**Definition**

Labor at term, normal labor – from 37 till 42 weeks when the term and mature fetus is born.

Preterm labor – from 22 till 37 weeks when the prematurely born and unripe fetus is born.

Postterm pregnancy – more than 42 weeks.

at the time of delivery the woman is called the parturient woman

the woman at whom labors occur for the first time call primipara

at repeated labors – multipara.

up to 22 weeks pregnancy child is nonviable.

the end of pregnancy to this term is called abortion.

 The viable fetus is considered about 22 weeks of pregnancy when its weight of 500 grams, length of 25 cm.

**Patrimonial majorant** – a functional condition of the central nervous system which unites the highest nervous centers of a regulation and executive bodies in uniform dynamic system that is necessary for well-timed offensive and a normal current of a labor.

The cerebral cortex, hypothalamus, structures of a limbic complex is involved in process. An important role in development of patrimonial activity is played by gradual falling of excitability of a cerebral cortex and ascending of excitability of a spinal cord.

Induction of labors is bound to rising in a blood of estrogens. Throughout pregnancy the spontaneous uterine activity is braked by Progesteronum. Depression of its production before labors and rising in the last two weeks of level of estrogens is led to activation of contraction activity of a myometrium. Estrogens stimulate formation of Prostaglandinums - they possess the main role in induction of patrimonial activity. Bind secretion of Oxytocinum (oppress production of an oxytocinase), depression of level of Progesteronum, formation of receptors on membranes of cells of a myometrium to Oxytocinum, Acetylcholinum, a serotonin and alpha adrenoreceptors to action of Prostaglandinums. Development of patrimonial activity is bound also to rise in a blood of a fetus of a hydrocortisone which conducts to augmentation of content of estrogens and Prostaglandinums. At the end of pregnancy intensifying of degenerative processes in the ripened placenta, accumulation of products of exchange of a fetus, body height of intensity of ferment reactions is observed. Immune response of mother to a mature fetus changes.

Changes of immune relationship between a maternal organism and a fetus conduct by the birth it as to a casting-off of an allotransplant.

The period, preparatory to labors, begins with 38-39 weeks of pregnancy. The complex of clinical implications is characteristic of harbingers of labors:

For 2-3 weeks to labors the uterine fundus falls by 4-5 cm below a xiphoid process. The pregnant woman notes respiration simplification. At primipara women in 38 weeks, at multipara from the beginning of patrimonial activity the head nestles on an entrance to a small pelvis.

In 2-3 days prior to labors body weight decreases by 1-2 kg that is bound to the strengthened removal from a liquid organism. Many women have nagging pains in the field of a sacrum and the lower part of a stomach in connection with rising of excitability of a uterine musculation. There is an amotio of the lower part of a bag of waters from uterus walls.

There is a maturing of a neck of uterus. The neck settles down on a wire axis of a basin, is shortened to 1-2 cm, softened. The cervical channel passes a finger, the internal fauces smoothly passes into the lower segment of a uterus, secretory function mucous the cervical channel increases, the mucous stopper is pushed out that is shown by release of slime from a vagina, sometimes with blood impurity.

**The normal preliminary period** is characterized by emergence at the full-term pregnancy irregular on the frequency, duration and intensity of pains of colicy character in the bottom of a stomach and in lumbar area.

the normal preliminary period is called a latent phase of labors which at primipara is peer to about 8 hours, at multipara — 5 h.

• At pregnant women gradual intensifying and an acceleration of pains and transition to regular labor pains is observed.

• Sometimes preliminary pains stop and renew in a day and more.

• At an external research the usual tonus of a uterus, heartbeat of a fetus clear, rhythmical is defined.

• At vaginal examonation a neck of uterus usually "mature", there are mucous allocations.

**The pathological preliminary period** has a certain clinical picture.

• Colicy pains, irregular on frequency, duration and intensity, in the bottom of a stomach, in the field of a sacrum and a loin become perceptible

more than 6 hours proceed.

• break a daily rhythm of a dream and wakefulness and the women causing a fatigue.

• The tonus of a uterus is raised in the field of the lower segment, the prelying part of a fetus settles down highly, parts of a fetus are badly palpated.

• At vaginal examonation the raised tonus of muscles of a pelvic bottom, a colpostenosis take place, the neck of uterus, as a rule, isn't ready".

 there don't occur structural changes in a neck of uterus and there is no its disclosure.

• At a hysterography research fights of different force and duration with unequal intervals are taped (dicoordinated).

At the long preliminary period the psychoemotional status of the pregnant woman is violated, there comes the fatigue and signs of fetal suffering of a fetus appear. The diagnosis of the pathological preliminary period is established on the basis of results of anamnestic data, clinical, tool and other trials.

**Monitoring**

**Bishop Score**

The bishop score is an assessment of ‘**cervical ripeness**‘ based on measurements taken during vaginal examination. It is checked prior to induction, and during induction to assess progress (6 hours post-table/gel, 24 hours post-pessary):

* **Score of ≥ 7** – suggests the cervix is ripe or ‘favourable’ – this means that there is a high chance of a response to interventions made to induce labour (i.e. induction of labour is possible).
* **Score of <4** – suggests that labour is unlikely to progress naturally and prostaglandin tablet/gel/pessary will be required

Failure of a cervix to ripen despite use of prostaglandins may result in the need for a caesarean section.

|  |
| --- |
| **Table 2 – Modified Bishop Score (RCOG 2001)** |
| **Cervical Feature** | **0** | **1** | **2** | **3** |
| **Dilation (cm)** | <1 | 1-2 | 2-4 | >4 |
| **Length (cm)** | >4 | 2-4 | 1-2 | <1 |
| **Station (relative to ischial spines)** | -3 | -2 | -1/0 | +1/+2 |
| **Consistency** | Firm | Average | Soft | – |
| **Position** | Posterior | Mid/anterior | – | – |



Fig 3 – Measuring the station of the fetus, in relation to the ischial spines.

