



Welcome

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REGISTRAR

**DEPT. OF PEDIATRIC SURGERY
AD-DIN WOMEN'S MEDICAL
COLLEGE & HOSPITAL**



RECONSTRUCTING CLEFT LIP & PALATE:

ANATOMY, EMBRYOLOGY AND CONTEMPORARY SURGICAL STRATEGIES

SCENARIO



SCENARIO

Disha , 6 months old girl presented with a cleft on the Left side of the upper lip just lateral to the philtrum. It extends upto the nostril. Alveolus is absent. Vermilion border is discontinuous, cupid's bow is deformed, philtral ridge is absent on affected side. Columella is short. Nasal septum is deviated to the Right (normal) side, ala of the nose is flat & tip of the nose is depressed.

SCENARIO

No scar mark in upper lip. Lower lip is normal. There is also a cleft involving the whole soft & hard palate . External auditory meatus normal. Auscultation of heart & lungs reveals no abnormality. If asked examination of oral cavity-Mucosa of the oral cavity is normal. All salivary gland opening is normally situated & intact. There is no muscle wasting of tongue & not deviated.

CLINICAL DIAGNOSIS

Left sided complete cleft lip with cleft hard & soft palate.

PRE OPERATIVE ASSESSMENT

- Nutritional assessment
- Pediatric evaluation
- Operative fitness

OPERATIVE TREATMENT

- Cheiloplasty (at the age of 6 months)



OPERATIVE TREATMENT

- Palatoplasty (at the age of 1 year 4 months)



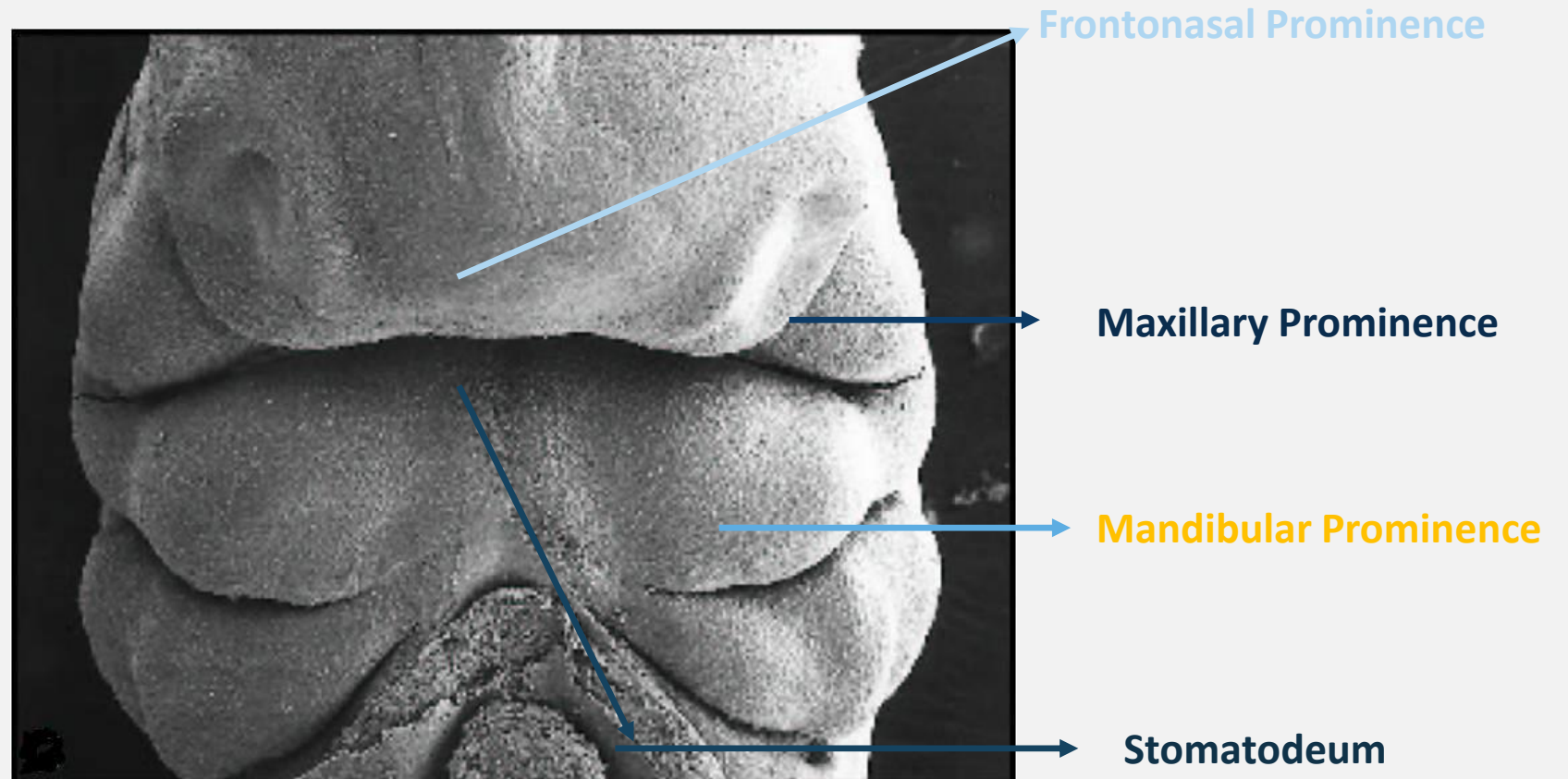


INTRODUCTION

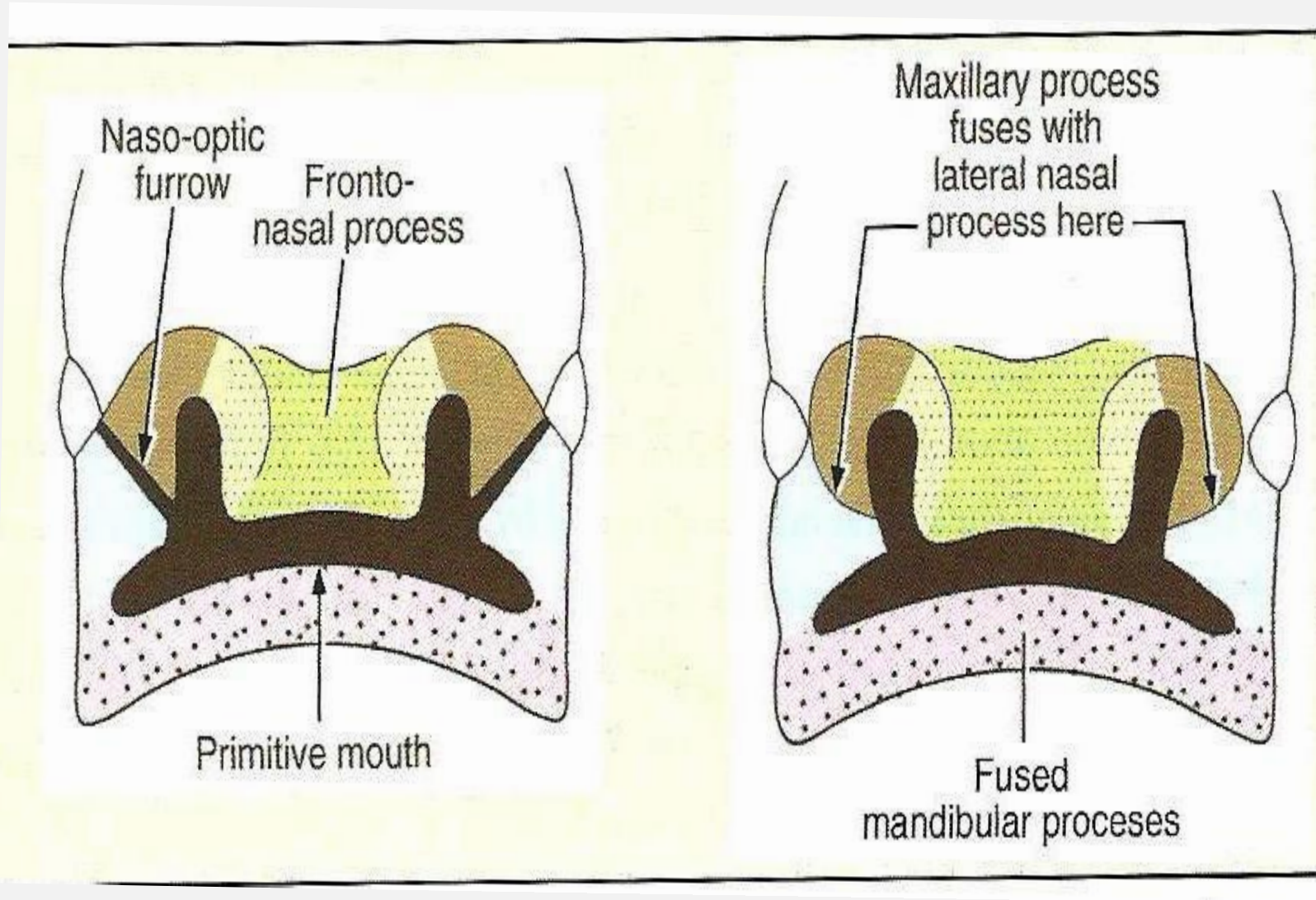
- Cleft lip and palate are most common congenital craniofacial anomalies
- Successful treatment of these children requires
 - Technical skill
 - Depth of knowledge of abnormal anatomy and
 - Multidisciplinary team approaches

