

# Basic Bronchoscopy

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# Disclosures

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- None

# Outline

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- Anatomy of a bronchoscope
- Mechanics of bronchoscopy
- Inspection of the airways
- Bronchoalveolar lavage (BAL)
  - Techniques
  - Indications
  - Contraindications
  - Complications

# Anatomy of a bronchoscope

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- Manuel Patricio Rodriguez Garcia
- 1855
- Visualizes cords



# Anatomy of a bronchoscope

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- Gustav Killian
- 1898
- Beyond the cords



KILLIAN: Tracheo-Bronchoscopy

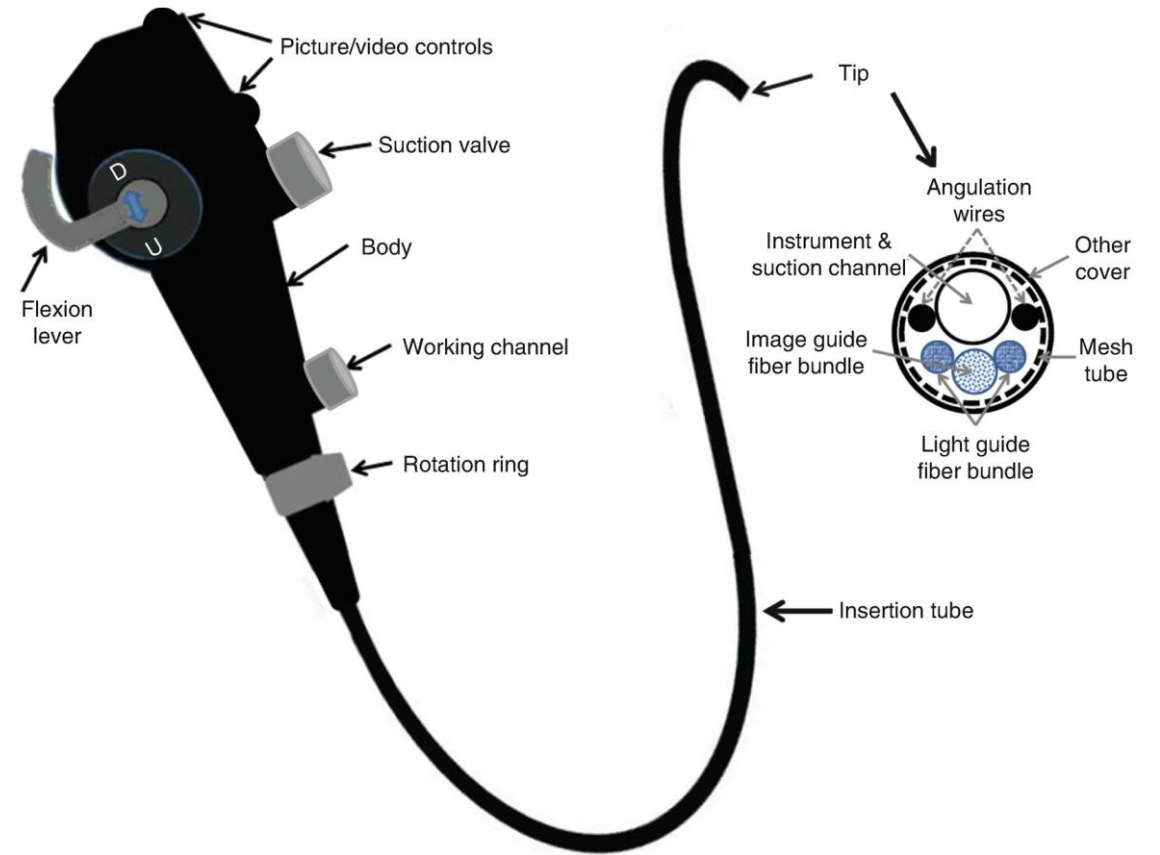
# Anatomy of a bronchoscope

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- Chevalier Jackson
- 1907
- Beyond the cords

