CESAREAN DELIVERY

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REPRODUCTIVE ENDOCRINOLOGY AND INFERTILITY

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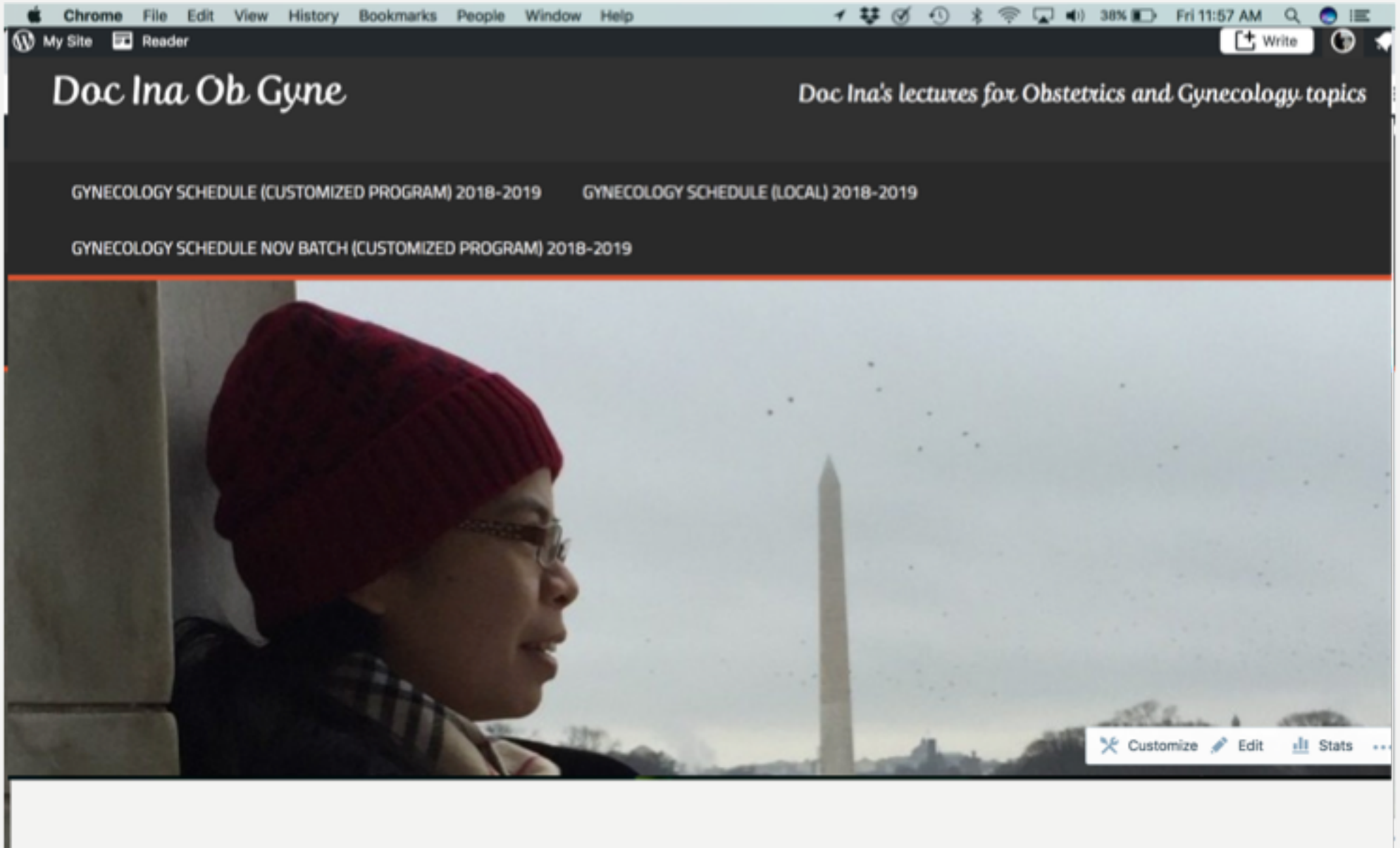


REFERENCE

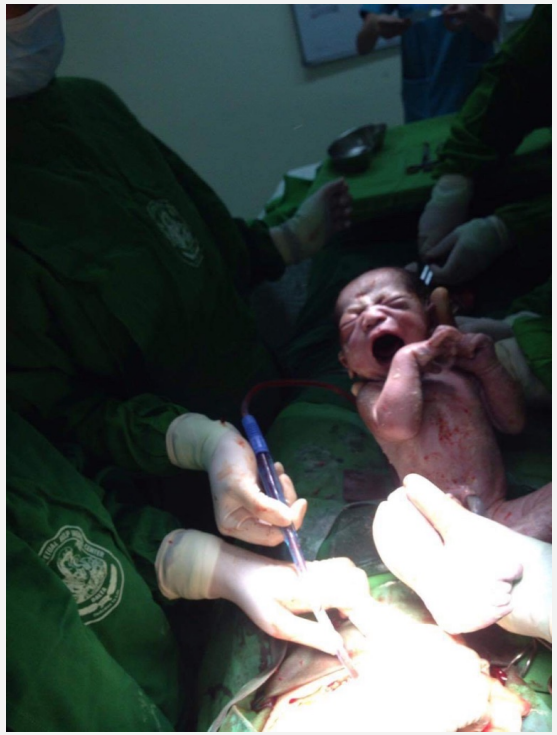
- Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, Casey BM, Sheffield JS (eds). William's Obstetrics 25th edition; chapter 30 Cesarean delivery

OUTLINE

- INDICATIONS
- TECHNIQUES
  - ABDOMINAL INCISION
    - PFANNENSTIEL
    - MIDLINE VERTICAL
    - Joel-Cohen and Misgav-Ladach Techniques
  - HYSTEROTOMY
    - LOW TRANSVERSE
    - CLASSICAL
  - PLACENTAL DELIVERY
  - UTERINE REPAIR
  - ABDOMINAL CLOSURE

CESAREAN DELIVERY

- birth of a fetus via laparotomy and then hysterotomy.
- two general types of cesarean delivery:
  - primary refers to a first-time hysterotomy
  - secondary denotes a uterus with one or more prior hysterotomy incisions.



