# ISUOG Basic Training

## Assessing normal and abnormal findings between 10 & 14 weeks in singleton and twin pregnancies

# Learning objective

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

- Compare the differences between the typical normal & the common abnormal appearances of singleton, dichorionic & monochorionic diamniotic twin pregnancies between 10 & 14 weeks of gestation

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# Key questions

1. How should gestational age be assessed, & the EDD assigned, between 10 & 14 weeks?

2. What is the normal ultrasound appearance of a fetus at 10-14 weeks?

3. What structural abnormalities can be diagnosed in the first trimester?

4. What are the principal differences in the ultrasound appearances of a dichorionic twin pregnancy & a monochorionic twin pregnancy?
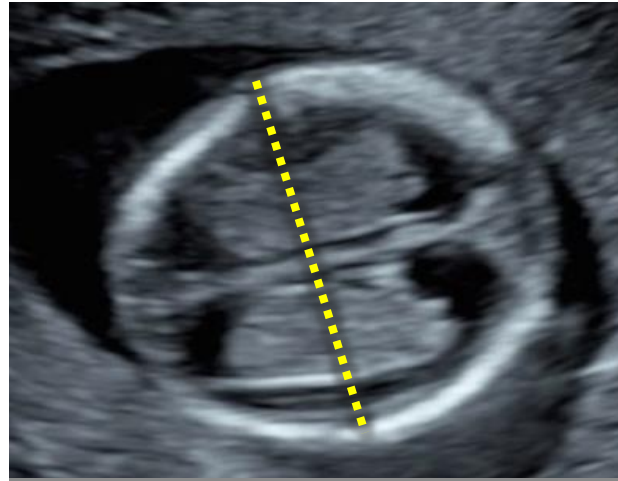
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# Ultrasound assessment of gestational age

ISUOG Practice Guidelines: performance of first-trimester
fetal ultrasound scan

Pregnant women should be offered an early ultrasound scan between 10 + 0 and 13 + 6 weeks to establish accurate gestational age. **(Grade A recommendation)**
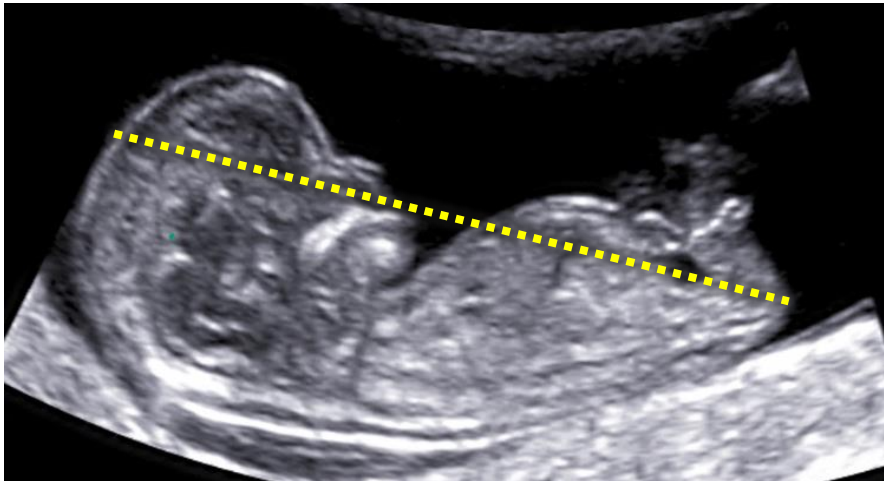