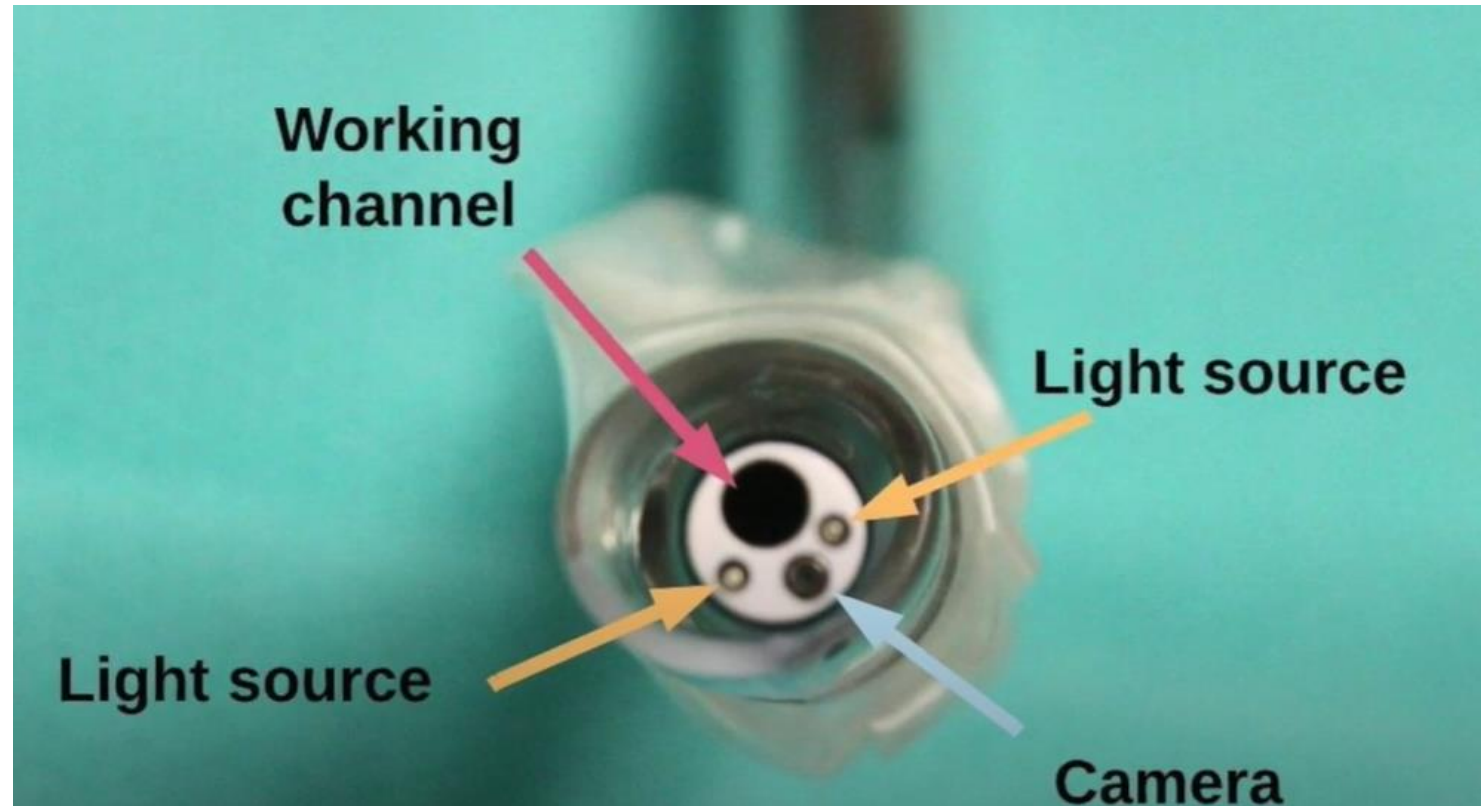


# Anatomy of a bronchoscope



# Anatomy of a bronchoscope

