Manual on HYSTEROSCOPY

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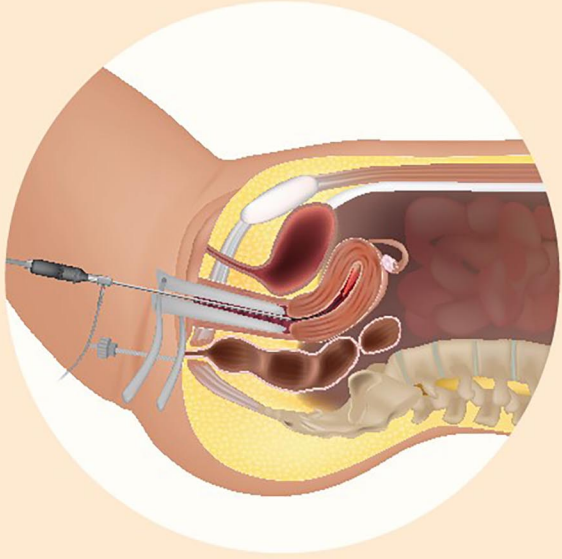

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CHAPTER 1

Instrumentation in Hysteroscopy

Deepika Dewani

Hysteroscopy is a procedure which is both diagnostic and operative. The various operative procedures which are done by hysteroscopic approach include excision of uterine polyp, submucous myoma excision, resection of uterine septum, tubal sterilization.[1]

INTRODUCTION TO HYSTEROSCOPIC INSTRUMENTATION

The success and safety of hysteroscopy heavily depend on the appropriate selection and use of specialized instruments.[2]

KEY COMPONENTS[3]

1. Sheaths
2. Endovision system (Telescope, Camera, Light source)
3. Electrosurgical instruments, cold instruments

SHEATHS

The telescope is fitted with a sheath so as to enable the infusion of distension media into the uterine cavity for panoramic viewing.

Types of Hysteroscopic Sheaths

Diagnostic

The diameter of the diagnostic sheath is 4–5 mm with approx. 1 mm clearance between the sheath and the telescope. A 5-mm instrument is usually easily passed through the endocervical canal and beyond the internal os with doing any cervical dilatation **(Fig. 1)**.

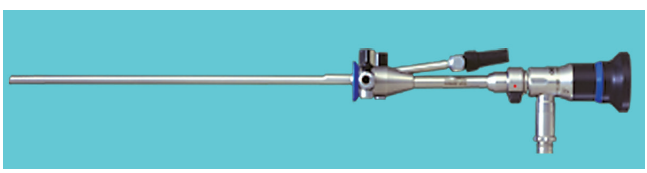


Fig. 1: A 3-mm telescope system.

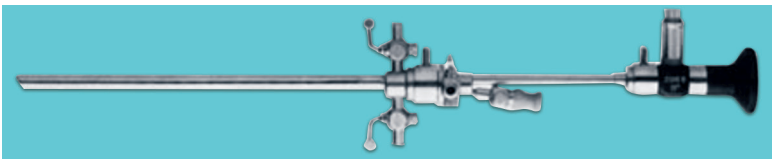


Fig. 2: Assembled operative hysteroscope.

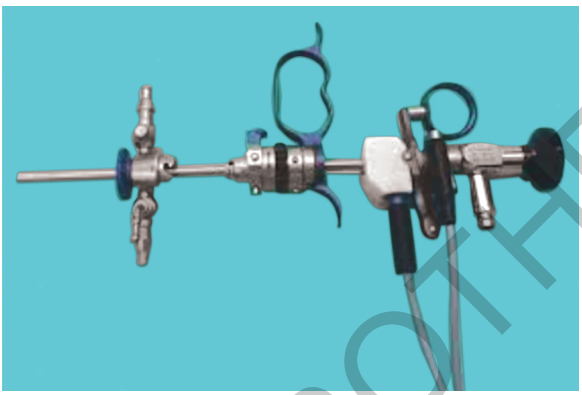


Fig. 3: Assembled resectoscope (coupled to a 30° telescope).

Operative

The diameter of operative sheaths is from 7 to 10 mm and there is space for insertion of operating device and inflow for distension medium. There is a rubber gasket which is used to seal the operating channel thereby preventing the leak of distension media. The newly developed sheath has a resectoscope along with the operative hysteroscope **(Fig. 2)**.

Resectoscope:

- It is an electrosurgical endoscope.
- It has an outer and inner sheath and allows usage of both monopolar and bipolar electrode devices.
- It comes with a 30° telescope.
- Diameter of an outer sheath is 8 mm or more hence, dilatation of cervix is required **(Fig. 3)**.

PARTS OF ENDOVISION SYSTEM

Telescope

There are three parts to a telescope, namely objective lens, the barrel and the eye piece. The sharpest, clearest image is obtained by a 4-mm telescope, and it also has a small outer diameter. There is a variation in viewing angle of telescopes. The telescope could be a 0° and therefore has a straight on view or a 30° telescope which has a fore oblique view and is commonly used **(Fig. 4)**.[4]

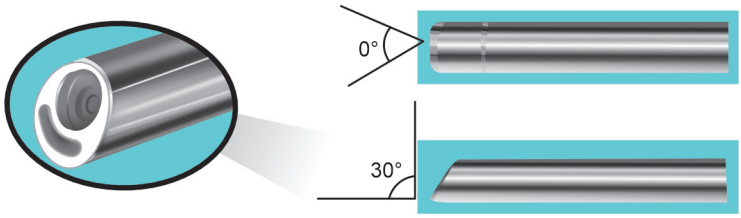


Fig. 4: 0° or 30° telescope.

