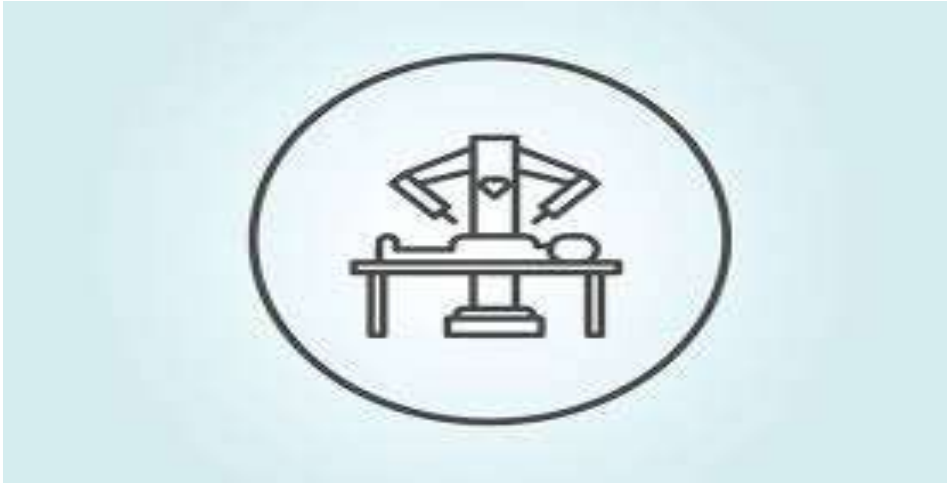
Essentials of Laparoscopic Instruments: What a Gynecologist Must Know

Dr. Shakuntla Kumar

Importance of laparoscopy in gynecology

- Minimally invasive → faster recovery, less pain, better outcomes
- Need for proper understanding of instruments

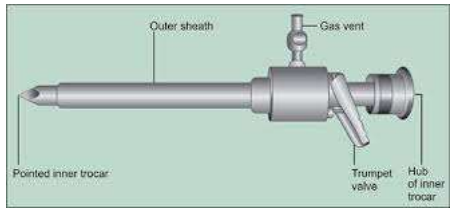


Basic Categories of Instruments

- Access Instruments
- Visualization Instruments
- Operating Instruments
- Energy Devices
- Ancillary Instruments

Access Instruments

- **Veress needle** – for pneumoperitoneum
- **Trocars & Cannulas** – 5mm, 10mm, 12mm
- Hasson technique (open entry)
  (Visual: Veress needle & trocars)



Care of Veress Needle

1. Before Use

- Inspect for **sharpness of the tip** and **smoothness of the spring-loaded blunt stylet**.
- Ensure the **spring mechanism is working**: when pressed, it should move freely and return instantly.
- Check the **lumen** for any blockage (pass saline/air through if needed).
- Verify the **locking mechanism** is intact.

2. During Use

- Hold correctly (like a dart) for controlled insertion.
- Avoid excessive force to prevent bending/damage.
- Confirm correct placement by aspiration, saline drop test, or pressure monitoring.

Veress Needle

3. After Use

- Immediately flush the lumen with sterile water or saline to prevent blood/tissue from drying.
- Gently clean the tip; avoid scrubbing with abrasive material.

4. Sterilization

- Prefer **autoclaving** (check manufacturer's instructions).
- Ensure complete drying before storage to avoid corrosion.
- Avoid chemical sterilants that may damage the spring.

5. Storage

- Store in a **protective case** to prevent bending or tip damage.
- Keep the spring mechanism lubricated (if recommended) with medical-grade lubricant.
- Do not store with heavy instruments on top.

6. Regular Maintenance

- Periodically test the **spring recoil**. If it's sluggish or stuck → replace.
- Replace if the tip is **blunt, bent, or broken**.
- Keep a **logbook of sterilization cycles** and servicing.

Trocars & Cannula

Pre-use Care

- Inspect trocar and cannula for **sharpness, damage, or cracks**.
- Ensure the **valves, seals, and obturator tips** are intact.
- Lubricate seals lightly (if recommended by manufacturer).

During Use

- Insert gently, avoiding **excessive force**.
- Keep the **optical trocar lens clear** of blood or fat.
- Avoid bending or twisting the shaft excessively.

Post-use Cleaning

- Disassemble the trocar (obturator, cannula, valves, seals).
- Rinse immediately with **warm water** to prevent blood/tissue drying.
- Use a **soft brush** for cleaning channels and seals.
- Flush with detergent solution to remove debris.

Trocars & Cannula

Disinfection & Sterilization

- Follow manufacturer’s instructions for autoclaving or low-temperature sterilization.
- Replace damaged or worn-out **seals, valves, and gaskets**.

Storage

- Store in a **dry, padded tray** to prevent damage.
- Keep sharp tips protected with covers.
- Avoid stacking with other instruments.

Visualization Instruments

- **Telescopes (laparoscopes)** – 0°, 30°
- Camera system
- Light source & fiber-optic cable
  (Visual: rigid laparoscope image)

Care of Telescope

- **Before Use**
- Inspect for **scratches, cracks, or dents** on the lens and sheath.
- Ensure the telescope is **clean, dry, and fog-free**.
- Use an **anti-fog solution** or warm saline to prevent fogging during surgery.
- Check **light transmission** and fiber optic cable connection.