**Crown-rump length (CRL)**

**Biparietal diameter (BPD)**

**Head circumference (HC)**

**It is recommended that CRL should be used to determine gestational age < 84 mm**
After this stage, HC can be used, as it becomes slightly more precise than the BPD.
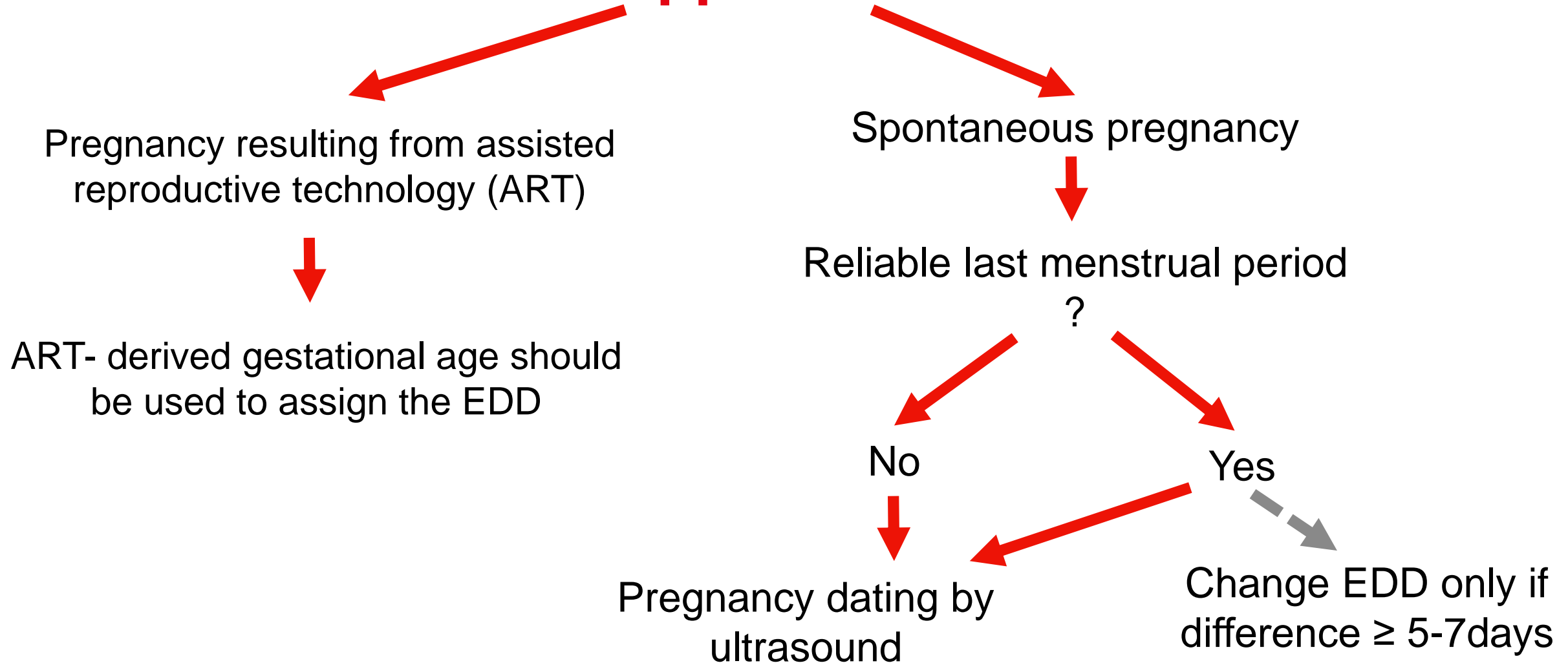**(GOOD PRACTICE POINT)**

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# Gestational age ranges

| Gestational age | Terminology |
| --- | --- |
| 1-10 weeks | Embryo |
| >10 weeks | Fetus |

# Pregnancy dating at 10-14 weeks: a practical approach

Pregnancy resulting from assisted reproductive technology (ART)

↓

ART- derived gestational age should be used to assign the EDD

Spontaneous pregnancy

↓

Reliable last menstrual period ?

No → Pregnancy dating by ultrasound

Yes → Change EDD only if difference ≥ 5-7days

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# Expected date of delivery (EDD) should be *clearly documented*

| | |
|---|---|
| Weeks of amenorrhea | 12+3 |
| EDD (amenorrhea) | 15/01/2019 |
| Gestational weeks (US) | 11+0 |
| **EDD (US)** | **25/01/2019** |

- …fetal dimensions correspond to the menstrual age

*OR*

- …fetal dimensions show discrepancy of +/- X days in respect to amenorrhea

**Table 2** Suggested anatomical assessment at time of 11 to 13 + 6-week scan *

| Organ/anatomical area | Present and/or normal? |
|---|---|
| Head | Present |
| | Cranial bones |
| | Midline falx |
| | Choroid-plexus-filled ventricles |
| Neck | Normal appearance |
| | Nuchal translucency thickness (if accepted after informed consent and trained/certified operator available)* |
| Face | Eyes with lens* |
| | Nasal bone* |
| | Normal profile/mandible* |
| | Intact lips* |
| Spine | Vertebrae (longitudinal and axial)* |
| | Intact overlying skin* |
| Chest | Symmetrical lung fields |
| | No effusions or masses |
| Heart | Cardiac regular activity |
| | Four symmetrical chambers* |
| Abdomen | Stomach present in left upper quadrant |
| | Bladder* |
| | Kidneys* |
| Abdominal wall | Normal cord insertion |
| | No umbilical defects |
| Extremities | Four limbs each with three segments |
| | Hands and feet with normal orientation* |
| Placenta | Size and texture |
| Cord | Three-vessel cord* |

*Optional structures. Modified from Fong et al.[28], McAuliffe et al.[87], Taipale et al.[60] and von Kaisenberg et al.[88].



