



Bronchoscopy Biopsies

Presented by:

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Introduction

- Procedure that visualizes the tracheobronchial tree



Pre-Procedural Preparation

- History and clinical exam
- Indications and contraindications
- Not to eat for at least six hours prior to the procedure



Informed Consent

- Discussing the potential complications
- Benefits
- Alternatives of the planned procedure
- Type of sedation
- Questions should be answered
- Implied consent



Personnel

- Bronchoscopist
- RN
- Respiratory Therapist



Sedation

- Moderate sedation
 - Procedure room is prepared
 - Equipment checked
 - Time-out is done



Diagnostic Indications

- Evaluation of pneumonia or infiltrate
 - Bronchoalveolar lavage BAL
 - Bronchial washings
 - Cannot produce sputum for collection
 - Immunocompromised
 - Slow or incomplete resolution of presumed pneumonia



Diagnostic Indications

- Persistent atelectasis
 - Airway obstruction
- Centrally located lung masses or nodules
 - Washing, brushing, BAL, or biopsy
 - Extrinsic compression
 - Direct sampling of peribronchial masses



Diagnostic Indications

- Mediastinal lymphadenopathy
- Hemoptysis
 - Identify and localize the cause of bleeding
 - Bleeding may be controlled
 - Rigid bronchoscopy is indicated in the management of massive bleeding
- Suspected airway obstruction



Diagnostic Indications

- Tracheobronchomalacia
 - Dynamic airway collapse
- Suspected lung transplant infection or rejection
 - Post transplant period
 - Rejection
 - Opportunistic infection
 - Evaluate the donor lung



Diagnostic Indications

- Toxic inhalation or burn injury
 - Extent of smoke or chemical inhalation injury
 - Carbonaceous debris
 - Mucosal pallor
 - Mucosal ulceration
 - Mucosal erythema



Diagnostic Indications

- Chest trauma
 - Trauma to the chest or neck
 - Pneumomediastinum
 - Membranous distal trachea or proximal main stem bronchi
- Cough
 - Last diagnostic modalities
 - Foreign body
 - Airways disease



Diagnostic Indications

- Tracheoesophageal fistula
 - Congenital
 - Malignancy
 - Prolonged intubation



Diagnostic Indications

- Bronchopleural fistula
 - Lost-lobectomy
 - Postpneumonectomy
- Evaluate complications of placement of artificial airways
 - Tracheostomy
 - Endotrachial tubes



Diagnostic Indications

- Precancerous lesion
 - Autofluorescence or narrow banding
- Confocal microbronchoscopy
 - 1.4mm fiberoptic miniprobe



Therapeutic indications

- Endotracheal tube placement
 - Difficult airway or to confirm the position of an endotracheal tube
- Foreign body removal
- Mucus impaction
 - Isolation in hemoptysis
- Laser of argon plasma coagulation
- Ablate endobronchial lesions
- Photodynamic therapy
 - A photosensitizer drug (usually a hematoporphyrin derivative)



Therapeutic indications

- Electrocoagulation
 - Coagulated within the airways
- Cryotherapy
 - Endobronchial tumor or granulation tissue
- Balloon dilation
- Brachytherapy catheter placement
 - Insert the radioactive pellet
 - Three weekly sessions



Therapeutic indications

- Tracheobronchial stents
- Bronchial thermoplasty
 - Severe asthmatics
 - Weakening the smooth muscles of the airway
- Facilitation of pigtail catheter
 - To drain parenchymal abscess
 - Antibiotics locally



Therapeutic indications

- Needle aspiration of mediastinal cysts
- Treatment of bronchopleural fistula
 - Endobronchial one-way valves or synthetic gels
- Treatment of Emphysema
 - Lung volume reduction



Contraindications

- Risk of pulmonary and cardiovascular decompensation
- High risk of bleeding
- Intolerance to sedation



Specific contraindications

- Severe hypoxemia
- Severe pulmonary hypertension
- Unstable or severe obstructive airways disease
- Hemodynamic instability and myocardial Ischemia
- Anticoagulants/coagulopathy
- Renal insufficiency
- Superior vena cava syndrome



Special populations

- Raised intracranial pressure
- Mechanical ventilation
- Large anterior mediastinal masses
- Pregnancy
- Older patients
- Patients requiring prophylactic antibiotics



Needle aspiration

- Endobronchial needle aspiration
- Transbronchial needle aspiration



Endobronchial biopsy

- Direct visual guidance
- Bronchoscope is placed 2 or 3 cm proximal
- Clear instructions
- Forceps are briskly pulled back
- Biopsy specimen handed to the assistant
- Sample
- Biopsied area should be inspected



