

# How to Scan it's Plane and Structures: the Fetal Face

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**WEEK SIX**

# OBJECTIVES



- Explain embryonic development of the face.
- Discuss sonographic approach to obtaining the images of the fetal face.
- Classify cleft lip and palate defects.
- Discuss embryology of the eye and leading orbital and periorbital anomalies.
- Relate sonographic features to discuss face anomalies.

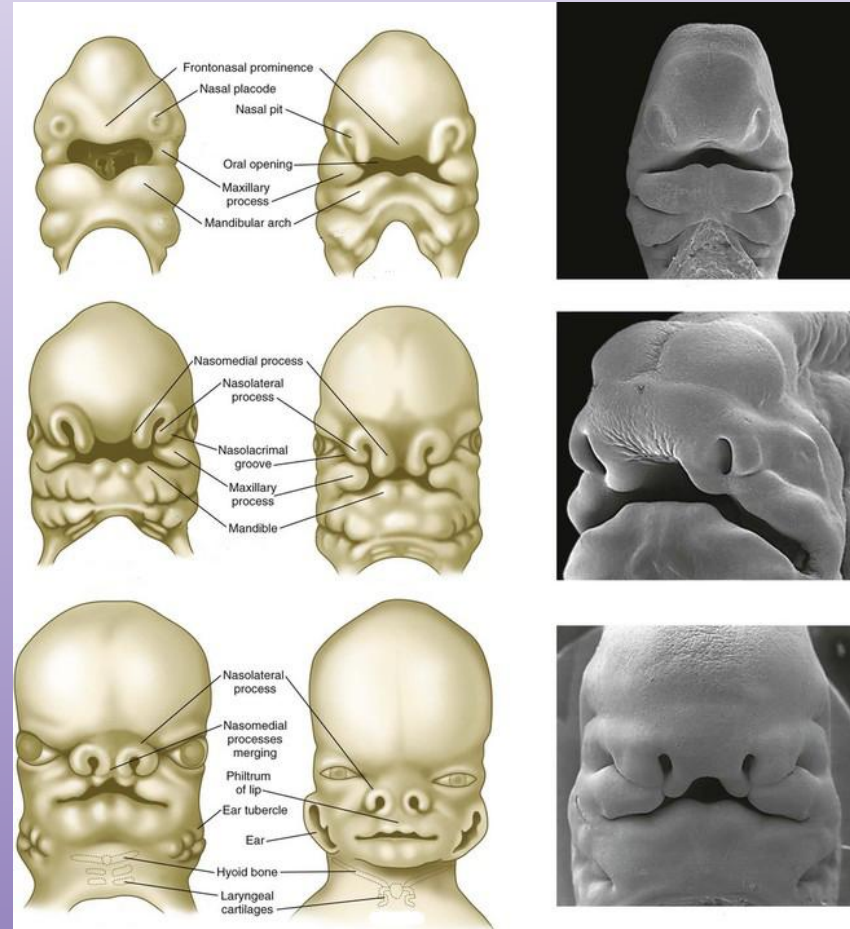
# Embryonic Development

## First Trimester

Day 22	Cells that will later become eyes/ ears appear lateral to the neural folds
Day 26	Facial arches appear
Day 52	Eyes developed on lat head, ears low set, and tongue is completely developed
Day 57	Palate and nasal septum begin fusion, ear formed

## Second trimester

10 weeks	Eyelids fused, intermaxillary segment continues fusion
12th week	Palate fusion completes
14th week	Philtrum of lip forms
16 weeks	Eyes and ears move to final location