DEVELOPMENTAL BACKGROUND

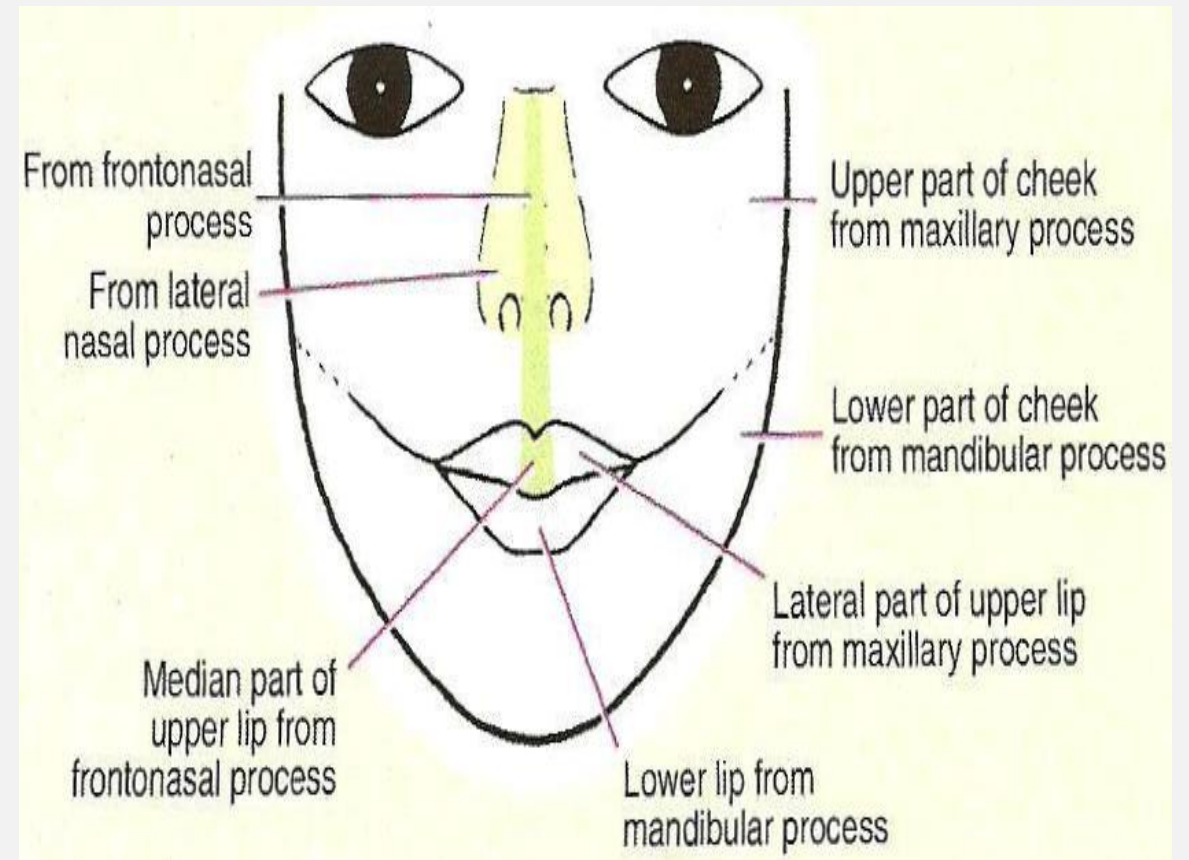
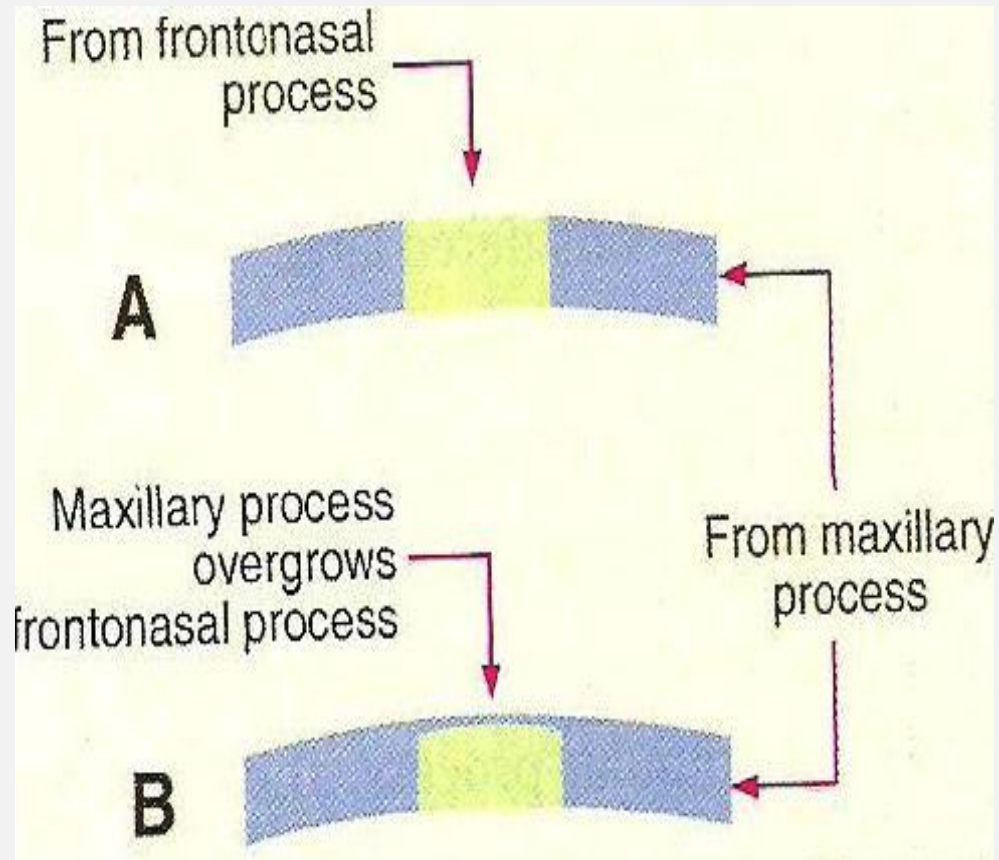
- Frontal
- Nasal
- Maxillary
- Mandibular