Transbronchial biopsy

- Blindly
- Fluoroscopic guidance



Complications

- Complication rates ranging from 0.08 to 6.8%
- Appropriate patient selection
- Procedure-related and /or sedation related
- Common complications
 - Hypotension
 - Bleeding
 - Pneumothorax
 - Nasal discomfort, a sore , and mild hemoptysis



Complications

- Less common complications
 - Bronchospasm
 - Hypoxemia
 - Epistaxis due to nasal trauma
 - Nausea & vomiting
 - Cardiac arrhythmias
 - Infection
 - Vasovagal syncope



Complications

- Bleeding
 - 2.8%
 - Ice cold saline and/or epinephrine
- Pneumothorax
- Hypotension and cardiac arrhythmias
- Hypoxemia and respiratory failure
- Others
 - Nausea and vomiting as well as aspiration
 - Airway injury
 - Late complications including bacteremia, fever, and pneumonia



Bronchoscopy-induced Hemorrhage

- 1% to 20%
- Cytological brushing or forceps biopsy
- Underlying coagulation disorders
- Neoplastic lesions
- Carcinoid tumors
- Necrotic endobronchial tumors
- Inadvertent laceration of pulmonary vessels
- Not related to the type of biopsy forceps used
- Cavitated lesions
- Bronchiectasis



9/6/2016

Flexible bronchoscopy in adults: Overview

Portable bronchoscope with monitor



A portable bronchoscope with built-in liquid crystal display (LCD) and light source. It has an outer diameter of 5.1 mm and working channel of 2.6 mm and can be operated without a large monitor or image processor.

Image courtesy of Olympus America Inc. Copyright © 2014 Olympus America Inc.

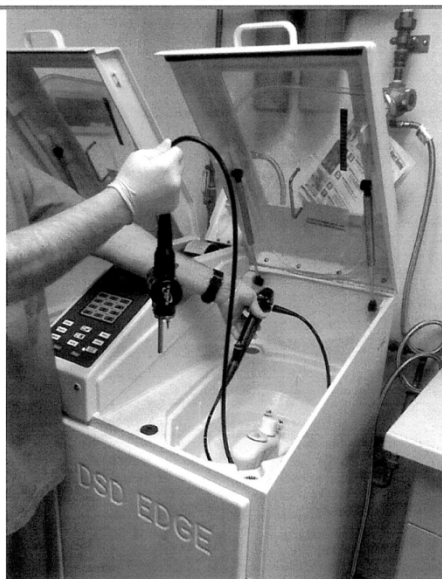
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Flexible bronchoscopy in adults: Overview

Bronchoscope reprocessing system



Bronchoscope reprocessing system. A dual chamber unit where the bronchoscope is placed for disinfection after enzymatic cleaning and leak testing is done.

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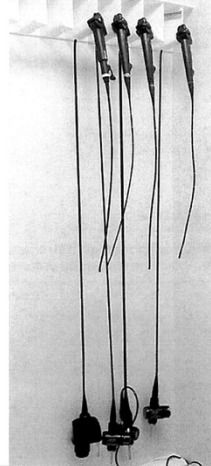
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Flexible bronchoscopy in adults: Overview

Bronchoscopes hung upright to prevent the accumulation of moisture



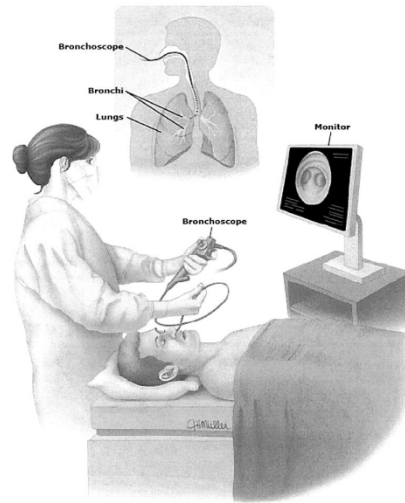
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Flexible bronchoscopy in adults: Overview

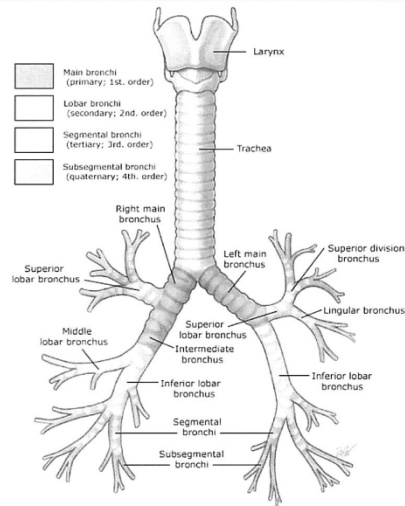
Patient undergoing video bronchoscopy



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Anatomy of the tracheobronchial tree



The pulmonary artery and its branches follow the same course as the tracheobronchial tree.

