OBSTETRICS

by Ten Teachers

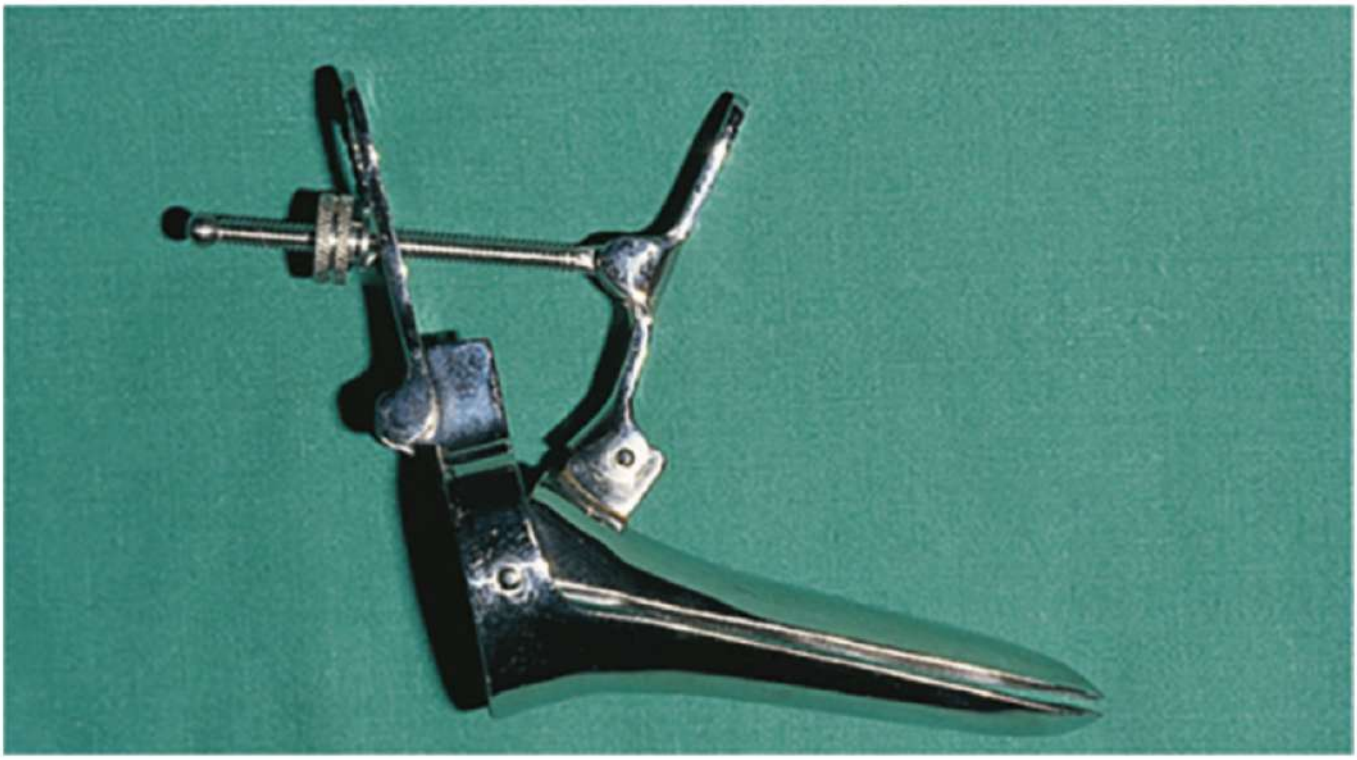

Figure 1.7 A Cusco speculum.

Done by

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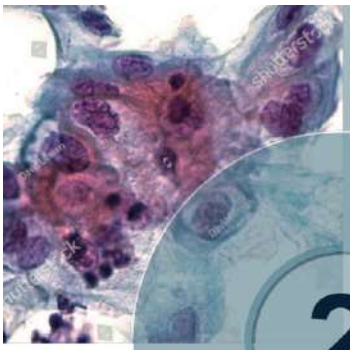


2 Antenatal care

FERGUS McCARTHY

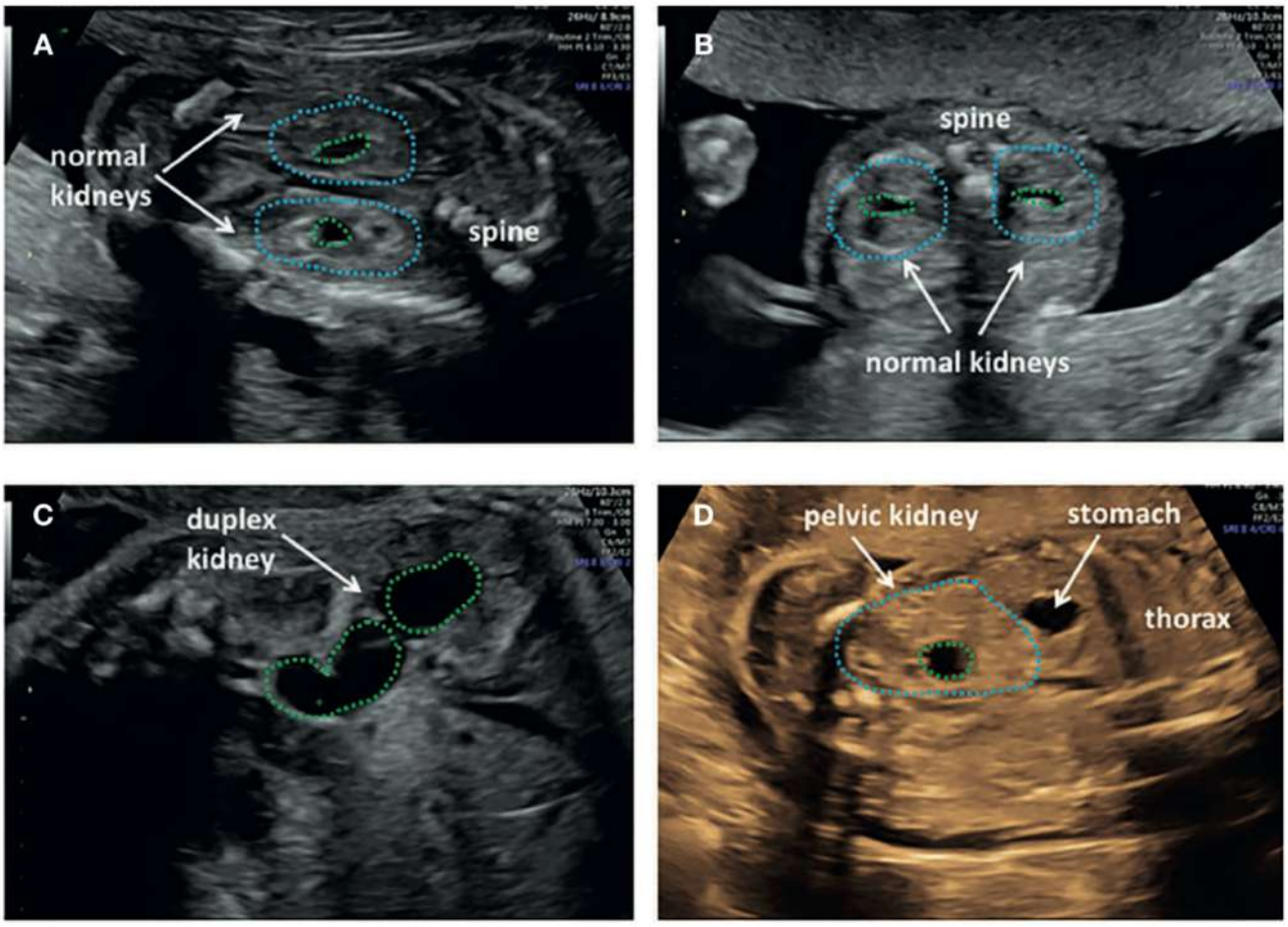


Figure 3.6 Normal kidneys in coronal view (**A**) and transverse view (**B**). The kidneys are outlined with blue dots and the renal pelvis in each kidney is outlined in green dots. (**C**) A duplex kidney with two separate dilated renal pelvises (green dots). (**D**) A pelvic kidney with a normal size renal pelvis (green dots outline the renal pelvis; blue dots outline the renal cortex).

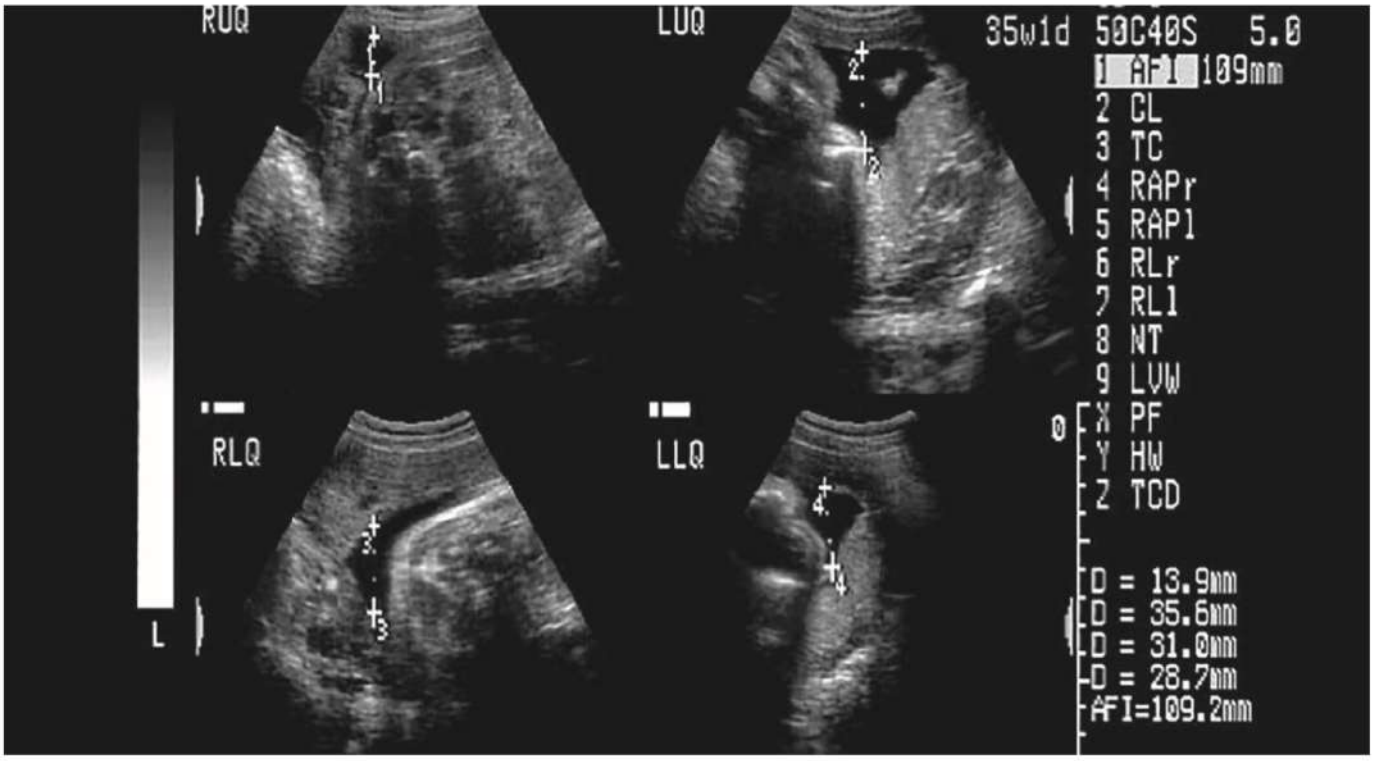


Figure 3.8 Amniotic fluid measurement and normal ranges.

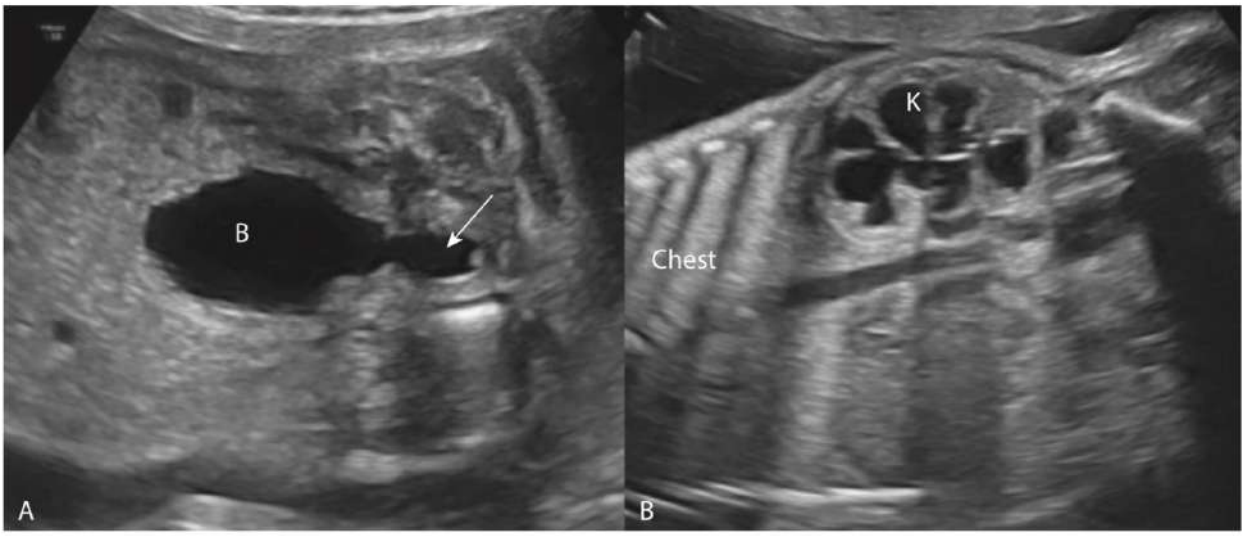


Figure 3.7 Posterior urethral valves. (**A**) The typical 'keyhole' sign in the fetal bladder (labelled 'B'), where the dilated upper posterior urethra is indicated (white arrow). (**B**) Dilatation of the collecting system of the fetal kidney (labelled 'K').

CASE HISTORY 3

A 30-year-old multiparous woman is referred to the fetal medicine unit because the midwife is concerned about the size of the uterus during a routine antenatal check at 30 weeks' gestation. The SFH measures 38 cm. Down syndrome screening by the combined test gave a low risk (1 in 20,000). On ultrasound examination, the fetal measurements are on the 80th centile. There is increased amniotic fluid with a single deepest pool of 10 cm (normal range <8 cm) and an amniotic fluid index of 35 cm (normal range <25 cm). Fetal movements and fetal umbilical artery and middle cerebral artery Doppler measurements are normal. In the transverse fetal abdominal views, there was a double bubble seen on the left side of the abdomen (**Figure 3.9**). There were no other abnormalities detectable; in particular, the fetal face was normal. The placenta was anterior high and had a normal structural appearance.

What is the most likely diagnosis and what are the differential diagnoses? What is the optimum management for the rest of the pregnancy and at birth?

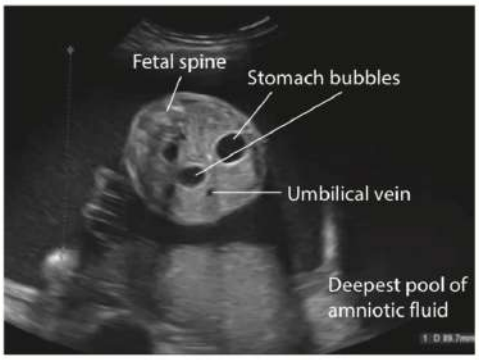


Figure 3.9 Ultrasound image showing the 'double bubble' appearance and polyhydramnios associated with duodenal atresia.

ANSWER

Polyhydramnios occurs in approximately 1–1.5% of pregnancies. This is a case of mild polyhydramnios (single deepest pool of liquor 8–11 cm). An underlying disease is only found in 17% of cases in mild polyhydramnios. In contrast, an underlying disease is detected in 91% of cases in moderate (12–15 cm) to severe polyhydramnios (>15 cm).

The most likely diagnosis is duodenal atresia, namely the congenital absence or complete closure of a portion of the lumen of the duodenum, which occurs in 1:2,500–5,000 live births. In 25–40% of cases, there is associated trisomy 21 (Down syndrome). The differential diagnosis includes:

- an obstructive structural malformation that prevents fetal swallowing (e.g. facial cleft or congenital high airways obstruction syndrome [CHAOS]) or prevents passage of amniotic fluid along the gut (e.g. oesophageal atresia)

(Contd.)

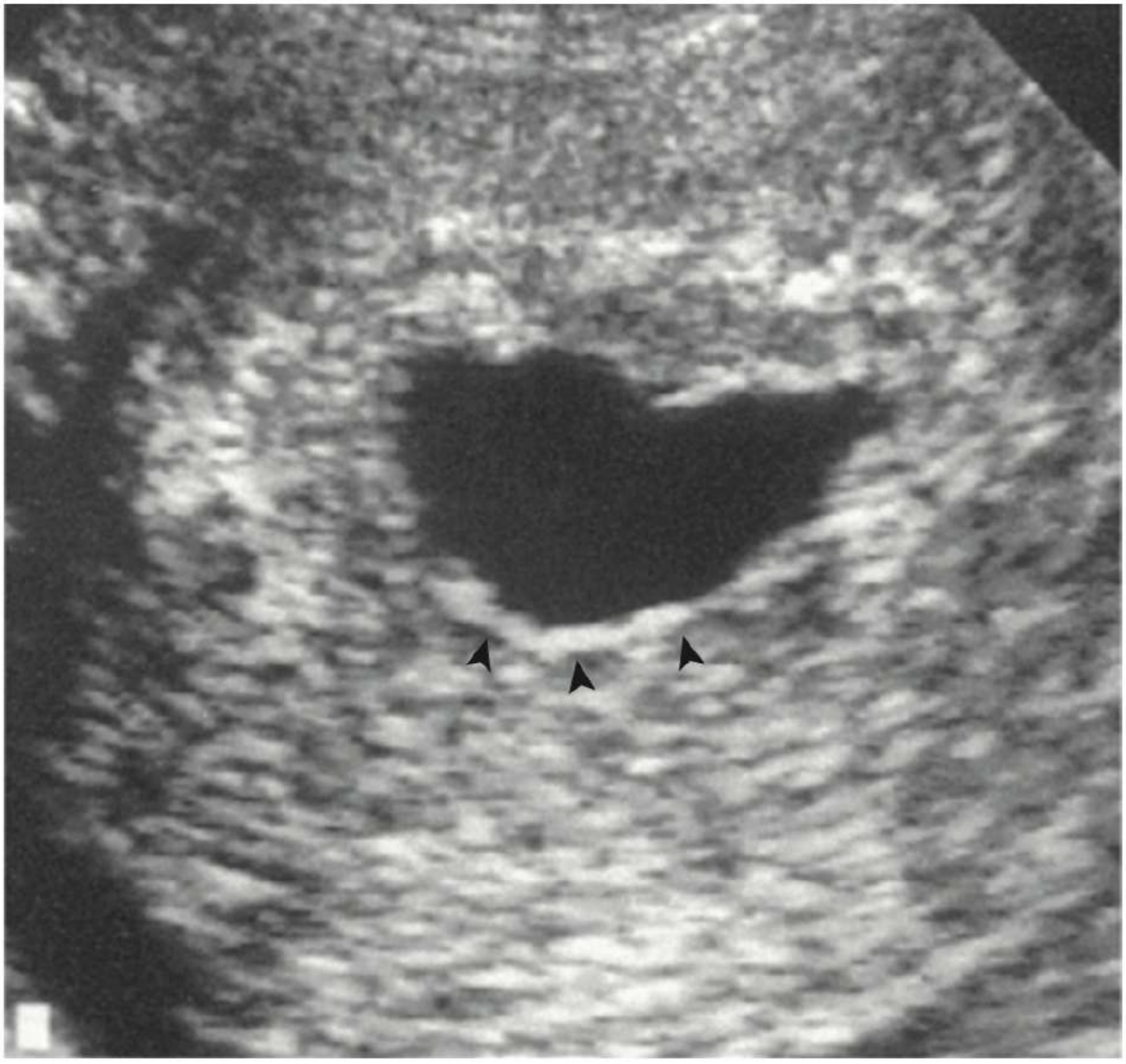
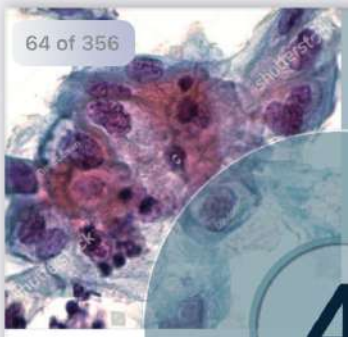


Figure 4.4 Ultrasound image showing an empty gestation sac (arrowheads) in a case of an anembryonic pregnancy.



4 Assessment of fetal well-being

ANNA L DAVID

Learning Objectives

- Understand the principles of imaging in obstetrics and its safety and benefits for examining the fetus during gestation.
- Know how ultrasound is used in pregnancy to confirm gestational age, to detect fetal structural abnormalities, to monitor fetal growth and development, to study the placenta and to assess fetal well-being.

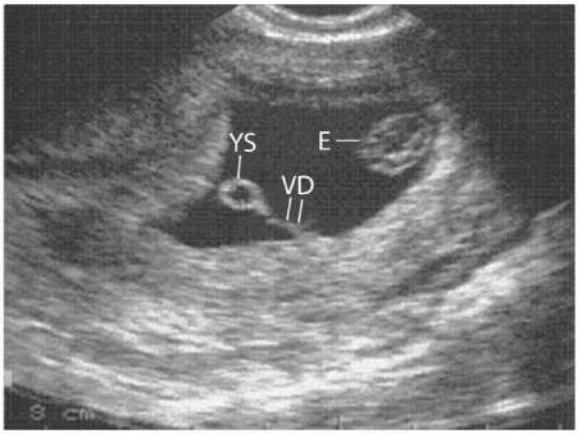


Figure 4.3 Ultrasound sac showing the yolk sac (YS) and embryo (E) with the vitelline duct (VD).

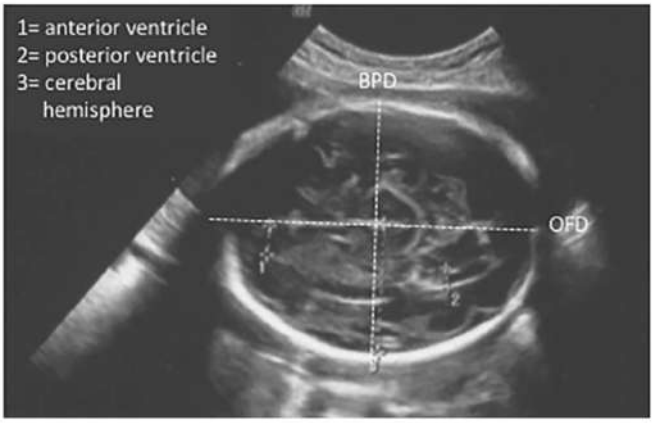


Figure 4.5 Biparietal diameter (BPD). (1, anterior ventricle; 2, posterior ventricle; 3, cerebral hemisphere. OFD, occipitofrontal diameter.)

Figure 4.6 Femur length.

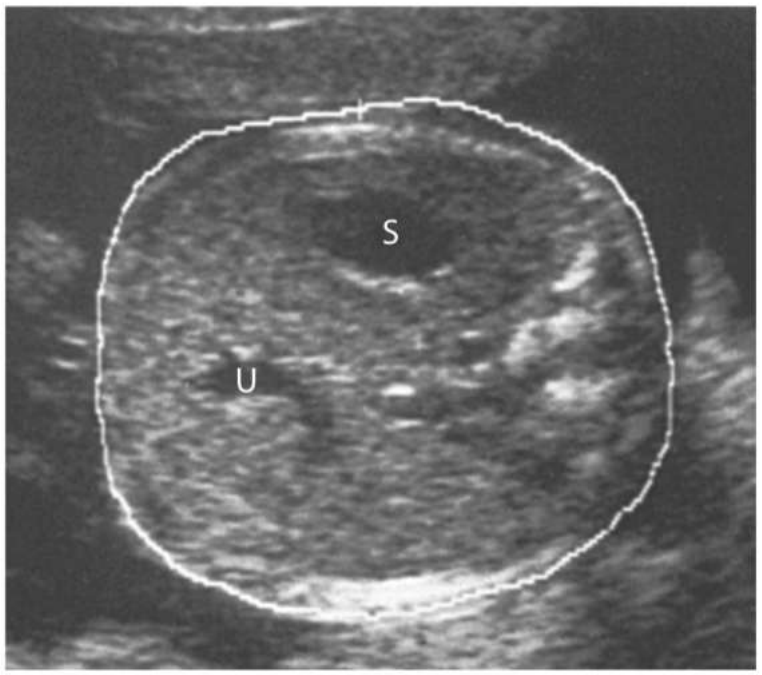


Figure 4.7 Abdominal circumference measurement demonstrating the correct section showing the stomach (S) and the umbilical vein (U).

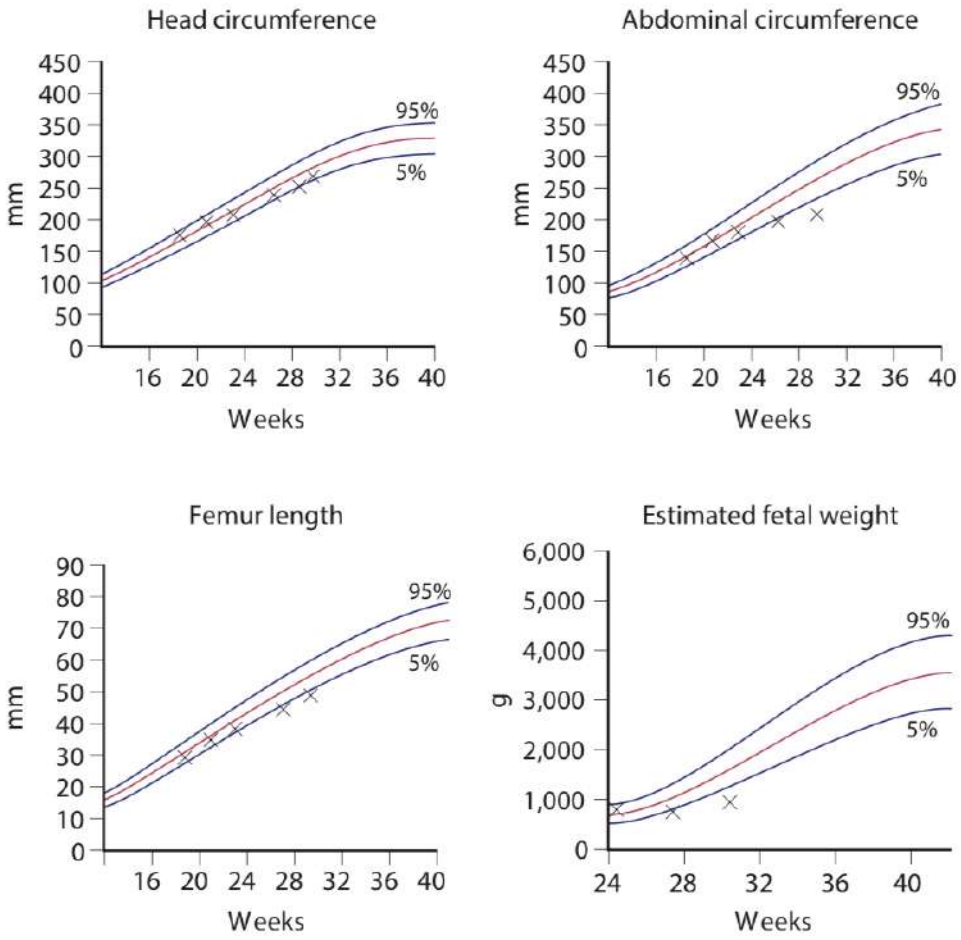


Figure 4.8 Ultrasound plots on reference range for head circumference, abdominal circumference, femur length and estimated fetal weight in a case of early-onset fetal growth restriction. Note that head circumference remains above the 5th centile, while the abdominal circumference falls below the 5th centile. This is a case of asymmetric fetal growth restriction with head sparing.

