Manual of Instruments in Obstetric and Gynecological Nursing

M. Santhoshkumari Jai Chandroo

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M. Santhoshkumari Jai Chandroo
MSc (nursing), MSc (psychology), PGDHM

Lecturer in Nursing
RAAK Nursing and Paramedical College
Puducherry, India

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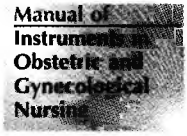

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to

my dear husband
Mr Jai Chandroo
and
my family

Foreword

I have great pleasure in writing the Foreword to this textbook which is being brought out exclusively on "Instruments used in obstetrics and gynecology" specialty to fulfill the needs of diploma, undergraduate as well as postgraduate nursing students in the specialty.

The book *Manual of Instruments in Obstetric and Gynecological Nursing* written by a young and talented author M. Santhoshkumari Jai Chandroo is the result of her keen interest in improving the students' knowledge and skill, especially in the instruments used in the field.

The language, styles of description, diagnosis, illustrations and pictures are well presented. I am sure this near state-of-art venture will be welcome by both the students and teacher alike, thus qualifying this book as a worthy addition to the existing literature meant for imparting fundamental knowledge in the field of obstetrics and gynecology to the future generation in the nursing profession.

I wish all the best for the publishers M/s CBS Publishers & Distributors Pvt Ltd, New Delhi, and the author, M. Santhoshkumari Jai Chandroo, all the success in this endeavour.

Prof (Dr) Manju Bala Dash
Head
Department of OBG Nursing
College of Nursing
Mother Theresa Postgraduate and
Research Institute of Health Sciences
Puducherry

Preface

Obstetric and gynecological nursing is an expanding area within the nursing profession as a result of the broadening scope of practice. This field deals with care given to the mother and the baby for their safe survival. To enhance better survival, the health care providers should be aware of all the procedures involved in this field. Instruments play a better role in performing most of the clinical procedures. Hence, students and the health care providers should be aware of the all these instruments to implement the best nursing care. This concept motivated me to develop this *Manual of Instruments in Obstetric and Gynecological Nursing*.

During my short career so far, I have experienced a growing need for an inclusive book on instruments used in obstetric and gynecological nursing. I have tried to fill this void by giving a complete version of all the instruments used in obstetric and gynecological nursing under one cover.

The main aim of this book is to generate an up-to-date knowledge and skill in the instruments used in various obstetrical and gynecological nursing procedures. This effort is well supported by neat and perfect illustrations, which are the true models of the instruments, giving an exact visual impression to the reader.

The focus of this book is mainly on all the instruments used in the obstetric and gynecological nursing procedures. This book will not only help the midwifery/nursing students to gain more knowledge in the various instruments used in this field, but also to help the fresh graduates in acquiring knowledge skills they are going to practise.

M. Santhoshkumari Jai Chandroo

Acknowledgements

I express my heartfelt gratitude to my family, my friends, my teachers, and well wishers for their encouragement and guidance in the preparation of this book.

My sincere thanks to CBS Publishers and Distributors, New Delhi, for their tireless effort in making my dream to come out with flying colors in the form of this book.

I express my sincere thanks to my beloved teacher Dr. Manju Bala Dash, Head, Department of OBG, College of Nursing, Mother Theresa Postgraduate and Research Institute of Health Sciences, Puducherry, who agreed to write the foreword to this book.

I also express my heartfelt thanks to Mrs Subashini, Principal, and Mrs Bharani, Vice Principal, RAAK Nursing and Paramedical College, Puducherry, for their support and timely help in developing this book.

Even though I am quite careful in the preparation of this book, I will appreciate any comments and suggestions from the readers which will help in improving the forthcoming editions of the book through my publishers.

M. Santhoshkumari Jai Chandroo

Contents

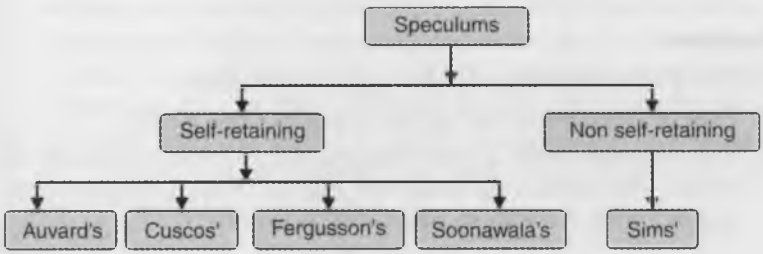
1 Speculums

A speculum is a medical tool for investigating body cavities by inserting it into the body cavity so that proper vision can be attained and the procedure can be performed easily. The word speculum was derived from the Latin word which is meant as 'mirror'. In ancient texts, the speculum may also be referred to as a **diopter** or **dioptra**. Like an endoscope, a speculum was inserted into a body cavity. But the difference between both of them is that endoscopes have optics to visualize the body cavities, whereas a speculum is intended for direct vision.

Speculums come in a variety of shapes based on their purpose; in any case the tube or blade(s) of the instrument allows the operator a direct vision of the area of interest and the possibility to introduce instruments for further interventions such as a biopsy.

There are numerous speculums available for various purposes (Flow chart 1.1). In this chapter, we are going to see about the speculums which are specially designed for the obstetrics and gynecological nursing purpose, i.e. vaginal speculum.

Flow chart 1.1: Types of speculum



A vaginal speculum is an instrument which helps to inspect the vagina by retracting the vaginal walls by using it.

Vaginal speculum is divided into two types. They are self-retaining and non self-retaining speculums.

SELF-RETAINING SPECULUMS

AUVARD'S SPECULUM

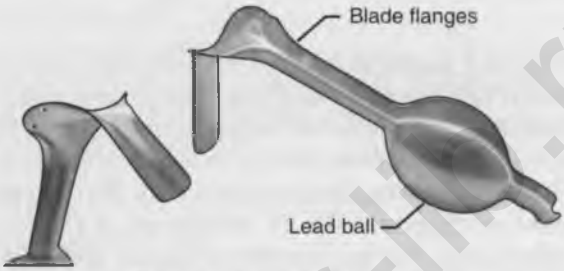


Fig. 1.1: Auvard's speculum

Other Name

It is also called Auvard's retractor or posterior vaginal wall speculum.

Definition

Auvard's speculum is a unique and massive style of speculum with 15/8′ wide and 4" long blade which weighs about 2 pounds 11 ounces (1960 g). The Auvard's weighted vaginal speculum is used inside the vagina as per the name it is called. It comes with a weight which can be separated for use. This speculum has one blade and it helps in keeping the vagina open so that the gynecologist can work with both hands free.

Features

1. It is a self-retaining type of vaginal speculum.
2. This instrument is heavier and bigger than others.
3. It is provided with a lead weight and suitable curvature to retract and stretch the posterior vaginal wall. The speculum is used with woman in lithotomy position.

4. This popular operative speculum is self-retaining because angle between the blade and handle is less than 90°. Owing to the weight, the blade also presses against the cut edge of the posterior vaginal wall and achieves homeostasis.
5. It is designed to be inserted, with the pendulum end over the end of the examining table; the weight of the pendulum exerts a constant pull on the opening into which it has been inserted.
6. Medium blade dimensions: 46 mm wide × 64 mm long.
7. Large blade dimensions: 35 mm wide × 86 mm long.
8. It has a couple of holes on each side of its everted outer ends. These holes were meant for fixation of the instrument to the adjacent part of the woman's thighs, though this practice is unnecessarily traumatic to her.
9. A trough runs through the length of the handle and also in the corresponding part of the weight attached to it so that any blood which collects over the blade during an operation runs off into a receptacle placed at the feet of the surgeon.

Material Made up of and Sterilization Method

When a pelvic exam is being conducted, gynecologists tend to use the Auvard's weighted vaginal speculum which is made out of stainless steel so that these can be sterilized and reused. It is sterilized by autoclaving.

Indications/Uses

1. It is used in major vaginal operations such as Fothergill's operation, for amputation of cervix, in carcinoma of cervix and for repair of fistulas.
2. It can also be used in expanding the vaginal cavity so that the surgeon can easily see what the problem may be if the woman is experiencing some abnormal bleeding or pain.
3. It is also used when a general pelvic exam may be conducted so that the condition of the woman's internal reproductive system can be examined whether it is functioning properly.
4. To reach into the cervix to apply medications, take swabs for culture and sensitivity, get biopsy specimens and do electrocautery in the cervix.

Advantages

No assistance is required, as it is self-retaining.

Disadvantages

The instrument cannot be used without anesthesia as it causes severe perineal pain by pressure. Hence, it is not useful for examination of the patient or for procedures under local anesthesia. It causes hemostasis from the posterior vaginal mucosal edge by compression. The rim of this instrument limits the available space at the introitus which is a technical disadvantage for carrying out operative procedures. As it weighs heavy and requires anesthesia, it is not commonly used for procedures. Lighter, handy and better instruments are available for use.

How to use?

When the examination is being performed, the woman is asked to lie on her back on the examination table and have her knees bent. The legs were kept in the stirrups which are attached onto the table (lithotomy position). Antiseptic and aseptic precautions are taken by the examiner. Anesthetize the woman. Labia is separated between the left thumb and index finger. Then the lubricated and sterile instrument is held in the right hand. Then the transverse diameter of Auvard's weighted vaginal speculum is gently inserted along the anteroposterior axis of the vagina to retract posterior vaginal wall. This allows the examiner to have a proper vision of the cervix. The speculum may also be attached to the thighs through the couple

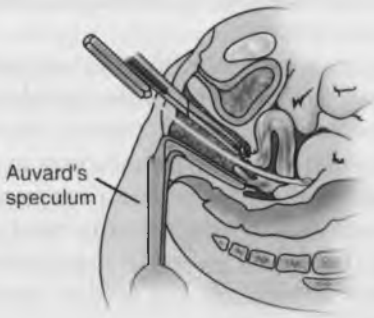


Fig. 1.2: Introducing the Auvard's speculum in a gynecological procedure

of holes on each side of the blade which allows the blade to remain in place throughout the procedure so that the surgeon can carry on with the work. The Auvard's weighted vaginal speculum is particularly helpful for all as it allows the examiner to perform other actions using both hands as none is occupied in holding onto the instrument (Fig. 1.2).

Complications

Auvard's speculum can cause tears in the posterior vaginal mucosa and bruising of the perineum during the operation which may cause postoperative pain.

CUSCOS' BIVALVED SPECULUM

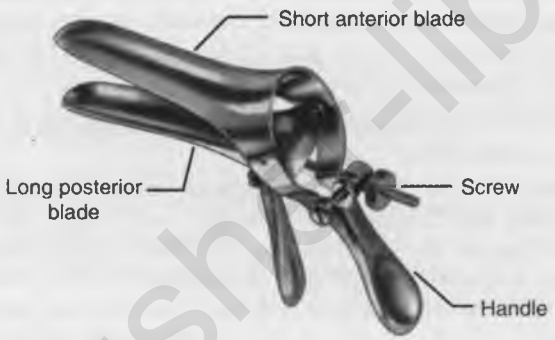


Fig. 1.3: Cuscos' bivalved speculum with parts

Other Name

It is also termed Cuscos' self-retaining speculum or Cuscos' speculum.

Features

It is a self-retaining type of speculum. It has two hinged blades which can be opened up and adjusted at various angles by means of a screw arrangement. The blades are concave inside and have rounded ends. Both the blades have handles at right angles. The blades are arranged in such a way that when handles are closed, blades will open. The upper blade has a notch at its outer end, through which a vulsellum may be passed inside without obstructing the field of vision. Posterior

blade is longer as posterior vaginal wall is deeper than anterior by 2 cm. It is a reusable type of speculum. This instrument is basically made up of stainless steel. But disposable speculum is also available. It is possible to visualize the cervix with the help of this instrument.

Size/Types

There are different sizes of Cuscos' vaginal speculum. The size is greatly determined by the doctor depending on the type and age of the woman. The vaginal speculum used in virgin women is different than those who have multiple children. The age also determines the type of speculum being used. This is mainly due to vaginal structure. The vaginal illustration of younger women is different than those in older women. Hence the type of vaginal speculum being used depends on the discretion of the gynecologist. There are different sizes of speculum (Fig. 1.4). These are as follows:

1. *Large (Cuscos' 1):* Its length is 100 mm and width is 35 mm, it has a center screw.
2. *Medium (Cuscos' 2):* It is the typical size of Cuscos' vaginal speculum and it is 80 mm in length and 22 mm in width.
3. *Small (Cuscos' 3):* Small in size and has a center screw. It is 75 mm in length and 22 mm in width.

Fig. 1.4: Different sizes of Cuscos' speculum

Available Materials

Cuscos' speculum was formerly made of metal, and sterilized after use. However, many, especially those used in emergency departments and doctor's offices, are now made of plastic, and are sterile, disposable, single-use items (Fig. 1.5). Those used in surgical suites are still commonly made of metal.

Fig. 1.5: Disposable Cuscos' speculum

Advantages

1. Being a self-retaining speculum, it does not need for an assistant.
2. It is easy to use.
3. The vaginal walls can be retracted to a variable extent.
4. It can be adjusted to the size of the vagina, and available in different sizes.
5. It gives a good exposure of the cervix.
6. Both anterior and posterior vaginal walls can be retracted with a single instrument.
7. It causes least discomfort to the woman.
8. It can be used even when the woman cannot be positioned at the edge of the table.

Disadvantages

The space available for carrying out any procedure is limited by the rim of instrument. The speculum covers the anterior and posterior vaginal walls and cannot be used for procedures on these structures such as diagnosis of genital prolapse. Speed is limited in this type of speculum.

Sterilization Method

It is sterilized by boiling or autoclaving.

Indications/Uses

It can be used

1. For taking a cervical biopsy, pap smear and colposcopy.
2. For inspecting cervix, for erosion, growth, bleeding through os and discharge.

3. For cauterization of cervical erosions.
4. For insertion and removal of IUCD.
5. For collection of discharge.
6. For collection of urine in vesicovaginal fistula.
7. For colposcopy.
8. For detection of antepartum and postpartum hemorrhage.
9. For diagnosis of incompetent os.
10. For performing the Schiller's test.

Prerequisites

- Explain the procedure to the patient.
- Take her consent.
- Put a bed screen for privacy or take to a separate examination room.
- Ask her to lie on her back with her legs bent at knee. Keep her covered and expose only the perineal part.
- Ask her to urinate prior to lying on bed.
- Place a mackintosh covered with a cloth under patient's hip.
- Wash your hand and put on sterile gloves.
- Swab the vulva and perineum with antiseptic solution from above downwards with the help of sponge holding forceps.
- Ask the women to take a deep breath.
- Stand at right side of patient before starting the procedure.
- Separate the labia widely with the non-examining hand, i.e. left hand fingers.

How to hold Cuscos' Speculum?

Fig. 1.6: Method of holding Cuscos' speculum during examination

Insertion of a Speculum into the Vagina to View the Cervical Opening (Figs 1.7 to 1.10)

Fig. 1.7: Cuscos' blades are held obliquely on entering the vagina

Fig. 1.8: Cuscos' blades are rotated to horizontal position as they pass the introitus

Fig. 1.9: Cuscos' blades are separated by depressing thumb piece and elevating the handle

Fig. 1.10: The speculum is inserted and the blades are adjusted and attached in the vaginal wall using the screw arrangement for the clear visualization of the cervix

How to use?

The speculum is lubricated by the nurse (with lubricating jelly except while taking pap smear where it is lubricated only with saline) and introduced into the vagina with its blades closed, in vertical position and parallel to the labia. The direction of the instrument should always be posterior. The blades are rotated by 90° and made horizontal and opened and locked in position by the butterfly screw. The cervix and some part of the lateral walls of the vagina are seen. To see the anterior and posterior walls, it is closed and rotated through 90° and opened up again. If the cervix is not seen, then some gentle adjustment of the position of the speculum may reveal the cervix. If the cervix is not seen after gentle manipulations, then the nurse should withdraw the speculum. It may be necessary to perform a vaginal examination in order to ascertain the position of the cervix before repeating the procedure.

Nursing Interventions

- Allow the woman by giving the opportunity to talk with the nurse performing the examination while sitting up, before being placed in a lithotomy position.
- The midwife should explain the procedure clearly to the woman and their family members and obtain their written consent.
- Reassure the client.
- Before examination, a woman should void to reduce her bladder size.
- Make her to lie in lithotomy position (on her back with her thighs flexed and her feet resting in the examining table stirrups).
- Properly drape her with a draw sheet over her abdomen that extends over her legs.
- Lubricate the speculum blades.
- A speculum is introduced with the blades in a closed position and directed toward the posterior rather than the anterior vaginal wall because the posterior wall is less sensitive.
- A speculum enters most readily if it is inserted at an oblique angle (the crease of the blades directed to 4 or 8 O' clock)

- Then the speculum rotated to a horizontal position when fully inserted (the crease of the blades pointing to a 3 or 9 O' clock position).
- When fully inserted and rotated to a horizontal position, the blades are opened so the cervix is visible and are secured in the open position by tightening the thumb screw at the side.
- Watch for any discomfort during the use of the instrument.
- Finally, the midwife should record the findings.

Possible Discomforts Encountered during Speculum Examination

1. *Vaginal wall laxity*: If the vaginal walls are lax and make visualization difficult, wider or longer speculum is been used. A condom with the end cut off placed over the speculum may prevent the vaginal wall from collapsing. Ensure the woman has no latex allergy.
2. *Difficulty in locating the cervix*: The nurse should withdraw the speculum rather than continuing to manipulate it and locate the position of the cervix with a gloved hand (moistened with water, not lubricant). Re-insert the speculum again at the appropriate angle. If the cervix is not visible consider asking the woman to "bear down" during insertion, which may assist relaxation of the vaginal muscles. It may be beneficial to consider asking the woman to self-insert the speculum.

FERGUSSON'S SPECULUM

Founder of Fergusson's Speculum

This type of vaginal speculum was devised by surgeon **Sir William Fergusson** (1808–1877). He was a leading surgeon in London during the mid-1800s. He also developed other surgical instruments. Some of these are still used.

Features

Fergusson's speculum (Fig. 1.11) is a tubular speculum, having no valves, i.e. it is a both way open tube. It is about 15 cm in length and has a flange at the outer end. Its inner or vaginal end is cut obliquely and the longer part going into the posterior fornix. This is essential because the depth of the posterior fornix is 10 cm and that of the anterior fornix is 7.5 cm.

Available Materials

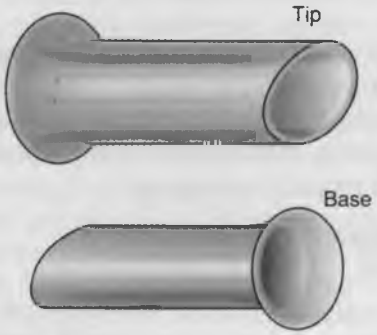


Fig. 1.11: Metal Fergusson's speculum

Fig. 1.12: Glass Fergusson's speculum

Glass Speculum

These are tubular specula made from glass with the inner surface mirrored so as to reflect as much light as possible and the outer surface covered in black gum or the speculum is made of glass as shown in Fig. 1.12.

Advantages

1. For an examination of the cervix, this is better than other specula.
2. Cervical discharges can be collected by this instrument as it is free from any vaginal contamination.
3. It protects the vaginal walls when in use because of its tubular nature.
4. By gradual withdrawal, both walls of the vagina can be examined.
5. No anterior vaginal wall retractor is necessary.

Uses

It is used:

1. When the midwife is taking biopsy or a smear from the cervix.
2. For electrocauterization of cervix (only a glass, vulcanite or plastic speculum can be used).
3. For Schiller's test, done for localizing suspicious pre-malignant area on the cervix.

4. To protect vaginal walls during decapitation operations with Gigli's wire saw. The wire is passed through the speculum so that the cervix and the vagina are protected.
5. McIndoe's vaginoplasty.
6. Chemical cauterization of the cervical erosion.

Disadvantages

Fergusson's speculum is not a very satisfactory instrument. It cannot be used for inspection of the vagina or in the operations of the vaginal walls because it covers the latter. Illumination at the level of the cervix is rather poor, as it is a long tubular instrument. It is a stiff instrument and demands technical skill for proper use. Rapid and careless manipulation may inflict injuries to the soft walls of the vagina. Fergusson's speculum is rarely, if ever, used in modern obstetrics and gynecological nursing.

Sterilization Method

It is sterilized by boiling or autoclaving. Hence, it can be reused after sterilization.

How to use?

The midwife should make the woman to lie on her back with knees flexed (lithotomy position). The vulva is swabbed with antiseptic solution. Then lubricate the speculum with sterile jelly. Introduce the speculum into the vagina in vertical position

Fig. 1.13: Insertion of Fergusson's speculum in lateral position

by separating the labia minora by thumb and index finger of the left hand. Make the woman to relax. The instrument is introduced very gently by its anterior end with slight rotational movements in both clockwise and anti-clockwise directions. Every care should be taken for lubrication and extremely gently manipulation of the instrument by the midwife. The cervix and some part of the lateral walls of the vagina are examined. Sometimes if the cervix cannot be seen in the dorsal position by the midwife, then the woman is examined using lateral position as shown in Fig. 1.13.

SOONAWALA'S SPECULUM

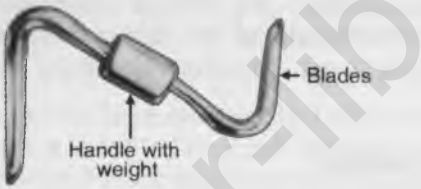


Fig. 1.14: Soonawala's speculum with double blades

Features

It has two blades at the ends, directed in opposite directions, making the speculum Z-shaped. One blade is 6 cm long while the other is 11.5 cm long. The former has a flat surface and square end. The other is with a rounded end which is smaller than that width of the blade at the base. Its upper surface also has raised edges so that blood collects on the surface and drains through a longitudinal groove in the handle. There is weight in the centre of the handle, making the speculum self-retaining.

Available forms and Sterilization Method

It is made of stainless steel. Hence, it has been sterilized by boiling or autoclaving.

Uses

The uses of Soonawala's speculum are similar as that of Auvards' speculum. They are:

1. It is used in major vaginal operations such as for amputation of cervix, in carcinoma of cervix and for repair of fistulas.
2. It can also be used in expanding the vaginal cavity if the woman is experiencing some abnormal bleeding or pain.
3. It is also used in general pelvic examination so that the woman's internal reproductive system can be examined.

How to use?

With the woman in lithotomy position under regional or general anesthesia, the short blade is inserted into the vagina to expose the cervix. After the pouch of Douglas has been opened, the longer blade is inserted into the peritoneal cavity.

NON SELF-RETAINING SPECULUMS

SIMS' SPECULUM

Definition

Sims' vaginal speculum is an instrument which is inserted into a woman's vagina so that we can get a proper visualization of the body cavity.

Other Name

It is also called duck-bill speculum because of its peculiar shape, or it can also be called posterior vaginal wall retractor.

Founder of Sims' Speculum

Dr. James Marion Sims (USA), "The founder of modern gynecology" was the founder of Sims' speculum.

Features

- It is not a self-retaining type of speculum and an assistant is required to hold it in position with pressure while examiner visualizes interior part.
- It is available in various sizes and is either single or double bladed.
- The two blades are connected by a handle which is grooved for drainage of discharge, and blades are curved from side-to-side to prevent vaginal laceration.
- Ends of the blades are rounded so that it is atraumatic.

- A groove is present along the entire length of the instrument, so that blood or secretions of the genital tract collect in it and run off along the groove in the handle and got drained.
- It is commonly used to retract posterior vaginal wall but at times can be used to retract anterior and lateral walls.

Types

1. *Double-bladed or double-ended:* A double-bladed speculum (Fig. 1.15) has two speculums in one. The blades are of unequal breadth to facilitate introduction into the vagina depending upon the space available (narrow blade in nulliparous and the wider blade in parous women). This may mean that a single-finger assessment of the introitus will need to be performed prior to selecting a speculum. This is particularly important in post-menopausal women or postoperative patients in whom there may be some narrowing of the introitus. The central portion can be used as a grip or a handle. A double-bladed speculum is available in three sizes: 26 and 31 mm, 31 and 36 mm, 36 and 42 mm in width. Double-bladed speculum is the most commonly used type.
2. *Single-bladed or single-ended:* The instrument is very light and is made of stainless steel (Fig. 1.16). It has a handle and a

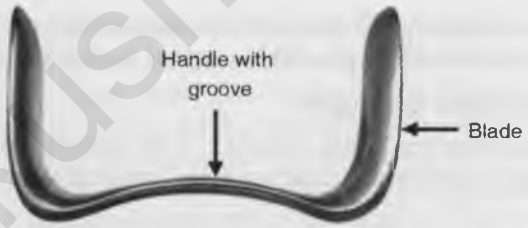


Fig. 1.15: Double-bladed Sims' speculum

blade. The blade is set almost at right angle with the handle. The blade is depressed centrally to help drainage of secretions. Now, Sims' speculum is available with an optic attachment in handle to project light into the vaginal cavity (Fig. 1.17).

Sizes

The Sims' vaginal speculum comes in a variety of sizes so that the size of each woman's vagina can easily be accommodated

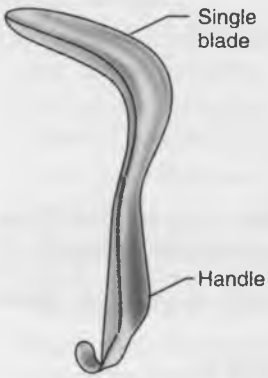


Fig. 1.16: Single-bladed Sims' speculum

Fig. 1.17: Sims speculum (double-ended) with fibreoptic light source

with the gynecological instrument. Small vaginal speculums are generally used on those women who may have a tight hymen, particularly virgins. The larger speculums are generally used for those women who have a large vaginal cavity. The midwife will decide on what kind of vaginal speculum is to be used for the vaginal examination.

Indications

1. Visual examination of the cervix and vagina, as a part of gynecological examination; a number of conditions can be thus diagnosed.
   - Leucorrhoea and its differential diagnosis
   - Vaginal wall prolapse
     - Cystocele
     - Urethrocele
     - Enterocele
     - Rectocele
     - Posthysterectomy vault prolapse
   - Uterine prolapse
   - Cervical erosion
   - Chronic cervicitis
   - Cervical erosion and its differential diagnosis

- Cervical polyps
- Ectropion, cervical tears
- Vesicovaginal fistula
- Rectovaginal fistula
- Urinary stress incontinence
- Vaginal wall cysts
- Congenital malformations (transverse vaginal speculum, longitudinal vaginal septum, uterus pseudo-didelphys)

2. Examination for obstetric trauma such as cervical tears, vaginal tears, etc.
3. Carrying out operative procedures such as:
   - Collecting an exfoliative cytological smear for genital tract malignancy or hormonal vaginal cytology.
   - Cervical biopsy
   - Endometrial biopsy
   - Insertion or removal of an IUCD
   - Polypectomy
   - Dilatation and curettage, dilatation and suction evacuation, blunt curettage for inevitable abortion.
   - Tubal patency tests
   - Hysteroscopy
   - Colposcopy and colpomicroscopy
   - Colpopuncture and colpotomy
   - Insertion of radium into the uterine cavity
   - Repair of obstetric trauma to the cervix and vagina
   - Packing uterine cavity and vagina for uncontrolled atonic postpartum hemorrhage.

Advantages

- Wide area for inspection
- Instrumentation is easy as it is very light
- Ideal speculum for diagnosis of vaginal wall prolapse
- No complication is known to occur after its use
- In a double bladed speculum, two sizes in a single instrument gives a technical advantage.

Disadvantages

1. An assistant is required to hold the speculum while carrying out any procedure.
2. An anterior vaginal wall retractor is needed to get a good view of vagina and cervix.
3. It requires traction during examination, as the instrument is very light.
4. The posterior vaginal wall can neither be seen nor operated upon at this instrument as the posterior vaginal wall gets hidden by this instrument.

   Examples of surgeries where Sims' speculum cannot be used are: Removal of posterior vaginal wall cyst, posterior colpoperineorrhaphy, repair of rectovaginal fistula and repair of complete perineal tear.

Uses in Obstetrics and Gynecology

Obstetrics	*Gynecology*
1. To clean the vagina following delivery	1. Inspection of cervix for erosion, growth and discharge
2. Per-speculum examination of cervix for detection of discharge, bleeding (to diagnose different types of abortion in early pregnancy and to diagnose antepartum hemorrhage in late pregnancy), leaking per vaginum	2. For inspection of vagina to detect vaginitis, cystocele, rectocele, enterocele, vesicovaginal fistula, and growth
3. It is used in first trimester pregnancy termination	3. To perform minor procedures in cervix
4. It is used in extraovular instillation of ethacridine lactate for second trimester pregnancy termination, cervical cerclage, uterine packing, etc.	4. Other minor procedures such as IUCD insertion, endometrial biopsy, hysteroscopy and hysterosalphinogram
5. It is used for administering PGE2 gel and intracervical Foley's insertion	5. To perform major gynecological operations, e.g. vaginal hysterectomy, Manchester's operation

Contd.

Contd.

Obstetrics	*Gynecology*
6. It is used for retracting the posterior vaginal wall	–
7. At the time of delivery to diagnose traumatic PPH and repair of cervical and vaginal tears	–

For per speculum examination in pediatric gynecology, Thudichum's nasal speculum or small right-angled retractor is used.

Sterilization Method

It is sterilized by boiling or autoclaving.

Prerequisites

1. The midwife should ask the woman to urinate and empty the bladder just immediately before the examination. A bladder with some urine will always give incorrect finding during vaginal examination.
2. A heavily loaded colon will also give a false impression of a pelvic tumour during vaginal examination. If such doubt appeared while palpating left fornix, the midwife should make the woman empty her bowel after laxative next day.
3. It is always advisable to keep a second person may be female attendant or relative while doing vaginal examination, especially if done by a male doctor or male midwife. A female midwife may not require such attendant.
4. The woman's consent should always be taken before doing a vaginal examination. For minor girls, parents consent should be obtained by the midwife.
5. The procedure should always be done by putting on a glove over hands. All other equipment should be available and antiseptic measures should be adopted well in advance by the midwife.
6. The instruments are to be well lubricated before use.
7. In cases where materials are to be obtained for culture and sensitivity, no antiseptic medication should be used.

How to hold Sims' Speculum? (Figs 1.18 and 1.19)

Figs 1.18 and 1.19: Mode of holding Sims' speculum

Positioning

Sims' position is the preferred choice. If any difficulty occurs in this position, a suitable alternative is the lithotomy position.

How to use? (Figs 1.20 and 1.21)

Fig. 1.20: In this picture, the woman is in Sims' position (semi-prone) which is useful if the anterior wall is to be studied (e.g. if fistula is suspected)

Fig. 1.21: An assistant is retracting the Sims' speculum while repairing the vesico-vaginal fistula

The midwife lubricates the speculum with an antiseptic solution or sterile jelly. The woman is put in lithotomy position with buttocks at the edge of the table so that an assistant can hold the lower end of speculum properly for retracting the posterior vaginal wall. Then the midwife introduces the speculum along its edge with the blade lying vertically in anteroposterior diameter of vagina. The instrument is then rotated by 90° into its position. Often Sims' anterior wall retractor has to be used along with this instrument for adequate exposure of the cervix.

Reasons for Inadequate Findings

- An obese or fatty woman whose abdominal wall is impermeable to the finger of external hand.
- An extremely nervous woman whose abdominal wall becomes rigid due to tension and excitement.
- An intact virgin who becomes very sensitive to such examination.
- Doubtful cases of suspected extrauterine pregnancy.

2 Retractors

DEFINITION

A retractor is a surgical instrument by which an obstetrician can either actively separate the edges of a surgical incision or wound, or can holdback underlying organs and tissues, so that body parts under the incision may be accessed.

Retractors act as key instruments for obtaining good exposure of the operation field, which has an immense value in the practice of surgery. A good exposure helps in the following ways:

1. It helps to improve the exposure of the operation field in a better way.
2. It helps to promote tissue respect by preventing undue handling.
3. It helps to curb out damage to adjacent tissues.
4. The bleeders can be better controlled directly under vision.

Features

Retractors are available in many shapes, sizes and styles. The general term retractor usually describes a simple handheld steel tool possessing a curved, hooked, or angled blade fitted with a comfortable handle, that when in place maintains the desired position of a given region of tissue. These simple retractors may be handheld, clamped *in situ*, or suspended at the end of an obstetrician's or assistant's arm.

General Rules of Retraction

- The retractors should be placed at correct sites and correct angles.
- The degree of exposure wanted should be known before hand, so that measured traction can be given.

- If the force required for traction is great and if the obstetrician apprehends damage to the tissues to be retracted, then a linen pack should be inserted between the structure and the retractor blade.
- It is of different sizes to suit woman's body size and depth.

Essential Parts of a Retractor

1. The blade that goes into the wound should not have any sharp edge.
2. The shaft of this instrument allows the assistant to stand away from the wound.
3. The handle is for firm grip and long-term retraction.

Instructions to be followed by the Midwife before using the Retractors

- The obstetrician is in charge for this instrument.
- The obstetrician places the retractor in the desired position.
- The midwife must maintain that position using lateral and upward forces without movement until the obstetrician makes a change.
- The midwife may not be able to see what is being retracted, unlike when he/she is using scissors or haemostats.
- The midwife should make sure that she maintains exactly the position of the retractor that he chooses.
- Keep quite still, particularly when the obstetrician is dissecting, cutting or stitching.
- Refer to the direction of retraction to fixed points, such as the woman's abdominal wall or part of the operating room wall to prevent your retractor straying or sagging.
- If the midwife wishes to take an active part in displaying the anatomy during the operation, she needs to know the steps of the operation, so that she can anticipate the obstetricians moves and guide him through the operation.

Do's and don'ts while using a Retractor (Table 2.1)

Table 2.1: Do's and don'ts while using a retractor

Do's	*Don'ts*
The midwife should always hold the retractor in such a way that it comes in from the periphery of the wound.	Do not cross the operating field to hold the retractor
The midwife should hold the retractor comfortably using the handle	Do not cross in front of the obstetrician's field of view
While placing the retractor, the midwife should always think of the tissues at the tip of the blade deep in the wound	Do not alter the position of the retractor because it will make the operation much more difficult
Beginners often concentrate on the part of the blade they can see and lose control of the deeper tissues where the operation is actually taking place	
If the retractor finds to become too heavy or too painful, tell the obstetrician before making any move	Do not pull on the retractor so hard that the desired position changes
The same applies to any other movement such as sneezing or coughing	Do not move the retractor to a more comfortable or less tiring position
	Do not make any sudden movement or change which may damage the tissues
	Do not insert the retractor unless asked to do so by the obstetrician.
	Do not change the angle of the retractor
	Do not put extra energy/movement into the operation. It is usually unnecessary and unhelpful
	Do not peer over to have a look, if you cannot see the operating area. You are likely to bang your head against the obstetrician's head. This is not a good principle

How to Hold the Retractors?

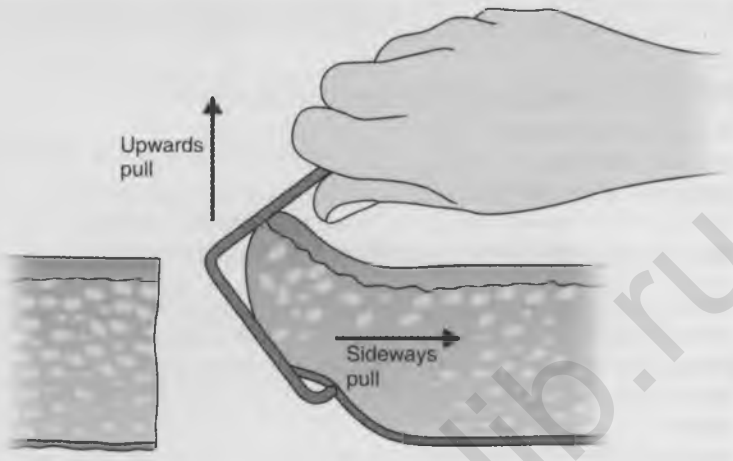


Fig. 2.1: Method of holding the retractor

1. For holding one retractor:
   - Use one hand or two hands if the retractor is deep and has a heavy load.
2. For holding two retractors:
   - Hold the retractors one in each hand.
   - Make sure that the hands are not crossed.
   - Make sure that the hands do not cross the operating field.
   - Do not be tempted to hold more than one retractor in one hand (poly-retracting). This type of error is common in beginners.
   - Retractors are usually held at an angle from one another for best exposure, in addition to sideways and upwards retraction. This means holding each retractor in a separate hand.
   - Make sure that each retractor is maintained in one position, if the retractor is given in each hand.
   - A few obstetricians who make unpredictable moves and at the same time expect their assistant to anticipate them lead to a most unsatisfactory state of affairs.
   - A discussion of the problem with the obstetrician outside the operating room at an appropriate time and in the presence of a more senior assistant is often rewarding.

- An obstetrician with predictable methods, and even written operation steps, will expect the assistant to rapidly learn the necessary movements of the retractor (Fig. 2.1).

How to Change the Retractors during Surgery?

If the obstetrician wishes to change one retractor for another, it is usually done by sliding the new one in front of the other and removing the first one without disturbing the tissues.

How to Adjust the Retractors during Surgery?

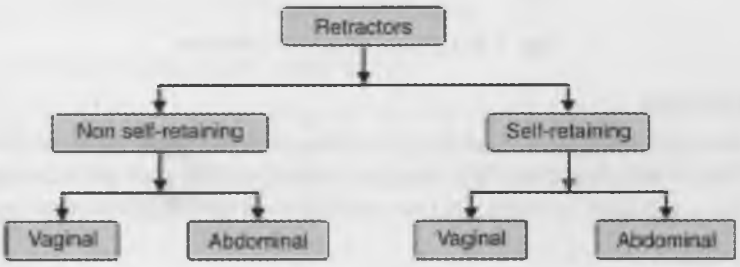
The obstetrician will probably want the retractor moved from time-to-time as the operation proceeds. This means he will grasp the retractor and move it. The midwife needs to learn to relax his/her grip when the obstetrician takes hold. The instinctive reaction of the beginner is to grip even tighter. This reaction should be suppressed. The midwife should be prepared for the surgery to move a retractor several times in quick succession while finding an ideal position.

How to Avoid Tissue Damage?

The obstetrician will place the retractor(s) so that the tissues are not damaged. The midwife should not change the position of the retractor(s). If the wound edge goes white, this is a sign of arterial insufficiency to the tissues. The obstetrician is to be informed if the midwife notices the wound edge going white or if the retractor is slipping or if he/she is getting tired, cramp, or are feeling faint.

Types of Retractors (Flow chart 2.1)

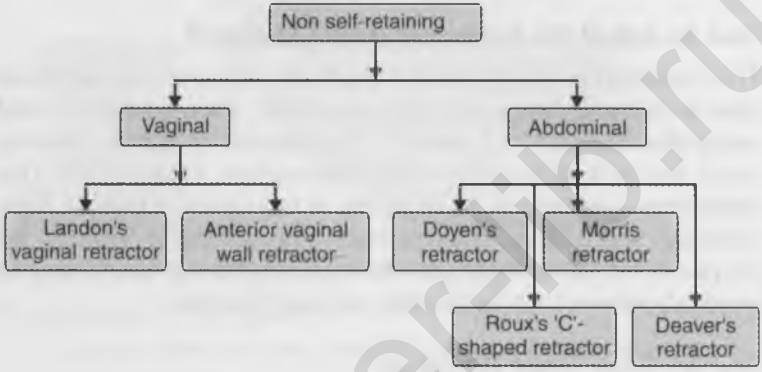
Flow chart 2.1: Types of retractors



NON SELF-RETAINING RETRACTORS

These are relatively simply designed instruments. There is a blade provided with a tip to hold tissues apart with the gentle traction. A long thin shaft is present for retraction from a distance. There is a handle to give a good grip (Flow chart 2.2).

Flow chart 2.2: Types of non self-retaining retractors



VAGINAL NON SELF-RETAINING RETRACTORS

Landon's Vaginal Retractor

Fig. 2.2: Landon's vaginal retractor

Features

A simple handheld L-shaped instrument with a flat blade about 2 cm, bent down at right angles to the handle and the handle has a circular opening in the center for finger introduction for

better grip. The long handle helps to hold the instrument without obstructing the work of the obstetrician. It is useful for temporary retraction of soft tissue. The blade being flat and narrow, occupies very little space in the anterior pouch, thus making the retractor ideal for vaginal surgery.

Other Name

It is also called right-angled retractor or Landon/Langenback bladder retractor.

Material made up of

It is made up of stainless steel. Hence it can be reused after sterilization.

Important use

It is introduced after opening the peritoneum to retract the bladder away from the field of operation, in vaginal operations (e.g. vaginal hysterectomy). This also prevents injury to ureters as it keeps them away during clamping of uterine vessels.

Other uses

- It is used to retract the abdominal wall during a minilaparotomy.
- It is used to retract the vagina during cervical cerclage.
- This retractor is used to retract lateral or anterior vaginal walls during any vaginal operation.
- It is used for retracting skin edges or big blood vessels and nerves.

Sterilization Method

It is sterilized by boiling or autoclaving.

Important Instructions before use

Right-angled retractors can be managed easily and it is important to instruct the assistants not to push too deeply with these retractors as this simply pushes the operative site further away from the obstetrician.

Anterior Vaginal Wall Retractor

Fig. 2.3: Anterior vaginal wall retractor

Features

Sims' anterior vaginal wall retractor is a long narrow metal instrument with spoon-shaped or oval-shaped fenestrated ends with transverse serrations. The fenestrated ends with serrations on either side are designed in such a way to fit into the rugosities of vagina, thus giving a better grip. It has a handle with loops at its ends. The loops are set at an angle to the shaft by 15°, and are angled in opposite directions. Instruments are introduced with angle at the oval facing upwards.

Material made up of and Sterilization Method

It is mainly made up of stainless steel and so it is sterilized by boiling or autoclaving.

Uses

1. It is used with Sims' speculum to retract the anterior vaginal wall for visualizing the cervix and the anterior fornix. This is required especially in presence of a cystocele/rectocele. The transverse serrations on its looped ends provide friction against rugous vaginal mucosa and aid in efficient retraction.
2. It is used to push the anterior vaginal wall upwards for a full exposure of cervix in cases of a loose and lax vaginal wall.

Blunt curettage: When the cervix is widely open and the uterine cavity is large as after a second trimester abortion or retained product of conception after delivery.

ABDOMINAL NON SELF-RETAINING RETRACTORS

Doyen's Retractor

Fig. 2.4: Doyen's retractor

Features

It is a stout instrument having a broad, transverse, and curved blade with its hollow towards the handle. The blade of Doyen's retractor looks like Sims' blade. It is made up of stainless steel. Its handle is slightly curved and has finger grip for better gripping and manipulation of the instrument. It is available in different sizes, viz. small, medium and large.

Uses

- It is used to retract the abdominal wall for proper exposure of lower uterine segment during LSCS. It is to be introduced after opening the abdomen; to be temporarily taken off while the baby is delivered, to be reintroduced after delivery of the baby and finally to be removed after toileting the peritoneal cavity.
- It used in the removal of ectopic pregnancy.
- It is also used in obstetric hysterectomy, abdominal hysterectomy, tuboplasty and in all major gynecological surgeries.
- It is used for retracting the anterior or posterior vaginal wall.

Sterilization Method

It is sterilized by boiling or autoclaving.

Advantages

By rotating it through 180°, it can be used alternately as an anterior vaginal retractor or a posterior vaginal speculum.

Disadvantages

1. It is not self-retaining and requires assistance.
2. For a thorough cervical examination, it cannot be used alone.

How to Hold?

The woman is placed in the lithotomy position and it is introduced in the same way as a Sims' speculum (Fig. 2.5).

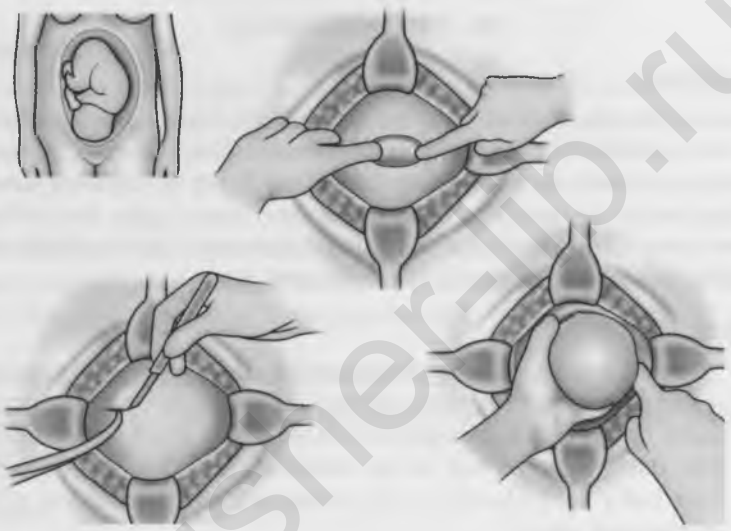


Fig. 2.5: Using Doyen's retractor for retracting abdominal wall in lower segment cesarean section

Roux's C-shaped Retractor

It is a C- or S-shaped narrow instrument made of stainless steel with a stout handle in the middle. The ends are curved in the same (C) or opposite (S) direction. It is available in small, medium and large sizes. It is sterilized by autoclaving and boiling (Figs 2.6 and 2.7).

Uses

1. To retract fascia and skin so that angle of peritoneum and rectus sheath can be sutured during abdominal closure.

2. To retract the sides of abdominal wall during mini-laparotomy or laparotomy operation in gynecology.

Fig. 2.6: Roux's C-shaped retractor

Fig. 2.7: Mini Roux's C-shaped retractor

How to Hold?

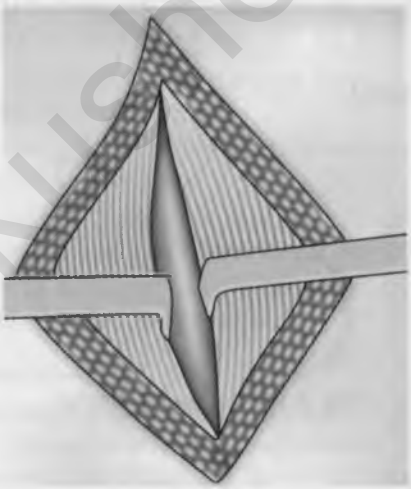


Fig. 2.8: The incision has been retracted using mini Roux's C-shaped retractor in an abdominal surgery

Morris Retractor

Types

1. Single-bladed (Fig. 2.9)
2. Double-bladed (Fig. 2.10)

Fig. 2.9: Single-bladed Morris retractor

Fig. 2.10: Double-bladed Morris retractor

This type of retractors is seen with blades in both ends without special handle. Hence, it is called double-bladed Morris retractor.

Uses

1. It is specially used to retract strong structures like abdominal wall and muscles. The beak at the end of the blade gives firm hold over the tissues and the concavity at the blade gives wider area for the work of the obstetrician.

Deaver's Retractor

Fig. 2.11: Deaver's retractor

Features

It is a large metal retractor with broad and gradually curved C-shaped blade and the proximal end has a handle which is straight with proximal tip curved acutely for hand grip. Handle is long and the end is curved like a hook which provides better

grip. It is available in small, medium and large size. It is very useful in the retraction of deep structures.

Advantages

The gentle curve prevents much crushing of the organs.

Uses

a. It is used for retracting abdominal organs like spleen, liver, etc. An abdominal pack is kept in between the blade of the retractor and *vice versa* to prevent direct pressure injury to the organ.
b. It can be used to retract bladder walls in intravesical operations.
c. This retractor provides clear visualization of large intestine by retracting the pelvic organs and prevents injuries to those organs during intestinal surgeries.

SELF-RETAINING RETRACTORS

Advantages of Self-retaining Retractors

- No assistance is required for holding them because of counter-pressure of the two blades, each engaging side of the wound. Some of the retractors have a third or more blades attached to the frame.
- These retractors allow the assistant to be employed in other tasks during the procedure.
- Maintains uniform traction throughout the procedure unlike the human hand, and retraction tiredness does not occur.
- The amount of traction can be adjusted by changing the position of the blades in the frame.

Types of Construction

The blades are shaped like plain retractors, but two variations are possible in the self-retaining mechanism.

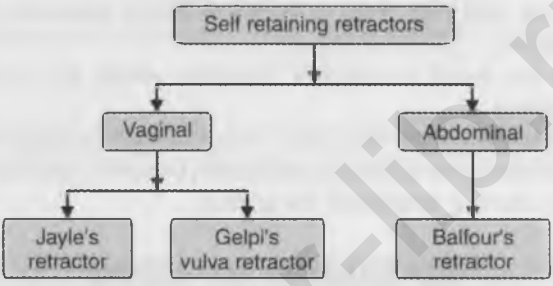
1. In one variety, the blades of the retractors are held apart by locking racks.
2. In another variety, the blades are set on a frame, on which they can be moved and adjusted in position by screws or pinions.

Disadvantages of Self-retaining Retractors

- They may cause pressure necrosis of tissues due to continuous pressure.
- Being fixed, difficulty in maneuvering to the obstetrician's choice.

Types of Self-retaining Retractors (Flow chart 2.3)

Flow chart 2.3: Types of self-retaining retractors



1. VAGINAL SELF-RETAINING RETRACTORS

1.1 Jayle's Vaginal Retractor

Fig. 2.12: Jayle's vaginal retractor

Features

It is a self-retaining retractor with one blade fixed while the other is movable. The movable blades slides on a transverse bar attached to the fixed blade. The movable blade can be fixed at any position by an adjustable screw.

How to use?

This is usually used along with an Auvard's speculum. The blades are closed and the instrument is gently introduced with

the transverse bar above and the blades in the anteroposterior axis of the vagina. The blades are then opened out and adjusted.

Uses

It is used to retract the lateral vaginal walls during operations on the anterior or posterior vaginal walls, the cervix and the uterus.

Sterilization Method

It is sterilized by boiling or autoclaving.

Gelpi's Vulva Retractor

This is self-retaining retractor for vulva. After the woman is anesthetized, this is applied to the inner walls of the vulva and opened. It is self-retaining type of retractor and gives a clear opening into the vagina (Fig. 2.13).

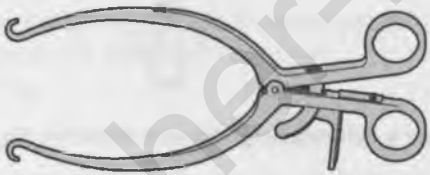


Fig. 2.13: Gelpi's vulva retractor

Features

It has two blades provided with hooked ends. The blades can be opened out by adjustable screw device.

How to use?

Place the woman in lithotomy position. Anesthetize the woman and insert the retractor into the vulva. The hooked ends are pressed over the labia and the blades are then opened out by suitably adjusting the screw.

Uses

1. It is used for the exposure of vulva in surgeries like urethrocele/cystourethrocele, removal of bartholin cyst, and urethral caruncle.
2. It is also used for the exposure of perineal tears.

Sterilization Method

It is sterilized by boiling or autoclaving.

ABDOMINAL SELF-RETAINING RETRACTORS

Balfour's Retractor

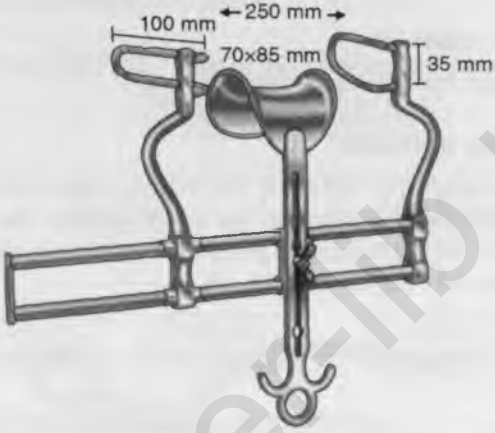


Fig. 2.14: Balfour's self-retaining retractor showing the measurements of blade

Definition

A Balfour retractor is a large metal surgical instrument with special fittings for retaining in the space. Retractors of all shapes and sizes are used to clearly expose the surgical site during surgeries so that the obstetrician can see what he or she is doing, and they work in a variety of ways. In the case of a Balfour retractor, the device holds itself in place, leaving the hands of obstetrician and assistants free to focus on surgical tasks.

Features

This retractor consists of rectangle metal pieces are connected together and two small retracting blades are attached to both ends of the rectangle pieces by metal rods. Rods are slightly curved to give space in between. There is a middle blade for the retractor which is adjustable by means of screw locks fitted at the middle. This is a detachable blade.

Parts

1. 4 feet 2. 1 screw 3. 1 blade

Fig. 2.15: Balfour's self-retaining retractor (dismantled)

Advantages

- Widens the operative field and more space to work
- Better exposure of deeper structures
- Self-retaining

Uses

It is used to retract the organs in abdominal surgery for prolonged time. As it is self-retaining, the works of the assistant is lessened.

How to Hold?

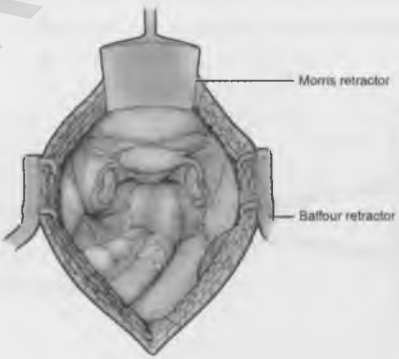


Fig. 2.16: An incision is retracted using Balfour and Morris retractors

Nursing Interventions while using Retractors

- Place the woman in proper position during the procedure.
- Ask the woman to void before starting the procedure.
- Provide psychological support to the woman.
- Encourage the woman to clarify the doubts, if any.
- Monitor the vital signs before and after the procedure.
- Obtain informed written consent.
- Make sure that the application of the retractors does not cause trauma to the adjacent structures during the procedure.
- Monitor the comfort of the woman throughout the procedure.
- Observe the procedure for any complications due to the retractor application.
- Record and report the procedure and the observations.

3 General Instruments

This chapter deals with the instruments which are commonly used in all the surgical procedures, but having specific obstetric and gynecological use.

Instruments discussed in this chapter are:

1. Allis' tissue forceps
2. Babcock's tissue forceps
3. Long straight hemostatic forceps
4. Sponge holding forceps
5. Vulsellum forceps
6. Uterine sound
7. Bladder sound

1. ALLIS' TISSUE FORCEPS

Tissue grasping forceps are designed to grasp tissues without crushing them so as to allow their manipulation (Fig. 3.1).

They look like hemostatic forceps except that the blades approximate only at the tips leave a space along the shaft for the tissue held. The tips are usually made in the form of teeth

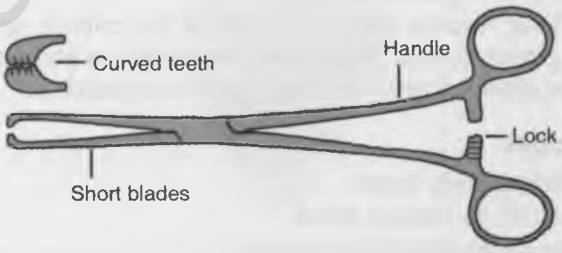


Fig. 3.1: Allis' tissue forceps

to reduce tissue damage and improved grip. To facilitate dissection, body tissues need to be held, maneuvered, freed and approximated. These instruments have shafts, rings and locking device.

Features

This forceps has long handle and short blades with inward curving teeth at distal end and a locking device in the handle to hold tough tissues. Blades are thin and without serrations. The blades are slightly widened. There are three into four or four into five teeth at the tip. It is used to approximate the edges of the skin and peritoneum, etc. While retracting tissue or structure, forceful hold is achieved by this forceps. Instrument may be short or long.

Size

Allis forceps come in sizes typically ranging from delicate, or just over five inches (12.7 cm), to ten inches (25.4 cm). The size of the blades and teeth can also vary. This variation in sizes allows the Allis forceps to be used in a many different surgical procedures. Depending on the type of medical procedure to be conducted, the obstetrician will select the type of Allis' tissue forceps to use. The 4 × 5 teethed forceps are usually appropriate to be used in gynecology and hence this forceps also comes under the category of gynecological instruments.

Types

There are two types of forceps:

a. Non-locking forceps can come with a hinge at one end, similar to a pair or tweezers, or hinged in the middle, similar to a pair of scissors.
b. Locking forceps can be hinged in the middle or close to the grasping end. These forceps are used when the surface to be grasped needs to be locked into position.

Advantages

Their holding ends have:

1. Elasticity to reduce injury
2. Space to accommodate tissue
3. Narrow tips.

Uses

i. To catch hold the anterior lip of the cervix in D + E operation, as a substitute for vulsellum.
ii. For holding the edges of the skin while stitching (e.g. episiotomy).
iii. For holding the margins of peritoneum, rectus sheath, vaginal mucosa while repair.
iv. It is used to hold the rectus sheath for suturing.
v. To catch hold the torn ends of the sphincter ani externus prior to suture in repair of complete perineal tear.
vi. To catch hold the margins and angles of the uterine flaps in LSCS after the delivery of the baby as an alternative to green-armytage hemostatic clamp.
vii. To hold ovary during operations.
viii. For holding uterine tubes.
ix. To hold vaginal flaps in anterior colporrhaphy operations
x. Also used in operations of posterior colporrhaphy.
xi. To catch a small fibroid or cut edges of its fibrous capsule during myomectomy operation.
xii. To take out the tissue in wedge biopsy.
xiii. Repair of VVF or RVF.
xiv. To hold the uterus in vaginal hysterectomy to deliver the fundus from one of the pouches.

How to use?

Fig. 3.2: Holding the labia majora and the vaginal wall using Allis' tissue forceps for a gynecological surgery

Sterilization

Allis' tissue forceps are usually meant to be reused after being sterilized, that is why, it is made of using high quality steel.

2. BABCOCK'S TISSUE FORCEPS

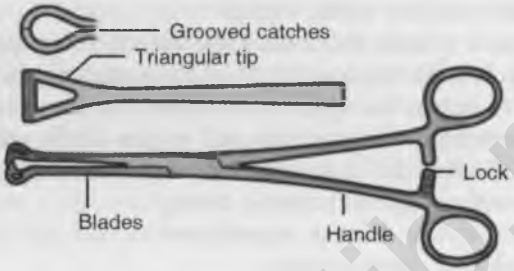


Fig. 3.3: Babcock's tissue forceps

Features

Babcock's tissue forceps is a tissue forceps with blades curved and fenestrated near the tip, triangular in shape and with grooved jaws. The instrument is extra light in weight. There is a transverse ridge at the tip which is also transversely serrated. The handles are provided with catches. It is used to catch soft and tubular structures like fallopian tube, ureter, appendix, bowel and bladder.

Sizes

1. Large
2. Medium
3. Small

The large and medium sized forceps have identical blades and they differ in their lengths only. The lengths being 17 and 12 cm, respectively. The small forceps is 10 cm long and has small blades, which are about 1/3 the size of the large blades.

Advantages

As they do not have any teeth, very little trauma is inflicted on the tissues, and which particularly helps in holding soft tissues and delicate structures. It is more delicate than Allis' tissue forceps.

Uses

- To hold the fallopian tube in tubal ligation, tuboplasty, and conservative operation for tubal pregnancy.
- To hold the ureter in radical gynecological surgery.
- It is used to hold round ligament in plication operation.
- To hold ovary in various conservative operations on it like ovarian biopsy, ovarian adhesiolysis, and ovarian ectopic.
- To hold the lymph glands during radical operations.
- To hold bowel and bladder during accidental injury in gynecological surgery.
- To hold appendix in appendicectomy.
- To dissect the vascular sheaths, and ligation of the anterior division of the internal iliac artery.

Sterilization Method

It is sterilized by either boiling or autoclaving.

3. LONG STRAIGHT HEMOSTATIC FORCEPS

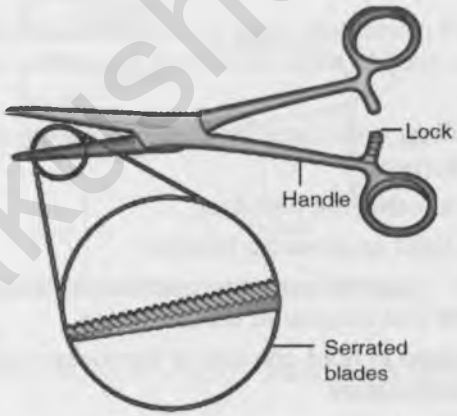


Fig. 3.4: Long straight hemostatic forceps

Definition

The instruments which are used to arrest the bleeding in the operating site during surgery is called hemostatic forceps. A

popular misnomer is artery forceps, but these instruments are used on vessels other than arteries, too.

Features

The blades are roughly half the size of the handles. The inner surface of the blades bears good transverse serrations for crushing. The handles are provided with catches for better apposition of the blades. It has no gap between the blades when the catches are applied. The forceps are conical to facilitate slipping of the ligature round it and down to the vessel held. The tip is blunt to prevent damage to the surrounding tissues.

Mechanism

These hemostatic forceps cause hemostasis by two ways:

1. One is by apposing the lips of the bleeder
2. The second is by crushing the tunics of the vessel. Crushing cause separation of the tunica media and tunica intima from the tunica adventitia. The outer coat contracts and the inner coats curl in. As a result the opening gets plugged.

Uses

1. This is not commonly used in obstetrics. It can be used to clamp the pedicle while removing the uterus as in rupture uterus.
2. The umbilical cord may be clamped as an alternative to Kocher's forceps.
3. It is used to catch the bleeders.
4. It may be used as dressing forceps.
5. It may be used to hold the peritoneal margins during exploration and closure of the abdomen.
6. It may be used to hold one end of the suture material during a continuous suture.
7. It may be used as ligature carrier.
8. It may be used to hold a needle during suture, in the absence of a needle holder.
9. It may be used as a blunt dissector.

Differences between Hemostatic Forceps and Needle Holder

S. No.	Features	Hemostatic forceps	Needle holder
1.	Instrument	Hairline, but thinner instrument on the whole	Hairline, but more robust instrument
2.	Blades	Roughly half the size of the handles	Smaller
3.	Inner surface of the blades	Transversely serrated	Serrated in a criss-cross pattern and may have a groove
4.	Tip	Blunt and thin than that of the hemostatic forceps	Blunt but thicker than hemostatic forceps

Sterilization Method

It is sterilized by either boiling or autoclaving.

4. SPONGE HOLDING FORCEPS

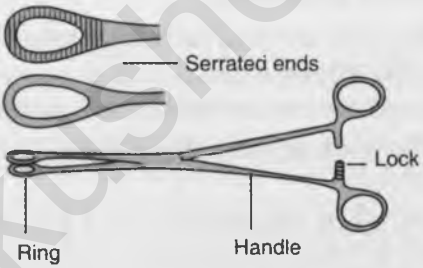


Fig. 3.5: Sponge holding forceps

Other Name

Sponge holding forceps is also called swab holding forceps (Fig. 3.5).

Features

This is made up of stainless steel. It is 22.5 cm (9½ inches) long. It is a long forceps with locking arrangements. It has ring shaped tips, which may be serrated or smooth on the inner

surface for better grip. A ratchet catch on the handles locks the fenestrated blades on closure and prevents the sponge from slipping. The fenestrated blades accommodate the bulk of the swab. The instrument is long because the antiseptics should be applied from a distance, so that the sterile, gloved hand of the obstetrician does not come in contact with the unprepared field of operation.

Uses

Sponge holding forceps has been proved useful in a variety of new surgical techniques. They are the most popular instrument which is used in various gynecological procedures.

1. Toileting the vulva, vagina and perineum prior to and following delivery.
2. To dissect the urinary bladder away from the lower uterine segment by blunt dissection during a cesarean section.
3. Antiseptic painting of the abdominal wall prior to cesarean section.
4. To catch hold the membranes if it threatens to tear during delivery of the afterbirths.
5. To catch hold the cervix (2 pairs are needed) for inspection in suspected cervical tear.
6. To catch hold the cervix during cerclage operation.
7. It is used for holding the sponges to swab the cavities, e.g. vagina.
8. Sometimes, when the anterior lip of the cervix is friable and cannot be held by vulsellum, sponge holding forceps can be used, because it does not traumatize the tissues.
9. It can be used in place of ovum forceps.
10. It may be applied on infundibulopelvic ligaments to control bleeding in myomectomy.
11. For applying antiseptics over vulva, vagina or abdominal skin before operations.
12. To hold the pedicle of twisted ovarian cyst before untwisting it.
13. To hold cervix in suction evacuation operation.

14. To hold the cervix during extraovular instillation of ethacridine lactate for second trimester pregnancy termination and during check curettage after the abortion.
15. To hold the cut edges of the lower segment during a cesarean section, for hemostasis and making the suturing easier.

How to Differentiate between Sponge Holding Forceps and Ovum Forceps

The rings have serration on the inner surface in sponge holding forceps but not in ovum forceps. The sponge holding forceps has a catch but ovum has no catch.

Sterilization Method

It is sterilized by boiling or autoclaving.

5. UTERINE VULSELLUM FORCEPS

Other Name

It is also known as a volsella or vulsella.

Features

It has got sharp teeth at the end which provides firm grip. Instead of pointed and toothed end, it has flat toothed end to hold cervix without much injury. It has locking arrangements. The curvature of the blades helps in retracting the anterior vaginal wall where the instrument is pulled up after holding the cervical tip thus providing a better visual field. It is 28 cm long with a gentle curve on side in its blades. It has two in three teeth in the tips of its blades.

Varieties

a. Straight
b. Curved

The curved variety can be retracted upwards or anteriorly with two advantages:

1. The blades of the instrument can act as anterior vaginal wall retractors.
2. A better view of the operation field is possible.

Types

A. Single-toothed vulsellum (also called tenaculum forceps)
B. Multiple teeth vulsellum (Teale's vulsellum forceps)

SINGLE-TOOTHED VULSELLUM (TENACULUM FORCEPS)

Definition

Tenaculum forceps are gynecological instruments which are used to grab hold of tissues. It is a single-toothed vulsellum. It is a type of locking forceps which hold itself in the place it has been locked into (Fig. 3.6).

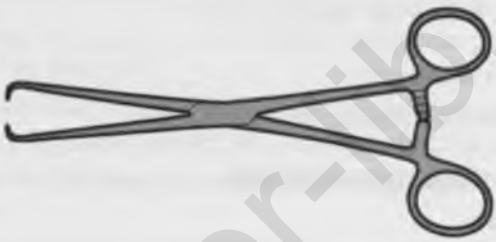


Fig. 3.6: Single-toothed vulsellum

Other Name

Single-toothed vulsellum is also called tenaculum forceps.

Features

It is a straight toothed vulsellum forceps and is used as volsellum. The tenaculum forceps have long and narrow handles which are attached onto hooks. The hooks are fastened onto the tissue which needs to be examined and the handles are locked into place once the hooks are safely attached to the tissue which needs to be examined and the required position has also been obtained.

Material made up of

Tenaculum forceps which are to be used for gynecological purposes may be manufactured using plastic or steel. Steel forceps can be sterilized and hence can be reused where those forceps which are made with plastic are only intended to be used once on a single woman. These are disposed of when the examination/procedure is over with the woman.

Advantages

The advantage is that it only pierces the tissue at one point so there is very slight bleeding, if any. The grip of the instrument is more secure than that of multiple-teeth vulsellum because of its bite which is deeper. It is better suited for nulliparous cervix with pinhole os because it occupies less space.

Uses

1. In Rubin's test (tubal patency test like HSG), it is used to grasp anterior lip of cervix transversely. It allows cannula to fit air tight in the cervix and prevents leakage of gas.
2. Cauterization or cryosurgery of cervix.
3. It can also be used in the place of vulsellum.

Disadvantages

Because of the bite on the cervix is deep in the substance of cervix, the chances of cervical tears are greater with the vulsellum.

How to Hold?

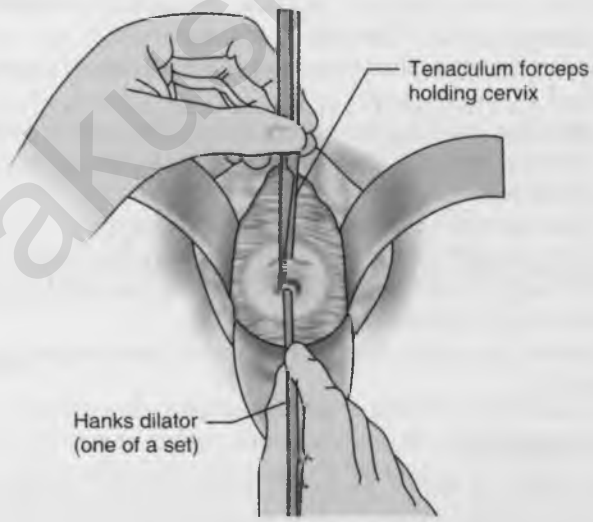


Fig. 3.7: Using tenaculum forceps in dilating the cervix

MULTIPLE-TOOTHED VULSELLUM
(TEALE'S VULSELLUM FORCEPS)

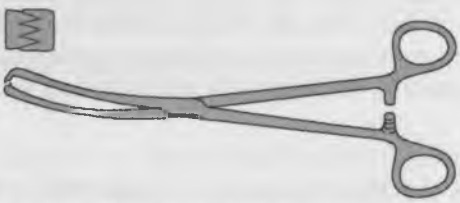


Fig. 3.8: Multiple-toothed vulsellum forceps

Features

The tip of the blades possesses multiple teeth which can inter lock. The handle has catches and finger bows.

Uses

Uses in Gynecology

1. It is used for holding the anterior or posterior lip of cervix in various operations, e.g. dilatation and curettage, cauterization of cervix, posterior colpotomy, insertion of IUCD, anterior colporrhaphy, Manchester's polypectomy.
2. To test mobility of cervix and laxity of ligaments in prolapse.
3. To bring down fundus of uterus, in vaginal hysterectomy.
4. For grasping small fibroids in myomectomy.
5. To hold the cervical stump after amputation of cervix or in subtotal hysterectomy.
6. It is used for holding the anterior lip of the cervix when it is not friable, that is, in gynecological conditions (tubal insufflations).
7. It is also used for introducing a laminaria tent.
8. To hold the cervix after opening the anterior fornix and to cut the vaginal wall around the cervix in an abdominal total hysterectomy operation.
9. To correct a mobile retroversion that cannot be corrected manually.

Uses in Obstetrics

To catch cervix in pregnant woman during early pregnancy as it gives firm grip without much trauma, e.g. D and E, suction evacuation.

