



La-Net

OBG 509

**LABOUR AND ITS
COMPLICATIONS,
OPERATIVE OBSTETRICS,
NEWBORN BABY,
PUERPERIUM AND ITS
ABNORMALITIES,
SAFE MOTHERHOOD**



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Course code: OBG 509

Course title: Labour and its Complications, Operative Obstetrics, Newborn Baby, Puerperium and its Abnormalities, Safe Motherhood

Course credit load: 3 Units

Series 1: Physiology and Management of Labour

- **Part 1.1: Physiology of Labour**
 - Sub Part 1.1.1: Onset and phases of normal labour
 - Sub Part 1.1.2: Uterine contractions and cervical change
 - Sub Part 1.1.3: Mechanism of labour
- **Part 1.2: Management of Labour and the Partogram**
 - Sub Part 1.2.1: First stage management
 - Sub Part 1.2.2: Second and third stage management
 - Sub Part 1.2.3: Use of the partogram
- **Part 1.3: Post-term Pregnancy**
 - Sub Part 1.3.1: Definition, incidence, and recurrence of post-term pregnancy
 - Sub Part 1.3.2: Physiological changes and complications of post-term pregnancy
 - Sub Part 1.3.3: Accurate pregnancy dating and membrane sweeping
- **Part 1.4: Induction of Labour**
 - Sub Part 1.4.1: Definition and indications for induction of labour
 - Sub Part 1.4.2: Methods of induction of labour
 - Sub Part 1.4.3: Induction versus expectant management in post-term pregnancy
- **Part 1.5: Managing Induction and its Challenges**
 - Sub Part 1.5.1: Failed induction of labour
 - Sub Part 1.5.2: Foetal surveillance during induction and post-term pregnancy
 - Sub Part 1.5.3: Complications of induction of labour



Introduction

Picture a woman in the final weeks of pregnancy, uncertain whether to wait for labour to begin naturally or to accept the offer of induction as her due date passes. Behind that seemingly simple decision lies a genuinely rich body of physiology and evidence: how labour actually begins and progresses, how it is safely monitored, and what happens when a pregnancy extends beyond term. This Series lays the essential foundation for the whole of this course, beginning with the physiology and management of normal labour before turning to post-term pregnancy and induction, the first of many clinical decisions that shape the course of childbirth.

The aim of this Series is to equip you with a thorough understanding of the physiology and management of normal labour, and the definition, causes, complications, and management of post-term pregnancy and induction of labour.

We shall commence this Series by examining the physiology of normal labour. Next, we will consider the management of labour, including the use of the partogram. Following that, our attention turns to post-term pregnancy, its incidence, physiological changes, and complications. We will then explore induction of labour and its methods. Finally, we will conclude by examining failed induction and the role of foetal surveillance.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 1.1:** describe the physiology of normal labour,
- **SLO 1.2:** describe the management of labour, including use of the partogram,
- **SLO 1.3:** define post-term pregnancy and induction of labour,
- **SLO 1.4:** describe the incidence and recurrence of post-term pregnancy,
- **SLO 1.5:** enumerate the physiological changes and complications associated with post-term pregnancy,
- **SLO 1.6:** describe interventions to reduce post-term pregnancy, including accurate pregnancy dating and membrane sweeping,
- **SLO 1.7:** discuss the management of post-term pregnancy, including induction versus expectant management, and
- **SLO 1.8:** describe failed induction of labour and the role of foetal surveillance.

1.1 Physiology of Labour



1.1.1 Onset and phases of normal labour

Labour is the physiological process by which the products of conception, the foetus, placenta, and membranes, are expelled from the uterus, marked by the onset of regular, painful uterine contractions accompanied by progressive cervical effacement and dilatation, distinguishing true labour from the irregular, non-progressive Braxton Hicks contractions that commonly occur throughout the later weeks of pregnancy without leading to cervical change.

Labour is traditionally divided into three stages: the first stage, from the onset of regular painful contractions to full cervical dilatation, further subdivided into a slower latent phase and a faster active phase; the second stage, from full dilatation to delivery of the baby; and the third stage, from delivery of the baby to delivery of the placenta and membranes, each stage governed by distinct physiological processes and having a different expected duration and pattern of progress.

Fill in the blank: True labour is distinguished from Braxton Hicks contractions by progressive cervical effacement and _____. The first stage of labour is subdivided into a slower latent phase and a faster _____ phase.

1.1.2 Uterine contractions and cervical change

Effective uterine contractions in labour arise from coordinated, synchronised contraction of the myometrium, spreading from pacemaker sites near the uterine cornua in a wave that sweeps downward, with the fundus contracting more strongly and for longer than the lower segment, a phenomenon known as fundal dominance, essential for effective cervical dilatation and descent of the presenting part.

Cervical effacement (progressive shortening and thinning of the cervix, typically preceding significant dilatation in a primigravida but occurring simultaneously with dilatation in a multigravida) and cervical dilatation (progressive opening of the cervical os) together reflect the softening, remodelling effect of prostaglandins and mechanical pressure from the presenting part, with the rate of cervical dilatation in the active phase used as the principal objective marker of labour progress.

Fill in the blank: Stronger, longer contraction of the fundus compared with the lower segment is known as fundal _____. The rate of cervical dilatation in the active phase is used as the principal objective marker of labour _____.

1.1.3 Mechanism of labour

The mechanism of labour describes the sequence of positional changes the foetus undergoes as it negotiates the maternal pelvis during the second stage, comprising engagement, descent, flexion (bringing the smallest diameter of the foetal head to present), internal rotation (aligning the head with the widest pelvic diameter at each level), extension (as the head delivers beneath the pubic symphysis), and restitution and external rotation (as the shoulders rotate into the anteroposterior diameter).



Each step of this mechanism reflects the foetal head and body adapting passively to the changing shape and dimensions of the successive pelvic planes it must pass through, a process that, in a normal labour with an appropriately sized foetus and adequate uterine contractions, proceeds without active intervention, though recognising deviation from this expected sequence is an essential skill in identifying labour that is not progressing normally.

Fill in the blank: Flexion of the foetal head brings the _____ diameter of the head to present during labour. Internal rotation aligns the foetal head with the widest _____ diameter at each level of the pelvis.

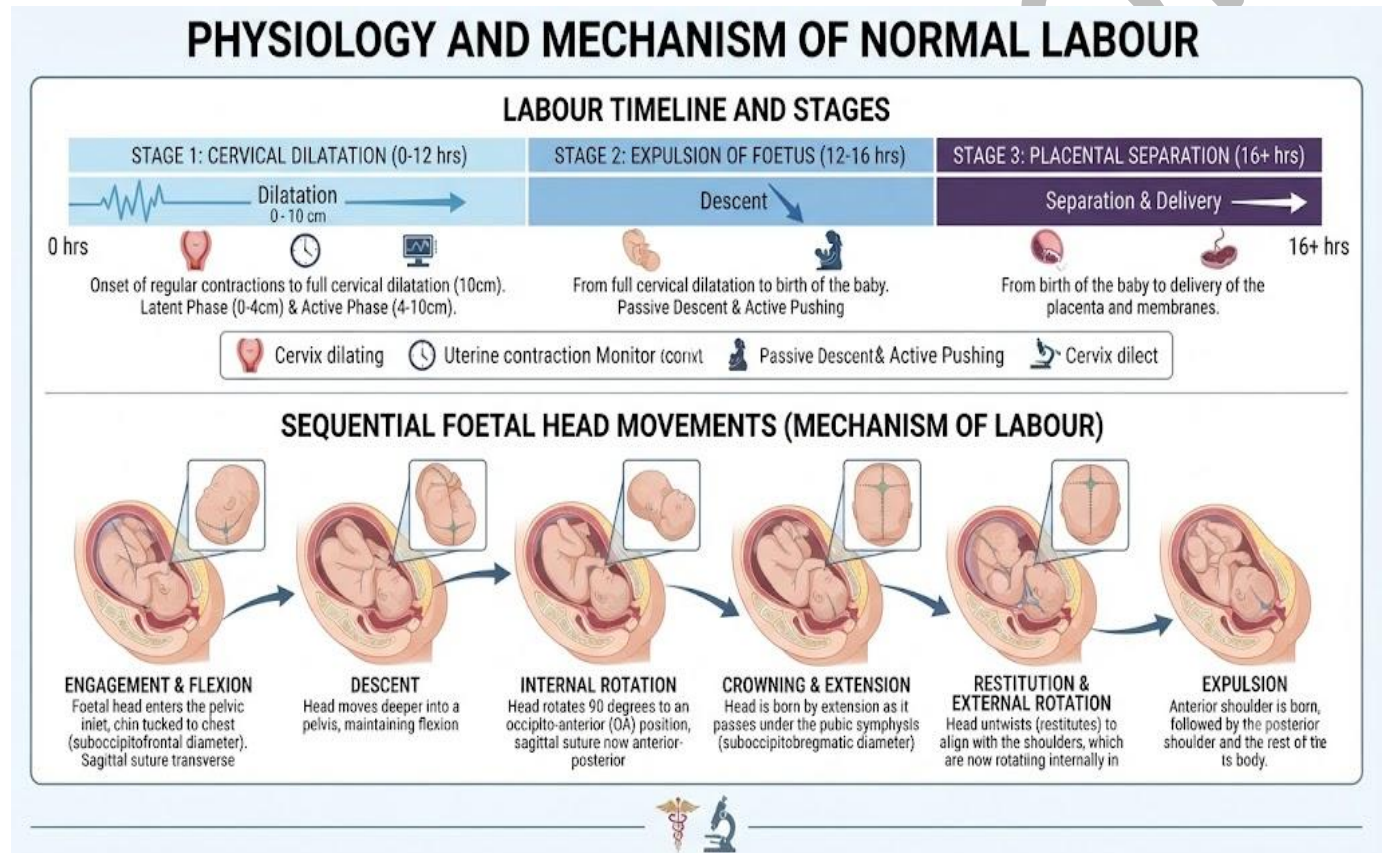


Figure 1.1: The three stages of labour and the mechanism of normal labour.

Pilot questions 1.1

1. Distinguish true labour from Braxton Hicks contractions. (Linked to SLO 1.1)
2. Describe the three stages of labour and their subdivisions. (Linked to SLO 1.1)
3. Explain the concept of fundal dominance and its importance. (Linked to SLO 1.1)
4. Distinguish cervical effacement from cervical dilatation. (Linked to SLO 1.1)
5. Describe the mechanism of normal labour. (Linked to SLO 1.1)



1.2 Management of Labour and the Partogram

1.2.1 First stage management

Management of the first stage of labour includes regular maternal observations (pulse, blood pressure, and temperature), assessment of contraction frequency and strength, intermittent auscultation or continuous electronic monitoring of the foetal heart depending on the woman's risk category, and regular vaginal examination to assess cervical dilatation and descent of the presenting part, with the frequency of each observation guided by local protocol and the woman's individual risk status.

Supportive care throughout the first stage, including appropriate analgesia, encouragement of mobility where safe and desired, adequate hydration, and continuous emotional support, meaningfully contributes to a positive labour experience and, in some circumstances, to more efficient labour progress, reflecting the recognition that management of labour extends well beyond clinical observation alone to encompass the woman's overall wellbeing and experience of childbirth.

Fill in the blank: Assessment of cervical dilatation and descent of the presenting part is performed by regular _____ examination. Supportive care throughout the first stage includes analgesia, mobility, hydration, and emotional _____.

1.2.2 Second and third stage management

Management of the second stage involves continued maternal and foetal monitoring, guidance and support of maternal pushing efforts once full dilatation is confirmed, and preparation for delivery, with the duration of the second stage monitored against locally defined time limits that vary according to parity and the use of regional analgesia, prompting consideration of instrumental or operative delivery if progress becomes inadequate.

Active management of the third stage (prophylactic uterotonic administration, controlled cord traction, and cord clamping) is now recommended as routine practice for the great majority of deliveries, given robust evidence that it substantially reduces the risk of postpartum haemorrhage compared with expectant, physiological management of this final stage of labour.

Fill in the blank: The duration of the second stage is monitored against locally defined _____ limits, varying by parity and use of regional analgesia. Active management of the third stage substantially reduces the risk of postpartum _____.

1.2.3 Use of the partogram

The partogram is a standardised graphical tool used to monitor the progress of labour, plotting cervical dilatation against time alongside maternal and foetal observations, including foetal heart rate, contraction frequency and duration, and maternal vital signs, providing an at-a-glance visual record allowing early, objective recognition of labour deviating from an expected normal pattern.



The alert and action lines plotted on the partogram provide a structured, standardised threshold for escalating concern and intervention when cervical dilatation crosses the expected trajectory, with crossing of the alert line prompting closer observation and consideration of the underlying cause of slow progress, and crossing of the action line prompting active intervention, making the partogram a genuinely central tool in the safe, systematic conduct of labour, particularly valuable in resource-limited settings.

Fill in the blank: The partogram plots cervical dilatation against _____, alongside maternal and foetal observations. The partogram is particularly valuable in _____-limited settings for early recognition of abnormal labour progress.

Parameter	Frequency of Assessment
<u>Cervical Dilatation</u>	Every 4 hours (or more frequently if progress is slow).
<u>Foetal Heart Rate</u>	Every 30 minutes in active labour; every 15 minutes in second stage.
<u>Contractions</u>	Every 30 minutes; record frequency, duration, and strength.
<u>Maternal Vital Signs</u>	Pulse and blood pressure every 30 minutes to 1 hour; temperature every 4 hours.
<u>Alert Line</u>	Plotted to identify slow progress in labour; prompts closer monitoring.
<u>Action Line</u>	Plotted 4 hours to the right of alert line; crossing indicates need for intervention.

Table 1.2: Components and assessment frequency of the partogram.

Pilot questions 1.2

1. Describe the observations performed during management of the first stage of labour. (Linked to SLO 1.2)
2. Describe the components of supportive care during the first stage of labour. (Linked to SLO 1.2)
3. Describe the management of the second stage of labour. (Linked to SLO 1.2)
4. Describe active management of the third stage of labour and its benefits. (Linked to SLO 1.2)
5. Describe the purpose and components of the partogram, including the alert and action lines. (Linked to SLO 1.2)

1.3 Post-term Pregnancy

1.3.1 Definition, incidence, and recurrence of post-term pregnancy

Post-term pregnancy is defined as pregnancy continuing beyond 42 completed weeks of gestation, distinguished from a prolonged pregnancy sometimes loosely used to describe pregnancy extending beyond the estimated date of delivery but not yet reaching the formal post-



term threshold, with the precise definition carrying direct practical importance for the timing of recommended intervention.

The incidence of post-term pregnancy varies across populations, generally affecting a meaningful minority of pregnancies where accurate dating and routine induction policies are not consistently applied, and a woman with one post-term pregnancy carries an increased risk of post-term pregnancy recurring in a subsequent pregnancy, reflecting both genuine biological factors and, in some cases, the influence of imprecise pregnancy dating carried forward between pregnancies.

Fill in the blank: Post-term pregnancy is defined as pregnancy continuing beyond _____ completed weeks of gestation. A woman with one post-term pregnancy carries an increased risk of post-term pregnancy _____ in a subsequent pregnancy.

1.3.2 Physiological changes and complications of post-term pregnancy

As pregnancy extends beyond term placental function progressively declines, with reduced placental reserve capacity, decreasing amniotic fluid volume (oligohydramnios), and, in some pregnancies, evidence of foetal growth restriction or macrosomia depending on the individual pregnancy's underlying trajectory, changes that together contribute to a measurably increased risk of adverse outcome as gestation advances beyond term.

Complications associated with post-term pregnancy include an increased risk of meconium-stained liquor and meconium aspiration syndrome, macrosomia with associated risk of shoulder dystocia and birth trauma, placental insufficiency with resultant foetal compromise, and an increased rate of caesarean section and instrumental delivery, together with a measurably increased risk of stillbirth as gestation advances progressively beyond 42 weeks.

Fill in the blank: As pregnancy extends beyond term, placental function progressively _____, with decreasing amniotic fluid volume. Post-term pregnancy carries an increased risk of meconium-stained liquor and meconium _____ syndrome.

1.3.3 Accurate pregnancy dating and membrane sweeping

Accurate pregnancy dating from an early, first-trimester ultrasound scan is the single most important intervention in reducing the misclassification of pregnancies as post-term, as dating based on an uncertain last menstrual period or a later, less accurate scan can lead to a pregnancy being incorrectly labelled post-term when it is not, or, conversely, a genuinely post-term pregnancy being missed and management inappropriately delayed.

Membrane sweeping (digital separation of the chorionic membrane from the lower uterine segment during vaginal examination, stimulating local prostaglandin release) is a simple, low-risk intervention offered from around 40 to 41 weeks of gestation to reduce the likelihood of formal induction being required, with evidence supporting its effectiveness in modestly reducing the incidence of post-term pregnancy and the need for subsequent formal induction.



Fill in the blank: Accurate pregnancy dating from an early, first-trimester _____ scan is the single most important intervention in reducing misclassification. Membrane sweeping stimulates local _____ release by digital separation of the chorionic membrane.

Category	Key Details
<u>Meconium Aspiration</u>	Increased risk due to prolonged intrauterine stress and meconium-stained liquor.
<u>Macrosomia</u>	Larger foetal size leading to obstructed labour, shoulder dystocia, and birth trauma.
<u>Placental Insufficiency</u>	Ageing placenta reduces oxygen and nutrient supply, risking foetal compromise.
<u>Increased Operative Delivery</u>	Higher rates of induction, instrumental delivery, and caesarean section.
<u>Stillbirth</u>	Risk rises significantly beyond 42 weeks due to placental senescence.
<u>Accurate Dating</u>	Early ultrasound dating reduces misclassification of gestational age.
<u>Membrane Sweeping</u>	Simple intervention at term to promote spontaneous labour and reduce post-term incidence.

Box 1.3: Complications of post-term pregnancy and interventions to reduce its incidence.

Pilot questions 1.3

1. Define post-term pregnancy and distinguish it from prolonged pregnancy. (Linked to SLO 1.3)
2. Describe the incidence and recurrence risk of post-term pregnancy. (Linked to SLO 1.4)
3. Describe the physiological changes that occur as pregnancy extends beyond term. (Linked to SLO 1.5)
4. List the complications associated with post-term pregnancy. (Linked to SLO 1.5)
5. Explain the role of accurate pregnancy dating and membrane sweeping in reducing post-term pregnancy. (Linked to SLO 1.6)

1.4 Induction of Labour

1.4.1 Definition and indications for induction of labour

Induction of labour is the artificial initiation of labour before its spontaneous onset, indicated whenever the risk of continuing the pregnancy is judged to outweigh the risk of delivery, most commonly for post-term pregnancy, but also for pre-eclampsia, suspected foetal compromise,



prelabour rupture of membranes at term without spontaneous labour onset, and various maternal medical conditions where continuing pregnancy poses a disproportionate risk.

Assessment of cervical favourability using the Bishop score (assessing cervical dilatation, effacement, consistency, position, and station of the presenting part) before induction guides both the likely success of induction and the specific method selected, with a low, unfavourable Bishop score indicating a need for cervical ripening before formal induction with amniotomy and oxytocin is likely to succeed.

Fill in the blank: Induction of labour is indicated whenever the risk of continuing pregnancy is judged to outweigh the risk of _____. Cervical favourability before induction is assessed using the _____ score.

1.4.2 Methods of induction of labour

Methods of induction include membrane sweeping (a simple preliminary measure rather than formal induction itself), prostaglandin administration (vaginal or, less commonly, oral, used for cervical ripening in an unfavourable cervix), mechanical methods (balloon catheter, used as an alternative or adjunct to prostaglandins, particularly favoured in some settings given lower cost and comparable effectiveness), and amniotomy combined with oxytocin infusion once the cervix is sufficiently favourable.

The specific method and sequence chosen depends on the initial Bishop score, parity, any relevant contraindication (such as previous caesarean section, where prostaglandin use requires particular caution given an increased risk of uterine rupture), and local availability and protocol, with careful, continuous foetal monitoring throughout given the recognised risk of uterine hyperstimulation with several induction methods.

Fill in the blank: Mechanical methods of induction, such as a balloon catheter, are favoured in some settings given lower cost and comparable _____. Prostaglandin use requires particular caution in women with a previous _____ section given increased rupture risk.

1.4.3 Induction versus expectant management in post-term pregnancy

The choice between induction of labour and expectant management (continued surveillance with delivery only if a specific indication arises) in post-term pregnancy is guided by robust evidence that routine induction at or around 41 weeks reduces the risk of stillbirth and other adverse outcomes without a corresponding increase in caesarean section rate, findings that have progressively shifted clinical practice and guideline recommendations towards more proactive offer of induction as pregnancy approaches the post-term threshold.

Where expectant management is chosen, whether by clinical decision or informed maternal preference, increased surveillance is essential, typically including regular cardiotocography and ultrasound assessment of amniotic fluid volume, with a clear, mutually understood plan for when induction would become recommended rather than continuing indefinitely without a defined endpoint or trigger for reconsideration.



Fill in the blank: Routine induction at or around 41 weeks reduces the risk of stillbirth without a corresponding increase in _____ section rate. Expectant management requires increased surveillance, typically including regular cardiotocography and assessment of amniotic fluid _____.

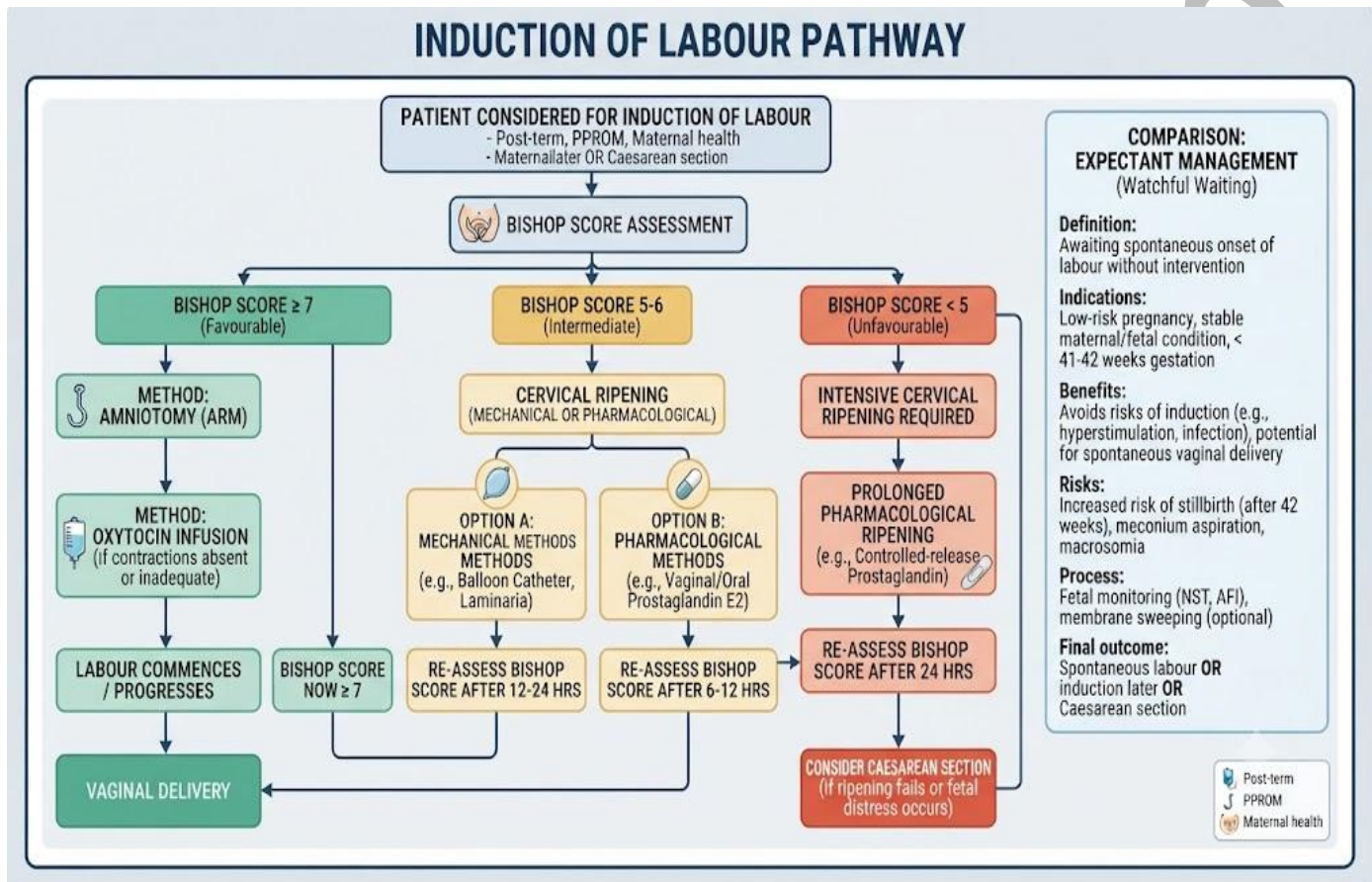


Figure 1.4: Induction of labour pathway according to Bishop score, and induction versus expectant management in post-term pregnancy.