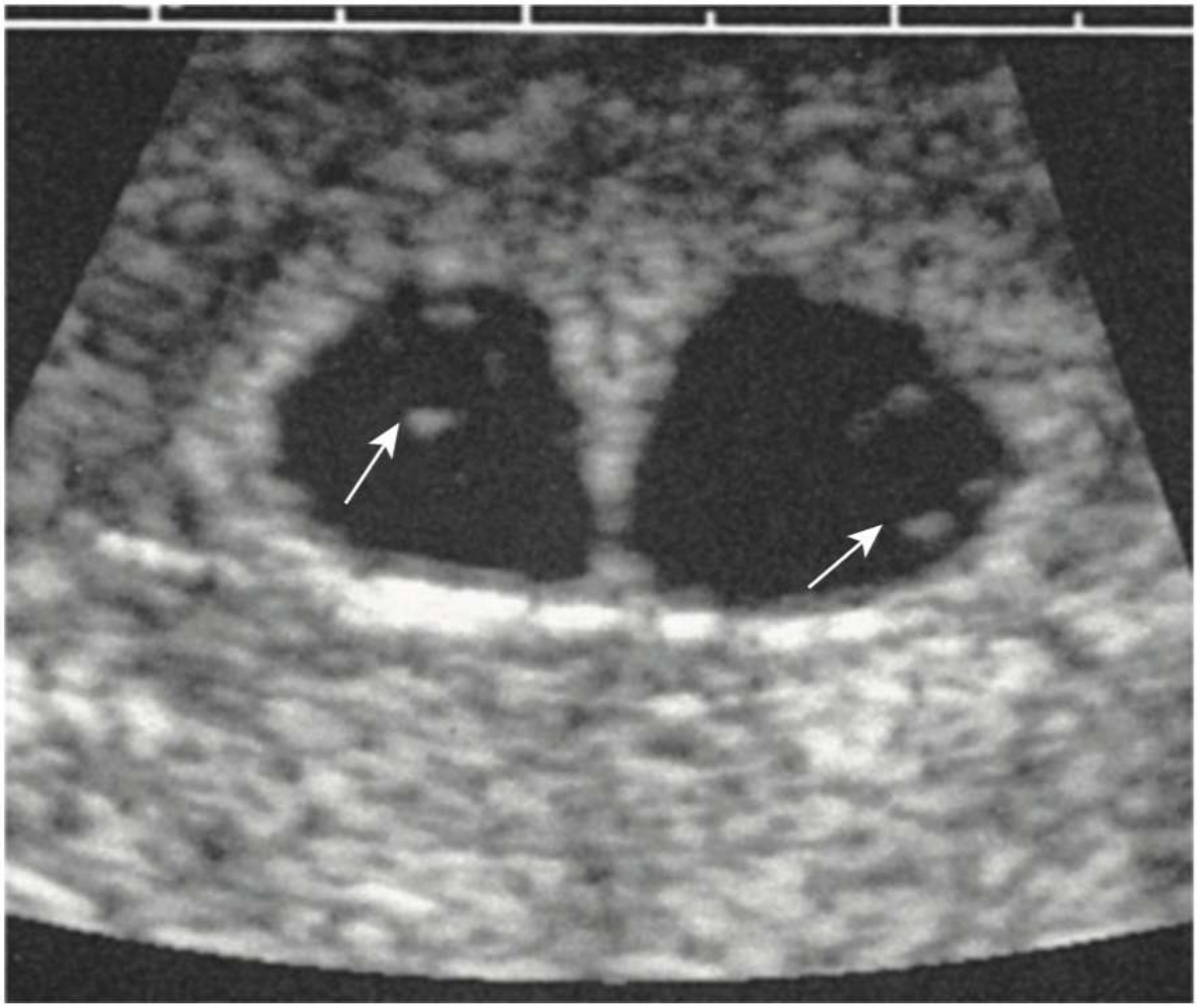


Figure 4.9 Early twin dichorionic pregnancy (arrows); note the 'peaked' inter-twin membrane.

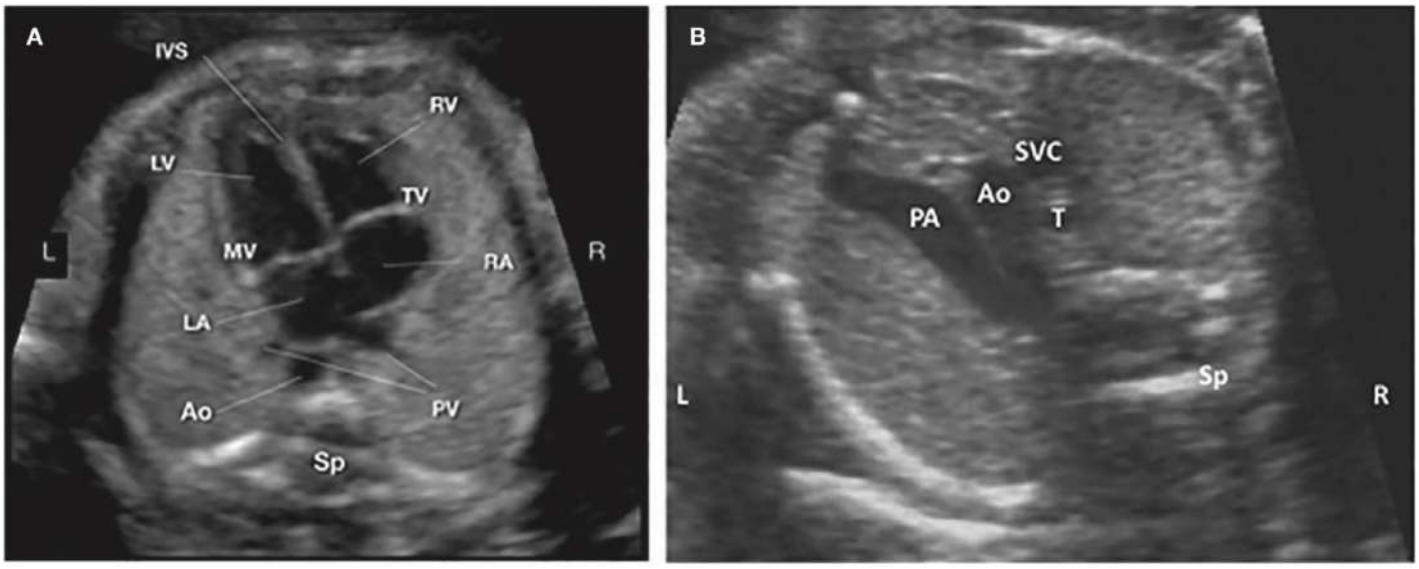


Figure 4.10 Ultrasound images of the fetal heart views used to screen for cardiac anomalies. (**A**) Four-chamber view. (**B**) Three-vessel trachea view. (Ao, aorta; IVS, interventricular septum; L, left; LA, left atrium; LV, left ventricle; MV, mitral valve; PA, pulmonary artery; PV, pulmonary veins; R, right; RA, right atrium; RV, right ventricle; Sp, spine; SVC, superior vena cava; T, trachea; TV, tricuspid valve.)

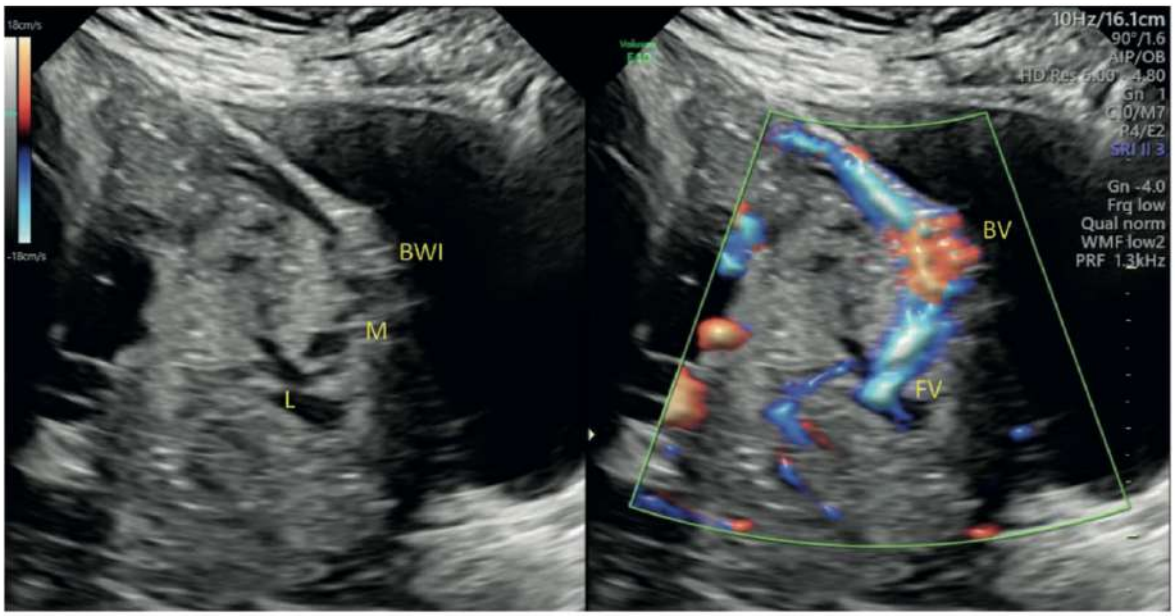


Figure 4.11 2D ultrasound images of placenta accreta spectrum illustrating the use of colour Doppler to improve the assessment of vascular perfusion in the right-hand image. The maternal bladder is kept full to better visualize the interface between the placenta and the bladder wall. (BV, bridging vessels; BWI, bladder wall interruption; FV, feeder vessels; L, large and irregular lacunae adjacent to the myometrium; M, myometrium indistinguishable from placenta.)

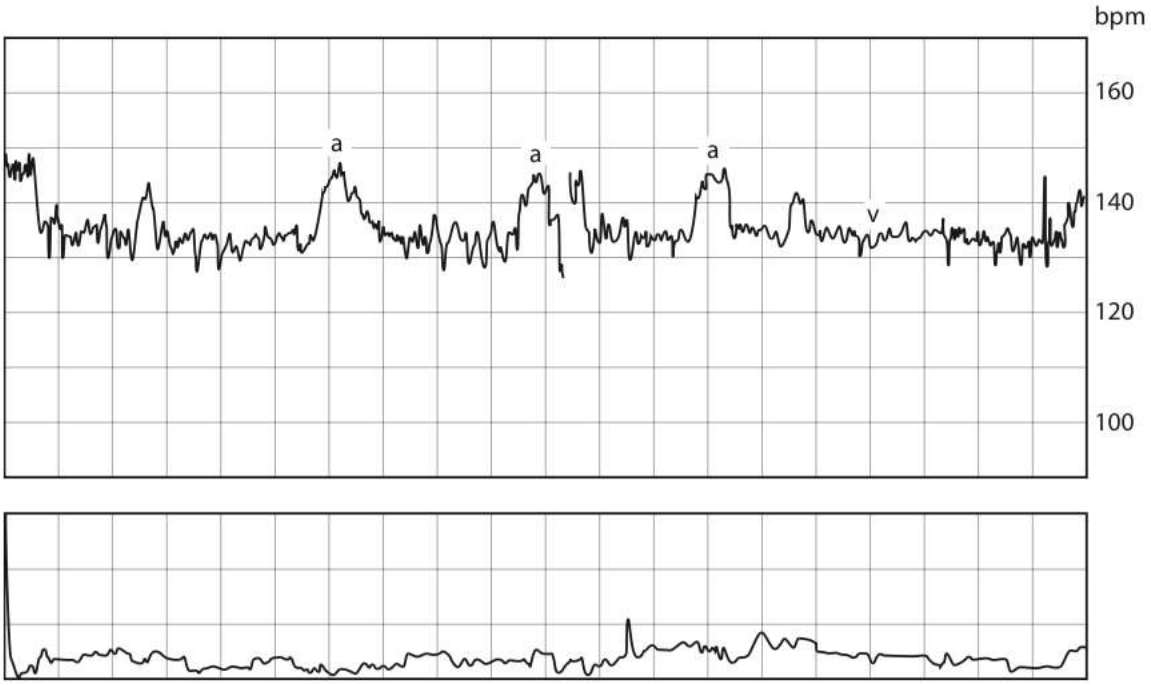


Figure 4.12 A normal fetal cardiotocograph showing a normal rate, normal variability (v) and the presence of several accelerations (a).

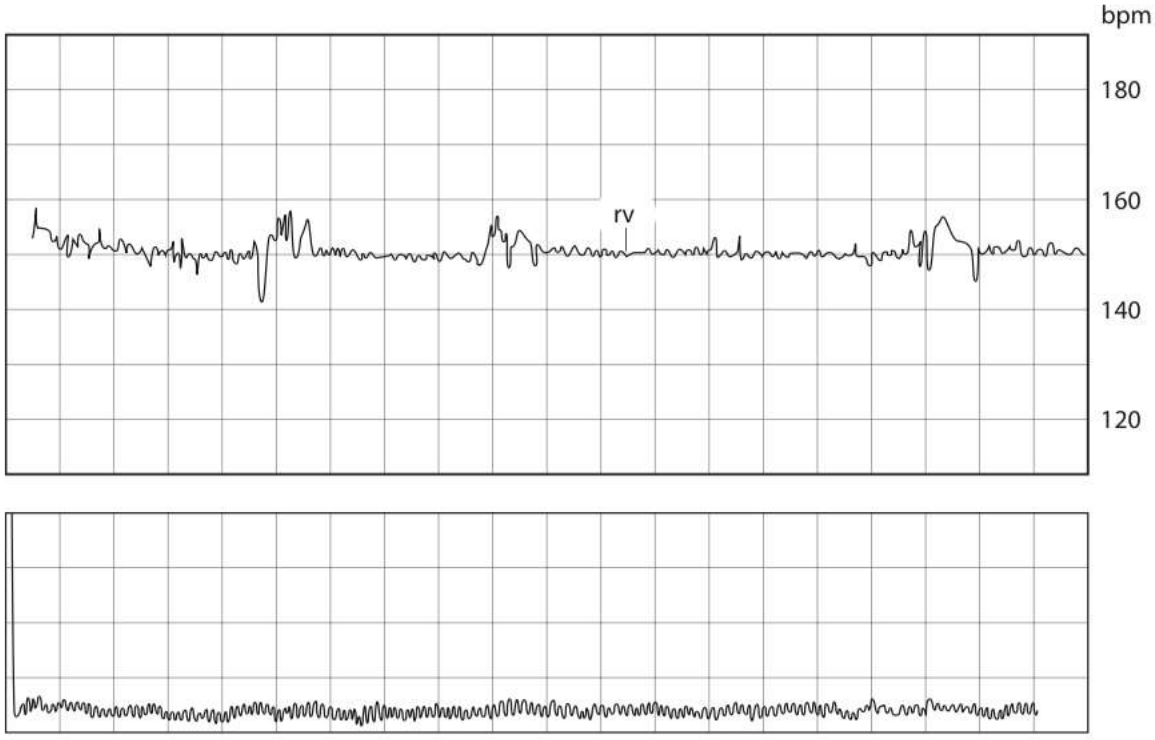


Figure 4.13 A fetal cardiotocograph showing a baseline of 150 bpm but with reduced variability (rv).

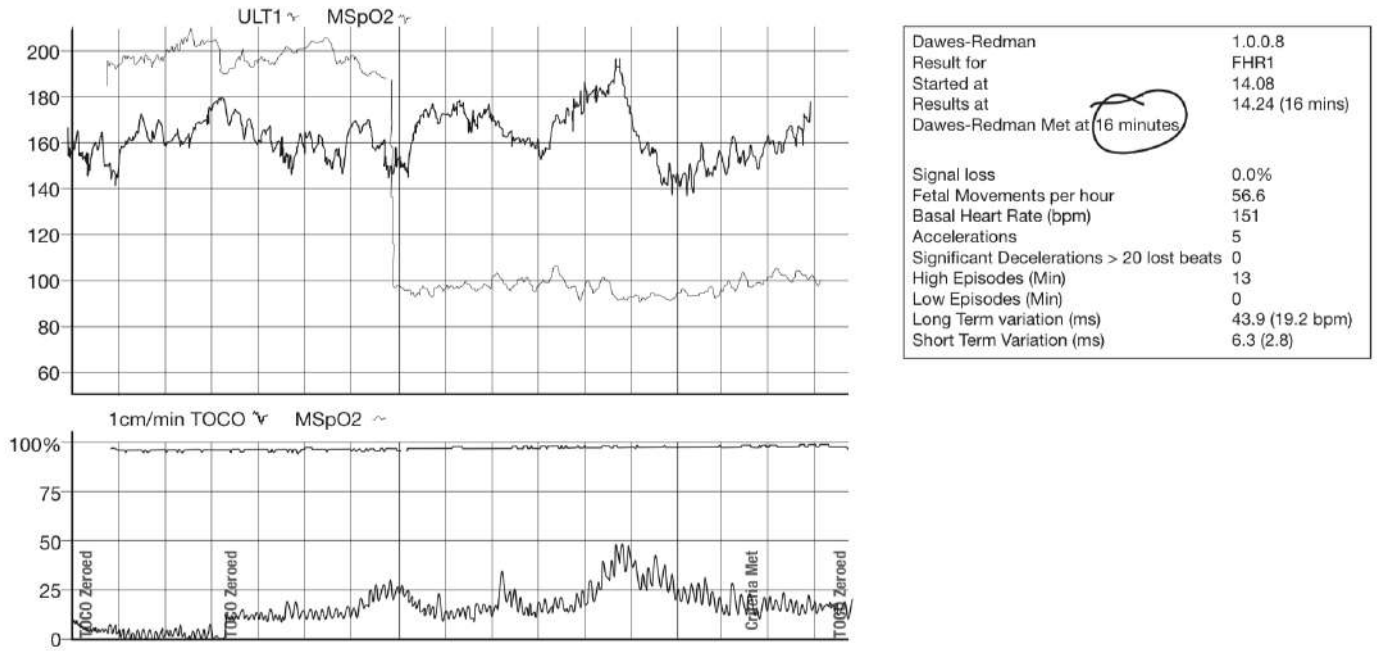


Figure 4.15 Computerized antenatal cardiotocograph showing Dawes Redman criteria have been met, indicating a normal fetus.

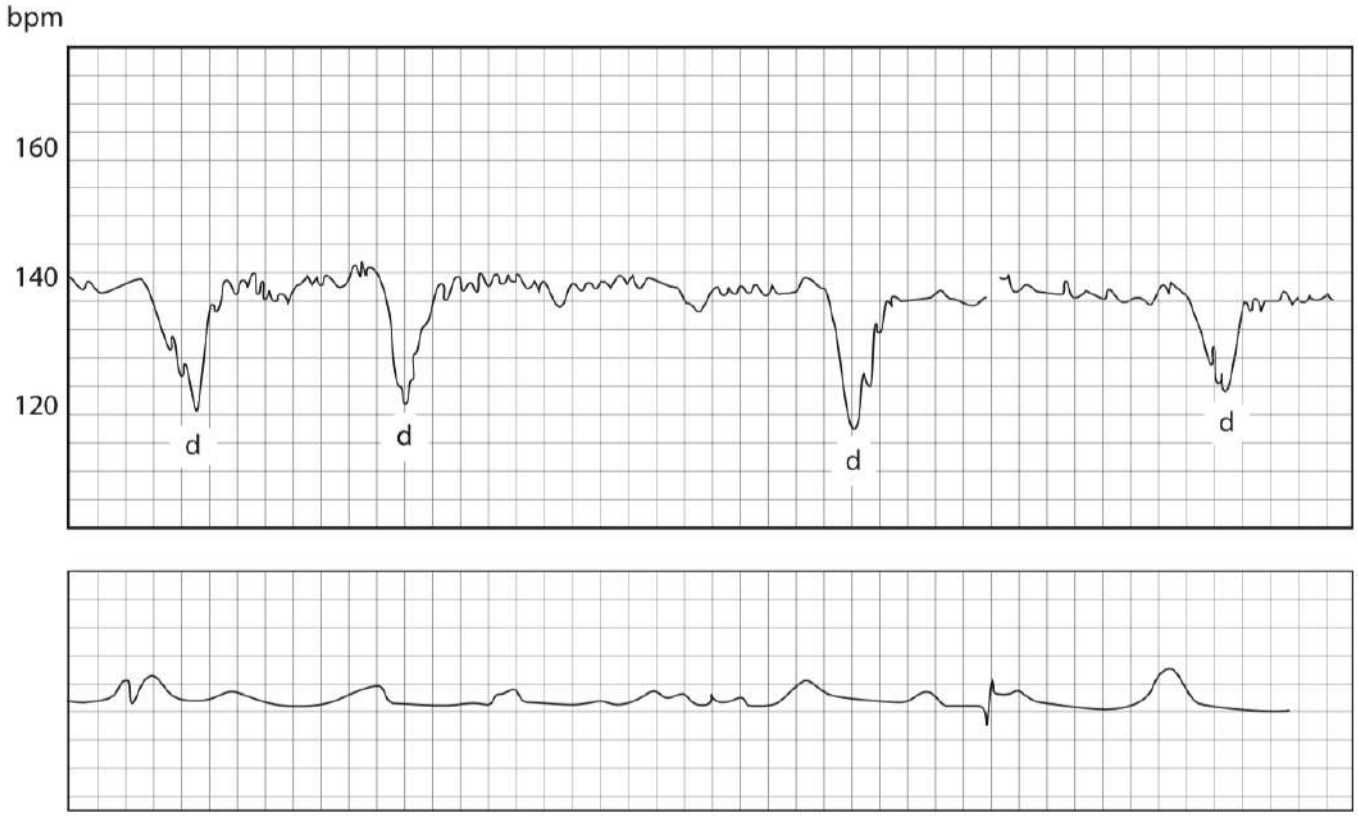


Figure 4.14 An admission cardiotocograph from a term pregnancy. Although the baseline fetal heart rate is normal, there is reduced variability, an absence of fetal heart rate accelerations and multiple decelerations (d). The decelerations were occurring after uterine tightening and are therefore termed 'late'.

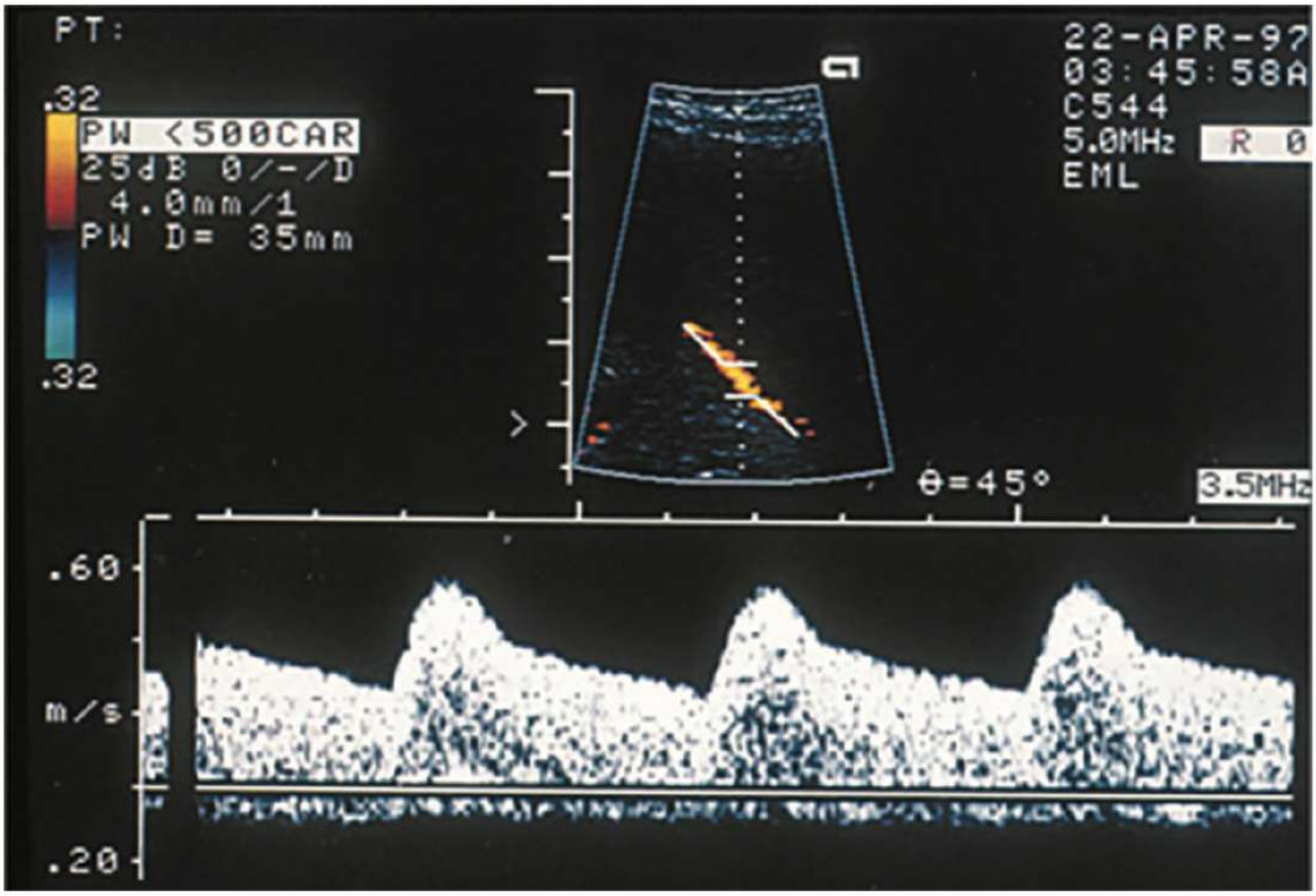


Figure 4.17 Normal umbilical arterial Doppler waveform.

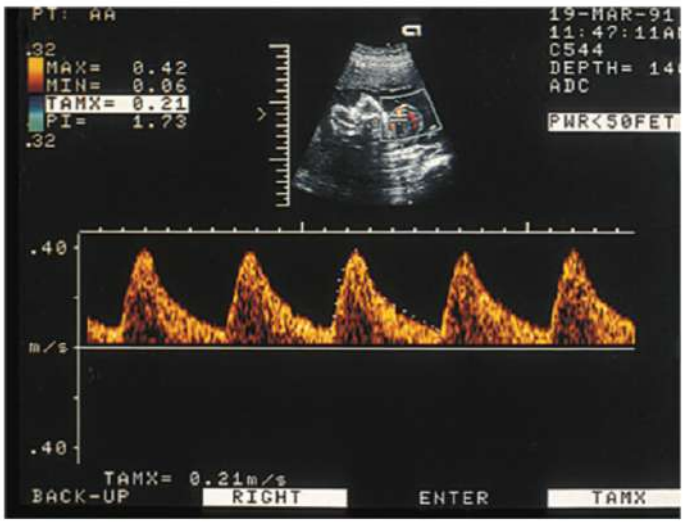


Figure 4.18 Reduced end-diastolic flow in umbilical artery compared with the normal waveform in Figure 4.17.

