

Poltava State Medical University  
Department of Orthodontics

Ukraine **NOW** <sup>ua</sup>



# Cleft defects

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Poltava  
2024



# Plan of lecture

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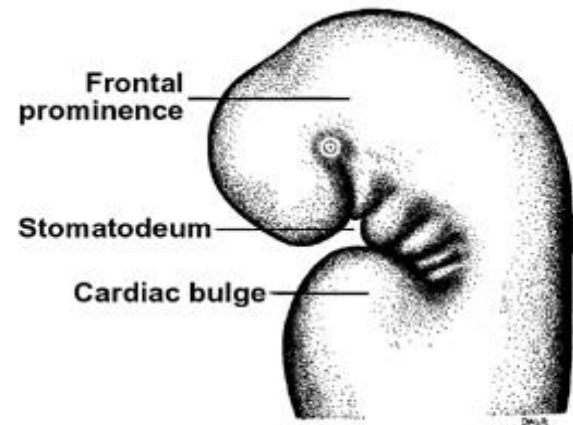
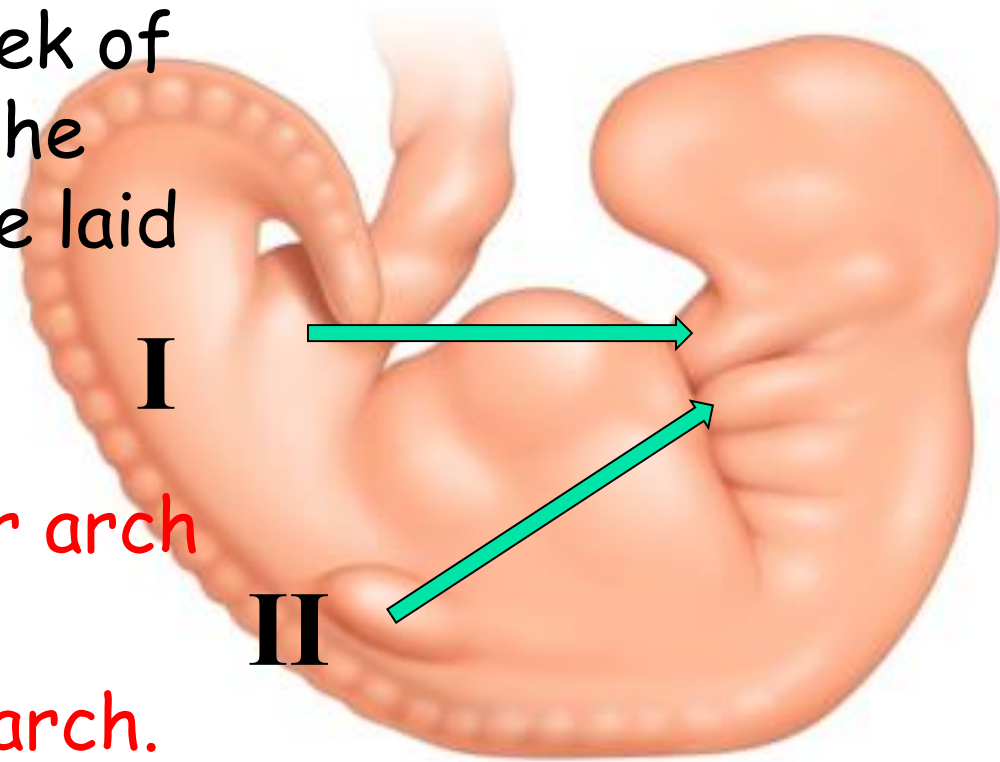
- Embriology of Face
- Classification of cleft defects
- Diagnostics
- Clinical manifestation
- Treatment
- Prevention

About the fourth week of intrauterine life, the pharyngeal arches are laid down

first arch- mandibular arch

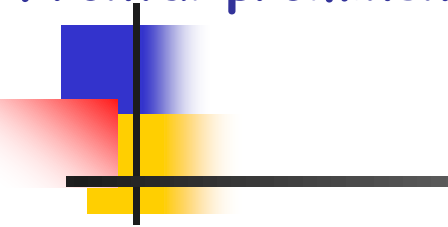
second arch - hyoid arch.

