



# ISUOG Basic Training

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

# Learning objectives

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

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

# Key questions

- How should gestational age be assessed, and the EDD assigned, between 10 and 14 weeks?
- What are the normal ultrasound appearance of a fetus at 10-14 weeks?
- What structural abnormalities can be diagnosed in the first trimester?
- What are the principal differences in the ultrasound appearances of a monochorionic twin pregnancy and a dichorionic twin pregnancy?



isuog International Society of Ultrasound in Obstetrics and Gynecology

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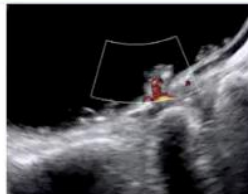
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## Welcome to ISUOG: The Society of Women's Imaging

ISUOG is a professional membership association and charity that aims to improve women's healthcare services through the provision and broad dissemination of the highest quality education and research information around ultrasound in obstetrics and gynecology. With 13,500 members in 128 countries, we are the leading society in this niche medical specialty. Member benefits include our [Journal](#), Ultrasound in Obstetrics and Gynecology, reduced fees to our [Courses](#) and [Congress](#), and online educational material (400+ [online learning lectures](#), [comprehensive learning modules](#), and Congress presentations on [ISUOG On Demand](#)). ISUOG is committed to extending education to under-resourced regions through its [Outreach Program](#). Find out more about our latest endeavours on our [news](#) pages.

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### Journal

UOG is the leading peer-reviewed journal in its field. View a selection of recent [free-access articles!](#)

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Visual encyclopedia on ultrasound in obstetrics and gynecology

### ISUOG News



#### Ultrasound and autism - no association

Recently, a study that suggests that heterogeneity in autism spectrum disorder (ASD) symptoms results from exposure to diagnostic ultrasound during early pregnancy has been published. The ISUOG Safety Committee has reviewed this paper and other related epidemiological literature, and has found no scientifically proven association between ultrasound exposure in the first or second trimesters and ASD. [Read the Safety Statement here.](#)



#### UOG App

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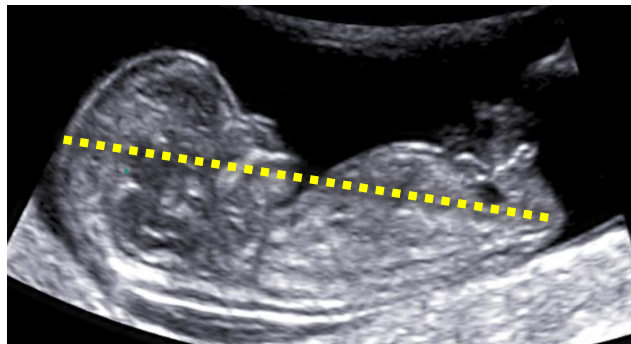
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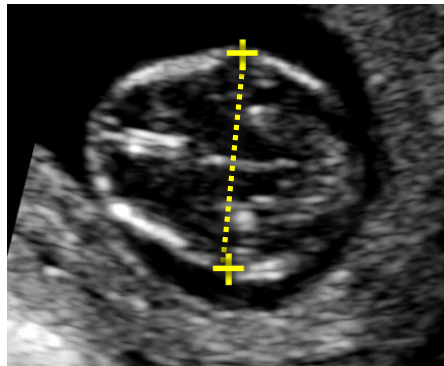
# Ultrasound assessment of gestational age

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

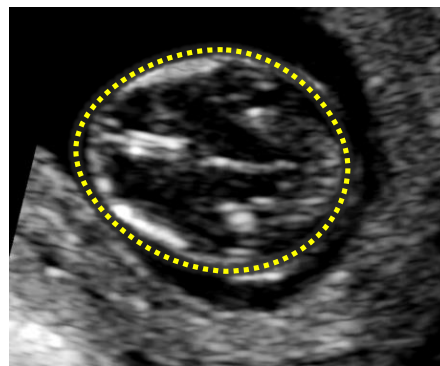
Pregnant women should be offered an early ultrasound scan between 10 + 0 and 13 + 6 weeks to establish accurate gestational age. **(Grade A recommendation)**