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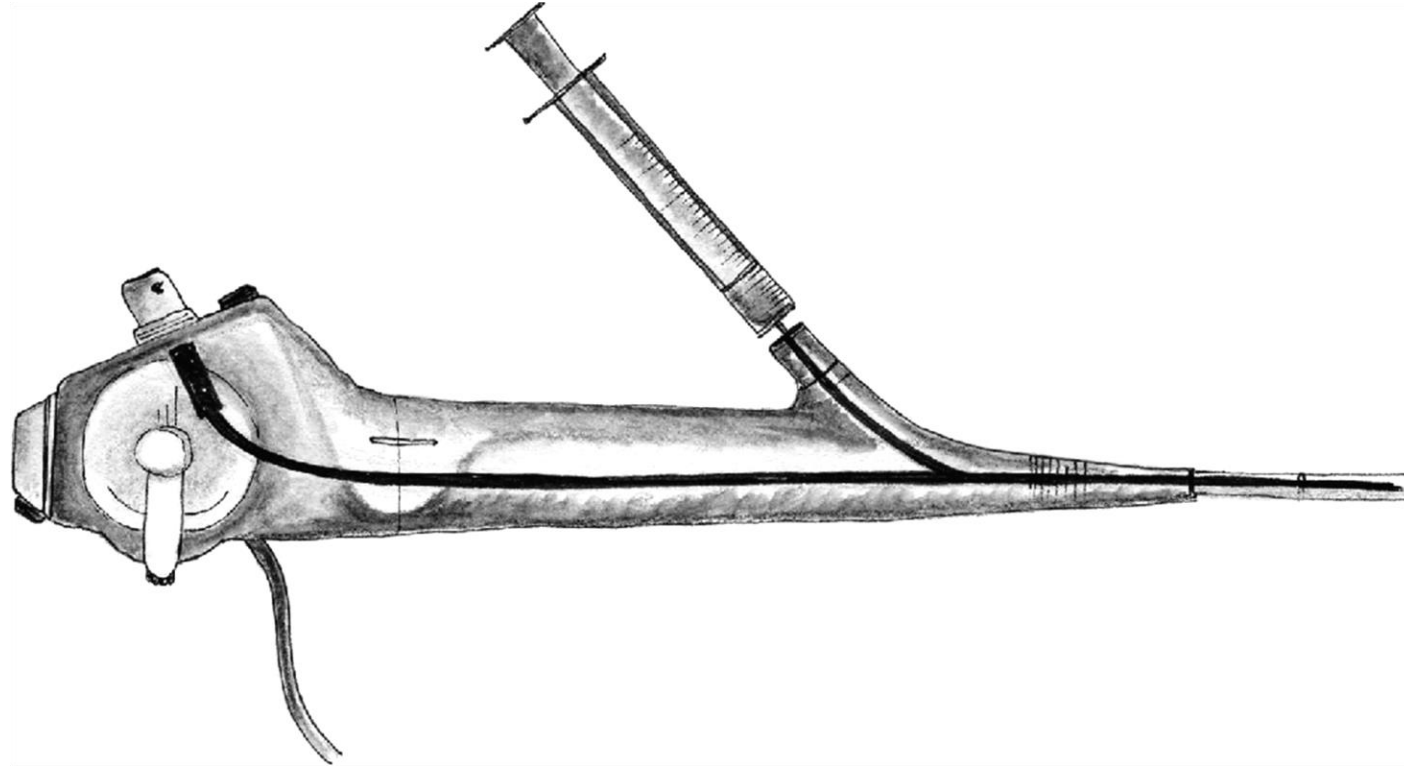