Development of the face  
Formed between the 5th and 8th weeks of gestation



# Face formation

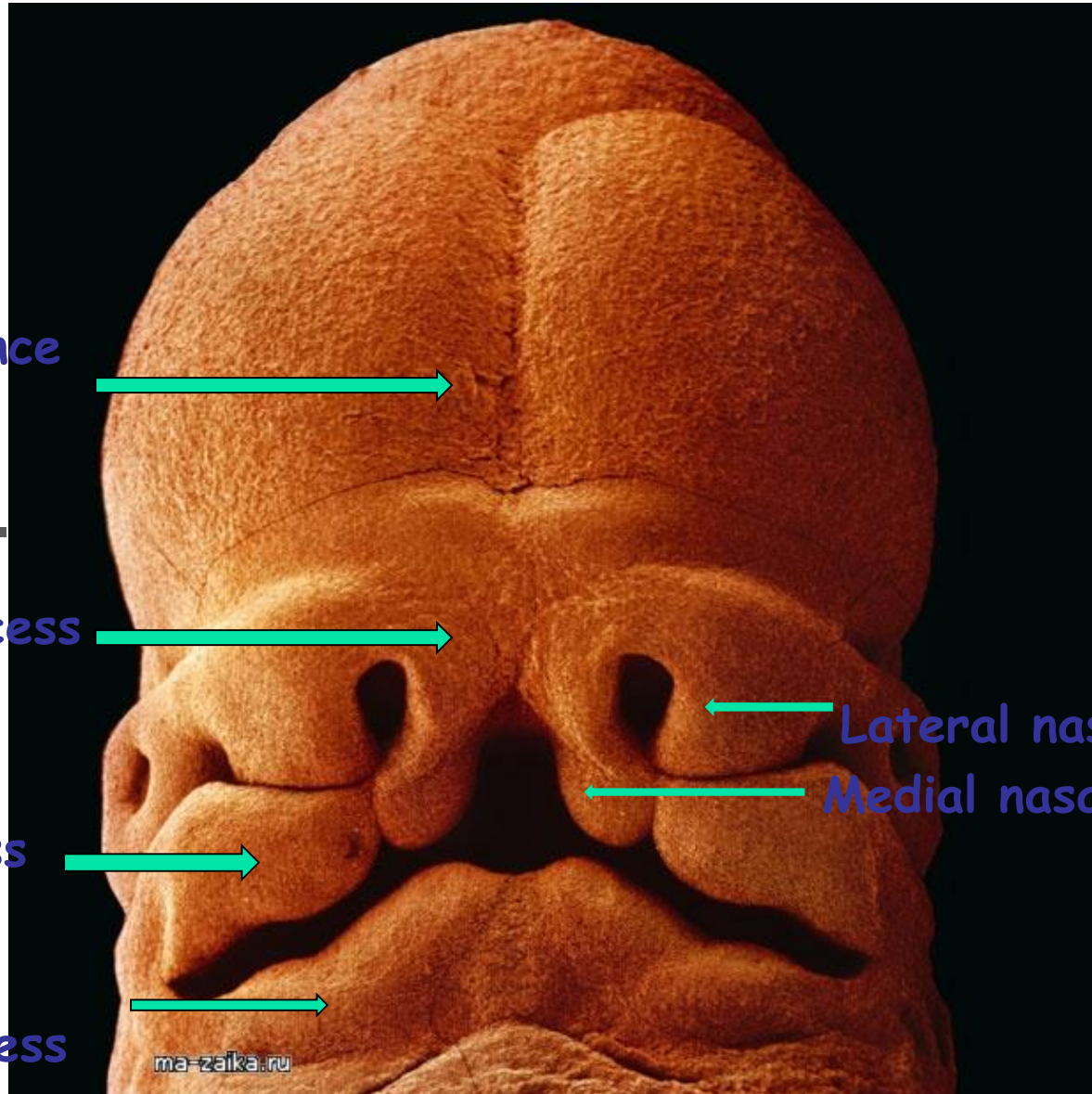
Frontal prominence



Frontonasal process

Maxillary process

Mandibular process



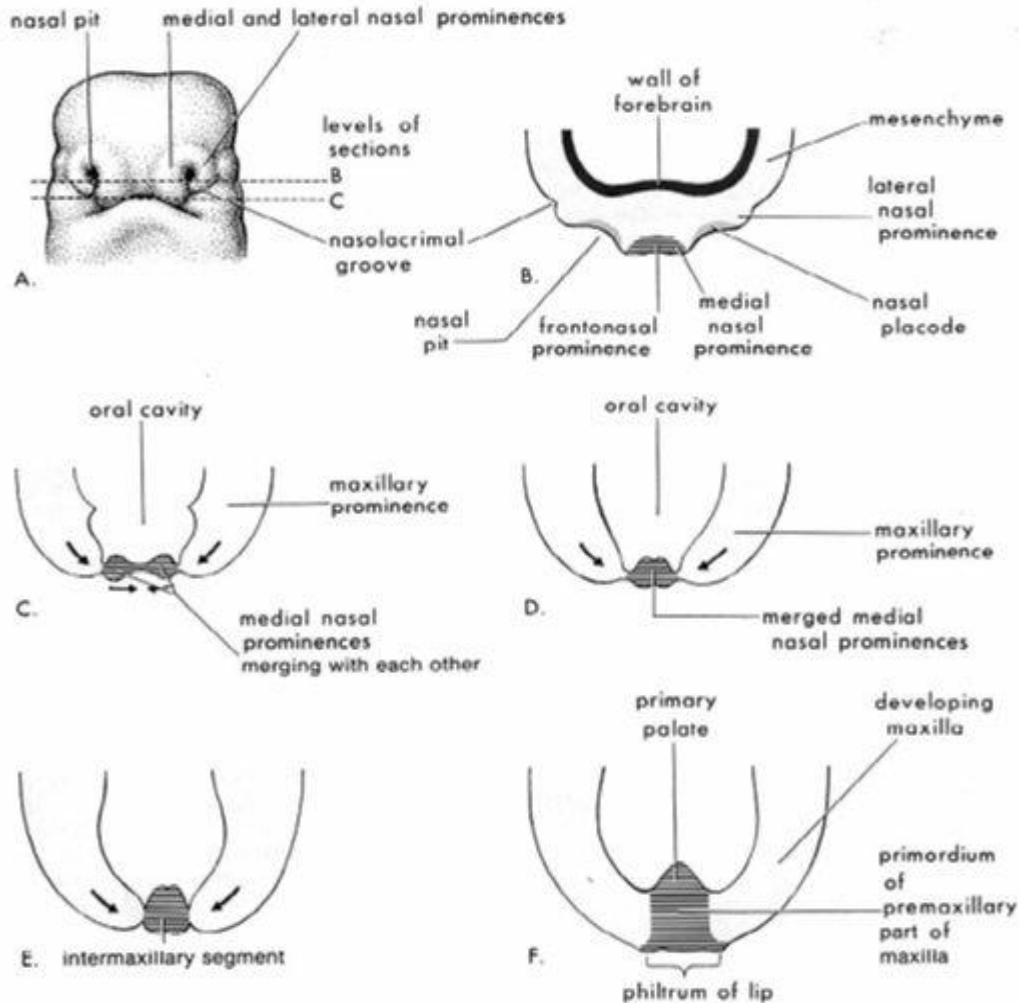
Lateral nasal process

Medial nasal process



# Development of the Palate:

## 1. Primary Palate

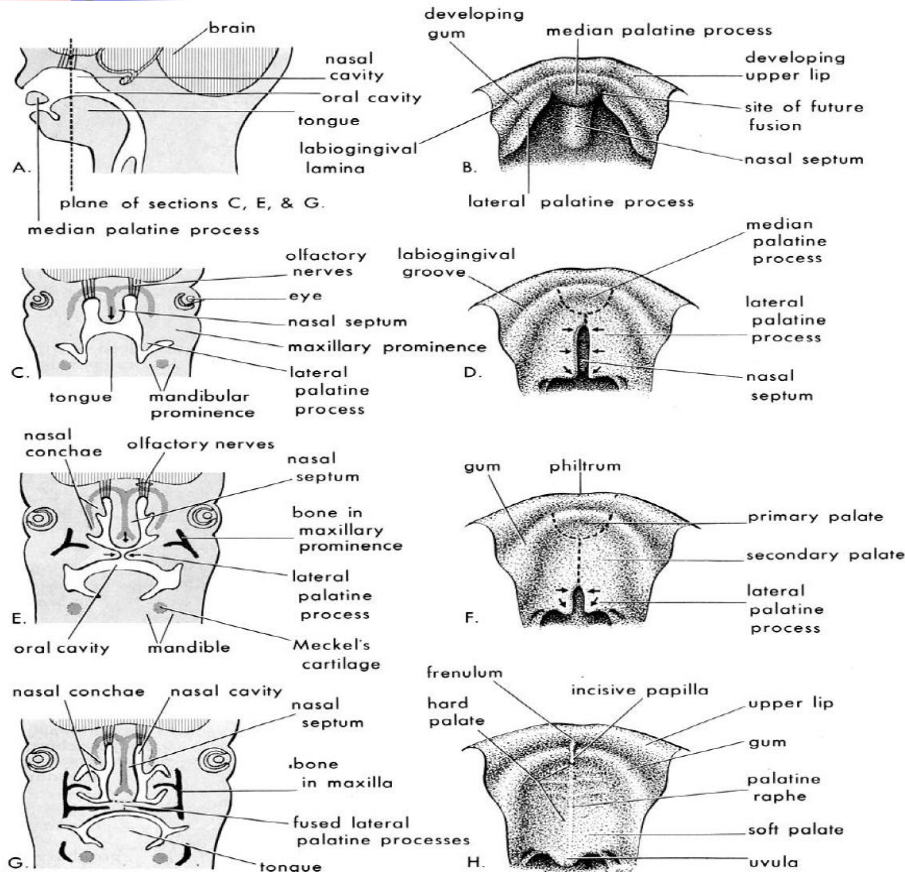


Palatal development begins in week 5, but weeks 6-9 are most critical

- Formation of intermaxillary segment from merged medial nasal prominences
- Primary palate forms from median palatine process