Pilot questions 1.4

1. Define induction of labour and list its common indications. (Linked to SLO 1.3)
2. Describe the Bishop score and its role in guiding induction. (Linked to SLO 1.7)
3. Describe the methods used for induction of labour. (Linked to SLO 1.7)
4. Discuss the evidence comparing induction and expectant management in post-term pregnancy. (Linked to SLO 1.7)
5. Describe the surveillance required when expectant management of post-term pregnancy is chosen. (Linked to SLO 1.7)



1.5 Managing Induction and its Challenges

1.5.1 Failed induction of labour

Failed induction of labour is generally defined as failure to achieve a favourable cervix or establish effective labour despite an adequate, appropriately conducted course of induction, occurring in a meaningful minority of inductions, particularly in nulliparous women with an initially unfavourable cervix, and requiring careful reassessment and discussion of further options with the woman once identified.

Management options following failed induction include a further course of prostaglandin or mechanical cervical ripening if the cervix remains genuinely unfavourable and the clinical situation allows continued attempts, or, where the original indication for induction remains pressing or repeated attempts have already failed, proceeding to caesarean section, with the specific decision individualised according to the original indication for induction, the woman's preference, and overall clinical circumstances.

Fill in the blank: Failed induction occurs more commonly in nulliparous women with an initially _____ cervix. Management options following failed induction include further cervical ripening or proceeding to _____ section.

1.5.2 Foetal surveillance during induction and post-term pregnancy

Continuous or frequent intermittent foetal heart rate monitoring is essential throughout induction of labour, given the recognised risk of uterine hyperstimulation with several induction methods, particularly prostaglandins and oxytocin, which can compromise placental perfusion and cause acute foetal distress if not promptly recognised and managed by reducing or discontinuing the causative agent.

In post-term pregnancy more broadly, whether awaiting spontaneous labour, undergoing induction, or being managed expectantly, foetal surveillance typically includes cardiotocography and ultrasound assessment of amniotic fluid volume, given the recognised association between post-term pregnancy, declining placental function, and increased risk of foetal compromise, with the specific frequency and intensity of surveillance guided by local protocol and individual risk factors.

Fill in the blank: Uterine hyperstimulation during induction can compromise placental perfusion and cause acute foetal _____. Foetal surveillance in post-term pregnancy typically includes cardiotocography and assessment of amniotic fluid _____.

1.5.3 Complications of induction of labour

Complications of induction of labour include uterine hyperstimulation with associated foetal compromise, failed induction requiring caesarean section, an increased risk of postpartum haemorrhage from a uterus that may contract less effectively following prolonged oxytocin



exposure, and, rarely, uterine rupture, particularly in women with a previous caesarean section scar undergoing induction with prostaglandins.

Careful patient selection for induction, appropriate choice of method according to individual risk factors, continuous or frequent monitoring throughout the process, and prompt recognition and management of any complication that does arise, together meaningfully reduce the risk associated with induction of labour, reinforcing why induction, despite being a common and generally safe intervention, should never be regarded as entirely without risk or undertaken without genuine clinical indication.

Fill in the blank: Complications of induction include an increased risk of postpartum haemorrhage from a uterus that may contract less effectively following prolonged _____ exposure. Uterine rupture during induction is a particular risk in women with a previous _____ section scar.

Complication	Risk Factors	Preventive Measures
<u>Uterine Hyperstimulation</u>	High-dose oxytocin, prostaglandin use, multiple pregnancy	Careful titration of oxytocin, monitor contractions, discontinue agents if overstimulation occurs.
<u>Failed Induction</u>	Unfavourable cervix (low Bishop score), obesity, primigravida	Assess cervical readiness, use cervical ripening agents, allow adequate time before declaring failure.
<u>Postpartum Haemorrhage</u>	Prolonged labour, uterine atony, multiple pregnancy	Active management of third stage, uterotonics, close monitoring of blood loss.
<u>Uterine Rupture</u>	Previous caesarean section, grand multiparity, excessive uterine stimulation	Avoid induction in high-risk cases, use lower doses, continuous foetal and maternal monitoring.

Table 1.5: Complications of induction of labour, risk factors, and preventive measures.

Pilot questions 1.5

1. Define failed induction of labour and describe the women most at risk. (Linked to SLO 1.8)
2. Describe the management options following failed induction of labour. (Linked to SLO 1.8)
3. Explain why continuous foetal surveillance is essential during induction of labour. (Linked to SLO 1.8)
4. Describe the foetal surveillance methods used in post-term pregnancy. (Linked to SLO 1.8)



5. Describe the complications of induction of labour. (Linked to SLO 1.8)

Series Summary

This Series has covered the physiology of normal labour, followed by its management, including the use of the partogram. It went on to examine post-term pregnancy, its incidence, physiological changes, and complications, before addressing induction of labour and its methods, and concluding with failed induction and the role of foetal surveillance.

You should now be able to describe the physiology and management of normal labour, define post-term pregnancy and induction of labour, describe the incidence, changes, and complications of post-term pregnancy, describe interventions to reduce it, discuss induction versus expectant management, and describe failed induction and foetal surveillance (Linked to SLOs 1.1 to 1.8).

Glossary of Terms

- **Bishop score:** a scoring system assessing cervical favourability before induction of labour.
- **Cervical effacement:** progressive shortening and thinning of the cervix during labour.
- **Failed induction of labour:** failure to achieve a favourable cervix or establish effective labour despite an adequate course of induction.
- **Fundal dominance:** stronger, longer contraction of the uterine fundus compared with the lower segment during labour.
- **Induction of labour:** the artificial initiation of labour before its spontaneous onset.
- **Membrane sweeping:** digital separation of the chorionic membrane from the lower uterine segment to stimulate local prostaglandin release.
- **Partogram:** a standardised graphical tool used to monitor the progress of labour.
- **Post-term pregnancy:** pregnancy continuing beyond 42 completed weeks of gestation.
- **Uterine hyperstimulation:** excessive uterine contraction frequency or duration, a recognised risk of induction of labour.
- **Meconium aspiration syndrome:** respiratory compromise in the newborn from inhalation of meconium-stained amniotic fluid, a recognised complication of post-term pregnancy.



- **Active management of the third stage:** a package of care comprising uterotonic administration, controlled cord traction, and cord clamping, reducing PPH risk.
- **Expectant management:** continued surveillance of a pregnancy with delivery only if a specific indication arises, an alternative to induction.

Concept Check Questions [Series 1]

Objective questions

1. The first stage of labour is subdivided into a slower latent phase and a faster _____ phase.
2. Stronger, longer contraction of the fundus compared with the lower segment is known as fundal _____.
3. Post-term pregnancy is defined as pregnancy continuing beyond _____ completed weeks of gestation.
4. Cervical favourability before induction is assessed using the _____ score.
5. Uterine rupture during induction is a particular risk in women with a previous _____ section scar.

Short-answer questions

6. Explain the concept of fundal dominance and its importance. (Linked to SLO 1.1)
7. Describe the purpose and components of the partogram, including the alert and action lines. (Linked to SLO 1.2)
8. List the complications associated with post-term pregnancy. (Linked to SLO 1.5)
9. Discuss the evidence comparing induction and expectant management in post-term pregnancy. (Linked to SLO 1.7)
10. Explain why continuous foetal surveillance is essential during induction of labour. (Linked to SLO 1.8)

Long-answer questions

11. Describe the physiology of normal labour and its three stages. (Linked to SLO 1.1)
12. Describe the management of labour, including the use of the partogram. (Linked to SLO 1.2)



13. Define post-term pregnancy and describe its incidence, physiological changes, and complications. (Linked to SLO 1.3, SLO 1.4, SLO 1.5)
14. Describe the methods of induction of labour and the comparison with expectant management in post-term pregnancy. (Linked to SLO 1.6, SLO 1.7)
15. Describe failed induction of labour and the role of foetal surveillance. (Linked to SLO 1.8)

Answers to Concept Check Questions [Series 1]

Objective questions

1. Active.
2. Dominance.
3. 42.
4. Bishop.
5. Caesarean.

Short-answer questions

6. Fundal dominance ensures the fundus contracts more strongly than the lower segment, essential for effective cervical dilatation and descent.
7. The partogram plots cervical dilatation against time, with alert and action lines prompting closer observation and active intervention respectively.
8. Meconium aspiration syndrome, macrosomia with shoulder dystocia risk, placental insufficiency, increased operative delivery, and stillbirth.
9. Routine induction around 41 weeks reduces stillbirth risk without increasing caesarean section rate compared with expectant management.
10. Uterine hyperstimulation can compromise placental perfusion and cause acute foetal distress if not promptly recognised and managed.

Long-answer questions



11. Basic response: Labour progresses through three stages governed by fundal dominance and progressive cervical change, with a defined mechanism of foetal descent.

Value-added response: The partogram provides objective, structured monitoring of labour progress, with alert and action lines guiding escalation of care.

12. Basic response: Post-term pregnancy is defined as beyond 42 weeks, with declining placental function and complications including meconium aspiration and stillbirth.

Value-added response: Accurate first-trimester dating and membrane sweeping both help reduce the incidence of post-term pregnancy and subsequent formal induction.

13. Basic response: Induction of labour is indicated when continuing pregnancy risk outweighs delivery risk, with the Bishop score guiding method selection.

Value-added response: Failed induction and continuous foetal surveillance both require careful individualised management, given the recognised risks of induction.

Answers to Pilot Questions [Series 1]

Part 1.1

1. True labour causes progressive cervical change with regular painful contractions; Braxton Hicks are irregular and non-progressive.
2. First stage (latent and active phases), second stage, and third stage, each with distinct physiology and duration.
3. The fundus contracts more strongly and longer than the lower segment, essential for effective dilatation and descent.
4. Effacement is shortening and thinning of the cervix; dilatation is progressive opening of the cervical os.
5. Engagement, descent, flexion, internal rotation, extension, and restitution and external rotation.

Part 1.2

1. Pulse, blood pressure, temperature, contraction assessment, foetal heart monitoring, and regular vaginal examination.
2. Appropriate analgesia, mobility where safe, adequate hydration, and continuous emotional support.



3. Continued monitoring, guidance of maternal pushing, and preparation for delivery, monitored against defined time limits.
4. It substantially reduces the risk of postpartum haemorrhage compared with expectant management of the third stage.
5. It plots cervical dilatation against time with maternal and foetal observations, with alert and action lines guiding escalation.

Part 1.3

1. Pregnancy beyond 42 completed weeks; prolonged pregnancy is a looser term for extension beyond the due date not yet reaching this threshold.
2. Incidence varies by population and dating accuracy; recurrence risk is increased in a subsequent pregnancy after one post-term pregnancy.
3. Declining placental function, reduced amniotic fluid volume, and variable growth trajectory as gestation extends.
4. Meconium aspiration syndrome, macrosomia, placental insufficiency, increased operative delivery, and stillbirth.
5. Accurate first-trimester dating reduces misclassification, and membrane sweeping modestly reduces post-term incidence and formal induction need.

Part 1.4

1. Artificial initiation of labour before spontaneous onset, indicated for post-term pregnancy, pre-eclampsia, and foetal compromise among others.
2. It assesses cervical dilatation, effacement, consistency, position, and station, guiding likely induction success and method.
3. Membrane sweeping, prostaglandins, mechanical balloon catheter, and amniotomy with oxytocin.
4. Routine induction around 41 weeks reduces stillbirth risk without increasing caesarean rate compared with expectant management.
5. Regular cardiotocography and ultrasound assessment of amniotic fluid volume, with a clear plan for reconsideration.

Part 1.5



- Failure to achieve a favourable cervix or effective labour despite adequate induction, more common in nulliparous women with an unfavourable cervix.
- Further cervical ripening if appropriate, or proceeding to caesarean section depending on the original indication and circumstances.
- Several induction methods risk uterine hyperstimulation, which can compromise placental perfusion and cause foetal distress.
- Cardiotocography and ultrasound assessment of amniotic fluid volume, guided by local protocol and individual risk.
- Uterine hyperstimulation, failed induction requiring caesarean, postpartum haemorrhage, and, rarely, uterine rupture.

References and Attributions [Series 1]

Textual References

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- National Institute for Health and Care Excellence (2021). Inducing Labour: NICE Guideline NG207. NICE.
- Royal College of Obstetricians and Gynaecologists (2013). Green-top Guideline No. 55: Induction of Labour at Term in Older Mothers. RCOG Press.

Figures, Plates, Tables, and Boxes

- Figure 1.1: The three stages of labour and the mechanism of normal labour. AI-generated using the prompt: "Create a professional medical diagram titled Physiology and Mechanism of Normal Labour, showing the three stages on a timeline and the sequential foetal head movements. Clean clinical educational diagram style."
- Table 1.2: Components and assessment frequency of the partogram. AI-generated using the prompt: "Create a clean reference table titled Components of the Partogram, listing monitored parameters and their assessment frequency. Simple clinical reference table style with outside border."



- Box 1.3: Complications of post-term pregnancy and interventions to reduce its incidence. AI-generated using the prompt: "Create a simple single-column reference box with an outside border titled Post-Term Pregnancy: Complications and Prevention, listing complications and preventive interventions. Clinical reference box style."
- Figure 1.4: Induction of labour pathway according to Bishop score, and induction versus expectant management in post-term pregnancy. AI-generated using the prompt: "Create a professional medical flowchart titled Induction of Labour Pathway, branching by Bishop score to different induction methods, with a comparison to expectant management. Clean clinical educational diagram style."
- Table 1.5: Complications of induction of labour, risk factors, and preventive measures. AI-generated using the prompt: "Create a clean reference table titled Complications of Induction of Labour, listing complications, risk factors, and preventive measures. Simple clinical reference table style with outside border."



Course code: OBG 509

Course title: Labour and its Complications, Operative Obstetrics, Newborn Baby, Puerperium and its Abnormalities, Safe Motherhood

Course credit load: 3 Units

Series 2: Complications of Labour and Malpositions

- **Part 2.1: Prolonged Labour and Feto-pelvic Disproportion**
 - Sub Part 2.1.1: Definition and causes of prolonged labour
 - Sub Part 2.1.2: Feto-pelvic disproportion
 - Sub Part 2.1.3: Diagnosis of prolonged labour and disproportion
- **Part 2.2: Obstructed Labour**
 - Sub Part 2.2.1: Causes of obstructed labour
 - Sub Part 2.2.2: Clinical features of obstructed labour
 - Sub Part 2.2.3: Complications of obstructed labour
- **Part 2.3: Management of Obstructed Labour**
 - Sub Part 2.3.1: Principles of managing obstructed labour
 - Sub Part 2.3.2: Mode of delivery in obstructed labour
 - Sub Part 2.3.3: Prevention of obstructed labour
- **Part 2.4: Face, Brow, and Other Malpresentations**
 - Sub Part 2.4.1: Face presentation
 - Sub Part 2.4.2: Brow presentation
 - Sub Part 2.4.3: Occipito-posterior position and other malpositions
- **Part 2.5: Obstetric Injuries and Uterine Rupture**
 - Sub Part 2.5.1: Perineal and genital tract injuries
 - Sub Part 2.5.2: Causes and risk factors for uterine rupture
 - Sub Part 2.5.3: Clinical features and management of uterine rupture



Introduction

In the last Series, we explored the physiology and management of normal labour, together with post-term pregnancy and induction. Not every labour, however, proceeds normally, and this Series turns to what happens when it does not: prolonged and obstructed labour, the malpresentations and malpositions that so often underlie them, and the serious injuries, including uterine rupture, that can follow when obstruction is not recognised and managed in time. These are among the most consequential topics in obstetric practice, and recognising them early is a genuinely life-saving skill.

The aim of this Series is to equip you with the knowledge to recognise, investigate, and manage prolonged and obstructed labour, face and brow presentation, occipito-posterior position, and obstetric injuries including uterine rupture.

We shall commence this Series by examining prolonged labour and feto-pelvic disproportion. Next, we will consider obstructed labour, its causes and clinical features. Following that, our attention turns to the management and prevention of obstructed labour. We will then explore face, brow, and other malpresentations. Finally, we will conclude by examining obstetric injuries and uterine rupture.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 2.1:** describe the definition and causes of prolonged labour and feto-pelvic disproportion,
- **SLO 2.2:** list the causes of obstructed labour and its clinical features,
- **SLO 2.3:** list the complications of obstructed labour,
- **SLO 2.4:** describe the management of obstructed labour, including mode of delivery,
- **SLO 2.5:** describe the prevention of obstructed labour,
- **SLO 2.6:** describe face and brow presentation,
- **SLO 2.7:** describe occipito-posterior position and other malpositions, and
- **SLO 2.8:** describe obstetric injuries and the causes, features, and management of uterine rupture.



2.1 Prolonged Labour and Feto-pelvic Disproportion

2.1.1 Definition and causes of prolonged labour

Prolonged labour refers to labour that progresses more slowly than expected, identified through careful, serial monitoring of cervical dilatation, most reliably using the partogram, where the rate of dilatation in the active first stage or the duration of the second stage falls outside the locally defined normal range for the woman's parity and circumstances. The underlying causes are traditionally grouped into three broad categories, often summarised as abnormalities of the power (inadequate or uncoordinated uterine contractions), the passenger (the foetus, including its size, presentation, position, or attitude), and the passage (the maternal pelvis, including its size, shape, and any soft tissue obstruction), with a careful, structured assessment of all three categories essential whenever labour is genuinely failing to progress as expected.

In practice more than one of these three categories frequently contributes simultaneously to a single episode of prolonged labour, and a systematic clinical assessment, rather than an assumption that only one single factor is responsible, is essential to correctly identify the dominant underlying cause and, in turn, select the most appropriate management strategy. For example, inefficient uterine action might itself be secondary to an underlying malposition of the foetal head, meaning that simply augmenting contractions with oxytocin without first identifying and addressing the malposition may prove ineffective, or, in some circumstances, genuinely unsafe for both mother and baby.

Fill in the blank: The causes of prolonged labour are traditionally grouped as abnormalities of the power, the passenger, and the _____. More than one of these categories frequently contributes _____ to a single episode of prolonged labour.

2.1.2 Feto-pelvic disproportion

Feto-pelvic disproportion (cephalopelvic disproportion) describes a mismatch between the size of the foetal head, or occasionally the foetal body more generally, and the dimensions of the maternal pelvis sufficient to prevent safe vaginal delivery without intervention, arising either from a genuinely small or abnormally shaped maternal pelvis, an unusually large foetus (as may occur with maternal diabetes or post-term pregnancy), or, very commonly, an unfavourable presentation or position that effectively presents a larger diameter of the foetal head to the pelvis than would otherwise be the case with a well-flexed, occipito-anterior presentation.

Importantly true disproportion is a clinical diagnosis made principally on the basis of poor labour progress despite adequate uterine contractions, rather than through antenatal pelvic measurement or estimation of foetal weight in isolation, both of which have repeatedly proved poor, unreliable predictors of whether an individual labour will in fact progress successfully to a safe vaginal delivery. This distinction matters greatly in clinical practice, as it discourages premature, unnecessary recourse to caesarean section purely on the basis of estimated measurements, favouring instead a genuine trial of labour with close, structured monitoring wherever it is safe to do so.



Fill in the blank: Feto-pelvic disproportion can arise from a small maternal pelvis, a large foetus, or an unfavourable foetal _____ or position. True disproportion is a clinical diagnosis based principally on poor labour progress despite adequate uterine _____.

2.1.3 Diagnosis of prolonged labour and disproportion

Diagnosis of prolonged labour relies primarily on the partogram, with cervical dilatation crossing the alert line prompting closer clinical review of contraction strength and frequency, foetal position and station, and any evidence of caput or moulding of the foetal head, all of which together help distinguish a labour that is genuinely obstructed from one that is simply progressing more slowly than typical but likely to progress further with time, adequate hydration, and, where appropriate, careful augmentation.

Vaginal examination findings of particular diagnostic value include the degree of moulding (overlap of the foetal skull bones, reflecting the pressure exerted by an unyielding pelvis) and caput succedaneum (soft tissue swelling of the foetal scalp), both of which increase in severity the longer labour remains obstructed, providing the examining clinician with valuable, tangible clinical evidence of the severity and duration of any underlying disproportion, information that history and abdominal examination alone cannot reliably provide.

Fill in the blank: Diagnosis of prolonged labour relies primarily on the _____, with dilatation crossing the alert line prompting closer review. Increasing moulding and _____ on vaginal examination provide evidence of the severity of obstruction.

Category	Example Causes
Power	Ineffective uterine contractions, uterine inertia, maternal exhaustion.
Passenger	Malpresentation (e.g., occiput posterior, breech), foetal macrosomia, multiple pregnancy.
Passage	Cephalopelvic disproportion, contracted pelvis, pelvic masses obstructing the birth canal.

Table 2.1: The three categories of causes of prolonged labour, with examples.

Pilot questions 2.1

- Describe the three categories traditionally used to classify the causes of prolonged labour. (Linked to SLO 2.1)
- Explain why more than one category of cause frequently contributes to prolonged labour. (Linked to SLO 2.1)
- Define feto-pelvic disproportion and describe its causes. (Linked to SLO 2.1)
- Explain why feto-pelvic disproportion is diagnosed clinically rather than by antenatal measurement. (Linked to SLO 2.1)



- Describe the value of assessing moulding and caput succedaneum in diagnosing prolonged labour. (Linked to SLO 2.1)

2.2 Obstructed Labour

2.2.1 Causes of obstructed labour

Obstructed labour occurs when a genuine mechanical obstruction prevents further descent of the presenting part despite strong, adequate uterine contractions, most commonly from cephalopelvic disproportion, malpresentation (such as brow or transverse lie), or malposition (such as a persistent occipito-posterior position), and, less commonly, from a pelvic mass or contracted pelvis from a previous pelvic fracture, rickets, or other structural pelvic abnormality.

In many low-resource settings, including much of Nigeria obstructed labour remains a significant, largely preventable cause of maternal and perinatal morbidity and mortality, reflecting a combination of factors including inadequate access to skilled birth attendance, delayed recognition of poor labour progress, and delayed access to emergency obstetric care once a genuine obstruction has developed, echoing the broader themes of preventable maternal mortality and the three delays framework encountered elsewhere in this programme of study.

Fill in the blank: Obstructed labour occurs when a genuine mechanical obstruction prevents further _____ of the presenting part. Obstructed labour remains a significant, largely preventable cause of maternal and perinatal _____ in many low-resource settings.

2.2.2 Clinical features of obstructed labour

The clinical features of obstructed labour develop progressively as the condition worsens, beginning with poor progress on the partogram despite strong, frequent contractions, and advancing to signs of maternal distress including tachycardia, dehydration, and ketosis from prolonged exertion without adequate intake, alongside increasing caput succedaneum and moulding of the foetal head, and, in advanced cases, a visibly distended, tender lower segment (Bandl's ring) as the uterus works ever harder against an unrelenting obstruction.

