— Flucloxacillin/cloxacillin 250–500 mg by mouth four times a day for 5 days.

- If the infection is deep, involves muscles and is causing necrosis (necrotising fasciitis), give antibiotics until the necrotic tissue has been removed and the patient has been fever-free for 48 hours:
  — Flucloxacillin/cloxacillin 500 mg–1 gram IV 6 hourly plus penicillin G 2 million units IV every 6 hours, plus metronidazole 500 mg IV every 8 hours.

Necrotising fasciitis requires urgent wide surgical debridement. Perform secondary closure 2 to 4 weeks later, depending on the resolution of infection.

It is important to inform the mother on discharge that she is at risk of uterine rupture during her next pregnancy. Offer child spacing/family planning advice.

Other complications

Peritonitis

Signs and symptoms
These include severe generalised abdominal pain, nausea and vomiting, fever, absent bowel sounds, rigid abdominal wall and shock.

Treatment
1. Call a surgeon and an anaesthetist.
2. Provide nasogastric suction.
3. Treat shock if present, but always place a wide-bore IV line and infuse fluids.
4. Give antibiotics until the patient has been fever-free for 48 hours:
   - ampicillin 2 grams IV every 6 hours, plus gentamicin 80 mg IV/IM every 8 hours or 5 mg/kg body weight IV/IM once every 24 hours, plus metronidazole 500 mg IV every 8 hours.
5. If necessary, perform laparotomy for peritoneal washout.

Pelvic abscess

Give antibiotics before draining the abscess, and continue until the patient has been fever-free for 48 hours:
- ampicillin 2 grams IV every 6 hours, plus gentamicin 80 mg IV/IM every 8 hours or 5 mg/kg body weight IV/IM once every 24 hours, plus metronidazole 500 mg IV every 8 hours.
- If the abscess is fluctuant in the pouch of Douglas (cul-de-sac), perform culdocentesis. If the spiking fever continues, perform a laparotomy.

Care of the patient after spinal anaesthesia

Observations

Standard post-anaesthetic observations
Sensation should return within 4 hours. If after 4 hours the patient remains numb and/or cannot move her legs, contact the anaesthetist urgently.

Analgesia
Severe pain may return suddenly when the effects of the spinal block have worn off. Give analgesia when the patient first experiences pain.

Fasting
Fasting is not needed unless it is a surgical requirement (e.g. after abdominal operations).

Posture
The patient does not have to lie flat. Allow them to sit up as soon as they are able to do so.

Mobilising
If not contraindicated by the surgery, the patient can get out of bed 2 hours after the return of normal sensation, but only with assistance. Before getting the patient out of bed, sit her up slowly. If she feels faint, dizzy or sick then lie her down, take her blood pressure and inform the anaesthetist.

Potential complications
- Postural hypotension: lie the patient on the bed, give or increase IV fluids and inform the anaesthetist.
- Urinary retention: encourage the patient to pass urine when sensation returns. If the patient has not passed urine and she has a palpable bladder, she may need a catheter.

2.13 Obstetric procedures

The importance of basic and comprehensive Emergency Obstetric and Neonatal Care in resource-limited settings

The availability of Emergency Obstetric and Neonatal Care (EmONC) indicates how well any healthcare system can respond to the obstetric and newborn complications that are the main causes of maternal and newborn deaths. The Averting Maternal Death and Disability Program (AMDD) and the United Nations have defined nine essential EmONC services that directly treat these complications. These are termed signal functions.

The functional status of an EmONC facility depends on the 24-hour availability of these life-saving signal functions and whether they have been performed recently. To qualify as a basic EmONC (or BEmONC) facility, health centres and hospitals must have performed the following seven signal functions within the past 3 months:
1 administered IM or IV antibiotics
2 administered IM or IV anticonvulsants
3 administered IM or IV uterotonic drugs
4 performed manual removal of the placenta
5 performed removal of retained products of conception (manual vacuum aspiration)
6 performed assisted vaginal delivery (with vacuum extractor or forceps)
7 performed neonatal resuscitation with a bag and mask.

To qualify as a comprehensive EmONC (or CEmONC) facility, health centres and hospitals must have performed all seven basic services listed above plus the following two additional signal functions within the past 3 months:
1 blood transfusion
2 Caesarean section.

In order for these EmONC systems to work adequately, there must be effective coordination of the supplies of essential emergency drugs, medical and surgical supplies and equipment to every facility providing this care. Essential drugs must include oxytocin, magnesium sulphate, misoprostol, antibiotics and antihypertensive drugs. Essential supplies include sutures and urinary catheters. Essential equipment includes manual vacuum aspirators, vacuum delivery kits and self-inflating bag-and-mask ventilators for newborn resuscitation.

Urethral catheterisation

Method
Use an appropriate size of catheter, which is one that is smaller in diameter than the external urethral meatus (to minimise the risk of subsequent urethral stricture formation). Usually this will be size 10–14 French gauge.

Using sterile precautions (gloves, etc.), wash the area with gauze swabs soaked with antiseptic (although sterile water or 0.9% saline can be just as effective), and clean from anterior to posterior with downward movements (to avoid faecal contamination). Sterile lubricant should be used to aid passage of the catheter. Use a syringe of sterile water or 0.9% saline to inflate the balloon if it is a Foley catheter, with the woman lying on her back or in the left lateral tilt position if she is more than 20 weeks’ pregnant. The catheter is inserted far enough (urethra length is around 4 cm) for urine to be seen in the tube. Attach a catheter bag (if available). Secure the catheter to the thigh with tape to prevent traction damage to the bladder.

The balloon must be deflated before the catheter is removed.

Ventouse (vacuum) delivery

Introduction
The ventouse creates a vacuum in a cup attached to the fetal head to assist delivery. This technique is also called vacuum-assisted vaginal delivery or vacuum extraction (VE).

The advantages of the ventouse over forceps are that less training is needed, there is less risk of excessive traction, there are clear-cut rules on its use (e.g. the number of contractions during which traction is allowed), if the baby needs to rotate in order to be delivered this can occur spontaneously, and it can cause less injury to the mother.

The disadvantages are that it cannot be used for preterm delivery, face presentation, breech or after-coming head of breech, and if the mother is unable to provide expulsive efforts the ventouse is generally not effective. The equipment is more complex than forceps and more difficult to sterilise and maintain, and there can be more trauma to the baby (e.g. cephalhaematoma).

A number of different types of cups are available.

The original (Malmström) metal cup (see Figure 2.13.2) has the chain within a pipe leading to the cup. It may be difficult to sterilise the tube adequately.

The Bird metal cup (see Figure 2.13.3) has two configurations:
1 The 5 cm anterior metal cup is used for occipito-anterior positions. The smaller 4 cm cup is reserved for the small fetus (e.g. a second twin, and particularly if the cervix is no longer fully dilated).
2 The posterior metal cup is used for occipito-posterior positions, particularly those with significant deflexion. This is often also the cup of choice for the deep transverse arrest, as the abnormal angle of the baby’s head to the vertical, which is often marked, makes correct placement with the anterior cup highly unlikely.

The plastic cup (50 or 60 mm internal diameter) comes in two main forms:
- a silastic/silicon soft cup (see Figure 2.13.4) is the safest of all for the fetus, but has a slightly higher failure rate, especially with occipito-posterior positions
- the easy-to-use Kiwi OmniCup (see Figure 2.13.5), which is reusable but relatively expensive (www.youtube.com/watch?v=TgAcG9rJhw).
The application of negative pressure to the cup, including a vacuum gauge to show how much pressure is being applied, is shown in Figure 2.13.6.

**Indications for an assisted delivery using the vacuum extractor**
- Delay in the second stage of labour.
- Fetal distress in the second stage.
- Maternal conditions that require a short second stage (e.g. eclampsia, heart disease).
- Maternal exhaustion.

**Contraindications**
- Face presentation.
- Gestation less than 34 weeks.
- Breech presentation.
- Signs of obstructed labour.

**Prerequisites**
- Full dilatation of the cervix and engagement of the head (head at least at 0 station and no more than 1/5 above the symphysis pubis).
- The position of the fetal head in relation to the pelvis must be known.
- A fetus greater than 36 weeks’ gestation, or with great care if between 34 and 36 weeks.
- Cooperation of the mother is helpful so that she can enhance contractions and traction by bearing down.
- Uterine contractions must be present.
- Ensure that a healthcare worker who is able to undertake neonatal resuscitation is present in case this is required.
- Ensure that the equipment is working, in particular that the vacuum reaches the correct value by testing the cup on the palm of the hand of the operator (covered by a sterile glove).
Basic rules
- If the patient is mobile, ask them to empty their bladder. If not, catheterise them. If the patient is catheterised, ensure that any within-catheter balloon is deflated.
- No additional anaesthetic is required (perineal infiltration with lidocaine will suffice if an episiotomy is planned).
- Lithotomy is the commonest position used, but delivery may be possible in a dorsal, lateral or squatting position. The mother should be in a 45-degree sitting position to aid expulsion.
- The delivery should be clearly achievable after three pulls, with evidence of descent with each pull.
- The head, not just the scalp, should descend with each pull.
- The cup should be reapplied no more than twice provided that it has been in the right position and the direction of pull is correct (and after one detachment an experienced operator, if available, should be summoned).
- If failure with the ventouse occurs despite good traction, do not try the forceps but proceed to Caesarean section (provided that it is safe, and available within a reasonable time).

Methods
First check your equipment. Attach the cup to the suction, and ensure the suction is working by testing it. This can be done by briefly holding the cup against your hand while suction is applied.

