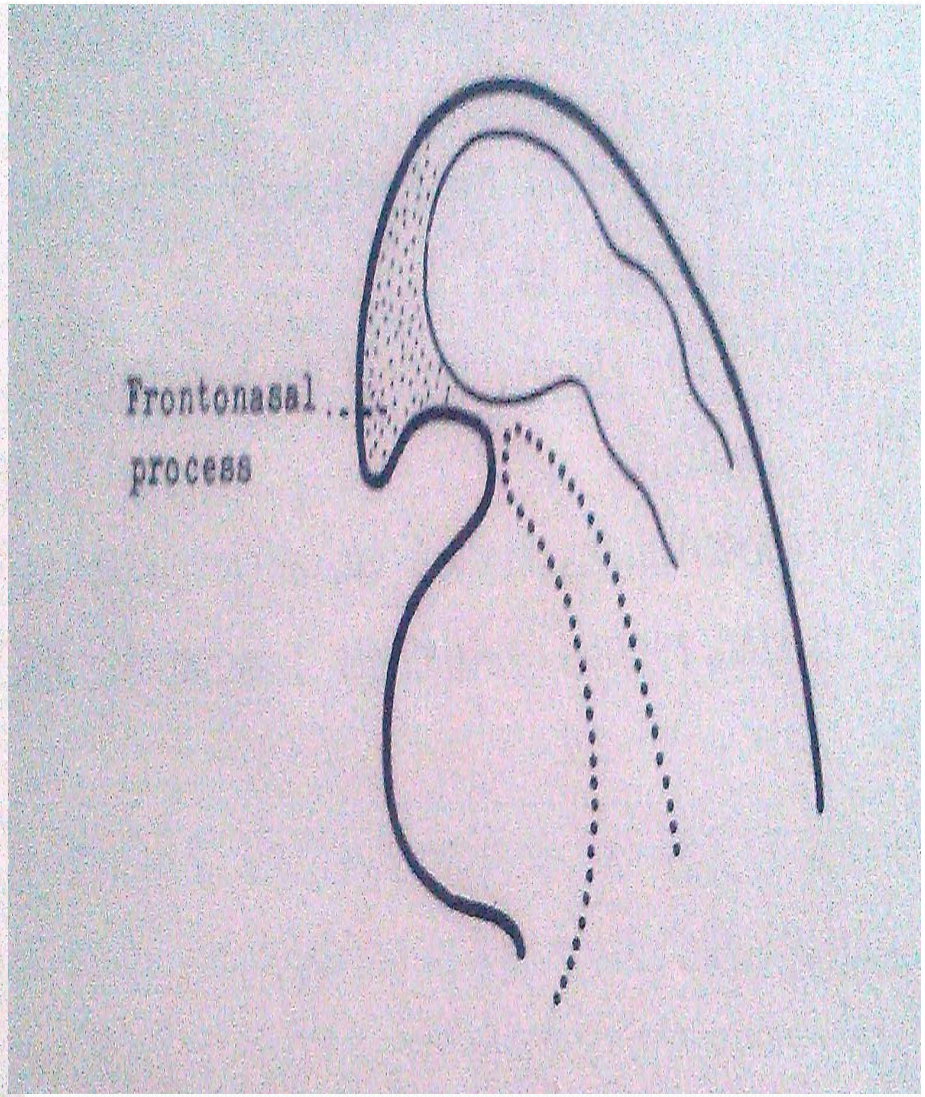

Extraembryonic mesoderm
Extraembryonic coelom
Amniotic cavity
Primitive streak
Ectoderm
Connecting stalk (Note intraembryonic mesoderm passing into it)
Intraembryonic mesoderm
Endoderm
Yolk sac

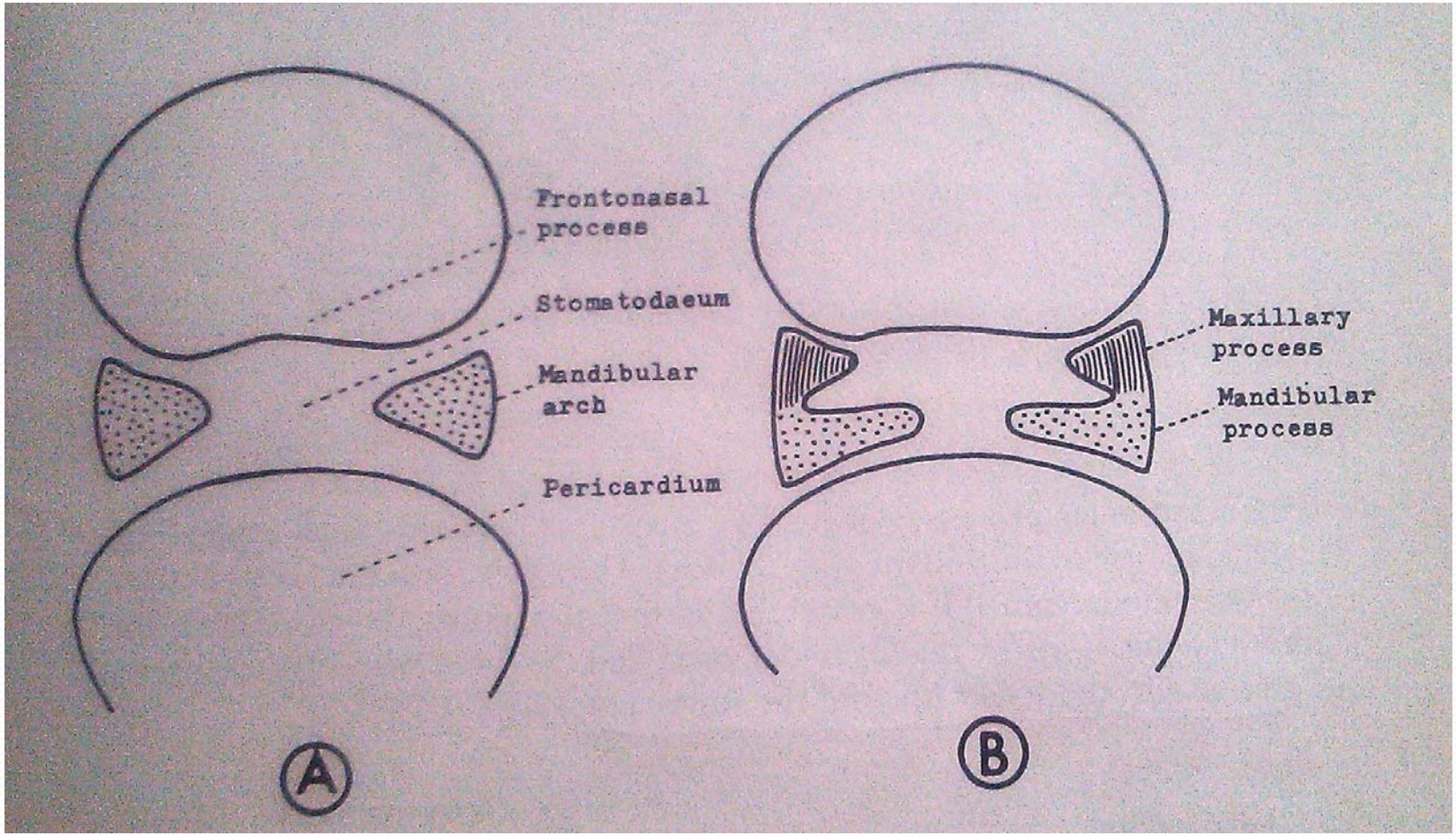

Amniotic cavity
Prochordal plate
Pericardial cavity
Septum transversum
Heart tube
Neural plate
Notochord
Primitive streak
Cloacal membrane
Allantoic diverticulum
Yolk sac
5.13

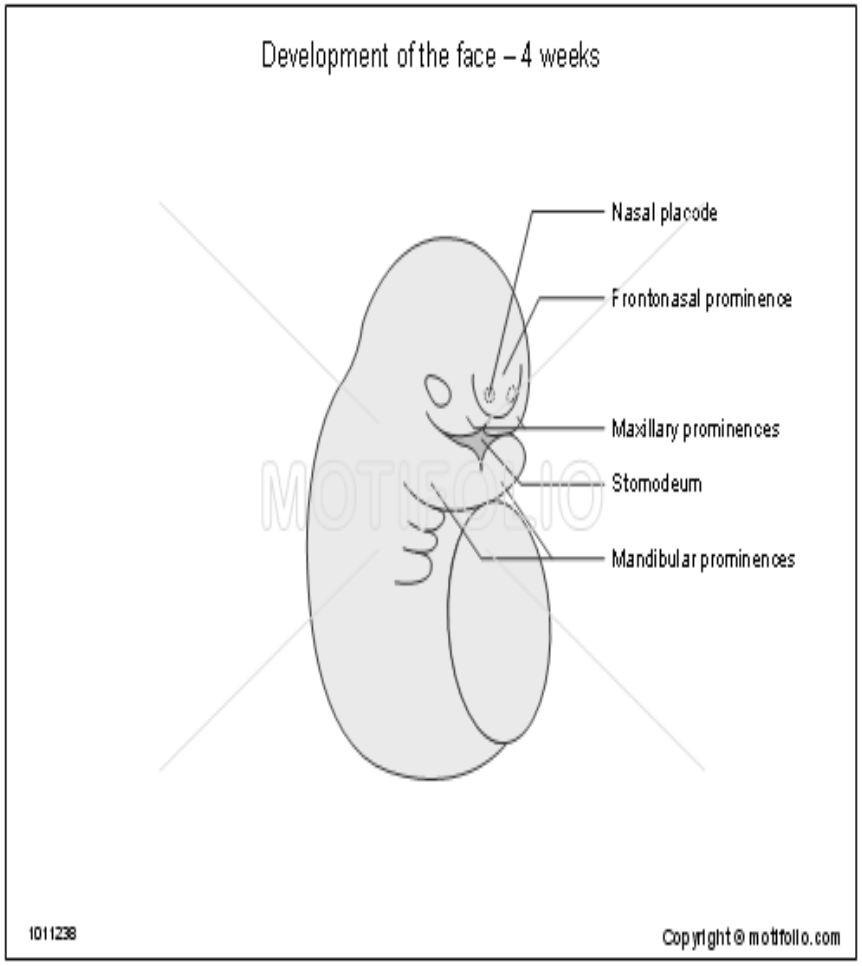

Foregut
Neural plate
Bucco-pharyngeal membrane
Heart tube
Pericardial cavity
Septum transversum
Yolk sac
Amniotic cavity
Notochord
Primitive streak
Allantoic diverticulum
Cloacal membrane
5.14

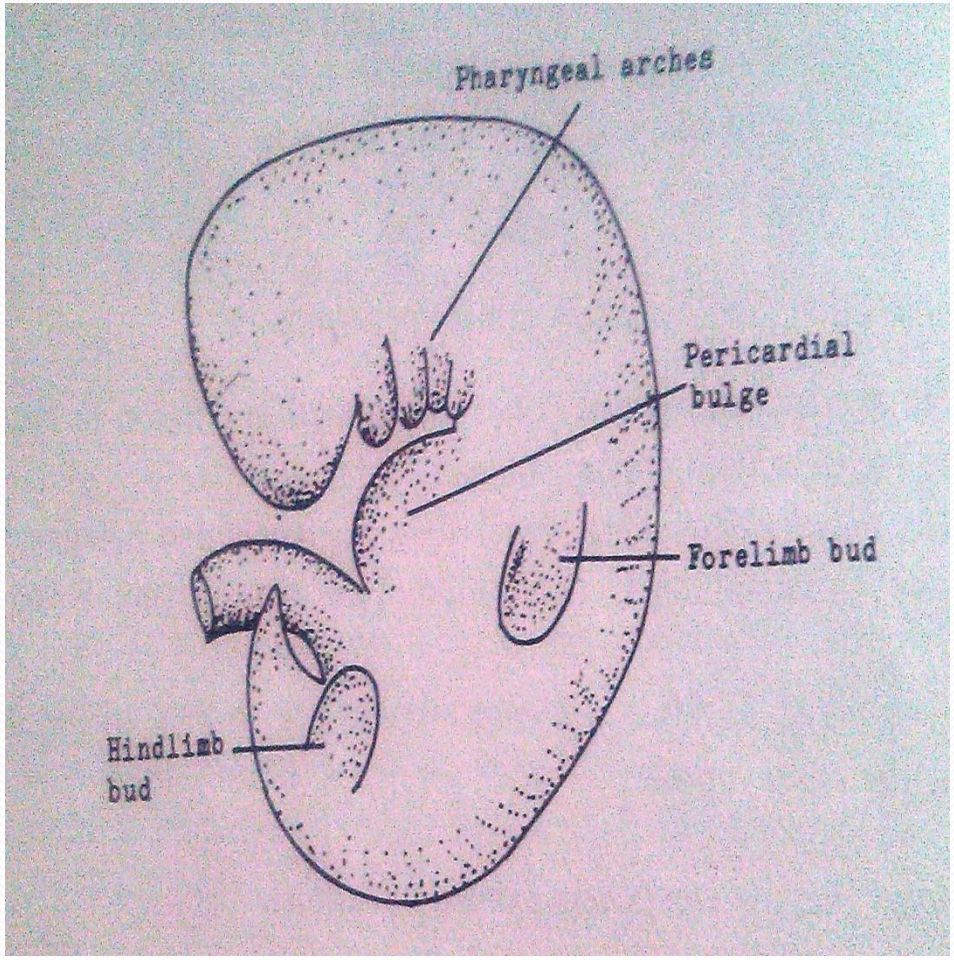

Foregut
Midgut
Hind gut
Developing brain
Bucco-pharyngeal membrane
Amniotic cavity
Notochord
Primitive streak
Cloacal membrane
Heart tube in pericardial cavity
Septum transversum
5.15
Allantoic diverticulum

