

# Endoscopy Instruments

## Their Role in Delivering Optimal Patient Care

By Jane Shrubbs, R.N.

It is imperative to have available proper, functioning, sterile instruments for surgical procedures to decrease the opportunity for intra and post operative patient complications:

- Maintain patient safety,
- Decrease time patient is under anaesthesia, and
- Achieve a zero infection rate.

Perioperative nurses should know as much as possible about surgical instruments and equipment so as to identify the preparation requirements and to analyze the impact of the related work load and activities. Consider the following guidelines to greater efficiency.

- Organize preparation requirements to allow more flexibility in scheduling surgical procedures.
  - Address special individual patient care needs.
  - Be aware of compatible options and substitutes with instruments to decrease instrument down time.
  - Be able to trouble shoot incidents as they occur.
  - Assess what are reasonable inventory levels of instruments and equipment to accomplish the institutions' case volume.
  - Decrease operational expenses and prolong utilization (life span) of the instruments.
  - Establish effective and efficient instrument care and maintenance routines and processes.
  - Proactively schedule periodic preventative maintenance programs to decrease repair cost and instrument down time.
- Become familiar with the recommended practices, patient and technical standards, regulations and guide-

lines and incorporate them into the various operational activities (these aspects should also be reflected in the information distributed by the manufacturer/supplier). Standards and guidelines should include:

- Perioperative Patient Care Standards
- Universal Precautions
- Sterilization Standards
- Aeration Standards and Guidelines
- Recommended Practices for Disinfection
- Endoscopes - Recommended Practices (Rigid and Flexible)
- Electro-Surgical - Recommended Practices
- Employee Health and Safety Standards

Keep abreast and informed on clinical and operational issues concerning instrumentation and compare present practices and activities for consistency.

#### Inservice:

Inservice should include auxiliary and resource staff as well as the staff directly involved.

#### Network:

Network within the hospital, with support services and related departments to ensure consistent patient

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care throughout the hospital, i.e. Surgical Day Care, Labor and Delivery, Endoscopy Clinic, Materials Management Supply and Processing Department, Respiratory and Biomedical Resource Department.

Network outside the hospital with perioperative nursing peers and other professionals and technicians in related health care specialties, i.e. Local, Provincial, and National (O.R./SPD) Associations. Attend conferences/seminars whenever possible.

#### Subscribe to Educational Publications:

Subscribe to a variety of related professional journals, for example, *the Canadian Operating Room Nurses Journal*, *the American Operating Room Nurses Journal*, *O.R. Manager*, *O.R. Reports*, *ECRI Bulletins*, *Medical Alert Resources*, *Biomedical Journals*, and the *Journal of Health Care Materiel Management*, and the *Infection Control Journal* (Canadian and American).

#### Request Information:

Obtain written detailed information from the supplier or manufacturer. Instrumentation has become a maze of technical, complex, systems and devices, which can cause employees additional anxiety and frustration.

Request simple, concise, easy to follow information and instructions covering:

- care and maintenance manuals, guidelines, efficacy and compatibility studies.
- instructional videos for additional inservice, orientation, and refresher sessions.
- quick reference instruction sheets and posters which serve as "On the spot" reminders for the staff.
- additional information such as instructional tools, posters, software information, guest speakers for meetings.

Investigate and evaluate the supplier or manufacturer as well as the product. Review their customer service program, repair and turn-around time, loaner capability, and any other additional services.

#### Summary

Information about instruments is pertinent to patient care.

1. Always check that the information given is validated with references and bibliography.

2. Use the information as reference when reviewing and revising policies, procedures, and processes.

Any change in practice should be done in collaboration with representation from end users, auxiliary staff handling the equipment and including hospital resource personnel, i.e. infection control, risk management, biomedical engineering, and materiel's management.