Disadvantages

It cannot be used after the first trimester because then the cervix becomes very soft and tears easily. Hence, only sponge holding forceps should be used to hold pregnant cervix (except in early pregnancy).

Sterilization Method

It is sterilized by boiling or autoclaving.

Dangers

Injury to the uterine vessels and the adjacent tissues.

6. UTERINE SOUND (SIMPSON'S)

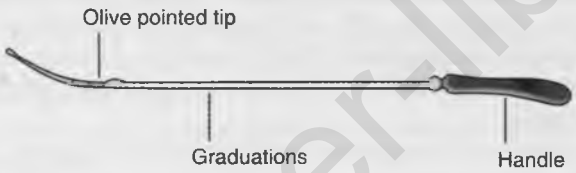


Fig. 3.9: Simpson's uterine sound

Definition

Uterine sound is a slender, flexible, metal gynecological instrument which is used to examine the vaginal cavity and to measure how deep the uterus actually is. This metal rod is also used to calibrate or dilate the cervical canal or to hold the uterus in various positions during gynecologic surgery.

Founder

Uterine sound (Simpson's) named after Sir James Young Simpson.

Features

It is a graduated, malleable, olive pointed, metallic uterine sound of about 12 inches (30 cm) long, of which 5 cm length is that of its handle. The distal end is curved at an angle of 150°at a distance of 6.5 cm from the bulbous tip (normal uterocervical canal length). The tip of the instrument is blunt. This instrument

is fully graduated for accurate depth determination, with a bulbous tip to reduce the risk of perforation. It is provided with a corrugated handle. It is a light-weighted instrument.

Uses

1. To know the position of the uterus and the length of the uterine cavity prior to dilatation of the cervix in D + E operation.
2. To sound the uterine cavity to detect any foreign bodies such as tumor, polyp, placenta, products of conception or an IUCD.
3. It is used to ascertain the size and direction of the uterus (anteverted or retroverted) before passing the cervical dilator.
4. To ascertain the position of abnormal uterine contents, e.g. tumor, polyp, placenta, or products of conception.
5. To check for displaced IUCD. Sound is introduced in the uterine cavity and X-ray antero-psterior and lateral view are taken.
6. Diagnosis of congenital malformation of uterus such as bicornuate uterus.
7. To differentiate between chronic inversion and uterine polyp.
8. Diagnosis of cervical stenosis—failure of sound to pass through cervix is due to stenosis.
9. To test the mobility of urethra in urinary stress incontinence.
10. To diagnose supravaginal elongation of cervix.
11. It is used cautiously for correction of a mobile retroverted uterus.
12. Uterus is sounded routinely before operations on uterus and cervix.
13. It also acts as an initial or as first dilator of the cervical canal.

Historical Tests

1. *Shirodkar's test:* Passage of sound through internal os without resistance or pain is diagnostic of incompetent os.
2. *Acosta-Sison's test:* Passage of uterine sound for ≥ 11 cm without resistance is diagnostic of vesicular mole.

Contraindications

1. Known or suspected pregnancy.
2. Cervical infection.

Precautions

Care should be taken to prevent perforation of the uterus while introducing the uterine sound.

Sterilization Method

It is sterilized by boiling or autoclaving.

Method of use

Per vaginam examination is must before sounding. It is held in pen holding fashion and inserted gently in the direction of uterine cavity (as determined by vaginal examination) after grasping the cervix with vulsellum. If during D and C sound cannot be passed, then:

1. Pull the cervix to straighten the uterocervical axis.
2. Use probe.
3. Remove instrument and reassess by performing a per vaginal examination (Fig. 3.10).

Fig. 3.10: Passage of uterine sound

Causes of Increased Uterocervical Length

- False passage due to perforation
- Fibroid uterus, adenomyosis
- Pyometra, hematometra
- Congenital elongation
- Prolapse, subinvolution
- Endometrial carcinoma
- Pregnancy and vesicular mole

Causes of Decreased Uterocervical Length

- Menopause
- Hyperinvolution
- Hypoplastic uterus
- Chronic inversion
- Uterine synechiae
- Cervical amputation

Complications

1. Sepsis
2. Perforation

7. BLADDER SOUND

Fig. 3.11: Bladder sound

Other Name

It is also called urethral sound (Fig. 3.11).

Features

It is a metallic rod with a long shaft ending with a tip slightly bent by 5 cm and blunt up. It is about 10 inches (25 cm) long. It also has a handle. It has no markings on it.

It is an outdated instrument used previously before the introduction of radiography and ultrasonography.

Sizes

Bladder sounds are available in sets of increasing sizes. No.1 size is 1.5 mm in diameter and the diameter increases by 0.5 mm of each subsequent angulations but a smooth curve and it is not graduated. It does not have an olive tip like the uterine sound too.

Uses

1. To determine the limits of bladder during operations involving anterior vaginal wall, e.g. repair of cystocele.
2. Diagnosis of accidental bladder injury during obstetric or gynecological operations.
3. To differentiate between urethral diverticulum and cystocele or urethrocele and anterior vaginal cyst.
4. To diagnose a calculus in bladder.
5. To determine the position of urinary fistula in vagina.
6. To diagnose suburethral diverticulum and to define the extent of it during its dissection for excision.
7. To test the mobility of the urethra in urinary stress incontinence.
8. To dilate the urethra by passing the sounds of increasing size.
9. To sound the urinary bladder for foreign body, e.g. stone, perforated IUCD.

Difference between Uterine Sound and Bladder Sound

It is differentiated from uterine sound by following features:

- The curve at distal end is uniform
- It is not graduated

4 Cervical Dilators

DEFINITION

Cervical dilators are metallic instruments used for the rapid dilatation of the cervix in pathological conditions where approach to the uterine cavity is required through the cervical canal and for therapeutic management of cervical stenosis. Unlike the uretheral dilators, these instruments do not taper gradually.

Features

Cervical dilators may be single-ended or double-ended. Each dilator is a solid rod curved near the tip, and somewhat tapering toward the tip. The markings on the dilators indicate the circumference in millimeters. There is a difference of 3 mm between the diameter at the tip and the maximum diameter. The maximum diameter is reached at 1.5 cm from the tip. The dilators are numbered as 3/6; the numerator indicating the diameter near the tip and the denominator indicated the diameter near the base.

Forms

1. *Metallic:* Most commonly used
2. *Plastic:* Disposable dilators are also available.

Types

A. Hawkins-Amblers' cervical dilators
B. Das or Hegar's cervical dilators
C. Bonney's dilators
D. Fenton's dilators
E. Hank's dilators

F. Pratt's dilators
G. Purandare's dilators
H. Ramsay's dilators

A. Hawkins-Amblers' Cervical Dilators

It is a single-ended cervical dilator with a disk-shaped finger grip at the non-dilating end with number marking on it. It is less curved than Hegar's. It has got 16 sizes, the smallest one being 3/6 the largest one being 18/21. The smaller one arbitary in the scale of Hawkins-Amblers. The smaller one denotes measurement at the tip and the larger one measures the maximum diameter at the base in mm (Fig. 4.1).

Fig. 4.1: Hawkins-Amblers' cervical dilators

These are available in gradually increasing sizes. The markings on the instrument indicate the circumference in millimeters. A 6/9 size of Hawkins-Amblers' dilator indicates that the circumference at the tip is 6 mm and it reaches 9 mm at its base.

B. Das Cervical Dilators

Other Name

It is also called Hegar's dilators (Fig. 4.2).

Fig. 4.2: Das or Hegar's dilators

Features

It is a solid rod curved near the tip and somewhat tapering near the tip. The S-shaped curve is shallow and the dilating portion is within the terminal 1.5 cm of the dilator. It can be single-ended or double-ended one. There is a difference of 3 mm in the diameter near the tip and the maximum dilating portion of the dilator. There is a number on the instrument which indicated maximum external diameter in mm. Single-ended are available in a set of 25 having diameter from 2–26 mm, double-ended are available in a set of 12 from 1/2 mm to 23/24 mm. Both the sides are used with the lower number first.

C. Bonney's Dilators

Other Name

It is also called Bonney's improved cervical dilator (Fig. 4.3).

Fig. 4.3: Bonney's dilators

Features

It is a single-ended solid instrument with finger grip at one end and gradually tapering curved tip at the other end. This dilator is shaped like the Hegar's dilator, except that it has a collar beyond its widest diameter. Length of the dilating part is equal to that of the normal cervix which is limited by a collar which functions as a shoulder to provide safety during introducing dilator by preventing excessive entry of the dilator into the uterine cavity.

D. Fenton's Dilators

It is a long double-ended instrument with or without connecting narrow shaft between the two portions (Fig. 4.4). It is more tapering and more curved than the Hegar's dilator, i.e. its point of maximum diameter is farther away from the tip than in the Hegar's dilator. Dilatation is easier and there are fewer failures, but the risk of uterine perforation is higher as compared to

Fig. 4.4: Fenton's dilators

Hegar's, because of increase in curvature. Gradual increase in the diameter results in smoother dilatation of the cervix and fewer failures. The greater curve makes the use of the instrument more convenient with an anteverted or retroverted uterus.

E. Hank's Dilators

This instrument is similar to Hegar's dilator. It is less curved, hollow double-ended instrument with difference in diameter of successive dilators being 0.5 mm instead of 1 mm in other dilators. It is graduated in numbers double the diameter of that dilator. Its sizes vary from 9/10 to 19/20. It is half graduated. It is also hollow so that it avoids piston action on the uterine contents which tends to force them through the fallopian tubes into the peritoneal cavity. Hence it is useful in the treatment of pyometra. For example, 9/10 dilator has a diameter of 4.5/5 due to hollow central open part, it can drain the intrauterine contents during dilatation (Fig. 4.5).

Fig. 4.5: Hank's dilators

F. Pratt's Dilators

This dilator is shaped like Hegar's dilator. But it is half graduated, i.e. the difference between successive dilators is 0.5 mm and not 1 mm as in Hegar's or Fenton's dilators. It is a solid double-ended less curved dilator. Thus, it achieves smoother and less traumatic dilatation than the latter (Fig. 4.6).

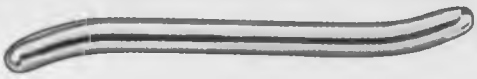


Fig. 4.6: Pratt's dilators

G. Purandare's Dilators

This cervical dilator has a guard and long tapering end. The guard helps in preventing insertion beyond that length and protect against perforation. Here in the picture it is numbered 2, 3, 4, 5 representing diameter in mm from the tip to the guard. It has a shoulder guard of 1.5 inches from the tip to prevent perforation of uterus (Fig. 4.7).

Fig. 4.7: Purandare's dilators

H. Ramsay's Dilators

It is a single-ended hollow tubular dilator. Unlike Hank's dilator, it is single-ended. There is a notch in the instrument 6.25 cm from the tip, i.e. at normal uterocervical length. It also permits drainage of uterine contents during dilatation. It is specifically indicated in conditions like pyometra, where it is not desirable to have the possibility of the piston action of the dilator forcing the contents of the uterine cavity into the peritoneal cavity through the fallopian tubes.

Uses

Uses in Gynecology

1. Dilatation and curettage.
2. To prevent stenosis in procedures like Manchester's trachelorrhaphy following conization.
3. For insufflation tests.
4. In congenital or acquired stenosis.
5. For manipulation of uterus during laparoscopy.
6. In cases of cesarean section, it passes from within the uterus and is taken out from vagina to facilitate the passage of lochia.
7. For application of intrauterine source of irradiation, e.g. radium.

8. To diagnose incompetent os of cervix by passing number 8 (eight) Hegar's dilator in non-gravid uterus.
9. In operations on cervix, e.g. amputation of cervix, repair and cauterization of cervix.
10. To relieve some cases of spasmodic dysmenorrhea (not done now).
11. Drainage of pyometra.
12. After Manchester operation for uterine prolapse, the cervix is dilated because it helps in formation of cervical lips and epithelialization.

Uses in Obstetrics

1. Dilatation and evacuation for MTP, vesicular mole and incomplete abortion.
2. Retrograde dilatation of cervix in elective cesarean or hysterotomy, and metroplasty when os is not open.
3. Drainage of lochiometra.

Degree of Dilatation Required

1. *Incomplete abortion*: Sufficient to introduce the index (usually 16/19).
2. *In suction evacuation:* One size smaller than the size of the suction cannula.
3. *In medical termination of pregnancy (MTP) by dilatation and evacuation (D + E):* Sufficient dilatation to introduce ovum forceps (usually 9/12).

Contraindications

- Suspected or known pregnancy
- Genital sepsis except drainage of pyometra
- Acute cervicitis
- Endometriosis
- Pelvic inflammatory disease.

Sterilization Method

It is sterilized by boiling or autoclaving.

How to Hold?

Fig. 4.8: Dilatation of the cervix using Hawkins-Amblers' dilators

Fig. 4.9: Dilatation of the cervix using Das or Hegar's dilators

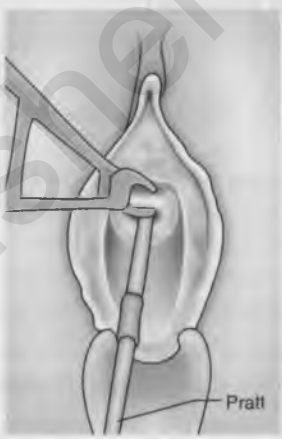


Fig. 4.10: Dilatation of the cervix using Pratt's dilators

Prerequisites

- Review for indications.
- Review general care principles.
- Ask the woman to empty the bladder.

- Provide emotional support and encouragement and give pethidine IM or IV before the procedure. If necessary, use a paracervical block.
- Administer oxytocin 10 units IM or ergometrine 0.2 mg IM before the procedure to make the myometrium firmer and reduce the risk of perforation.

Method of use

The indications for using dilators have been given above. In those procedures, dilatation of the cervix is the prior procedure with the use of the dilators. The steps involved in the dilatation are:

1. Perform bimanual pelvic examination to assess the size and position of the uterus and the condition of the fornices. Apply antiseptic solution to the vagina and cervix (especially the os).
2. Check the cervix for tears or protruding products of conception. If products of conception are present in the vagina or cervix, remove those using ring (or sponge) forceps. With incomplete abortion, a ring (sponge) forceps is preferable as it is less likely than the tenaculum to tear the cervix with traction and does not require the use of lignocaine for placement. Gently, grasp the anterior lip of the cervix with a vulsellum or single-toothed tenaculum.
3. If using a tenaculum to grasp the cervix, first inject 1 ml of 0.5% lignocaine solution into the anterior or posterior lip of the cervix which has been exposed by the speculum

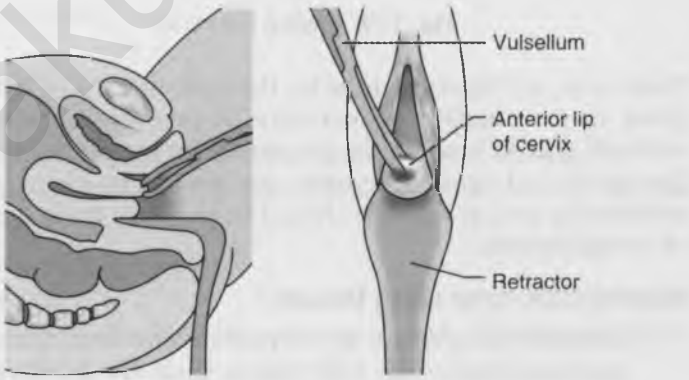


Fig. 4.11: Inserting a retractor and holding the anterior lip of the cervix

(the 10 O'clock or 12 O'clock position is usually used). Dilatation is very important in cases of missed abortion or when some retained products of conception have remained in the uterus for several days. Sounding of the uterus is must before dilatation to know the version of the uterus. Gently, introduce the graduated dilators before passing the cannula or curette in case of dilatation and curettage procedure. Dilator is held in a pen holding manner and gradually increasing number of dilators is used till adequate dilatation is achieved (usually 10–12 mm). Care should be taken in order to prevent cervical tear or in creating a false opening. The uterus is very soft in pregnancy and can be easily injured during this procedure. Perform a bimanual pelvic examination to check the size and firmness of the uterus.

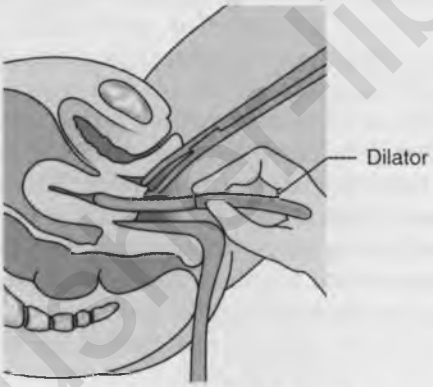


Fig. 4.12: Dilating the cervix

Note: Use of dilators is done by the obstetricians or surgeons prior to the curetting procedure in case of abortion. The midwife should assist in the procedure for proper dilatation of the cervix and post-procedural care should be given. Proper monitoring and evaluation should be done for early detection of complications.

Nursing Care after using Dilators

1. Replace the uterus, by removing the tenaculum and speculum and using both hands, push the uterus gently, but firmly, upwards.

2. Give analgesics as needed.
3. Place woman on bed rest for 3 days and limit the woman's activity for at least 7 days.
4. Encourage the woman to eat, drink and walk about as she wishes.
5. Excessive bleeding may require packing the uterine cavity with long, continuous sterile roller gauze and observing for shock, until the woman is out of danger and hemostasis is achieved.
6. Monitor woman for any signs of infection during the recovery period.
7. The midwife should attend to woman's emotional needs and concerns during the recovery period.
8. Offer other health services, if possible, including tetanus prophylaxis, counselling or a family planning method.
9. Discharge the uncomplicated cases in 1–2 hours.
10. Educate the woman to watch for the below symptoms and signs which requires immediate attention:
    - Prolonged cramping (more than a few days)
    - Prolonged bleeding (more than 2 weeks)
    - Abnormal bleeding more than normal menstrual bleeding
    - Severe pain
    - Fever, chills or malaise
    - Fainting

Dangers

1. Sepsis
2. Vasovagal shock due to sudden forceful dilatation.
3. *Injuries:* Lacerations or tear of cervix, false passage, uterine perforation
4. Hemorrhage
5. Infection
6. *Late effects:* Cervical incompetence, cervical stenosis due to injury.

5 Curettes

DEFINITION

A curette is a surgical instrument designed for scraping biological tissue or debris in a biopsy, excision, or cleaning procedure. Curette is a small hand tool, often similar in shape to a stylus; at the tip of the curette, there is a small scoop, hook, or gouge. The meaning of curette is to scrape. Obstetricians often use a curette of the debridement of tissue, a common example of which is dilation and curettage of the uterus performed in gynecology.

This chapter deals with the important curettes which are most commonly used in obstetrics and gynecological nursing. Application of curette is done by the obstetricians and the role of midwife is to assist in the procedure and formulation of the nursing care plans for the woman who had undergone curetting procedure whether it may be endometrial curetting, endocervical curetting or suction curetting.

Parts of Curette

Each curette consists of 3 parts (Fig. 5.1).

1. *The handle:* The handle is corrugated on the aspect which corresponds to the direction of the bend at the tip. It can be either on the side (single-ended) or in the middle (double-ended).
2. *The shank or shaft:* The shank is malleable and is hollow in the flushing variety to convey irrigating fluids which stimulates the uterus to contract and can also be used to deliver antiseptic material.
3. *The curetting end:* The curetting end may be sharp or blunt, and some are spoon-shaped. Some types have a curetting

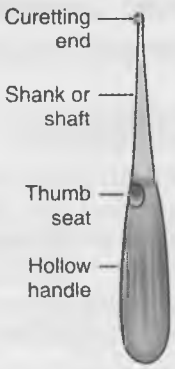


Fig. 5.1: Parts of curette

end on either tip (double-ended) with the handle in the middle.

Forms of Curette

1. Single-ended
2. Double-ended

Indications for Diagnostic Curettage

a. Bleeding
   - Dysfunctional uterine bleeding
   - Symmetrically enlarged uterus
   - Suspected uterine malignancy
   - Secondary postpartum and postabortive bleeding.
   - Cervical adenomatous polyp
   - Doubtful extrauterine pregnancy to exclude the presence of chorionic villi.
   - Suspected TB and bilharzia.

b. Amenorrhea
   - Atrophic endometrium
   - Polycystic ovarian syndrome
   - TB endometrium

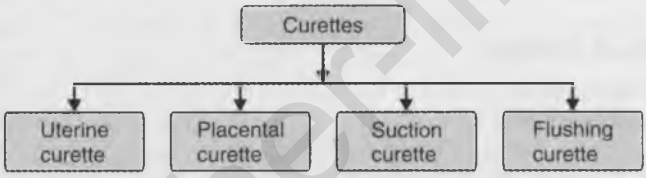
c. Sterility
   - Anovulation
   - TB endometrium
   - Non-responsive endometrium
   - Hormonal function of the ovaries

Indications for Therapeutic Curettage

1. For temporary or permanent cure of non-malignant uterine bleeding.
2. Membranous dysmenorrhea
3. Removal of endometrial polyp
4. In the management of some abortions: Inevitable, incomplete, missed, cervical and therapeutic abortions, to ensure complete removal of the conceptus and deciduas.
5. Vesicular mole
6. To remove unhealthy endometrium during operation, e.g. Manchester (Fothergill's) operation and myomectomy.

Types of Curettes

Flow chart 5.1: Types of curettes



UTERINE CURETTE

Definition

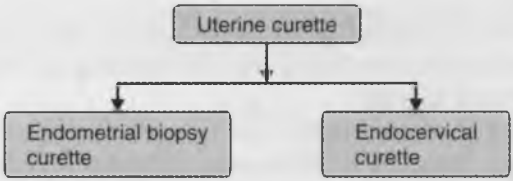
Uterine curettes are only one kind of curettes which are specifically used in a woman's vagina to scrape tissue for examination purposes. Usually, tissue is scraped off to send it for biopsy or autopsy when this is conducted during a surgery.

Features

It has a central shaft and one small oval loop at each end. The loops are set at an angle to the shaft in opposite directions for ease of curettage. The size of the loop varies between 6 and 10 mm. The edge of the loop may be sharp at both ends or sharp at one and blunt at the other. In D + E operation, the curettage is done by blunt curette as the uterine wall is very soft and it can be easily perforated by sharp curette.

Types of Uterine Curette

Flow chart 5.2: Types of uterine curette



ENDOMETRIAL BIOPSY CURETTE

An endometrial curette is a gynecological instrument used to extract substances from a woman's uterus and endometrial lining, usually during a surgical procedure known as a dilation and curettage (D and C). The curette's shape often resembles that of an oblong spoon, although some can also look straw-like. This medical device allows obstetricians to remove pieces of the uterine lining or objects attached to the uterus for disposal or inspection. Use of curettes to take materials out of the womb can protect women from disease and infection. The curette end may be single port or multiport. The elongated multiports are suitable for larger area tissue withdrawal. They have a suction plunger to create a constant vacuum.

Features

This is a slender, hollow, blunt tipped instrument. It has got a notch with a cutting edge near the blunt tip. The notch points away from blunt tip. There is a slight angulation about 5 cm from the tip for easier negotiation of the instrument into the uterus. This instrument has a stylet for removing the biopsied tissue. It is a 23 cm (9 inches) long tubular stainless steel instrument curved near the tip. The proximal end of the instrument has a luer-lock mount and can be attached to a BD syringe. A long stiff wire is supplied with the instrument which functions as a stillete and can be used to force out the strip of endometrium from the lumen or to clean the instrument from inside. The external diameter of the curette is 2 mm, so no dilatation or anesthesia is required before the procedure.

Indications/Uses

- Diagnosis of anovulation: Endometrial biopsy is taken on 21st to 28th day or 1st day of menstruation, if cycles are irregular.
- Diagnosis of corpus luteum insufficiency: Day 21–24
- Diagnosis of dysfunctional uterine bleeding not responding to hormonal therapy.
- Diagnosis of endometrial tuberculosis.
- Diagnosis of endometrial carcinoma by fractional curettage.
- Prior to myomectomy, to rule out submucous polyps, endometrial hyperplasia or carcinoma.
- Diagnosis of uterine choriocarcinoma.
- Removal of intrauterine contraceptive devices whose threads are missing.
- Removal of tubal prosthesis after tuboplasty.

Contraindications

1. Pregnancy
2. Acute pelvic inflammatory disease
3. Clotting disorders (coagulopathy)
4. Acute cervical or vaginal infections
5. Cervical cancer
6. Possible fetal viability (except for elective termination)
7. Woman refusal
8. Uterus greater than 14 weeks size is a relative contraindication.

Conditions Prohibiting Endometrial Biopsy Curette use

- Morbid obesity
- Severe pelvic relaxation with uterine descensus
- Severe cervical stenosis

Disadvantages

1. Adequate tissue may not be available with endometrial biopsy.
2. Diagnosis of malignancy and tuberculosis can be missed if only a few strips are taken. Postmenopausal bleeding requires dilatation and curettage under general anesthesia.

Types of Endometrial Curette

a. *Sim's curette:* Sim's curette is a scraping curette which is used to scrap out the contents from the uterine cavity. It is single-ended which is available in various sizes. It has a long handle to facilitate the curettage (Fig. 5.2).

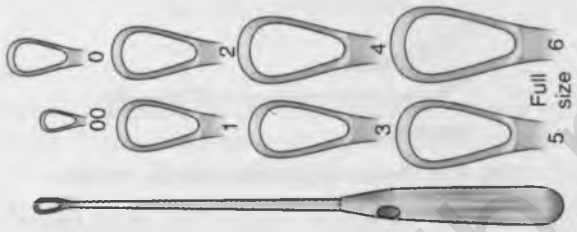


Fig. 5.2: Sim's curette

b. *Goldstein's curette*: It has an arrangement to irrigate the uterus, after the products of conception are curetted out, with a solution of antiseptics. But nowadays, it is not used due to the risk of fluid embolism.

c. *Sharp and blunt curette (Blake's uterine curette):* It is a double-ended curette with one sharp end and other blunt end. Single-ended curette also available which may be blunt or sharp. It is about 25 cm long and has loops at the end. Loops are set at an angle to the shaft and their size varies from 2 × 3 mm to 6 × 10 mm. There are transverse ridges on the middle portion of shaft for better grip. Sharp end is usually used for gynecological procedures and blunt end for obstetric procedures because the risk of uterine perforation is less. The indications for blunt curette are incomplete abortion, postpartum hemorrhage due to retained products of conception, after evacuation of a vesicular mole, septic abortion and following dilatation and suction evacuation for first trimester pregnancy termination to confirm the completion of the procedure (Fig. 5.3).

Fig. 5.3: Sharp and blunt curette

d. *Novak endometrial biospsy curette:* This instrument is similar in design to the Randall's endometrial biopsy curette, except that instead of a single notch with cutting edge, it has four notches in succession so that its efficiency as an endometrial curette is increased. The remaining discussion for this instrument is as for Randall's endometrial biopsy curette (Fig. 5.4).

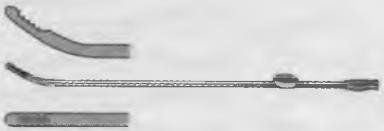


Fig. 5.4: Novak endometrial biopsy curette

e. *Randall's endometrial biopsy curette:* This instrument is 23 cm long. It is tubular and curved near the tip to facilitate entry into the uterine cavity. It has a subterminal opening with a sharp edge in its distal part such that during withdrawal of the instrument pressing against the uterine wall, a strip of endometrium will be removed. This strip enters the lumen of the instrument. The proximal end of the instrument has a luer-lock mount and can be attached to a BD syringe. A long stiff wire is supplied with the instrument, which functions as a stylet and can be used to force out the strip of endometrium inside the lumen of the instrument, or to clean the instrument from the inside (Fig. 5.5).

Fig. 5.5: Randall's endometrial biopsy curette

f. *Heaney curette:* This curette is also one type of endometrial curette which is basket shaped with sharp edges. It has a long handle and the body, to easily enter the uterine cavity and helps to curette the contents (Fig. 5.6).

Fig. 5.6: Heaney curette

g. *Uterine scoop:* Uterine scoops are used to extract substances such as tissue from inside the uterus of the woman. These are in the shape of a spoon, hence called scoops (Fig. 5.7).

Fig. 5.7: Uterine scoop

How to use?

The external diameter of the endometrial biopsy curette is 2 mm so that it can be passed into the uterine cavity without dilating the cervix. Thus, anesthesia is not necessary for the procedure and it can be carried out on an outpatient basis.

Procedure

The woman is placed in the lithotomy position and bimanual examination is performed to determine the uterine size and position, and whether uterocervical angulation exists. The physician can pick up the sterile speculum from the sterile tray and place it in the woman's vagina. Avoid contaminating the sterile instruments on the tray. Once the cervix is centered in the speculum, the cervix can be anesthetized by spraying 20 percent benzocaine spray for 5 seconds and then cleansing it with povidone-iodine solution.

The cervix is gently probed with the uterine sound. The cervix often is too mobile to allow for passage of the sound but can be stabilized with the tenaculum. The tenaculum is placed on the anterior lip of the cervix, grabbing enough tissue that the cervix will not lacerate when traction is applied. Pull outward on the tenaculum gently, straightening the uterocervical angle to reduce the chance of posterior perforation. Attempt to insert the uterine sound to the fundus.

If the uterine sound will not pass through the internal os, consider placement of small Pratt's uterine dilators. The smallest size is inserted, followed by insertion of successively larger dilators until the sound passes easily to the fundus. The distance from the fundus to the external cervical os can be measured by the gradations on the uterine sound and generally will be 6 to 8 cm.

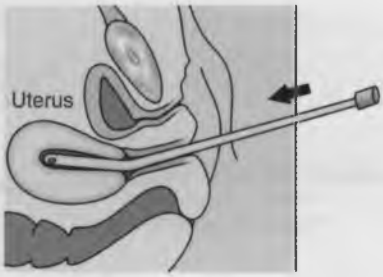


Fig. 5.8: The curette tip is inserted into the uterine fundus

The endometrial biopsy curette tip is inserted into the cervix, avoiding contamination from the nearby tissues. The curette tip is then inserted into the uterine fundus or until resistance is felt (Fig. 5.8).

Once the curette is in the uterine cavity, the internal piston on the curette is fully withdrawn, creating suction at the curette tip (Fig. 5.9).

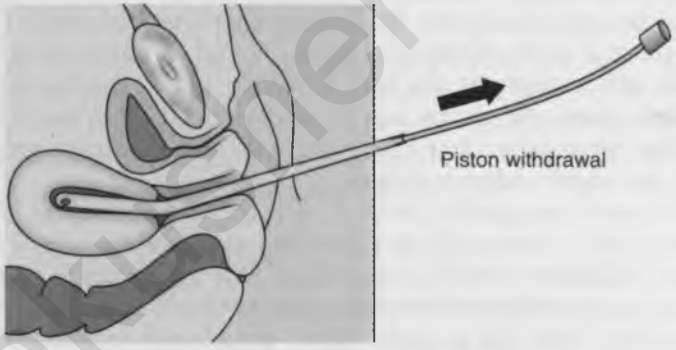


Fig. 5.9: The internal piston is fully withdrawn

The curette tip is moved with an in-and-out motion, but the tip does not exit the endometrial cavity through the cervix, which maintains the vacuum effect. Use a 360-degree twisting motion to move the curette between the uterine fundus and the internal cervical os (Fig. 5.10). Make at least four up and down excursions to ensure that adequate tissue is in the catheter.

Once the curette fills with tissue, it is withdrawn, and the sample is placed in the formalin container. To remove the

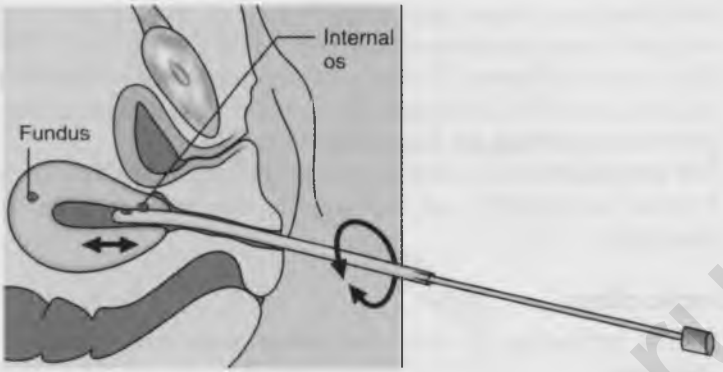


Fig. 5.10: A 360-degree twisting motion is used as the catheter is moved between the uterus fundus and the internal os

sample from the endometrial curette, the piston can be gently reinserted, forcing the tissue out of the curette tip. The tenaculum is gently removed. Pressure can be applied with cotton swabs if the tenaculum sites bleed following removal of the tenaculum. Excess blood and povidone-iodine solution are wiped from the vagina, and the vaginal speculum is removed.

Pitfalls of using the Instrument

- The catheter would not go up into the uterus easily in perimenopausal woman. The internal cervical os may be very tight in perimenopausal and menopausal woman.
- Woman report cramping associated with the procedure. Intraoperative and postoperative cramping frequently accompany instrumentation of the uterine cavity. Pre-procedure oral non-steroidal anti-inflammatory medications, such as ibuprofen (Motrin), can significantly reduce the prostaglandin-induced cramping. Spraying the cervix with a topical anesthetic, such as 20 percent benzocaine, can also help with discomfort.
- The procedure should not be performed in pregnant woman. Endometrial biopsy should not be performed in the presence of a normal or ectopic pregnancy.
- The pathologist reports that the specimens have insufficient sample for diagnosis. Some physicians are less vigorous in

obtaining specimens, and a single pass of the catheter may not yield adequate tissue. A second pass can be made with the suction catheter, if it is not contaminated when it is emptied after the first pass. The second pass almost always prevents reporting an insufficient sample.
- The tenaculum causes discomfort when applied to the cervix. Topical anesthesia can reduce the discomfort from the tenaculum.

Complications

- *Uterine perforation*: Fundal perforation is the commonest
- Infection

ENDOCERVICAL CURETTE

Definition

Endocervical curettes are used to take tissue samples from the cervix.

Both endometrial and endocervical curettes can be classified under uterine curettes.

Indications/Uses

- To curette out the products of conception in cases of missed or incomplete abortion.
- To curette out endometrium in cases of endometrial diseases for diagnostic and therapeutic purposes. For examples:
  - In cases of infertility to know the pattern of endometrium and for hormonal assay.
  - In women with postmenopausal bleeding.
  - For diagnosis and treatment of endometrial carcinoma.
  - In both primary and secondary amenorrhea for diagnosis of tuberculosis and atrophic endometrium.
  - For diagnosis of choriocarcinoma.
  - For diagnosis of submucosal polyps.
- For check curettage done 1 week after evacuation of hydatidiform mole.
- For check curettage after MTP.
- For breaking adhesions in Asherman's syndrome.
- It can also be used in D + C operation following evacuation of hydatidiform mole.

Types of Endocervical Curette

1. London Curette

Fig. 5.11: London curette

2. Kevorkian Endocervical Curette

Fig. 5.12: Kevorkian endocervical curette

3. Endocrette Curette

Fig. 5.13: Endocrette curette

How to use?

Prerequisites

- The midwife must explain the procedure and offers the opportunity to ask any questions that the woman might have about the procedure.
- Obtain the written consent that gives the woman's permission to do the procedure.
- Generally, no prior preparation, such as fasting or sedation, is required for a simple cervical curettage. In certain cases of cervical curettage, it requires regional or general anesthesia, the woman may need to fast for a certain number of hours before the procedure, generally after midnight.

- Notify physician if the women is sensitive to or are allergic to any medications, latex, tape, iodine, and anesthetic agents (local and general).
- Notify the physician of all medications (prescribed and over-the-counter) and herbal supplements that the woman is taking.
- Notify the physician if the woman has a history of bleeding disorders or if history of taking any anticoagulant (blood-thinning) medications, aspirin, or other medications that affects blood clotting. It is necessary to stop these medications prior to the procedure.
- The woman should not use tampons, vaginal creams or medications, douche, or have sexual relations for 24 hours before the procedure.

Procedure

Undress the woman completely or from the waist down and put on a hospital gown. Instruct the woman to empty bladder prior to the procedure. Make the woman to lie on the examination table, with her feet and legs supported as for a pelvic examination. Then the physician inserts speculum into the vagina to spread the walls of the vagina apart to expose the cervix.

Often, the physician uses a colposcope, an instrument with a special lens similar to a microscope, to magnify the cervical tissues. The colposcope will be placed at the opening of the vagina but does not enter the vagina. The physician locates any problem on the cervix or in the vagina. Photographs with the colposcope or sketches of the areas on cervix may be made for healthcare record. The cervix is cleansed and soaked with a vinegar solution, also called an acetic acid solution. This solution helps to make the abnormal tissues turn white and become more visible. The woman may feel a mild burning sensation. An iodine solution may be used to coat the cervix, called the Schiller test. The type of biopsy or curettage to be performed will be determined by the size, shape, location, and other characteristics of the abnormalities. The physician numbs the area using a small needle to inject medication. Tenaculum is inserted to hold the cervix steady for the biopsy. The woman may feel some cramping when the tenaculum is applied.

The amount and location of tissue removed depends on the type of biopsy. For a simple cervical biopsy, sometimes called a punch biopsy, one or more small samples of tissue will be removed by using a special type of forceps. When this is performed, the woman may feel a slight pinch or cramp. Cells from the inside of the cervical canal may be sampled with an endocervical curette or an endocervical brush. This may also cause some cramping. For a cone biopsy, in which a larger cone-shaped piece of tissue is removed from the cervix, the loop electrosurgical excision procedure (LEEP) or the cold knife cone biopsy procedure may be used. With the cold knife cone biopsy, a laser or a surgical scalpel may be used to remove tissue. This procedure requires the use of regional or general anesthesia. Bleeding from the biopsy site may be treated with a paste-like topical medication. Electrocauterization (use of a probe with high frequency electrical signals to stop bleeding) or sutures may be used in some cases. After a cone biopsy, the cervix may be packed with a pressure dressing. The tissue will be sent to a lab for examination.

Post-procedural Care

- The recovery process will vary depending upon the type of biopsy performed and if anesthesia was administered.
- If the woman received regional or general anesthesia, she was shifted to the recovery room for observation. Once the blood pressure, pulse, and breathing are stable and the woman is alert, she can be discharged to home.
- Make the woman wear a sanitary pad for bleeding. It is normal to have some mild cramping, spotting, and dark or black-colored discharge for several days. The dark discharge is from the medication applied to the cervix to control bleeding.
- Analgesics can be taken for cramping as recommended by the physician. Aspirin or certain other pain medications may increase the chance of bleeding. Be sure to take only recommended medications.
- Not to douche, use tampons, or have intercourse for one week after a biopsy procedure, or for a period of time recommended by the physician.

- After a cone biopsy, you should not insert anything into vagina until the cervix has healed, which may take several weeks. The woman also has other restrictions on her activity, including no heavy lifting.
- Notify your physician if you have any one of the following:
  - Bleeding
  - Foul-smelling drainage from the vagina
  - Fever and/or chills
  - Severe lower abdominal pain

Sterilization Method

It is sterilized by boiling or autoclaving.

Complications

- Hemorrhage
- Sepsis
- Perforation of uterus
- Vigorous curettage leads to amenorrhea (Asherman's syndrome)
- Tears in cervical canal.

PLACENTA CURETTE

Placenta curette (Fig. 5.14) has a wide looped end for curetting and a handle at the other end. The edges of the loop are blunt.

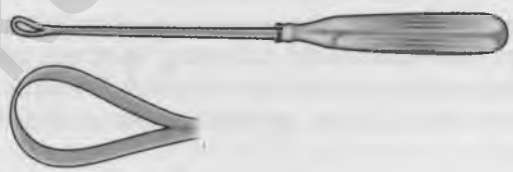


Fig. 5.14: Placenta curette

Indications

1. Check curettage for incomplete abortion and retention of the placenta in second trimester abortions.
2. Retained segments or bits of placenta after delivery of a viable fetus.

How to use?

The procedure of placental curetting is the same as that of endometrial curetting (Fig. 5.15).

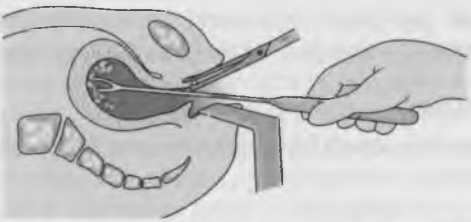


Fig. 5.15: Curetting the placenta using placenta curette

Complications

1. Perforation of the cervix or the corpus by uterine sound, cervical dilator or endometrial curette.
2. Injury to intra-abdominal structures if curettage continues after perforation.
3. Pelvic infection.

SUCTION CURETTE

Definition

Suction curette (Fig. 5.16) is the instrument used for the removal of the uterine contents by introducing it into the uterus, through which suction is applied, after dilatation.

The suction biopsy curettes are gynecological instruments which are used to remove some of the uterus lining so that it can be examined by the gynecologist to find out whether it is benign or malignant.

Fig. 5.16: Suction curette

Other Name

Suction curette is also called vacuum curette.

Features

The tip is blunt which helps to prevent perforation. Below the tip, there are two sharp openings for suction and curetting the cavity. Usually, suction force of 60 mm Hg is applied. It is numbered as per outer diameter. The size of the cannula selected is equal to number of weeks of pregnancy.

Indications/Uses

This instrument is used for first trimester MTP, and suction of vesicular mole.

Contraindications

Curetting should not be done in case of septic abortion. Because the leucocytic barrier that is formed in case of septic abortion will be disturbed by curettage causing septicemia.

How to use?

1. The woman is placed in the dorsal lithotomy position after appropriate anesthesia (general, regional, or local) has been administered.
2. A careful pelvic examination is performed to accurately ascertain the gestational size of the uterus.
3. A Sims' posterior retractor is used to obtain adequate exposure to the upper vagina and cervix. Lateral retractors or self-retaining retractors are rarely needed for this procedure.

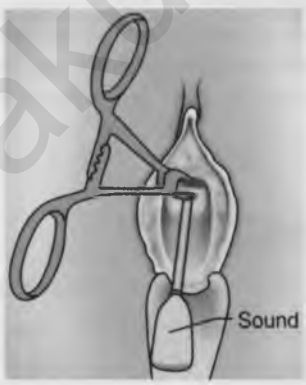


Fig. 5.17: Sounding the uterus by holding the anterior lip of the cervix

Fig. 5.18: Dilating the cervix with Pratt's dilators

4. The anterior lip of the cervix is grasped with a tenaculum. Single-toothed tenaculum should be avoided, as they tend to tear the pregnant cervix. A uterine sound is passed through the undilated cervix until the fundus is reached. The length of the uterine cavity is recorded (Fig. 5.17).
5. Tapered cervical dilators, such as Pratt's dilators, are used to progressively dilate the cervix, usually to 10 mm in diameter (Fig. 5.18). Non-tapered dilators, such as Hegar's dilators, should be avoided because they are difficult to pass through the cervix, particularly in nulliparous woman, and produce a greater amount of cervical trauma.
6. After appropriate dilatation, a suction curette is introduced through the cervix. Prefer large-diameter straight suction curette, such as 10 mm straight curette, rather than the curved or angulated variety. This is because 360° arcs of the curette must be made to adequately remove all gestational tissue. When 360° arcs are made with angulated curette, the diameter of the arc created in the intrauterine cavity by the angulated suction curette is excessive (Figs 5.19 and 5.20).

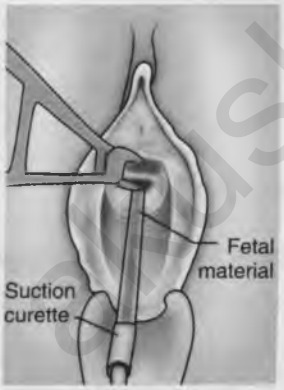


Fig. 5.19: Introducing the suction curette into the cervix and suctioning the fetal materials

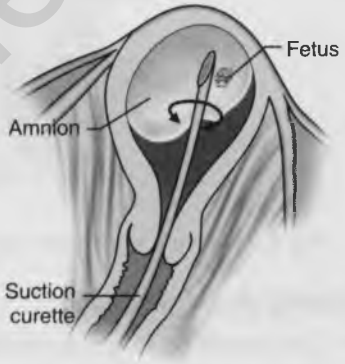


Fig. 5.20: Rotating the curette in a 360° angle

7. The suction curette should be introduced all the way to the fundus.
8. The suction is applied to the curette. The curette is rotated in a 360° arc and is slowly withdrawn in 1 cm increments.

9. The suction curette should be introduced 2–3 times to ensure that all products of conception have been adequately removed.
10. It is efficacious at this point to administer 50 international units of pitocin in an intravenous drip and 0.2 mg of Methergine given intravenously. This has significantly reduced blood loss by inducing uterine contraction.
11. An ovum or sponge forceps is introduced into the endometrial cavity and are opened, closed, and withdrawn several times to ensure that all gestation tissue has been removed (Fig. 5.21).
12. The woman is observed for 2 hours for hemorrhage prior to discharge.

Fig. 5.21: Ovum forceps or sponge holding forceps is introduced

Nursing Interventions

- Care must be taken to determine the length of gestation of the pregnancy. This should be done by history and by physical examination of the pelvis.
- The uterine cavity should be accurately measured with a sound prior to initiating the procedure.
- Pregnancies exceeding 13 weeks should be diagnosed, and suction curette is used, in those circumstances where the potential benefits outweigh the risks of performing a second-trimester abortion with the suction technique.

- The assistant or the midwife should be sure that adequate airflow through the suction pump is maintained at all times. Airflow in the system of approximately 100 ml/minute is preferred. For most standard suction curettage machines, this means turning the pump to the maximum setting. Reduced or low airflow through the system allows retained products of conception, and therefore, increases the risk of hemorrhage and postpartum infection.
- If perforation of the uterus is suspected, the vacuum should be turned off, and the curette should be removed with caution to prevent injury to the intestine.

FLUSHING CURETTE

Features

It is a 30 cm long hollow instrument open at both ends (Fig. 5.22). Its distal end is spoon-shaped blunt curette with vertical slits on it. It has a chromium plated shaft.

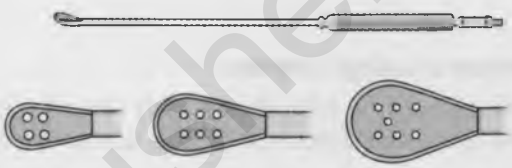


Fig. 5.22: Flushing curette

Available Sizes

It is available in 3 sizes. Small – 8 mm, medium – 11 mm and large – 14 mm.

Uses

1. It was used in the past to wash out uterine cavity
2. It is used to stimulate uterine contractions by using hot saline between 114 and 118° F.
3. It is also used to control bleeding after D and C, abortion and atonic PPH.
4. Flushing curette is used to collect samples from vagina, uterus and rectum for diagnosis of cancer.

How to use?

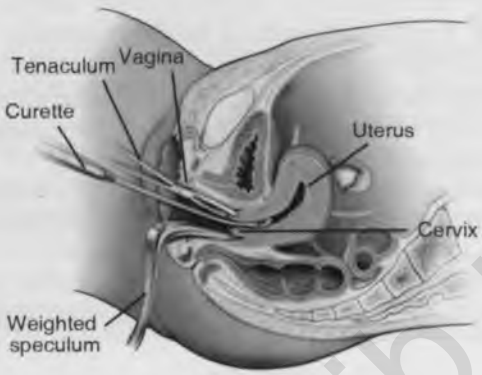


Fig. 5.23: Scraping the uterus by means of flushing curette

After passing it into the uterus, sample is scraped. This instrument is easy-to-use and finds application in hospitals and clinics.

Ideal Technique of using Curettes

1. The curette should be introduced only after knowing the length, position and direction of the uterus by a uterine sound.
2. The curette should be taken first to the fundus, and it should be rotated in one direction only, either clockwise or anti-clockwise all along, keeping in contact with the endometrium.
3. The whole of the uterine cavity including the cornu and internal os should be curetted.
4. Curettage should be done till there is a grating sensation perceived through the instrument.
5. Collection tray, proper preservatives and test tubes should be kept ready.

Risk Increases

- Obesity
- Smoking
- Poor nutrition

- Recent or chronic illness
- Use of drugs such as anti-hypertensives, muscle relaxants, tranquilizers, sleep inducers, insulin, sedatives, narcotics, beta-adrenergic blockers or cortisone
- Use of mind-altering drugs including narcotics, psychotics, hallucinogens, marijuana, sedative, hypnotics or cocaine.

Complications

1. Sepsis
2. Perforation of uterus
3. Permanent amenorrhea and sterility
4. Excessive bleeding may occur during curettage in cases of carcinoma of the uterine body.
5. The use of a flushing curette may push endometrial tissue through the fallopian tubes, leading to pelvic endometriosis or peritonitis.

6 Obstetric Forceps

DEFINITION

Obstetrical forceps are instruments which are designed to aid in the delivery of the fetus by applying traction to the fetal head. They are paired instruments made up of two branches attached to each other by a locking mechanism and specially designed to achieve vaginal extraction of head, thereby accomplish delivery of fetus.

History of Forceps

The history of obstetrical forceps is long and very interesting.

- **Approximately 1500 BC:** Sanskrit writings contain evidence of single and paired instruments; Egyptian, Greek, Roman, and Persian writings and pictures refer to forceps that were originally used for extraction following fetal demise to save the mother's life.
- **1600:** The credit for the invention of the precursor of the modern forceps to be used on live infants goes to Peter Chamberlen of England.
- **1745:** William Smellie described the accurate application to the occiput, rather than the previously performed pelvic application, regardless of the position of the head.
- **1747 AD:** Introduction of pelvic curve by Levret.
- **1752:** William Smellie (London) introduced the shank and double slot lock. He described the accurate application to the occiput, rather than the previously performed pelvic application, regardless of position of head.
- **1845:** Sir James Simpson developed a forceps that was designed to appropriately fit both cephalic curvatures and pelvic curvatures.

- **1877 AD:** Introduction of axis traction device.
- **1915:** Christian Kielland devised rotation forceps for deep transverse arrest.
- **1920:** Joseph Delee further modified that instrument and advocated the prophylactic forceps delivery. In an era in which many women labored and delivered under heavy sedation, forceps deliveries became common.
- **1929:** Edmund Piper (Philadelphia) introduced forceps for after coming head of breech.
- **1935:** Wrigley introduced short, light forceps with a generous cephalic curve, ideal outlet forceps.
- In **current obstetrical practice**, the use of forceps has become much less common. Clinical studies performed before the 1970s suggested that the risk of fetal morbidity and mortality was higher when the second stage of labor exceeded 2 hours. With contemporary obstetrical management, morbidity rates no longer increase with longer labors if fetal surveillance is reassuring. Thus, the length of the second stage of labor alone is no longer an absolute indication for operative termination of labor.
- Other factors were also at work to decrease the use of forceps deliveries. In particular, the availability of blood products and greater choices in antibiotics helped make cesarean delivery a safe alternative to operative vaginal deliveries.
- In the **1980s**, information became available suggesting that some forceps deliveries (midforceps deliveries) may be associated with an increased risk of fetal morbidity, though this issue remains controversial. These factors combined to greatly reduce the appeal of forceps delivery.
- **Currently,** many obstetrical training programs in North America struggle to teach forceps delivery. Problems include the lack of adequate personnel comfortable with teaching forceps-assisted vaginal deliveries, changes in consumer attitudes, and the demand for natural delivery. In addition, many practitioners fear litigation if a forceps-assisted delivery results in a poor outcome.

Material made up of and Sterilization Method

Obstetric forceps are made of stainless steel and are sterilized by boiling or autoclaving.

Classification of Forceps Delivery

Many different types of forceps have been developed. Generally, forceps consist of 2 mirror image metal instruments that are maneuvered to cradle the fetal head and are articulated, after which traction is applied to effect delivery.

This classification emphasizes the two most important discriminators of risk for both mother and infant: Station and rotation. Station is measured in 0 to 5 centimeters. Deliveries are categorized as outlet, low and midpelvic procedures. High operations are those in which instruments are applied above 0 station, and thus, before engagement. These have no place in contemporary obstetrics.

1. *High cavity forceps:* It is termed application of forceps at any time prior to full engagement of the head. It has become obsolete now.
2. *Midcavity or axis traction forceps:* It is termed application of forceps when the head is engaged, but the conditions for outlet forceps have not been met. Any delivery requiring artificial rotation regardless of station is included.
   For example: a. Haig-Ferguson's forceps
   b. Neville-Barne's forceps
   c. Milne-Murray forceps

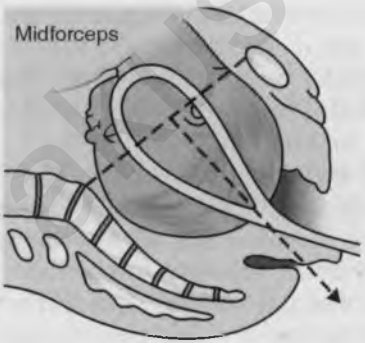


Fig. 6.1: Midforceps

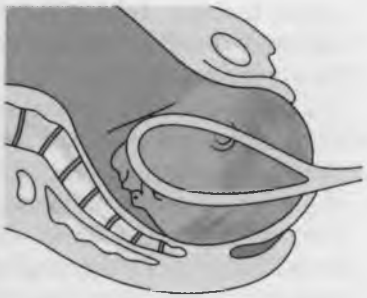


Fig. 6.2: Low forceps

3. *Outlet forceps:* It is termed application of forceps when the scalp is or has been visible at the introitus without

separation of the labia, the skull has reached the pelvic floor and sagittal suture is in the anteroposterior diameter of the pelvis, e.g. Anderson's forceps, Wrigley's forceps.

Types of Application of Forceps Blades

1. *Cephalic application:* The forceps is applied on the side of the fetal head in the mentovertical diameter so injury of the fetal face, eyes and facial nerve is avoided.
2. *Pelvic application:* The forceps is applied along the maternal pelvic wall irrespective to the position of the head. It is easier for application but carries a great risk of fetal injuries.
3. *Cephalopelvic application:* It is an ideal application and possible when the occiput is directly anterior or posterior or in direct mentoanterior position.

Parts

1. *Curved blades:* The blades grasp the fetus. Each blade has a curve to fit around the fetal head. The blades are oval or elliptical and can be fenestrated (with a hole in the middle) or solid. Many blades are also curved in a plane 90° from the cephalic curve to fit the maternal pelvis (pelvic curve). Each blade has a toe or a tip, a heel or a base and a body

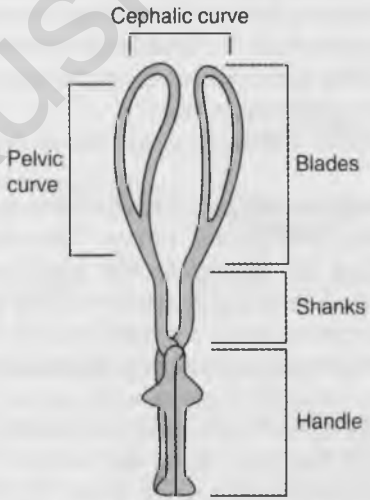


Fig. 6.3: Parts of forceps

which is fenestrated. Fenestrated gradually tapered blades: 18 cm long, shallow cephalic curve, distance between toes 2.5 cm.

2. *Shanks*: The shanks connect the blades to the handles and provide the length of the device. They are either parallel or crossing (6.5 cm or 2½ inches).
3. *Lock or Joint:* The lock is the articulation between the shanks. Many different types have been designed (Fig. 6.4).

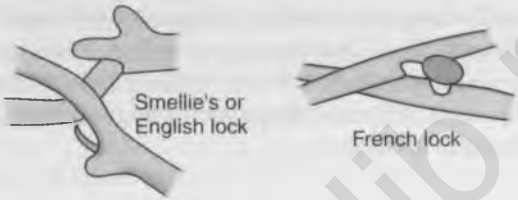


Fig. 6.4: Types of lock

4. *Handles:* The handles are where the operator holds the device and applies traction to the fetal head (12.5 cm or 5 inches).

How to identify the blades: When articulated, place the instrument in front of pelvis with the tip of blades pointing upwards and concave side of the pelvic curve forwards. The blade which corresponds to the left of maternal pelvis is left blade and that to the right side is the right blade when isolated:

1. The tip should point upwards
2. The cephalic curve is to be directed inwards and pelvic curve forwards.

Most of the modern obstetric forceps have two curves—fetal or cephalic curve and pelvic curve. The cephalic curve is designed to adapt the blades to the fetal head. The pelvic curvature corresponds to the curvature of the pelvic canal and it enables the forceps to obtain a central grip of the head without changing its attitude during traction. Kielland's forceps, being an exception, is a straight forceps without any pelvic curve.

The latest modification is an axis traction attachment to allow the application of traction along the axis of the pelvis. The ordinary forceps, however, can be used to give effective and accurate traction by pajot maneuver, i.e. by forming a fulcrum

between the two hands holding the forceps. The right hand gives traction in forward direction, whereas the left hand gives traction in a backward direction.

Categories

According to the Countries used

There are two specific kinds of obstetrical forceps:

1. *First category*: English forceps or short forceps
2. *Second category*: All American forceps or long forceps

The English forceps are used when the baby's head has descended and has come close to the mother's pelvis. The long forceps are used when the baby is still quite inside the womb and further away from the pelvis. Both long and short forceps are used in various parts of the world. In the United States and United Kingdom, short forceps are more commonly used, whereas in the rest of the world, long forceps are more dominant.

DIFFERENT TYPES OF FORCEPS AND ITS DESCRIPTION

WRIGLEY'S OUTLET FORCEPS

Wrigley's forceps is about 27.5 cm length (Fig. 6.5). It is having English lock and short shank. It is having a marked cephalic curve and slight pelvic curve. It can be used only as outlet forceps for extension of the head.

Fig. 6.5: Wrigley's forceps

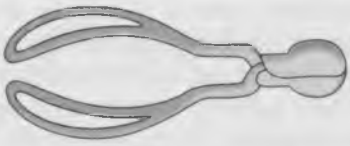


Fig. 6.6: Simpson's short obstetric forceps

SIMPSON'S SHORT OBSTETRICAL FORCEPS

This forceps is about 27.5 cm in length (Fig. 6.6). It has short shank and small handles. As there is no pelvic curve, there is no distinction between right and left branches. It has English lock.

SIMPSON'S LONG OBSTETRICAL FORCEPS

The outlet forceps is about 11 inches (35 cm) long and has cephalic as well as pelvic curvatures. The maximum distance between closed blades is 8.5 cm and the distance between toes is 3.5 cm. It has a shallow cephalic curve with a radius of 11.25 cm and the radius of pelvic curve is 17.5 cm. The shanks are 6.25 cm long, parallel and diverging rapidly from the English lock so that the distention of the maternal perineum is marked. It is used for delivering a fetus with face presentation, direct occipitoposterior presentation and in a case when the mother fails to deliver the baby with head crowning at the introitus. It may also be used in mother with heart disease with a view to cut down second stage of labour (Fig. 6.7).

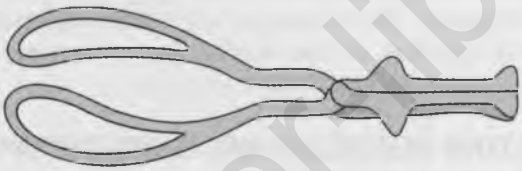


Fig. 6.7: Simpson's long obstetric forceps

KIELLAND'S LONG STRAIGHT FORCEPS

This is a rotational obstetric forceps with a single curvature, viz. cephalic curvature. This forceps is about length 40 cm. The handles is about 12 cm, the shanks measures about 13 cm and that of blades measures about 15 cm respectively. The blades are 4 cm broad, slightly thicker than usual due to beveled edges which achieve a better grip on the fetal head. The shanks are overlapping. There is no lock but the blades are articulated by a slot which permits vertical sliding of the blades, thus enabling to hold an asynchilitic head (Fig. 6.8).

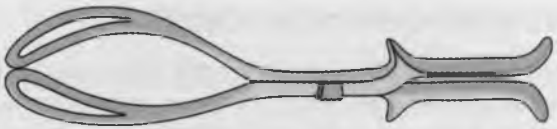


Fig. 6.8: Kielland's long straight forceps

A button on the superior aspect of each handle near the finger grip serves as a marker, indicating the position of the occiput. Solid handles which are cylindrical and curved at end.

It is usually used as rotation forceps in deep transverse arrest of occipitoposterior position of the head. Its main advantages over the long curved obstetric forceps are that it can be used in unrotated vertex or face presentation and that it facilitates grasping and correction of asynchilitic head because of its sliding lock (Fig. 6.9).

Its blades are named anterior and posterior identified as concavity of slight pelvic curve should correspond towards the side where occiput lies. Anterior blade is always introduced first (Fig. 6.10).

Fig. 6.9: Kielland's forceps showing side view with claw lock

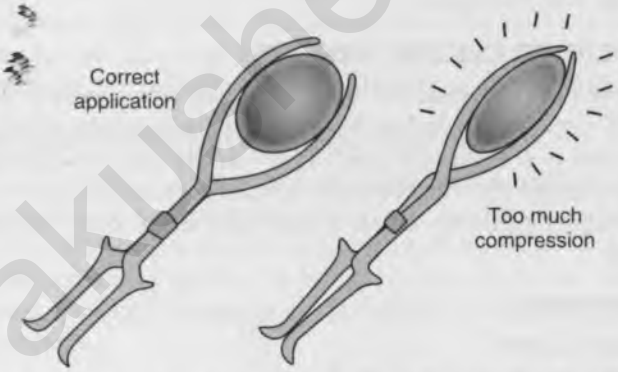


Fig. 6.10: Correct and incorrect application of Kielland's forceps

Indications

1. Occipitoposterior position, deep transverse arrest.
2. Persistent occipitoposterior.
3. Face presentation, rotation of mentoposterior to mento-anterior.

Description

- Weight 500 gm: Light construction.
- Longest forceps: 40 cm long (blade 15 cm, shank 13 cm, handle 12 cm).
- Blades are very thin (2.5 cm), bayonet-shaped blades, i.e. shallow cephalic curve to facilitate rotation.
- Lack of pelvic curve to facilitate application and rotation.
- Beveled inner surface of blades, to minimize fetal head injury.
- Sliding lock to permit application of blades to an asynclitic head.
- It has an anterior and posterior blade and not left and right.

Three Methods of Application

1. Classical (obsolete)
2. Wandering (most popular): Shown in Fig. 6.35
3. Direct: Shown in Fig. 6.34.

Complications

- Rupture of uterus in classical application
- Injury to urethra in direct application
- Spiral tear of vagina.

LONG CURVED OBSTETRIC FORCEPS

The long curved obstetric forceps is relatively heavy and is about 87 cm long. In India Das's variety (named after Sir Kedar Nath Das) is commonly used. It is comparatively lighter and slightly shorter than its Western counterpart, and is quiet suited for the comparatively small pelvis and small baby of Indian women.

Measurements

- Length 37 cm
- Distance between the tips 2.5 cm
- Widest diameter between the blades 9 cm
- Blades are named left or right in relation to the maternal pelvis in which they lie when applied
- Each blade consists of the following parts:
  - Blade
  - Shank – 6.25 cm (2 1/2")
  - Lock
  - Handle with or without screw – 12.5 cm (5").

Fig. 6.11: Das long curved forceps

AXIS TRACTION FORCEPS

It includes axis traction rods (right and left) and handle. The rods are assembled in the blades of long-curved obstetric forceps prior to introduction and lastly the handle is attached to the rods. The devices are required where much force is necessary for traction as in mid forceps operation. These are less commonly used now. This forceps has detachable rods and handles for an axis traction mechanism. The rods fit into the fenestrations of the blade. It also contains a traction handle.

Identification of the Traction Rods: Right or Left?

- Hold the knob pointing inwards and let the rod hang
- Small transverse bar at the bottom is to be directed forwards
- Groove attached to the bar is pointing to the side (in relation to the maternal pelvis) to which the traction rod belongs and accordingly the same is attached to corresponding blade of forceps.

MILNE-MURRAY'S FORCEPS

This forceps has detachable rods and handles for an axis traction mechanism (Fig. 6.12). The rods fit into the fenestrations of the blade in a key hole shaped slot after which the two rods are joined to a transverse bar for applying traction. Traction rods turn away from the handles at the level of the lock, so that the transverse traction handle lies 8.75 cm away from the handle (Fig. 6.13).

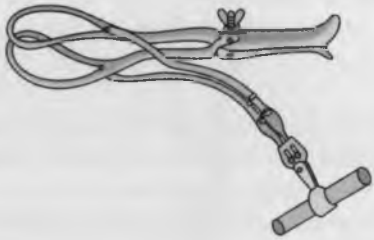


Fig. 6.12: Milne-Murray's forceps with axis traction device

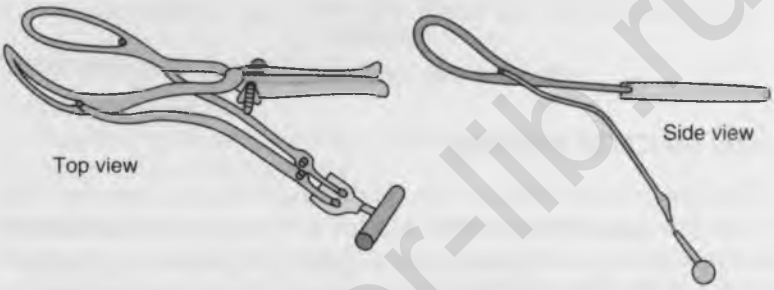


Fig. 6.13: Milne-Murray's forceps showing top and side views

NEVILLE-BARNE'S FORCEPS

This forceps has a traction handle which fits into a bolt hole in the application handle. Traction is being made such that the arrow and the line remain in one line. This forceps is similar to Simpson's long forceps (Fig. 6.14).

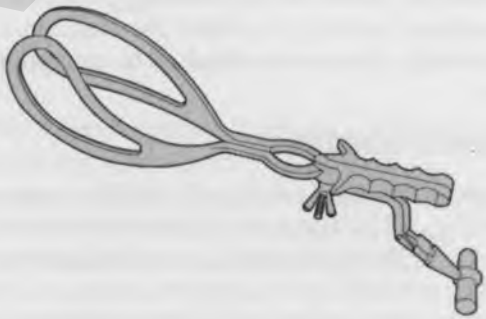


Fig. 6.14: Neville-Barne's forceps

HAIG-FERGUSSON FORCEPS

The traction handle is attached to the shanks by a coupler. Perforation in the edges of the blades was originally meant for passing long tapes for traction. Joints in the handle and the traction rods allow mobility around both horizontal and vertical planes (Fig. 6.15).

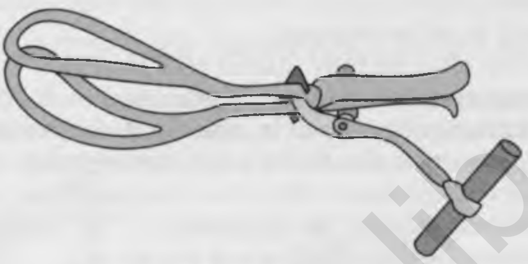


Fig. 6.15: Haig-Fergusson forceps

Indications for Forceps Delivery

The forceps are usually used when there is reason to shorten the second stage or when it is unduly prolonged. The individual indications may be:

1. Faults in the power of uterus
2. Faults in the passages
3. Faults in the passenger
4. *Dangers threatening the mother:* Systemic diseases like pregnancy induced hypertension, eclampsia, decompensated heart disease, etc.
5. Dangers threatening the child
6. Prophylactic application of forceps to shorten second stage.

Contraindications for Forceps Application

- Any contraindication to vaginal delivery
- Refusal of the patient to verbally consent to the procedure
- Cervix not fully dilated or retracted
- Inability to determine the presentation and fetal head position
- Inadequate pelvic size
- Confirmed cephalopelvic disproportion

- Unsuccessful trial of vacuum extraction (relative contraindication)
- Absence of adequate anesthesia/analgesia
- Inadequate facilities and support staff
- Inexperienced operator

Prerequisites

Prerequisites for forceps delivery include the following:

- The head must be engaged.
- The cervix must be fully dilated and effaced.
- The position of the head must be known.
- Clinical assessment of pelvic capacity should be performed. No disproportion should be suspected between the size of the head and the size of the pelvic inlet and mid pelvis.
- The membranes must be ruptured.
- The patient must have adequate analgesia.
- Adequate facilities and supportive elements should be available.
- The bladder must be emptied.
- Presence of good uterine contractions as a safeguard to postpartum hemorrhage.
- The operator should be competent in the use of the instruments and the recognition and management of potential complications. The operator should also know when to stop so as not to force the issue.

Positioning before Forceps Application

Forceps deliveries are most often performed with the parturient in the lithotomy position. Both legs must be placed simultaneously to avoid strain on the woman's back and hips.

The woman should be tilted towards the left at an angle of 15° by the use of a pillow or a rubber wedge under the mattress to prevent aortocaval occlusion.

How to Apply the Forceps?

The most crucial point of forceps delivery is knowledge of the presenting position of the fetus. The term pelvic application is used when the left blade is applied on the left side of the pelvis and the right blade is applied on the right side of the pelvis,

regardless of the fetal position. Pelvic application is never to be used as a substitute for assessing the fetal position; inappropriate pelvic application may cause serious harm.

Forceps delivery is skill-oriented procedure as well as dependent on training. The operator must have a clear understanding and knowledge of his or her own capabilities, as well as the safe limits of the procedure, and must not exceed either of these.

APPLICATION TECHNIQUE (OUTLET FORCEPS DELIVERY)

The pictorial demonstration of a simple outlet forceps delivery for an occipitoanterior position is shown in Figs 6.16 to 6.25.