Camera

There are various camera systems available which vary in sensitivity (Lux), resolution, the quality of the reproduction/video images. Now with improvisation in the technology, there is availability of high-definition cameras which have high resolution as well as natural color reproduction.[5]

Light Source

Parts of Light Source

Lamp/bulb: For light emission

Condensing lens: For vision

Fan: For reducing the temperature of light

Types of Light Source

- *Halogen:* It gives yellow colored light, produces more heat.
- *Xenon:* It consists of quartz glass. It gives better tissue differentiation.
- *LED:* It provides cold light, light intensity equivalent to xenon, lower power consumption, advanced technology, average life >50000 hours.

Light Cable

Working principle: Total multiple internal reflections

Light cable: They are of two types:

1. *Fiberoptic cable **(Fig. 5)**:*
   Fiber size: 10–25 mm diameter
   - Made up of a bundle of optical fiber glass thread.
   - They are fragile with good quality transmission.
   - Maintenance is easier.
2. *Liquid crystal gel cable:*
   - Made up of liquid crystal or clear optical gel.
   - Transmits approx. 30% more light than optic cable.
   - They have more transmission of heat than fiber optic cable.

Fig. 5: Fiberoptic cable.

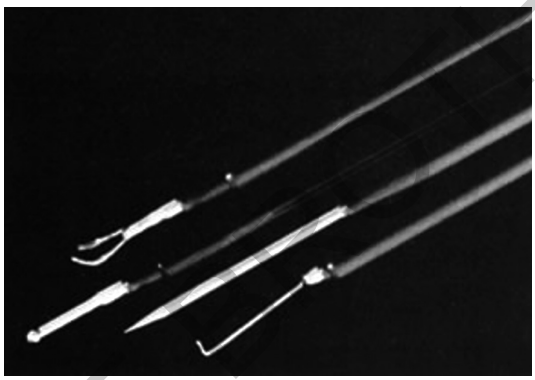


Fig. 6: *Electrodes (top to bottom):* Loop electrode, ball electrode, needle, and hook electrode.

ACCESSORY INSTRUMENTS

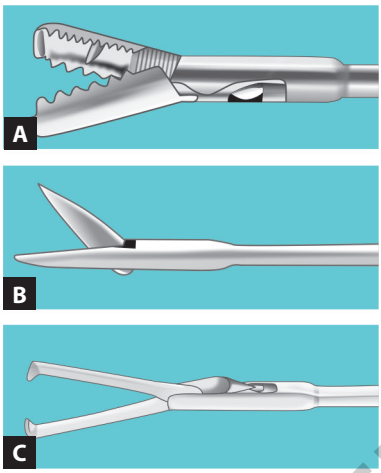
- *They are of two types:* Semirigid and flexible
- The semirigid instruments are small in size, hence fragile and prone to breakage, whereas flexible devices are less prone to breakage.
- They are with a diameter of 2–3 mm.
- *They include the following:* Electrosurgical electrodes, scissors, biopsy forceps, and grasping forceps **(Figs. 6 and 7)**.[6]

Hand Instruments

Figures 7A to C shows the hand instruments, e.g., biopsy/grasping forceps, pointed scissors, and tenaculum.

FLUID MANAGEMENT SYSTEMS/IRRIGATION SYSTEMS (FIG. 8)

- *Gravity fall of liquid*: The bag is suspended at a suitable height (90–100 cm from the patient's perineum is sufficient to obtain an irrigation pressure of approx. 70 mm Hg).



Figs. 7A to C: (A) Biopsy/grasping forceps; (B) Pointed scissors; (C) Tenaculum.

Fig. 8: Fluid management system.

- *Pressure cuff:* The pressure is obtained by inflating the pressure cuff and must be kept at around 80 mm Hg by an assistant.
- *Electronic suction and irrigation pump:* It has set values parameters like flow rate, irrigation pressure, suction pressure. This device enables controlling the flow rate as well as monitoring as well as adjustment of the preset volumetric difference between the in- and outflow irrigation liquid.[7]

MAINTENANCE AND STERILIZATION OF INSTRUMENTS

- Cleaning of telescopes and lenses should be done with utmost care.

- Warm water is used for washing and there after the endoscope must be cleaned with cotton pledgets.
- Special disinfectants should be used to clean the fiber optic cables and later while storage the optic cables should always be arranged in large loops.
- Instruments like scissors and biopsy forceps should be first cleaned, rinsed under water and after drying should be lubricated.
- Endoscopes when undergo sterilization by autoclaving should be placed in a perforated metal container.
- Ethylene oxide gas is the ideal system for sterilization as it works on low hence minimal damage to the instruments.[8]

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