Foetal features of obstructed labour include an abnormal or absent foetal heart rate pattern, reflecting worsening foetal hypoxia as labour continues unresolved, and, in the most severe or prolonged cases, intrauterine foetal death, making prompt recognition of the early clinical features of obstructed labour, well before this most severe and tragic endpoint is reached, a genuinely critical clinical skill for anyone practising in a setting where obstructed labour remains a common presentation.

Fill in the blank: A visibly distended, tender lower uterine segment in advanced obstructed labour is termed a Bandl's _____. Prompt recognition of obstructed labour is essential, as the most severe and tragic endpoint is intrauterine foetal _____.



2.2.3 Complications of obstructed labour

The complications of obstructed labour are extensive and potentially devastating, including uterine rupture (a genuine obstetric emergency, discussed further later in this Series), postpartum haemorrhage from the resulting uterine atony that so often follows a prolonged, exhausting labour, sepsis, and obstetric fistula (vesicovaginal or rectovaginal) from prolonged, unrelieved pressure necrosis of the tissues trapped between the foetal head and the maternal pelvis.

Foetal complications include hypoxic-ischaemic encephalopathy from prolonged intrapartum hypoxia, birth trauma, and stillbirth, together representing a genuinely devastating combination of maternal and foetal consequences that together underscore why obstructed labour, despite being largely preventable with timely, appropriate care, remains one of the most important and consequential conditions covered throughout this entire course, deserving genuine clinical vigilance wherever it may occur.

Fill in the blank: Prolonged, unrelieved pressure necrosis of trapped tissues in obstructed labour can result in obstetric _____. Foetal complications of obstructed labour include hypoxic-ischaemic _____ from prolonged intrapartum hypoxia.

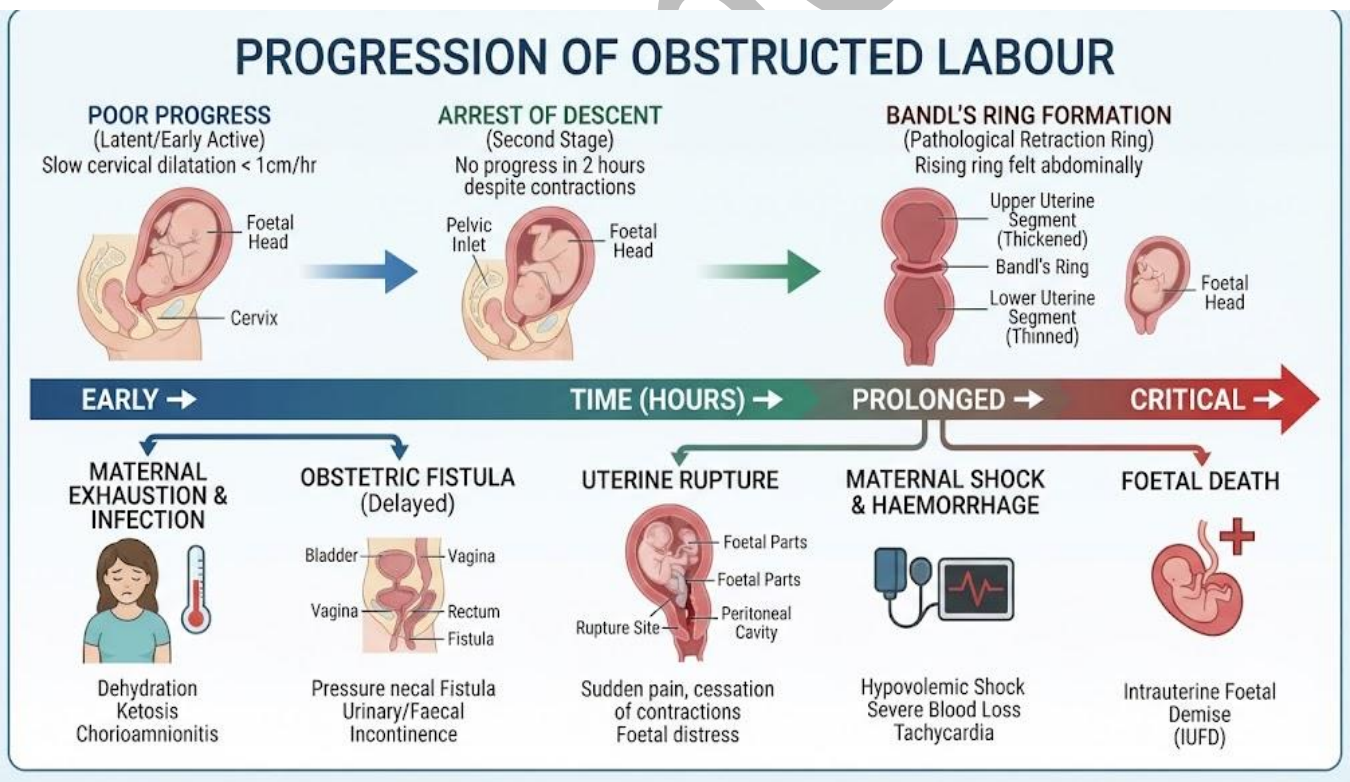


Figure 2.2: Progression of obstructed labour from poor progress to its major complications.

Pilot questions 2.2

1. List the causes of obstructed labour. (Linked to SLO 2.2)



2. Explain why obstructed labour remains a significant preventable cause of maternal mortality in low-resource settings. (Linked to SLO 2.2)
3. Describe the clinical features of obstructed labour, including Bandl's ring. (Linked to SLO 2.2)
4. List the maternal complications of obstructed labour. (Linked to SLO 2.3)
5. List the foetal complications of obstructed labour. (Linked to SLO 2.3)

2.3 Management of Obstructed Labour

2.3.1 Principles of managing obstructed labour

Once obstructed labour has been diagnosed management follows the same general principles applied to any obstetric emergency established earlier in this programme: immediate resuscitation with intravenous fluids, correction of any dehydration or ketosis, broad-spectrum antibiotics given the significant risk of sepsis, and urgent delivery, with the specific mode of delivery determined by the foetal condition, the degree and cause of obstruction, and whether the foetus is alive or has already died before the woman is reached.

Continuous maternal and foetal monitoring throughout the resuscitation and preparation for delivery is essential, given the genuinely rapid potential for further deterioration in obstructed labour, and a clear, decisive management plan, communicated effectively to the entire clinical team and, wherever possible, to the woman and her family, avoids the harmful, sometimes fatal delay that can occur when management decisions are made hesitantly or without adequate senior clinical involvement in a situation that, by its very nature, allows little room for indecision.

Fill in the blank: Management of obstructed labour includes resuscitation, correction of dehydration, broad-spectrum antibiotics, and urgent _____. A clear, decisive management plan avoids harmful _____ in a situation that allows little room for indecision.

2.3.2 Mode of delivery in obstructed labour

Caesarean section is the mode of delivery of choice for obstructed labour with a live foetus, performed as an emergency once the woman has been adequately, though rapidly, resuscitated, with careful surgical technique essential given the frequently oedematous, friable lower uterine segment and the increased risk of extension of the uterine incision or injury to adjacent structures in this specific, technically more challenging clinical context.

Destructive operations (procedures that reduce the size of the foetal head or body to permit vaginal delivery) are now rarely performed in most modern obstetric settings, reserved almost exclusively for cases of confirmed intrauterine foetal death where the mother's overall clinical condition makes caesarean section a genuinely higher-risk option, an approach requiring specific



additional training and, given its rarity in contemporary practice, one increasingly taught and maintained through simulation-based training rather than frequent real clinical exposure.

Fill in the blank: Caesarean section is the mode of delivery of choice for obstructed labour with a _____ foetus. Destructive operations are now reserved almost exclusively for cases of confirmed intrauterine foetal _____.

2.3.3 Prevention of obstructed labour

Prevention of obstructed labour begins during antenatal care, with careful risk assessment identifying women with known risk factors, such as a very short maternal stature, a previous history of obstructed labour or caesarean section, or antenatal suspicion of malpresentation, and appropriate advance planning of delivery at a facility equipped and staffed to provide timely emergency obstetric care, including caesarean section, should the need arise during labour.

At a population level prevention also depends on broader, sustained investment in accessible antenatal and skilled birth attendance services, appropriate use of the partogram to enable early recognition of poor labour progress before genuine obstruction develops, and functioning, well-understood referral systems that allow timely transfer of a woman with evolving obstructed labour to a facility capable of providing definitive emergency obstetric care without the delays that so often prove fatal in this genuinely time-critical condition.

Fill in the blank: Prevention of obstructed labour begins during antenatal care with careful _____ assessment and advance delivery planning. Population-level prevention depends on accessible antenatal care, partogram use, and functioning _____ systems.

Category	Key Details
Resuscitation	Stabilise mother with IV fluids, oxygen, and monitoring of vital signs.
Antibiotics	Administer broad-spectrum antibiotics to reduce risk of sepsis.
Bladder Care	Catheterise to prevent bladder injury and monitor urine output.
Delivery	Expedite birth, usually via caesarean section; consider destructive procedures only if foetus is dead and caesarean is not feasible.
Postpartum Monitoring	Watch for haemorrhage, sepsis, fistula formation, and provide supportive care.
Antenatal Prevention	Early detection of risk factors, adequate antenatal care, and timely referral.
Population-Level Prevention	Improve maternal health services, skilled birth attendance, access to emergency obstetric care, and community education.

Box 2.3: Emergency management and prevention of obstructed labour.



Pilot questions 2.3

1. Describe the general principles of managing obstructed labour once diagnosed. (Linked to SLO 2.4)
2. Describe the mode of delivery for obstructed labour with a live foetus. (Linked to SLO 2.4)
3. Describe the role and modern indications for destructive operations. (Linked to SLO 2.4)
4. Describe the antenatal measures used to help prevent obstructed labour. (Linked to SLO 2.5)
5. Describe the population-level strategies important in preventing obstructed labour. (Linked to SLO 2.5)

2.4 Face, Brow, and Other Malpresentations

2.4.1 Face presentation

Face presentation occurs when the foetal head is fully extended rather than flexed, presenting the face as the leading part, most commonly arising secondary to an underlying cause of extension such as anencephaly, a large fibroid or pelvic mass altering the normal shape of the birth canal, or, in some cases, occurring without any clearly identifiable predisposing cause, and diagnosed by vaginal examination identifying facial landmarks (the mouth, nose, and orbital ridges) rather than the sutures and fontanelles typical of a cephalic vertex presentation.

The outcome of labour in face presentation depends critically on the position of the foetal chin (mentum): a mentoanterior position (chin towards the maternal pubis) can generally deliver vaginally, as the fully extended head is able to negotiate the pelvis in this specific orientation, while a mentoposterior position (chin towards the maternal sacrum) cannot deliver vaginally, as the fully extended neck and the fixed relationship between the foetal chest and the maternal sacral curve genuinely prevent further descent, making caesarean section necessary in this specific situation.

Fill in the blank: Face presentation occurs when the foetal head is fully extended, presenting the _____ as the leading part. A mentoposterior position of the foetal chin cannot deliver vaginally and requires _____ section.

2.4.2 Brow presentation

Brow presentation represents an intermediate degree of extension between the fully flexed vertex presentation and the fully extended face presentation, presenting the largest possible diameter of the foetal head, the mento-vertical diameter, to the maternal pelvis, making vaginal



delivery of a normally sized, term foetus in a persistent brow presentation genuinely impossible in the great majority of cases because of this unfavourably large presenting diameter.

Diagnosis of brow presentation is made by vaginal examination, identifying the anterior fontanelle on one side and the orbital ridges and root of the nose on the other, without palpating either the fully flexed occiput of a vertex presentation or the mouth and chin characteristic of a face presentation, and, once persistent brow presentation is confirmed, caesarean section is generally required, as spontaneous conversion to either a fully flexed vertex or a fully extended face presentation, while occasionally observed, cannot be relied upon during the course of labour.

Fill in the blank: Brow presentation presents the mento-_____ diameter, the largest possible diameter, to the maternal pelvis. Persistent brow presentation generally requires _____ section, as spontaneous conversion cannot be relied upon.

2.4.3 Occipito-posterior position and other malpositions

Occipito-posterior position (the foetal occiput lying towards the maternal sacrum rather than the pubis) is the most common malposition encountered in clinical practice, often associated with a longer, more painful labour, particularly characterised by significant backache, and a higher rate of instrumental delivery or caesarean section compared with the more favourable occipito-anterior position, though a genuine majority of cases will still ultimately rotate spontaneously to an occipito-anterior position and deliver vaginally without specific intervention.

Deep transverse arrest (failure of the foetal head to complete internal rotation, remaining persistently in the transverse position at the level of the pelvic mid-cavity despite adequate contractions and descent) represents a specific, recognised complication of occipito-posterior position, requiring either manual or instrumental rotation to complete delivery vaginally, or, where these measures are unsuccessful or judged inappropriate, caesarean section, with the specific approach chosen guided by the experience and training of the attending clinician and the overall clinical circumstances of the individual labour.

Fill in the blank: Occipito-posterior position is often associated with a longer labour and significant _____. Deep transverse arrest is failure of the foetal head to complete internal _____, remaining persistently transverse.



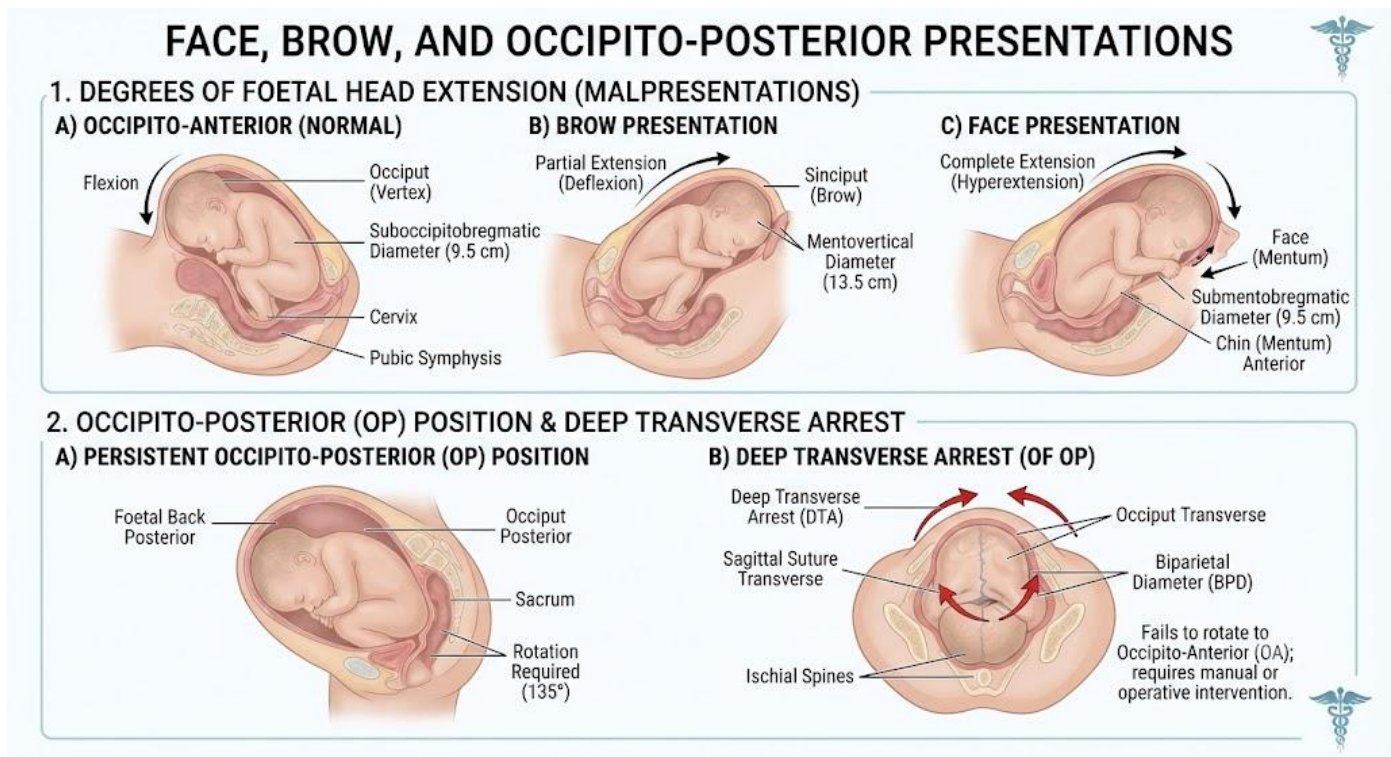


Figure 2.4: Progressive degrees of head extension in face and brow presentation, and occipito-posterior malposition.

Pilot questions 2.4

1. Describe the causes and diagnosis of face presentation. (Linked to SLO 2.6)
2. Explain why the position of the foetal chin determines the outcome of labour in face presentation. (Linked to SLO 2.6)
3. Describe brow presentation and explain why vaginal delivery is generally not possible. (Linked to SLO 2.6)
4. Describe the clinical features and typical outcome of occipito-posterior position. (Linked to SLO 2.7)
5. Describe deep transverse arrest and its management. (Linked to SLO 2.7)

2.5 Obstetric Injuries and Uterine Rupture

2.5.1 Perineal and genital tract injuries

Perineal trauma during vaginal delivery is common, classified by degree according to the depth and extent of tissue involved: first degree (skin only), second degree (skin and perineal muscles),



third degree (extending into the anal sphincter, further subdivided by the proportion of sphincter thickness torn), and fourth degree (extending through the anal sphincter into the rectal mucosa), with accurate classification directly guiding the specific repair technique required and the woman's subsequent risk of longer-term complications such as faecal incontinence.

Other genital tract injuries sustained during delivery include cervical tears (particularly associated with precipitate labour or instrumental delivery before full cervical dilatation), vaginal wall lacerations, and, rarely, injury to adjacent structures such as the bladder or urethra, all requiring careful, systematic examination immediately after delivery to ensure the full extent of any injury is identified and appropriately repaired before the woman leaves the delivery room.

Fill in the blank: Third degree perineal trauma extends into the anal _____, further subdivided by the proportion of thickness torn. Careful, systematic examination immediately after delivery ensures the full extent of any genital tract injury is identified and _____.

2.5.2 Causes and risk factors for uterine rupture

Uterine rupture (complete or partial disruption of the uterine wall) most commonly occurs at the site of a previous caesarean section scar, particularly during a trial of labour after caesarean section, though it can also occur in an unscarred uterus, particularly in the context of obstructed labour, especially in settings with limited access to timely emergency obstetric care, injudicious oxytocin use causing uterine hyperstimulation, or grand multiparity, each of which weakens the uterine wall's ability to withstand the mechanical stresses of labour.

Additional recognised risk factors for uterine rupture include a short interval between pregnancies following a previous caesarean section, a classical (vertical) rather than lower segment (transverse) uterine incision at previous caesarean section, which carries a substantially higher rupture risk, and any form of uterine instrumentation or trauma, with careful antenatal and intrapartum risk assessment essential in any woman with one or more of these recognised risk factors present, particularly during labour after a previous caesarean section.

Fill in the blank: Uterine rupture most commonly occurs at the site of a previous _____ section scar. A classical, vertical uterine incision at previous caesarean section carries a substantially higher rupture risk than a _____ segment incision.

2.5.3 Clinical features and management of uterine rupture

Uterine rupture classically presents with sudden, severe abdominal pain, sometimes described as a tearing sensation, that may paradoxically improve as uterine contractions cease following the rupture, alongside cessation of previously established contractions, vaginal bleeding (which may be less than expected given the severity of the underlying event, as bleeding is often predominantly intra-abdominal), and acute foetal compromise or foetal death, together constituting one of the most acutely life-threatening emergencies in obstetric practice.

Management requires immediate resuscitation following ABCDE principles and emergency laparotomy without delay, with the specific surgical approach, repair of the rupture versus



hysterectomy, determined by the extent and site of the rupture, the woman's haemodynamic stability, and her future fertility wishes where these can reasonably be balanced against the immediate, overriding priority of controlling what is often genuinely life-threatening haemorrhage.

Fill in the blank: Uterine rupture pain may paradoxically improve as uterine _____ cease following the rupture. Management of uterine rupture requires immediate resuscitation and emergency _____ without delay.

Category	Key Details
<u>First-Degree Trauma</u>	Injury limited to vaginal mucosa and perineal skin.
<u>Second-Degree Trauma</u>	Extends into perineal muscles but not anal sphincter.
<u>Third-Degree Trauma</u>	Involves anal sphincter complex (partial or complete).
<u>Fourth-Degree Trauma</u>	Extends through rectal mucosa, involving anal sphincter and rectal wall.
<u>Uterine Rupture Features</u>	Sudden severe abdominal pain, cessation of contractions, abnormal foetal heart rate, vaginal bleeding, loss of foetal station, maternal shock.

Table 2.5: Classification of perineal trauma and key clinical features of uterine rupture.

Pilot questions 2.5

- Describe the classification of perineal trauma by degree. (Linked to SLO 2.8)
- Describe the other genital tract injuries that can occur during delivery. (Linked to SLO 2.8)
- Describe the causes and risk factors for uterine rupture. (Linked to SLO 2.8)
- Describe the clinical features of uterine rupture. (Linked to SLO 2.8)
- Describe the emergency management of uterine rupture. (Linked to SLO 2.8)

Series Summary

This Series has covered prolonged labour and feto-pelvic disproportion, followed by obstructed labour, its causes, clinical features, and complications. It went on to examine the management



and prevention of obstructed labour, and face, brow, and other malpresentations, before concluding with obstetric injuries and uterine rupture.

You should now be able to describe the causes of prolonged labour and disproportion, list the causes, features, and complications of obstructed labour, describe its management and prevention, describe face and brow presentation and other malpositions, and describe obstetric injuries and uterine rupture (Linked to SLOs 2.1 to 2.8).

Glossary of Terms

1. **Bandl's ring:** a visibly distended, tender lower uterine segment seen in advanced obstructed labour.
2. **Brow presentation:** an intermediate degree of foetal head extension presenting the mento-vertical diameter to the maternal pelvis.
3. **Caput succedaneum:** soft tissue swelling of the foetal scalp, increasing in severity with prolonged or obstructed labour.
4. **Cephalopelvic disproportion:** a mismatch between foetal head size and maternal pelvic dimensions sufficient to prevent safe vaginal delivery.
5. **Deep transverse arrest:** failure of the foetal head to complete internal rotation, remaining persistently transverse at the pelvic mid-cavity.
6. **Face presentation:** a presentation in which the foetal head is fully extended, presenting the face as the leading part.
7. **Mentoposterior position:** a face presentation with the foetal chin towards the maternal sacrum, unable to deliver vaginally.
8. **Moulding:** overlap of the foetal skull bones reflecting the pressure exerted by an unyielding maternal pelvis.
9. **Obstetric fistula:** an abnormal connection, such as vesicovaginal or rectovaginal, resulting from prolonged pressure necrosis in obstructed labour.
10. **Obstructed labour:** labour in which a genuine mechanical obstruction prevents further descent of the presenting part despite strong contractions.
11. **Occipito-posterior position:** a foetal position with the occiput lying towards the maternal sacrum rather than the pubis.
12. **Uterine rupture:** complete or partial disruption of the uterine wall, most commonly at the site of a previous caesarean section scar.



Concept Check Questions [Series 2]

Objective questions

- The causes of prolonged labour are traditionally grouped as abnormalities of the power, the passenger, and the _____.
- A visibly distended, tender lower uterine segment in advanced obstructed labour is termed a Bandl's _____.
- Caesarean section is the mode of delivery of choice for obstructed labour with a _____ foetus.
- A mentoposterior position of the foetal chin cannot deliver vaginally and requires _____ section.
- Uterine rupture most commonly occurs at the site of a previous _____ section scar.