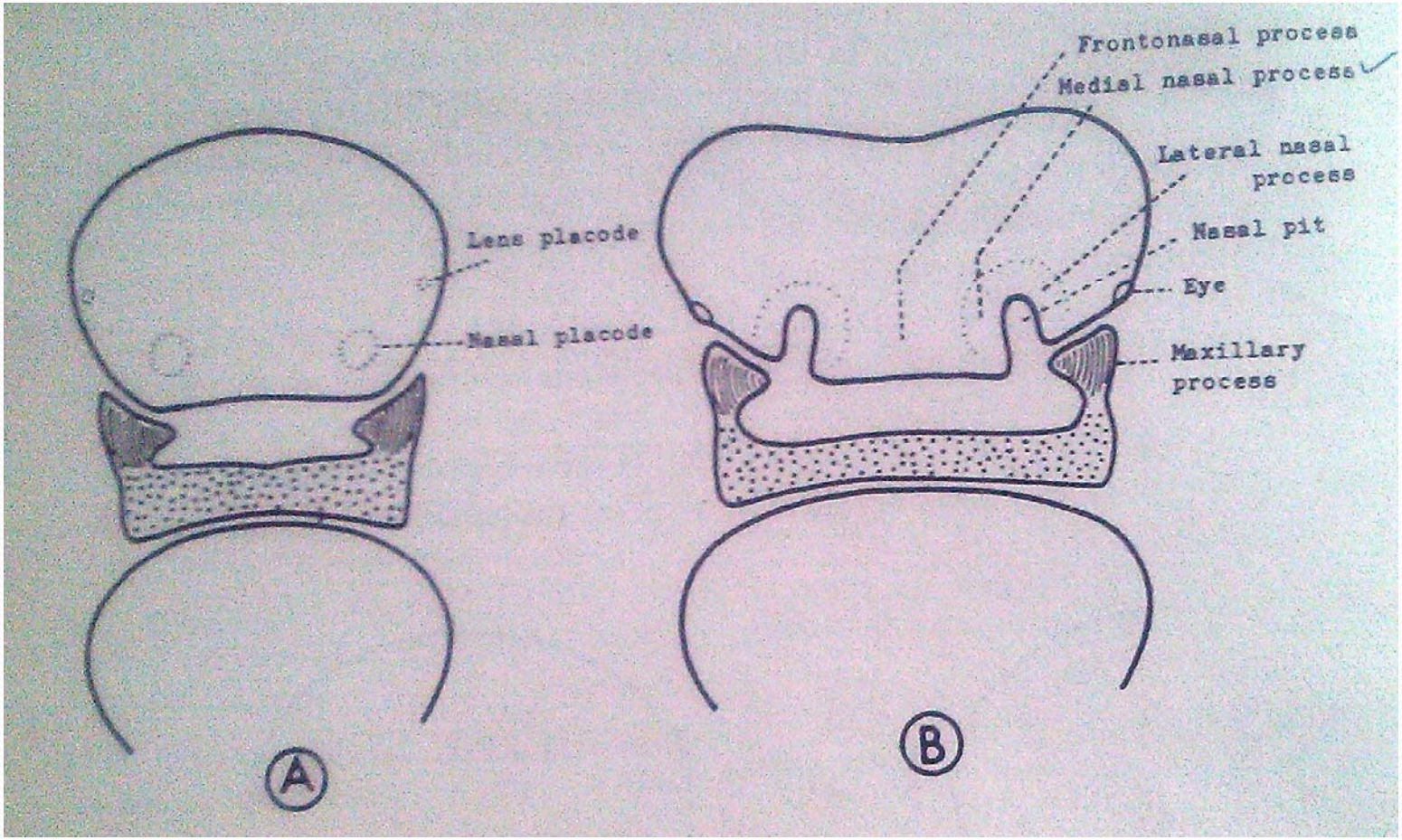

Mesenchyme covering forebrain
Developing forebrain
Stomatodaeum
buccopharyngeal membrane
Foregut
Pericardium

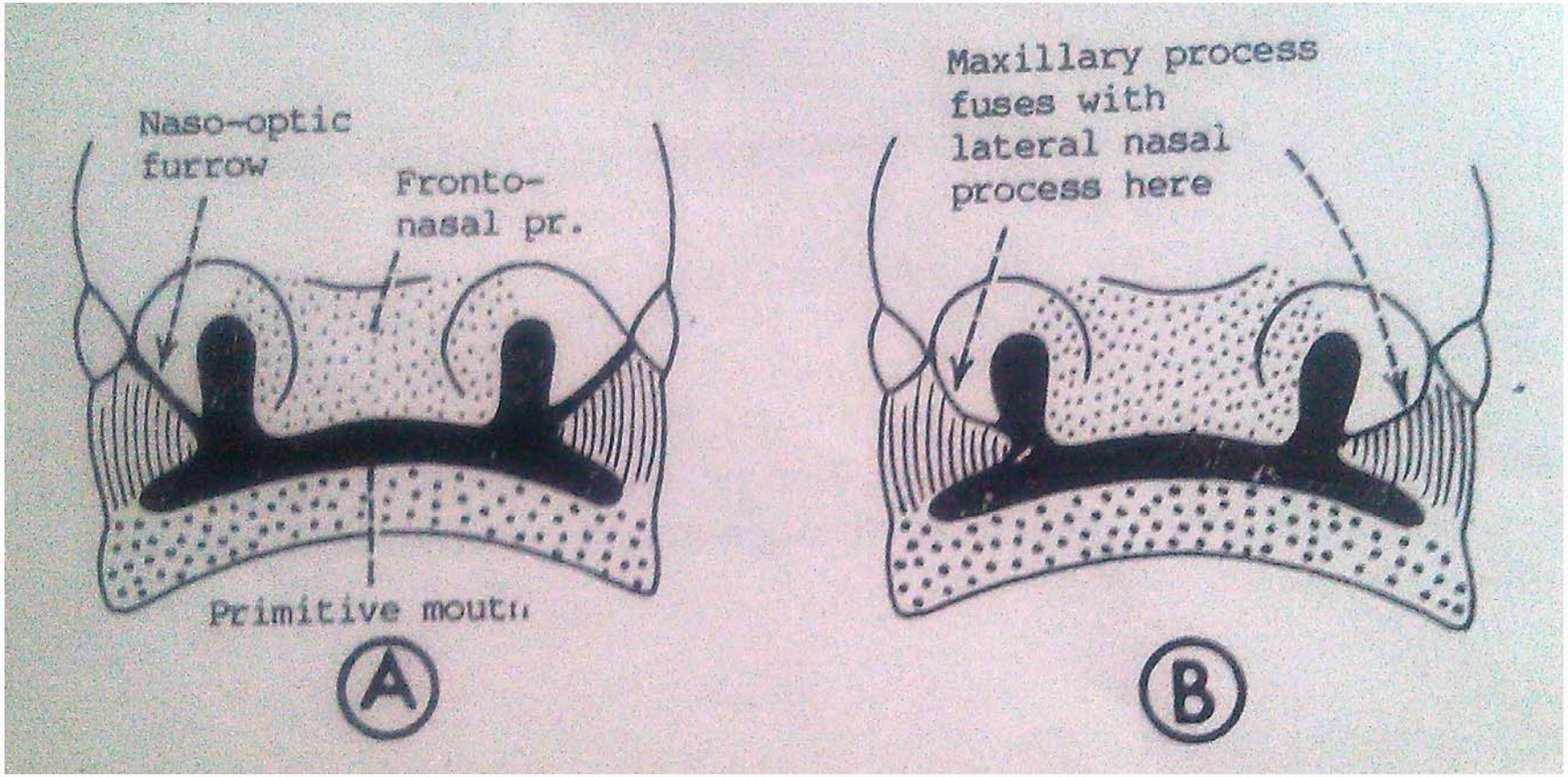

Frontonasal process

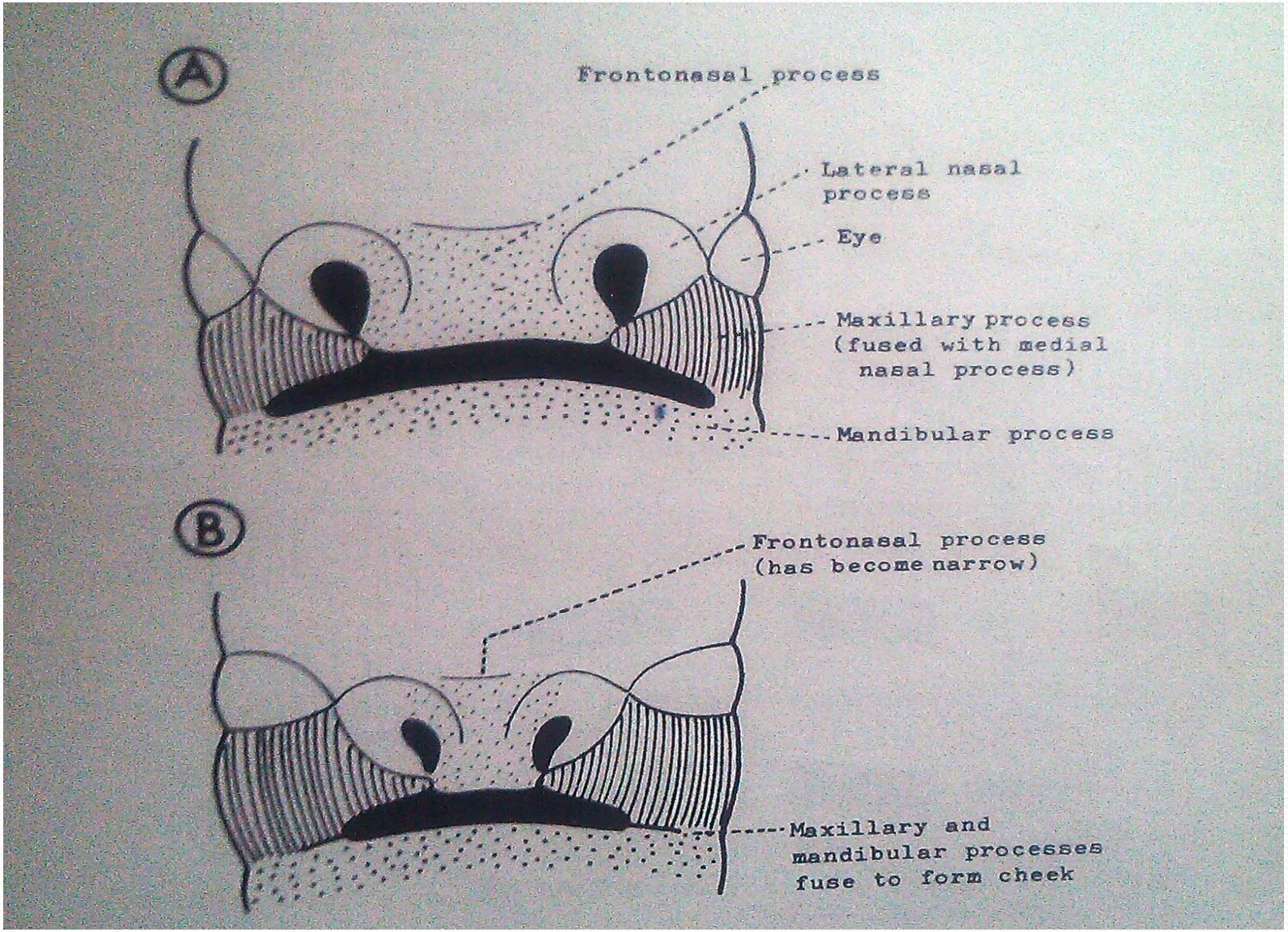

Frontonasal process
Stomatodaeum
Mandibular arch
Pericardium
A
Maxillary process
Mandibular process
B