- Ossifies as the premaxillary portion of the maxilla

# Development of the Palate:

## 2. Secondary Palate



- Lateral palatine processes
- Ingrowths from maxillary prominences
- Eventually project horizontally above the tongue
- Fuse with each other, primary palate and nasal septum
- Nasal septum
- Downgrowth of med. nas. promin.
- Fusion with lateral palatine processes starts anteriorly, then moves back
- Hard palate
- Primary palate: premaxilla
- Lateral palatine processes: maxilla
- Soft palate: unossified portion of lateral palatine processes

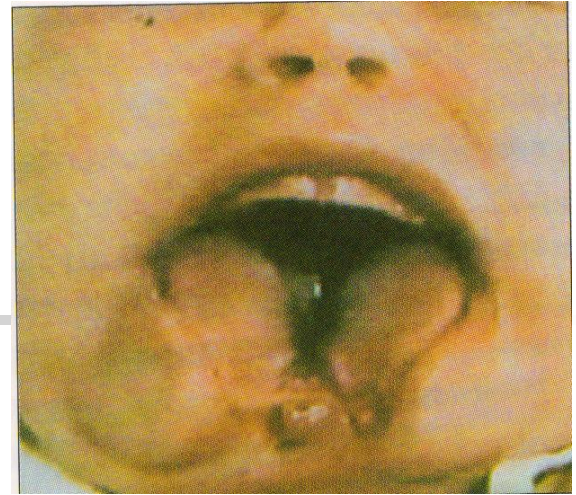


# A. Kolesov'

## Classification :

### I. Face cleft:

1. middle face clefts;
2. oblique face clefts;
3. macrostomia.



## II. Upper lip's clefts:

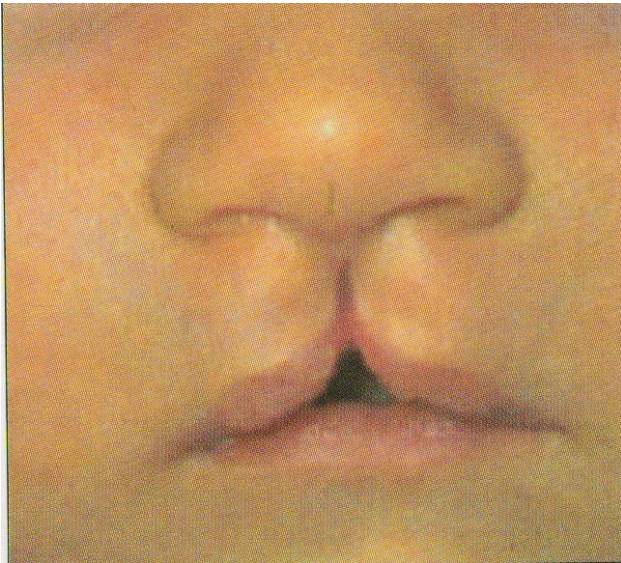
1. Innate hidden cleft of upper lip (one-sided or two-sided);

2. innate incomplete cleft of upper lip:

a) without deformation of dermic-cartilaginous department of nose (one-sided or two-sided);

b) with deformation of dermic-cartilaginous department of nose (one-sided or two-sided);

3. innate complete cleft of upper lip (one-sided or two-sided).