1. Examine the mother carefully using a sterile procedure and gloves and ideally an obstetric cream such as Hibitane. Estimate the size of the baby by abdominal examination, and ensure that the head is fully engaged (no more than 1/5 of the head should be palpable). The membranes should have ruptured.

2. Determine the position of the vertex and the amount of caput by vaginal examination. Identify the posterior fontanelle.

3. Describe the attitude of the presenting part as ‘flexed’ or ‘deflexed’. In a flexed attitude only the posterior fontanelle can be felt, whereas any situation in which the anterior fontanelle can be felt or the posterior fontanelle cannot be found should be described as deflexed.

4. With two fingers press on the perineum posteriorly to widen the vaginal opening (see Figure 2.13.7).

5. Insert the cup, avoiding the urethra. Apply the largest cup that will fit, with the centre of the cup over the flexion point, 2–3 cm anterior to the posterior fontanelle (see Figures 2.13.8 and 2.13.9). This placement will promote flexion, descent and autorotation with traction. Suction is applied to draw the fetal scalp into the cup.

6. Ensure that no maternal tissue is caught under the edge of the cup.

7. Place the middle of the cup 1–2 cm anterior to the baby’s posterior fontanelle/posterior to the anterior fontanelle. This will flex the head during its passage through the pelvis.

- If you put it more towards the front it will tend to extend the head, so that it will be less easy to pull out. The distance ‘Y’ when the head is deflexed (bent backwards) is much longer than the distance ‘X’ when it is flexed (bent forward).
- If you put the cup to one side, the head will bend to one side.

8. Connect the cup to the pump (see Figure 2.13.6), and check for leaks prior to commencing the delivery.

- First increase the pressure to 0.2 kg/cm², and then, after checking again that there is no maternal tissue caught under the cup, increase the pressure to 0.8 kg/cm², but never any higher than this.
- Common problems include suction bottles not tightly screwed in or tubing loosely attached to the metal cup.
- The metal cup should have a meshed bottom plate, which functions to maintain a clear space between
the scalp and the cup so that an effective vacuum can be applied.

9 Only perform an episiotomy when the head stretches the perineum (to avoid blood loss), and only if the perineum is interfering with the delivery.

10 Check the application. Ensure that there is no maternal soft tissue (cervix or vagina) within the rim.

11 During a contraction, encourage the patient to push, and aid her expulsive efforts by applying traction to the cup/fetal head (method described below).

Delivery with the anterior metal or plastic cup

The metal or plastic cup is lightly lubricated with sterile delivery cream (e.g. chlorhexidine cream) and then inserted sideways into the vagina. To orientate the cup correctly, direct the chain towards the occiput, which will result in the vacuum pipe lying centrally. Take the pressure up to 0.2 kg/cm². Check that no maternal tissue is caught under the cup and then increase the pressure directly to 0.8 kg/cm², but never any higher than this. Begin traction with the next contraction after this pressure has been achieved.

Traction should be along the pelvic axis for the duration of the contraction (initially down, then progressively forwards, and finally upwards as the head delivers) and always perpendicular to the cup (see Figure 2.13.10).

Always pull in the direction of the birth canal.

<table>
<thead>
<tr>
<th>FIGURE 2.13.10</th>
<th>Delivery with the Bird anterior metal cup.</th>
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<tbody>
<tr>
<td>(a) down</td>
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<tr>
<td>(b) along</td>
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<tr>
<td>(c) up</td>
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FIGURE 2.13.11 How to ensure that the vacuum cup is securely on the infant’s head as you pull.

FIGURE 2.13.12 Guiding the cup with the fingers to detect any slippage while pulling.

FIGURE 2.13.13 Cup slipping off with sideways traction.

1 Pull downwards towards the floor until the head is below the ischial spines.
2 Pull outwards until the head is stretching the perineum.
3 Finally pull upwards until the baby is delivered.

During traction keep one finger or thumb on the edge of the cup and another finger on the scalp so that the earliest sign of detachment or slippage is detected (see Figures 2.13.11 and 2.13.12).

With each contraction apply traction in a line perpendicular to the plane of the cup rim to help to prevent the cup slipping off (see Figure 2.13.13). Place a finger on the scalp next to the cup during traction to assess potential slippage and descent of the vertex (see Figure 2.13.12).

Slight side-to-side movements may help to edge the head down the pelvic wall, but side-to-side movements must be small to keep the traction line perpendicular and prevent the cup from detaching.
As the head crowns, the angle of traction changes through an arc of over 90 degrees.

If the perineum is stretching as normal, it is simply supported with the hand that was on the cup. An episiotomy must only be undertaken if perineal resistance is preventing delivery.

Occasionally, an edge of the cup might lift off at the introitus (this is more likely to happen if there is caput present). If this occurs, one has to be careful not to catch maternal tissue under the cup as it reattaches. Therefore this should be rechecked before final delivery of the head.

Once the head has delivered, release the vacuum and take off the cup and complete the delivery normally.

**Delivery with the posterior metal cup**

For a deflexed head in an occipito-posterior position, the ‘OP’ cup or if this is not available a plastic cup, ideally a Kiwi OmniCup, should be used. It is applied as far back on the head as possible, again ideally in the midline over the occiput. To allow good placement of the cup, it sometimes helps to try to flex the head, with two fingers of the left hand pressing on the sinciput, while the right hand inserts the cup behind the head. Once correctly placed, the vacuum can be started and taken directly to the required level. (Because the cup lies parallel to the vagina it is unlikely to catch any maternal tissue.) The first pull will be in the direction required to flex the head. With flexion of the head, the presenting diameter immediately becomes less. Thereafter, traction will be along the pelvic axis. The delivery may be completed simply by a standard spontaneous rotation of the baby with maternal effort and gentle assistance. It is essential not to try to twist the cup to rotate the baby. This will cause trauma, especially spiral tears of the scalp, with maternal tissue under the cup as it reattaches. Therefore this should be rechecked before final delivery of the head.

**Note the following:**

- Never use the cup to actively rotate the baby’s head.
- Rotation of the baby’s head will occur naturally with traction, if it is going to rotate.
- Do not continue to pull between contractions and expulsive efforts.
- With progress, and in the absence of fetal distress, continue the ‘guiding’ pulls to achieve delivery. Descent must be seen with each pull, and delivery should be clearly achievable following three pulls.

**Causes and management of failure to deliver with the ventouse**

Vacuum extraction has failed if:

- the head does not advance with each pull
- the fetus is not delivered or delivery is not imminent after three pulls
- the cup slips off the head twice at the proper direction of pull with a maximum negative pressure.

Every application should be considered a trial of vacuum extraction. Do not persist if there is no descent with every pull.

Generally delivery is achieved with three pulls. As a minimum, it should be clear after three pulls that the delivery is definitely going to be achieved imminently by the vaginal route.

**Failures occur for the following reasons.**

1. Inadequate initial assessment of the case:
   - The head being too high: a classic mistake is to assume that because caput can be felt below the ischial spines, the head must be engaged.
   - Misdiagnosis of the position and attitude of the head: attention to simple detail will minimise this.

2. Anterior or lateral placements will increase the failure rate.
   - If the cup placement is found to be incorrect, it may be appropriate to begin again with correct placement (i.e., midline over the flexion point).

3. Failures due to traction in the wrong direction.
   - Gentle sustained traction in the correct direction is what is needed, and sideways movements will be ineffective and increase scalp trauma and cup detachments.

4. Excessive caput.
   - Rarely, even with metal cups, adequate traction is not possible because of excessive caput.
   - In these cases, consideration must be given to delivery by Caesarean section unless the head is well down, in which case forceps can be used.

5. Poor maternal effort.
   - Maternal effort can contribute substantially to success.
   - Adequate encouragement and instruction should be given to the mother.
   - This may be a reason for preferring forceps to ventouse if the patient is under general anaesthetic.

6. The incidence of cephalo–pelvic disproportion (CPD) (true failure) is low. However, in settings where the majority of women deliver at home or in community clinics, it must be remembered that the patient is likely to have been fully dilated for some time before arrival in the hospital, if she has been referred for failure to progress in the second stage. CPD is likely to be relatively more common in this group.
One of the main problems with using a ventouse in resource-limited settings is difficulty with the availability of reliable suction. Although this is integral to the Kiwi, these are expensive and usually disposable. A new technique to provide negative pressure for a plastic or metal cup (the EgAr device) has been developed in Gambia by a senior midwife and is described here.

The main components are two valves from out-of-use aneroid blood pressure machines, a 100-mL bladder syringe, a four-way open tap from a urine bag, a urine bag control valve, and a vacuum gauge (see Figure 2.13.14).

The blood pressure system valves are attached to the outflow control unit of a urine bag, which is then attached to the syringe. The valves are arranged in such a way that when the plunger of the syringe is pulled, air is withdrawn into the syringe through the first valve (i.e. valve A). When the plunger is pushed back, the air in the syringe is expelled through the second valve (i.e. valve B). Since the valves (when closed) allow air to flow in only one direction, the syringe can function both to create vacuum pressure by pulling the plunger, and also as an air pump when the plunger is pushed back.

A standard conventional vacuum delivery cup (either the metal or silicon type) is attached to the syringe through one of the blood pressure valves, using the tube from the blood pressure machine. Both valves are closed to ensure that air flows into the syringe only through the first valve (A) when the plunger is pulled, and is expelled only through the second valve (B) when the plunger is pushed back. The vacuum cup is attached to the fetal head and a few pulls (three or four) on the plunger create a negative pressure measured on the vacuum gauge attached to the fourth outlet of the four-way tap (D) sufficient to deliver the baby without the need for continuous pumping. Vacuum pressure is released when the baby is born through the valve (C) from the urine bag near to where the cup is attached.