Fig. 6.16: The left handle of the forceps is held in the left hand (Simpson forceps)

Fig. 6.17: The left blade of the forceps is introduced into the left side of the pelvis

Fig. 6.18: When the left blade is in place, the right blade is introduced by using the right hand

Fig. 6.19: A median or mediolateral episiotomy is performed. A left mediolateral episiotomy is shown here

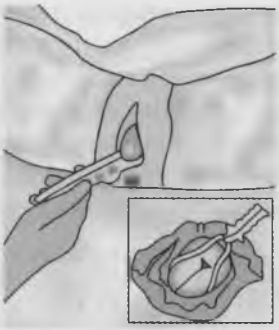


Fig. 6.20: The forceps have been locked. Internal picture shows the left occipitoanterior position

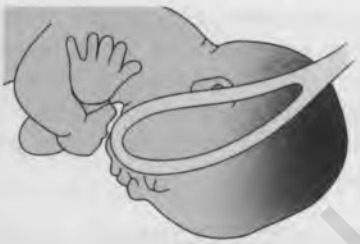


Fig. 6.21: The correct cephalic application is with the head in the occipitoanterior position as shown

Fig. 6.22: Horizontal traction has been given with the operator seated

Fig. 6.23: After horizontal traction, upward traction is been given to deliver the head of the baby

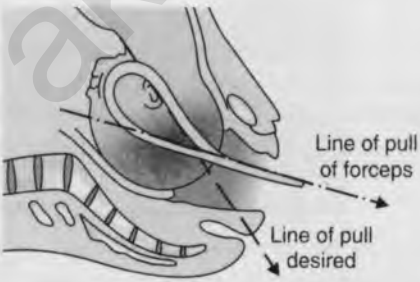


Fig. 6.24: Marking of the line of pull of forceps and the desired line of pull

Fig. 6.25: After delivering the head of the baby, the forceps was unlocked and the blades are removed

APPLICATION TECHNIQUE (MIDFORCEPS DELIVERY)

Fig. 6.26: Liberal episiotomy has been given before starting the procedure

Fig. 6.27: First apply the left blade with hand by protecting the vagina from damage by careless insertion of blade

Fig. 6.28: Next apply the right blade in the same manner as that of the left blade is inserted

Fig. 6.29: After applying both the blades the rods have been locked and handle has been applied

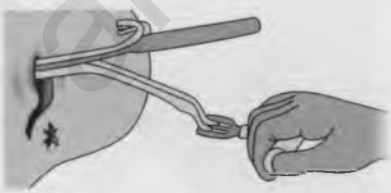


Fig. 6.30: Traction has been applied by keeping the traction rods parallel to the shank

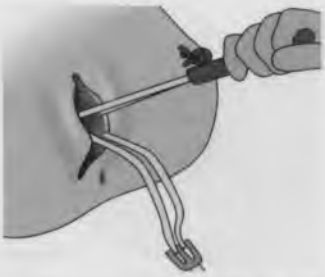


Fig. 6.31: When the head starts to crown, the forceps are held by handles and the head is lifted over the perineum

APPLICATION TECHNIQUE (KEILLAND'S FORCEPS DELIVERY)

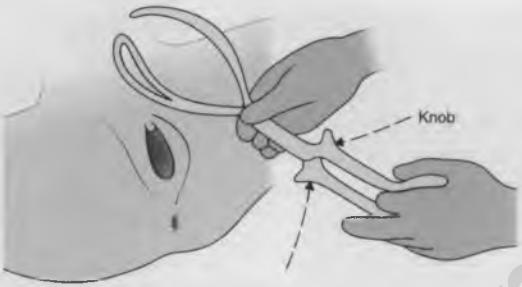


Fig. 6.32: Hold the forceps with the knobs directed towards the fetal occiput

Fig. 6.33: Applied the anterior blade first

Fig. 6.34: The anterior blade is guarded by the finger and slipped into the correct position on the side of the head (the direct method)

Fig. 6.35: The guarded blade is applied laterally (to region of occiput or face) and then gently eased round to lie on top of head (the wandering method)

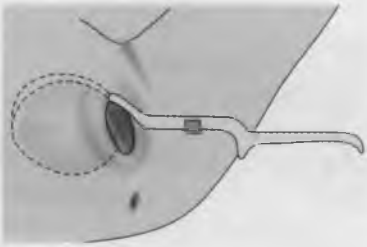


Fig. 6.36: Now it lies with the concavity of the blade applied to left (uppermost) side of the fetal head

Fig. 6.37: The posterior blade is applied directly in the same manner as that of the anterior blade. The guiding hand must be well inside the vagina to prevent injury

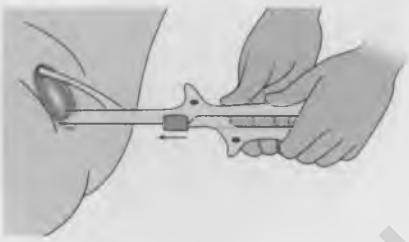


Fig. 6.38: After applying both the blades, the forceps are locked. Note how their position shows asynclitism

Fig. 6.39: Asynclitism is corrected and the blades are opposite to each other

Fig. 6.40: The head is gently rotated to the OA position. Varying asynclitism and gentle traction help to rotate into the pelvic axis

Fig. 6.41: Liberal episiotomy is given

Fig. 6.42: A thumb is kept in between the handles, to prevent over compression of the baby's head

Fig. 6.43: As the head extends, the direction of pull must be altered upwards

OTHER APPLICATIONS OF FORCEPS

Delivery of the Head in the Occipitoposterior Position

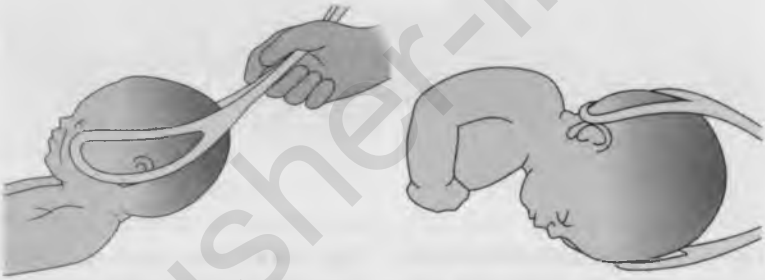


Fig. 6.44: Forceps application in occipitoposterior position

Fig. 6.45: Oblique application of forceps

This is the easiest and often the best method of delivering an infant with the head in the direct occipitoposterior position. If the head is low in the pelvis, it is likely to be deliverable with very little traction and the fetus is spared the risks of manipulation. A large episiotomy is necessary.

Sometimes an oblique grip is obtained by mistake. This is undesirable unless very little traction is needed for delivery.

If the head is transverse it is permissible to apply the forceps laterally, obtaining an anteroposterior application. Manual rotation or by Kielland's forceps is better.

Fig. 6.46: Transverse application of forceps

Fig. 6.47: Delivery of head in breech presentation

Fig. 6.48: Delivery of head in face presentation

In a breech presentation, the safest method of delivering head is by applying the forceps once it has entered the pelvis.

In a face presentation (mentoanterior), the forceps may be applied direct. (Mentoposterior positions must be rotated.)

How to Check for Correct Forceps Application?

1. The sagittal suture lies in the midline of the shanks.
2. The operator cannot place more than a finger tip between the fenestration of the blade and the fetal head.
3. The posterior fontanelle is not more than one finger-breadth above the plane of the shanks.

Traction should be

1. Gentle by the force of the arm only.
2. Intermittent with uterine contractions only.

3. In correct direction, i.e. downwards and backwards till the occiput appears at the vulva, then downwards and forwards.
4. The 2 blades are unlocked between contractions to minimize the period of head compression.

Advantages of Forceps Over Ventouse

1. In suspected pelvic contraction where moderate traction is required.
2. Forceps can expedite delivery in case of fetal distress where ventouse takes longer time.
3. Forceps is safer in premature delivery where fetal head remains inside protective cage.
4. Forceps can be applied in anterior face and aftercoming head of breech.
5. Cephalhematoma is less compared to ventouse.
6. Simplicity of instrument, less costly and handy.
7. Less failure rate compared to ventouse.

Difficulties in Forceps Application

The difficulties are mainly due to faulty assessment before the operative delivery is undertaken. However, there is hardly any difficulty with low forceps application.

Difficulties in the application of blades are caused by incompletely dilated cervix and unrotated or non-engaged head. Difficulty in locking is caused by:

1. Application on unrotated head.
2. Improper insertion of the blade.
3. Failure to depress the handle against the perineum.
4. Entanglement of the cord or fetal parts inside the blades.

Failed Forceps

When a deliberate attempt in vaginal delivery with forceps has failed to expedite the process, it is called failed forceps.

Causes

1. Cephalopelvic disproportion
2. Contracted outlet

3. Incomplete cervical dilatation
4. Constriction ring
5. Head is not engaged
6. Malpositions as persistent occipitoposterior
7. Malpresentations as brow
8. Fetal congenital anomalies as hydocephalus, ascitis and conjoined twins.

Management

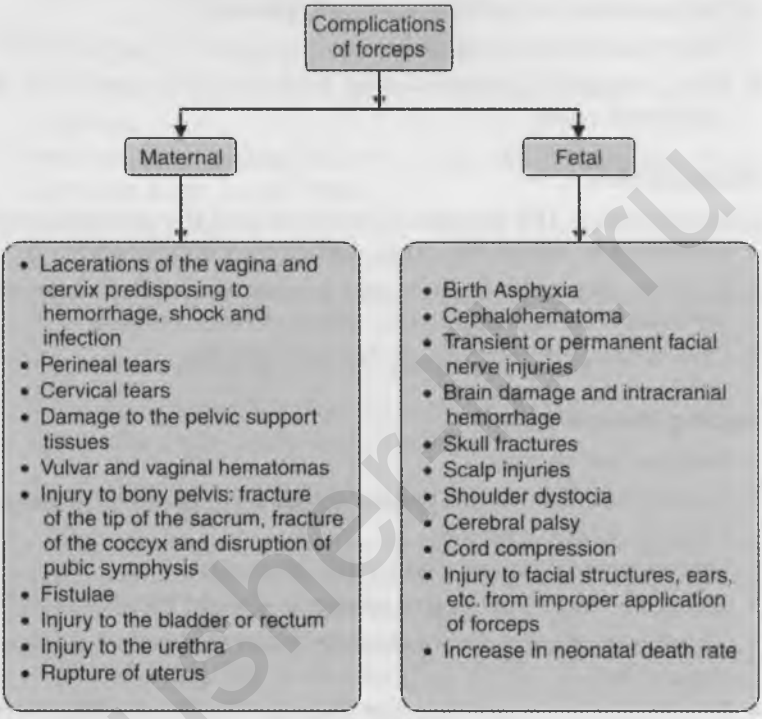
1. *Reassessment*: The forceps is removed and the patient is re-examined to detect the cause and correct it if possible.
2. *Cesarean section*: It is indicated in uncorrectable causes as cephalopelvic disproportion, and contracted outlet.
3. *Exploration of the birth canal*: For any injuries.

Nursing Interventions

- Prepare the woman.
- Full explanation of the procedure and the need for it must be given to the woman.
- Obtain forceps designated by the physician.
- Adequate and appropriate analgesia should be given.
- Check, report, and record the fetal heart rate before forceps are applied.
- Inform the woman that the forceps blades fit like two tablespoons around an egg. The blades come over the fetus ears.
- Recheck, report, and record the fetal heart rate again before traction is applied after application of the forceps. Compression of the cord between the fetal head and the forceps would cause a drop in fetal heart rate. The physician would then remove and reapply the forceps.
- Give support to the woman.
- Observe for signs and symptoms of complications.
- Assess the newborn for indications of injury.

Complications of Forceps

Flow chart 6.1: Complications of forceps application



7

Vacuum Extractor (Ventouse)

DEFINITION

Vacuum extractor (Fig. 7.1) is an instrumental device which assists in delivery of the baby by applying traction and creating a vacuum between it and the fetal scalp.

Fig. 7.1: Vacuum extractor

Other Name

Vaccum extractor is also termed ventouse. In the United States, the device is referred to as the vacuum extractor, whereas in Europe it is commonly referred to as a ventouse.

History

- **James Young Simpson** invented the first practical vacuum extractor in 1849.
- Simpson experimented with vacuum devices, producing a working delivery instrument in the late 1840s that he successfully employed. However, his interest soon moved to other obstetric issues and his 'air tractor' fell from popular attention.

- The immediate antecedent to modern extractors was the stainless steel cup device, introduced by malmstrom in the late 1950s.
- This device entered the United States practice late in the 1960s; however, because of technical problems with the original design and case reports of severe fetal complications, interest promptly wanned.
- Within the last several years following the introduction of disposable soft-cup extractors and improved rigid cup designs, vacuum extractor has experienced a revival.
- This renewed interest has also led to a more scientific study of vacuum technique, improving both the success and safety of vacuum extractor.

Mechanism of Action

Vacuum extractor is used as an alternative to obstetric forceps in cases where forceps delivery is indicated despite poor uterine contractions. Here traction is applied by an instrument that is made to adhere to the fetal skull by creating a negative pressure or vacuum between it and the fetal skull which helps in the delivery of the baby.

Instrument used

The equipment (Fig. 7.2) consists of the following:

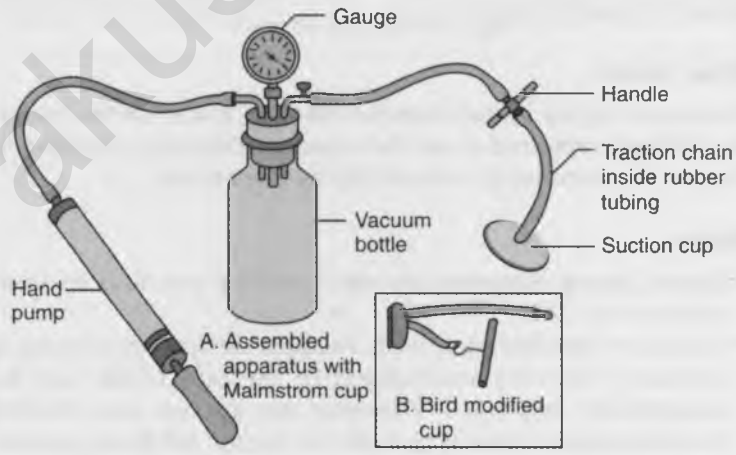


Fig. 7.2: Basic components of the vacuum extractor

1. ***Vacuum pump:*** The vacuum pump used may be hand operated pump or electrical pump.
2. ***Vacuum bottle with a pressure gauge:*** The pressure gauge reads in kg/cm^2. The bottle has an airtight lid with two openings. One opening is connected to the vacuum pump and the other to the traction system. The bottle is kept in a metal stand for support.
3. ***Rubber tubes:*** The rubber tubes are used to connect the vacuum bottle to the pump and the traction handle.
4. ***Traction handle:*** The traction handle is transverse with a tube running through its entire perpendicular to it. It has a screw cap at one end. One end of the central tube is connected to the vacuum pump with a rubber tube. The traction chain passes through this tube and emerges through the other end. The screw cap is removed and a metal pin is passed through the chain after it has been pulled out. Thus the chain is fixed. The screw cap is replaced. The other end of the central tube is connected to the rubber tube from the vacuum bottle.
5. ***Suction cups:*** A vacuum extractor has a suction cup of various sizes that can be attached to the fetal skull. The cup may be made of metal or softer material like silastic. Differences in the shape of the cup aim at achieving better line of traction with less chances of the cup slipping off the fetal head.

Types of Suction Cups

A. **Malmstrom's cup:** It is flattened hemisphere whose margins are incurved so that marginal diameter is smaller than the greatest diameter at the center of the cup. Thus when applied, it forms an artificial caput (called by Rosa in 1955 as 'Chignon') thus formed fills the entire cup does not slip

Fig. 7.3: Malmstrom's cup

out. In French, chignon means large coil or bun. The instrument is made of stainless steel. The cup is available in 4 sizes: 30, 40, 50 and 60 mm in diameter. The depth of the cup is 20 mm. The center of the cup has a 16 mm long tube attached to it communicating with the cavity of the cup. A 15 to 30 cm long rubber tube is attached to it. A flat metal plate with 6 crenellations in its margins lies at the apex of the cup so as to prevent it from making an air tight seal. A chain is attached to it. It passes through the metal and rubber tube to the traction bar, to which it is fixed by means of a metal pin. A small knob is present on the outer surface of the cup, to be used to indicate the position of the occiput.

B. Bird's anterior and posterior cup

a. *Anterior cup:* The cup is similar to the Malmstrom cup, except that the 16 mm long metal tube is placed eccentrically and a hook is placed in the center, to which a chain is attached for making traction. It can be assembled with great ease. The traction chain and the vacuum tube are separate and thus can be adjusted independent of each other. The cup is available in 3 sizes: 40, 50 and 60 mm in diameter. The cup is useful for occipitoanterior positions of the fetal head.

b. *Posterior cup*: The cup is similar to Bird's anterior cup, except that the metal tube for vacuum is shifted to the side for occipitotransverse and occipitoposterior positions of fetal head.

Fig. 7.4: Bird's anterior and posterior suction cup

C. **Silastic vacuum cup:** Now silastic vacuum cup is also available. These cups are made up of silastic instead of metal and are pliable, softer and safer. It is flexible so that it can be inserted into the vagina with ease. However, it is rigid enough to maintain its shape on creation of vacuum and during traction. It is less traumatic to the fetal head than a metal cup. They are used more commonly in modern obstetric practice.

Fig. 7.5: Silastic vacuum cup

Disposable Vacuum Extractor

This device consists of a funnel-shaped soft cup, a flange connection, traction handle, and a pressure release valve. The cup has rounded edges, interior ribbing and unlike the metal cup is devoid of a mushroom flange.

Fig. 7.6: Disposable vacuum extractor

It is a one piece design and occupies less space. Major disadvantage is that it detaches more frequently during traction. It builds pressure quickly in 1 or 2 minutes and is very handy and transportable.

Advantages

1. It can be applied even when the cervix is not fully dilated.
2. It causes much less injury to the fetal skull.
3. Injury caused to the vaginal wall is minimal.
4. It can be used in affecting rotation of an unrotated head, as in occipitoposterior positions.

Advantages of Ventouse Over Forceps

1. It can be used in unrotated and malrotated occipito-posterior position of head.
2. It can be applied even through incompletely dilated cervix (1st stage of labor).
3. It is not a space occupying device like forceps.
4. Lesser traction force is needed (10 kg vs. 13–18 kg in forceps).
5. It can be used even when head is at high level and exact position is unknown.
6. It is comfortable and injuries to the mother are less.
7. Fetal complications are less.
8. Requires less technical skill.
9. Application is easy with relative disregard for fetal position.
10. Rotation occurs by itself as the head descends with traction. Thus complicated rotation maneuvers are dispensed with.
11. Since there are no manipulations in the lower segment, anesthesia in the form of pudendal block with perineal infiltration is sufficient and it is not necessary to give a regional block or general anesthesia as would be required with midforceps operations.

Note: Vacuum is an excellent alternative to midforceps, but not to low forceps operations.

Indications/Uses

a. *Obstetrical uses:* It is used in the operation of vacuum extraction of the head.

- Disordered uterine activity: For maternal distress or non-progress of labor, to deliver the second of twins if the cervix starts closing down.
- Fetal distress
- Cord prolapse
- Maternal disease: Heart disease, respiratory insufficiency, previous subarachnoid hemorrhage, myasthenia gravis, paraplegia, severe myopia, maternal nervousness, etc.
- Obstetric complications: Occipitoposterior or occipito-transverse arrest, pregnancy-induced hypertension, placenta previa degrees I and II, abruption placenta, minor cephalopelvic disproportion, elderly primigravida, symphysiotomy to guide the fetal head away from the vulnerable bladder neck, previous scars on the uterus, etc.
- Women who have undergone psychoprophylactic preparation for childbirth may prefer vacuum to forceps because it allows them to assist their own delivery.
- It may be used during cesarean section to deliver the fetal head.

b. *Gynecological uses*: To manipulate and deliver large ovarian cysts without enlarging abnormal incision: Cysts cup may be used.

Absolute Contraindications

1. Operative inexperience.
2. Major degree of pelvic contraction.
3. Any presentation other than vertex.
4. Any other form of insuperable obstruction to vaginal delivery.
5. Preterm fetus (< 34 weeks), chance of scalp avulsion or sub-aponeurotic hemorrhage.
6. Suspected fetal coagulation disorder.
7. Suspected fetal macrosomia (> 4 kg).
8. Recent scalp blood sampling.
9. Conditions in which bearing down should be avoided:
   - Cardiac failure
   - Severe pregnancy—induced hypertension
   - Eclampsia, etc.
10. Intrauterine fetal death.
11. Congenital anomalies in the fetus.

Relative Contraindications

1. Unfavorable attitude of fetal head
2. Rotation > 45° from occiput anterior or occiput posterior (vacuum).
3. Midpelvic station.

Conditions to be Fulfilled

- Pelvis is deemed adequate
- Informed consent must be obtained
- Appropriate analgesia is in place
- Maternal bladder has been emptied
- There should not be any slightest bony resistance below the head
- The head of the singleton baby should be engaged
- Exact position of the head can be determined, so proper placement of the instrument can be achieved
- Cervix should be at least 6 cm dilated
- Adequate facilities and back up personnel are available
- Operator must have the knowledge, experience, and skill necessary to use the instruments and manage complications that may arise
- Back up plan.

Application

1. Review for conditions—vertex presentation, term fetus, cervix fully dilated and head at least at 0 station or no more than 2/5 above symphysis pubis.

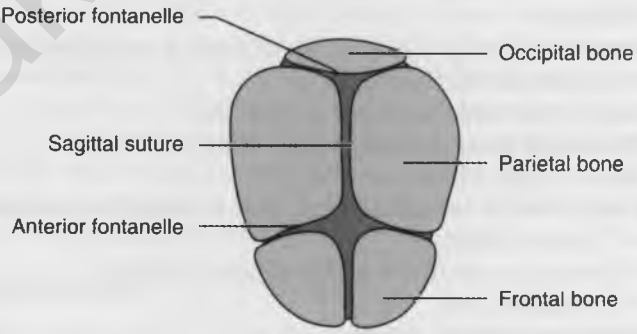


Fig. 7.7: Landmarks of the fetal skull

2. The woman is put in lithotomy position. The bladder is catheterized and emptied.
3. Bilateral pudendal block with perineal infiltration is given.
4. Check all connections and test the vacuum on a gloved hand.
5. Provide emotional support and encouragement. If necessary, use a pudendal block.
6. Assess the position of the fetal head by feeling the sagittal suture line and the fontanelles.
7. Identify the posterior fontanelle.
8. Apply the largest cup that will fit, with the center of the cup over the flexion point, 1 cm anterior to the posterior fontanelle. This placement will promote flexion, descent and autorotation with traction.

Fig. 7.8: Applying the Malmstrom cup

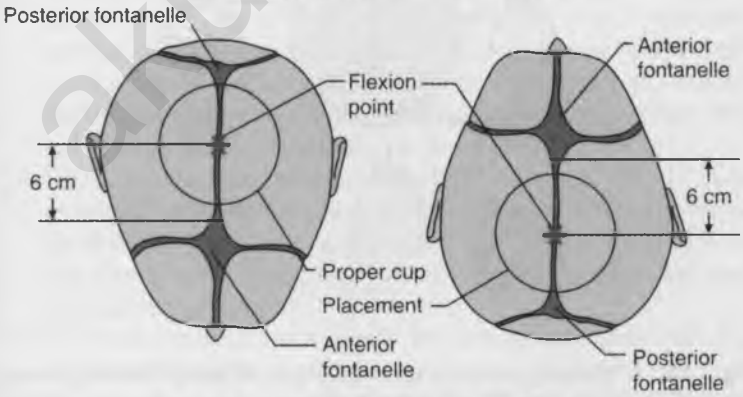


Fig. 7.9: Correct sites of cup placement

Figs 7.10 and 7.11: Chignon produced by rigid-cup vacuum extractor

9. The cup is to be fitted to the scalp of the forecoming head by producing 'Chignon' with the help of vacuum.
10. An episiotomy may be needed for proper placement at this time. If an episiotomy is not necessary for placement, delay the episiotomy until the head stretches the perineum or the perineum interferes with the axis of traction. This will avoid unnecessary blood loss.

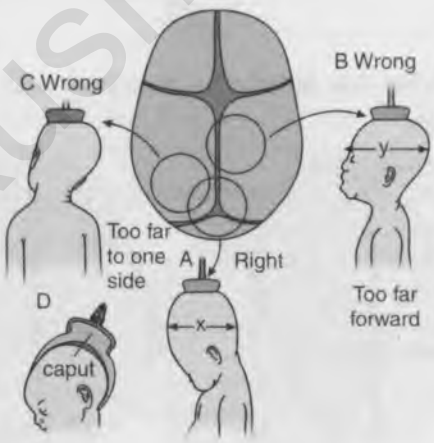


Fig. 7.12: "A" showing correct placement of cup, "B and C" showing wrong placement of cup and "D" showing that how to leave the cup on long enough for caput to be formed inside it before starting to pull

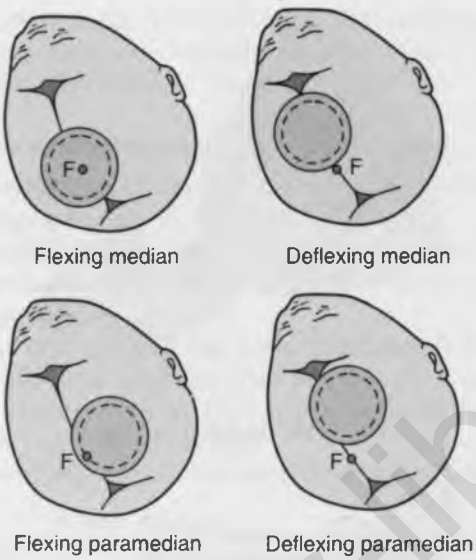


Fig. 7.13: Incorrect sites of cup placement

11. Check the application. Ensure there is no maternal soft tissue (cervix or vagina) within the rim.
12. With the pump, create a vacuum of 0.2 kg/cm^2 negative pressure and check the application.
13. Increase the vacuum to 0.8 kg/cm^2 and check the application.
14. After maximum negative pressure, start traction in the line of the pelvic axis and perpendicular to the cup. If the fetal head is tilted to one side or not flexed well, traction should be directed in a line that will try to correct the tilt or deflexion of the head (i.e. to one side or the other, not necessarily in the midline).
15. With each contraction, apply traction in a line perpendicular to the plane of the cup rim. Wearing high-level disinfected gloves, place a finger on the scalp next to the cup during traction to assess potential slippage and descent of the vertex.
16. Between contractions check the fetal heart rate and the application of the cup.
17. The cup is maintained in firm contact with the fetal head by means of pressure with two fingers both in between

Fig. 7.14: Applying traction

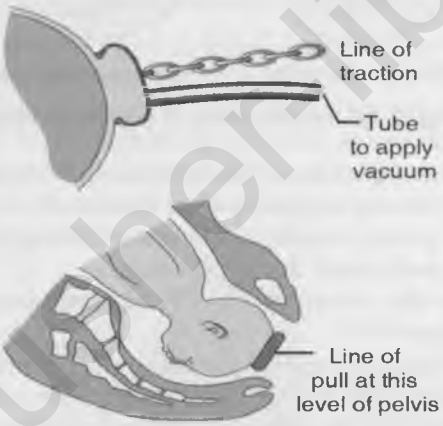


Fig. 7.15: Line of traction and line of pull

and during contractions. Traction is made during a uterine contraction along the curve of carus. Detachment does not occur if the traction force is less than 20 kg. Oblique traction is more likely to dislodge the cup than a perpendicular traction.

18. The vacuum should be released as soon as the head is delivered, and the cup is slowly eased off the chignon and removed.
19. It is essential that the woman bears down during vacuum extraction as the traction force is not sufficient to extract

the fetus by itself. If the cup slips, it may be reapplied over the same chignon. However, more than 2 applications should not be done.

Safety Rules while Applying Vacuum Extractor

- Never use the cup to actively rotate the baby's head. Rotation of the baby's head will occur with traction.
- The first pulls help to find the proper direction for pulling.
- Delivery or almost complete delivery should occur with no more than 3 pulls.
- The head and not just the scalp must begin to move with first traction and advance with subsequent tractions.
- In midcavity extractions, the head must be on the pelvic floor by the end of the second pull.
- Do not continue to pull between contractions and expulsive efforts.
- With progress, and in the absence of fetal distress, continue the "guiding" pulls for a maximum of 30 minutes.
- If any of these conditions is not satisfied, the procedure is abandoned.

Failure

Vacuum extraction fails if:

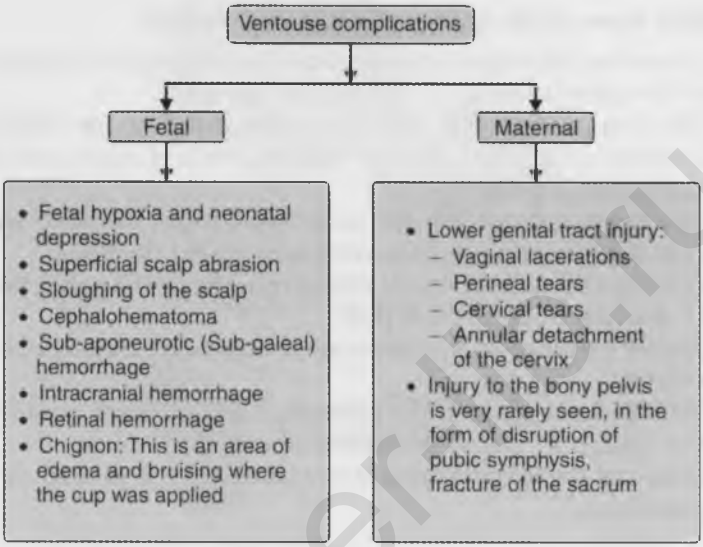
- The head does not advance with each pull.
- The fetus is undelivered after three pulls with no descent, or after 30 minutes.
- The cup slips off the head twice at the proper direction of pull with a maximum negative pressure.
- Every application should be considered a trial of vacuum extraction. Do not persist if there is no descent with every pull.
- If vacuum extraction fails, use vacuum extraction in combination with symphysiotomy or perform cesarean section.

Postoperative Nursing Interventions

- Care of episiotomy.
- Watch for and treat complications as they arise in the woman and the newborn.

Complications

Flow chart 7.1: Complications of ventouse application



Role of Midwife

Vacuum extraction is a midwife assisted procedure and not the nursing procedure. The role of midwife in this instrument application is proper maintenance of the woman's health, continuous monitoring of the maternal and fetal condition, assisting in the delivery of the baby along with the obstetrician, care of episiotomy and the prevention and treatment of complications due to the instrument application.

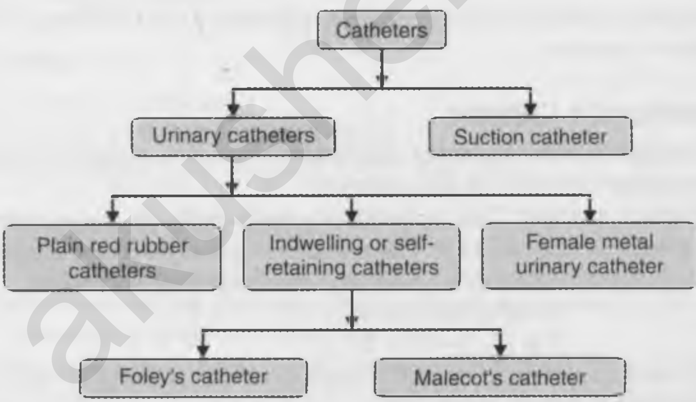
8

Catheters

DEFINITION

A catheter is a tube that can be inserted into a body cavity, duct or vessel, thereby it allows drainage or injection of fluids or access by surgical instruments. The process of inserting a catheter is catheterization. Classification of cathters is given in flow chart 8.1.

Flow chart 8.1: Classification of catheters



URINARY CATHETERS

Plain red rubber catheter

Indwelling or self-retaining catheter:

Foley's catheter

Malecot's catheter

Female metal urinary catheter

PLAIN RED RUBBER CATHETER

Fig. 8.1: Plain red rubber catheter

Definition

It is a non self-retaining, Indian rubber, radiopaque (due to lead oxide) catheter used for giving bladder wash, enema, bowel wash and to drain the urine in case of acute retention of urine (Fig. 8.1).

Other Name

It is also called simple red rubber catheter or non self-retaining rubber catheter.

Gauzing of a Catheter

1. *English system:* External diameter = E/2 + 1, where E is the number written on the catheter.
2. *French system:* The number corresponds to the circumference of the catheter. The relationship between the English and French system is given by the following formulas:
   $$F = (E/2 + 1) \times 3$$
   $$E = (F/3 - 1) \times 2$$
3. *American system:* External diameter of the catheter is half the number of the catheter.

Uses

1. Before any pelvic examination, if the woman is not able to evacuate her bladder satisfactorily (except for examining a woman with stress urinary incontinence).
2. For evacuation of bladder when self-retaining catheter is not required or kept.

3. To measure the amount of residual urine.
4. To relieve the acute retention of urine.
5. To collect urine sample for culture sensitivity in case of chronic UTI.
6. To do three swab tests in case of urinary fistula.
7. To do cystourethrography.
8. As a rubber tourniquet during myomectomy operation for hemostatic purpose in case of Bonney's myomectomy clamp.
9. Retention of urine when woman is in labor.
10. Prior to instrumental delivery (forceps, ventouse delivery).
11. Prior to pelvic surgery, obstetric or gynecological surgery.
12. To evacuate bladder in case of atonic PPH.
13. *Induction of second trimester abortion:* Multiple catheters were passed into the extraovular space. This is not done any more in modern obstetrics.
14. *To replace prolapsed umbilical cord:* The cord was repositted by gently typing it to the tip of the catheter. This is not done in modern obstetrics.
15. Enema catheter.

Modified uses

1. As suction catheter.
2. As nasal catheter to give oxygen.
3. As tourniquet for drawing blood samples.

How to Introduce a Catheter?

- Take a verbal consent after properly explaining the procedure to the woman and gaining confidence.
- Woman is placed in dorsal position.
- The vulva is swabbed with antiseptic solution from before backwards. The labia are held apart and the urethral meatus is swabbed similarly.
- Strict asepsis and antiseptic technique is maintained.
- Lubricate the catheter at the tip by immersing in lubricating jelly such as lignocaine jelly or liquid paraffin.
- With left index finger and thumb, labia minora is separated and external urethral meatus is identified, catheter is held in right hand and the tip is gently negotiated through the meatus.

- Once the urine comes out through the catheter, the midwife can be sure that the catheter is in place.
- Urine is allowed to drain out. This may be helped by gentle suprapubic pressure.
- The other end of the catheter is placed in a kidney tray.
- After the bladder is empty, the catheter is pinched before it is removed to avoid introduction of air into the bladder.

Difficulty in Passing a Catheter

1. Small external urinary meatus.
2. Stricture of the urethra.
3. Too large catheter.

Sterilization

It is sterilized by cleaning in cold running water with detergent and then boiling/autoclaving/chemical disinfection/or gas sterilization and thus can be reused again.

Complications

a. Infection
b. Catheter fever if the catheter is kept for a few days.
c. Sudden drainage of distended bladder may lead to intravesical hemorrhage.

INDWELLING OR SELF-RETAINING CATHETER

Foley's Catheter

Features

Foley's catheters are flexible usually latex tubes that are passed through the urethra during urinary catheterization and into the bladder to drain urine. They are self-retained by means of a balloon at the tip which is inflated with sterile water. Usually, No.14 or 16 F catheter is used for female catheterization.

Other Name for Foley's Catheter

Foley's catheter can be left in place in the bladder for a period of time. Hence, it is also called an indwelling catheter.

Founder of Foley's Catheter

Foley's catheter was designed by Dr. Frederic Foley, a surgeon who worked in Boston, Massachusetts in the 1930s when he was a medical student.

Parts of a Foley's Catheter

The following are the parts of Foley's catheter (Fig. 8.2):

1. Bladder opening
2. *Balloon or bulb:* The bulb can be inflated with saline or plain water. The capacity of the bulb varies and is usually mentioned in the catheter. The balloons typically come in

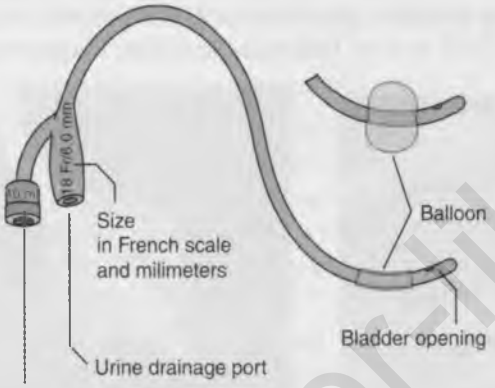


Fig. 8.2: Parts of Foley's catheter

two different sizes: 5 cc and 30 cc (15 to 50 ml). They are commonly made in silicone rubber or natural rubber. Silicon-coated catheters are better tolerated and can be kept in bladder for three weeks while the ordinary one has to be changed after one week.

3. *Size:* The relative size of a Foley's catheter is described using French units (F). The most common sizes are 10 to 28 F.
   1 F is equivalent to 0.33 mm = 0.013 = 1/77 of diameter.
   Thus, the size in French units is roughly equal to the circumference of the catheter in millimeters.
   As per this French scale:

$$\text{The diameter of catheter in mm} = \frac{\text{Cather number}}{3}$$

4. *Channels:* Foley's catheters have two channels. Small channel is for sub terminal balloon inflation (balloon port) and other big one is for drainage of urine (urine drainage port).

Sub-types of Foley's Catheters

Foley's catheters come in several sub-types:

- *Coude catheters:* Coude catheters (Fig. 8.3) have a 45° bend at the tip to allow easier passage through an enlarged prostate.
- *Council tip catheters:* These catheters have a small hold at the tip which allows them to be passes over a wire (Fig. 8.4).
- *Three-way catheters:* Three-way catheters (Fig. 8.5) are used primarily after bladder, prostate cancer or prostate surgery. They have a third arm or bell that allows an irrigant to pass

Fig. 8.3: Coude catheters

Fig. 8.4: Council tip catheters

to the tip of the catheter through a small separate channel into the bladder. This serves to wash away blood and small clots through the primary arm that drains into a collection device. This prevents larger clots, which might plug the catheter, from forming. The second or inflation arm has a small plastic valve that allows for the introduction or removal of sterile water through a very small channel to inflate or deflate the retaining balloon.

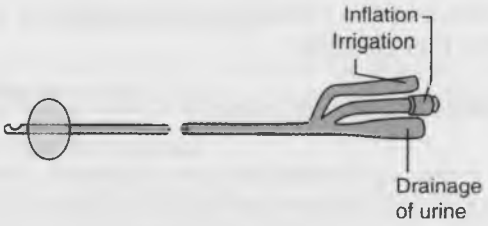


Fig. 8.5: Three-way catheters

Uses

Uses in gynecology

1. Following gynecological operations:
   - Simple cystocele-rectocele repair: 48–72 hours
   - Manchester's operation: 48–72 hours
   - Vaginal hysterectomy with repair: 48–72 hours
   - Stress urinary incontinence: 5–7 days
   - VVF repair: 14–21 days
   - Werthiem's hysterectomy: 14 days
   - Vaginoplasty: 7–14 days
   - Other surgical operations: 7–10 days
   - Le Fort's repair: 3 days
2. Retention of urine due to impacted mass in pelvis like ovarian tumor and fibroid.
3. Incontinence of urine.
4. During Kelly's operation, bulb of catheter defines the bladder neck where stitches are taken.
5. Pediatric Foley's catheter may be used intrauterine
   - To control bleeding after hysteroscopic surgery
   - To prevent recurrence of adhesions after treatment of Asherman's syndrome.
   - HSG
   - For sonography and sonosalpingography.
6. For retrograde filling of bladder in suspected bladder injury during major surgeries.
7. For treatment of Asherman's syndrome.
8. Before removal of the catheter, it is clamped and released every 2 hours for 24 hours. The residual urine is measured after removal of catheter and if in the end, it is more than 50 ml, catheter is reinserted.

Uses in obstetrics

1. Retention of urine in case of retroverted gravid uterus.
2. Mid-trimester MTP for extra-amniotic instillation of hypertonic saline, ethacridine lactate.
3. Cesarean section, obstetric hysterectomy for post-operative drainage of urine for 12–24 hours.

4. Obstructed labor, to prevent formation of VVF.
5. To monitor urine output in:
   - *Eclampsia:* Woman is given magnesium sulfate and to drain the bladder if the woman is unconscious or sedated.
   - Abruption placenta
   - Obstetric shock due to APH, PPH, ectopic pregnancy and rupture uterus.
   - Severe PIH.
6. Repair of paraurethral tears
7. If vagina is packed after delivery to control bleeding, catheterization is done.
8. Postoperatively in symphysiotomy for 3 days.
9. *Ripening of cervix for induction of labor:* The catheter is inserted behind the cervical wall and inflated with 30 cc of normal saline. The remaining length of the catheter is gently pulled and taped to the inside of the woman's leg. The inflated balloon applies pressure to the cervix, like the baby's head would prior to labor, causing it to dilate. Over time the catheter is adjusted and retaped to maintain pressure on the cervix. When the cervix has dilated sufficiently, the catheter simply drops out.
10. *Cord prolapse:* If the fetus is alive, the bladder is inflated with 500 ml of normal saline using a Foley's catheter to displace the presenting part up and relieve cord compression.

Contraindications

1. *Urethral trauma:* Urethral injuries may occur in women with multisystem injuries and pelvic fractures, as well as straddle impacts. If this is suspected, one must perform a genital and rectal exam first. If one finds blood at the meatus of the urethra or a pelvic fracture, then a high suspicion of urethral tear is present.

Sterilization Method

It is sterilized by exposure to gamma radiation.

Principles to be followed

- Strict asepsis and antisepsis
- Smallest size of the catheters
- Gentle manipulation
- Slow decompression
- Closed drainage system
- Proper catheter care

How to Insert Foley's Catheter?

Pre-preparation

- Keep the genital area clean.
- Change to loose-fitting cotton clothing.
- Do not use chemical irritants in the genital area prior to having the catheter inserted.

Procedure

1. Gather equipment.
2. Explain procedure to the woman and ensure privacy and good lighting.
3. Assist woman into supine position with legs spread and feet together.
4. Open catheterization kit and catheter.
5. Wash hands, remove outer tray wrapper and put on sterile gloves before opening the sterile inner packet.
6. Prepare a sterile field and place a specimen collection vessel between the woman's legs.
7. Check balloon for patency.
8. Apply sterile drape (Fig. 8.6).

Fig. 8.6: Applying the sterile drape on the woman

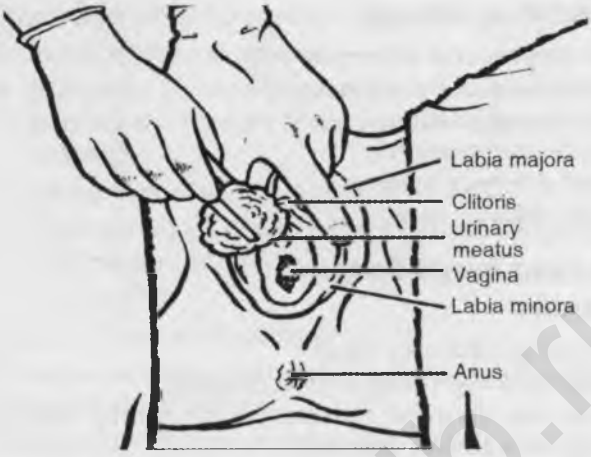


Fig. 8.7: Cleansing the labia from inward to outward direction

9. Cleanse the labia according to established guidelines (Fig. 8.7).
10. If an anesthetic lubricating gel is used, instill approximately 0.16 fl oz (5 ml) of 2% lignocaine hydrochloride gel into the urethra or apply the gel to the meatus to achieve surface anesthesia within three to five minutes (Fig. 8.8).
11. Separate labia using non-dominant hand. Maintain hand position until preparing to inflate balloon.
12. Using dominant hand-to-handle forceps, cleanse periurethral mucosa with cleansing solution. Cleanse anterior to posterior, inner to outer, one swipe per swab, discard swab away from sterile field.

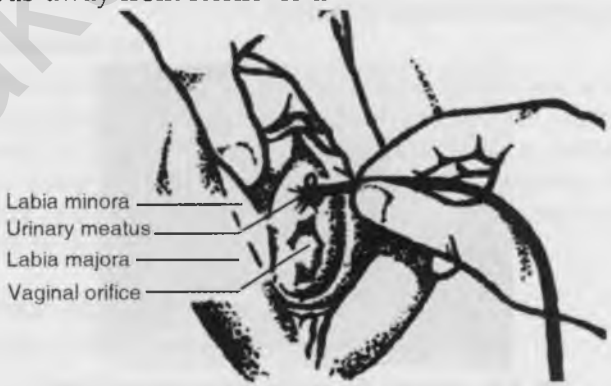


Fig. 8.8: Inserting the tip of the catheter into the urinary meatus

Fig. 8.9: Inflating the balloon using sterile water

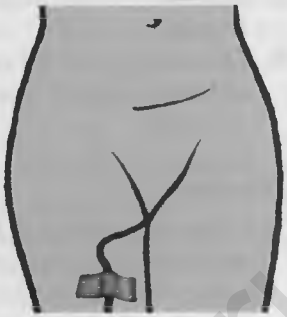


Fig. 8.10: Securing the catheter on the thighs

13. Pick up catheter with gloved (and still sterile) dominant hand. Hold end of catheter loosely coiled in palm of dominant hand.
14. Identify the urinary meatus and gently insert until 1 to 2 inches beyond where urine is noted.
15. Inflate balloon, using correct amount of sterile liquid (usually 10 cc but check actual 14 balloon size) (Fig. 8.9).
16. Gently pull catheter until inflation balloon is snug against bladder neck.
17. Connect catheter to drainage system.
18. Secure catheter to abdomen or thigh, without tension on tubing (Fig. 8.10).
19. Place drainage bag below level of bladder (Fig. 8.11).
20. Evaluate catheter function and amount, color, odor, and quality of urine.

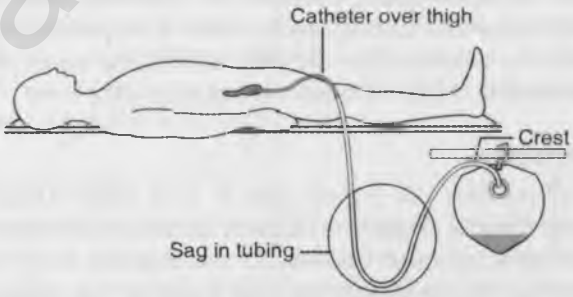


Fig. 8.11: Way of placing the drainage bag

21. Remove gloves, dispose of equipment appropriately, wash hands.
22. Document size of catheter inserted, amount of water in balloon, woman's response to procedure, and assessment of urine.

Aftercare

- Continuous drainage into a sterile plastic disposable bag.
- Application of povidone iodine cream to the portion of the catheter that lies in the distal urethra. This is done by making gentle traction on the catheter, and applying the cream to the portion that gets drawn out.
- Nitrofurantoin for the duration of catheterization.
- Bladder wash periodically if the urine drained is turbid or shows the presence of deposits.
- Cessation of drainage must be watched for and the catheter should be changed if the block cannot be removed by flushing.
- Woman using intermittent catheterization to manage incontinence may require a period of adjustment as they try to establish a catheterization schedule that is adequate for their normal fluid intake.
- Antibiotics should not be prescribed as a preventative measure for woman at risk for urinary tract infections. Prophylactic use of antibacterial agents may lead to the development of drug-resistant bacteria. Woman who practice intermittent self-catheterization can reduce their risks for UTI by using antiseptic techniques for insertion and catheter care.
- Attach the indwelling catheter to the drainage system, slightly curve the tubing, and anchor it to prevent urethral traction. In women, the catheter should be secured to the anteromedial thigh with non-allergenic adhesive.

Disadvantages

- *The balloon does not inflate after it is in place:* Usually the midwife should check the balloon inflation before inserting the catheter into the urethra. If the balloon still does not inflate after its placement into the bladder, the midwife has to insert another Foley's catheter.

- *Urine stops flowing into the bag:* The midwife will check for correct positioning of the catheter and bag or for obstruction of urine flow within the catheter tube.
- *Urine flow is blocked:* The midwife has to change the bag or the Foley's catheter or both.
- *Urethral bleeding:* The midwife has to monitor the bleeding.
- *Infection:* The Foley's catheter may introduce an infection into the bladder. The risk of infection in the urine increases with the number of days the catheter is in place.
- If the balloon is opened before the Foley's catheter is completely inserted into the bladder, bleeding, damage and even rupture of the urethra can occur. In some individuals, long-term permanent scarring and strictures of the urethra could occur.

Side Effects

- Any pink or red urine or bleeding from the urethra.
- Symptoms are not rectified.
- Symptoms of infection such as:
  - Burning sensation upon urination
  - Urgency and frequency
  - Increased lower abdominal pain
  - Fever
  - Foul-smelling discharge coming from the urethra or in the genital area
  - Redness or swelling in the genital area
  - Pain in the urethral area or genital area.

If the woman is sent home with a Foley's catheter and a leg bag, she may develop urinary retention (inability to urinate). The catheter should not be left in place for long period of time because this can lead to urinary tract infections, narrowing of the urethra, bladder stones, recurring bladder spasm, and abscesses along the urethra.

How to Remove?

Before removal of the catheter, it is clamped and released every 2 hours for 24 hours. The residual urine is measured after removal of the catheter and if it is more than 50 ml, the catheter is reinserted.

- Locate the inflation port on the catheter's side and attach a small syringe.
- Draw out the fluid using syringe until no more fluid can be drawn.
- Remove the catheter slowly by gently pulling it out completely.
- Cut the balloon port tubing, using surgical scissors, as a second alternative to remove the catheter. Wait for all the fluid to drain before slowly pulling out the catheter.
- Advance the catheter to make sure it is in the bladder.
- Cut the balloon port at the inflation valve to remove the valve, allowing fluid to drain. If fluid does not drain, there likely is an obstruction at the balloon's entrance or along the length of the catheter.
- Lubricate a fine-gauge guide wire and then pass it through the inflammation channel. Fluid should drain along the wire.
- Pass a 22-gauge central venous catheter over the guide wire if the fluid still has not drained. Remove the wire when the catheter tip is in the balloon and it should drain.
- Dissolve the balloon using mineral oil if fluid still has not drained. Inject 10 ml of mineral oil with a small syringe through the inflation port. Within 15 minutes, the balloon should dissolve.
- Inject an additional 10 ml of mineral oil if, after 15 minutes, the balloon has not drained.

Nursing Care of the Catheter

Everyday care of catheter and drainage bag is important to reduce the risk of infection. Such precautions include:

- Cleansing the urethral area (area where catheter exits body) and the catheter itself.
- Disconnecting drainage bag from catheter only with clean hands.
- Disconnecting drainage bag as seldom as possible.
- Keeping drainage bag connector as clean as possible and cleansing the drainage bag periodically.
- Use of a thin catheter where possible to reduce risk of harming the urethra during insertion.
- Drinking sufficient liquid to produce at least two liters of urine daily.

- Sexual activity is very high risk for urinary infections, especially for catheterized woman.
- Make sure that urine is flowing out of the catheter into the urine collection bag. Make sure that the catheter tubing does not get twisted or kinked.
- Keep the urine collection bag below the level of the bladder.
- Make sure that the urine collection bag does not drag and pull on the catheter.
- Check for inflammation or signs of infection in the area around the catheter. Signs of infection include pus or irritated, swollen, red, or tender skin.
- Clean the area around the catheter twice a day using soap and water. Dry with a clean towel afterward.
- Do not apply powder or lotion to the skin around the catheter.
- Do not tug or pull on the catheter.

Complications

- Allergy or sensitivity to latex
- Bladder stones
- Blood infections (septicemia)
- Blood in the urine (hematuria)
- Kidney damage (usually only with long-term, indwelling catheter use)
- Urethral injury
- Urinary tract or kidney infections
- Renal inflammation
- Nephrocystolithiasis
- Pyelonephritis if left in for prolonged periods.
- *Short-term complications:* Inability to insert catheter, and causation of tissue trauma during the insertion.
- Trauma and/or introduction of bacteria into the urinary system, leading to infection and, rarely, septicemia.
- Trauma to the urethra and/or bladder from incorrect insertion or removal of the catheter with the balloon inflated. Repeated trauma may cause scaring and/or stricture, or narrowing of the urethra.
- Bypassing of urine around the catheter. Inserting a smaller catheter size can minimize this problem.

- Ischemic damage to the walls of the urethra with the use of large-sized catheter.
- Impaired healing of a repaired vesicovaginal fistula, if the site is near the bladder neck, due to pressure of the balloon of the catheter.
- *Foley's catheter syndrome*: Inadequate duration of drainage and inadequate training of the bladder prior to removal of the catheter may result in disturbed bladder function, leading to chronic retention with frequency and incomplete emptying.

1.2.2 Malecot's Catheter (Self-retaining)

Fig. 8.12: Malecot's catheter

Features

This catheter has a bulging and winged at the tip which makes it self-retaining. It has a flower-like expansion near the tip, the sides of the expansion being split. This bulbous tip can be stretched over an artery forceps, to facilitate its introduction through an opening smaller than its bulbous tip. It is made up of India rubber. The bulging has longitudinal strips with gaps in between the strips. This is not used as a urethral catheter.

Indications/Uses

1. As a self-retaining transurethral catheter: It may be used instead of a Foley's catheter, but the latter is superior and hence Malecot's catheter is not used for this purpose.
2. It can be used as transurethral or suprapubic catheter.
3. It is also used for postoperative drainage of any cavity where any transudation or exudation is expected postoperatively.
4. Drainage of pelvic abscess through posterior colpotomy.

Advantages

- Self-retaining
- Reusable
- Can be easily sterilized.

Method of use

The method of Malecot's catheter insertion is similar to the simple red rubber catheter insertion. Under aseptic and antiseptic precautions, the vulva and the urethral meatus are swabbed with antiseptic solution. The distal end of the catheter is straightened with a special stylet for introduction, which when passed through the catheter reaching the tip straightens out the bulb, so that catheter is readily introduced into the bladder and the stylet is removed. Removal of stylet results in re-expansion of the flower-shaped portion, and the catheter becomes self-retaining. For removal, only traction is required.

Disadvantages

It is more irritant and there are more chances of infection, false passage because of metal introducer and woman may easily pull it out.

Catheter Removal

The removal of this catheter is very simple. One has to just clamp the catheter and then to pull it out gently.

Sterilization

It is sterilized by boiling or autoclaving. Plastic or polyvinyl catheters are usually supplied sterilized by gamma radiation. These are usually disposed off. If reused, they are to be kept immersed in chlorhexidine solution for 20 minutes.

Complications

- Urinary tract infection
- Catheter fever
- Trauma to the urethra during insertion
- Reaction of urethral mucosa to Indian rubber
- Intense urethritis may result, which is avoided with the use of Foley's catheter.
- Detachment of the expanded terminal portion while removing the catheter; this portion needs to be removed by cystoscopy or suprapubic cystotomy.

1.3 FEMALE METAL URINARY CATHETER

Fig. 8.13: Female metal urinary catheter

Features

It is a long metal catheter with a shallow gentle curve near the tip and the stylet inside. There are two eyes near the tip for drainage of urine. Metal catheters should preferably be avoided unless all other catheters have failed to pass definite obstruction in the urethra. It may be used temporarily to relieve acute retention in cases of stricture urethra.

Indications/Uses

1. To empty bladder prior to major vaginal operations.
2. It is used when rubber or plastic catheter cannot be passed.
3. It not only facilitates the operation, but also minimizes injury to bladder.
4. Confirm the diagnosis of Gartner's cyst from cystocele.
5. Commonly used in gynecological procedures such as cystocele repair, vaginal hysterectomy to know the extent of bladder.

Advantages

1. Easily sterilized
2. Can be reused

Disadvantages

1. It is not used in obstetrics to avoid trauma, urethral lacerations and subsequent stricture formation.
2. It can lead to false passage
3. More irritant to the tissues.
4. It cannot be kept in position for more than 48 hours for the danger of ulceration of the urethral mucosa and subsequent stricture formation.

Sterilization

It is sterilized by cleaning in cold running water with detergent and then boiling/autoclaving/chemical disinfection/or gas sterilization and thus can be reused again.

Steps in Introducing Metal Catheter

- All the usual preliminary steps for ordinary catheterization.
- The midwife should preferably stand on the left side of the woman.
- The lubricated tip of the catheter is placed over the external meatus in such a fashion that, its shaft lies parallel to the inguinal ligament.
- The catheter is slowly pushed in and its shaft is rotated anticlockwise to bring it to the midline over the abdomen.
- A little resistance is felt as the tip reaches the internal meatus.
- A gentle manipulation overcomes the resistance and the shaft of the catheter is depressed slowly towards the thigh.
- At the midline position of the base end between the thighs, a free rotation of the catheter in all directions and escape of urine indicate that the catheter is inside the bladder.
- The left index finger when inserted in the rectum can guide the whole course of instrumentation.

Complications

1. Reflex and endotoxic shock
2. Anuria
3. Intravesical bleeding
4. Bruising, ulceration and subsequent stricture formation of urethra
5. False passage
6. Cystitis

SUCTION CATHETER

Fig. 8.14: Suction catheter

Definition

A suction catheter is a flexible, long tube attached on one end to the breathing tube (endotracheal or tracheostomy tube). The other end of the suction catheter is connected to a collection container (suction canister) and a device that generates suction.

Critically, ill or injured patients who require a breathing (endotracheal) tube or tracheostomy tube need occasional suctioning to remove secretions from the airway. The respiratory therapist, midwife, or ICU technician suctions a woman by inserting a small flexible tube called a suction catheter into the breathing tube.

Aim/Purpose

The purpose of suction catheter is to keep the upper respiratory tract clear of secretions and hopefully prevent plugging of the airways in patients who are unable to do so independently.

Frequency

The frequency of using suction catheter is determined by the amount of secretions that the woman produces. The breathing tube is suctioned whenever fluid builds up in the lungs.

Indications

Due to the potential for adverse effects, use of suction catheter should not be carried out on a routine basis. The decision to suction must be made on the basis of the clinical need to maintain the patency of the tracheobronchial tree. This implies that different diagnostic groups and individual patients will have different requirements and so suctioning is only done when clinically indicated by signs which could include:

1. Visible or audible secretions (such as sputum or blood);
2. Respiratory:
   - Desaturation
   - Rising peak inspiratory pressure
   - Decreasing tidal volume
   - Increased respiratory rate
   - Increased work of breathing
   - Coarse breathe sounds on auscultation.
3. Cardiovascular: Increased heart rate and blood pressure.
4. Other: Restless woman or diaphoresis.

Contraindications

- Tracheoesophageal fistulae
- Severe bronchospasm
- Stridor
- Basal skull fractures
- Severe epistaxis
- Leakage of cerebral spinal fluid
- Occluded nasal passage
- Clotting problems
- Jaw fractures

Types of Suction Catheter

a. *Whistle-tip:* For tracheobronchial suctioning, the soft, flexible suction catheter, also called a 'whistle-tip' catheter, should be used. In this type of catheter, a hole near the distal end that prevents the catheter from adhering to mucosa is present. It has molded ends that will minimize trauma of the tracheal and bronchial walls.

The **whistle-tip catheter** (Fig. 8.15) is designed to slide down the endotracheal tube easily. A port on the proximal end of the catheter is occluded with the thumb to generate suction. Prior to performing tracheobronchial suctioning, the whistle-tip catheter should be lubricated with a water-soluble gel.

b. ***Argyle airflow suction catheter***

Fig. 8.15: Whistle-tip suction catheter

Fig. 8.16: Argyle airflow catheter

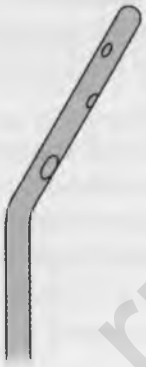


Fig. 8.17: Coude directional suction catheter

c. ***Coude directional suction catheter:*** This catheter is curved at the end (directional catheter). The purpose of this catheter is to direct into the left mainstem bronchus easily. But it may not always work. For best results, position woman on left side (Fig. 8.17).

Suction Catheter Sizing

The French catheter scale or "French units" (Fr) is commonly used to measure the outside diameter of needles, catheters, and other cylindrical medical instruments.

1 Fr is equivalent to 0.33 mm = 0.013" = 1/77" of diameter.

Thus, the size in French units is roughly equal to the circumference of the catheter in millimeters.

Choosing the Right Catheter

Multiply the tracheal tubes inner diameter by 2. Then use the next smallest size catheter.

Example: 6 mm ETT: 6 × 2 = 12; next smallest catheter is 10 French.

Example: 8 mm ETT: 8 × 2 = 16; next smallest catheter is 14 French.

Table 8.1: Suction catheter sizes for adults and pediatrics

Suction catheter selection	*Catheter sizes for adults*
Type of suction	*Suction Catheter*
Route	m
Nasal	10 or 12
Oropharyngeal airway	12
Nasopharyngeal airway	10 or 12
Catheter sizes for pediatrics	
Nasal only	6–10

Routes for Suctioning

Suctioning can be performed using a number of routes. The most appropriate route should be chosen that minimizes or prevents trauma.

- **Oral:** This removes secretions from the mouth.
- **Oropharyngeal:** This can be performed on patients who can breathe spontaneously, but are unable to maintain an open airway. This means an airway adjunct may be required. Most conscious patients cannot tolerate the placement of this type of airway. A size 2, 3 or 4 is used in adults and 0, 1, 2 or 3 in pediatrics.
- **Nose:** Catheters may be inserted directly into the nose or via a nasopharyngeal airway. This method is only used in patients who have a very weak cough, to collect virology specimens or in pediatrics for clearance of retained secretions.
- **Endotracheal and tracheostomy tubes:** These will be used for patients requiring artificial ventilation or long-term airway protection.

Principles of Suctioning

- "Oxygenate" the woman before suctioning by giving high-flow oxygen by mask to saturate the blood.
- Open the woman's mouth and then look into the oral pharynx to locate the fluid or object that need to remove before starting using suction catheter.
- Insert the tip of the suction catheter into the pharynx before applying suction.

- Be careful not to insert the catheter farther than the midwife can see because this may result in trauma to the soft oral tissues.
- Initiate the gag reflex in a responsive or semi-responsive woman, or force a foreign body farther into the airway.
- To initiate suction, turn the machine on or cover the suction hole on the catheter.
- Suction only as deep as you can see to prevent pushing foreign matter farther into the airway.
- Use either a side-to-side or circular motion, while suctioning the airway and slowly withdraw the catheter from the airway.
- Remember to always protect the c-spine if you suspect any spinal trauma.
- Apply suction for no more than 10–15 seconds at a time because the procedure does not remove fluid and debris only; it also removes oxygen, which could cause the woman's condition to worsen.
- In a child, suction the airway for only 5–10 seconds.
- Repeat the procedure as needed until the airway is clear.
- When active oral bleeding or repeated vomiting is involved, it may be necessary to use gravity and suction concurrently to clear the airway.

Procedure for Suctioning

- Explain procedure to woman.
- Wash hands.
- Prepare equipment.
- Attach suction tubing to suction machine and attach oral sucker to suction tubing, ensuring a tight fit.
- Regularly check that the suction machine is working and ready for use by plugging it in, switching it on and kinking the suction tubing. This should cause the pressure dial to rise.
- Ensure that clean suction tubing is changed between patients, and that flexible catheters are easily accessible to the machine.
- Position the woman in a semi-recumbent position with head turned towards the midwife. If the woman is unconscious she should be nursed in a semi-prone position, facing the midwife.
- Place a towel or pad under chin.

- Switch the suction machine on and set suction level.
- Oral or nasopharyngeal suction should be gentle so that the mucous membrane, teeth, or gums are not damaged.
- Ideal suction levels for oral suction have little supporting evidence but experience suggests that 20 kilopascals (kPa) or 120 mm Hg for wall suction units is the maximum pressure.
- Put on gloves, eye shield and mask.
- Open the woman's mouth and assist her, if necessary (Fig. 8.18).
- Insert the suction catheter into the mouth along one side and guide it along the inside of the cheek towards the oropharynx without applying suction.
- Insert the tip of the catheter no farther than the base of the tongue, making sure you can still see the tip of the catheter (Fig. 8.19).
- Suction is prevented by either kinking the suction catheter or leaving the hole in the suction catheter open.
- Apply suction by either unkinking the tubing or occluding the hole in the suction catheter, and remove secretions and debris from mouth as required.
- Do not force the sucker between the teeth or touch the posterior pharyngeal wall of the soft palate as it can make the woman gag or vomit.
- Suction for 10–15 seconds at a time in an adult.
- Release suction and remove oral sucker from the woman's mouth. Oral suction should not be for prolonged periods as it can be very distressing to the woman.

Fig. 8.18: Open and clear the woman's mouth

Fig. 8.19: Insert the tip of the catheter no farther than the base of the tongue

Fig. 8.20: Suction while withdrawing the tip

- Clean the sucker and tubing by suctioning through sterile water until all debris has been cleared.
- If further suctioning is required, allow the woman to rest for at least 30 seconds and repeat above procedure.
- Ask the woman to deep breathe and/or cough between suctions, if she can, so that secretions can rise to the upper airway.
- Wash hands.
- Document the quantity, colour, consistency and odour of secretions and the woman's response to the procedure.

Signs of Effective Suctioning

- Reduced work of breathing
- Reduced respiratory rate
- Increased oxygen saturation
- Visible evidence of removal of secretions
- Absence of audible secretions in large airways
- Woman's color improves.

Staff Who May Undertake the Procedure

- Oral/nasal pharyngeal suction is regarded as a clinical practice. A clinical practice may be defined as an aspect of care, which may be undertaken by registered nurses, midwives and physiotherapists who accept accountability for their actions and feel competent to undertake the procedure.

- Student nurses and nurses may undertake this practice under the supervision of a registered nurse or midwife who feels competent in this aspect of care and in the supervisory role.
- Patient and care givers may undertake this procedure if felt appropriate by nurse or midwife.

Precautions

- Recent oesophageal or tracheal surgery
- Coagulopathy and bleeding disorders
- Upper airway lesions
- Irritable airways
- Pulmonary oedema
- Loose teeth

Complications and Hazards of Suctioning

- Respiratory (e.g. reduction in lung volumes, hypoxia, alveoli collapse, introduction of infection, hypoxemia and trauma to the trachea).
- Cardiovascular (e.g. bradycardia and hypertension, cardiac arrhythmias).
- Neurological (e.g. increase in intracranial pressure and reduction in cerebral blood flow).
- Nosocomial infection
- Woman distress.
- Soft tissue damage such as epistaxis, mucosal damage and ulceration.

9 Clamps

CLAMPS

Clamps are the surgical instrument with serrated jaws and locking handles which is used for gripping, holding, joining, supporting, or compressing an organ, vessel, or tissue. In surgery, clamps are generally used for hemostasis and clamping tissue.

The most important clamps which are discussed in this chapter are:

1. Bonney's myomectomy clamp
2. Berkley-Bonney vaginal clamp
3. Wertheim's vaginal clamp
4. Wertheim's parametrium clamp
5. Hysterectomy clamp
6. Maingot's clamp
7. Kocher's hemostatic forceps
8. Heaney's pedicle clamp
9. Shirodkar's cervical clamp

1. BONNEY'S MYOMECTOMY CLAMP

Founder

This instrument is devised by Victor Bonney of England.

Fig. 9.1: Bonney's myomectomy clamp

Features

It is a long metal clamp with slightly diverging blades which are set with the handles at an angle of 120°. There are two overlapping transverse bars attached to the blades with one each. These divide the space between the blades into two approximately equal parts. The distal half of blades is covered with rubber tubes to prevent injury to uterine vessels, which must be removed for sterilization by chemical method because heat damages them. Handles have two pairs of finger bows but only proximal pair is provided with catches.

Parts of Bonney's Clamp

1. *Curved blades* are covered with rubber caps distal to the site of the transverse bars to prevent damage to vascular structures. They need to be removed for sterilization by chemical methods because heat damages them.
2. *Transverse bar locks:* Overlapping transverse bar locks prevent the isthumus and round ligaments from slipping towards shank, thus maintaining the compression on cervix.
3. *Shank:* The blades are extended in a curved manner beyond the transverse bar lock as the shank. It gives length to the blades, thus when applied the cervix is kept in the center of the pelvic cavity and the bladder is accommodated between the pubic symphysis and the cervix.
4. *Angulation* of 120° exists between shanks and handles.
5. *Handle with two pairs of rings:* The proximal pair of rings, nearer the angulation, is for opening the blades wide enough so that they can be passed over the bulky nodular uterus and brought down along with the round ligaments up to the isthumus. The distal rings are for clamping, releasing and manipulating.

Indications

1. This instrument is used to hold the uterus at the level of internal os for stabilization.
2. It is used to hold the uterine artery at the level of the internal os for securing hemostasis.
3. It is used to hold the round ligament of the uterus to prevent the uterus from falling back.

4. It is used to control hemorrhage during the following surgeries:
   - Myomectomy
   - Metroplasty
   - Hysterotomy
5. It is used in the manipulation of the uterus.

It is used in the operations on fibroid to hold the uterine artery and the round ligament at the level of internal os. Uterine artery is held to control the excessive bleeding in the fibroid operation and by holding the round ligament, it does not allow the uterus to fall back posteriorly. The blades are covered by rubber tubing to avoid trauma to vessels.

Contraindications

1. Pregnancy.
2. Puerperium and 6 weeks period following an abortion.
3. Woman above age of 40 years.
4. Numerous leiomyomas rendering the uterus a mere mass of multiple growths so that some will definitely be left behind, which will grow necessitate hysterectomy later.
5. Both the fallopian tubes irreparably damaged or removed in past.
6. Diffuse adenomyosis.
7. Carcinoma of endometrium or uterine cervix: Suspected or proved.
8. Suspected sarcomatous change in the leiomyoma.
9. Endometrial or pelvic tuberculosis.
10. Bilateral ovarian endometriosis which was not obvious clinically, where adequate ovarian tissue cannot be saved.
11. Cervical leiomyoma—in this case the cervical leiomyoma is first enucleated and then the clamp is applied.

Mechanism of Action

This instrument is used to achieve temporary compression of the uterine blood vessels so as to reduce intraoperative blood loss. The distal finger rings are used during the application of the instrument because the blades can be opened wider with fingers in the distal grips rather than in the proximal ones. For tightening the lock as well as releasing it, the proximal grips are used because they offer greater degree of mechanical

advantage than the distal ones. The instrument is applied with the angle downwards so that the blades go into the pelvis over the pubis while the handles remain horizontal between the woman's thighs. The space between the blades distal to the transverse bars includes the uterus just above the cervix, and both the round ligaments. The round ligaments are taut and hence they hold the uterine fundus down. If the uterus is allowed to slip upwards, as it would but for the inclusion of the round ligaments, the uterine arteries would no more be compressed and blood loss during the operation would not be controlled. The transverse bars prevent the round ligaments from slipping. As myomectomy proceeds, the clamp needs to be tightened intermittently.

To control the blood supply through the ovarian vessels, a sponge holding forceps is applied over each infundibulopelvic ligament during the operation.