Graphic 104076 Version 2.0



Size of ultrathin bronchoscope compared to routine diagnostic and therapeutic bronchoscope

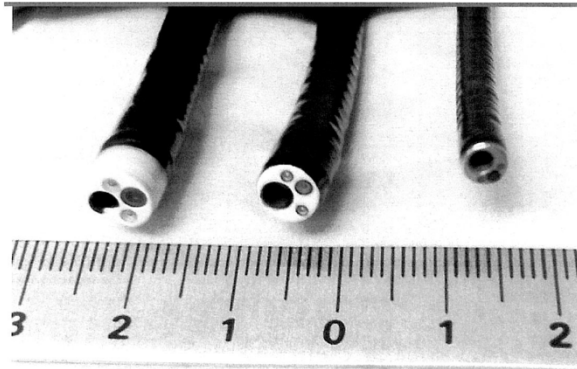


Figure shows an ultrathin bronchoscope (right) compared with therapeutic (left) and diagnostic (middle) bronchoscopes. The ultrathin bronchoscope allows access to small airways or through tight endobronchial obstructions.

Graphic 94870 Version 1.0





GRAPHICS

Indications for bronchoscopy

Inspection
Cough (persistent, unexplained)
Hemoptysis
Wheeze (localized/fixe)
Diaphragmatic paralysis*
Unexplained hoarseness and/or vocal cord paralysis/stridor
Suspected tracheo-esophageal fistula
Chest trauma
Suspected tracheomalacia
Toxic inhalation or burn injury
Verify tracheostomy or endotracheal tube placement
Evaluate precancerous lesions (autofluorescence)
Donor transplant lung evaluation
May require biopsy, BAL, or other procedure
Focal/unilateral hyperinflation or hyperlucency
Localization of broncho-pleural fistula
Atelectasis (persistent)
Abnormal chest radiograph
Pleural effusion †
Paratracheal/mediastinal/hilar mass
Parenchymal mass/nodule
Diagnosis of etiology of pneumonia
Recurrent/nonresolving (immunocompetent host)
Nosocomial
Immunocompromised host
Foreign body in airway (known or suspected)
Evaluation for rejection in lung transplant recipient
Delivery of brachytherapy
Research

* Utility/yield for this indication are controversial.

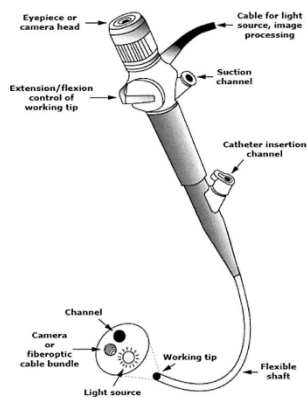
† Diagnostic yield ≥ 40 percent only when effusion is massive or associated with hemoptysis, mass, or atelectasis.

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GRAPHICS

Diagram of a flexible bronchoscope



Graphic 67231 Version 4.0

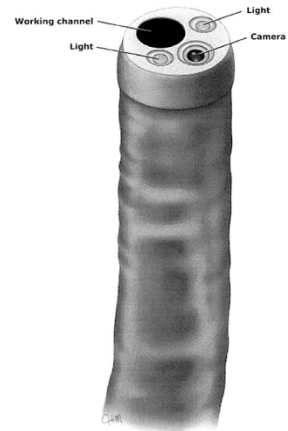




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Flexil™ bronchoscopy in adults: Preparation, procedural technique and complications

Diagram of a flexible bronchoscope's distal tip (ie, working tip)