# Anatomy of a bronchoscope

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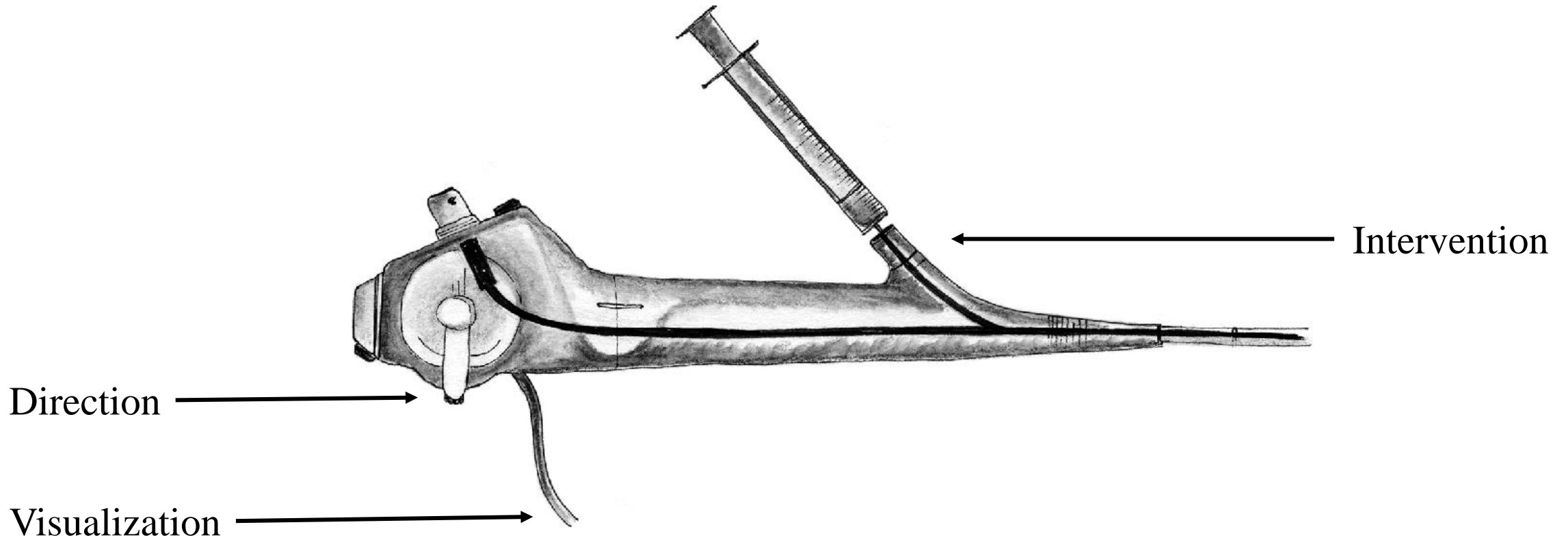
- Anatomy supports physiology



# Anatomy of a bronchoscope

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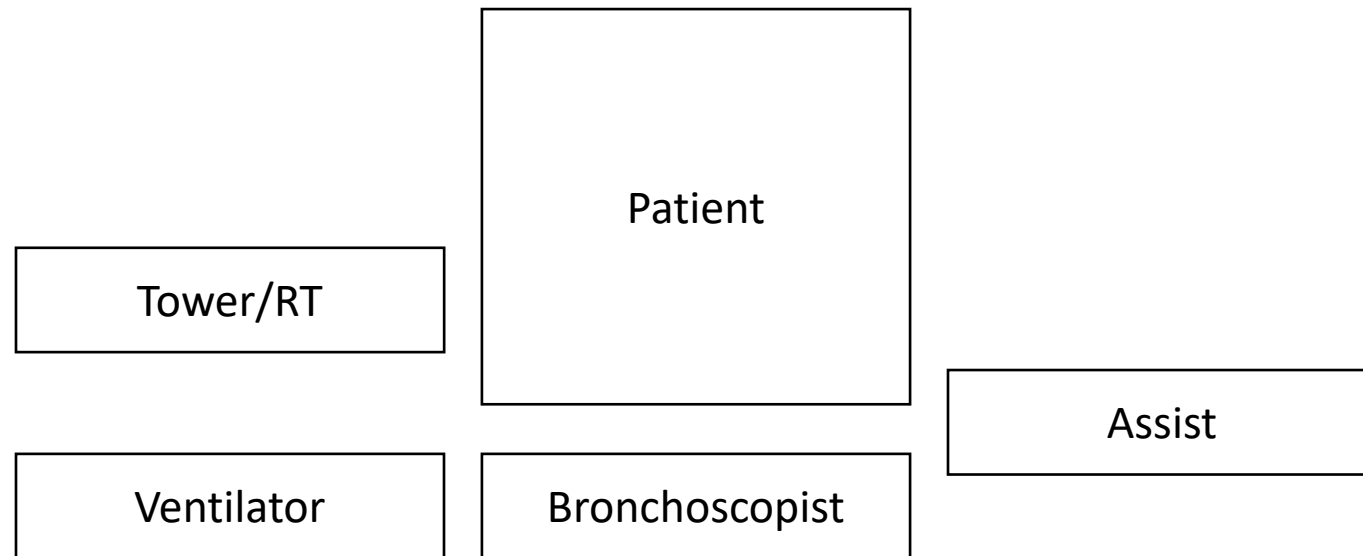
- Anatomy supports physiology



