ISUOG Basic Training

Examining the Upper Lip, Face & Profile

Learning objectives

At the end of the lecture you will be able to:

- Describe how to obtain the 3 planes required to assess the anatomy of the fetal face
- Recognise the differences between the normal & most common abnormal ultrasound appearances of the 3 planes

The 2 + 20 planes

Anatomical area	Plane	Description
Overview 1	Sweep 1	longitudinal head & body for initial orientation
Spine	1 2 3	sagittal complete spine with skin covering coronal complete spine coronal section of body
Head	4 5 6	transventricular plane* transthalamic plane* transcerebellar plane*
Thorax	7 8 9 10	lungs, 4 chamber view of heart left ventricular outflow tract (LVOT) right ventricular outflow tract (RVOT) & crossover of LVOT 3 vessel trachea (3VT) view of heart

* measurement required

The 2 + 20 planes

Anatomical area	Plane	Description
Abdomen	11 12 13	transverse section of abdomen with stomach & umbilical vein* transverse section of abdomen at cord insertion transverse section(s) of left kidney & pelvis, right kidney & pelvis
Pelvis	14	transverse section of pelvis, bladder, both umbilical arteries
Limbs	15 16 17	femur diaphysis length* 3 bones of both legs, both feet & normal relationships to both legs 3 bones of both arms, both hands & normal relationships to both arms
Face	**18** **19** **20**	**coronal view of upper lip, nose & nostrils** **both orbits, both lenses** **median facial profile**
Overview 2	Sweep 2	transverse sweep of body from neck to sacrum, one vertebra at a time

* measurement required

20 + 2 planes & abnormal appearances

Plane	Area	Abnormal appearances (50+IUD) excluded by the correct 2+20 approach
Sweep 1		anencephaly, IUD
1-3	Spine	abnormal abdominal situs, left sided diaphragmatic hernia, meningocoele, open spina bifida, sacral agenesis, sacral coccygeal teratoma,
4-6	Head	alobar holoprosencephaly, banana shaped cerebellum, cystic hygroma, large posterior fossa cyst, lemon shaped skull, occipital encephalocoele, skin oedema, ventriculomegaly
7-10	Thorax	AVSD, CPAM, double aortic arch, ectopia cordis, overriding aorta, persistent left vena cava*, right aortic arch, severe aortic stenosis, coarctation & pulmonary stenosis, significant pericardial effusion (>4.0mm) & pleural effusion (>4.0mm), situs inversus/ambiguous, tetralogy of Fallot, transposition, univentricular heart
11-13	Abdomen	ascites, bilateral renal agenesis, duodenal atresia, echogenic bowel*, gastroschisis, omphalocoele, renal pelvic dilatation (>7.0mm AP), small/absent stomach
14	Pelvis	cystic renal dysplasia, lower urinary tract obstruction, 2 vessel cord
15-17	Limbs	fixed flexion deformities wrist, severe skeletal dysplasia (some), talipes
18-20	**Face**	**anopthalmia, cataract*, cleft lip, proboscis*, severe micrognathia**

AVSD – atrioventricular septal defect
CPAM – congenital pulmonary airway malformation IUD - intrauterine death

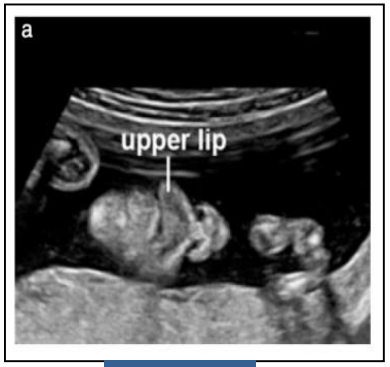
* optional, for local decision as to whether or not included

Key questions

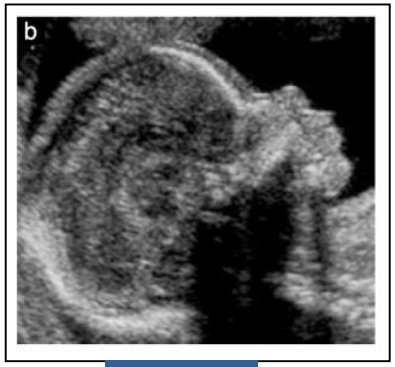
- What are the key ultrasound features of plane 18?
- What are the key ultrasound features of plane 20?
- What probe movements are required to move from plane 18 to plane 20?
- Which abnormalities should be excluded after correct assessment of planes 18,19 & 20?