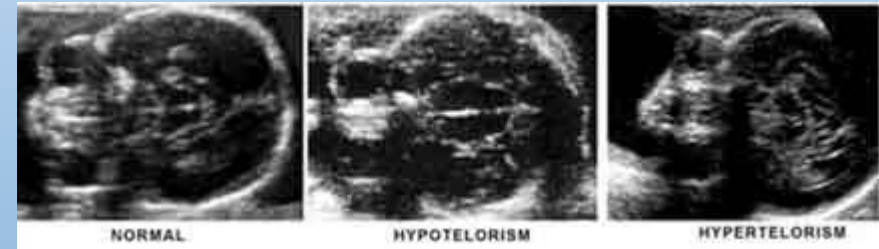


*condensed chart from textbook pg 469*

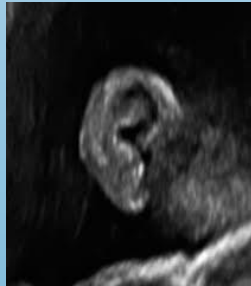
# The Face

## Orbits and eyes

- View the same plane that measure the BPD
- Measurement between the eyes.
  - Hypotelorism, closely spaced
  - Hypertelorism, widely spaced
- Outer orbit distance has a greater range of normal variation
- Outlines the lens of the fetal eye
  - Ciliaris muscles
  - Zonular fibers
- May image within the fetal globe
  - Hyaloid artery



# The Face



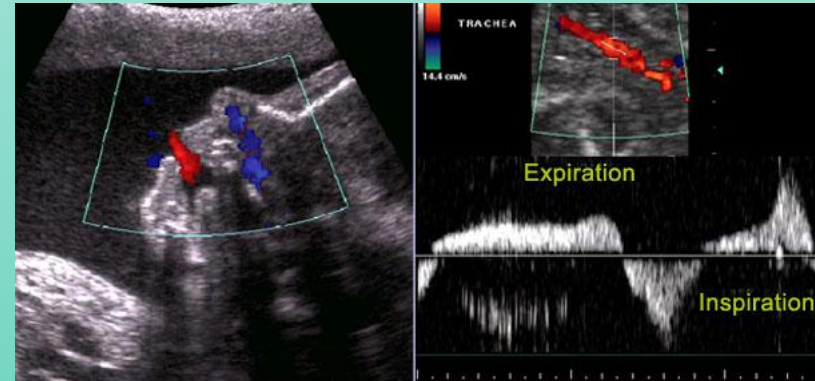
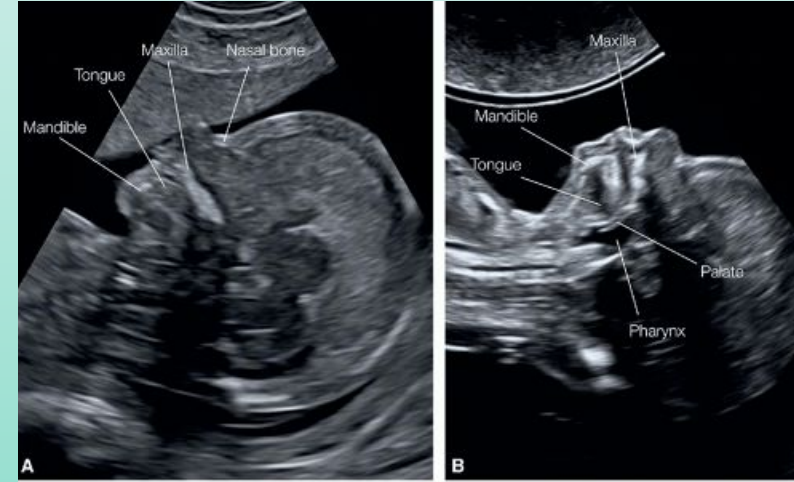
## Ears

- Pinna of the ear
  - Best seen with 3D surface rendering
- In accordance with a linear growth pattern, the fetal ear length can be useful as a possible biometric measurement

# The Face

## Lower Face

- Nares and upper lip, seen at a coronal scan, and the face
  - can be searched for cleft lip
- Fetal tongue motion/swallowing can be seen
- Midline sagittal view = the fetal profile
  - Confirms the shape and position of the fetal nose and chin
- Color flow doppler
  - Demonstrates normal fetal breathing