### Endoscopic Instruments

(Quick Reference Chart)

#### The Purpose, Function, Features, Benefits and Care and Maintenance of Surgical Instruments:

##### Veress Needle:

- Penetrates tissue to create pneumoperitoneum.
- Keep stylet and trocar together as they often are a matched set.
- Ensure tip is smooth and sharp.
- Sterilize disassembled with valve in open position.

##### Trocar and Cannula:

- Establishes and maintains channels to perform surgery - 6mm, 9, 11, 12, 15 and 22mm diameters are available.
- Before surgery always confirm compatibility (sizes of cannulas and instruments) if integrating different manufacturers of instruments and disposable instrument products.
- Cannula sleeves are mat or / anodized finish, with or without external spiral thread and the end may be oblique or straight.
- Cannula may be rigid, FLEXIBLE, reusable or disposable (thoracic surgery).
- Trocar tips may be conical, pyramidal or blunt
- Valve mechanism on cannula may be trumpet / automatic (trap door) / or multi-function.
- The "Hasson" or open style trocar cannula is inserted through a small stab wound and fixed to the abdomen with sutures to stabilize the working channel.
- Disassemble all components for processing and sterilization.
- Use sterilization key to ensure automatic valve (trap door assembly) remains open during sterilization.

### Graspers/Forceps:

- Long shafted instruments with different jaw/tip configurations to perform surgery, diameter of instrument shaft may be 3, 5 or 10mm.
- Length can vary as much as 10mm depending on single or multiple puncture procedure.
- Handle configurations vary from ratchet, non ratchet, displaceable ratchet, spring loaded.
- To perform surgery Instruments jaws may be traumatic, atraumatic, and/or rotatable, for dissection, fixation or retraction.
- Instrument exterior maybe insulated for electro-surgical application. **Insulation integrity is very important - thoroughly inspect each instrument.**

### First generation of instruments:

- most of them can not be disassembled although some instrument handles can be disassembled to expose the instrument shaft end to allow flushing with syringe bulb, cleaning pistol or mechanical device.

### Second generation of instruments:

- are designed with flushing ports (standard luer lock port with a cap). This makes it easier to flush the shaft of the instrument.
- The cleaning port caps are to remain "off" during sterilization.

### Third generation of instruments:

(hybrid and semi - disposable)

- are designed to be totally disassembled for easy processing, and to allow sterilent to come in contact with all surfaces and lumens.

Interchangeable options with take apart type instruments increases flexibility, and permits instruments to be reassembled into different jaw configurations via changing the insert. This will prevent instrument down time and decrease repair and inventory costs. These instruments are commonly called TAKE APART™ (semi disposable/hybrid).

### Scissors:

- Designed to dissect tissue or cut suture.
- Blade styles available are micro, straight, curved (metz), hook, blade edges may be serrated.
- TAKE APART™ models are available with or without rotateable jaw and interchangeable blade inserts.
- Options
  - exterior may be insulated, or non insulated,
  - monopolar and bipolar electro-surgical application models are available.

- Blade sharpness can be tested by cutting a latex glove.
- Scissors must be sharpened by qualified repair technicians.

### Converter/Reducer:

- Reduces 10mm. cannula port diameter to 5mm.
- All parts of the instrument must be disassembled for cleaning and processing.
- Washers or caps deteriorate (soften) with repeated processing.
- Inspect frequently and replace when it becomes supple.

### Dilation Set:

- Series of cannula used to increase 5mm. cannula port to 10 mm.

### Telescope:

- Used to visualize operative site
  - Field of view ranges from 0°, 15°, 30°, 70°, 120°
  - Sterilize via steam, ETO, paracetic acid, plasma
  - Some telescopes have:
    - model numbers that identify method of sterilization
    - autoclave parameters inscribed on the eye piece
    - detachable eye piece to adapt cylindrical (smaller) camera heads
    - serial numbers to facilitate tracking repair costs, and the life span of the telescope for budget purposes
  - Maintain lens clarity by wiping lenses with alcohol after cleaning, and periodically polish Light Post with instrument (silver) polish.
  - **During surgery prevent fogging by:**
    - using single dose anti fog solution
    - using the "visceral wipe" technique
    - warming the telescope in a container (lined with a gauze at the bottom) of warm water **not hot.**
- Note: temperature of very hot water can cause fine cracks in the lens.