ISUOG Guideline

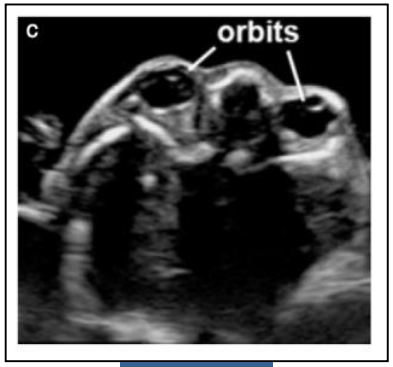
- Minimum evaluation of the fetal face should include an attempt to visualise the upper lip for possible cleft anomaly
- If technically feasible, other facial features that can be assessed include the median facial profile, orbits, nose and nostrils[1]



Plane 18



Plane 20

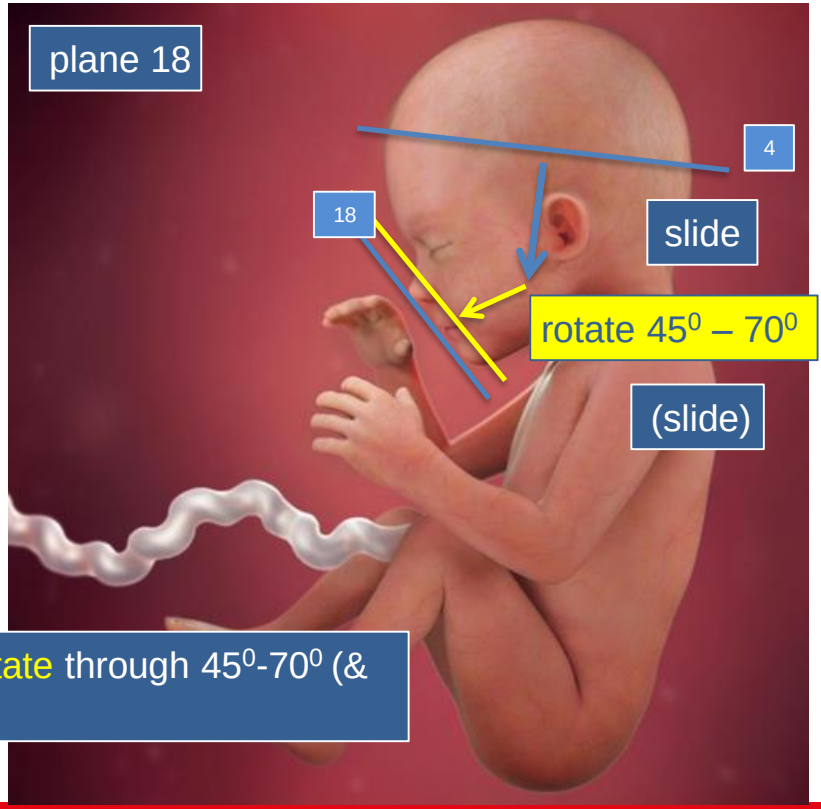


Plane 19

1. Practice guidelines for performance of the routine midtrimester scan (UOG 2011; **37**:116-126)

Plane 18 – probe movements

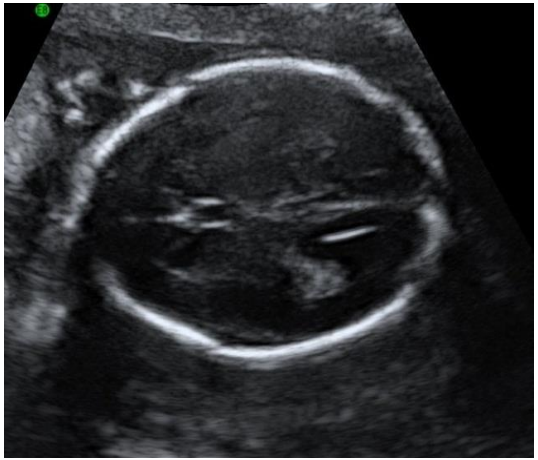
Plane	Description
4	transventricular plane
18 19 20	**Coronal view of upper lip, nose & nostrils** Both orbits, both lenses Median facial profile



From plane 4 to 18 - slide & rotate through 45^0-70^0 (& slide)

Plane 18 - probe movements

- HC section, midline horizontal, slide
- Orbits & cerebellum section, rotate 45^0 - 70^0
- Coronal section of face, slide to lips & nasal tip



What is an adequate section?