### III. Palate clefts:

1. innate clefts of soft palate:

a) hidden;

b) incomplete;

c) complete.



FIGURE 1: Different extents of isolated cleft palate: A) uvula, B) soft palate, C) incomplete hard palate and D) complete hard palate

2. innate clefts of soft and hard palate:

a) hidden;

b) incomplete;

c) complete.

3. innate clefts of soft, hard palate and alveolar process (one-sided or two-sided).

4. innate clefts of alveolar process and front area of hard palate:

a) incomplete (one-sided or two-sided);

b) complete (one-sided or two-sided).

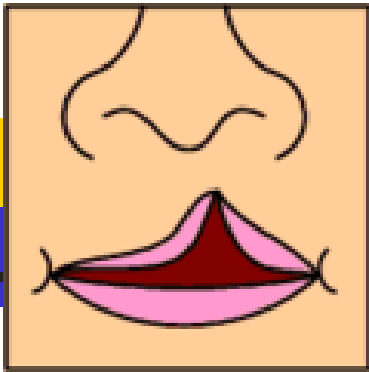


IV. Innate clefts of upper lip and alveolar process  
(one-sided or two-sided).

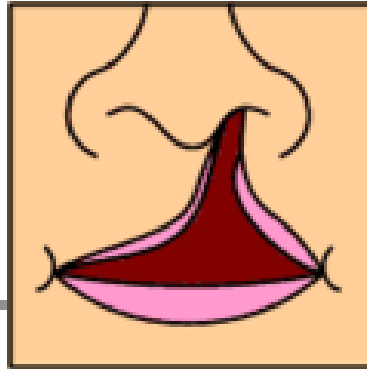
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V. Innate clefts of upper lip, alveolar process,  
hard and soft palate (one-sided or two-sided).

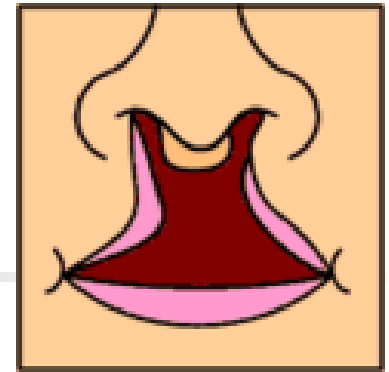




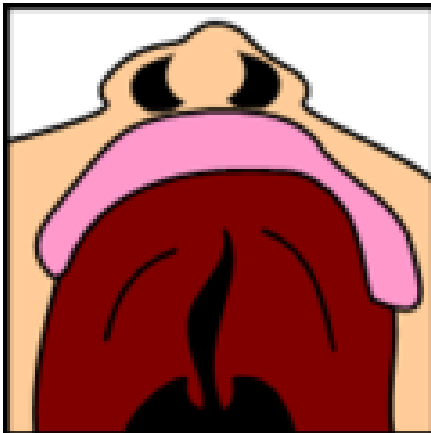
Unilateral incomplete



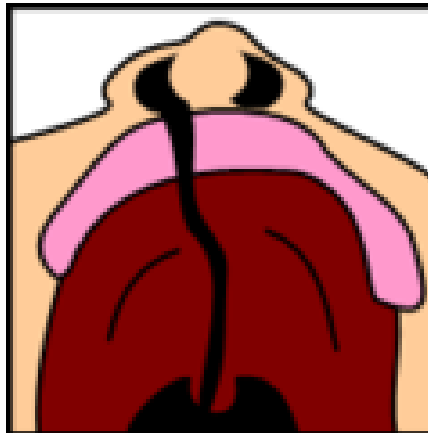
Unilateral complete



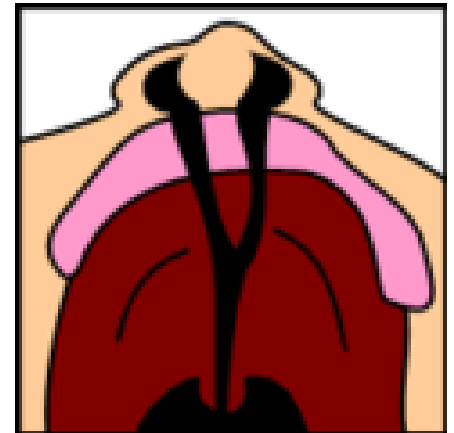
Bilateral complete



Incomplete cleft  
palate



Unilateral complete  
lip and palate



Bilateral complete



# Etiology

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## 1. Genetic disorders

n Factor in over 400 different genetic syndromes

## 2. Chromosomal aberrations

## 3. Teratogenically induced disorders

n Environmental teratogens are agents that interfere with or interrupt normal fetal development

## 4. Mechanically induced abnormalities

Amniotic rupture, uterine tumors, irregularly-shaped uterus



# Etiology



## ■ Cigarette smoking

- Noted with mothers of children with facial clefting, both CL/P and CP.
- Teratogenesis has been attributed to hypoxia as well as a component of tobacco (cadmium).