There are two main classifications of premature membrane rupture:

* **Premature rupture of membranes (PROM)** – the rupture of fetal membranes at least 1 hour prior to the onset of labour, at ≥37 weeks gestation.
	+ It occurs in 10-15% of term pregnancies, and is associated with minimal risk to the mother and fetus due to the advanced gestation.
* **Pre-term premature rupture of membranes (P-PROM)** – the rupture of fetal membranes occurring at <37 weeks gestation.
	+ It complicates ~2% of pregnancies and has higher rates of maternal and fetal complications. It is associated with 40% of preterm deliveries.

In this article, we shall look at the risk factors, clinical features and management of PROM and P-PROM.

**Etiology and Pathophysiology**

The **fetal membranes** consist of the chorion and the amnion. They are strengthened by collagen, and under normal circumstances, become weaker at term in preparation for labour.

The physiological processes underlying this weakening include apoptosis and collagen breakdown by **enzymes**.

In cases of premature rupture of membranes and P-PROM, a combination of factors can lead to the early weakening and rupture of fetal membranes:

* **Early activation of normal physiological processes** – higher than normal levels of apoptotic markers and MMPs in the amniotic fluid.
* **Infection**– inflammatory markers e.g. cytokines contribute to the weakening of fetal membranes. Approximately 1/3 of women with P-PROM have positive amniotic fluid cultures.
* **Genetic predisposition**



Fig 1 – The layers of the fetal membranes; the chorion and amnion.

**Risk Factors**

The risk factors for premature rupture of membranes and P-PROM are listed in Table 1.

|  |
| --- |
| **Table 1 – Risk Factors Associated with PROM and P-PROM** |
| Smoking (especially < 28 weeks gestation).Previous PROM/ pre-term delivery.Vaginal bleeding during pregnancy.Lower genital tract infection. | Invasive procedures e.g. amniocentesis.Polyhydramnios.Multiple pregnancy.Cervical insufficiency. |

*Note: In many cases of PROM and P-PROM, there are no identifiable risk factors.*

**Clinical Features**

In premature rupture of membranes, a typical history is of **‘broken waters’** – with women experiencing a painless popping sensation, followed by a gush of watery fluid leaking from the vagina.

However, the symptoms can often be more non-specific, such as **gradual leakage** of watery fluid from the vagina and damp underwear/pad, or a change in the colour or consistency of vaginal discharge.

On speculum examination, fluid draining from the cervix and pooling in the **posterior vaginal fornix** may be seen. To ensure an adequate examination, the woman should be laid on an examination couch for at least 30 minutes. This will allow pooling of any leaking amniotic fluid in the top of the vagina.

Additionally, a lack of normal vaginal discharge (**‘washed clean**’) can be suggestive of rupture of membranes. Asking the woman to cough during the examination can cause amniotic fluid to be expelled. A speculum is not required if amniotic fluid is seen draining from the vagina.

*Note: In women with suspected P-PROM or PROM, it is important to avoid performing digital vaginal examinations until the woman is in active labour. This is because it has been shown that digital examination reduces the time between rupture of membranes and onset of labour (latency). This is likely due to the increased risk of introducing an ascending intrauterine infection.*

**Investigations**

Diagnosis of PROM or P-PROM is usually made by; (1) maternal history of membrane rupture and; (2) positive examination findings.

**Ultrasound** is not used routinely, but may facilitate diagnosis in cases where it remains unclear. Reduced levels of amniotic fluid within the uterus are more suggestive of membrane rupture.

In all cases of premature membrane rupture, a **high vaginal swab** should be taken. It may grow Group B Streptococcus (GBS) which would indicate antibiotics in labour, or give information as to a potential cause for PPROM (bacterial vaginosis is commonly implicated).

**Management**

Rupture of the fetal membranes releases **amniotic fluid** – which acts to stimulate the uterus. Therefore, the vast majority of women with rupture of membranes will fall in to labour within 24-48 hours. There is very little that can be done to halt this.

If labour doesn’t start, it is important to consider the risks and benefits of expectant management versus [induction of labour](http://teachmeobgyn.com/labour/delivery/induction-of-labour/) (IOL) when formulating an appropriate management plan for women with PROM:

* **<34 weeks gestation** – the balance would normally be in favour of aiming for increased gestation.
* **>36 weeks gestation** – if labour does not start, induction of labour ought to be considered at 24–48 hours. This is because the risk of infection outweighs any benefit of the fetus remaining *in utero.*
* **34 – 36 weeks** – Historically the aim was to get the pregnancy to 36 weeks if there was no evidence of infection. However, with improvements in neonatal care (and evidence for poorer outcomes in babies if there is maternal infection), management has shifted towards 34 weeks and induction of labour once there has been a course of steroids.

With P-PROM, if there is no concern for developing infection and there are no signs of labour, it may be possible to continue conservative management at home.

|  |
| --- |
| **Table 3 – Principles of Management of PROM and P-PROM** |
| **> 36 weeks**    | Monitor for signs of clinical chorioamnionitis.Clindamycin/penicillin during labour if GBS isolated.Watch and wait for 24 hours (60% of women go into labour naturally), or consider induction of labour.IOL and delivery recommended if greater than 24 hours (but women can wait up to 96 hours – beyond this is their choice after counselling) |
| **34 – 36 weeks**     | Monitor for signs of clinical chorioamnionitis, and advise patient to avoid sexual intercourse (can increase risk of ascending infection).Prophylactic erythromycin 250 mg QDS for 10 days.Clindamycin/penicillin during labour if GBS isolated.Corticosteroids if between 34 and 34+6 weeks gestation.IOL and delivery recommended. |
| **24 – 33 weeks**    | Monitor for signs of clinical chorioamnionitis, and advise patient to avoid sexual intercourse.Prophylactic Erythromycin 250 mg QDS for 10 days.Corticosteroids (as less than 34+6).Aim expectant management until 34 weeks. |

**Complications**

The outcome of PROM generally correlates with the **gestational age** of the fetus.