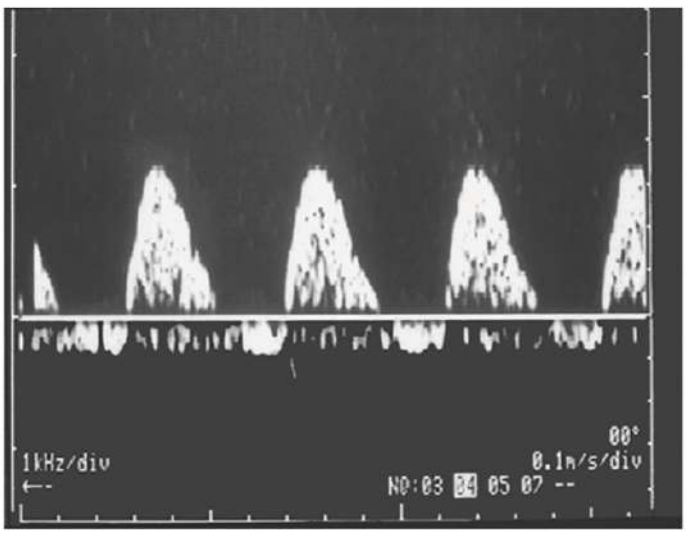


Figure 4.19 Reverse end-diastolic flow in the umbilical artery.

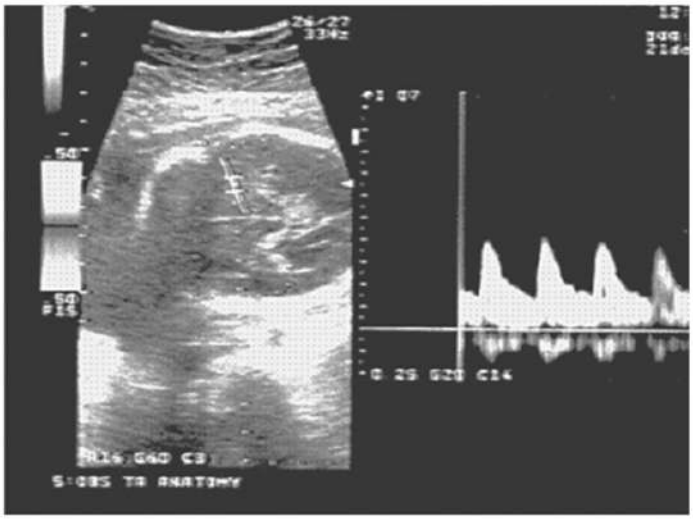


Figure 4.20 Middle cerebral artery Doppler showing increased diastolic flow with possible redistribution to brain in hypoxia.

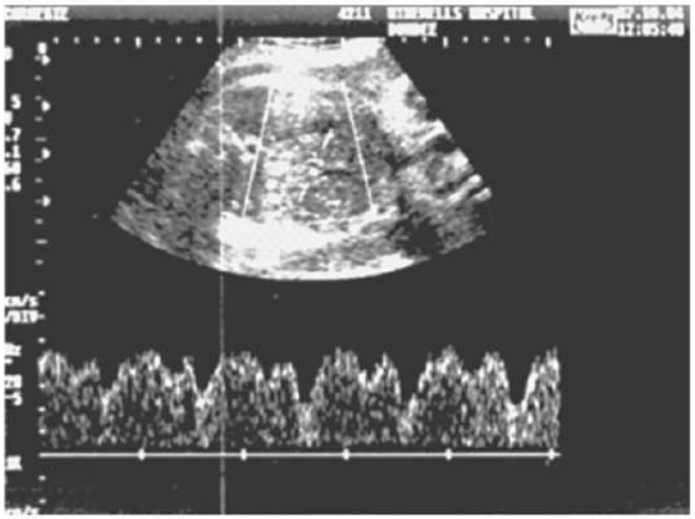


Figure 4.21 Normal ductus venosus Doppler waveform.

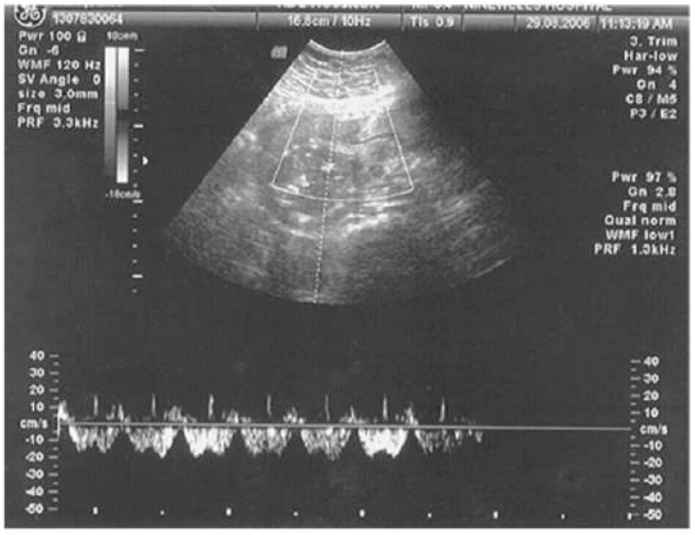


Figure 4.22 Reverse flow in ductus venosus

the fetal aorta reflecting compensatory vasoconstriction in the fetal body. Absent diastolic flow in the fetal aorta implies fetal acidaemia. Perhaps the most sensitive index of fetal acidaemia and incipient heart failure is demonstrated by increasing pulsatility in the central veins supplying the heart, such as the ductus venosus (DV) and inferior vena cava (IVC). The DV shunts a portion of the umbilical vein blood flow directly to the IVC and thence to the right atrium, allowing oxygenated blood from the placenta to bypass the fetal liver. The DV Doppler flow velocity therefore reflects atrial pressure–volume changes during the cardiac cycle. As

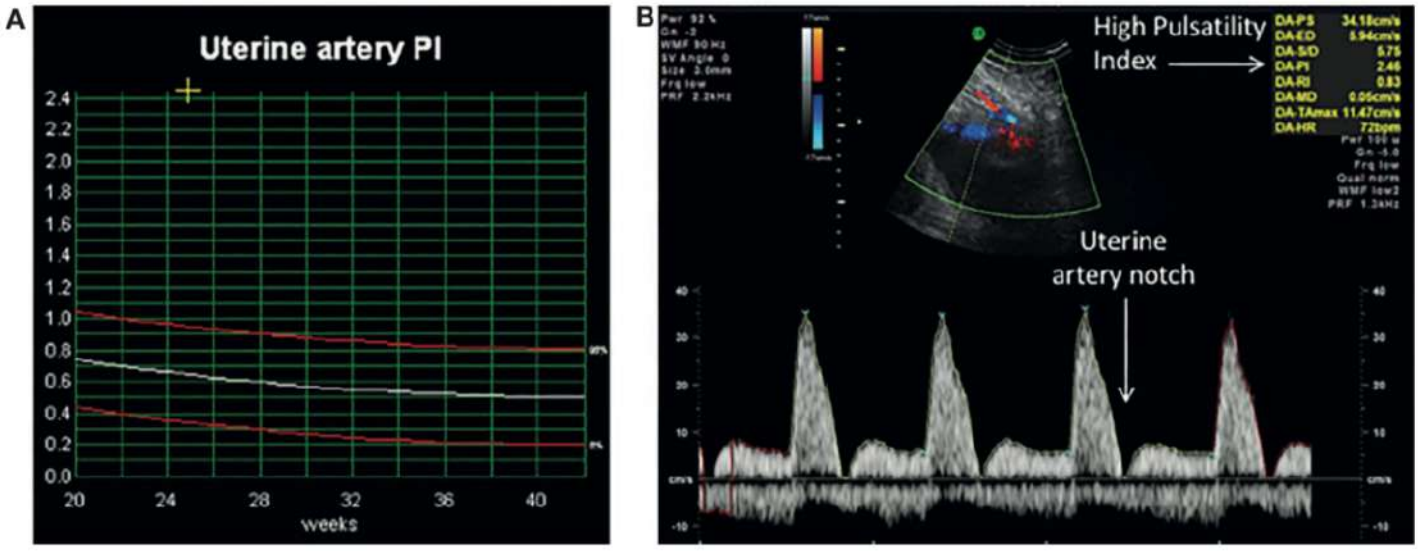


Figure 4.23 (**A**) Uterine artery waveform with diastolic notch. (**B**) Pulsatility index (PI) above the 97th centile.

KEY LEARNING POINTS

The aims of obstetric ultrasound include:

- the early pregnancy scan (11–14 weeks), namely to:
  - confirm fetal viability
  - provide an accurate estimation of gestational age
  - diagnose multiple gestation, and in particular determine chorionicity
  - identify markers that would indicate an increased risk of fetal chromosome abnormality such as Down syndrome
  - identify fetuses with gross structural abnormalities.
- the 20-week scan (18–22 weeks), namely to:
  - provide an accurate estimation of gestational age if an early scan has not been performed
  - carry out a detailed fetal anatomical survey to detect any fetal structural abnormalities or markers for chromosome abnormality
  - locate the placenta and identify pregnancies with a low-lying placenta for a repeat scan at 34 weeks to exclude placenta praevia
  - estimate the amniotic fluid volume
  - perform Doppler ultrasound examination of maternal uterine arteries to screen for adverse pregnancy outcome, for example SGA
  - measure cervical length to assess the risk of preterm delivery where there are risk factors for spontaneous preterm birth.
- ultrasound in the third trimester, namely to:
  - assess fetal growth
  - assess fetal well-being.

year old in her first pregnancy attends for review antenatal clinic at 34 weeks' gestation. Her dates were confirmed by ultrasound at booking (12 weeks). She is a smoker. The midwife measures her fundal height at 30 cm. An ultrasound scan is performed because of the midwife's concern that the fetus is SGA, and the measurements are plotted in **Figure 4.24**.

A Do the ultrasound findings support the clinical diagnosis of SGA?

B What additional features/measures on ultrasound assessment could give an indication of fetal well-being?

ANSWERS

A Yes, because the fetal AC is below the 5th centile for gestation. This finding does not give an indication of the well-being of the fetus and is compatible with FGR secondary to placental insufficiency or a healthy, constitutionally small baby.

B The additional features/measures are as follows.

Liquor volume

Amniotic fluid volume is decreased in FGR associated with fetal hypoxia where there may be redistribution of fetal blood flow away from the kidneys to vital structures such as the brain and heart, with a consequent reduction in renal perfusion and urine output.

Doppler ultrasound

Umbilical artery

Waveforms from the umbilical artery provide information on fetoplacental blood flow and placental resistance. Diastolic flow in the umbilical artery increases (i.e. placental resistance falls) throughout gestation. If the resistance index in the umbilical artery rises above the 95th centile of the normal graph, this implies poor perfusion of the placenta, which may eventually result in fetal hypoxia. Absent or reversed end-diastolic flow in the umbilical artery is a particularly serious development, with a strong correlation with fetal hypoxia and intrauterine death.

Fetal vessels

Falling oxygen levels in the fetus may lead to cerebral redistribution, diverting blood from the fetal body to the brain, heart, adrenals and spleen. The middle cerebral artery will show increasing diastolic flow as hypoxia increases, while a rising resistance in the fetal aorta reflects compensatory vasoconstriction in the fetal body. When diastolic flow is absent in the fetal aorta, this implies fetal acidaemia. Increasing pulsatility in the central veins supplying the heart, such as the DV and IVC, is an indicator of fetal acidaemia and impending heart failure; when late diastolic flow is absent in the ductus venosus, fetal death is imminent.

Cardiotocography

Fetal tachycardia, reduced variability in heart rate, absence of accelerations and presence of decelerations identified on a CTG are associated with fetal hypoxia.

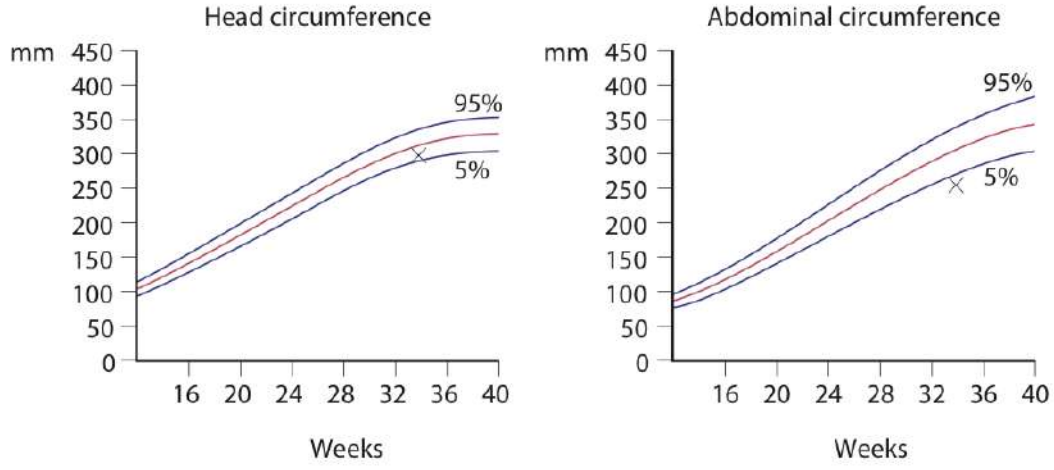
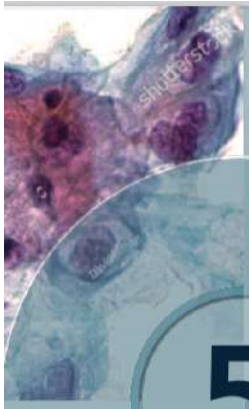


Figure 4.24 Plot of fetal head circumference and fetal abdominal circumference.



5 Prenatal diagnosis

ANNA L DAVID

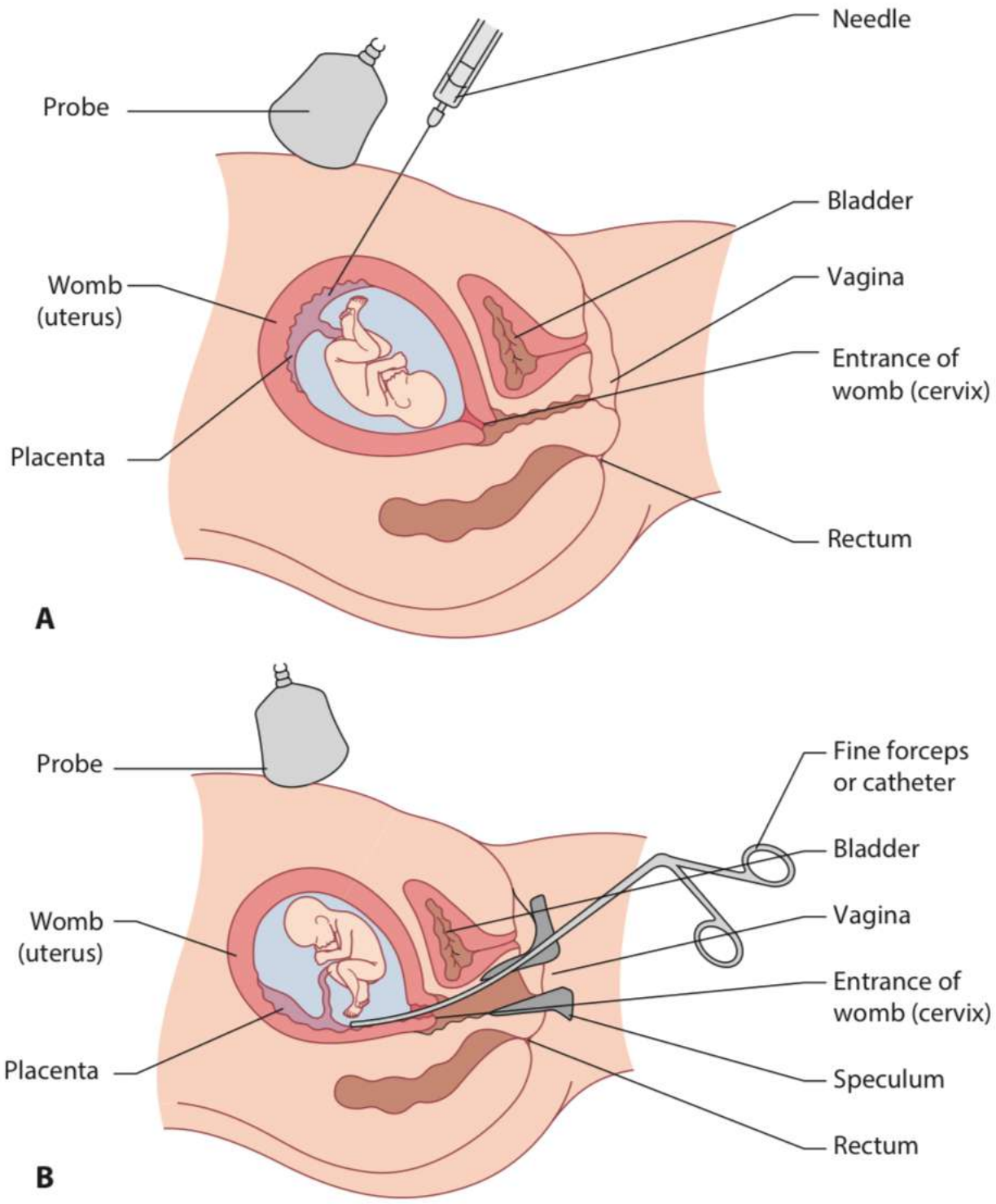


Figure 5.1 Chorionic villus sampling via (**A**) the transabdominal approach and (**B**) the transvaginal approach. (Adapted from the RCOG information leaflet of both approaches.)

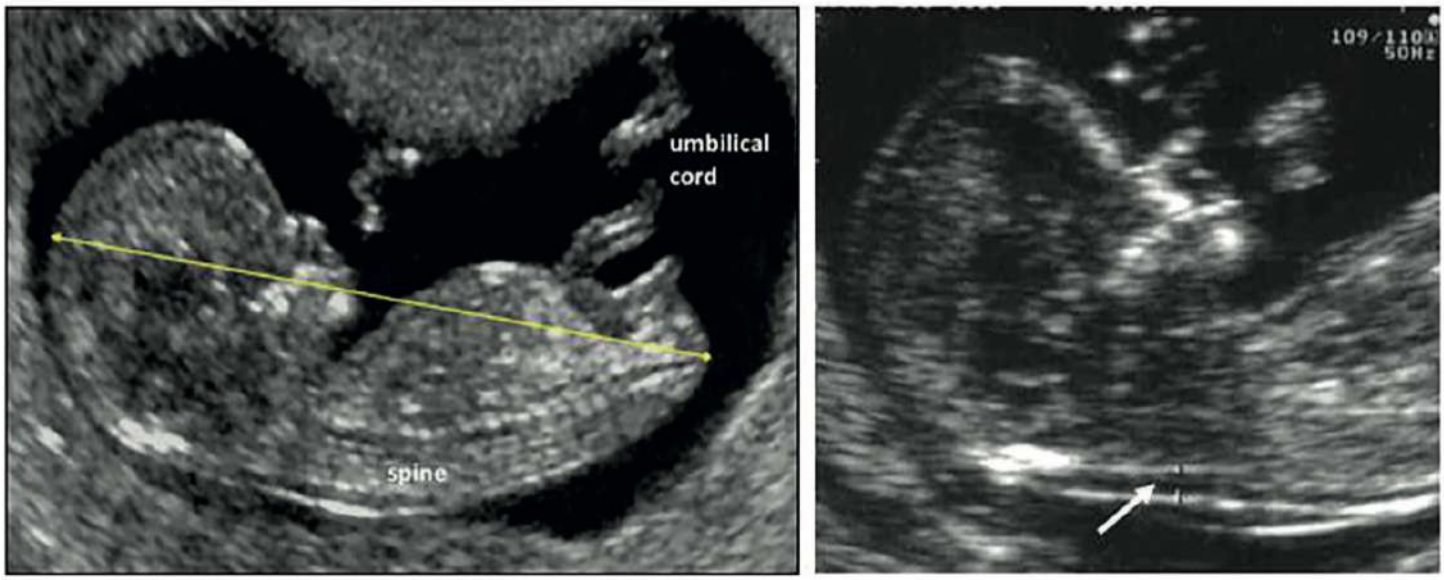


Figure 5.3 Ultrasound images demonstrating the measurement of crown–rump length (left-hand image) and nuchal translucency (arrow, right-hand image).

CASE HISTORY 1

Ms N is a 22-year-old woman living in the North West of England. She found herself unexpectedly pregnant and had not been taking peri-conceptual folic acid. When she first attended the antenatal clinic, an ultrasound scan showed her to be 19 weeks' pregnant. The fetus was noted to have an abnormal head shape, the cerebellum was described as banana shaped and a myelomeningocoele was identified in the lumbar region. The fetus had bilateral talipes.

Figure 5.4 shows normal intracranial anatomy imaged in the plane of the thalami to visualize the ventricles (**Figure 5.4A**) and the transcerebellar plane (**Figure 5.4B**). Note

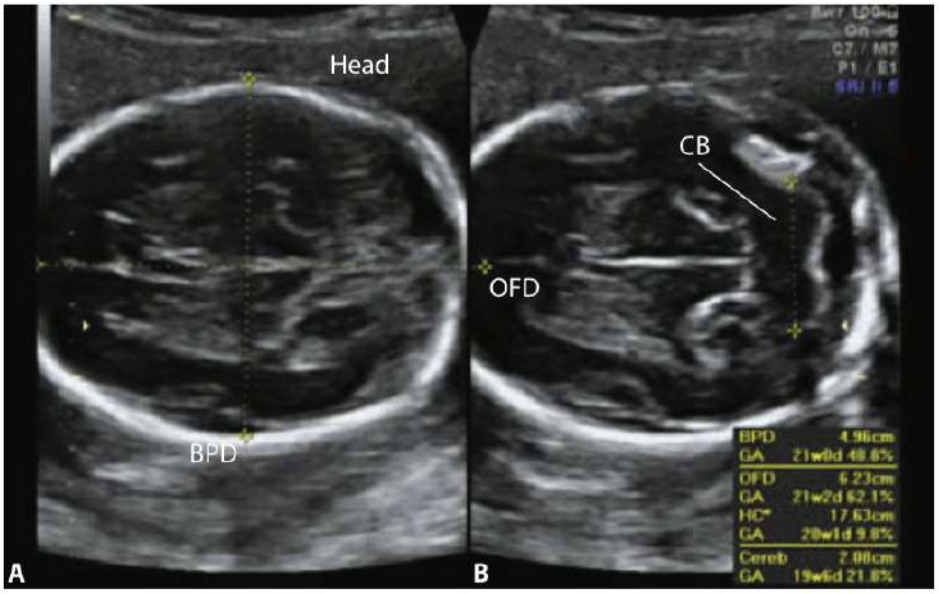


Figure 5.4 Normal cranial anatomy in (**A**) the plane of the thalami to visualize the ventricles and (**B**) the transcerebellar plane. Note the ovoid head shape and the dumb bell-shaped cerebellum. BPD, biparietal diameter; CB, cerebellum; OFD occipitofrontal diameter.

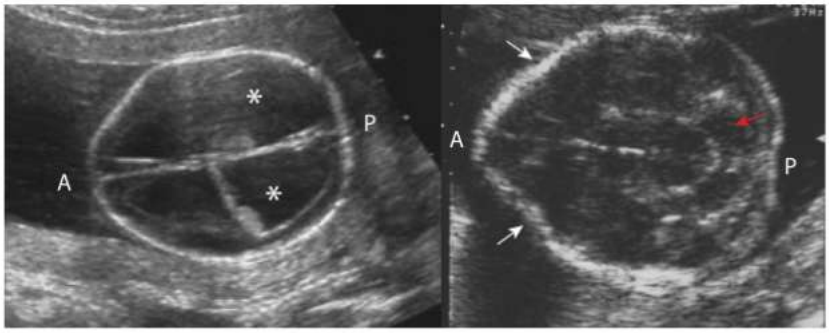


Figure 5.5 Abnormal cranial anatomy in a fetus with a neural tube defect in (**A**) the plane of the thalami to visualize the ventricles marked with asterisks, which are dilated (ventriculomegaly), and (**B**) the transcerebellar plane: note the scalloped head shape anteriorly (lemon shaped) marked by the white arrows and the banana-shaped cerebellum (red arrow). (A, anterior; P, posterior.)

the ovoid head shape and the dumb bell-shaped cerebellum (indicated by white arrow). **Figure 5.5** is a similar plane in Ms N, whose fetus has a neural tube defect.

A How should this patient be managed?
B What is the outlook for the baby/child?
C What options does Ms N have?
D What is the risk of it happening again in a future pregnancy?
E What advice would you give about future pregnancies?

ANSWERS

A A prenatal diagnosis of a neural tube defect has been made on ultrasound scan. Ultrasound scan will detect at least 90% of all neural tube defects. Ms N should be seen by the consultant and the ultrasound findings should be explained to her. She should have the opportunity to discuss the prognosis with a neurosurgeon, and this may be best organized by referring her to a tertiary fetal medicine unit.

B For pregnant women to make decisions about whether to continue with their pregnancy or not, they need an honest and realistic view of the likely outcome for their baby/child. It is always difficult to predict the outlook for the baby/child but lower lesions generally have a better prognosis. The main problems encountered are:
- problems with mobility – individuals with a neural tube defect tend to become wheelchair bound as they get older
- continence and voiding – both bladder and bowel
- low intelligence quotient (IQ)
- repeated surgery – shunts, bladder and bowel, orthopaedic
- difficulty forming normal relationships and living independently

C Ms N may choose to continue with the pregnancy with support from healthcare professionals both before and after delivery. Parents who choose to continue with a pregnancy may benefit from contacting a parent support group such as SHINE. Postnatal surgery has until recently been the only option. Fetal surgery is now being offered in the UK and many other countries to repair the myelomeningocoele defect during pregnancy. MRI should be performed to confirm the hindbrain herniation (Chiari II malformation) and to exclude other structural anomalies. Invasive prenatal testing to confirm a normal karyotype is also required. Fetal surgery involves extensive maternal surgery with an associated risk of spontaneous preterm birth. However, there is now outcome data up to 20 years to show benefit for the affected neonate/child of improved mobility and continence. Alternatively, the mother may opt for termination of the pregnancy.

D The risk of recurrence of a neural tube defect is 5% after one affected pregnancy (12% after two affected pregnancies and 20% after three affected pregnancies). Neural tube defects are more common in some geographical areas (e.g. Ireland, Scotland and North West England), if the mother has diabetes or epilepsy, if the mother is taking anti-epileptic medication and in the pregnant population who are obese. Folic acid (400 µg) taken pre-conceptually and for the first trimester reduces the risk of neural tube defects.

E By taking folic acid for at least 3 months pre-conceptually, the risk of recurrence can be reduced. Ms N should take a higher dose of pre-conceptual folic acid (5 mg instead of the usual 400 µg). She should also ensure that she eats healthily and that her weight is normal. Any medication she is taking should be reviewed.