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INDICATIONS FOR CESAREAN DELIVERY

Maternal
Prior cesarean delivery
Abnormal placentation
Maternal request
Prior classical hysterotomy
Unknown uterine scar type
Uterine incision dehiscence
Prior full-thickness myomectomy
Genital tract obstructive mass
Invasive cervical cancer
Prior trachelectomy
Permanent cerclage
Prior pelvic reconstructive surgery
Pelvic deformity
HSV or HIV infection
Cardiac or pulmonary disease
Cerebral aneurysm or arteriovenous malformation
Pathology requiring concurrent intraabdominal surgery
Perimortem cesarean delivery

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INDICATIONS FOR CESAREAN DELIVERY

Maternal-Fetal
Cephalopelvic disproportion
Failed operative vaginal delivery
Placenta previa or placental abruption
Fetal
Nonreassuring fetal status
Malpresentation
Macrosomia
Congenital anomaly
Abnormal umbilical cord Doppler study
Thrombocytopenia
Prior neonatal birth trauma

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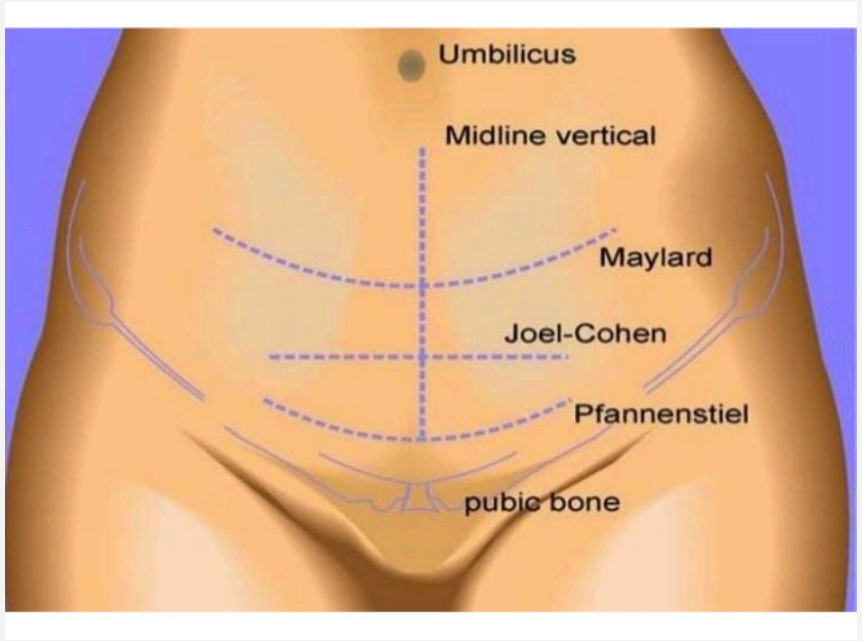
TECHNIQUE FOR CEASAREAN DELIWERY

Abdominal Incision

- midline vertical
- suprapubic transverse incision (Pfannenstiel or Maylard incisions)



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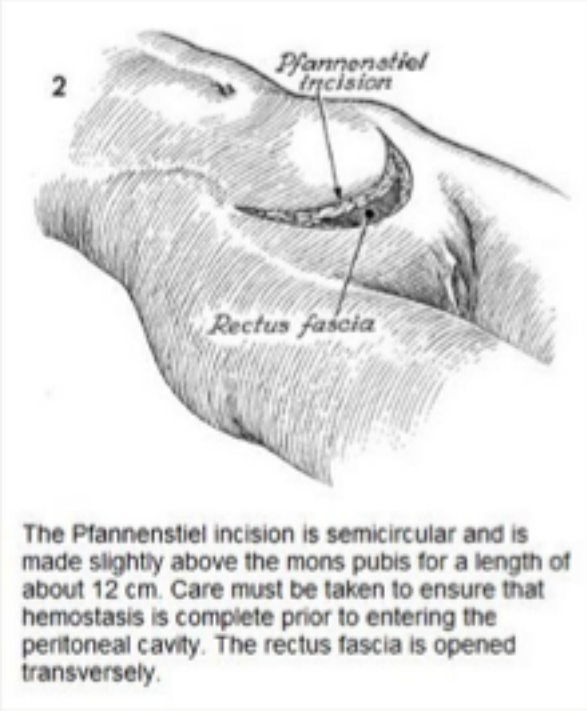
ABDOMINAL INCISION: PFANNENSTIEL INCISION ("BIKINI CUT")

- the skin and subcutaneous tissue are incised using a low, transverse, slightly curvilinear incision.
- made at the level of the pubic hairline, which is typically 3 cm above the superior border of the symphysis pubis.
- incision is extended beyond the lateral borders of the rectus abdominis muscles.
- It should be of adequate width to accommodate delivery—12 to 15 cm is typical.



The Pfannenstiel incision is semicircular and is made slightly above the mons pubis for a length of about 12 cm. Care must be taken to ensure that hemostasis is complete prior to entering the peritoneal cavity. The rectus fascia is opened transversely.

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ABDOMINAL INCISION: PFANNENSTIEL INCISION ("BIKINI CUT")

- Sharp dissection is continued through the subcutaneous layer to the fascia.
- superficial epigastric vessels can be identified halfway between the skin and fascia, several centimeters from the midline, and coagulated.
- fascia is then incised sharply at the midline.
- the anterior abdominal fascia is typically composed of two visible layers:
  - the aponeurosis from the external oblique muscle
  - fused layer containing aponeuroses of the internal oblique and transverse abdominis muscles.
- inferior epigastric vessels typically lie outside the lateral border of the rectus abdominis muscle and beneath the fused aponeuroses of the internal oblique and transverse abdominis muscles.

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ABDOMINAL INCISION: PFANNENSTIEL INCISION ("BIKINI CUT")

- Once the fascia is incised, the inferior fascial edge is grasped with suitable clamps and elevated by the assistant as the operator separates the fascial sheath from the underlying rectus muscles either bluntly or sharply until the superior border of the symphysis pubis is reached.
- the superior fascial edge is grasped and again, separation of fascia from the rectus muscles is completed; fascial separation is carried near enough to the umbilicus to permit an adequate midline longitudinal incision of the peritoneum.
- rectus abdominis and pyramidalis muscles are then separated in the midline by sharp and blunt dissection to expose the transversalis fascia and peritoneum.
- transversalis fascia and preperitoneal fat are dissected carefully to reach the underlying peritoneum.
- peritoneum near the upper end of the incision is opened carefully

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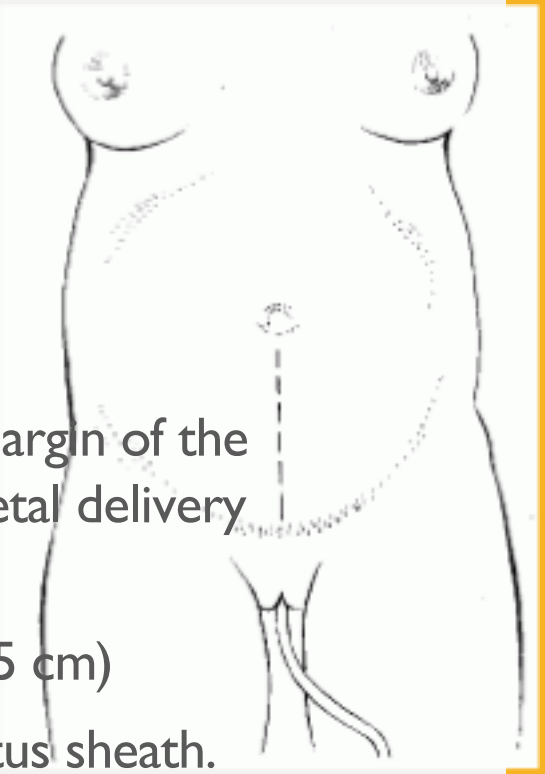
ABDOMINAL INCISION: VERTICAL INCISION



- An infraumbilical midline vertical incision begins 2 to 3 cm above the superior margin of the symphysis, up to the infraumbilical area (should be of sufficient length to allow fetal delivery without difficulty).
- Incision length should correspond with the estimated fetal size (approx. 12 to 15 cm)
- Sharp or electrosurgical dissection is performed to the level of the anterior rectus sheath.
- A small opening is made sharply with scalpel in the upper half of the linea alba (to avoid bladder injury).
- Index and middle fingers are placed beneath the fascia, and the fascial incision is extended superiorly and inferiorly with scissors or scalpel.
- Midline separation of the rectus muscles and pyramidalis muscles and peritoneal entry are then similar to those with the Pfannenstiel incision.

