ISUOG Basic Training
Assessing the Neck & Chest
Learning objectives

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

• Recognise the differences between the normal & most common abnormal ultrasound appearances of the neck in plane 6 (transcerebellar)

• Recognise the differences between the normal & most common abnormal ultrasound appearances of plane 7 (chest), excluding the heart
Key questions

1. What are the key ultrasound features that describe the normal appearance of the fetal neck?

2. What probe movements should be used to distinguish between true & a false positive suspicion of nuchal abnormality?

3. What are the key ultrasound features that distinguish between normal & abnormal appearances of the fetal lungs?

4. Which abnormalities should be excluded after correct assessment of the neck & chest, excluding the heart?
## The 20 + 2 planes

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

* measurement required
## Requirements from each plane

<table>
<thead>
<tr>
<th>Plane</th>
<th>Description</th>
<th>Structures to be evaluated(^2,3,4)</th>
<th>Measurement(^1,2) &amp; criteria for referral</th>
<th>Abnormalities that can be excluded from the normal appearances of the section</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Transcerebellar plane</td>
<td>Frontal horns of both lateral ventricles CSP Thalami Cerebellum Cisterna magna (normal range 2–10 mm)</td>
<td>TCD</td>
<td>Banana shaped/absent cerebellum (open spina bifida) Large cyst in posterior fossa Occipital encephalocele Cystic hygroma Skin oedema</td>
</tr>
<tr>
<td>7</td>
<td>Lungs 4 chamber view LVOT RVOT &amp; crossover 3VT</td>
<td></td>
<td></td>
<td>Left sided diaphragmatic hernia Congenital pulmonary airway malformation (CPAM) Significant pleural effusion (&gt;4 mm) Significant pericardial effusion (&gt;4 mm)</td>
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Basic Training
Neck & Chest – planes 6 (transcerebellar) & 7 (chest)
### Basic Training

**Moving through the 20 planes**

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From plane 4 to 5 – (rotate &) slide minimally
From plane 4 to 6 - rotate
Plane 6 (transcerebellar)

- Focal zone at appropriate level
- Image at appropriate depth
- Axial plane of the head
- Falx equidistant from both parietal bones
- CSP, thalami & cisterna magna visible
- Cerebellar hemispheres symmetrical
- Cerebellar vermis visible
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Moving through the 20 planes:

- From plane 6 to 7 – slide towards feet
- From plane 7 to 10 – slide towards head
- From plane 6 to 10 – slide towards the feet
Moving through the 20 planes

From plane 6 to 7 - slide towards feet
From plane 7 to 10 – slide towards head
From plane 6 to 10 - slide towards feet

From plane 1 or 2 to 4 - rotate through 90°
From plane 4 to 5 – (rotate &) slide minimally
From plane 4 to 6 - rotate
Which abnormalities can be excluded after correct assessment of the neck?

- Cystic hygroma
- Occipital encephalocele
- Skin oedema
Which abnormalities can be excluded after correct assessment of the neck?

- Cystic hygroma
- Occipital encephalocele
- Skin oedema

![Normal](Normal.png)
![Occipital encephalocele at 13 weeks](Occipital_encephalocele_at_13_weeks.png)
![Occipital encephalocele](Occipital_encephalocele.png)
Which abnormalities can be excluded after correct assessment of the neck?

- Cystic hygroma
- Occipital encephalocele
- Skin oedema

Normal nuchal fold

Increased nuchal fold at 19 weeks

Skin oedema at 16 weeks
Plane 7 (chest)
Which abnormalities can be excluded after correct assessment of the plane 7 (chest)

- Left sided diaphragmatic hernia
- Congenital pulmonary airway malformation (CPAM)
- Significant pleural effusion (>4 mm)
- Significant pericardial effusion (>4 mm)
Congenital pulmonary airway malformation (CPAM)

- Prevalence ~1:1500-4000 live births, male predominance
- Diffuse or localised
  - Type I: single or multiple large anechoic cysts with usually mediastinal shift
  - Type II: variable appearances depending on the composition of the malformation
  - Type III: homogeneously solid masses with normal adjacent parenchyma
When seen antenatally a CPAM may:

- Increase in size
- Remain stable throughout the pregnancy
- Regress to the point it is no longer detectable by ultrasound

As a CPAM may create a mass effect displacing the heart, the pregnancy should be followed to ensure there is no progression to hydrops. Conversely, compression of normal lung tissue can result in pulmonary hypoplasia. Postnatal surgery may be required with type 1 lesions offering the best prognosis.
Congenital pulmonary airway malformation (CPAM)
Significant pleural effusion (>4 mm)

- Significant left sided pleural effusion (14 wks)
- Right sided pleural effusion (mild)
- Significant bilateral pleural effusions R>L
Significant pericardial effusion (>4 mm)
Key points

1. Sliding between planes 6,7 & 10 allows identification of the most common pathologies of the neck & the chest

2. Always double check the structures with a sagittal & parasagittal sweep

3. Verify echogenicity & homogeneity of the lungs

4. Your role is to distinguish between the range of normal & abnormal appearances

5. Any appearance which you cannot confirm as normal should be referred for a more experienced opinion
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