## ■ Alcohol

- Associated with an increased risk of fetal facial clefting.
- Alterations in cell membrane fluidity or reduced activity of specific enzymes such as superoxide dismutase.

## ■ Folate deficiency

- Contributes to a range of birth defects.
- Evidence is emerging for a similar association with the development of CL/P.
- **Medications** —phenytoin, sodium valproate, methotrexate.

# Prenatal Diagnosis

Diagnosed until the soft tissues of the fetal face can be clearly visualized sonographically (13 to 14 weeks).



# Morphological violations

1. Postoperative scars and residual defects.

2. Flattening of front area upper dental arc.

3. Narrowing of upper dental arch (quite often asymmetric) at one-sided cleft, expressed mainly in area of upper first premolars; expansion of lower dental arc in molars area.

4. Adentia of upper lateral incisors in area of the cleft.



5. Presence of supernumerary teeth in area of the cleft.



6. Rotation or Disposition of upper lateral incisors.

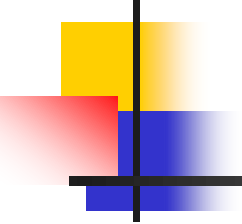
7. Palatal inclination of incisors on the side of the cleft.

8. Denta - alveolar shortening

9. Tendency to development of caries

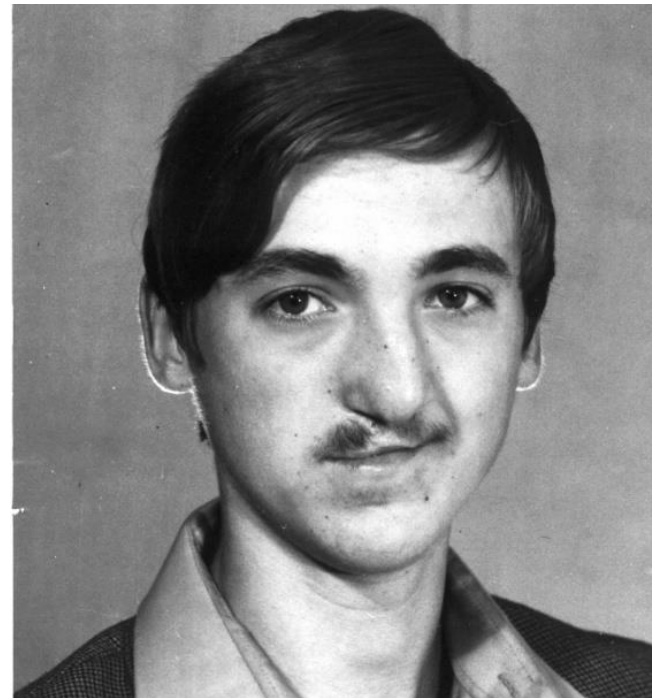


# Functional violations

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1. Sucking
  2. Swallowing
  3. Speech
  4. Hearing
  5. Malocclusion
  6. Limited mobility of upper lip
  7. Insufficient closing of lips in connection with shortening of upper lip on the side of the cleft.
  8. Laying of tongue in the area of defect of lip and alveolar process
  9. Mouth breathing
  10. Parafunction of mimic muscles

# Aesthetic violations

1. Flattening of upper lip and violation of profile
2. Violation of upper lip border contour (lines of Cupid), defect of upper lip, its insufficient closing with lower.
3. Wrong position of incisors, visible at a smile.
4. Deformation of nose's wing (one-sided or two-sided).