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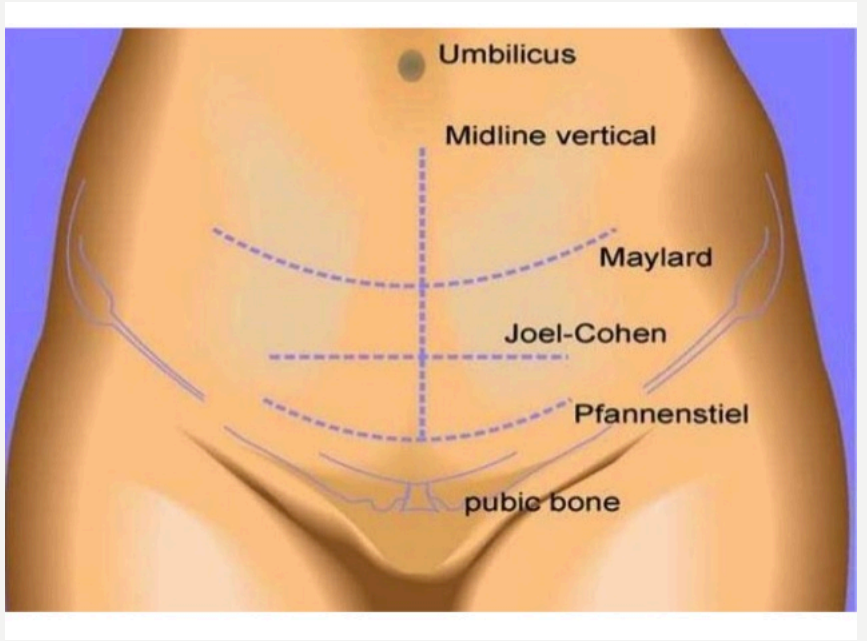
JOEL-COHEN AND MISGAV-LADACH TECHNIQUES

- **Joel-Cohen technique** creates a straight 10-cm transverse skin incision 3 cm below the level of the anterior superior iliac spines.
- the subcutaneous tissue layer is opened sharply 2 to 3 cm in the midline → carried down, without lateral extension, to the fascia.
- A small transverse incision is made in the fascia, and a finger from each hand is hooked into the lateral angles of this fascial incision → incision is then stretched transversely.
- All the layers of the abdominal wall are then manually stretched laterally in opposition to further open the incision.



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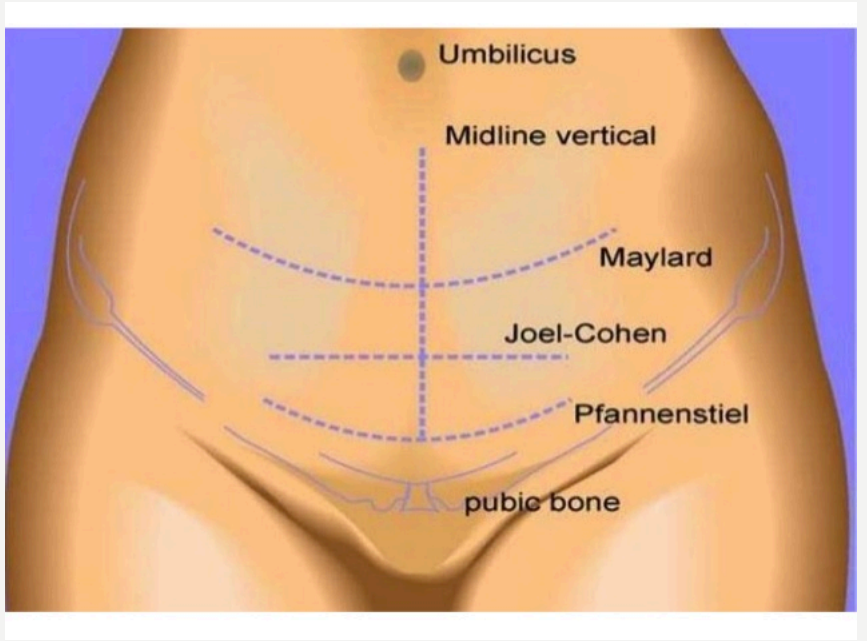
JOEL-COHEN AND MISGAV-LADACH TECHNIQUES

- The myometrium is incised transversely in the midline and then opened and extended laterally with one finger hooked into each corner of the hysterotomy incision. Interrupted sutures are used for hysterotomy closure. Neither visceral nor parietal peritoneum is closed.
- The **Misgav-Ladach technique** is similar and differs mainly in that myometrial incision closure is completed with a single-layer locking continuous suture
- these techniques have been associated with shorter operative times and with lower rates of intraoperative blood loss and postoperative pain



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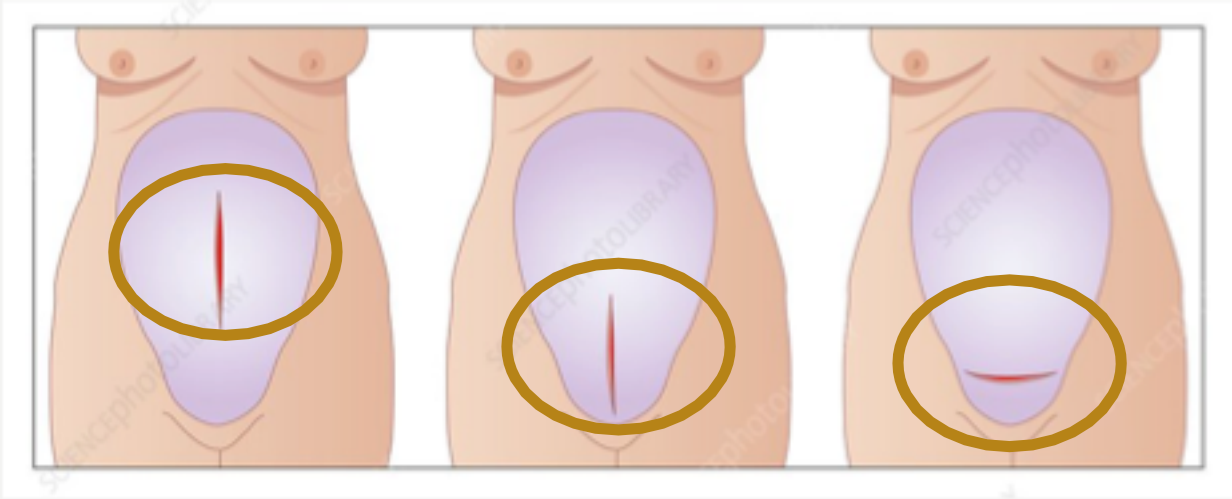
HYSTEROTOMY



2 techniques:

- Low transverse incision: the lower uterine segment is incised transversely as described by Kerr in 1921; preferred over Classical incision

- Classical incision: vertical incision into the body of the uterus above the lower uterine segment and reaches the uterine fundus; similar to the low-segment vertical incision as described by Krönig

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HYSTEROTOMY: LOW TRANSVERSE CESAREAN INCISION

- The reflection of peritoneum above the upper margin of the bladder and overlying the anterior lower uterine segment—termed the bladder flap—is grasped in the midline with forceps and incised transversely with scissors.