CASE HISTORY 3

Ms E is a 37-year-old woman who attended for her first scan at 18 weeks' gestation. On ultrasound scan, a smooth protrusion could be seen on the anterior abdominal wall of the fetus. It appeared to be covered by a membrane and the umbilical cord inserted into the apex of the protrusion. The sonographer described this as an exomphalos in her report. **Figure 5.7** shows an ultrasound image of an exomphalos with the sac containing the herniated bowel.

A How should this patient be managed?
B What options are available to Ms E?

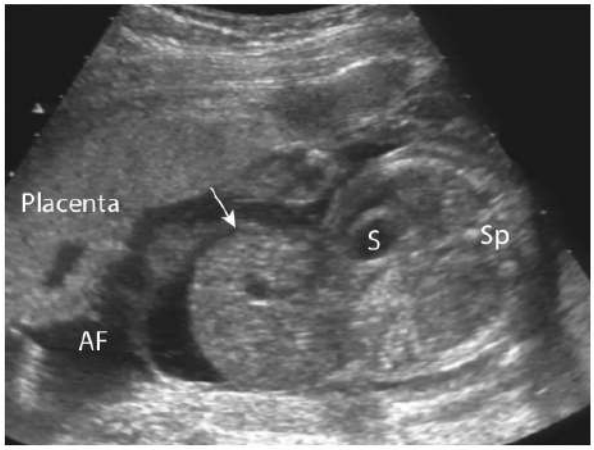


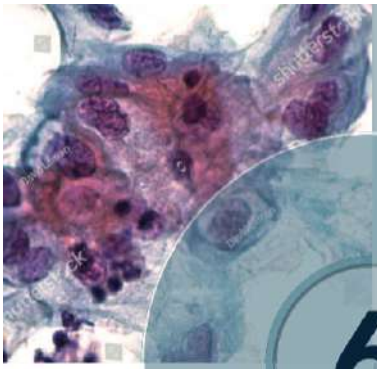
Figure 5.7 Ultrasound image of exomphalos, showing the sac containing the herniated bowel (white arrow). AF, amniotic fluid; S, fetal stomach; Sp, fetal spine.

ANSWERS

A A prenatal diagnosis of an exomphalos has been made on ultrasound scan. Ultrasound scan will detect at least 90% of all exomphalos defects, but this diagnosis cannot be made until after 12 weeks' gestation. Prior to 12 weeks, there is developmental physiological herniation of abdominal contents into the base of the umbilical cord. Ms E should be seen by the consultant and the ultrasound findings should be explained to her. As there is a high incidence of associated abnormalities (in 70–80% of fetuses), she should be referred to a tertiary unit for detailed ultrasound. The consultant should also explain that there is a high chance of chromosomal abnormality (approximately one-third of fetuses) and discuss the option of invasive testing (see **Table 5.3**).

B Ms E's options include:
- do nothing
- terminate the pregnancy
- CVS now and continue if the chromosomes are normal – it is possible that other abnormalities may still be detected on ultrasound later in pregnancy; if the chromosomes are abnormal, she would still have the option of a surgical termination of pregnancy up to 14 weeks' gestation in some hospitals
- wait until after 15 weeks' gestation, then have an amniocentesis with a lower risk of miscarriage – even if the chromosomes are normal, it is still possible that other abnormalities may be detected on ultrasound later in pregnancy

Ms E chose to have a CVS that showed that the fetus had trisomy 18. She then chose to terminate her pregnancy, as she knew that most fetuses with trisomy 18 either were stillborn or did not live beyond the first few months.



6 Antenatal obstetric complications

SURABHI NANDA

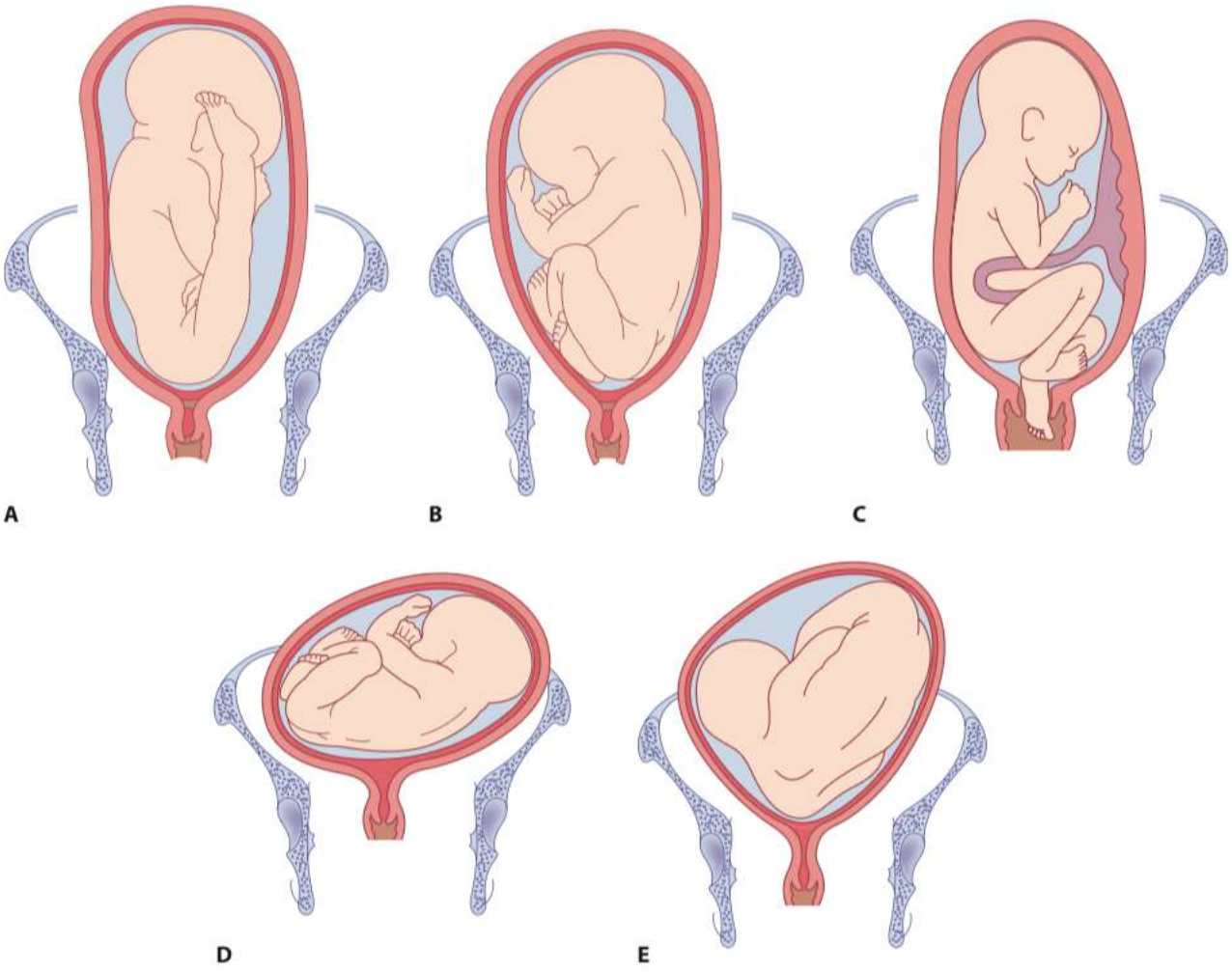


Figure 6.3 (**A**) Frank breech (also known as extended breech) presentation with extension of the legs. (**B**) Breech presentation with flexion of the legs. (**C**) Footling breech presentation. (**D**) Transverse lie. (**E**) Oblique lie.

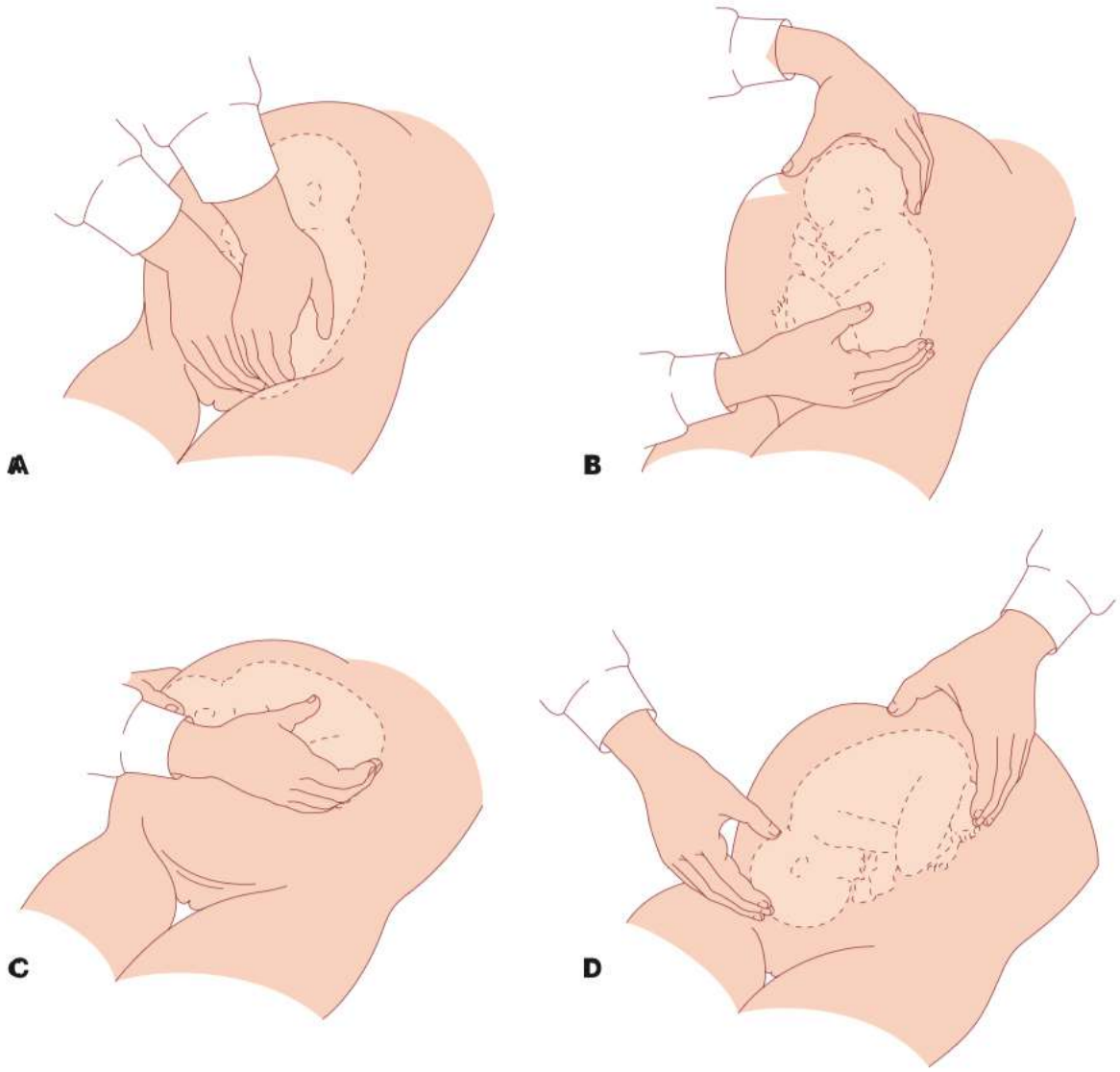


Figure 6.4 External cephalic version. (**A**) The breech is disengaged from the pelvic inlet. (**B**) Version is usually performed in the direction that increases flexion of the fetus and makes it do a forwards somersault. (**C**) On completion of version, the head is often not engaged for a time. (**D**) The fetal heart rate should be checked after the external version has been completed.

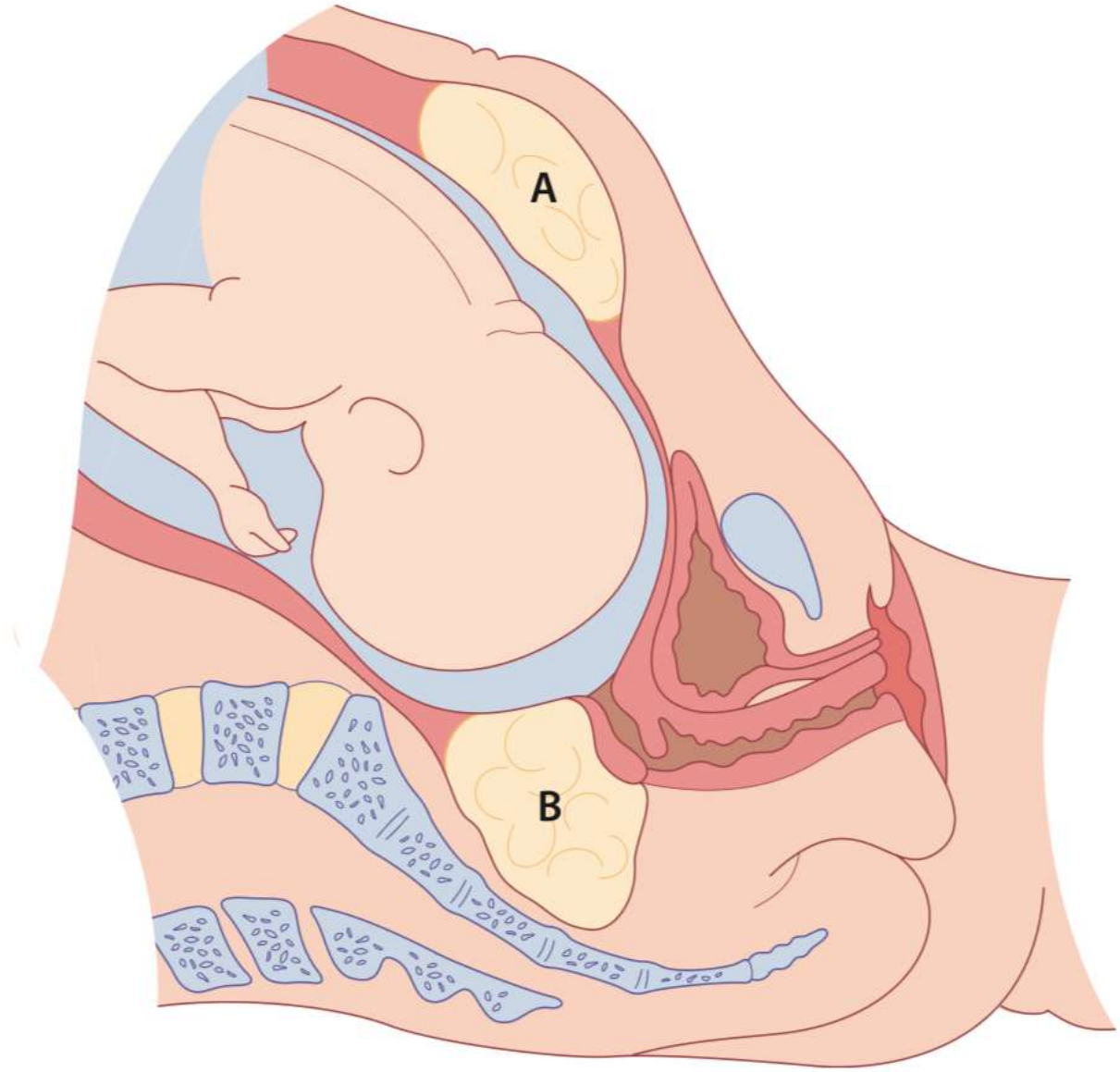


Figure 6.1 Fibroids complicating pregnancy. The tumour in the anterior wall of the uterus (**A**) has been drawn up and out of the pelvis as the lower segment formed, but the fibroid (**B**) arising from the cervix remains in the pelvis and will obstruct labour.

spine becomes visible, delivery of the second arm will follow. This can be imagined as a 'rocking boat' with one side moving upwards and then the other. The Lovset manoeuvre essentially copies these natural movements (**Figure 6.5**). However, it is unnecessary

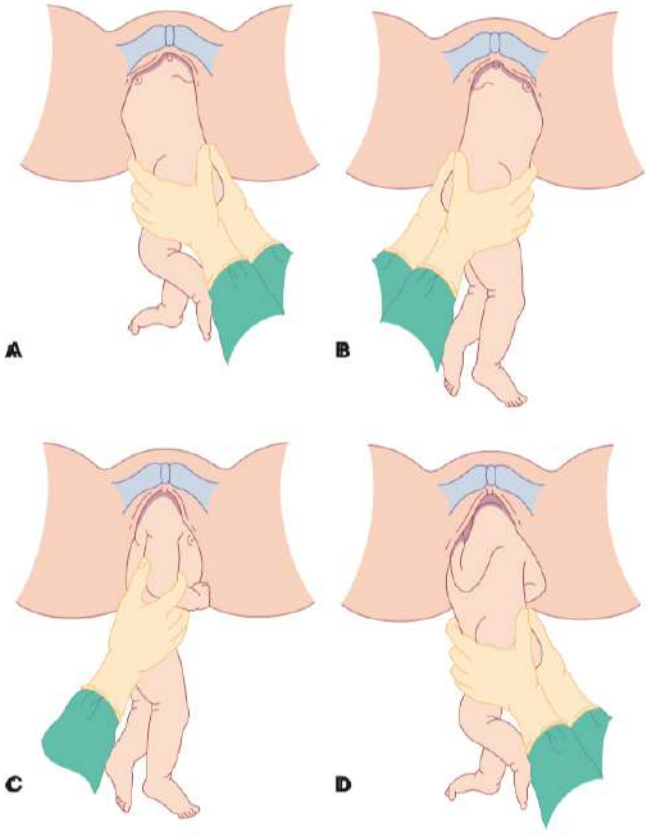


Figure 6.5 Lovset manoeuvre. (**A**) Turning the infant to bring down the anterior shoulder. (**B**) Downward traction and descent of shoulders along the midline (sacral-pubic) axis. (**C**) Delivering the anterior arm and shoulder. (**D**) Delivering the posterior arm and shoulder.

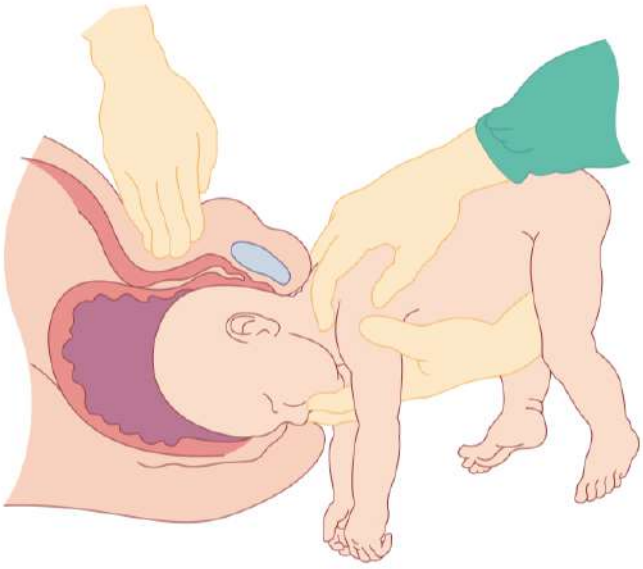


Figure 6.6 Mauriceau–Smellie–Veit manoeuvre for delivery of the head.

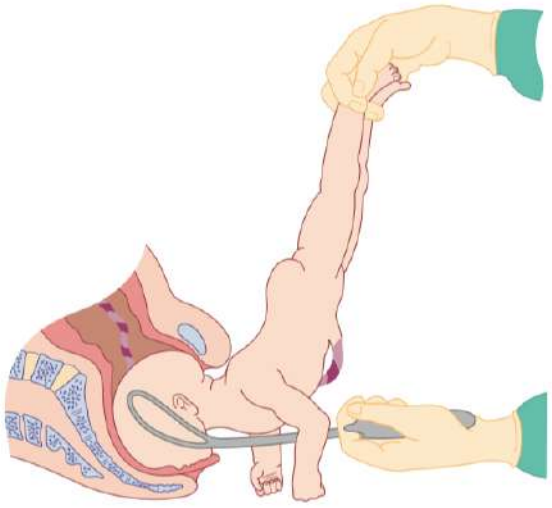


Figure 6.7 Delivery of the aftercoming head with forceps.

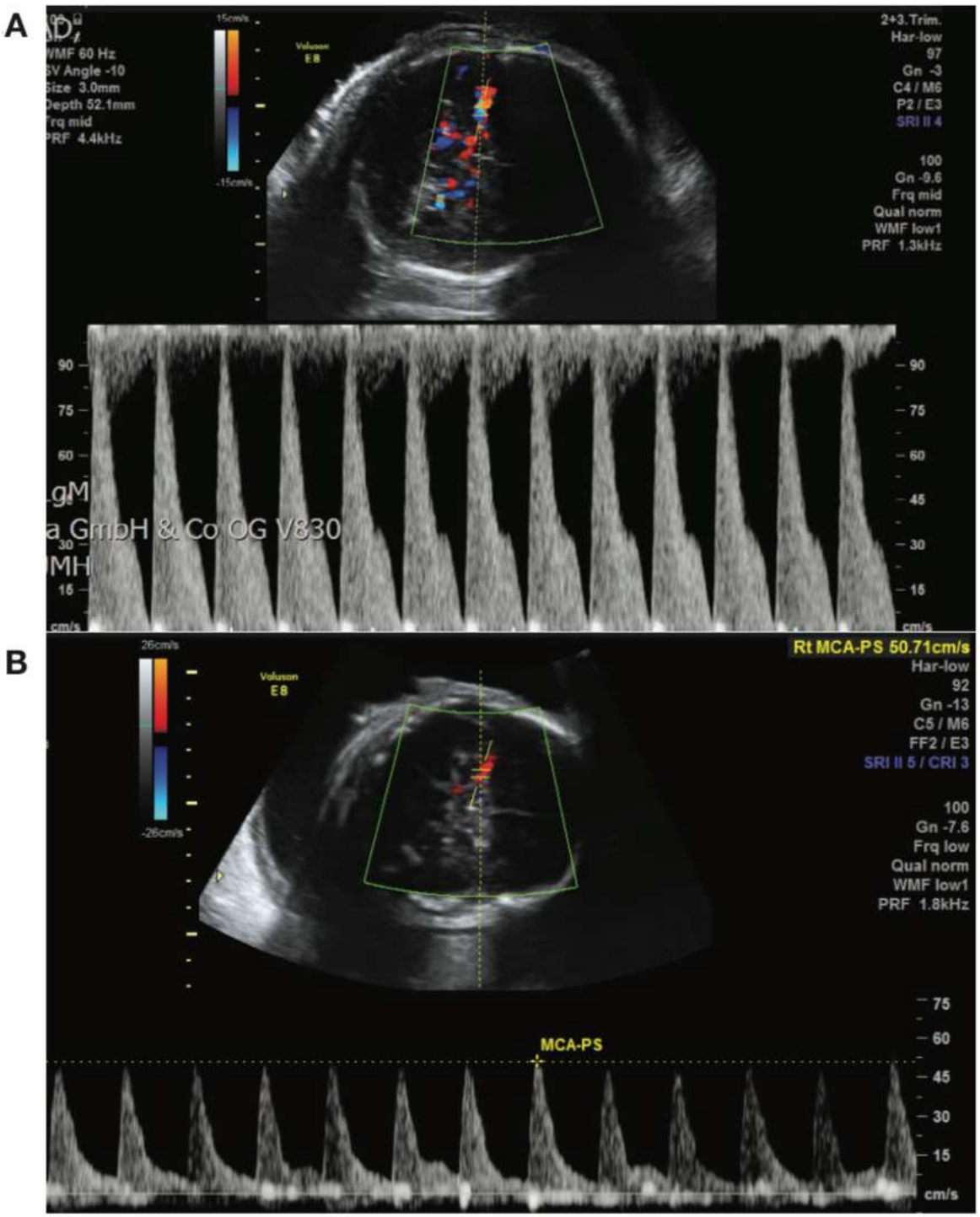
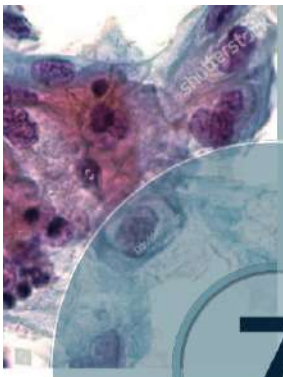
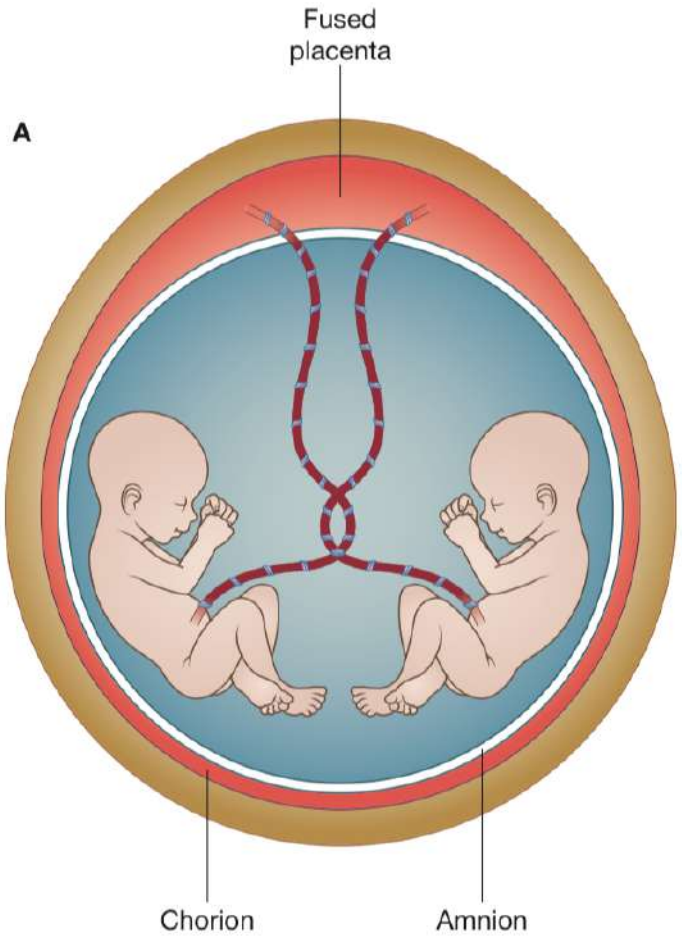


Figure 6.10 Middle cerebral artery Doppler waveform analysis of (**A**) a fetus with anaemia secondary to rhesus disease demonstrating an increased peak systolic velocity and (**B**) the same fetus 48 hours following an intrauterine transfusion.