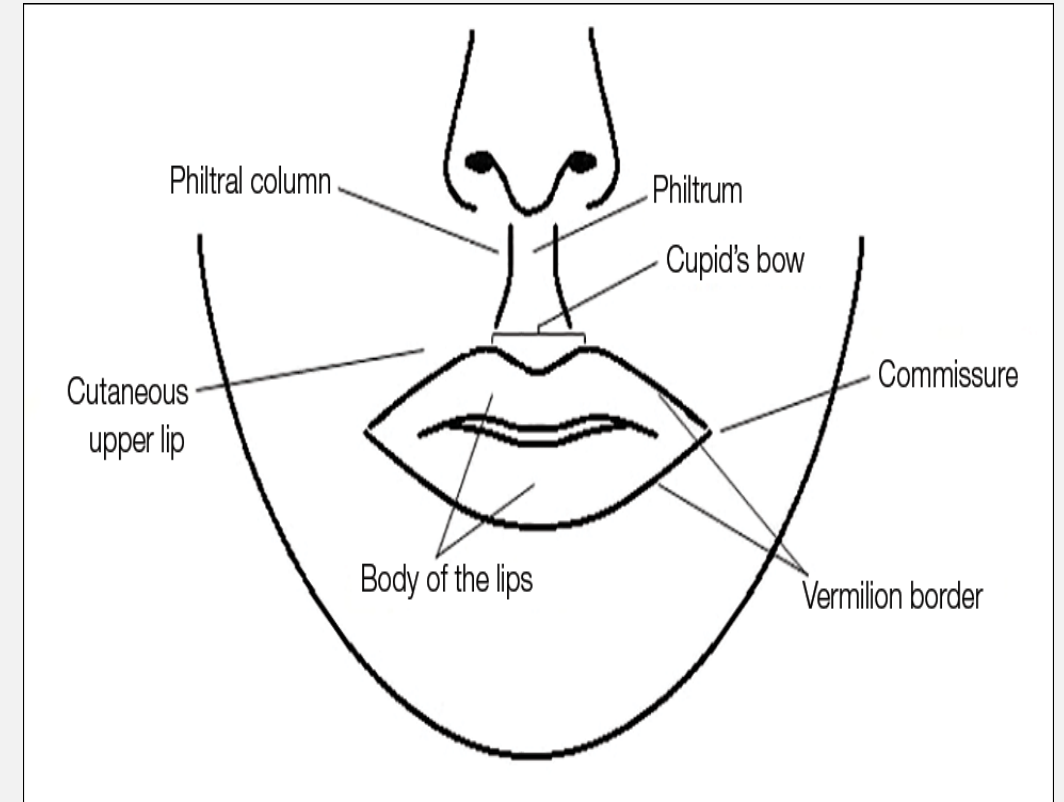
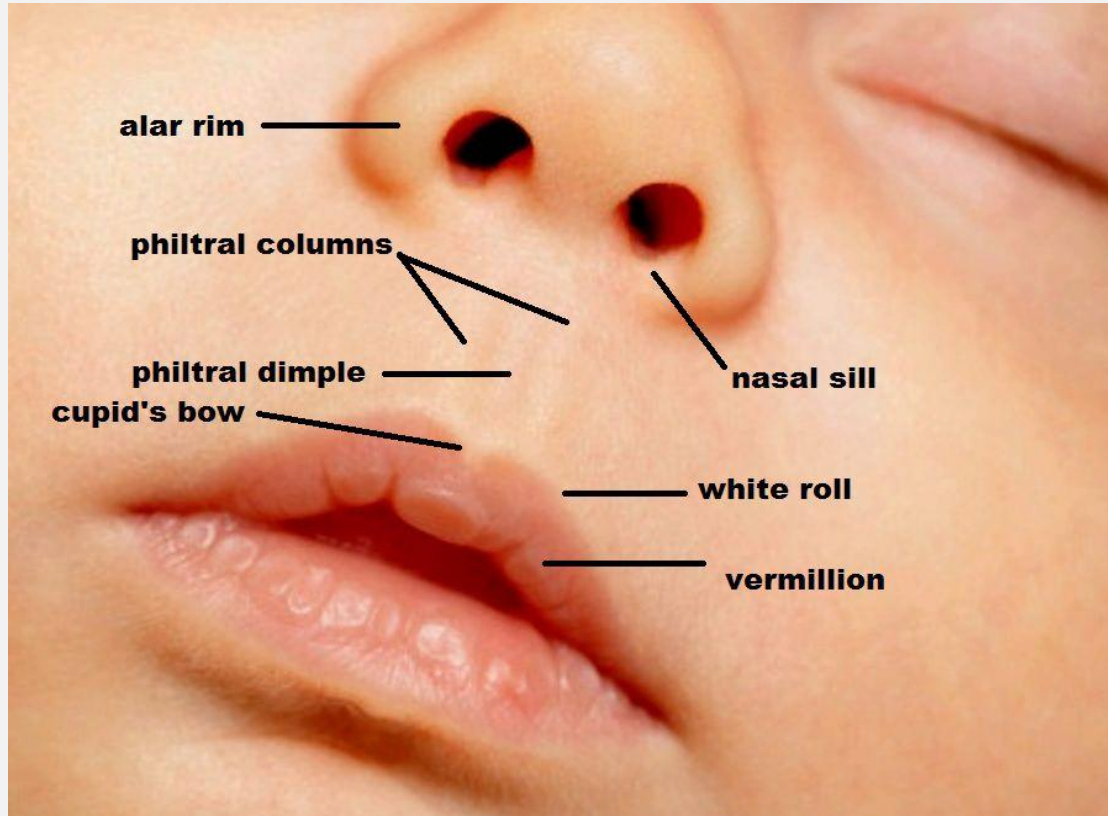
FORMATION OF UPPER LIP



FORMATION OF UPPER LIP



SURGICAL ANATOMY OF THE LIP

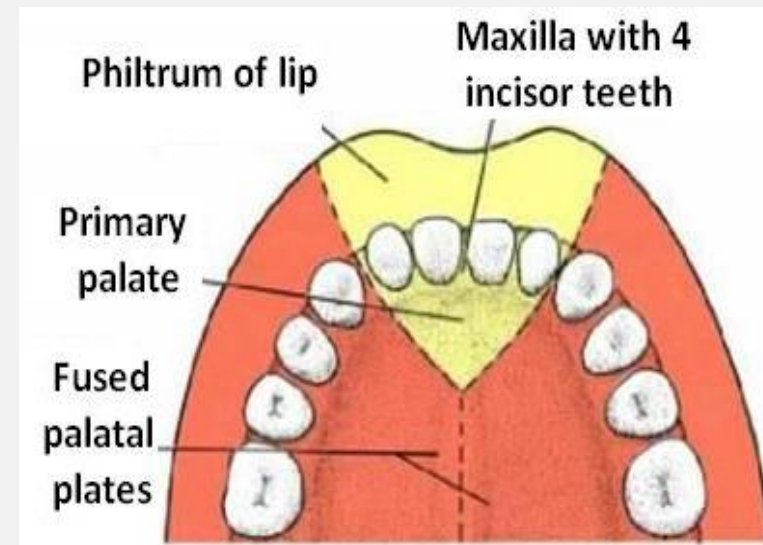
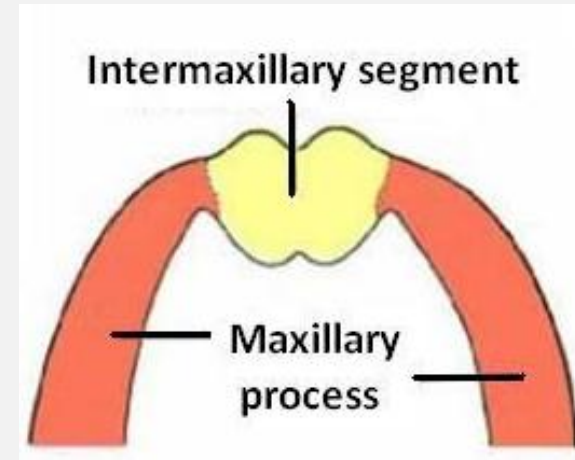


DEVELOPMENT OF PALATE

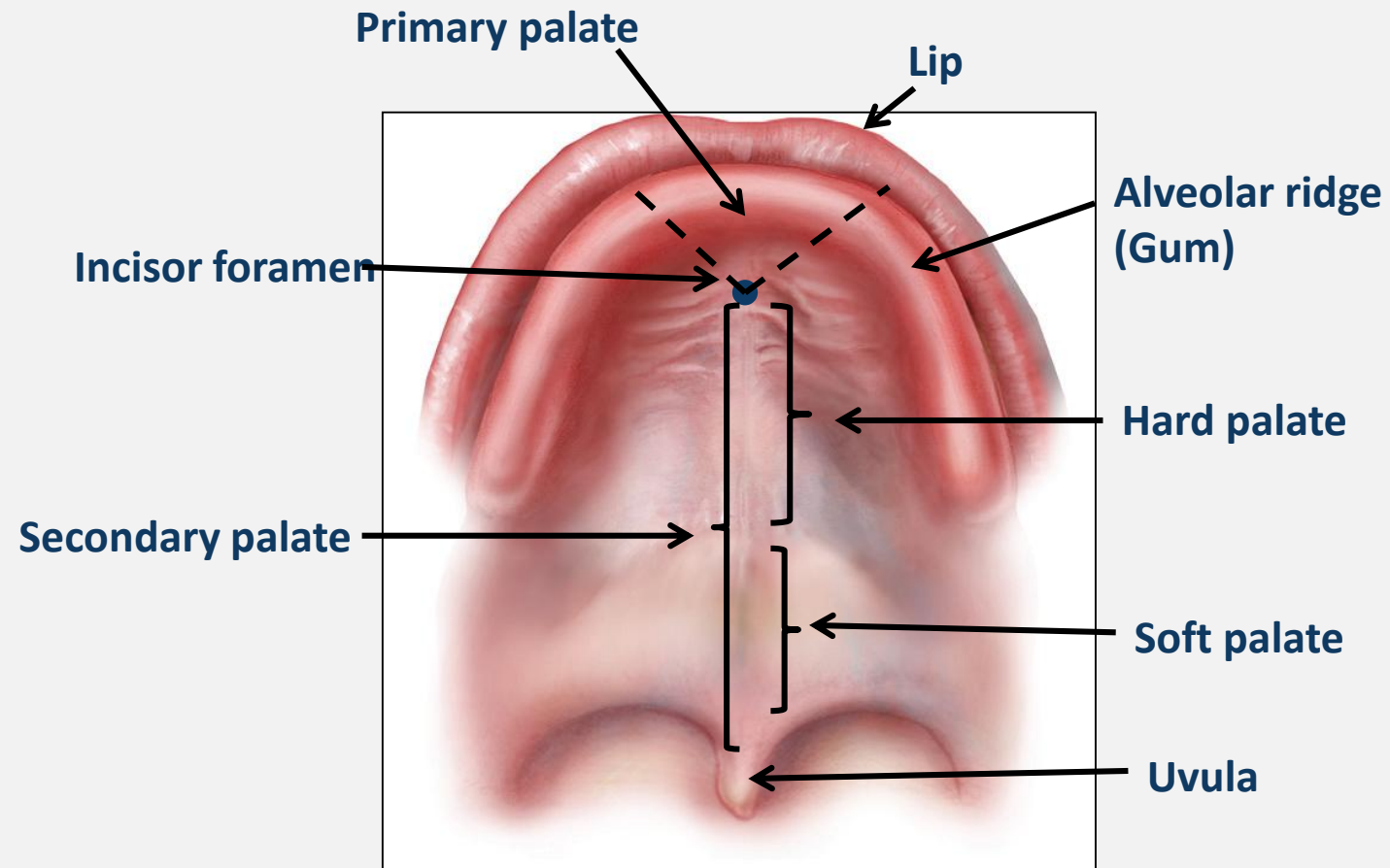
- Intermaxillary Segment
 - Philtrum of the lip
 - Premaxillary part of the maxilla
 - Primary palate

