

Labour

Labour or human parturition is the physiological process that results in birth of a baby, delivery of the placenta and the signal for lactation to begin .

Normal labour requires observation and support and falls within the expertise of midwifery care.

Useful definitions when discussing the presenting part

- *Presentation* is the lowermost part of the fetus presenting to the pelvis. In more than 95% of cases the vertex is the presenting part and is called normal presentation. Any other presentation (e.g. face, brow, breech, and shoulder) is called malpresentation.
 - *Denominator* is the most definable peripheral landmark of the presenting part, i.e. occiput for the vertex, mentum for the face, and sacrum for the breech presentation.
 - *Position of the presenting part* is the relationship of the denominator to the fixed points of the maternal pelvis, i.e. sacrum posteriorly, pubic symphysis anteriorly, sacro-iliac joints posterolaterally, and ileo-pectineal eminences anterolaterally.
 - *Station* is the relationship of the most prominent leading part of the presenting part to the ischial spines expressed as $\pm 1,2,3\text{cm}$.
- In the vertex presentation more than 90% present in the occipito-anterior position, i.e. the occiput is in the anterior half of the pelvis and is called the normal position. If the occiput is pointing laterally or is in the posterior half of the pelvis, it is called malposition and is associated with deflexed head presenting a larger anteroposterior diameter of the vertex (11.5cm) and, hence, difficulties with progress of labour (Fig. 1.3).

- The first important step is to recognize when labour has started.
- Labour is then divided into three stages:
- the first stage begins with diagnosis of the onset of labour and is complete when full cervical dilatation has been reached;
- the second stage begins with full cervical dilatation and ends with birth of the baby; and the
- third stage begins with birth of the baby and ends with complete delivery of the placenta and membranes.

- An understanding of the physiological and anatomical principles involved in normal and abnormal labour is best summarized using the '3 Ps', which are the **powers, the passages and the passenger**

- The 'powers' refers to forces,
- firstly the contractions of the uterine muscle that result in passage of the fetus through the birth canal,
- and secondly the maternal effort of pushing in the second stage of labour.

- The 'passages' refers to the birth canal itself, which is made up of the bony pelvis, the muscles of the pelvic floor and the soft tissues of the perineum

- The 'passenger' refers to the fetus in terms of its **size** (small, average, large), **presentation** (that part of the fetus entering the pelvis first, e.g. vertex of head, face, brow or breech) and **position** (orientation of the presenting part in relation to the maternal pubic symphysis, e.g. occipito-anterior, occipito-posterior)

- When the 3Ps are favourable, normal labour is likely to ensue, resulting in an unassisted or spontaneous vaginal birth.
- When any of the 3Ps are unfavourable, labour is likely to be abnormal, resulting in the need for intervention and with that, an increased risk of morbidity or mortality

Physiology of labour

- The mechanisms underlying human parturition are **not fully understood** and differ from other animal models that have been studied. In particular, the process that initiates labour is poorly understood

- There are a number of important elements. The cervix, which is initially long, firm, and closed, with a protective mucus plug, must soften, shorten, thin out (effacement) and dilate for labour to progress.
- The uterus must change from a state of relaxation to an active state of regular, strong, frequent contractions to facilitate transit of the fetus through the birth canal

- Each contraction must be followed by a resting phase in order to maintain placental blood flow and adequate perfusion of the fetus.
- The pressure of the presenting part on the pelvic floor muscles as the fetus descends from the midpelvis to the pelvic outlet produces a maternal urge to push, enhanced further by stretching of the perineum.

- The onset of labour occurs when the factors that inhibit contractions and maintain a closed cervix diminish and are overtaken by the actions of factors that do the opposite.
- Both mother and fetus appear to contribute to this process.

The uterus

- Myometrial cells of the uterus contain filaments of actin and myosin, which interact and bring about contractions in response to an increase in intracellular calcium.
- Prostaglandins and oxytocin increase intracellular free calcium ions, whereas beta-adrenergic compounds and calcium-channel blockers do the opposite

- Separation of the actin and myosin filaments brings about relaxation of the myocyte;
- however, unlike any other muscle cell of the body, this actin–myosin interaction occurs along the full length of the filaments so that a degree of shortening occurs with each successive interaction.

- This progressive shortening of the uterine smooth muscle cells is called **retraction** and occurs in the cells of the upper part of the uterus.
- The result of this retraction process is the development of the thicker, actively contracting 'upper segment'.
- At the same time, the lower segment of the uterus becomes thinner and more stretched.

- Eventually, this results in the cervix being 'taken up' (effacement) into the lower segment of the uterus so forming a continuum with the lower uterine segment .
- The cervix effaces and then dilates, and the fetus descends in response to this directional force.

- It is essential that the myocytes of the uterus contract in a coordinated way.
- Individual myometrial cells are laid down in a mesh of collagen. There is cell-to cell communication by means of gap junctions, which facilitate the passage of various products of metabolism and electrical current between cells.

- These gap junctions are absent for most of the pregnancy but appear in significant numbers at term.
- Gap junctions increase in size and number with the progress of labour and allow greater coordination of myocyte activity.