Prerequisites

1. Blood compatible with woman's blood ready.
2. Consent for hysterectomy.
3. Cervical exfoliative cytology.
4. Endometrial curettage to rule out endometrial carcinoma and submucous leiomyomatous polyps.
5. All other conditions possibly responsible for the woman's complaints ruled out.

How to Hold?

Fig. 9.2: Bonney myomectomy clamp applied to the lower uterus

Method of use

In myomectomy, after delivering the uterus from abdominal incision, the instrument is applied from the foot end of the woman at the level of isthmus including both the round ligaments (it maintains anteversion of uterus). Concavity at the joint rests over the symphysis pubis of the woman. Finger bows at the level of catches are used for application of the clamp while distal pair of finger bows is used for manipulation.

Instrument should be released intermittently, i.e. every 15–20 minutes during the operation to prevent ischemic damage to the uterus and also histamine and similar substances accumulate in the uterine circulation and when released into general circulation after releasing the clamp can cause acute vasodilatation and hypotension. After enucleation of fibroid the instrument should be released before closing the cavity to see any bleeding points which otherwise cause postoperative hematoma.

It is seldom used nowadays, being replaced by occlusion of the vessels by a catheter tourniquet passing through the avascular area of the broad ligament at the level of the internal os.

Postprocedural Care

- General management as for an exploratory laparatomy
- All blood lost must be replaced
- Broad spectrum antibiotics are given
- Pregnancy is avoided for 3 months
- All future pregnancies are terminated by elective cesarean section one week before the due date, if the uterine cavity has been opened.

Material Made of and Sterilization Method

It is made of stainless steel and sterilized by means of boiling or autoclaving. The rubber tubes which cover the distal half of blades must be removed for sterilization by chemical method because heat damages them.

Complications

1. Hemorrhage
2. Collection of hematoma in the layers of the myometrium due to inadequate closure of enucleation cavities.

3. Injury to the bladder or ureter
4. Injury to the interstitial portion of the fallopian tube
5. Infection
6. Omental or bowel adhesions to the scar
7. Endometriosis if the uterine cavity has been opened.
8. Rupture of uterine scar in a subsequent pregnancy.

Other Contributions of Victor Bonney

1. Bonney's myomectomy clamp
2. Bonney's round ligament forceps
3. Bonney's test for stress urinary incontinence
4. Bonney's hood operation for posterior wall fibroid
5. Bonney's uterine compressor
6. Bonney's vaginal clamp for occluding the vaginal canal prior to Wertheim's hysterectomy.

2. BERKLEY-BONNEY VAGINAL CLAMP

Fig. 9.3: Berkley-Bonney vaginal clamp

Features

It is 27 cm long. It is a metal clamp with curved blades which are set with the two handles. There are two bars at the tip of the blade one each. These divide the space between the blades into two approximately equal parts. Handles have two pairs of finger bows but only proximal pair is provided with catches.

Uses

It is used to occlude the vaginal canal prior to cutting the vagina in Wertheim's hysterectomy.

How to use?

A Wertheim's hysterectomy removes the uterus, cervix, part of the vagina, fallopian tubes, peritoneum, the lymph glands and fatty tissue of the pelvis and possibly one or both ovaries. A Wertheim's hysterectomy is usually performed in cases where cancer is suspected or known to be present.

Risks

- Urinary retention
- Damage to the bowel, bladder or rectum
- Urinary tract or other pelvic infection
- Pain during intercourse

3. WERTHEIM'S VAGINAL CLAMP

Fig. 9.4: Wertheim's vaginal clamp

Features

This clamp has short blades which are L-shaped to the shank and it measure about 2 inches. They have transverse serrations in the vertical portion of the L, and longitudinal serrations in the horizontal portion of the L. Thus, the serrations are perpendicular to the muscle and fibrous tissue strands in the vagina and the risk of the clamp slipping is less.

The shanks measure 6 inches to the joint, and are bowed so as to include the uterus without compressing it, being at their widest point's 21 inches apart. The handles measure 7 inches from the joint, and are provided with two pairs of finger-rings, the lower of which end 3 inches from the joint and are used for adjustment, whilst the upper, which are at the extreme ends of the handles, are used when actually clamping the vagina.

Uses

It is used in Wertheim's operation to clamp the vagina. It is also used to remove whole of uterus, ovaries and tubes, parametrium, upper third of vagina and pelvic lymph nodes.

Procedure

The angle of the L lies at the lateral angle of the vagina after application of the clamp. After division of the paracopium and the parametrium during radical abdominal hysterectomy, one clamp is applied over the vagina on each side and the vagina is divided below the level of the clamp. This is important during hysterectomy for carcinoma of the cervix, to prevent spillage of the malignant cells from the surface of the tumor into the peritoneal cavity.

The blades of these forceps will be found amply large enough to span the breadth of any vagina, their failure to accomplish this in some operators' hands being due to the fact that the previous division of the paravaginal tissue has not been sufficient. This clamp secures a very firm hold, minimizes the risk of injuring the ureter, and allows of direct traction upwards on the vagina.

4. WERTHEIM'S PARAMETRIUM CLAMP

Fig. 9.5: Wertheim's parametrium clamp with longitudinal serrations

Fig. 9.6: Wertheim's parametrium clamp with transverse serrations

This clamp has short blades with longitudinal serrations and a ridge and a groove. It is meant especially for clamping the parametrium which does not require a long clamp. Lack of teeth at the tips makes it ideal for this purpose, as the teeth can bite into the tissues nearby and the resultant bleeding is difficult to control. Another type has transverse serrations on the blades but no teeth or ridge and groove. This type tends to slip.

5. HYSTERECTOMY CLAMP

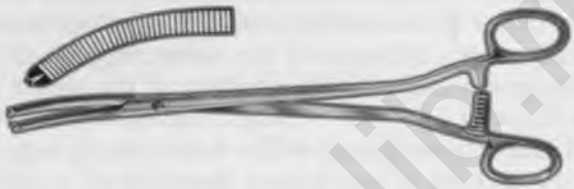


Fig. 9.7: Hysterectomy clamp

Features

Hysterectomy blades have small blades with longitudinal serrations. It is meant especially for clamping the uterine layers in hysterectomy which does not require a long clamp. The tip has sharp teeth at the end which helps for better grip. It has a long handle ended with a ratchet lock.

Indications

It is used in total hysterectomy which means removal of uterus.

Contraindications

1. Invasive carcinoma of the uterine cervix.
2. Endometrial carcinoma.
3. Uterus larger than the size of 12 weeks gestation.
4. Pelvic inflammatory disease.
5. Endometriosis.
6. Ovarian tumors.

How to use?

Usual preoperative preparation is done. Put the woman in lithotomy position. Clean vulva and vagina. Catheterize the bladder and examine under anesthesia. Infiltrate with diluted

saline, and then stretch transverse cervical and uterosacral ligaments. This may result in a degree of uterine descent. Open the pouch of Douglas. After dissection of bladder and opening of the uterovesical peritoneum, clamp using hysterectomy clamp and ligate the pedicles and remove uterus. Close the pelvic peritoneum. Close the vagina. Apply vaginal pack and Foley's catheter.

Complications

- Vesicovaginal and ureterovaginal fistulae.
- Hemorrhage and shock.
- Pelvic infection.
- Postoperative urinary retention with bladder atony
- Peritonitis
- Intestinal obstruction, bowel injury.
- Pulmonary complications.

6. MAINGOT'S CLAMP

Fig. 9.8: Maingot's clamp

Features

This instrument is 20.5 cm long. Its blades are curved on flat. One blade has a longitudinal ridge which fits in a longitudinal groove on the other blade. The tips of the blades have one in two teeth. The blades can be tightened by means of a ratchet lock on the handles.

This instrument is similar to Kocher's clamp or hemostatic forceps except that the Kocher's clamp has transverse serrations on its blades.

Indications

1. Hysterectomy:
   - To clamp the uterosacral ligaments, uterine blood vessels

and cornual structures or infundibulopelvic ligaments in vaginal hysterectomy. The order is reverse in abdominal hysterectomy.
2. Oophorectomy for ovarian cysts or tumors.
3. Removal of pedunculated leiomyomatous polyps.
4. Salpingectomy for tubal ectopic gestation.
5. Cesarean hysterectomy.
6. Clamping the umbilical cord of the newborn.
7. Artificial low rupture of membranes: Instead of the usual instruments for this purpose.

Method of use

The clamp is applied with its curve facing the structure to be removed so that a ligature can be passed around the clamped pedicle easily. If the curve faces away from the structure to be removed, not only it is difficult to be sure that all the tissues clamped have been included in the ligature, but also there is the risk of inclusion of unintended structures in the tip of the clamp. The teeth at the tips of the blades prevent the structures clamped from slipping. The longitudinal groove and the ridge ensure that occlusion of vessels in the pedicle clamped is complete, which may not be so with transverse serrations on the blades. It is also more efficient in prevention of slipping of the pedicle than are clamps with transverse serrations on the inner surface of the blades.

7. KOCHER'S HEMOSTATIC CLAMP OR FORCEPS

Fig. 9.9: Kocher's hemostatic clamp

Features

It is also called pedicle clamp. It is strong straight metal instrument. Kocher's clamp has transverse serrations on the

blades, and its lips have, one in two teeth. It resembles spencer wells artery forceps in shape but is heavier, stouter and with slightly longer blades. Its transverse serrations are deep and one in two teeth is present at the tip. It has a catch-lock to bring the blades together for locking. It may be straight or curved.

Mechanism

The serrations crush the umbilical vessels so that the risk of bleeding is reduced and the vessels get thrombosed faster. The teeth at the tip prevent slipping of the umbilical cord through the clamp.

Material made of and Sterilization Method

It is made of stainless steel. So it is sterilized by means of boiling and autoclaving.

Uses

1. To clamp the umbilical cord: For better grip and effective crushing effect to occlude the vessels.
2. In low rupture of membranes as surgical induction of labor or augmentation of labor.
3. This instrument can also be used to clamp various pedicles during cesarean hysterectomy.
4. It is used for removal of an ectopic pregnancy by salpingectomy.
5. To catch hold of the retracting perforating vessels during radical mastectomy operation.
6. It is used to catch the edges of the incision while suturing the skin.

8. HEANEY'S PEDICLE CLAMP

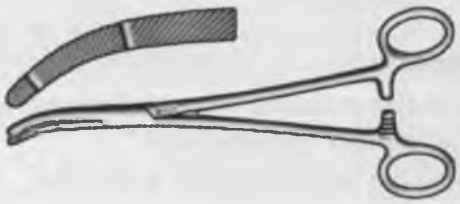


Fig. 9.10: Heaney's pedicle clamp

Features

This metal instrument is made of obliquely serrated blades. The blades of the clamp are having two horizontal grooves in the middle of the blade. The tip of the clamp is not toothed, hence there is more chance of slipping when moved from tissue. There is a long handle present. At the end of the handle, a ratchet lock is present.

Material made of

It is made of stainless steel. It is sterilized by boiling or autoclaving.

Advantages

- Minimal chance of injury to the blood vessels and viscera as there is no tooth in the blades.
- There is minimal chance of lateral stripping of structures as the serrations in the blade are oblique.

Disadvantages

There is more chance of slipping while moving the tissue because of absence of tooth in the blades.

Use

Uses in Gynecology

1. As a pedicle clamp during abdominal hysterectomy and vaginal hysterectomy, Manchester's operation.
2. To clamp the pedicles of ovarian tumor and pedunculated fibroid.
3. Salpingectomy for tubal pregnancy.
4. Straight Kocher's forceps is used to hold the uterus during abdominal hysterectomy.

Uses in Obstetrics

1. As a pedicle clamp during obstetric hysterectomy.
2. For artificial rupture of membranes.
3. For clamping the cord afterbirth of the baby.

How to use?

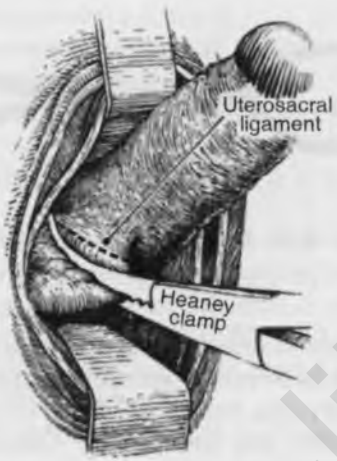


Fig. 9.11: Using Heaney's clamp in hysterectomy surgery

Difference between Kocher's Clamp and Heaney's Pedicle Clamp

Table 9.1: Differences between Kocher's and Heaney's pedicle clamp

S. No.	*Kocher's*	*Heaney's*
1.	Tip security is better, no slippage of tissues from the tip	Tip is without tooth, so when moved tissue from tip may slip
2.	Grip is not very good, if tip remains open	Grip is better than Kocher's clamp
3.	There are chances of injury to vessel or viscera by the tooth at the tip	No such possibility, there is always some part of the blade beyond the tooth
4.	More chances of lateral stripping of the structures	Less chances, because serrations are oblique

Note: The proximal end of all clamps is similar having rings with ratchet lock for secure grip. Ratchet has three steps: First to catch, second to clamp, and third is to crush tissues.

9. SHIRODKAR'S CERVICAL CLAMP

Fig. 9.12: Shirodkar's cervical clamp

Features

Shirodkar's cervical clamp has curved blades which help to hold the uterus in between it without compression. The ends have curved transverse bars with some degree of mobility. These curved blades are covered by rubber caps to avoid trauma to the uterus as it is held and manipulated. The ratchet lock on the handles helps to compress the uterine isthmus and occlude the cervical canal. The firm grip allows manipulation of the uterus without the slipping of the instrument.

Indications/Uses

1. Uterine sling surgeries for uterine prolapse
2. Culdoplasty
3. Tuboplasty
4. Salpingectomy for tubal ectopic gestation.

How to use?

This clamp is applied with its blades in front of and behind the uterine isthmus. The ratchet lock is tightened sufficiently to occlude the isthmic canal.

Material made of and Sterilization Method

This instrument is made of stainless steel. It is sterilized by means of boiling or autoclaving. The rubber caps on its blades are removed during sterilization by heat because heat damages the rubber material. These rubber caps are sterilized by chemical methods of sterilization.

Nursing Interventions after using Clamps

1. Assess for signs of hemorrhage.
2. Monitor vital signs every 4 hours.
3. Monitor intake and output chart.
4. Assess for complications.
5. Assess for vaginal discharge, instruct the woman in perineal care.
6. Encourage turning, coughing, deep breathing and early ambulation.
7. Encourage fluid intake.
8. Teach the woman to recognize signs of complications that should be reported to the obstetrician or midwife:
   - Temperature greater than 100°F (37.7°C).
   - Vaginal bleeding that is greater than a typical menstrual period or is bright red.
   - Urinary incontinence, urgency, burning or frequency.
   - Severe pain.

10 Scissors

DEFINITION OF SCISSORS

Scissors (Latin word cisorium = a cutting instrument, from caedere = to cut) are hand-operated cutting instruments.

By closing the blades, scissors can be used as an effective cutting instrument, as an instrument to fashion and design tissues for reconstruction and to achieve a slit. By thrusting a pair of scissors with its blades closed in loose areolar tissues, in fascial spaces, in aponeurotic sheets and in desired cleavage planes and by opening the blades thereafter, scissors can be utilized as a very effective dissecting instrument. There are a variety of scissors used for specific purposes, e.g. for cutting stitches, for cutting bandages, etc. Scissors is used for blunt as well as sharp dissection and also for cutting various structures and sutures.

Founder of Scissors

In 14th century BC, **Jean-Claude Margueron** of Emar invented scissors. Scissors are one of the oldest surgical instruments used by obstetricians.

History

Scissors were invented around 1500 BC in ancient Egypt. The earliest known scissors appeared in Mesopotamia 3,000 to 4,000 years ago. These were of the 'spring scissor' type comprising two bronze blades connected at the handles by a thin, flexible strip of curved bronze which served to hold the blades in alignment, to allow them to be squeezed together, and to pull them apart when released.

Spring scissors was continuously used in Europe until the sixteenth century. However, pivoted scissors of bronze or iron, in which the blades were pivoted at a point between the tips and the handles which were the direct ancestor of modern scissors, were invented by the Romans around AD 100. They entered common use not only in ancient Rome, but also in China, Japan, and Korea, and the idea is still used in almost all modern scissors.

Features

Scissors are usually made of very hard stainless steel for ongoing toughness. Some scissors have tungsten carbide reinforcements along their cutting edges. The hardness of this material allows the manufacturers to create sharper edges, which allows for easier and smoother cuts and keeps the scissors sharp for longer.

They consist of a pair of metal blades pivoted so that the sharpened edges slide against each other when the handles opposite to the pivot are closed.

Material made up of

Usually the scissors is made up of stainless steel, zirconia ceramic, nitinol and titanium. More expensive scissors have tungsten edges which are sharp, tough and long lasting.

Mechanism of Action

The cutting action of scissors results from the moving-edge contact between the blades, which are given a slight set towards each other. If the blades spring apart, the cutting action is replaced by a chewing effect. The blades may be forced apart if delicate scissors are used to cut tough tissues.

Parts of Scissors

Scissors have five parts (Fig. 10.1):

- Blade
- Cutting edge
- Fulcrum or screw lock
- Handle or shanks
- Finger rings

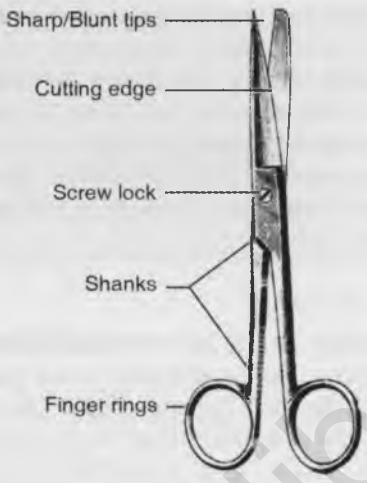


Fig. 10.1: Parts of sharp and blunt scissors

Advantages

- Inexpensive.
- Safe in safe hand.
- Operator determined precised action.
- Closed blades, can work for blunt dissection and electrocautery.
- Piercing tissue with closed blades and then opening helps in obtaining a good plane of dissection.

Disadvantages

- Non-hemostatic.
- Accidental chances of cutting small ducts and vessels.
- Due to its pointed end, if overlooked there is chance of injury to viscera.
- Its blades get blunt easily, if used for electric coagulation.

Uses of Scissors

1. Scissors can be used for blunt or sharp dissection.
2. Cutting the tissues in various structures.
3. For cutting the ligatures and sutures.
4. Gauze or bandage scissors are used only for cutting the gauze or bandages in required size and length.

5. Straight or pointed curved scissors are used for removing the sutures of the incisions.
6. Curved on flat scissors used to cut the ligatures or other suture material during operation by the assistant obstetricians or scrubbed midwife.
7. Straight or curved Mayo scissors which are very smooth at the ends used to cut the tissues and internal organs so that adjacent tissues are protected while using.

Sterilization of Scissors

It is sterilized by means of autoclaving, because boiling affects the sharpness of the instruments. Repeated autoclaving also can do the same damage. Therefore, these instruments require periodic sharpening or replacement.

Classification of Scissors

Scissors are available in various sizes and designs, each having its use for a particular situation. The various classifications available are:

A. **According to curvature or angles**
   1. Straight scissors
   2. *Angled-on-edge scissors:* It is used for the purpose of cutting structures which are directed obliquely.
   3. *Curved-on-flat scissors:* It is used at depth where the space to work is very much confined.

B. **According to points or tips**
   1. *Sharp pointed scissors:* It is used liberally at places where there are no risks of injuring important structures.
   2. *Blunt pointed scissors:* It is used where the obstetricians apprehends damage to important structures.

C. **According to use**
   1. *Dressing scissors or bandage scissors*: It is designed to save the skin from any damage while a bandage is being cut (Fig. 10.2).

Fig. 10.2: Bandage scissors

One blade has a flat area which passes easily between skin and bandage without any chance of injury.

Bandage scissors are angled tip scissors, with a blunt tip on the bottom blade, which helps in cutting bandages without gouging the skin. Bandage scissors are very popular in any healthcare sector because they are designed to safely lift bandages away from skin for easy cutting. The bottom blade of the scissor is longer and goes easily under the bandages. The blunt tip design of the scissor prevents accidental injury while making bandage removal very easy, smooth, and quick.

Features of bandage scissors

- The blades of bandage scissors are made from stainless steel for long-lasting durability.
- Bandage scissors materials are generally ferrous materials like stainless steel materials. Nonferrous materials as well as hard metals or alloys may also be used. Therefore, the method for plating and also the plating material should be properly selected taking the scissors blade material into consideration.
- They make a useful addition to any first-aid kit.
- They can cut through cloth, plastic and metal.
- They have serrated blades for not slipping while cutting.
- They can be autoclaved.
- They are usually available with contoured handles in various colors. The handles are plastic or metal made.

2. *Tissue scissors or saw toothed scissors:* Tissue (saw-tooth) scissors (Fig. 10.3) have long curved handles and short serrated jaws suitable for cutting soft tissue. It is a "curved-on-angle" type of scissors.
3. *Stitch scissors or suture removal scissors or stitch removal scissors:* It is mainly used for stitch removal. It has a hook-

Fig. 10.3: Tissue scissors

Fig. 10.4: Stitch scissors

shaped point on one blade to hook under the stitch before cutting it with the opposing blade (Fig. 10.4).

How to use Stitch Scissors?

Step 1: The stitches are cleaned thoroughly with spirit before removal.
Step 2: Note that the suture knot is located to one side of the incision line (Fig. 10.5). The suture is cut below this knot on the same side.
Step 3: Grasp one end of the suture with the toothed forceps and lift up. Maintain gentle traction upward to expose a small portion of the suture that has been just below the skin surface. Cut the suture using the stitch scissors below the portion originally exposed at the surface (Fig. 10.6). Place the rounded tip of the scissors next to the skin surface (suture scissors have one rounded and one sharp tip).
Step 4: Pull the cut suture up and out of the skin (Fig. 10.7). Thus, no exposed portion of the suture ever transverses the suture tract, thereby abolishing any chance of infection.

Fig. 10.5: Note that the suture knot is located to one side of the incision line

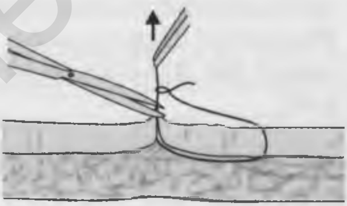


Fig. 10.6: Cutting the suture using stitch scissors by lifting the knot

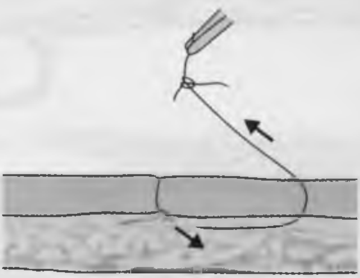


Fig. 10.7: Pulling out the suture

MAYO'S SCISSORS

Mayo's scissors are heavy-duty surgical scissors used for cutting large tissues and fascia. These scissors are heavy in weight, and have narrow, but blunt, pointed blades. These scissors are available in regular and extra-long sizes.

Mechanism of Action

During the surgical procedure, the Mayo surgery scissors can act as a dissecting instrument by penetrating the tissues with the tips closed. Once inserted, the scissors are opened so that the blades spread out the tissue.

Configuration

The blades of Mayo's scissors may be either straight or curved.

1. *Straight-bladed:* Mayo's scissors are designed for cutting body tissues near the surface of the wound. Use these scissors for cutting sutures, stitches, bandages and tapes.
2. *Curved-bladed:* Mayo's scissors allow deeper penetration into the wound that its straight-bladed counterparts cannot reach. The curved design enables the scissor to cut thick layers of tissues like those found in the uterus, muscles, breast and foot.

Mayo's Straight Blunt Scissors

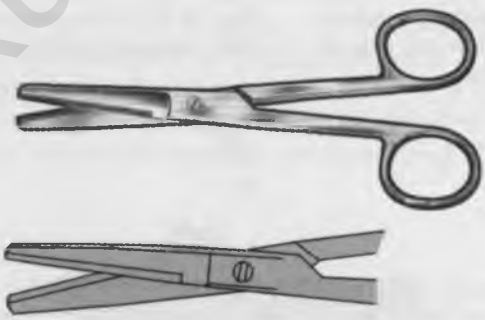


Fig. 10.8: Mayo's straight blunt scissors

Parts of Mayo's Straight Blunt Scissors

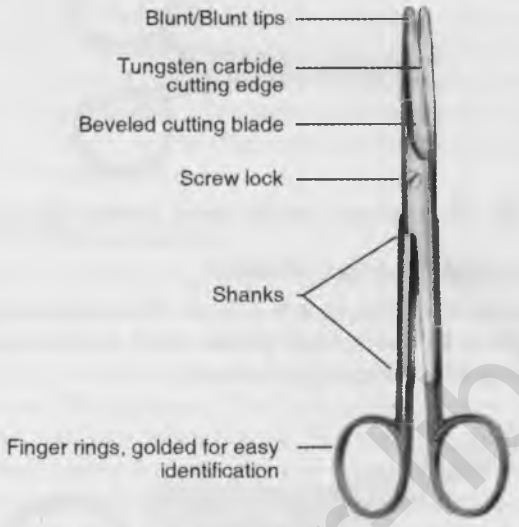


Fig. 10.9: Parts of Mayo's straight blunt scissors

Mayo's Curved-on-flat Scissors

The curvature of its blade is along its long axis in vertical plane. Such a scissors is used for dissecting at a depth. For example, it is used for cutting the adhesions of a growth/organ inside the abdominal cavity. This scissors can be used to trim the sutures during closure.

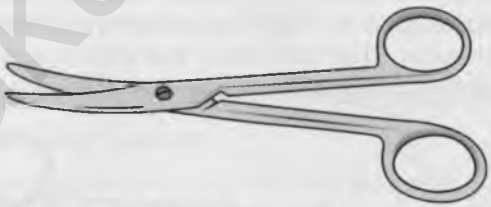


Fig. 10.10: Mayo's curved-on-flat scissors

Mayo's Straight Sharp Pointed Scissors

A straight shape fine pointed scissors can be used in the place of stitch removal scissors.

Fig. 10.11: Mayo's straight sharp pointed scissors

Mayo's Angled-on-edge Scissors

The blades of the scissors are curved at an acute angle, along its long axis, in the horizontal plane. Such a scissors is used for cutting obliquely directed structures.

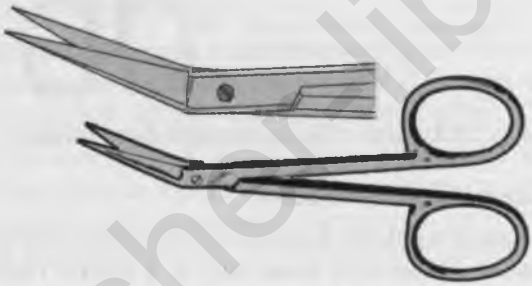


Fig. 10.12: Mayo's angled-on-edge scissors

BONNEY GYNECOLOGICAL SCISSORS

Bonney gynecological or dissecting scissors are often marketed as Mayo's scissors. They are heavy but have a sureness about them that allows for accurate gentle dissection, particularly of

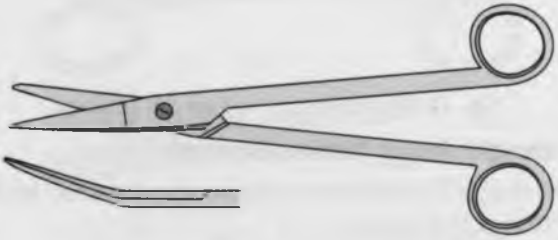


Fig. 10.13: Bonney's gynecological scissors

the 'separate and cut' type. The ends of the scissors are relatively blunt and will do little damage when separating tissue, whereas the blades are powerful enough when coupled with the long levers of the 25 cm handles to cope with the toughest of scar tissue. This latter characteristic is especially important in cancer work when operating on tissues previously treated with radiotherapy.

How to Hold the Scissors?

The scissors should be held in the right hand between the thumb and the ring finger. The index finger is kept over the scissors in its long axis and the middle finger is kept by the side of the handle of the scissors. Such a grip gives a firm and steady control over the scissors. The other hand may be used to support the scissors from below. Notice how the ring finger, thumb and index finger form a triangle, which form an engineering viewpoint is a rigid, stable structure. This gives precise control of the instrument (Fig. 10.14).

Fig. 10.14: Correct method of holding the scissors

How to Cut using Scissors?

The best method used is cut with the tips of the scissors, not the main part of the blades. There are three reasons for cutting in this method.

1. The tips are usually the sharpest part of the blades.
2. If you cut with the mid part of the blades, it is possible that the tips will also inadvertently cut something else, perhaps the sort of something that should not be cut.
3. The user will have better control.

Method of using Scissors for Suture Removal

There are four main steps which are involved in the process of using the scissors. They are:

1. **Checking the scissors**
   a. *The blades:* Check the blades are sharp and free from notches.
   b. The joint: An ideal firm joint plays a key part in the shearing action of the scissors. Check for loose or tight joint. The joint will loosen with the continuous pressure of the curvature of the blades for shearing. The levering action also tends to loosen the joint. A firm joint and satisfactory shearing of the blades gives comfortable feel to the scissors, at a pressure of about 100 gm. A higher closing pressure will prevent the assistant feeling the cutting of the stitch. This is a serious loss of sensation. It can be dangerous. It applies to all instruments with joints of this type. A tight joint in scissors and in virtually all forceps with ratchets is unacceptable.
2. *Approach:* The midwife should check how long the obstetrician wishes the sutures to be cut. Some obstetricians will be helpful by specifying the number of millimeters of suture they want to remain beyond the knot. Some may want the suture cut at the knot. Others may not say until you have cut it either too long or too short. Check which suture(s) the obstetrician wishes to have cut if there is more than one. If in doubt, ask the obstetrician and clarify the doubt. Let the obstetrician see where the midwife is cutting. Where possible

Fig. 10.15: Correct method of using the scissors

hold the scissor blades on edge rather than flat. This will prevent the blades obscuring the suture.

A helpful obstetrician will hold the suture:

- At right angles to the assistant so that the assistant can see where he/she is cutting.
- At right angles to the obstetrician himself so that he can check the stitch is being cut at the correct place.
- This means that the suture is not pointing at the assistant, and not at the obstetricians, since, under these circumstances, neither will be able to see how far from the knot the scissors are cutting.
- Make sure you can see the target area and the surrounding tissues clearly.
- Make sure you can reach the suture.
- Ask for a stool, if necessary.
- Use a standard two-handed grip.

3. *Cutting:* Cut the stitch, where the obstetrician wishes at the first attempt, cleanly, quickly, without delay, without cutting anything else and allowing the obstetrician see where the stitch is being cut. Do not obscure the obstetrician's view by crossing the operation field. Come in from the periphery of the operating field, not across it. Cut the suture without hesitating, without shaking and without fumbling. The midwife also need to be able to cut at any point of the compass, using which ever hand is the nearest and also at any depth in the wound. The midwife may also need to use a single handed grip with either right hand or left hand without notice. Do not cut blood vessel.
4. *Withdrawing:* Make sure that you have cut the stitch completely before you pull the scissors away. Avoid unnecessary and extravagant gestures. Prepare to cut the next suture. Return to your original position.

Points to Remember while using Scissors

1. Scissors are made for right-handed users and the lateral pressure of the right-handed thumb tends to result in the blades being pressed together. When held in the left hand, the pressure of the thumb tends to lever the blades apart.
2. With the hand in mid-pronation, hold scissors by inserting only part of the fits phalanx of the thumb through one ring;

this controls the moving blade. Insert only the first phalanx of the ring finger into the other ring, and wrap the middle and little fingers around the handle to steady it; this will be the fixed blade. Place the tip of your index finger on the hinge.

3. Hold the hand in mid pronation. If the midwife is right-handed, press with the thumb towards the left while opening and closing the scissors, note that the blades bind together. If the midwife holds the scissors in left hand in mid pronation and press with thumb towards the right, the binding effect is reduced between the blades and abolished if the joint is loose.
4. As a rule, the midwife's hand is most comfortable in the mid-prone position but if she is cutting down a deep hole try fully supinating the hand so that she have a clearer view of the structures at the tip. A hand in pronation may obstruct the view.
5. Choose the correct scissors for the task. Use lighter scissors for very light work only. Remember that it is more difficult to make the blades of curved scissors accurately engage along their whole length. If the midwife is cutting down a hole, prefer long-handled scissors so that the rings remain outside the hole. The longer the scissors, the more likely is any tremor to be magnified, so be willing to rest the hinge on the fingers of the non-dominant hand.

Nursing Interventions

- Do not use the scissors or cut stitches in more than one place as a part of it may be left behind and may cause infection.
- Suture is lifted slightly by the knot to allow scissors to go under and one part of the suturing from the cleanest part of the wound to the most contaminated part.
- Cleanse the skin around with antiseptic.
- After using the scissors for suture removal, inspect the scar for wound healing and apply iodine on the skin punctures if the woman is not sensitive to iodine.
- Keep the woman comfortable and tide.
- Record the state of the wound.
- Clean and return the equipment to their proper places.

11 Cannula

BOZEMANN CANNULA

Fig. 11.1: Bozemann cannula

Features

This instrument has an S-shaped tube. It is a double-channeled cannula. The outer tube which fits the distal half of this tube has large holes at various places and is fixed over it by means of a nut. It has a longitudinal slit on each side in its subterminal part and a rounded opening near the proximal end. The water goes in through the narrow inner tube and comes into the outer channel by capillary action.

Available Sizes

It is available in three sizes: 8, 10 and 12 mm.

Indications/Uses

1. To wash out uterine contents in operation like D and C.
2. For giving hot douches to stimulate uterine contraction in cases of D and C and postpartum hemorrhage by injecting antiseptic solution at 45°C.
3. To wash out the broken up contents of the fetal skull after craniotomy.
4. It is used in drainage of lochiometra.
5. To wash out the uterine cavity and the vagina after curetting. This instrument is not used in modern obstetrics.

How to use?

In case of obstructed labor with a dead baby, in a woman with contracted pelvis, this Bozemann cannula is used. The perforator is used into the calvarium and the brain matter is churned up and the medullary centers destroyed. Then the perforator is withdrawn and replaced by a Bozemann cannula which is made to enter the calvarium through the site of perforation. The fetal brain matter is flushed out. The reduced size of the fetal head can now be brought down into the pelvis. Traction on the fetal skull with the help of vulsellum applied to the scalp helps to accomplish delivery.

HYSTEROSALPINGOGRAPHY CANNULA

Hysterosalpingogram

A hysterosalpingogram, or HSG is an important radiology procedure usually done in the radiology department of a hospital or outpatient radiology facility in which a radiographic contrast (dye) is injected into the uterine cavity through the vagina and cervix. The uterine cavity fills with dye and if the fallopian tubes are open, dye fills the tubes and spills into the abdominal cavity. This shows whether the fallopian tubes are open or blocked and whether a blockage is at the junction of the tube and uterus (proximal) or at the other end of the tube (distal).

Cannulas used for Hysterosalpingogram

1. Rubin's tubal insufflation cannula
2. Shirodkar's cannula
3. Jarcho's cannula
4. Leech Wilkinson's cannula

1. RUBIN'S TUBAL INSUFFLATION CANNULA

Fig. 11.2: Rubin's tubal insufflation cannula

Definition

Rubin's tubal insufflation cannula (Fig. 11.2) is a cannula which is used to push the radiopaque dye into the uterus to outline the uterine cavity and to delineate the fallopian tubes in a procedure called hysterosalpingogram.

Other Name

It is also called hysterosalpingography cannula or uterosalpingography cannula.

Features

It is slightly curved hollow tube with an open end and multiple side apertures near the tip. It is a 30 cm long metal cannula with a diameter of 4 mm. A conical collar or the conical shoulder is fitted 5–6 cm behind the tip around the tube, which presses against the external os when cannula is introduced into uterine cavity. There is a movable rubber acorn with a fixation screw behind it and the position of this conical rubber can be adjusted according to uterocervical length.

Rubber tubing connects the outer open end of cannula to carbon dioxide delivery or air insufflations apparatus.

Uses

- To test the tubal patency (Rubin's test). This method is diagnostic as well as therapeutic in few cases.
- To push radiopaque dye inside the uterine cavity in hysterosalpingography.
- In chromotubation, methylene blue dye is pushed through it and spilling of dye is viewed through fimbrial end of fallopian tube by laparoscope.
- It is also used in the investigation of primary or secondary infertility particularly in women who have recently had myomectomy, abortion, operation for ectopic pregnancy, salpingoplasty, appendicectomy and disorders which may be complicated by tubal obstruction.
- Hydrotubation.

Advantages

- This cannula has a rubber guard which needs adjustment. It prevents backward leak of the dye.

2. SHIRODKAR'S CANNULA

It resembles Leech Wilkinson's cannula except that it is bent at right angle near its proximal end and terminating in a metal cup with a luer lock attachment inside and a screw cap to close the cup.

3. JARCHO'S CANNULA

It is a self-retaining metal cannula with rubber acorn, the position of which along the length can be fixed where required by means of a sliding metal collar with a screw. Terminal part of cannula is curved to suit the curvature of uterocervical canal. The other end has luer mount and a two-way valve to close the channel in the cannula. There are two rings on either side for gripping the cannula. Foley's catheter, usually no.12 can also be used in place of these metal cannulas.

4. LEECH WILKINSON'S CANNULA

Other Name

It is also called Calwin's cannula.

Features

It is 28 cm long with a fixed spiral cone at the one end and luer lock mount at the other. A long metal stillete is supplied with the cannula for cleaning it. The conical end is introduced through the external os and rotated clockwise.

Fig. 11.3: Leech Wilkinson's cannula

Uses

1. This cannula is also used for testing tubal patency (hysterosalpingography).
2. Rubin's test
3. Chromopertubation during laparoscopy.
4. Kymography.

How to use?

It is a straight instrument with conical tip. This cone is screwed into the cervix. Then dye is injected.

Contraindications for using Hysterosalpingography Cannula

- Pregnancy
- Appendicitis
- Recent genital tract infection
- Chronic pelvic infection or untreated sexually transmitted diseases
- Uterine bleeding
- Recent dilatation and curettage
- Uterine surgery

Types of Dye Injected in Each Procedure

In hysterosalpingography, radiopaque iodine (urografin) is used. Urografin is colorless to naked eye but on X-ray is seen as opaque white. For laparoscopy, methylene blue dye is injected through the cannula. These tests are also performed after tuboplasty.

Timing of Insertion

It is carried out immediately after the end of menstruation. If this test is done in the latter half of the cycle, insufflations might disturb an implanted ovum. Carbon dioxide is used because of its high solubility into the blood. It enters the blood stream through the uterine veins. Air is not used due to risk of air embolism. Gas from a cylinder of carbon dioxide is supplied at a steady rate and flows through a safety valve which prevents the pressure to exceed 240 mm of Hg. The pressure is recorded on a revolving drum.

Preparation

1. On the night before the procedure, provide laxative or enema to empty the bowels.
2. Prior to the procedure, provide mild sedative or over the counter medication to minimize any potential discomfort.

3. Ensure any allergies especially to barium or iodinated contrast materials.
4. Remove jewelry, removable dental appliances, eye glasses and any metal objects or clothing that might interfere with X-ray images.

How to use?

1. As the procedure does not require cervical dilatation, it obviates the need for any anesthesia.
2. A vaginal examination is made to determine the position of the uterus at the time of the test.
3. A speculum is then passed and the vagina portion of the cervix is thoroughly cleansed.
4. If there is any evidence of vaginitis or cervicitis, the test should not be done.
5. Next the anterior lip of the cervix is held by a single toothed vulsellum and then the selected hysterosalpingography cannula is introduced into the cervical canal.
6. By giving a gentle traction on the vulsellum, a gas tight closure is obtained.
7. The gas is now insufflated into the uterine cavity and the intrauterine pressure is noted.
8. Initially a pressure up to about 60 mm of Hg is used.
9. 10 to 15 ml of a selected iodine containing radiopaque dye

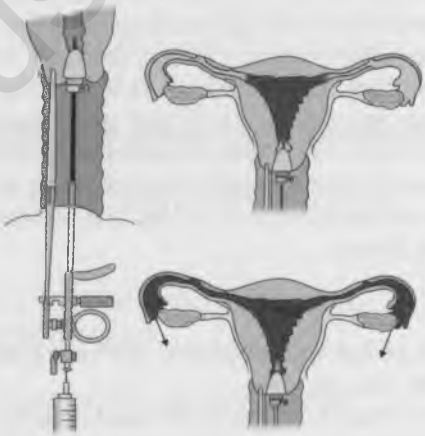


Fig. 11.4: Inserting the hysterosalpingography cannula into the cervix and assessing the tubal patency

(dipidiol or diginol or urografin) is injected through the cannula.

10. A horizontal wave pattern tracing indicates tubal peristalsis.
11. Bubbling or squeaking sound may be heard on auscultation over the lower lateral abdomen.
12. The woman will also experience referred pain at either shoulder, usually the right when she sits up after the test. It is due to gas present under the diaphragm.
13. When insufflation is unsuccessful it should be repeated at least once more before the tubes can be labeled as blocked.
14. A normal study will show a normal uterine cavity and contrast spilling out of the tubes into the pelvis. It is done in radiology department without anesthesia.

This procedure may cause minor discomfort. There may be slight discomfort and cramping when the catheter is placed and the contrast material is injected, but it will not last long. There may be slight irritation of the peritoneum, the lining of the abdominal cavity, causing generalized lower abdominal pain, but should also be minimal and not long lasting. Most women experience vaginal spotting for a few days after examination, which is normal.

Findings

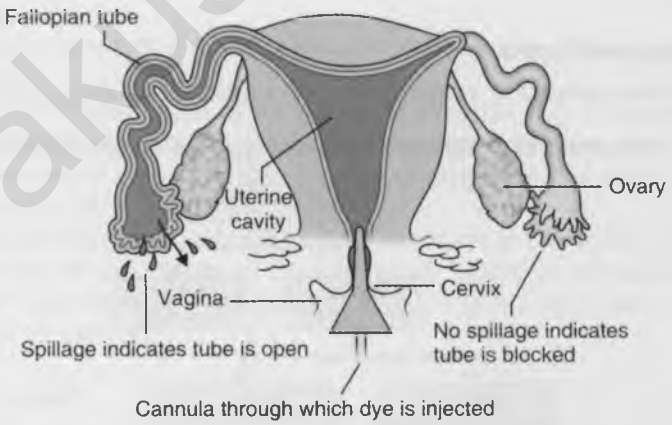


Fig. 11.5: Findings after using Rubin's cannula

Limitations

It is used only to see inside of the uterus and fallopian tubes. Abnormalities of ovaries, wall of the uterus, and other pelvic structures may be evaluated with MRI or ultrasound.

Complications

1. Embolism
2. Infection
3. Allergic reactions to the materials used
4. Intravasation of the material
5. Tubal rupture
6. Hemoperitoneum
7. Interruption of pregnancy.

BUDIN'S CANNULA

The catheter is double-channeled with an incomplete outer channel. The tip shows multiple openings. The inner channel is to push the fluids into the perforated skull to wash out brain matter. The outer channel is for clearing the washed brain matter.

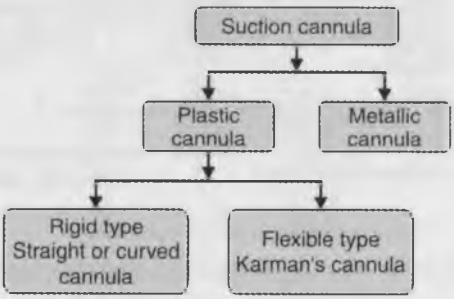
SUCTION CANNULA

The size of the cannula indicated its external diameter in millimeters.

Forms and Types

Suction cannula is available in two forms (Flow chart 11.1)

Flow chart 11.1: Different forms and types of suction cannula



PLASTIC CANNULA

RIGID PLASTIC CANNULA

Rigid plastic cannulas may be straight or curved and come in five sizes ranging from 8 to 12 mm in diameter.

STRAIGHT OR CURVED CANNULA

It is a straight or curved cannula with rounded tip with single slanted lateral opening at the tip and centimeter marking on the barrel indicating the depth to which it has been inserted. This instrument is 18 gauge BD; 12 cm long and with a luer-lock mount. Since it is transparent, the product of conception removed can be seen through it. It is available in 5 sizes ranging from 8 to 12 mm. It is curved at a distance of 1.5 cm from the blunt tip. Wall thickness of a plastic cannula is greater than that of a metal cannula of the same external diameter as plastic is softer than metal and the cannula would not be right enough to allow successful evacuation if the walls were as thick as those of the metal cannula.

Indications

1. Collection of cervical mucus from the external os and the cervical canal.
2. Artificial insemination: Intracervical or intravaginal
3. Postcoital test.
4. Aspiration of the posterior fornix contents for cytological study.
5. Medical termination of pregnancy during the first trimester by suction evacuation after rapid cervical dilatation.
6. Completion of inevitable abortion during first trimester of pregnancy.

The cannula is attached to a BD syringe for use either for aspiration or for injection. The curvature facilitates aspiration from or injection into the cervical canal. The blunt tip avoids trauma to the cervix.

How to use?

1. The procedure is carried out under general anesthesia or parenteral sedation and paracervical block.

2. The woman is placed in lithotomy position.
3. The cervix is exposed with a speculum and its anterior lip is held with a vulsellum.
4. The cervical canal is sounded with a uterine sound.
5. The cervix is dilated with metal or plastic cervical dilators.
6. The dilatation achieved in millimeters is the same as the number of weeks of gestation or one millimeter less.
7. The cannula of the same external diameter is passed into the uterine cavity to point short of the uterine fundus.
8. The other end of the cannula is connected to the suction pump with a rubber tube prior to insertion of the cannula into the uterine cavity.
9. The products of the conception are removed by suction moving the cannula to and fro or in a rotating movement.

Postprocedural Nursing Care

1. Sterile pad to vulva.
2. Abstinence from sexual intercourse for 2 weeks.
3. Methyl ergometrine orally for 2 to 3 days.
4. Analgesics for pain.
5. The woman may be sent home 2 hours after the procedure if done under local anesthesia and 4 to 6 hours if done under general anesthesia.
6. Rho (D) immune globulin if the woman is a nonsensitized Rh negative gravid and her husband is Rh positive. The dose is 50 micrograms after both menstrual regulation and rapid dilatation and suction evacuation.

Complications

1. Cervical tears and bleeding
2. Cervical and/or uterine perforation with uterine sound, suction cannula, ovum forceps or blunt curette.
3. Damage to intraperitoneal structures by suction cannula, ovum forceps or blunt curette after uterine perforation.
4. Bleeding due to incomplete abortion.
5. Infection.

FLEXIBLE CANNULA—KARMAN'S CANNULA

Fig. 11.6: Karman's cannula

Other Name

It is also called vacuum cannula or Karman's cannula or flexible plastic cannula (Fig. 11.6).

Founder

This instrument was developed by Harvey Karman.

Features

It is a transparent flexible polyethylene. It is available in 5 sizes, i.e. 4–8 mm. It has single or double-hooded lateral openings. It has a rounded tip and two sub-terminal sharp triangular opening with overhanging convex hoods. Its tip bends without blocking its opening and collapses without perforating the uterus. Because of two openings, there are fewer chances of blocking and it requires 180° rotation to cover the whole uterine cavity instead of 360°. Its external diameter is 4 or 5 mm so that it can be inserted into the uterine cavity without dilatation of the cervix.

Rarely the tip of the cannula at the level of opening may get arrested at internal os and may break off to be left inside the uterus. It can be removed by uterine dressing forceps or ovum forceps. The hooded cannula can be used as a curette as well.

Sizes

This flexible cannula is available in five sizes: 4, 5, 6, 7 and 8 mm in diameter.

Indications

- D and E, it is used when pregnancy advances more than 14 weeks.
- It is used for menstrual regulation (diameter 4 or 5 mm).
- It is used for endometrial aspiration.
- It is used for suction evacuation of vesicular moles or inevitable abortion up to 8 weeks of gestation.
- It is used for suction evacuation of early second trimester pregnancy terminations.
- Recovering threads of IUCD withdrawn into the uterine cavity with the IUCD in the uterine cavity: Application of suction through the Karman cannula results in withdrawal of the threads.

Contraindications

1. Gestational size is in excess of 6 weeks
2. Pelvic sepsis
3. Presence of large fibroids
4. Coagulation disorders

Advantages

There are minimal chances of perforating the uterus because of its blunt tip.

Disadvantages

There may be failure to evacuate, incomplete evacuation, infection and bleeding. Trauma to the cervix and uterine perforation are rare complications.

Sterilization

Plastic cannula is usually disposable but if it has to be used, it is sterilized by ethylene oxide or immersion in antiseptic solution or using gamma rays.

How to use?

- Anesthesia is not necessary. Some obstetricians administer a paracervical block.
- The woman is placed in lithotomy position.

- The cervix is exposed with a speculum and its anterior lip is held with a vulsellum.
- The cervical canal is sounded with a sound or the Karman cannula itself.
- The valve assembly is installed on the Karman syringe and the cannula is attached. The vacuum retention button is depressed and locked.
- The syringe plunger is pulled back until locking tabs are engaged on both sides.
- The cannula is inserted into the uterine cavity to a point short of the fundus. If it buckles during insertion, a smaller Karman cannula may be passed inside it to strengthen the cannula.
- The vacuum retention button is released and the cannula is rotated from side-to-side as well as moved to and fro.
- If the suction is lost or the syringe fills to 25 ml before the procedure is complete, the syringe is disconnected leaving the cannula *in situ*.
- The syringe is emptied, connected again, vacuum is created as described before and the procedure is continued.
- End point is indicated by gripping of the cannula by the uterus, grating sensation on to and fro movement of the cannula and a firm contracted feel of the uterus on bimanual pelvic examination.

Postprocedural Care

- Sterile pad to vulva.
- Abstinence from sexual intercourse for 2 weeks.
- Analgesics for pain.
- The woman may be sent home 2 hours after the procedure with instructions to report immediately if she experiences severe cramp, excessive bleeding per vaginam, fever and if her next menstrual period does not occur within 4 to 5 weeks after the procedure.
- Rho (D) immune globulin if the woman is a nonsensitized Rh negative gravid and her husband is Rh positive.

Complications

- Uterine perforation
- Severe uterine cramps during or after the procedure

- Cervical trauma
- Fainting during the procedure
- Vomiting during the procedure
- Infection
- Bleeding due to incomplete abortion
- Rh-isoimmunization

2. METALLIC CANNULA

Fig. 11.7: Metallic cannula

Features

It is 25 cm long and curved instrument with a rounded tip and one or two sub-terminal openings. There is a convex hood overhanging each opening which acts as a curette while the suction draws on the uterine wall. There is a thumb rest near a proximal end with center hold in it, connecting to the lumen of the cannula. Hence, thumb is kept over the thumb rest to control the vacuum. When the thumb covers it, vacuum can be built in the cannula and on removing the thumb from the hole, the vacuum is broken. The cannula is usually curved in its terminal portion for convenience. The wall thickness of cannula should be less than 10% of outer diameter. The front cut of the curette opening should be as close to the tip as possible so as to avoid missing a fundal implantation. The proximal end is grooved for fitting the rubber tube which connects it to the vacuum source.

Sizes

The metal cannulas are available in diamteres of 6, 8, 10, 12, 14, and 16 mm.

Advantages over Plastic Cannula

It is reusable and the walls are thinner. It has greater internal diameter than plastic cannula of the same diameter.

Disadvantage

It is more traumatic over plastic cannula.

Uses

1. For evacuation of uterus by suction evacuation in missed, incomplete, inevitable, vesicular mole or for 1st trimester MTP. In MTP, the size of the cannula used is ≤ 1 than the period of gestation.
2. Flexible plastic cannula of 4–5 mm may be used for menstrual regulation.
3. Endometrial aspiration.

Sterilization Method

It is sterilized by means of boiling or autoclaving.

How to use?

For first trimester pregnancy termination, the size of the cannula selected is equal to the number of weeks of gestation or one less. After dilatation of the cervix under general anesthesia or paracervical block, the cannula is inserted into the uterine cavity beyond the internal os and a suction force of 60 cm of mercury is applied. The movement of the cannula is to and fro if it is of Karman type. Before removal of the cannula, the suction is broken by removing the thumb from the thumb rest, if it is a metal cannula, and by switching off the suction pump, if it is a plastic cannula. The suction is not started before the cannula is in the uterine cavity as that would cause suction of the endocervical mucosa into the cannula impeding its entry into the uterine cavity and traumatize the cervix. End of the procedure is indicated by the cannula getting gripped by the uterine wall and by a grating sensation on to and fro movements of the cannula.

Complications

1. Uterine perforation.
2. Damage to omentum or bowel by aspiration into the cannula after uterine perforation.
3. Hemorrhage from incomplete evacuation, uterine perforation, etc.
4. Postabortal infection of the genital tract.
5. Tip of the flexible plastic cannula may break inside the uterine cavity and be retained; it is removed by suction with a larger cannula or by a curette.

Nursing Interventions after using Cannulas

1. Vaginal care: Vaginal pads for 1 to 2 days if the woman has some vaginal spotting (bloody discharge). Some leftover dye after the procedure may also come out of the vagina. After discharge, carefully wash the vagina with soap and water. Afterwards, put on a clean, new vaginal pad. Change the vaginal pad any time it gets wet or dirty. Ask the midwife for any doubts about vaginal care.
2. Contact the caregiver if the woman has:
   - Fever.
   - Chills, a cough, or feel weak and achy.
   - Nausea or vomiting.
   - Pads become soaked with blood.
   - Skin is itchy, swollen, or has a rash.
   - Decreased urine output.
3. Seek care immediately if:
   - Fever.
   - Bulging vagina and not going back in.
   - Abdominal pain not responding to pain medicines.
   - Sudden breathing problems or other signs of an allergic reaction to the dye.
   - Bloody urine.
   - Pain when passing urine or having sex.
   - Pus or a foul-smelling odor is coming from vagina.

12 Instruments used in Induction of Labor

DEFINITION OF INDUCTION OF LABOR

Induction of labor is the process used to encourage labor to start artificially. Some of these processes involve administration of drugs; all aim to encourage the cervix to shorten and soften, and ultimately to open it with the help of contractions to allow the baby to be born. Induction of labor aims to initiate labor, but occasionally this does not work.

Indications for Induction of Labor

- Post-term pregnancy, i.e. if the pregnancy has past 42 weeks.
- Intrauterine growth retardation (IUGR).
- There are health risks to the woman in continuing the pregnancy (e.g. pre-eclampsia).
- Premature rupture of the membranes (PROM).
- Premature termination of the pregnancy (abortion).
- Fetal death *in utero*.
- Twin pregnancy continuing beyond 38 weeks.

Contraindications

- Malpresentations (e.g. transverse or oblique lie, footling breech).
- Absolute cephalopelvic disproportion.
- Placenta previa.
- Previous major uterine surgery or classical cesarean section.
- Invasive carcinoma of the cervix.
- Cord presentation.
- Active genital herpes.
- Gynecological, obstetrical or medical conditions that preclude vaginal delivery.

Advantages

- For serious medical conditions, induction can be life-saving.
- The mother and the healthcare provider can schedule the labor.

Disadvantages

- Restricted movement—non-active birth.
- Continual fetal monitoring.
- More intense labor.
- More request for pain relief.
- Increase in use of epidural.
- Time pressures.
- Huge increase in chance of cesarean.
- Above average blood loss afterbirth.
- Strong uterine contractions may cause fetal distress.
- Can cause cord prolapse, bleeding and infection.

Deterrents of Induction of Labor

- Risk of failure—unripe cervix, low Bishop's score.
- Cephalopelvic disproportion.
- Unfavorable presentation (transverse lie).
- Previous repeated cesarean section.
- Grand multipara.
- Overdistension of uterus (polyhydramnious or multiple pregnancy).
- Pre-existing hypertonus.
- Serious maternal illness.
- Poor facility for labor with inadequate supervision.
- Previous history of difficult labor and/or traumatic delivery.

Limitations

It cannot be employed in unfavorable cervix. Cervix should be at least one finger dilated.

Complications

1. **Maternal**
   - Maternal fear and anxiety
   - Uterine inertia-prolonged labor

- Intrapartum induction
- Abruptioplacenta
- Rupture of the uterus
- Cervical laceration
- Amniotic fluid embolism
- Postpartum hemorrhage

2. **Fetal**
   - Hypoxia
   - Iatrogenic prematurity (wrong dates)
   - Prolapse cord
   - Infection

Instruments used in Induction

Instruments which are used in induction of labor are:

1. Drew Smythe catheter
2. Amniotomy scissors
3. Amnion hook or amnicot

1. DREW SMYTHE CATHETER

Fig. 12.1: Drew Smythe catheter

Other Name

Drew Smythe catheter is also called membrane perforator or cannula.

Features

It is a 'S' shaped catheter with a blunt spring loaded stillete used for high rupture of the fetal membranes and also has a side opening which helps to allow escape of liquor amnii through it. It allows a controlled leakage of liquor amnii. It is passed up between the membranes and wall of uterus for some distances before the puncture is made. The high rupture of membranes preserves the dilating effect of bag of waters and also the chances of infection and prolapse of cord are reduced.

Material made up of and Sterilization Method

This instrument is made of stainless steel. Hence, it is sterilized by means of boiling or autoclaving.

Indications/Uses

a. *High amniotomy:* It is used for high rupture of membranes in cases of polyhydramnios, when hydramnios is causing gross discomfort to mother.
b. In normal labor when os is three-fourths dilated and contractions are getting weaker. Rupture of membranes help to accelerate the progress of labor.
c. Before induction of labor by oxytocin in cases of post-maturity.
d. To drain a hydrocephalic head through a cervical spina bifida in case of a breech delivered up to the head.

Advantages

1. The dilating effect of bag of forewaters is preserved.
2. Chances of ascending infection are less.
3. Prolapse of the cord is prevented.
4. Measured volumes of liquor amnii can be removed at desired rate.

Amount of Fluid Drained in Case of Hydramnios

The amniotic fluid is drained till the pressure symptoms subside but not exceeding one pint (500 ml).

Immediate Beneficial Effects

- Lowering of blood pressure in pre-eclampsia/eclampsia.
- Relief of maternal distress in hydramnios.
- Control of bleeding in antepartum hemorrhage.
- Relief of tension in abruptio placentae and initiation of labor.

How to use?

The fetal heart sound is recorded. The woman was made to lie in lithotomy position. Strict aseptic and antiseptic precautions were maintained. Evacuation of bladder and bowel was done. Through vaginal examination, the condition of cervical os is noted. If os permits one finger, the membranes are separated.

The midwife assists the obstetrician to press the fundus per abdomen for proper fixation of the presenting part. The catheter is held by the left hand at a right angle. The stillete is slightly drawn in. The instrument is pushed per vaginam under cover of the palm and fingers of the right hand, keeping the instrument between the separated membrane and the right-hand fingers. The catheter is to be introduced till it does not become horizontal.

The stillete is pushed in and the catheter is depressed towards the perineum. The stillete is now slowly withdrawn just beyond the mark of the side nozzle. The fluid is allowed to come out and collected in a container. The stillete is again pushed back and the whole instrument is now withdrawn keeping it under the cover of the palm and fingers. The condition of the cervix is noted to exclude any injury.

Complications

1. Placental separation
2. Fetomaternal hemorrhage
3. Infection

Note: High amniotomy was recommended in the past for hydramnios. It is not done any more in modern obstetrics due to high risk of complications.

2. AMNIOTOMY FORCEPS

Features

Amniotomy forceps (Fig. 12.2) is curved on flat in such a fashion that it is S-shaped in profile. This shape facilitates amniotomy. The tips of the forceps have transverse serrations. It is a sharp pointed instrument.

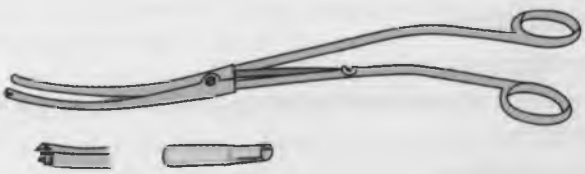


Fig. 12.2: Amniotomy forceps

Indications

The forceps is used for performing low rupture of membranes of induction of labor in the following conditions, as well as for augmentation of labor.

I. Obstetrical indications

- Pregnancy induced hypertension
- Eclampsia
- Abruptio placenta
- Placenta previa: Degree I and II anterior
- Postmaturity
- Fetal malformations incompatible with life
- Rho (D) isoimmunization
- Unstable lie
- Repeated intrauterine fetal death at term
- Hydramnios with cardiorespiratory embarrassment
- Hyperemesis with signs of ketosis in late pregnancy.

II. Medical

- Chronic hypertension
- Chronic glomerulonephritis
- Chronic pyelonephritis
- Diabetes mellitus
- Repeated sickle cell crisis
- Icterus gravidarum: Rarely
- Chorea gravidarum: Rarely
- Rapidly progressive malignant or terminal disease of the mother, when she wishes to deliver the fetus before she dies.

Contraindications

1. Major degree of pelvic contraction.
2. Other forms of insuperable pelvic obstruction to the delivery of the baby.
3. Malpresentation.
4. Fetal immaturity.

5. Intrauterine fetal death: Rupture of membranes greatly increases the risk of sepsis.
6. Acute gonorrhea and herpes genitalis.

Material made up of and Sterilization Method

The instrument is made up of stainless steel and is sterilized by boiling or autoclaving.

Advantages

1. High success rate.
2. Chance to observe amniotic fluid for blood or meconium.
3. Access to use fetal scalp electrode or intrauterine pressure catheter or for fetal scalp blood sampling.

Method of use

1. Anesthesia is not necessary for performing amniotomy.
2. The woman is placed in lithotomy position, dorsal position with legs flexed, or Sim's lateral position.
3. The forceps is introduced along the index and middle fingers of the right hand in the maternal vagina by keeping the blades closed.
4. The tips of the blades are inserted through the cervical canal up to the fetal membranes.
5. The membranes are grasped with the tips of the forceps and are ruptured.
6. If the membranes are bulging, it is not even necessary to grasp the membranes, but mere touching the membranes will rupture them.
7. If the fetal head is not engaged at the time of amniotomy, the woman is put in a Trendenlenburg position, a contraction is elicited by massaging the uterus and downward pressure is maintained on the uterine fundus to engage the fetal head in the pelvis.
8. The fetal head is also fixed in the pelvic inlet to prevent cord prolapse after amniotomy.
9. Only a small area of membranes is ruptured at first and as soon as the fetal head is firmly fixed in the pelvic inlet, larger area of membranes is detached and ruptured.

10. Liquor amnii is drained under finger control.
11. When no more liquor comes out, horizontal position is given, after which more liquor drains out.
12. The fingers must not be removed from the vagina until the head descends against the cervix, and the fetal heart rate is found to be normal.
13. If there is fetal bradycardia, it is due to cord compression.
14. If amniotomy is done during labor, it is done in between uterine contractions to avoid cord prolapse as amniotic fluid gushes out.
15. Amniotomy acts by causing release of prostaglandins from the membranes.

Labor Onset

Latent period between amniotomy and onset of labor is 9 hours in a primigravida and 5 hours in a multigravida. With amniotomy alone, 60 to 70% gravidas deliver in 24 hours. Additional 5 to 10% go in labor in 8 hours when an oxytocin infusion is started 24 hours after amniotomy. Almost 100% multigravidas with ripe cervix go in labor and deliver within 2 hours after amniotomy, or after an additional oxytocin infusion started 6 to 10 hours later if labor has not started yet.

Complications

1. Failed induction.
2. Prematurity.
3. Unforeseen disproportion.
4. Uterine inertia after amniotomy.
5. Sepsis: Chorioamnionitis.
6. Placental site retraction and fetal asphyxia.
7. Partial placental separation and a bloody tap: More likely to occur after a high rupture of membranes.
8. Dry labor.
9. Abruption placenta: May follow amniotomy in hydramnios.
10. Fetal pneumonia.
11. Cord prolapse.
12. Amniotic fluid embolism.

3. AMNION HOOK OR AMNICOT

Artificial rupture of membranes (AROM) is also called an amniotomy. It may be performed by a midwife or obstetrician to induce or accelerate labor. The membranes may be ruptured using a specialized tool, such as an amnihook or amnicot. In one study comparing amnihook versus amnicot for artificial rupture of membranes, use of an amnicot was associated with fewer neonatal scalp lacerations.

Amnion Hook

The amnion hook is a rigid, plastic device with a pointed tip at the end of smooth curve, attached to a 10-inch handle.

Other Name

It is also called amniotomy hook or amnihook (Figs 12.3 and 12.4).

Fig. 12.3: Amnion hook

Fig. 12.4: Tip of the amnion hook

Amnicot

The amnicot has a pointed plastic tip embedded in a latex or latex-free finger cot.

Other Name

Amnicot is also called AROM-cot or amniotic finger cot (Fig. 12.5).

Fig. 12.5: Amnicot

Mechanism of Action

It is hypothesized that amniotomy increases the production of, or causes a release of, prostaglandins locally. The amniotic fluid is rich in a hormone called prostaglandin, and the bathing of the cervix by this fluid increases the strength and frequency of uterine contractions.

Indications/Uses

- To induce labor or augment uterine activity.
- To enable the obstetrician or midwife to monitor the baby's heartbeat internally. A scalp electrode is placed against the baby's head and an ECG of the baby's heartbeat can be directly recorded. This provides a much more reliable indication of the fetal well-being than external monitoring alone.
- To check the color of the amniotic fluid. If there is a suspicion of the presence of meconium, certain preparations must be made. Suctioning must be set up and more personnel are required to be in attendance.
- To avoid having the baby aspirate the contents of the amniotic sac at the moment of birth. In a rare case, the baby can be born with an intact bag that must be quickly broken to allow the baby to breathe.

Contraindications

- Known or suspected vasa previa.
- Any contraindications to vaginal delivery.
- Unengaged presenting part (this obstacle may be overcome with the use of a controlled amniotomy or the application of fundal or suprapubic pressure).

Criteria to be Fulfilled

There are certain criteria for an amniotomy to be performed. They are:

1. The mother should be in active labor (four or more centimeters dilated).
2. The mother should be at term.
3. The head should be engaged (0 station or more).
4. There should be an indication for the procedure.

Pre-Preparation

1. Amniotomy is usually performed with the woman supine in the labor bed, with knees and hips flexed (i.e. "frog-legged"). It may also be performed with the woman in the lithotomy position, especially if a speculum is required.
2. Once the woman is positioned, wear sterile gloves.
3. The dominant hand is used to perform a cervical examination to assess dilation, effacement, position, and station. The presenting fetal part should be determined to be well applied to the cervix before performing amniotomy.

How to Hold Amnion Hook?

Fig. 12.6: Method of holding amnion hook

How to use?

A pelvic examination is performed to evaluate the cervix and station of the presenting part. The fetal heart rate is recorded before and after the procedure. The presenting part should be well applied to the cervix. The membranes over the fetal head are removed by the examining finger.

With the amnion hook method, the handle of the sterile plastic hook is held with one hand outside the vagina, while two fingers of the opposite hand are placed in the vagina to guide the tip. It is inserted into the cervical os through the vagina by sliding it along the hand and fingers and used to puncture the membranes containing the amniotic fluid. Care should be taken to protect maternal tissues from the point. If an amniotic finger cot is used, the device is placed on the index or middle finger of the examining hand.

Once the hook reaches the amniotic sac, the tip is pushed up against the sac with the index or middle finger of the internal

Fig. 12.7: Inserting the amnion hook and puncturing the sac guided by two fingers

hand to pierce the membranes (Fig. 12.7). The hook is then pulled through the membranes with the external hand holding the handle to create a hole in the sac. If an amniotic finger cot is being used, the pointed tip is dragged through the membranes with the finger to create the amniotomy. The examining hand should remain in place to confirm that there has been no prolapse of the umbilical cord during the amniotomy. The hand is then removed from the vagina.

With the membranes punctured, amniotic fluid is able to escape from the uterus and exit the vagina. The membranes are scratched or hooked to effect rupture. The absence of a fluid buffer between the fetus and uterus stimulates uterine contractions, which are also promoted by the rush of prostaglandins from the amniotic fluid. The nature of the amniotic fluid is recorded (clear, bloody, thick or thin, meconium). The fetal heart rate should be monitored for several minutes after the procedure.

Risks

- Umbilical cord prolapse or compression
- Maternal or neonatal infection
- FHR deceleration
- Bleeding from placenta previa or low-lying placenta
- Possible fetal injury
- Increased chances of malpresentation

Nursing Interventions for Using the Instruments in the Induction of Labor

1. Communication should be clear between personnel with good liaison between midwifery, obstetric, medical teams and the pediatric services to ensure support and care available as needed.
2. Mothers and their birth partners should be given factual and unbiased information about induction of labor.
3. Written information should be available as well as an opportunity to discuss issues relating to induction with both medical and midwifery staff.
4. The process of induction of labor should only be considered when vaginal delivery is felt to be the appropriate route of delivery.
5. Assessment of gestational age (39 weeks).
6. Monitoring fetal heart rate for reassurance before and during the use of instruments.
7. Pelvic examination with assessment of the cervical status.
8. The Bishop score must be 8 or more.
9. All maternal and fetal observations are recorded on the partogram.
10. Monitoring and management of hyperstimulation of uterus.
11. The midwife caring for the woman should be aware of her local labor ward protocols and policies for induction of labor.
12. The midwife is monitoring the well-being of the mother and fetus throughout the process of induction.
13. Position and station of the presenting part will also be noted and these observations act a baseline for assessing progress of the labor.
14. Vaginal examinations are usually carried out every 4 hours, but this may vary if progress is slow, or may be dependent on local policies and the woman's choice.

13 Instruments used in Labor

LABOR

Labor is a physiologic process during which the products of conception that is the fetus, membranes, umbilical cord, and placenta are expelled outside the uterus. Changes in the biochemical connective tissue and gradual effacement and dilatation of the uterine cervix as a result of rhythmic uterine contractions of sufficient frequency, intensity, and duration leads to delivery of the baby.

Instruments which are used in the process of delivery are listed below:

1. Episiotomy scissors
2. Mucus sucker
3. Cord cutting scissors
4. Umbilical cord clamp
5. Scholler's cord carrier

1. EPISIOTOMY SCISSORS

Definition

Episiotomy scissors is the instrument which is used to make a surgically planned incision on the perineum and the posterior vaginal wall during second stage of labor which helps to facilitate delivery. Episiotomy is one of the most common medical procedures performed on women, and although its routine use in childbirth has steadily declined in recent decades, it is still widely practiced in many parts of the world including Latin America, Poland, Bulgaria, India and Taiwan.