□ Palate develops from 2 primordia

- ✓ Primary palate
- ✓ Secondary palate

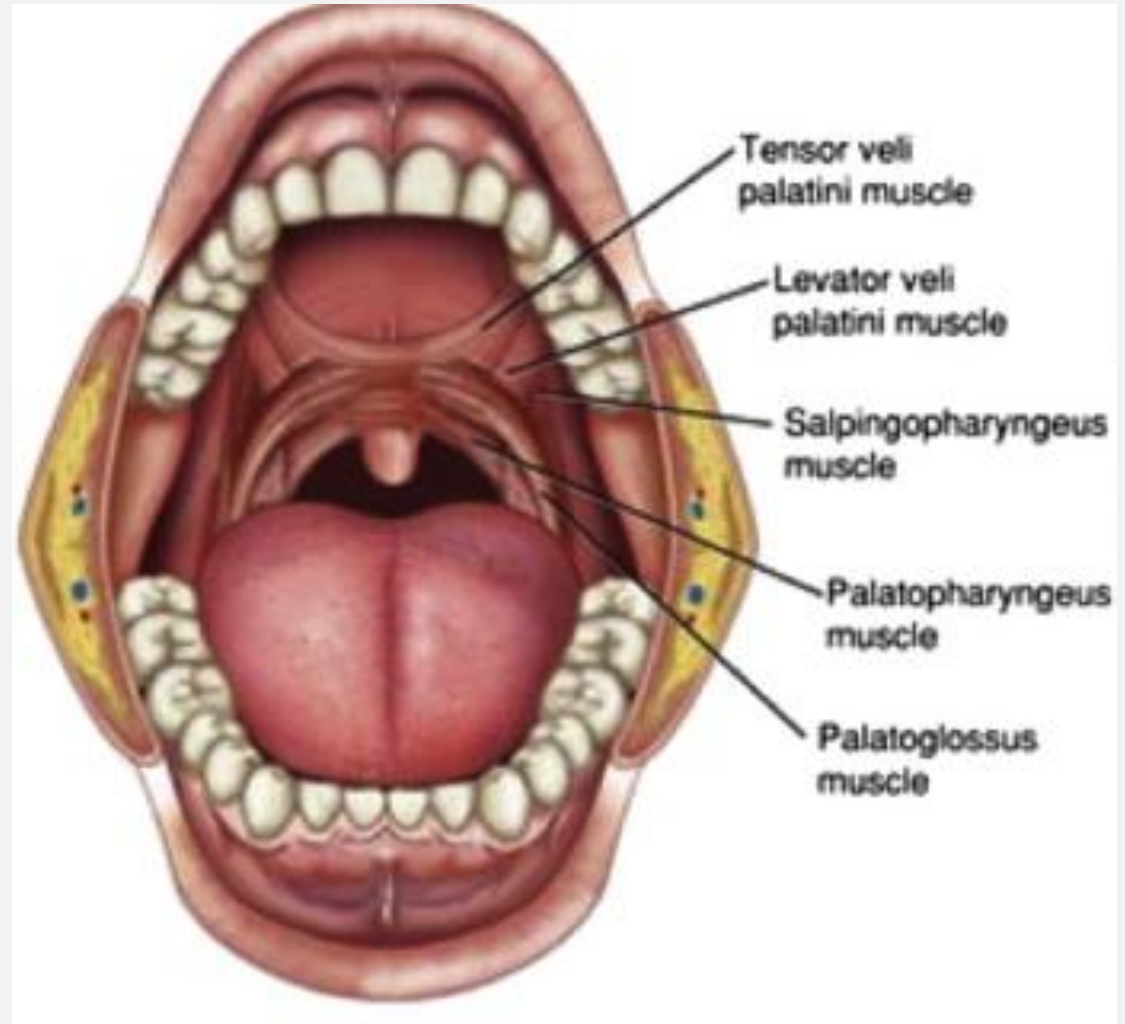
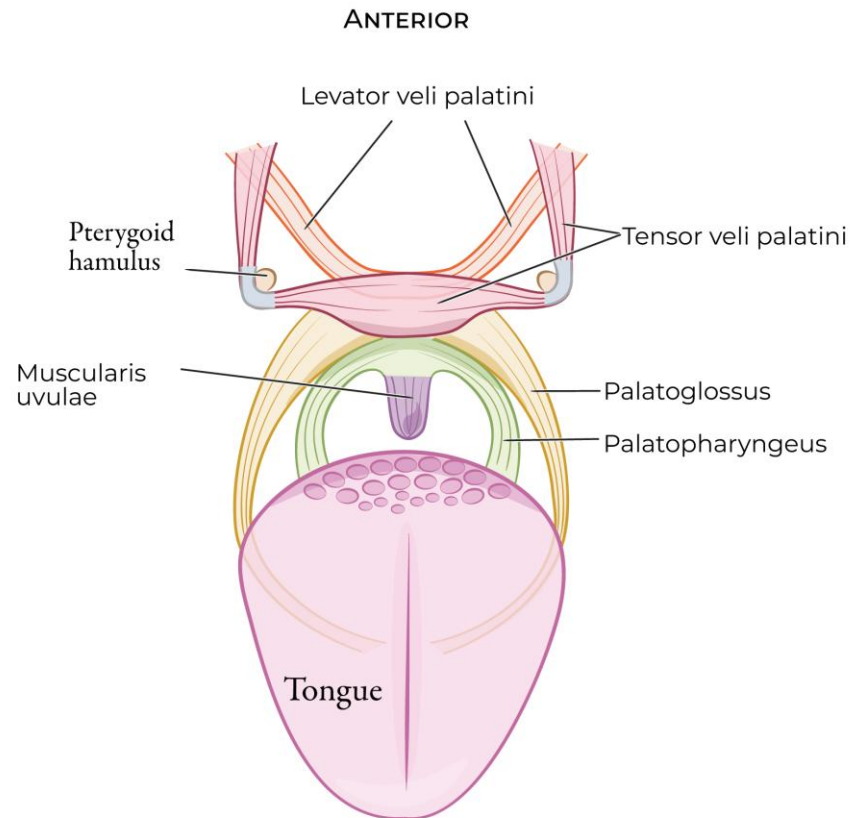


SURGICAL ANATOMY OF THE PALATES



MUSCLES OF PALATE

Soft Palate muscles



DEFINITION

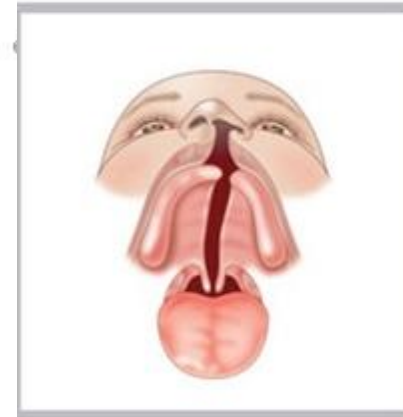
- **Cleft lip:** Failure of fusion of medial nasal process with maxillary process.
- **Cleft palate:** Failure of fusion of 2 palatine shelves of maxillary process.