Short-answer questions

1. Explain why feto-pelvic disproportion is diagnosed clinically rather than by antenatal measurement. (Linked to SLO 2.1)
2. List the maternal complications of obstructed labour. (Linked to SLO 2.3)
3. Describe the role and modern indications for destructive operations. (Linked to SLO 2.4)
4. Explain why the position of the foetal chin determines the outcome of labour in face presentation. (Linked to SLO 2.6)
5. Describe deep transverse arrest and its management. (Linked to SLO 2.7)

Long-answer questions

6. Describe the causes and diagnosis of prolonged labour and feto-pelvic disproportion. (Linked to SLO 2.1)
7. Describe the causes, clinical features, and complications of obstructed labour. (Linked to SLO 2.2, SLO 2.3)



8. Describe the management and prevention of obstructed labour. (Linked to SLO 2.4, SLO 2.5)
9. Describe face and brow presentation and their implications for mode of delivery. (Linked to SLO 2.6)
10. Describe obstetric injuries and the causes, features, and management of uterine rupture. (Linked to SLO 2.8)

Answers to Concept Check Questions [Series 2]

Objective questions

11. Passage.
12. Ring.
13. Live.
14. Caesarean.
15. Caesarean.

Short-answer questions

16. Antenatal pelvic measurement and estimated foetal weight are poor, unreliable predictors of labour outcome, so diagnosis relies on labour progress.
17. Uterine rupture, postpartum haemorrhage, sepsis, and obstetric fistula.
18. Now reserved almost exclusively for confirmed intrauterine foetal death where caesarean section poses a higher maternal risk.
19. A mentoanterior position can deliver vaginally, while a mentoposterior position cannot, as the fixed relationship with the sacral curve prevents descent.
20. Persistent transverse arrest of the foetal head at the mid-cavity, managed with manual or instrumental rotation, or caesarean section.

Long-answer questions



21. Basic response: Prolonged labour arises from abnormalities of power, passenger, or passage, with disproportion diagnosed clinically by poor progress despite adequate contractions.

Value-added response: Obstructed labour progresses from poor partogram progress to Bandl's ring and serious complications including rupture, sepsis, and fistula, remaining a major preventable cause of mortality.

22. Basic response: Management of obstructed labour follows emergency principles with caesarean section as the mode of delivery for a live foetus, prevented by antenatal risk assessment and skilled birth attendance.

Value-added response: Face presentation outcome depends on chin position, while brow presentation almost always requires caesarean section given its unfavourable presenting diameter.

23. Basic response: Obstetric injuries range from perineal trauma to uterine rupture, with rupture presenting acutely and requiring immediate resuscitation and emergency laparotomy.

Answers to Pilot Questions [Series 2]

Part 2.1

1. Power (contractions), passenger (the foetus), and passage (the maternal pelvis).
2. More than one category often contributes together, such as inefficient contractions secondary to an underlying malposition.
3. A mismatch between foetal and pelvic dimensions preventing safe vaginal delivery, from a small pelvis, large foetus, or unfavourable position.
4. Antenatal measurement and estimated foetal weight are poor predictors, so diagnosis relies on observed labour progress.
5. Increasing moulding and caput reflect the severity and duration of obstruction, providing evidence unavailable from history alone.



Part 2.2

6. Cephalopelvic disproportion, malpresentation, malposition, and, less commonly, a pelvic mass or contracted pelvis.
7. It reflects delayed recognition and delayed access to emergency obstetric care, echoing the three delays framework.
8. Poor partogram progress, maternal distress, increasing caput and moulding, and a distended, tender Bandl's ring in advanced cases.
9. Uterine rupture, postpartum haemorrhage, sepsis, and obstetric fistula.
10. Hypoxic-ischaemic encephalopathy, birth trauma, and stillbirth.

Part 2.3

11. Resuscitation, correction of dehydration and ketosis, broad-spectrum antibiotics, and urgent delivery.
12. Caesarean section, performed as an emergency once the woman is adequately, though rapidly, resuscitated.
13. Reserved almost exclusively for confirmed intrauterine foetal death where caesarean poses a higher maternal risk.
14. Risk assessment for known risk factors and advance planning of delivery at a facility equipped for emergency obstetric care.
15. Accessible antenatal and skilled birth attendance services, partogram use, and functioning referral systems.

Part 2.4

1. Full extension of the foetal head, secondary to causes such as anencephaly or a pelvic mass, diagnosed by palpating facial landmarks.
2. A mentoanterior chin position allows vaginal delivery, while mentoposterior prevents descent, requiring caesarean section.
3. It presents the largest mento-vertical diameter to the pelvis, generally preventing vaginal delivery of a normally sized term foetus.



4. A longer, more painful labour with significant backache, though most cases still rotate spontaneously and deliver vaginally.
5. Persistent transverse arrest of the head at the mid-cavity, managed by manual or instrumental rotation or caesarean section.

Part 2.5

1. First (skin only), second (skin and muscle), third (extending into the anal sphincter), and fourth degree (through into rectal mucosa).
2. Cervical tears, vaginal wall lacerations, and, rarely, bladder or urethral injury.
3. Previous caesarean scar, obstructed labour, oxytocin misuse, grand multiparity, and a classical uterine incision.
4. Sudden severe pain that may paradoxically improve, cessation of contractions, bleeding, and acute foetal compromise.
5. Immediate ABCDE resuscitation and emergency laparotomy without delay, with repair or hysterectomy depending on findings.

References and Attributions [Series 2]

Textual References

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7. World Health Organization (2018). Managing Complications in Pregnancy and Childbirth: A Guide for Midwives and Doctors (2nd ed.). WHO Press.
8. Royal College of Obstetricians and Gynaecologists (2015). Green-top Guideline No. 26: Third and Fourth Degree Perineal Tears. RCOG Press.
9. National Population Commission and ICF (2019). Nigeria Demographic and Health Survey 2018. NPC and ICF.



Figures, Plates, Tables, and Boxes

1. Table 2.1: The three categories of causes of prolonged labour, with examples. AI-generated using the prompt: "Create a clean reference table titled Causes of Prolonged Labour: Power, Passenger, Passage, listing example causes under each category. Simple clinical reference table style with outside border."
2. Figure 2.2: Progression of obstructed labour from poor progress to its major complications. AI-generated using the prompt: "Create a professional medical diagram titled Progression of Obstructed Labour, showing a timeline from poor progress through Bandl's ring to major complications. Clean clinical educational diagram style."
3. Box 2.3: Emergency management and prevention of obstructed labour. AI-generated using the prompt: "Create a simple single-column reference box with an outside border titled Obstructed Labour: Emergency Management and Prevention, listing management steps and prevention strategies. Clinical reference box style."
4. Figure 2.4: Progressive degrees of head extension in face and brow presentation, and occipito-posterior malposition. AI-generated using the prompt: "Create a professional medical diagram titled Face, Brow, and Occipito-Posterior Presentations, showing degrees of head extension and occipito-posterior position with deep transverse arrest. Clean clinical educational diagram style."
5. Table 2.5: Classification of perineal trauma and key clinical features of uterine rupture. AI-generated using the prompt: "Create a clean reference table titled Perineal Trauma Classification and Uterine Rupture Features, listing trauma degrees and rupture clinical features. Simple clinical reference table style with outside border."



Course code: OBG 509

Course title: Labour and its Complications, Operative Obstetrics, Newborn Baby, Puerperium and its Abnormalities, Safe Motherhood

Course credit load: 3 Units

Series 3: Operative Obstetrics and Interventions

- **Part 3.1: Obstetric Analgesia: Non-Pharmacological and Systemic Methods**
 - Sub Part 3.1.1: Non-pharmacological methods of analgesia in labour
 - Sub Part 3.1.2: Systemic pharmacological analgesia
 - Sub Part 3.1.3: Choosing and counselling about labour analgesia
- **Part 3.2: Regional and General Anaesthesia in Obstetric Practice**
 - Sub Part 3.2.1: Epidural and spinal analgesia
 - Sub Part 3.2.2: Indications, contraindications, and complications of regional techniques
 - Sub Part 3.2.3: General anaesthesia in obstetric practice
- **Part 3.3: Instrumental Delivery: Forceps and Vacuum**
 - Sub Part 3.3.1: Indications and prerequisites for instrumental delivery
 - Sub Part 3.3.2: Forceps delivery technique
 - Sub Part 3.3.3: Vacuum delivery technique and comparison with forceps
- **Part 3.4: Destructive Operations and Symphysiotomy**
 - Sub Part 3.4.1: Destructive operations
 - Sub Part 3.4.2: Symphysiotomy
 - Sub Part 3.4.3: Modern role of destructive operations and symphysiotomy
- **Part 3.5: Caesarean Delivery**
 - Sub Part 3.5.1: Indications for caesarean section
 - Sub Part 3.5.2: Caesarean section technique



- Sub Part 3.5.3: Complications of caesarean section

Introduction

In the last Series, we explored the complications of labour and malpositions that can complicate an otherwise normal birth. We now turn to the interventions available to manage pain and, where necessary, to expedite or complete delivery: obstetric analgesia and anaesthesia, instrumental delivery by forceps and vacuum, the now rare destructive operations and symphysiotomy, and caesarean section, one of the most common major operations performed anywhere in the world. Mastering when and how to use each of these interventions is at the very heart of operative obstetric practice.

The aim of this Series is to equip you with the knowledge of obstetric analgesia and anaesthesia, instrumental delivery, destructive operations and symphysiotomy, and caesarean section.

We shall commence this Series by examining non-pharmacological and systemic analgesia in labour. Next, we will consider regional and general anaesthesia in obstetric practice. Following that, our attention turns to instrumental delivery by forceps and vacuum. We will then explore destructive operations and symphysiotomy. Finally, we will conclude by examining caesarean delivery, its indications, technique, and complications.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 3.1:** describe non-pharmacological and systemic analgesia in labour,
- **SLO 3.2:** describe regional and general anaesthesia in obstetric practice,
- **SLO 3.3:** describe the indications, prerequisites, and technique of forceps delivery,
- **SLO 3.4:** describe the technique of vacuum delivery,
- **SLO 3.5:** compare forceps and vacuum delivery,
- **SLO 3.6:** describe destructive operations and symphysiotomy and their modern role,
- **SLO 3.7:** describe the indications and technique of caesarean section, and
- **SLO 3.8:** describe the complications of caesarean section.



3.1 Obstetric Analgesia: Non-Pharmacological and Systemic Methods

3.1.1 Non-pharmacological methods of analgesia in labour

Non-pharmacological approaches to managing the pain of labour include continuous one-to-one support from a birth companion or doula (consistently associated with improved outcomes, including reduced need for pharmacological analgesia), maternal mobility and position change, breathing and relaxation techniques, warm water immersion, and transcutaneous electrical nerve stimulation, all of which offer genuine analgesic and psychological benefit without any of the recognised side effects associated with pharmacological methods, making them a valuable first-line option for many women, particularly during the earlier phases of labour.

The value of these approaches lies not only in direct pain relief but in supporting the woman's own sense of control and active participation in her labour, a psychological dimension increasingly recognised as genuinely important to the overall experience of childbirth, and one that should not be dismissed as merely supplementary or secondary to pharmacological pain relief, but rather integrated as a genuine, valued component of holistic intrapartum care offered to every labouring woman regardless of her eventual choice of further analgesia.

Fill in the blank: Continuous one-to-one support from a birth companion is consistently associated with reduced need for _____ analgesia. Non-pharmacological approaches support the woman's own sense of control and active _____ in her labour.

3.1.2 Systemic pharmacological analgesia

Systemic pharmacological analgesia in labour includes inhalational agents such as Entonox (a fixed mixture of nitrous oxide and oxygen, self-administered by the woman and offering rapid onset and offset well suited to the intermittent nature of labour pain), and parenteral opioids (such as pethidine or, increasingly, remifentanyl by patient-controlled infusion), each offering meaningful pain relief but with recognised side effects including maternal sedation, nausea, and, particularly with opioids given close to delivery, potential respiratory depression in the newborn requiring specific monitoring and, occasionally, reversal.

The choice of systemic analgesia should be individualised according to the stage and expected duration of labour, the woman's own preference, and any relevant contraindication, with clear counselling about the expected degree of pain relief, which for systemic opioids in particular is generally more modest than the substantial and more complete relief typically achieved with regional analgesic techniques discussed in the following sub-part.

Fill in the blank: Entonox is a fixed mixture of nitrous oxide and _____, self-administered by the labouring woman. Opioid analgesia given close to delivery carries a risk of respiratory _____ in the newborn requiring monitoring.

3.1.3 Choosing and counselling about labour analgesia



Effective counselling about labour analgesia should ideally begin during the antenatal period, allowing the woman genuine time to consider her preferences and ask questions away from the pressure and intensity of active labour itself, while remaining genuinely flexible and responsive to her wishes as labour actually progresses, recognising that a woman's preferences expressed antenatally may reasonably change once she is actually experiencing established labour.

A structured, stepwise approach to analgesia, beginning with non-pharmacological measures and escalating through systemic and, where appropriate and desired, regional techniques as labour progresses and the woman's needs evolve, respects both her autonomy and the genuinely dynamic, unpredictable nature of labour pain, avoiding either the extreme of withholding effective analgesia inappropriately or of imposing a particular method without adequate, genuine discussion of the woman's own informed preference.

Fill in the blank: Counselling about labour analgesia should ideally begin during the _____ period, allowing genuine time for consideration. A structured, stepwise approach respects the woman's autonomy and the _____, unpredictable nature of labour pain.

Method	Mechanism	Degree of Pain Relief	Key Side Effects
<u>Non-Pharmacological Methods</u>	Techniques such as breathing exercises, relaxation, massage, water immersion, and continuous support reduce anxiety and enhance coping.	Mild to moderate relief; highly variable depending on maternal preference and support.	Minimal side effects; may be insufficient for severe pain.
<u>Entonox</u>	Inhaled 50:50 nitrous oxide and oxygen mixture acts rapidly via central nervous system depression.	Moderate relief; effective for short painful episodes.	Dizziness, nausea, drowsiness; no significant effect on uterine contractions or foetus.
<u>Parenteral Opioids</u>	Systemic opioids (e.g., pethidine, morphine) act on opioid receptors to reduce pain perception.	Moderate relief; less effective than regional techniques.	Maternal sedation, nausea, vomiting; risk of neonatal respiratory depression.

Table 3.1: Comparison of non-pharmacological and systemic analgesic methods in labour.

Pilot questions 3.1

- Describe the non-pharmacological methods available for managing labour pain. (Linked to SLO 3.1)
- Explain the value of continuous one-to-one support during labour. (Linked to SLO 3.1)



- Describe the mechanism and use of Entonox in labour. (Linked to SLO 3.1)
- Describe the side effects associated with opioid analgesia in labour. (Linked to SLO 3.1)
- Describe a structured, stepwise approach to counselling about labour analgesia. (Linked to SLO 3.1)

3.2 Regional and General Anaesthesia in Obstetric Practice

3.2.1 Epidural and spinal analgesia

Epidural analgesia (local anaesthetic and opioid infused into the epidural space, providing continuous, titratable pain relief) offers the most effective, complete analgesia available for labour, generally well tolerated with recognised but manageable side effects including hypotension, motor block affecting maternal mobility, and a modestly increased likelihood of instrumental delivery, though robust modern evidence has substantially reassured clinicians and women that epidural analgesia does not meaningfully increase the overall rate of caesarean section.

Spinal anaesthesia (a single injection of local anaesthetic directly into the cerebrospinal fluid, providing rapid onset, dense anaesthesia) is the technique of choice for most caesarean sections performed under regional anaesthesia, offering the woman the considerable benefit of remaining awake for the birth while avoiding the risks associated with general anaesthesia, and combined spinal-epidural techniques are increasingly used where both the rapid onset of spinal anaesthesia and the flexibility of continued epidural infusion are desired for a longer procedure or an anticipated prolonged labour.

Fill in the blank: Epidural analgesia offers the most effective, complete analgesia available for labour, with recognised side effects including hypotension and motor _____. Spinal anaesthesia is the technique of choice for most caesarean sections, allowing the woman to remain _____ for the birth.

3.2.2 Indications, contraindications, and complications of regional techniques

Regional anaesthesia and analgesia are indicated for effective pain relief in labour, planned or emergency caesarean section where time and maternal condition allow, and instrumental delivery, but are contraindicated in the presence of maternal coagulopathy, systemic infection at the proposed injection site, haemodynamic instability, or the woman's own informed refusal, each of which substantially increases the risk of the procedure or renders it genuinely unsafe to perform.

Recognised complications of regional techniques include hypotension (from sympathetic blockade, managed with intravenous fluids and, where needed, vasopressor medication), post-dural puncture headache (following inadvertent dural puncture during epidural insertion,



generally self-limiting but occasionally requiring a specific blood patch procedure for relief), and, very rarely, more serious complications including epidural haematoma or abscess, each requiring prompt recognition and appropriate specialist management.

Fill in the blank: Regional anaesthesia is contraindicated in the presence of maternal _____, systemic infection at the injection site, or haemodynamic instability. Post-dural puncture headache may occasionally require a specific blood _____ procedure for relief.

3.2.3 General anaesthesia in obstetric practice

General anaesthesia in obstetric practice is generally reserved for situations where regional anaesthesia is contraindicated, has failed, or genuine time constraints in a true category one emergency caesarean section make the more rapid onset of general anaesthesia clinically necessary, though it carries recognised additional risks specific to the pregnant patient, including a substantially higher risk of difficult airway management from pregnancy-related airway changes and an increased risk of aspiration of gastric contents.

Preoperative preparation for general anaesthesia in the pregnant patient specifically includes antacid prophylaxis to reduce gastric acidity and, where time allows, appropriately experienced anaesthetic staff and equipment prepared in advance for the recognised possibility of a difficult intubation, reflecting the genuinely elevated risk profile of general anaesthesia in pregnancy compared with the non-pregnant population, a difference that should inform every aspect of its use in obstetric practice.

Fill in the blank: General anaesthesia in obstetric practice carries a substantially higher risk of difficult _____ management compared with the non-pregnant population. Preoperative preparation includes _____ prophylaxis to reduce gastric acidity before induction.



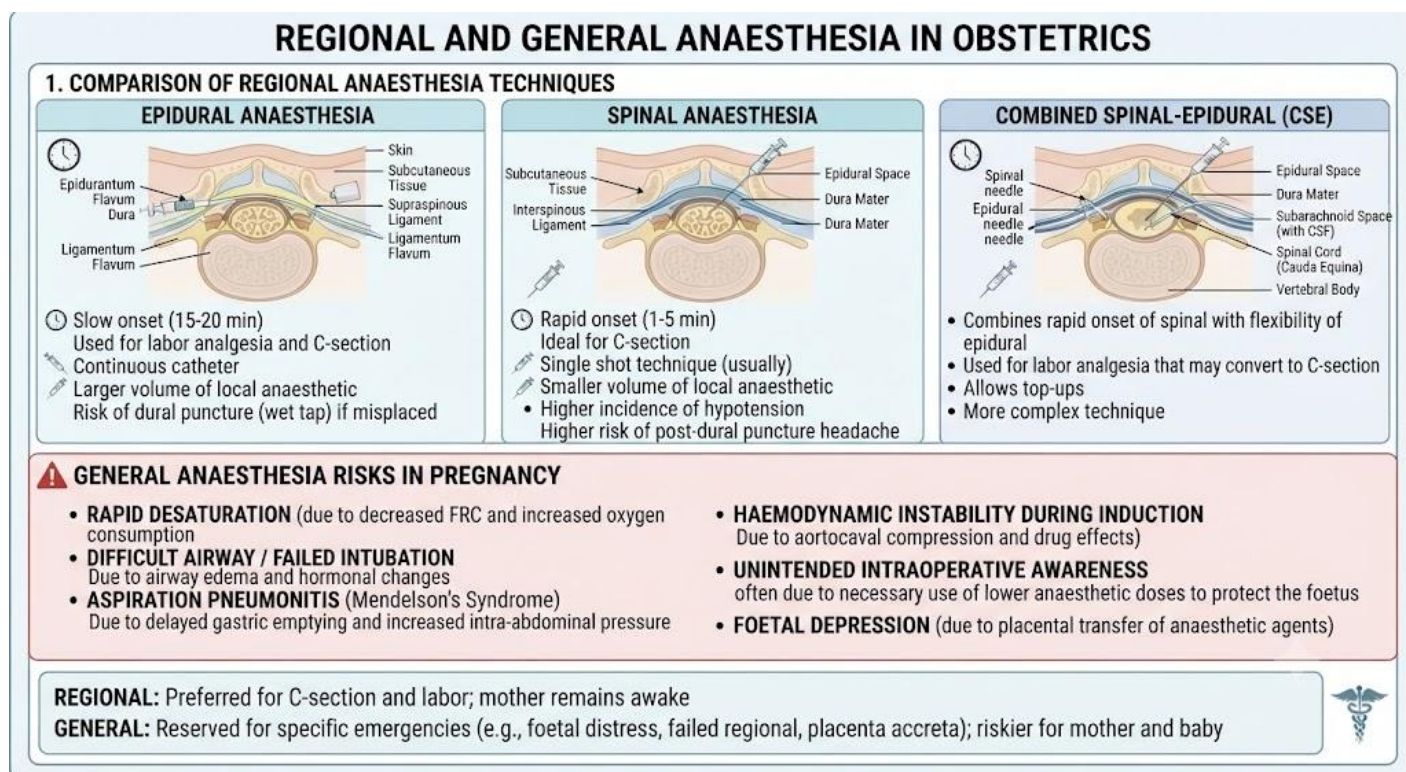


Figure 3.2: Comparison of regional anaesthetic techniques and the specific risks of general anaesthesia in pregnancy.

Pilot questions 3.2

1. Describe the mechanism and side effects of epidural analgesia. (Linked to SLO 3.2)
2. Describe spinal anaesthesia and its use in caesarean section. (Linked to SLO 3.2)
3. Describe the indications and contraindications for regional anaesthesia. (Linked to SLO 3.2)
4. Describe the complications of regional anaesthetic techniques. (Linked to SLO 3.2)
5. Explain why general anaesthesia carries additional risks in the pregnant patient. (Linked to SLO 3.2)

3.3 Instrumental Delivery: Forceps and Vacuum

3.3.1 Indications and prerequisites for instrumental delivery

Instrumental vaginal delivery (using either forceps or vacuum extraction) is indicated for a prolonged or delayed second stage of labour, suspected foetal compromise in the second stage, or maternal exhaustion or a specific maternal medical condition making prolonged active pushing



genuinely inadvisable, and requires specific prerequisites including full cervical dilatation, a known and favourable foetal position, adequate analgesia, and an experienced, appropriately trained operator before the procedure can be safely attempted.

Additional prerequisites include an empty maternal bladder (reducing the risk of bladder trauma during the procedure), adequate uterine contractions or, where needed, oxytocin augmentation, and, critically, a genuine willingness and readiness to abandon the attempt and proceed to caesarean section if delivery is not achieved within an appropriate number of attempts or pulls, avoiding the recognised, well-documented harm associated with a prolonged, repeatedly unsuccessful attempt at instrumental delivery.

Fill in the blank: Instrumental delivery requires full cervical dilatation, a known favourable foetal position, and an experienced _____. A genuine willingness to abandon the attempt and proceed to caesarean section avoids the harm of a prolonged, unsuccessful _____ attempt.

3.3.2 Forceps delivery technique

Forceps delivery involves application of two curved blades, each individually inserted and locked together around the foetal head, applying traction synchronised with maternal contractions and expulsive effort to assist delivery, with correct blade application, confirmed by careful checking of specific anatomical landmarks before traction is applied, essential to avoid asymmetric traction and the increased risk of maternal and foetal trauma that incorrect application can cause.

Forceps delivery is particularly well suited to delivery of the after-coming head in an assisted breech birth, and to situations requiring a controlled, protective delivery of the head, such as significant maternal cardiac disease where prolonged, forceful maternal pushing is genuinely inadvisable, reflecting specific clinical circumstances in which the particular mechanical properties of forceps offer a genuine advantage over vacuum extraction.

Fill in the blank: Correct forceps blade application is confirmed by checking specific anatomical _____ before traction is applied. Forceps are particularly well suited to delivery of the after-coming head in an assisted _____ birth.