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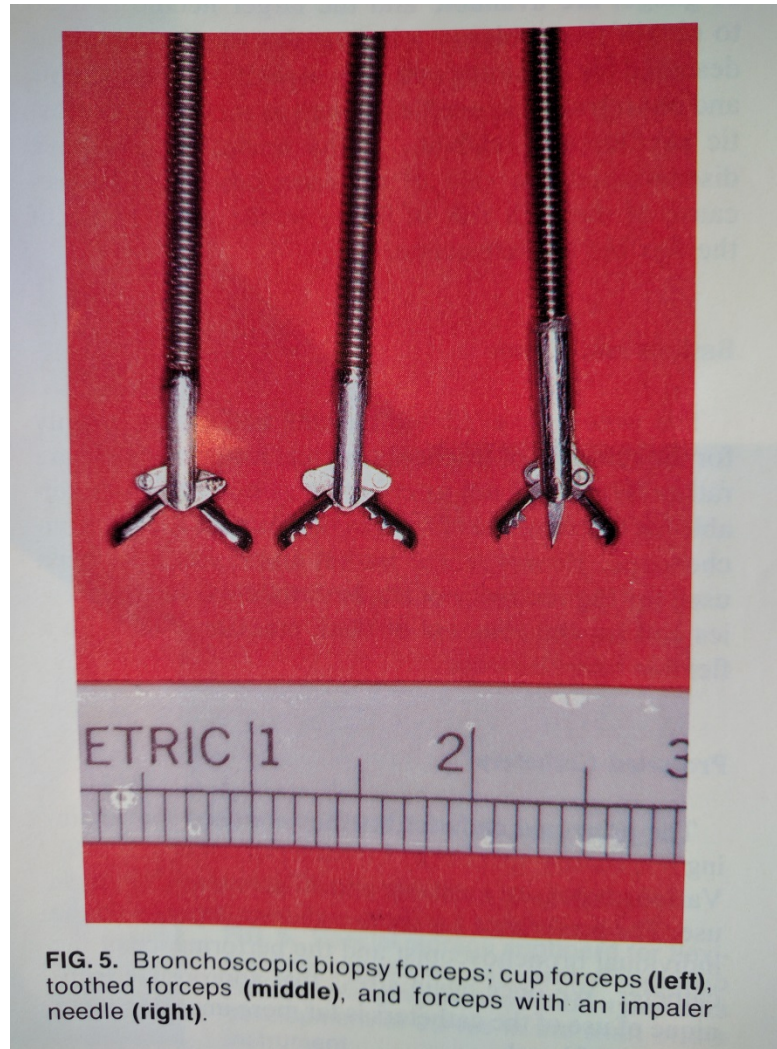
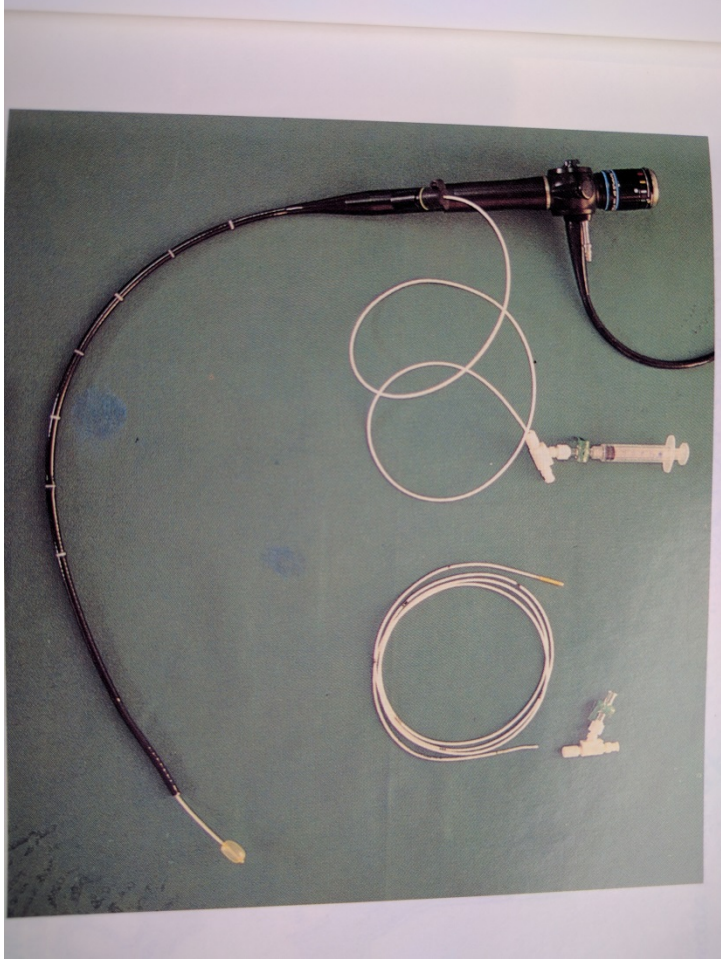




TABLE 1. *Indications for diagnostic bronchoscopy*

Cough
Wheeze and stridor
Abnormal chest roentgenogram
Persistent pneumothorax
Diaphragmatic paralysis
Vocal cord paralysis and hoarseness
Chemical and thermal burns of tracheobronchial tree
Refractory lung abscess
Thoracic trauma
Bronchography
Hemoptysis (Chapter 17)
Abnormal or atypical sputum cytology (Chapter 15)
Diagnostic bronchoalveolar lavage (Chapters 13 and 14)
Suspected pulmonary infections (Chapters 13 and 14)
Suspected tracheoesophageal or bronchoesophageal fistula (Chapters 16 and 22)
Follow-up of bronchogenic carcinoma (Chapter 15)
Carcinoma of the lung (Chapter 15)
Mediastinal neoplasm (Chapter 22)
Esophageal carcinoma (Chapter 22)
Suspected foreign body in the tracheobronchial tree (Chapter 18)
Obstructing neoplasms (Chapters 19–21)
Tracheobronchial strictures and stenoses (Chapter 21)
Bronchopleural fistula (Chapters 16 and 22)
Assessment of endotracheal tube placement (Chapter 16)
Assessment of potential endotracheal tube–related injury (Chapter 16)
Postoperative assessment of tracheal, tracheobronchial, or bronchial anastomosis (Chapter 22)
Research