7 Multiple pregnancy

ASMA KHALIL



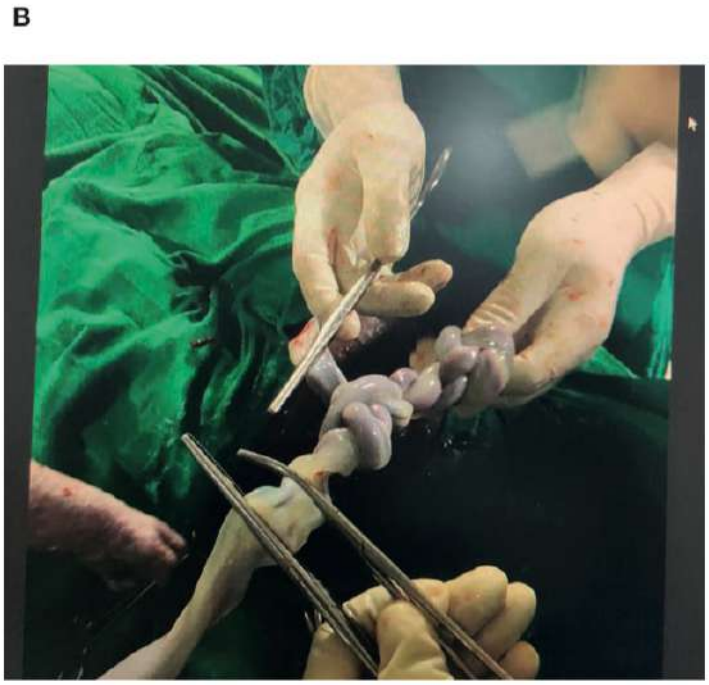


Figure 7.10 Monochorionic monoamniotic twin pregnancy. (**A**) Schematic diagram of a monochorionic monoamniotic twin pregnancy with cord entanglement. (**B**) Cord entanglement was confirmed at the time of caesarean delivery at 33 weeks.

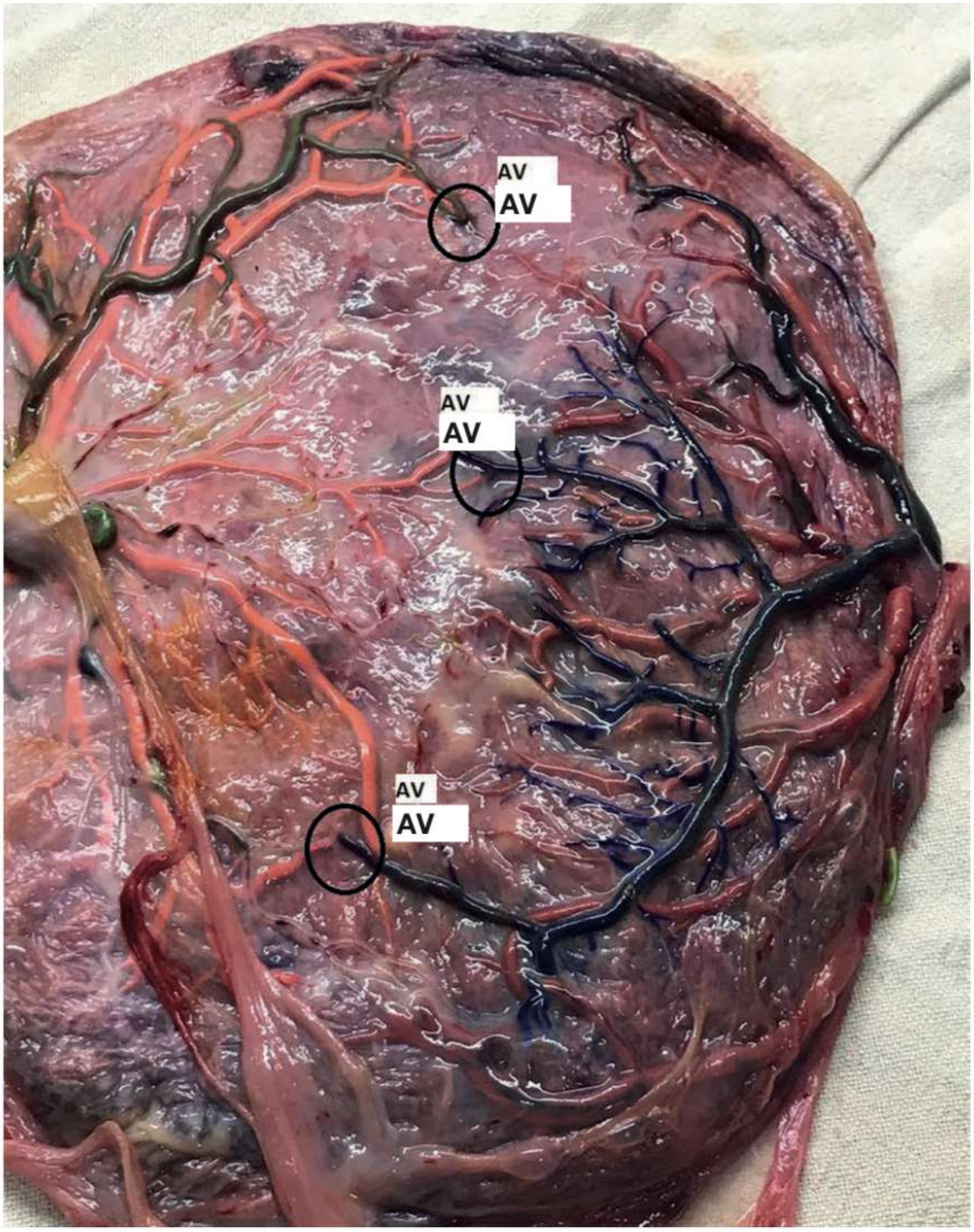
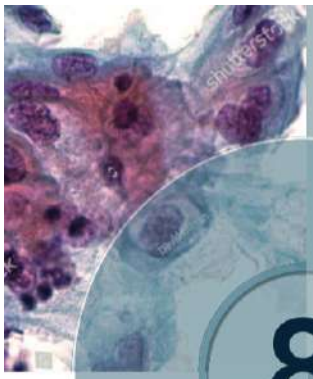


Figure 7.4 Placental injection of a typical uncomplicated monochorionic diamniotic placenta showing arteriovenous (AV) anastomosis. There appears to be equal sharing of the placental territory and the twins delivered at 36 weeks.



8 Preterm labour

DAVID LISSAUER

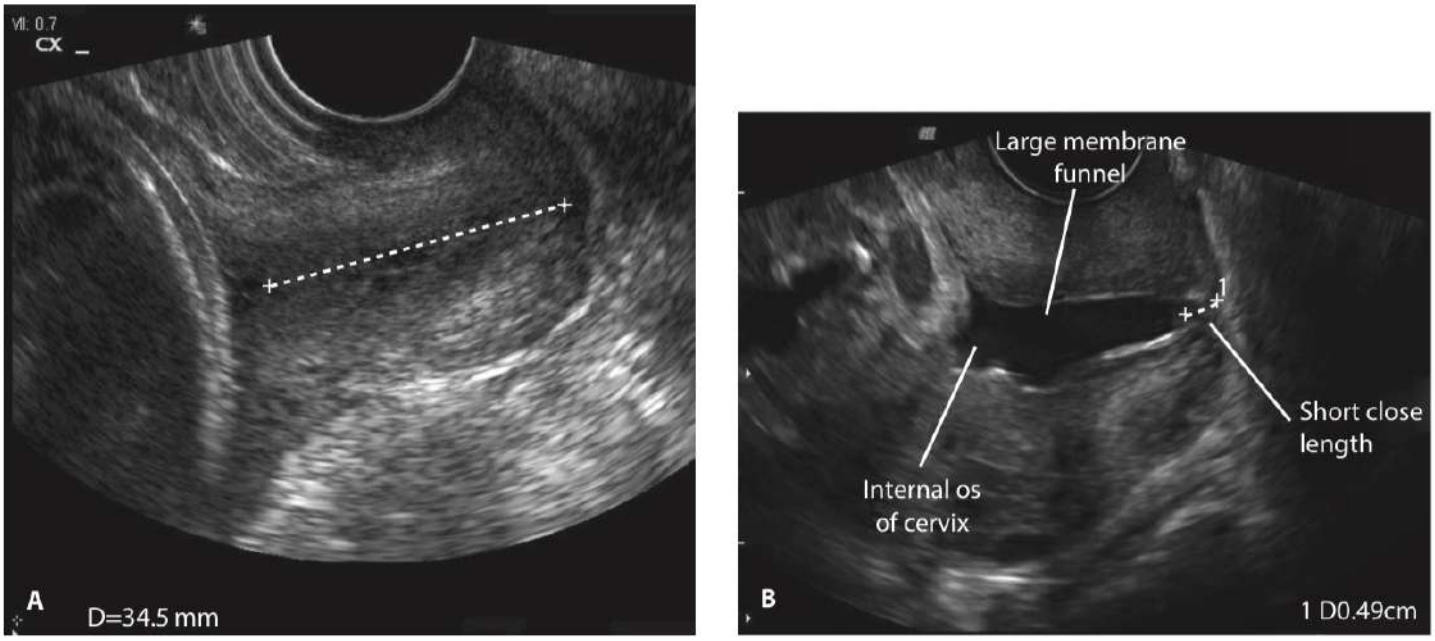
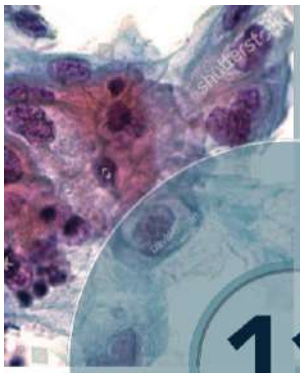


Figure 8.12 (**A**) Normal cervix. (**B**) Cervical length and funnelling on ultrasound.

Figure 8.13 Cervical cerclage seen on ultrasound (arrows).



11 Perinatal infections

DAVID LISSAUER

Figure 11.4 Primary syphilitic chancre. (Courtesy of Dr Raymond Maw, Royal Victoria Hospital, Belfast.)

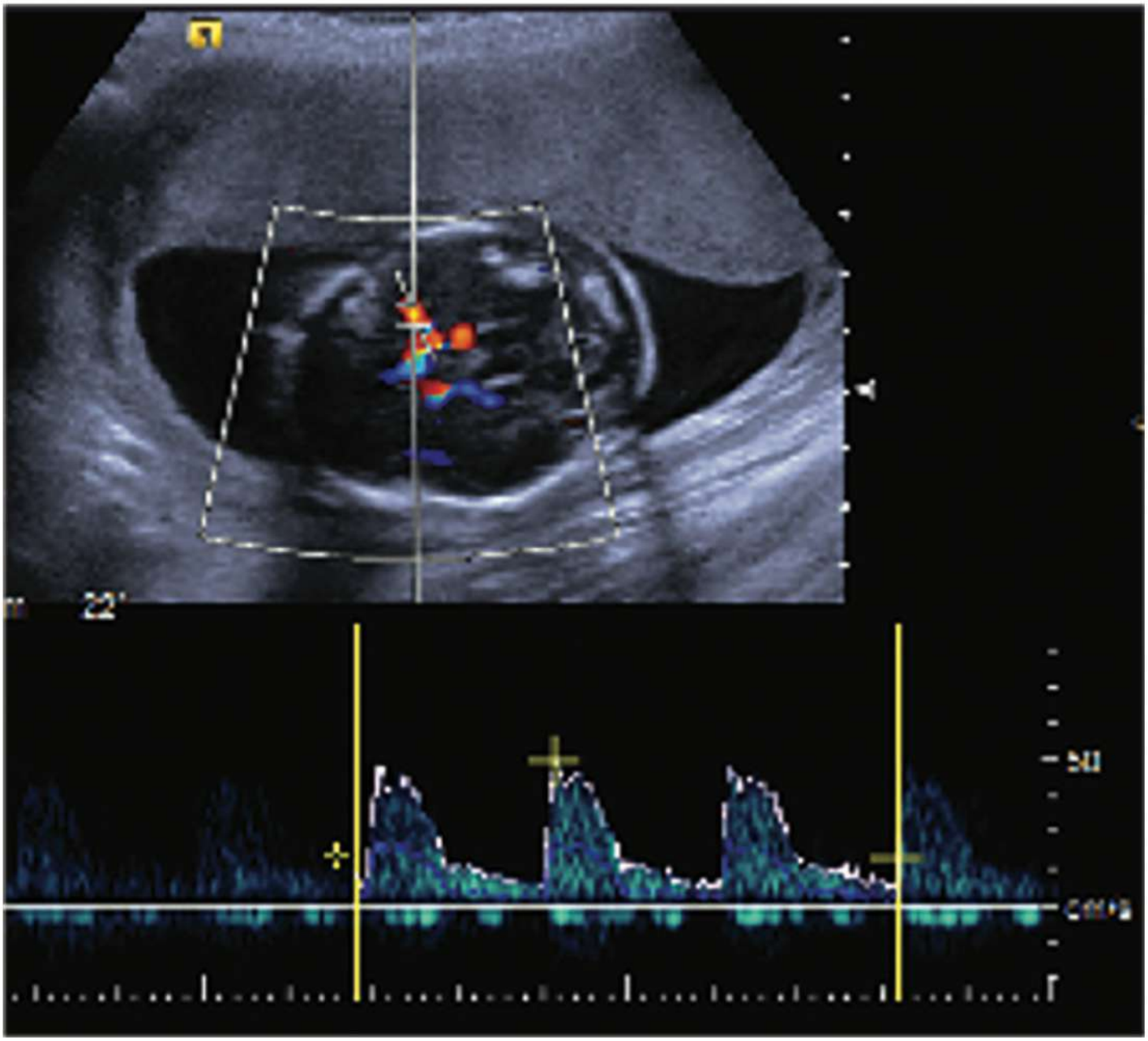
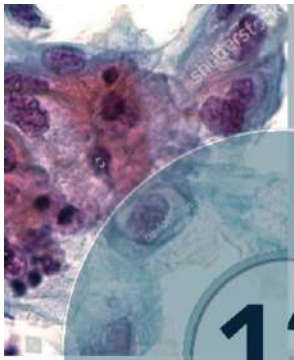


Figure 11.6 Middle cerebral Doppler assessment to test for fetal anaemia. (Courtesy of Dr Ed Johnstone, St Mary's Hospital, Manchester.)

Figure 11.5 Fetal ascites. (Courtesy of Dr Ed Johnstone, St Mary's Hospital, Manchester.)

Figure 11.7 Primary genital herpes. (Courtesy of Dr Richard Lau, St George's Hospital, London.)



12 Labour: Normal and abnormal

DEIRDRE J MURPHY

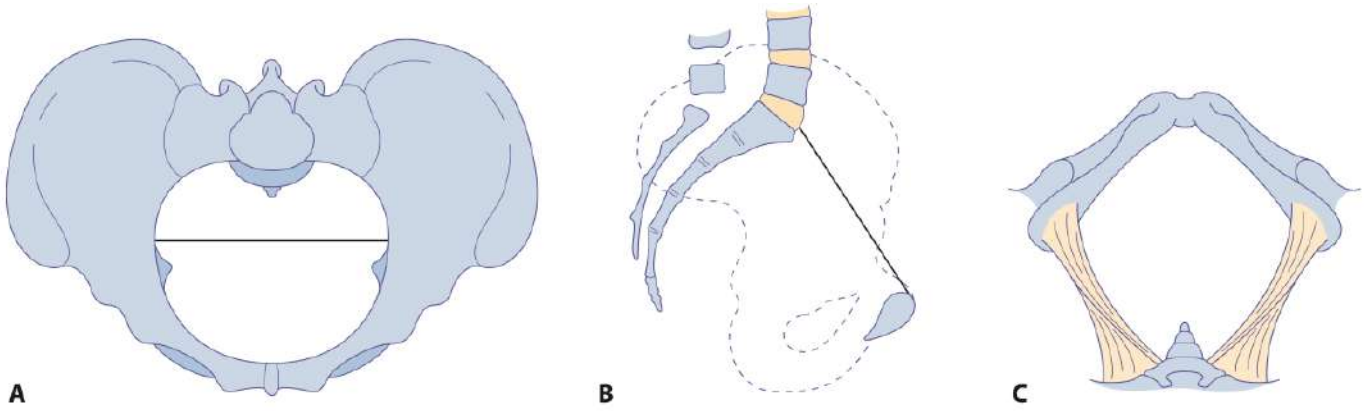


Figure 12.5 The gynaecoid pelvis: (**A**) brim, (**B**) lateral view and (**C**) outlet.

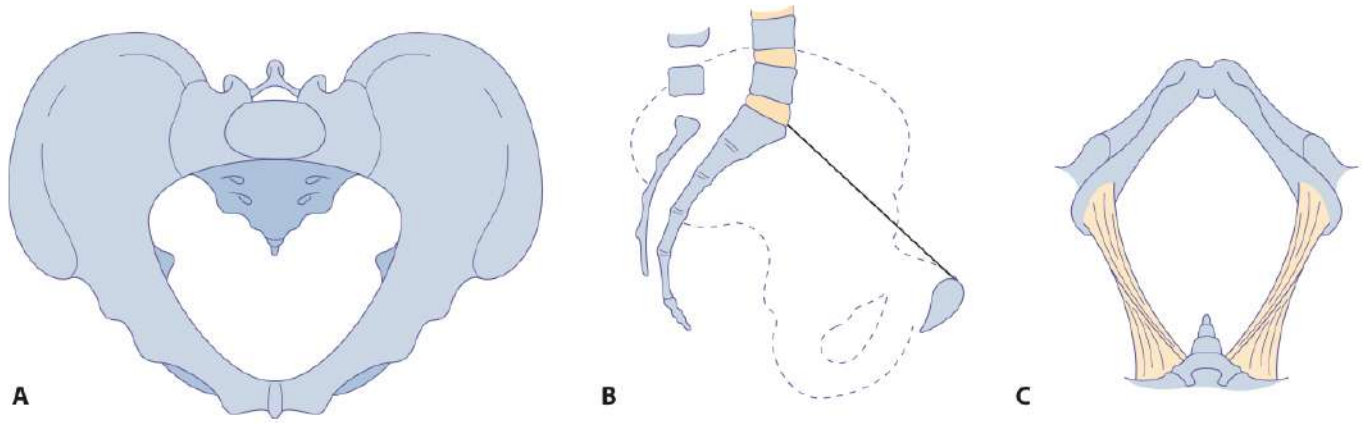


Figure 12.6 The android pelvis: (**A**) brim, (**B**) lateral view and (**C**) outlet.

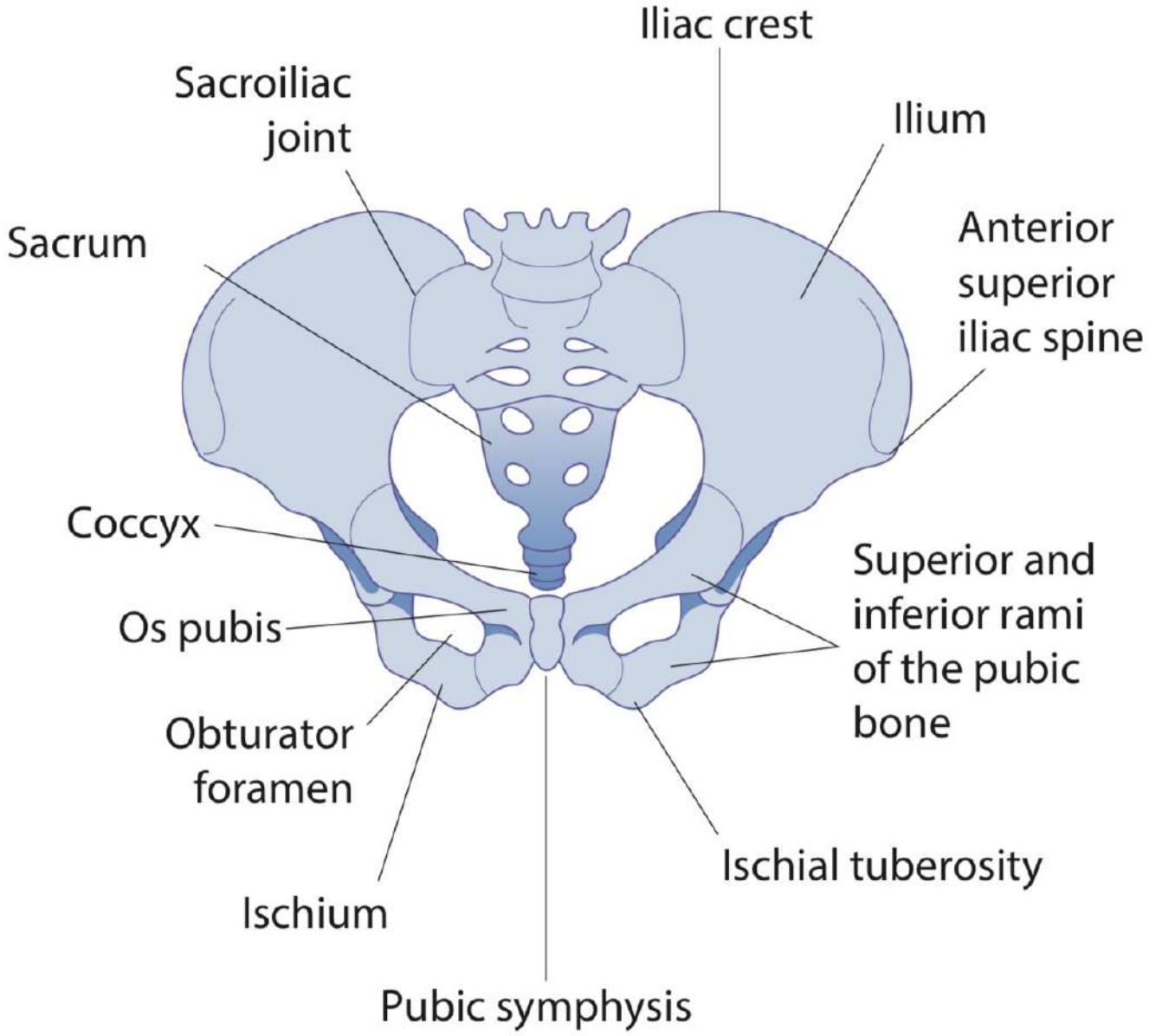


Figure 12.1 The bony pelvis.

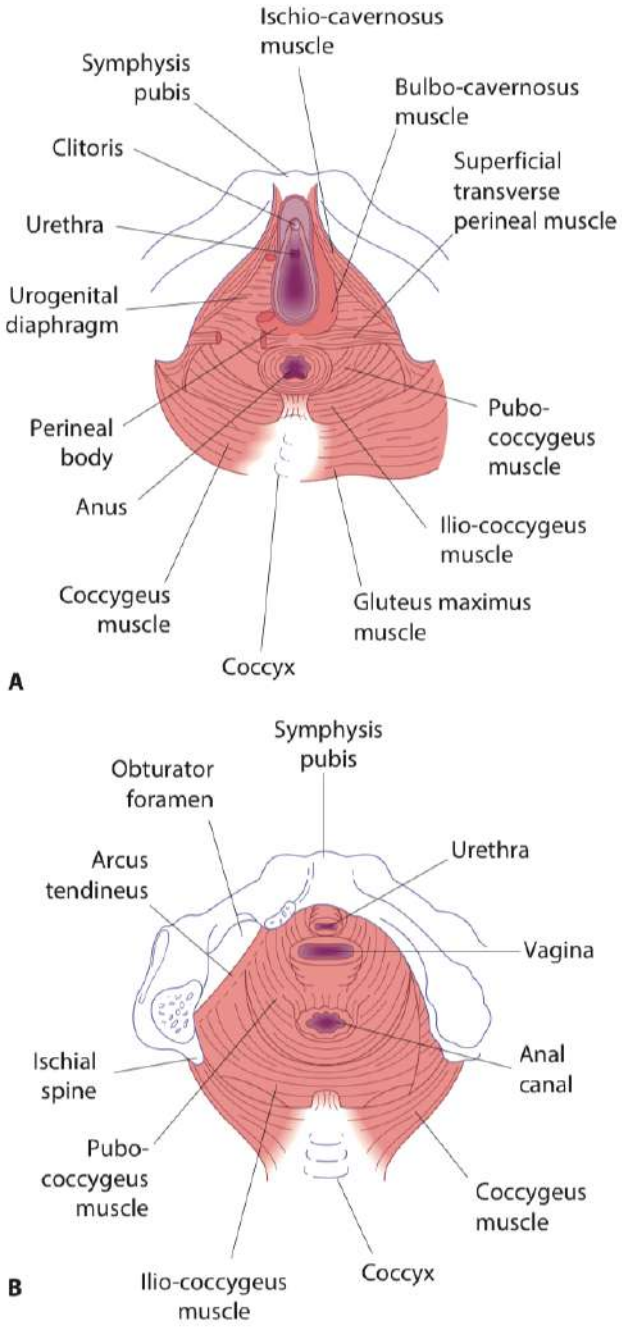


Figure 12.10 The perineum, perineal body and pelvic floor from below, showing superficial (**A**) and deeper (**B**) views. The pelvic floor muscles are made up of the levator ani (pubo-coccygeus and ilio-coccygeus).

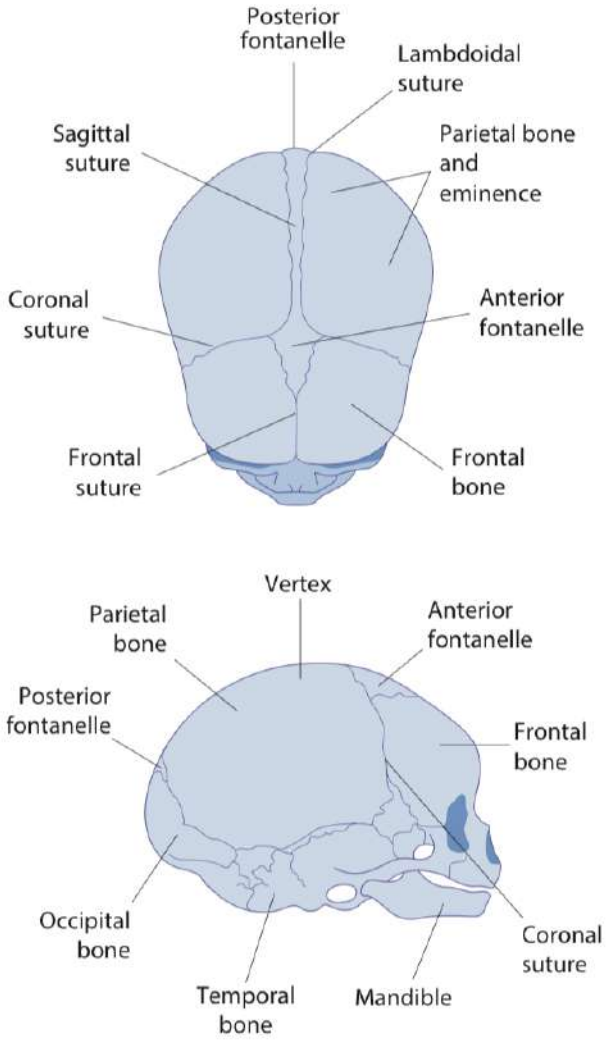


Figure 12.11 The fetal skull from superior and lateral views.