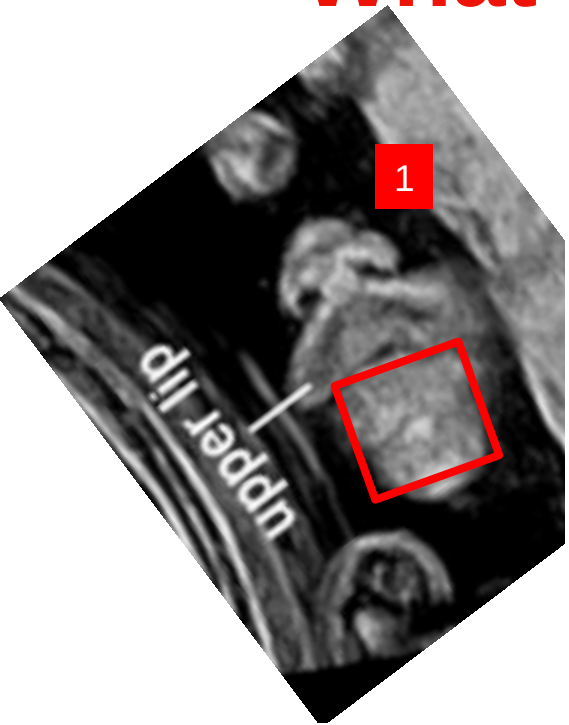


Fig 4. Incomplete unilateral cleft lip

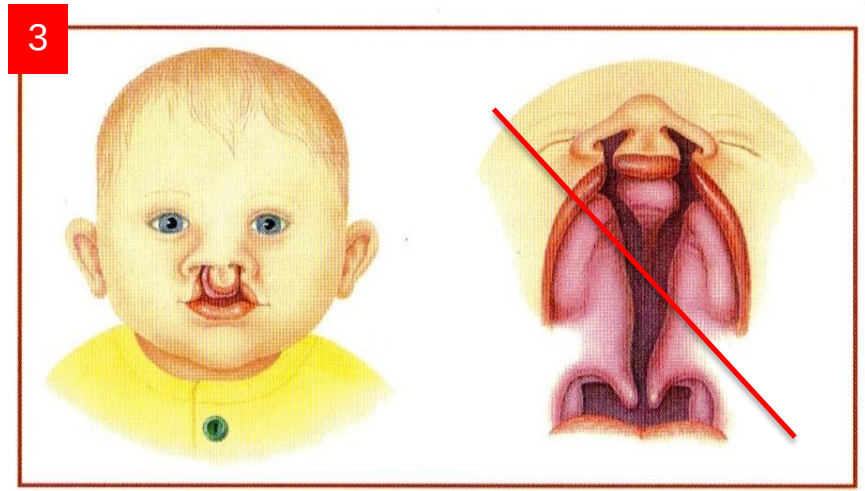
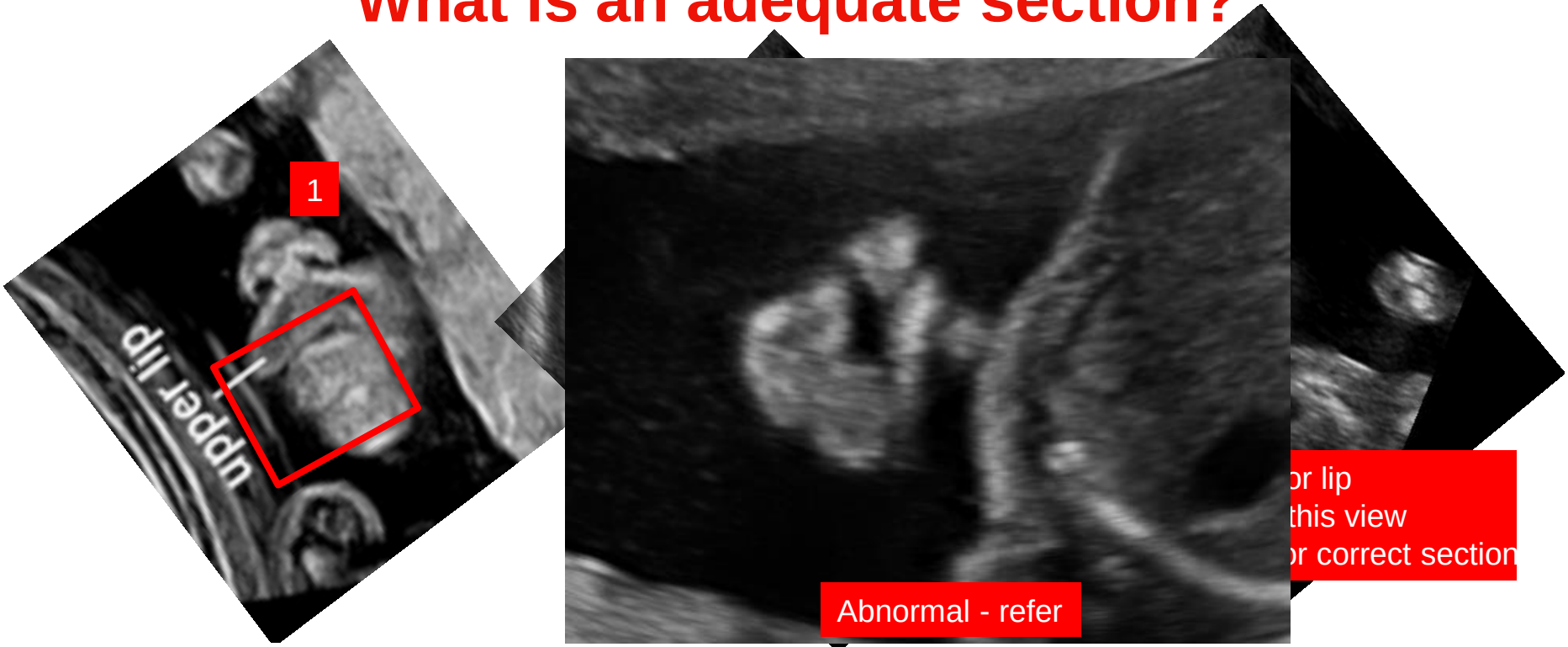