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## Head

- Cranial bones
- Midline falx
- Choroid-plexus-filled ventricles

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## Neck

- Normal appearance
- Nuchal translucency thickness *(if accepted after informed consent and trained/certified operator available)\**
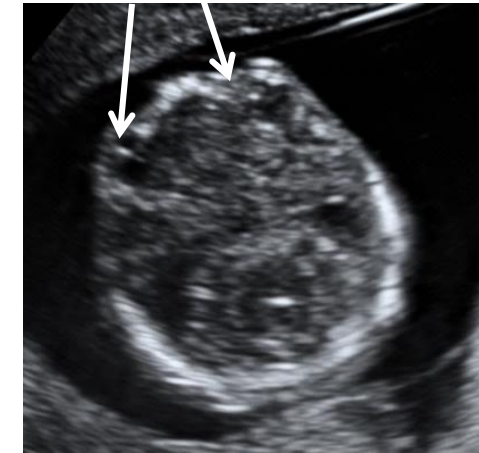
\* OPTIONAL



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## Face

- Eyes with lens*
- Nasal bone*
- Normal profile/mandible*
- Intact lips*



Upper lip

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## Spine

- Vertebrae (longitudinal and axial)*
- Intact overlying skin*



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## Chest

- Symmetrical lung fields

- No effusions or masses

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## Heart

- Cardiac regular activity

- Four symmetrical chambers*



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## Abdomen

- Stomach present in left upper quadrant

- Bladder*

- Kidneys*

Kidneys

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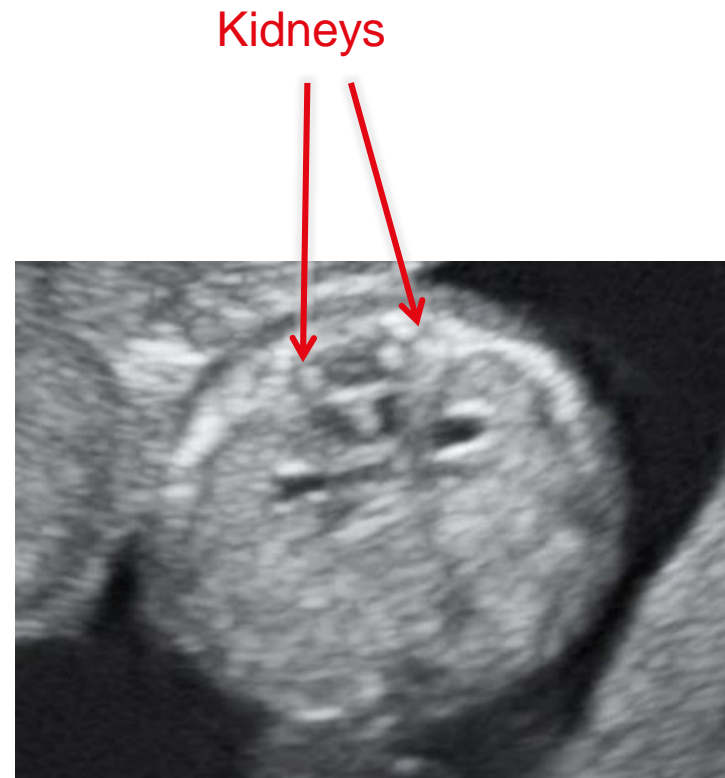
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## Abdominal wall

- Normal cord insertion

- No umbilical defects

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## Extremities

- Four limbs each with three segments

- Hands and feet with normal orientation*

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- **Placenta Size and texture**
- **Three-vessel cord***
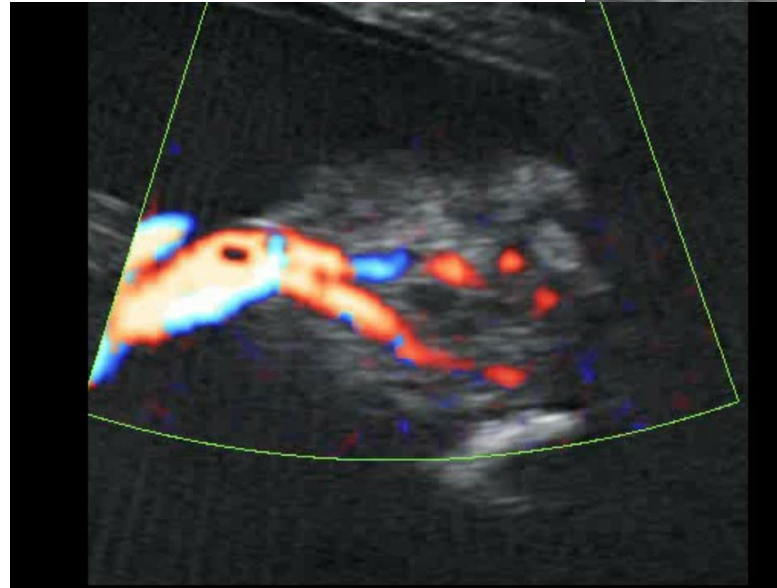
## High percentage detection rate

- Acrania, anencephaly, ectopia cordis, encephalocele

## 50–99% detection rate

- Cystic hygroma
- Double-outlet right ventricular flow, Fallot's, hypoplastic left heart syndrome, septal defects, transposition of great vessels, valvular disease
- Gastroschisis, omphalocele
- Holoprosencephaly, megacystis
- Limb reduction, polydactyly