Development of the face – 4 weeks
Nasal placode
Frontonasal prominence
Maxillary prominences
Stomodeum
Mandibular prominences
1011238
Copyright © mottfollo.com

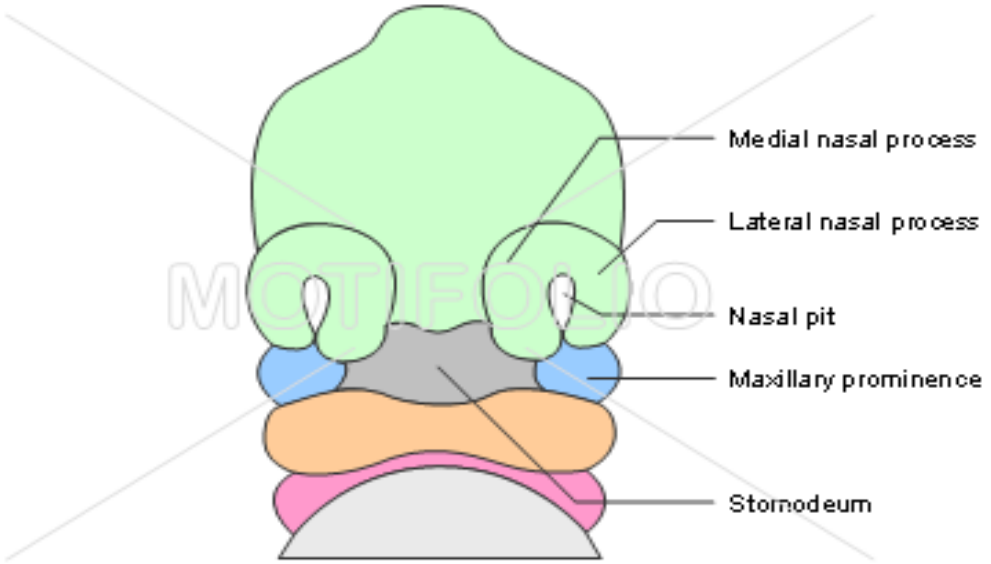

Pharyngeal arches
Pericardial bulge
Forelimb bud
Hindlimb bud


Lens placode
Nasal placode
A
Frontonasal process
Medial nasal process
Lateral nasal process
Nasal pit
Eye
Maxillary process
B

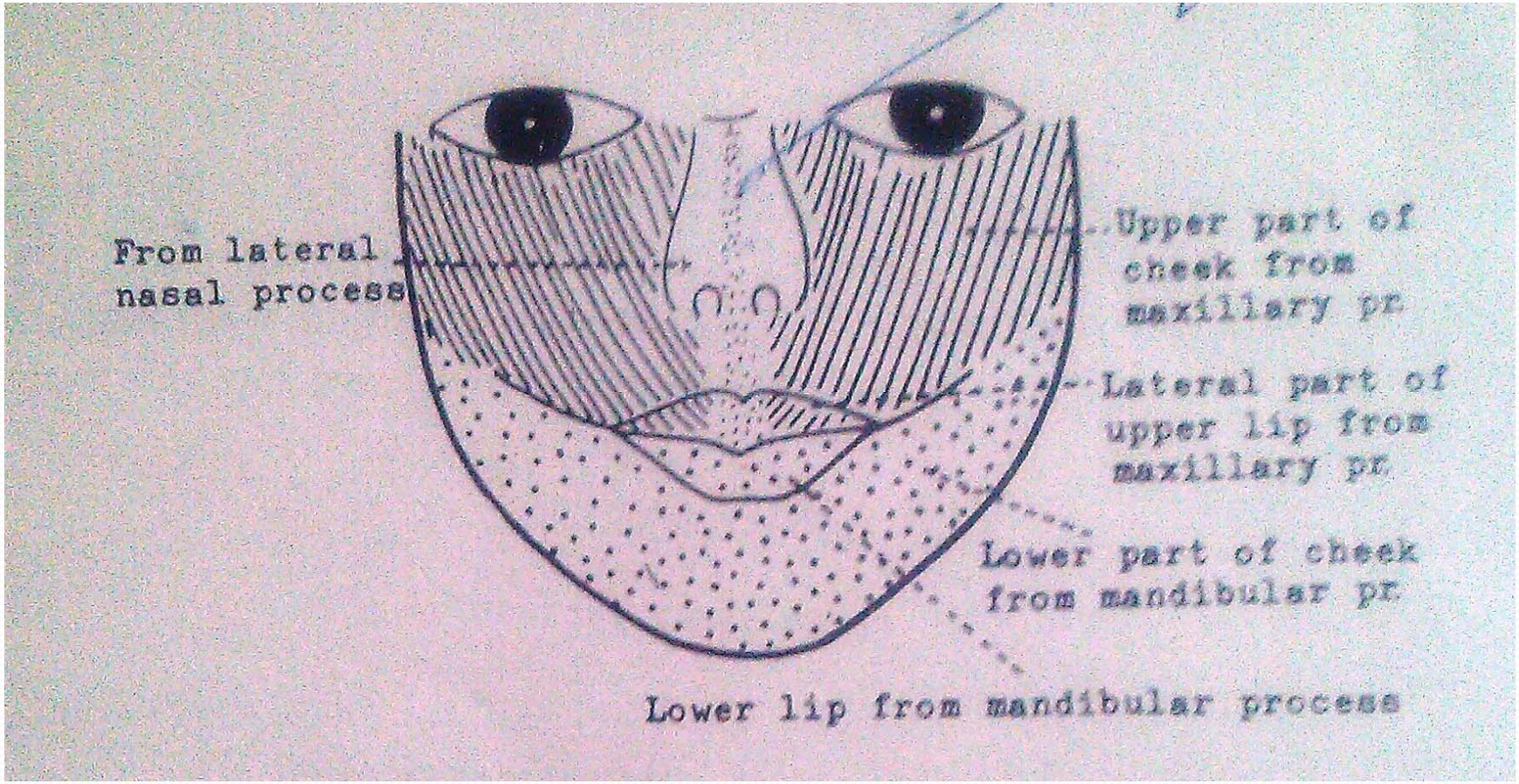

Naso-optic furrow
Fronto-nasal pr.
Primitive mouth
A
Maxillary process fuses with lateral nasal process here
B

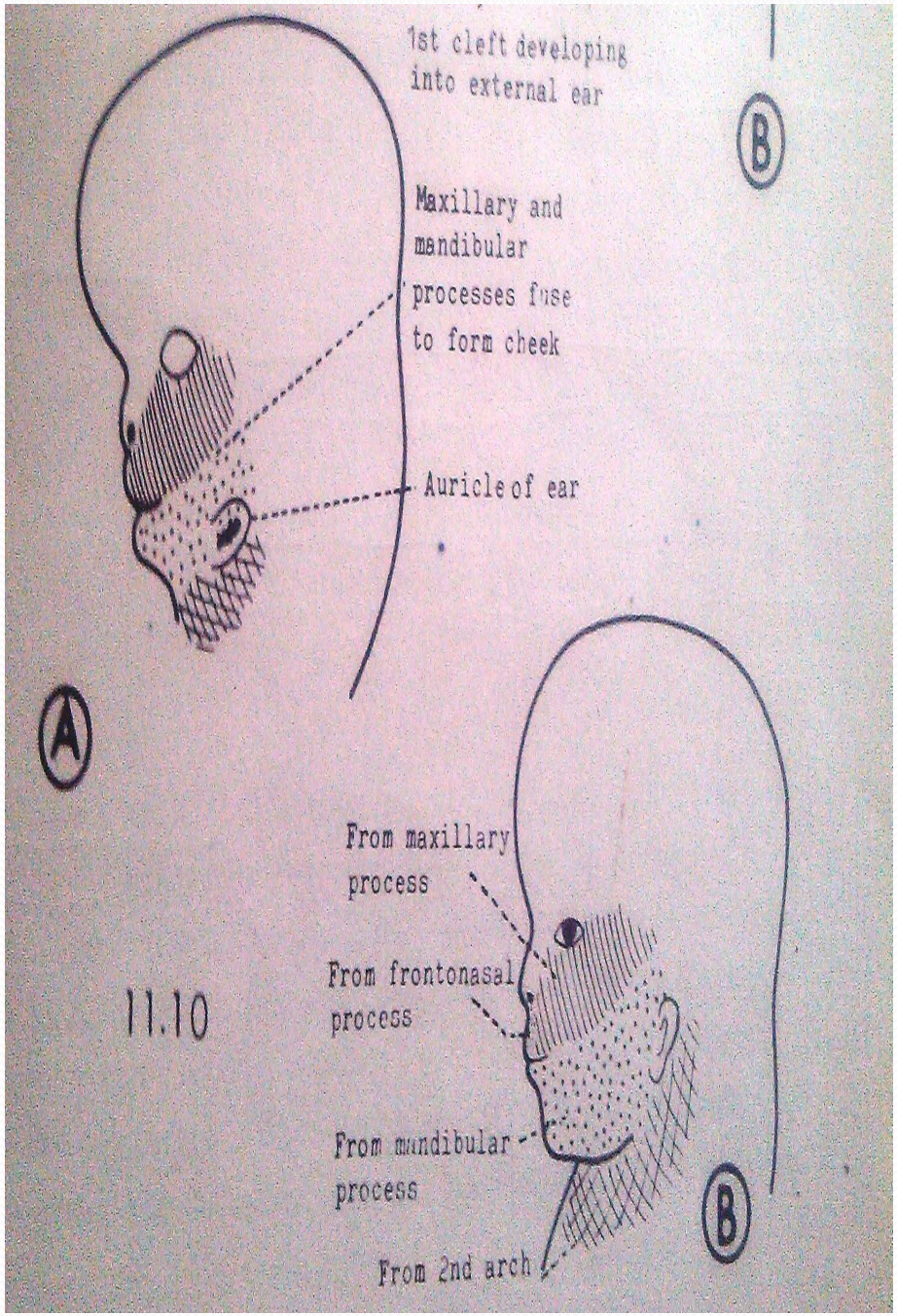

A
Frontonasal process
Lateral nasal process
Eye
Maxillary process (fused with medial nasal process)
Mandibular process
B
Frontonasal process (has become narrow)
Maxillary and mandibular processes fuse to form cheek

Development of the face – 6 weeks



1011239


From lateral nasal process
Upper part of cheek from maxillary pr
Lateral part of upper lip from maxillary pr
Lower part of cheek from mandibular pr
Lower lip from mandibular process


1st cleft developing into external ear
B
Maxillary and mandibular processes fuse to form cheek
Auricle of ear
A
From maxillary process
From frontonasal process
From mandibular process
From 2nd arch
B

11.10

Development of nasal cavities

- Formed from extension of nasal pits
- Fusion of medial & lateral process form primitive palate=pre-maxilla
- Nasal pits deepen to form nasal sac
- Bucconasal membrane separate nasal cavity from oral
- Medial process thin to form nasal septum
- Maxillary process =palatal process
- Palatal process undergoes intramembranous ossification – hard palate