During Use

- Handle gently; always hold by the **shaft**, not the eyepiece or tip.
- Avoid **contact of the distal lens with instruments, tissue, or trocar**.
- Prevent accidental bending or dropping.
- Keep the **light source intensity low initially**, then increase—prevents overheating and damage.

After Use

- Disconnect **light cable before turning off light source** to prevent heat damage.
- Rinse immediately in **distilled water** to remove blood/tissue residues.
- Avoid harsh brushing or abrasive cleaning.
- Use only **neutral pH enzymatic detergents**.

Sterilization

- Prefer **ETO or plasma sterilization** (cold methods).
- If using autoclaving, ensure the telescope is **autoclavable**.
- Dry thoroughly before storage to prevent fogging/corrosion.

Operating Instruments (Grasping & Dissecting)

- Graspers: atraumatic vs traumatic
- Scissors
- Dissectors (Maryland, Dolphin)
  (Visual: laparoscopic scissors & graspers)

Pre-Use Care

- **Inspection:** Check jaws, tips, insulation, and working mechanism before every use.
- **Functionality test:** Open–close movement should be smooth; no loose joints.
- **Insulation check:** No cracks in the shaft insulation (prevents diathermy burns).
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Cleaning Immediately After Use

- **Rinse promptly:** Flush with sterile/distilled water to prevent blood/tissue from drying.
- **Disassembly:** If instrument is dismantlable, open/remove jaws and handles for cleaning.
- **Soaking:** Use enzymatic detergent (neutral pH) – avoid corrosive agents.
- **Brushing:** Clean the jaws, hinges, and lumens with soft brushes. Avoid metal brushes.

Sterilization

- **Autoclaving:** Most hand instruments are autoclavable (check manufacturer’s guide).
- **Dry thoroughly before sterilization** to prevent rusting.
- **Keep jaws open** during autoclaving to ensure proper steam penetration.
- **Low-temperature methods** (ETO, plasma sterilization) may be needed for delicate instruments.

Handling & Storage

- **Do not mix** delicate scissors with heavy instruments (to prevent damage to cutting edges).
- **Store in instrument trays** with silicone holders to prevent bending/tip breakage.
- **Keep separate trays** for insulated instruments to avoid insulation cracks.
- **Lubrication:** Use instrument milk or water-based lubricants for joints after cleaning.
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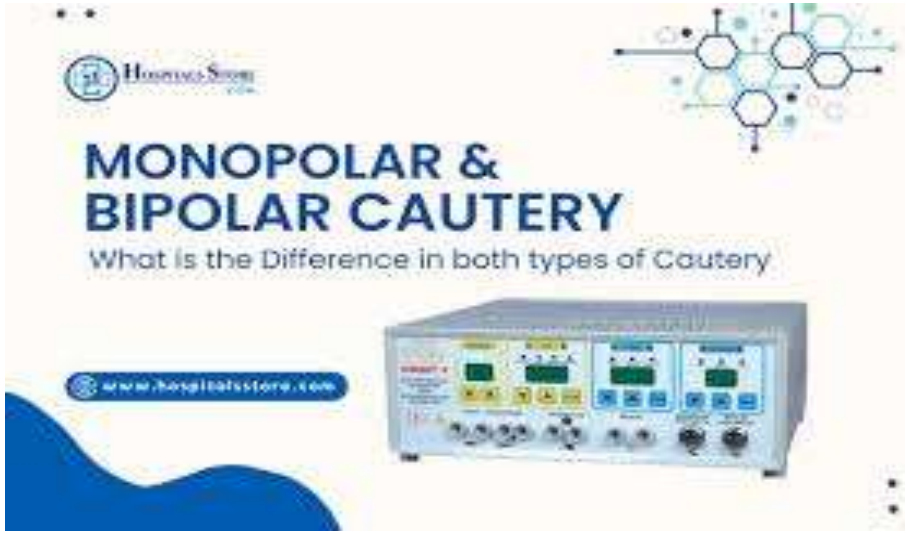
Special Precautions

- **Scissors:** Never use for anything except tissue cutting (not sutures, drains, or gauze).
- **Graspers/Dissectors:** Avoid excessive force; tips can bend easily.
- **Electrosurgical instruments:** Always check insulation integrity before use.

Energy Devices

- **Monopolar cautery**
- **Bipolar cautery**
- **Advanced devices** – Harmonic scalpel, LigaSure
- Pros & cons
  (Visual: energy sources comparison)



General Precautions (common to all)

- Handle with care; these are **delicate, high-cost instruments**.
- Avoid **excessive bending, twisting, or dropping**.
- Always **disconnect from power source** before cleaning.
- Do not immerse the **handpieces** (especially with electronic components) in fluids.

Care of Cautery

- **Check insulation** before each use (to avoid stray current burns).
- Clean tips immediately after use to prevent carbonization.
- Use only **recommended cleaning brushes**; avoid metal brushes.
- Store in protective trays to prevent damage to insulation.