- Prostaglandins stimulate their formation, while beta-adrenergic compounds are thought to do the opposite.
- A uterine pacemaker from which contractions originate probably exists but has not been demonstrated histologically.

- Uterine contractions are involuntary in nature and there is relatively little extrauterine neuronal control.
- The frequency of contractions may vary during labour and with parity

- Throughout the majority of labour, they occur at intervals of 2–4 minutes and are described in terms of the frequency within a 10-minute period (i.e. 2 in 10 increasing to 4–5 in 10 in advanced labour).
- Their **duration** also varies during labour, from 30 to 60 seconds or occasionally longer.

- The **frequency** of contractions can be recorded on a cardiotocograph (CTG) using a pressure transducer (tocodynamometer) positioned on the abdomen at the fundus of the uterus.
- The **intensity** or amplitude of the intrauterine pressure generated with each contraction averages between 30 and 60 mmHg

The cervix

- The cervix contains myocytes and fibroblasts separated by a 'ground substance' made up of extracellular matrix molecules.
- Interactions between collagen, fibronectin and dermatan sulphate (a proteoglycan) during the earlier stages of pregnancy keep the cervix firm and closed.
- Contractions at this point do not bring about effacement or dilatation.

Under the influence of **prostaglandins**, and other humoral mediators, there is an increase in proteolytic activity and a reduction in collagen and elastin. Interleukins bring about a proinflammatory change with a significant invasion by neutrophils.

- Dermatan sulphate is replaced by the more hydrophilic hyaluronic acid, which results in an increase in water content of the cervix.
- This causes cervical softening or 'ripening', so that contractions, when they begin, can bring about the processes of effacement and dilatation

Hormonal factors

Progesterone maintains uterine relaxation by suppressing prostaglandin production, inhibiting communication between myometrial cells and preventing oxytocin release.

Oestrogen opposes the action of progesterone.

Prior to labour, there is a reduction in progesterone receptors and an increase in the concentration of oestrogen relative to progesterone.

Prostaglandin synthesis by the chorion and the decidua is enhanced, leading to an increase in calcium influx into the myometrial cells.

The production of **corticotrophin-releasing hormone** (CRH) by the placenta increases in concentration towards term and potentiates the action of prostaglandins and oxytocin on myometrial contractility.

The **fetal pituitary** secretes **oxytocin** and the fetal adrenal gland produces **cortisol**, which stimulates the conversion of progesterone to oestrogen.

It is unclear which of these hormonal changes actually initiates labour.

As labour becomes established, the output of oxytocin increases through the 'Fergusson reflex'. Pressure from the fetal presenting part against the cervix is relayed via a reflex arc involving the spinal cord and results in increased oxytocin release from the maternal posterior pituitary

Diagnosis of labour

The onset of labour can be defined as the presence of strong regular painful contractions resulting in progressive cervical change.

Therefore, a diagnosis of labour strictly speaking requires more than one vaginal examination after an interval and is made in retrospect.

In practice, the diagnosis is suspected when a woman presents with contraction-like pains, and is confirmed when the midwife performs a vaginal examination that reveals effacement and dilatation of the cervix.

Loss of a 'show' (a blood-stained plug of mucus passed from the cervix) or spontaneous rupture of the membranes (SROM) does not define the onset of labour, although these events may occur around the same time.

Labour can be well established before either of these events occurs, and both may precede labour by many days. Although much is understood about the physiology of labour in humans, the initiating process is still unclear.

It is certainly true, however, that the uterus and cervix undergo a number of changes in preparation for labour, which start a number of weeks before its onset.

Stages of labour:

Labour can be divided into three stages.

The definitions of these stages rely predominantly on anatomical criteria, and in real terms the moment of transition from first to second stage may not be apparent.

The important events when labour is normal are the diagnosis of labour and the maternal urge to push, which usually corresponds with full dilatation of the cervix and the baby's head resting on the perineum.

Defining the three stages of labour becomes more relevant if labour is not progressing normally.

The average duration of a first labour is 8 hours, and that of a subsequent labour 5 hours.

First labour rarely lasts more than 18 hours, and second and subsequent labours not usually more than 12 hours.

First stage

This describes the time from the diagnosis of labour to full dilatation of the cervix(10 cm).

The first stage of labour can be divided into two phases:

1.The 'latent phase' :
is the time between the onset of regular painful contractions and 3–4 cm cervical dilatation. During this time, the cervix becomes 'fully effaced'.

Effacement is a process by which the cervix shortens in length as it becomes incorporated into the lower segment of the uterus. The process of effacement may begin during the weeks preceding the onset of labour, but will be complete by the end of the latent phase

Effacement and dilatation should be thought of as consecutive events in the nulliparous woman, but they may occur simultaneously in the multiparous woman.

Dilatation is expressed in centimetres from 0 to 10 cm.

The duration of the latent phase is variable, and time limits are arbitrary.

However, it usually lasts between 3 and 8 hours, being shorter in multiparous women.

2. The second phase of the first stage of labour is called the 'active phase' and describes the time between the end of the latent phase (3–4 cm dilatation) and full cervical dilatation (10 cm).