- Change CO<sub>2</sub> (cool) insufflation port, to a port other than the one on the telescope cannula.
- Always check telescope light post adaptability/compatibility to light cable

**Ideally, a steam autoclavable telescope should be sterilized in its own container in a gravity displacement steam sterilization cycle.**

If high level disinfection is used to reprocess the telescope - use a solution with a balanced pH and a low level surfactant A high surfactant level causes build up

of film on telescope and lenses.

Two separate and thorough rinses are recommended to prevent film build up and to ensure no disinfection solution remains.

### Dissection Electrode Cannula:

- Is a combination cauterization and dissection instrument.
- Tip configurations may be L, J, U hook, or spatula,
- Valve mechanism on some models allows the release of cauterization plume.
- Visually inspect integrity of the insulation, and that the tip is secure and properly aligned.
- Brush lumens with appropriate size brush.
- Sterilize via steam, ETO, paracetic acid, plasma

### Suction/Irrigator:

- Control mechanism on this instrument is a trumpet valve or a thumb lever mechanism.
- Disassemble for sterilization.

Irrigation fluid may be attached via I.V. tubing to pressurized bag or an automatic infusion pump (infusion pressure should be higher than the intra abdominal pressure).

### Needle Drivers :

- For intracorporeal suturing (suturing inside the abdomen) needle drivers are used in pairs, one to hold the suture needle and one to manipulate the suture tail.
- Various handle configurations are available to facilitate certain suturing techniques (surgeons' preference).

### Knot Pusher:

- Used in extra corporeal suturing where suture knots are created outside the abdomen and then delivered into the abdominal cavity.
- It is a long metal probe type instrument with slotted tip or small slotted ring tip.

### Probes :

- A long smooth instruments used to inspect and probe anatomy.

These are the common, basic, minimal access surgery instruments. There are many other instruments available that are particular to certain surgical techniques and procedures.

## Endoscopic Accessories

### Electro-surgical Cable:

- Monopolar, and or bipolar frequency cables are available.
- Check cable compatibility, with instrument and electro-surgical unit inlet.
- Sterilize via steam, (using dry cycle), ETO, or plasma.

### Light Cable:

- Common Fibre diameter options are 3.5 or 5mm.
- Cable ends must be compatible with telescope and light source.
- Outer sheath should be durable to minimize sharp bending that will cause fibres to crack and decrease light transmission.
- Always wrap separately to prevent "heat transference".

In the construction of some light cables there is a space between the fibre bundle and the outer sheath/cladding. Always follow manufacturer's recommended sterilization instructions, as this space may be influenced by dramatic vacuum steam sterilization cycles, and cause the sheath to deteriorate quickly.

### Insufflation Hose

- Tubing may be of silicone, rubber, latex, or disposable plastic.
- If the tubing is made in house; the fitting is a standard luer lock style connector. **Note: the internal diameter of the tubing must be compatible with the electronic insufflation unit.**

### Small Parts Container:

- A small autoclavable perforated container for instrument parts.
- Confining all the small bits and pieces (washers, caps and special fittings, etc. ) when instruments are disassembled will prevent loss in cleaning and processing.

## Electronics

### Camera:

- One, three, and half chip technology affect the weight and size of the camera head.
- Drape with disposable drape.

- Keep the camera cable up off the floor.

**Note:**

**Cable and camera head require careful handling.**

**Monitor:**

- Allows visualization of the procedure (in some situations two units are used).

**Insufflator:**

- Supplies CO<sub>2</sub> to create pneumo in cavity for visualization.