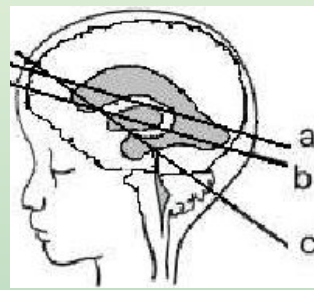




# The Face



*Minimum Face Views Obtained During the  
**Sonographic Exam**  
pg 477 of the textbook*

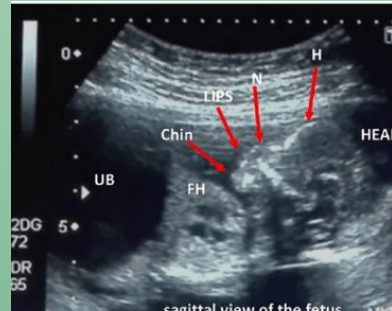


**Axial-- Ventricles**

**Ventricles,  
choroid plexus**

**Coronal- Face**

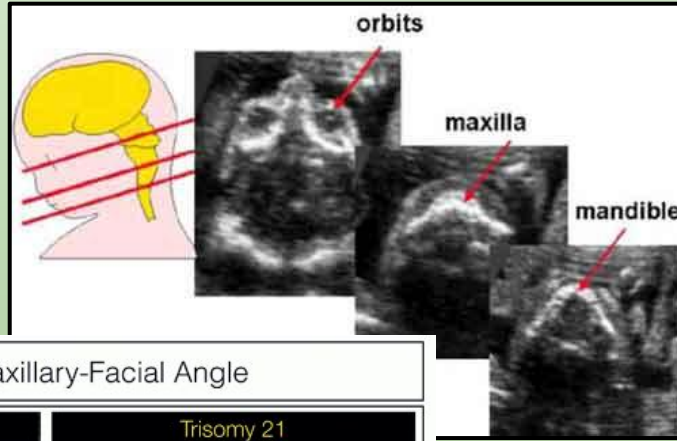
**Soft tissues of  
the nose, lips, chin**



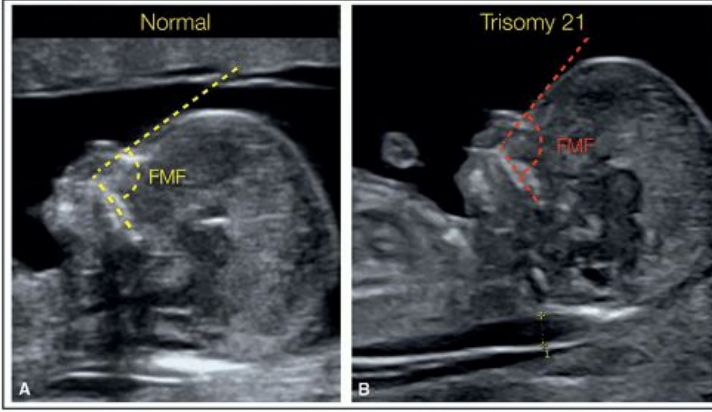
**Sagittal- Profile**

**Confirm correct symmetry  
of forehead, nose, lips, chin**

# Normal Sonographic Anatomy



Fronto-Maxillary-Facial Angle

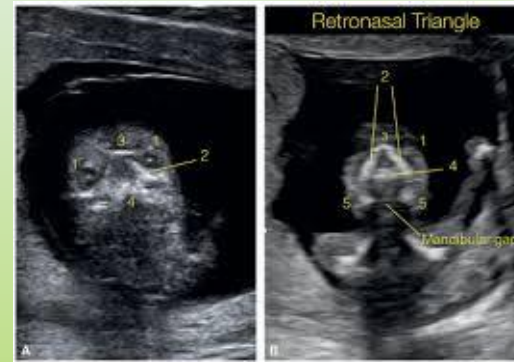
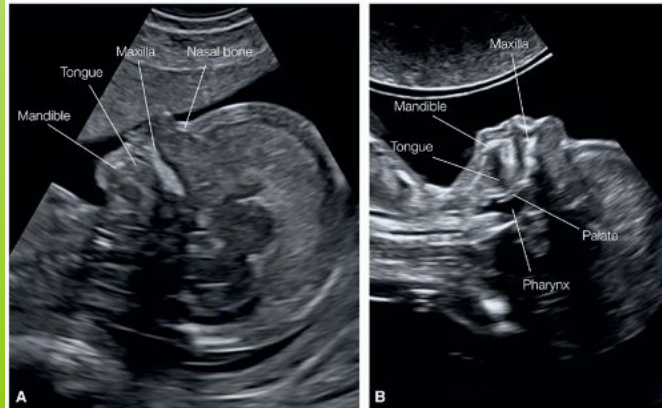