It is also variable in length, usually lasting between 2 and 6 hours, shorter in multiparous women.

Cervical dilatation during the active phase occurs typically at 1 cm/hour or more in a normal labour (again, an arbitrary value), but is only considered abnormal if it occurs at less than 1 cm in 2 hours.

Second stage

This describes the time from full dilatation of the cervix to delivery of the fetus or fetuses.

The second stage of labour may also be subdivided into two phases:

1. The 'passive phase' describes the time between full dilatation and the onset of involuntary expulsive contractions. There is **no maternal urge to push** and the fetal head is still relatively high in the pelvis.

2. The **second phase** is called the 'active second stage'. There is a **maternal urge to push** because the fetal head is low (often visible), causing a reflex need to 'bear down'.

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. In a normal labour, the second stage is often diagnosed at this late point because the maternal urge to push prompts the midwife to perform a vaginal examination.

Conventionally, a normal active second stage should last no longer than 2 hours in a nulliparous woman and 1 hour in women who delivered vaginally before.

Again, these definitions are fairly arbitrary, but there is evidence that a second stage of labour lasting more than 3 hours is associated with increased maternal and fetal morbidity.

Use of epidural anaesthesia will influence the length and management of the second stage of labour.

A passive second stage of 1 or 2 hours is usually recommended to allow the head to rotate and descend prior to active pushing.

Third stage

This is the time from delivery of the fetus or fetuses until complete delivery of the placenta(e) and membranes.

The placenta is usually delivered within a few minutes of the birth of the baby.

A third stage lasting more than 30 minutes is defined as abnormal, unless the woman has opted for 'physiological management' in which case it is reasonable to extend this definition to 60 minutes

The duration of labour

There is no ideal length of labour for all women but morbidity increases when labour is too fast (precipitous) or too slow (prolonged).

From a psychological perspective, the morale of most women starts to deteriorate after 6 hours in labour, and after 12 hours the rate of deterioration accelerates.

There is a greater incidence of fetal hypoxia and need for operative delivery associated with longer labours. It is difficult to define prolonged labour, but it would be reasonable to suggest that labour lasting longer than 12 hours in nulliparous women and 8 hours in multiparous women should be regarded as prolonged.

Precipitous labour is defined as expulsion of the fetus within less than 3 hours of the onset of regular contraction

The mechanism of labour

This refers to the series of changes in position and attitude that the fetus undergoes during its passage through the birth canal.

It is described here for the vertex presentation and the gynaecoid pelvis.

The relation of the fetal head and body to the maternal pelvis changes as the fetus descends through the pelvis.

This is essential so that the optimal diameters of the fetal skull are present at each stage of the descent.

1.Engagement

The fetal head normally enters the pelvis in the transverse position or some minor variant of this, taking advantage of the widest pelvic diameter.

Engagement is said to have occurred when the widest part of the presenting part has passed successfully through the inlet.

Engagement has occurred in the vast majority of nulliparous women prior to labour, usually by 37 weeks' gestation, but not so for the majority of multiparous women.

The number of fifths of the fetal head palpable abdominally is used to describe whether engagement has taken place. If more than two-fifths of the fetal head is palpable abdominally, the head is not yet engaged

2.Descent

Descent of the fetal head is needed before flexion, internal rotation and extension can occur .

During the first stage and passive phase of the second stage of labour, descent of the fetus occurs as a result of uterine contractions.

In the active phase of the second stage of labour, descent of the fetus is assisted by voluntary efforts of the mother using her abdominal muscles and the Valsalva manoeuvre .

3.Flexion

The fetal head is not always completely flexed when it enters the pelvis. As the head descends into the narrower midpelvis, flexion occurs. This passive movement occurs, in part, due to the surrounding structures and is important in reducing the presenting diameter of the fetal head.

4.Internal rotation

If the head is well flexed, the occiput will be the leading point, and on reaching the sloping gutter of the levator ani muscles it will be encouraged to rotate anteriorly so that the sagittal suture now lies in the AP diameter of the pelvic outlet.

If the fetus has engaged in the OP position, internal rotation can occur from an OP position to an OA position. This long internal rotation may explain the increased duration of labour associated with OP position.

Alternatively, an OP position may persist, resulting in a 'face to pubes' delivery. Furthermore, the persistent OP position may be associated with extension of the fetal head and a resulting increase in the diameter presented to the pelvic outlet.

This may lead to obstructed labour and the need for instrumental delivery or even caesarean section.

5.Extension

Following completion of internal rotation, the occiput is beneath the symphysis pubis and the bregma is near the lower border of the sacrum. The well-flexed head now extends and the occiput escapes from underneath the symphysis pubis and distends the vulva. This is known as 'crowning' of the head.

The head extends further and the occiput underneath the symphysis pubis acts as a fulcrum point as the bregma, face and chin appear in succession over the posterior vaginal opening and perineal body.

This extension process, if controlled, reduces the risk of perineal trauma. However, the soft tissues of the perineum offer resistance, and some degree of tearing occurs in the majority of first births.