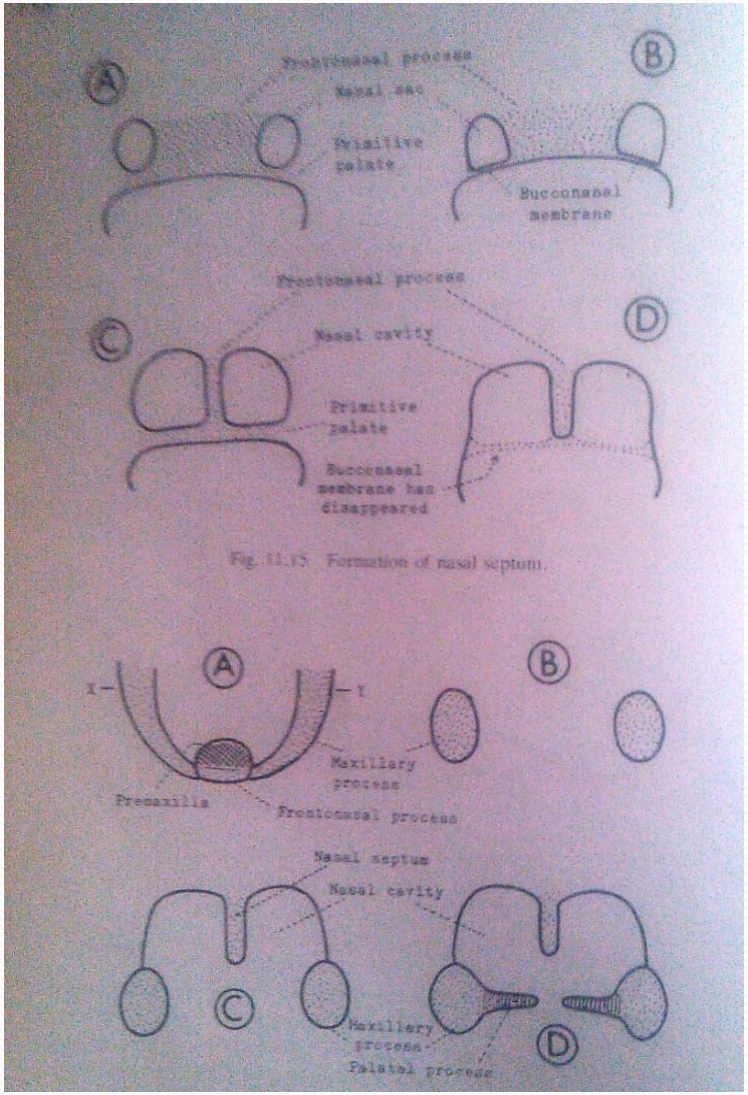
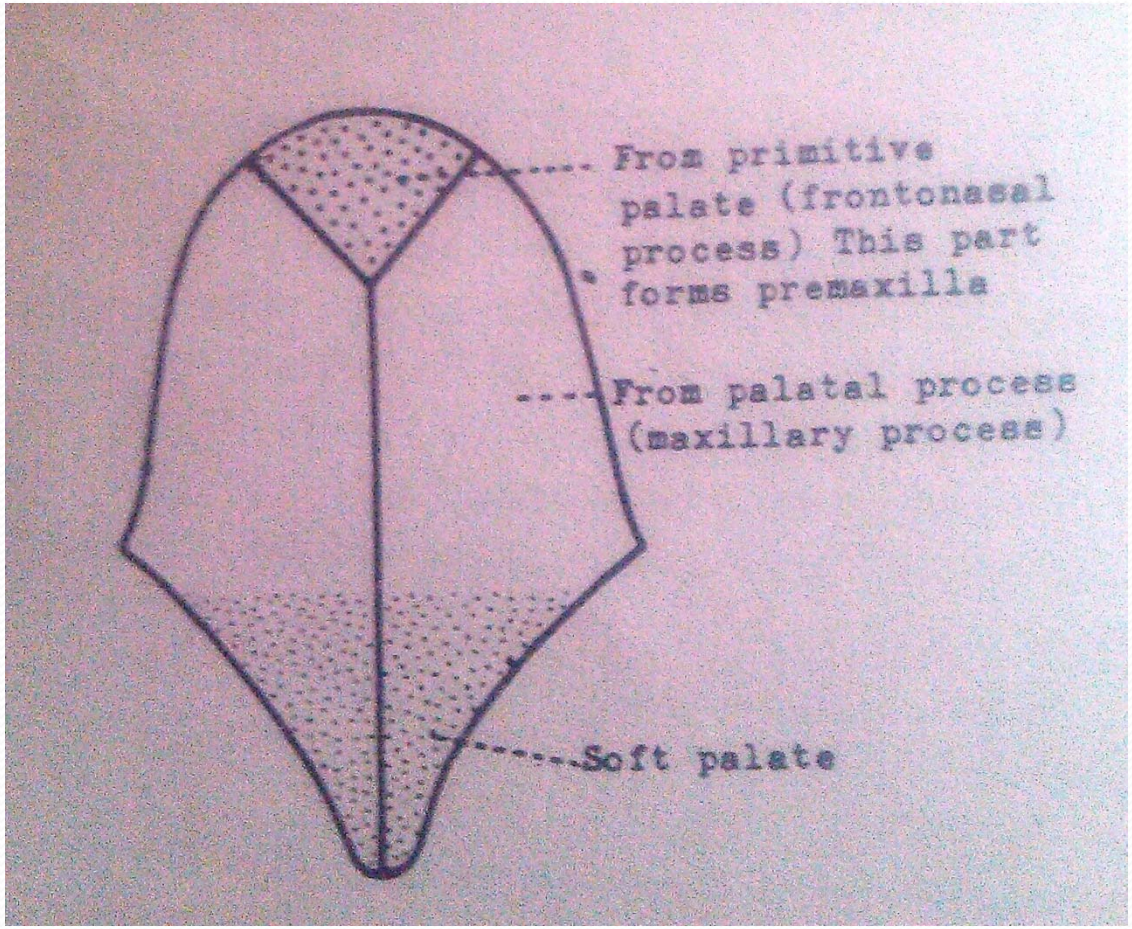
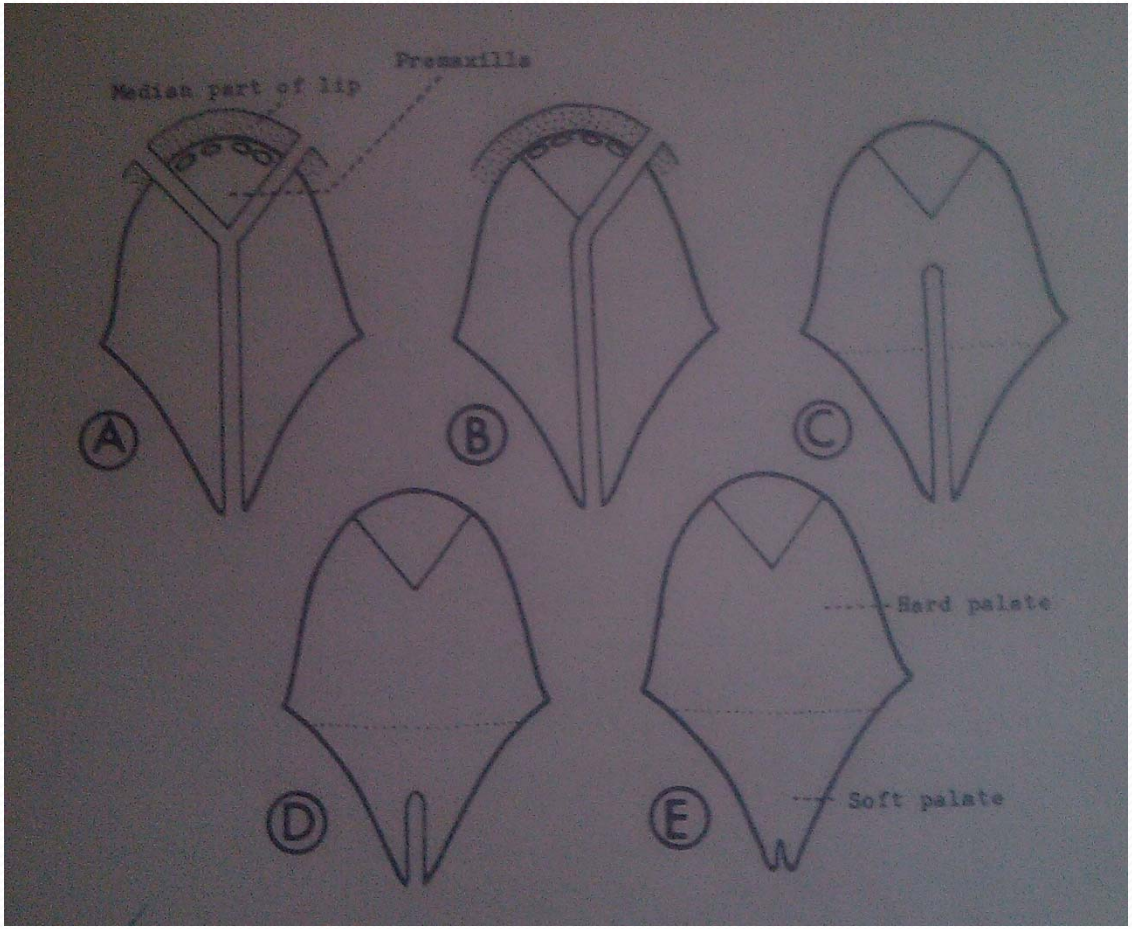


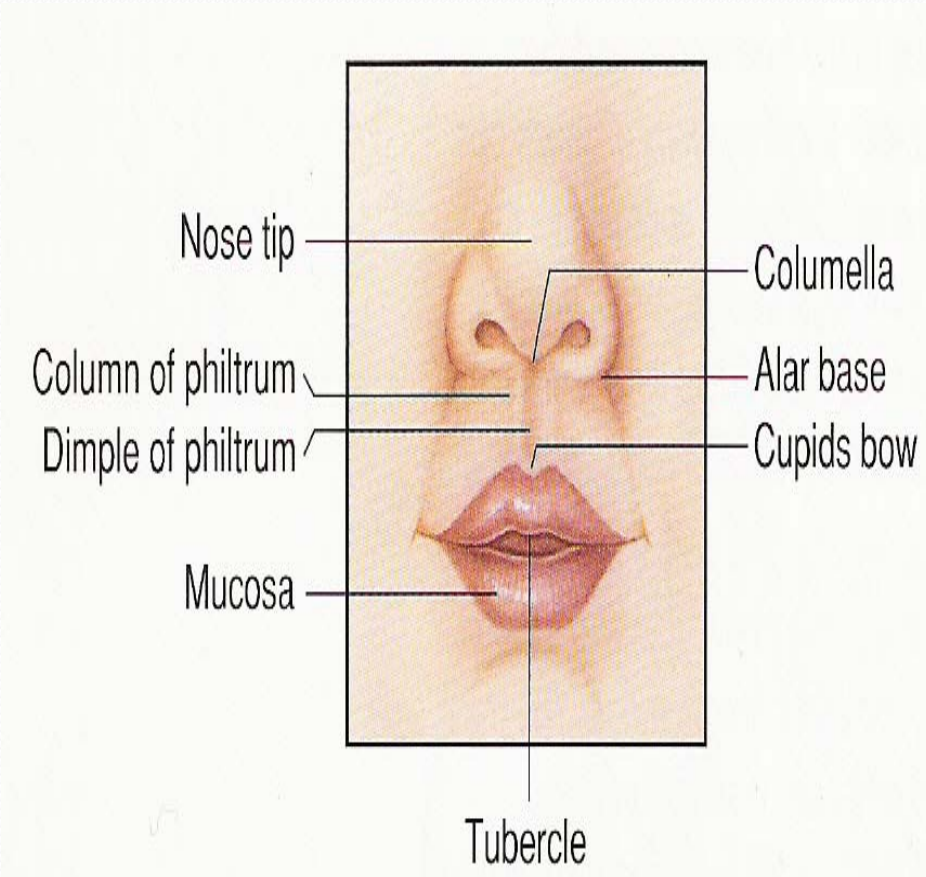
Fig. 11.13 Formation of nasal septum.