possible, the needle up to

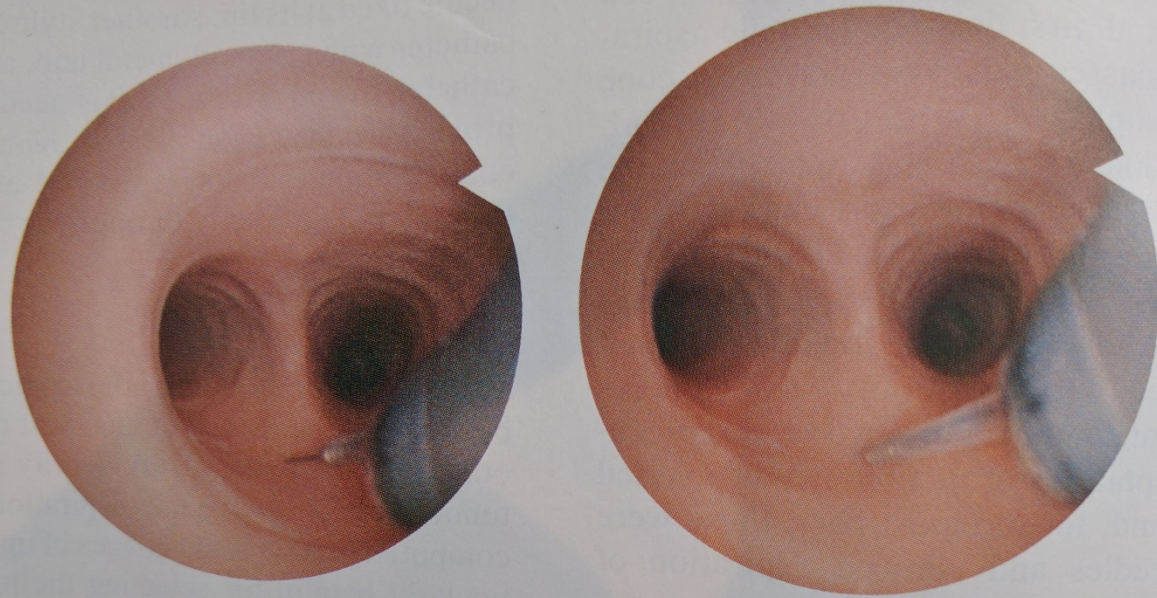


FIG. 1. (A) Bronchoscopic image of another bronchoscope in the process of performing transcarinal needle insertion in a model of a tracheobronchial tree. Note the ideal distance to which the needle has extended outside the flexible bronchoscope. **(B)** The needle has fully entered the carina.



FIG. 3. Flexible bronchoscope with bronchoscopic biopsy forceps in place for biopsy.