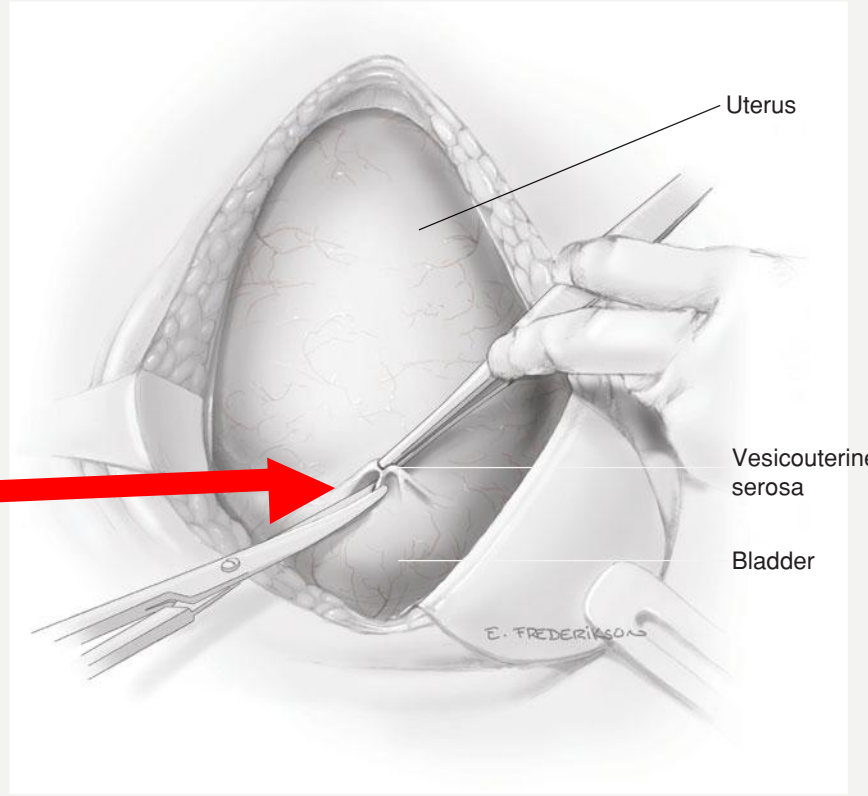

FIGURE 30-1 The loose vesicouterine serosa above the bladder reflection is grasped with forceps and incised with Metzenbaum scissors.

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HYSTEROTOMY: LOW TRANSVERSE CESAREAN INCISION

- Following the initial incision, scissors are inserted between the vesicouterine serosa and myometrium of the lower uterine segment → scissors are pushed laterally from the midline on each side to further open the visceral peritoneum and expose the myometrium.

- the lower edge of peritoneum is elevated, and the bladder is gently separated from the underlying myometrium with blunt or sharp dissection within this vesicouterine space

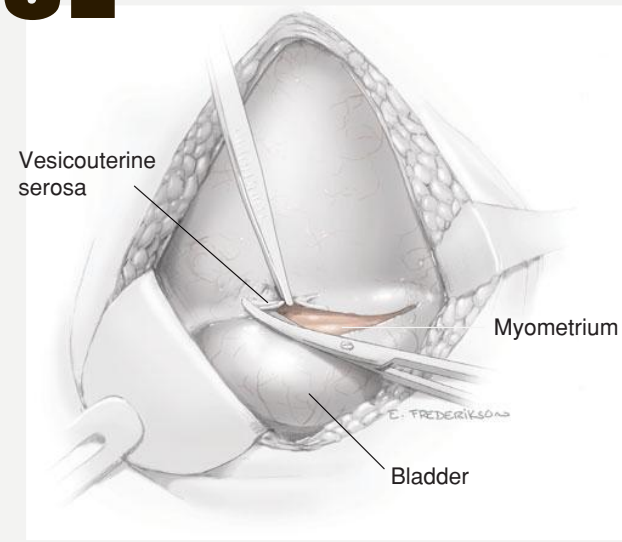

FIGURE 30-2 The loose serosa above the upper margin of the bladder is elevated and incised laterally.

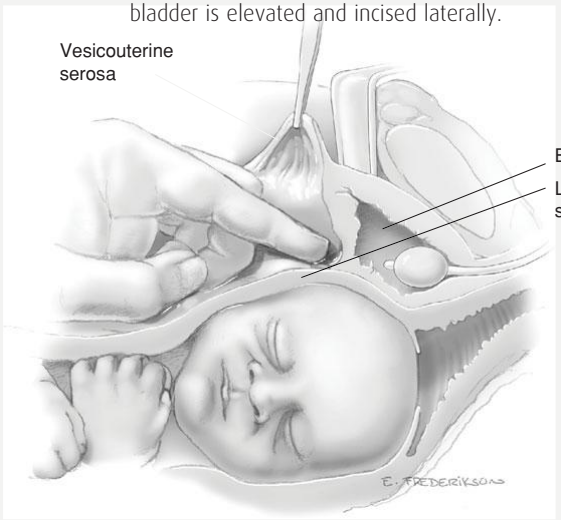

FIGURE 30-3 Cross section shows blunt dissection of the bladder off the uterus to expose the lower uterine segment.

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HYSTEROTOMY: LOW TRANSVERSE CESAREAN INCISION

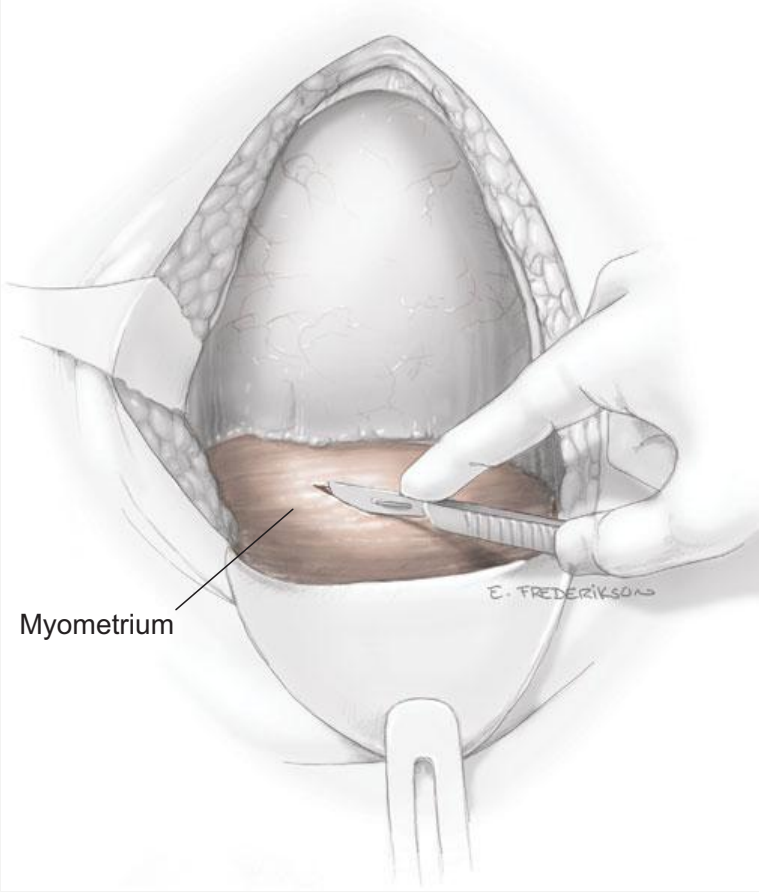

FIGURE 30-4 The myometrium is carefully incised to avoid cutting the fetal head.