Unilateral cleft lip



Bilateral cleft lip

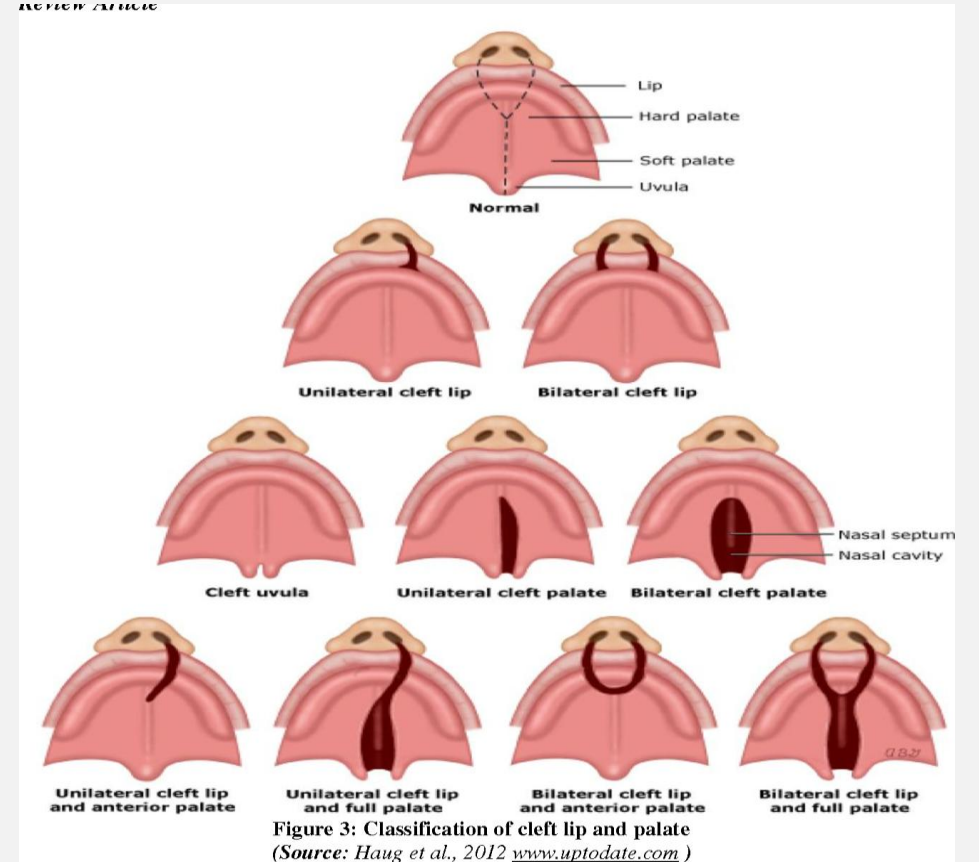
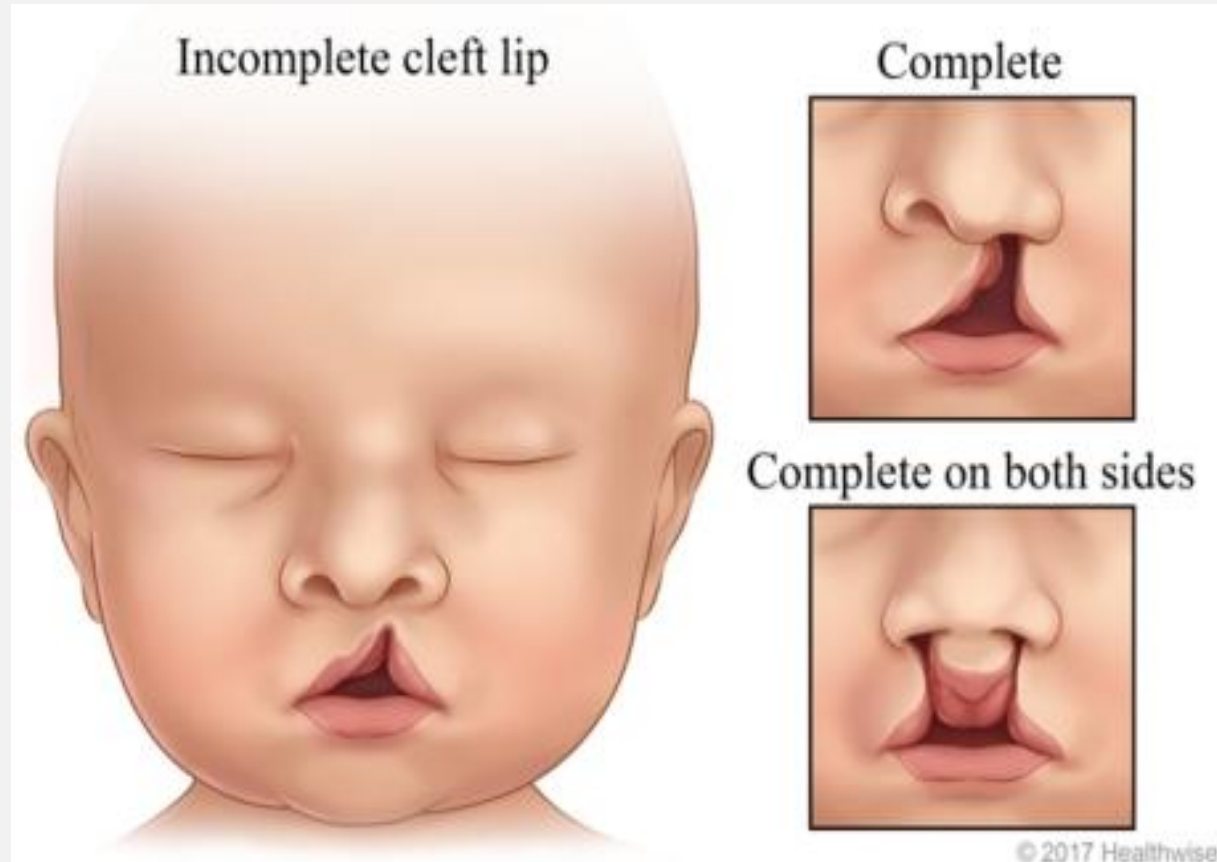


5. Left unilateral cleft lip and palate



6. Bilateral cleft lip and palate

CLASSIFICATION



SUBMUCOSAL CLEFT



EPIDEMIOLOGY

- **Global prevalence:** ~1 in 700 live births
- **Isolated cleft lip:** ~21% of all cleft cases
- **Unilateral clefts:** 9× more common than bilateral clefts
- **Male predominance:** More common in males
- Associated syndromes occur in approximately 30% of children with cleft lip ± cleft palate and 50% of those with isolated cleft palate.

ETIOLOGICAL FACTOR

- Genetic
- Environmental
- Maternal:
 - Smoking
 - Alcohol
 - Obesity
 - Older Age
 - Stress/ Anxiety
 - Epilepsy
- Vitamin deficiency
- Anti epileptic drugs

PRENATAL DIAGNOSIS

- Ultrasonography in the second trimester
- Three dimensional image has been introduced to prenatal diagnosis of cleft anomalies

ADVANTAGES OF PRENATAL DIAGNOSIS

- Time for parental education
- Time for parental psychological preparation
- Opportunity to investigate other associated anomalies
- Gives parents the choice of continuing the pregnancy
- Opportunity for fetal surgery

CLINICAL PRESENTATION

Cleft Lip

- Extends up to the nostril
- Deformed cupid bow
- Discontinuous vermillion border
- Absent philtral ridges
- Flat ala of the nose
- Scar



Unilateral cleft lip



Bilateral cleft lip

CLINICAL PRESENTATION

Cleft Palate

- Gap involving the uvula, soft palate & whole of the hard palate on either side
- Nasal regurgitation
- Nasal intonation
- Defective dentition