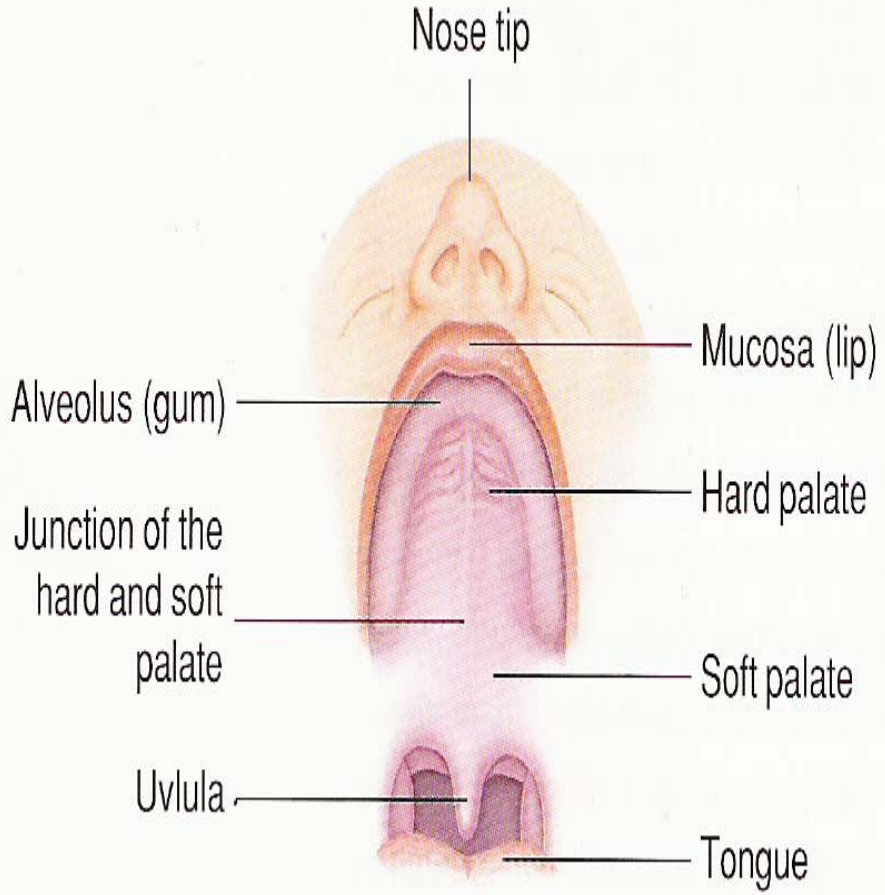

From primitive palate (frontonasal process) This part forms premaxilla
From palatal process (maxillary process)
Soft palate


Median part of lip
Premaxilla
A
B
C
D
E
Hard palate
Soft palate

CLEFT LIP AND PALATE

Oral Anatomy





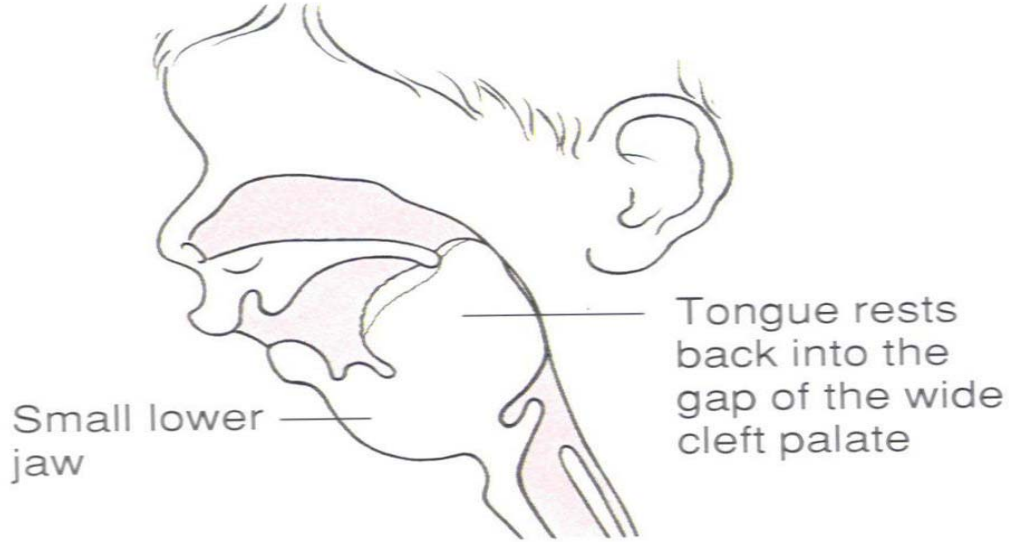
- Most common congenital facial abnormality
- Lips, alveolus, hard & soft palate
- Incidence cleft lip & palate (CL/P) 1:600, cleft palate (CP) 1:1000
- CL 15%, CL/P 45%, CP 40%.
- CL/P males, CP females
- Unilateral CL 60% left side.
- May be isolated, associated with cong heart disease or over 300 recognized syndrome

Syndromic Cleft Lip +/- Palate

- 300 syndromes associated with CLP
- Chromosomal anomalies -
  trisomy 13(Patau), 18(Edwards), 21(Downs), velocardiofacial (22q11)
- Inherited Syndromes -
  Sticklers(AD) -
  Treacher Collins(AD) -
  Van der Woude(AD)
- Non inherited syndromes -
  Pierre Robin Sequence (50%have a syndrome-
  Sticklers/22q11)

Pierre Robin Sequence;

- **Micrognathia**
- **U or V-shaped palatal cleft**
- **Glossoptosis / airway obstruction**



Causes of Isolated Cleft Lip +/- palate

- Multifactorial

- Environmental + genetic factors -
  positive family history in first degree in 1:25

- Known Teratogens
  -specific drugs, i.e. phenytoin, methotrexate, sodium valproate, alcohol, cigarette smoking, pesticides(dioxin)

- Three muscle rings of Delaire

A. Nasolabial muscle ring,
B. Bilabial muscle ring,
C. Labiomental muscle ring

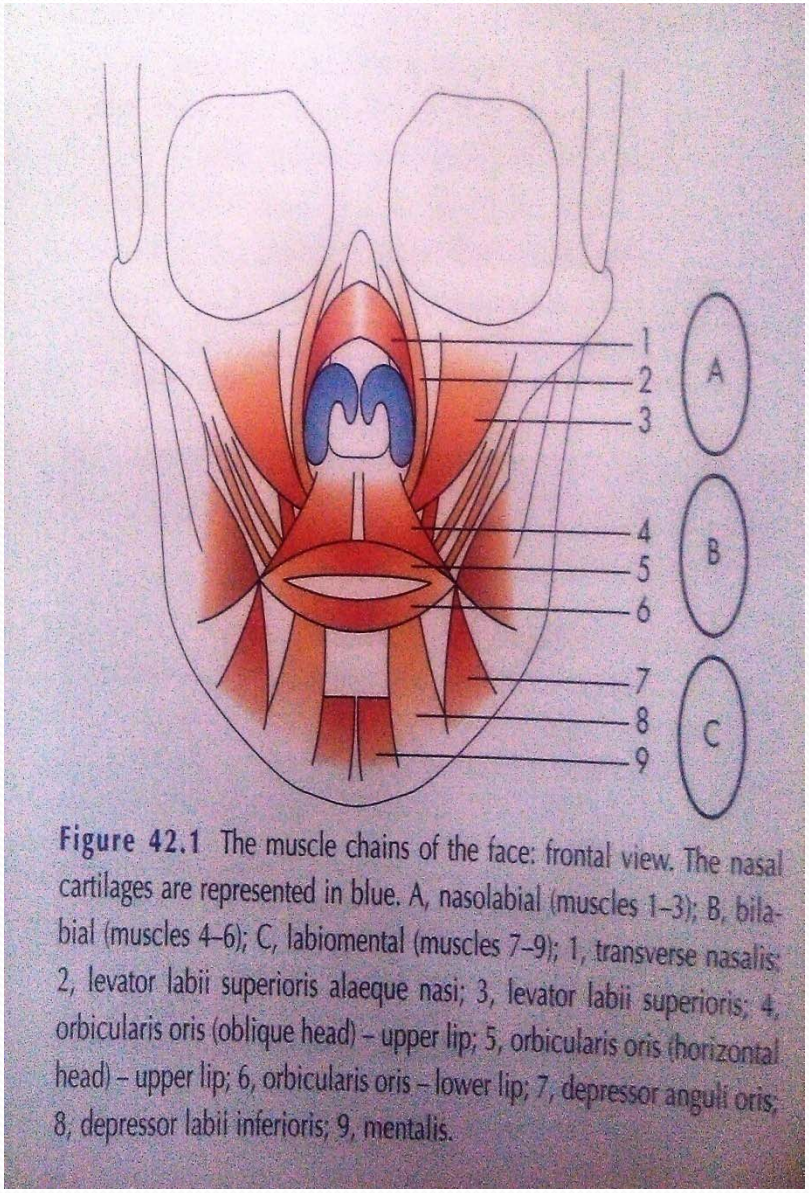
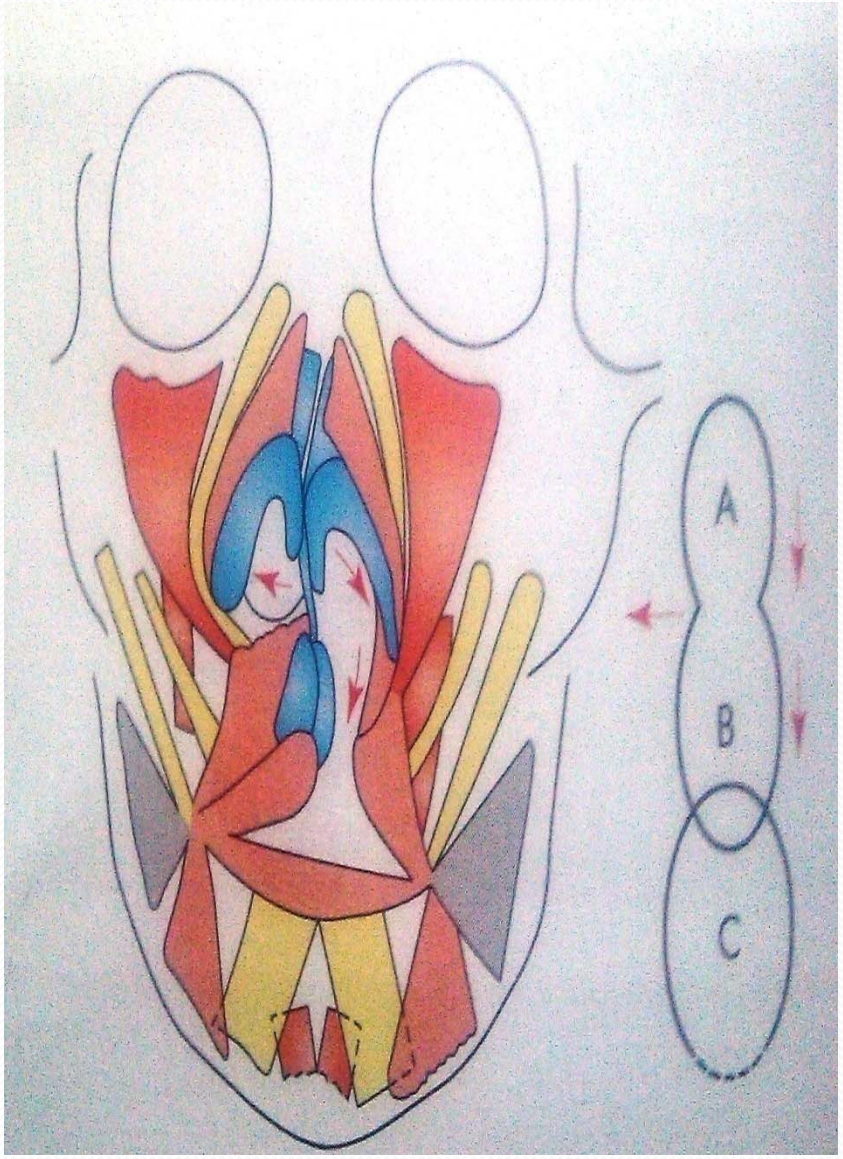
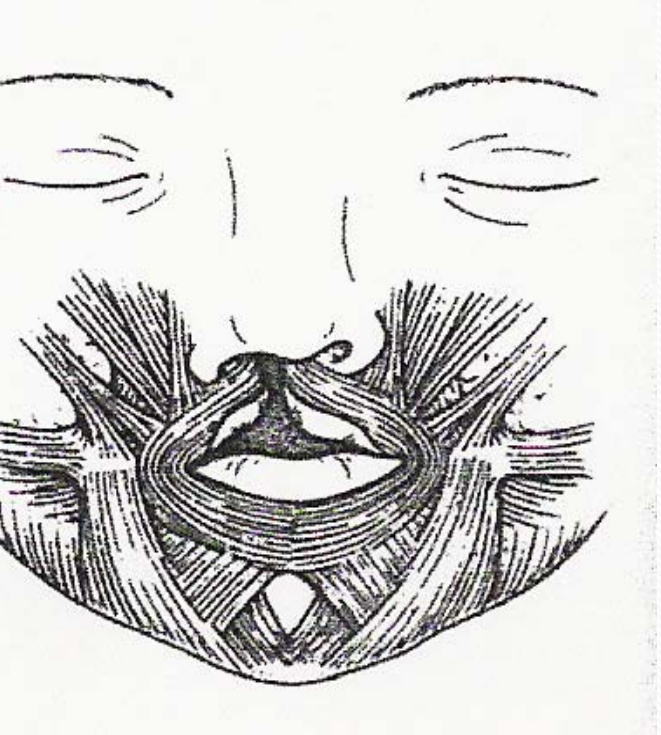