To prevent the possibility of any foreign particles from entering the abdomen, a filter can be applied to the out flow port of the unit- ensure model of filter is compatible with insufflation unit flow rate (i.e. Mille pore pore filter).

**Light Source:**

- Provides and regulates light intensity for visualization in the cavity i.e. xenon (type).
- Always keep extra bulb on hand.

**Utility Cart:**

- Align the electronic components to facilitate easy monitoring of the control panels and to connect cables: monitor on the top followed by light source and insufflator on one shelf (if possible), camera processor and VCR recorder.
- Utilize a closed cabinet to store and transport video components.
- Cabinet features to consider:
  - recessed area to hold two Co<sub>2</sub> tanks
  - opening at the back to access electronics
  - adequate ventilation
  - locks for security
  - recessed transport handles
  - large, smooth rolling, locking wheels

## Cleaning Accessories

### Mechanical Cleaning Tools

**Water pistol** - pressurized water pistol with adapters to flush and rinse instruments.

**Flushing units** - pressurized flushing units designed to deliver cleaning agents and rinse water through instrument lumens channels and shafts.

"Clean Set", "Endo Flush", "Endo-Clean" and "Medisafe" ( a pressurized flushing and ultrasonic combined unit) are a sample of some brand name products appropriate for such cleaning.

**• Sonic Cleaners:**

Investigate cleaning protocols and the necessity of using the unit as part of each cleaning routine.

**•Air Pistol:**

Can be attached to regulator on a compressed air tank, or inline air hose to facilitate drying instruments, lumens and channels prior to sterilization, especially before:

- ETO to prevent formation of toxic residuals.
- Plasma sterilization process as extra moisture may disrupt cycle parameters and cause unit to abort cycle process.

**• Cleaning Brushes:**

Select appropriate brush length and diameter. **Ensure tips are smooth** to prevent scratching internal instrument surfaces.

## Care & Maintenance Tools

**• Spare Parts Container:**

Keep a small inventory of spare parts, and appropriately label the compartments with the catalogue number and required quota to prevent instrument downtime and simplify reordering.

**• Instrument Containers:**

Utilize perforated, rigid containers of plastic or stainless steel .

**• Protection Materials:**

- Autoclavable and reusable materials are available for example: open cell type sponge i.e. "ReticuCel".
- Instrument tip protectors provide added protection for delicate instruments and instrument tips.
- Silicone peg mats are available to offer additional cushioning to the bottom of rigid instrument containers and work surfaces in the processing department.

**• Repair Tags:**

Autoclavable, plastic, with easy to remove lock clasp can be used to indicate repair required. Colour coding can be used to identify repair needs i.e. red to indicate rush repair, yellow to indicate sharpening required etc. A stainless steel safety pin is another suggestion to mark instruments for repair.

**• Bar Coding Labels:**

- Labels can be affixed to serialize many instruments. This is an excellent way to monitor repair data for budget purposes.
- Many label configurations are available which are very heat and chemical resistant.

**• Inline Water Filtering**

Hardness of water is of **prime importance** in processing and sterilization. There are many undesirable side effects caused by the combination of chemicals in water, cleaning solutions and the different instrument metals, as well as affecting the quality of steam. Adverse effects include decrease in sharpness of instrument cutting edges (scissors, curettes), film build up in crevices and freezing of the jaw mechanisms of instruments, rust, corrosion, and general discoloration of instruments.

## Flexible Endoscopes

Flexible endoscopes are technical, delicate pieces of equipment. There are many variables to consider when addressing additional expenses that may be incurred when using this equipment:

- the number of different departments using the same equipment.
- number of flexible scopes in use and the age of the scope.
- activity level, number of cases, both elective and emergency.
- number of attending staff Surgeons and Medical Physicians, Fellows and/or Residents using the equipment.
- hospital and departmental infection control program.
- the number and levels of personnel involved with the handling the equipment, i.e. doctors, nurses, technicians, and auxiliary staff.
- care and maintenance protocols.
- service and maintenance programs (including warranty and loaner program).