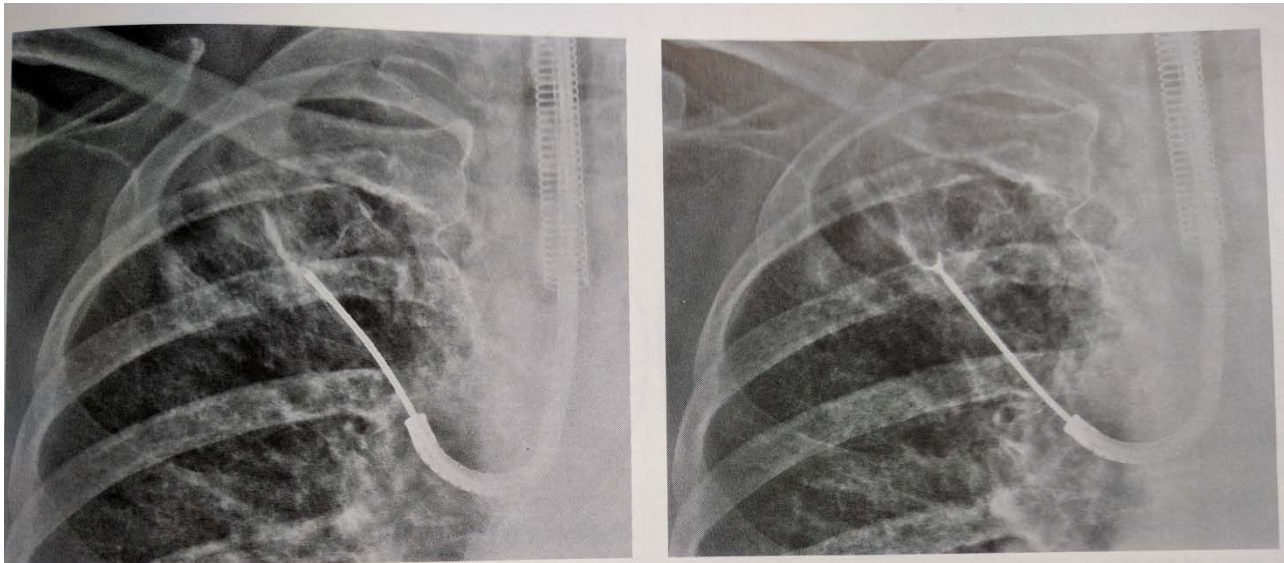
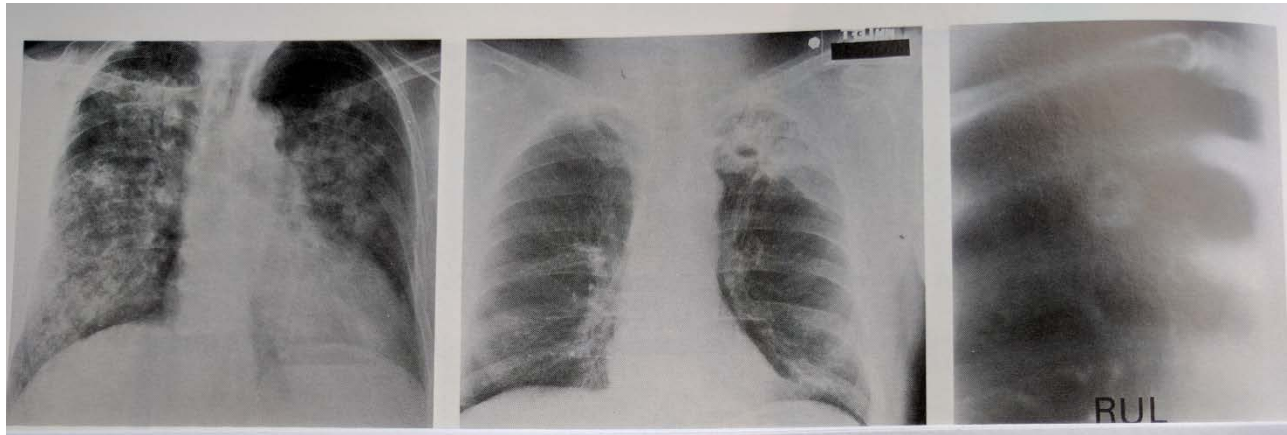


FIG. 25. Even the fluoroscopic monitoring (single plane) may not clearly show the open jaws of the biopsy forceps even when they are open **(A)**. Under fluoroscopic guidance, the bronchoscopy assistant turns the handle of the forceps until the open jaws are clearly visible on fluoroscopic monitor **(B)**.