3.3.3 Vacuum delivery technique and comparison with forceps

Vacuum (ventouse) delivery uses a suction cup applied to the foetal scalp, connected to a vacuum source generating negative pressure sufficient to allow traction synchronised with maternal contractions, with correct cup placement over the flexion point of the foetal head (a specific point on the sagittal suture) essential to promote flexion and the smallest possible presenting diameter during the actual delivery, rather than promoting deflexion and a larger, less favourable diameter.

Compared with forceps vacuum delivery is generally associated with less maternal perineal trauma but a somewhat higher rate of failure to achieve delivery and, characteristically, minor, self-limiting neonatal scalp trauma including caput or, rarely, a more significant



cephalhaematoma, meaning the specific choice between forceps and vacuum should be individualised according to the clinical circumstances, foetal station and position, and the operator's own training and experience with each specific instrument.

Fill in the blank: Correct vacuum cup placement over the flexion point of the foetal head promotes flexion and the smallest possible presenting _____. Vacuum delivery is generally associated with less maternal trauma but a somewhat higher rate of _____ compared with forceps.

Aspect	Forceps	Vacuum
<u>Maternal Trauma Profile</u>	Higher risk of perineal tears, vaginal lacerations, and pelvic floor injury.	Lower maternal trauma compared to forceps, but risk of vaginal wall abrasions.
<u>Neonatal Trauma Profile</u>	Facial bruising, lacerations, rare facial nerve palsy.	Scalp abrasions, cephalohematoma, rare subgaleal haemorrhage.
<u>Specific Indications</u>	Useful in cases of malposition (e.g., occiput posterior), when precise rotational control is needed.	Preferred for maternal exhaustion, prolonged second stage, or when less traction is required.
<u>Shared Prerequisites</u>	Fully dilated cervix, ruptured membranes, engaged head, known position, adequate analgesia, empty bladder, and skilled operator.	Same prerequisites as forceps — essential for safe instrumental delivery.

Box 3.3: Comparison of forceps and vacuum instrumental delivery.

Pilot questions 3.3

1. Describe the indications and prerequisites for instrumental vaginal delivery. (Linked to SLO 3.3)
2. Describe the technique of forceps delivery. (Linked to SLO 3.3)
3. Describe the specific clinical circumstances that particularly favour forceps over vacuum. (Linked to SLO 3.3)
4. Describe the technique of vacuum delivery, including correct cup placement. (Linked to SLO 3.4)
5. Compare forceps and vacuum delivery in terms of maternal and neonatal trauma. (Linked to SLO 3.5)



3.4 Destructive Operations and Symphysiotomy

3.4.1 Destructive operations

Destructive operations (procedures that reduce the size of the foetal head or body to permit vaginal delivery) include craniotomy (perforation and evacuation of the foetal skull contents) and, less commonly today, other techniques historically used for a severely obstructed or malpresenting foetus, generally performed only in the setting of confirmed intrauterine foetal death, where preserving the integrity of the already deceased foetus is no longer a relevant clinical consideration.

These procedures are now rarely performed in most modern obstetric settings given the widespread availability of caesarean section, but remain genuinely relevant in specific circumstances, particularly in some resource-limited settings, where a woman's overall clinical condition, the practical unavailability of timely caesarean section, or a specific combination of both factors together makes a destructive operation the safer, more appropriate option for the mother in that particular, difficult clinical situation.

Fill in the blank: Craniotomy involves perforation and evacuation of the contents of the foetal _____. Destructive operations are generally performed only in the setting of confirmed intrauterine foetal _____.

3.4.2 Symphysiotomy

Symphysiotomy is a surgical procedure that divides the fibrocartilage of the pubic symphysis under local anaesthesia, permanently widening the pelvic outlet by a small but occasionally clinically significant degree, historically used as an alternative to caesarean section for obstructed labour with a live foetus in settings where caesarean section was genuinely unavailable or judged excessively hazardous for the individual woman's specific circumstances.

The procedure carries recognised risks, including damage to the urethra or bladder if performed incorrectly, longer-term gait disturbance, and chronic pelvic pain in some women, meaning it has become progressively less commonly performed as access to safe caesarean section has expanded, though it retains a genuinely important, if now rare, historical and, in some settings, continuing contemporary role in the management of obstructed labour where caesarean section remains genuinely unavailable.

Fill in the blank: Symphysiotomy divides the fibrocartilage of the pubic _____, permanently widening the pelvic outlet. Recognised risks of symphysiotomy include urethral or bladder damage and longer-term gait _____.

3.4.3 Modern role of destructive operations and symphysiotomy

In contemporary obstetric practice across most of the world, including the great majority of Nigerian tertiary centres, both destructive operations and symphysiotomy have become genuinely rare procedures, largely superseded by the widespread availability and demonstrated



safety of caesarean section, reflecting a broader, welcome global trend towards expanded access to safe, timely emergency obstetric care that has substantially reduced the clinical need for these historically important but now infrequently performed interventions.

Nonetheless understanding the indications, technique, and specific role of these procedures remains genuinely important for any obstetric practitioner, particularly one who may practise in a genuinely resource-limited setting where caesarean section is not always immediately or safely available, and simulation-based training, increasingly used given the rarity of real clinical exposure to these procedures, offers a valuable, safe means of maintaining this important, if infrequently used, clinical competency.

Fill in the blank: Destructive operations and symphysiotomy have become rare, largely superseded by the widespread availability of _____ section. _____-based training offers a valuable means of maintaining this important but infrequently used competency.

Aspect	Destructive Operations	Symphysiotomy
<u>Indication</u>	Used when the foetus is dead and obstructed labour prevents safe delivery.	Used in obstructed labour with live foetus when caesarean section is not feasible.
<u>Technique</u>	Procedures such as craniotomy, decapitation, or evisceration to reduce foetal size and allow vaginal delivery.	Surgical division of the symphysis pubis to enlarge pelvic diameter and facilitate vaginal delivery.
<u>Key Risks</u>	Maternal trauma, haemorrhage, infection, psychological distress.	Pelvic instability, chronic pain, urinary incontinence, infection.
<u>Modern Relevance</u>	Rarely performed today; largely replaced by caesarean section.	Obsolete in most settings; occasionally used in resource-limited areas where caesarean is unavailable.

Table 3.4: Comparison of destructive operations and symphysiotomy.

Pilot questions 3.4

1. Describe destructive operations and their modern indications. (Linked to SLO 3.6)
2. Describe the technique of symphysiotomy. (Linked to SLO 3.6)
3. Describe the risks associated with symphysiotomy. (Linked to SLO 3.6)
4. Explain why destructive operations and symphysiotomy have become rare in contemporary practice. (Linked to SLO 3.6)
5. Explain the value of simulation-based training in maintaining competency in rare obstetric procedures. (Linked to SLO 3.6)



3.5 Caesarean Delivery

3.5.1 Indications for caesarean section

Caesarean section is indicated for a wide range of maternal and foetal circumstances, ranging from planned, elective procedures (such as placenta praevia, breech presentation where external cephalic version is unsuccessful or contraindicated, or maternal request in appropriately counselled circumstances) to genuine intrapartum emergencies (such as foetal compromise, cord prolapse, obstructed labour, or failed instrumental delivery), with the specific urgency category assigned to each case guiding the target time from decision to delivery.

A structured categorisation system (commonly using four categories from immediately life-threatening to planned, non-urgent) helps communicate the required urgency clearly and consistently across the entire clinical team, ensuring resources, including theatre availability and appropriately experienced staff, are mobilised in genuine proportion to the true clinical urgency of each individual case, rather than every caesarean section being treated with identical priority regardless of its actual indication.

Fill in the blank: Caesarean section indications range from planned procedures such as placenta praevia to genuine intrapartum _____. A structured categorisation system helps communicate the required _____ clearly across the clinical team.

3.5.2 Caesarean section technique

The lower segment transverse incision is the standard technique for the great majority of caesarean sections, offering a lower risk of subsequent uterine rupture in a future pregnancy compared with a classical (vertical) incision, involving a transverse skin incision, opening of the abdominal layers, a transverse incision into the lower uterine segment, delivery of the baby, and, subsequently, delivery of the placenta and systematic, layered closure of the uterine and abdominal incisions.

A classical (vertical) uterine incision is reserved for specific circumstances where the lower segment is inaccessible or unsuitable, including very preterm gestation where the lower segment has not yet fully formed, a transverse lie with the back down, or a large lower segment fibroid, and carries a substantially higher risk of subsequent uterine rupture in any future pregnancy, a risk that must be explicitly discussed with the woman when planning any future pregnancy and delivery.

Fill in the blank: The lower segment transverse incision is the standard technique, offering a lower risk of subsequent uterine _____ than a classical incision. A classical vertical incision is reserved for circumstances where the lower segment is _____ or unsuitable.

3.5.3 Complications of caesarean section

Complications of caesarean section include intraoperative haemorrhage and visceral injury (bladder, bowel, or, rarely, ureter), postoperative infection (wound, endometritis, or urinary



tract), venous thromboembolism, and, specific to the pregnant patient, an increased risk of placenta praevia and accreta spectrum disorders in future pregnancies, reflecting how a caesarean scar can influence the subsequent implantation and course of a later pregnancy in ways not relevant to vaginal delivery.

Appropriate perioperative measures to reduce these risks include thromboprophylaxis, prophylactic antibiotics, careful surgical technique, and early postoperative mobilisation, alongside genuinely thorough, honest counselling of the woman about both the immediate risks of the procedure and its potential longer-term implications for future pregnancies, an essential component of properly informed consent for what remains, despite its frequency, major abdominal surgery.

Fill in the blank: Complications of caesarean section include an increased risk of placenta praevia and accreta spectrum disorders in _____ pregnancies. Thorough counselling about immediate risks and longer-term implications is an essential component of informed _____ for caesarean section.

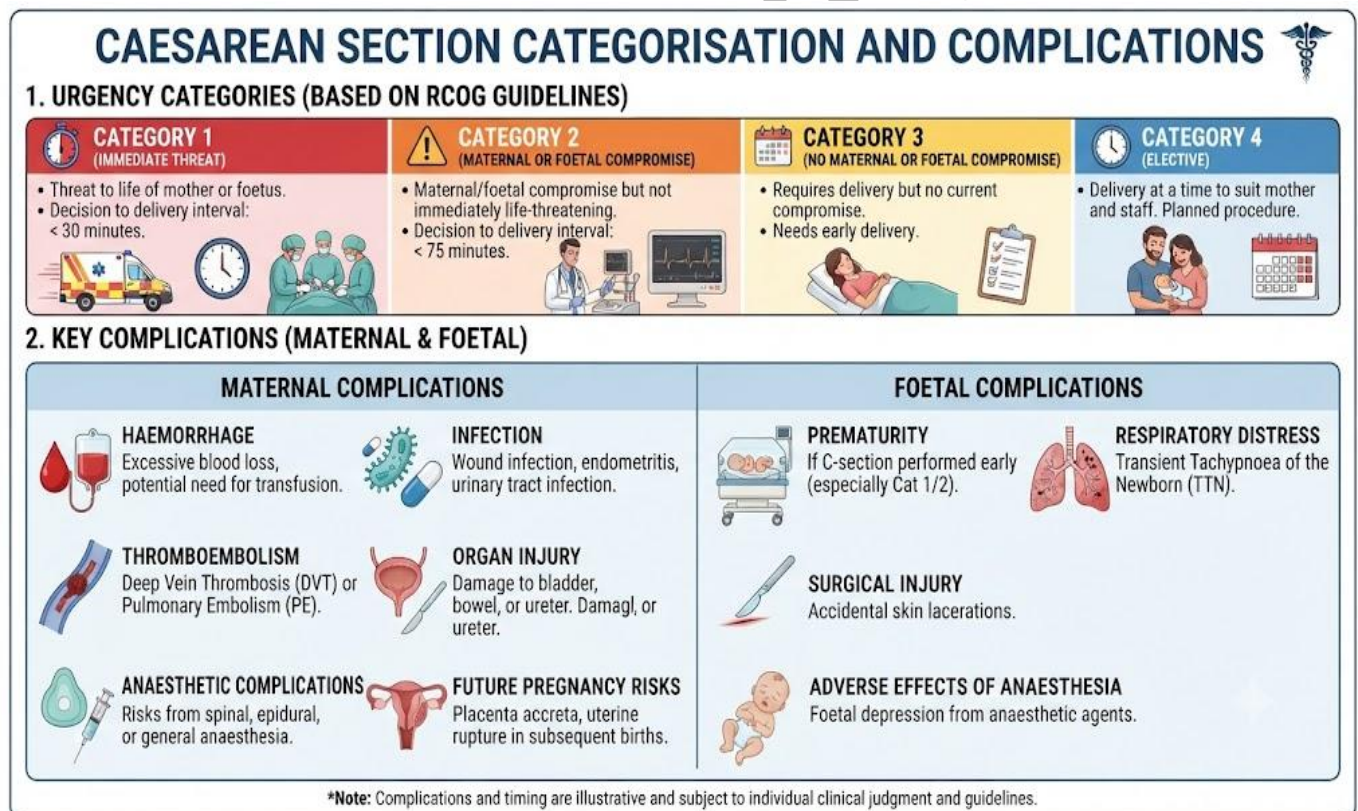


Figure 3.5: Caesarean section urgency categorisation and its complications.

Pilot questions 3.5

- Describe the indications for caesarean section. (Linked to SLO 3.7)



- Describe the structured urgency categorisation system used for caesarean section. (Linked to SLO 3.7)
- Describe the technique of the lower segment transverse caesarean section. (Linked to SLO 3.7)
- Describe the circumstances in which a classical uterine incision is used. (Linked to SLO 3.7)
- Describe the complications of caesarean section, including implications for future pregnancy. (Linked to SLO 3.8)

Series Summary

This Series has covered non-pharmacological and systemic analgesia in labour, followed by regional and general anaesthesia in obstetric practice. It went on to examine instrumental delivery by forceps and vacuum, destructive operations and symphysiotomy, before concluding with caesarean delivery, its indications, technique, and complications.

You should now be able to describe non-pharmacological and systemic analgesia, describe regional and general anaesthesia, describe forceps and vacuum delivery and compare them, describe destructive operations and symphysiotomy, and describe the indications, technique, and complications of caesarean section (Linked to SLOs 3.1 to 3.8).

Glossary of Terms

1. **Combined spinal-epidural:** an anaesthetic technique combining the rapid onset of spinal anaesthesia with the flexibility of continued epidural infusion.
2. **Craniotomy:** a destructive operation involving perforation and evacuation of the contents of the foetal skull, performed after intrauterine foetal death.
3. **Entonox:** a fixed mixture of nitrous oxide and oxygen, self-administered for labour analgesia.
4. **Epidural analgesia:** local anaesthetic and opioid infused into the epidural space, providing continuous, titratable labour pain relief.



5. **Flexion point:** the point on the foetal sagittal suture over which the vacuum cup should be correctly placed.
6. **Lower segment transverse incision:** the standard caesarean section technique, carrying a lower future rupture risk than a classical incision.
7. **Post-dural puncture headache:** a headache following inadvertent dural puncture during epidural insertion, occasionally requiring a blood patch.
8. **Spinal anaesthesia:** a single injection of local anaesthetic into the cerebrospinal fluid, providing rapid, dense anaesthesia.
9. **Symphiotomy:** surgical division of the pubic symphysis to widen the pelvic outlet, historically an alternative to caesarean section.
10. **Vacuum (ventouse) delivery:** instrumental delivery using a suction cup applied to the foetal scalp.
11. **Category one caesarean section:** the most urgent caesarean section category, for immediate threat to the life of the mother or baby.
12. **Placenta accreta spectrum:** abnormal placental attachment, an increased risk in future pregnancies after caesarean section.

Concept Check Questions [Series 3]

Objective questions

- Entonox is a fixed mixture of nitrous oxide and _____.
- Spinal anaesthesia is the technique of choice for most caesarean sections, allowing the woman to remain _____ for the birth.
- Correct forceps blade application is confirmed by checking specific anatomical _____ before traction is applied.
- Correct vacuum cup placement over the flexion point promotes flexion and the smallest possible presenting _____.
- The standard caesarean section technique is the lower segment _____ incision.

Short-answer questions



1. Explain the value of continuous one-to-one support during labour. (Linked to SLO 3.1)
2. Describe the complications of regional anaesthetic techniques. (Linked to SLO 3.2)
3. Describe the specific clinical circumstances that particularly favour forceps over vacuum. (Linked to SLO 3.3)
4. Explain why destructive operations and symphysiotomy have become rare in contemporary practice. (Linked to SLO 3.6)
5. Describe the structured urgency categorisation system used for caesarean section. (Linked to SLO 3.7)

Long-answer questions

6. Describe the analgesic and anaesthetic options available in labour, from non-pharmacological to regional and general techniques. (Linked to SLO 3.1, SLO 3.2)
7. Describe the indications, technique, and complications of forceps and vacuum delivery, and compare the two. (Linked to SLO 3.3, SLO 3.4, SLO 3.5)
8. Describe destructive operations and symphysiotomy and their modern role in obstetric practice. (Linked to SLO 3.6)
9. Describe the indications and technique of caesarean section. (Linked to SLO 3.7)
10. Describe the complications of caesarean section, including its implications for future pregnancy. (Linked to SLO 3.8)

Answers to Concept Check Questions [Series 3]

Objective questions

11. Oxygen.
12. Awake.
13. Landmarks.
14. Diameter.
15. Transverse.



Short-answer questions

16. It is consistently associated with improved outcomes, including reduced need for pharmacological analgesia.
17. Hypotension, post-dural puncture headache, and, rarely, epidural haematoma or abscess.
18. Delivery of the after-coming head in assisted breech birth, and situations requiring controlled delivery such as maternal cardiac disease.
19. Widespread availability and demonstrated safety of caesarean section has substantially reduced the clinical need for these procedures.
20. A structured system, commonly four categories from immediately life-threatening to planned, guiding the target time from decision to delivery.

Long-answer questions

21. **Basic response:** Labour analgesia ranges from non-pharmacological measures through systemic agents to regional techniques, chosen according to stage of labour and individual preference.

Value-added response: Regional anaesthesia offers the most complete pain relief and is the technique of choice for caesarean section, though general anaesthesia carries additional risks in pregnancy.

22. **Basic response:** Forceps and vacuum delivery share common prerequisites, with forceps favoured for controlled delivery and vacuum associated with less maternal but more neonatal trauma.

Value-added response: Destructive operations and symphysiotomy have become rare with expanded caesarean section access, though they retain relevance in specific resource-limited settings.

23. **Basic response:** Caesarean section indications span planned and emergency circumstances, with the lower segment transverse incision standard and complications including infection and future pregnancy risk.

Answers to Pilot Questions [Series 3]



Part 3.1

1. Continuous support, mobility and position change, breathing and relaxation techniques, water immersion, and TENS.
2. It is consistently associated with improved outcomes, including reduced need for pharmacological analgesia.
3. A self-administered mixture of nitrous oxide and oxygen offering rapid onset and offset suited to intermittent labour pain.
4. Maternal sedation, nausea, and, particularly close to delivery, potential neonatal respiratory depression.
5. Beginning with non-pharmacological measures and escalating through systemic and regional techniques as labour progresses.

Part 3.2

6. Local anaesthetic and opioid infused into the epidural space, with side effects including hypotension and motor block.
7. A single injection into the cerebrospinal fluid providing rapid, dense anaesthesia, used for most caesarean sections.
8. Indicated for labour pain relief and caesarean section; contraindicated in coagulopathy, infection, or instability.
9. Hypotension, post-dural puncture headache, and, rarely, epidural haematoma or abscess.
10. Pregnancy-related airway changes increase the risk of difficult intubation, and there is an increased aspiration risk.

Part 3.3

11. Prolonged second stage, suspected foetal compromise, or maternal exhaustion, requiring full dilatation and a known position.
12. Two curved blades are applied and locked around the foetal head, with traction synchronised to contractions.
13. Delivery of the after-coming head in breech birth, and situations needing controlled delivery such as maternal cardiac disease.



14. A suction cup is applied over the flexion point on the sagittal suture, with traction synchronised to contractions.
15. Vacuum causes less maternal trauma but more neonatal scalp trauma and a higher failure rate than forceps.

Part 3.4

1. Reduction of the foetal head or body size, most commonly by craniotomy, to permit vaginal delivery after foetal death.
2. Division of the pubic symphysis fibrocartilage under local anaesthesia to widen the pelvic outlet.
3. Urethral or bladder damage, longer-term gait disturbance, and chronic pelvic pain in some women.
4. Widespread availability and safety of caesarean section has reduced the clinical need for these procedures.
5. It allows deliberate, repeated practice of rare but important skills without the need for frequent real clinical exposure.

Part 3.5

1. Planned indications such as placenta praevia and breech presentation, and emergencies such as foetal compromise or obstructed labour.
2. A structured system of four categories from immediately life-threatening to planned, guiding required urgency.
3. Transverse skin and lower uterine segment incisions, delivery of baby and placenta, and layered closure.
4. Very preterm gestation, transverse lie with the back down, or a large lower segment fibroid.
5. Haemorrhage, visceral injury, infection, thromboembolism, and increased future risk of placenta praevia or accreta.

References and Attributions [Series 3]



Textual References

6. Cunningham, F. G., Leveno, K. J., Dashe, J. S. et al. (2022). Williams Obstetrics (26th ed.). McGraw Hill.
7. National Institute for Health and Care Excellence (2021). Intrapartum Care: NICE Guideline NG235. NICE.
8. Royal College of Obstetricians and Gynaecologists (2020). Green-top Guideline No. 26: Operative Vaginal Delivery. RCOG Press.
9. World Health Organization (2018). Managing Complications in Pregnancy and Childbirth: A Guide for Midwives and Doctors (2nd ed.). WHO Press.

Figures, Plates, Tables, and Boxes

1. Table 3.1: Comparison of non-pharmacological and systemic analgesic methods in labour. AI-generated using the prompt: "Create a clean reference table titled Labour Analgesia: Non-Pharmacological and Systemic Methods, comparing mechanism, pain relief, and side effects. Simple clinical reference table style with outside border."
2. Figure 3.2: Comparison of regional anaesthetic techniques and the specific risks of general anaesthesia in pregnancy. AI-generated using the prompt: "Create a professional medical diagram titled Regional and General Anaesthesia in Obstetrics, comparing epidural, spinal, and combined techniques and listing general anaesthesia risks in pregnancy. Clean clinical educational diagram style."
3. Box 3.3: Comparison of forceps and vacuum instrumental delivery. AI-generated using the prompt: "Create a simple single-column reference box with an outside border titled Forceps versus Vacuum Delivery, comparing trauma profile, indications, and shared prerequisites. Clinical reference box style."
4. Table 3.4: Comparison of destructive operations and symphysiotomy. AI-generated using the prompt: "Create a clean reference table titled Destructive Operations and Symphysiotomy, comparing indication, technique, risks, and modern relevance. Simple clinical reference table style with outside border."
5. Figure 3.5: Caesarean section urgency categorisation and its complications. AI-generated using the prompt: "Create a professional medical diagram titled Caesarean Section Categorisation and Complications, showing urgency categories and listing key complications. Clean clinical educational diagram style."



Course code: OBG 509

Course title: Labour and its Complications, Operative Obstetrics, Newborn Baby, Puerperium and its Abnormalities, Safe Motherhood

Course credit load: 3 Units

Series 4: Newborn Care and Puerperium Management

- **Part 4.1: Management of the Newborn Baby**
 - Sub Part 4.1.1: Immediate care and resuscitation of the newborn
 - Sub Part 4.1.2: Newborn examination and Apgar scoring
 - Sub Part 4.1.3: Common newborn problems in the first days of life
- **Part 4.2: The Puerperium, Episiotomy, and Postpartum Haemorrhage**
 - Sub Part 4.2.1: Normal physiology of the puerperium
 - Sub Part 4.2.2: Episiotomy: indications and technique
 - Sub Part 4.2.3: Postpartum haemorrhage and retained placenta
- **Part 4.3: Abnormal Placentation and Uterine Inversion**
 - Sub Part 4.3.1: Placenta praevia
 - Sub Part 4.3.2: Placenta accreta spectrum
 - Sub Part 4.3.3: Acute uterine inversion
- **Part 4.4: Postpartum Collapse and Puerperal Infections**
 - Sub Part 4.4.1: Sudden postpartum collapse
 - Sub Part 4.4.2: Puerperal pyrexia
 - Sub Part 4.4.3: Upper genital tract infections in the puerperium
- **Part 4.5: Postpartum Contraception**
 - Sub Part 4.5.1: Principles of postpartum contraception
 - Sub Part 4.5.2: Contraceptive options in the puerperium
 - Sub Part 4.5.3: Contraception in breastfeeding women



Introduction

In the last Series, we explored operative obstetrics, from analgesia through to caesarean section. We now turn to what happens after delivery: caring for the newborn baby, and managing the puerperium and its many possible complications, from postpartum haemorrhage and abnormal placentation to sudden collapse, infection, and, eventually, the practical question of contraception. This Series covers a genuinely wide sweep of postnatal practice, reflecting just how much clinical attention the weeks following birth continue to demand from every member of the obstetric team.