The visualization of the fetal face requires multiple approaches from the sagittal, coronal, and axial planes.



## ***Sagittal Planes (Profile view)***

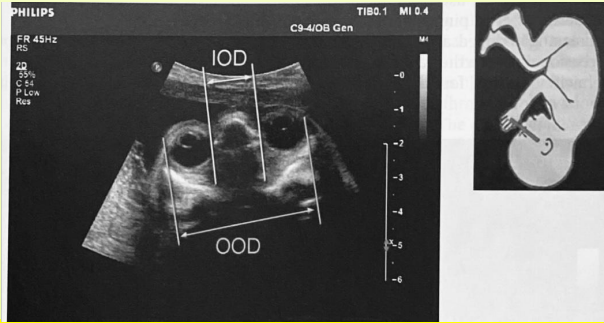
- the forehead
  - “frontal bossing”
- nose with nasal bone
  - “equal sign”
- mouth with maxilla
  - Recognized as a developing bone region in the fetal face
- mandible anteriorly
  - An echogenic dot under the anterior maxilla .



## ***Coronal Planes***

- Relationship between the orbits/ eyes and the nasal bridge/ maxilla.
- The retronasal triangle
- A mandibular gap, seen between the maxilla and the mandible





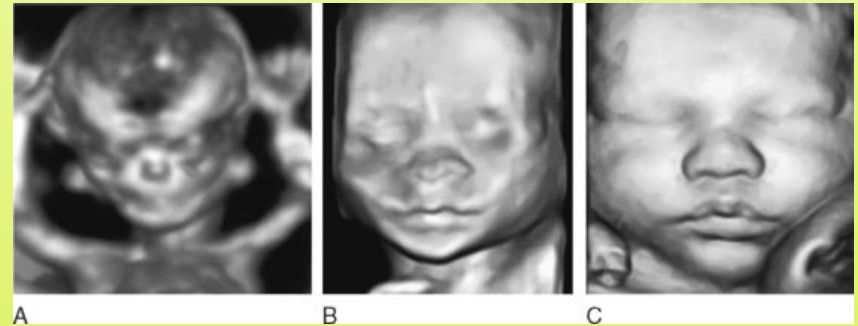
### ***Axial Planes***

- demonstration of orbits, nasal bridge, the maxilla, and the mandible.