Features

- It is 16 cm long.
- The blades are angled on side.
- The finger grip is directed in the same direction, which makes it more convenient to use by avoiding its lower finger grip putting against the woman's buttock. The angle also serves the same purpose.
- Lateral serrations on one blade for a secure grip of tissue, are combined with the curved blades or a smooth straight incision.
- It is a curved on angle type of scissors.

Types

- **Curved**

Fig. 13.1: Curved episiotomy scissors

- **Straight**

In case the curved type of scissors is not available, a straight episiotomy scissors may be used (Fig. 13.2).

Fig. 13.2: Straight episiotomy scissors

Material

This instrument is made of stainless steel.

How to Sterilize?

It is sterilized by immersion in lysol or gluteraldehyde.

Advantages

The use of episiotomy scissors can decrease the amount of pushing which the mother must do during delivery. It can also decrease the trauma to the vaginal tissues and expedite delivery of the baby when delivery is necessary quickly. The tip of the scissors is not sharply pointing which helps to avoid damage to the surrounding tissue while working.

Types of Incisions

There are four main types of episiotomy:

1. *Mediolateral or posteriolateral:* The incision is made downward and outward from midpoint of fourchette either to right or left. It should not be more than 3 cm long and it is directed diagonally in straight line which runs about 2 to 5 cm away from the anus (midpoint between anus and ischial tuberosity). If the anus is considered to be 6 on the clock, the incision would be directed to 7 O'clock.

Fig.13.3: Mediolateral episiotomy

This type of incision is the widely used method of birth practitioners and does not require careful control of baby's head which may damage or tear through the anal sphincter (Fig. 13.3).

2. *Median:* The incision commences from centre of the fourchette and extends on posterior side along midline for approximately 2 to 5 cm. It requires careful control of the baby's head as it passes through the vaginal opening. There is a great risk that the incision will be extended during delivery and can go directly into the anal sphincter which leads to third degree tear. When vaginal manipulation is necessary or the baby is large, the median incision does not provide as much space as the mediolateral incision. The advantages of this type of

Fig. 13.4: Median or midline episiotomy

episiotomy are less bleeding, easy and successful repair, greater subsequent comfort for the woman (Fig. 13.4).

3. *Lateral:* The incision starts from about 1 or more cm away from the centre of fourchette and extends laterally. This type of incision is not favored. The main disadvantage is chance of injury to Bartholin's duct. The levator ani muscle is weakened. Bleeding is more profuse. Suturing is more difficult and the woman experiences subsequent discomfort. Thus some practitioners have totally condemned it.
4. *'J' shaped:* The incision begins in the centre of the fourchette and is directed posteriorly along midline for about 2 cm and then directed downwards and outwards along 5 or 7 O'clock position to avoid the anal sphincter. Suturing of this type of incision is difficult. Shearing of the tissues occurs in this type. The repaired wound tends to be puckered. This type of episiotomy is also not used widely (Fig. 13.5).

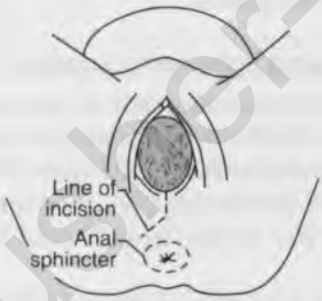


Fig. 13.5: 'J' shaped episiotomy

Difference between Midline and Mediolateral Episiotomy

Table 13.1: Difference between midline and mediolateral episiotomy

Sl. No.	*Characteristics*	*Mediolateral*	*Midline*
1	Surgical repair	More difficult	Easy
2	Faulty healing	More common	Rare
3	Postoperative pain	Common	Minimal
4	Anatomical results	Occasionally faulty	Excellent
5	Blood loss	More	Less
6	Dyspareunia	Occasional	Rare
7	Extensions	Uncommon	Common

Uses

- If there is a serious risk of second or third degree tearing to the mother.
- In cases where a natural delivery is adversely affected, but a cesarean section is not indicated.
- If natural tearing causes an increased risk of maternal disease being vertically transmitted.
- If the baby is macrosomic baby (very large baby).
- If the mother has excessively rigid perineal muscles.
- When instrumental delivery is indicated.
- When a woman has undergone female genital mutilation.
- If there is prolonged late deceleration or fetal bradycardia during active pushing.
- Shoulder dystocia, or a bony association. The episiotomy does not directly resolve this problem, but it is indicated to allow the operator more room to perform maneuvers to free shoulders from the pelvis.

Prerequisites for using Episiotomy Scissors

1. Ensure that the presenting part is directly applied to the perineal tissues, which will be evidenced as bulging perineum.
2. Ensure that vaginal orifice is distended by approximately 3 cm diameter of presenting part between contractions.
3. The presenting part of the fetus should be protected from injury.
4. A single cut in any direction is preferable to repeated snipping, as repeated snipping will have jagged ends.
5. The episiotomy should be large enough to meet the purpose.
6. The timing of the cut should be such that lacerations are prevented and unnecessary blood loss is avoided.

How to use?

1. Make the woman lie down in lithotomy position or dorsal recumbent position when the fetal head is distending in the perineum.
2. Inject local anesthesia of about 10 ml. Wait for 3 to 5 minutes. In some countries, we find this is not necessary since we use the episiotomy as a last resort and the perineal tissue is usually stretched to a very thin maximum already

Fig. 13.6: Infiltration of the perineal tissues using local anesthesia

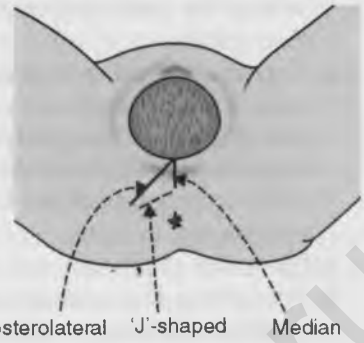


Fig. 13.7: Various types of episiotomy incisions

and not requiring anesthesia. Anything given to the mother will cross the placenta and have effect on the baby (Fig. 13.6).

3. The type of incision is chosen according to the woman's condition (Fig. 13.7).
4. Place the index and middle fingers in the vagina with palmar side downwards. Separate them slightly and exert outward pressure on the perineal body. Place the blades of the scissors in a straight up and down position, so that one blade is against the posterior vaginal wall and the other blade against the skin of the perineal body with the point where the blades cross at the middle of the posterior fourchette.
5. A mediolateral episiotomy is given. This is a standard procedure in a hospital birth. It is supposed to facilitate descent of the baby's presenting part. Extend the vaginal

Fig. 13.8: Mediolateral episiotomy

side of the incision if needed by incising the vaginal band (Fig. 13.8).

6. Care must be taken to prevent injury to the fetal presenting part. A blunt-ended side of the scissors should be used on the inside of the perineum and the presenting part protected by the midwife doing the episiotomy.
7. After completion of the delivery, the midwife sutures the episiotomy incision.
8. Clean the perineum and apply perineal pads.
9. Straighten the woman's legs and assist her to supine position with legs crossed.
10. Wash and dry the instruments used for episiotomy.
11. Record in the labor record about the time of episiotomy, type of episiotomy, suturing carried out and woman's reaction.
12. Check for any bleeding from inner areas or hematoma formation and any other tear or laceration.
13. Check vital signs and record the findings.

Client Instructions after using Episiotomy Scissors

- Lochia may drain for up to four weeks, so pads should be changed frequently. Do not use tampons after delivery. Tampons may cause infection.
- Educate to keep the stitches clean and dry.
- Avoid straining for passing urine or stools.
- Urination can be painful after delivery. Squirting warm water over the perineum during urination may ease the pain. When finished urinating, gently put the perineum dry.
- Sit with thighs closed so as not to put a strain on the wound.
- Avoid heavy work or weight lifting in the initial days as it may strain the episiotomy sutures.
- Explain the woman to remain active and mobile and also to take adequate rest.
- Kegel's exercises helps to strengthen and tone the pelvic muscles and lessen perineal pain. Kegel's exercises are small movements of the vaginal muscles similar to the movement we make if we are trying to stop urinating.
- Take some oral medicines such as an antibiotic and if necessary an oral analgesics for pain relief for a few days.
- Apply an antiseptic ointment over the wound for a few days.

- Clean the area with some warm water and a microbicidal like Betadine, a couple of times a day to avoid infection.
- The midwife often also advises to sit in a tub of warm water (Sitz's bath) in which an antiseptic solution has been added for 10–20 minutes daily for a few days. A pinch of salt is sometimes added to the water. Sitz's bath helps in cleansing as well as in reducing pain and swelling.
- Avoid sexual intercourse until there is no more perineal pain. Most healthcare providers recommend pelvic rest until four weeks after delivery, but there are no clear guidelines. If the woman needs to use a lubricant for sex, make sure it is water-soluble.

Side Effects

- Infection
- Increased pain
- Increase in 3rd and 4th degree vaginal lacerations
- Longer healing times
- Increased discomfort when intercourse is resumed.

When to Seek Medical Care

Seek the medical care if any of the following symptoms occur:

- Bad-smelling discharge from vagina.
- Burning pain with urination.
- Passing urine more frequently than usual.
- Urge to pass urine frequently, but decreased output.
- Severe pain in perineum, pelvis, or lower abdomen.
- High fever.
- Passing gas or stool through the vagina.
- Blistering or herpes outbreaks.
- Nausea and vomiting.
- Severe abdominal or pelvic pain.
- Heavy vaginal bleeding (soaking through more than one pad every hour).

Complications

a. Immediate

- Extension of episiotomy to complete perineal tear particularly median type.

- Vulval hematoma
- Wound infection and non-union.

b. Delayed

- Dyspareunia
- Implantation dermoid
- Injury to the bowel leads to fistula formation.

2. MUCUS SUCKER

Definition

Mucus sucker is the instrument specially designed to clear the airway by suctioning the secretion from the nose and mouth of the newborn baby, thereby ensuring good respiration.

Features

It comes in stainless steel, rubber as well as disposable materials.

Types

a. Disposable Mucus Sucker

Disposable mucus sucker is specially designed for aspiration of secretion from oropharynx in newborn babies to ensure free respiration.

It is 23 cm long. It is made of two parts.

Each part has a cup at one end, and the two cups fit together to make a safety chamber. Catheters do not end abruptly into the cups, but continue for some distance, so that the aspirated mucus collects in the chamber and does not enter the midwife's mouth. The fetal end is curved and has lateral holes.

Fig. 13.9: Disposable mucus sucker

It is very transparent. Low friction surface catheter is provided with open end silk smooth round tip for trauma free insertion of the aspiration. It is also suitable for obtaining mucus specimen for microbiological examination. Spare plug cap is provided to seal the container for safe transportation of specimen to the laboratory or aseptic

disposal of container. Mucus extractor with step connector and mucus trap for bronchoscope application are also available (Fig. 13.9).

How to use the disposable mucus sucker: First put the tube that goes into the bottom of the jar in the baby's mouth. It should not go more than 10 cm (4 inches) down the baby's throat. Suck on the other tube while wiggling the first tube around in the baby's mouth. The fluid in the baby's mouth or nose will go into the jar but not into the midwife's mouth. After cleaning the baby's mouth, clean the baby's nose in the same way (Fig. 13.10).

Fig. 13.10: Suctioning the baby using disposable mucus sucker

b. Rubber Bulb Mucus Sucker

A bulb mucus sucker is a small, rubbery object that is used to remove mucus in a newborn baby (Fig. 13.11).

Fig. 13.11: Disposable bulb mucus sucker

Different positions used before using rubber bulb mucus sucker

- Hold the baby in arm at an angle with his head up. Cover his outside hand with your forearm and hold his inside hand with your same hand. This will not only isolate the use of his hands to put you away, but it will also limit his head movement in the bend of your arm.
- If two people are available, one may hold the baby in the same manner as above and use his free hand to hold both of the baby's hands while the other person suctions.

- You may also lay your baby on his side on a changing table. This allows you to hold his hands with one of your hands while using your other hand to suction.

How to use rubber bulb mucus sucker:

It is important to position the child correctly when using a bulb mucus sucker.

1. Sterilize a bulb syringe before using it.
2. To use the bulb mucus sucker properly, first hold the bulb mucus sucker with the tip between middle finger and forefinger. The bulb should be in the palm of the hand. Then before inserting the suction bulb in the baby's nose—push .all the air out of it with the thumb on the top of the bulb (Fig. 13.12).

Fig. 13.12: Pressing the bulb with the thumb and squeezing the air out of it

3. Gently and carefully, insert the tip of the bulb into mouth which requires suctioning first. Slowly release the thumb. Always suction an infant's mouth first and then the nose. Suction the mouth and throat until they are clear of mucus. When suctioning the mouth, be sure to put the suction bulb in the side of the child's mouth (Figs 13.13 to 13.15).

Fig. 13.13: Squeeze the bulb and insert the tip into the mouth and suctioning it first

Fig. 13.14: Insert tip into nostril and suction the nose

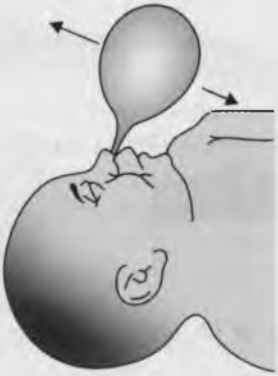


Fig. 13.15: Release the bulb after suctioning

4. While releasing the thumb, air re-enters the bulb. This will draw the fluids out of the nose and mouth. It is very important to get the clogs cleared from the baby's airway. Allow time for the baby to recover and breathe in between suctioning (Fig. 13.16).

Fig. 13.16: Releasing the thumb from the bulb helps to withdraw the fluids out of the nose and mouth.

c. Metal

It is used to suck out the mucus from the nasopharynx following delivery of the head of the baby. To be of value, the mucus is to be sucked prior to the attempt of respiration; otherwise the tracheobronchial tree may be occluded leading to inadequate pulmonary aeration and development of asphyxia neonatorum. The metal sucker requires a sterile simple rubber catheter to be fitted at one end and a sterile piece of gauze to the other end. Currently, electric or the disposable sucker is being used (Fig. 13.17).

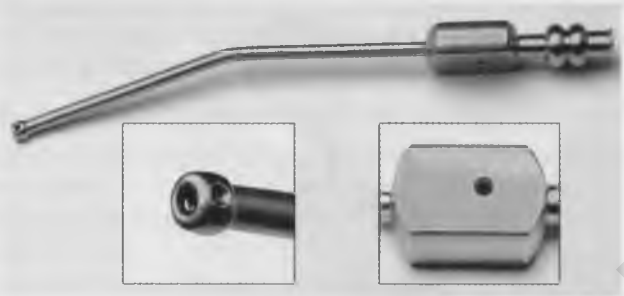


Fig. 13.17: Metal mucus sucker

Sterilization Method

It is sterilized by boiling or autoclaving.

Uses

1. A mucus sucker is used to clear the upper respiratory tract of the newborn baby by suction, so that mucus, amniotic fluid and meconium, if any are removed and the newborn baby can breathe without the danger of aspiration.
2. It is also useful when the neonate regurgitates after a feed and is likely to aspirate the regurgitated material. The instrument should be used with care, because its metallic tip can injure the pharynx of the newborn.
3. It is useful in institution practice when the electrical suction machine fails, and in domiciliary midwifery.

3. CORD CUTTING SCISSORS

Fig. 13.18: Cord cutting scissors

Other Name

It is also called umbilical cord scissors.

Features

This instrument is made of stainless steel. It is 10.5 cm long. Its blades are so curved that on closing they meet only at their tips, leaving a gap in between for accommodating the cord. The proximal end has finger rings without ratchet lock.

Mechanism of Action

The cord slips while being cut with ordinary scissors because it contains Wharton's jelly and is covered by smooth amniotic membrane. That is avoided by the use of this instrument, because the tips of the blades meet beyond the umbilical cord.

Uses

This is used for cutting the umbilical cord of the newborn after delivery. The curved blades meet around and beyond cord, thus preventing it from slipping. Nowadays, cord is clamped between two artery forceps and cut in between with ordinary scissors.

Material made of and Sterilization

It is made of stainless steel. It is sterilized by immersion in lysol or gluteraldehyde.

When to Clamp and Cut the Cord?

Ideally cord is clamped after the pulsations of umbilical cord ceases. The idea is to allow about 80–100 ml of blood to go to the fetus.z

Early cord clamping should be done in:

- Prematurity
- Asphyxia
- Rh isoimmunization
- Multiple pregnancy
- Intrauterine growth retardation.
- Suspected congenital heart disease.

In babies with asphyxia, Rh isoimmunization, diabetes and cord must be kept 5–6 inches long.

Prerequisites

- Follow strict aseptic technique.
- Allow for the cessation of pulse in the umbilical cord.

How to Hold?

Fig. 13.19: Way of holding the cord cutting scissors

How to use?

- Transfer the mother to the delivery room.
- Monitor for uterine contractions and per vaginal examination findings.
- Maintain labor progress chart.
- Once the onset of second stage of labor has been confirmed, place the woman in dorsal position with knees bent at lower end of the delivery bed.
- Deliver the head of the baby. Sweep the fingers in both directions of the head to feel the umbilical cord.
- If cord is felt and if it is loose, slip it over the baby's head. If the cord is tight, apply clamps about 3 cm apart and cut the cord at the middle of the neck.
- If cord is not felt around the neck, deliver the baby and wipe the fluids off in the face.
- Suction the baby.
- Place the two clamps on the cord about 8 to 10 cm from the cord and cut it while covering it with the gauze (Fig. 13.20).
- The time of clamping made no difference to the mother, but it has effects for the baby. If the cord is clamped after 1–3 minutes, the infant receives increased amounts of hemoglobin in their first months of life, but may have an increased risk of needing phototherapy to treat jaundice.

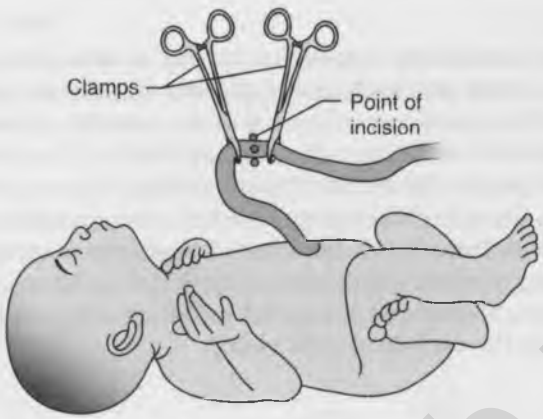


Fig. 13.20: Placing two clamps on the cord and cutting it in between

Sometimes a newborn's liver is slow to breakdown all of the red cells they had in the womb, particularly if they are left with more fetal blood. Delayed cord clamping and phototherapy helps to speed the breakdown.

- Watch for any congenital abnormalities in the cord.
- Shift the baby to the nursery for further observation.
- Record the details of the delivery.

4. UMBILICAL CORD CLAMP

Definition

When a woman delivered a baby, the baby is separated from the mother's placenta which provides oxygen for the fetus throughout the time of pregnancy. In order to remove the baby from the mother, an instrument is used which is called the umbilical cord clamp.

Features

It has two blades, which are joined at one end. The other end has teeth, which locks with each other when applied over the umbilical cord. It gets shed along with the cord.

Uses

This clamp is used to cut the umbilical cord between the placenta and the baby by which the baby is separated from the mother.

Types

Umbilical cord clamp comes in a variety of appearances. Most of these clamps are made using plastic, aluminium and some in metal. The plastic cord clamp usually consists of teeth in the front which fit together when the instrument is closed, i.e. clamped. Some of the other plastic clamps have a variety of fittings on the side of the clamp which is open in order to ensure that the instrument can be used in a secure manner. Many countries produce this particular kind of gynecological instrument, however, China and India are very well-known for making the umbilical cord clamp.

1. Metal

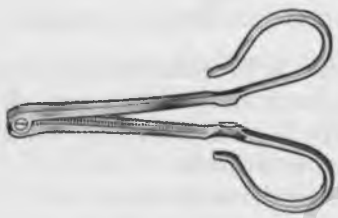


Fig. 13.21: Kane umbilical cord clamp

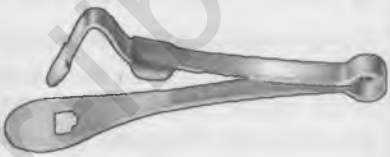


Fig. 13.22: Collin umbilical cord clamp

2. Disposable

It is a disposable clamp made of plastic. Inner surface has serrations for tight grip on the cord. It is supplied in a sterile pack. The open end can be locked after applying it over the cord by giving pressure. The cord clamp is to be kept in place until it falls off together with the detached stump of umbilical cord after 7–10 days. It is disposable and is for single use only (Fig. 13.23).

Fig. 13.23: Disposable umbilical cord clamp

How to use?

Immediately after a baby is born, the obstetrician or midwife gently clears mucus and other material from the mouth, nose, and throat with a suction bulb. The newborn is then able to take a breath. Two clamps are placed on the newborn's umbilical cord, side-by-side, and the umbilical cord is then cut between the clamps after the cord pulsation ceases. Umbilical cord clamp is applied. The stump should be kept clean and dry. The newborn is dried and laid carefully on the mother's abdomen with skin-to-skin contact or on a sterile, warm blanket (Fig. 13.24).

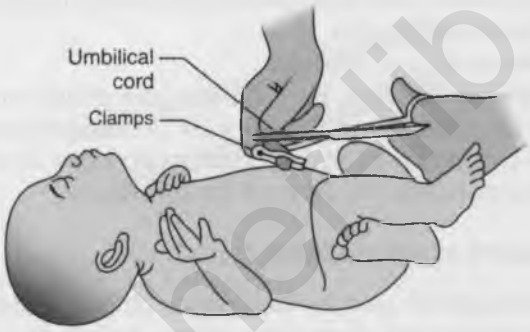


Fig. 13.24: Using umbilical clamp-to-clamp the cord

The first step consists of using the umbilical cord clamp to clamp the cord itself while it is being cut. In some cases, the clamp is left on by the surgeons for many days in order to allow the cord attached to the baby to dry out.

Benefits of Delaying for Preterm Infants

- Improved bilirubin levels.
- Decreased red cell transfusion requirements.
- Lowered the infant's dependence on supplemental oxygen.

Risks of Delayed Cord Clamping

- Polycythemia.
- Hyperbilirubinemia.

Risks of Early Cord Clamping

- Infant anemia.
- Childhood mental disorders.
- Hypoxic ischemic brain damage.

Sterilization Method

It is sterilized by gamma rays. Clamps made of aluminium can be sterilized by immersion in an antiseptic solution.

Nursing Interventions after using Cord Cutting Scissors and Cord Clamp

- Wash the hands with soap and water before and after contact with the umbilical area.
- Keep the cord clean and dry.
- Wet cotton swab may be used to clean gently around the base of the cord. Alcohol swabs are not recommended.
- Expose cord to air or cover loosely with clean clothes.
- Fold diaper below the level of the umbilicus.

5. SCHOLLER'S CORD CARRIER

It is the instrument used for holding or changing the position of the umbilical cord. It is also used to reduce the umbilical cord in cord prolapse. But it is not used in modern obstetrics (Fig. 13.25).

Fig. 13.25: Scholler's cord carrier

14 Instruments used in Investigative Procedures

1. AYRE'S SPATULA

Fig. 14.1: Ayre's spatula

Definition

Ayre's spatula is a disposable instrument which consists of a convenient handle on the opposite ends of which there are two shovels of different forms which are used for taking a superficial surface biopsy of the cervix in screening for malignancy.

Features

The instrument is about 15 to 17 cm long. One end of the spatula is 3 mm broad and 2 cm long. The other end is broad and has two projections, one of them projecting beyond the other.

Indications/Uses

Ayre's spatula is used for collecting an exfoliative cytological smear from the cervix, posterior vaginal fornix, upper one-third of the lateral vaginal wall, or the buccal mucosa. The following are the indications for using Ayre's spatula:

1. Cytological screening for cervical carcinoma from the cervix and the posterior fornix.

2. Screening for upper genital tract malignancy from the posterior fornix.
3. Follow-up of treated cases of cervical carcinoma.
4. Diagnosis of persistent or recurrent cervical carcinoma.
5. Hormonal cytology from the upper one-third of the lateral vaginal wall.

Advantages

The instrument allows taking the material from the surface of cervix and also from the lower third of cervical canal simultaneously. Depending on the anatomic features of cervix, wider or narrower shovel can be used. The instrument is supplied sterile and ready for use.

Who Can Undergo this Test?

a. Any woman above the age of 25.
b. Any patient attending the gynecological, antenatal, postnatal, veneral diseases or family planning clinic for some other reason.

Qualified Persons for Taking Smear using Ayre's Spatula

The doctors, midwives and nurses with appropriate qualification involved in taking cervical sample must be given at least 3 days theoretical and practical training in the technique.

Pre-preparation

a. Organize the equipment and ensure that the clinical examination area is prepared before commencing the procedure.
b. Equipment should include glass slides, pencil, slide holder, cytological fixing solution, Ayre's spatula, endocervical brush, vaginal swabs for culture, and Cusco's speculum.
c. Label the slide in pencil with the woman's name, identifying chart number and date of birth.
d. Place the light source in an appropriate position.
e. Instruct the woman to avoid intercourse for 24 hours, douching for 48 hours, and vaginal creams or medication for 1 week.
f. Just before the test, instruct the woman to empty her bladder.

g. During the procedure, she might experience a slight discomfort but no pain from the speculum; however, she may feel some pain when the cervix is scraped.
h. Explain the procedure which takes only 5 to 10 minutes to perform.
i. Instruct the woman to disrobe from the waist down and to drape herself.
j. Ask her to lie on the examining table and to place her heels in the stirrups.
k. Tell her to slide her buttocks to the edge of the table.

How to use?

This procedure does not require any anesthesia. A vaginal examination should not be carried out prior to taking a smear. Warm the speculum. Separate the labia minora with index and middle fingers of left hand. Introduce the speculum to the introitus at an angle, 30–45° from the horizontal level.

The longer end of this end of the spatula is inserted into the external os while the shorter end comes in contact with the vagina. The tip of spatula is inserted into the external os, after it has been swabbed with saline and the spatula is rotated through 360° so as to pick up exfoliated cells from the vagina. The scraping from the mucoepithelial junction thus obtained is spread on a clean glass slide and fixed in equal parts of 95% alcohol and ether (Figs 14.2 and 14.3).

Fig. 14.2: Obtain vaginal pool material from the posterior fornix

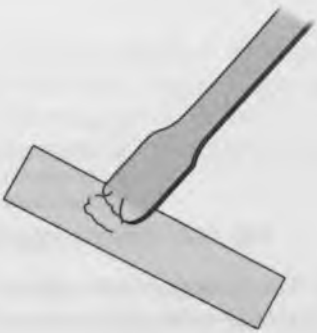
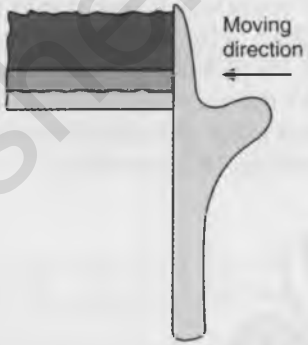


Fig. 14.3: Place adequate drop 1 inch from the end of the slide, smear, fix and dry

The long and narrow end of the spatula is next inserted into the cervical canal and is rotated to pick up cells from the cervical canal. Another smear is made and fixed as before. Broad end of another Ayre's spatula is used to obtain material for a smear from the posterior fornix (Figs 14.4 to 14.6).

Fig. 14.4: Obtaining cervical scraping from complete squamocolumnar junction around external os, high up in the endocervical canal

Fig. 14.5: Placing the material 1 inch from end of slide, smear, fix and dry



● Cells from the endocervix
◎ Cells from the transformation zone
○ Cells from the ectocervix

Fig. 14.6: Direction of moving the spatula in the glass slide

The presence of vaginal discharge should be noted and a swab for culture be taken if appropriate. Open the speculum screw and gently remove the speculum taking care not to allow it to trap the walls of the vagina. Inspect the walls of the vagina after removing the speculum.

Nursing Interventions

1. Help the woman up and allow the woman to dress in privacy when the examination is completed.
2. Supply the woman with a sanitary napkin if cervical bleeding occurs.
3. Explain the findings of the examination and discuss further management with the woman.
4. Give her an explanatory booklet if appropriate.
5. Arrange follow-up appointment.
6. Dispose of equipment.

Precautions

Preserve the slides immediately after the specimen is collected, as exposure to air or light can cause distortion of cells.

Reasons for Inadequate Smear

- Carelessness in following procedures
- Uncooperative woman because insufficiently reassured.
- Cervix inadequately exposed
- Cervix not scraped firm enough
- Transformation zone and endocervix incompletely sampled
- Material incompletely transferred to the slide
- Sample poorly smeared (too thick or too thin or with excessive pressure causing distortion)
- Smear allowed to dry before fixation
- Insufficient fixative
- Incorrect staining
- Smear consisting mainly of blood or inflammatory exudates
- Contamination of the smear with lubricant, vaginal creams, spermicides or creams used for the ecographic probe
- Menstrual smear containing a large number of endometrial cells and red blood cells.

Material Made of and Sterilization Method

This instrument is made of wood, plastic or stainless steel. It is essential to sterilize the spatula to prevent transmission of any infection from the genital tract of one woman to that of another. The wooden spatula is sterilized by dry heat in a hot air oven. The plastic spatula is sterilized by immersion in antiseptic

solutions like cetrimide or hibitane. The stainless steel spatula is sterilized by boiling or autoclaving.

Complications

Bleeding

2. CERVICAL PUNCH BIOPSY FORCEPS

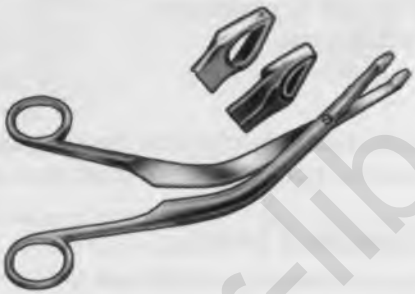


Fig. 14.7: Cervical punch biopsy forceps

Features

This instrument is 22.5 cm long. It has cup-shaped ends. The edges of the cups are cutting and the inside of one cup has a tiny pin that fits into a tiny depression in a corresponding position in the other cup. This pin holds the cervical biopsy specimen in place. The handles of the instrument are rather long to give mechanical advantage so that a biopsy can be taken from the firm cervical tissue with application of moderate force. The handles are also bent downward so that they do not obstruct the field of vision during the procedure. There is no catch on the handles, because it is not necessary. Its punched ends have a basket to hold the specimen firmly.

Indications/Uses

1. Cervical lesion, suspected to be carcinomatous.
2. Suspicion of cervical carcinoma from a papanicolaou smear.
3. Abnormal colposcopic findings.
4. To evaluate the response to radiotherapy for cervical carcinoma.

5. Diagnosis of persistent cervical carcinoma after radiotherapy.
6. Diagnosis of recurrence of cervical carcinoma.
7. Differential diagnosis of cervical carcinoma.

Contraindications

Acute cervicitis.

Prerequisites

1. Cervical exfoliative cytology.
2. Some method of determining the site of biopsy.

How to use?

1. Anesthesia is not necessary.
2. The woman is put in lithotomy position and the cervix is exposed with a vaginal speculum.
3. The site of biopsy is determined by one of the following tests:
   a. *Schiller's test:* Application of Schiller's iodine or Gram's iodine to the cervix results in mahogany brown staining of the epithelium of the posterior vaginal wall except in areas of carcinoma, erosion, ulceration, atrophy, hyperkeratosis, parakeratosis, metaplasia, etc.
   b. *Toluidine blue test:* Application of 1% toluidine blue to the cervix results in the blue-black staining of the carcinomatous area.
   c. *Colposcopy:* Leukoplakia, acetowhite epithelium, punctuation, mosaic and abnormal vascular pattern in intraepithelial neoplasia.
   d. Any ulcerative or proliferative hypertrophic lesion which bleeds to touch.
   e. *Impression cytology:* The site of the source of the abnormal cells is biopsied.
   f. Older method of blind four quadrant biopsy is not followed any more as the chances of missing a carcinoma are high and unnecessary biopsies are also taken.
4. A piece of cervical epithelium and underlying stroma are removed with cervical biopsy forceps (Fig. 14.8).
5. Hemostasis is achieved by one of the following means:

Fig.14.8: Taking a piece of cervical epithelium using one type of cervical biopsy forceps

- Pressure with a gauze pad.
- Application of Monsel's solution (ferric subchloride)
- A suture with no. 1/0 plain catgut.
- If profuse bleeding occurs from the biopsied area, it can be stopped by putting a mattress suture or vagina can be packed for 12–24 hours.
- Electrocauterization.

Postoperative Care

- Abstinence from sexual intercourse for 2 weeks
- Reassurance that some bleeding may occur per vaginam.

Risks

The woman may have some bleeding after the biopsy for up to 1 week. If bleeding is very heavy or lasts for longer than 2 weeks, or if there is any signs of infection like fever, foul odor, or discharge, call the healthcare provider immediately.

Special Considerations

If the examination or biopsy does not show why the Pap smear was abnormal, healthcare provider may suggest that the woman has a more extensive biopsy. Avoid douching, sexual intercourse or using tampons for 1 week after the biopsy to allow the cervix to heal.

3. GRAVLEE JET WASHER

Gravlee jet washer is a diagnostic instrument which is employed to obtain endometrial cells for cytologic and histologic examination. The procedure of endometrial washing, for which the Gravlee jet washer is used, provides a relatively quick and easy means of screening for endometrial carcinoma in its early stages.

History

The Gravlee jet wash irrigator was introduced in 1964.

Features

This instrument has a double channeled uterine metal cannula with a cervical stop. The two tubes in the cannula diverge away from each other at the other end of the cannula. One of them has a luer-lock hub at its end. The other enters a glass tube with a right fitting lid.

Parts

1. Cannula
2. An adjustable rubber flange
3. A saline reservoir
4. A 30 ml syringe

Mechanism of Action

The instrument uses the principle of negative pressure.

Indications/Uses

This is one of the number of devices available for increasing the yield of an endometrial sample. While not satisfactory as a method of assessing benign endometrial disease, it has proved successful in obtaining identifiable samples of the relatively viable cells of endometrial adenocarcinoma.

Advantages

The main advantage of the jet washer is the fact that any desired amount of irrigating solution can be used with little or no danger of tumor dissemination because the fluid is circulated in a negative pressure system.

Contraindications

- Pregnancy.
- Acute vaginal or cervical infection.
- Pelvic inflammatory disease.
- Clotting disorders.

How to use?

The glass tube is filled with sterile normal saline. The uterine cannula is introduced into the uterine cavity with the woman in lithotomy position. A 30 ml capacity syringe is applied to the luer-lock hub and suction is applied while a tight contact is maintained between the cervix and cervical stop by pressing in the cannula and making traction on the cervix with the vulsellum holding it. The negative pressure created in the uterine cavity draws the saline from the glass tube into the uterus, which finally enters the syringe. This saline irrigates the uterine cavity and picks up exfoliated endometrial cells. The cannula is withdrawn after the procedure is over.

Complications

- Prolonged bleeding.
- Infection.
- Uterine perforation and post-procedure pain.
- Bacteraemia can occur after endometrial sampling (antibiotic prophylaxis must be given to patients at risk of endocarditis).

Note: Jet washing is a useful procedure, but it is not as accurate as a diagnostic curettage. If one's index of suspicion is high, or symptoms persist, a negative report for cancer should be substantiated by curettage.

4. ISAAC'S ASPIRATOR

Features

This instrument is 24 cm long, 1.9 mm in diameter and the first 3.8 cm long segment of the cannula near the tip has 48 perforations. The malleable aluminium cannula inside can be slide to-and-fro within a 7 cm polyvinylchloride sheath, which has a cervical stop and a 2 cm long intracervical tube. The other end of the metal cannula has a luer-lock hub.

Indications

This instrument is used for endometrial aspiration cytology in the diagnosis of the following conditions:

a. Endometrial carcinoma
b. Endometrial hyperplasia
c. Anovulation
d. Evaluation of response to ovulation inducing agents.
e. Follow-up examination of patients on long-term therapy with estrogen or who are using combination oral contraceptives for long periods.
f. Follow-up of cases of endometrial carcinoma treated with radiotherapy.

Advantages

The instrument is thin enough to be passed through non-dilated cervix. Hence, anesthesia is not necessary for its use.

How to use?

The woman is asked to lie on the table with her feet in the stirrups for a pelvic examination. A speculum will be inserted into the vagina to spread the walls of the vagina apart to expose the cervix. The cervix will then be cleansed with an antiseptic solution. A tenaculum, a type of forceps, will hold the cervix steady for the biopsy. The Isaac's aspirator will be inserted into the uterine fundus and with a scraping and rotating motion some tissue will be removed. The removed tissue will be placed in formalin or equivalent for preservation. The tissue will be sent to a laboratory, where it will be processed and tested. It will then be read microscopically by a pathologist who will provide a histologic diagnosis. Both the application of the tenaculum as well as the removal of tissue by the biopsy may cause pain.

Sterilization Method

It is disposable. If it needs to be sterilized, it is done by gamma rays or ethylene oxide gas.

5. VABRA ASPIRATOR

Features

This instrument has a stainless steel cannula 2 mm in diameter.

Fig. 14.9: Vabra aspirator

It has a cut out opening near the tip and two pressure control holes at the other end. It is connected to a plastic collecting chamber. The chamber can be opened by removal of the lid to which the cannula is attached. There is a tissue filter within the catheter. A suction tube can be attached to the other end of the chamber after removal of a cap covering the end (Fig. 14.9).

Indications

The indications are the same as that of Isaac's aspirator.

Contraindications

1. Pregnancy
2. During or after menopause unless a woman has abnormal vaginal bleeding.

Advantages

It does not require dilatation of the cervix and hence anesthesia is not necessary.

How to use?

Using Vabra aspirator is usually done by a gynecologist, a family medicine physician, or a nurse practitioner who has been trained to do the test. First, cervix is numbed by a spray or injection of local anesthetic. Remove the clothes below the waist. Then ask her drape around the waist. Then make the woman to lie on her back on an examination table with the feet raised and supported by foot rests (stirrups).

Insert the smooth, curved blades of the speculum into the vagina. The speculum gently spreads apart the vaginal walls so that the healthcare provider can see inside the vagina and the cervix. The cervix is washed with an antiseptic solution and grasped and held in place with a clamp called a tenaculum. Then the Vabra aspirator which is used to collect the sample is guided through the cervix into the uterus. Endometrial suction is done by a suction cannula in the Vabra aspirator. Bits of endometrium collect outside the tissue filter while the suction

force applied to its inside removes fluid aspirated through the mesh of the filter. These bits are subjected to histopathological examination. Most women have some cramping during the sample. This procedure may take 5 to 15 minutes.

Aftercare

The woman may feel some soreness in the vagina for a day or two. Some vaginal bleeding or discharge is normal for up to one week after the procedure. The woman can use a sanitary pad for the bleeding. Avoid strenuous exercise or heavy lifting for one day after the procedure. Do not have sex, use tampons, or douche until the spotting stops.

Call the healthcare provider if any of the following symptoms occurs:

- Heavy vaginal bleeding (more than a normal menstrual period).
- Fever
- Abdominal pain
- Bad-smelling vaginal discharge.

Complications

- Bleeding
- Infection

15 Instruments used in Destructive Operations

Destructive operations on the unborn child have been designed to reduce its bulk (head, shoulder girdle or body) and so enable a vaginal delivery of a baby which is otherwise too large to be delivered through the normal birth canal without jeopardizing the well-being of the mother. Such procedures were adopted in the past to deliver a mother suffering from an obstructed labor and threatened uterine rupture, when the baby was dead or dying or so grossly malformed that its survival was doubtful.

The era in which these operations were in vogue was one in which an abdominal delivery was hazardous, and infection was rampant, but the present day obstetric conditions have changed. Destructive operation in case of an obstructed labor, where the baby is alive, is neither acceptable nor justified as cesarean section has become a very safe operation.

Most hospitals now record a declining incidence of all destructive obstetric procedures. After every such operation the maternal birth canal should be thoroughly examined to be certain that no injury has been caused during instrumentation or by sharp bony spicules from the bony skull.

These operations are rarely performed in modern obstetrics. They are occasionally required in the developing countries, where adequate obstetric care may not be available at all.

Other Name

Destructive operations are also known as embryotomy.

Indications

1. Obstructed labor with fetal death
   - Brow presentation

- Mentoposterior face presentation
- Vertex presentation with cephalopelvic disproportion
- Aftercoming head of the breech
- Transverse lie.
- Compound presentation
- Locked twins
- Abdominal or thoracic tumor of the fetus
- Shoulder dystocia

2. The fetus is alive but has a congenital malformation which is in compatible with life. For example, hydrocephalus, bicephalic monster.

Contraindications

1. Live fetus, except when it has any congenital abnormalities incompatible with life such as anencephaly.
2. Extreme degree of contracted pelvis (true conjugate less than 5.5 cm).
3. Insuperable obstruction to vaginal delivery.
4. Cervix less than 3/4 dilated (partially dilated cervix).
5. Threatened rupture of the uterus.
6. Obstructing pelvic tumors.
7. A free or non-engaged head. The operation can be difficult and risky which leads to uterine rupture.
8. Major degree of placenta previa.

Advantages

Destructive operative procedures leave the woman with an intact uterus, which is less likely to rupture in next pregnancy and in already infected patient, chances of peritonitis is less. Destructive operations require shorter time in bed than that required after a cesarean section.

Disadvantages

These operations are gruesome and unpleasant; few obstetricians presently have had training in performing this, so that in their hands the maternal dangers of such destructive procedures may often outweigh the risks of a well executed cesarean section.

Types of Destructive Operations

1. Craniotomy
2. Decapitation
3. Cleidotomy
4. Evisceration
5. Spondylotomy

Instruments

1. Craniotomy:
   a. Oldham's perforator
   b. Oldham's perforator (Simpson's modification)
   c. Cranioclast
   d. Cephalotribe
   e. Cranioclast and cephalotribe combined
   f. Willet's scalp traction forceps
2. Decapitation:
   a. Decapitation hook (Braun's)
   b. Sharp decapitation hook (Jardine's)
   c. Blunt decapitation hook
   d. Breech hook with crotchet
   e. Blond-Heidler's saw
3. Cleidotomy:
   a. Cleidotomy scissors
4. Evisceration:
   a. Embryotomy scissors
   b. Giant vulsellum
5. Spondylotomy Oldham's vertebral hook

Prerequisites for using Destructive Surgery Instruments

- Antibacterial drug therapy.
- Make ready of at least two units of blood compatible with the woman's blood.
- An intravenous line with an 18 gauze needle.
- Cervix preferably fully dilated. Greater the cervical dilatation, safer the procedure.
- Membranes ruptured.
- Preparations for general anesthesia: Emptying of the stomach, increasing the pH of the gastric contents.

1. INSTRUMENTS USED IN CRANIOTOMY

Craniotomy (perforation of the cranium)

It refers to various methods of reducing the size of the fetal head.

Indications

1. It is done where there is a great degree of cephalopelvic disproportion, provided the fetus is dead and delivery by forceps or version is difficult to accomplish.
2. In cases of malformation of fetal head, e.g. severe hydrocephalus, which are not compatible with life.
3. Malposition like brow or mento-posterior with a dead fetus.
4. Retained after coming head of a dead fetus in breech presentation.

OLDHAM'S PERFORATOR

Fig. 15.1: Oldham's perforator

Features

The strong handles of the perforator are separated widely when the blades are closed because of a spring lever arrangement. When the blades are pressed together the cutting edges are forced apart. The Oldham's perforator had no such lever arrangement.

Uses

The instrument is required in craniotomy to perforate the skull bone for the decompression of the head.

Site of Perforation

The site of perforation varies as follows:

1. *Vertex presentation:* Parietal bone
2. *Face presentation:* Eye sockets (orbit), roof of mouth.

3. *Brow presentation:* Frontal bone
4. *Deflexed head:* Dependent portion
5. Aftercoming head of breech presentation:
   - Occipital bone behind the mastoid
   - Posterolateral fontanelle
   - Hard palate through the floor of mouth
   - Foramen magnum
   - Through the spina bifida, if present (by passing a catheter up to the spinal canal).

How to use?

The woman is placed in lithotomy position and the part is cleaned and draped. The instrument is introduced under the cover of surgeon's hand to prevent any injury to the surrounding tissues. The tip of the instrument is guided onto the side of perforation by the fingers of one hand and is now pushed in by the other hand. Once the tip enters the cranial cavity, the blades are opened up to enlarge the hole. The blades are closed again and the instrument is rotated through 90°. Re-open the blades to further enlarge the opening (Fig. 15.2).

Fig. 15.2: Using Oldham's perforator in the delivery of fetal head

The brain material is sucked out and the cranial cavity is allowed to collapse. It is preferable to open the cranial cavity through a skull bone rather than through a suture because a hole through the sutures tends to close when the cranial cavity collapses. The perforated head may be expelled by natural forces or may have to be extracted with craniotomy forceps or cephalotribe or cranioclast.

Material made of

Oldham's perforator is made up of stainless steel and it is sterilized by autoclaving.

OLDHAM'S PERFORATOR (SIMPSON'S MODIFICATION)

Fig. 15.3: Oldham's perforator (Simpson's modification)

Features

It is 28.5 cm long. Its blades have triangular tips with outer cutting edges. Each blade has two shoulders, the proximal one to prevent excessive penetration of the fetal skull, and the distal one to prevent the instrument from coming out before the opening in the skull is enlarged. The distal shoulder is located just proximal to the cutting edge of the triangular tip of the blades.

The handles have a flat spring between them. It gets compressed on approximation of the handles, so that on releasing, the handles go back to their original position. There is a locking system between the ends of the handles, which locks the blades in closed position. To open the blades, the lock has to be opened by inward pressure and the handles have to be approximated.

Indications

1. This instrument is used to perform craniotomy.
2. It is also used to open fetal thorax or abdomen for evisceration.

How to use?

General anesthesia is not necessary. Bilateral pudendal block with perineal infiltration is sufficient. The bladder is emptied by catheterization. The head is fixed by suprapubic pressure by an assistant. This pressure is maintained throughout the procedure to steady the head during craniotomy and to express out the brain matter after craniotomy.

The cervix is exposed with a speculum and anterior vaginal wall retractor. The central part of the exposed scalp of the fetus in a cephalic presentation is held with Willet's clamps or Allis forceps. The fold of the scalp between the clamps is cut. Simpson's perforator is guided into this opening along the palm and fingers of the left hand. The skull is perforated with strong steady push, keeping the direction of the perforator perpendicular to the outlet. The blades of the perforator are pushed in as far as the distal shoulder and are then opened in various directions to enlarge the hole. Brain destruction may be done with the perforator, but the long internal member of the cranioclast is better suited for this purpose. The perforated head may collapse sufficiently to permit a vaginal delivery (Fig. 15.4).

After the delivery of the baby and the placenta, the uterine cavity is explored for any injury.

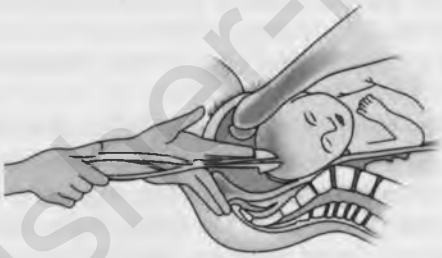


Fig. 15.4: Inserting Oldham's perforator (Simpson's modification) into the fetal skull

Material made up of and Sterilization Method

This instrument is made of stainless steel and it is sterilized by boiling or autoclaving.

CRANIOCLAST

Fig. 15.5: Cranioclast

Features

It is 42 cm long and sturdy. Its blades are small and are parallel curves, with coarse serrations on their opposing surfaces. The two parts can be fixed together by means of a winged screw and nut on the handles. The solid blade passes into the skull through the craniotomy opening and the other blade fits on the outer surface of the skull. By approximating the handles, the vault is crushed. By twisting the handles, the portion of the vault between the blades is removed. This long sturdy instrument is shaped somewhat like obstetric forceps.

Indications

1. To crush the vault of the skull after craniotomy.
2. To crush the base of skull after craniotomy.
3. To break up the vault of skull and remove it piecemeal (cranioclasm).
4. To extract the fetal head after craniotomy and crushing.

How to use?

Bilateral pudendal block with perineal infiltration is given for the woman. Catheterization of the bladder is done. The midwife fixes the head by means of suprapubic pressure. This pressure is maintained throughout the procedure, to help steady the head during craniotomy and to express out the brain matter after craniotomy. The cervix is exposed with a speculum and anterior vaginal wall retractor. The central part of the exposed

Fig. 15.6: Inserting the cranioclast into the vagina

scalp of the fetus in a cephalic presentation is held with Willet's clamps or Allis forceps (Fig. 15.6).

The solid blade of the cranioclast is passed into the craniotomy opening, its convexity facing the sacral hollow. The fenestrated blade is passed into the sacral hollow, the two blades are locked and the fixation screw is tightened, thereby crushing the head and obtaining a good grip on it. Any sharp ends of bone projecting out are removed. The fetal head is delivered by traction during uterine contractions. After the delivery of the baby and the placenta, the uterine cavity is explored for any injury.

Material and Sterilization Method

This is a heavy instrument made of stainless steel. It is sterilized by boiling or autoclaving.

CEPHALOTRIBE

Fig. 15.7: Cephalotribe

Features

This instrument is similar to a cranioclast except that the blades face each other rather than facing the same direction. They have grooves or serrations on the inner surface for a secure grip on the fetal head. The pelvic curve of the instrument is slight. The blades fit on either side of the fetal skull after craniotomy. The vault is crushed by approximation of the handles and the head is extracted by making traction.

Indications

1. To crush the vault of the fetal head after craniotomy.
2. To extract the fetal head after craniotomy and crushing.

How to use?

It is an operation in which the vault of the skull is removed piecemeal by crushing and twisting in between two blades of the cranioclast. After the delivery of the baby and the placenta, the uterine cavity is explored for any injury.

CRANIOCLAST AND CEPHALOTRIBE COMBINED

Fig. 15.8: Cranioclast and cephalotribe combined

Features

It is 42 cm long. It is really a cephalotribe with addition of the solid central blade of the cranioclast. The blades are numbered 1 to 3. The central blade is numbered 1, the blade with its curve parallel to that of the central blade is numbered 2 and the third one is numbered 3. The numbers indicate the order of application of the blades. A long screw with a butterfly nut is attached to the end of the handle of the central blade such that it can be swung into a groove in the base of the handle of both the remaining blades. The adjacent surfaces of the parallel curve blades are strongly serrated. Blades numbered 2 and 3 are fenestrated.

The central blade is passing into the base of the fetal skull through the craniotomy opening and the other two blades fitting on either side of the skull. The vault and base of the fetal skull are crushed by approximation of the handles, and the head is delivered by traction.

Indications/Uses

1. To crush the vault and base of fetal skull after craniotomy.
2. To extract fetal head after craniotomy and crushing.
3. Blades 1 to 2 may be used as a cranioclast.

How to use?

The solid blade numbered one is driven into the base of skull through the craniotomy opening such that its convex surface is towards the fetal face. The second number is guided over the fetal face and the two blades are locked and tightened, crushing the vault and the base of the skull between the two. The third blade is guided over the occiput and is locked with the other two, crushing the vault and the base of skull in between. If the occiput is crushed first, the head may get extended and then the third blade may not be able to pass over the entire face. The fetal head is delivered by traction during uterine contractions (Figs 15.9 to 15.12).

The perforated head may be expelled by natural forces or may have to be extracted with craniotomy forceps or

Fig. 15.9: Perforation of the fetal head using the solid blade

Fig. 15.10: Collapsing the fetal head

Figs 15.11 and 15.12: Extraction of the fetal head

cephalotribe or cranioclast. The cephalotribe along with cranioclast are used commonly. After the delivery of the baby and the placenta, the uterine cavity is explored for any injury.

Material made of and Sterilization Method

This instrument is made of stainless steel. It is sterilized by boiling or autoclaving.

WILLET'S SCALP TRACTION FORCEPS

Fig. 15.13: Willet's scalp traction forceps

Features

Willet's scalp traction forceps has small rectangular obliquely serrated blades. The ends of the blades are T-shaped with oblique serrations. One of the blades has two tiny teeth lying side-by-side, which fit in two holes on the other blade, thereby achieving a sure grip on fetal scalp. A ratchet lock on the handles ensures a firm grip. This instrument is available in two sizes—18.7 and 30 cm in length.

Indications/Uses

1. It is used to give traction on the fetal head after craniotomy, to hasten the delivery.
2. It is used in cases of placenta previa type I and type II anterior with vertex presentation. This forceps is used to provide traction over the scalp and the fetal skull, which presses upon the bleeding site, thus reducing the amount of bleeding. Continuous traction is applied by tying a string to the finger grips of the instrument and attaching a weight to its other end after passing it over a pulley at the foot end of the patient's bed. Hence it controls the bleeding by compressing

the placental site. The instrument is not used nowadays as there are better and safer ways of dealing with patient's having placenta previa.

3. It may also be used to pull the head after the cord has been replaced in case of cord prolapse. It is also used in case of cesarean section to disengage the head when required.
4. It may also be used for extracting the head during lower segment cesarean section and for continuous scalp traction in case of contraction ring obstructing a delivery (Figs 15.14 and 15.15).

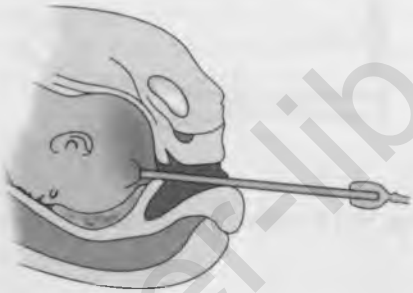


Fig. 15.14: Grasping the fetal scalp using the Willet's scalp traction forceps

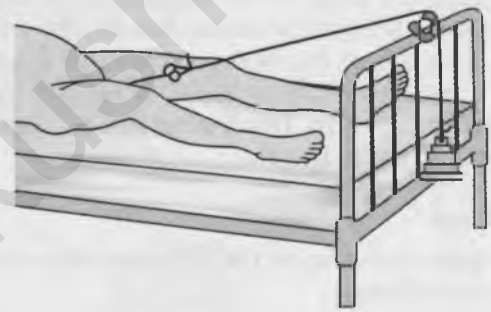


Fig. 15.15: Using Willet's scalp traction forceps in woman with placenta previa

Complications

1. Laceration of fetal scalp, avulsion of the scalp.
2. Hemorrhage from fetal scalp injury.
3. Fetal scalp infection.
4. Accidental injury to maternal genital tract.

Note: This instrument is not used in modern obstetrics.

2. INSTRUMENTS USED IN DECAPITATION

Decapitation

Decapitation is an operation in which the fetal neck is severed.

Indications

1. Impacted shoulder presentation with fetal death, the fetal neck being accessible per vaginam.
2. Head-to-head locking of twins, the first baby dead.
3. Double-headed monster with obstructed labor.

DECAPITATION HOOK (BRAUN'S)

Braun's decapitation hook has a long handle with a narrow hook at its end. The tip of the hook is bulbous. It is used in decapitation operation in neglected transverse lie. It acts by dislocating the atlanto-axial joint of the fetal cervical spine. For decapitation of the first baby of the locked twin, a simple scalpel and embryotomy scissor is enough (Fig. 15.16).

Fig. 15.16: Braun's decapitation hook

SHARP DECAPITATION HOOK (JARDINE'S)

It is similar to that of Braun's hook except that it has a knife-edge fitted in the concavity of the hook. After dislocation of the atlanto-axial joint, the knife-edge cuts through the cervical soft tissues, obviating the need for another instrument to cut them (Fig. 15.17).

Fig. 15.17: Jardine's decapitation hook

BLUNT DECAPITATION HOOK

Fig. 15.18: Blunt decapitation hook

Features

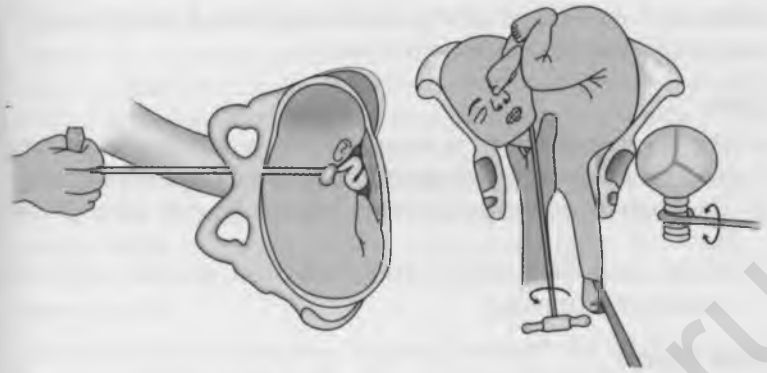
This instrument is available in two sizes. One size is of 33 cm while the other is 30 cm long. The hook is in the form of 1/3 to 1/2 circle of diameter at least 7 cm.

Indications

1. To apply groin traction in case of a breech presentation. For breech extraction only if the fetus is dead.
2. To pull down a fetal leg in case of a transverse lie; if the fetus is dead, and the woman is in labor advanced sufficiently to allow this maneuver, but in the absence of any of the signs of threatened rupture of the uterus.

How to use?

Under general anesthesia, the neck is brought down as low as possible by giving traction over the prolapsed arm. The decapitation saw is introduced under the palm of the hand and is guided between the shoulder and pelvic wall till it lies above the neck. The fetus is beheaded by sawing movement. The head may be removed by a cephalotribe if the pelvis is contracted (Figs 15.19 and 15.20).



Figs 15.19 and 15.20: Using decapitation hook in the delivery of fetal head in transverse lie

The blunt decapitation hook may also be used for similar purposes. The method of introduction is the same as explained above. The hook is used to dislocate the cervical vertebra dividing the soft tissue with a pair of scissors. The advantage of this instrument lies in its small size.

The decapitated head is removed with a crotchet. The crotchet is introduced into the mouth or head and withdrawn. The hooked end of this instrument is used to give traction on to the groins in cases of extended breech presentation.

BREECH HOOK WITH CROTCHET

Fig. 15.21: Breech hook with crotchet

Features

This is made of stainless steel. It is available in two sizes, 30 cm and 33 cm long. The hook is in the form of 1/3 to 1/2 circle of

diameter 7 cm. The crochet is small and with a sharp bend. A long, rigid handle connects the two.

Uses

1. The decapitated head is removed with a crotchet by making traction on the fetal lower jaw, orbit or foramen magnum.
2. The hook is used to pull down a leg of a fetus in a transverse lie.
3. It can also be used to make traction on the edges of craniotomy opening.

How to use?

The hook is used to give groin traction in a dead baby when the breech is impacted at the outlet and groin traction fails to deliver the baby. The crochet is used to the delivery of the decapitated head by hooking the mandible through mouth.

Sterilization Method

It is sterilized by boiling or autoclaving.

BLOND-HEIDLER'S SAW

Fig. 15.22: Blond-Heidler's saw

Other Name

It is also called Gigli saw.

Features

This is a long wire saw made by twisting together long metal wires. It is covered with rubber tubing except over 7 cm of its

central part, which cuts through the fetal neck. The rubber covering protects maternal soft parts from injury during sawing. Handles can be fitted to the ends of the saw. A thimble with a wire loop can also be attached to its end, which is used to draw the saw around fetal neck, the index finger passing around the fetal neck and picking the thimble off the thumb, by means of the wire loop. This instrument is used for decapitation.

How to use?

Blond-Heidler's wire saw is passed around the fetal neck with the aid of a thimble resting on the thumb is front of the fetal neck, and the index or the middle finger drawing it off to behind the neck by means of a ring attached to the thimble. The saw is attached to the thimble and is thus passed around the fetal neck. Fetal neck is severed by sawing movements. Aftercoming head of a breech can be severed with Dubois' scissors (Figs 15.23 to 15.26).

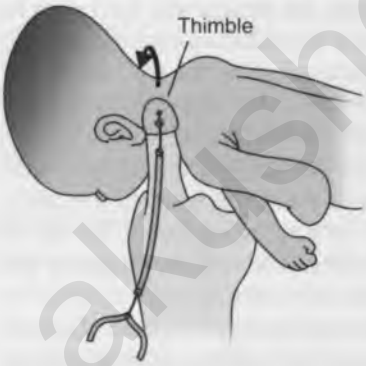


Fig. 15.23: Blond-Heidler's wire saw is passed around the fetal neck

Fig. 15.24: Blond-Heidler's wire saw is drawn behind the neck by a ring attached to the thimble

How to use Decapitation Instruments?

The patient is placed in lithotomy position under general anesthesia using a uterine relaxing agent. The bladder is emptied by catheterization. If an arm has prolapsed, a sling is

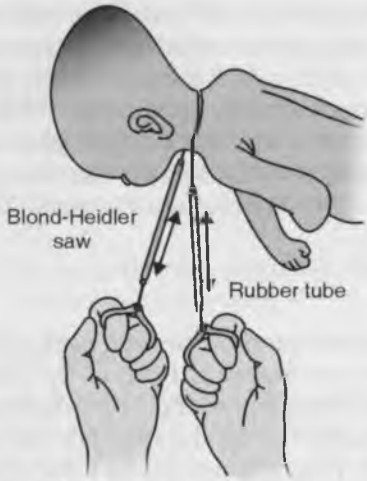


Fig. 15.25: Fetal neck is severed by sawing movements

Fig. 15.26: Severed fetal neck is removed using forceps

tied to it to steady the fetus and to aid in the delivery of the trunk after decapitation. If an arm has not prolapsed, it is brought out for this purpose. The left hand is introduced into the uterine cavity to reach the fetal neck. It is encircled by the middle finger and the thumb, the palm facing forward. The decapitation hook is introduced over the left forearm and the hand to bring it in contact with the fetal neck. Then its handle is rotated such that its blade comes to lie across the neck from the front to the back. The neck is severed by sawing or cutting movements, the tip of the hook being in contact with the tip of the middle finger of the left hand so as to protect maternal soft parts.

A snapping sound indicated fracturing of fetal cervical spine. Completion of the procedure can be done either with the same instrument or with Dubois' scissors. The decapitation knife is withdrawn by maneuvers exactly opposite to those during application. Decapitated head is pushed up above the pelvic brim and the trunk is delivered by traction on the prolapsed arm. The head is then pushed down by fundal pressure and is delivered by hooking the right index finger into the fetal mouth. In more difficult cases, forceps extraction or craniotomy may be required.

3. INSTRUMENTS USED IN CLEIDOTOMY

CLEIDOTOMY

In this operation one or both of the clavicles are divided with a pair of scissors to help extraction of broad shoulder through a narrow pelvis by decreasing the bisacromial diameter.

Indications

1. To reduce the width (bisacromial diameter) of a large dead baby.
2. It is required for shoulder dystocia if the conventional methods fail.
3. Occasionally it is required in a similar situation for live fetus which would otherwise die (Fig. 15.27).

Fig. 15.27: Cleidotomy scissors

Large scissors used to decapitate fetal head, divide collar bones of the fetus on obstructed labor. Dividing the collar bones allowed the shoulders to collapse and thus allow delivery.

How to use?

The woman is put in a lithotomy position under general anesthesia. The bladder is catheterized and emptied. It is generally easier to reach the posterior clavicle as more room is available in the sacral hollow. An assistant exerts moderate traction on the head, deflecting it obliquely anterior. At the same time strong fundal pressure is maintained. Use the cleidotomy scissors to make a small incision in the skin of the neck of the fetus. Through this incision, guided by the fingers of the other hand, feel inside the skin until a small part of clavicle is caught between the tips of the opened blades. The ends of clavicle will then overlap and narrow the fetal shoulders.

Unilateral cleidotomy usually relieves the dystocia, if cleidotomy is not done on the opposite side too. If done on live fetus, there is the risk of injury to the subclavian vessels.

Sterilization Method

It is sterilized by boiling or autoclaving.

4. INSTRUMENTS USED IN EVISCERATION

Evisceration

It is the incision made in the abdomen or thorax of a dead fetus to reduce its size by evacuating its viscera, allowing its vaginal delivery.

Indications

1. Fetal ascites.
2. Thoracic/Abdominal tumors.
3. Malformations—sacrococcygeal teratoma.
4. Monstrosity.
5. Impacted shoulder presentation with fetal death.
6. Conjoined twins joined over the trunk.

In this operation, under general anesthesia, the thoracic and abdominal cavities are opened up with strong evisceration scissors or embryotomy scissors and the viscera is removed piecemeal.

How to use?

Dubois' scissors are introduced along the left forearm and the fetal skin over the ribs is cut followed by the ribs so that the thoracic cavity is opened. The abdomen is opened similarly. The viscera are removed with two or more finger introduced through the rent or by Weibel's method using long-handled ovum or placenta forceps. Delivery following evisceration is still not an easy matter and may require a spondylotomy.

EMBRYOTOMY SCISSORS

Embryotomy refers to operations involving the destruction of a dead or near dead fetus with a view to diminish its bulk to facilitate its extraction through the genital tract.

This instrument is 27 cm long, curved on flat, and rather stout. It is much heavy (Fig. 15.28).

Fig. 15.28: Embryotomy scissors

Uses

- It is used in destructive operation to cut the thoracic cage or the abdominal wall during evisceration to cut the remnant of the soft tissue of the neck left behind during decapitation or in cleidotomy or spondylotomy operation. With this instrument only, the tissues of the baby are cut.
- Decapitation: To cut soft tissues of fetal neck after dislocation of atlantoaxial joint with a Braun's hook.

Sterilization Method

It is sterilized by immersion in lysol or gluteraldehyde.

GIANT VULSELLUM

Fig. 15.29: Giant vulsellum

It is used in destructive operation especially in evisceration to have a good grip of the fetal parts for giving traction (Fig. 15.29).

5. INSTRUMENTS USED IN SPONDYLOTOMY

OLDHAM'S VERTEBRAL HOOK

It is defined as the division of the vertebral column.

Indications

1. Transverse impaction of a dead fetus when the neck cannot be reached (Fig. 15.30).

Fig. 15.30: Oldham's vertebral hook

How to use?

The spine is divided by the Oldham's vertebral hook or the embryotomy scissors, the fetus is then delivered in two halves. The upper portion is delivered next. Due to spondylotomy, it may be possible to draw the fetal neck deeper into the pelvis, so that it can be divided too.

Nursing Interventions after Destructive Operations

1. Ergometrine 0.25 mg should be given intravenously as the fetus is delivered.
2. Manual removal of placenta should be done and uterus should be examined for any tears.
3. Ensure a well contracted uterus, setting an IV oxytocin drip.
4. Check the cervix, vagina and vulva for tears.
5. Continue oxytocin drip for 24 hours and ensure perioperative antibiotics.
6. Anti D to be administered to all Rh negative non-immunized women. Lactation suppressing drugs to be started postoperatively.

Complications

1. Postpartum hemorrhage—atonic and traumatic.
2. Maternal soft part trauma: Vaginal, vesical or rectal injuries and fistulas.
3. Acute urinary retention.
4. Shock from excessive manipulations.
5. Puerperal sepsis.
6. Uterine rupture.
7. Maternal death – 2 to 8% after craniotomy.

Caution

Ensure that the mother does not see the baby after any destructive operations.

16 Other Forceps used in Obstetric and Gynecological Nursing

1. OVUM FORCEPS

Features

It is a forceps with cupped blade with linear fenestrations. It has spoon-shaped and blunt ends which just come in contact with each other when the finger-grips are approximated. The shape of blade achieves a good grip on the structure held without nipping it at the base. Thus during removal of an adherent piece of ovum or placenta, the uterine wall is not nipped. There is no catch on the handles. It is about 30 cm in length.

Types

1. *Non-locking type:* The non-locking forceps come in two kinds; those which are hinged at one of the ends and those which may be hinged only in the center (Fig. 16.1).

Fig. 16.1: Ovum forceps (non-locking type)

Fig. 16.2: Ovum forceps (locking type)

2. *Locking type:* Locking type ovum forceps are usually hinged in the middle only and then there are some forceps which have hinges and close to the end from which they are going to be held onto by the obstetrician using them. The locking forceps allows objects to be grasped easily in a closed

position so that they can then be manipulated and stay in place while the procedure is being performed (Fig. 16.2).

Advantages

It has got no catch and the blades are slightly bent and fenestrated. Absence of catch minimizes uterine injury, if accidentally caught. It prevents crushing of the conceptus. It is to be introduced with the blades closed, to open up inside the uterine cavity, to grasp the products and to take out the instrument with slight rotator movements. The rotator movements not only facilitate detachment of the products from the uterine wall but also minimize the injury of the uterine wall, if accidently grasped.

Uses

a. For removal of bits of placenta and membranes in D and E operation, after second trimester incomplete abortion, inevitable and missed abortion, vesicular mole evacuation, 1st trimester MTP.
b. To evacuate uterus in secondary PPH due to retained product of conception.
c. For removing retained membranes from the uterus after delivery.
d. For removing any foreign body from the uterus.
e. For twisting pedunculated polyps.
f. Manipulation of uterus for laparoscopic surgery, the ovum forceps is passed into the uterine cavity and its ends separated, so that they occupy the corneal position. With twisting movement of the handle, uterus can be manipulated.

Difference between Ovum Forceps and Sponge Holding Forceps

S. No.	*Ovum forceps*	*Sponge holding forceps*
1.	Serrations absent	Serrations present
2.	Catch absent	Catch present
3.	Less chances of injury to intra-abdominal structures	More chances of injury because of catch

Material made of and Sterilization Method

It is made of stainless steel. Hence it is sterilized by boiling or autoclaving.

How to use?

The procedure can be carried out under general anesthesia or paracervical block and sedation. If the cervix is already dilated, paracervical block is not necessary and sedation alone is sufficient. With the woman in lithotomy position, the cervix is exposed, held with a vulsellum and dilated sufficiently to permit the passage of the ovum forceps. The ovum forceps is held with the thumb and the ring finger of the right hand in the finger grips and two fingers in between along the length of the instrument to steady it. It is passed into the uterine cavity with the palm facing either up or down. The jaws are opened inside the uterine cavity, the products of conception are grasped and the forceps is withdrawn. In this manner the uterine cavity is emptied (Fig. 16.3).

Fig. 16.3: Using the ovum forceps to grasp the conceptus

Nursing Interventions

1. Assess the woman's health, conduct history, physical examination, establish gestational age, and review laboratory findings, noting Rh factor and need for Rh (D) immune globulin treatment.
2. Assess the amount and character of blood loss (pad count and weight).