Fig 6. Bilateral cleft lip, alveolus & palate

1. Practice guidelines for performance of the routine midtrimester scan (UOG 2011; **37**:116-126)
2. Fitzgerald M J & Fitzgerald M 1994. In *Human Embryology*, p 168-173. Balliere Tindall
3. Chudleigh T & Cook K 2001. Cleft Lip & Palate: A Guide for Sonographers, prepared by CLAPA


COMP
COMP
COMP
TIs <0.1
TIb <0.1
MI 0.7
RM6C
OB
9.8cm / 1.1
66°/ 29Hz
Routine 2 Trim.
HH PI 6.90 – 3.40
Gn 3
C6 / M7
FF1 / E3
SRI II 2 / CRI 2

What is an adequate section?



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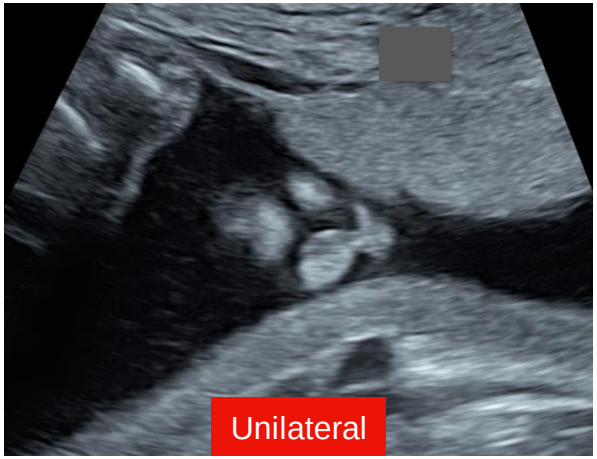
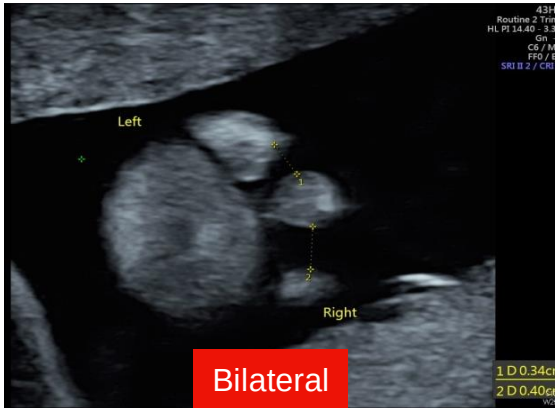
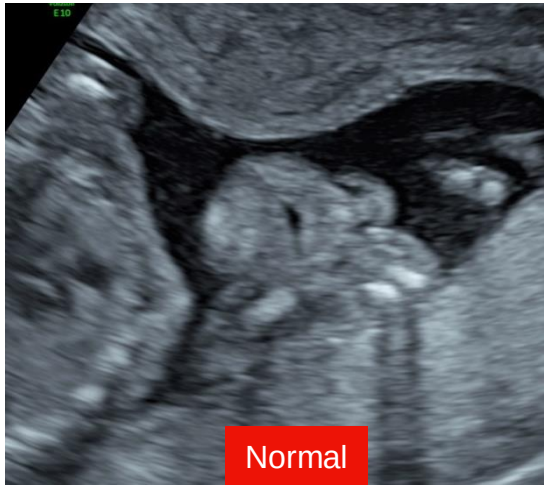
Terminology & incidence