The aim of this Series is to equip you with the knowledge to manage the newborn baby and the puerperium, including its major complications and the principles of postpartum contraception.

We shall commence this Series by examining the management of the newborn baby. Next, we will consider the puerperium, episiotomy, and postpartum haemorrhage. Following that, our attention turns to abnormal placentation, placenta praevia, and acute uterine inversion. We will then explore sudden postpartum collapse and puerperal infections. Finally, we will conclude by examining postpartum contraception.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 4.1:** describe the management of the newborn baby,
- **SLO 4.2:** describe the normal physiology of the puerperium and routine postnatal care,
- **SLO 4.3:** describe episiotomy, including its indications and technique,
- **SLO 4.4:** describe the management of postpartum haemorrhage and retained placenta,
- **SLO 4.5:** describe placenta praevia and the placenta accreta spectrum,
- **SLO 4.6:** describe acute uterine inversion,
- **SLO 4.7:** describe sudden postpartum collapse,
- **SLO 4.8:** describe puerperal pyrexia and upper genital tract infections, and
- **SLO 4.9:** describe postpartum contraception.



4.1 Management of the Newborn Baby

4.1.1 Immediate care and resuscitation of the newborn

Immediate care of the newborn at birth prioritises warmth (drying and covering the baby promptly to prevent heat loss), assessment of breathing and tone, and, for the majority of healthy term babies, early skin-to-skin contact with the mother, which supports thermoregulation, early breastfeeding initiation, and the beginning of maternal-infant bonding, with delayed cord clamping (waiting at least one minute, or until pulsation ceases) now recommended as routine for babies not requiring immediate resuscitation.

Neonatal resuscitation follows a structured, stepwise algorithm beginning with drying, stimulation, and positioning the airway, progressing to face mask ventilation if the baby remains apnoeic or the heart rate is inadequate despite these initial steps, and, in a small minority of babies, chest compressions and medication if the heart rate remains inadequate despite effective ventilation, with the overwhelming majority of newborns requiring resuscitation responding fully to the early, basic steps alone, making effective mask ventilation genuinely the single most important skill in the entire resuscitation sequence.

Fill in the blank: Delayed cord clamping is now recommended as routine for babies not requiring immediate _____. The single most important skill in the neonatal resuscitation sequence is effective mask _____.

4.1.2 Newborn examination and Apgar scoring

The Apgar score assesses five parameters, heart rate, respiratory effort, muscle tone, reflex irritability, and colour, each scored zero to two at one and five minutes after birth, providing a structured, rapid, standardised assessment of the newborn's immediate condition and response to any resuscitative intervention, though it should never be used in isolation to guide the timing or nature of resuscitation itself, which must always be based on real-time clinical assessment as the resuscitation is actually taking place.

The routine newborn examination performed within the first 24 to 72 hours of life systematically assesses every major body system, including cardiac and respiratory examination, abdominal palpation, examination of the hips for developmental dysplasia, and genital examination, providing an important, structured opportunity to identify any congenital anomaly or other abnormality not detected antenatally, before the baby is discharged home into the care of the family.

Fill in the blank: The Apgar score assesses heart rate, respiratory effort, muscle tone, reflex irritability, and _____. The routine newborn examination includes assessment of the hips for developmental _____.

4.1.3 Common newborn problems in the first days of life



Physiological jaundice (visible yellow discolouration from the normal, transient rise in unconjugated bilirubin as the newborn liver matures) is common, typically appearing after the first 24 hours of life and resolving within one to two weeks, distinguished importantly from jaundice appearing within the first 24 hours of life, which is never physiological and always requires urgent investigation to exclude a serious underlying cause such as haemolytic disease or sepsis.

Other common early problems include transient tachypnoea of the newborn (delayed clearance of foetal lung fluid, more common after caesarean section, generally self-limiting), hypoglycaemia (particularly in infants of diabetic mothers or those who are small or large for gestational age, requiring monitoring and, where indicated, early feeding or supplementation), and feeding difficulties, each requiring specific recognition, appropriate monitoring, and, where genuinely indicated, timely intervention before the baby is considered safe for discharge home.

Fill in the blank: Jaundice appearing within the first _____ hours of life is never physiological and always requires urgent investigation. Transient tachypnoea of the newborn is more common after _____ section and is generally self-limiting.

Category	Key Details
Resuscitation Algorithm	Warm and dry → Clear airway if needed → Stimulate breathing → Assess breathing and heart rate → Provide ventilation if HR <100 → Chest compressions if HR <60 → Administer medications if no response.
Apgar Score Parameters	Appearance (colour), Pulse (heart rate), Grimace (reflex irritability), Activity (muscle tone), Respiration (effort).
Jaundice	Yellow discolouration due to bilirubin accumulation; may be physiological or pathological.
Tachypnoea	Rapid breathing often due to transient tachypnoea of the newborn or respiratory distress.
Hypoglycaemia	Low blood glucose, common in preterm or infants of diabetic mothers; can cause jitteriness or seizures.

Box 4.1: Neonatal resuscitation steps, Apgar score parameters, and common early newborn problems.

Pilot questions 4.1

- Describe the priorities of immediate newborn care at birth. (Linked to SLO 4.1)
- Describe the stepwise approach to neonatal resuscitation. (Linked to SLO 4.1)
- Describe the components of the Apgar score and the routine newborn examination. (Linked to SLO 4.1)
- Distinguish physiological jaundice from jaundice appearing within the first 24 hours of life. (Linked to SLO 4.1)



- Describe other common newborn problems in the first days of life. (Linked to SLO 4.1)

4.2 The Puerperium, Episiotomy, and Postpartum Haemorrhage

4.2.1 Normal physiology of the puerperium

The puerperium (the six-week period following delivery during which the maternal body returns towards its pre-pregnancy state) is characterised by progressive uterine involution (the uterus reducing in size and returning to the pelvis over one to two weeks), lochia (vaginal discharge progressing from red through pink-brown to white or yellow over the following weeks as the uterine lining heals), and the establishment of lactation under the hormonal influence of prolactin and oxytocin.

Routine postnatal care during the puerperium includes monitoring for signs of infection or haemorrhage, assessment of uterine involution and lochia, support for successful breastfeeding initiation and establishment, and screening for postnatal mental health concerns, recognising that the puerperium is a period of both significant physiological recovery and considerable psychological adjustment for the woman and her family, deserving genuinely comprehensive, holistic clinical attention rather than a narrow focus on physical recovery alone.

Fill in the blank: The puerperium is characterised by progressive uterine _____, lochia, and the establishment of lactation. Routine postnatal care includes screening for postnatal mental _____ concerns.

4.2.2 Episiotomy: indications and technique

Episiotomy (a surgical incision of the perineum performed during the second stage of labour to enlarge the vaginal opening) is no longer performed routinely, given evidence that restrictive rather than routine use reduces overall perineal trauma without compromising other outcomes, but remains indicated in specific circumstances, including suspected foetal compromise requiring expedited delivery, instrumental delivery, and, in some cases, a rigid perineum genuinely impeding progress despite adequate maternal effort.

The mediolateral technique (an incision angled away from the midline towards the ischial tuberosity) is generally preferred over a midline incision, as it carries a substantially lower risk of extension into the anal sphincter, and correct, layered repair technique following delivery, addressing the vaginal mucosa, perineal muscles, and skin in sequence, is essential to minimise the risk of longer-term complications including dyspareunia and perineal pain.

Fill in the blank: Restrictive rather than routine use of episiotomy reduces overall perineal trauma without compromising other _____. The mediolateral technique carries a substantially lower risk of extension into the anal _____.

4.2.3 Postpartum haemorrhage and retained placenta



Postpartum haemorrhage (blood loss of 500 millilitres or more after vaginal delivery, or 1000 millilitres or more after caesarean section) remains the leading direct cause of maternal death worldwide and in Nigeria, with causes summarised by the four Ts, tone, tissue, trauma, and thrombin, and management following a structured, simultaneous approach of calling for help, resuscitation, monitoring, and identifying and treating the underlying cause.

Retained placenta (failure of the placenta to deliver within 30 to 60 minutes of the birth, depending on local protocol) requires active management, including controlled cord traction, and, if unsuccessful, manual removal of the placenta under appropriate anaesthesia, given the significant, ongoing risk of postpartum haemorrhage that a retained placenta continues to pose for as long as it remains undelivered, making prompt, decisive management genuinely important once this diagnosis is confirmed.

Fill in the blank: The causes of postpartum haemorrhage are summarised by the four Ts: tone, tissue, trauma, and _____. Retained placenta may require manual removal under appropriate _____ if controlled cord traction is unsuccessful.

Category	Key Details
<u>Lochia Phases</u>	Lochia rubra: Red, blood-stained discharge, days 1–4. Lochia serosa: Brownish/pink discharge, days 5–10. Lochia alba: Yellowish-white discharge, days 10–28.
<u>PPH Causes – Four Ts</u>	Tone: Uterine atony. Tissue: Retained products of conception. Trauma: Genital tract lacerations, uterine rupture. Thrombin: Coagulopathies.
<u>Retained Placenta</u>	Failure of placenta to deliver within 30 minutes of birth, risking haemorrhage and infection.

Table 4.2: Phases of lochia, causes of postpartum haemorrhage, and retained placenta definition.

Pilot questions 4.2

1. Describe the normal physiological changes of the puerperium. (Linked to SLO 4.2)
2. Describe the components of routine postnatal care. (Linked to SLO 4.2)
3. Describe the indications for episiotomy and the preferred technique. (Linked to SLO 4.3)
4. Describe the causes of postpartum haemorrhage summarised by the four Ts. (Linked to SLO 4.4)
5. Describe the definition and management of retained placenta. (Linked to SLO 4.4)



4.3 Abnormal Placentation and Uterine Inversion

4.3.1 Placenta praevia

Placenta praevia is a placenta implanted wholly or partly within the lower uterine segment, classified by its relationship to the internal cervical os (minor, not covering the os, or major, partially or completely covering the os), presenting classically with painless vaginal bleeding, often recurrent, typically in the second half of pregnancy, and diagnosed by transvaginal ultrasound, which offers superior accuracy to transabdominal scanning for accurately localising the placental edge.

Management of placenta praevia depends on the severity of bleeding and the gestational age at presentation, with conservative management (admission, monitoring, and corticosteroids if preterm) appropriate for stable bleeding, and delivery, almost always by caesarean section given the risk of catastrophic haemorrhage with attempted vaginal delivery, planned electively for a major praevia at an appropriate gestation, or performed as an emergency should significant bleeding occur before this planned date.

Fill in the blank: Placenta praevia presents classically with painless vaginal bleeding, typically in the _____ half of pregnancy. Delivery in placenta praevia is almost always by _____ section given the risk of catastrophic haemorrhage.

4.3.2 Placenta accreta spectrum

The placenta accreta spectrum describes abnormal, excessively firm adherence of the placenta to the uterine wall, classified by depth of invasion as accreta (adherent to the myometrium without invading it), increta (invading into the myometrium), and percreta (invading through the full thickness of the myometrium and, in the most severe cases, into adjacent structures such as the bladder), a condition strongly associated with a previous caesarean section combined with a placenta praevia overlying the previous scar.

Antenatal diagnosis by ultrasound, supplemented by MRI in complex or uncertain cases, allows advance planning of delivery at a specialist centre with appropriately experienced multidisciplinary teams, blood bank support, and, frequently, planned caesarean hysterectomy without attempting placental separation, an approach that has been shown to substantially reduce the catastrophic haemorrhage risk associated with attempted removal of a deeply invasive, abnormally adherent placenta.

Fill in the blank: Placenta percreta invades through the full thickness of the myometrium and, in severe cases, into adjacent structures such as the _____. Antenatal diagnosis allows advance planning of delivery at a specialist centre, often with planned caesarean _____.

4.3.3 Acute uterine inversion

Acute uterine inversion (a rare but serious obstetric emergency in which the uterine fundus inverts and descends through the cervix, sometimes protruding beyond the introitus) typically



follows mismanaged delivery of the placenta, particularly excessive cord traction applied before the placenta has genuinely separated, or fundal pressure applied to a poorly contracted uterus, presenting with severe pain, haemorrhage, and rapid, profound haemodynamic shock disproportionate to visible blood loss alone.

Management requires immediate recognition and resuscitation, with manual replacement of the uterus attempted promptly, ideally before the cervix has had time to contract around the inverted fundus, using uterine relaxant medication if needed to facilitate replacement, and, if manual replacement fails, surgical correction, with uterotonic drugs given only once the uterus has been successfully repositioned, as their administration beforehand would make replacement considerably more difficult.

Fill in the blank: Acute uterine inversion typically follows excessive cord traction applied before the placenta has genuinely _____. Uterotonic drugs should be given only once the uterus has been successfully _____, not beforehand.

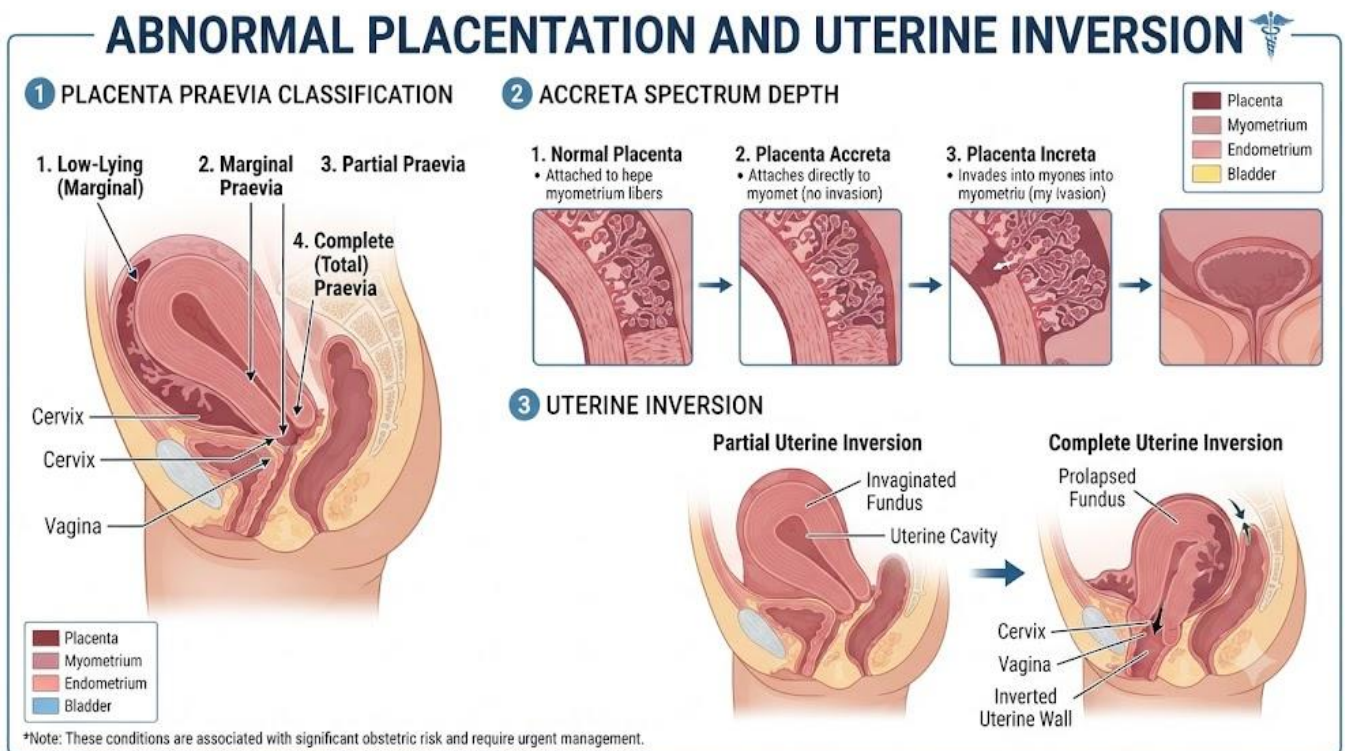


Figure 4.3: Classification of placenta praevia and accreta spectrum, and acute uterine inversion.

Pilot questions 4.3

1. Describe the classification and clinical presentation of placenta praevia. (Linked to SLO 4.5)



2. Describe the management of placenta praevia according to severity and gestation. (Linked to SLO 4.5)
3. Describe the classification of the placenta accreta spectrum by depth of invasion. (Linked to SLO 4.5)
4. Describe the principles of antenatal diagnosis and delivery planning for placenta accreta spectrum. (Linked to SLO 4.5)
5. Describe the presentation and emergency management of acute uterine inversion. (Linked to SLO 4.6)

4.4 Postpartum Collapse and Puerperal Infections

4.4.1 Sudden postpartum collapse

Sudden postpartum collapse is a genuine obstetric emergency with a broad differential diagnosis, including massive postpartum haemorrhage, amniotic fluid embolism (a rare but frequently catastrophic event in which amniotic fluid enters the maternal circulation, presenting with sudden collapse, hypoxia, and coagulopathy), pulmonary embolism, eclampsia, and, less commonly, cardiac causes, each requiring a structured, systematic ABCDE approach to assessment and immediate resuscitation.

Management of sudden postpartum collapse proceeds in parallel with, rather than only after, diagnostic assessment, with immediate resuscitation, senior multidisciplinary team involvement, and targeted investigation and treatment guided by the most likely cause suggested by the clinical picture, reflecting the same fundamental principle of parallel action established throughout this entire course, that in a genuine emergency, resuscitation and diagnosis must proceed together rather than sequentially.

Fill in the blank: Amniotic fluid embolism presents with sudden collapse, hypoxia, and _____. In sudden postpartum collapse, resuscitation and diagnostic assessment should proceed in _____ rather than sequentially.

4.4.2 Puerperal pyrexia

Puerperal pyrexia (fever of 38 degrees Celsius or higher occurring at any time within 42 days of delivery) has a broad differential diagnosis, including genital tract infection (endometritis, the most common cause), urinary tract infection, mastitis or breast abscess, wound infection following caesarean section or perineal repair, and, less commonly, respiratory tract infection or venous thromboembolism, each requiring specific, targeted assessment to identify the underlying source.



A structured approach to assessment of puerperal pyrexia includes a thorough history and examination directed towards each of the possible sources, appropriate investigations including full blood count, blood cultures where systemic infection is suspected, and imaging where indicated, with prompt initiation of empirical broad-spectrum antibiotics while awaiting the results of investigation in any woman who appears systemically unwell, rather than delaying treatment until a definitive diagnosis has first been confirmed.

Fill in the blank: Puerperal pyrexia is defined as fever of _____ degrees Celsius or higher within 42 days of delivery. The most common cause of puerperal pyrexia is genital tract infection, specifically _____.

4.4.3 Upper genital tract infections in the puerperium

Endometritis (infection of the uterine lining, the most common cause of puerperal pyrexia) presents with fever, uterine tenderness, and offensive lochia, more common after caesarean section, prolonged labour, or prolonged rupture of membranes, managed with broad-spectrum intravenous antibiotics covering the likely polymicrobial, aerobic, and anaerobic organisms involved, with evacuation of any retained products of conception where these are identified as a contributing factor.

If inadequately treated upper genital tract infection can progress to parametritis (spread to the surrounding pelvic connective tissue) and, in severe cases, pelvic abscess or generalised peritonitis, mirroring the pathophysiological progression seen in septic abortion discussed elsewhere in this programme, underscoring why prompt, adequate treatment of puerperal genital tract infection at its earliest stage genuinely matters for preventing this progression to more severe, potentially life-threatening disease.

Fill in the blank: Endometritis is more common after caesarean section, prolonged labour, or prolonged rupture of _____. If inadequately treated, upper genital tract infection can progress to parametritis and, in severe cases, pelvic abscess or generalised _____.

Category	Key Details
<u>Sudden Postpartum Collapse</u>	Postpartum haemorrhage – massive blood loss with hypovolemic shock. Pulmonary embolism – sudden dyspnoea, chest pain, collapse. Amniotic fluid embolism – acute cardiovascular collapse with coagulopathy. Eclampsia – seizures and hypertension in postpartum period. Cardiac disease – arrhythmia or cardiomyopathy presenting acutely.
<u>Puerperal Pyrexia</u>	Endometritis – fever with foul-smelling lochia and uterine tenderness. Urinary tract infection – dysuria, frequency, positive urine culture. Wound infection – erythema, discharge at caesarean or perineal site. Mastitis – breast pain, swelling, fever. Respiratory infection – cough, chest signs, fever.

Box 4.4: Differential diagnosis of sudden postpartum collapse and puerperal pyrexia.



Pilot questions 4.4

1. List the causes of sudden postpartum collapse. (Linked to SLO 4.7)
2. Describe the principles of managing sudden postpartum collapse. (Linked to SLO 4.7)
3. Define puerperal pyrexia and list its causes. (Linked to SLO 4.8)
4. Describe the structured assessment of a woman with puerperal pyrexia. (Linked to SLO 4.8)
5. Describe the presentation and management of endometritis and its potential complications. (Linked to SLO 4.8)

4.5 Postpartum Contraception

4.5.1 Principles of postpartum contraception

Postpartum contraception should be discussed with every woman before discharge from the delivery facility, given that ovulation can resume as early as three weeks after delivery in a non-breastfeeding woman, meaning that a woman not exclusively breastfeeding is potentially fertile again well before her six-week postnatal check, making early, proactive discussion of contraceptive options genuinely important rather than a topic to be deferred until this later routine visit.

Individualised contraceptive counselling should consider the woman's breastfeeding status, personal and family planning preferences, any relevant medical history, and the desired interval before a subsequent pregnancy, given the recognised association between a very short interpregnancy interval and increased risk of adverse outcomes in the subsequent pregnancy, information that should be woven sensitively and supportively into the counselling discussion rather than presented as pressure towards any particular contraceptive choice.

Fill in the blank: Ovulation can resume as early as _____ weeks after delivery in a non-breastfeeding woman. A very short interpregnancy interval is associated with increased risk of adverse outcomes in the _____ pregnancy.

4.5.2 Contraceptive options in the puerperium

Progestogen-only methods (the progestogen-only pill, implant, or injectable) are generally suitable from immediately after delivery regardless of breastfeeding status, given their lack of meaningful effect on lactation or increased venous thromboembolism risk, while combined hormonal contraception (containing oestrogen) is generally deferred until at least three weeks postpartum, given the increased background risk of venous thromboembolism in the immediate puerperium, and further deferred in breastfeeding women given a theoretical, if now considered relatively modest, effect on milk supply.



Long-acting reversible methods including the intrauterine device or system can be inserted within 48 hours of delivery or, alternatively, delayed until after four weeks, avoiding the intervening period when the risk of expulsion is recognised to be higher, and postpartum sterilisation (tubal ligation), for women who have genuinely completed their family and are certain in this decision, can be performed at the time of caesarean section or shortly after vaginal delivery, following thorough, unhurried preoperative counselling.

Fill in the blank: Combined hormonal contraception is generally deferred until at least _____ weeks postpartum given the increased background risk of venous thromboembolism. Intrauterine device insertion is best performed within 48 hours of delivery or delayed until after _____ weeks.