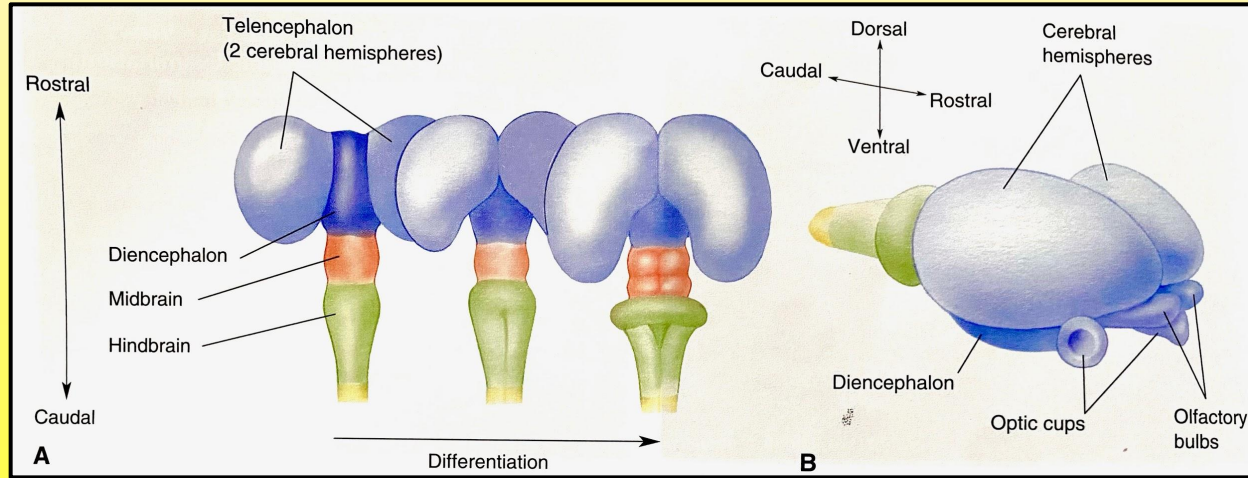


### ***Three-Dimensional Ultrasound of the Fetal Face***

- Good visualization of facial structures
- Can often be transabdominal, but transvaginal provides the best resolution and details
- Helps evaluate for facial anomalies



# Embryology of the Eye



- Day 28
  - Optic vesicles
- Day 48
  - developing eye
- As the first trimester comes to an end, the fetal facial structures roam into the midline of the head.

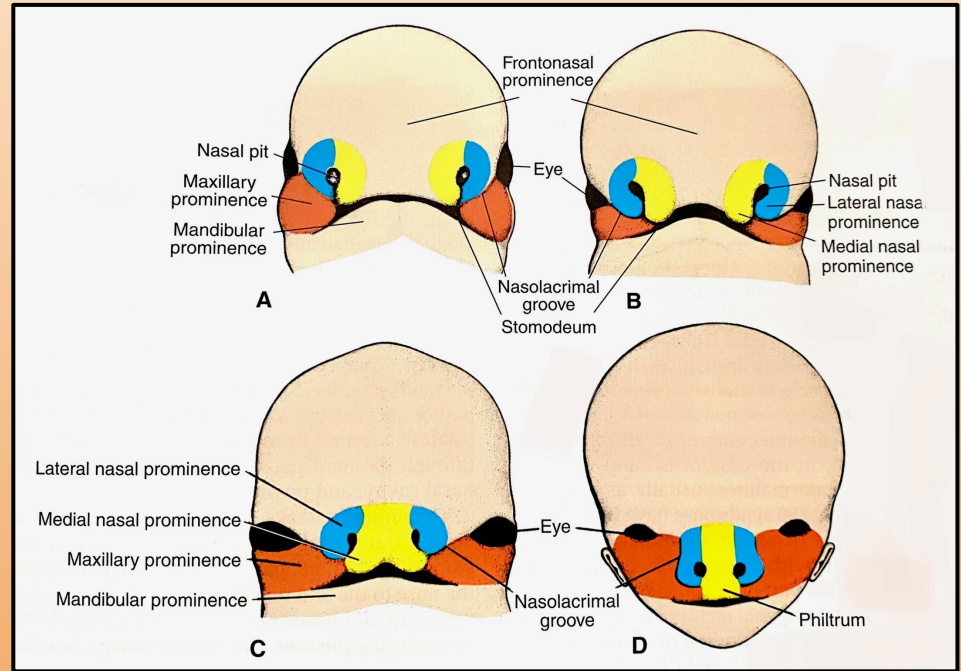
# Embryology of the Eye

- Hypotelorism
  - Decreased interorbital distance
  - Typically found with other severe anomalies
    - holoprosencephaly
- Hypertelorism
  - Increased orbital distance
  - Isolation or with another malformation and syndrome.
- Microphthalmia
  - Decreased orbit size
  - Typically isolated
- Anophthalmia
  - Absence of the eye