3. Assess for signs and symptoms of shock or infection.
4. Respond promptly to complications.
5. Immediate measures may be necessary, such as volume and blood replacement, oxygen therapy, and medical or surgical interventions.
6. Provide emotional support to the woman and family during this difficult experience.
7. Teach regarding self and home care and the importance of follow-up appointment.
8. Treat the woman with respect and maintain confidentiality.
9. Review discharge instructions.
10. Help to ensure compliance.

Complications

1. Uterine perforation
2. Injury to intra-abdominal structures
3. Infection
4. Incomplete evacuation.

2. BERKLEY-BONNEY ROUND LIGAMENT FORCEPS

Features

Blades of this instrument are thin, long, curved on flat and with transverse serrations near the tip. It has a ratchet lock on the handles.

Indications/Uses

1. Ventrisuspension by modified Gilliam's operation (this procedure is not used in modern gynecology).
2. *Purandare's cervicopexy:* To catch rectus sheath strip or mersilene tape for extraperitoneal passage to the front of the cervix uteri.
3. *Khanna's sling operation:* To carry the mersilene tape extraperitoneally to the back of the cervix uteri and the lateral end of the inguinal ligament.
4. Williams Richardson operation for correction of vault prolapse.
5. Shaw's operation for correction of vault prolapse.

3. CROSSEN'S ROUND LIGAMENT FORCEPS

Features

Blades of this instrument are long, thin and curved on flat. One of the blades is longer than the other and has a triangular pointed end. The other blade has a small tooth at the tip which fits in a slot at the base of the triangular tip of the longer blades.

Indications/Uses

The instrument is used in a similar manner as that Berkley-Bonney round ligament forceps for similar indications.

Advantages

1. Its pointed triangular tip aids in the penetration of the transversalis fascia.
2. The tooth at the tip of one blade fitting into the slot on the other gives secure grip on the structure held.

Disadvantage

It is potentially more traumatic than Berkley-Bonney round ligament forceps.

4. BROAD LIGAMENT FORCEPS

Fig. 16.4: Broad ligament forceps

Features

These are strong pair of forceps which may be curved or straight. The blades are long with transverse or oblique serrations to ensure a firm grip.

Uses

1. To clamp broad ligament in hysterectomy.
2. A clamp is placed on each side of uterus, for applying traction on uterus during abdominal hysterectomy.

3. To grasp pedicles of cyst, fibroids and tube in ectopic pregnancy.

5. FRIEDMAN SELF-RETAINING FORCEPS

Self-retaining forceps come in use particularly when obstetricians do not have an assistant to hold onto the instruments they are using. The Friedman self-retaining forceps can simply be locked into place so that the obstetrician can easily conduct the procedure and at the same time have the right visual which is required. It also prevents excessive tissue damage while the tissue is being removed (Fig. 16.5).

Fig. 16.5: Friedman self-retaining forceps

6. GREEN ARMYTAGE FORCEPS

The forceps are used in lower segment cesarean section. Four pairs of forceps are ordinarily required—one for each angle and one for each flap. Its functions are homeostasis and to catch hold of the margins so that they are not missed during suture.

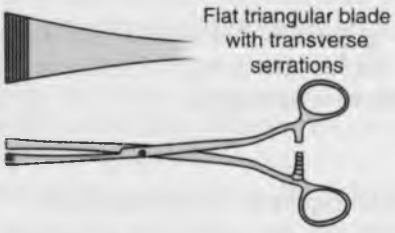


Fig. 16.6: Green armytage forceps

It cannot be used in classical cesarean section. Alternative to this, Allis' tissue forceps may be used (Fig. 16.6).

Features

This instrument is made of stainless steel. This forceps has triangular blades with a transverse serrated edge. A ratchet lock makes its grip secure. There is a small space left between the blades even when the forceps is fully closed.

Uses

a. It is used as hemostat, to decrease the bleeding from the cut edges of the uterine incision by compressing the bleeding uterine vessels and also to elevate them so that sutures can be passed easily.
b. Also used as a retractor.

Advantages

It is atraumatic and a very good hemostat.

Sterilization Method

It is sterilized by boiling or autoclaving.

7. LANE'S TISSUE FORCEPS

Fig. 16.7: Lane's tissue forceps

Features

This is stronger than Allis forceps. The blades are curved, stronger and stouter than other tissue forceps with interlocking toothed end. It has locking mechanism. The blades are fenestrated, i.e. there is an opening in the thickness of the blade for the accommodation of a good amount of tissues. The handle has catches.

Uses

1. It is used to hold parietal wall (tough or bulky tissues) for retraction during abdominal operations with transverse incision.
2. It is used to hold skin for apposition during surgery.
3. It is used to hold lymph nodes and appendix during operation.
4. It is used to hold the polyp or fibroid in polypectomy or myomectomy operation.
5. To hold the towel during draping.
6. It may be used as a mild retractor.

Advantages

1. Fenestrated blades are advantageous for tissues.
2. It can lie within them without being crushed.

8. PYESMITH'S FORCEPS (TROCAR FORCEPS)

It is used to hold the ovarian cyst after it had been punctured by the trocar and cannula. It remains in position till the whole cyst has been removed. It is also used to hold the leaking ovarian cyst when it is punctured accidentally during surgery. Otherwise, the leaking into peritoneum may later on give rise to peritonitis, and leaking malignant cells may get implanted into abdominal cavity (Fig. 16.8).

Fig. 16.8: Pyesmith's forceps

9. SHIRODKAR'S FORCEPS

This instrument has two finger grips with a cross bar connecting the two together. There is a single blade which is curved on flat and has an eye near the tip. There is no joint as seen with other round ligament forceps, so that the problem of the joint getting caught in the tissues is avoided.

Indications/Uses

1. Ventrisuspension by modified Gilliam's operation.
2. Purandare's cervicopexy:
   - Though the round ligament holding forceps is the instrument of choice for this purpose, this instrument may be used for the same purpose. The forceps blade is passed starting lateral to the rectus abdominis into the broad ligament to emerge in the uterovesical space, the strip of rectus sheath or mersilene tape is sutured to its tip through the eye. It can also be passed by an exactly reverse route and then the rectus sheath strip or mersilene tape may be drawn back sutured to its tip through its eye.

10. UTERINE ELEVATING FORCEPS

Uterine elevating forceps are gynecological instruments which are used to retrieve tissue from within the woman's uterus by elevating part of the vaginal wall.

Other Name

It is also called uterine holding forceps.

Features

It is a forceps with diverging blades and curved with rubber caps to prevent trauma to the uterus. Rubber caps have to be removed before autoclaving because heat damages them. These caps are sterilized by chemical methods. The instrument has curved blades so that uterus is accommodated in between without compression. The handles have got finger bows and ratchet lock. Ratchet lock on the handles achieves compression of uterine isthumus and occlusion of cervical canal. Firm grip allows manipulation of uterus without the instrument slipping.

Uterine elevating forceps are generally made of steel and the holds where the fingers go resemble the way in which a scissor is made. The opposite end of the handle has a clamp which allows the tissue to be retrieved from the uterus/vaginal cavity.

Types

1. Collin uterine elevating forceps (Fig. 16.9)
2. Somer uterine elevating forceps (Fig. 16.10)
3. Dartigues elevating forceps (Fig. 16.11)

Fig. 16.9: Collin

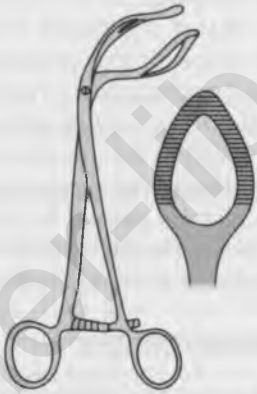


Fig. 16.10: Somer

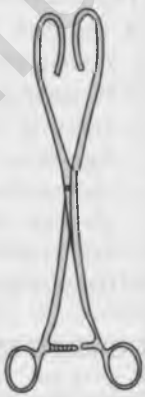


Fig.16.11: Dartigues

Uses

1. It is used in extracting tissue to test for cancer.
2. It is used to clamp tissue and/or blood vessels.
3. It is also used to remove tumors and polyp.
4. Uterine dressings, the uterine arteries as well as the maneuvering of the uterine wall can also be accomplished with the help of uterine elevating forceps.
5. *Tuboplasty operations:* To occlude the isthmus so that tubal patency can be tested by transfundal injection of diluted methylene blue solution and to hold and steady the uterus and thereby fallopian tubes.
6. Uterine sling operations such as Shirodkar's sling operation, Purandare's, Khanna's sling operation, etc.

7. To hold and lift the uterus in salpingectomy for tubal pregnancy.
8. Moschowitz culdoplasty.
9. Repair of VVF and RVF by abdominal route.
10. It is used for holding the uterus during operations. It is specifically used for holding the uterus in salpingectomy operation and in the Gilliam's operation when uterus is moved anteriorly through the fundus to maintain retroverted uterus in position while the round ligaments are plicated and sutured together in front of the rectus muscle.

Mode of Sterilization

The uterine elevating forceps made out of steel are sterilized by autoclaving. Disposable forceps may also be available which can be used once and discarded. These instruments are made using surgical quality plastic.

11. UTERINE PACKING FORCEPS

Fig. 16.12: Uterine packing forceps

Other Name

It is also called uterine dressing forceps.

Features

It is an 'S' shaped forceps, its curvatures corresponding to axis of parturient canal. The instrument is often confused with laminaria tent introducing forceps. The blades are blunt and slightly curved anteriorly with transverse serrations on inner surface, while in the later, there is a groove on either blade. The proximal end has a handle which is slightly curved posteriorly. The curve is to accommodate the angles of uterus and vagina. The inner surface of the blades is smooth, and their tips are rounded. It is made of stainless steel.

Uses

1. To swab the uterine cavity following D + E with small gauze pieces.
2. To dilate the cervix in lochiometra or pyometra.
3. It is used for packing the uterus in cases of dilatation and curettage where bleeding is not controlled by other methods.
4. It can also be used for sterilizing the cervix and vagina with antiseptic lotions in cases of procedentia.
5. It can also be used in place of a laminaria tent applicator.
6. It can be used for vaginal packing to control bleeding from lacerations and tears of vaginal walls and cervix due to traumatic labor.
7. In cases of antepartum hemorrhage where suitable hospital facilities are not available and woman's life is in danger, the uterine cavity may be packed to control the bleeding till the woman is transferred to some institution.
8. To pack the uterus in cases of atonic PPH and severe postabortal bleeding. The definite indication in modern obstetrics is in cesarean section in placenta previa.
9. It is used after vaginal hysterectomy.
10. For dissection in radical surgeries.
11. To pack uterus to control bleeding after polypectomy or hysteroscopy.

Sterilization Method

It is sterilized by boiling or autoclaving.

17 Instruments used in Laparoscopy

LAPAROSCOPY

Laparoscopy involves use of an indirect endoscopy (laparoscope) through a small abdominal incision after creating pneumoperitoneum, in order to diagnose or treat certain gynecological diseases.

Founder

In 1910, Hans Christian Jacobaeus, of Sweden, reported the first laparoscopic operation in humans.

Indications

A. Therapeutic

- Tubal sterilization
- Biopsies from intrapelvic or intra-abdominal organs
- Removal of foreign body
- *In vivo* fertilization
- Wedge resection of ovaries
- Adhesiolysis
- Evacuation of tubal abortion, conservative treatment of unruptured tubal ectopic gestation.

B. Diagnostic

- For acute or chronic pelvic pain
- Suspected ectopic gestation
- Pelvic inflammatory disease or mass of unknown etiology
- Pelvic endometriosis
- Tuberculosis of genitourinary tract
- Localization of tubal block, tubo-ovarian mass, tubal kinks

and peritubal adhesions, altered tubo-ovarian relationship, polycystic ovaries, Müllerian agenesis, etc.
- Evaluation of infertile or amenorrheic woman
- Gynecological malignancy
- Lost intrauterine devices or foreign body
- Gonadal dysgenesis or ambiguous genitalia.

C. *Non-gynecological indications*
- Target liver biopsy from focal hepatic lesions
- Peritoneal biopsy
- For evaluating hepatobiliary and pancreatic diseases
- Undiagnosed abdominal mass
- Intra-abdominal trauma.

Contraindications

1. Extensive intra-abdominal scarring following previous surgeries.
2. Intestinal obstruction or peritonitis.
3. Woman with decreased cardiorespiratory reserves.
4. Extreme obesity.
5. Bowel obstruction.
6. Second or third trimester of pregnancy.
7. Diaphragmatic hernia, abdominal wall hernia.
8. Large pelvic masses.

Advantages

- More accurate diagnosis.
- Reduced hemorrhaging, which reduces the chance of needing a blood transfusion.
- No stitches. Smaller incision, which reduces pain and shortens recovery time, as well as resulting in less post-operative scarring. It does not even need a stitch.
- Less pain, leading to less pain medication needed.
- Although procedure times are usually slightly longer, hospital stay is less, and often with a same day discharge which leads to a faster return to everyday living.
- Reduced exposure of internal organs to possible external contaminants, thereby reduced risk of acquiring infections.
- Therapeutic benefit. The obstetrician may be able to treat the cause during the laparoscopy.

Disadvantages

- The obstetrician has limited range of motion at the surgical site resulting in a loss of dexterity.
- Poor depth perception.
- Obstetricians must use tools to interact with tissue rather than manipulate it directly with their hands. These results in an inability to accurately judge how much force is being applied to tissue as well as a risk of damaging tissue by applying more force than necessary. This limitation also reduces tactile sensation, making it more difficult for the obstetrician to feel tissue (sometimes an important diagnostic tool, such as when palpating for tumors) and making delicate operations such as tying sutures more difficult.
- The tool endpoints move in the opposite direction to the obstetrician's hands due to the pivot point, making laparoscopic surgery a non-intuitive motor skill that is difficult to learn.

Mechanism of Action

The laparoscope, a telescopic rod lens system, is put through a small incision made near the umbilicus of the woman. The system is connected to a video camera (single chip or three chips). A fiber optic cable system connected to a 'cold light source (halogen or xenon)' is used to illuminate the operative field. The woman's abdomen is distended with carbon dioxide gas to create a viewing and working space for the obstetrician. Carbon dioxide is used as it is familiar to the human body and gets removed by the respiratory system if it gets absorbed through tissues. The surgical equipment are put into the abdomen through two 5 mm incisions (punctures) made near the earlier entry. The skilled obstetrician, by looking at the monitor, can perform surgery with precision and perfection.

Parts of Laparoscopy Instrument

1. Laparoscope
2. Pneumoperitoneum needle (veress needle)
3. Trocar and cannula
4. Combined uterine manipulator and cannula
5. Pneumoperitoneum apparatus (Fig. 17.1)

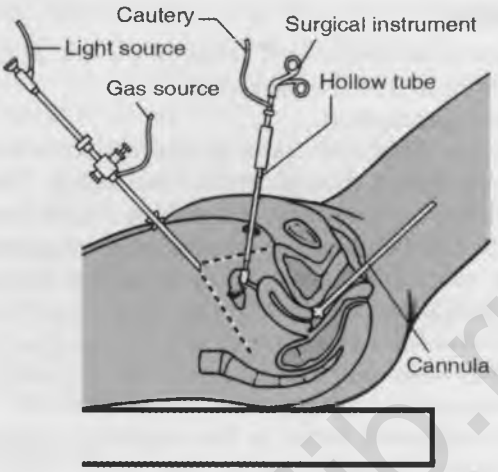


Fig. 17.1: Parts of laparoscopy instrument

1. LAPAROSCOPE

The telescope used in laparoscopy is usually 35 to 40 cm long, 6.5 mm or 10.5 mm in diameter and is fitted with a Hopkin's rod lens optical system. It has a viewing angle varying from 0° to 120° from its axis. The commonly used laparoscope has a 30° for oblique view, thus providing not only a larger field of vision but also facilitates a complete view of the pelvis by just rotating the instrument along its axis. The laparoscope has an objective or working end, an eyepiece and a light inlet for the fiber optic light cable attachment (Fig. 17.2).

Fig. 17.2: Laparoscope

The laparoscope is a refractive indirect endoscope where the image is transferred from the objective to the eyepiece by refraction using a long Hopkin's multicoated rod lens. Illumination is provided by a fiber optic system consisting of larger diameter fiber units attached to a cold light source which has a built in circulating fan and more than one light sources as a standby.

Most re-usable instruments are partially dismountable so that it can be cleaned and washed properly. Some manu-

facturers have produced modular system where part of the instrument can be changed to suit the obstetrician favorite attachment like handle or working tip.

2. PNEUMOPERITONEUM NEEDLE

The commonly used pneumoperitoneum needle is also referred to as Veress needle. This needle is used for creating pneumoperitoneum (putting air or carbon dioxide in the peritoneal cavity) for laparoscopy. It consists of a 120 mm long, 2 mm diameter sharp beveled needle containing a spring loaded blunt cannula which projects beyond the tip of the needle. When the needle is forced through the abdominal wall, the blunt cannula is forced back by the skin exposing the sharp needle tip but as it enters the abdominal cavity, the spring loaded blunt cannula projects out from the needle tip thus avoiding any visceral injury. Veress needle is available in three length, namely 80 mm, 100 mm, 120 mm. In obese woman, 120 mm and in very thin woman with scaphoid abdomen 80mm, Veress needle should be used. Before inserting it is grasped like a dart at its base. The test for successful entry into peritoneal cavity is drop of saline gets sucked and nothing comes after aspiration with syringe (Fig. 17.3).

Fig. 17.3: Pneumoperitoneum needle

Indications

1. Diagnosing the abnormalities in pelvic and abdominal organs.
2. To specify the cause of amenorrhea.
3. To take biopsy from any part of pelvic or abdominal organs.
4. To do tubal sterilization.

Anesthesia

Sedation and local anesthesia is required. General anesthesia is required if woman is uncooperative.

Procedure

1. Empty bladder.
2. Introduce Sim's speculum and visualize cervix.
3. Check the Veress needle.
4. Connect the insufflator tubing to the Veress needle.
5. Switch on the CO_2 flow at 1 litre per minute.
6. Open the gas flow tap on the Veress needle to confirm a flow.
7. Check whether the gas flow tap on the Veress needle is open.
8. Insert uterine elevator in proper direction to allow manipulation of the uterine and withdraw speculum.
9. Make a small abdominal opening just below umbilicus and insert Veress needle in the peritoneal cavity (Fig. 17.4).

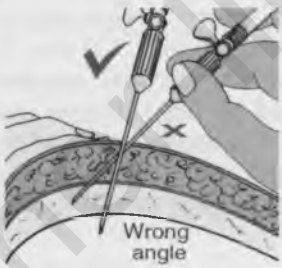


Fig. 17.4: Correct and wrong insertion of the Veress needle

10. Infuse 1–2 L of CO_2 into the cavity at the rate of 3/4 l/mm.
11. Increase the infraumbilical incision and introduce trocar 45° toward the pelvis.
12. Withdraw obturator and introduce assembled laparoscope into the abdominal cavity.
13. Identify and group the oviduct by tongs and drain into sleeve of the laparoscope.
14. Push the falope ring over the knuckle of the tube 3 cm from the cervical area.
15. Repeat procedure on the other side.
16. Withdraw laparoscope and expel CO_2 from the abdominal cavity.
17. Close the incision.

Alternative Sites for Introducing Veress Needle

For avoiding the injury to the adhered portion of bowel in the woman with previous abdominal surgeries, the alternative site for the introduction of Veress needle can be chosen other than umbilicus.

3. TROCAR AND CANNULA

The word "Trocar" is usually used to refer to the entire assembly but actual trocar is a stylet which is introduced through the cannula. The trocars are available with different type of tips. The cutting tips of these trocars are either in the shape of a three-edged pyramid or a flat two-edged blade. Conical tipped trocars are supposed to be less traumatic to the tissue. The tip can be penetrated through the parietal wall without cutting and decreased risk of herniation or hemorrhage is reported (Fig. 17.5).

Fig. 17.5: Trocar and cannula

Trocar with pyramidal tip and cannula are used to pierce the abdominal wall once the pneumoperitoneum has been created using Veress needle. The cannula is fitted with an automatic flap valve system which opens or closes during introduction or removal of endoscope.

It has got a hollow outer tube with a sharp trocar with handle at proximal end. The trocar is slightly longer than cannula and may be fitted into it. The trocar has a tapering and sharp tip and is used as an obturator and a perforator as well. It is also called port (port of entry to telescope and other instruments.) It is numbered as per outer diameter. 10 mm is used for operative telescope, 7 mm is used for band applicator for tubal ligation, 5 mm is used for other hand instruments like grasper, etc. A reducer sleeve is available to use large size port for small

instrument. It has a trumpet valve to prevent gas leak. On one side there is opening for connecting it to gas (CO_2 or air).

Cannulas are in general made from plastic or metal. Plastic devices whether they are transparent or opaque, need to be designed in such a way as to minimize the reflection of light from the telescope. Reusable and disposable trocars are constructed by a combination of metal and plastic. The tip of disposable trocar has a two-edged blade. These are very effective at penetrating the abdominal wall by cutting the tissue as they pass through.

Most of the disposable plastic trocar has a spring loaded mechanism that withdraws the sharp tip immediately after it passes through the abdominal wall to reduce the incidence of injury of viscera.

All the cannula has valve mechanism at the top. Valves of cannula provide internal air seals, which allow instruments to move in and out within cannula without the loss of pneumoperitoneum. These valves can be oblique, transverse, or in piston configuration. These valves can be manually or automatically retractable during instrument passage. Trumpet type valves are also present which provide excellent seals, but they are not as practical as some of the other systems. They require both hands during instrument insertion, which may explain why they are less often used in advanced laparoscopic cases. The flexible valves limit the carbon dioxide leaks during work whatever the diameter of the instrument used.

Parts of Trocar and Cannula

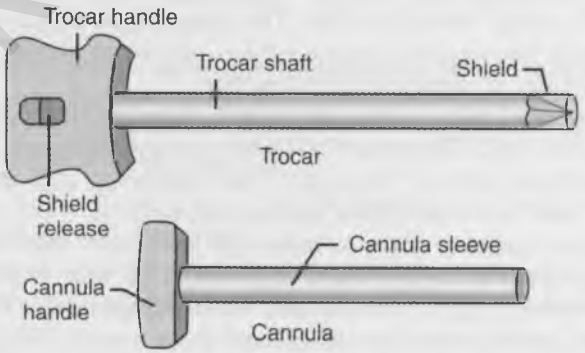


Fig. 17.6: Parts of trocar and cannula

Uses

1. It is used for puncturing a big ovarian cyst to reduce its size before its final removal.
2. This is also used to puncture the abdominal wall in cases when laparoscopic examination is intended. Here the laparoscope is introduced into the abdomen through the cannula.

Precautions

- Use the trocar before inserting the cannula to avoid punctures to the cannula seal.
- Place the cannula so that it extends through the tissue and fat layers and becomes visible within the joint cavity. If the cannula tip is placed within the soft tissue, fluid extravasation into the tissue is minimized.
- Wetting the instruments before inserting them through the cannula is helpful but not necessary.

How to use?

1. *Ovarian cyst:* It is used by fixing the cannula over the wall of the cyst without trocar, the trocar is pushed in and cyst is punctured and the trocar removed. The required amount of

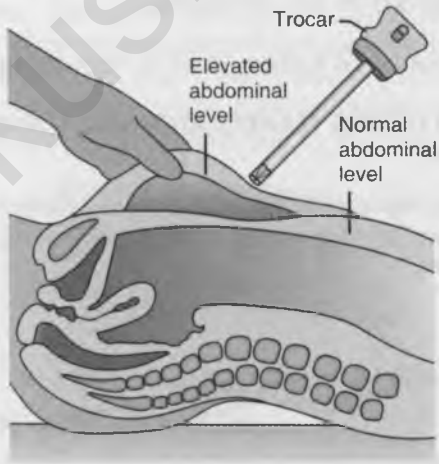


Fig. 17.7: Inserting trocar and cannula into abdominal wall in laparoscopy

fluid is taken from the cyst till the size is such that it can be removed easily. After the fluid has come out, the wall of the cyst can be closed by Pye-Smith's clamp.

2. *Laparoscopy*: Trocar is put into the cannula and then inserted into abdominal cavity for laparoscopy (Fig. 17.7).

How to Hold?

Fig. 17.8: Method of holding trocar and cannula

Complications

1. Hemorrhage in the wall of the uterus, inside the cyst or the peritoneal cavity
2. Necrosis, gangrene and sloughing
3. Infection
4. Rupture because of torsion itself or hemorrhage.

4. COMBINED UTERINE MANIPULATOR AND CANNULA FOR LAPAROSCOPY

Combined uterine manipulator and cannula helps to move the organ into view. The laparoscope shows the pelvic organs into view (Fig. 17.9).

Fig. 17.9: Combined uterine manipulator and cannula for laparoscopy

Procedure

The woman is anesthetized, the bladder emptied, the uterus sounded and often curetted and a cannula and forceps fixed to the cervix. This allows the uterus to be moved about once the endoscope is passed, and dye can be injected through the cannula to test the patency of the tubes (Figs 17.10 and 17.11).

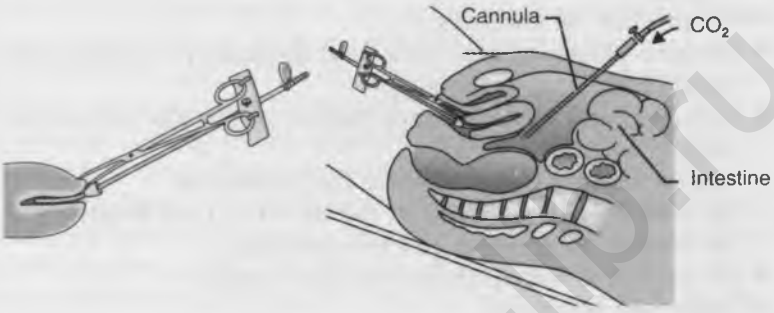


Fig. 17.10: Uterine manipulator with cannula is inserted into the cervix

Fig. 17.11: Uterine manipulator with cannula helps to move the organs

5. PNEUMOPERITONEUM APPARATUS

Most of the modern pneumoperitoneum insufflations are fully automatic with indicators for gas flow, intra-abdominal pressure, etc. The gaseous agents commonly used for insufflations of peritoneal cavity` are carbondioxide, nitrous oxide or even air. However, if electrocautery is to be used with laparoscopy, then only carbon dioxide should be used as it is non-inflammable and therefore safe to use (Fig. 17.12).

Fig. 17.12: Pneumoperitoneum apparatus

Pre-preparation for Laparoscopy

- Check for any allergies to any medicines, including anesthesia.

- Find out the history of any bleeding problems or are taking any blood-thinning medicines, such as aspirin or warfarin (Coumadin).
- Check for the possibilities of pregnancy.
- Do not eat or drink anything after 12:00 midnight, the night before surgery. Do not smoke or chew gum after 12:00 midnight.
- Remove all the jewelries.
- Remove glasses, contact lens, and dentures or a removable bridge before the laparoscopy.
- Use an enema several hours before or the day before the surgery to empty the colon.
- Get the written consent before the procedure.
- An airway will be placed in the throat to help breathing if the woman undergone general anesthesia.
- Put on the urinary catheter into the bladder.
- Pubic hair is shaved.
- The abdomen and pelvic area is washed with a special soap.
- Wear loose-fitting clothes to prevent any unnecessary pressure on the umbilicus on the day of surgery.

Procedure

Laparoscopy is done under controlled general anesthesia. In case the operation is being done for sterilization, laparoscopy may be done under sedation and local anesthesia. After induction of anesthesia, the woman is placed in modified lithotomy position (Fig. 17.13).

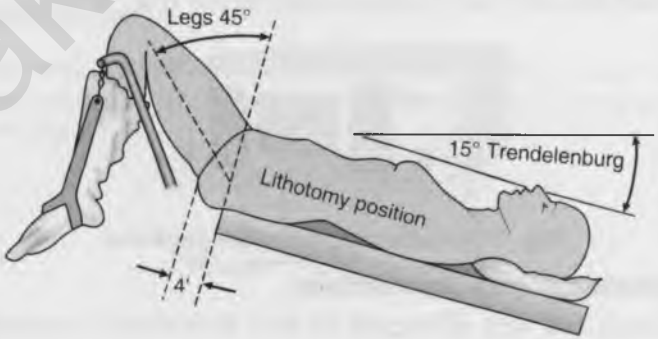


Fig. 17.13: Woman placed in lithotomy position

The woman is asked to pass urine before the procedure. After cleaning and draping the abdomen, woman is tilted into 35° Trendelenburg position for induction of pneumoperitoneum. Veress needle is usually inserted just below the umbilicus by means of an incision. Entry into the peritoneal cavity can be confirmed by a number of tests. A drop of saline placed on the hub of the needle gets sucked into the peritoneal cavity due to subatomospheric pressure. On aspiration, fecal matter or gas would be obtained if the needle tip was in bowel and urine would be obtained if it were in the urinary bladder. Saline can be injected without resistance if the needle tip lies in the peritoneal cavity and it cannot be recovered by aspiration as it spreads in the peritoneal cavity.

A semilunar 1 cm long incision is made and the abdominal wall just below the incision is pinched up. The Veress needle is then inserted in the direction of pelvis with tip of the needle pointed towards the coccyx. Once tip of the needle enters the peritoneal cavity it becomes freely mobile from side-to-side. The needle is connected to insufflations apparatus after an initial negative aspiration with a syringe to rule out any viscera puncture. A flow rate of about one liter per minute is used and the intraperitoneal pressure of 20 mm Hg is achieved and maintained. The usual requirement is about 3 to 4 liters of gas (Fig. 17.14).

Fig. 17.14: Gas filled abdomen which helps in viewing the organs

Creation of a satisfactory pneumoperitoneum is confirmed by noting uniform distension of the abdomen and obliteration of the liver dullness. After producing a satisfactory pneumoperitoneum, the needle is removed and a trocar and cannula are inserted through the same incision in a similar manner. Once the cannula enters the distended peritoneal cavity, the trocar is replaced by the laparoscope with light source for further examination of the pelvic organs.

A trocar and cannula for second puncture instrumentation are inserted through a suprapubic transverse incision. Through this a manipulating blunt probe can be passed for manipulation as well as measuring the size of intraperitoneal structures. Other second puncture instruments that can be used are silastic band applicator, scissors, knife, aspirating needle, electrode for electrocauterization, biopsy forceps and forceps with blunt jaws for holding structures like the round ligament or the utero-ovarian ligament. Tubal patency is tested by chromopertubation (Fig. 17.15).

After completion of the procedure, the gas is let out through the cannula and the woman is put back in the horizontal position. The cannula is then taken out as parallel to the anterior abdominal wall as feasible to avoid the omentum getting into the cannula and blocking the residual gaseous escape. Then

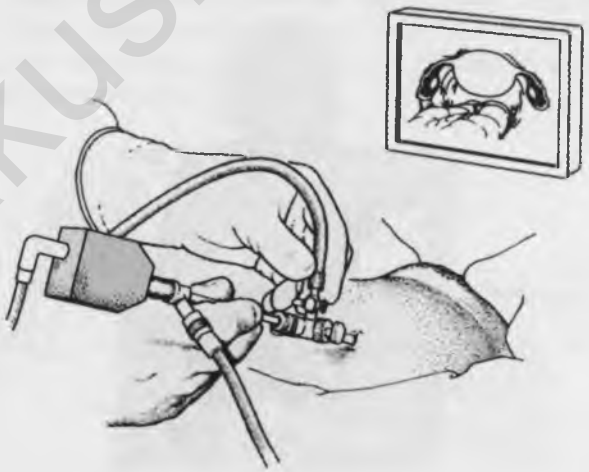


Fig. 17.15: Insertion of laparoscope into the trocar

the incision is closed with a single stitch of linen or silk which is to be removed after 7 days.

Nursing Interventions after the Procedure

After surgery, the woman is shifted to the recovery room where midwife will care for and watch the vital signs (temperature, blood pressure, oxygen level, and heart rate). The woman will stay in the recovery area for about 2 to 4 hours, and then the woman may be discharged when not developed any complications.

The woman may have some bloating. There may be bruising around the incisions for a few days. Pain around the incisions and shoulder may be present for a couple of days. The woman should avoid drinking carbonated beverages for 1 to 2 days after the laparoscopy to lower the chance of gas pains and vomiting. The gas used during the laparoscopy can irritate the diaphragm for a few days. Some of the gas in the abdomen may leak into the skin and cause a crackling sound if the woman rubs the skin surrounding the stitches. This is not a serious problem and will resolve in a few days. The woman may experience a sore throat. This is caused by irritation from a tube placed in the throat (trachea) during anesthesia. It usually lasts for just a few days and can sometimes be helped by throat lozenges.

Seek the medical help immediately if the woman has the following symptoms:

- A large area of redness or swelling around the incisions.
- Bleeding or drainage from the stitches.
- Fever.
- Severe abdominal pain.
- Hoarseness in voice that lasts more than a few days or gets worse.

Procedure Pitfalls

Reasons that the obstetrician may not be able to have the surgery or why the results may not be helpful include:

- If the woman is obese, this may make the laparoscopy harder to do.
- If the woman have scar tissue from another surgery or an injury.

- If a tissue sample is taken for a biopsy, but the results are not clear about what the problem is.

Complications

1. Failed insufflation or procedure
2. Direct trauma to the bowel or viscera
3. Injury to retroperitoneal major vessels
4. Parietal emphysema
5. Burns due to cautery use
6. Cardiac arrest
7. Cardiac arrhythmias due to hypercarbia
8. Hemorrhage
9. Infection
10. Air embolism.

18 Contraception

Contraception or birth control refers to the various procedures used to deliberately prevent the likelihood of pregnancy. It is used to limit family size and to plan future pregnancies.

INDICATIONS FOR CONTRACEPTION

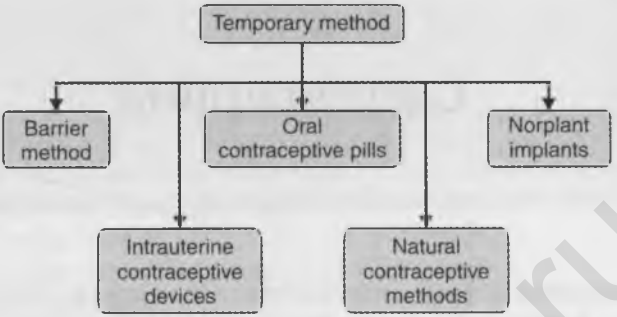
1. Population control.
2. Improvement of the stock.
3. Temporary ill health of the wife or husband.
4. Chronic ill health of the wife.
5. To give time for recovery from past obstetric conditions:
   - Pregnancy induced hypertension.
   - Cesarean section.
6. To give time for recovery from gynecological surgery:
   - Myomectomy.
   - Metroplasty.
   - Corneal implantation of the tubes.
7. Inheritable diseases.
8. Birth spacing.
9. Avoiding out of wedlock pregnancies.

Methods of Contraception

Contraception includes all methods used to prevent conception and thus regulate fertility. Each method prevents pregnancy in a different way. The contraceptive method may be:

- Temporary (spacing) for delaying first pregnancy or spacing the child births.
- Permanent (sterilization), for limiting the family after achieving the desired family size—tubectomy and vasectomy (Flow chart 18.1).

Flow chart 18.1: Types of temporary contraceptive methods

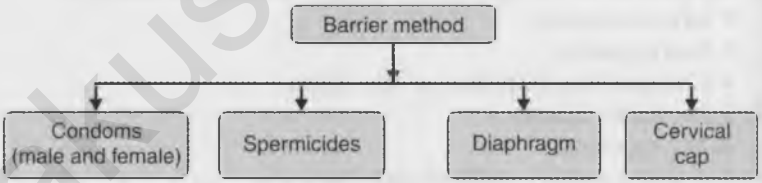


BARRIER METHOD

Barrier methods are some of the oldest and safest forms of contraception (birth control). These methods work by acting as barriers to keep the man's sperm from reaching the woman's egg. Some methods also may protect against certain sexually transmitted diseases (STDs).

There are several types of barrier methods. The types of barrier methods used today include (Flow chart 18.2):

Flow chart 18.2: Types of barrier methods



CONDOMS

MALE CONDOM

Definition

Male condom is made up of thin sheaths of rubber, vinyl or natural products which may be treated with a spermicide for added protection (Fig. 18.1).

Fig. 18.1: Male condom

Mechanism of Action

- Condom prevents deposition of sperm in the vagina. It collects the semen and prevents the sperm from entering the woman's vagina.
- It also prevents microorganisms which are causing diseases like sexually transmitted diseases, passing from one partner to another.

Types of Condoms

There are three different types of condoms available. They are
1. Latex
2. Polyurethane
3. Natural skin (made from animal tissue)

Latex condoms are the most common and inexpensive of the other two types. However, they are also the type that is most likely to cause irritation, mainly in people who have a latex allergy (Table 18.1).

Table 18.1: Types and features of male condom

Type	*Protects against*	*Material*	*Cost*
Latex	Pregnancy and STDs	Natural rubber	Low
Plastic	Pregnancy and STDs	Polyurethane	Moderate
Natural skin	Pregnancy only	Lamb membrane	High

Advantages

1. Immediate effect.
2. Easily available.

3. Easy to carry.
4. Inexpensive.
5. Protects against STDs and AIDS.
6. Ensures male participation in family planning.
7. Do not affect breastfeeding.
8. Can be used as back up to other methods.
9. No prescription is needed.
10. No systemic side-effects.
11. May prolong erection and time to ejaculation.
12. Effective when used with a spermicide.
13. Helps in prevention of cancer cervix in female partner.

Disadvantages

1. Interrupts sexual intercourse as condom has to be put on an erect penis.
2. Penile sensitivity sometime decreases.
3. It may tear off or slip off during intercourse.
4. Condom may deteriorate in too much heat or light or if stored for more than 3 years.

Selection of Condom

Condoms are available in large variety of sizes, thickness, colors, textures as well as in lubricated or non-lubricated forms. Selection of condom is most important in person with latex allergy or lubricants allergy, because it may cause local irritation.

Best Time for use of Condoms

1. As a back-up method, when birth control pills are forgotten for more than 2 days.
2. When other contraceptive methods are contraindicated for women, e.g. heart disease, liver disease, or the woman is unwilling to use other effective methods.
3. Women who are breastfeeding and need contraceptive.
4. Men who wish to participate actively in family planning.
5. Couples who need contraception immediately.

6. Couples who need a temporary method while awaiting another method (e.g. implants, IUD or voluntary sterilization).
7. Couples who have intercourse infrequently.
8. Couples in which either partner has more than one sexual partner who are at high risk for STDs, including HBV and HIV/AIDS, even if using another method.

Do's and Don'ts While using Male Condoms

Table 18.2: Do's and don'ts while using the male condom

S. No.	Do's	Don'ts
1.	Use only latex or polyurethane (plastic) condoms	Use out of date condoms. Check the expiration date carefully. Old condoms can be dry, brittle or weakened and can break more easily
2.	Store the condoms in a cool, dry place	Unroll the condom before putting it on the erect penis
3.	Use the condom on an erect (hard) penis before there is any contact with a partner's genitals	Leave condoms in hot places like your wallet or in your car
4.	Apply plenty of water-based lubricant with latex condoms. It reduces friction and helps to prevent the condom from tearing	Use oil-based products, like baby oil, cooking oils, mineral oil, hand lotion or petroleum jelly (like Vaseline) as lubricants with latex condoms. The oil quickly weakens latex and can cause condoms to break
5.	Squeeze the air out of the tip of the condom when rolling it over the erect penis. This allows room for the semen	Use fingernails or teeth when opening a condom wrapper. It is very easy to tear the condom inside
6.	After sex, hold the condom in place at the base of the penis before withdrawing (pulling out)	Reuse a condom. Always use a new condom for each kind of sex you have

Contd.

Table 18.2: Do's and don'ts while using the male condom (*Contd.*)

S. No.	*Do's*	*Don'ts*
7.	Dispose of used condoms by placing in a waste container, in latrine or burying	Regularly use lubricants with spermicide called nonoxynol -9 ("N-9") as they may cause skin irritation or tiny abrasions that make the genital skin more susceptible to STIs
8.	Keep an extra supply of condoms available	Use a condom if the package is broken or the condom appears damaged or brittle

How to use?

1. Carefully open the package so the condom does not tear (Fig. 18.2).
2. Do not unroll condom before putting it on.
3. When putting on the condom, be sure the rolled up ring is on the outside (Fig. 18.3).

Fig. 18.2: Open the package without tearing the condom

Fig. 18.3: Rolled up ring in the condom

Fig. 18.4: Putting the condom on the penis when it is hard

Fig. 18.5: Pinching the tip of the condom and placing it till the end of the penis

4. Put condom on the penis when it is hard (Fig. 18.4).
5. If not circumcised, pull foreskin back. Pinch tip of condom and place it on end of penis (Fig. 18.5).
6. Continue pinching tip while unrolling condom to base of penis (Fig. 18.6).
7. After intercourse, remove the condom slowly by pinching the tip so as to avoid the semen leaking out the condom (Fig. 18.7).

Fig. 18.6: The condom is unrolled till the base of the penis

Fig. 18.7: Removal of the condom

Possible Side Effects

Most men and women have no problems while using the condoms. The side effects that can occasionally occur include:

- Allergy to latex condoms
- Irritation of the penis or the vagina from spermicides or lubricants that sometimes used with condoms.

Limitations

- Moderately effective (3–14 pregnancies per 100 women).
- Effectiveness depends on willingness to follow instructions.
- Disposal of used condoms may be a problem.
- Adequate storage must be available at client's home.
- Supplies must be readily available before intercourse begins.
- User-dependent (require continued motivation and use with each act of intercourse).
- May reduce sensitivity of penis, making maintenance of erection more difficult.

FEMALE CONDOM

Definition

The female condom is a thin, loose soft fitting polyurethane pouch that lines the vagina. The female condom is not used very often.

The female condom provides a physical barrier that prevents sperm from entering the cervix. Like the male condom, the female condom is more effective when used with a spermicide. Female condoms can be bought over-the-counter and do not need to be fitted.

Parts of the Female Condom

The female condom is polyurethane sheath or pouch about 17 cm (6.5 inches) in length. At each end there is a flexible ring. At the closed end of the sheath (inner ring), the flexible inner ring is inserted into the vagina which helps to aid in easy insertion and retention of the female condom in place. At the other open end of the sheath, the outer ring stays outside the vulva at the entrance to the vagina. There is silicone-based lubricant present in the inner surface of the condom, but additional lubrication can be used. The condom does not contain spermicides (Fig. 18.8).

Fig. 18.8: Parts of female condom

Mechanism of Action

1. It prevents sperms from gaining access to female reproductive tract.
2. It prevents microorganisms (STDs) passing one partner to another.

Fig. 18.9: Action of female condom

Indications

Table 18.3: Indications of the female condom

Women	*Couples*
Who prefer not to use hormonal methods or cannot use them (e.g. smokers over 35 years of age)	Who need contraception immediately
Who prefer not to use IUDs	Who need a temporary method while awaiting another method (e.g. implants, IUD or voluntary sterilization)
Whose partners cannot or will not use the male condom	Who need a backup method
Who has recently given birth	Who have intercourse infrequently
Who are breastfeeding and need contraception Who want protection from STDs. Who have had a hysterectomy Who are in perimenopause or postmenopause	People who are allergic or sensitive to latex male condom should use female condom as an alternative

Contraindications

- Women whose age, parity or health problems make pregnancy at high-risk.
- Women with physical disabilities or who find it unpleasant to touch their genitals (vulva or vagina).
- Women with uterine prolapse (uterus protruding into the vagina).
- Women with severe cystocele or rectocele (bulging of the walls of the bladder or rectum into the vagina).
- Women with vaginal stenosis (narrowing of the vaginal canal).
- Women with genital anomalies (e.g. septated vaginal canal)

Advantages

- Effective immediately
- Do not affect breastfeeding

- Do not interfere with intercourse (may be inserted up to 8 hours before)
- Can be used as backup to other methods.
- No method-related health risks.
- No systemic side effects.
- No prescription or medical assessment necessary.
- Controlled by the woman.
- May provide protection against STDs.
- May help prevent cervical cancer.
- Insertion is easy, once learned.
- Allow women to share responsibility for preventing infection.
- Can be inserted by a partner as a part of sex play.
- Can be used by people whose partners are allergic to latex male condom.
- Can be used with oil-based as well as water-based lubricants.
- Do not have an effect on a woman's natural hormones.
- May enhance sex play—the external ring may stimulate the clitoris.
- Stay in place whether or not partner maintains his erection.

Disadvantages

- The outer ring frame which is visible outside the vagina will make some women feel self-conscious.
- Female condoms can make noises during intercourse which can be prevented by adding more lubricant to the condom.
- Some women find hard to insert and remove the female condom.
- Female condom has a higher failure rate in preventing pregnancy than non-barrier methods such as the pill.
- It is relatively expensive and relatively limited in availability in some countries.

Steps of using a Female Condom

- Use a new condom every time while having intercourse.
- The condom can be inserted about 8 hours prior to sexual intercourse and can be kept in for about another 12 hours after intercourse. It can be used more than once during this period.
- Wash hands with soap and water.

Fig. 18.10: Remove the condom from the package

Fig. 18.11: Holding the inner ring in between the thumb and middle finger

- Remove the condom from the package. Do not use teeth, knife, scissors or other sharp utensils to open package. Check date on condom package to ensure that it is not out of date. Do not use a condom if the package is broken or the condom appears damaged or brittle (Fig. 18.10).
- Hold the condom with the open end down.
- Use the thumb and middle finger to squeeze the flexible ring at the closed end into a narrow oval (Fig. 18.11).
- With your other hand, spread the lips of the vagina.
- Squeeze the inner ring between the fingers (Fig. 18.12).
- Insert the ring and sheath into the vagina (Figs 18.13 and 18.14).
- Use the index finger to push the ring as far as possible into the vagina (Fig. 18.15).
- Push the ring up till the pubic bone.
- Make sure the outer ring and part of the sheath are outside the vagina over the vulva. About an inch of the open end should be outside the body (Fig. 18.16).

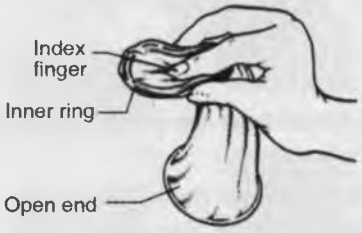


Fig. 18.12: Using thumb and index finger to squeeze the flexible ring

Fig. 18.13: Woman is separating the labia majora and inserting the condom

Fig. 18.14: Woman is inserting the inner ring and sheath into the vagina

Fig. 18.15: Inserting the index finger to push the ring into the vagina

Fig. 18.16: The outer ring and part of the sheath are present outside the vagina

Fig. 18.17: Penis should enter the sheath and stay within the sheath during intercourse

- Take care to be sure the penis enters the sheath and stays within the sheath during intercourse (Fig. 18.17).
- Do not use the female condom with a male condom.

- Right after ejaculation, squeeze and twist the outer ring and pull the pouch out gently. Remove the condom before you stand up.
- Each condom should only be used once.
- Keep an extra supply of condoms available. Do not store them in a warm place or they will deteriorate and may leak during use.

Positions for Inserting the Female Condom

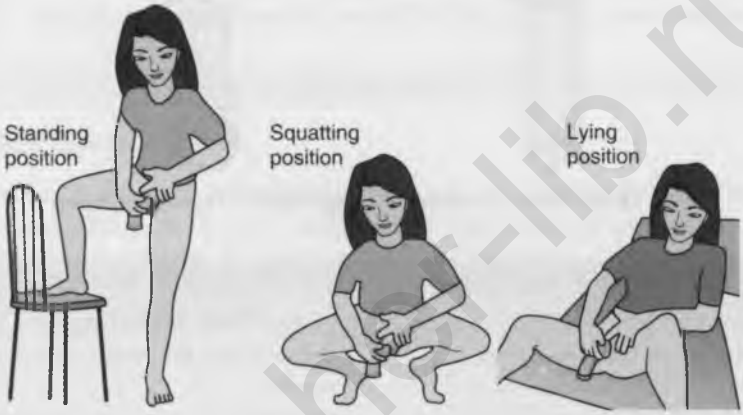


Fig. 18.18: Different positions for inserting female condom

Disposal of Female Condom

- Female condoms need not to be removed immediately after a man ejaculates, unlike the male condom. But they should be taken out before the woman stands up to avoid having the semen spilling out.

Fig. 18.19: Disposal of female condom

- The outer ring of female condom should be twisted (clockwise) to seal the condom so that no semen comes out.
- Female condom can be pulled out and wrapped in the package by which it came or in tissue paper.
- Female condom should be disposed in waste containers and not in the toilet.

Difference between Male Condom and Female Condom

Fig. 18.20: Male condom

Fig. 18.21: Female condom

Table 18.4: Difference between male condom and female condom

Male condom	*Female condom*
Rolled on the man's penis	Inserted into the woman's vagina
Made from latex rubber	Made from plastic polyurethane
Fits on the penis	Loosely lines the vagina
Lubrication:	Lubrication:
Present only on the outside of the condom, not lubricated much	Present both on the inside and outside of the condom, highly lubricated, helps in insertion and intercourse
Can be put only on an erect penis	Can be inserted prior to intercourse, not dependent on an erect penis
Must be removed immediately after ejaculation	Does not need to be removed immediately after ejaculation. But should be removed before the woman gets up
Covers most of the penis and protects the woman's internal genitalia	Covers both the woman's internal and external genitalia and the base of the penis, thus provides broader protection

Limitations

- Expensive (at this time).
- Moderately effective (5 to 21 pregnancies per 100 women).
- Effectiveness depends on willingness to follow instructions.
- User-dependent (require continued motivation and use with each act of intercourse).
- Disposal of used condoms may be a problem.
- Adequate storage must be available.
- Supplies must be readily available before intercourse begins.

SPERMICIDES

DEFINITION

Spermicides are chemicals which kill the sperm and prevent conception. It is also available in the form of creams and foaming tablets or suppositories. "Delfen"—a cream and "Today"—a foaming tablet are available. They contain Nonoxynol-9. They can be used with condoms to increase effectiveness.

Types

- Aerosols (foams)
- Vaginal tablets, suppositories or dissolvable film
- Creams (Fig. 18.22)

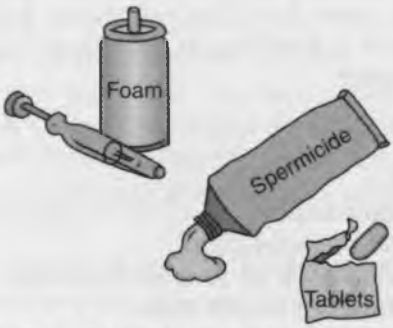


Fig. 18.22: Types of spermicides

Mechanism of Action

Spermicides inactivate the sperms. It causes the sperm cell membrane to break, which decreases sperm movement (motility and mobility) and their ability to fertilize the egg. The protection begins 10 to 15 minutes after insertion and they remain effective for about one hour.

Indications

1. Breastfeeding mother.
2. Women using barrier methods like condoms.
3. Women who are at risk of exposure to STD including AIDS.
4. Women who are unwilling to use or have contraindications to other methods.
5. Couples needing a temporary method while awaiting another method.
6. Couples needing a backup method.
7. Couples who have intercourse infrequently.

Contraindications

- Women or partner allergic to Nonoxynol-9.
- Woman who has age, parity or health problems that make pregnancy a high-risk.
- Woman who has physical disabilities or finds it unpleasant to touch external genitalia (vulva and vagina).
- Woman who has genital anomalies or other abnormalities.
- Woman who does not want any inconvenience.
- Woman who needs a highly effective method of contraception.
- Woman who wants a method not related to intercourse.
- Woman who is not willing to use correctly and with each act of intercourse.

Advantages

1. Easy to use.
2. Effective immediately.
3. Do not affect breastfeeding.
4. Can be used as back up to other methods.
5. No method-related health risks.
6. Increases lubrication during intercourse.

7. Reversible.
8. No medical intervention or prescription required.
9. Helps protection against STDs.
10. No systemic effects.

Disadvantages

1. Effective for a short period—1 hour only.
2. Must be used before each act of sexual intercourse.
3. May interrupt sexual intercourse and needs privacy as it is to be inserted 10 minutes before the act.
4. Some woman may be sensitive to spermicide and develop irritation.

Selection of Spermicides

- Aerosols (foams) effective immediately after insertion.
- Aerosols are recommended if spermicide is to be used as the only contraceptive method.
- Foaming vaginal tablets and suppositories are convenient to carry and store. But it requires waiting time of 10 to 15 minutes after insertion before intercourse.
- Melting vaginal suppositories also require waiting time of 10 to 15 minutes after insertion before intercourse.
- Spermicidal jellies usually used only with diaphragms.

Instructions

1. It should be inserted just before each act of intercourse.
2. There is a 10 to 15 minutes waiting interval after insertion of vaginal tablets, suppositories or film. There is no waiting interval after inserting aerosols (foams).
3. It is important to follow the recommendations of the manufacturer for use and storage of each product. (Example: Shake aerosols before filling the applicator.)
4. Apply more spermicide if intercourse does not take place within 1 to 2 hours.
5. Additional spermicide needed for each repeated intercourse.
6. It is important to place the spermicide high in the vagina so the cervix is well covered.

How to use?

1. Aerosol (foam)

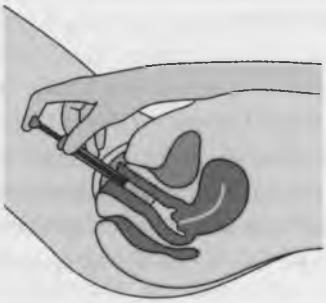


Fig. 18.23: Inserting spermicidal foam with an applicator

- Shake the container 20–30 times before using it (Fig. 18.23).
- Place container in upright position and put applicator over valve. Press applicator to side so it fills with foam.
- While lying down, insert applicator into the vagina until the tip is at or near the cervix. Push the plunger and release the foam. There is no need to wait for the foam to work.
- The foam applicator should be washed with soap and warm water, rinsed and dried. It can be taken apart for easier cleaning. Do not share applicator with others.
- Keep an extra supply of foam available, especially if you cannot see whether the container is empty.

2. Vaginal Tablet, Suppository or Film

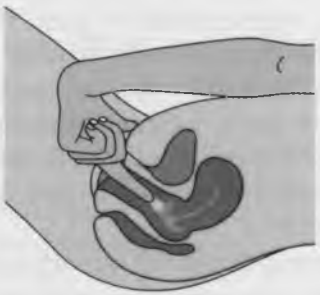


Fig. 18.24: Inserting a spermicidal suppository

- Remove vaginal tablet, suppository or film from package (Fig. 18.24).
- While lying down, insert vaginal tablet, suppository or film high in the vagina. (If applicator provided, insert it into vagina until the tip is at or near the cervix.)
- Wait 10–15 minutes before having intercourse.
- The applicator should be washed with soap and warm water, rinsed and dried. It can be taken apart for easier cleaning. Do not share applicator with others.
- Keep an extra supply of vaginal tablets, suppositories or film on hand.
- Some foaming vaginal tablets may cause a warm sensation in the vagina. This is normal.

3. Cream

- To insert contraceptive cream, squeeze into applicator until full. Insert the applicator into the vagina until the tip is at or near the cervix. Push the plunger and release the cream. There is no need to wait for the cream to work.
- The applicator should be washed with soap and warm water, rinsed and dried. It can be taken apart for easier cleaning. Do not share the applicator with others.
- Keep an extra supply of cream available, especially if you cannot see whether the container is empty.

Limitations

- Moderately effective (6–25 pregnancies per 100 women during the first year of use).
- Effectiveness as contraceptives depends on willingness to follow instructions.
- User-dependent (require continued motivation and use with each act of intercourse).
- User must wait 10–15 minutes after application before intercourse (vaginal foaming tablets, suppositories and film).
- Each application is effective for only 1–2 hours.
- Supplies must be readily available before intercourse begins.
- Resupply must be available.

DIAPHRAGM

DEFINITION

The diaphragm is a small, round, thin, saucer shaped rubber dome with a metal coil in its firm, flexible rim that fits inside the woman's vagina and covers the cervix. It is used with a spermicide (Fig. 18.25).

Fig. 18.25: Diaphragm

Material

This type of barrier birth control is made out of thin flexible silicone rubber.

Types

1. Flat spring (flat metal band) (Fig. 18.26)
2. Arcing spring (combination metal spring) (Fig. 18.27)
3. Coil spring or hinged spring (coiled wire) (Fig. 18.28)

Fig. 18.26: Flat spring

Fig. 18.27: Arcing spring

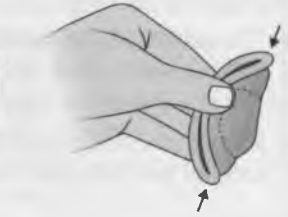


Fig. 18.28: Hinged spring (arrows indicate hinges)

Table 18.5: Types, material and sizes of various types of contraceptive diaphragms

Diaphragm type	*Material*	*Sizes (mm)*
Flat spring	Rubber	55–105
Coil spring	Latex rubber	50–95
	Rubber	50–105
	Silicone	60–95
Arcing spring	Rubber	55–95
	Latex rubber	50–95
	Silicone	60–95

Mechanism of Action

The diaphragm works by creating a barrier between sperm and the uterus. The diaphragm slides into place behind the pubic bone, completely covering the cervix. This prevents any sperm deposited during sexual intercourse from swimming through cervix and into the uterus, where fertilization of an egg can occur. Spermicide placed inside the dome and around the rim of the diaphragm helps to kill any sperm that comes into contact with it. As a result, sperm is prevented from slipping around the diaphragm and swimming into the uterus (Fig. 18.29).

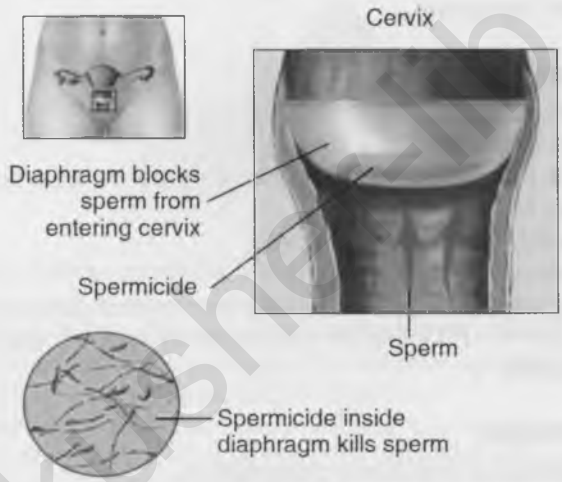


Fig. 18.29: Action of diaphragm along with spermicide

Indications

- Women who prefer not to use hormonal methods or who should not use them (e.g. smokers over 35 years of age)
- Women who prefer not to or should not use IUDs
- Women who are breastfeeding and need contraception
- Women who want protection from STDs and whose partners will not use condoms
- Couple who need a temporary method while awaiting another method
- Couple who need a backup method

- Couple who have intercourse infrequently
- Either partner has more than one sexual partner (at high risk for STDs), even if using another method.

Contraindications

Diaphragms are not recommended unless other methods are not available or acceptable if a woman has:

- A history of toxic shock syndrome (TSS)
- An allergy to rubber or spermicides
- Repeat urinary tract infections (UTIs)
- Uterine prolapse
- Vaginal stenosis
- Genital anomalies

Advantages

- Effective immediately.
- Do not affect breastfeeding.
- Do not interfere with intercourse (may be inserted up to 6 hours before).
- No method-related health risks.
- No systemic side effects.
- Some protection against sexually transmitted diseases (STDs) (e.g. HBV, HIV/AIDS) especially when used with spermicide.

Disadvantages

- A diaphragm requires a prescription.
- Women should be fitted with the largest comfortable size.
- You will need to be refitted if:
  - Woman gained or loses 10 pounds weight or more.
  - Woman had pelvic surgery.
  - Woman who gave birth or had an abortion.
  - Women who have repeated urinary tract infections.
  - Woman or her partner feels pain or pressure during sex.

Prerequisites

Diaphragms need to be fitted by the healthcare provider. It is essential to check that the diaphragm is well fitted because improperly fitted diaphragms may lead to pregnancy. During

the pelvic exam, the healthcare provider assesses the vagina to determine the size of the diaphragm. After measuring the vagina, the diaphragm corresponding to that size is prescribed.

How to use?

1. Use diaphragm during each intercourse.
2. Empty your bladder and wash your hands.
3. Check diaphragm for holes by pressing rubber and holding it up to light or filling with water.
4. Squeeze small amount of spermicidal cream or jelly into cup of diaphragm (Fig. 18.30).

Fig. 18.30: Putting spermicidal jelly inside the diaphragm and on its rim

5. Lubricate by applying small amount of cream/jelly on leading edge of diaphragm or in vaginal opening to make insertion easier. Squeeze rim together.
6. Various positions like one foot raised up on a chair or toilet seat, lying down or squatting for inserting diaphragm.
7. Spread apart the lips of vagina.
8. Insert diaphragm and cream/jelly back in vagina and push front rim up behind pubic bone (Fig. 18.31).
9. Put a finger in the vagina and feel the cervix (feels like your nose) through the rubber to make sure it is covered (Fig. 18.32).
10. After the diaphragm is in place, the cervix should be completely covered by the rubber dome (Fig. 18.33).
11. Additional cream or jelly is needed for each repeated intercourse.
12. Leave diaphragm in for at least 6 hours after the last time intercourse occurs. Do not leave it in more than 24 hours after intercourse.

Fig 18.31: Squeezing the diaphragm together for insertion

Fig. 18.32: Putting the diaphragm on the cervix and checking its correct position

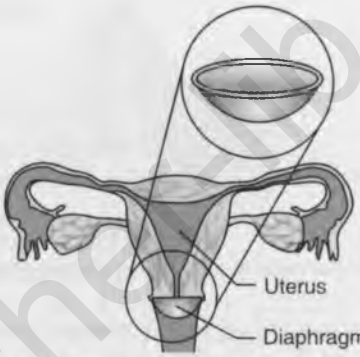


Fig. 18.33: Diaphragm is inserted in cervix

13. Vaginal douching is not recommended at any time. If done, it should be delayed for 6 hours after intercourse.
14. Remove diaphragm by hooking finger behind front rim and pulling it out. If necessary, put your finger between diaphragm and pubic bone to break the suction before pulling out.
15. Wash diaphragm with mild soap and water and dry it thoroughly prior to returning it to container.

Client Instructions

1. If having trouble finding cervix, talk with obstetrician or nurse about how to place the diaphragm.
2. A diaphragm is effective only if it is used correctly each time while having sex.

3. A diaphragm should be replaced with a new one about every 2 years.
4. The diaphragm may slip out of place, so be sure to check its placement before and after sex. If the diaphragm is dislodged during sex, spermicide should be reapplied.
5. After sex, the diaphragm must be left in place for about 6 hours.
6. It should not be left in place for more than 24 hours.
7. A diaphragm may fade or change colors over time. It can be still used unless holes in the rubber are noticed. To check for holes, hold the diaphragm up to a light and stretch the rubber gently between your fingers. Filling the diaphragm with water also is a good way to check for holes.
8. Use only water-based lubricants when using a diaphragm. Do not use any oil-based lubricants such as petroleum jelly or body lotion. The oil can damage the rubber. Also, some medications used in the vagina are oil-based and can affect a diaphragm.
9. Do not use talcum powder to dry diaphragm. Talc may increase the risk of ovarian cancer.
10. A diaphragm may increase the risk of urinary tract infections. If a woman got a urinary tract infection, physician may treat it with antibiotics. If the woman keeps having infections, she may need to be refitted, or she may need to change to another type of birth control.
11. Use of a diaphragm can cause a reaction in those who have an allergy to spermicides or latex. It cannot be used just after giving birth.

Limitations

- Moderately effective (6 to 10 pregnancies per 100 women during the first year of use if used with spermicide).
- Effectiveness as contraceptives depends on willingness to follow instructions.
- User-dependent (require continued motivation and use with each act of intercourse).
- Pelvic examination by trained service provider (may be non-physician) required for initial fitting and postpartum refitting.

- Associated with urinary tract infections in some users.
- Must be left in place for 6 hours after intercourse.
- Supplies must be readily available before intercourse occurs.
- Resupply must be available (spermicide required with each use).

CERVICAL CAP

Fig. 18.34: Cervical cap

DEFINITION

The cervical cap is a small, thin rubber or plastic dome shaped like a thimble. It is smaller than a diaphragm. It fits tightly over the cervix and stays in place by suction. The cervical cap is a type of barrier birth control that is used to prevent unplanned pregnancies.

Founder of Cervical Cap

In 1838, German gynecologist **Friedrich Wilde** created the first modern cervical cap by making custom-made rubber molds of the cervix for some of his patients.

Types of Cervical Cap

1. *Femcap:* The femcap is a clear, silicone cap with a removal strap over the dome. It has a groove between the brim and the dome that is designed to hold spermicide and trap sperm. The femcap covers the cervix and part of the vaginal fornices. It comes in three sizes: 22, 26, and 30 mm and is available in the United States and Europe (Fig. 18.35).
2. *Oves:* The oves cap is a clear, disposable, silicone cap that comes in three sizes: 26, 28, and 30 mm. It has a small loop

Fig. 18.35: Femcap

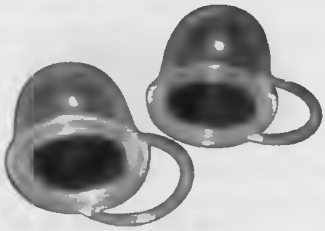


Fig. 18.36: Oves cervical cap

Fig. 18.37: Dutch cap

Fig. 18.38: Vimule cervical cap

on the rim for easy removal. This is no longer available (Fig. 18.36).

3. *Dutch cap:* It is also known as the "Dumas". The Dumas is a shallow, bowl-shaped latex cap. It covers the cervix and part of the vaginal tract. The Dumas cap comes in five sizes: 50, 55, 60, 65, and 75 mm external diameter. This is also no longer available (Fig. 18.37).
4. *Vimule*: The Vimule is bell-shaped with a flanged rim. It covers the cervix and a part of the upper vaginal tract. The Vimule comes in three sizes: 42, 48, and 52 mm external diameter. This product is no longer being manufactured anywhere due to a high incidence of vaginal lesions (Fig. 18.38).
5. *Prentif:* The Prentif cap is a small flexible cup made of latex. It is thimble-shaped and fits tightly over the cervix. The Prentif cap comes in four sizes: 22, 25, 28, and 31 mm. This product is no longer being manufactured anywhere (Figs 18.39 and 18.40) .

Figs 18.39 and 18.40: Prentif cervical cap

Parts of Cervical Cap (Femcap)

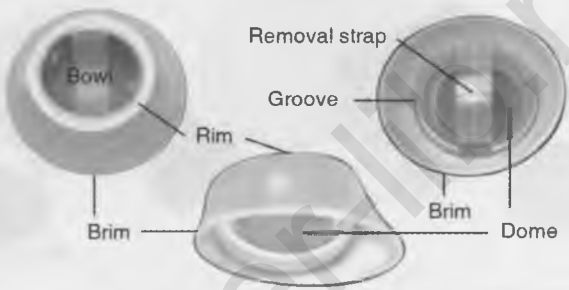
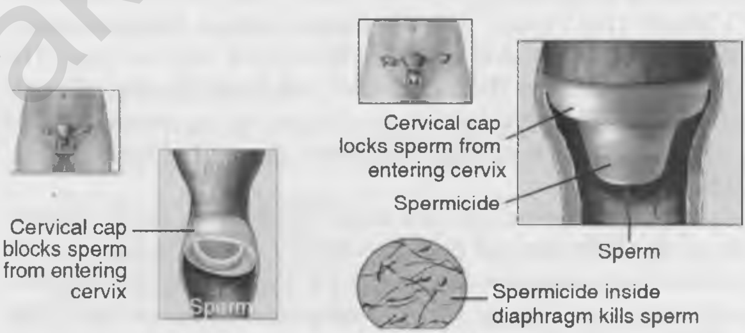


Fig. 18.41: Parts of cervical cap

Mechanism of Action

The cervical cap works to prevent pregnancy by blocking the cervix. The cervical cap tightly covers the cervix, preventing sperm from entering the uterus and fertilizing an egg. The cap is held in place by the vaginal muscles, which stop it from



Figs 18.42 and 18.43: Action of femcap and Prentif cervical cap

becoming dislodged during intercourse. The cervical cap is to be used with spermicide, which works to kill any sperm that come into contact with the cap (Figs 18.42 and 18.43).

Selection of Cervical Cap

The cervical cap is available by prescription from the healthcare provider. It is necessary to get a cervical cap that fits snugly and comfortably inside of the woman's vagina.

It is available in the following sizes based on the individual's obstetrical history:

- Small—22 millimeters, this is designed for women who have never been pregnant.
- Medium—26 millimeters, which is designed for women who have been pregnant but never had a vaginal birth.
- Large•30 millimeters, this is designed for women who have had previous vaginal births.

Advantages

- It does not affect the fertility or menstrual cycle.
- It can be left in vagina for up to 48 hours.
- It is usually unnoticeable to both partners.
- It requires less spermicide than the diaphragm, which increases the pleasure of oral sex.

Disadvantages

Cervical cap is uncomfortable to apply and is rarely used nowadays. The cervical cap is not a perfect method of birth control and does have some disadvantages:

- It must be fitted by the healthcare provider.
- It is difficult to insert properly and may become dislodged during intercourse.
- Unlike some other kinds of birth control, it is not effective in protection against STDs.

Similarities between Cervical Cap and Diaphragm

The cervical cap has many similarities to the diaphragm:

- It reduces the risk of some STDs.

- Oil-based lubricants (e.g. petroleum jelly) should not be used with it.
- It can be used in combination with the male condom for better protection from pregnancy and sexually transmitted diseases (STDs).
- It cannot be used just after giving birth.
- It must be checked for tear or holes before use.
- It must be refitted after giving birth, having an abortion, or after weight gain or loss.

Difference between Diaphragm and Cervical Cap

Table 18.6: Difference between diaphragm and cervical cap

S. No.	*Diaphragm*	*Cervical cap*
1.	It is a shallow latex cup	It is a silicone cup shaped like a sailor's hat
2.	84–94 percent effective against pregnancy	It is about 71 percent effective for women who have given birth vaginally, and 86 percent effective for women who have never been pregnant or given birth vaginally
3.	It can be used for up to 24 hours	It can be used for up to 48 hours
4.	The diaphragm covers the cervix and the area around it	The cervical cap fits more snugly on the cervix itself

How to use?