## 1–49% detection rate

- Spina bifida, hydrocephalus, skeletal dysplasia, facial cleft, Dandy-Walker, aortic coarctation, arthrogryposis

## 0% detection rate

- Corpus callosum agenesis, cerebellar hypoplasia
- Duplex kidneys, hydronephrosis, renal agenesis
- Congenital pulmonary adenomatoid malformation, extralobar sequestration
- Duodenal atresia, bowel obstruction

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# Detection rate of structural abnormalities by gestational age
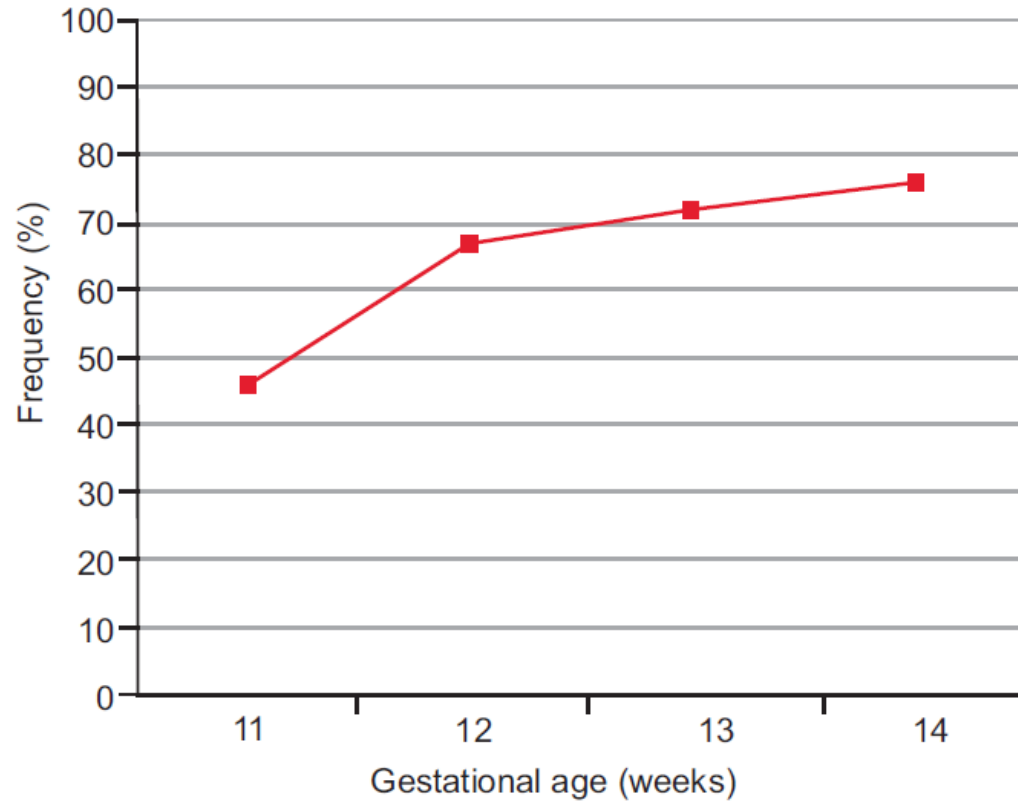