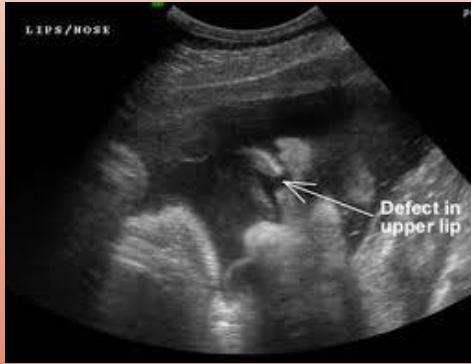


# Embryology of the Lower Face

- Originally from the first arch, the paired mandibular processes connect into the the development of the lower face
- Maxillary and 1/5 prominences that creates the nose will then form the fetus upper lip
  - cleft palate or lip may occur if there is any lack of fusion
- Abnormalities
  - Macroglossia
  - Micrognathia

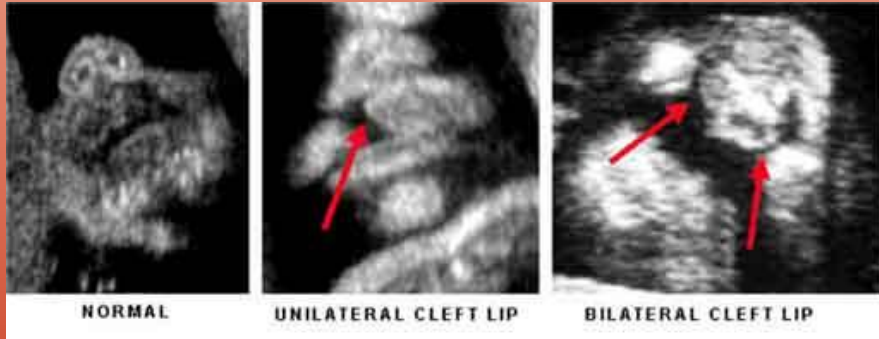


# Facial Cleft Lip



## Isolated cleft lip (CL)

- occur independent
- males
- Clubfoot
- Polydactyly
- Ultrasound
  - anterior coronal or axial plane

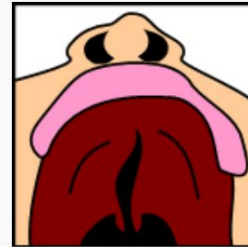
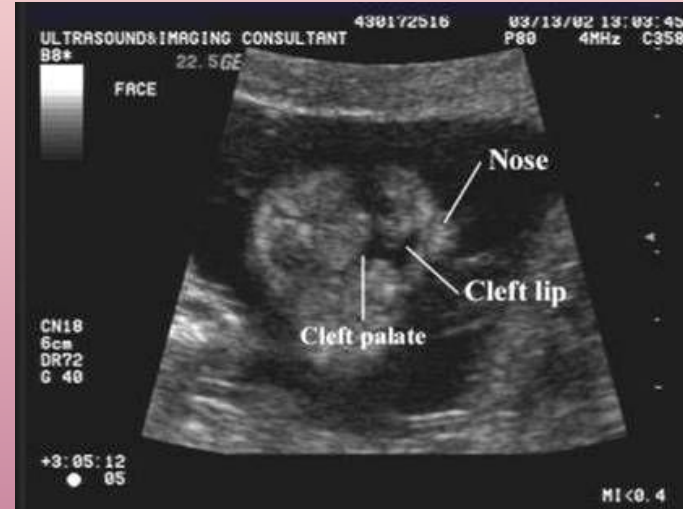




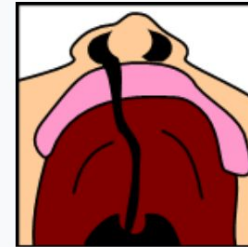
# Facial Cleft Palate

Isolated cleft palate (CP)

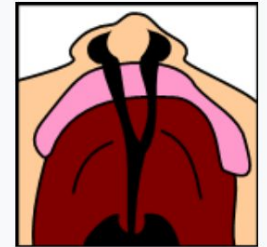
- females
- Clubfoot
- Polydactyly
- Ultrasound
  - 3D ultrasound