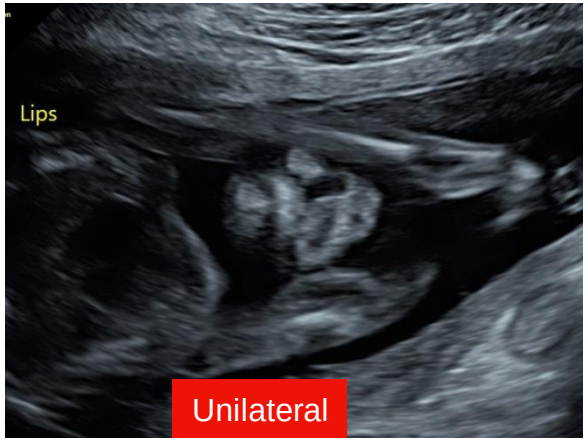
- In the context of facial clefting, ‘lip’ may describe upper lip only or upper lip & alveolar ridge/alveolus
- Overall incidence of cleft lip & palate malformations (live births) in uk/most of europe ~1:700. Similar to that of down’s & talipes
- Isolated cleft lip (+/- alveolar ridge) 25%
- Cleft lip, alveolar ridge & palate, of varying degrees, 35%
  - 25% unilateral
  - 10% bilateral
- Isolated cleft palate 40%

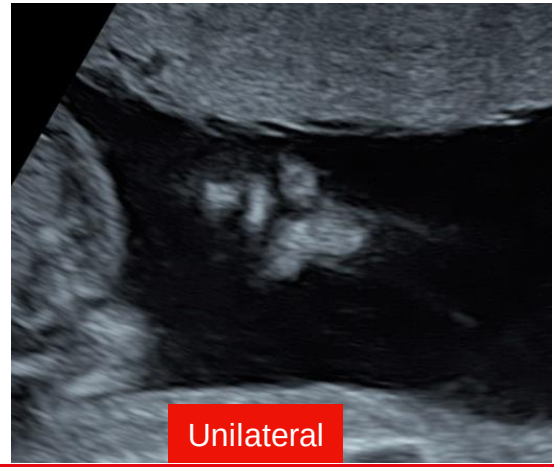
Normal or abnormal?





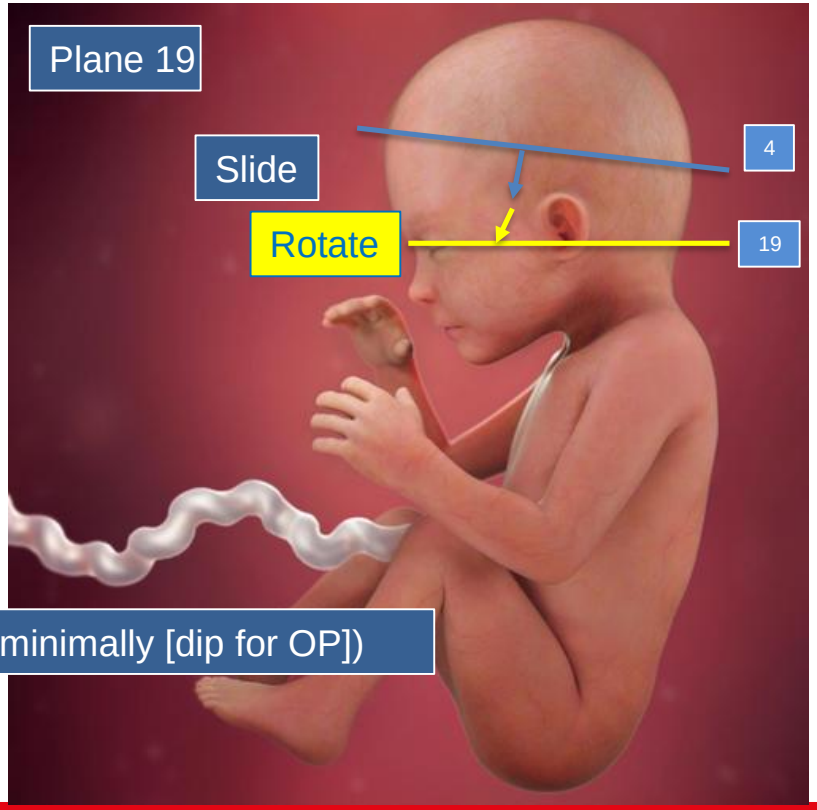






Plane 19 - probe movements

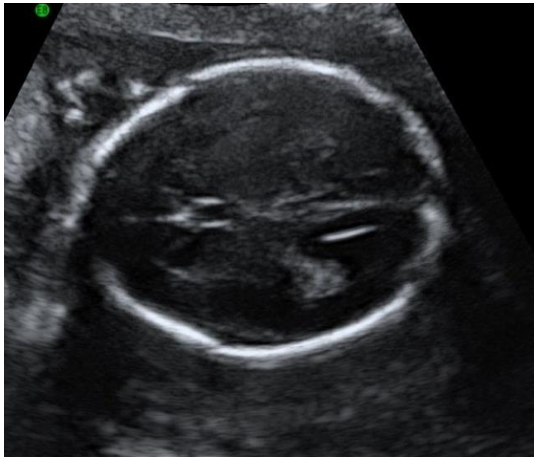
Plane	Description
4	transventricular plane
18 **19** 20	Coronal view of upper lip, nose & nostrils **Both orbits, both lenses** Median facial profile