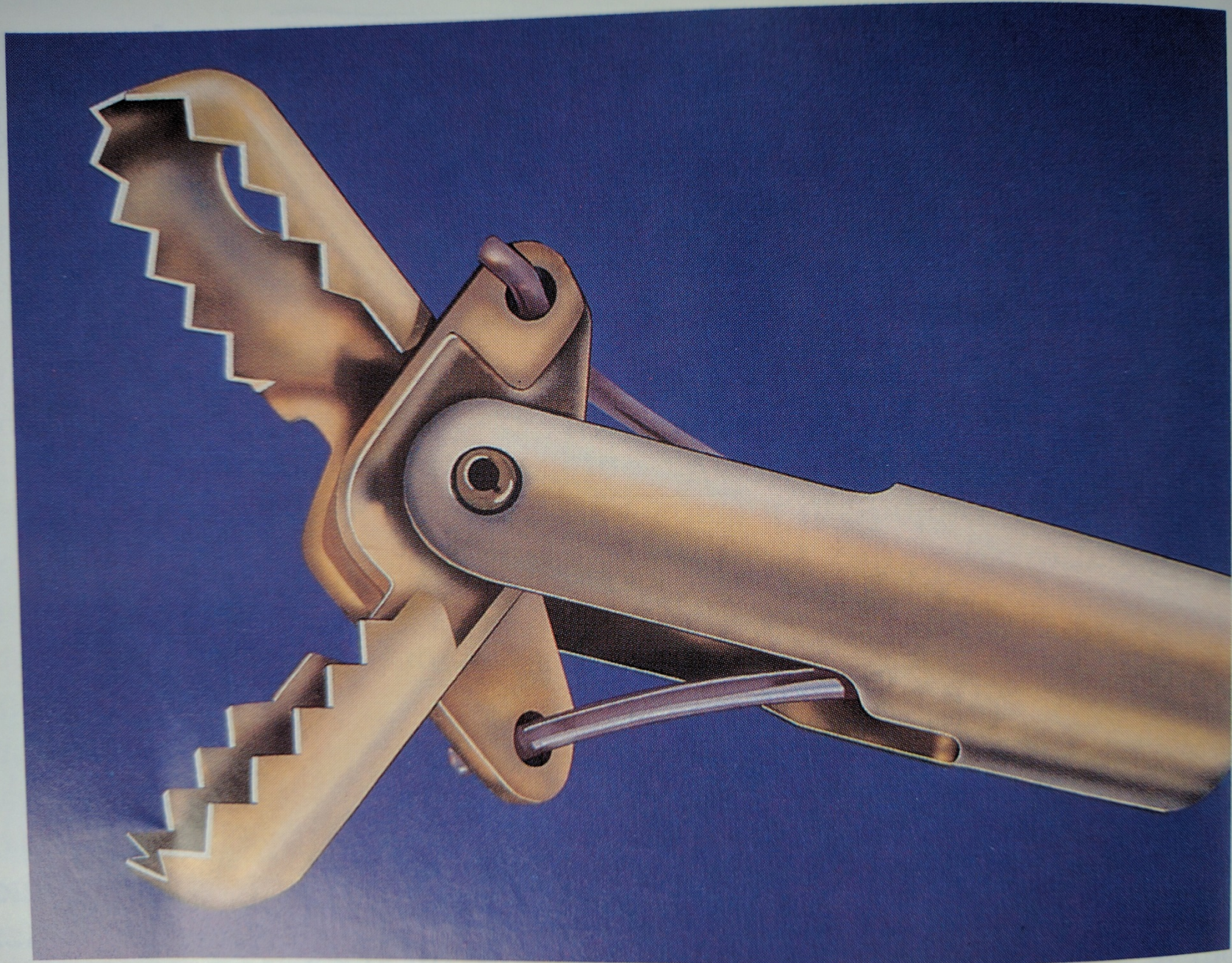






TABLE 1. *Equipment for rapid tracheal intubation, airway management, and resuscitation*

Equipment	Pulse oximeter Capnograph Electrocardiogram monitor and leads Suction (wall outlet with attachment or portable) Compressed oxygen (wall outlet with adapter or E cylinder) Defibrillator
Airway management	Laryngoscope with assorted blades Ambu bag Anesthesia masks (small, medium, and large) Assorted endotracheal tubes and intubating stylets Nasal airways Suction catheters, tubing, and tonsil-tipped firm catheters
Medications	Sodium thiopental Propofol Succinylcholine Epinephrine Bretylum tosylate Calcium chloride Sodium bicarbonate Lidocaine Phenylephrine Atropine Glycopyrrolate Narcotics and benzodiazepines as needed