If vacuum extraction fails, use vacuum extraction in combination with symphysiotomy (see below) or perform Caesarean section.

Vacuum extraction and symphysiotomy

Vacuum extraction may be used in combination with symphysiotomy in the following circumstances:

- the head is at least –2 station or no more than 2/5 palpable above the symphysis pubis
- Caesarean section is not feasible or immediately available
- the provider is experienced and proficient in performing symphysiotomy
- vacuum extraction alone has failed or is expected to fail
- there is no major degree of disproportion.

Complications of vacuum extraction

Complications usually result from not observing the conditions of application, or from continuing efforts beyond the time limits stated above.

Fetal complications

- Localised scalp oedema (artificial caput or chignon) under the vacuum cup is harmless and disappears within a few hours.
- Cephalhaematoma (see Figure 2.13.15) requires observation, and will usually clear in 3 to 4 weeks.
- Scalp abrasions (common and harmless) and lacerations

...may occur. Clean and examine lacerations to determine whether sutures are necessary. Necrosis is extremely rare.

- Sub-galeal haemorrhage is more serious.

There have been reports of transmission of herpes viral infections from the mother to the fetal scalp following the use of a metal cup. It is theoretically possible that hepatitis or HIV infection may also be transmitted in this way. There is a lower risk of scalp injury using the flexible/plastic cups. Therefore for straightforward ventouse deliveries use the flexible cup when possible, bearing in mind that where rotation is needed as part of the delivery the metal cup is more successful. The metal cup can also deliver a stronger traction force.

Maternal complications

Tears of the genital tract may occur. Examine the woman carefully and repair any tears to the cervix or vagina, or undertake episiotomy repair.

Special indications for delivery with the ventouse

With the exception of second twin deliveries (where the cervix is in effect recently parous), vacuum extraction before full dilatation is generally only possible in multiparous women in which the cervix is soft and easily stretchable. This is definitely not always the case even with multiparous women, and great caution must be taken before proceeding to any vaginal delivery before full dilatation. Complications of such deliveries include cervical tears which can extend upward to involve the uterus, and therefore may require laparotomy for repair or even hysterectomy as for a ruptured uterus.

If the operator is uncertain about the degree of engagement, degree of cervical dilatation or the position of the head, a more experienced practitioner should assist (if available).

Forceps delivery after failure to deliver with the ventouse

There is no place for an attempt at forceps delivery if there...
has been no descent with the ventouse despite adequate traction. However, if traction has been inadequate (due to caput, leaking equipment or no maternal assistance), it may be justified to change to forceps. The most experienced operator should make this decision.

The ventouse is the instrument of first choice for operative vaginal delivery provided conditions for its use are safe and suitable.

**Forceps delivery**

**Introduction**

Forceps are particularly helpful in the delivery of the after-coming head of a breech, delivery of a mento-anterior face presentation, and delivery before 34 weeks (although this is controversial).

**Conditions for possible use of forceps**

These include the following:

- Vertex presentation
- Face presentation with chin anterior
- Entrapped after-coming head in breech delivery; some operators will routinely control the delivery of the head here by using forceps, provided that the cervix is fully dilated.

At the very minimum, the sagittal suture should be in the midline and straight, guaranteeing an occiput-anterior or occiput-posterior position.

**Outlet forceps**

In resource-limited settings, forceps at the outlet can be helpful for delay in the second stage when the baby’s head is near the outlet, but for all other situations the ventouse is preferred if suitable. The conditions for the use of outlet forceps are as follows:

- The fetal skull is visible without separating the labia
- The fetal skull has reached the pelvic floor
- The sagittal suture is in the anterior-posterior diameter or right or left occiput-anterior or occiput-posterior position (rotation does not exceed 45 degrees)
- The fetal head is at or on the perineum.

The blade on the mother’s left always goes in first, and the right blade fits on top of it.

**Procedure**

- Ensure that the head is engaged in the pelvis. Abdominal palpation must be undertaken, particularly in the case of face presentation.
- Urinary catheterisation is required.
Repeat the same manoeuvre on the other side, using the left hand and the right blade of the forceps (see Figure 2.13.19).

**FIGURE 2.13.19** Applying the right blade of the forceps.

- Depress the handles and lock the forceps.
- Difficulty in locking usually indicates that the application is incorrect. In this case, remove the blades and recheck the position of the head. Reapply only if the head is in the appropriate position for the use of forceps.
- After locking check that the sagittal suture lies vertically in the midline between the shanks of the forceps. Also ensure that no more than two fingers can be placed laterally into the fenestrations of the blades. Note: these checks do not ensure correct placement but do help detect some instances of mal-placement.
- After locking, apply steady traction inferiorly and posteriorly with each contraction (see Figures 2.13.20 and 2.13.21). There should be both traction and pressure on top of the joined forceps.

**FIGURE 2.13.20** Locking the handles.

**FIGURE 2.13.21** The correct way of applying traction with downward pressure.

Between contractions check the fetal heart rate and correct application of forceps.
- When the head crowns, make an adequate episiotomy.
- Lift the head slowly out of the vagina between contractions.
- The head should descend with each pull. Only two or three pulls should be necessary.
- Ensure that the head rather than the blades of the forceps are descending with each pull by feeling the fingers on the fetal head moving down. It is very harmful to the fetus if the blades slide down the side of the fetal head.

**Failure of forceps**
- The fetal head does not advance with each pull.
- The fetus is not delivered after three pulls.

Every application should be considered a trial of forceps. Do not persist if there is no descent with every pull. If forceps delivery fails, consider a symphysiotomy or perform a Caesarean section.
- After repairing any episiotomy, ensure that swab and instrument counts are correct.
- Do a rectal examination to check the integrity of the rectal sphincter and the mucosa for tears.

**Complications of forceps use**

**Fetal complications**
- Injury to facial nerves requires observation. This injury is usually self-limiting.
- Lacerations of the face and scalp may occur. Clean and examine any lacerations to determine whether sutures are necessary.
- Fractures of the face and skull require close monitoring.

**Maternal complications**
Tears of the genital tract may occur. Examine the woman carefully and repair any cervical or vaginal tears and undertake episiotomy repair.

**Caesarean section**
The WHO suggests that systems should be in place to ensure that Caesarean section is performed in a minimum of 5% of all expected births.

**Indications**
- Obstructed labour.
- Obstetric haemorrhage (especially if ongoing or the mother or fetus is unstable).
- Severe maternal illness where urgent delivery is indicated and is not achievable rapidly by vaginal delivery (e.g. eclampsia where delivery is advised within 12 hours).
- Fetal distress.
- Malpresentation.
- Major placenta praevia.

**Pre-operative considerations**
- Check for fetal life by listening to the fetal heart rate.
- Examine for fetal presentation and to ensure vaginal delivery is not achievable.
- Avoid performing a Caesarean section if there is no maternal indication and the fetus is dead.
- Obtain informed consent from the mother.
Take a blood sample for haemoglobin or haematocrit, blood grouping and cross-matching if indicated. More than 2 × 500 mL units may be needed if antepartum bleeding or massive haemorrhage is anticipated.

- Transfer the patient to the operating theatre in the left lateral position with a wedge under the right buttock.
- Give antacid immediately prior to general anaesthetic (30mL of 0.3% sodium citrate (preferable non-particulate) or 300mg of magnesium trisilicate). This neutralises the stomach acid and minimises damage to the lungs if aspiration occurs.
- Start an IV infusion with a crystalloid such as Ringer-lactate or Hartmann’s solution.
- Spinal or general anaesthesia with rapid sequence induction, or ketamine, or local infiltration may be used, depending on local circumstances.

(For choice of anaesthesia, see Section 1.24.)

In theatre, the operating table must be kept in the left lateral tilt position or a pillow placed under the woman's right lower back to reduce aorto-caval compression until after delivery.

**Urinary catheterisation**

The woman must be catheterised and her bladder emptied before starting the procedure, both to avoid injury to the bladder and to monitor urine output.

- Remove the catheter after 8 hours if the urine is clear; if not, wait until it is.
- Wait 48 hours before removing the catheter if there is:
  - uterine rupture
  - prolonged or obstructed labour
  - gross perineal oedema
  - puerperal sepsis with pelvic peritonitis.

If the bladder was damaged, leave the catheter in for 7 days. The urine should be clear of blood and remain so after 48 hours. If the woman is not receiving antibiotics, give nitrofurantoin 100 mg (or cefalexin 500 mg or amoxicillin 500 mg) orally once daily until the catheter has been removed.

**Skin preparation**

The presence of a large amount of pubic hair around the site of skin incision can interfere with healing. A suitable proportion of this should be shaved off immediately before the skin is disinfected and the incision is made. There must not be a gap between shaving and operation.

Tinctures of chlorhexidine, iodophor and tincture of iodine are the recommended antiseptic products for preparing the patient's operative site. Apply three times to the incision site using disinfected ring forceps and a cotton or gauze swab. Do not contaminate the glove by touching unprepared skin.

Begin at the proposed incision site and work outwards in a circular motion away from the incision site. At the edge of the sterile field discard the swab.

The use of alcohol or hexachlorophene as a single agent is not recommended unless the patient's skin is sensitive to the recommended antisepsic products. Impregnated adhesive film as skin preparation is not recommended.