# Mechanics of bronchoscopy

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- Set yourself for success
  - Preparation & positioning (patient, bronchoscopist, support staff, equipment)
- ICU

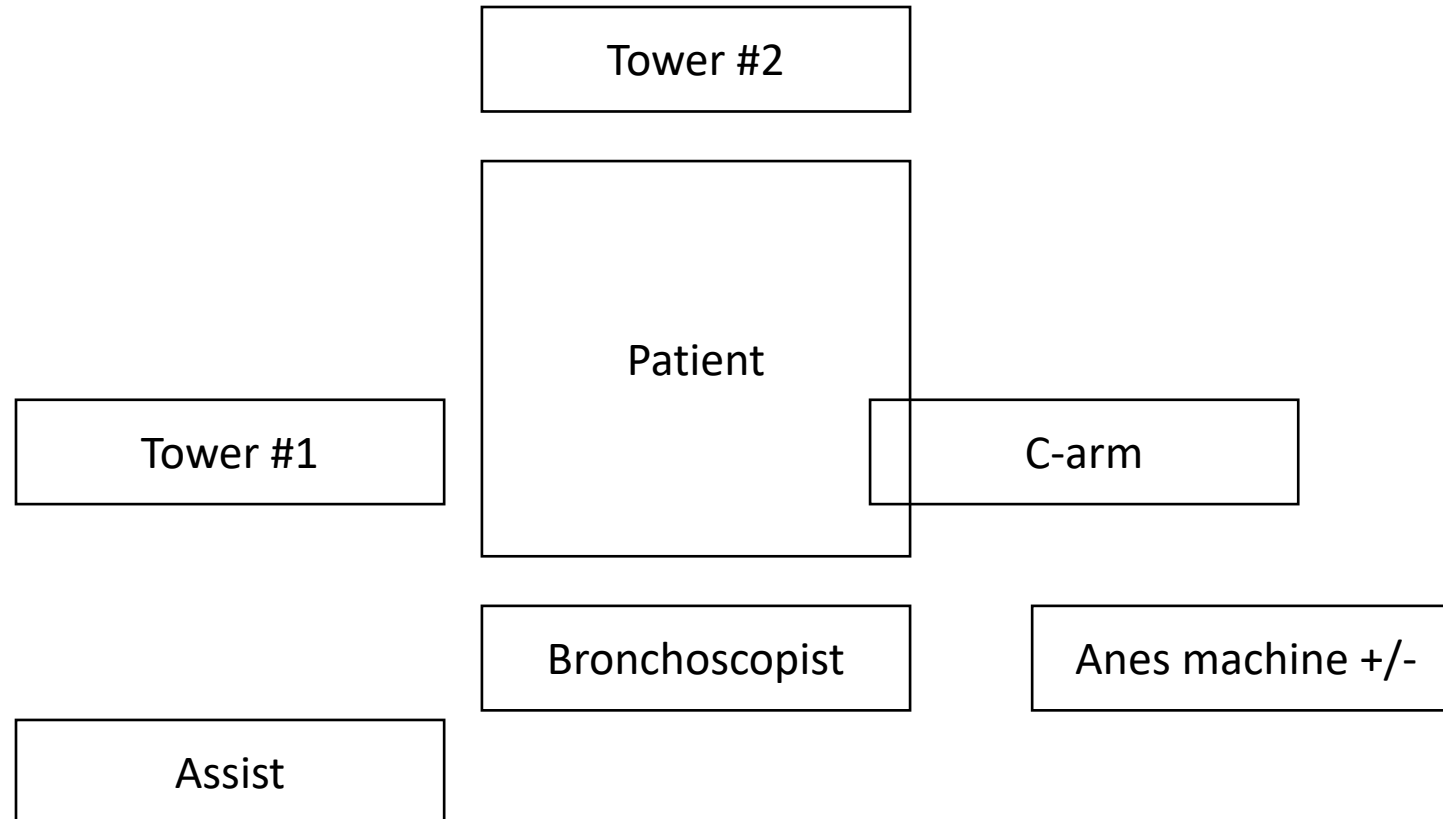


# Mechanics of bronchoscopy

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- Set yourself for success
  - Preparation & positioning (patient, bronchoscopist, support staff, equipment)