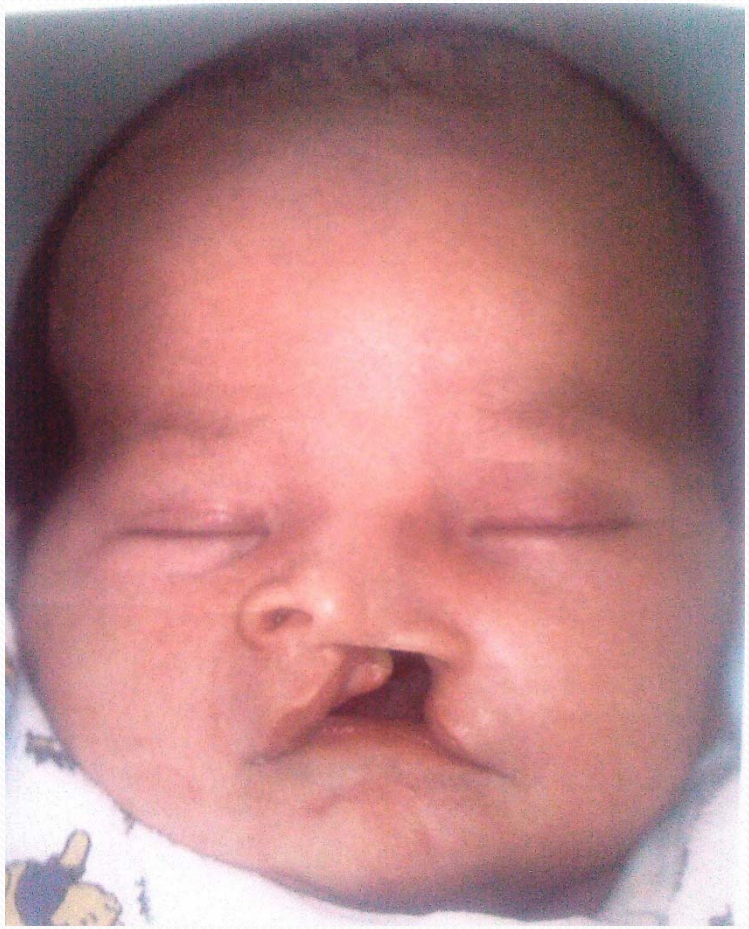
Figure 42.1 The muscle chains of the face: frontal view. The nasal cartilages are represented in blue. A, nasolabial (muscles 1–3); B, bilabial (muscles 4–6); C, labiomental (muscles 7–9); 1, transverse nasalis; 2, levator labii superioris alaeque nasi; 3, levator labii superioris; 4, orbicularis oris (oblique head) – upper lip; 5, orbicularis oris (horizontal head) – upper lip; 6, orbicularis oris – lower lip; 7, depressor anguli oris; 8, depressor labii inferioris; 9, mentalis.

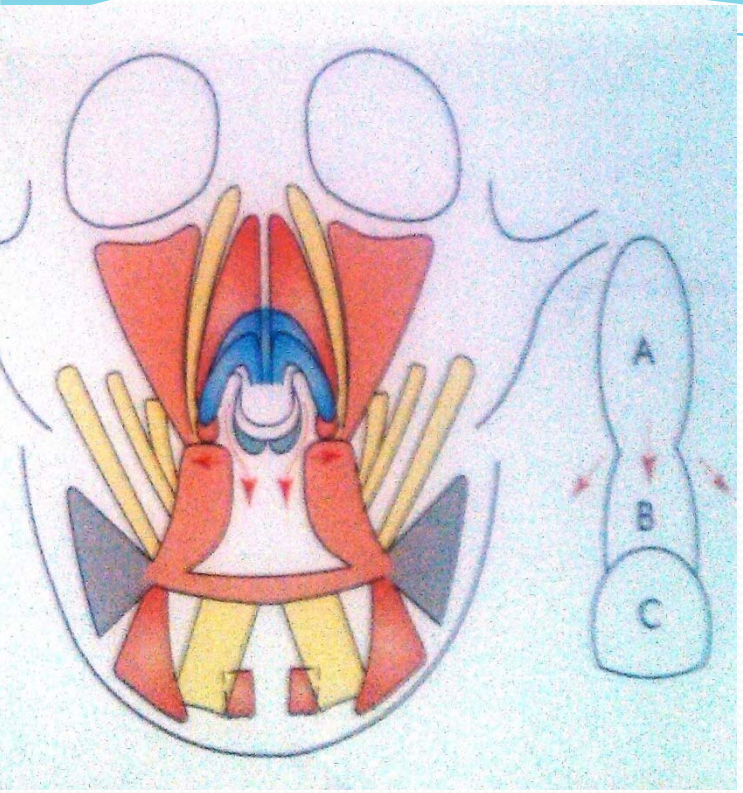
- Unilateral cleft lip disruption of nasolabial muscle ring & bilabial muscle ring of one side

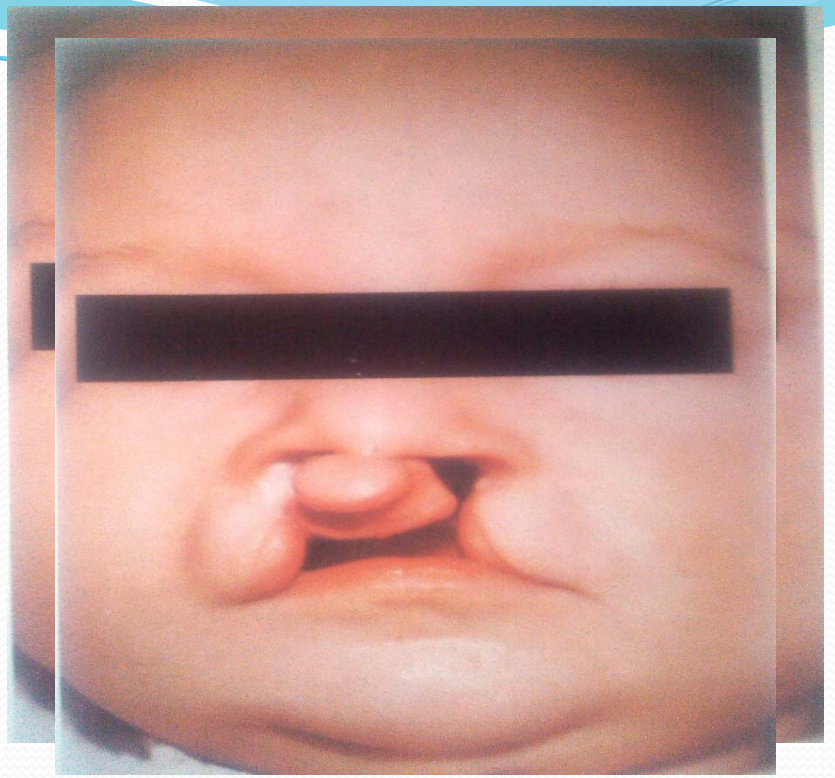
- Bilateral both side

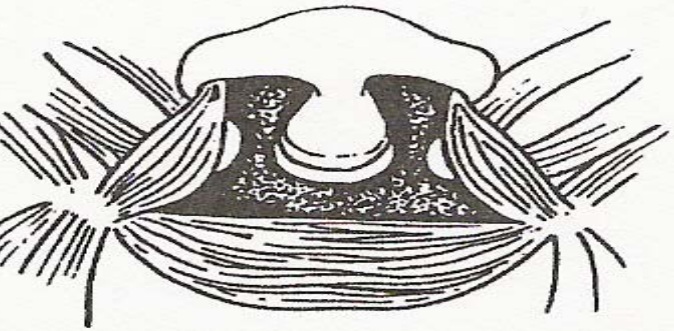












The orbicularis oris muscles run parallel to the edge of the cleft and inserts into the alar margin. . There is no muscle in the prolabium in bilateral cleft

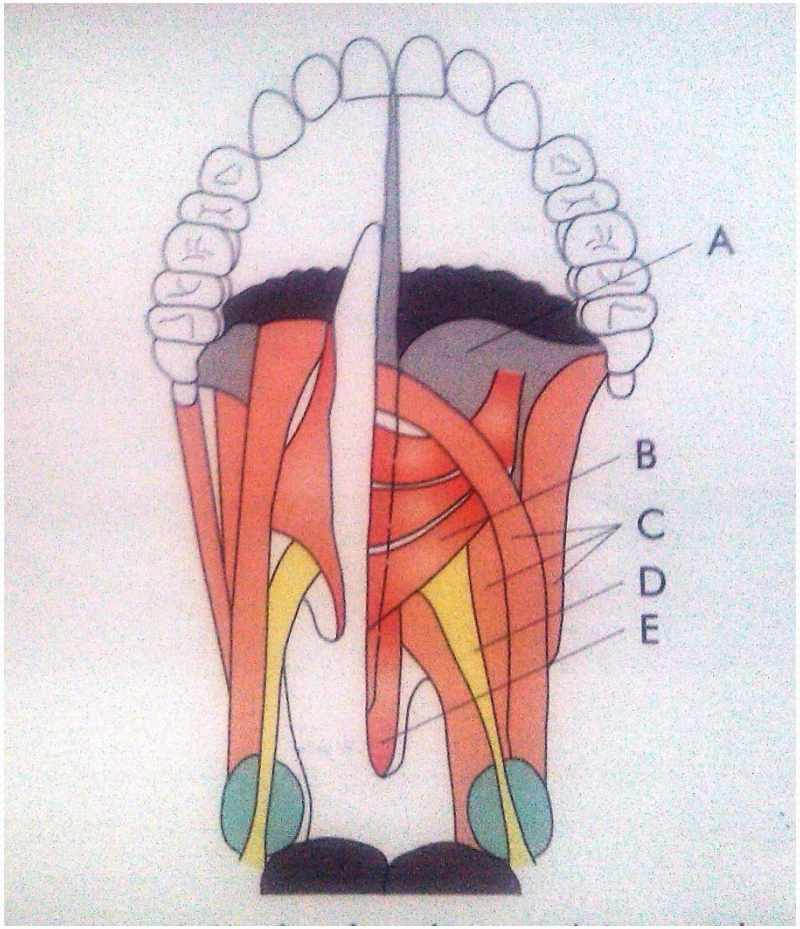
Tensor palati

Levator palati

Palatopharyngeus

Palatoglossus

Musculus uvulae

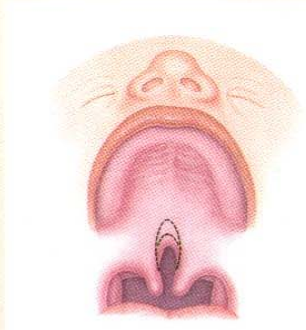


ft lip

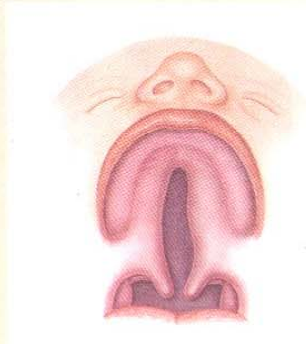
complete cleft lip

omplete cleft lip
lveolus (gum) not involved)