# Long list of list of procedures these children undergo

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- Neonatal orthopaedics-orthodontist
- 3-12 months repair of lip and anterior maxilla- plastic surgeon
- 9-18 months repair palate-plastic surgeon
- 5 yrs revision of lip repair-plastic surgeon
- 7-10 yrs orthodontics +repair - oral surgeon
- 12-18 yrs orthodontics/orthognathic surgery

# 11 month old girl cleft lip repair





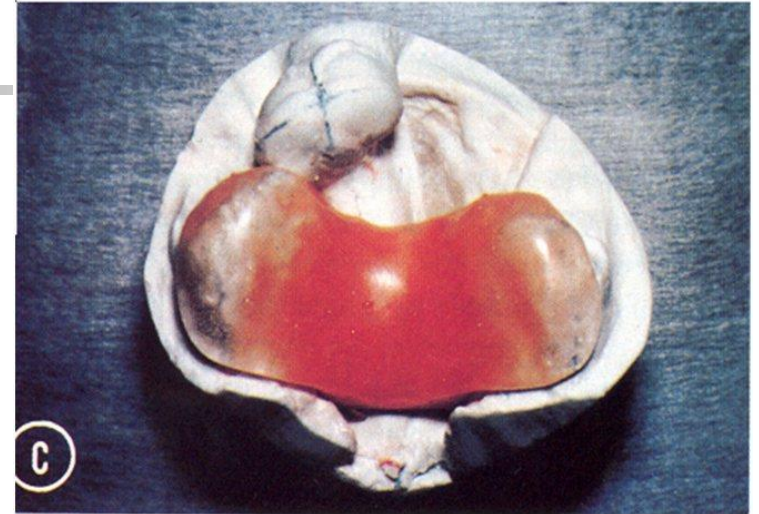
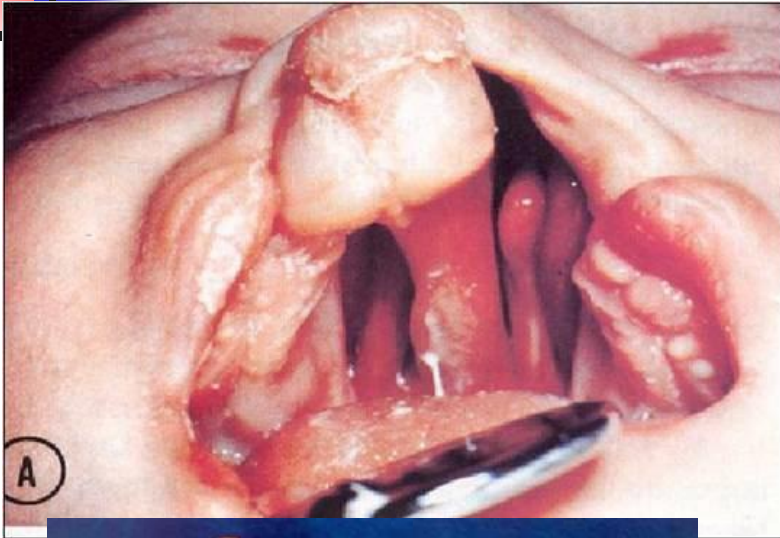
# Orthodontic treatment:- performed at different stages of development.

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- Neonatal maxillary orthopaedics as an infant
- Orthodontic-orthopaedics in deciduous dentition.
- Orthodontics in the mixed dentition.
- Orthodontics alone or in conjunction with maxillofacial surgery (+/\_distraction osteogenesis) in the permanent dentition.

(Patients with cleft of lip only or soft palate only, defect will not effect dentition.)