6. Restitution

When the head is delivering, the occiput is directly anterior. As soon as it crosses the perineum, the head aligns itself with the shoulders, which have entered the pelvis in the oblique position. This slight rotation of the occiput through one-eighth of the circle is called 'restitution'.

7. External rotation

In order to be delivered, the shoulders have to rotate into the direct AP plane (remember, the widest diameter at the outlet). When this occurs, the occiput rotates through a further one-eighth of a circle to the transverse position. This is called external rotation

Delivery of the shoulders and fetal body

When restitution and external rotation have occurred, the shoulders will be in the AP position. The anterior shoulder is under the symphysis pubis and delivers first, and the posterior shoulder delivers subsequently.

Although this process may occur without assistance, traction is often exerted by gently pulling the fetal head in a downward direction along the axis of the pelvis to help release the anterior shoulder from beneath the pubic symphysis.

Normally the rest of the fetal body is delivered easily, with the posterior shoulder guided over the perineum **by gentle upward traction** in the opposite direction, so delivering the baby on to the maternal abdomen.

Management of normal labour

Women are advised to contact their local labour suite or their community midwife if they think their waters may have broken (SR0M) or when their contractions are occurring every 5 minutes or more.

It is important to recognize that women have very different thresholds for seeking advice and reassurance.

The need for pain relief may result in admission to hospital before either of these two criteria is reached.

Whether at home or in hospital, the attending midwife will then make **an assessment of the situation based on the history and on clinical examination, and the preferences of the woman**

1. History

A detailed history should be taken including past obstetric history, history of the current pregnancy, relevant medical history and events leading up to hospital attendance.

Admission history

1. Previous births and size of previous babies.
2. Previous caesarean section.
3. Onset, frequency, duration and perception of strength of the contractions.
4. Whether membranes have ruptured and, if so, colour and amount of amniotic fluid lost.
5. Presence of abnormal vaginal discharge or bleeding.
6. Recent activity of the fetus (fetal movement).
7. Medical or obstetric issues of note (e.g. diabetes, hypertension, fetal growth restriction [FGR]).
8. Any special requirements (e.g. an interpreter or particular emotional/psychological needs).
9. Maternal expectations of labour and delivery?

2. General examination

It is important to identify women who have a **raised body mass index (BMI)**, as this may complicate the management of labour. The **temperature, pulse and blood pressure** must be recorded and a sample of **urine** tested for protein, blood, ketones, glucose and nitrates.

Abdominal examination

After the initial **inspection** for **scars** indicating previous surgery, it is important to determine the **lie** of the fetus (longitudinal, transverse or oblique) and the nature of the **presenting part** (cephalic or breech). If it is a cephalic presentation, the degree of **engagement** must be determined in terms of fifths palpable abdominally.

A head that remains high (five-fifths palpable) and unengaged (more than two-fifths palpable) is a poor prognostic sign for successful vaginal delivery.

If there is any doubt as to the **presentation** or if the head is high, an **ultrasound scan** should be performed to confirm the presenting part or the reason for the high head (e.g. OP position, deflexed head, placenta praevia, fibroid, etc).

Abdominal examination also includes an assessment of the contractions; this takes time (at least 10 minutes) and is done by palpating the uterus directly, not by looking at the tocograph.

The tocograph provides reliable information on the frequency, regularity and duration of contractions, but not the strength .

Vaginal examination

The purpose and technique of vaginal examination is explained to the woman and her consent must be obtained.

Most women find vaginal examinations uncomfortable and every effort should be made to maintain the woman's privacy. The index and middle fingers are passed to the top of the vagina and the cervix.

The cervix is examined for position, length and effacement, consistency, dilatation and application to the presenting part.

The length of the cervix at 36 weeks' gestation is about 3 cm.

It gradually shortens by the process of effacement and may still be uneffaced in early labour.

The dilatation is estimated digitally in centimetres.

At about 4 cm of dilatation, the cervix should be fully effaced.

Providing the cervix is at least 4 cm dilated, it should be possible to determine both the **position and the station of the presenting part**. When no cervix can be felt, this means the cervix is fully dilated (10 cm).

A vaginal examination also allows assessment of the fetal head position, station, attitude and the presence of caput or moulding.

In normal labour, the vertex will be presenting and the position can be determined by locating the occiput.

The occiput is identified by feeling for the **triangular posterior fontanelle and the three suture lines.**

Failure to feel the posterior fontanelle may be because the head is :

1. deflexed (abnormal attitude),
2. the occiput is posterior (malposition) or
3. there is so much caput and moulding that the sutures cannot be felt.

All of these indicate the possibility of a prolonged labour or a degree of mechanical obstruction.

Normally, the occiput will be transverse (OT position) or anterior (OA position). Relating the leading part of the head to the ischial spines will give an estimation of the station.