The fontanelles are the junctions of the various sutures. The anterior fontanelle, also known as bregma, is at the junction of the sagittal, frontal and coronal sutures and is diamond shaped. On vaginal examination, four suture lines can be felt. The posterior fontanelle lies at the junction of the sagittal suture and the lambdoidal sutures between the two parietal bones and the occipital bone and is smaller and trian-

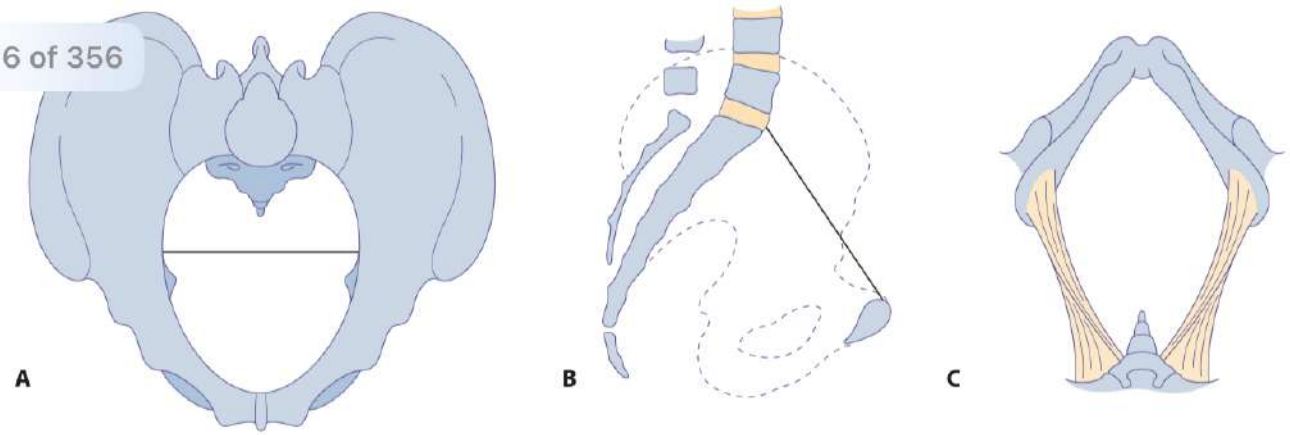


Figure 12.7 The anthropoid pelvis: (**A**) brim, (**B**) lateral view and (**C**) outlet.

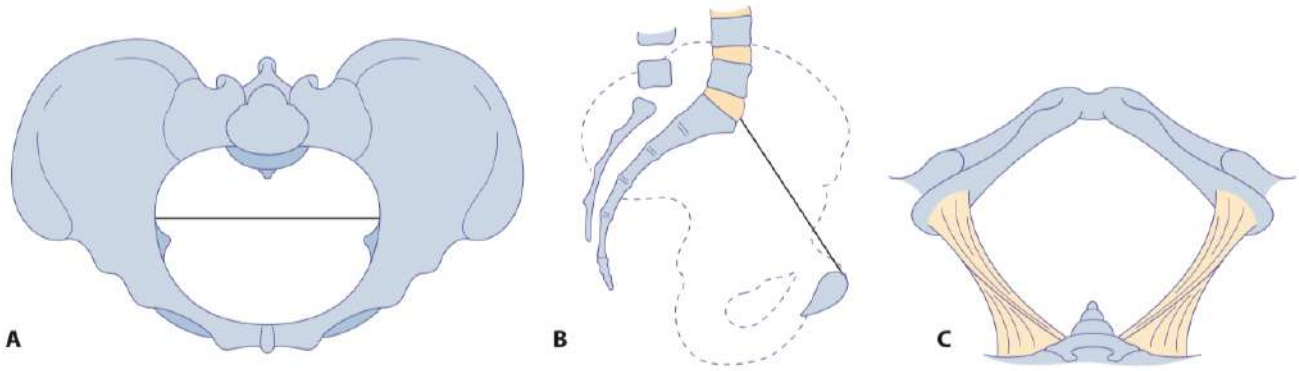


Figure 12.8 The platypelloid pelvis: (**A**) brim, (**B**) lateral view and (**C**) outlet.

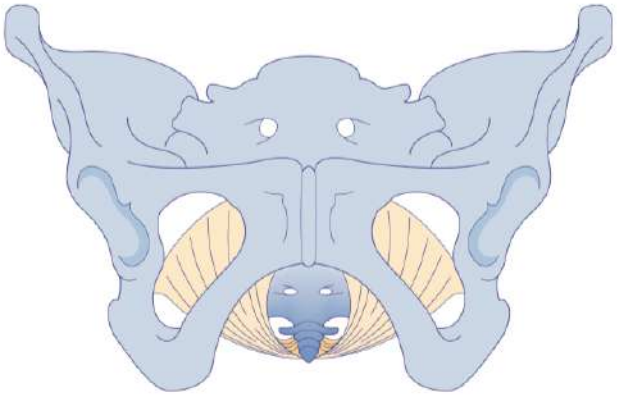


Figure 12.9 The musculofascial gutter of the levator sling.

muscles, the medial ends of the superficial and deep transverse perineal muscles and the anterior fibres of the external anal sphincter. The perineum is taut and relatively resistant in the nulliparous individual and pushing can be prolonged. Vaginal birth may result in tearing of the perineum and pelvic floor muscles, or an episiotomy (surgical cut) may be required. The perineum is stretchy and less resistant in multiparous individuals, resulting in faster labour and a higher probability of delivering with an intact perineum.

FETAL SKULL

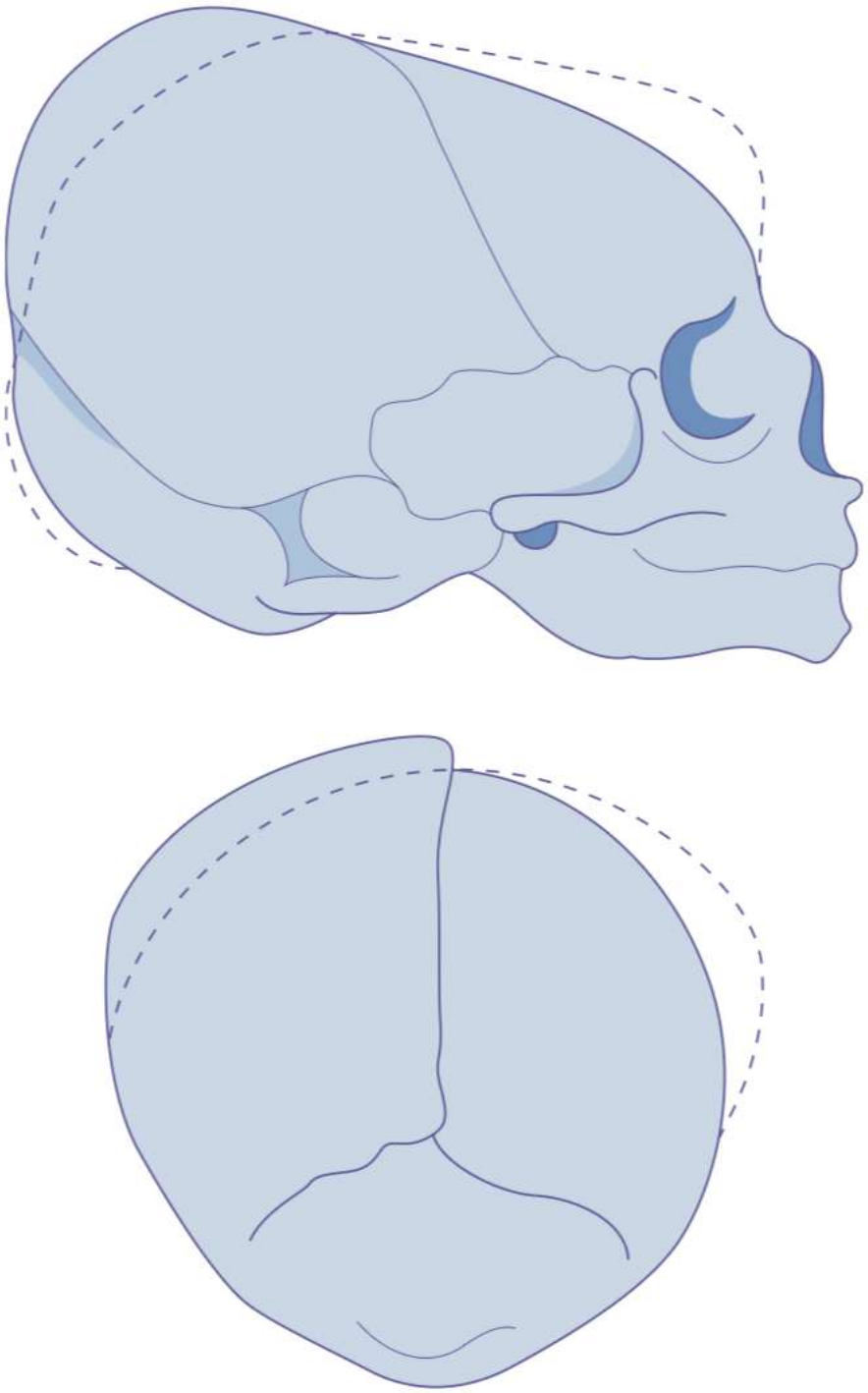


Figure 12.12 A schematic representation of moulding of the fetal skull.

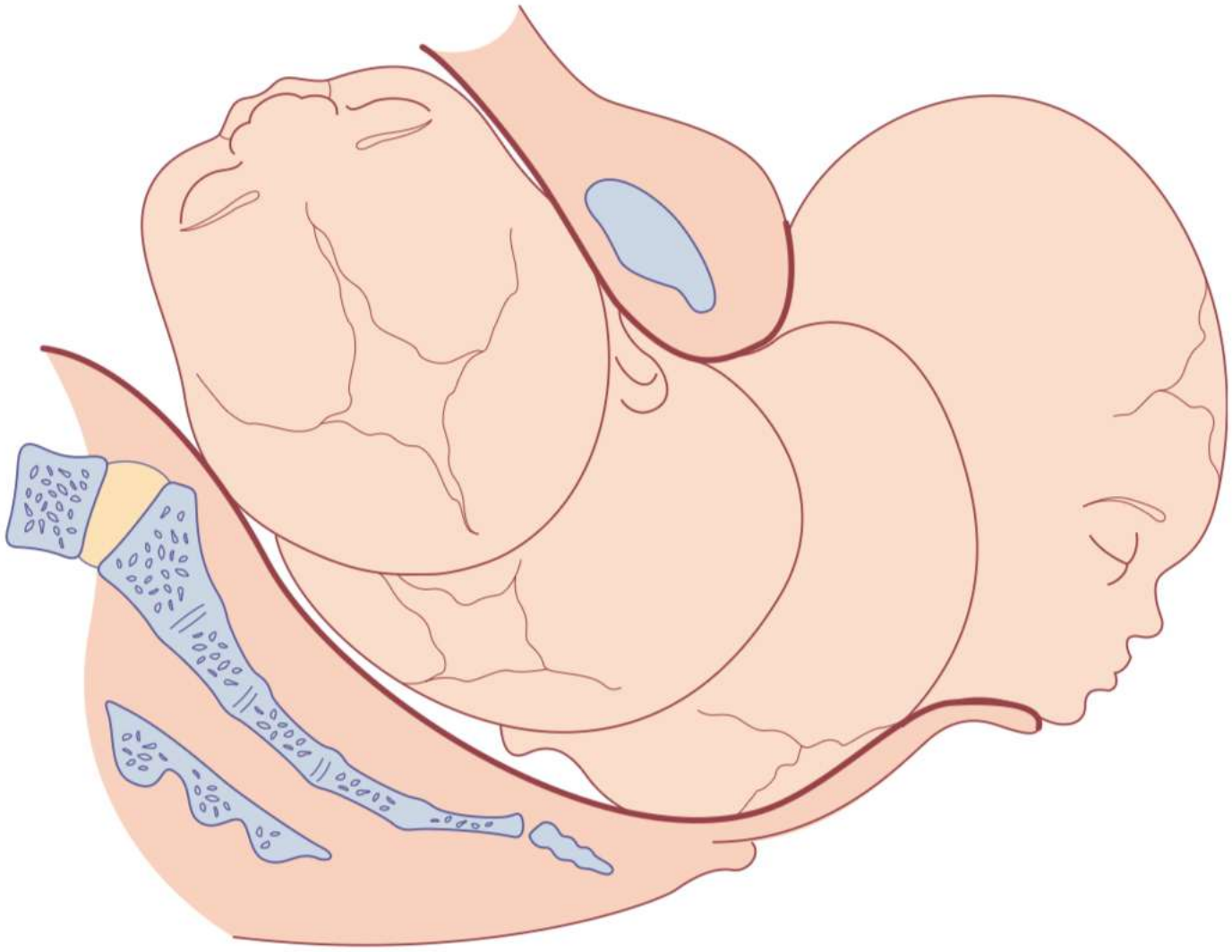


Figure 12.16 Descent and flexion of the head followed by internal rotation and ending in birth of the head by extension.

KEY LEARNING POINTS

Maternal and fetal anatomy

- The pelvic inlet is wider in the transverse than in the AP diameter.
- The pelvic outlet is wider in the AP than in the transverse diameter.
- The ischial spines are in the mid-pelvis and denote station zero.
- The fetal head enters the pelvis in a transverse position, rotates in the mid-pelvis and delivers in an AP position.
- Pelvic dimensions may increase during labour due to pelvic ligament laxity.
- The shape of the pelvis and pelvic floor muscles aid flexion and rotation of the fetal head.
- The sutures and fontanelles are used to assess the position and attitude of the fetal head.
- Moulding of the skull bones during labour reduces the dimensions of the fetal head.
- A fetus in a flexed OA position with a gynaecoid pelvis is most favourable for vaginal birth.
- Perineal tissues present resistance to delivery especially in the nulliparous population.

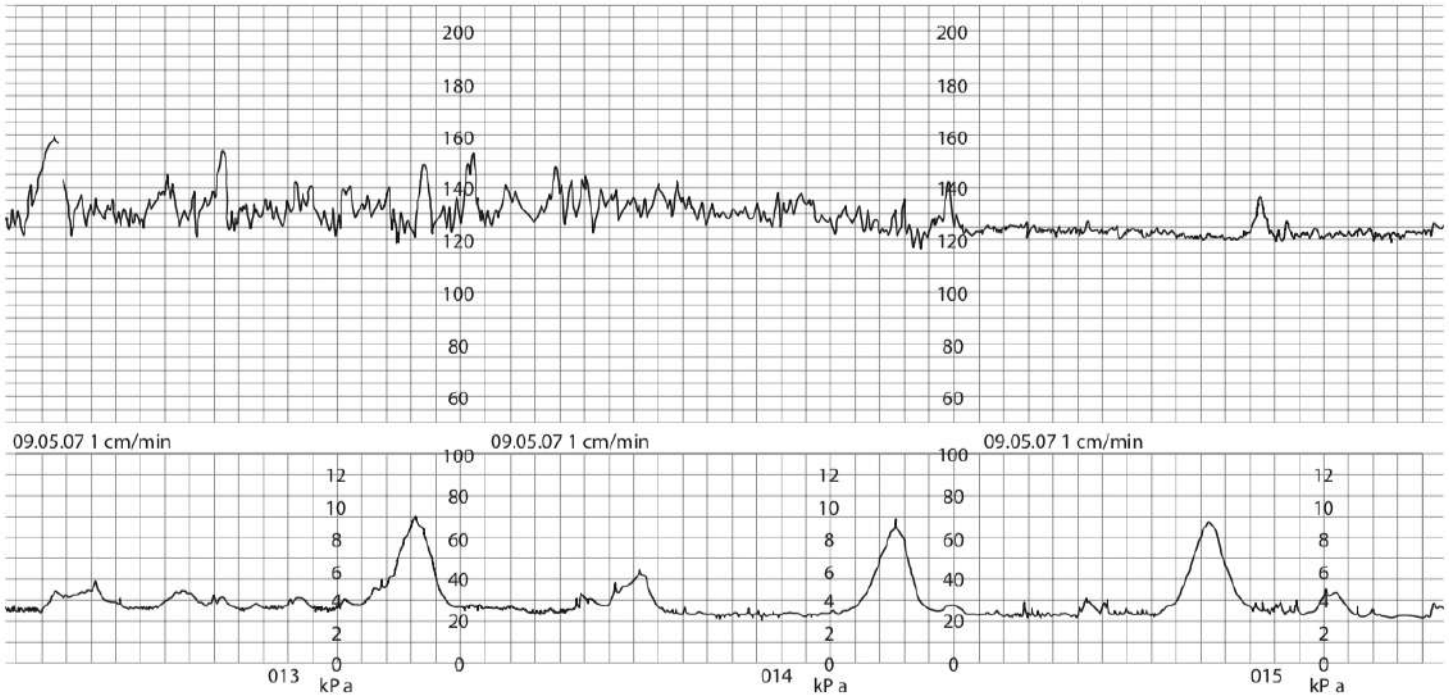


Figure 12.18 A normal cardiotocograph showing a baseline fetal heart rate of approximately 120 beats per minute (bpm), baseline variability of 10–15 bpm, frequent accelerations, and no decelerations. The uterus is contracting approximately once every 5 minutes (or 2 in 10).

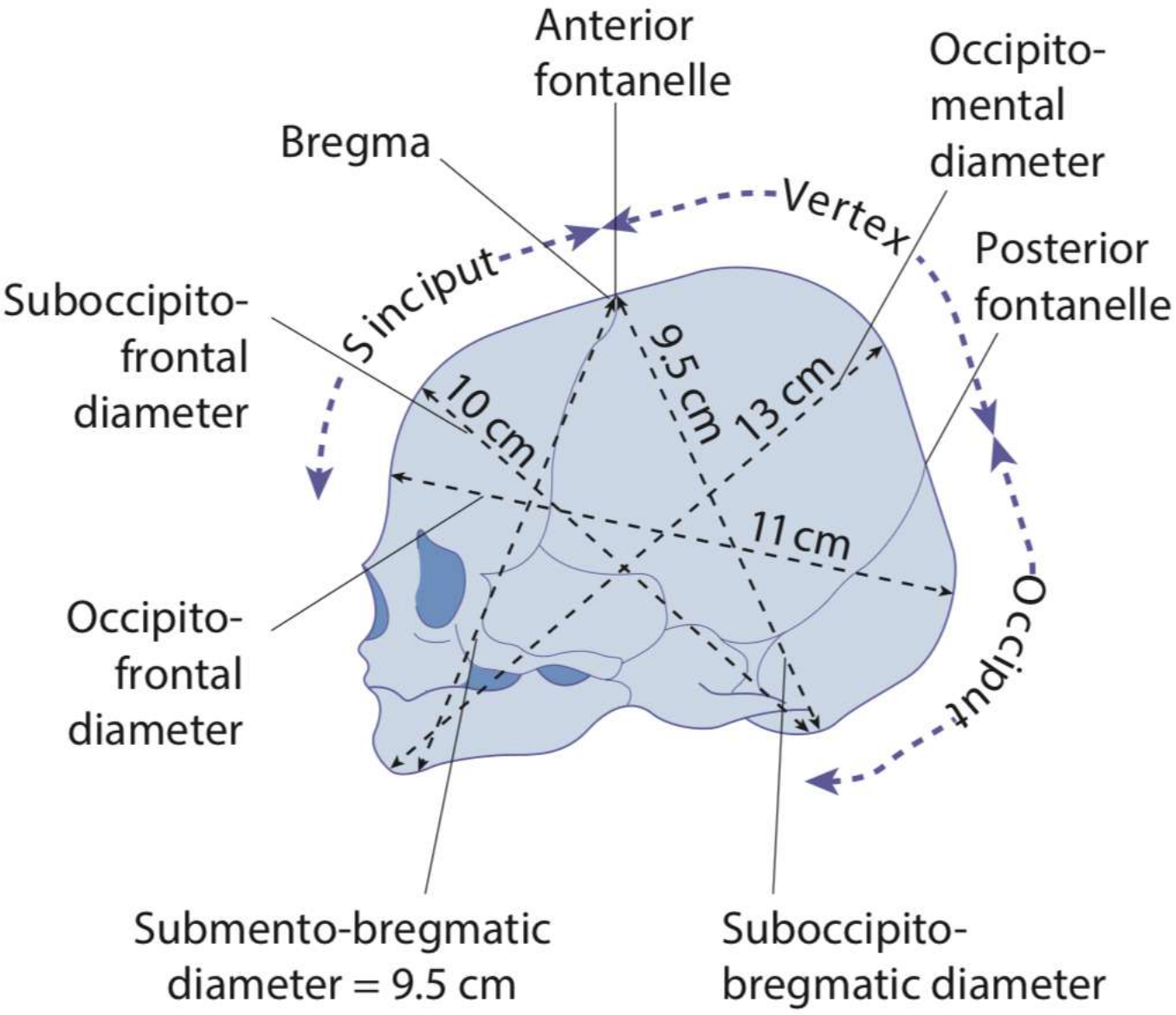


Figure 12.13 The diameters of the fetal skull.

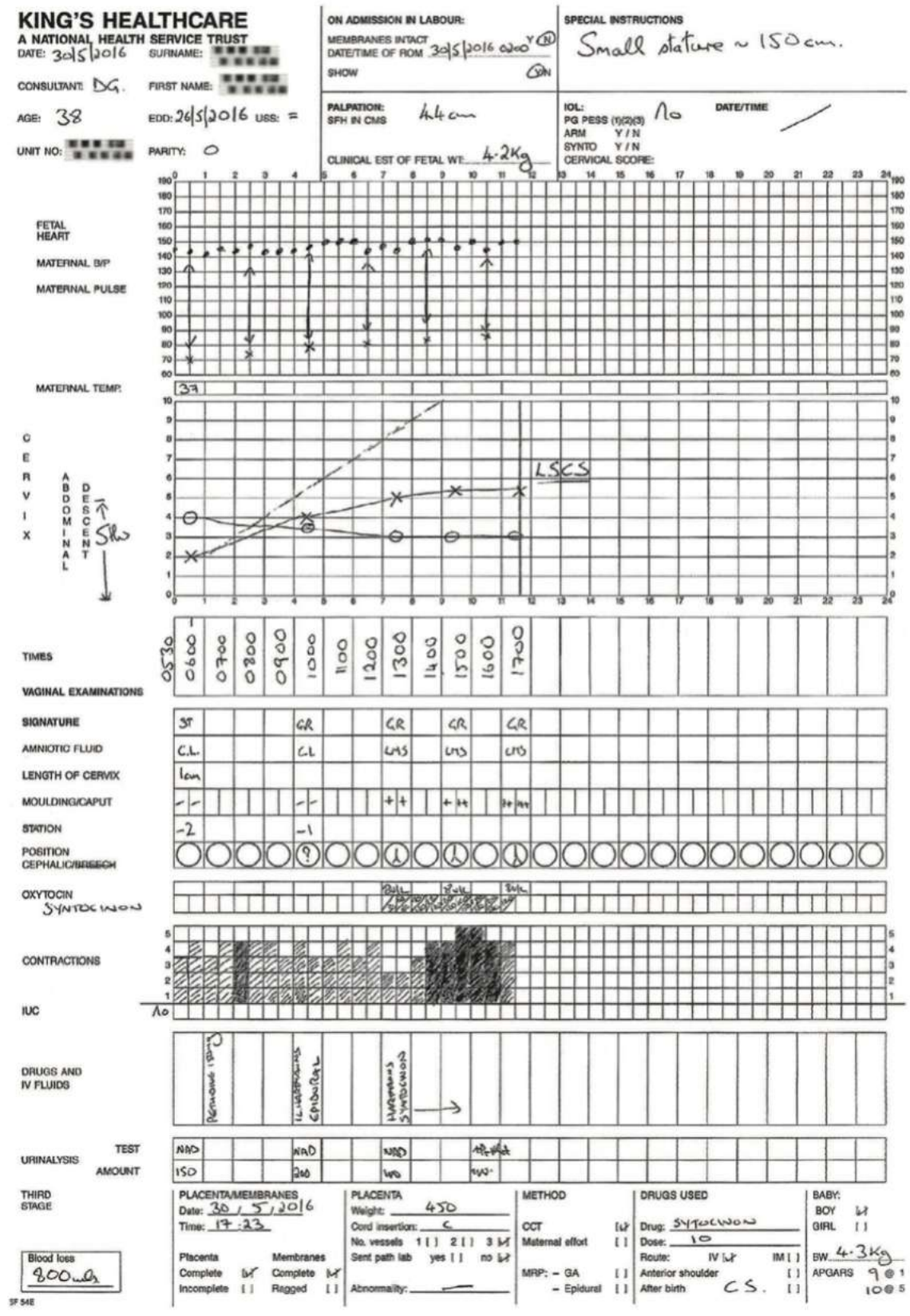


Figure 12.19 A typical partogram. This is a partogram of a nulliparous woman of short stature with a big baby and an augmented labour. The labour culminates in an emergency caesarean section for cephalopelvic disproportion.

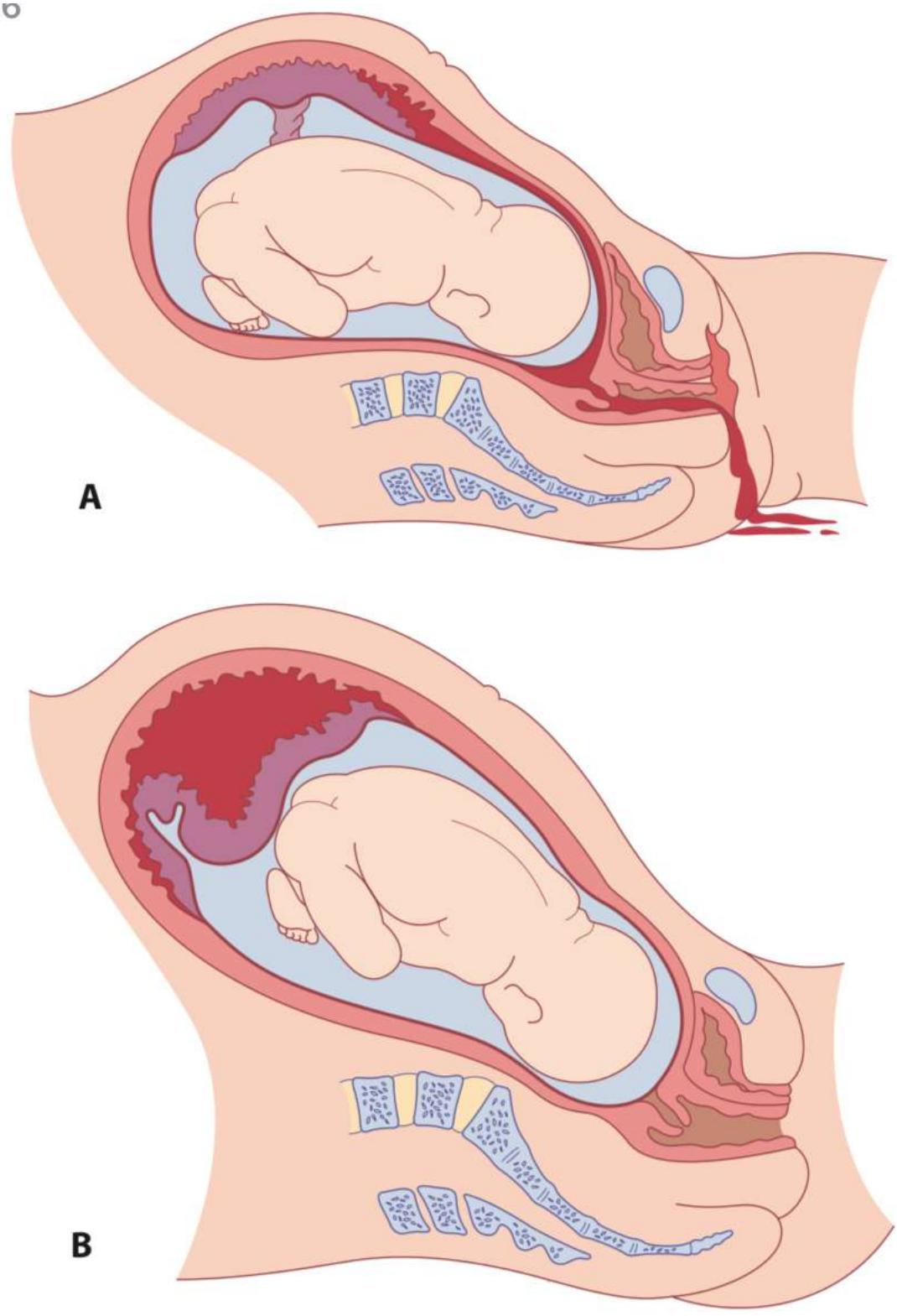
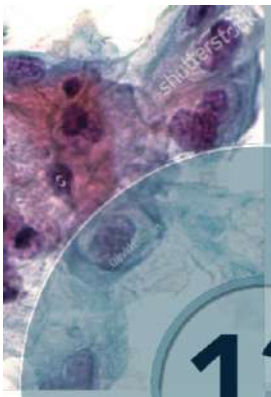


Figure 14.4 (**A**) Placental abruption with revealed haemorrhage. (**B**) Placental abruption with concealed haemorrhage.