***Crown-rump length (CRL)***



***Biparietal diameter (BPD)***



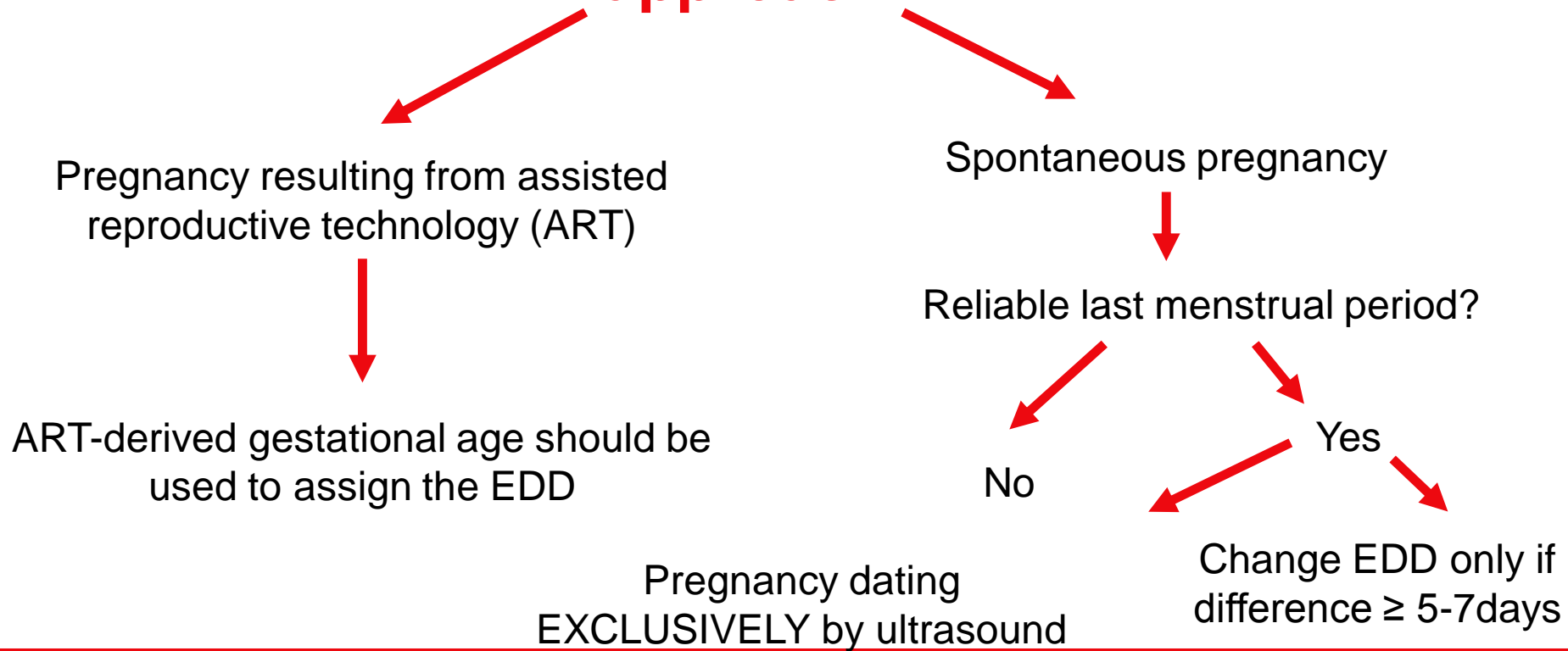
***Head circumference (HC)***

**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 is BPD.

**(GOOD PRACTICE POINT)**

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



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

Weeks of amenorrhea	12+3
EDD (amenorrhea)	15/01/2015
Gestational weeks (US)	11+0
<b>EDD (US)</b>	<b>25/01/2015</b>