The majority of women at term will enter spontaneous labour within 24 hours after membrane rupture, but there is a greater **latency period** the younger the gestational age. This pre-disposes to a greater risk of maternal and fetal complications:

* **Chorioamnionitis** – inflammation of the fetal membranes, due to infection. The risk increases the longer the membranes remain ruptured and baby undelivered.
* **Oligohydramnios** – this is particularly significant if the gestational age is less than 24 weeks, as it greatly increases the risk of lung hypoplasia.
* **Neonatal death** –  due to complications associated with prematurity, sepsis and pulmonary hypoplasia.
* **Placental abruption**
* **Umbilical cord prolapse**

**Summary**

* PROM is defined as rupture of membranes > 1 hour prior to the onset of labour occurring ≥ 37 weeks gestation.
* P-PROM is rupture of the amniotic sac < 37 weeks gestation.
* Diagnosis of membrane rupture is usually from maternal history and sterile speculum examination.
* IOL and delivery should be considered where gestational age > 34 weeks and expectant management < 34 weeks gestation.
* P-PROM is associated with much higher rates of complications than PROM. The main causes of neonatal mortality include complications associated with prematurity, sepsis and pulmonary hypoplasia.

**Introduction to labour**

Labour is the **process of passage** of the [fetus](https://www.myvmc.com/medical-dictionary/foetus/) and [placenta](https://www.myvmc.com/medical-dictionary/placenta/) from the [uterus](https://www.myvmc.com/medical-dictionary/uterus/), through the [vagina](https://www.myvmc.com/medical-dictionary/vagina/), to be external to the mother. It is part of the process of [parturition](https://www.myvmc.com/medical-dictionary/parturition/), which refers to **labour, delivery and birth**. Parturition requires the **dilation of the cervical canal** to accommodate for the passage of the fetus, as well as **contractions of the uterine muscle** wall that are strong enough to expel the fetus.

 **Stages of labour**

There are **three distinct stages** of labour:

* First stage – dilation of the [cervix](https://www.myvmc.com/medical-dictionary/cervix/).
	+ Latent phase (0-4 cm dilated)
	+ Active phase (4-8cm dilated)
	+ Retardation phase (8-12cm dilated)
* Second stage – fully dilated till expulsion of the foetus
	+ Descent of the head
	+ Pushing phase
* Third stage – following expulsion of the foetus till the placenta and membranes are delivered.

The entire process of labour and vaginal birth takes an **average of 13 hours** in women giving birth for the first time, and 8 hours in women who have given birth before. However, the exact duration varies a great deal from one woman to another. 18 hours of first stage is considered ‘prolonged’, and 1.5-2 hours of second stage is considered ‘prolonged’.

 **Stage 1 – Cervical dilation**

Stage one lasts from the **initiation of labour** until there is **full dilation** of the cervix. The cervix will become thinner (a process known as effacement) and stretches (dilation) as the baby’s head will descend and “engage” with the pelvis. This process of contractions, thinning and stretching is usually painful for the mother. First stage is generally the longest stage. In a woman who is having her first baby, this first stage takes on average 8 hours. In a woman who has had previous children, this stage will be shorter, and takes on average 4 hours.

The **first stage** is divided into two parts:

* The **latent phase**, which is defined as period between the start of labour up until the cervix is 4cm dilated. This latent phase tends to be slow, lasting an average of around 6 hours for a first baby, and 4 to 5 hours for women who have had babies before, though it may last up to 8 to 12 hours. Rate of disclosure of 0,35cm/hr.
* The **active phase** is from 4cm of cervical dilation until 8cm. During the active phase, it is expected that the cervix should dilate at least 1,5 - 2cm an hour in women who are having their first baby. The cervix in women who have had a previous vaginal birth tends to dilate more quickly (about 2-2,5cm/hr). During the first stage of labour, the midwife or doctor will regularly do a vaginal examination to assess how dilated the cervix is, how the baby is descending, and the colour of the amniotic fluid. This is done at least every four hours, or more regularly if necessary. The descent of the foetus through the birth canal is also tracked by examining the abdomen. The baby is monitored either intermittently or continuously using a CTG for signs of distress.
* Retardation phase (8-12cm dilated) , proceeds 1-2 h, begins with 8 cm of disclosure of a neck and comes to an end with full disclosure of a uterine fauces. Rate of disclosure in this phase is slowed down (1-1,5 cm/hour). The endometrial pressure increasing during the fight promotes advance of the prelying part on the patrimonial channel. Rate of advance of a head at disclosure of a neck of uterus at primipara 1 cm/h, and at multipara – 2 cm/hour.

***Monitoring the progress of labour***

Once labour has been confirmed, the doctor/midwife will **assess progress** by monitoring:

* changes in cervical effacement and dilation;
* how far down the birth canal the baby’s head is;
* the quality of contractions of the uterus;
* the wellbeing of the baby.
* control of health and condition of the parturient woman (measurement of pulse, ABP, body temperature, etc.);
* observation over appearance of the parturient woman, her behavior. Recommend active behavior of the parturient woman, a standing position or lying edgewise.
* Vaginal examinations are conducted with an interval of 4 hours.
* maintaining partogramm.
* control of an uterine activity;
* continuous control of a condition of a fetus, its cordial activity, head configuration degree;
* control of bladder emptying each 2-3 hours

 **Stage 2 – Expulsion**

This is from the time of **full dilatation** of the cervix **until** **the** **baby is delivered**. During this stage there are two phases:

* The initial part is a **passive** (descent) phase; where the baby’s head moves down through the mother’s vagina.
* This is followed by an **active** phase where the mother feels the desire to push.

This urge to push is usually less strong if the woman has an [epidural](https://www.myvmc.com/treatments/epidural-analgesia/). The pushing involves contracting the abdominal muscles in time with each uterine contraction. Pushing usually comes instinctively so there is no need to worry about “not knowing how to push”, however, it is important to push in time with uterine contractions to maximise efficiency and minimise fatigue.

In a woman who has had children previously, this active “pushing” phase takes on average 15-30 mins. In a woman who is having her first baby, the active phase takes an average of 60 mins.

Once the baby is delivered, the umbilical cord will be clamped and cut by the midwife/doctor. The stump shrivels up in a few days to form the belly button. The baby is then free to be held by the mother.

Breastfeeding soon after delivery is often encouraged as this may assist with the third stage of delivery and is beneficial to the baby.