Cleft palate



Cleft lip and cleft palate



SCHEDULE OF CLEFT REPAIR

- **Birth to 1 month**

Initial assessment

Presurgical conservative

- **3 month**

Primary lip repair

- **6 month**

Primary Palate repair

- **2 years**

Speech assessment

- **3-5 years**

Lip revision surgery

SCHEDULE OF CLEFT REPAIR

- **8-9 years**

Initial orthodontic intervention for alveolar bone

Continuing speech therapy

- **10 years**

Alveolar bone grafts

- **12-14 years**

Definitive orthodontics

- **16 years**

Nasal revisionary surgery

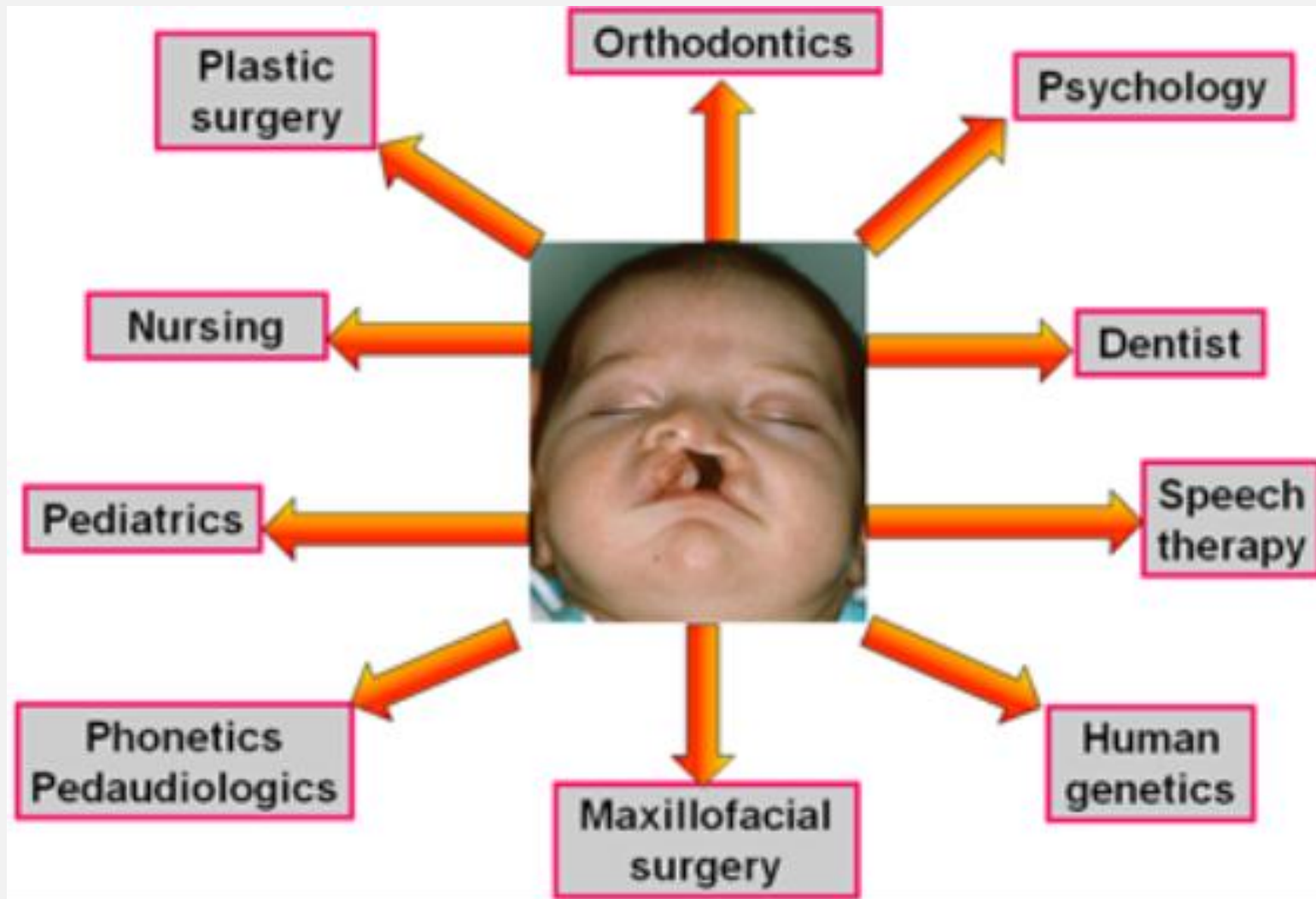
- **17-20 years**

Advanced conservative treatment

TIMING OF PRIMARY CLEFT LIP AND PALATE PROCEDURE

Cleft lip alone		
Unilateral (one side)	One operation	at 5-6 months
Bilateral (both side)	One operation	at 4-5 months
Cleft palate alone		
Soft palate only	One operation	after 6 months
Soft and hard palate	One/Two operations	Within 18 months
Cleft lip and palate		
Unilateral	Two operations	Cheiloplasty: at 5-6months
		Palatoplasty: within 18 months
Bilateral	Two operations	Cheiloplasty: at 5-6months
		Palatoplasty: within 18 months

MANAGEMENT



MANAGEMENT

- Non surgical management
- Surgical management

NON SURGICAL MANAGEMENT

CARE FOR CLEFT PATIENT

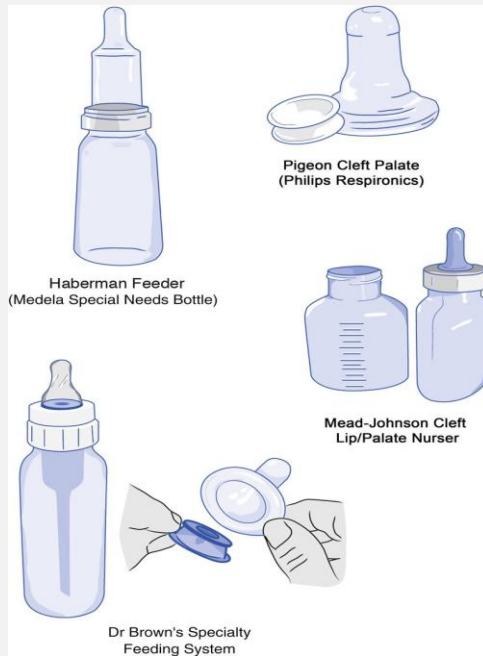
- The following specialists are required to evaluate
 - Neonatologist
 - Pediatrician
 - Feeding specialists nurses
 - Geneticist to assess syndrome associations
 - Clinical psychologist
 - Pediatric Surgeon

CARE FOR CLEFT PATIENT

Immediately after birth

- Feeding and psychological problems are the biggest issue
- A cleft lip or palate makes feeding of baby more difficult
- The major problems with feeding a baby with clefts are problems with sucking and with formula coming through the nose

FEEDING DEVICE



OBTURATOR



Figure 1: Procedural steps for making innovative feeding appliance

CARE FOR CLEFT PATIENT

- Maintain adequate nutrition
- Feeding in proper position
- Provide appropriate feeding tools

CARE FOR CLEFT PATIENT

- Newborn children with clefts presents the risk of aspiration and always obstruction which may lead to acute asphyxia in children with small mandibles like in Pierre Robinson syndrome
- Such case may requires **tracheostomy** at birth

CARE FOR CLEFT PATIENT



Presurgical orthopaedics

1. It facilitate the creation of good functioning palate.
2. Normalize tongue position.
3. Help in speech development.
4. Improve symmetry of nose and cleft of maxilla.
5. Psychologically boost patient and parents as the patient get continued supervision.

NON SURGICAL MANAGEMENT

RULE OF TEN

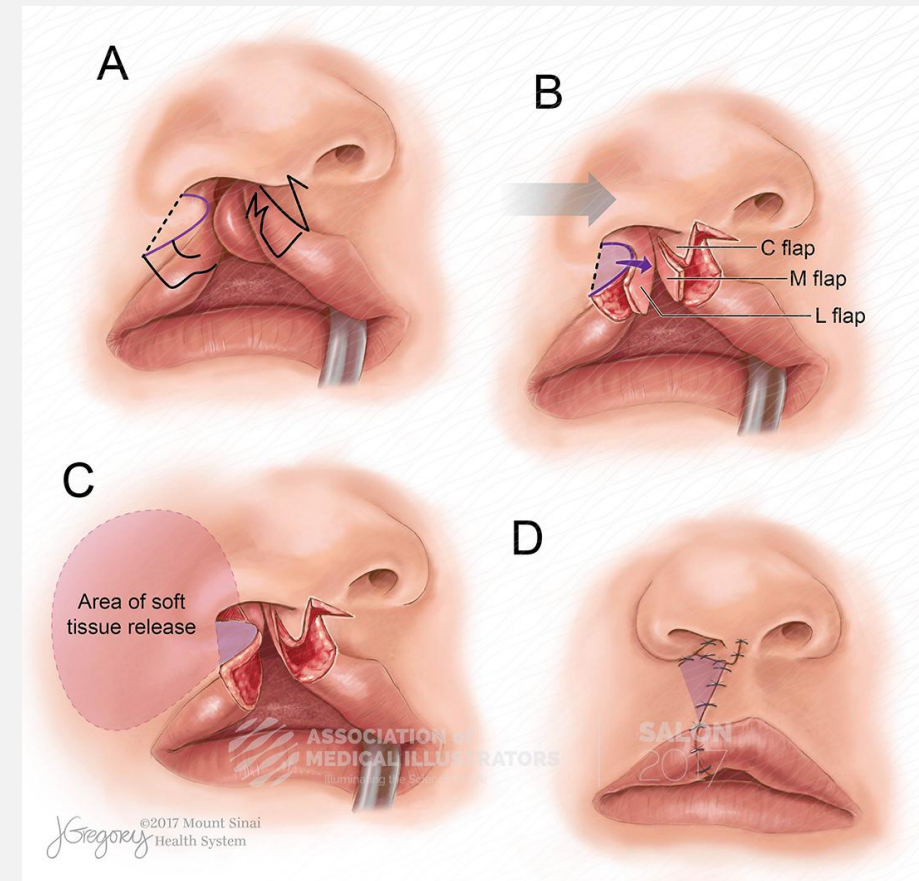
- Child age at least 10 weeks
- Child weight at least 10 pound
- Child has a hemoglobin at least 10 gm/dl