CRL 78 mm

CRL 46 mm

Rossi & Prefumo, Obstetrics & Gynecology, 2013

# Acrania/exencephaly/anencephaly sequence

**Normal**

**Alobar holoprosencephaly**

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# Other neural tube defects


**Encephalocele**


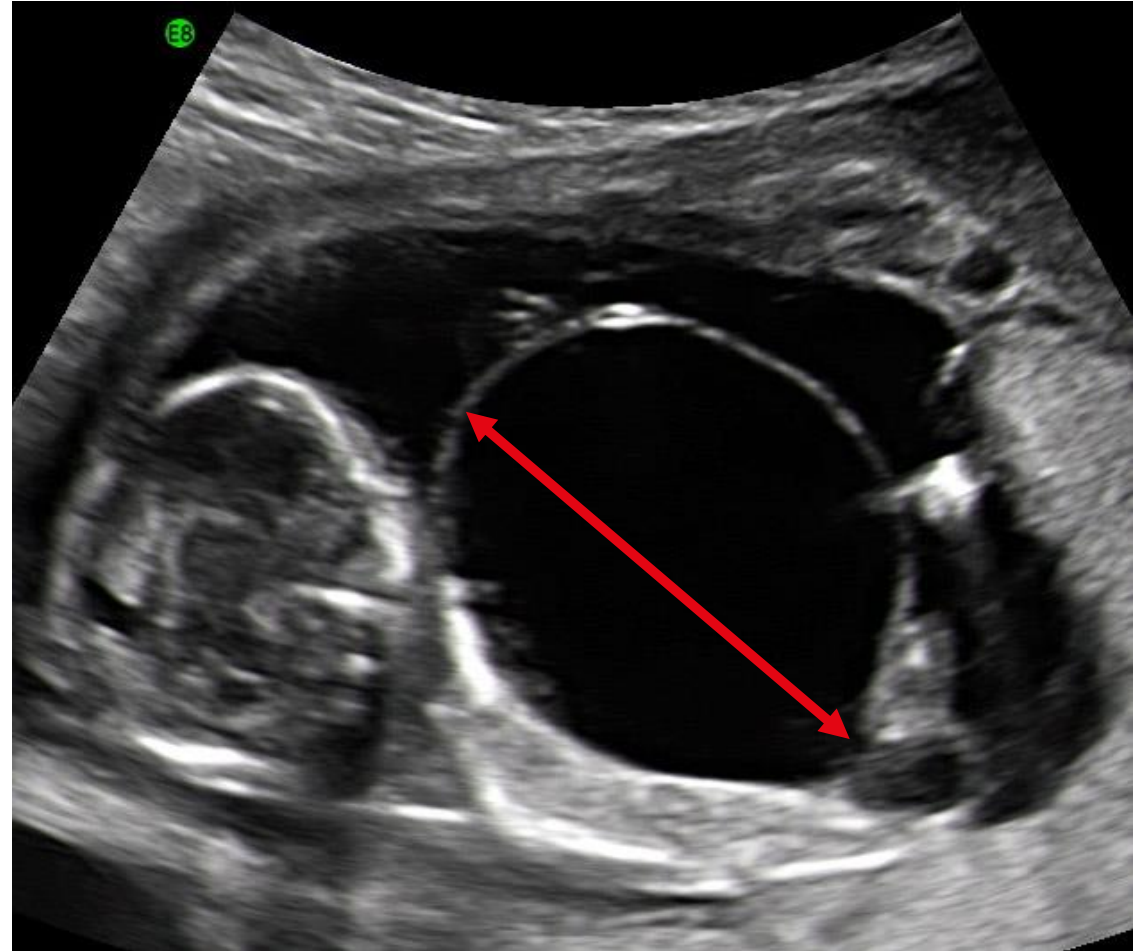**Encephalocele and severe spinal malformation**

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# Lethal skeletal dysplasia

# Micrognathia

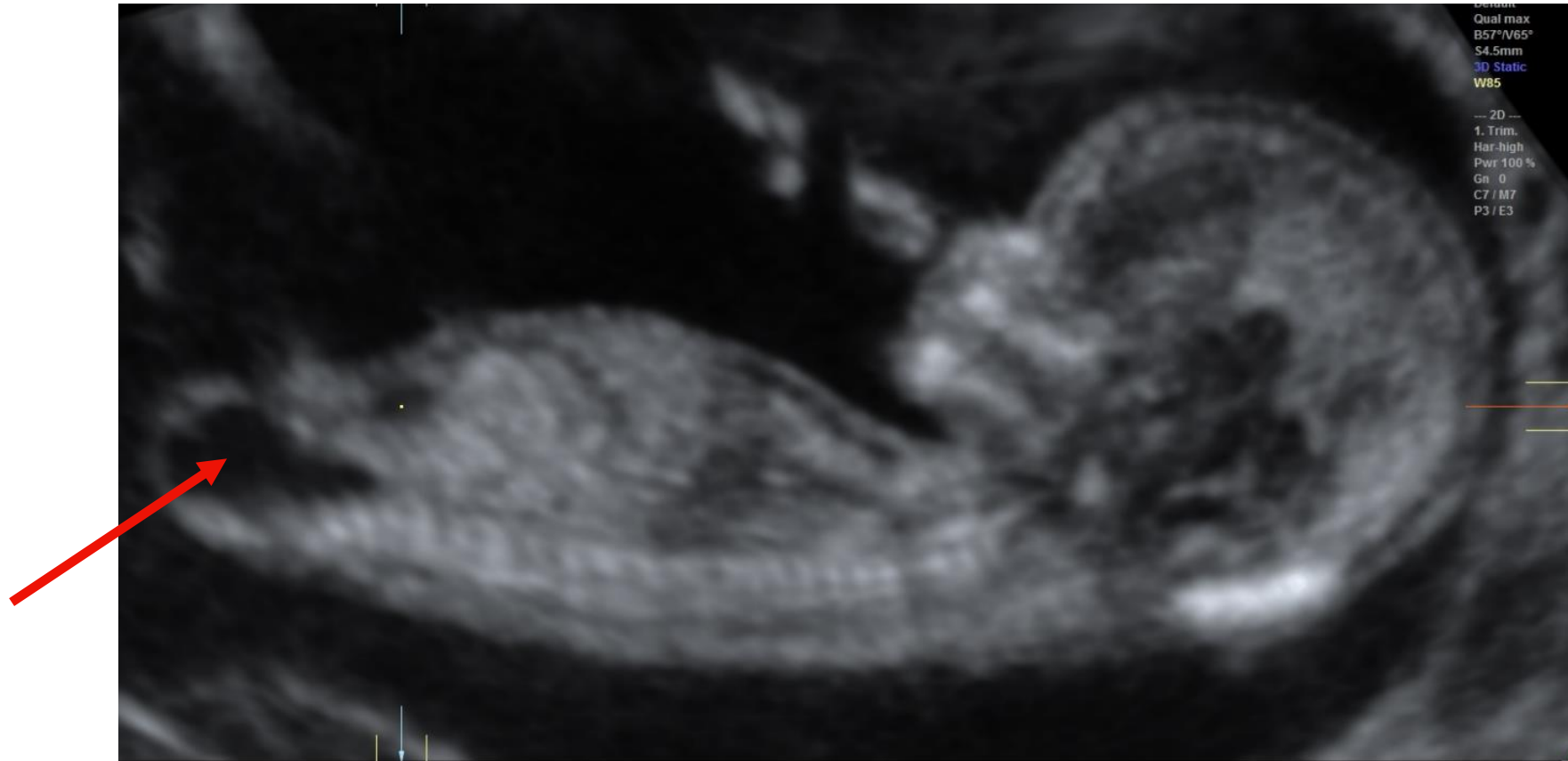# Megacystis (Longitudinal bladder diameter of 7 mm or more)