All patients should be given a prophylactic antibiotic, ampicillin 2 grams IV, before the skin incision, and ideally thromboprophylaxis post-operatively (compression stockings, mobilisation, and 5000 units of heparin subcutaneously 12-hourly until the patient is discharged from hospital).

**Prevention of exposure of staff to HIV and hepatitis**

In many operations, micro-holes develop in gloves (not due to needled stick injuries). These micro-holes will of course be more prevalent if gloves are reused, as in some resource-limited settings. If there is a significant risk of HIV or hepatitis, double gloves or special thick gloves should be used. A clear plastic facial shield reduces exposure to blood.

**Opening the abdomen**

Abdominal and uterine scars are two separate issues. Classical section is a vertical uterine scar, usually but not always associated with a vertical abdominal scar. A vertical abdominal scar may be present with either a classical or lower segment uterine scar.

**Skin incision**

The choice of skin incision depends on the following:

- the gestational age of the fetus
- the indication for section
- the presence of previous scars
- the operator's surgical experience.

A low transverse incision is preferred to the vertical incision, as there is less likelihood of wound dehiscence and hernia. There are two possibilities, namely the Pfannenstiel incision and the Joel-Cohen incision.

**The Joel-Cohen incision**

The Joel-Cohen technique includes straight transverse incision through the skin only, 3 cm below the level of the anterior superior iliac spines (higher than the Pfannenstiel incision; see below). The subcutaneous tissues are opened only in the middle 3 cm. The fascia is incised transversely in the midline and then extended laterally with a blunt finger. Finger dissection is used to separate the rectus muscles vertically and laterally and open the peritoneum. All of the layers of the abdominal wall are stretched manually to the extent of the skin incision. The bladder is reflected inferorly. The myometrium is incised transversely in the midline, but not to breach the amniotic sac, then opened and extended laterally with finger dissection. Interrupted sutures are used for the closure of the myometrium.

**The Pfannenstiel incision**

This consists of a curved skin incision, two finger-breathths above the symphysis pubis, transverse incision of the sheath, blunt separation of the rectus muscles, and incision of the parietal peritoneum in the midline.

**The low vertical incision**

The incision is made from the base of the umbilicus to the pubic hair line. This is preferred if better exposure is needed or local anaesthesia is used. It allows easier access to the upper abdomen, is indicated if the lower uterine segment is difficult to access due to adhesions from previous Caesarean sections, if the lie of the fetus is transverse with the back down, and if there are fetal malformations, large fibroids over the lower segment, a vascular lower segment due to placenta praevia, or carcinoma of the cervix.

**Compared with Pfannenstiel-based Caesarean...**
section, Joel-Cohen-based Caesarean section has been shown to be associated with a reduction in blood loss, operating time, time to oral intake, fever, duration of post-operative pain, analgesic injections, and time from skin incision to birth of the baby.

The surgeon must ensure that the access to the uterus is adequate to deliver the fetus without difficulty, and in the presence of scarring a Pfannenstiel incision may give better exposure.

**Length of incision**

A minimum length of 15 cm is indicated (which accommodates an open Allis forceps).

Excision of the previous scar is not essential for better healing and cosmetic results unless there is keloid scarring.

**General measures**

- Handle tissue gently.
- Prevent bleeding.
- Eradicate dead space.
- Minimise the amount of desensitised tissue and foreign material in the wound.

**Practical points**

- Extend incision of the fascia, peritoneum and myometrium digitally or with scissors rather than with a scalpel.
- Transfer sharp instruments into a basin/tray.
- Retract tissue with instruments, reposition suture needles with forceps and remove the needle before the final tying of sutures.

Make the skin incision to the level of the fascia.

If the Caesarean section is performed under local anaesthesia, make a vertical incision that is about 4 cm longer than when general/spinal anaesthesia is used. A Pfannenstiel incision takes longer, retraction is poorer and it requires more local anaesthetic.

**Make a 2–3 cm vertical incision in the fascia.**

- Hold the fascial edge with forceps and lengthen the incision from side to side using scissors.
- Use fingers or scissors to separate the rectus muscles (abdominal wall muscles).
- Use scissors to make an opening in the peritoneum near the umbilicus. Use scissors to lengthen the incision up and down in order to see the entire uterus. Use scissors to separate the layers and open the lower part of the peritoneum, taking care to avoid bladder injury.
- Place a bladder retractor over the pubic bone.
- Use forceps to pick up the loose peritoneum covering the anterior surface of the lower uterine segment, and incise with scissors.
- Extend the incision by placing the scissors between the uterus and the loose serosa. Cut transversely about 3 cm on each side.
- Use two fingers to push the bladder downwards off the lower uterine segment. Replace the bladder retractor over the pubic bone and bladder.

**Opening the uterus**

- Use a scalpel to make a 3 cm transverse incision in the lower segment of the uterus. It should be about 1 cm below the level where the vesico-uterine peritoneal fold was incised to bring the bladder down.

- Widen the incision by placing a finger at each edge and gently pulling upwards and laterally at the same time.
- If the lower uterine segment is thick and narrow, extend the incision in a crescent shape, using scissors instead of fingers to avoid extension into the uterine vessels.
- It is important to make the uterine incision large enough to deliver the head and body of the baby without tearing the incision.

**Uterine incision**

A high vertical uterine incision is indicated if any of the following are present:

- an inaccessible lower segment due to dense adhesions from previous Caesarean section
- transverse lie (with the baby’s back down) for which a lower uterine segment incision cannot be safely performed
- fetal malformations (e.g. conjoined twins)
- large fibroids over the lower segment
- a highly vascular lower segment due to placenta praevia
carcinoma of the cervix.

A lower transverse incision is commonly used because:

- less dissection of the bladder is needed
- entry into the uterus is easier
- there is less blood loss
- there is a lower incidence of uterine rupture with subsequent pregnancies.

Lower vertical incision (De Lee’s incision) can be useful if the lower uterine segment is poorly formed and thickened, in which case a transverse incision would be unwise.

If a lower transverse incision has been attempted and found to be inadequate, it can be extended upwards in a J-shaped incision to avoid blood vessels and enable adequate access.

**Delivery of the baby and placenta**

- To deliver the baby, place one hand inside the uterine cavity between the uterus and the baby’s head.
- With the fingers, grasp and flex the head.
Gently lift the baby’s head through the incision (see Figure 2.13.23), taking care not to extend the incision down towards the cervix.

FIGURE 2.13.23 Delivering the baby’s head.

- With the other hand, gently press on the abdomen over the top of the uterus to help to deliver the head.
- If the baby’s head is deep down in the pelvis or vagina, ask an assistant (wearing sterile gloves) to reach into the vagina (which must be sterilised as described above) and push the baby’s head up into the uterus. Then lift and deliver the head (see Figure 2.13.24).

FIGURE 2.13.24 Delivering the deeply engaged head abdominally with assistance via the vagina.

Method of delivery of fetus

The head delivers into the wound in a transverse direction, so gentle rotation with lateral flexion of the neck is required. In the following circumstances this can be difficult or impossible:

- Caesarean section in the second stage of labour following failed forceps/ventouse, when the head is very low
- occipito-posterior position
- impacted breech
- transverse lie
- prematurity and oligohydramnios where the lower segment is poorly formed and thick.

Manoeuvres that may help include the following:

- an assistant can disengage and push the presenting part upwards from the vagina
- modified lithotomy position with a combined abdomino-vaginal approach
- application of forceps when the head is free
- grasping a foot and delivering by the breech in the presence of transverse lie
- uterine relaxation.

Other practical points

- If there is posterior placenta praevia, open the uterus and reach in below the placenta, separating it upwards until the membranes are reached, and then deliver the baby. If the placenta is anterior, as soon as you cut into it there will be haemorrhage from the fetus. It is vital that the cord is clamped as quickly as possible.
- In all cases of fetal distress, quick delivery is required.
- Suction the baby’s mouth and nose when delivered, especially if there is meconium-stained liquor.
- Deliver the shoulders and body.
- Give oxytocin 5 units IV to aid delivery of the placenta, and then infuse 40 units in 500 mL of IV fluids (Ringer-lactate or Hartmann’s solution) over 4 hours if there is a risk of haemorrhage.
- Clamp and cut the umbilical cord.
- Keep gentle traction on the cord and massage the uterus through the abdomen.
- Deliver the placenta and membranes.

Delivery of the placenta

Spontaneous delivery after oxytocin has been given on delivery of the baby, and with controlled cord traction, is preferred to manual removal. Manual delivery of the placenta may be necessary, and routine checking of the cavity is essential to ensure that no retained placental fragments or membranes are present, as this cannot always be ensured by inspection of the placenta.

Closing the uterine incision

General principles

- Meticulous handling with re-approximation of tissues.
- Avoid strangulating tissue with tight knots.
- Haemostasis: isolate and ligate major bleeding vessels.
- Grasp minimal tissue while cauterising.

Exteriorisation of the uterus

This may be necessary in order to visualise the lower segment for suturing, and it may thereby reduce blood loss. It may cause vagal stimulation leading to bradycardia, and may be uncomfortable if performed under spinal or epidural anaesthesia. It is important to inform the anaesthetist of the need to exteriorise.
Suturing of the uterus
Sutures of polyglycolic acid suture are preferred to catgut. Use of thick suture causes more foreign body and tissue reaction, but if too thin it will cut through the myometrium. Usually the uterus is closed in two layers.