**Maintaining the second period of labors**

* The watch over the parturient woman has to be doubled. Control of the general state, coloring of integuments, visible mucosas, pulse, arterial pressure is necessary.
* Observation over frequency, force and duration of pains and attempts continues.
* trackings a condition of a fetus
* careful observation over advance on patrimonial ways of a head or other prelying part of a fetus
* observation over the nature of patrimonial activity: frequency, by force and duration of pains and attempts.
* Control the nature of allocations from a vagina.

**Stage 3 – Delivery of the placenta**

The **third stage** lasts from the delivery of the baby till delivery of the placenta and membranes (afterbirth). Third stage may be:

* Active: the doctor or midwife gives a drug ([oxytocin](https://www.myvmc.com/medical-dictionary/oxytocin/)) via an injection into the mother’s thigh just as the baby’s head is crowning (widest part coming through the vaginal opening) to help the uterus contract down to speed up delivery of the placenta, and they gently pull on the cord of the placenta to help deliver it. Active management of third stage is faster (around 5-10 minutes) and has been shown to reduce blood loss after delivery, so many hospitals prefer to use this method; or
* Physiological: No drugs or pulling on the placenta. The placenta delivers without assistance, or with gentle pushing from the mother. This takes a bit longer than active third stage (up to 30 minutes).

**Signs that the placenta is beginning to separate include:**

* A sudden gush of blood
* Lengthening of the visible portion of the umbilical cord.
* The uterus, which is usually soft and flat immediately after delivery, becomes round and firm.
* The uterus, the top of which is usually about half-way between the pubic bone and the umbilicus, seems to enlarge and approach the umbilicus.

Immediately after the delivery of the baby, uterine contractions stop and labor pains go away. As the placenta separates, the woman will again feel painful uterine cramps. As the placenta descends through the birth canal, she will again feel the urge to bear down and will push out the placenta.

If the placenta is not promptly expelled, or if the patient hemorrhages while awaiting delivery of the placenta, this is called a "retained placenta" and it should be manually removed.

After delivery of the placenta, the uterus normally contracts firmly, closing off the open blood vessels which previously supplied the placenta. Without this contraction, rapid blood loss would likely prove very problematic or worse.

To encourage the uterus to firmly contract, oxytocin 10 mIU IM can be given after delivery. Alternatively, oxytocin 10 or 20 units in a liter of IV fluids can be run briskly (150 cc/hour) into a vein. Breast feeding the baby or providing nipple stimulation (rolling the nipple between thumb and forefinger) will cause the mother's pituitary gland to release oxytocin internally, causing similar, but usually milder effects.

A simple way to encourage firm uterine contraction is with uterine massage. The fundus of the uterus (top portion) is vigorously massaged to keep it the consistency of a tightened thigh muscle. If it is flabby, the patient will likely continue to bleed.

Schröder's sign. After unit of a placenta the uterus from spherical becomes flattened, its bottom rises above a belly-button and deviates to the right.

Alfeld's sign. After the child's birth the cord at the level of the sexual purpose is dressed a ligature. At shift of the separated placenta down the ligature with a cord falls by 10-12 cm.

Kyustner's sign – Chukalova. A rib of a palm press on a stomach over pubic area. If the placenta separated – the cord isn't involved, at not separated placenta is displaced in a vagina.

**Ways of allocation of the separated afterbirth**

If the placenta separated but the afterbirth wasn't allocated empty a bladder and suggest the parturient woman to be extinguished. For allocation of an afterbirth at the separated placenta several receptions are offered.

**Abuladze's way**. At a free bladder carefully mass a uterus before its reduction. The abdominal wall by two arms is collected pleated and suggest the woman to be extinguished.

**Genter's way**. Remove urine. The uterus is displaced in median situation, carefully massed for its reduction. The arms compressed in fists located in the field of tubal angles slowly press inside and from top to bottom till the afterbirth birth.

**Krede-Lazarevich's way.** After bladder emptying the uterus is displaced in median situation, light massage cause its reduction. An arm cover a uterus in the field of a bottom that the thumb settled down on a forward surface of a uterus, and four fingers on back. The uterus is squeezed between fingers and at the same time pressed for the bottom in the direction down and forward.

**Labour complications**

The second stage of labour may be delayed or lengthy due to:

1. malpresentation ([breech birth](https://en.wikipedia.org/wiki/Breech_birth) (i.e. buttocks or feet first), face, brow, or other)
2. failure of descent of the fetal head through the pelvic brim or the interspinous diameter
3. poor uterine contraction strength
4. active phase arrest
5. [cephalo-pelvic disproportion](https://en.wikipedia.org/wiki/Pelvimetry) (CPD)
6. [shoulder dystocia](https://en.wikipedia.org/wiki/Shoulder_dystocia)

Secondary changes may be observed: swelling of the tissues, maternal exhaustion, fetal heart rate abnormalities. Left untreated, severe complications include death of mother and/or baby, and genitovaginal [fistula](https://en.wikipedia.org/wiki/Fistula).

**Obstructed labour**

Obstructed labour, also known as dystocia, is when, even though the [uterus](https://en.wikipedia.org/wiki/Uterus) is contracting normally, the baby does not exit the pelvis during childbirth due to being physically blocked.

**Postpartum Haemorrhage (PPH)**

Postpartum haemorrhage, as defined by the World Health Organisation, is **vaginal blood loss** in excess more than 0,5% ml **following childbirth**. If the blood loss occurs in the first 24 hours following delivery, this is termed [primary postpartum haemorrhage](https://www.myvmc.com/medical-dictionary/primary-postpartum-haemorrhage/). [Secondary postpartum haemorrhage](https://www.myvmc.com/medical-dictionary/secondary-postpartum-haemorrhage/) refers to excessive vaginal bleeding between 24 hours and six weeks following childbirth.

The site of blood loss varies depending on the cause of the bleeding.