- The cervical cap should be inserted prior to intercourse.
- Apply a small amount of spermicide to the bowl and brim of the cap.
- Half a teaspoon of spermicide is also to be applied on the groove on the cervical cap, in order to protect against pregnancy (Fig. 18.44).
- To insert the cap, pinch the cap so that it folds in half, bowl side up (Fig. 18.45).
- Push the cap into the woman's vagina and down towards rectum (Fig. 18.46).

Fig. 18.44: Applying spermicide on the groove of the cervical cap

Fig. 18.45: Inserting the cap inside the vagina

Fig. 18.46: Insert the finger into the vagina and push the cap

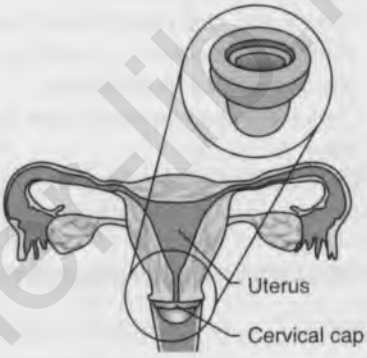


Fig. 18.47: Cervical cap is inserted properly and fitted in position

- Then push the cervical cap as far back as you can, so that it covers the cervix (Fig. 18.47).
- Cervical cap can be kept in place for up to 48 hours.
- There is no need to reapply spermicide every time while having sex.
- Be sure to leave the cap in place for at least eight hours after intercourse.
- To remove the cap, insert finger into vagina and push gently on the dome of the cap.
- This will release the suction that is holding the cap on cervix.
- Pull on the strap located on the front of the cap and remove the device.

- After it has been removed, wash the cervical cap in warm water and mild antibacterial hand soap.
- Allow to air dry or pat with a towel, and store the cap in its protective case.

Client Instructions while using Cervical Cap

- Before each act of sex, the cervix should be checked to make sure it is covered.
- Avoid putting baby powder or oil-based lubricants on the cap, as this can damage the silicone.
- Try to prevent the cap from coming into contact with vaginal creams or antibiotics.
- Check the cap every time before using it for holes or tears. This can be done by holding the cap up to the light or by placing water in the bowl.
- Cervical caps generally last for about one year, when looked after properly.
- Care for the cervical cap is similar to that of the diaphragm. A cervical cap needs to be replaced with a new one once a year.

2. INTRAUTERINE CONTRACEPTIVE DEVICES

Copper T is an intrauterine contraceptive device.

Mechanism of Action

- Interferes with ability of sperm to pass through uterine cavity.
- Thicken cervical mucus.
- Change endometrial lining.
- Interfere with reproductive process before ova reach uterine cavity.
- Prevents the implantation as it stimulates foreign body reaction.

Types

1. **First generation**
   - Lippes loop
   - Saf-T-coil

   Lippes loop: It is made of polyethylene. It is available in four sizes. It is first marketed in the year 1962. The length ranges from 26.2 mm to 27.5 mm, width 22.2 mm to 30.0 mm, and

the two strings available in four different colors—blue, black, yellow and white. Formerly it is used worldwide except in China. Currently, it is used in Indonesia.

Saf-T-coil:

Fig. 18.48: Early intrauterine contraceptive devices

Fig. 18.49: Saf-T-coil

2. **Second generation:** Cu T-200, Cu-7 and Multiload Cu-250, Cu T-380 A, Nova-T, Mutiload Cu-375, Cu T-220 C, Cu T-200 and Cu T-200 B: It is made of polyethylene with barium sulfate added for visibility on X-rays. 200 mm^2 copper wire wrapped around stem. The Cu T-200 B has a ball at the tip. The length is 36 mm and width is about 32 mm. It is first marketed in the year 1972 (Figs 18.50 and 18.51).

Fig. 18.50: Cu T-200

Fig. 18.51: Cu T-200 B

Multiload-250 (MLCu-250) and 375 (MLCu-375): It is also made up of polyethylene. The MLCu-250 has 250 mm^2 copper wire on the stem and is available in 2 sizes. It is first marketed in the year 1974. The standard length for Cu T-

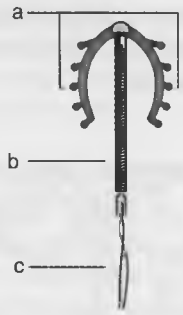


Fig. 18.52: Multiload Cu-250 (a) Flexible plastic arms, (b) small plastic rod with copper wire wound around it, (c) nylon thread

Fig. 18.53: Multiload Cu-375

250 and 375 is 5 mm; 375 SL—29 mm; 250 short—24 mm. The width for all types is 18 mm. The approved lifespan for: MLCu-250 is 3 years and MLCu-375 is 5 years (Figs 18.52 and 18.53).

TCu-220 C: It is also made up of polyethylene. 220 mm^2 copper in 7 copper sleeves has been attached, 2 on the arms and 5 on the stem of the Cu T. It was marketed in the year 1980. The length is 36 mm and the width is 32 mm. It has two strings (Fig. 18.54).

TCu-380 A and TCu-380: It is made of polyethylene rays. 314 mm^2 of copper wire is placed on vertical stem and two 33mm^2 in the transverse arm. The length is 36 mm and the width is 32 mm. It has two white strings (formerly blue). The lifespan of TCu-380 A is 10 years (Fig. 18.55).

Fig. 18.54: Copper T-220 C

Fig. 18.55: Copper T-380 A

Fig. 18.56: Nova T

Nova T: Nova T has 200 mm^2 copper wire with a silver core wrapped around the stem. CuNova T has 380 mm^2 wire wrapped around the stem. Nova T was first introduced in the year 1979 and CuNova T in the year 1994. The length is 32 mm and the width is 32 mm. The approved lifespan for Nova T and CuNova T is 5 years in various European countries (Fig. 18.56).

3. Third generation

Progestasert and mirena

Progestasert: It is made of ethylene vinyl acetate copolymer. Vertical stem contains a reservoir of 38 mg progesterone and barium sulfate. It releases about 65 micrograms progesterone per 24 hours. It was first introduced in the year 1976. The length of the progestasert is 36 mm and the width is 32 mm (Fig. 18.57).

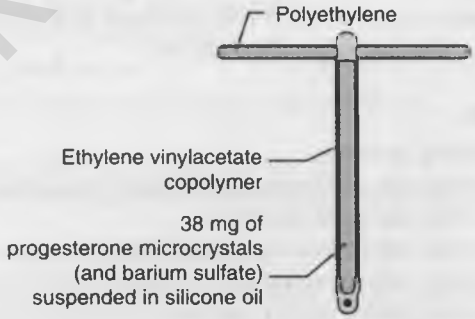


Fig. 18.57: Progestasert

Levonorgestrel (LNG-20) intrauterine system (mirena/levonova): It is made of polyethylene T frame surrounded by a levonorgestrel-containing cylinder. The cylinder is covered with a rate-controlling membrane. The release rate is 20 micrograms levonorgestrel per 24 hours. In the year 1990, it was first marketed in Finland. The length is 32 mm and the width is 32 mm. The hormone cylinder is 19 mm in length, 2.8 mm outer diameter and 1.2 mm inner diameter. The approved lifespan in the United Kingdom is 3 years and in other countries is 5 years (Fig. 18.58).

Fig. 18.58: Levonorgestrel

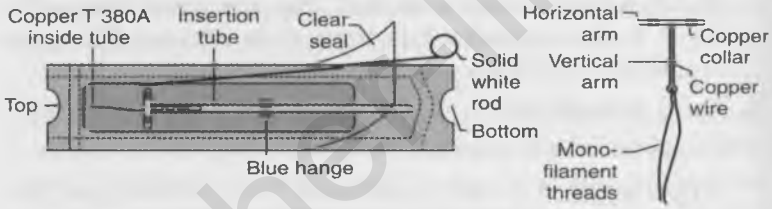


Fig. 18.59: Structure of intrauterine contraceptive devices

Structure of IUCD: It is a T-shaped device made of polyethylene, impregnated with barium sulfate, with strings attached to the lower end. Copper bands are present on the horizontal arm and copper wire is present on the vertical stem. There is an insertion rod, plunger and the depth gauge present in the package (Fig. 18.59).

Indications

- Breastfeeding mother.
- Women who are postpartum and not breastfeeding.
- Women who are post-abortion.
- Women who are at low risk for STDs.
- Women who cannot remember to take a pill everyday.
- Women who prefer not to use hormonal methods or should not use them.
- Women who are in need of emergency contraception.

Advantages

1. One time insertion procedure.
2. It is readily reversible. Immediately return to fertility upon removal.
3. Effective immediately.
4. Long-term method (up to 10 years of protection with Copper T 380 A)
5. It is coitus independent.
6. Highly effective.
7. It is cost effective.
8. Do not affect breastfeeding.
9. Few side effects than other methods.
10. After follow-up visit, client needs to return to clinic only if problems occur.
11. No supplies needed by client.
12. Decreases menstrual cramps (progestin-releasing only).
13. Decreases menstrual bleeding (progestin-releasing only).
14. Decreases ectopic pregnancy.

Contraindications

1. *Absolute*
   - Pregnancy
   - Anemia with hemoglobin less than 8 gm
   - Excessive or irregular menstrual bleeding
   - Active genital tract infection, e.g. vaginitis, cervicitis, pelvic inflammatory disease, septic abortion, cervical erosion.
   - Enlarged uterus.
   - Malignant trophoblast disease
   - Known pelvic tuberculosis.
   - Genital tract cancer.
   - Previous history of ectopic pregnancy.
2. *Relative*
   - Previous history of cesarean section
   - Medical disorders like heart disease, diabetes, etc.

Conditions Requiring Precautions

IUCDs are not recommended unless other methods are not available or acceptable if a woman has:

- Benign trophoblast disease
- A partner who has more than one sexual partner

Selection of Cases

1. Any woman in the reproductive age group who wants to space or avoid pregnancy.
2. It should be promoted in couples having two children when the age of the younger child is less than five years.
3. Woman who has borne at least one child.
4. Woman who has no history of pelvic diseases.
5. Woman who has normal menstrual periods.

Timing of Insertion

- The safest and optimum time for insertion is the last two days of the menstruation but can be inserted within 7–10 days of the LMP.
- Anytime during the menstrual cycle when you can be reasonably sure the client is not pregnant.
- Immediately after MTP is performed.
- Postpartum (immediately following delivery, during the first 48 hours postpartum or after 4 to 6 weeks; after 6 months if using lactational amenorrhea method).
- Post-abortion (immediately or within the first 7 days) provided no evidence of pelvic infection.

The most suitable time for Cu T insertion is during menstruation or within 10 days of the beginning of menstrual period.

Counseling

The woman should be counseled in a simple language which she understands and the following information should be provided to her:

1. It is one of the most effective and reversible methods for family planning.
2. It is ideal for spacing of children, as it does not affect the quality of milk in lactating mothers. Spacing is important for health of the mother and children.
3. It can be easily removed when desired.
4. It provides continuous protection for 3 years.
5. Its insertion is a simple procedure and the optimal time of insertion is during the last two days of the menstrual period

and immediately following MTP. It can be inserted within seven to ten days after last menstrual period.

6. It neither affects sexual pleasure, performance nor hurt the husband.
7. IUCD does not affect a woman's chance of becoming pregnant after its removal.
8. IUCD does not cause cancer.
9. It has 1 to 3% chance of failure.

Examination of the Woman

1. *History taking:* It includes the age, medical, surgical and gynecological history. Last menstrual period must invariably be noted.

   Menstrual and obstetric history needs to be carefully taken
   - Periods (regular or irregular, flow—excessive or normal)
   - Date of last menstrual period.
   - No. of deliveries and abortions/MTP, previous history of cesarean section/ectopic pregnancy.
   - Recent history of postpartum/postabortal infection.
2. *General examination:* Particular attention has to be paid to detect whether the client has severe anemia, diabetes or heart disease.

Prerequisites

1. Make sure that the woman is an appropriate candidate for intrauterine device insertion.
2. Use of an analgesic before insertion is at the discretion of the woman and the nurse.
3. Establish the size and position of the uterus by pelvic examination.
4. Insert a speculum and cleanse the vagina and cervix with an antiseptic solution.
5. Apply a tenaculum to the cervix and use gentle traction to align the cervical canal with the uterine cavity.
6. Gently insert a sterile sound to measure the depth of the uterine cavity.

7. The uterus should sound to a depth of 6 to 9 cm except when inserting the device immediately postabortion or postpartum. Insertion of Cu T into a uterine cavity measuring less than 6 cm may increase the incidence of expulsion, bleeding, pain, and perforation. If the nurse encounters cervical stenosis, avoid undue force. Dilators may be helpful in this situation.

How to use?

1. Open the pack at the far end (Fig. 18.60)
2. Holding the package with open end up, put the white solid rod into the insertion tube to almost touch the bottom of the Cu T (Fig.18.60a) .

Fig. 18.60: Opening the pack at the far end

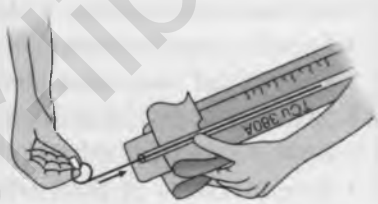


Fig. 18.60a: Putting the white rod into the insertion tube

3. Withdraw the copper T with insertion tube a little downwards (Fig. 18.61).
4. Place the package on the clean, hard, flat surface. Pull the solid white rod partially from the package so it will not interfere with assembly. Place thumb and index finger on the top of package on ends of the horizontal arms. Use other hand to push insertion tube against arms of the Cu T. This will start bending the T arms (Fig. 18.62).

Fig. 18.61: Withdrawing the copper T with insertion tube

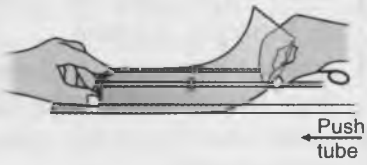


Fig. 18.62: Pushing the insertion tube against arms to bend T arms

5. Bring the thumb and index finger closer together to continue bending the arms until they are alongside of the stem. Use the other hand to withdraw the insertion tube just enough so that the insertion tube can be pushed and rotated onto the tips of the arms. The goal of the nurse is to secure the tips of the arms inside the tube. Insert the arms no further than necessary to insure retention. Introduce the solid white rod into the insertion tube from the bottom, alongside the threads, until it touches the bottom of the copper T (Fig. 18.63).

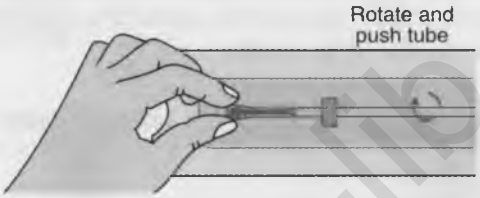
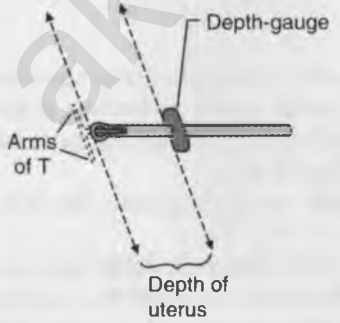


Fig. 18.63: Inserting the solid white rods of Cu T into the insertion tube

6. Grasp the insertion tube at the open end of the package; adjust the blue flange so that the distance from the top of the copper T (where it protrudes from the inserter) to the blue flange is the same as the uterine depth that you measured with the sound. Rotate the insertion tube so that the horizontal arms of the T and the long axis of the blue flange lie in the same horizontal plane (Figs 18.64 and 18.65).



Figs 18.64 and 18.65: Adjusting blue length gauge to set the length of the uterus

7. Take the Cu T from the cover and now pass the loaded insertion tube through the cervical canal until copper T just touches the fundus of the uterus. The blue flange should be at the cervix in the horizontal plane (Fig. 18.66).

Fig. 18.66: Taking the copper T from cover

8. *IUD insertion:* Withdrawal method (Fig. 18.67).
9. To release the arms of copper T, hold the solid white rod steady and withdraw the insertion tube no more than one centimeter. This releases the arms of copper T high in the uterine fundus (Fig. 18.68).

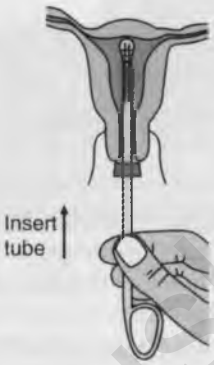


Fig. 18.67: Inserting the copper T into the uterus

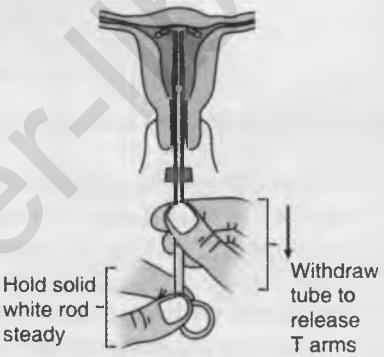


Fig. 18.68: Releasing the arms of copper T

10. Remove the plunger first.
11. Gently and carefully move the insertion tube upward toward the top of the uterus, until slight resistance is felt. This will ensure placement of the T at the highest possible position within the uterus (Fig. 18.69).
12. Hold the insertion tube steady and withdraw the solid white rod (Fig. 18.70).
13. Gently and slowly withdraw the insertion tube from the cervical canal. Only the threads should be visible protruding from the cervix. Trim the threads so that 3 to 4 cm protrude into the vagina. Note the length of the

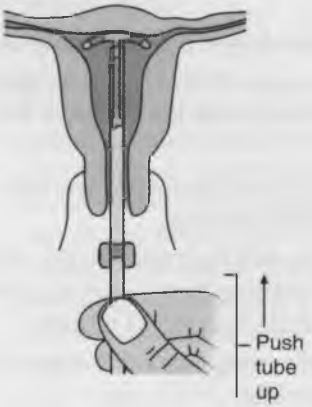


Fig. 18.69: Positioning the IUCD high in the uterus

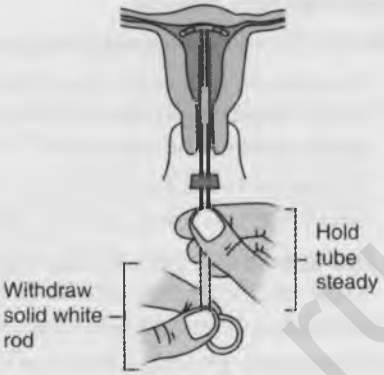


Fig. 18.70: Withdrawing the solid white rod

threads in the woman's records. If you suspect that copper T is not in the correct position, check placement (with ultrasound, if necessary). If copper T is not positioned completely within the uterus, remove it and replace it with a new copper T. Do not reinsert an expelled or partially expelled copper T (Fig. 18.71).

14. Do not catch the tail with artery forceps (Fig. 18.72).

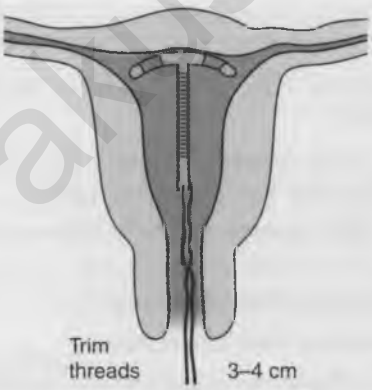


Fig. 18.71: Trim the threads of the copper T to about 3–4 cm

Fig. 18.72: Avoid catching the tail with artery forceps

Post-insertion Advice

The IUCD wearer should be given the following instructions:

1. She should regularly check the threads or tail to be sure that the IUD is in the uterus; if she fails to locate the threads, she must consult the physician.
2. She should visit the clinic whenever she experiences any side-effect such as fever, pelvic pain and bleeding.
3. If she misses a period, she must consult the obstetrician. As there will be more loss of blood during menstruation, the client is advised to take iron and folic acid (IFA) tablets.
4. There may be slight pain and or bleeding for a few days or the IUD may be expelled spontaneously.

Client Instructions

- IUD is effective immediately.
- The IUD can come out of the uterus spontaneously, especially during the first few months.
- Bleeding or spotting may occur during first few days.
- Menstrual bleeding may change depending on type of IUD.
- The IUD may be removed anytime when the woman wishes. However, it is safe and effective for a number of years depending upon the type of IUD.
- IUDs do not provide protection against STDs (e.g. HBV, HIV/AIDS.)
- Return for checkup after the first post-insertion menses, 4 to 6 weeks after insertion.
- During the first month after insertion, check the strings several times, particularly after the menstrual period.
- Should check for strings after first month, only if the woman have:
  - Cramping in the lower part of the abdomen
  - Spotting between periods or after intercourse
  - Pain after intercourse (or if partner experiences discomfort during sex).

Warning Signs

Contact healthcare provider or clinic if you develop any of the following problems:

- Delayed menstrual period with pregnancy symptoms (nausea, breast tenderness, etc.).
- Persistent or cramping lower abdominal pain, especially if accompanied by not feeling well, fever or chills (symptoms suggest possible pelvic infection).
- Strings missing or the plastic tip of IUD can be felt when checking for strings.
- Either you or your partner begin having sexual relations with more than one partner; IUDs do not protect women from STDs (e.g. HBV, HIV/AIDS).

Indications for Removal

- If the client desires
- At the end of effective life of the IUD
  – TCu 380A = 10 years
- If change in sexual practices (high risk behavior), consider adding barrier method (condoms) or removal.
- If treated for STD or documented pelvic infection.
- Menopause

How to Remove?

Remove the copper T with forceps, pulling gently on the exposed threads. The arms of copper T will fold upwards as it is withdrawn from the uterus. The nurse may immediately insert a new copper T if the woman requests it and has no contraindications.

Embedment or breakage of copper T in the myometrium can make removal difficult. Analgesia, paracervical anesthesia, and cervical dilation may assist in removing an embedded copper T. An alligator forceps or other grasping instrument may be helpful. Hysteroscopy may also be helpful.

Side Effects

- Heavier menstrual bleeding
- Intermenstrual cramps

- Infection
- Perforation
- Pregnancy
- Spontaneous expulsion
- Missing IUD string
- Ectopic pregnancy
- Spontaneous abortion
- Partner complains about feeling strings.

Sterilization

Cu T is available in a pre-sterilized pack. The nurse must ensure that all instruments and gloves are preferably autoclaved. In case autoclaving is not possible, the nurse must see that the instruments are fully immersed in water and boil for at least 20 minutes.

Limitations

- Pelvic examination required before insertion.
- Screening for sexually transmitted diseases (STDs) recommended before insertion.
- Require trained provider for insertion and removal.
- Need to check for strings after menstrual period if there is occurrence of cramping, spotting or pain.
- Woman cannot stop using IUCDs whenever she wants (provider-dependent).
- Increased menstrual bleeding and cramping during the first few months (copper-releasing only).
- May be spontaneously expelled.
- Rarely (less than 1 in 1000 cases), perforation of the uterus may occur during insertion.
- Do not prevent all ectopic pregnancies (especially progestasert).
- May increase risk of pelvic inflammatory diseases and subsequent infertility in women at risk for sexually transmitted diseases (e.g. HBV, HIV/AIDS).

3. ORAL CONTRACEPTIVE PILLS

Fig. 18.73: Oral contraceptive pills

Mechanism of Action

- Stops sovulation (release of eggs from ovaries)
- Also thickens cervical mucus, making it difficult for sperm to pass through.
- They produce changes in endometrium that tend to prevent implantation, so that endometrium is not adequately prepared to receive a fertilized ovum.
- Reduce sperm transport in upper genital tract (fallopian tubes).

Some of the Oral Contraceptives and their Composition

Table 18.7: List of oral contraceptives and their composition

Commercial Names	*Composition*		*No. of tablets*
	Progestins (mg)	*Oestrogen (mg)*	
1. Mala N (Govt. of India)	Norgestrel I 0.30	Ethinyl estradiol 30	21+7 iron tablets
2. Mala D	D-norgestrel I 0.30	Ethinyl estradiol 30	21+7 iron tablets
3. Femilon (Infar)	Desogestrel 0.15	Ethinyl estradiol 20	21
4. Loette (Wyeth)	Levonorgestrel I 0.1 mg	Ethinyl estradiol 20	21

Indications

- Women of any reproductive age or parity who want highly effective protection against pregnancy.
- Women who are breastfeeding (6 months or more postpartum).
- Women who are postpartum and are not breastfeeding (begin after third week).
- Women who are postabortion (start immediately or within 7 days).
- Women with anemia.
- Women with severe menstrual cramping.
- Women with irregular menstrual cycles.
- Women with a history of ectopic pregnancy.
- Women in need of emergency contraception.

Contraindications

a. If the woman is pregnant (known or suspected)
b. If the woman has diabetes (> 20 years duration)
c. If the woman is breastfeeding
d. If the woman is jaundiced
e. If the woman has ischemic heart disease or stroke
f. If the woman has blood clotting disorders like deep vein thrombosis or pulmonary embolus.
g. If the woman has disease of the liver.
h. If the woman has cancer of the breast or reproductive organs.
i. If the woman has varicose veins
j. If the woman has asthma, eczema
k. If the woman is a smoker and age 35 years or older.
l. If the woman has headaches (migraine)
m. If the woman has high blood pressure (> 180/110)
n. If the woman has to undergo major surgery with prolonged bed rest.

Advantages

1. Very effective when used correctly.
2. No need to do anything at time of sexual intercourse.
3. Increased sexual enjoyment because no need to worry about pregnancy.

4. Monthly periods are regular; lighter monthly bleeding and fewer days of bleeding; milder and fewer menstrual cramps.
5. Can be used as long as a woman wants to prevent pregnancy. No rest period needed.
6. Can be used at any age from adolescence to menopause.
7. Can be used by women who have children and by women who do not.
8. User can stop taking pills at anytime.
9. Fertility returns soon after stopping.
10. Can be used as an emergency contraceptive after unprotected sex.
11. Can prevent or decrease iron deficiency anemia.
12. Help to prevent:
    - Ectopic pregnancies
    - Ovarian cysts
    - Endometrial cancer
    - Ovarian cancer
    - Pelvic inflammatory disease
    - Benign breast disease.

Disadvantages

1. Not highly effective unless taken everyday. Difficult for some women to remember everyday.
2. New packet of pills must be at hand every 28 days.
3. Not recommended for breastfeeding women because they affect quality and quantity of milk.
4. In a few women, may cause mood changes including depression, less interest in sex.
5. Very rarely can cause stroke, blood clots in deep veins of the legs or heart attack. Those at highest risk are women with high blood pressure and women who are age 35 or older and at the same time smoke more than 20 cigarettes per day.
6. Do not protect against sexually transmitted diseases including AIDS.

Conditions Requiring Precautions

Oral contraceptive pills are not recommended unless other methods are not available or acceptable if a woman:

- Is less than 3 weeks of postpartum (even if not breastfeeding)

- Has unexplained vaginal bleeding (only if serious problem suspected)
- Has high blood pressure (above 160/100 and below 180/110)
- Has a history of breast cancer
- Has symptomatic gallbladder disease
- Is taking drugs for epilepsy (phenytoin or barbiturates) or tuberculosis (rifampin).

Time of Intake

- Anytime you can be reasonably sure the client is not pregnant
- Days 1 to 7 of the menstrual cycle
- Postpartum:
  - After 6 months if using lactational amenorrhea method (LAM)
  - After 3 weeks if not breastfeeding
- Postabortion (immediately or within 7 days)

Client Instructions

- Take 1 pill each day, preferably at the same time of day.
- Take first pill on first to seventh day (first day preferred) after beginning of your menstrual period.
- Some pill packs have 28 pills. Others have 21 pills. When 28-day pack is empty, immediately start taking pills from a new pack. When 21-day pack is empty, wait 7 days and begin taking pills from new pack.
- If you vomit within 30 minutes of taking pill, take another pill or use a backup method if you have sex during next 7 days.
- If you forget to take 1 pill, take it as soon as you remember, even if it means taking 2 pills on 1 day.
- If you forget to take 2 or more pills, you should take 2 pills everyday until you are back on schedule. Use a backup method (e.g. condoms) or do not have sex for 7 days.
- If you miss 2 or more menstrual periods, you should go to the clinic to check to see if you are pregnant.

Side Effects

1. Nausea
2. Spotting or bleeding between menstrual periods, especially if a woman forgets to take her pills or takes them late
3. Mild headaches
4. Breast tenderness
5. Slight weight gain
6. Amenorrhea

Myths and Facts About Pills

Table 18.8: Myths and facts about oral pills

S. No.	*Myths*	*Facts*
1.	Pills may lead to cancer	Pills offer protection against cancer of ovary and endometrium No demonstrated increased risk of breast cancer
2.	Pills cause infertility	Pills do not lead to permanent infertility After discontinuation of pills, fertility returns rapidly in majority women
3.	Pills harm woman's health permanently	Observations on millions of women have proved that there are no permanent ill effects Taking pills is safer than pregnancy and childbirth Pills in current use contain very low amounts of hormones and hence do not lead to major complications
4.	Baby may be deformed	Even if pills are accidently used during undiagnosed early pregnancy, there is no increase in risk of fetal abnormalities
5.	Pills should be discontinued intermittently	Pills can be safely used continuously for 5 years. Interruption of pills without use of other contraceptive can result in unwanted pregnancy

People who can Provide Contraceptive Services

- Nurses, nurse-midwives, nurse practitioners
- Auxiliary nurse midwives
- Midwives
- Physicians, including gynecologists, obstetricians
- Physicians' assistants, physicians' associates
- Primary health workers, community health workers
- Specially trained traditional birth attendants.

Limitations

- User-dependent (require continued motivation and daily use)
- Some nausea, dizziness, mild breast tenderness, headaches or spotting may occur
- Effectiveness may be lowered when certain drugs are taken
- Forgetfulness increases method failure
- Can delay return to fertility
- Rare serious side effects possible
- Resupply must be readily and easily available
- Do not protect against STDs (e.g. HBV, HIV/AIDS).

4. NATURAL CONTRACEPTIVE METHODS

A. Lactational amenorrhea method
B. Calendar method
C. Basal body temperature (BBT)
D. Cervical mucus method (Billings)
E. Symptothermal (BBT + cervical mucus).

LACTATIONAL AMENORRHEA METHOD (LAM)

MECHANISM OF ACTION

1. Frequent intense suckling disrupts secretion of gonadotropin releasing hormone (GnRH).
2. Irregular secretion of GnRH interferes with release of follicle stimulating hormone (FSH) and luteinizing hormone (LH).
3. Decreased FSH and LH disrupts follicular development in the ovary to suppress ovulation.

Indications

- Are fully or nearly fully breastfeeding
- Have not had return of menses
- Are less than 6 months postpartum

Advantages

- Effective immediately
- Does not interfere with sexual intercourse
- No systemic side effects
- No medical supervision necessary
- No supplies required
- No cost involved

Non-contraceptive Benefits

For Child

- Passive immunization and protection from other infectious diseases
- Best source of nutrition
- Decreased exposure to contaminants in water, other milk or formulas, or on utensils.

For Mother

Decreased postpartum bleeding

Instructions for Breastfeeding

- Breastfeed from both breasts on demand (about 6 to 10 times per day)
- Breastfeed at least once during night (no more than 6 hours should pass between any two feedings)
- Do not substitute other food or liquids for breast milk meal
- If baby does not want to breastfeed 6 to 10 times per day or baby chooses to sleep through the night, LAM will be less effective as contraceptive method
- Once you substitute other food or drink for breastfeeding meals, the baby will suckle less, and LAM will no longer be effective contraceptive method.

Instructions for Contraception

- Always keep a backup method of contraception, such as condoms, readily available. Use it if:
  - Your menses returns
  - You begin supplementing your baby's diet
  - Your baby reaches 6 months of age
- Consult your healthcare provider or clinic before starting another contraceptive method
- If you or your partner is at high risk for STDs, including the AIDS virus, you should use condoms as well as LAM.

Limitations

- User-dependent (requires following instructions regarding breastfeeding practices)
- May be difficult to practice due to social circumstances
- Highly effective only until menses return or up to 6 months
- Does not protect against STDs (e.g. HBV, HIV/AIDS).

CALENDAR METHOD

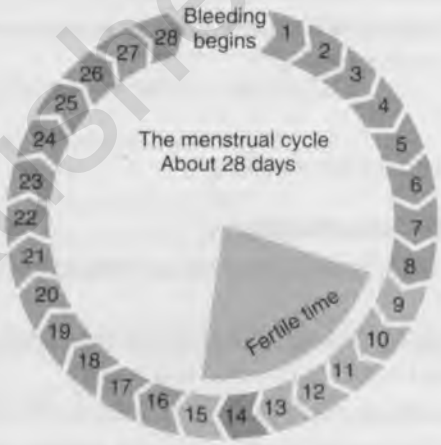


Fig. 18.74: Calendar method

MECHANISM OF ACTION
For Contraception

Avoid intercourse during the fertile phase of the menstrual cycle when conception is most likely.

For Conception

Plan intercourse near mid-cycle (usually days 10 to 15) when conception is most likely.

Indications

- Women of any reproductive age
- Women of any parity, including nulliparous women
- Women with religious or philosophical reasons for not using other methods
- Women who are unable to use other methods
- Women who are willing to abstain from intercourse for more than 1 week each cycle
- Women who are willing and motivated to observe, record and interpret fertility signs.

Advantages

- Can be used to prevent or achieve pregnancy
- No method-related health risks
- No systemic side effects
- Inexpensive
- Improved knowledge of reproductive system
- Possible closer relationship between couple
- Increased male involvement in family planning.

Instructions

- Monitor length of at least 6 menstrual cycles while abstaining or using another contraceptive method. Then calculate when fertile days occur following the instructions below.
- From number of days in longest cycle, subtract 11. This identifies the last fertile day of cycle.
- From number of days in shortest cycle, subtract 18. This identifies the first fertile day of your cycle.
- Your fertile period is calculated to be days 8 through 19 of cycle (12 days of abstinence needed to avoid pregnancy). Abstain from sexual intercourse during fertile days.

Limitations

- Moderately effective (1 to 25 pregnancies per 100 women during the first year of use)

- Effectiveness depends on willingness to follow instructions
- Considerable training required to use correctly
- Requires trained provider (nonmedical)
- Requires abstinence during fertile phase to avoid conception
- Requires daily record keeping
- Vaginal infections make cervical mucus difficult to interpret
- Basal thermometer needed for some methods
- Does not protect against STDs (e.g. HBV, HIV/AIDS).

BASAL BODY TEMPERATURE METHOD

DEFINITION

Basal body temperature is the lowest temperature attained by the body during rest (usually during sleep). It is generally measured immediately after awakening and before any physical activity has been undertaken, although the temperature measured at that time is somewhat higher than the true basal body temperature. In women, ovulation causes an increase of one-half to one degree Fahrenheit (one-quarter to one-half degree Celsius) in basal body temperature (BBT); monitoring of BBTs is one way of estimating the day of ovulation. The tendency of a woman to have lower temperatures before ovulation, and higher temperatures afterwards, is known as a biphasic pattern. Charting of this pattern may be used as a component of fertility awareness.

Uses

1. Basal body temperature can be used to predict fertility to help you gauge the best days to have or to avoid unprotected sex.
2. The basal body temperature method can also be used to detect pregnancy. Following ovulation, a rise in basal body temperature that lasts for 18 or more days may be an early indicator of pregnancy.

Factors Influencing Basal Body Temperature

- Illness
- Stress
- Shift work

- Interrupted sleep cycles or oversleeping
- Drinking alcohol
- Travel and time zone differences
- Gynecologic disorders
- Certain medications

Advantages

- It does not require any obstetrician appointments and it comes without side effects.
- Basal body temperature is best used as proof that the calendar method is working. Having some measure of proof of natural family planning (aside from not being pregnant) can provide reassurance.
- The basal body temperature is a good predictor of when a woman should be having intercourse to make a baby.
- It is absolutely free.
- There are no side effects or complications from hormones.
- Some religions and cultures approve of this method as the only acceptable form of contraception.

Disadvantages

1. It is not a particularly reliable method of birth control, especially for women with irregular cycles. Outside factors, such as a lack of sleep, can cause a woman's temperature to vary.
2. Basal body temperature cannot be used alone because sperm can live for two to seven days and any sperm deposited ahead of time can still impregnate the woman. This means that you must also follow the calendar method, which precludes sex during much of the month.
3. This method of birth control does not protect you from HIV/AIDS or other sexually transmitted diseases.
4. It takes at least 6 months of recording cycles to learn how to use natural family planning. During this time, the woman must abstain from sex or use a barrier method.
5. This method is often unreliable during times of stress or illness because cycles may be irregular.

Do's and Don'ts of Basal Body Temperature Charting

- Do take the temperature at the same time everyday.
- Do take the temperature consistently.
- Do keep a chart beside the bed.
- Do take the temperature after at least three hours of restful sleep.
- Do not get upset if overslept or forget to write a temperature down.
- Do not drink, smoke or eat anything before taking the temperature.

Basal Body Temperature Chart

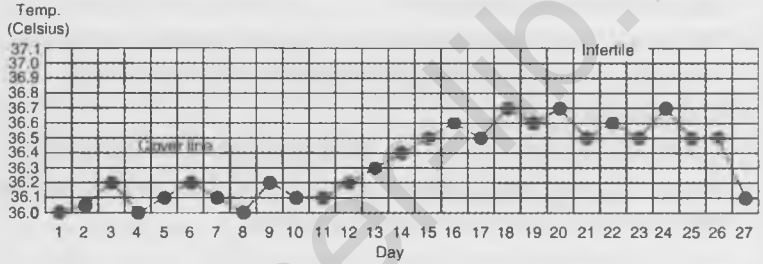


Fig. 18.75: Basal body temperature chart

How to use?

Thermal Shift Rule

- Take temperature at about same time each morning (before rising) and record temperature on chart.
- Use temperatures recorded on chart for first 10 days of menstrual cycle to identify highest of "normal low" temperatures (i.e. daily temperatures charted in typical pattern without any unusual conditions).
- Disregard any temperatures that are abnormally high due to fever or other disruptions.
- Draw a line 0.05 to 0.1°C above highest of these 10 temperatures. This line is called the cover line or temperature line.
- The infertile phase begins on the evening of the third consecutive day that temperature stays above the cover line (thermal shift rule).

- Abstain from sexual intercourse from beginning of menstrual period until beginning of infertile phase.
- If any of 3 temperatures falls on or below cover line during 3-day count, this may be a sign that ovulation has not yet taken place. To avoid pregnancy, wait until 3 consecutive temperatures are recorded above cover line before resuming intercourse.
- After infertile phase begins, you may stop taking temperature until next menstrual cycle begins and continue to have intercourse until first day of next menstrual period.

CERVICAL MUCUS METHOD (BILLINGS METHOD)

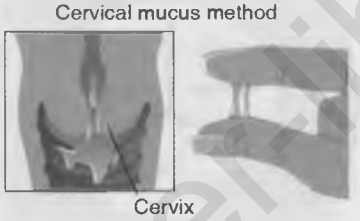


Fig. 18.76: Cervical mucus method

Other Name

It is also called billings method.

Ways of Checking the Mucus

There are three ways of checking the cervical mucus:

1. Use finger or toilet paper to wipe across the opening of vagina and then take a look at the mucus.
2. Wear a panty liner and examine any cervical mucus that may be left on it (this can be hard to detect).
3. The best way: Reach in and get a sample of the cervical mucus. Examine the consistency and try to stretch the mucus between the fingers. If you can stretch it at least three inches without it breaking, then ovulation is about to occur.

If a woman do not want to get pregnant, then sex should be avoided from the time, she begins to notice the slippery, stretchy mucus until at least two days after it is gone.

Effectiveness

This method is not as reliable as other methods of birth control and has an average failure rate of 20% per year. However, using the cervical mucus method along with another form of fertility awareness, like the symptothermal method, can offer more insight as to when the woman is most fertile.

Instructions for Billings Method

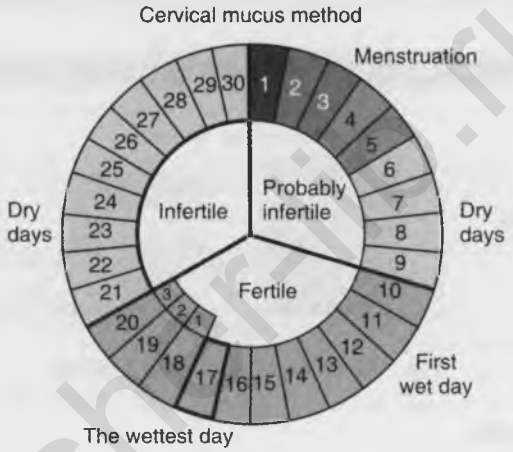


Fig. 18.77: Days of testing the cervical mucus method

- As mucus may change during the day, observe it several times throughout the day. Every night before going to bed, determine highest level of fertility and mark chart with appropriate symbol.
- Abstain from sexual intercourse for at least 1 cycle so that you will know the mucus days. Avoid intercourse during your menstrual period.
- During dry days after period, it is safe to have intercourse every other night.
- As soon as any mucus or sensation of wetness appears, avoid intercourse or sexual contact (Figs 18.78 and 18.79).
- Mark last day of clear, slippery, stretchy mucus with an X. This is the peak day, the most fertile time.

Fig. 18.78: Slippery cervical mucus (avoid sexual intercourse)

Fig. 18.79: No slippery cervical mucus (can have sexual intercourse)

- After the peak day, avoid intercourse for next 3 dry days and nights. These days are not safe.
- Beginning on the morning of the fourth dry day, it is safe to have intercourse until your menstrual period begins again.

Factors Affecting the Mucus Pattern

- Breastfeeding
- Cervical surgery especially with cryotherapy or electrocautery
- Douches or other "feminine hygiene" products
- Perimenopause
- Recent use of hormonal contraceptives, including emergency contraception
- Spermicide
- Sexually transmitted infections
- Vaginitis

SYMPTOTHERMAL METHOD

The basal body temperature method may be combined with another method of natural family planning, such as the cervical mucus method or calendar method. This combination is sometimes referred to as the symptothermal method.

Effectiveness of the Symptothermal Method

This method can be more difficult to use for women with small infants, as getting up frequently in the night can make the temperature readings less accurate. Illness, travel, or alcohol consumption can throw off the basal temperature reading as well. This is why it is important to use as many body signs as possible to predict ovulation for maximum efficacy.

Instructions for Symptothermal Method

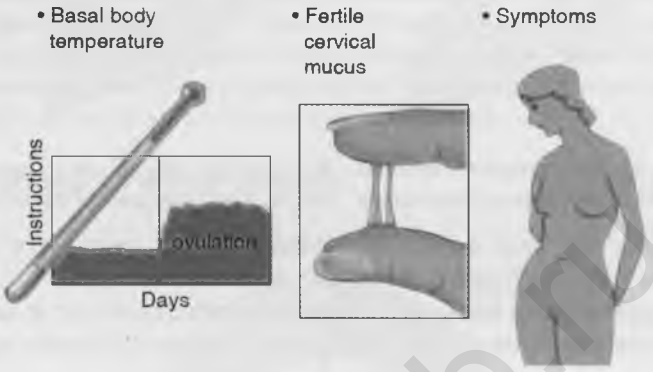


Fig. 18.80: Symptothermal method

- After menstrual bleeding stops, you may have intercourse on evening of every other dry day during infertile days before ovulation.
- The fertile phase begins when wet vaginal sensations or any mucus appears. Abstain from intercourse until fertile phase ends.
- Abstain from intercourse until both peak day and thermal shift rules have been applied.
- When these rules do not identify the same day as end of fertile phase, always follow rule that identifies the longest fertile phase.

4. NORPLANT IMPLANTS

Fig. 18.81: Norplant implant

Definition

Norplant is the implantation of matchstick-sized rod which is virtually invisible under the surface of the woman's skin. Six thin, flexible capsules filled with levonorgestrel (LNG) that are inserted just under the skin of a woman's upper arm (subdermally).

Features

It is made of soft medical polymer. It is just 1.5 inches long and 0.08 inches wide.

Parts of Norplant Implant

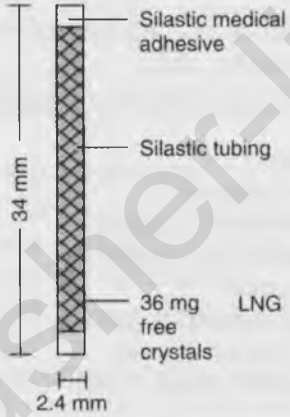


Fig. 18.82: Norplant implant

Mechanism of Action

Norplant implants is placed underneath the surface of the skin, thereby body receives steady dose of progestin (especially) etonogestrel. This helps to make the contraception more effective, as the body never misses a dose. This type of birth control is long-term, fertility will return once the implants are removed. This implant acts by suppressing the ovulation, decreasing tubal motility, changing the endometrium and thickening of the cervical mucus. Each implant rod contains 68 mg of etonogestrel. This hormone is steadily released into the body. During the first year of use, about 60 to 70 micrograms

are released into the body system daily. This amount decreases over time until, in the third year, where only 25 micrograms is released a day.

Advantages

- Highly effective (0.05–11 pregnancies per 100 women during the first year of use)
- Rapidly effective (< 24 hours)
- Long-term method (up to 5 years protection)
- Pelvic examination not required prior to use
- Do not interfere with intercourse
- Do not affect breastfeeding
- Immediate return of fertility on removal
- Few side effects
- Client needs to return to clinic only if problems
- No supplies needed by client
- Can be provided by trained non-physician (nurse or midwife)
- Contain no estrogen
- Decrease ectopic pregnancy
- May decrease menstrual cramps
- May decrease menstrual bleeding
- May improve anemia
- Protect against endometrial cancer
- Decrease benign breast disease
- Protect against some causes of pelvic inflammatory disease (PID).

Indications

- Women of any reproductive age
- Women of any parity including nulliparous women
- Women who want highly effective, long-term protection against pregnancy
- Women who are breastfeeding (6 weeks or more postpartum) and need contraception
- Women who are postpartum and not breastfeeding
- Women who are postabortion
- Women with desired family size who do not want voluntary sterilization
- Women with histories of ectopic pregnancy

- Women who have blood pressure < 180/110, blood clotting problems or sickle cell disease
- Women with moderate to severe menstrual cramping
- Women who smoke (any age, any amount)
- Women who prefer not to or should not use estrogen
- Women who cannot remember to take a pill everyday.

Contraindications

Norplant implants should not be used if a woman:

- Is pregnant (known or suspected)
- Has unexplained vaginal bleeding until the cause is determined and any serious problems are treated
- Has breast cancer
- Has any allergy to material or hormones used in the rod implant
- Has liver disease
- Has a personal history of serious blood clots.

Conditions Requiring Precautions

Norplant implants are not recommended unless other methods are not available or acceptable if woman:

- Is jaundiced (active, symptomatic)
- Has ischemic heart disease (past or current)
- Has had breast cancer
- Has liver neoplasia (hypothetical concern only)
- Is taking drugs for epilepsy (phenytoin and barbiturates) or tuberculosis (rifampin).

Conditions which do not Need Precautions

Norplant implants can be used safely in clients who:

- Have diabetes mellitus (uncomplicated or < 20 years duration)
- Have hepatitis (asymptomatic and carriers)
- Have high blood pressure (< 180/110)
- Have pre-eclampsia (history of)
- Smoke (any age, any amount)
- Will have surgery (with or without prolonged bed rest)
- Have valvular heart disease (including symptomatic)
- Have venous thromboembolic diseases (blood clotting).

Time of Insertion

- Anytime you can be reasonably sure the client is not pregnant
- Days 1 to 7 of the menstrual cycle
- Postpartum:
  - After 6 months if using lactational amenorrhea method (LAM)
  - After 6 weeks if breastfeeding but not using LAM
  - Immediately or within 6 weeks if not breastfeeding
- Postabortion (immediately or within the first 7 days).

Site of Placing the Norplant Implant

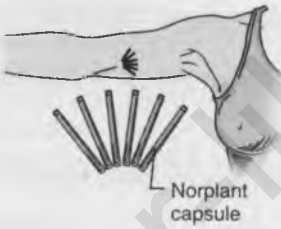


Fig. 18.83: Site of inserting norplant implant

Infection Control Recommendations

- Wash client's entire arm and hand with soap and water prior to antiseptic preparation.
- Use sterile or high-level disinfected instruments, surgical gloves and other items.
- After use, decontaminate all items.
- Place disposables (needle and syringe) and waste items in a puncture-proof container prior to disposal.
- Clean and finally process reusable items by sterilization (or high-level disinfection).

Parts of Norplant Implant Applicator

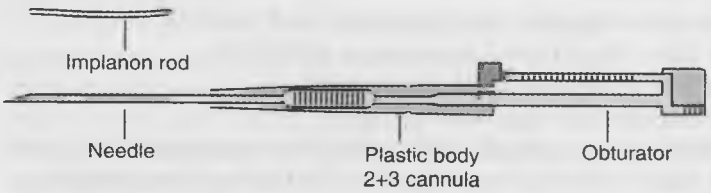


Fig. 18.84: Parts of norplant implant applicator

How to use?

Implantation of the implants is a simple and straight procedure. It takes about only a few minutes and can be performed in the hospital or any health centre.

1. Have the woman lie on her back on the examination table with her left arm (if the woman is left-handed, the right arm) flexed at the elbow and externally rotated so that her hand is lying by her head. The capsules will be inserted subdermally through a small 2-mm incision and positioned in a fanlike manner with the fan opening towards the shoulder (Fig. 18.85).
2. Prepare the woman's upper arm with antiseptic solution; cover the arm above and below the insertion area with a sterile cloth. The optimal insertion area is in the inside of the upper arm about 8 to 10 cm above the elbow crease (Fig. 18.86).

Fig. 18.85: Make the woman lie down with her left arm flexed at the elbow

Fig. 18.86: Preparing the woman's upper arm

3. Open the sterile norplant system (levonorgestrel implants) package carefully by pulling apart the sheets of the pouch, allowing the capsules to fall onto a sterile drape. Count the six capsules (Fig. 18.87).
4. After determining the absence of known allergies to the anesthetic agent or related drugs, fill a 5-ml syringe with the local anesthetic. Since blood loss is minimal with this procedure, use of epinephrine-containing anesthetics is not considered necessary. Anesthetize the insertion area by first inserting the needle under the skin and injecting a

small amount of anesthetic. Then anesthetize six areas about 4 to 4.5 cm long, to mimic the fanlike position of the implanted capsules (Fig. 18.88).

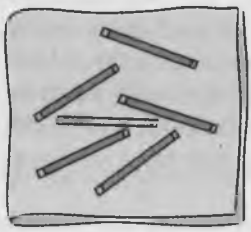


Fig. 18.87: Opening the sterile norplant package

Fig. 18.88: Anesthetizing the insertion area

5. Use the scalpel to make a small incision (about 2 mm) just through the dermis of the skin. Alternatively, the trocar may be inserted directly through the skin without making an incision with the scalpel. The bevel of the trocar should always face up during the insertion (Fig. 18.89).

Fig. 18.89: Small incision is made using the scalpel

Fig. 18.90: Trocar or inserting the norplant implant

6. The trocar has two marks on it. The first mark is closer to the hub and indicates how far the trocar should be introduced under the skin before the loading of each capsule. The second mark is close to the tip and indicates how much of the trocar should remain under the skin following the insertion of each implant (Fig. 18.90).
7. Insert the tip of the trocar through the incision beneath the skin at a shallow angle. Once the trocar is inserted, it

should be oriented with the bevel up toward the skin to keep the capsules in a superficial plane. It is important to keep the trocar subdermal by tenting the skin with the trocar, as failure to do so may result in deep placement of the capsules and could make removal more difficult.

Advance the trocar gently under the skin to the first mark near the hub of the trocar. The tip of the trocar is now at a distance of about 4 to 4.5 cm from the incision. Do not force the trocar, and if resistance is felt, try another direction (Fig. 18.91).

Fig. 18.91: Gently insert the tip of the trocar through the incision beneath the skin

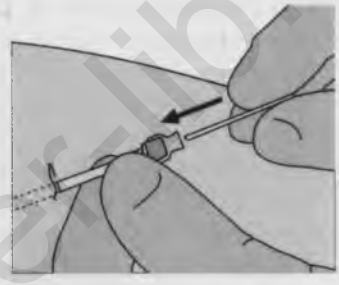


Fig. 18.92: First capsule is inserted into the trocar

8. When the trocar has been inserted the appropriate distance, remove the obturator and load the first capsule into the trocar using the thumb and forefinger (Fig. 18.92).
9. Gently advance the capsule with the obturator towards the tip of the trocar until you feel resistance. Never force the obturator (Fig. 18.93).
10. Hold the obturator steady, and bring the trocar back until it touches the handle of the obturator (Fig. 18.94).
11. The capsule should have been released under the skin when the mark close to the tip of the trocar is visible in the incision. Release of the capsule can be checked by palpation. It is important to keep the obturator steady and not to push the capsule into the tissue (Fig. 18.95).
12. Do not remove the trocar from the incision until all capsules have been inserted. The trocar is withdrawn only

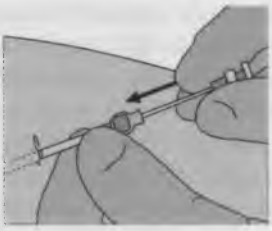


Fig. 18.93: Advancing the capsule with obturator towards the tip of the trocar

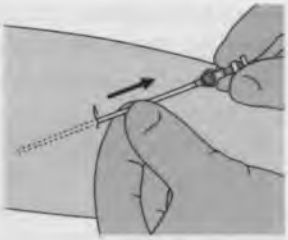


Fig. 18.94: Bringing back the trocar until it touches the handle of obturator

to the mark close to its tip. Each succeeding capsule is always inserted next to the previous one, to form a fan-like shape. Fix the position of the previous capsule with the forefinger and middle finger of the free hand, and advance the trocar along the tips of the fingers. This will ensure a suitable distance of about 15 degrees between capsules and keep the trocar from puncturing any of the previously inserted capsules (Fig. 18.96).

Leave a distance of about 5 mm between the incision and the tips of the capsules. This will help avoid spontaneous expulsions. The correct position of the capsules can be ensured by feeling them with the fingers after the insertion has been completed.

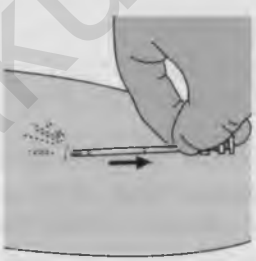


Fig. 18.95: Inserting the norplant underneath the skin

Fig. 18.96: Remove the trocar after placing all the capsules

13. After placement of the sixth capsule, sterile gauze may be used to apply pressure briefly to the insertion site to ensure

Fig. 18.97: Palpate the distal ends of the capsules

Fig. 18.98: Closing the incision with skin closure

hemostasis. Palpate the distal ends of the capsules to make sure that all six have been properly placed (Fig. 18.97).

14. Press the edges of the incision together, and close the incision with a skin closure. Suturing the incision should not be necessary (Fig. 18.98).
15. Cover the insertion area with a dry compress, and wrap gauze around the arm to ensure hemostasis (Fig. 18.99).

Fig. 18.99: Covering the insertion area with dry compress

Observe the woman for a few minutes for signs of syncope or bleeding from the incision before she is discharged. Advise the woman to keep the insertion area dry and avoid heavy lifting for 2 to 3 days. The gauze may be removed after 1 day, and apply the butterfly bandage as soon as the incision has healed, i.e. normally in 3 days.

16. Once the rods are implanted, it is not visible to the eyes. However, we can feel the area to make sure whether it has been properly inserted. Norplant implants are effective within eight hours after insertion.

Instructions

- Keep incision area dry for 48 hours. The incision could become infected if the area gets wet while bathing.
- Keep pressure bandage on for 48 hours and leave Band-Aid on until incision heals (3–5 days).
- Bruising, swelling and tenderness at insertion site are common.
- Routine work can be done immediately. Avoid bumping the area, carrying heavy loads or applying unusual pressure to incision site.
- After healing, area can be touched and washed with normal pressure.

Side Effects

- Vaginal discharge
- Headache
- Pelvic pain
- Weight gain
- Dizziness
- Breast pain
- Genital itching
- Nervousness
- Mood swings
- Menstrual disturbances
- Cervicitis, vaginitis
- Chance in libido
- Nausea

Removal of the Capsules

- The capsules must be removed after five years. Norplant implants no longer prevent pregnancy after five years.
- The capsules can be removed at any time. If the woman wants to stop using norplant implants at any time, return to the health facility.
- Alternate removal techniques have been developed.
- The removal of the implants will usually take more time and may be more difficult and/or more painful than the insertion. Capsules are sometimes nicked, cut, or broken during removal, or may be difficult to locate.

- Before initiating removal, all capsules should be located by palpation. If all six capsules cannot be located by palpation, they may be localized by ultrasound (7 MHz), X-ray, or compression mammography.
- Before removal, apply the anesthetic under the capsule ends nearest the original incision site.
- If the removal of some of the capsules proves difficult, interrupt the procedure and have the woman return for another visit. The remaining capsule(s) will be easier to remove after the area is healed.
- It may be appropriate to seek consultation or provide referral for woman in whom initial attempts at capsule removal prove difficult.

Myths and Facts About Norplant Implants

Table 18.9: Myths and facts about norplant implants

S. No.	*Myths*	*Facts*
1.	Surgery is needed to put implant or to taken out	Major surgery is not required for the contraceptive implant A qualified clinician can put the implant in and take it out in just a few minutes in the hospital
2.	It hurts a lot to have the implant put in and taken out	Most women report little pain with insertion or removal. Importantly the obstetrician or nurse will use anesthetics to numb the skin so that the woman may feel comfortable
3.	Once the implant is put in, it can move around the body	The implant cannot move to distant locations in the body. There is a small chance that the implant can shift positions slightly under the skin soon after insertion. Thereafter, the implants have almost always been to less than 1 inch away from the original insertion area

Contd.

Table 18.9: Myths and facts about norplant implants (*Contd.*)

S. No.	*Myths*	*Facts*
4.	The implant causes cancer	No evidence suggests the implant causes any kind of cancer
5.	The implant is still experimental	The implant is not experimental The US Food and Drug Administration reviewed data on the implant very carefully before it was approved for use in the United States
6.	Getting the implant will cause a big scar	The implant does not cause a scar. It is inserted with a special needle. The nurse will use a bandage to cover the area, in case there is some bleeding
7.	People will be able to see the implant.	The implant cannot usually be seen under the skin. It is possible that in women who are very thin the implant might be seen

Warning Signs

Return to hospital if any of the following occur:

- Delayed menstrual period after several months of regular cycles (may be sign of pregnancy)
- Severe lower abdominal pain
- Heavy bleeding
- Pus or bleeding at insertion site
- Infection at insertion site
- Expulsion
- Migraine headaches

Limitations

- Cause changes in menstrual bleeding pattern (irregular bleeding/spotting initially) in most women
- Require trained provider for insertion and removal
- Woman must return to healthcare provider or clinic for insertion of another set of capsules or removal
- Woman cannot stop whenever she wants (provider dependent).

19 Miscellaneous Instruments

1. KARMAN'S SYRINGE

Fig. 19.1: Karman's syringe

Other Name

It is also called manual vacuum aspiration syringe or manual vacuum aspirator.

Founder

The Karman syringe was founded by Harvey Karman in the early years of 1970s.

Features

It is a 50 ml plastic syringe. It has side arm catchers which flare out to hold the plunger in extended position. The tip has a rubber attachment with valve. The rubber piston is sutured to the plunger so that the piston does not get detached during intense suction. The dead space between the opening in the cannula and the piston is small so that maximum pressure can be built up. There is an easily operated pressure control valve attached between the nozzle of the syringe and the suction cannula. The handle of the piston has a hole for convenience in

use. The capacity of a 50 cc syringe is more adequate to accommodate the products or the lining of a normal-sized uterus.

Mechanism of Action

The piston when withdrawn can be locked. It creates negative suction which helps to suction the uterine contents by creating negative pressure. To the rubber attachment at the tip, plastic cannula is attached and is inserted in uterine cavity. The valve is released and with negative pressure contents of the uterine cavity are sucked. This should be repeated till the cavity is empty.

Indications/Uses

1. Manual vacuum aspiration.
2. Menstrual regulation.
3. Pregnancy termination up to 8 completed weeks of gestation.
4. Endometrial aspiration for diagnosis of endometrial pathology.
5. Evacuation of incomplete molar pregnancy up to 8 weeks.

Contraindications

1. Gestational age is greater than 6 weeks
2. Pelvic sepsis
3. Presence of large fibroids
4. Coagulation disorders

Advantages

1. It is simple to manufacture
2. Safe and effective to use
3. Relatively inexpensive
4. Easily transported
5. Relatively silent during the procedure
6. It is independent of electrical power sources which are unreliable in many parts of the developing countries.

Disadvantages

- Volume capacity of 50 ml of the syringe is inadequate for gestations beyond 8 weeks of gestation.

- Failure to evacuate
- Incomplete evacuation
- Infection and bleeding

Forms

1. Single valve aspirator
2. Double valve aspirator

The double-valved syringe accommodates larger cannula sizes and provides a non-electric means of evacuating the uterus with vacuum technique through the entire first trimester (Figs 19.2 and 19.3).

Fig. 19.2: Single valve aspirator

Fig. 19.3: Double valve aspirator

Parts of the Karman's Syringe

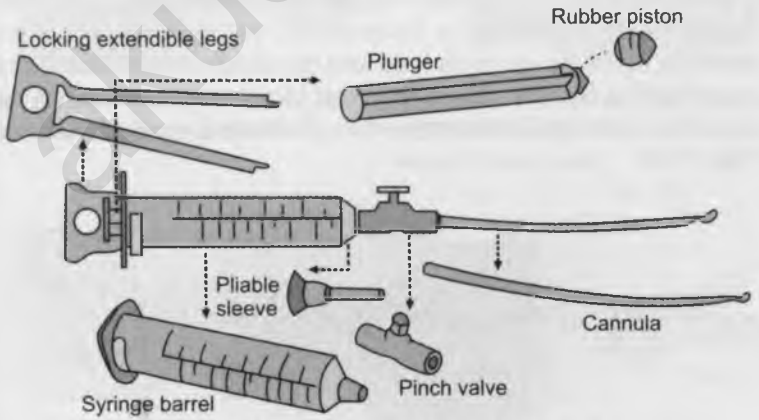


Fig. 19.4: Parts of the Karman's syringe

Prerequisites

- This procedure is performed as an outpatient short procedure.
- The woman is explained about the procedure.
- Proper consent was obtained.
- Provide counseling about future contraceptive advice.
- Empty her bladder and bowel.
- Place the woman in lithotomy position
- Paint the lower abdomen, thighs, vulva, vagina and perineum with antiseptic solution such as Betadine and then drape the area with sterile sheets.
- Perform vaginal examination to determine the size and direction of the uterus.

How to Hold?

Fig. 19.5: Method of holding Karman's syringe

How to use?

Expose the cervix using Sim's vaginal speculum and an anterior vaginal wall retractor or bivalve self-retaining speculum. Anterior lip of the cervix is held and steadied with a tenaculum or vulsellum forceps. A paracervical block may or may not be required. Gently dilate cervix with graduated tapered dilators (Fig. 19.6).

Fig. 19.6: Dilating the cervix using dilators

Note short speculum to facilitate uterine manipulation during dilatation. Introduce flexible or rigid suction cannula into uterine cavity, with size of cannula corresponding to gestational age. Create suction on manual vacuum aspiration syringe by closing pinch valves until they lock, then pulling out plunger until arms snap out and rest on edges of the barrel. At this stage a vacuum of 60 cm of mercury is created in the syringe. Hold syringe only by barrel, not arms. Attach syringe to cannula, stabilizing cannula with one hand. Some operators prefer to seat cannula into syringe before inserting cannula into uterus. The valve is then opened so that uterine aspiration starts. Gently move cannula back and forth while rotating to evacuate uterus (Figs 19.7 to 19.11).

If the syringe fills to 25 to 30 ml before the procedure is complete, the syringe and the cannula are withdrawn, the syringe is emptied and the vacuum is built inside it again before the cannula is reinserted into the uterine cavity. Evacuation is usually complete when gritty sensation is felt as cannula moves

Fig. 19.7: Inserting the flexible cannula inside the uterus

Fig. 19.8: Pulling out the plunger until arms snap out and rest on edges of the barrel

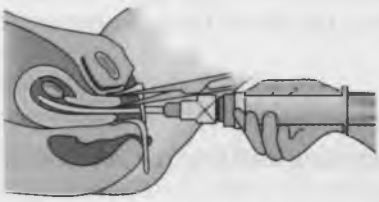


Fig. 19.9: Holding the syringe only by barrel

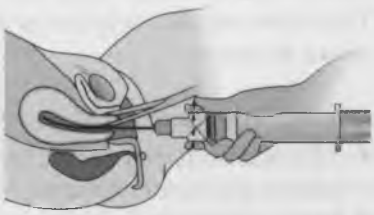


Fig. 19.10: Opening the valve to start uterine aspiration

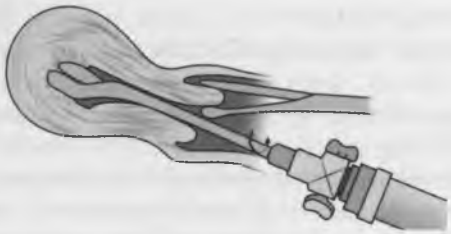


Fig. 19.11: Moving the cannula back and forth to evacuate the contents

along uterine wall and no more tissue appears in syringe. Contents of syringe can be placed in specimen cup, vacuum can be reset, and cannula can be introduced again into uterine cavity to complete evacuation. Care must be taken to avoid contaminating tip of cannula if multiple passes are required. This is accomplished by maintaining no-touch technique or by attaching new cannula for each repeated suctioning. Alternatively, operator can leave cannula tip within uterine cavity, detach and empty syringe, and then reattach syringe to cannula after resetting suction with pinch valves.

If the cannula gets blocked or the vacuum is lost, the syringe is detached from the cannula and fresh vacuum is created in the syringe. Again a fresh attempt is made to evacuate the uterine cavity. The pressure created within the menstrual regulation syringe measures about 50 to 70 mm Hg.

Sterilization Method

It is reusable. The method of cleaning is the syringe is easily disassembled and cleaned with soap and water or diluted povidone iodine solution and air dried before reassembling. A small amount of silicone lubricant to the rubber piston prior to reuse ensures a tight seal and maintenance of a high vacuum. The lubricant also helps to prolong the life of the syringe up to about 80 uses.

Nursing Interventions

- Monitor body temperature, bleeding and vaginal secretions (character, color, volume).
- Strict aseptic technique.
- Strengthen the perineum care.

- Maintain the vulva clean.
- Avoid intercourse or the use of tampons or douches for at least 2 weeks.

Complications

Complication of the procedure is incomplete evacuation because of limited suction pressure.

2. LAMINARIA TENT

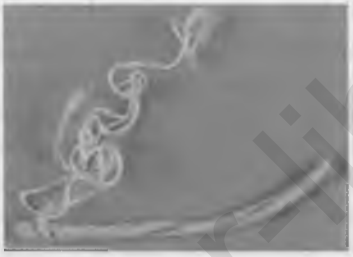


Fig. 19.12: Laminaria tent

Definition

The name is a misnomer. It is a stick like wooden item. It is made up of hygroscopic material (high power of absorbing water) derived from stems of seaweed, *Laminaria digitata seatangle* or *Laminaria japonica.*

Features

A tent is 6 to 8 cm long cylindrical rods, and either 2 to 4 mm in diameter (small) or 8 to 10 mm in diameter (large). Laminaria tents (sticks) are available in packets of 50 or 100 pieces in market. A string is attached to the proximal end to facilitate removal.

Mechanism of Action

The tent swells up by absorbing fluid causing cervical dilatation. A single tent may not be able to cause sufficient dilatation and hence at a single time two or three tents are introduced side-by-side into the cervical canal. The tent is allowed to remain in place for 12–24 hours. It acts by its

hygroscopic action; they absorb moisture from cervical tissue and swell to 3–5 times their original diameter. At one end, one thread is attached for making easy removal by pulling the thread. The cervical canal is packed with as many tents as it can accommodate with the tips of the tents just beyond the internal os. The threads of the tents are tied over a piece of gauze. The tents either spontaneously fall off or are removed after 12 to 24 hours.

Other Dilators of Cervix

Isabgol Tents (Isogel)

It is dried granules prepared from the husks of "certain mucilaginous tropical seeds" powdered and rolled into sticks wrapped in fine gauze. CDRI, Lucknow has developed it. A small tent measures 3 to 3.25 mm in diameter, while a large tent measures 4.5 to 4.75 mm in diameter. An Indian version, in the form of Isabgol tent, is available locally. However, the failure rate and rate of infection is very high with these tents. Usually more than one tent is to be introduced to prevent dumbling of the ends. This dehydrated, compressed Chinese seaweed produces slow dilatation of the cervical canal, as it swells up due to hygroscopic action. It swells to 3 to 5 times the original diameter in 24 hours in moist environment like the cervical canal.

Magnesium Sulfate Tent (Lamicel)

It is made of polyvinyl alcohol sponge containing 450 mg of magnesium sulfate.

Indications/Uses

1. Expulsion of products of conception in cases of:
   - First trimester MTP
   - Incomplete abortion
   - Missed abortion
   - Hydatidiform mole
   - Gynecological D and C if cervical dilatation is difficult.
2. It may be used for cervical dilatation in cases of spasmodic dysmenorrhea where the medical treatment has failed.

Contraindications

1. *Absolute*

   The procedure is absolutely contraindicated in a patient who is trying to become pregnant.
2. *Relative*
   - Laminaria tents should not be used in cases of pyometra
   - Pelvic inflammatory disease; vaginal or cervical infections (treat before dilation).

Advantages

1. Laminaria tent is less invasive than other medications and procedures.
2. Unlike other medications that help ripen the cervix, laminaria tent does not require the mother to remain on fetal monitors and does not increase the risk of uterine rupture.
3. Laminaria tent is more natural than most other cervical ripening agents. This can be very important to women hoping to avoid medications during labor and delivery.

Disadvantages

1. Slow dilatation of cervix
2. Possibility of accidental rupture of membranes
3. Introduction of infection.

Note: Because of these disadvantages, it is not recommended in cases involving intrauterine fetal death. With rapidly acting prostaglandins being available, the laminaria tent is rarely used in modern obstetric practice.

Sterilization Method

It is sterilized by gamma irradiation, ethylene oxide gas or immersion in absolute alcohol for 24 hours.