CLEFT LIP SURGERY

□ Unilateral

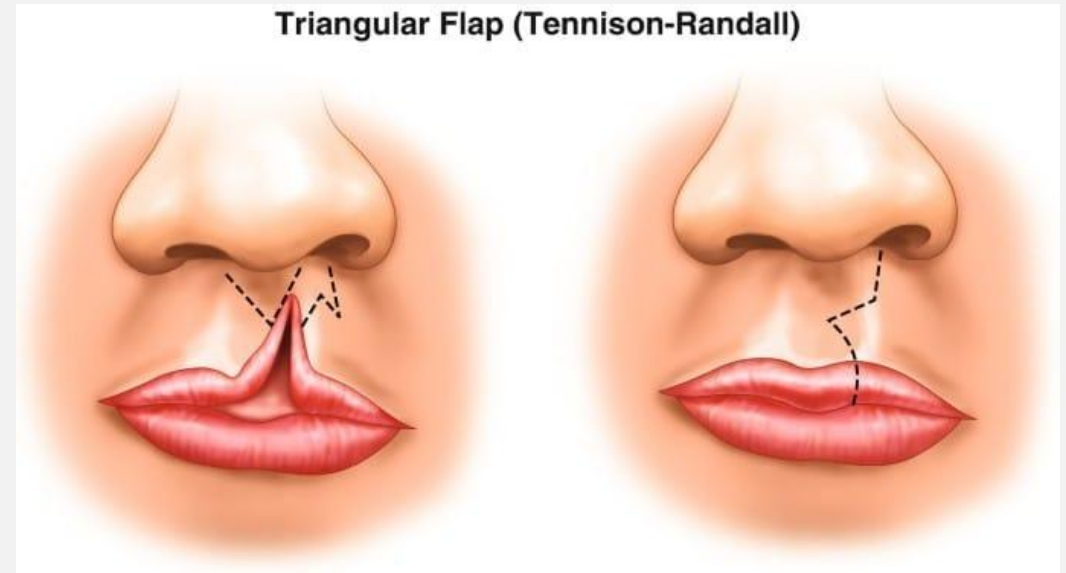
There are multiple surgical techniques for cleft lip repair