The causes of **primary** postpartum haemorrhage include:

* Uterine atony – which is the failure of the [uterus](https://www.myvmc.com/medical-dictionary/uterus/) to contract down following delivery of the [placenta](https://www.myvmc.com/medical-dictionary/placenta/). This allows the blood vessels feeding into the site where the placenta was attached to continue to bleed. This is the most common cause of primary postpartum haemorrhage.
* Trauma – trauma sustained during delivery can lead to considerable blood loss. Sites of injury may include an episiotomy, the vulva, vagina and/or cervix, a ruptured uterus and other rarer causes.
* Retained placenta – if part, or all, of the placenta remains in the uterus, it prevents the normal process of contraction and as a result the blood vessels feeding into the site where the placenta was attached continue to bleed. There is no correlation between the amount of tissue retained and the amount of blood lost.
* Blood clotting abnormalities- in rare cases women may have an [inherited bleeding disorder](https://www.myvmc.com/medical-dictionary/inherited-bleeding-disorder/) such as [haemophilia](https://www.myvmc.com/diseases/haemophilia-a-2/) or von Willebrand disease that can lead to excessive bleeding following childbirth. Other complications during pregnancy including [preeclampsia](https://www.myvmc.com/diseases/preeclampsia-toxemia-pregnancy-induced-hypertension/), fetal death in utero, severe infection, [amniotic fluid embolus](https://www.myvmc.com/medical-dictionary/amniotic-fluid-embolus/) and [placental abruption](https://www.myvmc.com/diseases/placental-abruption-abruptio-placentae/) can lead to problems with [blood clotting](https://www.myvmc.com/medical-dictionary/blood-clotting/).

The cause of a **secondary** postpartum haemorrhage is unclear in approximately one third of women. The most common causes include failure of the uterus to contract down normally, retained placenta and infection.

**Mechanism of Normal Labor**
There are five classical steps in the normal mechanism of labor. They are:

* Descent
* Flexion
* Internal Rotation
* Extension
* External Rotation

Usually, labor progresses in this fashion, if the fetus is of average size, with a normally positioned head, in a normal labor pattern in a woman whose pelvis is of average size and gynecoid in shape.

There is overlap of these mechanisms. The fetal head, for example, may continue to flex or increase its flexion while it is also internally rotating and descending.

|  |  |  |
| --- | --- | --- |
| <http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/LaborandDelivery/Labor/Descent.jpg> | http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/LaborandDelivery/Labor/Descent1.jpg | Descent: As the fetal head engages and descends, it assumes an occiput transverse position because that is the widest pelvic diameter available for the widest part of the fetal head. |
| http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/LaborandDelivery/Labor/Flexion.jpg | http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/LaborandDelivery/Labor/Flexion1.jpg | Flexion: While descending through the pelvis, the fetal head flexes so that the fetal chin is touching the fetal chest. This functionally creates a smaller structure to pass through the maternal pelvis. When flexion occurs, the occipital (posterior) fontanel slides into the center of the birth canal and the anterior fontanel becomes more remote and difficult to feel. The fetal position remains occiput transverse. |
| http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/LaborandDelivery/Labor/InternalRotation.jpg | http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/LaborandDelivery/Labor/InternalRotation1.jpg | Internal Rotation: With further descent, the occiput rotates anteriorly and the fetal head assumes an oblique orientation. In some cases, the head may rotate completely to the occiput anterior position. |
| http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/LaborandDelivery/Labor/ExternalRotation.jpg | http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/LaborandDelivery/Labor/Extension1.jpg | Extension: The curve of the hollow of the sacrum favors extension of the fetal head as further descent occurs. This means that the fetal chin is no longer touching the fetal chest. |
| http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/LaborandDelivery/Labor/ExternalRotation.jpg | http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/LaborandDelivery/Labor/ExternalRotation1.jpg | External Rotation: The shoulders rotate into an oblique or frankly anterior-posterior orientation with further descent. This encourages the fetal head to return to its transverse position. This is also known as restitution. |

**Statistics on Postpartum Haemorrhage (PPH)**

Postpartum haemorrhage occurs in 10.5% of women with live births.

Secondary postpartum haemorrhage affects approximately 1% of women following childbirth.

**Risk Factors for Postpartum Haemorrhage (PPH)**

Several factors increase the risk for **primary** postpartum haemorrhage, which include:

* Uterine over-distension;
* Having greater than five pregnancies over 20 weeks gestation;
* Previous postpartum haemorrhage;
* Vaginal bleeding during the pregnancy or labour;
* Previous retained placenta;
* [Anaemia](https://www.myvmc.com/medical-dictionary/anaemia-3/);
* Rapid or incoordinate labour;
* Prolonged labour;
* Induction of labour;
* Obesity;
* Asian ethnicity;
* [Caesarean section](https://www.myvmc.com/medical-dictionary/caesarean/) delivery;
* Fever during labour;
* Age >40;
* [Placental abruption](https://www.myvmc.com/diseases/placental-abruption-abruptio-placentae/);
* [Placenta praevia](https://www.myvmc.com/diseases/placenta-praevia/);
* [Chorioamnionitis](https://www.myvmc.com/medical-dictionary/chorioamnionitis/);
* Genital tract trauma;
* [Stillbirths](https://www.myvmc.com/medical-dictionary/stillbirth/);
* [Epidural anaesthesia](https://www.myvmc.com/treatments/epidural-analgesia/);
* Maternal bleeding disorders;
* Condition of high blood pressure including preeclampsia and [gestational hypertension](https://www.myvmc.com/medical-dictionary/gestational-hypertension/); and
* The use of certain drugs during pregnancy.

Those at greater risk of a **secondary** postpartum haemorrhage include:

* Women with primary postpartum haemorrhage – 7 times greater risk; and
* Women who underwent manual removal of a retained placenta – 4 times greater risk.

**Symptoms of Postpartum Haemorrhage (PPH)**

Post partum haemorrhage affects different women in different ways depending on:

* The amount of blood lost;
* The availablitly of treatments, including blood transfusions; and
* The health condition of the woman prior to and during the pregnancy.

If the bleeding occurs in the first 24 hours following delivery (primary postpartum haemorrhage) it is likely that the abnormal blood loss will be picked up by the midwifery staff or obstetrician caring for you. However, if the excessive blood loss is occurs following the first 24 hours after delivery (secondary postpartum haemorrhage) you yourself may notice the increased blood loss as increased need for sanitary napkin changes and/or increased loss into the toilet/shower.