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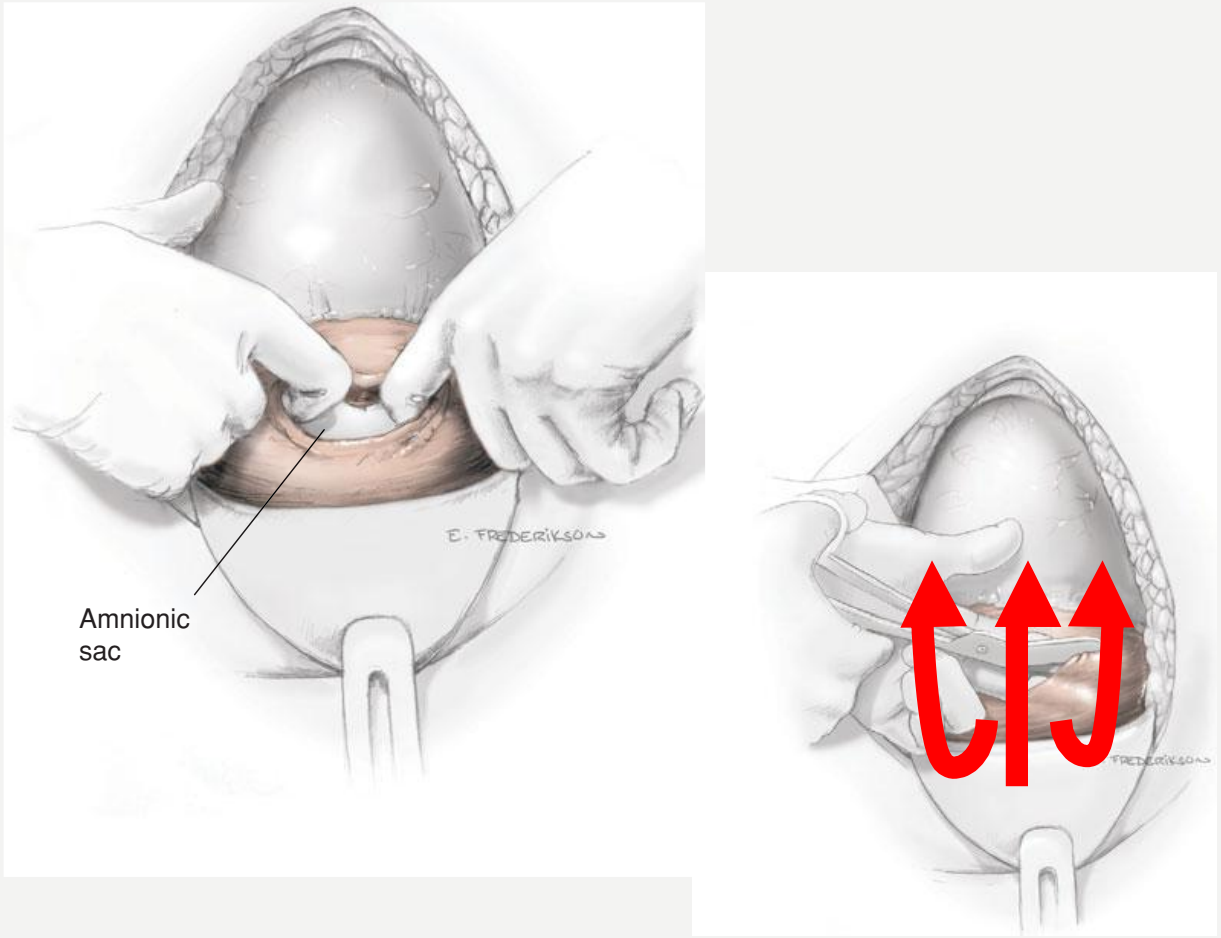
HYSTEROTOMY: LOW TRANSVERSE CESAREAN INCISION



- J incision
- U incision
- T incision

FIGURE 30-5 After entering the uterine cavity, the incision is extended laterally with fingers or with bandage scissors (*inset*).

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HYSTEROTOMY: DELIVERY OF THE FETUS