# Exomphalos (omphalocele) ≠ Physiological bowel herniation (<11 weeks)
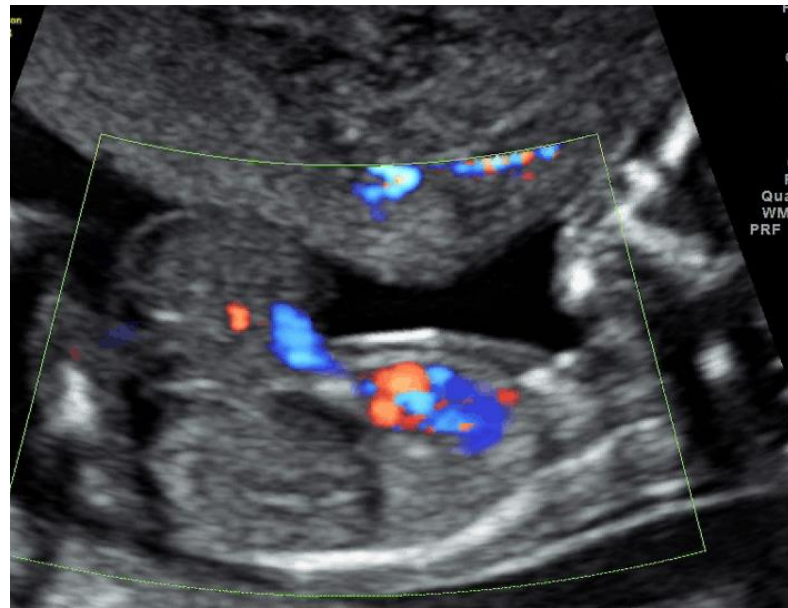
# Abdominal wall defect: gastroschisis
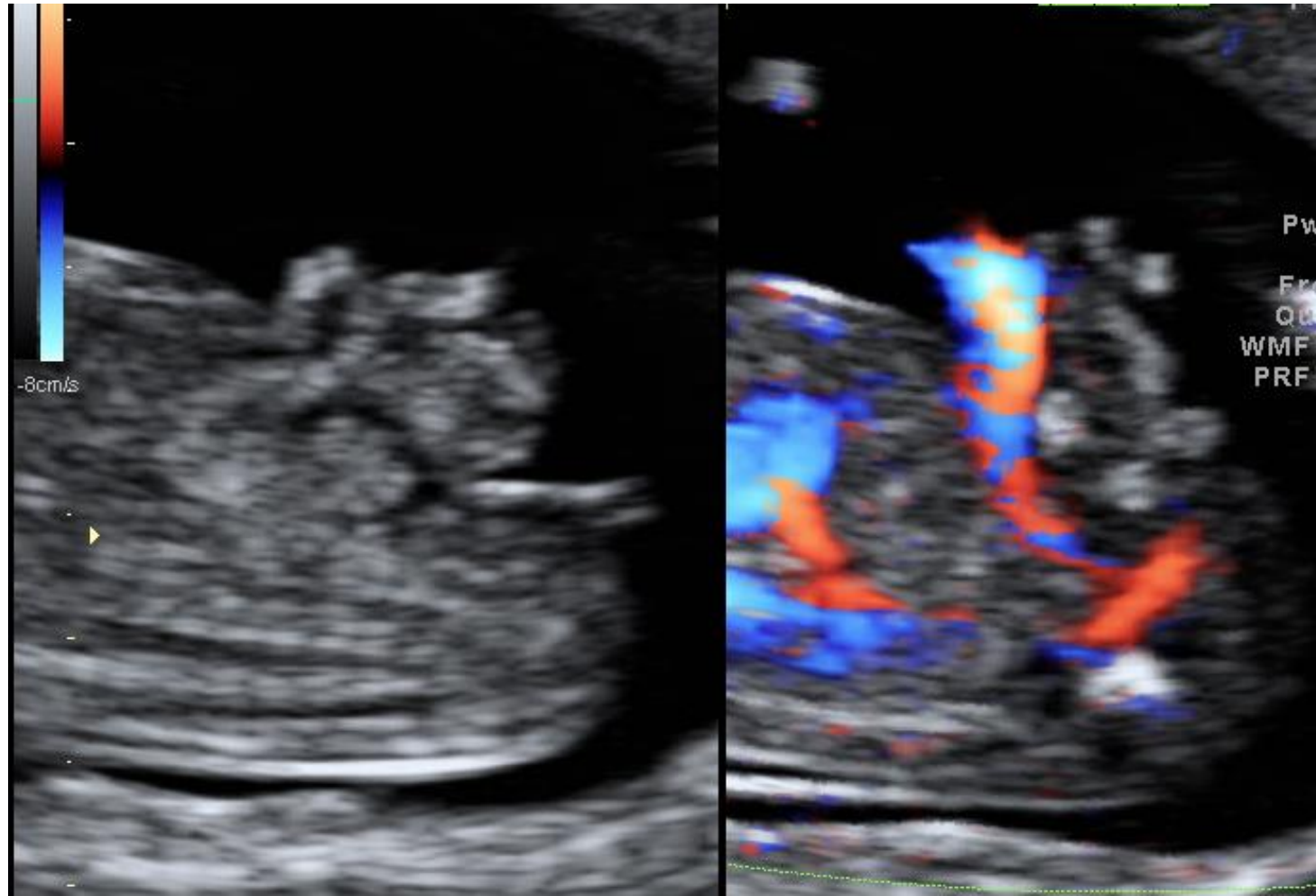
# Sacrococcygeal teratoma