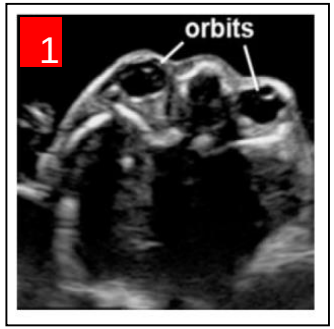
From plane 4 to 19 – slide (rotate minimally [dip for OP])

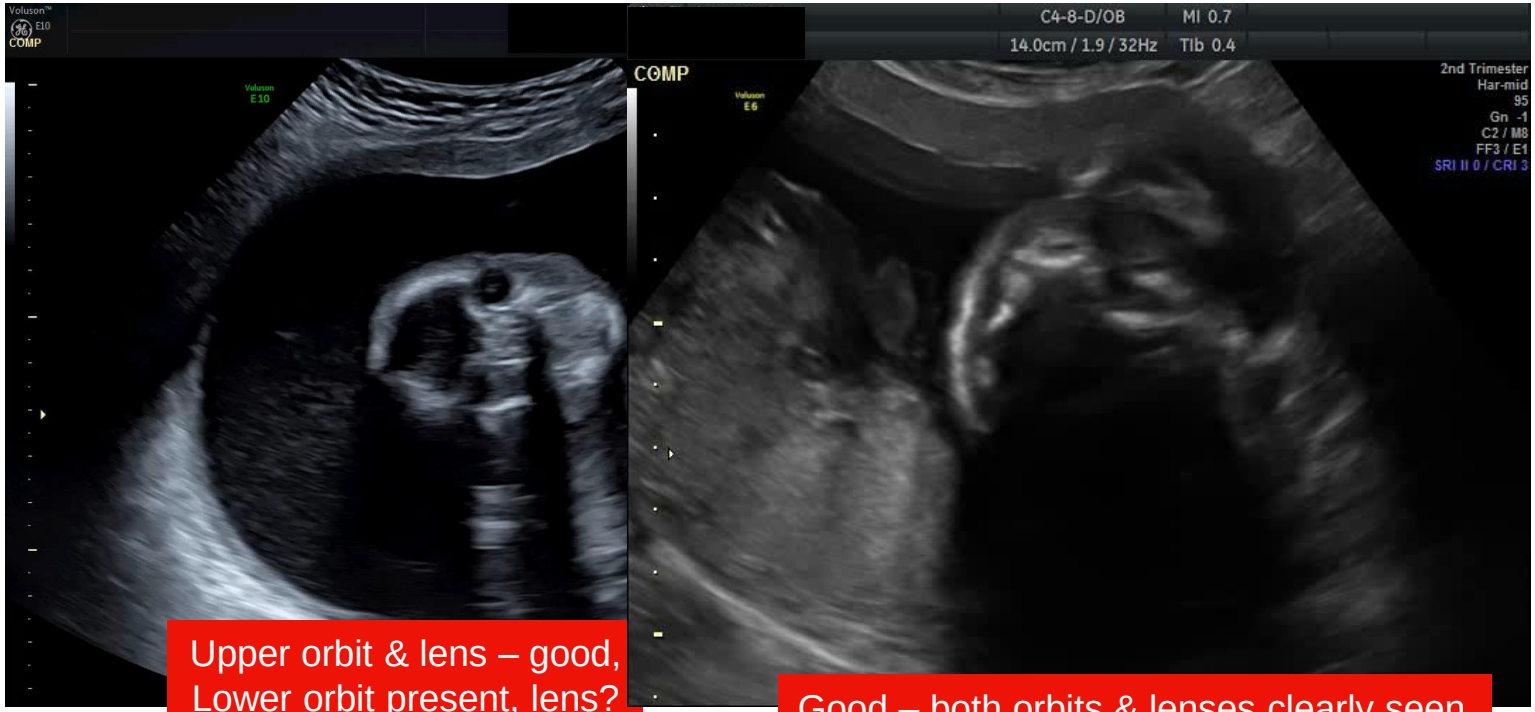
Plane 19 - probe movements

- HC section, midline horizontal → slide
- Orbits & cerebellum section → rotate towards neck minimally
- Section will be ~OT → dip (~90^0) for OP section



What is an adequate section?





Upper orbit & lens – good,
Lower orbit present, lens?