- Branch suite

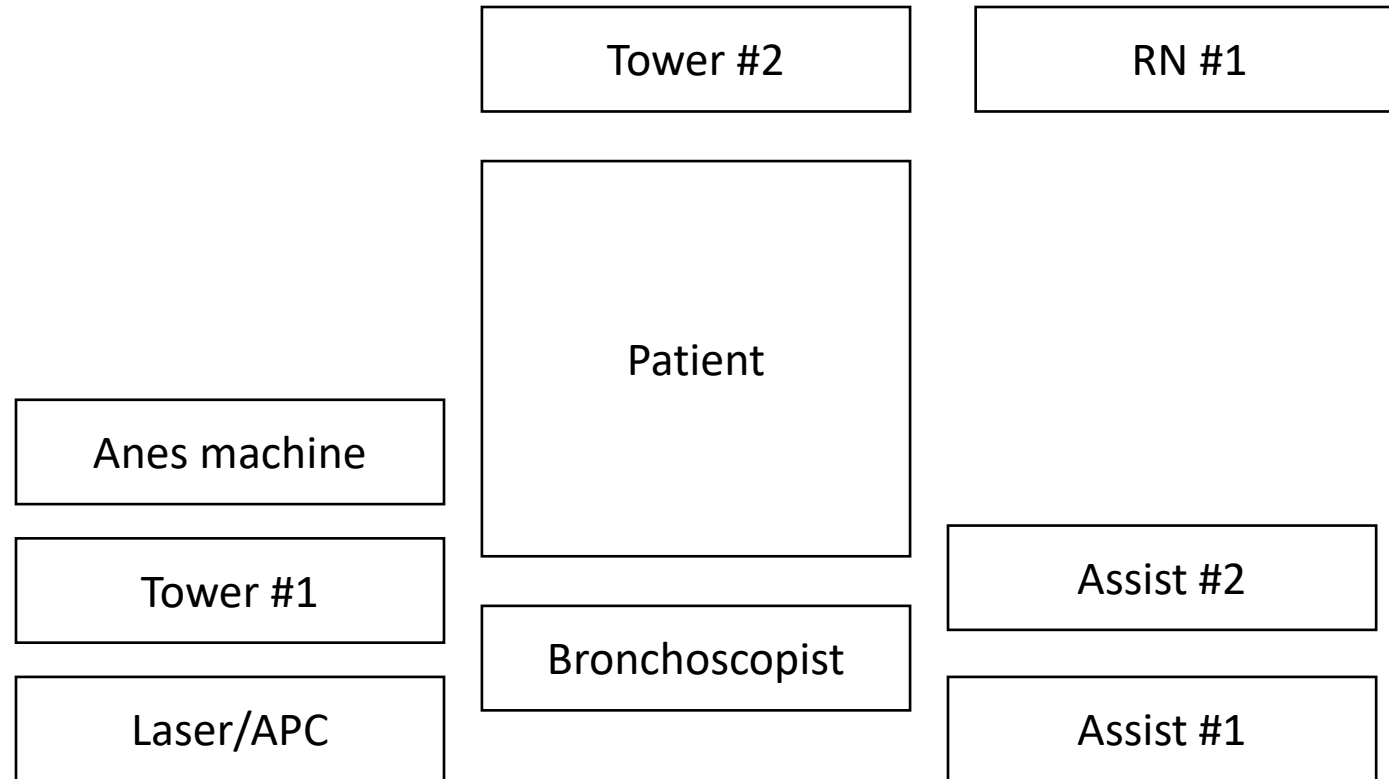


# Mechanics of bronchoscopy