4.5.3 Contraception in breastfeeding women

The lactational amenorrhoea method (relying on the contraceptive effect of exclusive, frequent breastfeeding) can provide effective contraception for up to six months postpartum, but only when three specific criteria are all genuinely met: the woman is exclusively or near-exclusively breastfeeding, amenorrhoeic, and less than six months postpartum, with effectiveness declining rapidly once any of these three specific conditions is no longer reliably met.

For breastfeeding women wishing to use a more reliable, less condition-dependent method, progestogen-only methods remain the preferred hormonal option given their favourable safety profile in lactation, while combined hormonal methods, though now considered to have a more modest effect on milk supply than previously believed, are still generally deferred until breastfeeding is well established, typically around six weeks postpartum, reflecting an appropriately cautious, individualised approach to this specific and genuinely important clinical decision.

Fill in the blank: The lactational amenorrhoea method requires exclusive breastfeeding, amenorrhoea, and being less than _____ months postpartum. Combined hormonal methods in breastfeeding women are generally deferred until breastfeeding is well _____.

Method	Recommended Timing	Breastfeeding Considerations
<u>Progestogen-Only Methods</u>	Can be started immediately postpartum.	Safe during breastfeeding; does not affect milk supply.
<u>Combined Hormonal Contraception</u>	Generally delayed until 6 weeks postpartum (risk of thrombosis earlier).	May reduce milk supply; avoid in first 6 months if exclusively breastfeeding.
<u>Intrauterine Device (IUD)</u>	Can be inserted within 48 hours postpartum or after 4 weeks.	Safe during breastfeeding; highly effective long-term option.
<u>Sterilisation</u>	Can be performed at time of caesarean or within immediate postpartum period.	Permanent method; no impact on breastfeeding.



Method	Recommended Timing	Breastfeeding Considerations
<u>Lactational Amenorrhoea Method (LAM)</u>	Effective up to 6 months postpartum if exclusively breastfeeding and amenorrhoeic.	Relies on exclusive breastfeeding; effectiveness declines after 6 months or with mixed feeding.

Table 4.5: Postpartum contraceptive options, timing, and breastfeeding considerations.

Pilot questions 4.5

- Explain why postpartum contraception should be discussed before discharge from the delivery facility. (Linked to SLO 4.9)
- Describe the factors that should guide individualised postpartum contraceptive counselling. (Linked to SLO 4.9)
- Describe the timing and suitability of progestogen-only and combined hormonal contraception postpartum. (Linked to SLO 4.9)
- Describe the timing of intrauterine device insertion postpartum. (Linked to SLO 4.9)
- Describe the lactational amenorrhoea method and the criteria required for its effectiveness. (Linked to SLO 4.9)

Series Summary

This Series has covered the management of the newborn baby, followed by the puerperium, episiotomy, and postpartum haemorrhage. It went on to examine placenta praevia, the placenta accreta spectrum, and acute uterine inversion, and sudden postpartum collapse and puerperal infections, before concluding with the principles and options of postpartum contraception.

You should now be able to describe the management of the newborn baby, describe the puerperium and episiotomy, describe the management of postpartum haemorrhage and abnormal placentation, describe postpartum collapse and puerperal infections, and describe postpartum contraception (Linked to SLOs 4.1 to 4.9).



Glossary of Terms

1. **Endometritis:** infection of the uterine lining, the most common cause of puerperal pyrexia.
2. **Episiotomy:** a surgical incision of the perineum performed during the second stage of labour to enlarge the vaginal opening.
3. **Lactational amenorrhoea method:** a contraceptive method relying on the effect of exclusive, frequent breastfeeding.
4. **Lochia:** vaginal discharge following delivery, progressing in colour as the uterine lining heals.
5. **Placenta accreta spectrum:** abnormal, excessively firm placental adherence, classified as accreta, increta, or percreta by depth of invasion.
6. **Placenta praevia:** a placenta implanted wholly or partly within the lower uterine segment.
7. **Puerperal pyrexia:** fever of 38 degrees Celsius or higher occurring within 42 days of delivery.
8. **Puerperium:** the six-week period following delivery during which the maternal body returns towards its pre-pregnancy state.
9. **Retained placenta:** failure of the placenta to deliver within 30 to 60 minutes of birth, depending on local protocol.
10. **Uterine inversion:** a rare obstetric emergency in which the uterine fundus inverts and descends through the cervix.
11. **Uterine involution:** the process by which the uterus reduces in size and returns to the pelvis after delivery.
12. **Amniotic fluid embolism:** a rare, frequently catastrophic event in which amniotic fluid enters the maternal circulation.

Concept Check Questions [Series 4]

Objective questions

- The single most important skill in the neonatal resuscitation sequence is effective mask _____.



- Jaundice appearing within the first _____ hours of life is never physiological.
- The mediolateral episiotomy technique carries a substantially lower risk of extension into the anal _____.
- Placenta percreta invades through the full thickness of the myometrium and, in severe cases, into the _____.
- The lactational amenorrhoea method requires exclusive breastfeeding, amenorrhoea, and being less than _____ months postpartum.

Short-answer questions

1. Distinguish physiological jaundice from jaundice appearing within the first 24 hours of life. (Linked to SLO 4.1)
2. Describe the definition and management of retained placenta. (Linked to SLO 4.4)
3. Describe the principles of antenatal diagnosis and delivery planning for placenta accreta spectrum. (Linked to SLO 4.5)
4. Describe the structured assessment of a woman with puerperal pyrexia. (Linked to SLO 4.8)
5. Describe the timing and suitability of progestogen-only and combined hormonal contraception postpartum. (Linked to SLO 4.9)

Long-answer questions

6. Describe the management of the newborn baby, including resuscitation and common early problems. (Linked to SLO 4.1)
7. Describe the puerperium, episiotomy, and the management of postpartum haemorrhage and retained placenta. (Linked to SLO 4.2, SLO 4.3, SLO 4.4)
8. Describe placenta praevia, the placenta accreta spectrum, and acute uterine inversion. (Linked to SLO 4.5, SLO 4.6)
9. Describe sudden postpartum collapse and puerperal infections. (Linked to SLO 4.7, SLO 4.8)
10. Describe the principles and options for postpartum contraception. (Linked to SLO 4.9)



Answers to Concept Check Questions [Series 4]

Objective questions

- 11. Ventilation.
- 12. 24.
- 13. Sphincter.
- 14. Bladder.
- 15. Six.

Short-answer questions

- 16. Physiological jaundice appears after 24 hours and resolves within weeks; jaundice within 24 hours always requires urgent investigation.
- 17. Failure of placental delivery within 30 to 60 minutes, managed with controlled cord traction or, if unsuccessful, manual removal.
- 18. Antenatal ultrasound, supplemented by MRI, allows planning of delivery at a specialist centre with multidisciplinary support and blood bank access.
- 19. History and examination directed at each possible source, with investigations and empirical antibiotics for a systemically unwell woman.
- 20. Progestogen-only methods are suitable from immediately after delivery; combined hormonal methods are deferred at least three weeks given thrombosis risk.

Long-answer questions

- 21. **Basic response:** Newborn management prioritises warmth, resuscitation if needed, and structured assessment including Apgar scoring and routine examination.

Value-added response: Recognising jaundice within 24 hours as always pathological, and other common early problems, ensures timely intervention before discharge.



22. Basic response: The puerperium involves uterine involution and lochia, with episiotomy now used restrictively and PPH managed by the four Ts framework.

Value-added response: Retained placenta requires prompt management given its ongoing haemorrhage risk, reinforcing the need for decisive puerperal care.

23. Basic response: Placenta praevia and accreta spectrum are diagnosed antenatally and managed with planned delivery, while uterine inversion is a rare emergency requiring prompt manual replacement.

Answers to Pilot Questions [Series 4]

Part 4.1

1. Warmth, assessment of breathing and tone, and early skin-to-skin contact for healthy babies, with delayed cord clamping where appropriate.
2. Drying, stimulation, and airway positioning, progressing to ventilation, then compressions and medication if needed.
3. Apgar assesses heart rate, respiratory effort, tone, reflex irritability, and colour; the routine examination assesses all major body systems.
4. Physiological jaundice appears after 24 hours and resolves within weeks; jaundice within 24 hours is never physiological.
5. Transient tachypnoea, hypoglycaemia, and feeding difficulties, each requiring recognition and appropriate monitoring or intervention.

Part 4.2

6. Progressive uterine involution, lochia progressing in colour, and establishment of lactation under hormonal influence.
7. Monitoring for infection or haemorrhage, assessment of involution and lochia, breastfeeding support, and mental health screening.
8. Suspected foetal compromise, instrumental delivery, or a rigid perineum impeding progress; mediolateral technique is preferred.



9. Tone (atony), tissue (retained products), trauma (laceration), and thrombin (coagulation disorder).
10. Failure of delivery within 30 to 60 minutes, managed with controlled cord traction or manual removal if unsuccessful.

Part 4.3

11. A placenta in the lower uterine segment, classified as minor or major by relation to the os, presenting with painless bleeding.
12. Conservative management for stable bleeding, with delivery by caesarean section planned electively or performed as an emergency.
13. Accreta (adherent without invasion), increta (invading the myometrium), and percreta (invading through the full thickness).
14. Antenatal ultrasound and MRI allow planning of delivery at a specialist centre with multidisciplinary support.
15. Sudden pain, haemorrhage, and profound shock, managed with prompt manual replacement, or surgery if this fails.

Part 4.4

1. Massive haemorrhage, amniotic fluid embolism, pulmonary embolism, eclampsia, and cardiac causes.
2. A structured ABCDE approach with resuscitation and diagnosis proceeding in parallel, with senior multidisciplinary involvement.
3. Fever of 38 degrees Celsius or higher within 42 days of delivery, from genital tract, urinary, breast, or wound infection.
4. History and examination directed at each possible source, with targeted investigations and empirical antibiotics if unwell.
5. Fever, uterine tenderness, and offensive lochia, managed with antibiotics; untreated it can progress to parametritis or peritonitis.



Part 4.5

1. Ovulation can resume as early as three weeks postpartum, so contraception should be discussed before this risk period begins.
2. Breastfeeding status, personal preferences, medical history, and desired interpregnancy interval.
3. Progestogen-only methods are suitable immediately; combined hormonal methods are deferred at least three weeks given thrombosis risk.
4. Within 48 hours of delivery, or delayed until after four weeks to avoid the period of higher expulsion risk.
5. Exclusive breastfeeding, amenorrhoea, and being less than six months postpartum, all three criteria required together.

References and Attributions [Series 4]

Textual References

6. Cunningham, F. G., Leveno, K. J., Dashe, J. S. et al. (2022). Williams Obstetrics (26th ed.). McGraw Hill.
7. World Health Organization (2018). WHO Recommendations for the Prevention and Treatment of Postpartum Haemorrhage. WHO Press.
8. Royal College of Obstetricians and Gynaecologists (2018). Green-top Guideline No. 27a: Placenta Praevia and Placenta Accreta Spectrum. RCOG Press.
9. Faculty of Sexual and Reproductive Healthcare (2017). Contraception After Pregnancy. FSRH Clinical Guideline.

Figures, Plates, Tables, and Boxes

1. Box 4.1: Neonatal resuscitation steps, Apgar score parameters, and common early newborn problems. AI-generated using the prompt: "Create a simple single-column reference box with an outside border titled Newborn Care Essentials, listing resuscitation steps, Apgar parameters, and common early problems. Clinical reference box style."



2. Table 4.2: Phases of lochia, causes of postpartum haemorrhage, and retained placenta definition. AI-generated using the prompt: "Create a clean reference table titled Puerperium and Postpartum Haemorrhage Essentials, listing lochia phases, PPH causes, and retained placenta definition. Simple clinical reference table style with outside border."
3. Figure 4.3: Classification of placenta praevia and accreta spectrum, and acute uterine inversion. AI-generated using the prompt: "Create a professional medical diagram titled Abnormal Placentation and Uterine Inversion, showing placenta praevia classification, accreta spectrum depth, and uterine inversion. Clean clinical educational diagram style."
4. Box 4.4: Differential diagnosis of sudden postpartum collapse and puerperal pyrexia. AI-generated using the prompt: "Create a simple single-column reference box with an outside border titled Postpartum Collapse and Pyrexia: Differential Diagnosis, listing causes with distinguishing features. Clinical reference box style."
5. Table 4.5: Postpartum contraceptive options, timing, and breastfeeding considerations. AI-generated using the prompt: "Create a clean reference table titled Postpartum Contraception Options, listing methods with timing and breastfeeding considerations. Simple clinical reference table style with outside border."



Course code: OBG 509

Course title: Labour and its Complications, Operative Obstetrics, Newborn Baby, Puerperium and its Abnormalities, Safe Motherhood

Course credit load: 3 Units

Series 5: Safe Motherhood and Reproductive Outcomes

- **Part 5.1: The Safe Motherhood Initiative**
 - Sub Part 5.1.1: Origins and principles of the Safe Motherhood Initiative
 - Sub Part 5.1.2: Pillars and strategies of safe motherhood
 - Sub Part 5.1.3: Safe motherhood programmes in Nigeria
- **Part 5.2: Maternal Mortality in Nigeria**
 - Sub Part 5.2.1: Definitions and measurement of maternal mortality
 - Sub Part 5.2.2: Causes of maternal mortality in Nigeria
 - Sub Part 5.2.3: Strategies to reduce maternal mortality in Nigeria
- **Part 5.3: Age and Reproductive Outcome**
 - Sub Part 5.3.1: Adolescent pregnancy and reproductive outcome
 - Sub Part 5.3.2: Advanced maternal age and reproductive outcome
 - Sub Part 5.3.3: Optimising reproductive outcome across the maternal age spectrum
- **Part 5.4: Parity and Reproductive Outcome**
 - Sub Part 5.4.1: Grand multiparity and reproductive outcome
 - Sub Part 5.4.2: Nulliparity and primiparity: reproductive considerations
 - Sub Part 5.4.3: Interpregnancy interval and reproductive outcome
- **Part 5.5: Integrating Safe Motherhood into Practice**
 - Sub Part 5.5.1: Monitoring and evaluation of safe motherhood programmes
 - Sub Part 5.5.2: The role of the individual clinician in safe motherhood



- Sub Part 5.5.3: Course synthesis: from physiology to safe motherhood

Introduction

In the last Series, we explored newborn care and the management of the puerperium. We conclude this course, and this entire journey through Labour and its Complications, Operative Obstetrics, Newborn Baby, Puerperium and its Abnormalities, and Safe Motherhood, by stepping back from the individual clinical encounter to the broader picture: the Safe Motherhood Initiative, the ongoing burden of maternal mortality in Nigeria, and how a woman's age, parity, and pregnancy spacing shape her reproductive outcome. This final Series asks you to see every consultation you have studied throughout this course as part of something larger: a sustained, collective effort to make childbirth safe for every woman.

The aim of this Series is to equip you with an understanding of the Safe Motherhood Initiative, maternal mortality in Nigeria, the effects of age and parity on reproductive outcome, and the role of the individual clinician in promoting safe motherhood.

We shall commence this Series by examining the origins, principles, and strategies of the Safe Motherhood Initiative, including its implementation in Nigeria. Next, we will consider maternal mortality in Nigeria, its definition, causes, and strategies for its reduction. Following that, our attention turns to the effect of age on reproductive outcome. We will then explore the effect of parity and interpregnancy interval on reproductive outcome. Finally, we will conclude by examining how safe motherhood is monitored and evaluated, and the role of the individual clinician in promoting it, bringing this course to a close.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 5.1:** describe the origins and principles of the Safe Motherhood Initiative,
- **SLO 5.2:** describe safe motherhood programmes and strategies in Nigeria,
- **SLO 5.3:** define and describe the measurement of maternal mortality,
- **SLO 5.4:** describe the causes of maternal mortality in Nigeria,
- **SLO 5.5:** describe strategies to reduce maternal mortality in Nigeria,
- **SLO 5.6:** discuss the effect of age on reproductive outcome,
- **SLO 5.7:** discuss the effect of parity on reproductive outcome,



- **SLO 5.8:** describe the effect of interpregnancy interval on reproductive outcome, and
- **SLO 5.9:** describe the role of the individual clinician in promoting safe motherhood.

5.1 The Safe Motherhood Initiative

5.1.1 Origins and principles of the Safe Motherhood Initiative

The Safe Motherhood Initiative was launched internationally in 1987 in response to growing recognition that maternal death and disability had been substantially neglected within global health priorities relative to their genuine scale and largely preventable nature, establishing the foundational principle that the great majority of maternal deaths are avoidable with timely access to skilled care before, during, and after childbirth, a principle that continues to underpin safe motherhood programming worldwide to this day.

Central to the initiative's philosophy is the recognition that maternal mortality reflects far more than a purely clinical or medical problem, reflecting deep-rooted social, economic, and structural determinants including poverty, gender inequality, limited female education, and inadequate health system investment, meaning that genuinely effective safe motherhood programming must address these broader determinants alongside, rather than instead of, direct clinical interventions targeted at pregnant women themselves.

Fill in the blank: The Safe Motherhood Initiative was launched internationally in _____. Central to its philosophy is the recognition that maternal mortality reflects broader social, economic, and _____ determinants.

5.1.2 Pillars and strategies of safe motherhood

The core strategies of safe motherhood programming include ensuring universal access to quality antenatal care, skilled attendance at every birth (whether by a midwife, doctor, or other appropriately trained provider), timely access to emergency obstetric and newborn care when complications arise, family planning to enable women to plan and space pregnancies according to their own wishes, and safe abortion care where legally permitted, together forming a genuinely comprehensive, mutually reinforcing package rather than a series of isolated, disconnected interventions.

Skilled attendance at birth is widely regarded as the single most critical intervention within this broader package, given that the great majority of maternal deaths occur during labour, delivery, or the immediate postpartum period, precisely when a skilled attendant's ability to recognise and promptly manage an emerging complication can make the genuine difference between a straightforward recovery and a life-threatening or fatal outcome for the woman.



Fill in the blank: The core strategies of safe motherhood include universal antenatal care, skilled birth attendance, and timely access to emergency _____ care. Skilled attendance at birth is regarded as the single most _____ intervention within safe motherhood programming.

5.1.3 Safe motherhood programmes in Nigeria

Nigeria has implemented a range of safe motherhood initiatives over recent decades, including efforts to expand access to free or subsidised maternal health services in various states, task-shifting to expand the pool of skilled birth attendants, and community-based health insurance schemes aimed at removing the financial barriers that so often delay or prevent women from seeking timely care, reflecting a broadly consistent national commitment to addressing the country's persistently high maternal mortality burden.

Nonetheless substantial regional variation persists in the coverage and effectiveness of these programmes across Nigeria, generally more successfully implemented and more consistently effective in urban and southern regions than in some northern and rural areas, reflecting the same underlying disparities in health system infrastructure, female education, and general socioeconomic development that continue to drive much of the country's persistent maternal mortality burden more broadly.

Fill in the blank: Nigerian safe motherhood initiatives include task-shifting and community-based health _____ schemes to remove financial barriers to care. Substantial _____ variation persists in the coverage and effectiveness of these programmes across the country.

Strategy	Key Details
Antenatal Care	Regular monitoring and counselling during pregnancy to detect and manage complications early.
Skilled Birth Attendance	Presence of trained health professionals during delivery to ensure safe labour and immediate newborn care.
Emergency Obstetric Care	Access to facilities capable of managing life-threatening complications such as haemorrhage, eclampsia, and obstructed labour.
Family Planning	Providing contraceptive options to prevent unintended pregnancies and space births safely.
Safe Abortion Care	Ensuring access to safe abortion services and post-abortion care to reduce maternal mortality from unsafe procedures.

Box 5.1: Core strategies of the Safe Motherhood Initiative.

Pilot questions 5.1

- Describe the origins of the Safe Motherhood Initiative. (Linked to SLO 5.1)



- Explain why maternal mortality is considered more than a purely clinical problem. (Linked to SLO 5.1)
- Describe the core strategies of safe motherhood programming. (Linked to SLO 5.1)
- Explain why skilled attendance at birth is regarded as the single most critical safe motherhood intervention. (Linked to SLO 5.1)
- Describe safe motherhood programmes implemented in Nigeria and their regional variation. (Linked to SLO 5.2)

5.2 Maternal Mortality in Nigeria

5.2.1 Definitions and measurement of maternal mortality

The maternal mortality ratio (MMR) is defined as the number of maternal deaths per 100,000 live births, distinguishing it from the maternal mortality rate, which expresses maternal deaths relative to the population of women of reproductive age rather than live births, a distinction commonly confused but genuinely important for correctly interpreting and comparing published statistics between different countries, regions, or time periods.

A maternal death is formally defined as the death of a woman during pregnancy or within 42 days of its end, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes, a definition that requires careful clinical judgement to apply correctly in individual cases and underscores the importance of thorough, systematic maternal death review to ensure accurate classification and, in turn, accurate national and international mortality statistics.

Fill in the blank: The maternal mortality ratio is defined as the number of maternal deaths per 100,000 _____ births. A maternal death is defined as occurring during pregnancy or within _____ days of its end, from a related cause.

5.2.2 Causes of maternal mortality in Nigeria

Direct obstetric causes account for the majority of maternal deaths in Nigeria and include postpartum haemorrhage (the leading single cause), hypertensive disorders of pregnancy (pre-eclampsia and eclampsia), sepsis (including that following unsafe abortion), obstructed labour, and complications of unsafe abortion, most of which are genuinely preventable with timely access to appropriate emergency obstetric care of the kind explored throughout this course.

Indirect causes of maternal death arise from pre-existing or coincidental medical conditions aggravated by the physiological demands of pregnancy, including anaemia (itself often multifactorial, related to malaria, poor nutrition, and haemoglobinopathy), malaria, and cardiac disease, all of which require specific attention during antenatal risk assessment rather than being



treated as incidental to the pregnancy itself, given their substantial and genuinely preventable contribution to Nigeria's overall maternal mortality burden.

Fill in the blank: The leading single direct cause of maternal death in Nigeria is postpartum _____. Indirect causes of maternal death include anaemia, malaria, and _____ disease.

5.2.3 Strategies to reduce maternal mortality in Nigeria

The three delays model (delay in deciding to seek care, delay in reaching a health facility, and delay in receiving adequate care once at the facility) provides a useful, practical framework for understanding preventable maternal death, with effective prevention requiring coordinated intervention at all three levels simultaneously rather than focusing disproportionately on only one dimension of this genuinely multifactorial problem.

National and community-level strategies to reduce maternal mortality in Nigeria include strengthening emergency obstetric and newborn care services, expanding skilled birth attendance through task-shifting, community health insurance and free maternal healthcare schemes to remove financial barriers, improving referral and transport systems, and sustained investment in female education, all recognised as genuinely complementary rather than competing approaches to this complex, deeply rooted public health challenge.

Fill in the blank: The three delays model describes delay in deciding to seek care, delay in reaching a facility, and delay in receiving adequate _____. Effective prevention of maternal mortality requires coordinated intervention at all _____ levels simultaneously.

Category	Examples	Preventability Notes
Direct Causes	Postpartum haemorrhage, eclampsia, obstructed labour, sepsis, unsafe abortion.	Largely preventable with timely access to skilled birth attendance, emergency obstetric care, and safe abortion services.
Indirect Causes	Anaemia, malaria, HIV/AIDS, heart disease, malnutrition.	Preventable through antenatal screening, treatment of chronic conditions, malaria prophylaxis, and improved maternal health services.

Table 5.2: Direct and indirect causes of maternal mortality in Nigeria.

Pilot questions 5.2

1. Distinguish the maternal mortality ratio from the maternal mortality rate. (Linked to SLO 5.3)
2. Define a maternal death according to the formal international definition. (Linked to SLO 5.3)
3. List the leading direct causes of maternal mortality in Nigeria. (Linked to SLO 5.4)



4. List the indirect causes of maternal mortality in Nigeria. (Linked to SLO 5.4)
5. Describe the three delays model and strategies to reduce maternal mortality in Nigeria. (Linked to SLO 5.5)

5.3 Age and Reproductive Outcome

5.3.1 Adolescent pregnancy and reproductive outcome

Adolescent pregnancy (pregnancy in a girl aged 10 to 19 years) carries an increased risk of several adverse outcomes, including pre-eclampsia, preterm birth, low birth weight, and obstructed labour, the latter reflecting the fact that the maternal pelvis may not yet be fully mature in a younger adolescent, alongside a substantially increased risk of obstetric fistula formation from prolonged, unrelieved obstruction in settings with limited access to timely emergency obstetric care.