- Grasp the corners of the uterine incision with clamps.
- Grasp the bottom edge of the incision with clamps. Make sure that it is separate from the bladder.
- Look carefully for any extensions of the uterine incision.
- Repair the incision and any extensions with a continuous locking stitch using a robust absorbable suture such as No. 1 or 0 chromic catgut, polyglycolic acid or Vicryl (see Figure 2.13.25).
- A routine second layer of sutures is usually undertaken for the uterine incision, as it may help to reduce the risk of haemorrhage and subsequent uterine rupture through the scar.
- If there is any persisting bleeding from the incision site, close with figure-of-eight sutures.

![FIGURE 2.13.25 Closing the uterine incision.](image)

Peritoneal closure of parietal and visceral peritoneum is safe. Healing and strength of the wounds are not affected. The duration of surgery is reduced and there is less tendency to form intra-abdominal adhesions.

Rectus sheath
Standard single-layer closure with a synthetic delayed absorbable suture is recommended. Place each suture 1 cm from the wound edge to allow healing. In vertical incisions, mass closure using synthetic permanent suture is appropriate, but the stitch should not be locking, as this increases post-operative pain and wound hernias.

Subcutaneous tissue and skin closure
Closure of Camper’s fascia with continuous suture reduces the rate of wound disruption. The routine use of closed suction drainage in non-obese patients is not recommended.

Subcuticular or interrupted skin suturing may be undertaken. The type of suture material used for subcuticular suturing does not affect the outcome. Interrupted mattress sutures are recommended in obese patients and in cases where delayed healing is anticipated. Placement of clips has similar results.

If a Couvelaire uterus (swollen and discoloured by blood) is seen at Caesarean section, as a result of major placental abruption, close it in the normal manner and monitor closely for 48 hours after delivery.

- Closing the abdomen. Look carefully at the uterine incision before closing the abdomen. Make sure that there is no bleeding and the uterus is firm. Use a sponge to remove any clots inside the abdomen.
  - Examine carefully for any injuries to the bladder, and repair these.
  - If there are signs of infection, pack the subcutaneous tissue with gauze and insert loose 0 catgut (or polyglycolic) sutures. Delay closure of the skin until the infection has cleared.
  - If there are no signs of infection, close the skin with vertical mattress sutures of 3-0 nylon (or silk) and apply a sterile dressing.
  - Gently push on the abdomen over the uterus to remove clots from the uterus and vagina. Swab out the vagina to remove any clots. Any bleeding subsequently noted will therefore be recognised as fresh loss.
  - Ensure that there are no instruments or swabs left in the abdomen. One way of achieving this is to have a black or white board in the operating theatre on which is documented every swab or instrument used during the operation, and to ensure that these are available when the abdomen is closed.

Types of needle and suture material
In resource-limited settings it is often only possible to find two types of suture material for a Caesarean section, for example:
1. chromic catgut which can be used on a round-bodied needle for the uterus
2. polyglycolic acid which can be used on a round-bodied needle for the uterus and on a cutting/round-bodied needle for the rectus sheath and the skin.

Complications of Caesarean section
In cases of previous Caesarean section, other abdominopelvic operations or pelvic sepsis, bowel may be adherent to the undersurface of the peritoneum. Extra care must then be taken when opening the peritoneum, dividing it transversely under direct vision when possible.

In such cases, the peritoneum should be opened with a knife or scissors rather than with the fingers.

Bladder may be adherent to the lower segment, and care must be taken to push the bladder well down in order to avoid trauma to the bladder or ureters. Emptying the bladder pre-operatively reduces the likelihood of bladder damage.

Fibroids may obstruct access to the lower segment. A decision has to be made as to whether to make the uterine incision above, below or around the fibroids, or to cut through them. Alternatively, a classical (midline) uterine incision may be necessary, with its attendant greater risk of scar rupture in future pregnancies.

In cases of placenta praevia, the placenta is encountered on making the lower segment incision. This may lead to excessive bleeding.

The placenta may be morbidly adherent to a previous Caesarean section scar (placenta accreta). It is important not to traumatise the uterine wall by delivering the placenta piecemeal. It may be necessary to leave the adherent fragment in situ, and monitor carefully for bleeding and signs of infection. Postpartum hysterectomy may be required in this situation.

Caesarean section at full dilatation may be complicated by difficulty in dis-impacting the fetal head. An assistant should push firmly but gently from the vagina using sterile...
gloves and obstetric chlorhexidine cream on their fingers. Once the head is dis-impacted, fundal pressure is required.

Excessive bleeding at Caesarean section is most commonly due to uterine atony, lateral extension of the lower segment incision, or a combination of these two factors (see Section 2.5.D.iv on postpartum haemorrhage).

Where a trial of forceps has taken place prior to Caesarean section, care must be taken to identify and suture any vaginal tears, which may bleed heavily.

**Uncontrolled bleeding**

**Primary haemorrhage**

The cause of the haemorrhage, whether due to atony or trauma, should be determined. Help should be sought from senior colleagues (if available). The anaesthetist must be informed about the haemorrhage, and blood should already be cross-matched (at least 4 to 6 units). In cases of vertical extension into the vagina, suturing should be attempted from the lowest part of the tear before suturing the transverse incision. Massage the uterus to expel blood and blood clots. The presence of blood clots will inhibit effective uterine contractions.

**Broad ligament haematomas**

The leaves of the broad ligament need to be opened and the ureters should be identified before suturing the bleeding point.

**Atonic uterus**

If the uterus is atonic, massage it, continue to infuse oxytocin, and give:

- Ergometrine 200–500 micrograms IM (must not be used if the patient has hypertension), if the mother is fully conscious
- And/or misoprostol 400–600 micrograms sublingually or orally or 800 micrograms rectally if the mother is drowsy or unconscious.

These drugs can be given together or sequentially.

Transfuse as necessary.

Have an assistant apply firm pressure with a fist over the aorta to reduce the bleeding until the source of bleeding can be found and stopped.

If bleeding is not controlled, see Section 2.5.D.iv for details of the many methods of treatment that can be adopted. They include a hysterectomy.

**Breech delivery at Caesarean section**

The fetal back should always be upwards during breech delivery. Gentle rotation of the fetal trunk may be required, being careful to grasp the bony pelvis and legs, thereby avoiding traumatising the fetal abdomen.

The baby is delivered as if performing a breech extrac- tion vaginally. In summary, place the fingers of each hand into the groin of the baby and lift out the buttocks and legs.

Deliver the arms by the Løvset's manoeuvre; legs and the body up to the shoulders, then deliver the arms.

Flex the head and deliver using the Mauriceau–Smelle–Veit manoeuvre.

Complete the delivery as for a vaginal delivery.

**Transverse lie delivery at Caesarean section**

Assess the position of the fetus, including the position of the head, before opening the uterus. If the membranes are intact and there is liquor around the fetus, try to convert the transverse lie to a longitudinal lie.

- If the back is up (near the top of the uterus), reach into the uterus and find the baby's ankles.
- Grasp the ankles and pull gently through the incision to deliver the legs and complete the delivery as for a breech baby.
- If the back is down, a high vertical uterine incision may be preferred, but this is too late if only discovered once inside the uterus.
- Following the incision, reach into the uterus and find the feet. Pull them through the incision and complete the delivery as for a breech baby.
- To repair the vertical incision, three layers of suture will be needed.

**Placenta praevia**

If a low anterior placenta is encountered, find an edge of the placenta and move the placenta laterally or incise through it and deliver the fetus.

- An ultrasound scan prior to the operation will help the operator to judge whether it will be possible to manually displace the placenta in order to access the amniotic cavity.
- After delivery of the baby, if the placenta cannot be detached manually, the diagnosis is placenta accreta, occasionally seen at the site of a previous Caesarean scar.
- There are two approaches to this problem. The placenta can be left in situ to degenerate spontaneously, or a hysterectomy may be performed. If the former approach is followed, a careful watch will need to be kept for any signs of infection in the postnatal period, and prophylactic antibiotics will be required.
- Women with placenta praevia are at high risk of postpartum haemorrhage.
  - If there is bleeding at the placental site, under-run the bleeding sites with chromic catgut (or polyglycolic/Vicryl) sutures before closing the wound.
  - It may also be helpful to compress the lower segment vessels by packing the uterus or inserting a condom-catheter.
  - Watch for bleeding in the immediate postpartum period and take appropriate action.

**Post-operative care**

- Bowel function should be normal after 12 hours.
- If progress is uncomplicated, give liquids immediately and solids when the patient is passing gas per rectum.
- If there is infection, obstructed labour or uterine rupture, wait until bowel sounds reappear before giving oral fluids.
- Keep a dressing on the wound for 24 hours to ensure re-epithelialisation.
- If blood is leaking, reinforce the dressing or replace it with a new one if it is more than half soaked.

If bleeding occurs:

- Massage the uterus to expel blood and blood clots. The presence of blood clots will inhibit effective uterine contractions:
  - Give oxytocin 5 units IV slowly or 10 units IM and then infuse 40 units in 500 mL of IV fluids (Ringer-lactate or Hartmann’s solution) over 4 hours.
or ergometrine 500 micrograms IM or misoprostol 400 micrograms sublingually or orally provided that the mother is fully conscious
or misoprostol 800 micrograms rectally if the mother is drowsy or unconscious.

These drugs can be given together or sequentially.
- If there are signs of infection or the mother has a fever, give a combination of antibiotics until she has been fever-free for 48 hours:
  - Ampicillin 2 grams IV every 6 hours
  - plus gentamicin 80 mg IV/IM every 8 hours or 5 mg/kg body weight IV/IM once every 24 hours
  - plus metronidazole 500 mg IV every 8 hours.
- Give appropriate analgesic drugs.