This vaginal assessment of station should always be taken together with assessment of the degree of engagement by abdominal palpation. **If the head is fully engaged (zero-fifth palpable) at or below the ischial spines (0 to +1 cm or more) and the occiput is anterior (OA), the outlook is favourable for vaginal delivery.**

The condition of the membranes should also be noted. If they have ruptured, the colour and amount of amniotic fluid draining should be noted. A generous amount of clear fluid is a good prognostic feature; scanty, **heavily blood-stained or meconium-stained fluid is a warning sign of possible fetal compromise.**

*Women who are found not to be in established labour should be offered appropriate analgesia and support. Most can safely go home, to return when the contractions increase in strength and frequency.

The admission history and examination provide an initial screen for abnormal labour and increased maternal/fetal risk.

If all features are normal and reassuring, the woman will remain under midwifery care.

If there are risk factors identified, medical involvement in the form of the on-call obstetric team may be appropriate.

Women in labour should have :

their pulse measured hourly and their temperature and blood pressure every 4 hours.

The frequency of contractions should be recorded every 30 minutes

and a vaginal examination performed every 4 hours (unless other factors suggest it needs to be repeated on a different time-frame).

It should be noted when the woman voids urine, and this should be tested for ketones and protein.

Women who chose epidural analgesia may need to be catheterized.

Once the second stage is reached, the blood pressure and pulse should be performed hourly, and vaginal examinations offered every hour also.

The partogram

The introduction of a **graphic record of labour** in the form of a partogram has been an important development. This record allows an instant visual assessment of the rate of cervical dilatation and comparison with an expected norm, according to the parity of the woman, so that slow progress can be recognized early and appropriate actions taken to correct it where possible.

Other key observations are entered on to the chart, including the frequency and strength of contractions, the descent of the head in fifths palpable, the amount and colour of the amniotic fluid draining, and basic observations of maternal well-being, such as blood pressure, pulse rate and temperature

A line can be drawn on the partogram at the end of the latent phase demonstrating progress of 1 cm dilatation per hour. Another line ('the action line') can be drawn parallel and 4 hours to the right of it.

If the plot of actual cervical dilatation reaches the action line, indicating slow progress, then consideration should be given to a number of different measures which aim to improve progress .

Progress can also be considered slow if the cervix dilates at less than 1 cm every 2 hours.

Management of first stage of labour:

1. First stage of labour is the interval from diagnosis of labour to full dilatation of the cervix.
2. One-to-one midwifery care should be provided.
3. Additional emotional support from a birth partner should be encouraged.
4. Obstetric and anaesthetic care should be available as required.

5. Maternal and fetal wellbeing should be monitored.

6. Vaginal examinations are performed 4 hourly or as clinically indicated.

7. Progress of labour is monitored using a partogram with timely intervention if abnormal.

8. Appropriate pain relief should be provided consistent with the woman's wishes.

9. Ensure adequate hydration and light diet to prevent ketosis

Women who are in the latent phase of labour should be encouraged to mobilize and should be managed away from the labour suite where possible.

Indeed, they may well go home, to return later when the contractions are stronger or more frequent.

Encouragement and reassurance are extremely important.

Intervention during this phase is best avoided unless there are identified risk factors.

Simple analgesics are preferred over nitrous oxide gas and epidurals.

There is no reason to restrict eating and drinking, although lighter foods and clear fluids may be better tolerated.

Vaginal examinations are usually performed every 4 hours to determine when the active phase has been reached (approximately 4 cm dilatation and full effacement).

Thereafter, the timing of examinations should be decided by the midwife in consultation with the woman.

Four-hourly is standard practice; however, this frequency may be increased if the midwife thinks that progress is unusually slow or fast or if there are fetal concerns.

The lower limit of normal progress is 1 cm dilatation every 2 hours once the active phase has been reached.

Descent of the presenting part through the pelvis is another crucial component of progress and should be recorded at each vaginal examination.

Full dilatation may be reached, but if descent is inadequate, vaginal delivery will not occur.

*During the first stage, the membranes may be intact, may have ruptured spontaneously or may be ruptured artificially.

*Generally speaking, if the membranes are intact, it is not necessary to rupture them if the progress of labour is satisfactory.

*Maternal and fetal observations are carried out as described previously and recorded on the partogram.

*Women should receive one-to-one care (i.e. from a dedicated midwife) and should not be left alone for any significant period of time once labour has established.

*They should be able to choose birth partners themselves and should be able to adopt whatever positions they find most comfortable.

*Mobility during labour is encouraged and it is likely that standing upright encourages progress.

*Unfortunately, many women adopt a supine position (lying down), especially if there is a need for continuous EFM (i.e. the CTG)

*Women may drink during established labour and those who are becoming dehydrated may benefit from intravenous fluids to prevent ketosis, which can impair uterine contractility.

*Light diet is acceptable if there is no obvious risk factor for needing a general anaesthetic and if the woman has not had pethidine or diamorphine for pain relief, which can cause vomiting.

*Shaving and enemas are unnecessary and antacids need only be given to women with risk factors for complications, or to those who have had opioid analgesia.

*A variety of methods of pain relief are available, depending on the location of the birth, and these are discussed below under Pain relief in labour.

‘Active management of labour’ was a collection of interventions that was routinely recommended to nulliparous women to maximize the chances of a normal birth. It included :

1. one-to-one midwifery care,
2. 2-hourly vaginal examinations,
3. early artificial rupture of membranes and use of oxytocin
4. augmentation if progress fell more than 2 hours behind the schedule of 1 cm dilatation per hour.