1. The Millard rotation-advancement technique
2. The Millard rotation-advancement technique with modifications



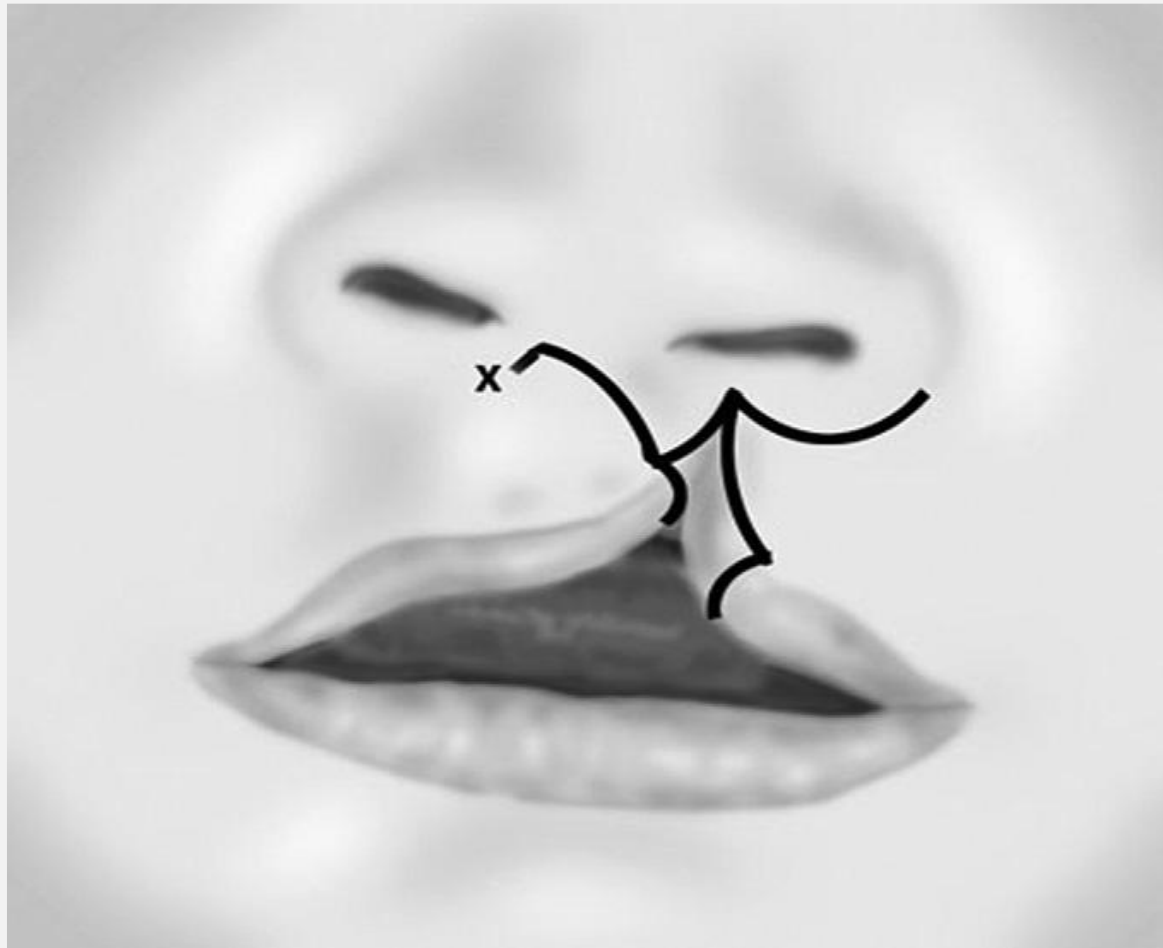
CLEFT LIP SURGERY

3. Triangular flap techniques



4. Rose-Thompson straight line repair

MILLARD LIP REPAIR

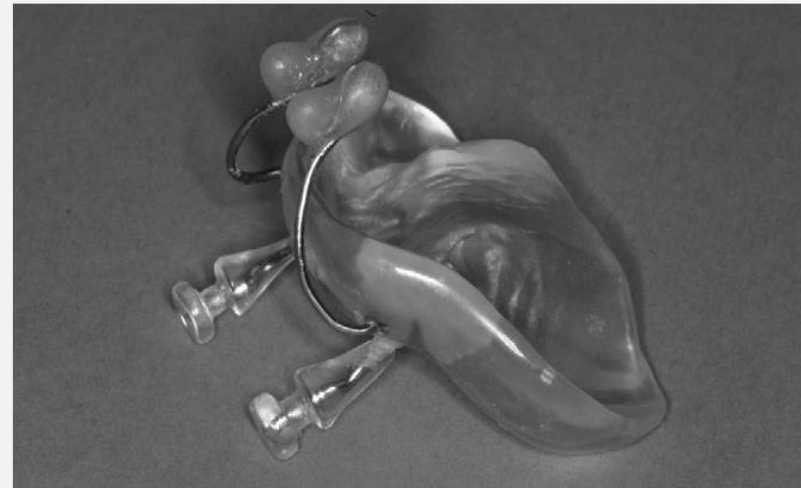


CLEFT LIP SURGERY

□ Bilateral

Techniques introduced by
Millard and by Mulliken

Many surgeons use
presurgical orthopedics to
decrease premaxillary
protrusion

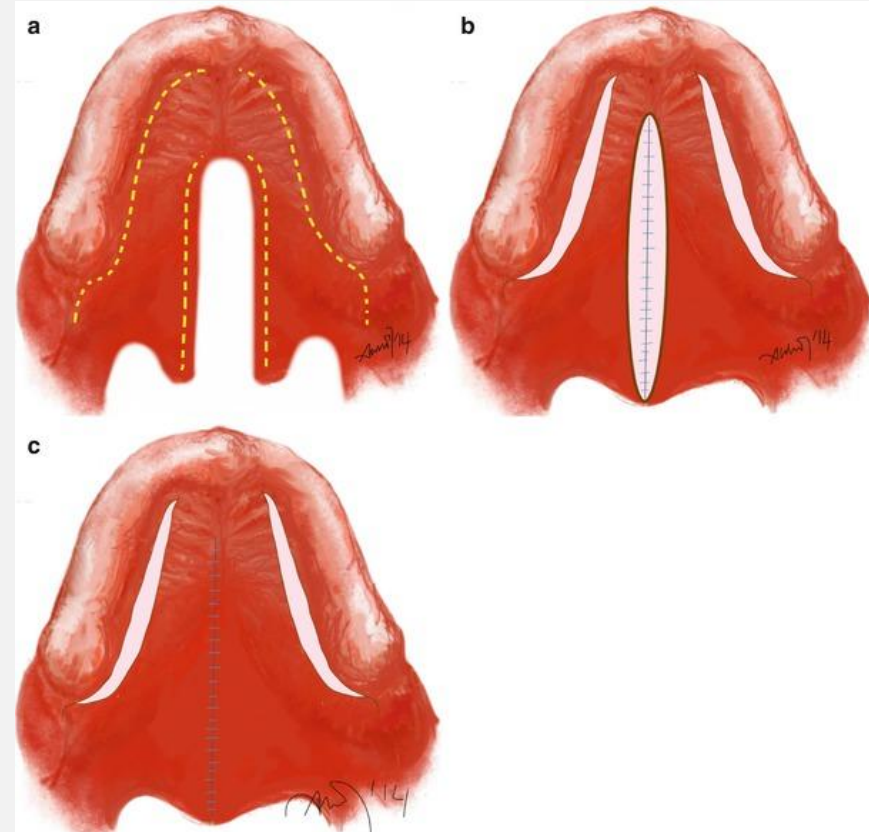


Presurgical orthopedics

CLEFT PALATE SURGERY

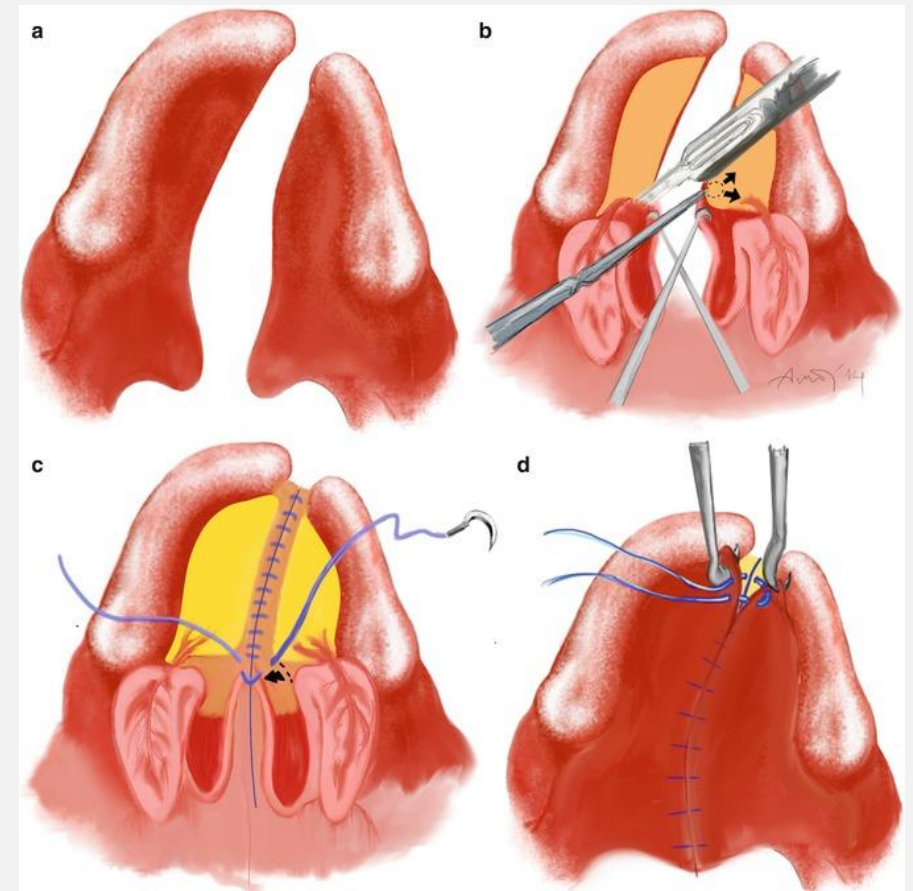
Generally performed between 9 to 12 months of age

1. The von Langenbeck



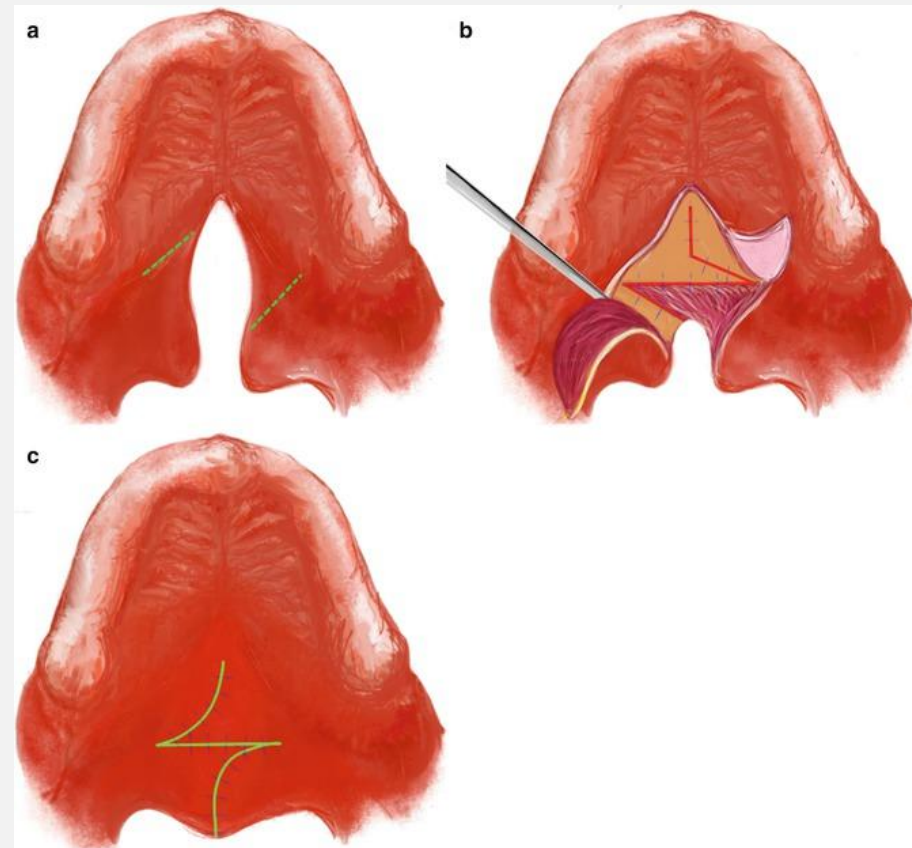
CLEFT PALATE SURGERY

2. The Bardach two-flap palatoplasty



CLEFT PALATE SURGERY

3. The Furlow palatoplasty



4. The Veau-Ward-Kilner (VWK)

Furlow palatoplasty

SECONDARY MANAGEMENT

- Hearing
- Speech
- Dental development
- Facial growth

SECONDARY SURGERY FOR CLEFT LIP AND CLEFT PALATE

- Cleft Lip revision
- Alveolar bone graft
- Simultaneous lip revision and alveolar bone graft
- Secondary palate procedures
- Dentoalveolar procedures
- Orthognathic surgery
- Rhinoplasty

SURGICAL OUTCOME

BEFORE



AFTER



SURGICAL OUTCOME

BEFORE



AFTER



SURGICAL OUTCOME

BEFORE



AFTER



SURGICAL OUTCOME

BEFORE



AFTER



CELEBRITIES WITH CLEFT DISORDER



CARMIT BACHAR



JOAQUIN PHOENIX



JESSE JACKSON

TAKE HOME MESSAGE

- Cleft is a treatable congenital condition—not a curse or disability.
- Early diagnosis and timely surgery provide excellent functional and cosmetic outcomes.
- Prenatal diagnosis and parental counseling improve treatment planning.
- Multidisciplinary care ensures optimal physical and psychosocial development.
- Awareness reduces stigma and improves quality of life.

Thank You