Cleft palate

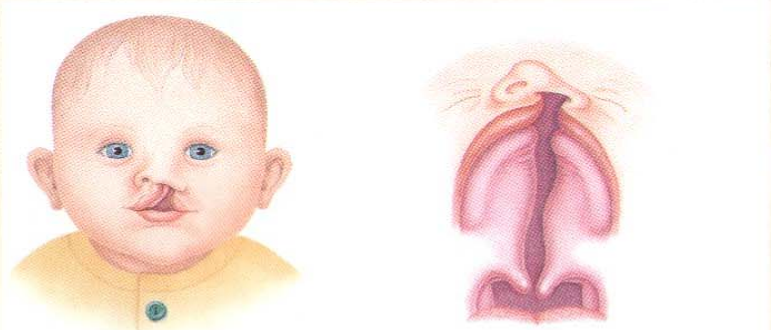


Cleft of the soft palate

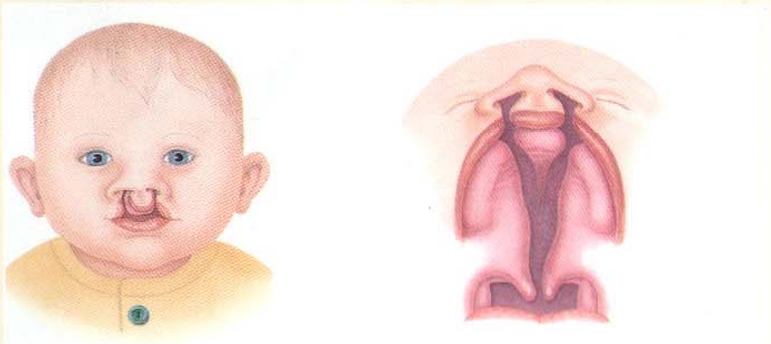


Cleft of the soft & hard palate

Cleft lip and palate



Unilateral cleft lip and palate
(alveolus involved)



Bilateral cleft lip and palate
(alveolus involved)

Cleft palate

primary palate

anterior to incisive foremen alveolus & upper lip

secondary palate

hard & soft palate

Cleft palate confine to soft palate, hard palate or both

Hard palate remain attached to nasal septum & vomer incomplete cleft palate

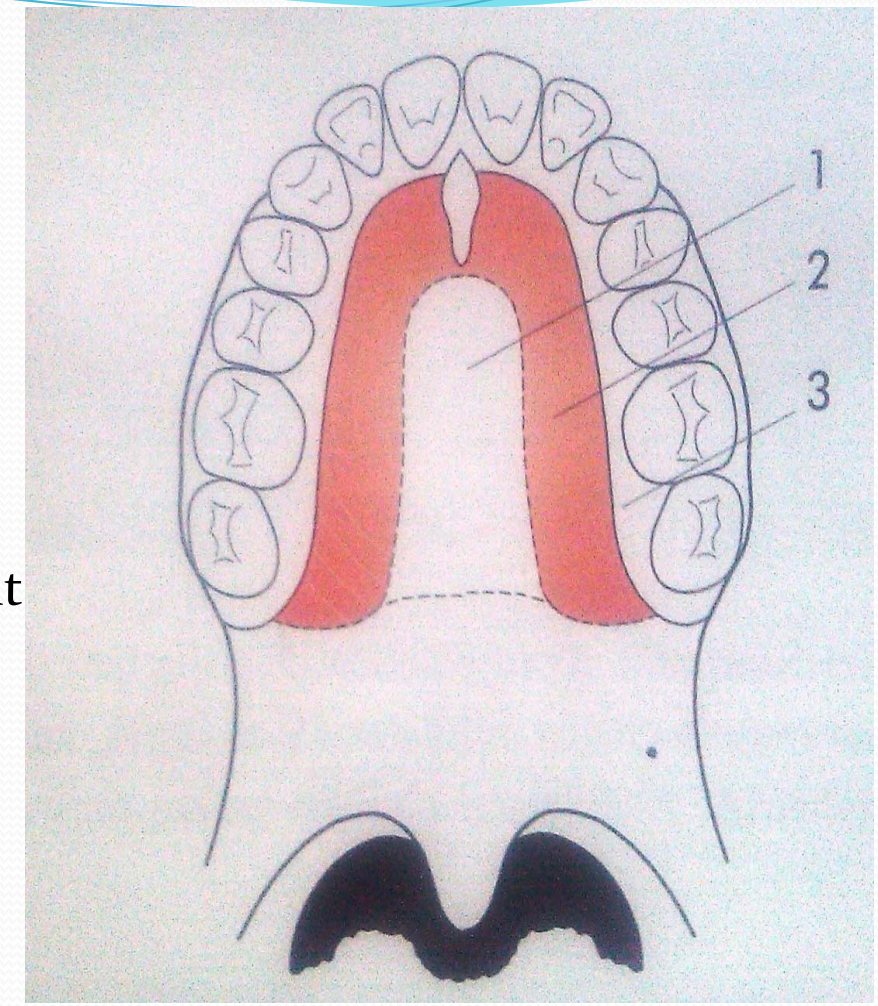
Not attached to nasal septum & vomer complete cleft palate

Soft palate close velopharynx essential for speech

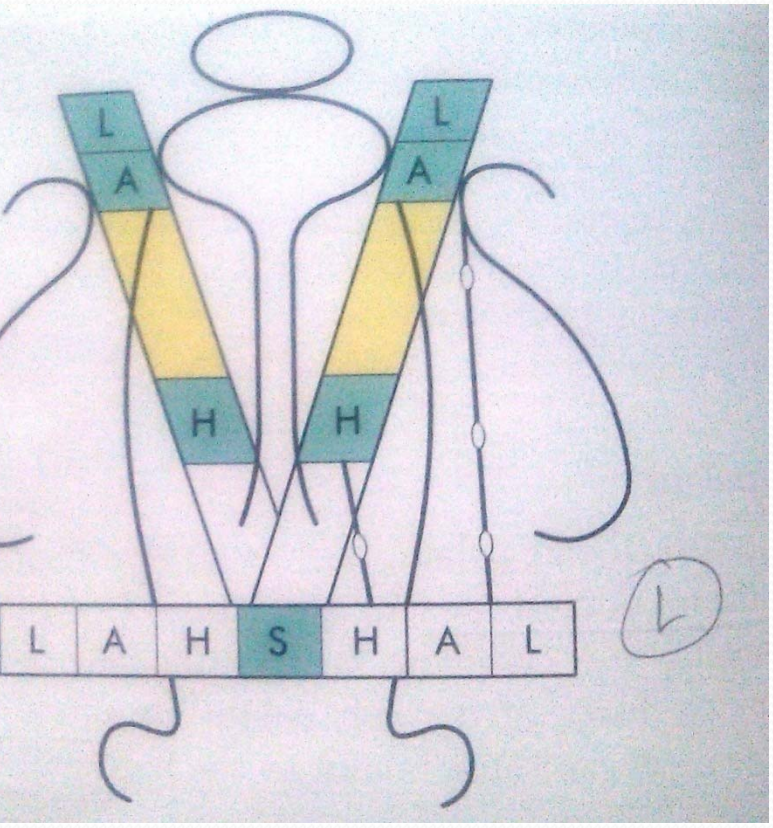
Palatal fibromucosa
Maxillary fibromucosa
Gingival fibromucosa

mplete cleft palate
edian part of palatal vault of is absent
alatal fibromucosa is reduced

naxillary & gingival unaffected



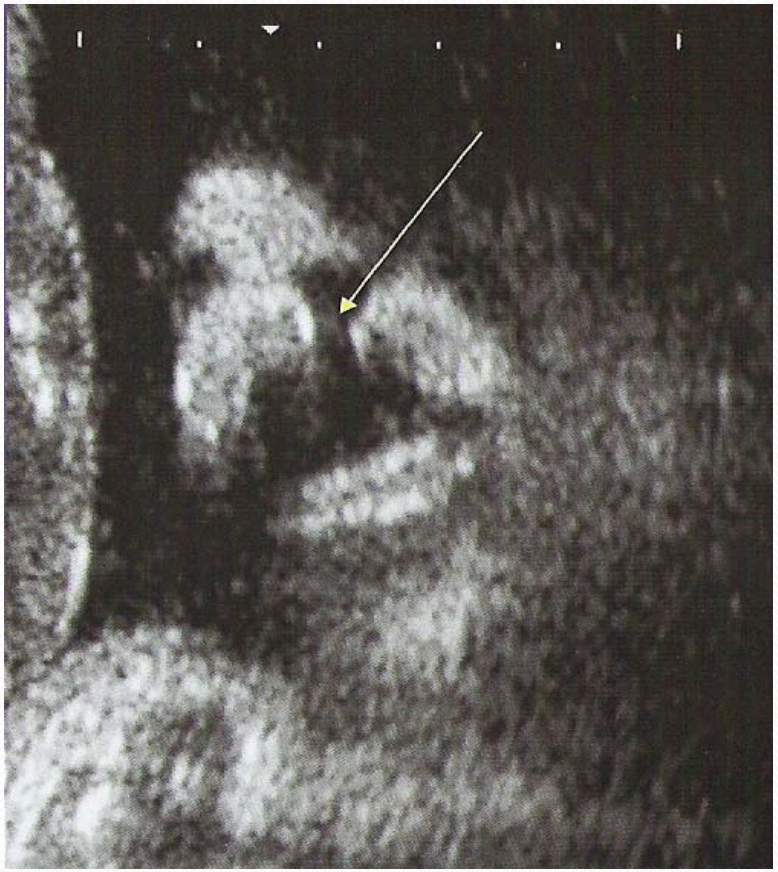
AHSAL system



- LAHSAL complete bilateral CL/P
- lahSh incomplete rt unilateral celft lip & alvelous with complete soft palate extending partly into hard palate

Antenatal diagnosis

8 week of gestation cleft lip



roblems immediately after birth

Feeding
some feed normally
some need assistance

Reduced negative intra-oral pressure

Cleft lip
- leads to poor stabilization of nipple

Cleft Palate-
reduced area of intact palate
tongue position may be posterior

Pierre Robin sequence-
micrognathia,
glossoptossis,
airway difficulties.

- NGT or gastrostomy support

- Airway : uncommon

occur in Pierre Robin sequence

Prone position

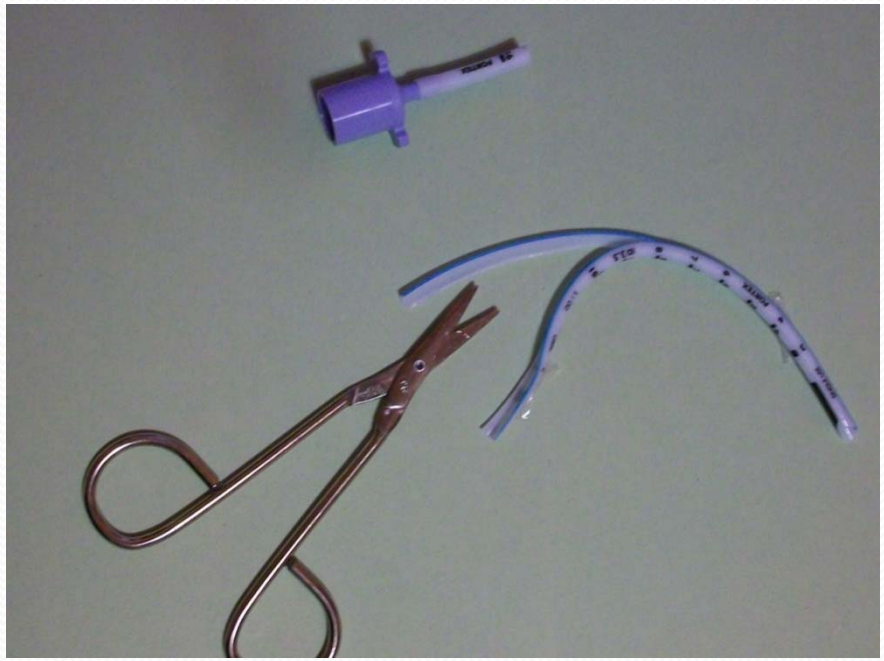
Labioglossopexy

laking a NP Airway

mating size and length of NPA
months 2.5 to 3.0 ET tube
months 3.5- 4.0 ET tube

gth can be estimated by
suring from edge of the
ril to front rim of the ear.

length of the tube will
l to be adjusted as the baby
ys.