Good – both orbits & lenses clearly seen

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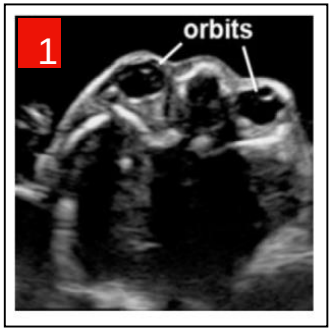
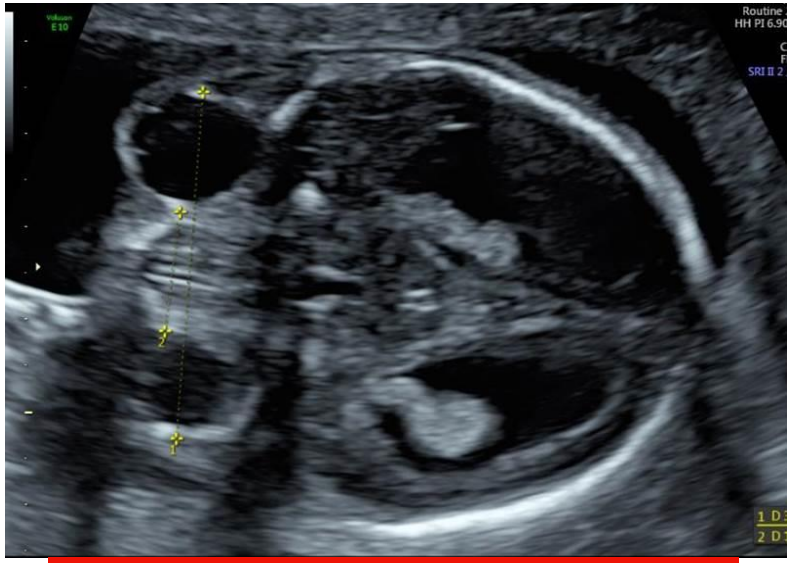
Normal or abnormal?





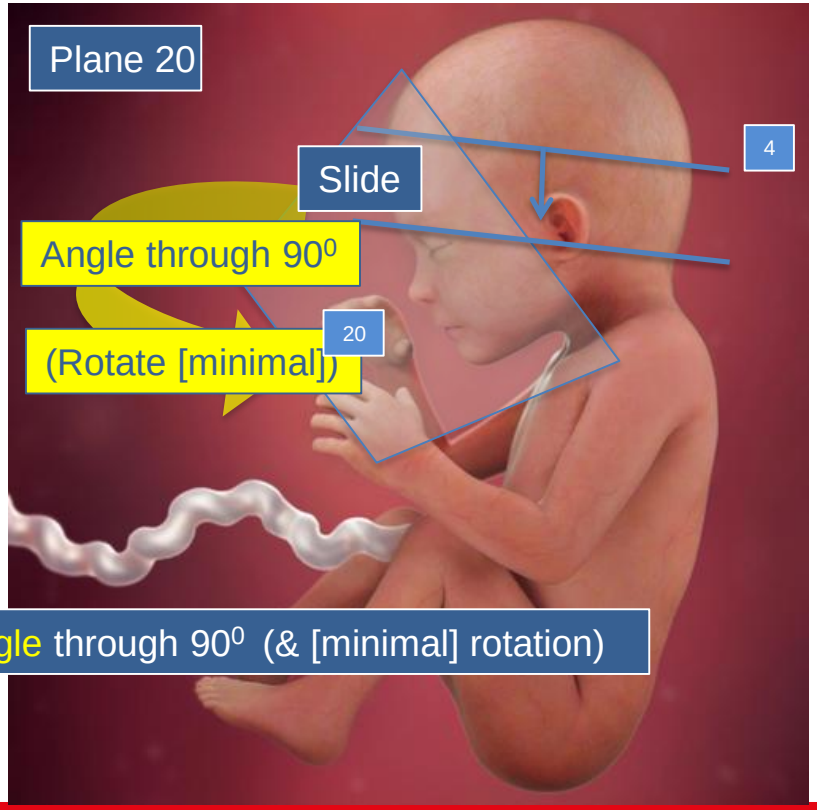
Size discrepancy of orbits - abnormal*
(?Ventricles)
Refer

?Normal ? nondiagnostic
- Section good enough to confirm appearances normal?

*Image courtesy of titia cohen

Plane 20 – probe movements

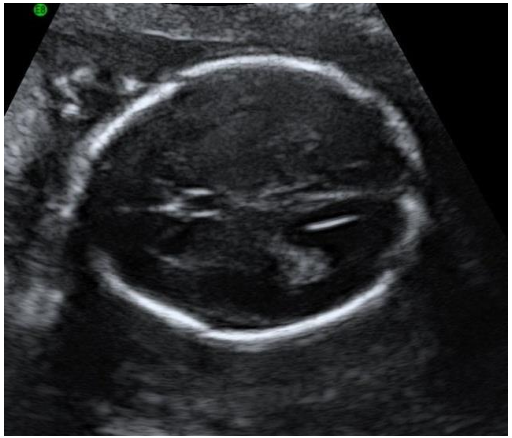
Plane	Description
4	Transventricular plane
18 19 **20**	Coronal view of upper lip, nose & nostrils Both orbits, both lenses **Median facial profile**