...fetal dimensions  
correspond to the  
menstrual age

**OR**

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

## 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\*



**GUIDELINES**

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

## 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\*



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

## Head

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



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

## Neck

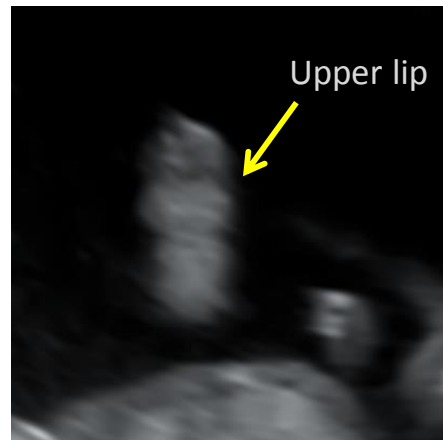
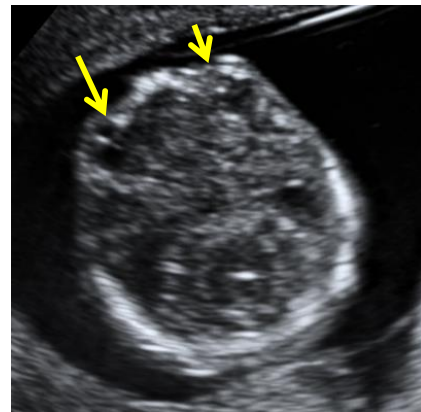
- Normal appearance
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**(if accepted after informed consent and trained/certified operator available)\***



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

## Face

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

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- Vertebrae (longitudinal & axial)\*
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**ISUOG Practice Guidelines: performance of first-trimester fetal ultrasound scan**

## Chest

- Symmetrical lung fields
- No effusions or masses



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

## Heart

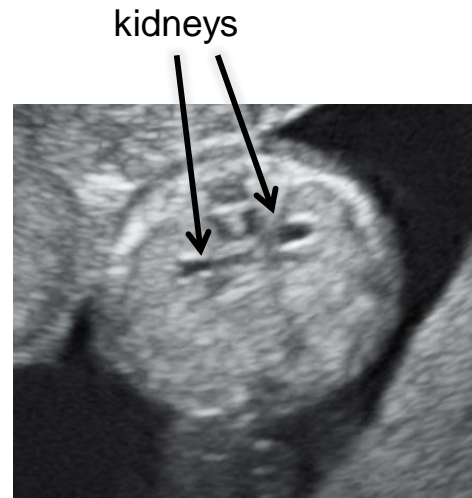
- Cardiac regular activity
- Four symmetrical chambers\*



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

## Abdomen

- Stomach present in left upper quadrant
- Bladder\*
- Kidneys\*





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

## Abdominal wall

- Normal cord insertion
- No umbilical defects





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

## Extremities

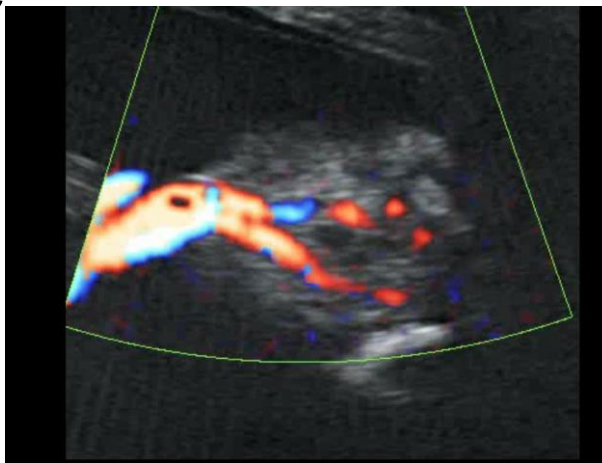
- Four limbs each with three segments
- Hands and feet with normal orientation\*



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



- Placenta Size and texture
- Three-vessel cord\*



# Accuracy of Ultrasonography at 11–14Weeks of Gestation for Detection of Fetal Structural Anomalies: A Systematic Review. *Rossi & Prefumo, Obstet & Gynecol 2013*