Depending on the amount of blood loss, you may experience some of the symptoms of anaemia including tiredness and lethargy. The amount of blood loss may be so severe that you may require a blood transfusion. You may even need to undergo other treatments including surgery (discussed below) to help prevent further blood loss.

You may experience difficulty breastfeeding your baby if your pituitary gland has been affected by the blood loss as well as other symptoms of Sheehan’s syndrome, discussed above.

**Prophylaxy:**

**It is necessary :**

1. to remove urine by catheter,
2. to put cold on a stomach bottom,
3. to enter Oxytocinum,
4. early applying to a breast.

**Clinical Examination of Postpartum Haemorrhage (PPH)**

The doctors involved need to carefully but quickly make an assessment on the amount of blood lost and to monitor vital signs including temperature, pulse, breathing and blood pressure until the bleeding is controlled.

Questions regarding the pregnancy, labour and delivery may be asked to assess for risk factors which may help to identify the cause of bleeding.

While managing the blood loss, several key examinations need to be performed in an attempt to identify the cause and control the haemorrhage. These include:

* Examination of uterine size;
* Examination of the placenta for completeness; and
* Examination of the birth canal for trauma .

Postpartum haemorrhage is diagnosed clinically when significant blood loss (>500mL) is observed.

**Prognosis of Postpartum Haemorrhage (PPH)**

The consequences of postpartum haemorrhage vary depending on several factors including:

* Amount of blood loss;
* Health of the mother prior to the event; and
* Treatment availability including blood transfusions.

Significant postpartum haemorrhage may be associated with the development of [Sheehan’s syndrome](http://www.myvmc.com/diseases/sheehans-syndrome-postpartum-hypopituitarism-postpartum-pituitary-insufficiency/), severe anaemia and maternal mortality.

 **Sheehan’s syndrome**

In postpartum haemorrhage, massive blood loss can reduce the supply of blood to the [pituitary gland](https://www.myvmc.com/medical-dictionary/pituitary-gland/) and cause cell death. If greater than 10% of the gland is affected, then the woman can be affected by symptoms of anterior pituitary insufficiency including:

* Failure to [lactate](https://www.myvmc.com/medical-dictionary/lactation/) (breastfeed);
* Weakness;
* Lethargy;
* Hypersensitivity to cold;
* Decreased sweating;
* Atrophy (shrinking) of the external genitalia;
* [Amenorrhea](https://www.myvmc.com/medical-dictionary/amenorrhoea/) (loss of periods) or [oligomenorrhea](https://www.myvmc.com/medical-dictionary/oligomenorrhoea/) (reduced periods);
* Hair loss; and
* Absences of [menopausal symptoms](https://www.myvmc.com/diseases/menopause/).

 **Anaemia**

Previously healthy pregnant women can withstand blood losses of up to one litre without any major complications. However, those with poor health conditions and especially those who were previously anaemic may suffer serious consequences such as severe anaemia with similar blood losses. Approximately 15% of women suffering secondary postpartum haemorrhage require a [blood transfusion](https://www.myvmc.com/treatments/blood-transfusion/).

 **Maternal mortality**

The incidence of maternal death in Australia is very low (approximately one death for every 10,000 deliveries) compared to other parts of the world. For example the rate of maternal death in Sub-Saharan African women is over 100 times greater. Postpartum haemorrhage remains a significant cause of maternal death worldwide and is responsible for 17% of all maternal deaths in developed countries such as Australia.

**Postpartum Haemorrhage (PPH) Treating**

Several **preventative measures** can be taken in an attempt to improve the outcome should a postpartum haemorrhage occur, which include:

* Antenatally, each women should know their [blood group](https://www.myvmc.com/anatomy/blood-types-blood-group/);
* Anaemia during pregnancy should be treated;
* Prolonged inhalatory pain relief should be avoided;
* Squeezing or kneading of the uterus prior to separation of the placenta should be avoided;
* The placenta should be delivered promptly following separation; and
* The woman should remain in the delivery room for at least one hour post delivery with careful observations made.

In high risk women additional precautions may need to be taken including several blood tests and the insertion of an intravenous [cannula](https://www.myvmc.com/medical-dictionary/canula/). An intramuscular injection of syntometrine may be given following delivery of the foetus to assist with delivery of the placenta.

**Active management of primary postpartum haemorrhage**

Post partum haemorrhage is an obstetric emergency and the first step of treatment includes the initiation of emergency care including:

* Calling for help;
* Massaging the uterus (done by a health professional);
* Measuring/estimating blood loss as soon as possible;
* Monitoring of vital signs (temperature, blood pressure, pulse and breathing); and
* Alerting senior obstetrics and anaesthetic doctors.

While this occurs, the doctors will be considering the likely cause of the bleeding. They may need to inspect the placenta for completeness and the genital tract for any trauma or lacerations. If an intravenous cannula is not already in place, one and possibly two will be inserted for the rapid delivery of fluids. Blood will be taken and the availability of blood for a blood transfusion determined. You may be given an intramuscular injection to help aid contraction of the uterus. A urinary catheter may also be inserted.

If an **episiotomy** or **other trauma** is the suspected cause of the bleeding, then this will be repaired as soon as possible.

If **uterine atony** is the suspected cause, the doctors will attempt to compress the uterus, which involves placing one hand on the abdomen and the other inside the vagina. Additional medication may be used to help the uterus contract.

**If the bleeding is greater than 1 litre, the bleeding does not stop or if the cause is not obvious you will be transferred to theatre.**

In theatre, compression of the uterus can be continued and an inspection of the birth canal made under an anaesthetic. You may be given fluids and substitutes to help replace the lost blood. Antibiotics may be given. The doctors may also decide on giving an injection directly into the uterus to aid contraction of the uterus.

If these measures prove to be ineffective other modalities of treatment include:

* **Uterine / vaginal** [**tamponade**](https://www.myvmc.com/medical-dictionary/tamponade/) – where a balloon like device is inserted into the uterus and filled with fluid until it expands and exerts pressure on the wall of the uterus.
* **Aortic** [**tamponade**](https://www.myvmc.com/medical-dictionary/tamponade/) **–** The use of pressure through the abdominal wall to compress the aorta against the spine may slow the rate of blood loss.