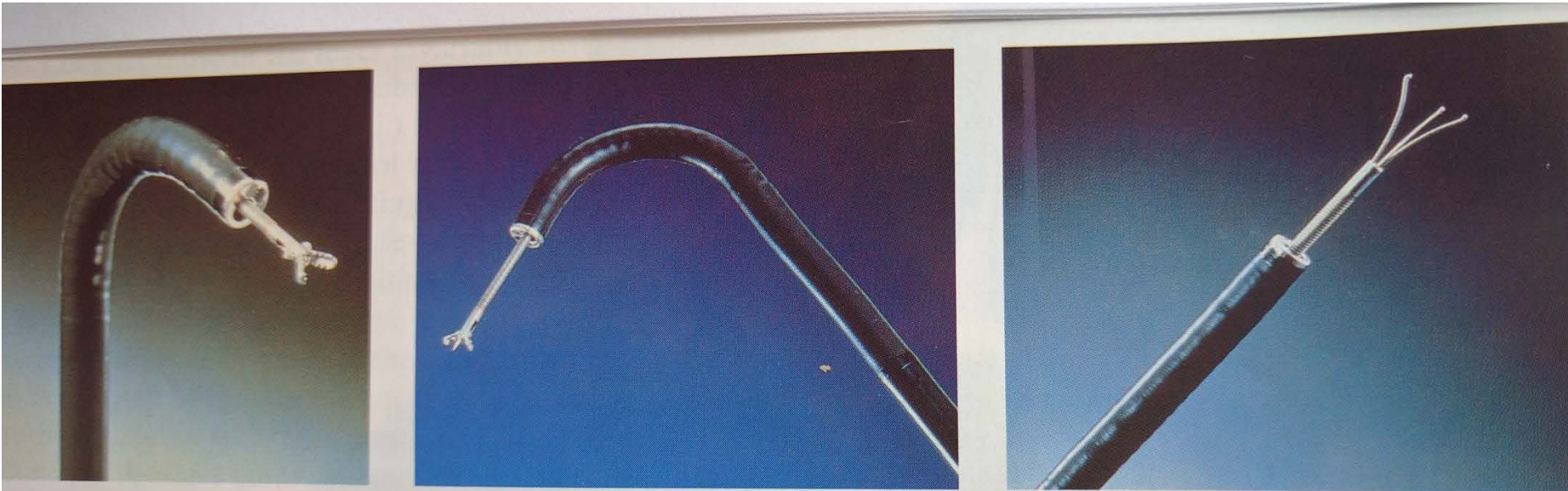
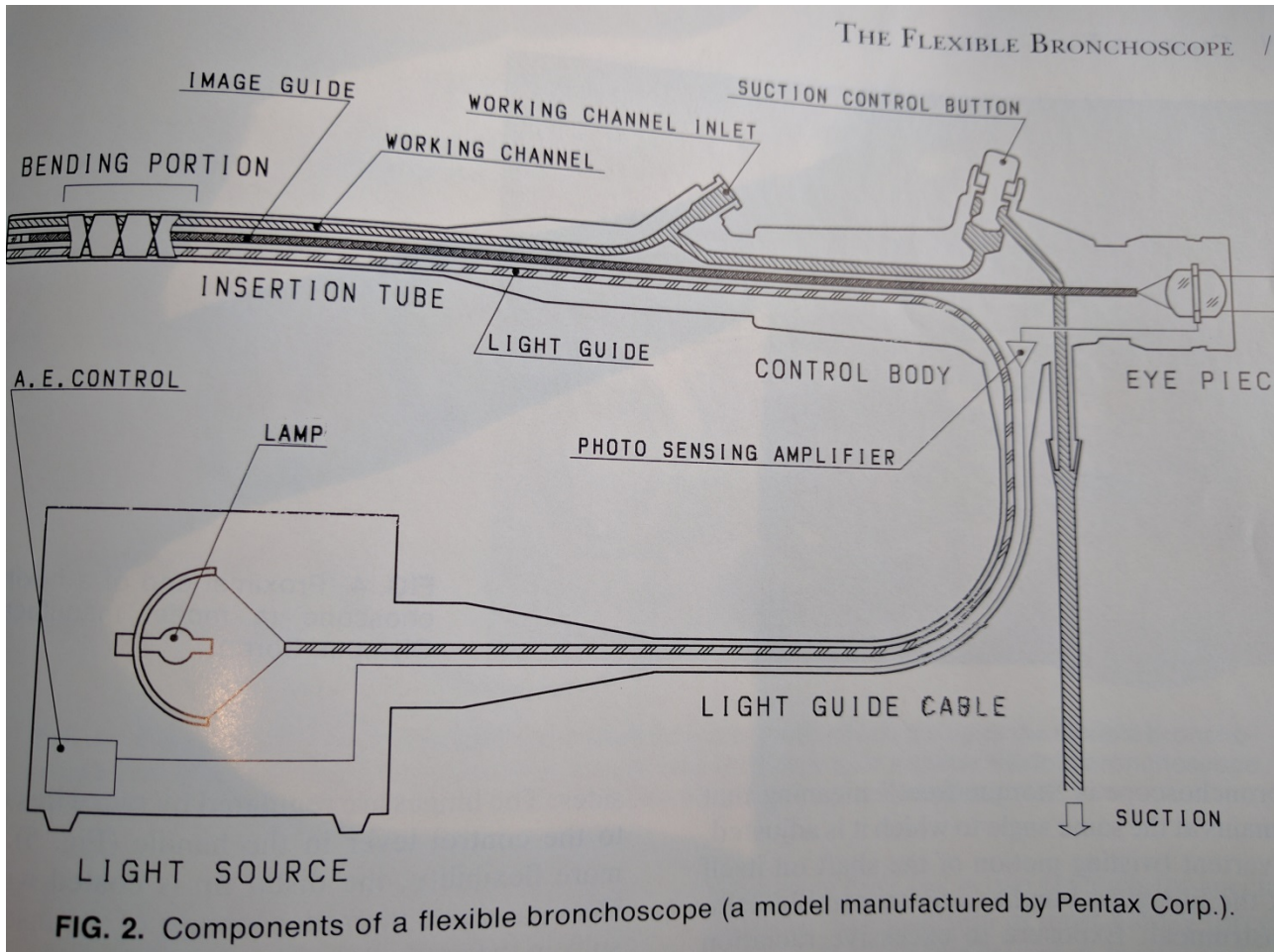


FIG. 8. A toothed biopsy forceps (**left**), biopsy forceps with an impaler needle (**middle**), and a claw (**right**) can easily traverse the working channel of a standard flexible bronchoscope. Courtesy of Olympus Corp.



"Do you sterilize
your instrument
after each use?"

"Well, I know my endoscopes are
sterilized after every use,
but I have no idea who does it."



Tom Hatcher