Discharge the mother home when her temperature has been normal for at least 24 hours, and she is mobilising and able to eat and drink normally.

Symphysiotomy

Background
Symphysiotomy is performed for the management of cephalo–pelvic disproportion in selected situations in resource-limited countries or ill-equipped obstetric units. It may be required for the delivery of the trapped after-coming head with a breech delivery, or for shoulder dystocia. Symphysiotomy results in a temporary increase in pelvic diameter (up to 2 cm) by surgically dividing the cartilage of the symphysis under local anaesthesia. Symphysiotomy in combination with vacuum extraction is a life-saving procedure in areas where Caesarean section is not immediately available.

Symphysiotomy leaves no uterine scar, so the risk of ruptured uterus in subsequent pregnancies is not increased. Caesarean section can have high morbidity and mortality rates in resource-limited healthcare facilities. Mortalities of up to 5% and uterine scar rupture in 7% of subsequent pregnancies have been reported. Symphysiotomy has a very low maternal mortality, with 3 deaths reported in a series of 1752 symphysiotomies. These deaths were unrelated to the procedure.

However, symphysiotomy has risks of complications, which include urethral and bladder injury, infection, pain and long-term difficulty in walking. Therefore it should only be performed when there is no safe alternative.

Symptoms following symphysiotomy include pain in the symphysis pubis and groin, hip or thigh pain, backache and stress incontinence.

The majority of mothers (73%) will have an uncomplicated vaginal delivery in a subsequent pregnancy.

Indications for symphysiotomy
- Trapped after-coming head in breech delivery, in the presence of full cervical dilatation.
- Shoulder dystocia, where all other methods have failed.
- A live fetus with vertex presentation and presumed cephalo–pelvic disproportion (i.e. prolonged second stage, no head descent after adequate augmentation, and failure or anticipated failure of vacuum extraction alone).
- At least one-third of the fetal head should have entered the pelvic brim.
- The cervix should be fully dilated, and the head should be at –2 station or no more than 3/5 above the symphysis pubis, with no overriding of the head above the symphysis.

Technique

Ask two assistants to support the woman’s legs with her thighs and knees flexed. The thighs should be abducted no more than 45 degrees from the midline, not the lithotomy position.

Abduction of the thighs more than 45 degrees from the midline may cause tearing of the urethra and bladder.
- Infiltrate the anterior, superior and inferior aspects of the symphysis with 1% lignocaine solution.
  - Aspirate (pull back on the plunger) to make sure that no vessel has been penetrated. If blood is returned in the syringe with aspiration, remove the needle. Recheck the position carefully and try again. Never inject if blood is aspirated.
- Infiltrate the local anaesthetic and wait for it to take effect.
- Insert a firm sterile urinary catheter to identify the urethra.
- Apply antiseptic solution to the suprapubic skin.
- Wearing sterile gloves:
  - Place the index and middle fingers of the left hand into the vagina.

![Symphysiotomy Technique Diagram](image-url)
Using the index finger, push and hold the catheter, and with it the urethra, away from the midline to the patient’s right side.

- The middle finger lies centrally under the symphysis to guide the incision.

- With the other hand, use a firm-bladed scalpel to make a vertical incision over the symphysis.

- Cut down through the cartilage joining the two pubic bones until the pressure of the scalpel blade is felt on the finger in the vagina.

- The symphysis pubis is incised in the midline at the junction of the upper and middle thirds. The point of the scalpel will be felt impinging on the vagina by the underlying finger of the left hand.

- The upper third of the uncut symphysis is used as a fulcrum against which the scalpel is levered to incise the lower two-thirds of the symphysis.

- The scalpel is then removed and rotated through 180 degrees, and the remaining upper third of the symphysis is cut.

- Once the symphysis has been divided, the pubic bones will separate.

1 The symphysis should open as wide as the operator’s thumb. A large episiotomy is required to relieve tension on the anterior vaginal wall. Usually a vacuum extractor will be used to pull the fetus downward at this point.

2 Delivery of the head and trunk of the baby occurs in a downward direction, taking care to avoid the temptation to lift the baby up until it is completely delivered.

3 After delivery of the baby and placenta, the symphysis is compressed between the thumb above and the index and middle fingers below for several minutes in order to express blood clots and promote haemostasis.

4 There is no need to close the incision unless there is bleeding.

5 Reinsert the urinary catheter.

**Post-procedure care**

- If there are signs of infection or the mother has a fever, give a combination of antibiotics until she has been fever-free for 48 hours:
Section 2.13

— Ampicillin 2 grams IV every 6 hours
— plus gentamicin 80 mg IV/IM every 8 hours or 5 mg/kg body weight IV/IM once every 24 hours
— plus metronidazole 500 mg IV every 8 hours.

Give appropriate analgesia.

Apply a binder or sheet or elastic strapping across the front of the pelvis from one iliac crest to the other to hold the pelvis together to aid pelvic healing and reduce pain. Nurse the woman on her side to allow gravity to aid pelvic healing.

Leave the urinary catheter in for at least 5 days.

Encourage oral fluids to ensure a good urinary output.

Encourage bed rest for 7 days after discharge from hospital.

If long-term walking difficulties and pain occur (2% of cases), treat them with physiotherapy.

Induction of labour for intrauterine death in the second or third trimester

See Section 2.6.B.

Destructive operations

Background

Destructive procedures are undertaken when a vaginal delivery must occur because:

- skilled staff are not available to carry out what may be a difficult or dangerous Caesarean section
- in neglected obstructed labour there is a risk of overwhelming infection following Caesarean section
- of the implications of a uterine scar for future pregnancies
- the patient does not give consent to Caesarean section.

Reasons for fetal death in obstructed labour

- Strong and continuous contractions (sometimes made worse by inappropriate use of oxytocic drugs or other non-prescription uterotonic drugs) interfere with placental exchange.
- Excessive moulding of the head, in cephalic presentation, can lead to intracranial haemorrhage. In breech presentation the head may be trapped by an incompletely dilated cervix, or may not enter the pelvis because of disproportion.
- Prolapsed cord.
- Ascending infection, amnionitis and intrauterine infection due to prolonged ruptured membranes and labour, and/or unsterile vaginal examinations.
- Ruptured uterus.

Destructive operations

Before a destructive procedure is undertaken the fetus must be dead.

Ensure that the mother is adequately resuscitated.

Ruptured uterus must be excluded.

Ensure adequate analgesia or anaesthesia.

The procedure can be performed under general or regional anaesthesia, or sedation and analgesia with morphine, midazolam and/or ketamine.

General issues relating to destructive procedures

- The operator must be competent at destructive deliveries.
- Destructive operations are most safely done at full dilatation, but may be performed when the cervix is 7 cm or more dilated. If there is hydrocephaly, it is best to drain the CSF at diagnosis without waiting for full dilatation, as the hydrocephalic head may cause uterine rupture.
- The bladder must be catheterised.
- Post-delivery care includes continuous catheterisation of the bladder, IV antibiotics and IV fluids.

Craniotomy

Craniotomy is used for the delivery of a dead fetus with cephalic presentation when labour is obstructed. Usually the head is impacted in the pelvic brim. If the head is mobile, craniotomy may be difficult and Caesarean section may be safer (if circumstances are suitable).

The head may need to be dis-impacted from the pelvis to facilitate urinary catheterisation.

A 3 cm incision is made on the posterior aspect of the skull using Mayo scissors. The index finger of the left hand is inserted into the incision and the suture and fontanelle are identified. The scissors are then pushed though the fontanelle into the cavity of the skull. Thereafter the brain is evacuated and Kocher’s forceps are clamped on to the edges of the parietal bones. A weight is attached to the Kocher’s forceps with a length of bandage. The mother’s legs are taken out of the lithotomy stirrups and placed on two stools for support. Delivery will take place within a period ranging from a few minutes to several hours. This method can be used when the cervix is at least 8 cm dilated.
Breech presentation with an entrapped head and dead fetus
- Make an incision through the skin at the base of the neck.
- Insert a craniotome (or large pointed scissors or a heavy scalpel) through the incision and tunnel subcutaneously to reach the occiput.
- Perforate the occiput and open the gap as wide as possible.
- Apply traction on the trunk to collapse the skull as the head descends.

Craniocentesis (skull puncture) for hydrocephalus and obstructed labour and dead fetus
- Pass a large-bore spinal needle through the dilated cervix and the sagittal suture line or fontanelles of the fetal skull (see Figure 2.13.36).
- Aspirate the cerebrospinal fluid until the fetal skull has collapsed. Then allow normal delivery to proceed.

Craniocentesis with a fully dilated cervix
- Palpate for the location of the fetal head.
- Apply antiseptic solution to the suprapubic skin.
- Pass a large-bore spinal needle through the abdominal and uterine walls and through the hydrocephalic skull.

Craniocentesis with a closed cervix
- Palpate for the location of the fetal head.
- Apply antiseptic solution to the suprapubic skin.
- Pass a large-bore spinal needle through the abdominal and uterine walls and through the hydrocephalic skull.

**FIGURE 2.13.33** X-shaped fetal skull incision.

**FIGURE 2.13.34** Perforating the skull: a life-saving operation. Your assistant is pushing the baby’s head into the mother’s pelvis. You have made an X-shaped incision in the skin of the baby’s scalp. You have found a suture line, and are pressing a strong pair of scissors into it.