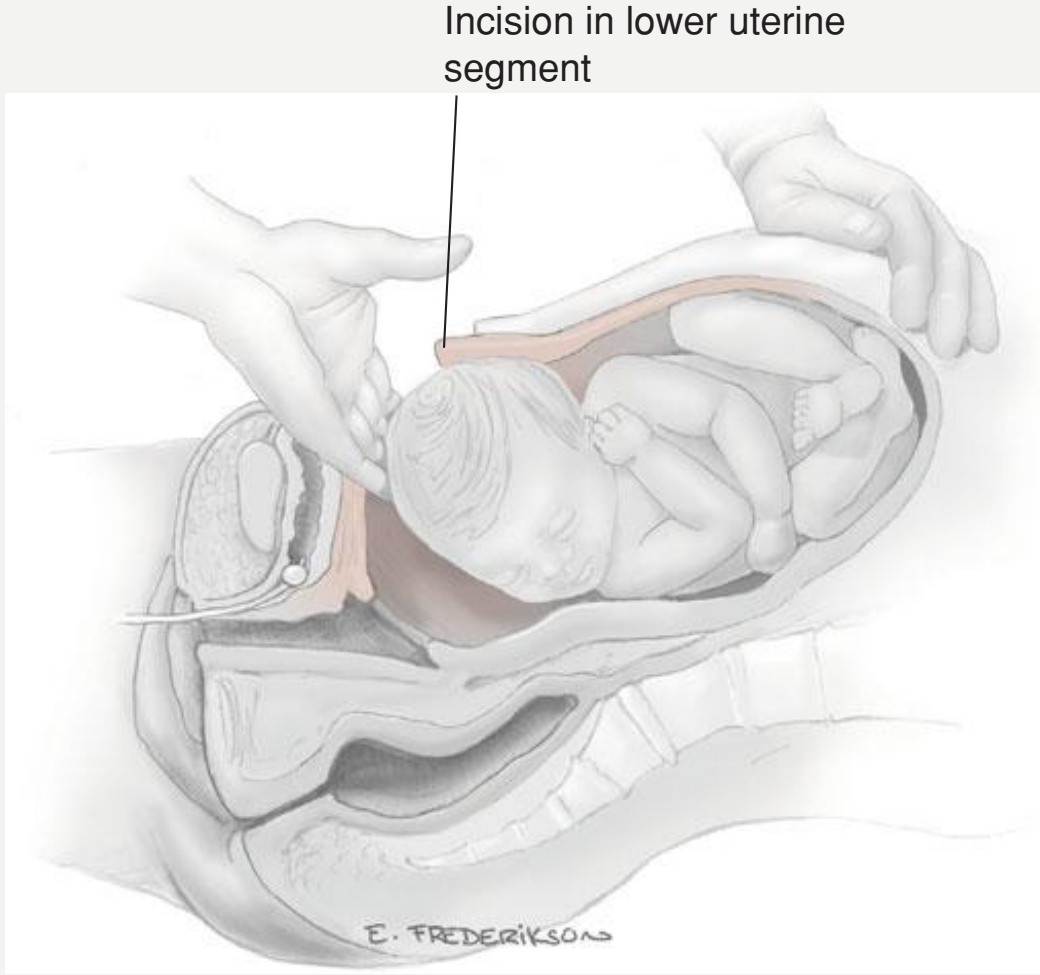

FIGURE 30-6 Delivery of the fetal head.

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HYSTEROTOMY: DELIVERY OF THE FETUS

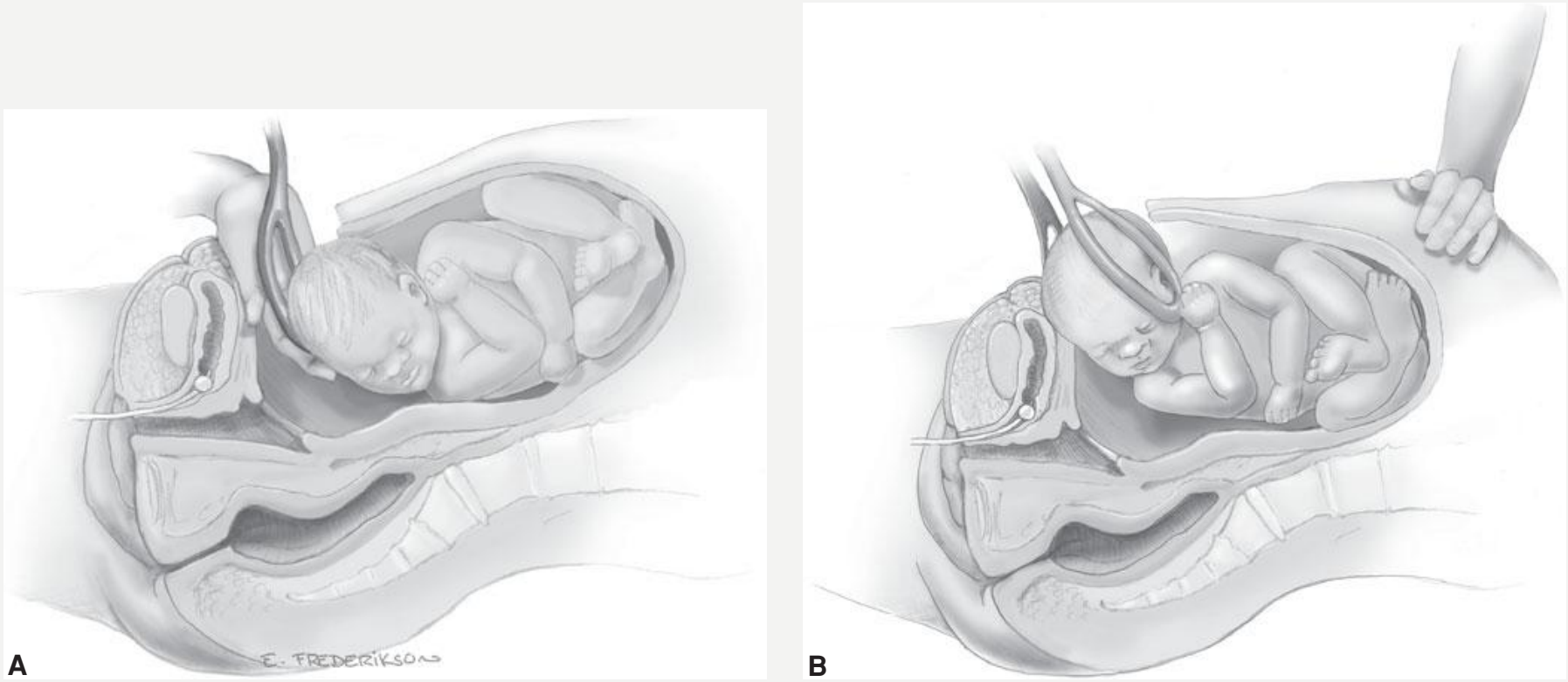

FIGURE 30-7 A. The first cesarean forceps blade is placed. **B.** Slight upward and outward traction is used to lift the head through the incision.

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HYSTEROTOMY: DELIVERY OF THE FETUS