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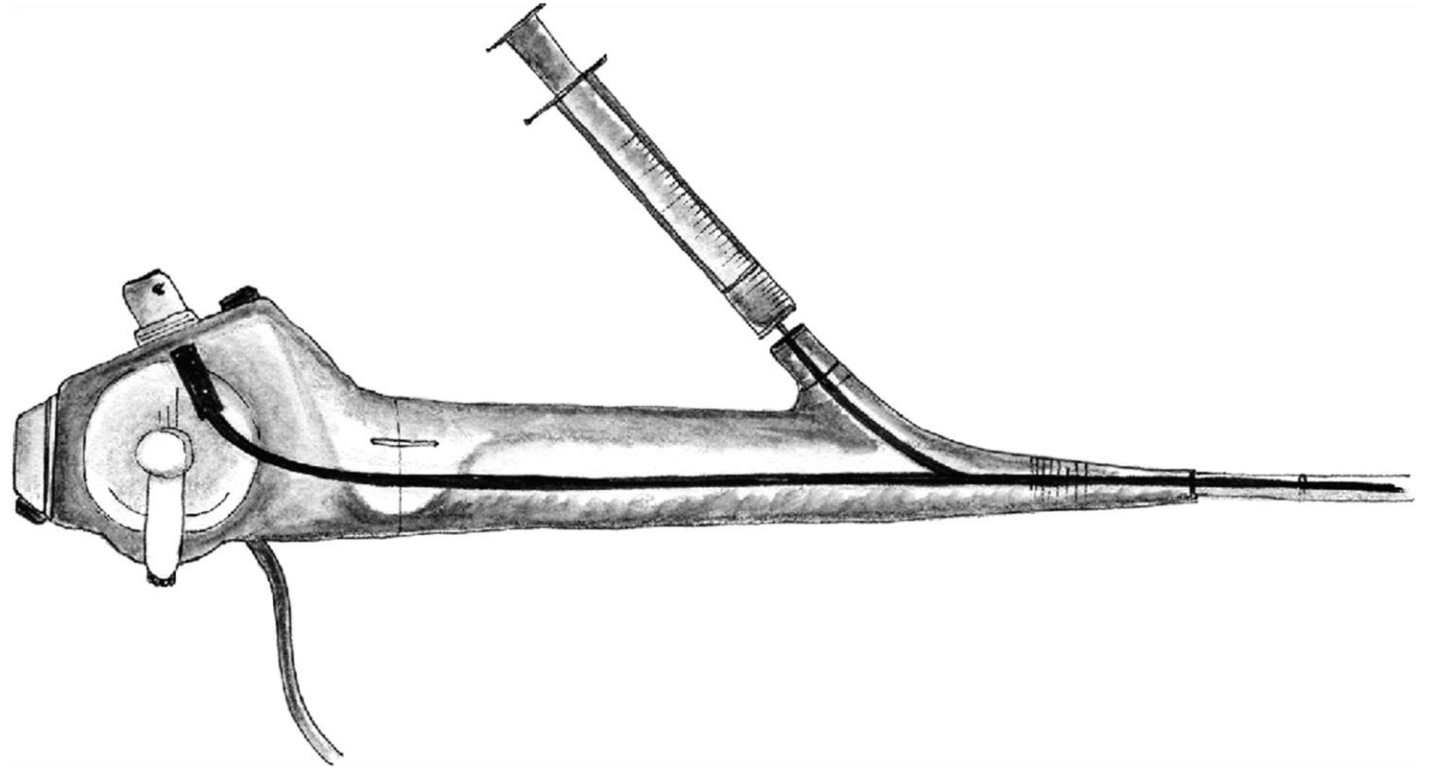
- OR 21