If the tube is too long, vomiting and choking can occur. If the tube is too short the obstruction caused by the tongue is not relieved

rgery for cleft

aire technique & sequence

Cleft lip alone

Unilateral 5-6 month

Bilateral 4-5 month

Cleft plate

Soft alone plate 6mth

Soft & hard plate 6mth/15-18mth

- Cleft lip & plate

Unilateral lip& soft plate 5-6 mth

hard 15-18mth

Bilateral CL/p 4-5 mth

hard plate 15-18 mth

Cleft lip

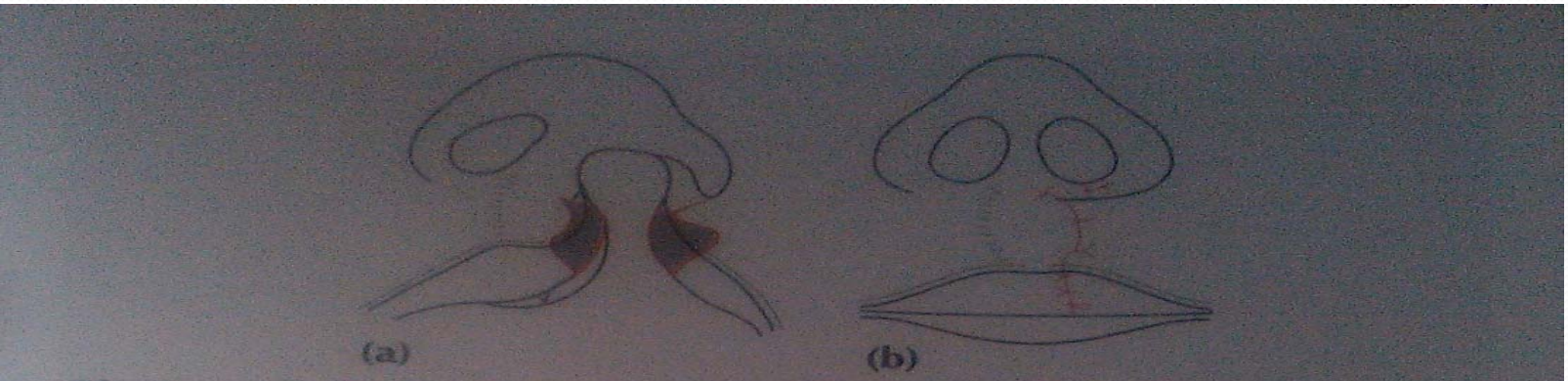


Figure 42.7 (a and b) Skin incisions (highlighted in red) for left unilateral complete cleft lip (after Delaire).

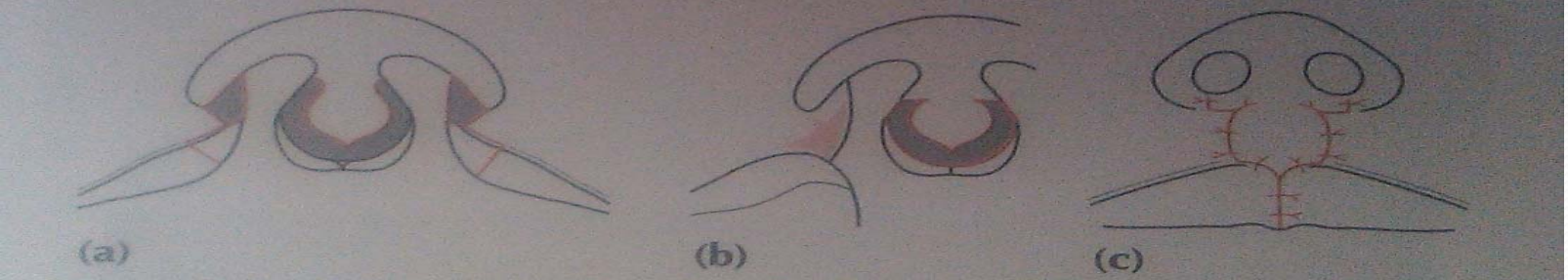
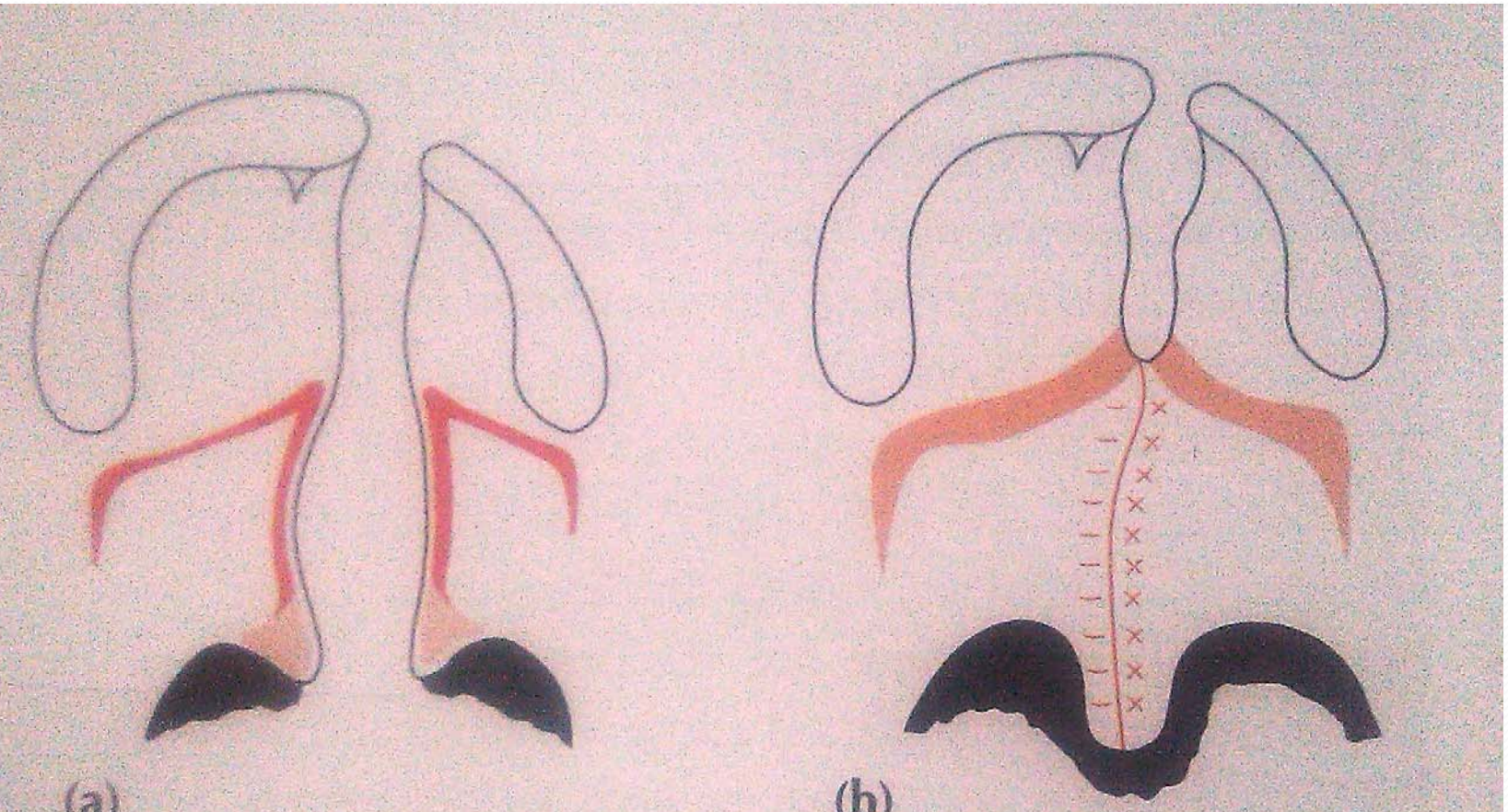
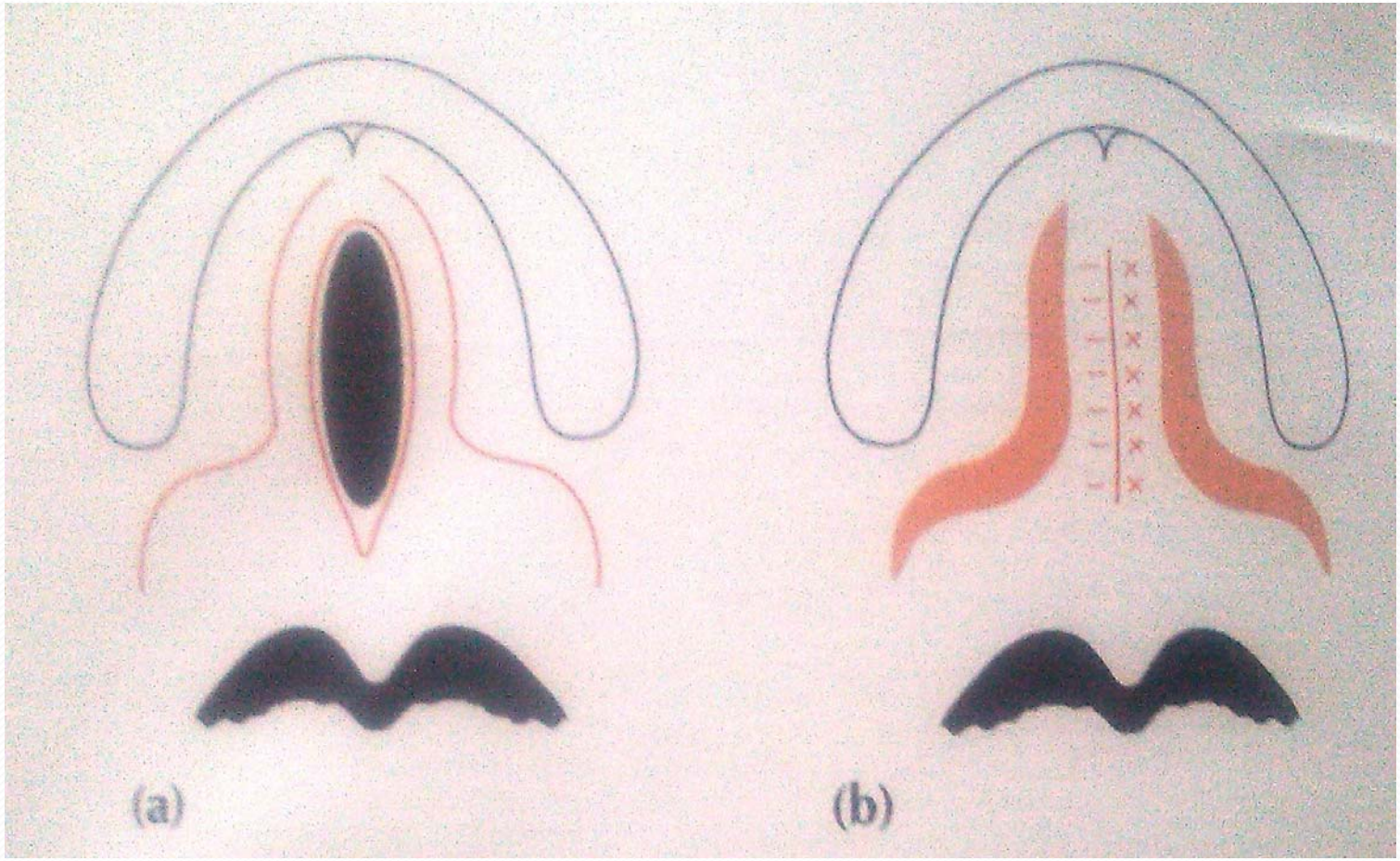


Figure 42.8 (a–c) Skin incisions for bilateral complete cleft lip, showing the shaded area from Fig. 42.7a. Areas for removal of excess mucosa

Soft palate



Hard palate



- Hearing
  - Eustachian tube dysfunction
  - Otitis media
- Speech
  - Velopharyngeal insufficiency
    - hypernasal speech
    - preschool
  - Speech & language therapy
- Dental development
- Facial growth