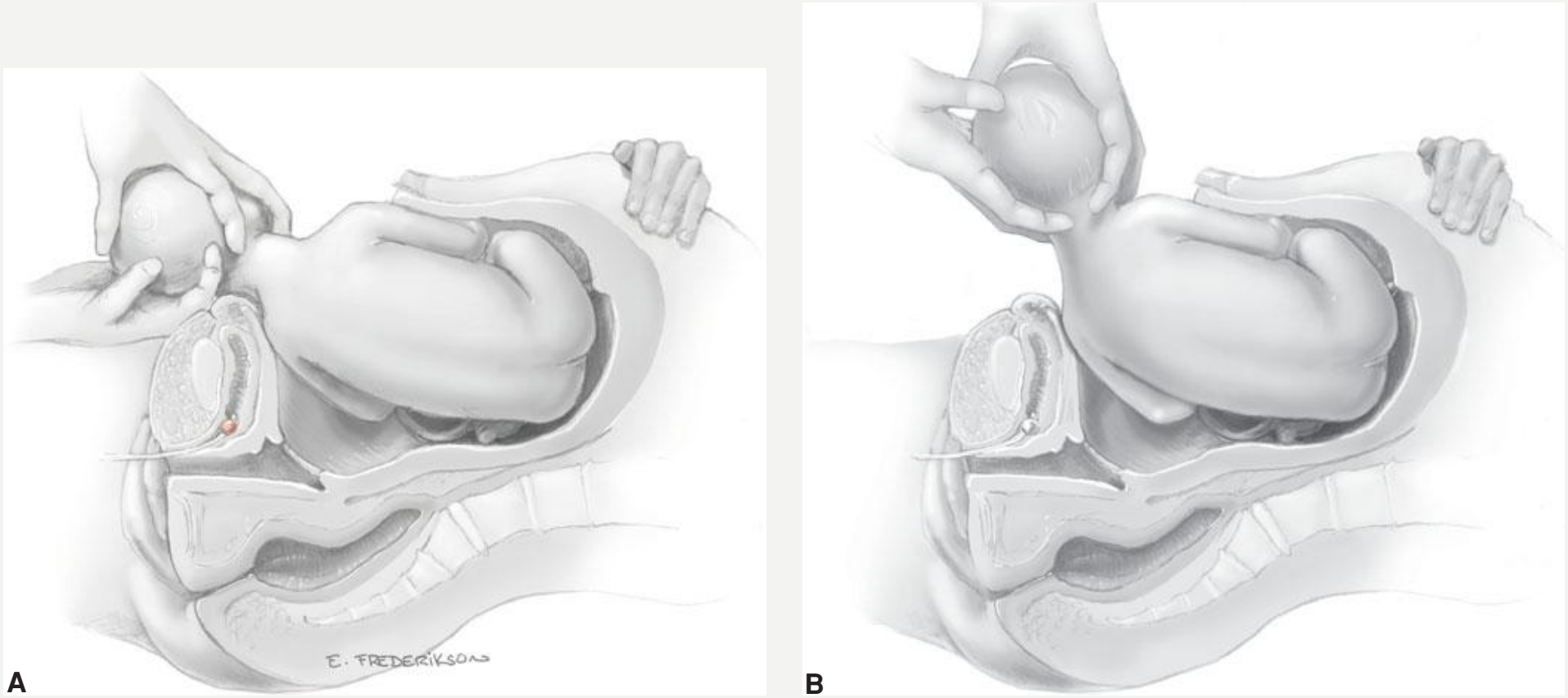

FIGURE 30-8 The anterior **(A)** and then the posterior **(B)** shoulder are delivered.

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AFTER DELIVERY OF THE FETUS

- After birth, an intravenous infusion containing two ampules or 20 units of oxytocin per liter of crystalloid is infused at 10 mL/min. Once the uterus contracts satisfactorily, the rate can be reduced.
- bolus doses of oxytocin are avoided because of associated hypotension
- An alternative to oxytocin is carbetocin—a longer-acting oxytocin derivative that provides suitable, albeit more expensive, hemorrhage prophylaxis
- Second-tier agents are ergot-alkaloids (contraindicated in hypertensive women), and misoprostol (considered illegal drug locally).

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PLACENTAL DELIVERY

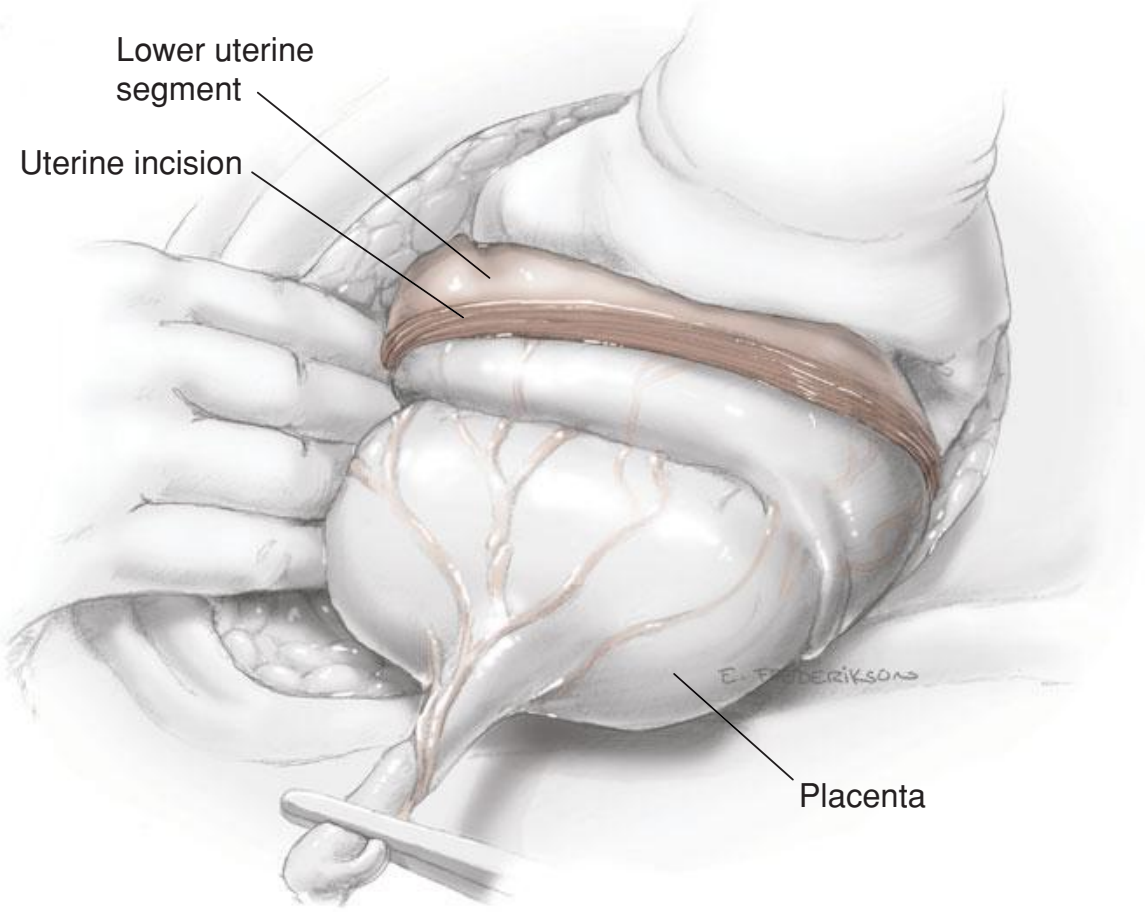

FIGURE 30-9 Placenta bulging through the uterine incision as the uterus contracts. A hand gently massages the fundus to help aid placental separation.