13 Operative delivery

DEIRDRE J MURPHY

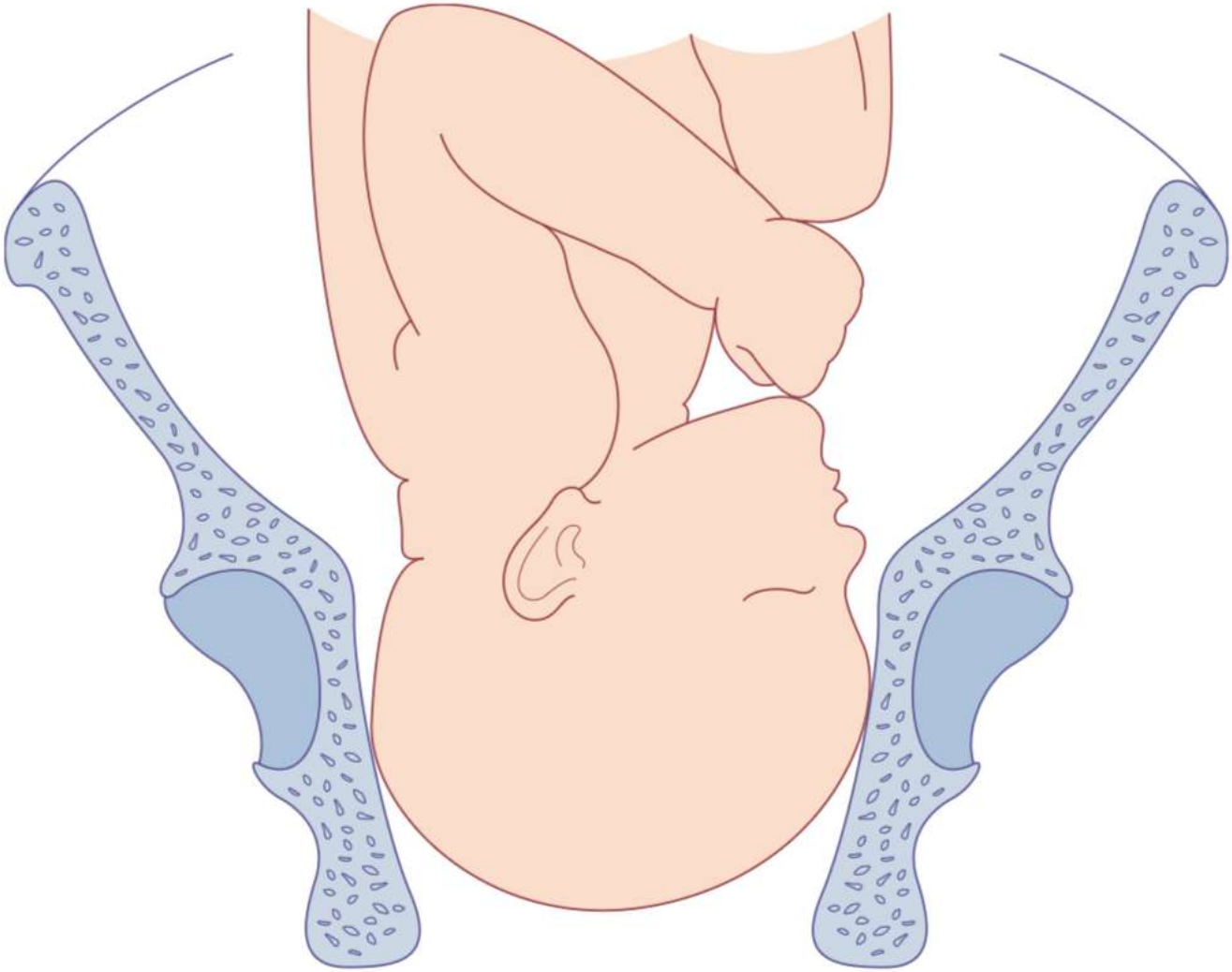


Figure 12.29 Deep transverse arrest of the head.

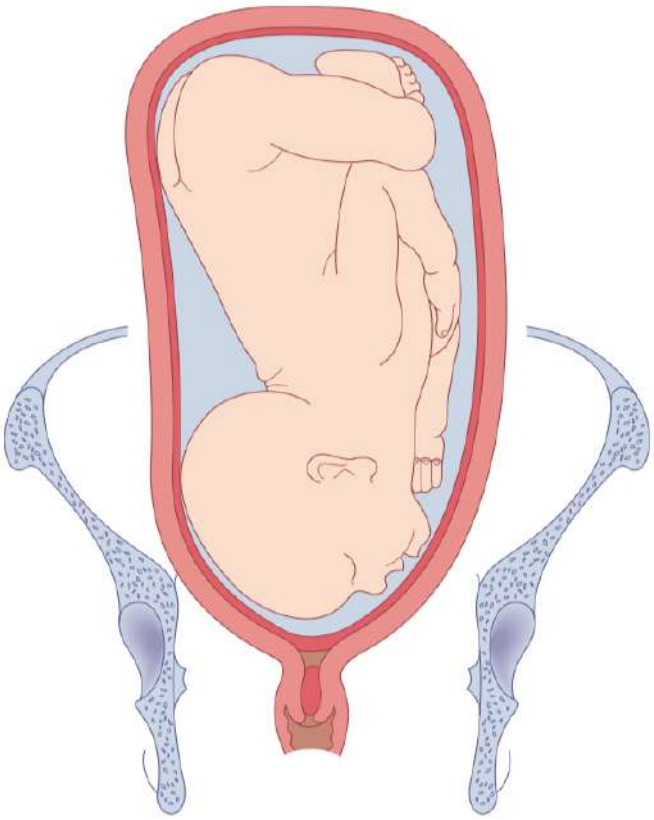


Figure 12.27 Brow presentation. The head is above the brim and not engaged. The mento-vertical diameter of the head is trying to engage in the transverse diameter at the brim.

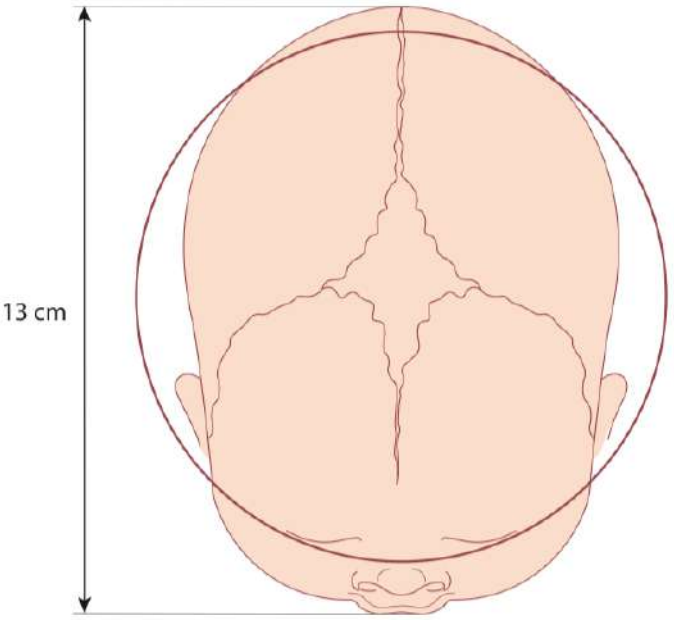


Figure 12.28 Vaginal examination with brow presentation. The circle represents the pelvic cavity, with a diameter of 12 cm. The mento-vertical diameter of 13 cm is too large to permit engagement of the head.

contractions may become weak and ineffectual and this is sometimes associated with maternal dehydration and ketosis. If no mechanical problem is anticipated and the woman is nulliparous, the treatment is with

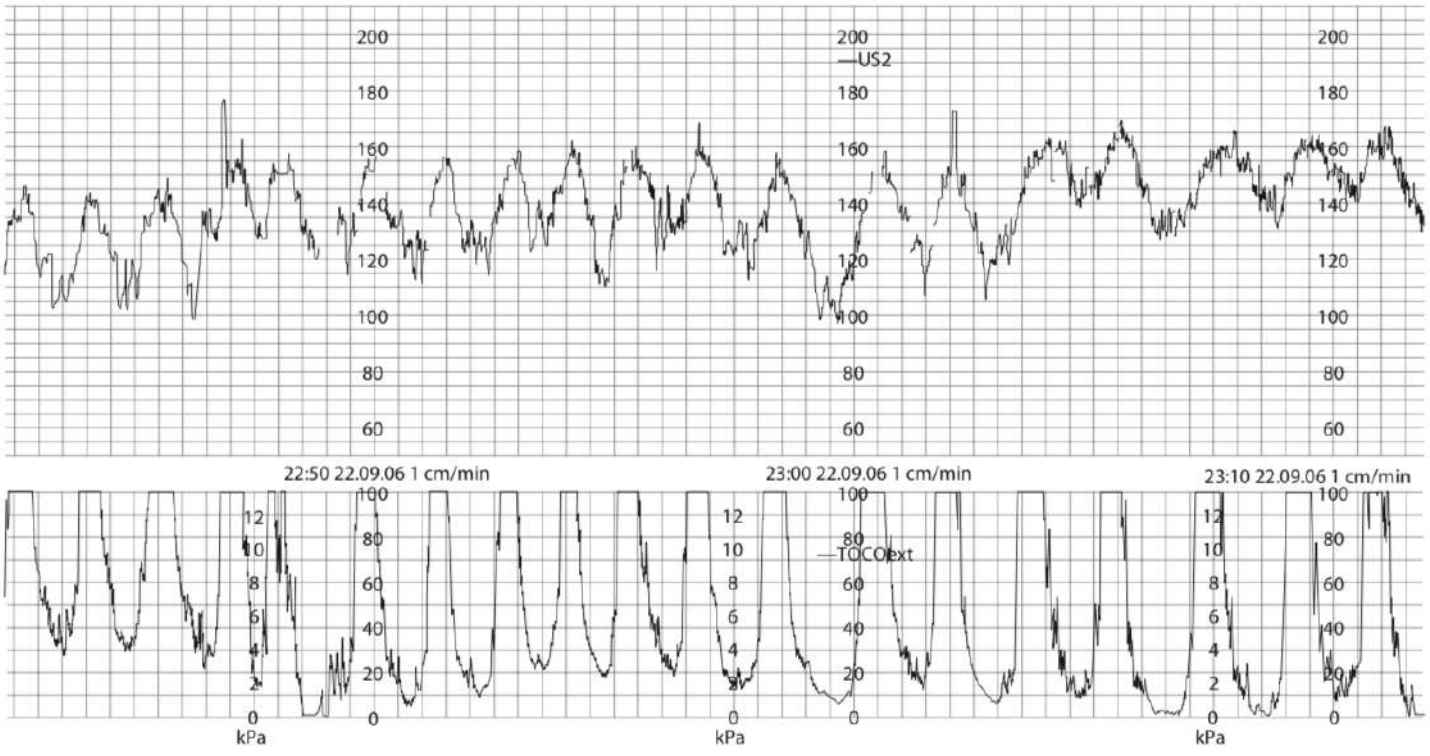


Figure 12.23 A pathological cardiotocograph secondary to uterine hyperstimulation.

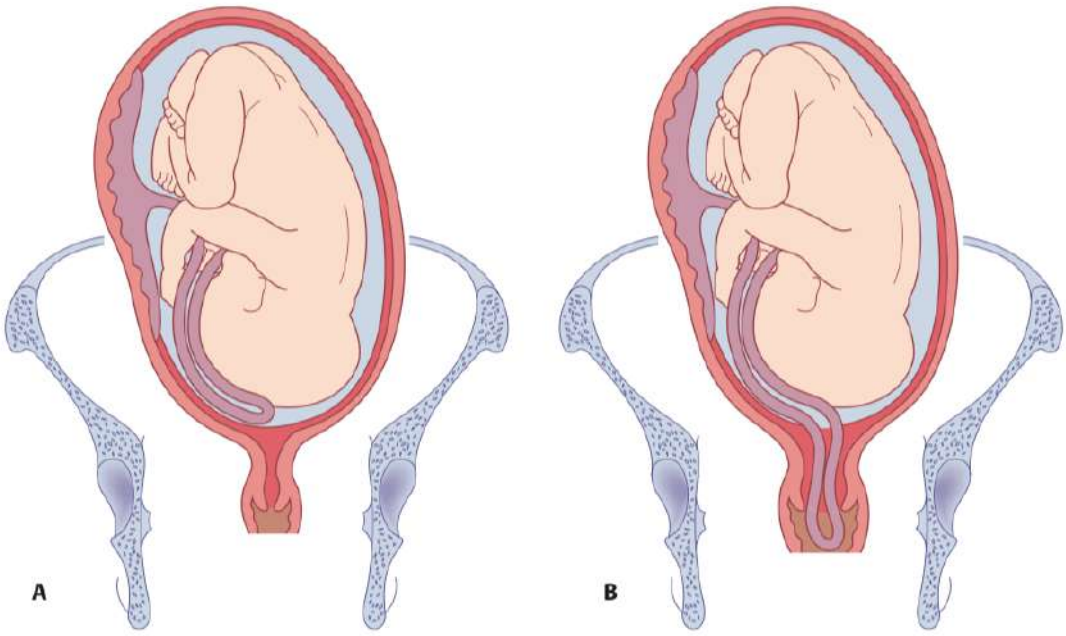


Figure 14.7 Cord prolapse. (**A**) Cord presentation: the cord is below the presenting party (head in this case but commonly a malpresentation) with the membranes intact. (**B**) Cord prolapse: the membranes have ruptured and the cord is below the presenting part and has prolapsed into the vagina.

Figure 13.5 Application of forceps.

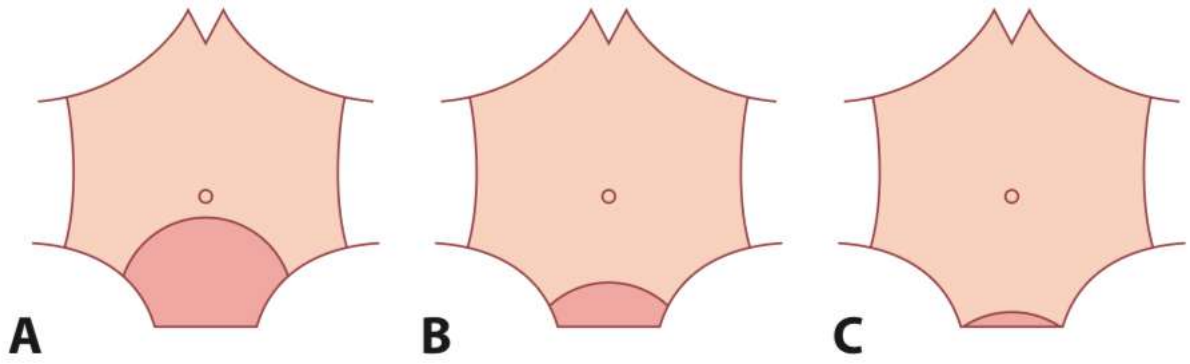


Figure 15.2 Involution of the uterus. (**A**) Day 1: 18-week-sized uterus (just below the umbilicus). (**B**) Day 7: 14-week-sized uterus. (**C**) Day 14: 12-week-sized uterus. The uterus is larger following caesarean section and in multiparous women.

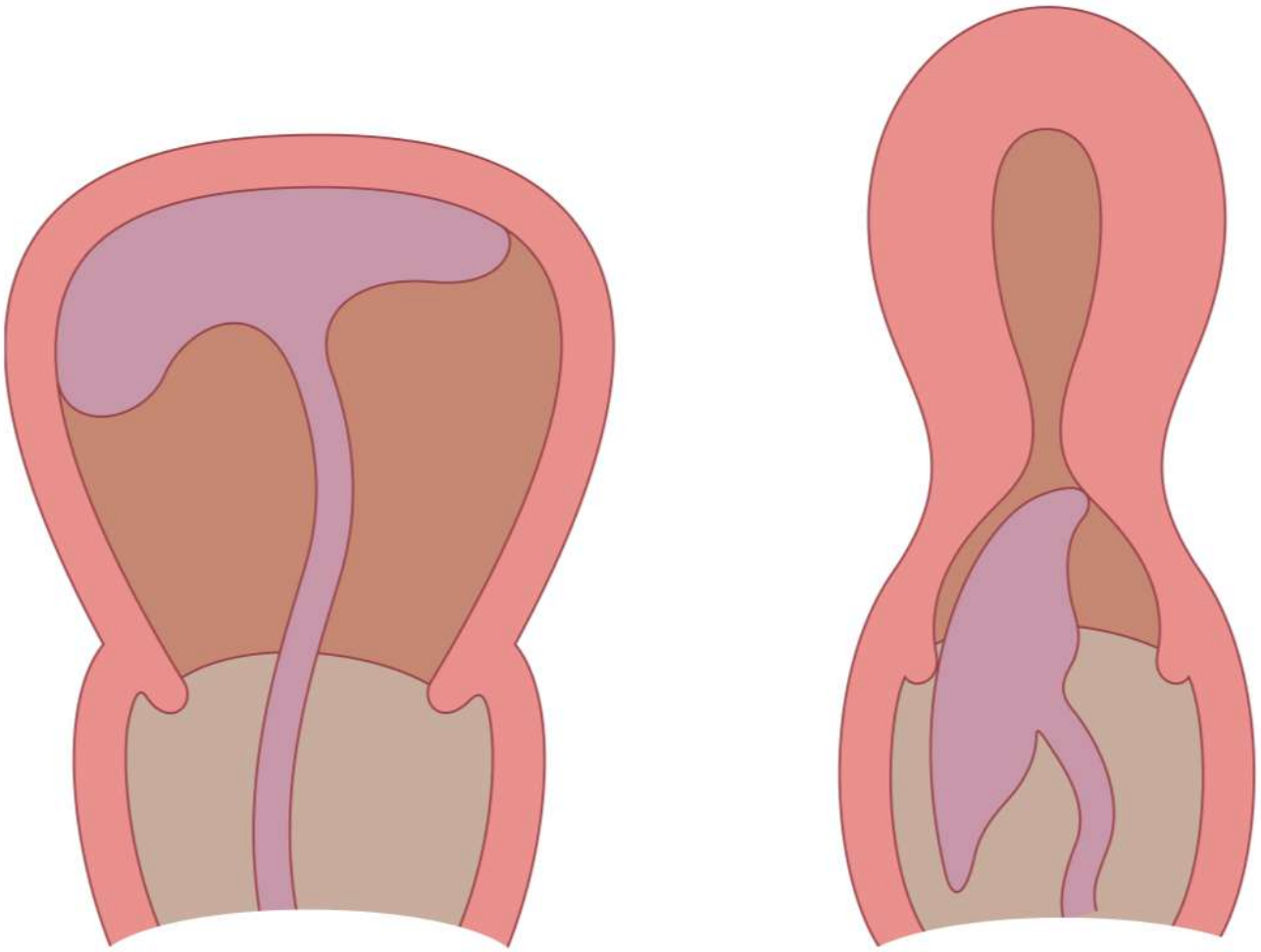


Figure 12.20 Signs of separation and descent of the placenta. After separation, the uterine upper segment rises and feels more rounded.

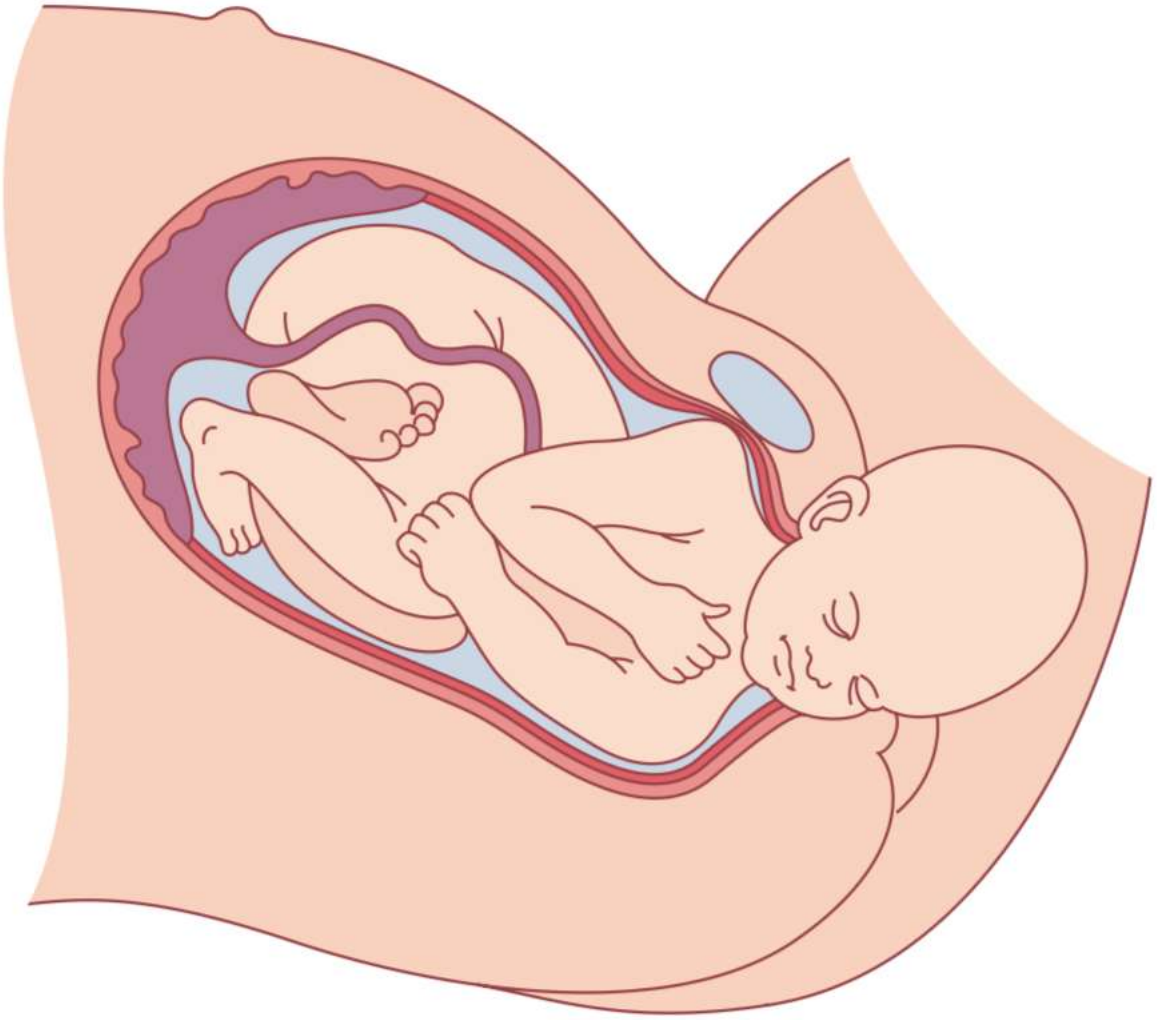


Figure 14.8 Shoulder dystocia. After delivery of the head, shoulder dystocia occurs due to the shoulders being unable to pass under the maternal symphysis pubis.

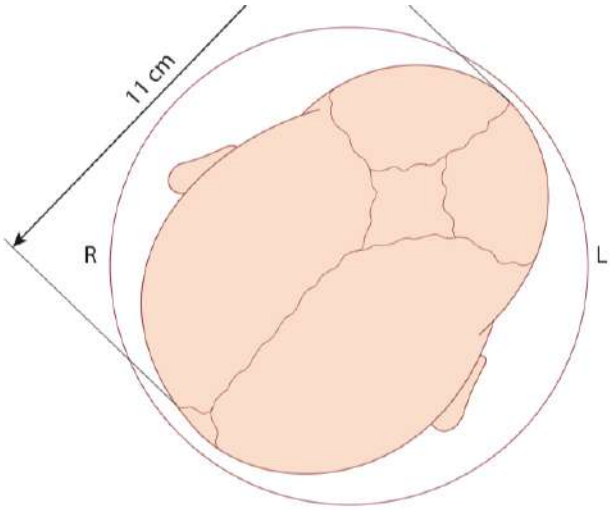


Figure 12.24 Vaginal palpation of the head in the right occipito-posterior position. The circle represents the pelvic cavity, with a diameter of 12 cm. The head is poorly flexed so that the anterior fontanelle is easily felt.

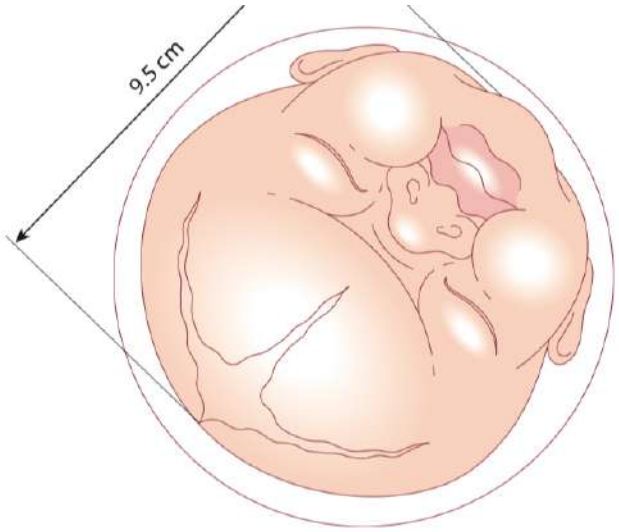


Figure 12.25 Vaginal examination in the left mento-anterior position. The circle represents the pelvic cavity, with a diameter of 12 cm.

BOX 12.6: Findings suggestive of CPD

- Fetal head is not engaged in labour
- Progress is slow or arrests despite efficient uterine contractions
- Vaginal examination shows severe moulding and caput formation
- Head is poorly applied to the cervix
- Haematuria

MALPRESENTATION ('PASSENGER')

A firm application of the fetal presenting part on to the cervix is necessary for good progress in labour. A face presentation (**Figures 12.25** and **12.26**) may apply poorly to the cervix and the resulting progress in labour may be slow, although vaginal birth is still pos-

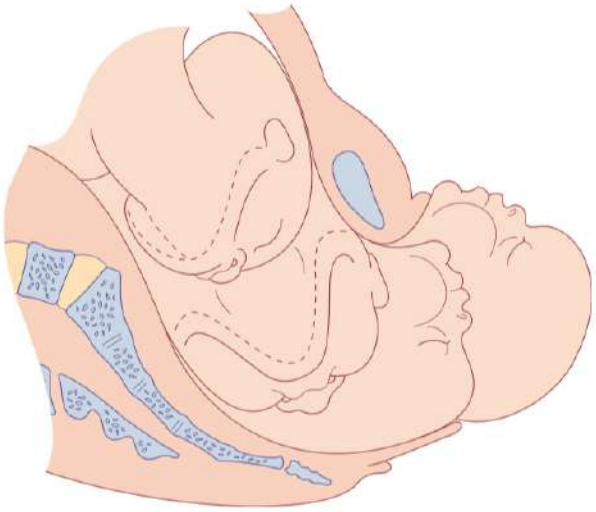


Figure 12.26 The mechanism of labour with a face presentation. The head descends with increasing extension. The chin reaches the pelvic floor and undergoes forwards rotation. The head is born by flexion.