# Scanning twins at 10-14 weeks: Objectives

## 1. Dating

- In pregnancies conceived spontaneously, **the larger of the two CRLs** should be used to estimate gestational age
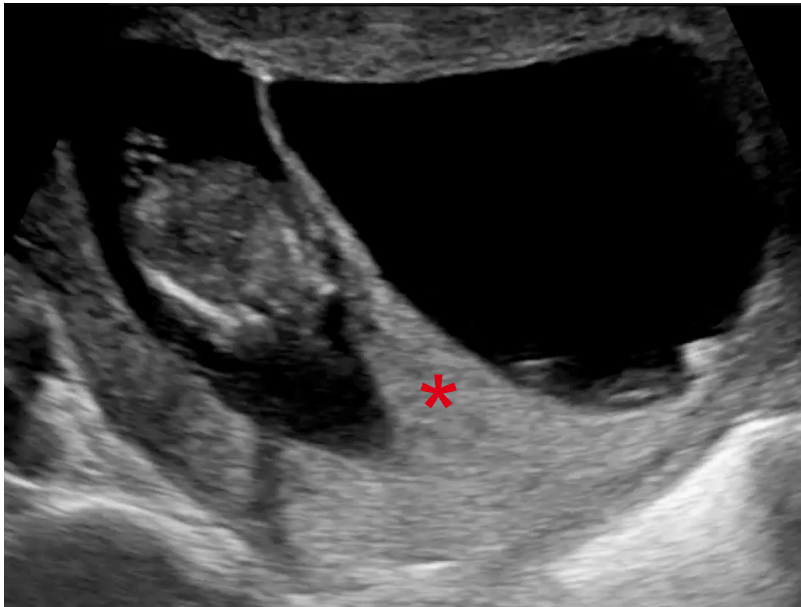
## 2. Labelling

- Site (left/right, upper/lower)
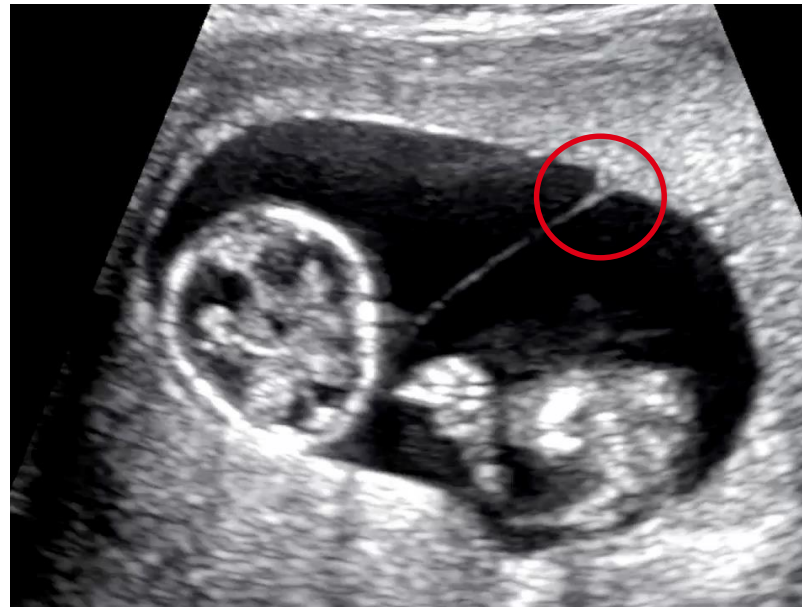- Cord insertion relative to the placental edges