**Breech presentation with an entrapped head and dead fetus**

**Craniocentesis (skull puncture) for hydrocephalus and obstructed labour and dead fetus**

**FIGURE 2.13.35** Hydrocephaly. A child with one abnormality often has several others as well.

**FIGURE 2.13.36** Draining a hydrocephalus. (a) Draining the vertex. (b) Draining the occiput. (c) Draining through a meningo-myelocoele. (d) Draining through the mother’s abdomen.
Aspirate the cerebrospinal fluid until the fetal skull has collapsed. Then allow vaginal delivery to proceed.

**Craniocentesis in breech where the hydrocephalic head is stuck and the fetus is dead**
- When the rest of the body has been delivered, insert a large-bore spinal needle through the dilated cervix and foramen magnum.
- Aspirate the cerebrospinal fluid and deliver the after-coming head as in breech delivery.

This can be managed similarly, by craniotomy with perforation of the head through the occiput. Where there is hydrocephalus and accompanying spina bifida, CSF can be withdrawn by exposing the spinal canal and passing a catheter into the canal and up into the cranium. Alternatively, the hydrocephalic head can be decompressed transabdominally using a spinal needle.

**Decapitation**

This procedure is summarised in Figure 2.13.37.

In cases of neglected obstructed labour with shoulder presentation and a dead fetus, decapitation is the treatment of choice. The lower uterine segment is very vulnerable. If the fetus is small, the neck can easily be severed with stout scissors. However, for the larger fetus, where the neck is not easily accessible, the Blond–Heidler decapitation tool is probably the safest instrument. If possible, an arm of the fetus is brought down in order to facilitate access and exposure of the neck. The saw is threaded around the fetal neck, and by keeping the handles at the ends of the saw close together, injury to the vagina is prevented and the neck can be severed with a few firm strokes. Delivery of the trunk is straightforward, and the after-coming head is delivered by grasping the stump with a heavy vulsellum.

**Cleidotomy**

Cleidotomy is indicated where the impacted shoulders prevent delivery of the dead fetus. The most accessible clavicle is divided first using stout scissors.

**Evisceration**

This is sometimes necessary for an abdominal tumour or very large fetus following craniotomy. An incision is made in the abdomen or thorax. The viscera are then extracted digitally. Once the bulk of the fetus has been reduced the fetus can be extracted easily.

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**FIGURE 2.13.37** Decapitation of dead fetus. (a) Fix the saw to the thimble and push it over the neck. (b) Remove the thimble and fix the handles to each end of the saw. (c) Saw to and fro. (d) Grasp the stump of the neck.
Complications of destructive operations
Instruments or sharp pieces of bone may cause a vesico-vaginal fistula. The vagina, cervix and perineum must therefore be carefully examined after the procedure.

Alternative to destructive operations
Symphysiotomy with episiotomy may avert the need for destructive operations if the fetus is still alive. Caesarean section may be preferred, if available, especially if the operator is inexperienced in performing destructive procedures. However, caesarean section will create a risk for scar rupture during a subsequent pregnancy and in low resource settings this could result in maternal and fetal death.

Post-procedure care
- After delivery, examine and repair any tears to the cervix or vagina, or undertake episiotomy repair.
- Leave a self-retaining catheter in place until bladder injury has been excluded.
- Ensure adequate fluid intake and urinary output.

Episiotomy
Episiotomy should be considered in the case of:
- complicated vaginal delivery (e.g. breech, shoulder dystocia, forceps, vacuum delivery)
- scarring from female genital cutting
- fetal distress
- delay in the second stage
- previous third- or fourth-degree tears
- where significant perineal trauma is anticipated if it is not performed.

Procedure
- Apply antiseptic solution to the perineal area.
- Use local infiltration with 1% lignocaine. Make sure that there are no known allergies to lignocaine or related drugs.
- Infiltrate beneath the vaginal mucosa, beneath the skin of the perineum and deeply into the perineal muscle (see Figure 2.13.38) using 5–10mL of 1% lignocaine solution.
- Aspirate (pull back on the plunger) to be sure that no vessel has been penetrated. If blood is returned in the syringe with aspiration, remove the needle. Recheck the position carefully and try again. Never inject if blood is aspirated.
- After local anaesthetic infiltration, wait for 2 minutes and then pinch the incision site with forceps. If the mother feels the pinch, wait a further 2 minutes and then retest.

TABLE 2.13.1 Possible situations of fetal death and the relevant procedures

<table>
<thead>
<tr>
<th>Clinical situation</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cephalic presentation:</td>
<td></td>
</tr>
<tr>
<td>Head &lt; 60% above the pelvic brim</td>
<td>Craniotomy</td>
</tr>
<tr>
<td>Head free or &gt; 60% palpable</td>
<td>Caesarean section</td>
</tr>
<tr>
<td>Hydrocephalus</td>
<td>Perforation before full dilatation</td>
</tr>
<tr>
<td>Obstruction due to abdominal tumour</td>
<td>Embryotomy if the abdomen is accessible, otherwise Caesarean section Cleidotomy</td>
</tr>
<tr>
<td>Impacted shoulders</td>
<td></td>
</tr>
<tr>
<td>Breech presentation:</td>
<td></td>
</tr>
<tr>
<td>Obstruction due to after-coming head</td>
<td>Perforation of the head</td>
</tr>
<tr>
<td>Obstruction due to abdominal tumour</td>
<td>Embryotomy</td>
</tr>
<tr>
<td>Impacted shoulders</td>
<td>Cleidotomy</td>
</tr>
<tr>
<td>Transverse or oblique lie:</td>
<td></td>
</tr>
<tr>
<td>Shoulder presentation or arm prolapse</td>
<td>Decapitation</td>
</tr>
<tr>
<td>Access to fetal neck difficult</td>
<td>Caesarean section</td>
</tr>
<tr>
<td>Ruptured uterus</td>
<td>Laparotomy – repair/ hysterectomy</td>
</tr>
<tr>
<td>Gross disproportion</td>
<td>Caesarean section</td>
</tr>
</tbody>
</table>

FIGURE 2.13.38 Infiltration of the perineum with local anaesthetic.

Do not perform an episiotomy until the perineum is thinned out and 3–4 cm of the baby’s head are visible during a contraction.

Performing an episiotomy will cause bleeding, so it must not be done too early.

1. Wearing disinfected gloves, place two fingers between the baby’s head and the perineum.
2. Use scissors to cut the perineum about 3–4 cm in the medio-lateral direction (see Figure 2.13.39). It is essential that the episiotomy cut is not made where, if it runs into a tear, it involves the anal sphincter. That is, it must be at an angle away from the anus, as shown in Figure 2.13.39.
3. Control the baby’s head and shoulders as they deliver, ensuring that the shoulders have rotated to the midline to prevent an extension of the episiotomy.
4. Carefully examine for extensions and tears, and repair them (see below).

Repair of episiotomy
It is important that absorbable sutures or Vicryl are used for closure. Polyglycolic sutures are preferred to chromic catgut because of their tensile strength, non-allergenic properties and lower risk of infection and episiotomy breakdown. However, chromic catgut is an acceptable alternative.

Apply antiseptic solution to the area around the episiotomy.

- If the episiotomy is extended (torn) through the anal sphincter or rectal mucosa, which should not happen if the original cut has been away from the vertical

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Section 2.13

Repair of cervical tears

- If the mother is bleeding heavily it may be best to resuscitate and then pack the tear with sterile gauze. Bimanual compression may be required. Ensure that whoever repairs this is experienced. This might need referral to another hospital.
  - Repair only when the mother is stable and most of the bleeding has stopped, unless there is heavy ongoing blood loss despite compression in which case repair needs to be undertaken urgently while resuscitation continues
  - Apply antiseptic solution to the vagina and cervix.
- Anaesthesia is not required for most cervical tears.
  - For tears that are high and extensive, give morphine 10 mg IV slowly over 5 minutes (provided that shock is not present), or use ketamine.
- Ask an assistant to massage the uterus and provide fundal pressure.
- Gently grasp the cervix with ring or sponge forceps.
  - Apply the forceps on both sides of the tear and gently use the forceps to pull each part of the cervix down in turn so that the entire cervix is examined.
  - There may be several tears.
- One way of finding a high tear is to insert a suture as high as possible and then use it to provide traction to work up to the apex to obtain haemostasis, and then to work downward towards the introitus.
- Close the cervical tears with a continuous polyglycolic/Vicryl suture starting at the apex (upper edge of tear), which is often the source of bleeding (see Figure 2.13.40).
- If a long section of the rim of the cervix is tattered and bleeding, under-run it with a continuous polyglycolic/Vicryl suture. Often if the bleeding is persistent but mild, compressing the ragged edges with a sterile pack is the most effective way of halting the bleeding, if no specific delineated tear is identified.
- If the apex is difficult to reach and ligate, it may be possible to grasp it with artery or ring forceps. Leave the forceps in place for 4 hours.
  - Do not persist in attempts to ligate the bleeding points, as this may increase the bleeding.
  - After 4 hours, open the forceps partially but do not remove.
  - After another 4 hours, remove the forceps completely.
- A laparotomy may be required to repair a cervical tear that has extended beyond the vaginal vault.

Complications of episiotomy

1. Haematoma. If this occurs, open and drain it. If there are no signs of infection and bleeding has stopped, reclose the episiotomy.
2. If there are signs of infection, open and drain the wound. Remove infected sutures and debride the wound:
   - If the infection is mild, antibiotics are not required.
   - If the infection is severe but does not involve deep tissues, give a combination of antibiotics:
     - Amoxicillin 500 mg orally four times a day for 5 days
     - Plus metronidazole 400 mg orally three times a day for 5 days.
   - If the infection is deep and involves muscles, give a combination of antibiotics until the necrotic tissue has been removed and the mother has been fever-free for 48 hours:
     - Penicillin G, 2 million units IV every 6 hours
     - Plus gentamicin 80 mg IV/IM every 8 hours or 5 mg/kg body weight IV/IM once every 24 hours
     - Plus metronidazole 500 mg IV every 8 hours.
   - When the mother has been fever-free for 48 hours, give:
     - Amoxicillin 500 mg orally four times a day for 5 days
     - Plus metronidazole 400 mg orally three times a day for 5 days.