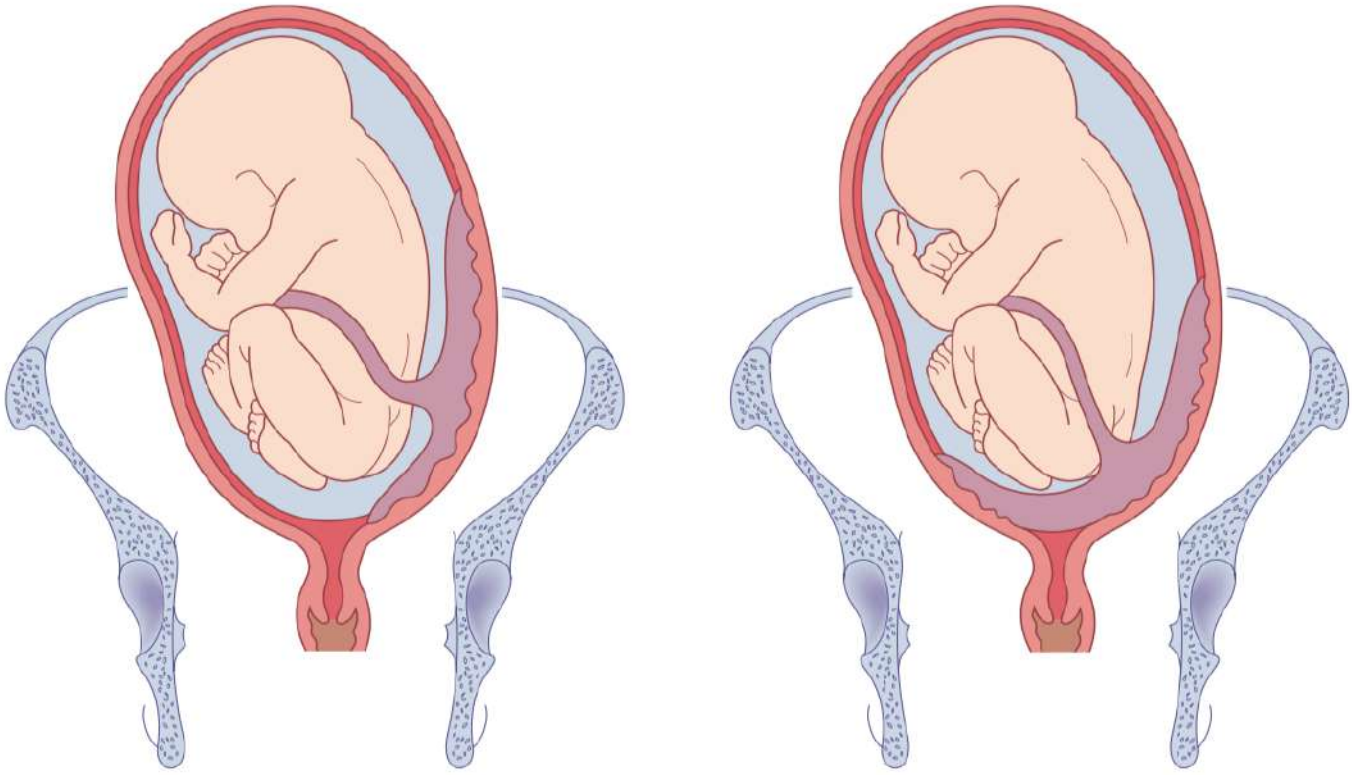


Figure 14.5 Placenta praevia.

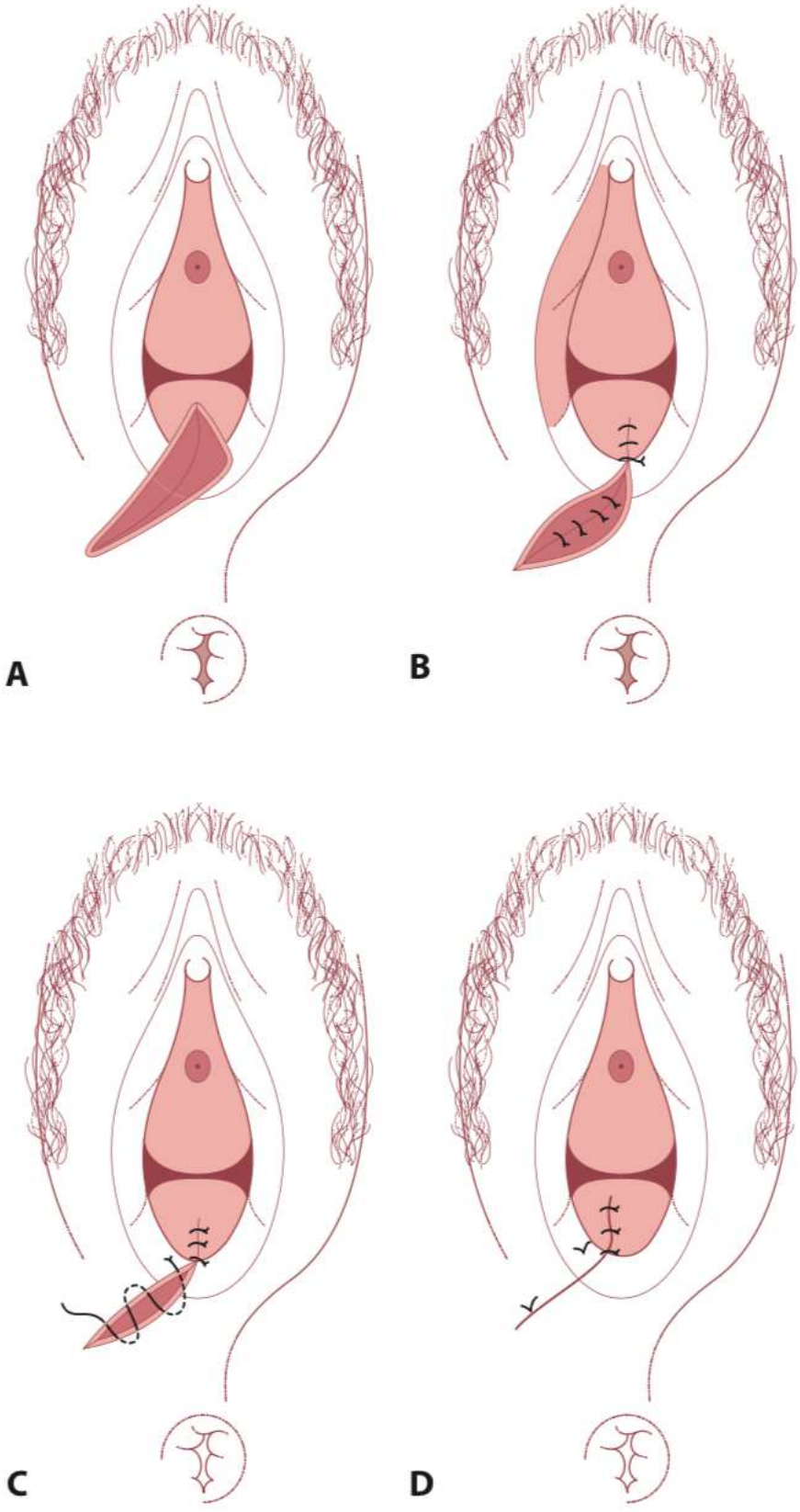
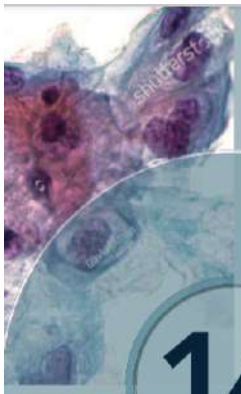


Figure 13.1 Repair of an episiotomy/second-degree perineal tear. (**A**) The perineum prior to the repair. (**B**) Continuous repair of the vaginal mucosa. (**C**) Subcutaneous suture of the skin. (**D**) Completed repair.



14 Obstetric emergencies

FERGUS McCARTHY

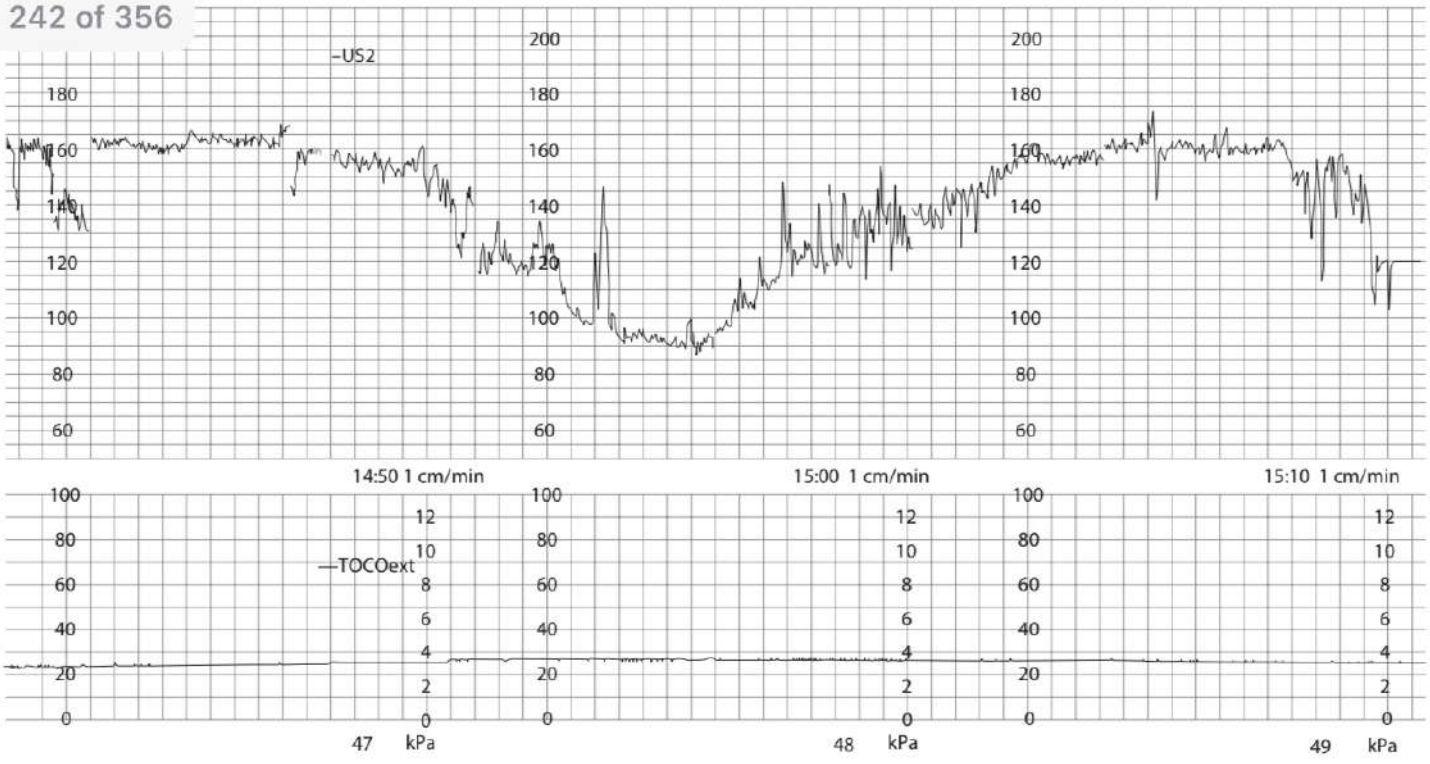


Figure 12.32 Fetal bradycardia to a heart rate of 90 beats per minute, lasting approximately 11 minutes.

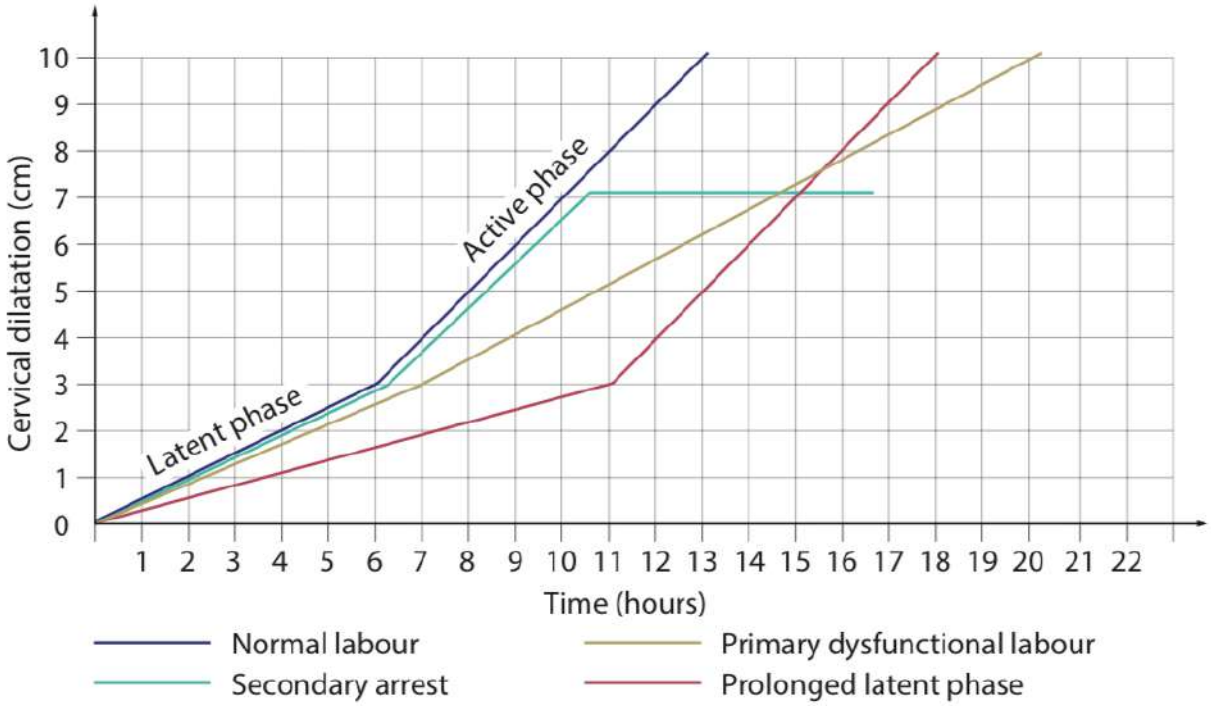


Figure 12.22 Abnormalities of the partogram.

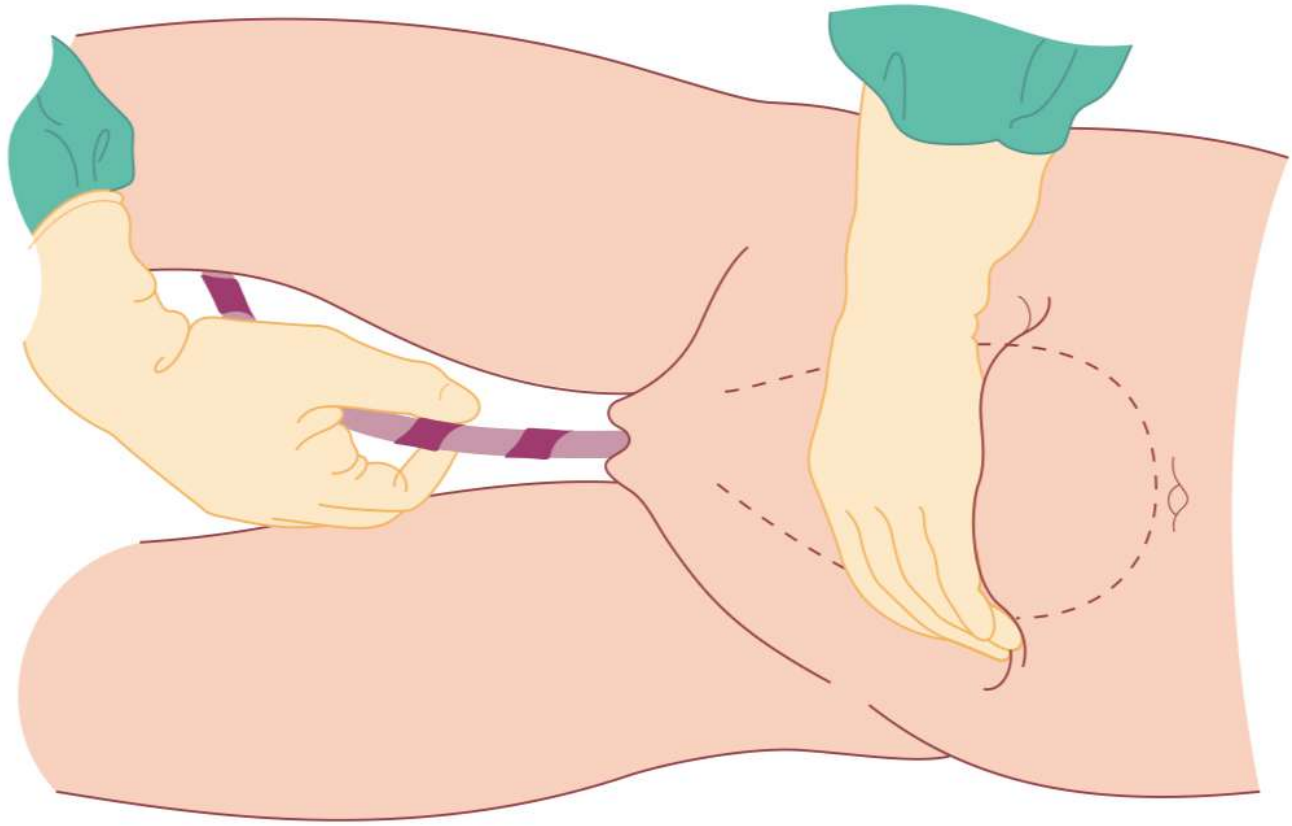
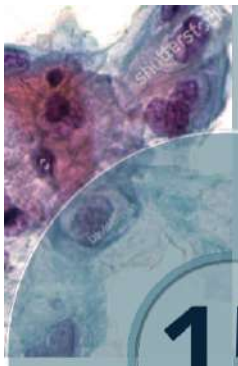


Figure 12.21 Delivering the placenta by controlled cord traction.



15 Puerperium

ANDREW D WEEKS

Figure 13.3 Ventouse/vacuum extractor cups. (**A**) Metal ventouse cup. (**B**) Silicone rubber cup. (**C**) OmniCup™.

Figure 13.4 Kielland rotational forceps (left) and Simpson non-rotational forceps (right).

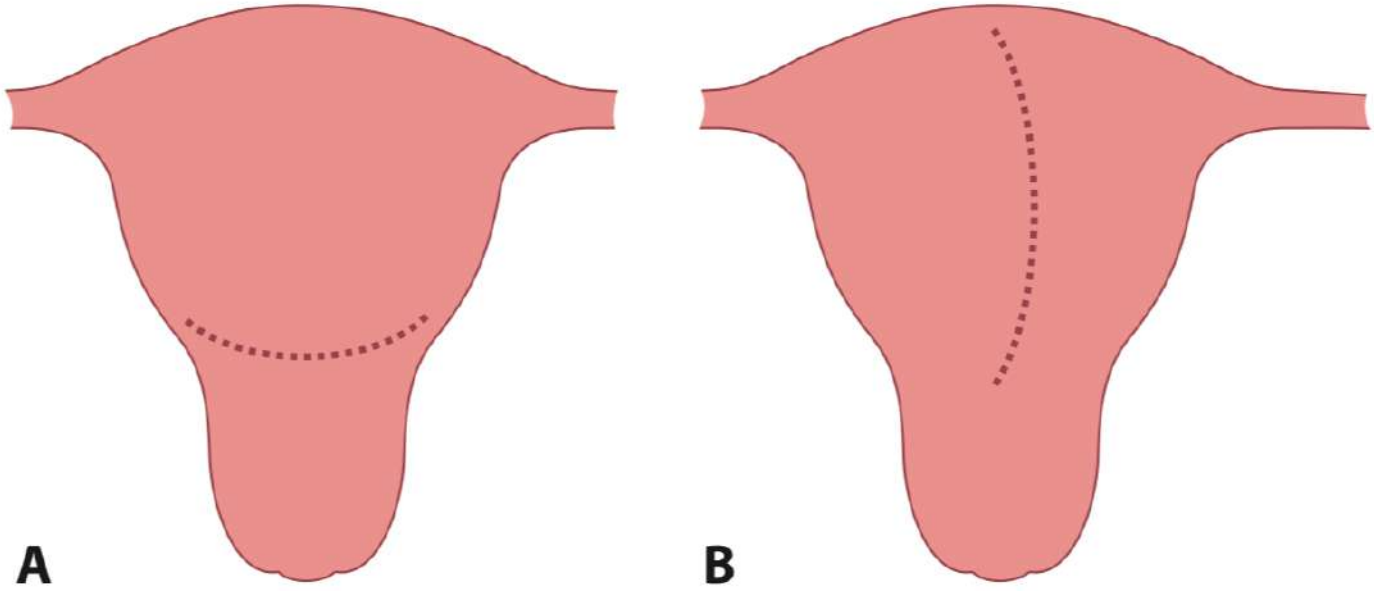


Figure 13.6 Uterine incisions for caesarean section. (**A**) Transverse lower segment incision. (**B**) Classical caesarean section incision.

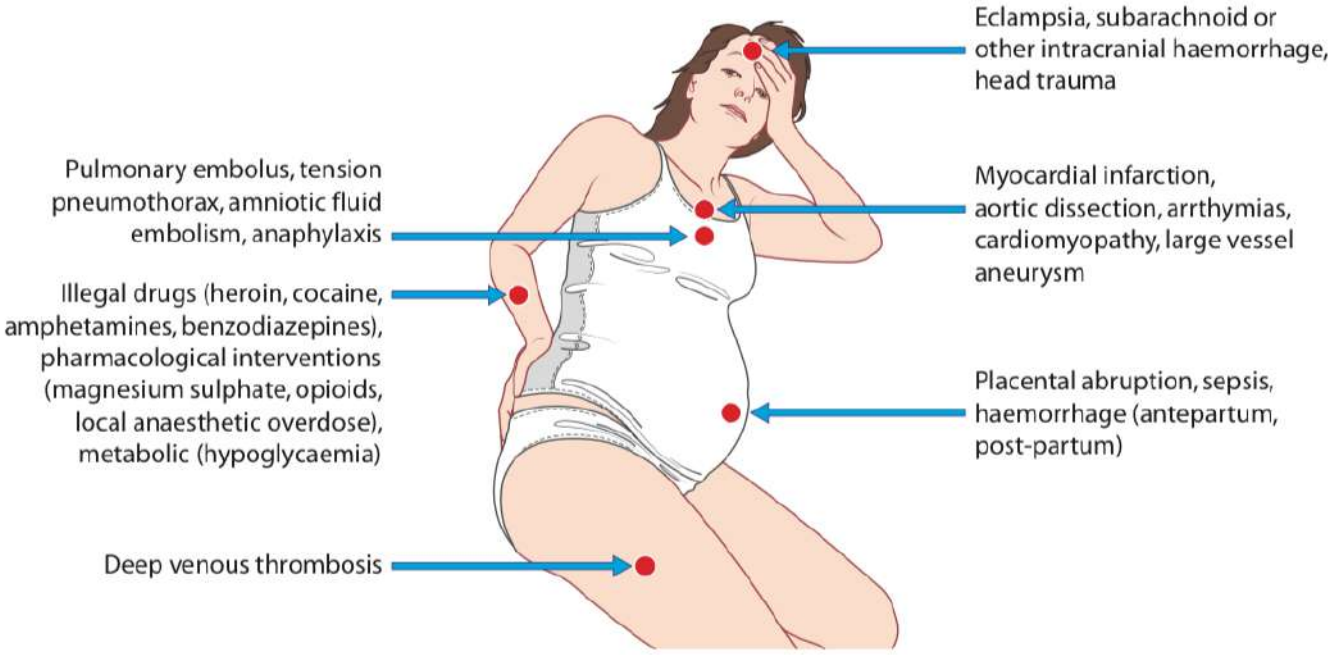


Figure 14.3 The differential diagnosis of acute maternal collapse.

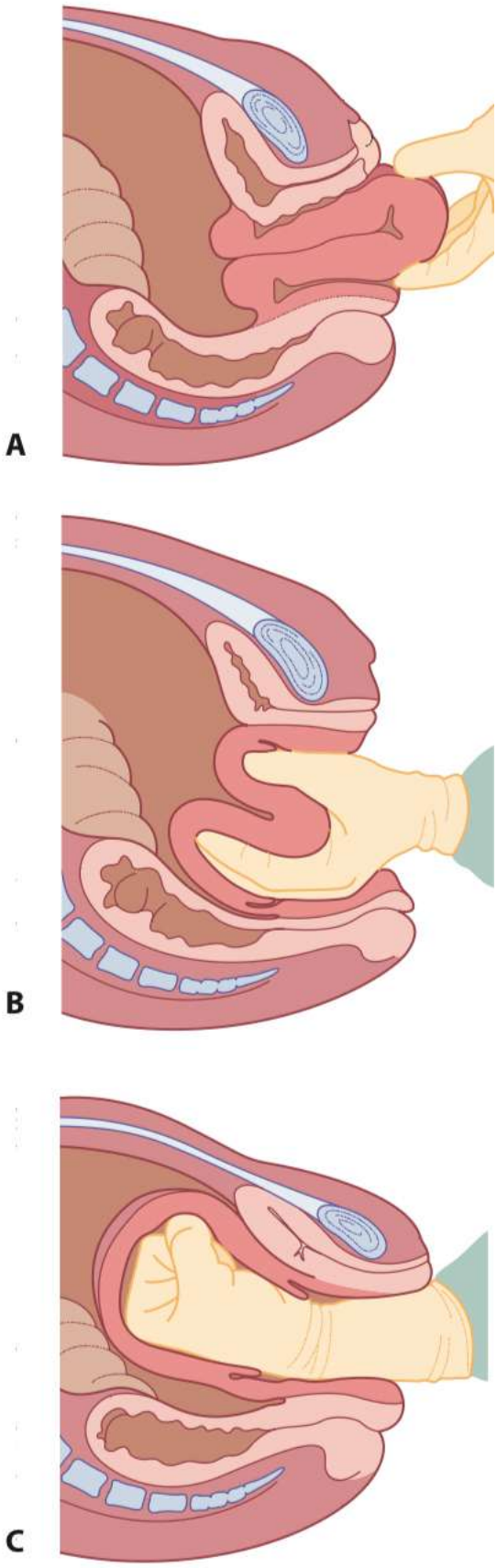


Figure 14.10 Uterine inversion.