Care of Ligasure

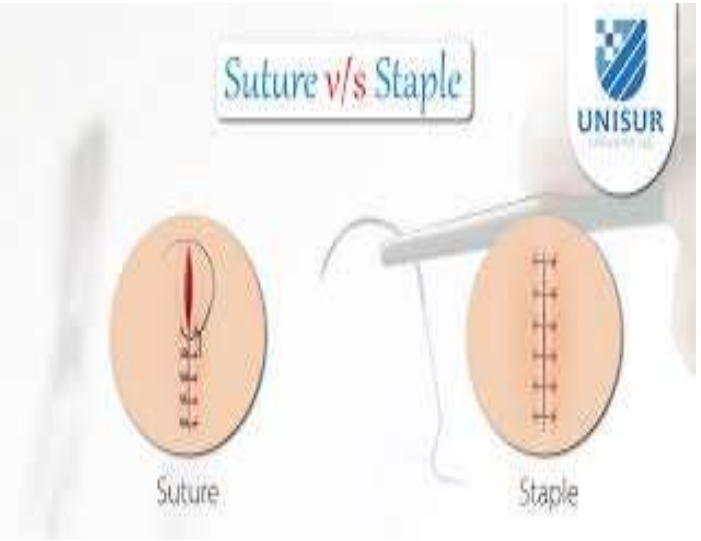
- **Handpiece is reusable**, but vessel-sealing electrodes may be single-use depending on model.
- Wipe off blood/tissue debris with moist (not dripping wet) gauze.
- Flush lumen (if applicable) with sterile water using cleaning adapters.
- Never use harsh detergents or ultrasonic cleaners on the **electronic handle**.
- Ensure proper sterilization as per manufacturer (usually **autoclave** for reusable handpiece).

Care of Harmonic Scalpel

- **Do not bend or scratch the blade**; it damages vibration efficiency.
- Clean immediately after surgery—wipe with wet gauze to prevent sticking of tissue.
- Use **non-abrasive detergent** and soft brush for shaft cleaning.
- Handpiece is delicate; avoid dropping or kinking the cable.
- Follow sterilization guidelines:
  - Handpiece: usually **autoclavable**.
  - Generator cords: **not autoclavable**; clean with disinfectant wipes.

Suturing & Stapling Instruments

- Needle holders (laparoscopic)
- Knot pushers
- Endoscopic staplers
  (Visual: laparoscopic suturing set)



General Principles

- Handle all instruments gently to prevent damage to jaws, needle holders, and stapler mechanisms.
- Follow manufacturer’s cleaning guidelines, especially for staplers (disposable vs. reusable).

Suturing Instruments (Needle Holders, Suturing Devices)

- **Cleaning & Decontamination**
- Immediately after use, rinse in sterile water to prevent blood/tissue drying.
- Use enzymatic detergents and soft brushes to clean serrations and joints.
- Ultrasonic cleaning can be used for thorough decontamination.

Sterilization

Maintenance

- Autoclave at recommended cycle (usually 121–134°C).
- Ensure instruments are completely dry before sterilization to avoid corrosion.
- Regularly check jaws for wear or misalignment.
- Lubricate joints with water-based lubricants (not oil-based, as they affect sterilization).
- Discard or repair if jaws slip or cannot hold a needle properly.

Stapling Instruments (Linear Staplers, Circular Staplers, Skin Staplers, Clip Appliers)

- **Disposable Staplers**
- Single-use only; discard in sharps container after use.
- **Reusable Staplers/Clip Appliers**
- Disassemble (if applicable) before cleaning.
- Clean thoroughly with brushes and flushing systems to remove tissue/blood clots from the cartridge area.
- Ultrasonic cleaning is preferable for fine parts.
- Dry thoroughly before sterilization.

Sterilization

Maintenance

Storage

- Autoclave at recommended settings.
- Avoid exposure to corrosive cleaning agents.
- Inspect staple cartridge areas and firing mechanisms for damage or incomplete closure.
- Test before surgery to ensure smooth functioning.
- Replace worn-out parts as per manufacturer’s instructions.
- Store in clean, dry instrument trays with silicone holders to prevent tip damage.
- Keep needle holders and staplers separate from delicate instruments (like laparoscopes).

Suction & Irrigation Devices

- Dual-purpose suction–irrigation cannula
- Importance in bleeding & visibility
  (Visual: suction irrigation set)

Ancillary Instruments

- Uterine manipulator
- Morcellator
- Retrieval bags
- Clip applicators
  (Visual: manipulator + morcellator)

Instrument Care & Maintenance

- Proper cleaning & sterilization
- Avoiding damage to optics & insulation
- Regular maintenance checks

Safety Considerations

- Insulation failure → risk of burns
- Safe entry techniques
- Energy source safety

Common Instrument Set for Gynecology

- Standard 10mm scope
- 2 × 5mm trocars + 1 × 10mm trocar
- Grasper, scissors, dissector, suction–irrigation, bipolar, needle holder

Conclusion

- Correct instrument use → safe & efficient surgery
- Knowledge = fewer complications
- Continuous skill update is essential