Beyond the purely clinical risks adolescent pregnancy is also strongly associated with adverse social and educational outcomes, including school dropout and reduced future economic opportunity, reflecting the genuinely interconnected nature of reproductive health with broader social determinants, and underscoring why prevention of adolescent pregnancy, through comprehensive sexuality education, access to contraception, and broader efforts to keep girls in school, represents a genuinely important, high-value component of safe motherhood strategy in Nigeria and globally.

Fill in the blank: Adolescent pregnancy carries an increased risk of obstructed labour, reflecting that the maternal pelvis may not yet be fully _____. Adolescent pregnancy is also strongly associated with adverse _____ outcomes, including school dropout.

5.3.2 Advanced maternal age and reproductive outcome

Advanced maternal age (generally defined as 35 years or older at the expected date of delivery) is associated with an increased risk of several adverse outcomes, including chromosomal abnormality (given the recognised age-related increase in meiotic non-disjunction), miscarriage, gestational diabetes, hypertensive disorders of pregnancy, placental abnormalities including placenta praevia, and an increased likelihood of instrumental or caesarean delivery.

These increased risks reflect a combination of age-related decline in oocyte quality, cumulative effects of pre-existing medical conditions that become more prevalent with advancing age, and reduced physiological reserve to accommodate the demands of pregnancy, meaning that women of advanced maternal age genuinely benefit from more intensive antenatal surveillance and a lower threshold for specialist obstetric involvement throughout their pregnancy compared with younger women without other identified risk factors.



Fill in the blank: Advanced maternal age is generally defined as _____ years or older at the expected date of delivery. Increased risks with advanced maternal age reflect age-related decline in oocyte _____ and reduced physiological reserve.

5.3.3 Optimising reproductive outcome across the maternal age spectrum

Optimising reproductive outcome for both adolescent and older mothers requires individualised, age-appropriate antenatal care, with adolescent mothers benefiting from particular attention to psychosocial support, nutrition, and the specific mechanical risks of a potentially immature pelvis, while older mothers benefit from more intensive screening for chromosomal abnormality, gestational diabetes, and hypertensive disorders, alongside genuinely open, honest counselling about the specific, age-related risks relevant to their individual pregnancy.

Ultimately while both extremes of the maternal age spectrum carry genuinely increased risk, the great majority of both adolescent and older mothers, when provided with appropriate, individualised antenatal care and skilled attendance at delivery, achieve entirely safe outcomes for themselves and their babies, reinforcing that age alone should never be used to justify anything less than genuinely respectful, high-quality, individualised maternity care for every woman, regardless of where she falls on this spectrum.

Fill in the blank: Adolescent mothers benefit from particular attention to psychosocial support, nutrition, and the risks of a potentially immature _____. Age alone should never be used to justify anything less than genuinely respectful, _____ maternity care for every woman.

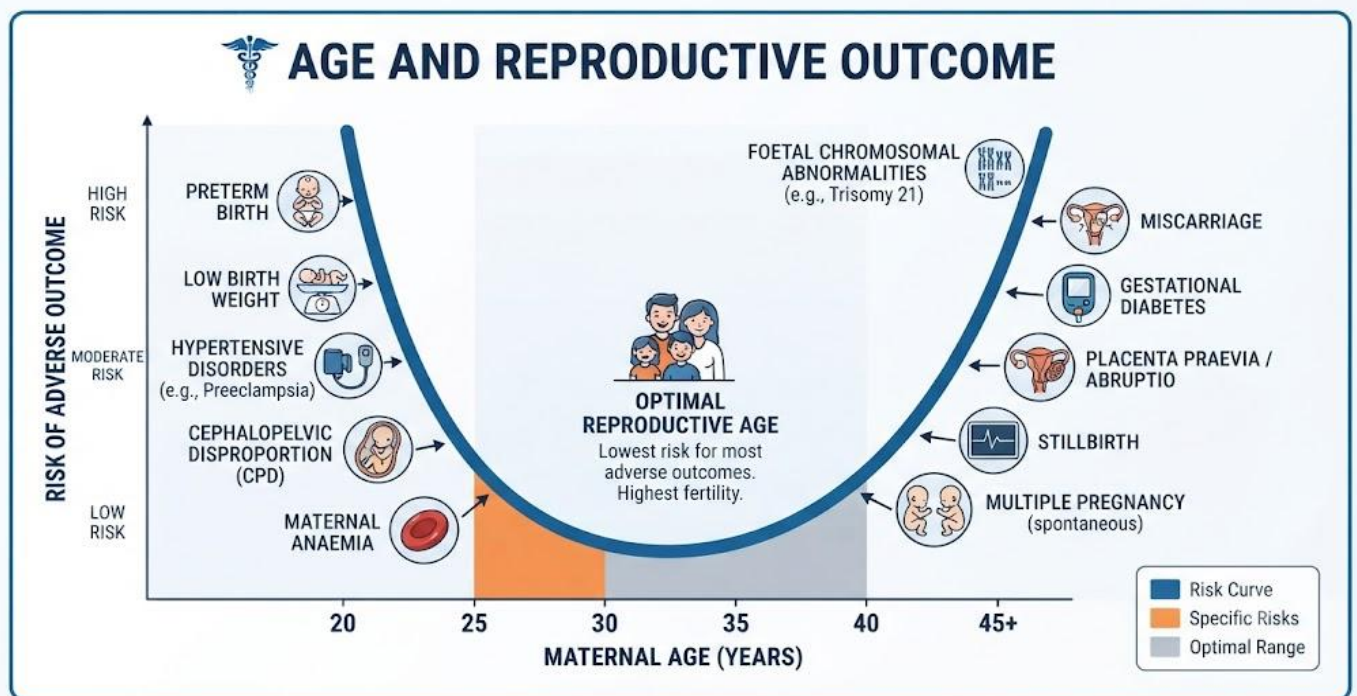


Figure 5.3: The U-shaped relationship between maternal age and reproductive risk.



Pilot questions 5.3

1. Describe the adverse outcomes associated with adolescent pregnancy. (Linked to SLO 5.6)
2. Explain the social and educational outcomes associated with adolescent pregnancy. (Linked to SLO 5.6)
3. Describe the adverse outcomes associated with advanced maternal age. (Linked to SLO 5.6)
4. Explain the mechanisms underlying the increased risks of advanced maternal age. (Linked to SLO 5.6)
5. Describe how antenatal care can be optimised for both adolescent and older mothers. (Linked to SLO 5.6)

5.4 Parity and Reproductive Outcome

5.4.1 Grand multiparity and reproductive outcome

Grand multiparity (generally defined as five or more previous deliveries) is associated with an increased risk of several adverse outcomes, including malpresentation (from reduced uterine tone and increased intrauterine space), placenta praevia and abruption, postpartum haemorrhage (from cumulative uterine scarring and reduced myometrial contractile efficiency after multiple previous deliveries), and uterine rupture, particularly where oxytocin augmentation is used during labour.

These increased risks reflect the cumulative structural and functional changes to the uterus resulting from repeated previous pregnancies and deliveries, meaning that a grand multiparous woman, despite often having previously experienced multiple straightforward deliveries, should never be regarded as automatically low-risk on the basis of parity alone, but rather requires the same careful, individualised risk assessment and vigilant intrapartum monitoring applied to any other woman with recognised risk factors for these specific complications.

Fill in the blank: Grand multiparity is generally defined as _____ or more previous deliveries. A grand multiparous woman should never be regarded as automatically low-risk on the basis of _____ alone.

5.4.2 Nulliparity and primiparity: reproductive considerations

Nulliparous women (those who have never previously given birth) generally experience longer labour, particularly a longer first and second stage, than parous women, reflecting the lack of previous cervical dilatation and perineal stretching, and carry a somewhat higher rate of



instrumental delivery and, in some circumstances, caesarean section, particularly for indications such as failure to progress or suspected disproportion.

Primiparous women (those who have delivered once previously) generally experience more favourable labour progress and outcomes than nulliparous women in a subsequent pregnancy, though a previous complicated delivery, such as a previous caesarean section or significant perineal trauma, carries specific implications for the management of the current pregnancy and labour, making a woman's individual obstetric history, rather than parity considered as a single, undifferentiated category, the more clinically relevant and genuinely informative factor guiding management in each specific case.

Fill in the blank: Nulliparous women generally experience a longer first and second stage of labour, reflecting the lack of previous cervical dilatation and perineal _____. A woman's individual obstetric _____ is more clinically relevant than parity alone in guiding management.

5.4.3 Interpregnancy interval and reproductive outcome

Interpregnancy interval (the time between the end of one pregnancy and the conception of the next) carries an independent influence on reproductive outcome, with a very short interval (generally defined as less than six months from delivery to the next conception) associated with an increased risk of preterm birth, low birth weight, and, specifically after a previous caesarean section, uterine rupture in a subsequent labour, given inadequate time for complete uterine and, where relevant, scar healing.

Conversely a very long interpregnancy interval, generally defined as five years or more, has also been associated with a modestly increased risk of certain adverse outcomes in some studies, though the evidence here is somewhat less consistent than for a short interval, meaning that appropriate birth spacing, generally recommended as an interval of at least 18 to 24 months between delivery and the next conception, represents an important, genuinely evidence-based component of preconception and postpartum contraceptive counselling.

Fill in the blank: A very short interpregnancy interval, generally less than _____ months, is associated with an increased risk of preterm birth and low birth weight. Appropriate birth spacing is generally recommended as an interval of at least _____ to 24 months.

Category	Key Risks
<u>Grand Multiparity</u>	Increased risk of postpartum haemorrhage, malpresentation, uterine rupture, anaemia, and poor maternal outcomes.
<u>Nulliparity</u>	Higher risk of pre-eclampsia, prolonged labour, cephalopelvic disproportion, and instrumental or caesarean delivery.



Category	Key Risks
<u>Short Interpregnancy Interval</u>	Associated with preterm birth, low birth weight, maternal anaemia, and increased perinatal mortality.
<u>Long Interpregnancy Interval</u>	Linked to pre-eclampsia, dysfunctional labour, and adverse perinatal outcomes due to loss of maternal physiological adaptation.

Box 5.4: Risks associated with parity extremes and interpregnancy interval.

Pilot questions 5.4

1. Describe the adverse outcomes associated with grand multiparity. (Linked to SLO 5.7)
2. Explain why grand multiparous women should not be regarded as automatically low-risk. (Linked to SLO 5.7)
3. Describe the labour characteristics typical of nulliparous women. (Linked to SLO 5.7)
4. Describe the risks associated with a very short interpregnancy interval. (Linked to SLO 5.8)
5. Describe the recommended interpregnancy interval and its rationale. (Linked to SLO 5.8)

5.5 Integrating Safe Motherhood into Practice

5.5.1 Monitoring and evaluation of safe motherhood programmes

Monitoring and evaluation of safe motherhood programmes relies on accurate, complete data collection, including maternal mortality surveillance and response systems, facility-based audit of near-miss events (severe complications from which a woman survives, offering valuable learning opportunities without the profound tragedy of an actual death), and routine health information system data on antenatal attendance, skilled birth attendance, and facility-based delivery rates.

Maternal death and near-miss review conducted in a genuinely blame-free, learning-focused manner, rather than one that seeks to assign individual fault, is essential to translate the lessons from each individual case into meaningful, sustained systemic improvement, reflecting the same



principle of structured, constructive debriefing encountered elsewhere in this course, now applied at the level of an entire health system rather than a single clinical team.

Fill in the blank: Facility-based audit of severe complications from which a woman survives is termed near-_____ audit. Maternal death review should be conducted in a genuinely blame-free, _____-focused manner.

5.5.2 The role of the individual clinician in safe motherhood

Every individual clinician caring for pregnant women, regardless of seniority or specific role, contributes directly to the broader safe motherhood effort through competent, timely clinical care, genuine respect for each woman's dignity and autonomy, accurate documentation supporting audit and learning, and active, sustained participation in ongoing professional development and simulation-based training of exactly the kind emphasised repeatedly throughout this course.

Beyond direct clinical care individual clinicians can meaningfully contribute to safe motherhood at a broader level through participation in quality improvement initiatives, mentorship and training of junior colleagues, and advocacy for the health system resources and broader policy changes genuinely necessary to address the persistent structural barriers to safe motherhood that no individual clinician, however skilled or dedicated, can realistically overcome through clinical care alone.

Fill in the blank: Every individual clinician contributes to safe motherhood through competent care, respect for dignity, and accurate _____ supporting audit and learning. Clinicians can also contribute through quality improvement, mentorship, and _____ for necessary system and policy change.

5.5.3 Course synthesis: from physiology to safe motherhood

Across this entire course we have travelled from the physiology of normal labour, through its complications and the operative interventions used to manage them, to the care of the newborn and the puerperium, and, in this final Series, to the broader public health framework of safe motherhood within which every one of these individual clinical encounters ultimately takes place, a deliberate structure reflecting how individual clinical competence and broader systemic and public health action are genuinely inseparable in achieving safe outcomes for mothers and babies.

As you move forward into clinical practice, carrying the knowledge and skills developed throughout this course, remember that every antenatal visit conducted with genuine care, every labour managed with vigilance and skill, and every complication recognised and treated promptly represents a direct, meaningful contribution to safe motherhood, not merely a discrete clinical task but a small yet genuinely important part of the sustained, collective effort required to make childbirth safe for every woman, everywhere.



Fill in the blank: This course has travelled from the physiology of labour through its complications to the broader public health framework of safe _____. Individual clinical competence and broader systemic and public health action are genuinely _____ in achieving safe outcomes.



Figure 5.5: The relationship between individual clinical care and the broader safe motherhood framework.

Pilot questions 5.5

- Describe the components of monitoring and evaluation of safe motherhood programmes. (Linked to SLO 5.9)
- Explain the value of near-miss audit alongside maternal death review. (Linked to SLO 5.9)
- Describe the direct clinical contribution of an individual clinician to safe motherhood. (Linked to SLO 5.9)



- Describe the broader contributions an individual clinician can make to safe motherhood beyond direct clinical care. (Linked to SLO 5.9)
- Reflect on how individual clinical competence and systemic public health action together contribute to safe motherhood. (Linked to SLO 5.9)

Series Summary

This Series has covered the origins, principles, and strategies of the Safe Motherhood Initiative, including its implementation in Nigeria, followed by maternal mortality in Nigeria, its definition, causes, and reduction strategies. It went on to examine the effect of age and parity on reproductive outcome, before concluding with the monitoring and evaluation of safe motherhood programmes and the role of the individual clinician, bringing this course on Labour and its Complications, Operative Obstetrics, Newborn Baby, Puerperium and its Abnormalities, and Safe Motherhood to a close.

You should now be able to describe the Safe Motherhood Initiative and its implementation in Nigeria, define and describe the causes and reduction of maternal mortality, discuss the effects of age and parity on reproductive outcome, and describe the role of the individual clinician in promoting safe motherhood (Linked to SLOs 5.1 to 5.9).

Glossary of Terms

1. **Advanced maternal age:** maternal age generally defined as 35 years or older at the expected date of delivery.
2. **Grand multiparity:** generally defined as five or more previous deliveries.
3. **Interpregnancy interval:** the time between the end of one pregnancy and the conception of the next.
4. **Maternal death:** the death of a woman during pregnancy or within 42 days of its end, from a cause related to or aggravated by the pregnancy.
5. **Maternal mortality ratio (MMR):** the number of maternal deaths per 100,000 live births.



6. **Near-miss audit:** facility-based review of a severe complication from which a woman survives, offering learning without the tragedy of a death.
7. **Nulliparous:** having never previously given birth.
8. **Safe Motherhood Initiative:** an international initiative launched in 1987 to reduce maternal mortality and disability through skilled care and broader systemic action.
9. **Skilled birth attendance:** delivery care provided by an appropriately trained midwife, doctor, or other skilled provider.
10. **The three delays model:** a framework describing delay in deciding to seek care, reaching a facility, and receiving adequate care as contributors to preventable maternal death.
11. **Task-shifting:** redistributing healthcare tasks among different categories of health workers to expand access to skilled care.
12. **Adolescent pregnancy:** pregnancy in a girl aged 10 to 19 years.

Concept Check Questions [Series 5]

Objective questions

- The Safe Motherhood Initiative was launched internationally in _____.
- The maternal mortality ratio is defined as the number of maternal deaths per 100,000 _____ births.
- Advanced maternal age is generally defined as _____ years or older at the expected date of delivery.
- Grand multiparity is generally defined as _____ or more previous deliveries.
- A very short interpregnancy interval, generally less than _____ months, is associated with an increased risk of preterm birth.

Short-answer questions

1. Explain why skilled attendance at birth is regarded as the single most critical safe motherhood intervention. (Linked to SLO 5.1)
2. List the leading direct causes of maternal mortality in Nigeria. (Linked to SLO 5.4)



3. Explain the social and educational outcomes associated with adolescent pregnancy. (Linked to SLO 5.6)
4. Explain why grand multiparous women should not be regarded as automatically low-risk. (Linked to SLO 5.7)
5. Explain the value of near-miss audit alongside maternal death review. (Linked to SLO 5.9)

Long-answer questions

6. Describe the origins, principles, and strategies of the Safe Motherhood Initiative, including its implementation in Nigeria. (Linked to SLO 5.1, SLO 5.2)
7. Describe the definition, causes, and strategies to reduce maternal mortality in Nigeria. (Linked to SLO 5.3, SLO 5.4, SLO 5.5)
8. Discuss the effect of age on reproductive outcome, across both adolescent and advanced maternal age. (Linked to SLO 5.6)
9. Discuss the effect of parity and interpregnancy interval on reproductive outcome. (Linked to SLO 5.7, SLO 5.8)
10. Describe the role of the individual clinician in promoting safe motherhood. (Linked to SLO 5.9)

Answers to Concept Check Questions [Series 5]

Objective questions

11. 1987.
12. Live.
13. 35.
14. Five.
15. Six.

Short-answer questions



16. The great majority of maternal deaths occur during labour, delivery, or the immediate postpartum period, when skilled recognition and management matter most.
17. Postpartum haemorrhage, hypertensive disorders, sepsis, obstructed labour, and complications of unsafe abortion.
18. Adolescent pregnancy is strongly associated with school dropout and reduced future economic opportunity.
19. Cumulative structural and functional uterine changes from repeated deliveries mean grand multiparity carries genuine, specific risks requiring individualised assessment.
20. Near-miss audit offers valuable learning opportunities from severe complications without the profound tragedy of an actual death.

Long-answer questions

21. **Basic response:** The Safe Motherhood Initiative began in 1987, promoting skilled birth attendance, antenatal care, and emergency obstetric care, implemented with regional variation in Nigeria.

Value-added response: Maternal mortality reflects broader social determinants, meaning genuinely effective safe motherhood programming addresses these alongside direct clinical interventions.

22. **Basic response:** Maternal mortality in Nigeria is driven by direct causes such as haemorrhage and indirect causes such as anaemia and malaria, addressed through the three delays framework.

Value-added response: Coordinated strategies addressing all three delays, alongside female education, are needed to meaningfully reduce Nigeria's maternal mortality burden.

23. **Basic response:** Adolescent and advanced maternal age both carry increased reproductive risk, requiring individualised, age-appropriate antenatal care for optimal outcomes.



Answers to Pilot Questions [Series 5]

Part 5.1

1. Launched internationally in 1987 in response to the neglected, largely preventable scale of maternal death and disability.
2. It reflects deep-rooted social, economic, and structural determinants, not merely a clinical problem alone.
3. Universal antenatal care, skilled birth attendance, emergency obstetric care, family planning, and safe abortion care.
4. The great majority of maternal deaths occur during labour, delivery, or the immediate postpartum period.
5. Nigeria has implemented free or subsidised services, task-shifting, and insurance schemes, with substantial regional variation in effectiveness.

Part 5.2

6. MMR is deaths per 100,000 live births; maternal mortality rate is deaths relative to the population of women of reproductive age.
7. Death during pregnancy or within 42 days of its end, from a cause related to or aggravated by the pregnancy, excluding accidental causes.
8. Postpartum haemorrhage, hypertensive disorders, sepsis, obstructed labour, and unsafe abortion complications.
9. Anaemia, malaria, and cardiac disease.
10. Delay in deciding to seek care, reaching a facility, and receiving adequate care, addressed through emergency care, task-shifting, and education.

Part 5.3

11. Pre-eclampsia, preterm birth, low birth weight, obstructed labour, and obstetric fistula.
12. It is associated with school dropout and reduced future economic opportunity.
13. Chromosomal abnormality, miscarriage, gestational diabetes, hypertensive disorders, and increased operative delivery.



14. Age-related decline in oocyte quality, cumulative medical conditions, and reduced physiological reserve.
15. Individualised, age-appropriate antenatal care addressing the specific risks relevant to each end of the age spectrum.

Part 5.4

1. Malpresentation, placenta praevia and abruption, postpartum haemorrhage, and uterine rupture.
2. Cumulative uterine changes from repeated deliveries carry genuine risk regardless of previously straightforward deliveries.
3. Longer first and second stage, reflecting the lack of previous cervical dilatation and perineal stretching.
4. Increased risk of preterm birth, low birth weight, and, after previous caesarean section, uterine rupture.
5. At least 18 to 24 months, allowing adequate time for maternal recovery and, where relevant, uterine scar healing.

Part 5.5

1. Maternal mortality surveillance, near-miss audit, and routine health information system data.
2. It offers valuable learning from severe complications without the tragedy of an actual death.
3. Competent, timely clinical care, respect for dignity, and accurate documentation supporting audit and learning.
4. Quality improvement participation, mentorship, and advocacy for necessary system and policy change.
5. Individual competence and systemic action are inseparable, with every well-managed encounter contributing to the collective effort.



References and Attributions [Series 5]

Textual References

6. Cunningham, F. G., Leveno, K. J., Dashe, J. S. et al. (2022). Williams Obstetrics (26th ed.). McGraw Hill.
7. World Health Organization (2015). Strategies Towards Ending Preventable Maternal Mortality (EPMM). WHO Press.
8. National Population Commission and ICF (2019). Nigeria Demographic and Health Survey 2018. NPC and ICF.
9. Knight, M., Bunch, K., Tuffnell, D. et al. (Eds.) (2021). Saving Lives, Improving Mothers' Care: MBRRACE-UK Confidential Enquiry into Maternal Deaths. National Perinatal Epidemiology Unit.

Figures, Plates, Tables, and Boxes

1. Box 5.1: Core strategies of the Safe Motherhood Initiative. AI-generated using the prompt: "Create a simple single-column reference box with an outside border titled Safe Motherhood Initiative: Core Strategies, listing each strategy with a one-line description. Clinical reference box style."
2. Table 5.2: Direct and indirect causes of maternal mortality in Nigeria. AI-generated using the prompt: "Create a clean reference table titled Causes of Maternal Mortality in Nigeria, listing direct and indirect causes with preventability notes. Simple clinical reference table style with outside border."
3. Figure 5.3: The U-shaped relationship between maternal age and reproductive risk. AI-generated using the prompt: "Create a professional medical diagram titled Age and Reproductive Outcome, showing a U-shaped risk curve across maternal age with specific risks labelled at each extreme. Clean clinical educational diagram style."
4. Box 5.4: Risks associated with parity extremes and interpregnancy interval. AI-generated using the prompt: "Create a simple single-column reference box with an outside border titled Parity and Interpregnancy Interval Risks, listing key risks for each category. Clinical reference box style."
5. Figure 5.5: The relationship between individual clinical care and the broader safe motherhood framework. AI-generated using the prompt: "Create a professional medical diagram titled From Individual Care to Safe Motherhood, showing concentric circles from individual care to national policy. Clean clinical educational diagram style."



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