## 3. Chorionicity

- Membrane thickness at the site of insertion of the amniotic membrane into the placenta **(Lambda vs. T-sign)**

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# Scanning twins at 10-14 weeks: chorionicity

**Lambda sign =**
Dichorionic
diamniotic (DCDA)

**T sign =**
Monochorionic
diamniotic (MCDA)

**No membrane =**
Monochorionic
monoamniotic
(MCMA)

# Chorionicity and zygosity

- **Chorionicity**: number of placentas
- **Zygosity:** number of zygotes (are the twins "identical"?)

## Twins

**Dizygotic (70%)**
('non-identical', fraternal)

**Monozygotic (30%)**
('identical' twins)

**Dichorionic diamniotic (DCDA)**

**Dichorionic diamniotic (DCDA)**

**Monochorionic diamniotic (MCDA)**

**Monochorionic monoamniotic (MCMA)**

**"Conjoined" Monochorionic monoamniotic (MCMA)**
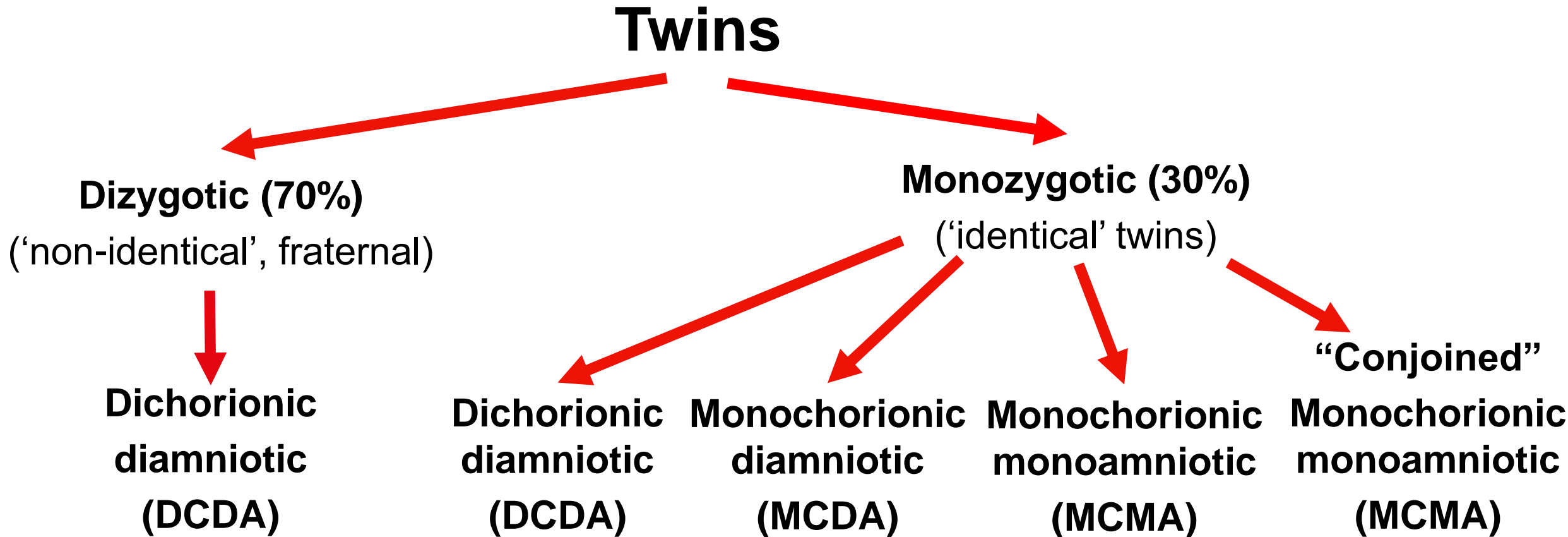
# Key points

1. Pregnant women should be offered an early scan between 10+0 & 13+6 wks
2. The aims of the first trimester scan are to:
   - confirm viability
   - establish gestational age accurately
   - determine the number of viable fetuses
   - if requested, evaluate fetal gross anatomy and risk of aneuploidy  (after proper counselling)
3. Many gross malformations may develop later in pregnancy, or may not be detected even with appropriate equipment & in the most experienced of hands
4. In twin pregnancies chorionicity should be accurately determined & documented.

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