 **Surgical therapies**

* [**B-lynch suture**](https://www.myvmc.com/medical-dictionary/b-lynch-suture/) – this method aims to exert continuous vertical compression by way of a suture that runs the full thickness of both the anterior and posterior uterine walls.
* [**Uterine artery ligation**](https://www.myvmc.com/medical-dictionary/uterine-artery-ligation/) – the uterine arteries are the major source of blood to the uterus and hence the ligation (tying off) of these arteries is a method of controlling postpartum haemorrhage. The uterus remains viable due to blood feeding into it from smaller vessels. Subsequent menstruation and pregnancies are unaffected by this procedure.
* [**Internal iliac artery ligation**](https://www.myvmc.com/medical-dictionary/internal-iliac-ligation/) – this can also be performed in an attempt to control postpartum haemorrhage or in any situation associated with uncontrolled pelvic bleeding. Care must be taken to positively identify both the external and internal branches of the iliac artery as ligation of the external iliac artery may result in loss of the lower limb. Care must also be taken to avoid the [ureter](https://www.myvmc.com/medical-dictionary/ureter/), which lies close by.
* [**Hysterectomy**](https://www.myvmc.com/medical-dictionary/hysterectomy/) – is an effective and often lifesaving procedure where the bleeding cannot be controlled by other methods. However, deaths do occur following and during hysterectomy in cases of massive haemorrhage and where the procedure is delayed until the patient is nearly moribund.

 **Non-surgical** **therapies**

* [**Selective pelvic arterial embolisation**](https://www.myvmc.com/medical-dictionary/selective-pelvic-arterial-embolisation/) – performed using radiologic guidance, this involves the insertion of a [catheter](https://www.myvmc.com/medical-dictionary/catheter/) through an artery in the leg, and is then fed through to the arteries supplying the uterus to occlude them. This procedure takes less than two hours.
* [**Recombinant factor VIIA**](https://www.myvmc.com/medical-dictionary/recombinant-factor-vii/) **(Novoseven)** – is an artificial clotting factor. Its effectiveness as a primary therapy in the treatment of postpartum haemorrhage is still being investigated, however, several case reports suggest that the use of recombinant factor VIIA is effective in treating ongoing bleeding in massively transfused patients. Its use requires consultation with at least two hospital consultants which should include an obstetrician/surgeon, anaesthetist and/or haematologist.

**Management of secondary postpartum haemorrhage**

The first step in managing the women with a secondary postpartum haemorrhage is to objectively measure and/or assess the amount of previous and ongoing blood loss and to monitor vital signs including temperature, pulse, respirations and blood pressure.

If the woman is [shocked](https://www.myvmc.com/medical-dictionary/hypovolaemic-shock/) or there is significant ongoing blood loss an emergency code is called for prompt resuscitation. The women should be transferred to theatre where an examination under anaesthetic can take place. Two intravenous cannulae are inserted with bloods samples taken. Intravenous antibiotics are initiated along with medications to aid contraction of the uterus. Bimanual compression of the uterus may be required if the ongoing blood loss is severe.

If the woman is stable, an intravenous cannula will still need to be inserted with a blood sample taken. The size of the uterus is assessed and the cervix examined. Examination of the cervix involves insertion of a speculum into the vagina, a similar process as involved in a pap smear.

All women with a secondary postpartum haemorrhage following a caesarean section will be admitted to hospital due to the risk of significant continued bleeding from infection and other causes.

Clinical examination will elucidate the cause, which can then be treated as appropriate. In many cases, initial treatment involves the use of antibiotics to control infection. If blood loss has not settled 24 hours post antibiotic therapy, then examination under anaesthetic is considered.

Selective pelvic arterial embolisation is considered for women with ongoing significant blood loss, especially if the woman has had a previous caesarean section.

Where the woman continues to bleed following examination under anaesthetic, other options include uterine tamponade, use of recombinant factors, laparotomy with ligation of uterine vessels or hysterectomy as for management of a primary postpartum haemorrhage.

**Pain during childbirth**

Almost all women experience **pain during childbirth**. [Pain](https://www.myvmc.com/anatomy/pain/) is an expected symptom of [labour](https://www.myvmc.com/anatomy/stages-of-labour/) and varies in severity. The majority of women experience severe labour pain, with only a small number reporting minor or no discomfort. **Severe pain during labour** can be associated with some physiological adverse effect such as:

1. Delayed gastric emptying which can increases the risk of aspiration and/or [hyperventilation](https://www.myvmc.com/medical-dictionary/hyperventilation/).
2. Increased [sympathetic nervous system](https://www.myvmc.com/medical-dictionary/sympathetic-nervous-system/) effects leading to [hypertension](https://www.myvmc.com/diseases/hypertension-high-blood-pressure/), [tachycardia](https://www.myvmc.com/medical-dictionary/tachycardia/) and/or potential placental hyperfusion.

The onset of labour is denoted by **rhythmic and forceful contraction** of the [uterus](https://www.myvmc.com/medical-dictionary/uterus/). There are three stages of labour, the first, [second](https://www.myvmc.com/medical-dictionary/second-stage-of-labour/) and [third](https://www.myvmc.com/medical-dictionary/third-stage-of-labour/) stages. Pain during the first stage of labour is generally felt in the lower abdomen, groins and lower lumbar and sacral regions. This is due to the [dilation of the cervix](https://www.myvmc.com/medical-dictionary/cervical-dilation/) and the lower segment of uterine followed by distension of the uterine body. On the other hand, the second stage of labour is associated with the lower back and anorectal pain, which is due to contraction of the uterus and pressure on the pelvic floor.

 **The management of childbirth**

Management of pain during childbirth falls into two categories, the **non-pharmacological (non-drug)** and **pharmacological (drug)** approaches.

 **Non-pharmacological control**

**Antenatal instruction**

Prior antenatal classes of the [pregnant](https://www.myvmc.com/health-topics/pregnancy/) women about childbirth and non-pharmacological approaches of pain management can assists with analgesia during labour.

**Relaxation and breathing techniques**

Controlled breathing techniques applied during contraction, with support of partner or friends, can help with coping of labour.