Review the following operational, physical, and procedural, aspects. Consideration of these details should assist and provide additional insight in projecting an appropriate budget and also highlight mechanisms and activity to decrease incidence of costly

repairs. Also include in the review the most current Recommended Practices/Standards on flexible endoscopy equipment. These standards outline in detail the many aspects involved with infection control, care and maintenance.

## Operational and Physical Guidelines

### Handling and Storage

- Always carefully handle flexible endoscopes, coiling the equipment gently in large circular fashion.
- Provide proper protection from accidental impact:
  - when not in use, endoscopes should be stored in a rigid casing or cabinet, each endoscope hanging in an appropriate hanging bracket with a support bracket for the umbilical end.
  - install hanging brackets at a reasonable height.
  - hang scope in a straight alignment (line the wall behind the scopes with a cushioning material, paying particular attention to the area directly behind the distal tip portion of the scope).
  - use rigid containers designed for flexible scopes for sterilization process (inexpensive products are available).
  - do not store endoscope in its case.
  - use a utility case cart specifically designed for endoscope procedures.
  - transport the flexible scope for repair in its case.

### Neoprene

Neoprene is the material used as the outer covering of the distal tip. This material is very soft and supple to facilitate the best angulation possible. This also makes it very susceptible to punctures and cuts. Pay particular attention not to drag or knock the tip of the scope over any rough, uneven, or metal surfaces.

### Care and Maintenance:

A separate adequate work area should be provided for proper cleaning, and processing.

### Infection Control

- follow the company's recommended practices for cleaning
- follow the hospital's recommendation for type of detergent ( i.e. enzymatic), disinfection solution ( note concentration percentages), and or sterilization process (ETO). Selection of products and practices must be done in consultation with the manufacturer.

### Establish Written/Illustrated Cleaning Protocols :

Use a manual and/or automatic cleaning process.

Written and illustrated information is available from the manufacturer. Several automated cleaning units are available. Investigate the manufacturer's literature which should describe an efficient, consistent cleaning process, which may also decrease the auxiliary staff work load in the department.

### Accessories:

To facilitate delicate cleaning, incorporate the use of an ultrasonic cleaner for the biopsy and forcep accessories.

To prevent any tear type incidence inspect the jaw alignment of the accessories under a magnifying glass.

### Establish Inservice Programs:

The Inservice program should be conducted on a regular basis and reflect needs of the personnel involved.

### Establish and Implement a Well Defined Preventative Maintenance Program:

Pre-book regularly scheduled dates for preventative maintenance (depending on unit activity) to be done in the off hours, so as not to interrupt the elective booking schedule.

Each P.M. check provides documentation (with dates), current description of the status of each scope, and draws attention to potential problems (if any).

### Monitoring Protocols:

Gather and analyze information on the unit activities and work load.

Implement an electronic or manual log book, to generate data for analysis, comparison, and budget purposes (i.e. forecasting expenses).

In the log book, consider recording: the patient, diagnosis, procedure time and date, physician, if scheduled case or emergency case, and the staff assisting with the case and cleaning. This monitoring will create an audit trail to help define scheduling, activity, protocol changes and/or potential problems.

Since this equipment has many technical aspects concerning handling, care and maintenance etc., having a designated staff assigned to work with the equipment in the various departments on a regular basis is a definite advantage.

Identify and assess what are the emergency or urgent procedures, done in the off hours or on weekends, and in what department; especially, if a call back system is necessary to provide assistance. This will help define which cases can be juggled, and or rescheduled (to do when staff, familiar with the equipment are available, (i.e. first thing Monday morning). It will also help define additional costs.

### Procedural Aspects:

The flexible insertion tube of the scope is the most delicate part of the instrument and repeated encounters of undo pressures, or resistance when introducing the scope, can cause problems in the angulation assembly over a short period of time. This is expensive to repair. The repair technicians, define this as 'pressure kink' (colonoscope, gastroscope), 'bite compression' (bronchoscope) damage.