A variety of studies failed to show any obvious benefit of active management, except that derived from one-to-one care, the only component now recommended for all women in normal labour.

Management during second stage

If the labour has been normal, the first sign of the second stage is likely to be an urge to push experienced by the mother. Full dilatation of the cervix should be confirmed by a vaginal examination if the head is not visible.

The woman will get an expulsive reflex with each contraction, and will generally take a deep breath, hold it, and strain down (the Valsalva manoeuvre).

Women will be guided by their own urge to push; however, the midwife has an important role to play, with advice, support and reassurance if progress is poor.

Women should be discouraged from lying supine, or semi-supine, and should adopt any other position that they find comfortable. Lying in the left lateral position, squatting and 'all fours' are particularly effective options.

Maternal and fetal surveillance intensifies in the second stage, as described previously.

The development of fetal acidaemia may accelerate, and maternal exhaustion and ketosis increase in line with the duration of active pushing.

Use of regional analgesia (epidural or spinal) may interfere with the normal urge to push, and the second stage is more often diagnosed on a routine scheduled vaginal examination.

Pushing is usually delayed for at least 1 hour and up to 2 hours if an epidural is *in situ* (the 'passive second stage').

However, in all cases the baby should be delivered within 4 hours of reaching full dilatation.

Descent and delivery of the head

The progress of descent of the head can be judged by watching the perineum.

At first, there is a slight general bulge as the woman bears down.

When the head stretches the perineum, the anus will begin to open and soon after this the baby's head will be seen at the vulva at the height of each contraction.

Between contractions, the elastic tone of the perineal muscles will push the head back into the pelvic cavity.

The perineal body and vulva will become more and more stretched, until eventually the head is low enough to pass forwards under the subpubic arch.

When the head no longer recedes between contractions it is described as crowning.

This indicates that it has passed through the pelvic floor, and delivery is imminent. Vaginal and perineal tears are common consequences of vaginal birth, particularly during first deliveries.

The 'hands-on' approach has been very popular. As crowning occurs, the hands of the accoucheur are used to flex the fetal head and guard the perineum.

The belief is that controlling the speed of delivery of the fetal head will limit maternal soft-tissue damage; however, there is little evidence to support this practice over the alternative 'hands-off' approach.

Once the head has crowned, the woman should be discouraged from bearing down by telling her to take rapid, shallow breaths ('panting').

An episiotomy is a surgical cut, performed with scissors, which extends from the vaginal fourchette in a mediolateral direction, usually to the right, through the perineum and incorporating the lower vaginal wall .

It is performed during most instrumental births (ventouse or forceps) or to hasten delivery if there is suspected fetal compromise (e.g. fetal bradycardia).

It will only accelerate the birth if the head has passed through the pelvic floor, so should not be performed too early.

It does not help prevent more severe perineal injury involving the anal sphincter and its routine use in normal labour was abandoned some time ago.

Effective analgesia is required, and this will usually be with infiltration of local anaesthetic if the woman does not have an epidural.

Delivery of the shoulders and rest of the body

Once the fetal head is born, a check is made to see whether the cord is wound tightly around the neck, thereby making delivery of the body difficult. If this is the case, the cord may need to be clamped and divided before delivery of the rest of the body.

With the next contraction, there is restitution and external rotation of the head and the shoulders can be delivered.

To aid delivery of the shoulders, there should be gentle traction on the head downwards and forwards until the anterior shoulder appears beneath the pubis.

The head is then lifted gradually until the posterior shoulder appears over the perineum and the baby is then swept upwards to deliver the body and legs.

If the infant is large and traction is necessary to deliver the body, it should be applied to the shoulders only, and not to the head

Management of third stage

The third stage is the interval between delivery of the baby and the complete expulsion of the placenta and membranes.

This normally takes between 5 and 10 minutes and is considered prolonged after 30 minutes, unless a physiological approach is preferred.

Separation of the placenta occurs because of the reduction of volume of the uterus due to uterine contraction and the retraction (shortening) of the lattice-like arrangement of the myometrial muscle fibres.

A cleavage plane develops within the decidua basalis and the separated placenta lies free in the lower segment of the uterine cavity.

Management of the third stage can be described as 'active' or 'physiological'.

Signs of placental separation

1. Apparent lengthening of the cord.
2. A small gush of blood from the placental bed.
3. Rising of the uterine fundus to above the umbilicus .
4. Uterine contraction resulting in firm globular feel on palpation.