## **100% detection rate**

- Acrania, anencephaly, ectopia cordis, encephalocele

## **50–99% detection rate**

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

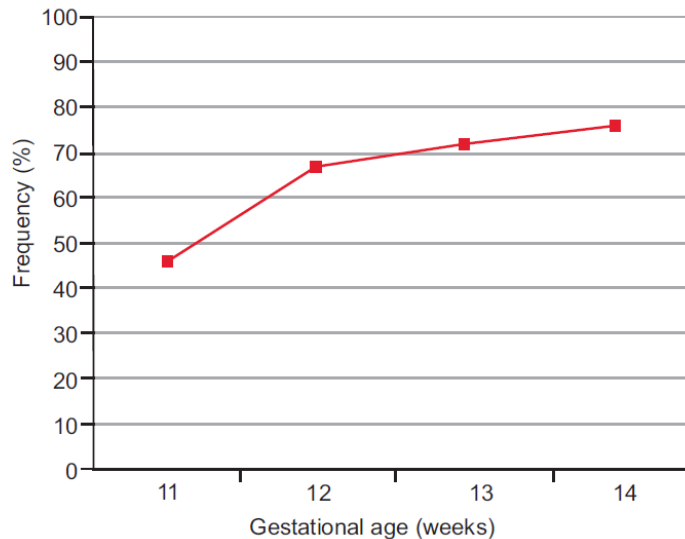
## **1–49% detection rate**

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

## **0% detection rate**

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

# 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**



# Other neural tube defects



Encephalocele



Encephalocele and severe spinal malformation



# Lethal skeletal dysplasia



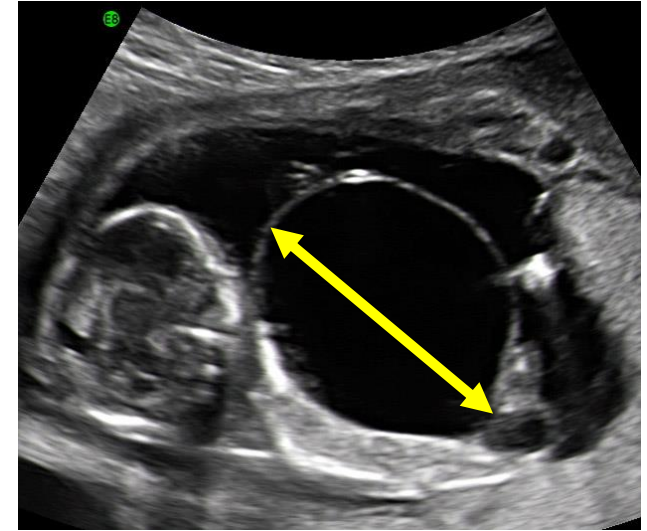


# Micrognathia



# Megacystis

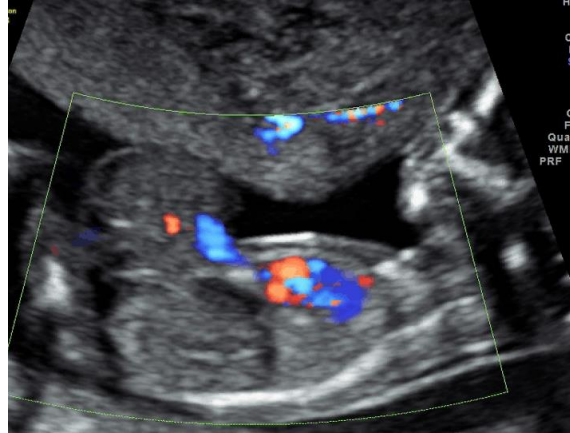
(longitudinal bladder diameter of 7 mm or more)