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UTERINE REPAIR

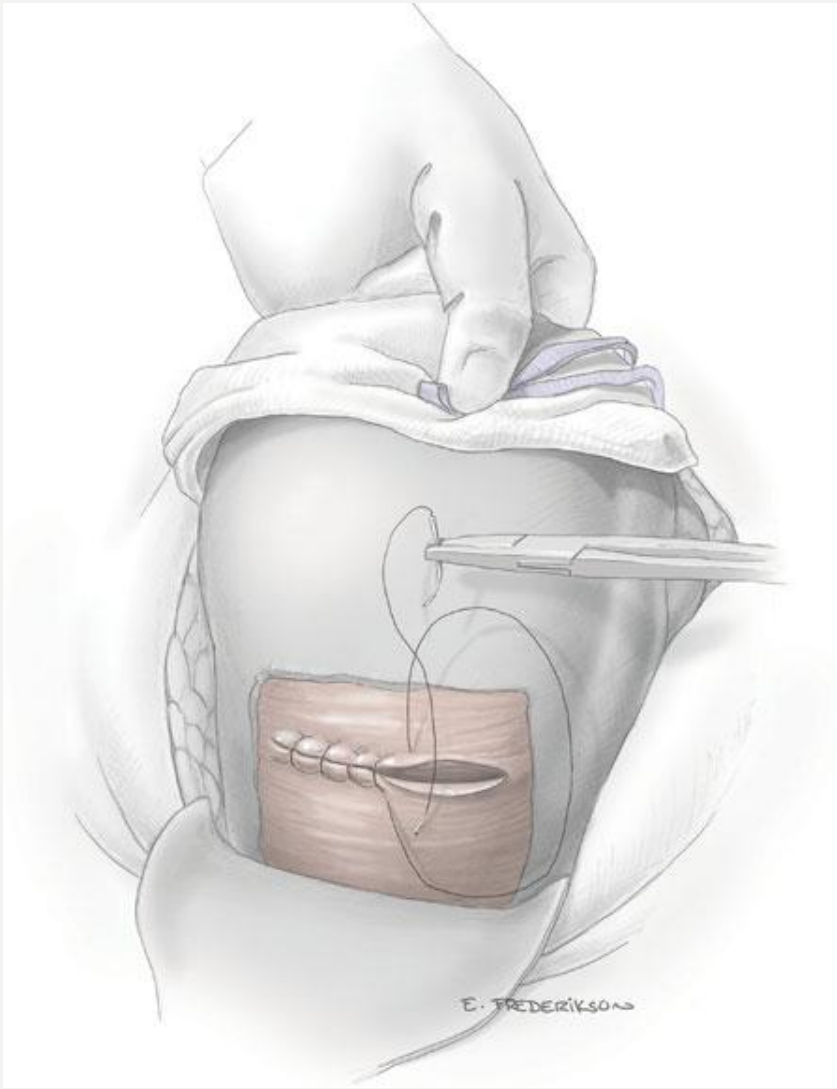

FIGURE 30-10 The cut edges of the uterine incision are approximated with a running-lock suture anchored at either angle of the incision.

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ABDOMINAL WALL CLOSURE

- Any laparotomy sponges are removed, and the paracolic gutters and cul-de-sac are gently suctioned of blood and amnionic fluid
- Some surgeons irrigate the gutters and cul-de-sac, especially in the presence of infection or meconium.
- Routine irrigation in low-risk women, however, leads to greater intraoperative nausea and without lower postoperative infection rates
- After sponge and instrument counts are found to be correct, the abdominal incision is closed in layers.
- As each layer is closed, bleeding sites are located, clamped, and ligated or coagulated with an electrosurgical blade.

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CLASSICAL CESAREAN INCISION

- this incision is usually avoided because it encompasses the active upper uterine segment and thus is prone to rupture with subsequent pregnancies.
- Indications:
  - difficulty in exposing or safely entering the lower uterine segment (a densely adhered bladder from previous surgery)
  - a leiomyoma occupies the lower uterine segment;
  - the cervix has been invaded by cancer;
  - An anteriorly implanted placenta previa
  - massive maternal obesity that precludes safe access to the lower uterine segment

→ ***continued…***

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CLASSICAL CESAREAN INCISION

- transverse lie of a large fetus
- when the fetus is very small, especially if breech, a classical incision may be preferable (poorly developed lower uterine segment provides inadequate space for the manipulations required for breech delivery)
- with multiple fetuses, a classical incision again may be needed to provide suitable room for extraction of fetuses that may be malpositioned or preterm.

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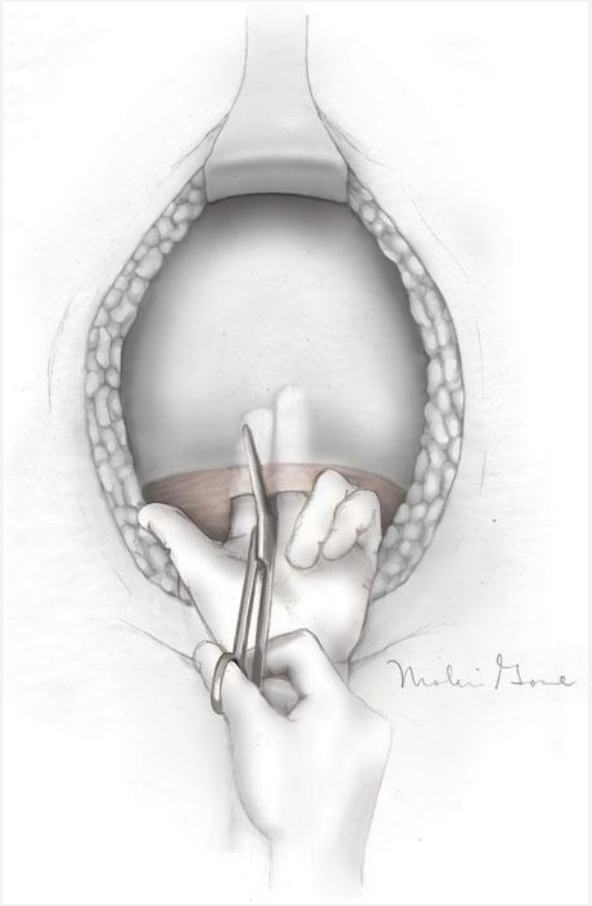
CLASSICAL CESAREAN INCISION



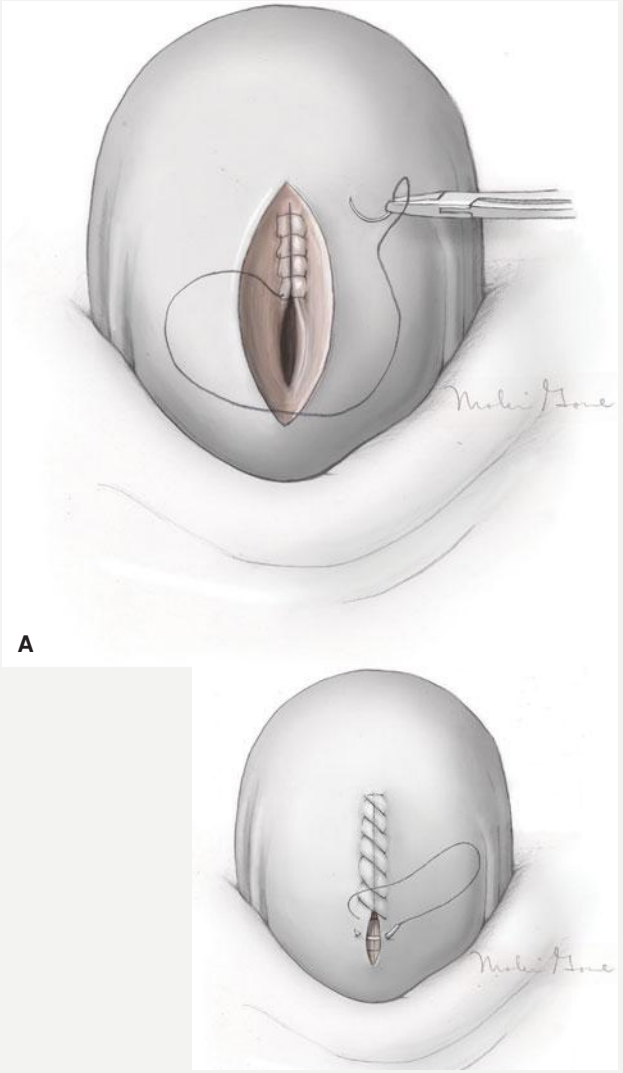


FIGURE 30-11 An initial small vertical hysterotomy incision is made in the lower uterine segment. Fingers are insinuated between the myometrium and fetus to avoid fetal laceration. Scissors extend the incision cephalad as needed for delivery.

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Thank you!

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