Prerequisites

1. Ask the woman to empty her bladder
2. Appropriate tent size should be selected
3. The threads attached to one end are tied to the roller gauze.

How to use?

1. After taking antiseptic and aseptic precautions, put the woman in lithotomy position.
2. Vulva and vagina is swabbed with antiseptic solution using posterior vaginal speculum.
3. Internal examination is done to note the size and position of the uterus and state of the cervix.
4. A vaginal speculum is introduced. The anterior lip of the cervix is grasped by an Allis' forceps to steady the cervix.
5. The cervical canal may have to be dilated, especially in primigravidae, by one or two metal dilators to facilitate the introduction of tents.
6. The tents are introduced one after the other holding it by tent introducing forceps. The tents are introduced for at least 4 cm (1.5") so that the tips are placed beyond the internal os. Ensure that the laminaria tent does not extend into the uterine cavity (Fig. 19.13).
7. Use the largest laminaria tent that will fit into the os. Sometimes, this may be quite small.
8. If unable to insert the laminaria tent, dilate the os further before its insertion (Fig. 19.14).

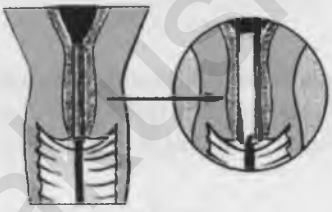


Fig. 19.13: Correct placement of laminaria tent

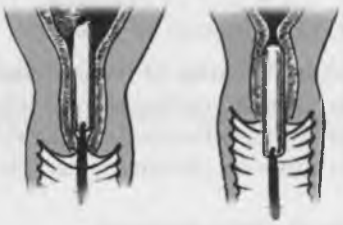
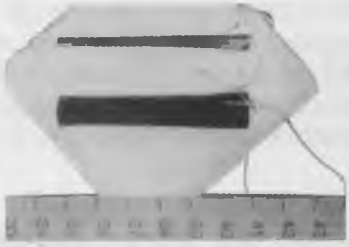


Fig. 19.14: Incorrect placement of laminaria tent

9. Laminaria are quite long and usually protrude out of the cervix for several millimeters (Figs 19.15 and 19.16).
10. The upper vagina is packed with roller gauze to prevent the displacement of tents.
11. The patient is returned and preferably confined to bed.



Figs 19.15 and 19.16: Laminaria tents before and after the uptake of water

12. Prophylactic antibiotic is usually administered. No anesthesia is required for the procedure.

Nursing Care after the Insertion

- If a laminaria tent is placed, the woman should be instructed to return within 24 hours for removal of the laminaria tent. 8 to 12 hours is often adequate.
- The woman should not engage in sexual intercourse while the laminaria is in place.
- If dilation was performed for cervical stenosis causing hematometra or pyometra, or after an excisional procedure, the woman should be instructed to return in 4 to 6 weeks for repeat examination and possible repeat dilation.
- The woman should return or call for fever, abdominal or pelvic pain, purulent vaginal discharge, or bleeding.
- In postmenopausal women not on estrogen replacement, or those with low estrogen states (e.g. depoprovera or implanon users), estrogen cream helps maintain patency of the os. This is especially important if dilation was done for postsurgical (conization) scarring complications.

Common Errors during Insertion

The most common error is failure to straighten the uterus. This occurs by not placing sufficient traction on the tenaculum or by using a speculum with long blades, trapping a flexed uterus in its flexed position. Failure to make this adjustment can result in uterine perforation, the most common complication of a difficult dilation. The laminaria may fail to dilate the canal

because it has not been inserted appropriately far enough. Sounding the canal and marking the laminaria will aid in knowing when it has been inserted far enough. The laminaria can be inserted too far, making it difficult to remove because of a bulbous swelling inside the uterine cavity.

Removal of Laminaria Tents

Remove osmotic dilators by inserting two fingers into the vagina. Using the gauze, the strings are pulled gently. If a keyhole dilator has been placed, taking out this device first usually facilitates removal of the remaining dilators. If gentle traction on the strings does not extract the dilators easily, then expose the cervix with a speculum and grasp the end of the one dilator at a time usually works. Some patients require cervical anesthesia or intravenous sedation to accomplish this step.

The number of dilators removed should equal the number inserted. If a discrepancy exists, one or more of the first devices placed may be intrauterine, having been pushed beyond the internal os by subsequent dilators. In this case, the obstetrician must inspect closely all materials removed from the uterine cavity to identify missing dilators. To avoid searching for devices that the woman may have passed spontaneously, the obstetrician should ask the woman if any dilators fell out before hand. Once the dilators are removed, a digital examination is often highly instructive. With this step, the obstetrician can assess the degree of cervical dilatation and pliability; the presence in the endocervical canal of any niches, fossae or lacerations created by improper insertion of osmotic dilating devices.

Complications

- Pain
- Hemorrhage
- Inability to dilate the os
- Infection (especially if the laminaria tent is left in over 24 hours)
- Anaphylaxis or allergic reaction to the laminaria tent (rare).

- Rupture of utuers while introducing it.
- Laminaria tents can break or separate on removal, making retrieval of the pieces difficult.
- Inability to remove the laminaria because of an excessively deep placement.

3. PESSARY

Definition

A pessary is usually a small ring-shaped device that is inserted into the vagina to help maintain the uterus in a normal position. This approach can have undesirable results, however. Pessaries are effective tools in the management of the pelvic floor prolapse and stress urinary incontinence.

History

Hugh Lenox Hodge, Professor of Gynecology at the University of Pennsylvania, designed a pessary using Goodyear's newly patented vulcanized rubber in the year 1860. Since that time, technological advances in composition and a wide variety of sizes and shapes now make fitting pessaries very easier.

Features

It may be solid or hollow. The latter may contain air, glycerine or a watch spring inside it giving it elasticity.

Indications

1. Stress urinary incontinence (including athletic stress urinary incontinence)
2. Uterine prolapse
3. Vaginal vault prolapse
4. Uterine retrodisplacement
5. Pelvic relaxation
6. Cystocele
7. Enterocele
8. Rectocele
9. Poor surgical candidates with significant symptoms
10. Prophylactic, postoperatively

Pessary Types by Indication

Table 19.1: Types of pessary by indications

S. No.	*Indications*	*Pessary types*
1.	Stress incontinence	Ring with knob Hodge Hodge with knob Smith Incontinence ring Incontinence dish Marland Gehrung with knob
2.	Preoperative evaluation for Burch procedure for stress incontinence	Hodge Hodge with support
3.	Uterine retrodisplacement	Smith Hodge
4.	Uterine prolapse, first or second degree	Ring Ring with support Shaatz Oval Smith Hodge
5.	Uterine or vaginal vault prolapse, third or fourth degree	Donut Cube Gellhorn (not well suited for severe vaginal prolapse)
6.	Stress incontinence with cystocele, first or second degree	Ring with support (with or without knob) Incontinence dish with support Gehrung with knob Hodge (with/without support, with/without knob) Marland with support
7.	Stress incontinence with uterine prolapse, first or second degree	Ring Incontinence ring Ring with support and knob Incontinence dish (with/ without knob)

Contraindications

- Noncompliant patient
- Impaired mental capacity leading to inability to follow-up
- Persistent vaginal ulceration/erosions (relative)
- Active vaginitis (relative)
- Any pelvic infections or lacerations (relative)
- Severe atrophic changes (relative)
- Lack of manual dexterity
- Fixed retroversion
- Prolapse of adnexal structures in pouch of Douglas, which is painful
- Cervicitis
- Suspected lower genital tract malignancy
- Adequate supervision is not possible.

Disadvantages

Pessaries can interfere with sexual intercourse and may also cause irritating discharge with an unpleasant odor and even infection.

Material made of and Sterilization Method

It is made of hard rubber, silicone, perspex, vinyl or polyethylene. Silicone has the advantage of being non-allergenic, and it does not absorb odors or secretions and is pliable and soft, so it is well tolerated. Rubber pessaries are avoided in women with latex allergy. It is sterilized by immersion in an antiseptic solution such as hibitane, dettol, etc. The pessary can also be autoclaved for 15 lb pressure for 15 minutes is the recommended method of sterilization for pessaries.

Selection of Pessary

Pessaries are available in a wide range of sizes and shapes, each with a specific indication and function. Different devices often are used to treat the same process in different patients. Selection depends on anatomy, symptoms of the condition, and the overall goal of treatment. Identifying the best choice is often a trial-and-error process; obstetricians and the woman using it should not be discouraged if the first selection is unsuccessful.

The most commonly prescribed pessaries are the ring, the Gellhorn and the donut. Pessaries are made with several modifications on the same theme. For example, the ring pessary has a version "with support," which has a silicone web across the central opening. This "Supports" the bladder, effectively reducing a mild-to-moderate cystocele. The "ring with knob" has a bulbous portion that is placed retropubically (at the pubic notch). In general, anterior defects tend to be best managed with ring or lever pessaries. Similarly, mild-to-moderate prolapse of the uterus or vaginal vault can also be treated with ring pessaries. More severe uterovaginal and vaginal vault prolapse is best treated with a space occupying pessary such as a Gellhorn, donut or cube; as these pessaries generally cannot be removed by the woman. If the woman is sexually active, a ring or other device should be tried first as these can be removed easily by the woman.

Types of Pessary

1. *Ring pessary*

Fig. 19.17: Ring pessary

Indications

1. Temporary correction of uterine prolapse in the following situations:
   a. To allow a decubitus ulcer on the cervix to heal before undertaking a corrective operation.
   b. To relieve symptoms while the woman is made fit for operation or until the social problem responsible for postponing the operation is solved.
   c. Uterine prolapse during pregnancy.
   d. *As a part of pessary test:* After removal of hodge pessary, a ring pessary may be inserted which reassures the woman

that she has a pessary, though she does not know that this pessary does not maintain the uterus in an anteverted position. If the symptoms are still relieved, they are not due to the mobile retroversion, but are likely to be psychological. If the symptoms recur, they are due to mobile retroversion.

Advantages

Ring pessary is easy to insert and remove by both the obstetrician and also the woman. The ability of the woman to remove and replace the pessary on her own also makes coitus possible. This pessary is fitted very similarly to a contraceptive diaphragm.

Disadvantages

The ring pessary cannot reduce cystocele, urethrocele, rectocele and enterocele.

How to use?

Ring pessary is inserted manually or using a ring pessary introducer. It is compressed into an oval using the thumb and the middle finger of the right hand, while the index finger is hooked into its lower end. It may be grasped and compressed by the introducer. It is inserted into the vagina held in the long axis of the introitus, and when half the pessary is inside the vagina, the index finger is straightened and is used to push the upper end of the pessary into the posterior fornix. The pessary rotates to a horizontal position and its lower end fits behind the pubic symphysis well above the urinary meatus. The pessary lies in the vaginal fornices above the level of the levator ani which hold it up. Through the attachment of the vaginal fornices to the cervix, the uterus is held up by the ring pessary (Fig. 19.18).

Fig. 19.18: Method of insertion of ring pessary

2. *Hodge pessary*

The hodge pessary is made of vulvanite, celluloid, hard rubber or plastic. It has double curve. Its lower end is square or flattened. It upper end is much broader than the lower end. It has wires that allow it to be manually shaped for different anatomies. It can be used for a first to second degree prolapse, cystocele, stress incontinence and an incompetent cervix or uterine retroversion. It is both with and without support. Because of the shapable wires, the Hodge pessary must be removed during X-rays, ultrasound and MRI. A Hodge pessary is often considered for a young, reproductive age woman with stress incontinence, who prefers conservative therapy (Figs 19.19 and 19.20).

Fig. 19.19: Hodge pessary

Fig. 19.20: Hodge pessary after insertion

3. *Cube pessary*

The cube pessary is designed for third degree prolapse, including procidentia, as well as a cystocele and rectocele. The cube pessary is available both with and without drainage holes and has a silicone tie to aid in removal. A cube pessary may be

Fig. 19.21: Cube pessary

Fig. 19.22: Insertion of cube pessary

used in women with either a very small or a large introitus due to its malleability. It is a very versatile pessary, but it should be used cautiously (Figs 19.21 and 19.22).

4. *Cup pessary*

The cup pessary, available with or without a support membrane, is used for a first or a mild second-degree uterine prolapse. It is available in eight sizes (Fig. 19.23).

Fig. 19.23: Cup pessary

5. *Dish pessary or incontinence dish*

Fig. 19.24: Dish pessary

The incontinence dish or dish pessary is used to relieve stress incontinence and minor degrees of prolapse. The incontinence dish comes with and without support. The incontinence dish is designed to provide bladder neck support as well as to support a cystocele. It is easy to fit and stays in place.

Fig. 19.25: Dish pessary after insertion

6. *Donut pessary*

Fig. 19.26: Donut pessary

The donut pessary is designed for third degree prolapse as well as cystocele and rectocele. The soft donut can be compressed for insertion. Health care providers often use the donut pessary on their patients with severe prolapse who are not immediately appropriate for surgery. It works well in a vaginal vault with little or no support, the problem which is commonly found in older, postmenopausal women (Fig. 19.27).

Fig. 19.27: After insertion of donut pessary

7. *Gehrung pessary*

Fig. 19.28: Gehrung pessary

The Gehrung pessary has wires that allow it to be manually shaped for different anatomies. It is used to support cystoceles, rectoceles and second to third degree uterine prolapse. Because of the shapable wires, the Gehrung pessary must be removed during X-rays, ultrasound and MRI. The Gehrung pessary's flexibility and adaptability make it an excellent choice for support of significant cystocele and rectocele, especially in cases of associated procidentia (Fig. 19.29).

Fig. 19.29: Gehrung pessary after insertion

8. *Gellhorn pessary*

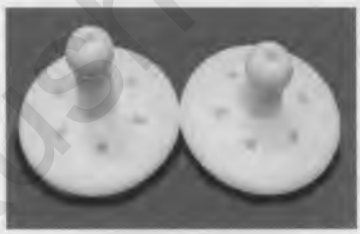


Fig. 19.30: Gellhorn pessary

The Gellhorn pessary is used for a second to third degree prolapse, or procidentia. It has drainage holes in its base. The knob of the Gellhorn easily folds over for insertion, and once in place rests on the posterior vaginal wall. The Gellhorn pessary is often a healthcare provider's first choice for women with more advanced pelvic organ prolapse. It is easy to insert and remove, and allows for self-care. This device is also less likely to be expelled (Fig. 19.31).

Fig. 19.31: Insertion of Gellhorn pessary

9. *Marland pessary*

Fig. 19.32: Marland pessary

The Marland pessary is used for stress incontinence and minor prolapse. It is available both with and without support in different sizes. The Marland pessary offers excellent support for moderate to extensive cystocele, as well as providing support for the bladder neck in managing stress incontinence (Fig. 19.33).

Fig. 19.33: Insertion of marland pessary

10. *Oval pessary*

Fig. 19.34: Oval pessary

The oval pessary is similar as that of the ring pessary but it is designed specifically to fit a narrow vaginal vault. It is available in different sizes, all with support, and is used for a first to second degree prolapse as well as an accompanying cystocele. The oval pessary works extremely well in women with a prior history of vaginal surgery, resulting in scarring and in some cases, palpable sutures from anterior repair or bladder suspension procedures. Where a round pessary is too wide, the oval pessary fits well and is comfortable and effective (Fig. 19.35).

Fig. 19.35: Insertion of oval pessary

11. *Shaatz pessary*

Fig. 19.36: Shaatz pessary

The Shaatz pessary is used for a first to second degree prolapse and an accompanying cystocele. The Shaatz pessary is versatile because it will help alleviate symptoms from uterine prolapse

Fig. 19.37: Insertion of Shaatz pessary

and cystocele. The convexity of its shape provides a snug fit. Additionally, the design with the drainage ports allows easier removal by the patient who is dextrous enough to maintain her own pessary (Fig. 19.37).

How to use Pessaries?

Pessaries are fit by trial and error. Proper fitting often requires multiple sizes and/or styles. The totally different shape of each pessary and whether the pessary fits in front of the cervix, e.g. the Gellhorn, donut, or cube, behind the cervix, e.g. the Hodge pessaries, or over the cervix, e.g. Gehrung pessary precludes simple conversions.

It is normal for the patient to experience an increase in vaginal discharge. However, odor, itching, change in color of discharge, or bleeding should be reported to the healthcare provider. Use of vaginal estrogen with pessaries generally prevents vaginal erosion and ulceration. Many healthcare providers overlook the importance of estrogen in maintaining the acid pH balance necessary to prevent vaginitis. The vagina should be re-estrogenized by using vaginal estrogen cream, 1 g every other night for 1 month, then two to three times per week thereafter. Alternating a pH-adjusted vaginal gel two or three times per week with the estrogen cream is beneficial as well if the pessary is left in place and not removed every night.

Pessary Care

Woman should remove the pessary and wash it with warm, soapy water. Soap with deodorants, perfumes, or detergents should not be used.

Complications

- Vaginitis
- Vaginal erosion or ulceration
- Discomfort
- Obstructed defecation and/or urination
- Impaction of the pessary

4. BREAST PUMP

Definition

A breast pump is a mechanical device that extracts milk from the breasts of a lactating woman. Breast pumps may be manual devices which are used by hand or foot movements or electrical devices powered by means of electricity or batteries.

History

LO Colbin was the inventor of a breast pump. In 1921–1923, Edward Lasker produced a mechanical breast pump that imitated an infant's sucking action and was regarded by physicians as a marked improvement on existing hand-operated breast pumps, which failed to remove all the milk from the breast.

Indications

1. Breast pumps are used to pump or to express breast milk, which is later bottle fed to their child by a caregiver.
2. It is also used to stimulate lactation for women with a low milk supply or those who have not just given birth.
3. It may be used to relieve engorgement for preventing a proper latch by the infant.
4. If an infant does not latch properly for direct breastfeeding and the mother still desires the benefits of breast milk, she may choose to pump exclusively.
5. If the mother needs to take medication that affects the breast milk and may be harmful to the infant, the mother may pump the breast milk to keep up her milk supply during the time period that she is on the medication and may resume nursing after the course of medication is completed.

6. It may be desirable to continue lactation and its associated hormones to aid in recovery from pregnancy even if the pumped milk is not used.

Parts of Breast Pumps

1. *Breast shield:* It is a cone-shaped cup that fits over the nipple and the areola.
2. *Pump:* It is used to create the gentle vacuum that expresses milk. The pump may be attached to the breast-shield or have plastic tubing to connect the pump to the breast-shield.
3. *Milk collection chamber or container:* A detachable milk collection container is present that fits below the breast-shield. The container is typically a disposable bag or a reusable bottle that can be used to store the milk, or attached to a rubber nipple and used for feeding a baby.

Types of Breast Pumps

1. ***Manual breast pump:*** Manual breast pumps are operated by squeezing or pulling a handle in a repetitive fashion. Once the breast-shield is placed over the nipple and areola, a small cylinder-shaped tube is pumped in and out of a larger cylinder to create a vacuum that expresses milk and collects it in an attached container (Fig. 19.38).
   It allows the user to directly control the pressure and frequency of milk expression. These pumps are small and inexpensive. The main disadvantages of this pump are it requires significant effort and it may be tiring because the user provides all the power. This type is recommended for infrequent usage such as when a woman is away from her baby for a single feeding. These pumps may not provide

Fig. 19.38: Breast pump

Fig. 19.39: "Bicycle horn" pump

sufficient stimulation and emptying of the breast. It is recommended that "bicycle horn" style manual pumps not to be used. It consists of a hollow rubber ball attached to a breast-shield. Though they are cheap, they can damage breast tissue and harbor bacteria in the rubber suction bulb, which is difficult to clean (Fig. 19.39).

2. ***Electric breast pumps:*** There are two types of electric breast pumps (Fig. 19.40):
   1. *Hospital grade pumps:* Hospital grade pumps are larger and intended for multiple users.
   2. *Personal use pumps:* Personal use pumps are smaller and generally intended for one user.

Fig. 19.40: Electric breast pumps

Electric breast pumps are powered by a motor which supplies suction through plastic tubing to a horn that fits over the nipple. The portions of the pump that come into direct contact with the expressed milk must be sterilized to prevent contamination. This type provides more suction, making pumping significantly faster, and allows pumping of both breasts at the same time. Electric breast pumps are ideal for a mother who is pumping daily. Electric breast pumps are larger than manual ones, but portable models are available that allows for easy transport of the pump.

3. ***Battery-powered pumps:*** A powered breast pump uses batteries, or a cord plugged into an electrical outlet to power a small motor that creates suction to extract milk from the breasts. One or more long plastic tubes connect the breast-shield to the motor. The motor has a control panel with a dial or switch to control suction. It is important that women who use a powered breast pump are prepared for emergency situations when electricity or extrabatteries may not be available. Having extrasupplies for pumping and a back-up method, such as a manual breast pump, may help a woman maintain her breast pumping schedule during an emergency.

Pumping Types

There are three different pumping types:

1. Single
2. Double
3. Double-alternating.

Table 19.2: Different pumping types and breast pumps

Pumping type	*How it works*	*Types of breast pumps*
Single	• It extracts milk from one breast at a time	• Manual breast pumps are single pumps • Battery-powered pumps are commonly single pumps
Double	• It can be used to extract milk from both breasts at the same time • A separate breast-shield can be attached to each breast and stimulate both time	• Some electric pumps are double pumps • Some women find that the dual suctioning of nipples at the same time decreases the amount of time it takes to empty their breasts.
Double-alternating	• It can be used to extract milk from both breasts at the same time • Unlike the double pump, the double-alternating pump releases suction from one breast before applying suction to the other breast	• Electric pumps are commonly double-alternating pumps

Prerequisites

1. *Wash and dry hands:* Before using the pump, wash hands with soap, scrub for 10–15 seconds, then rinse with plenty of warm water. After washing, dry hands thoroughly with a clean paper towel.
2. *Assemble the pump:* Consult pump's instruction manual for the proper way to assemble your pump.

3. *Get comfortable:* Find a clean and comfortable place where the woman can relax and not be disturbed while pumping. If it is an electric pump, find an area near an outlet so you can plug the pump in. Some mothers find it helpful to hold their baby, or to have a picture of their baby in front of them while they pump.
4. *Position the breast-shield:* The nipple of the woman should fit comfortably in the center of the opening in the breast-shield. Gently adjust the breast-shield(s) until it feels comfortable without pinching, pulling or otherwise irritating nipple or breast tissue.
5. *Begin pumping:* If the pump is electric or battery-powered, turn the switch to the on position. If the woman is using a manual pump, begin pumping. Check for an appropriate pumping speed. Adjust the speed that is comfortable for the woman.

How to use Breast Pumps?

Manual Breast Pump

- Hold the breast pump below the handle with the left hand, bring the breast pump to the left breast, and adjust the breast-shield so that it is centered comfortably over the nipple of the left breast.
- Support the left breast with right hand and use left hand to squeeze and release the handle of the breast pump. As the woman squeezes the handle, suction is created by the pump which gently pulls the nipple into the breast-shield and extracts milk. When the woman releases the handle, the suction is released. As the woman pumps her breast, the baby bottle fills with breast milk.

Electric Breast Pump

- Using left hand, position the breast pump on left nipple in the same way as the woman did with the manual pump, and support left breast with the right hand. The breast pump is already plugged into an electrical outlet, so the motor is switched on. The motor creates suction in the plastic tubing that is connected between the motor and the breast-shield. The suction applied to the nipple of the left breast causes it

to elongate and be sucked into the breast-shield, extracting milk from the breast. The milk flows into the baby bottle attached below the breast-shield.

- After pumping the breast milk, the electric pump is switched off. To remove the breast pump, the woman gently slides her index finger between the breast-shield and her left breast to break the vacuum seal that was formed when the breast pump was in use. Then remove the breast pump from breast.

After expressing the milk from the breast, the baby bottle is unscrewed from the plastic tubing and breast-shield in preparation for storage. Because this bottle of milk is intended for storage rather than for immediate feeding, it is sealed with its plastic lid to protect the breast milk inside. The bottle is then labeled with the date and time of pumping in preparation for storing it in the refrigerator or freezer.

Cleaning of the Breast Pumps

- Wash each piece separately using liquid dishwashing soap and plenty of warm water.
- Rinse each piece thoroughly with hot water for 10–15 seconds.
- Place the pieces neatly on a clean paper towel or in a clean drying rack and allow them to air dry.
- Avoid using a cloth towel to dry pump because they can carry germs and bacteria that are harmful to breast milk and baby.
- Once the pump is dry, assemble it before storing.
- Try not to touch the inside of any parts that will come in contact with milk, the next time when the woman pumps.

5. CAT'S PAW

It is thin metallic instrument. One end of the instrument is broad and carries a paw-like arrangement.

Uses

This instrument is used to bring the abdominal structures forward during a vaginal operation. For example:

1. To bring the uterus down during a vaginal hysterectomy.
2. To bring the uterine tube down during a vaginal ligation of the tube.

How to use?

This instrument is always used in pairs. After anterior fornix has been cut, it is made sure by palpation that neither intestinal coils nor any other neighboring structure are there. A single cat's paw is introduced into the pelvic cavity and is gripped onto the uterus. A gradual and controlled pull is exerted downwards. Another cat's paw then is gripped onto the other side of the uterus. Now a balanced traction will bring down the uterus down smoothly. Only a single cat's paw is required to bring the uterine tube down through the opening made in the anterior fornix when ligation is done.

Complications

1. This instrument may bite into the uterus and may cause hemorrhage.
2. The instrument may injure other neighboring structures if not used properly.

Fig. 19.41: Landau's trocar and cannula

6. LANDAU'S TROCAR AND CANNULA

Features

This cannula is 2 mm in diameter. There are two trocars, one pointed and the other ball tipped. The other end of the cannula has a luer mount.

Indications

1. Colpopuncture in the diagnosis of:
   a. Pelvic abscess
   b. Ruptured tubal ectopic gestation
   c. Ovarian tumors with ascites—for malignant cells
2. Tapping a hydrocephalic head either per abdomen or per vaginam

Abdominal tap is done suprapubically with the fetus in cephalic presentation or in a breech presentation when the trunk has delivered and the aftercoming head is arrested.

3. Abdominal paracentesis
   a. Diagnosis of hemoperitoneum, e.g. after rupture of an ectopic gestation.
   b. Ascites—for diagnosis as well as treatment, e.g. prior to exploratory laparotomy of an ovarian tumor with ascites.
   c. Diagnosis of peritonitis.

How to use?

1. The package label is detachable and may be affixed to the medical record of the patient.
2. Before beginning the procedure, verify overall compatibility of all instruments and accessories.
3. Inspect packaging before opening. The contents of the package are sterile if the packaging has not been compromised. Do not use the instrument if the sterility has been compromised. If the package is damaged or if it was opened and the instruments were not used, return the instruments and package.
4. Do not attempt to resterilize.
5. Remove the instrument from the package and place it in a sterile work area using aseptic technique. Avoid contact with exposed sharp edges of the trocar.
6. Inspect the instruments for any damage. Do not use the instruments if any damage is noted. Return the instrument(s) and packaging to the manufacturer if it (they) is (are) not in acceptable condition for surgery.
7. Start the procedure by making a small incision where the trocar will be introduced.
8. First, insert the trocar independently from the cannula. Direct the trocar with careful downward pressure toward the desired position.
9. Proceed according to standard procedure.
10. Verify with laparoscopic visualization that the cannula has fully entered.

11. Follow a suitable surgery protocol.
12. Withdraw the cannula from the area under direct visualization.

7. IUCD REMOVAL HOOK

Other Name

IUCD removal hook is also called Loop hook.

Features

It is similar to Simpson's uterine sound except that its tip has a hook instead of bulbous tip; the sharp point of the hook is directed towards the angled side of the instrument.

Simple Hook

Fig. 19.42: Simple IUCD removal hook

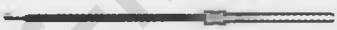


Fig. 19.43: Universal IUCD hook

Fig. 19.44: Double IUCD hook

Fig. 19.45: Flexible serpentine IUCD remover

Fig. 19.46: Alligator IUCD forceps

Uses

1. It is used to remove the IUCD from uterine cavity when the threads are missing. It is ideal for removal of lippes loop because of its transverse arms but Cu T whose lower arm is vertical; hence this is rarely used now.
2. It is also used in the removal of tubal prosthesis.

Method of use

Cervical canal is dilated if needed. The hook is introduced within the uterine cavity. The IUCD is felt and is grasped within the hook. It is then pulled out.

Precautions

Location of IUCD within uterine cavity must be confirmed. Trauma (perforation) to the uterus is to be avoided. Hysteroscopic removal can also be done.

8. MURLESS CRANIAL EXTRACTOR

Fig. 19.47: Murless cranial extractor

Other Name

It is also called vectis blade extractor.

Features

This instrument has a fensestrated blade which is hinged to the curved handle. The blade is curved like the cephalic curve of a forceps blade.

Indications

This instrument is used for extraction of the fetal head during cesarean section when the fetus presents by vertex.

How to use?

The blade is unlocked and allowed to angulate. Then it is inserted below the fetal head in the lower segment, the membranes being already ruptured. Once in position, the blade is allowed to go to its original straight position, is locked in that position and the fetal head is delivered by lifting it out. The hinge allows the adoption of the shape one convenient for delivery of the head (Fig. 19.48).

Fig. 19.48: Fetal head is extracted using Murless cranial extractor

9. MYOMA SCREW

Fig. 19.49: Myoma screw

Features

It is a coarse threaded screw (coiling is reverse to that of a cork screw) with a pointed tip at one end and a handle in the form of transverse bar or a closed oval at the other end.

Indications/Uses

1. During myomectomy operation, it is screwed in the center of the myoma to give traction for enucleation of the myoma after cutting the capsule.
2. It can also be used to hold and keep steady a big-sized uterus steady during abdominal hysterectomy.

3. It is used in the operation for removal of fibroids. It is screwed into the myoma to give a good grip on the tumor mass and it aids manipulation and removal of the fibroid.

10. PELVIMETER

A pelvimeter is a gynecological instrument which is specifically used in the procedure known as pelvimetry. Pelvimetry is a procedure in which the gynecologist examines the woman's pelvis and this examination is correlated to the process of delivery and labor.

Aim

The main aim of pelvimetry is to determine whether or not a normal birth procedure would be adequate for the delivery of the baby or whether a cesarean would be required (Fig. 19.50).

Fig. 19.50: Pelvimeter

Uses

1. It is used for measuring the external diameters of the pelvis. It usually measures the following diameters of the false pelvis (external conjugate, interspinous, intercrisal diameter, and intertrochanteric diameter). These diameters are of value in assessing the pelvic outlet.
2. It may also be used for measurement of internal diameters (diagonal conjugate).

11. PINARD'S FETOSCOPE

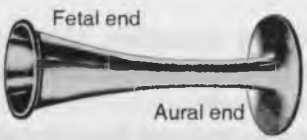


Fig. 19.51: Pinard's fetoscope

Other Name

The other name of Pinard's fetoscope is fetal stethoscope or fetoscope.

Founder

It is named Pinard stethoscope or Pinard, after a French obstetrician Adolphe Pinard (1844–1934) who has invented it (Fig. 19.52).

Fig. 19.52: Fetal stethoscope

Features

It is an acoustic stethoscope shaped like a listening trumpet. It is a hollow tube of conical or funnel shape. It has a broad, flat disc with a central perforation attached at the narrow end of the funnel. The rim of the broad end is rounded and not sharp to avoid pain to the woman by the edge cutting into the abdominal wall.

Mechanism of Action

Maternal skin stretched across its broad end acts as a diaphragm and because of its peculiar shape, sound waves get amplified and heard.

Material

This instrument is made up of wood, plastic or metal (aluminum). The metal stethoscope is cheaper and easier to make. However, its shape alters readily on falling. It is also cold to touch in winter. Wooden stethoscope can be made narrower. Its shape does not change and it does not feel cold to touch in winter.

Uses

This instrument is used to hear the fetal heart sounds in the antenatal period from 24 weeks, and during labor.

Finding the Position of the Heartbeat

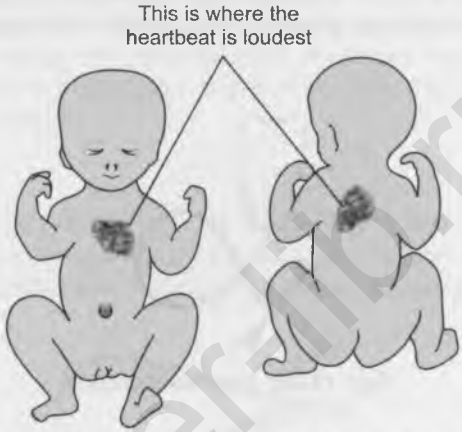


Fig. 19.53: Position of the heartbeat in the fetus

The baby's heartbeat is loudest in its upper chest or upper back, depending on which way the baby is facing. Think about which way the baby seems to be lying. Then start listening for the heartbeat near the spot where the baby's heart should be. The midwife may need to listen in many places on the mother's abdomen before she finds the spot where the heartbeat is the most loud and clear (Fig. 19.54).

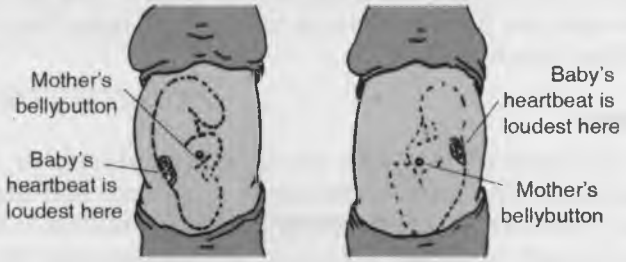


Fig. 19.54: Places where the fetal heartbeat is heard in mother's abdomen

How to use?

The woman is put in a supine position with 15° left lateral tilt. Examining room should be quiet. The position of the anterior shoulder is determined by palpation. Standing on the woman's right side, the broad end of the instrument is placed at this place. The narrow end with a wide rim is used as an ear piece. An ear is applied to the other end to hear the fetal heart sounds. The ear must be closed to the aural end. The instrument should be held firmly at right angles to the woman on abdominal wall. The left hand is placed over the uterine fundus to steady the fetus and to prevent upward displacement of the fetus by the pressure of the stethoscope. The instrument is not held with a hand during auscultation because that dampens the transmission of sound in the instrument.

By the last two months of pregnancy, the midwife can often hear the fetal heartbeat in a quiet room by putting the ear on the mother's abdomen (Figs 19.55 to 19.57).

Fig. 19.55: Listening to the fetal heartbeat with the ear on the mother's abdomen

Figs 19.56 and 19.57: Listening to the fetal heartbeat with a stethoscope or with a fetoscope

Fetal heart sounds are transmitted through the air in the instrument as well as through the metallic walls. Fetal heart sounds are auscultated not only between uterine contractions, but also during contractions and after contractions so that intrapartum fetal distress can be diagnosed early. The woman's pulse may be felt at the same time so that the difference in maternal and fetal pulse rate can be used to distinguish between the fetal heart sound and uterine souffle. It should be held firmly at right angle to the point on the abdominal wall. The ear must be firmly closed to the aural end (Fig. 19.58).

Fig. 19.58: Listening to fetal heart rate with fetal stethoscope

The fetal heartbeat is quiet and quick. It may sound like a watch ticking under a pillow, only faster. The fetal heartbeat is about twice as fast as a healthy adult heartbeat, usually 120 to 160 beats a minute. There is no need to count the heartbeats until the woman goes into labor. Hearing a clear fetal heartbeat during an antenatal visit just confirms that the baby is alive.

If the midwife hears a 'swishy' sound (shee-oo, shee-oo, shee-oo), it is probably the baby's pulse in the umbilical cord. Cord sound gives the information that how fast the baby's heart is beating, but they do not help to find the baby's position. If the heartbeat sounds slow, probably it may be the mother's pulse instead of the baby's cord sound. Try listening to a different place on the mother's abdomen.

20 Needles

1. PARACERVICAL BLOCK NEEDLE

Definition

Paracervical block needle is refined for pain management during cervical dilation for voluntary termination of pregnancy. It was a popular method of analgesia for the first stage of labour (Fig. 20.1).

Fig. 20.1: Paracervical block needle

Features

The needle is 15 cm long, number 20 BD. The needle guide is 13.5 cm long, and has a blunt bulbous tip. The proximal end of the needle guide is broader, and has a longitudinal slit with two grooves 1.5 cm apart in one of the slides of the groove. The proximal end of the needle has a knob projecting from the surface in a similar location which fits in the grooves.

Area which is Blocked?

Paracervical anesthesia blocks the Frankenhäuser's ganglion lying just posteriorly to the cervicouterine junction. It blocks the sensory nerve levels T10 to L1. Paracervical block makes cervical dilation pain free.

Indications

The needle is used to administer a paracervical block as well as a transvaginal pudendal block. Indications for a paracervical block are as follows:

1. Analgesia during first stage of labor.
2. Pain relief during cervical dilatation for endometrial curettage.
3. First trimester pregnancy termination under local anesthesia.
4. Diagnostic hysteroscopy.
5. Endometrial ablation.
6. Hysteroscopic female sterilization.

Material made of and Sterilization Method

The needle and the guide are made of stainless steel and are sterilized by boiling or autoclaving.

Anesthetic Choices for Block

Table 20.1: Anesthetic choices for paracervical block

S. No.	*Anesthetic agents*	*Strength*	*Onset*	*Duration of action*	*Maximal dose*
1.	Lidocaine	1%	Rapid (4–10 minutes)	45–60 minutes	4.5 mg/kg
2.	2-Chloro-procaine	2%	Rapid (6–10 minutes)	30–45 minutes	10.0 mg/kg (not to exceed 800 mg)
3.	Bupivacaine	0.25%	Slow (8 to 12 minutes)	46–80 minutes	2.0 mg/kg
4.	Mepivacaine	1%	Rapid (6–10 minutes)	90–180 minutes	7 mg/kg
5.	Ropivacaine	0.2–1%	Slow (8–12 minutes)	240–480 minutes	150–200 mg

Requirements

1. Sponge holding forceps
2. Sim's speculum
3. Anterior vaginal wall retractor

4. Tenaculum
5. 22 G needle
6. 10–20 ml syringes
7. Injection lignocaine 0.5%.

Precautions

Make sure that there are no known allergies to lignocaine or related drugs. Do not inject into the blood vessel.

Timing of Procedure

Timing of pudendal block is most important. It needs at least 5–10 minutes to take effect. Most of the obstetricians perform pudendal block immediately prior to delivery. Depending on the drug used, anesthesia may last 20–60 minutes. The obstetrician may repeat the block, if necessary, so long as the maximum dose of local anesthetic is not exceeded.

How to use?

Pudendal and paracervical blocks are typically administered by the woman's obstetrician or gynecologist, rather than an anesthesiologist. Vaginal preparation is not needed. Ask the woman to evacuate the bladder. Then she is put in lithotomy position on the operation table. Do aseptic ritual of cleaning and draping. Posterior vaginal wall is retracted with Sim's speculum. Anterior vaginal wall is retracted with anterior vaginal wall retractor or vulsellum. Clean the cervix twice with iodine solution. One ml of 0.5% lignocaine solution is injected into anterior lip where we are going to hold the cervix by tenaculum. Anterior lip of cervix held with tenaculum or sponge holder. 22 or 24 G needle is attached to 10–20 ml syringe and 10 ml of 0.5% lignocaine is loaded. Slight traction is applied on tenaculum to help identify the area between the smooth cervical epithelium and the vaginal tissue. This is the site for insertion of the needle around the cervix. Insert the needle just under the epithelium. The needle guide directs the needle to the proper place and of injection is not more than 3 mm (Figs 20.2 and 20.3).

Injections are given at 2 O' clock and 10 O' clock position or 4 O' clock and 8'O clock, some of the practitioners use 3 O'

Fig. 20.2: Needle guide

Fig. 20.3: Insertion of the needle around the cervix

clock and 9 O' clock position injection. After inserting the needle, aspirate the syringe to be sure that no blood vessel has been penetrated. If the blood come into syringe, then remove the needle and recheck at another position and try again. Never inject if blood is aspirated, it can lead to convulsions and even death. Inject 6 to 10 ml of lignocaine just under the epithelium. When correctly placed swelling and blanching of the tissue can be noted. Wait for 2–5 minutes, then pinch the cervix with forceps to check the effect of anesthesia.

Complications

- Hypersensitivity or anaphylactic response
- Laceration of the vaginal mucosa
- Twitching of muscle
- Convulsions
- Severe hypotension

- Fetal bradycardia
- Cardiovascular collapse
- Respiratory collapse
- Bleeding from the vaginal fornices
- Fetal scalp injection
- Parametrial hematoma
- Sacral plexus trauma
- Fetal bradycardia
- Fetal or neonatal death (rare).

2. TRANSVAGINAL PUDENDAL BLOCK NEEDLE

Fig. 20.4: Transvaginal pudendal block needle and guide

Features

The needle guide is 15 cm long and has a broader, blunt tip. This needle is 16 cm long and thus projects for 1 cm beyond the needle guide when inserted fully into the guide.

Indications

This instrument is used for the administration of transvaginal pudendal block for the following indications:

- Relief from pain in second stage of labor
- Episiotomy
- Any normal vaginal delivery
- Assisted breech delivery
- Low forceps or low-mid forceps
- Repair of vaginal or perineal lacerations
- Manual removal of placenta
- Minor surgeries of the lower vagina and perineum.

Contraindications

1. When the woman is not willing.
2. When the woman is unable to cooperate.
3. Sensitivity to local anesthetics.
4. Presence of infection in the ischiorectal space or the adjacent structures, including the vagina or perineum.
5. Coagulation disorders.

Material made of and Sterilization Method

This instrument is made of stainless steel and sterilized by boiling or autoclaving.

Mechanism of Action

The pudendal nerve gives sensory innervations of the lower vagina, vulva and the perineum. It provides motor branches to the perineal muscles and the external anal sphincter. The nerve is to be blocked before it divides into its terminal branches (Fig. 20.5).

Fig. 20.5: Pudendal nerves are blocked by pudendal block needles

Precautions

Make sure that there are no known allergies to lignocaine or related drugs. Do not inject into the blood vessel.

How to use?

The aim is to infiltrate about 15–20 ml of this solution around the pudendal nerve as it passes through the lesser sciatic notch

around the ischial spine. The procedure is carried out using sterile technique. The woman lies in the lithotomy position. Paint and drape. In the transvaginal procedure, a special pudendal needle guide or the kobacks needle is inserted in the vagina with the corresponding side index finger of the obstetrician in the vagina advanced towards the medial and posterior of the ischial spine (Figs 20.6 and 20.7).

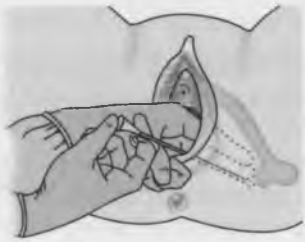


Fig. 20.6: Needle guide is in place on ischial spine

Fig. 20.7: Needle is inserted through needle guide

The needle inserted through this guide pierces the vaginal mucosa and sacrospinous ligament 1 cm medial and behind the ischial spine to get into the exact position. About 10–15 ml of the lignocaine solution is injected. The same procedure is repeated on the other side.

Complications

1. Reactions to local anesthetic agent
2. Accidental injection into pudendal artery or vein
3. Formation of a hematoma from vascular injury
4. Lethal infection can occur from puncture of the rectum or passage of the needle through an infected area.

Nursing Care while using Paracervical Block and Transvaginal Pudendal Block Needle

1. Obtain a 20 to 30 minutes baseline electronic fetal monitoring before inserting the needle.
2. Ensure that necessary emergency equipment is readily available, set up and functioning before the start of the procedure and resuscitation medications.
3. Assist the woman to maintain a sitting or sidelying position with feet supported on a chari or stool; head flexed forward

supported by herself with elbow resting on knees or leaning against the shoulder of a support person.
4. Encourage the use of breathing and relaxation techniques during the procedure.
5. After administration of the medication dose given, facilitate lateral or upright maternal position.
6. Maintain left lateral tilt of the pelvis with a pillow or rolled up blanket.
7. Monitor vital signs.
8. If complications occur, initiate interventions for intrauterine resuscitation and notify the obstetrician and anesthesia care providers.
9. Assess for symptoms of respiratory distress. Notify the anesthesia care provider and administer nalaxone as ordered.

3. SHIRODKAR'S CERCLAGE NEEDLE

Fig. 20.8: Shirodkar's cerclage needle

Other Name

It is also called Shirodkar's uterine sling needle.

Features

This instrument is a stout half circle needle with a subterminal eye and a stout handle set right angles to the needle. The diameter of the needle is 9.5 cm. There are two needles. One is for the right side and the other for the left side. It is a blunt tipped needle with a subterminal eye.

Indications

The needles are employed for cervical cerclage for incompetent os by Shirodkar's method and for cervical ectopic gestation. These needles are also used for Shirodkar's abdominal sling operation for uterine prolapse.

Contraindications

1. Threatened abortion or threatened preterm labour.
2. Placenta in the lower segment.
3. Ruptured membranes.
4. Intrauterine fetal death.
5. Congenital malformations incompatible with life.
6. Intrauterine sepsis.
7. Cervical or vaginal sepsis.
8. Cervical dilatation more than 4 cm and effacement more than 50%.
9. Gestational age more than 32 completed weeks.

Area of insertion

This is specially designed needle for putting stitch around the cervix. The needle is inserted around the cervix through the opening made in vagina.

Prerequisites

Ultrasonography of lower abdomen and pelvis is done. Hanging drop and culture of cervical and/or vaginal discharge if infection is suspected. Gestational age must be more than 12 completed weeks so as to avoid trapping a fetus which is destined to abort in the first trimester due to germ plasm defect.

How to use?

The procedure is carried out under general anesthesia. The procedure is short enough so as not to require a regional block. The woman is placed in lithotomy position. If the cervix is so dilated that the membranes are bulging through it, head low position is given so that the effect of gravity reduces them. The bladder need not to be catheterized, provided the woman has passed urine prior to induction of anesthesia.

The anterior and posterior lips of the cervix are held with sponge holding forceps. Adrenalin in saline is infiltrated into the submucosa of portiovaginalis 2 cm above the external os, to achieve constriction of small vessels and also to create a plane for dissection. A 1 cm long longitudinal incision is made on the mucosa at the junction of the cervix and the vagina posteriorly. Cervical cerclage suture may be passed with the

Shirodkar's needle. However, it is easier to use a half circle, round body 4 cm diameter needle. The suture material used for cerclage, either 5 cm broad mersiline tape or number 2 black braided silk, is threaded on this needle. The needle is passed through the right angle of the anterior incision and then submucosally on the right side of the cervix, to finally emerge in the posterior incision. The suture material is then removed from it and the other end of the suture is threaded into it. The needle is then passed into the left angle of the anterior incision and then submucosally on the left side of the cervix to finally emerge in the posterior incision.

If the membranes are bulging through the cervix, they are kept a saline soaked swab held with a sponge holding forceps. It is withdrawn as the cerclage is tied. At least 4 knots are tied with black silk and 3 with linen sutures through the knot, as it tends to slip. The ends of the sutures are cut 1 cm long. Then the vagina is closed.

Nursing Interventions

- Complete bed rest in a head low position.
- Parenteral administration of a betamimectic agent to prevent contractions due to operation on the cervix.
- Parenteral administration of progesterone to prevent uterine contractions.
- Antiseptic vaginal pessary every night for 7 days and then once a week till the cerclage is cut at the end of 37 weeks.
- Antibiotics are administered for 4 days.
- The woman is discharged from the hospital on the 7th day.
- Instructions are given to report immediately in the event of vaginal bleeding, leaking or abdominal pain, and once a week in absence of these complaints.

Complications

1. Rupture of membranes
2. Hemorrhage
3. Onset of threatened abortion or preterm labor
4. Sepsis
5. Uterine rupture
6. Ischemic necrosis of the cervix
7. Increased rate of cesarean section.

21 List of Instruments for Specific Obstetric and Gynecological Procedures

This chapter lists the instruments, equipment, and materials that should be included, as a minimum, on the surgical trays used for the obstetrics and gynecological nursing procedures. These items must be sterilized before use. For all the procedures, dressings and drugs, apart from local anesthetics, are not included.

Vaginal Examination

Table 21.1: List of instruments used in vaginal examination

S. No.	*List of instruments and equipment*	*Quantity*
1.	A sterile tray containing: Sterile cotton balls	–
2.	Sponge holding forceps	1
3.	Bowl with antiseptic lotion (savlon 1:20)	1
4.	Vaginal Sim's speculum	1
5.	Sterile cream for lubrication in a small bowl	1
6.	Sterile gloves	1 pair
7.	Sterile central hole towel	1

Artificial Rupture of Membranes

Table 21.2: List of instruments used in artificial rupture of membranes

S. No.	*List of instruments and equipment*	*Quantity*
1.	Amniotic membrane perforator: Amniotomy hook such as the amnihook, or an amniotomy finger cot, such as the amnicot	1 pair
2.	Long-toothed dissecting forceps or	1 pair

Contd.

Table 21.2: List of instruments used in artificial rupture of membranes *(Contd.)*

S. No.	*List of instruments and equipment*	*Quantity*
	Allis' tissue forceps	
3.	Antiseptic solution	–
4.	Sterile drapes	1
5.	Sterile gloves	1 pair
6.	Vaginal speculum and spinal needle (if a controlled amniotomy is to be performed)	1
7.	Foley's catheter	1
8.	Distilled water	–
9.	Syringe 2 cc or 5 cc	1
10.	Bowl	1
11.	Spot light or flash light	1
12.	Mask and apron	1

Conduction of Delivery

Table 21.3: List of instruments used in conduction of delivery

S. No.	*List of instruments and equipment*	*Quantity*
1.	**Delivery set** A sterile trolley, sterile gown, which should be covered with a wrapper sheet	–
2.	**A sterile tray contains**	
	Artery clamps	2
	Gauze pieces	4
	Gauze pads	2
	Tampon	1
	Episiotomy scissors	1
	Surgical towel	1
	Cord cutting scissors	1
	Cord clamp	1
	Syringe with needle	1
	Suction catheter	1
3.	**A clean tray containing**	
	Mother clothing includes leggings	2

Contd.

Table 21.3: List of instruments used in conduction of delivery (*Contd.*)

S. No.	*List of instruments and equipment*	*Quantity*
4.	Baby receiving tray with babies cloth	2
5.	Baby resuscitation tray	1
6.	Forceps delivery tray	1
7.	Episiotomy tray	1
8.	Emergency injection tray	1
9.	Catheter tray	1
10.	Tray to receive placenta	1

Episiotomy

Table 21.4: List of instruments used in episiotomy

S. No.	*List of instruments and equipment*	*Quantity*
1.	Episiotomy scissors	1 pair
2.	Small artery forceps	4 pairs
3.	Dissecting forceps—toothed	1 pair
4.	Dissecting forceps—non-toothed	1 pair
5.	Needle holder	1
6.	Sponge forceps	2 pairs
7.	5 ml syringe with needle	1

Episiotomy Suturing

Table 21.5: List of instruments used in episiotomy suturing

S. No.	*List of instruments and equipment*	*Quantity*
1.	Cutting needle (for skin)	1
2.	Round body needle (for muscles)	1
3.	Thumb forceps	1
4.	Suture material 2-0 chromic catgut	1
5.	Kidney tray	1
6.	Antiseptic solution	–
7.	Sterile gloves	1 pair
8.	Local anesthetic agent, e.g. lidocaine 1%	1
9.	Gauze swabs and sterile pad	–
10.	Suction catheters	1
11.	Gallipot	1
12.	Sterile drapes	1

Examination of Placenta

Table 21.6: List of instruments used in examination of placenta

S. No.	*List of instruments and equipment*	*Quantity*
1.	Placental tray to keep placenta	1
2.	Inch tape	1
3.	Weighing scale	1
4.	Kidney tray	1
5.	Gloves	1 pair

Perineal Care after Episiotomy Suturing

Table 21.7: List of instruments used in perineal care after episiotomy suturing

S. No.	*List of instruments and equipment*	*Quantity*
1.	**A sterile tray containing**	
	Artery clamp	1
	Thumb forceps	1
	Big cotton balls	10
	Bowl with 1:20 savlon	1
	Gauze pieces	3
2.	**A clean tray containing**	
	Spirit and betadine	–
	Kidney tray with lining	1
	Draping sheet	1
	Bed pan	1
	Sanitary napkin	1

Newborn Care

Table 21.8: List of instruments used in newborn care

S. No.	*List of instruments and equipment*	*Quantity*
1.	Suction machine	1
2.	Mucous sucker	1
3.	Radiant warmer	1
4.	Cord clamp	1
5.	Sterile cotton balls	–
6.	Sterile cord cutting scissors	1
7.	Measuring tape	1

Contd.

Table 21.8: List of instruments used in newborn care *(Contd.)*

S. No.	*List of instruments and equipment*	*Quantity*
8.	Rectal thermometer	1
9.	Baby cloth	1
10.	Baby sheet	1
11.	Identification tag	1

Neonatal Resuscitation

Table 21.9: List of instruments used in neonatal resuscitation

S. No.	*List of instruments and equipment*	*Quantity*
1.	**Suctioning articles** • Bulb syringe • Mucous trap (10 Fr) or mechanical suction • Suction catheters (6, 8, 10 Fr) • Feeding tube (8 Fr) • 20 ml syringe	1
2.	**Bag and mask articles** • Infant resuscitation bags with pressure releasing valve or pressure gauge with reservoir, capable of delivering 90–100% oxygen • Face masks with cushioned rims (newborn and premature sizes) • Oral airways • Oxygen with flow meter and tubing	1
3.	**Intubation articles** • Laryngoscope with straight blades (no. "0" for premature and no. "1" for newborn) • Extrabulbs and batteries for laryngoscope • Endotracheal tubes, sizes—2.5, 3.0, 3.5 and 4.0 mm internal diameter • Stylet scissors	1

Contd.

Table 21.9: List of instruments used in neonatal resuscitation (*Contd.*)

S. No.	*List of instruments and equipment*	*Quantity*
4.	**Medications**	
	• Epinephrine	1
	• Nalaxone hydrochloride	
	• Volume expander:	
	– 5% albumin solution	
	Normal saline	
	Ringer's lactate	
	• Sodium bicarbonate 4.2%	
	• Dextrose 10% concentration 250 ml	
	• Sterile water 30 ml	
	• Normal saline 30 ml	
5.	**Miscellaneous**	
	• Radiant warmer	1
	• Stethoscope	
	• Adhesive tape and bandage scissors	
	• Syringe 1 ml, 2 ml, 5 ml and 20 ml sizes	
	• Needles no. 21, 22 and 26 G	
	• Umbilical cord clamp	
	• Gloves	
	• Warm dry towels	

Vaginal Packing in Postpartum Hemorrhage

Table 21.10: List of instruments used in vaginal packing in postpartum hemorrhage

S. No.	*List of instruments and equipment*	*Quantity*
1.	Sterile gloves	1 pair
2.	Lubricant	1
3.	Sterile perineum pad or piece of sterile cloth or sterile roller gauze	1
4.	'T' bandage for fixing pad	1
5.	Source of light adjustable or a torch	1
6.	Soap and water	–

Postpartum Fundal Assessment

Table 21.11: List of instruments used in postpartum fundal assessment

S. No.	*List of instruments and equipment*	*Quantity*
1.	Gloves	1 pair
2.	Analgesics	–
3.	Perineal pad	1
4.	Urinary catheter (optional)	1

Newborn Assessment

Table 21.12: List of instruments used in newborn assessment

S. No.	*List of instruments and equipment*	*Quantity*
1.	Grib or examination table with a firm surface	1
2.	Scale with tray	1
3.	Scale paper if necessary	1
4.	Tape measure	1
5.	Length board	1
6.	Gloves	1 pair

Breast Pumping

Table 21.13: List of instruments used in breast pumping

S. No.	*List of instruments and equipment*	*Quantity*
1.	Manual or electric breast pump	1
2.	Sterile collection bag or bottle to store milk if desired	1
3.	Warm compresses and pillows (optional)	–

Vaginal Irrigation or Vaginal Douche

Table 21.14: List of instruments used in vaginal irrigation or vaginal douche

S. No.	*List of instruments and equipment*	*Quantity*
1.	Douche can with rubber tubing and clamp	1
2.	A douche nozzle in a sterile tray	1
3.	Sterile cotton in sterile container	1
4.	Sponge holding forceps	1
5.	Enema stand	1

Contd.

Table 21.14: List of instruments used in vaginal irrigation or vaginal douche *(Contd.)*

S. No.	*List of instruments and equipment*	*Quantity*
6.	Lotion thermometer	1
7.	Pint measuring jug	1
8.	Solutions (can use any one of the desired solution): • Plain sterile water 1½ to 2 L • Dettol 1:60 • Savlon 1:1000 • Potassium permanganate 1:5000 • Soda bicarbonate 1% to 2% • Normal saline • Lysol 1/2 to 1% • Iodine solution 1 cc in 100 cc of sterile water • Acetic acid or table vinegar 1 cup in 1 L of sterile water • Bichloride of mercury 1 in 4000 cc of water	–
9.	Bed pan	1
10.	Mackintosh	1
11.	Kidney tray	1

Cesarean Section

Table 21.15: List of instruments used in cesarean section

S. No.	*List of instruments and equipment*	*Quantity*
1.	Add the following to the tray for laparotomy – Uterine hemostasis forceps (Green-Armytage)	8 pairs
2.	Obstetric forceps	2 pairs (1 low, 1 mid-cavity)
3.	Vaginal speculum	1
4.	Suction catheters	–

Insertion of Intrauterine Contraceptive Device (IUCD)

Table 21.16: List of instruments used in insertion of IUCD

S. No.	*List of instruments and equipment*	*Quantity*
1.	IUCD pre-sterilized insertion packages	1
2.	**Sterile tray containing** Cuscos' speculum	1

Contd.

Table 21.16: List of instruments used in insertion of IUCD (*Contd.*)

S. No.	*List of instruments and equipment*	*Quantity*
	Vulsellum	1
	Uterine sound	1
	Sponge holding forceps	2
3.	Bowl containing swab and cotton	1
4.	Sterile gloves	2 pairs
5.	Scissors	1
6.	Disinfectant lotion	–
7.	Bucket for disposing waste material	1

Pap Smear Collection

Table 21.17: List of instruments used in pap smear collection

S. No.	*List of instruments and equipment*	*Quantity*
1.	Glass slide	1
2.	Sterile Ayre's spatula	1
3.	Cuscos' speculum	1
4.	Pipette	1
5.	A sterile cotton swab	1
6.	Sterile gloves	1
7.	Ether or 95% alcohol solution (1:1)	–
8.	Spray fixative	–
9.	A graphite pencil	1
10.	Light source	–
11.	K-Y jelly	1

Non-stress Test (NST)

Table 21.18: List of instruments used in non-stress test

S. No.	*List of instruments and equipment*	*Quantity*
1.	Electronic fetal heart monitor	1
2.	Ultrasound transducer	1
3.	Tocotransducer (tocodynamometer)	1
4.	Monitor strip	1
5.	Ultrasound gel	1
6.	Belts to hold the transducers in place	–

Oxytocin Challenge Test (OCT)

Table 21.19: List of instruments used in oxytocin challenge test

S. No.	*List of instruments and equipment*	*Quantity*
1.	Electronic fetal heart monitor	1
2.	Ultrasound transducer	1
3.	Tocotransducer (tocodynamometer)	1
4.	Monitor strip	1
5.	Ultrasound gel	1
6.	Belts to hold the transducers in place	1
7.	IV line to administer a dilute dose of oxytocin	1
8.	IV infusion pump to monitor the flow rate	1
9.	Medication and IV fluids	–

Internal Fetal Monitoring

Table 21.20: List of instruments used in internal fetal monitoring

S. No.	*List of instruments and equipment*	*Quantity*
1.	Electronic fetal monitor	1
2.	Spiral electrode and a drive tube	1
3.	Disposable leg plate pad or reusable leg plate with belt	1
4.	Conduction gel	1
5.	Antiseptic solution	–
6.	Hypoallergenic tape	1
7.	Sterile gloves	2 pair
8.	Intrauterine catheter connection cable and pressure sensitive catheter	1
9.	Graph paper	1

Amniocentesis

Table 21.21: List of instruments used in amniocentesis

S. No.	*List of instruments and equipment*	*Quantity*
1.	Temperature, pulse, and respiration tray	1
2.	Stethoscope	1
3.	Sterile gloves	1
4.	Dressing tray	1

Contd.

Table 21.21: List of instruments used in amniocentesis *(Contd.)*

S. No.	*List of instruments and equipment*	*Quantity*
5.	Sterile towels	4
6.	1% Lignocaine	1
7.	Disposable syringes 5 ml and 20 ml	1
8.	Cotton swabs	1
9.	Antiseptic solution	–
10.	Sterile bottles	2
11.	20–22 gauze spinal needle of 4 inch length with stillete	1
12.	Adhesive plaster	1

Urine Testing for Sugar and Acetic Acid

Table 21.22: List of instruments used in urine testing for sugar and acetic acid

S. No.	*List of instruments and equipment*	*Quantity*
1.	Test tube	1
2.	Test tube stand	1
3.	Test tube holder	1
4.	Spirit lamp	1
5.	Match box	1
6.	Acetic acid	–
7.	Benedict's qualitative reagent solution	–
8.	Fresh urine sample	–

Amnioinfusion

Table 21.23: List of instruments used in amnioinfusion

S. No.	*List of instruments and equipment*	*Quantity*
1.	Intrauterine pressure catheter (IUPC) and transducer cable	1
2.	Normal saline solution (0.9%)	–
3.	IV tubing	1
4.	Extension tubing (optional)	1
5.	Sterile gloves	1 pair
6.	Waterproof under pads	1

Cervical Cauterization

Table 21.24: List of instruments used in cervical cauterization

S. No.	*List of instruments and equipment*	*Quantity*
1.	Diathermy electrode	–
2.	Vaginal speculum	1
3.	Retractor for anterior vaginal wall	1
4.	Vulsellum forceps	1 pair
5.	Antiseptic solution	–
6.	Gauze swabs	–
7.	Kidney dish	1
8.	Gallipot	1
9.	Sterile drapes	2
10.	Sterile gloves	1 pair

Dilatation and Curettage

Table 21.25: List of instruments used in dilatation and curettage

S. No.	*List of instruments and equipment*	*Quantity*
1.	Vaginal speculum	1
2.	Vulsellum forceps	1 pair
3.	Uterine sound	1
4.	Uterine dilators	6 (one set)
5.	Uterine curette	1 (at least)
6.	Sponge forceps	2 pairs
7.	Retractor for anterior vaginal wall	1 (at least)
8.	Gauze swabs and vaginal pad	1
9.	Antiseptic solution	–
10.	Kidney dish	1
11.	Gallipot	1
12.	Sterile drapes	2
13.	Sterile gloves	1 pair

Laparotomy

Table 21.26: List of instruments used in laparotomy

S. No.	*List of instruments and equipment*	*Quantity*
1.	Curved dissecting scissors	1 pair
2.	Scalpel handle and blade	1

Contd.

Table 21.26: List of instruments used in laparotomy (*Contd.*)

S. No.	*List of instruments and equipment*	*Quantity*
3.	Short dissecting scissors	1 pair
4.	Long dissecting scissors	1 pair
5.	Stitch scissors	1 pair
6.	Small, curved artery forceps	6 pairs
7.	Small, straight artery forceps	6 pairs
8.	Large, curved artery forceps	6 pairs
9.	Large, straight artery forceps	6 pairs
10.	Needle holder–long	1
11.	Needle holder–short	1
12.	Retractors (Langenbeck)	medium, 1; narrow, 1
13.	Retractors (Deaver)	medium, 1; narrow, 1
14.	Self-retaining retractor	1
15.	Dissecting forceps, toothed	1 pair
16.	Long dissecting forceps, non-toothed	1 pair
17.	Tissue forceps (Allis')	2 pairs
18.	Tissue forceps (Duval)	2 pairs
19.	Tissue forceps (Babcock)	2 pairs
20.	Sponge forceps	4 pairs
21.	Malleable copper retractors (spatulae)	2
22.	Occlusion clamps	straight, 2; curved, 2
23.	Crushing clamps	large, 2; small, 2
24.	Syringe, 10 ml with needle	1
25.	Syringe, 20 ml with needle	1
26.	Sutures, no. 1, 0, and 2/0 chromic catgut and 2/0 plain catgut, ties and with needles	–
27.	Sutures, no. 1, 0, 2/0, and 3/0 thread, ties and with needles	–
28.	Sutures, no. 1, 0, and 2/0 nylon, ties and with needles	–
29.	Suction nozzle and diathermy electrode	1
30.	Sterile gloves	at least 3 pairs
31.	Flexible probe, with round point	1
32.	Grooved director	1
33.	Nasogastric tube	1
34.	Towel clips	6

Contd.

Table 21.26: List of instruments used in laparotomy (*Contd...*)

S. No.	*List of instruments and equipment*	*Quantity*
35.	Abdominal packs	5
36.	Kidney dishes	2
37.	Gallipots	2
38.	Linen tape, sterile drapes and gauze swabs	–
39.	Stainless-steel bowls	2
40.	Dissecting gauze rolls	–
41.	Antiseptic solution and adhesive tape	10
42.	Tubing for tension sutures and drainage tubes	1
43.	Safety pin	1
44.	Colostomy bags	optional

Tubectomy

Table 21.27: List of instruments used in tubectomy

S. No.	*List of instruments and equipment*	*Quantity*
1.	Sponge forceps	4 pairs
2.	Scalpel handle with blade	1
3.	Small curved artery forceps	3 pairs
4.	Small straight artery forceps	3 pairs
5.	Large straight artery forceps	2 pairs
6.	Large curved artery forceps	2 pairs
7.	Dissecting scissors	1 pair
8.	Stitch scissors	1 pair
9.	Needle holder	1
10.	Dissecting forceps–toothed	1 pair
11.	Dissecting forceps–non-toothed	1 pair
12.	Retractors (Langenbeck)	narrow, 2
13.	Tissue forceps (Allis')	2 pairs
14.	Suction nozzle	1
15.	Diathermy electrode	1
16.	Sutures, 0 and 2/0 thread, ties and with needles	1
17.	Sutures, 0 and 2/0 chromic catgut, ties and with needles	1
18.	Sutures, no. 1 nylon, ties and with needles	1
19.	Kidney dishes	2
20.	Gallipots	2
21.	Linen tape, 1 piece, 20–30 cm long	1

Contd.

Table 21.27: List of instruments used in tubectomy *(Contd.)*

S. No.	*List of instruments and equipment*	*Quantity*
22.	Gauze swabs	–
23.	Antiseptic solution	1
24.	Sterile drapes	2
25.	Sterile gloves	1 pair

Vulval Biopsy

Table 21.28: List of instruments used in valvula biopsy

S. No.	*List of instruments and equipment*	*Quantity*
1.	Scalpel handle with blade	1
2.	Small artery forceps	4 pairs
3.	Needle holder	1
4.	Tissue forceps (Allis)	2 pairs
5.	Small dissecting forceps–toothed	1 pair
6.	Small dissecting forceps–non-toothed	1 pair
7.	Stitch scissors	1 pair
8.	Sutures, 2/0 chromic catgut, ties and with needles	1
9.	Sutures, 2/0 thread, ties and with needles	1
10.	Syringe 5 ml with needle	1
11.	Lignocaine 1%	–
12.	Antiseptic solution	–
13.	Gauze swabs	–
14.	Gallipot	1
15.	Kidney dish	1
16.	Sterile drapes	2
17.	Sterile gloves	at least 1 pair

Endometrial Biopsy

Table 21.29: List of instruments used in endometrial biopsy

S. No.	*List of instruments and equipment*	*Quantity*
1.	**A sterile tray** Place the following items on a sterile drape covering the Mayo stand with the following items placed on the top: Sterile vaginal speculum	1 1

Contd.

Table 21.29: List of instruments used in endometrial biopsy *(Contd.)*

S. No.	*List of instruments and equipment*	*Quantity*
	Sterile gloves	1
	Uterine sound	1
	Sterile metal basin containing sterile cotton balls soaked in povidone-iodine solution	1
	Endometrial suction catheter	1
	Cervical tenaculum	1
	Ring forceps (for wiping the cervix with the cotton balls)	1
	Sterile 4 × 4 gauze (to wipe off gloves or equipment)	–
2.	**Non-sterile tray for examination of uterine position**	
	Non-sterile gloves	1
	Lubricating jelly	1
	Absorbent pad	1
	Formalin container (for endometrial sample) with the patient's name and the date recorded on the label	1
	20 percent benzocaine (hurricane) spray with the extended application nozzle	1
	Sterile scissors	1
	Keep sterile cervical dilators available, but do not open the sterile packaging unless the dilators are needed	1

Craniotomy

Table 21.30: List of instruments used in craniotomy

S. No.	*List of instruments and equipment*	*Quantity*
1.	Sims vaginal speculum	1
2.	Anterior vaginal wall retractor	1
3.	Simpson's perforator	1
4.	Budin's double channel catheter	1
5.	Craniotomy forceps	1
6.	Nibbling forceps	1
7.	Crotchet	1
8.	Rubber catheter	1

Decapitation

Table 21.31: List of instruments used in decapitation

Sl. No.	*List of instruments and equipment*	*Quantity*
1.	Decapitation knife	1
2.	Decapitation saw	1
3.	Braun's hook	1
4.	Blond-Heilder's wire saw	1
5.	Dubor's scissors or strong silk string	1
6.	Bone nibbling forceps	1
7.	Crotchet	1
8.	Obstetric forceps	1
9.	Cranioclast	1
10.	Rubber catheter	1

Cleidotomy

Table 21.32: List of instruments used in cleidotomy

S. No.	*List of instruments and equipment*	*Quantity*
1.	Embryotomy scissors	1

Evisceration

Table 21.33: List of instruments used in evisceration

S. No.	*List of instruments and equipment*	*Quantity*
1.	Dubor's scissors	1
2.	Long-handled ovum or placenta forceps	1

Index

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It contains a coherent and comprehensive description of instruments related to obstetric and gynecological nursing. The description is well supported by neat illustrations of the instruments. All the chapters have been defined and explained.

Written in a simple language and lucid style, it covers almost all the instruments in the field of obstetric and gynecological nursing. This will help in imparting more knowledge to auxiliary nurse midwives as well as the students of undergraduate and postgraduate courses in nursing.

M. Santhoshkumari Jai Chandroo

MSc (nursing), MSc (psychology), PGDHM

is currently Lecturer in Nursing, RAAK Nursing and Paramedical College, Puducherry, India.

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CBS Publishers & Distributors Pvt Ltd

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