Necrotic tissue requires wide surgical debridement. Perform secondary closure in 2 to 4 weeks (depending on resolution of the infection).
Manual removal of the placenta

If the placenta does not separate within 1 hour of delivery, or immediately if there is heavy bleeding:

- start an IV infusion
- ensure that the bladder is emptied either by the mother or by catheterisation
- give a slow IV injection of ketamine (1–2 mg/kg or 50–100 mg) or morphine (10 mg), ideally in the presence of an anaesthetist
- give a single dose of prophylactic antibiotics:
  - ampicillin 2 grams IV plus metronidazole 500 mg IV
  - or cefotaxime 1 gram IV plus metronidazole 500 mg IV
- Ensure full aseptic drapes.
- Hold the umbilical cord with a clamp. Pull the cord gently until it is taut.
- Wearing sterile gloves (ideally covering the forearms) insert a hand into the vagina and follow the cord up into the uterus until you reach the edge of the placenta (see Figure 2.13.41). If the cervix is closed, gentle pressure with one or two fingers will usually relax it and make it open.
- Let go of the cord with the other hand and move the hand up over the abdomen in order to support the fundus of the uterus and to provide counter-traction during removal to prevent inversion of the uterus (see Figure 2.13.42).

If uterine inversion occurs, reposition the uterus immediately.

- Move the fingers of the hand laterally until the edge of the placenta is located.
- If the cord has been detached previously, insert a hand into the uterine cavity.
  - Explore the entire cavity until a line of cleavage is identified between the placenta and the uterine wall.

FIGURE 2.13.41 Entering the uterus along the cord.

FIGURE 2.13.42 Supporting the fundus while detaching the placenta.

- Reach the placenta from the implantation site by keeping the fingers tightly together and using the edge of the hand to gradually make a space between the placenta and the uterine wall.
- Proceed slowly all around the placental bed until the whole placenta is detached from the uterine wall.
- If the placenta does not separate from the uterine surface by gentle lateral movement of the fingertips at the line of cleavage, suspect placenta accreta.
  - Consider laparotomy and possible subtotal hysterectomy.
  - Alternatively, the placenta can be left in situ to spontaneously degenerate.
  - The main risk is that of infection and delayed haemorrhage, and follow-up needs to be maintained to assess the woman for signs of sepsis.
- Hold the placenta and slowly withdraw the hand from the uterus, bringing the placenta with it (see Figure 2.14.43).
- With the other hand, continue to provide counter-traction to the fundus by pushing it in the opposite direction to the hand that is being withdrawn.

FIGURE 2.13.43 Withdrawing the hand plus the placenta from the uterus.

- Palpate the inside of the uterine cavity to ensure that all placental tissue has been removed.
- Give oxytocin 40 units in 500 mL of IV fluids (Ringer-lactate or Hartmann’s solution) over 4 hours.
- Ask an assistant to massage the fundus of the uterus to encourage a tonic uterine contraction.
- If there is continued heavy bleeding, give 10 units of oxytocin IM. If this does not work, try ergometrine 200–500 micrograms (not if there is or has been hypertension) IM and, if that does not work, give misoprostol rectally as 4 × 200 microgram tablets or pessaries (800 micrograms total) or, if the woman is conscious, misoprostol orally 3 × 200 microgram tablets.
- Examine the uterine surface of the placenta to ensure that it is complete. If any placental lobe or tissue is missing, explore the uterine cavity under strict surgical asepsis to remove it.
- Examine the mother carefully and repair any tears to the cervix or vagina, or undertake episiotomy repair.

Problems

If the placenta is retained due to a constriction ring or if hours or days have passed since delivery, it may not be possible to get the entire hand into the uterus. Consider using a general anaesthetic to help to relax the cervix, and extract the placenta in fragments using two fingers or ovum forceps, but be very careful not to penetrate the soft uterine wall. If hours or days have passed and/or signs of sepsis are present, treat for puerperal sepsis with a full course of IV antibiotics (see Section 2.5.G).
**Post-procedure care**

Observe the mother closely until the effect of IV analgesia has worn off.

- Monitor the vital signs (pulse, blood pressure, respiration and temperature) every 15 minutes for the first hour and then every 30 minutes for the next 6 hours or until the patient is stable.
- Palpate the uterine fundus to ensure that the uterus remains contracted.
- Check for excessive lochia.
- Continue infusion of IV fluids.
- Transfuse as necessary, especially if the mother is severely anaemic before the procedure.
- Warn the mother of the increased risk of this occurring at the time of the next pregnancy, and therefore advise her to deliver in a well-equipped comprehensive EmOC facility.

**Bilateral pudendal nerve block**

**Indications**

This technique is indicated for some instrumental deliveries, for repair of larger tears, and for craniotomy or craniocentesis.

A pudendal nerve block targets the pudendal nerve as it enters the lesser sciatic foramen, about 1 cm inferior and medial to the attachment of the sacrospinous ligament to the ischial spine. The aim is to block the nerve proximal to its terminal branches. Here the nerve is medial to the internal pudendal vessels. The transvaginal approach is described here, as it is the most reliable.

Dilute 20 mL of 1% lidocaine to 40 mL with Ringer-lactate or Hartmann’s solution, to make a solution of 0.5%. This is used starting with 15 mL on each side. The remaining 10 mL can be used to infiltrate the perineum during repairs if these are needed.

Adrenaline is not used with the lidocaine.

Ensure that IV access is in place.

The needle used should be around 15 cm in length and 20–22 gauge.

The procedure must be undertaken with surgical sterility after cleaning the vagina with chlorhexidine (Hibitane) obstetric cream, and always using sterile gloves.

Resuscitation equipment and medications should always be readily available in case an adverse reaction to the local anaesthetic occurs.

**Procedure**

Palpate the ischial spine through the vaginal wall.

A metal trumpet (see Figure 2.13.44) can facilitate the placement of the needle and limit the depth of submucosal penetration, but is not essential.

1. To perform a left-sided block, palpate the ischial spine with the index finger of the left hand, hold the syringe in the right hand, and guide the needle between the index finger and middle finger of the left hand toward the ischial spine (see Figure 2.13.45).
2. Place the end of the guide beneath the tip of the ischial spine.
3. Push the needle into the vaginal mucosa.
4. Aspirate to ensure that the needle is not in one of the pudendal blood vessels, which could be very dangerous if lidocaine is injected.
5. Inject 1 mL of local anaesthetic.
6. Advance the needle through the vaginal mucosa until it touches the sacrospinous ligament 1 cm medial and posterior to the ischial spine.
7. Aspirate to ensure that the needle is not in one of the pudendal blood vessels, which could be very dangerous if lidocaine is injected, and infiltrate with 3 mL of local anaesthetic.
8. Next, advance the needle further through the sacrospinous ligament for a distance of 1 cm until a loss of resistance is detected.
9. The tip now lies in the area of the pudendal nerve. At this point, the pudendal vessels lie just lateral to the pudendal nerve, so care must be taken to avoid intravascular administration. Aspirate to confirm that the needle placement is not intravascular prior to injecting lidocaine.
10. Inject another 3 mL of local anaesthetic solution into this region.
11 Subsequently, withdraw the needle into the guide and move the tip of the guide to just above the ischial spine.
12 At this new location, reinsert the needle through the mucosa and again inject 3 mL of local anaesthetic.

**Aspirate to confirm that the needle placement is not intravascular prior to injecting lidocaine.**

To block the right side of the pelvis, repeat these steps using the right hand to hold the needle and needle guide.

The block usually takes at least 5 minutes to become effective, and lasts for between 20 and 60 minutes. Check bilaterally for pain before starting the procedure.

A smaller repeat dose (up to 5 mL of 0.5% lidocaine) on each side can be used if an adequate block is not seen.

A **pudendal block does not provide adequate anaesthesia for deliveries that require uterine manipulation, postpartum examination and repair of the upper vagina and cervix, and manual exploration of the uterine cavity.**

Under these circumstances, the addition of intravenous narcotics or ketamine may be required.

**Vaginal examination in obstetrics**

Vaginal examination should be performed only if it is essential, and the risk of infection must be minimised by hygienic hand washing and the use of a new set of examination gloves. At all times it is important to preserve the patient’s dignity and privacy. In labour, a chlorhexidine obstetric cream can prevent ascending infection.

Always undertake abdominal palpation first.

Do not undertake vaginal examination if there is a possibility of placenta praevia, if there are ruptured membranes and the woman is not in labour, or if there is active herpes simplex infection in ruptured membranes unless the patient is in labour.

If you are using a speculum, offer to demonstrate it, explain how it is inserted and ensure that the correct size is used.

Document any blood loss, discharge and its characteristics, and any amniotic fluid and its characteristics. If female genital cutting is present, record this and describe the type.

Document the cervical length, position, dilatation, and application to the presenting part of the fetus. Determine if possible the presentation of the fetus and whether there is caput and/or moulding present. Evaluate pelvic size by examining the ischial spines and suprapubic arch.

At the end, provide a clean sanitary pad, auscultate the fetal heart, describe the results of the examination to the woman, and record the findings in the notes.