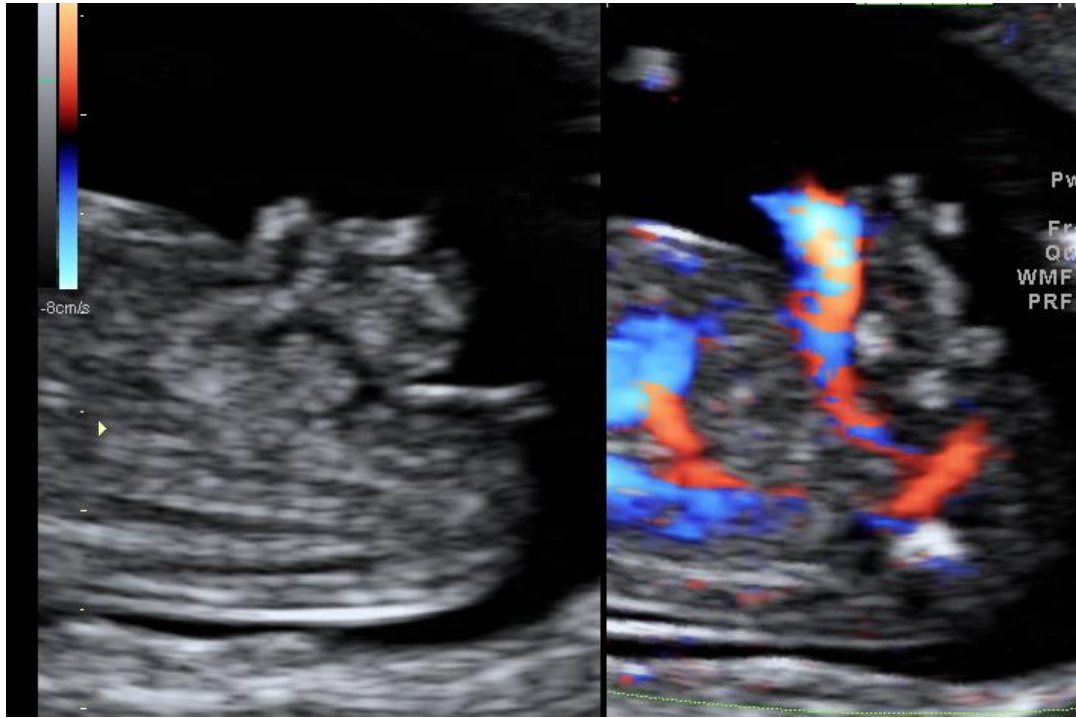
Exomphalos  
(omphalocele)

≠

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)**

# Scanning twins at 10-14 weeks: chorionicity

**Lambda sign =**  
dichorionic  
diamniotic



**T sign =**  
Monochorionic  
diamniotic

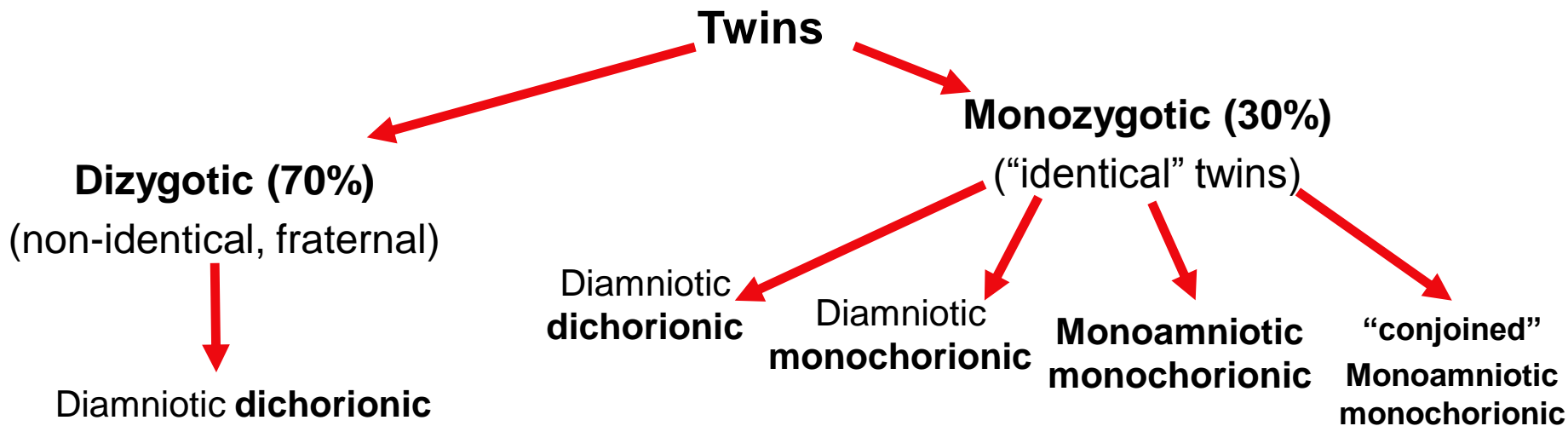


**No membrane =**  
Monochorionic  
Monoamniotic



# Chorionicity and zygosity

- **Chorionicity:** number of placentas
- **Zygosity:** number of zygotes (are the twins “IDENTICAL”?)





# Key points

1. Pregnant women should be offered an early ultrasound scan between 10 + 0 and 13 + 6
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 and in the most experienced of hands.
4. In twin pregnancies chorionicity should be accurately determined and documented



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