Incomplete cleft palate

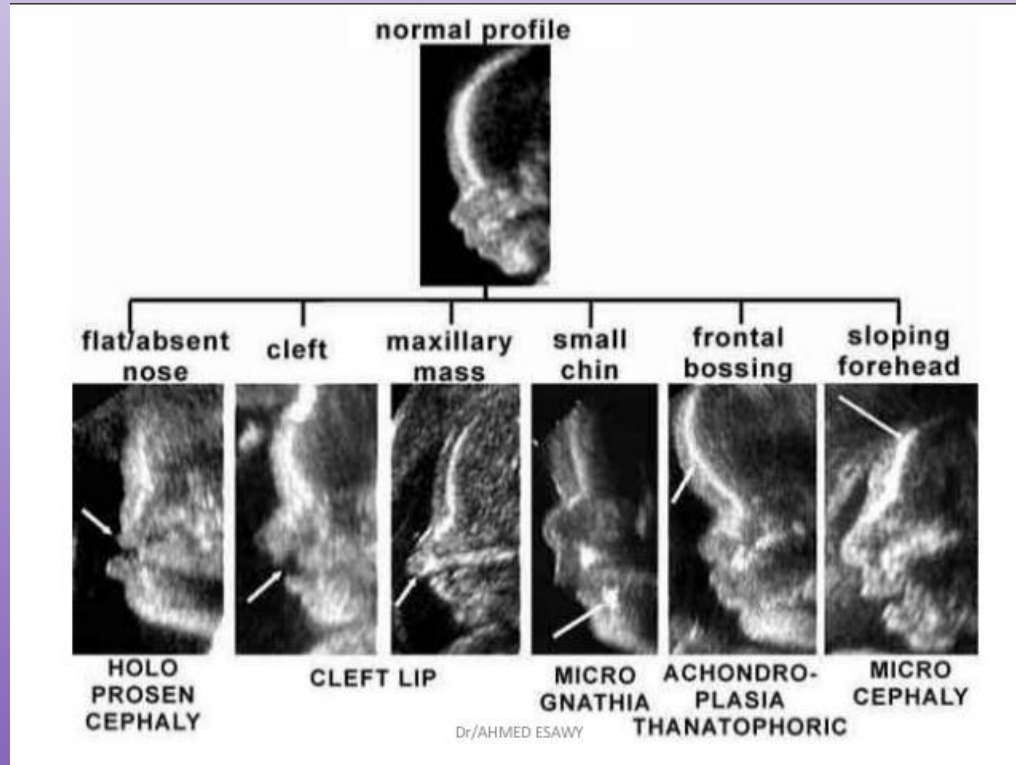


Unilateral complete lip and  
palate



Bilateral complete lip and  
palate

# Summary



# Resources:

Ultrasound Evaluation Of The Fetal Face And Neck

UFO Themes - <https://radiologykey.com/ultrasound-evaluation-of-the-fetal-face-and-neck/>

Nicolaides, Ximenes & Jeanty. "FACE." *FACE - DIAGNOSIS OF CONGENITAL ABNORMALITIES - THE 18-23 WEEKS SCAN*, Pilu, 2000, [sonoworld.com/client/fetus/html/chapter-03/face/facefmf.html](http://sonoworld.com/client/fetus/html/chapter-03/face/facefmf.html).

Şorop-Florea, Maria, et al. "Congenital Abnormalities of the Fetal Face." *IntechOpen*, IntechOpen, 2 May 2018, [www.intechopen.com/books/congenital-anomalies-from-the-embryo-to-the-neonate/congenital-abnormalities-of-the-fetal-face](http://www.intechopen.com/books/congenital-anomalies-from-the-embryo-to-the-neonate/congenital-abnormalities-of-the-fetal-face).

Barnes, Sam. "Development of the Face and Palate." *TeachMeAnatomy*, TeachMe Series, 17 Sept. 2020, [teachmeanatomy.info/the-basics/embryology/head-neck/face-palate/](http://teachmeanatomy.info/the-basics/embryology/head-neck/face-palate/).

Stephenson, Susan Raatz, and Julia Dmitrieva. *Diagnostic Medical Sonography*. 4th ed., Wolters Kluwer Health, 2018.