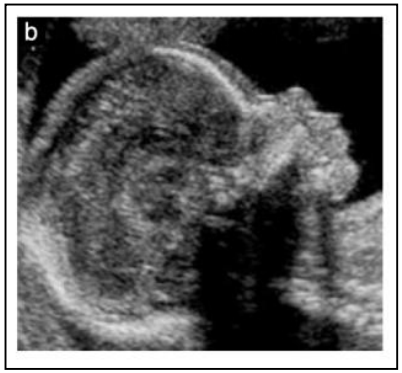
From plane 4 to 20 - slide, angle through 90^0 (& [minimal] rotation)

Plane 20 - probe movements

- HC section, midline horizontal, slide
- Angle probe through 90^0 to produce mid-sagittal section
- Minimal rotation of probe to acquire correct section



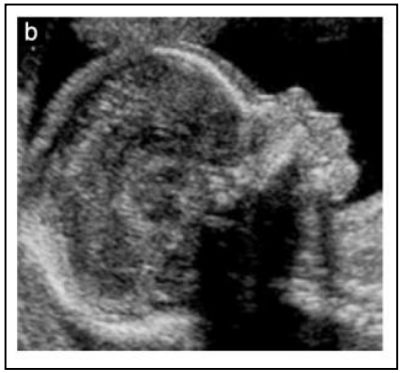
What is an adequate section?



Incorrect section, para-sagittal
- Slide (minimally)

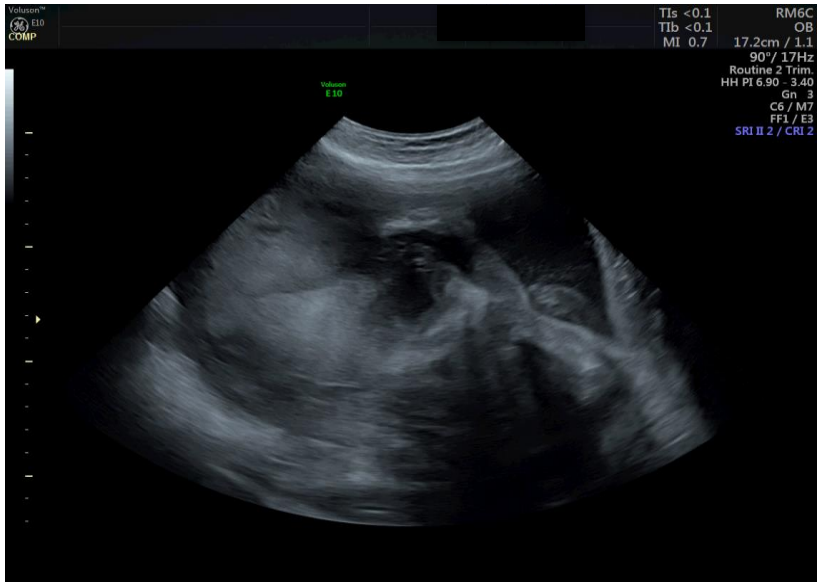
Incorrect section or abnormal?
?Chin - slight rotation

What is an adequate section?

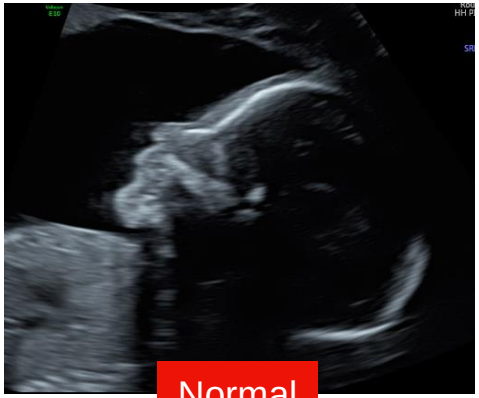


Acceptable - normal

What is an adequate section?



Normal or abnormal?



Normal

Abnormal - refer

Abnormal - refer

?normal

Abnormal - refer

Normal

?Section correct - (normal)

Lip of above

Key Points

1. Facial clefting has a birth incidence similar to Down's syndrome & talipes. Imaging the upper lip correctly is therefore an important component of assessing the mid-trimester fetus
2. Evaluation of the orbits & lenses can be performed from an OT position, providing that the lower orbit & lens are adequately imaged
3. Orbital anomalies & detectable abnormalities of the lens are rare

Key Points

4. The false positive suspicion of micrognathia decreases with experience. The most common reason for incorrectly suspecting micrognathia in a normal fetus is failing to appreciate that the section obtained is oblique, rather than truly mid-sagittal
5. If you are unable to confirm the normal appearance of all the structures required in planes 18, 19 or 20, the woman should be referred for a more detailed examination
6. Practice, performed correctly, makes perfect