**Positioning and movement**

Maintaining mobility is thought to play a role in reduction of childbirth pain. Altering positioning of pregnant women to whichever that is comfortable may be beneficial. However, lying flat on the back should be avoided due to the possibility of decreased placental blood supply, maternal hypotension and nausea.

**Heat and cold, showering, massage**

These are some extra non-pharmacological measures that can be experimented in order to alleviate the pain. Have your partner massaging your back as counterpressure may help to reduce the pain.

**Transcutaneous eletrical nerve stimulation**

Using [transcutaneous electrical nerve stimulation (TENS)](https://www.myvmc.com/devices/transcutaneous-electrical-nerve-stimulation-tens-devices/) during labour may help to reduce the pain, in approximately 20% of women.

**Hypnosis and medical acupuncture**

There is insufficient evidence to suggest the benefits of such therapies in management of childbirth pain.

 **Pharmacological control**

There are several pharmacological techniques available for **pain management during childbirth**, which include inhalational analgesia, parenteral opioid administration [epidural analgesia](https://www.myvmc.com/treatments/epidural-analgesia/), and [spinal anaesthesia](https://www.myvmc.com/treatments/spinal-anaesthesia/).

**Bupivacaine hydrochloride**

[Bupivacaine](https://www.myvmc.com/medical-dictionary/bupivacaine/) is a local anaesthetic that stabilises the neuronal membrane and prevents the initiation and transmission of nerve impulses. This drug is very potent, four times that of lignocaine, and has a rapid onset of anaesthesia with prolonged duration of action. Bupivacaine is suitable for continuous epidural blockade.

**Ropivacaine hydrochloride**

This drug also behave in the same manner as bupivacaine with exception that [ropivacaine](https://www.myvmc.com/medical-dictionary/ropivacaine/) has both anaesthetic and analgesic effects. At higher doses it produces surgical anaesthesia with motor block, while at lower doses it produces a sensory block, including analgesia, with little motor block.

**Lignocaine hydrochloride**

This medicine has the same mechanism of anaesthetic action to that of bupivacaine and ropivacaine.

**Inhalational analgesia**

[Entonox](https://www.myvmc.com/medical-dictionary/entonox/) is a self-administered gas formulation from equal concentration of nitrous oxide and oxygen. Its analgesic properties are well established.

This is a less effective option in controlling pain during labour requiring high concentration of nitrous oxide in order to provide adequate pain relief. Thus it is often accompanied with side effects such as drowsiness, [nausea](https://www.myvmc.com/symptoms/nausea-and-vomiting-emesis/), [vomiting](https://www.myvmc.com/symptoms/nausea-and-vomiting-emesis/) and nitrous oxide gas intolerability.

Nitrous oxide requires minimum of 45 seconds to achieve maximal effective analgesia concentration. In order for this therapy to be effective it needs to be administered at least 45 seconds before the peak uterine contraction. Its administration should be discontinued once the contraction has subsided to prevent excessive sedation.

**Parental opioids**

IV or IM injection of pethidine or morphine is historically common. Although pethidine is the most commonly prescribed opioid during labour because of its shorter half-life compared to [morphine](https://www.myvmc.com/medical-dictionary/morphine/), use of systemic opiates is declining because of their side effects: sedation/confusion in the mother, nausea and vomiting, and neonatal respiratory depression as well as limited evidence for their efficacy.

**Pethidine**

Pethidine is a potent drug used to relieve severe or constant pain such as childbirth pain, which cannot be controlled by any other pain relievers. [Pethidine hydrochloride](https://www.myvmc.com/drugs/pethidine-injection-bp-dbl/) is a synthetic opioid with analgesic and sedative properties. It exerts its effects by acting on specific opioid receptors in the brain, through which they block the pain messages being delivered. In doing so, Pethidine decreases the brain’s awareness of the pain and provides pain relieve to the patient.

Like any other analgesics, Pethidine produces respiratory depression, drowsiness, sedation, mood changes, mental clouding, nausea, vomiting, and [electroencephalographic (EEG)](https://www.myvmc.com/investigations/electroencephalogram-eeg/) changes. Administration of large doses of pethidine may cause excitation and convulsions.

**Morphine**

Morphine is an opioid with sedative properties used to relieve severe or constant pain such as childbirth pain, which cannot be controlled by any other pain relievers. Morphine exerts its analgesic effects by acting as an agonist and activating the opioid receptors in both the central and peripheral nervous systems. In doing so, the pain threshold is elevated and the brain’s awareness of the pain is decreased.

**Epidural analgesia**

Epidural analgesia is an injection of local anaesthetic that passes into the epidural space via a catheter. This is probably the most effective form of pain relief in labour. It is usually inserted at the L2/3 or L3/4 space. It should provide complete motor and sensory blockade (except pressure afferent fibres). The level of epidural block usually extends distal from the upper abdomen.

In most centres, a combination of local anaesthetic and opiate is administered via the epidural catheter. This method improves pain control, uses a smaller dose of either drug, and therefore has fewer side effects.

There are medical reasons to advise for epidural anaesthesia such as prolonged labour, to lower hypertension, abolish premature sensation to push and in instrumental or Caeserean delivery.

As a consequence of epidural analgesia, women become immobile and require more frequent observations by a midwife. They will also require a catheter to avoid urinary retention. Further complications include spinal tap with severe secondary headache, intravascular injection of local anaesthetic (toxicity), low blood pressure, and maternal fever.

Epidural is strictly contraindicated in cases of maternal sepsis, any coagulopathy, neurological disease, spinal abnormalities, or hypovolaemia. Epidural is considered safe however in experienced professionals. Therefore, in such cases patient-controlled analgesia (PCA) can be used, only when appropriate facilities are available.

Some examples of epidural analgesia include bupivacaine hydrochloride, ropivacaine hydrochloride and lignocaine hydrochloride.

**Spinal anaesthesia**

Spinal anaesthesia is a local anaesthetic is injected into the [CSF](https://www.myvmc.com/medical-dictionary/cerebrospinal-fluid-csf/), which is readily effective with a short half-life. The main complications are hypotension. In a patient without epidural catheter, it is the method of choice for caesarean section.