# Pre surgical plates, moulding plates, protective feeding plates.....



# Feeding plates to assist in early feeding

- Obturator plate



Fig 5.3 - Obturator Plate



# Nasoalveolar moulding





# Orthodontic orthopaedic treatment in the deciduous and mixed dentition

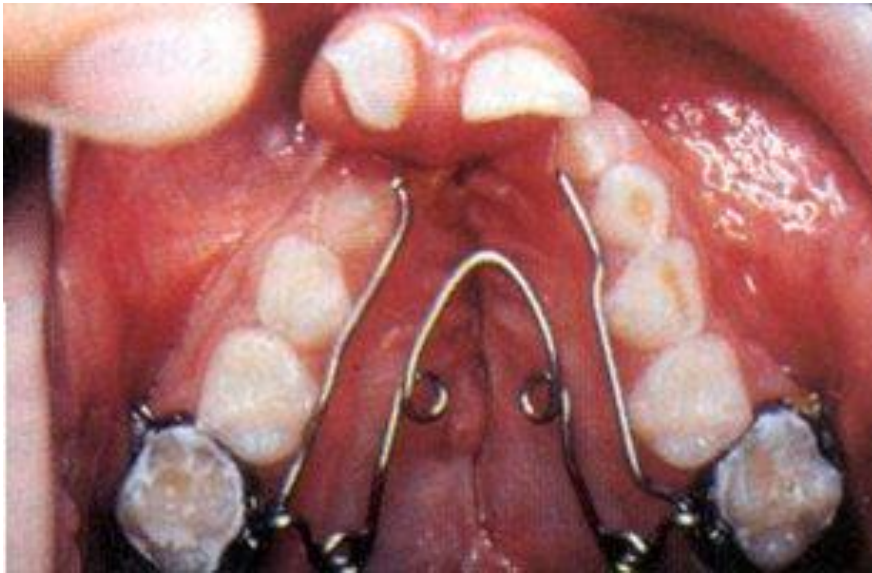


- Orthodontic treatment involves expansion to develop favourable arch form, alignment'
- Together with protraction headgear to 'develop the maxilla

# Repaired cleft palate in 8 year old



# Quadhelix to expand prior



angle brackets to keep roots  
away from cleft









# erupted canine

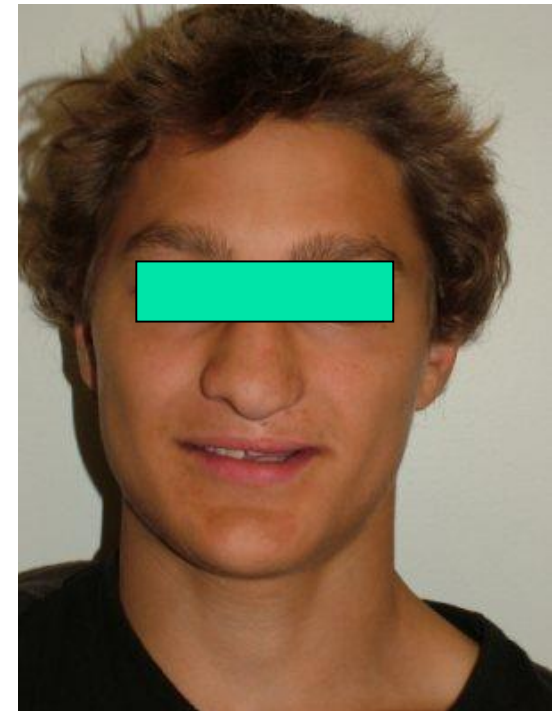




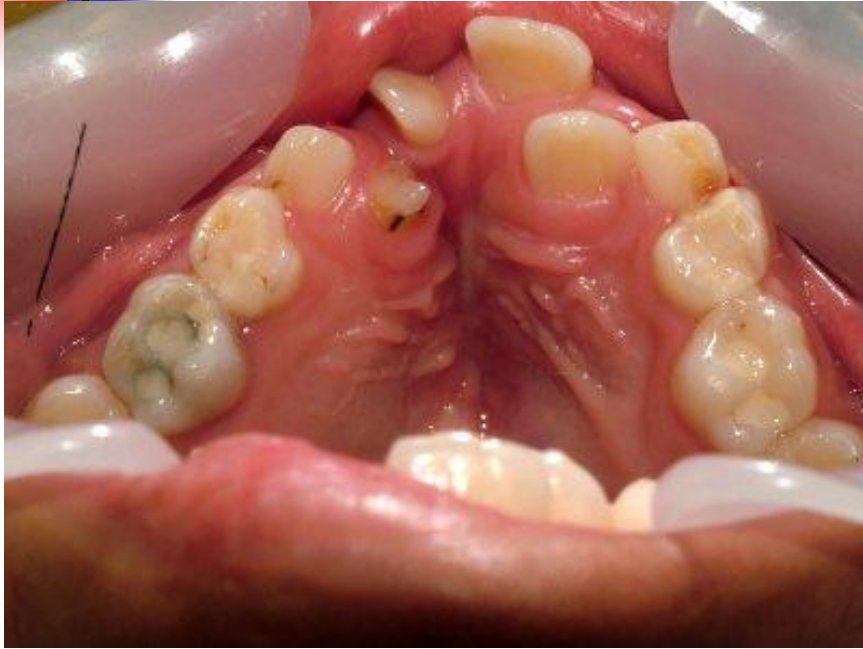
# Orthodontics in the permanent dentition

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- Orthodontics alone... adolescent.
- Orthodontics in conjunction with orthognathic/distraction surgery... adults.
- Long term retention especially important.



Adolescent treatment





# Adult treatment- Orthognathic surgery