Active management of the third stage

1. Intramuscular injection of 10 IU oxytocin, given as the anterior shoulder of the baby is delivered, or immediately after delivery of the baby.
2. Early clamping and cutting of the umbilical cord.
3. Controlled cord traction

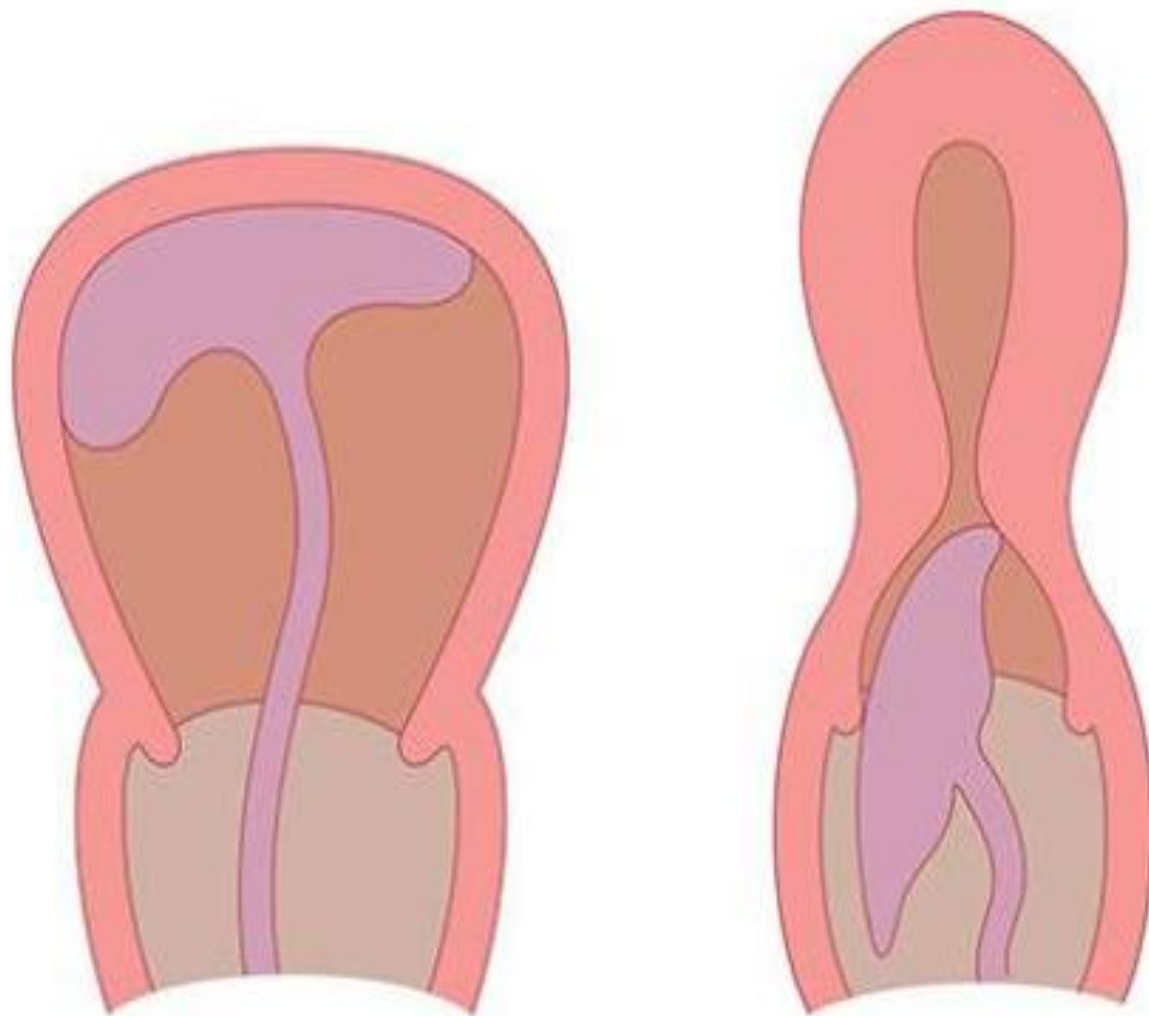


Figure 12.20 Signs of separation and descent of the placenta. After separation, the uterine upper segment rises up and feels more rounded.