Patient related issues can contribute additional strain and pressure on the insertion tube at the time of insertion: i.e. their anxiety level and lack of relaxation, obesity.

Review the preparation protocol for the patients with the attending staff:

- review (and or standardized) the drugs administered preoperatively, i.e. bowel preparation and medication, muscle relaxant as well as sedative. (Buscopan and Versed is a routine combination of medications for colonoscopy used in many centers.)

- ensure a digital dilataffon of the anus before insertion of the scope, this decreases the opportunity to cause "undo pressure and resistance," on the scope.

- ensure the use of a bite block, for G.I. and Thoracic endoscopy.

- review injection of varices procedure, especially with new residents (so they become familiar with handling the injection needle).

- do not resterilize disposable injection needles.

### Summary

The issue of "how to address flexible endoscope repair", and the incurred expenses is not new, 'NEWS.' Each hospital has its own unique situation and its own needs. Direct comparison of hospital situations point for point, or forecasting endoscope repair and additional expenses is difficult.

A reasonable long term consideration might be to centralize the equipment: in a self contained "Scope Store," which issues, receives, and reprocesses the equipment per requisition per discipline per staff. The store may also be incorporated into the Supply Processing Department, Endoscopy unit, or Respiratory Department.

This concept, or a variation of it, incorporated into the OR department has the potential to be financially beneficial. It would promote consolidating and standardizing equipment and cost effectively reduce operational expenses and provided consistency in patient care. ■

# Coaching

## As a Framework for Developing Staff in the Operating Room

By Jodi Cole, R, BA

Teamwork is essential to positive patient outcomes in the Operating Room. O.R. nurses function as integral members of a highly sophisticated team. New technology, equipment and procedures are regularly introduced, and O.R. nurses must continuously upgrade their knowledge and skills to accommodate these developments. Coaching is a technique that can be used to facilitate this process. It offers a framework for developing individuals while providing a mechanism for continuous performance feedback (Haas, 1992).

In support of this argument, this article will define coaching and describe the coaching process as it is applied in the workplace and the operating room. It will look at the characteristics of good coaches and the skills needed to be successful.

### What Exactly is Coaching?

Coaching has been defined as an ongoing face-to-face interaction between learner and coach. It is a process of influencing behaviour that assists employees in achieving an increase in job knowledge that will help them to execute their job responsibilities more efficiently and with greater job satisfaction. It pro-

vides individuals with opportunities for personal and professional growth while developing positive working relationships. Coaching responds to an identified need or situation and may be formal or spontaneous (Haas, 1992).

Coaching is a cyclic process of assessing, planning, implementing and evaluating that recognizes that: performance appraisals are no substitute for day-to-day skills of establishing performance expectations; taking corrective actions; recognizing positive results; establishing and following action plans and giving frequent constructive feedback. (Clemmer and McNeil, 1988).

It is a careful balance between the result-driven and the self-esteem humanistic approaches to human resource management. Good behaviour is supported and employees are encouraged to aspire to their best efforts (Clemmer and McNeil, 1988).

Coaching is not looking for flaws, criticizing or trying to win points at the expense of others. The learners and coaches are on the same team, sharing experiences and helping the learners to overcome obstacles that might prevent them from accomplishing their goals and objectives. When these goals and objectives are achieved, the whole team is seen to have won.

Coaching can be an effective way of showing a new person the ropes while advising and teaching. It is somewhere between precepting and mentoring, and involves building a one-to-one trusting relation-

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### Abstract

This paper looks at coaching as a framework for facilitating the development of staff in the Operating Room. It defines coaching as an ongoing, face-to-face interaction between the learner and coach that supports and encourages employees to aspire to their best efforts. It stresses that coaches are not born but trained in life skills that they practice regularly.