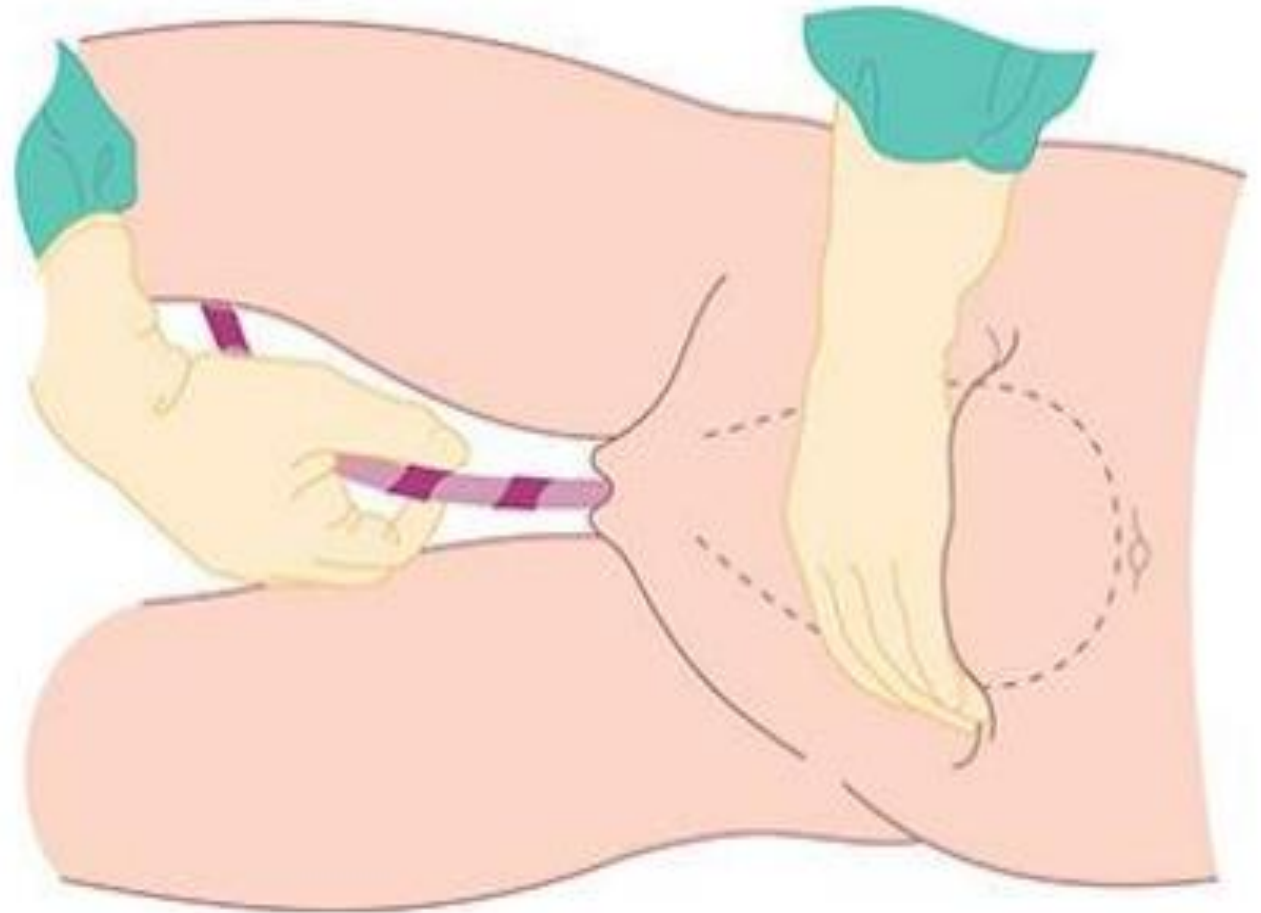


Figure 12.21 Delivering the placenta by controlled cord traction.

Active management

Active management of the third stage should be recommended to all women because high-quality evidence shows that it **reduces the incidence of postpartum haemorrhage (PPH) from 15% to 5%.**

When the signs of placental separation are recognized, controlled cord traction is used to expedite delivery of the placenta.

When a contraction is felt, the left hand should be moved suprapubically and the fundus elevated with the palm facing towards the mother.

At the same time, the right hand should grasp the cord and exert steady traction so that the placenta separates and is delivered gently, care being taken to peel off all the membranes, usually with a twisting motion.

Uterine inversion is a rare complication, which may occur if the uterus is not adequately controlled with the left hand and excessive traction is exerted on the cord in the absence of complete separation and a uterine contraction .

In approximately 2% of cases, the placenta will not be expelled by this method.

If no bleeding occurs, a further attempt at controlled cord traction should be made after 10 minutes.

If this fails, the placenta is 'retained' and will require manual removal under general or regional anaesthesia in the operating theatre.

It is now recognized that a **modified** approach to active management of the third stage may be preferable with delayed cord clamping for between 1 and 3 minutes.

This approach allows autotransfusion of placental blood to the neonate while maintaining the benefit of a reduced risk of PPH.

It is of particular importance in preterm birth.

Physiological management

Physiological management of the third stage is where the placenta is delivered by maternal effort and no uterotonic drugs are given to assist this process.

It is associated with heavier bleeding, but women who are not at undue risk of PPH should be supported if they choose this option.

In the event of haemorrhage (estimated blood loss >500 ml) or if the placenta remains undelivered after 60 minutes of physiological management, active management should be recommended.

After completion of the third stage, the placenta should be inspected for missing cotyledons or a succenturiate lobe. If these are suspected, examination under anaesthesia and manual removal of placental tissue (MROP) should be arranged, because in this situation the risk of PPH is high.

Finally, the vulva of the mother should be inspected for any tears or lacerations. Minor tears do not require suturing, but tears extending into the perineal muscles (or, indeed, an episiotomy) will require careful repair.

KEY LEARNING POINTS

Features of normal labour:

1. Spontaneous onset at 37–42 weeks' gestation.
2. Singleton pregnancy.
3. Cephalic vertex presentation.
4. No artificial interventions.
5. Cervical dilatation of at least 1 cm every 2 hours in the active phase of first stage.
6. Active second stage no more than 2 hours in primiparous and 60 minutes in multiparous woman.
7. Spontaneous vaginal delivery.
8. Third stage lasting no more than 30 minutes with active management