# Mechanics of bronchoscopy

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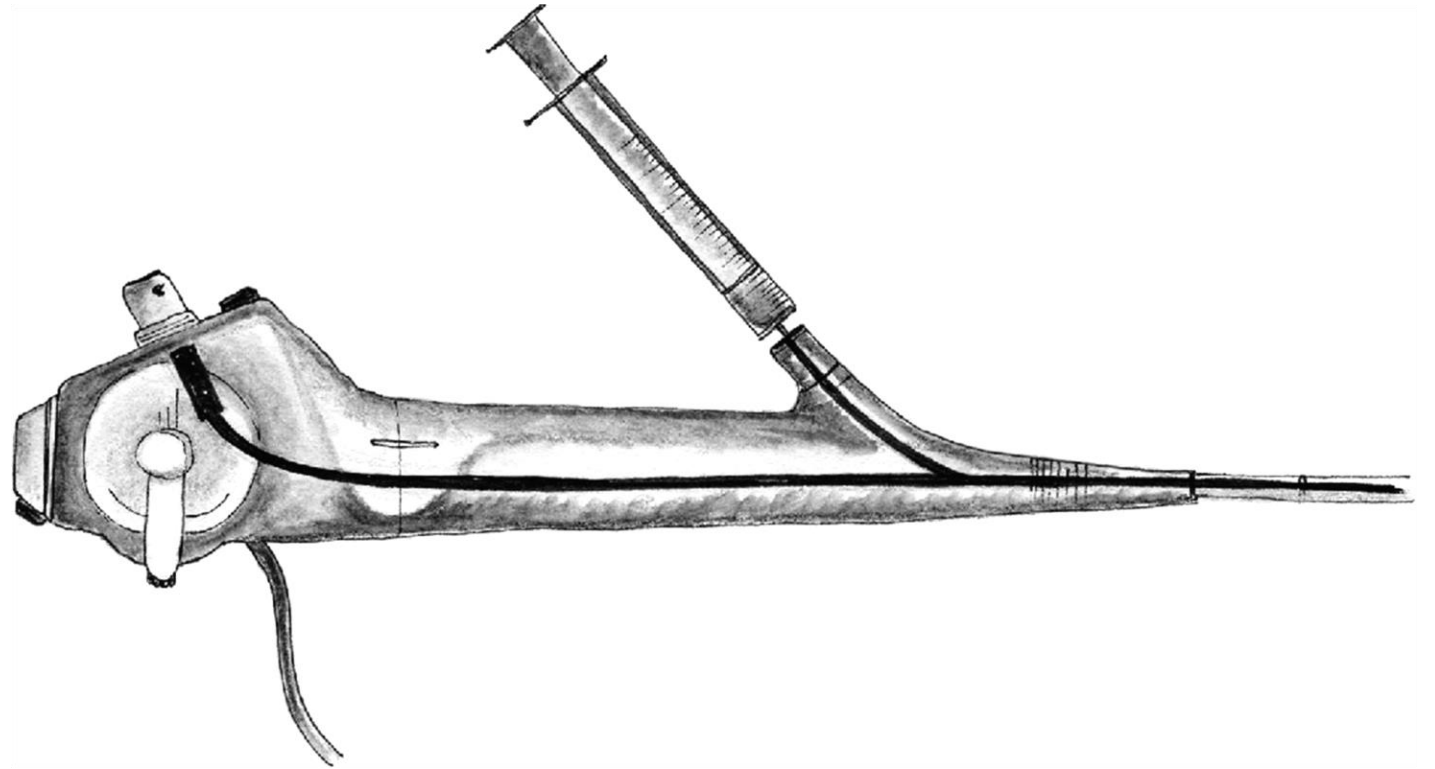
- Scope handling
  - 3-axis control
    - Wrist
    - Thumb
    - Advance/retract
  - Negate elbow and shoulder



# Mechanics of bronchoscopy

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- Wrist



# Mechanics of bronchoscopy

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Flexion



Retroflexion





# Mechanics of bronchoscopy

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- Flexion



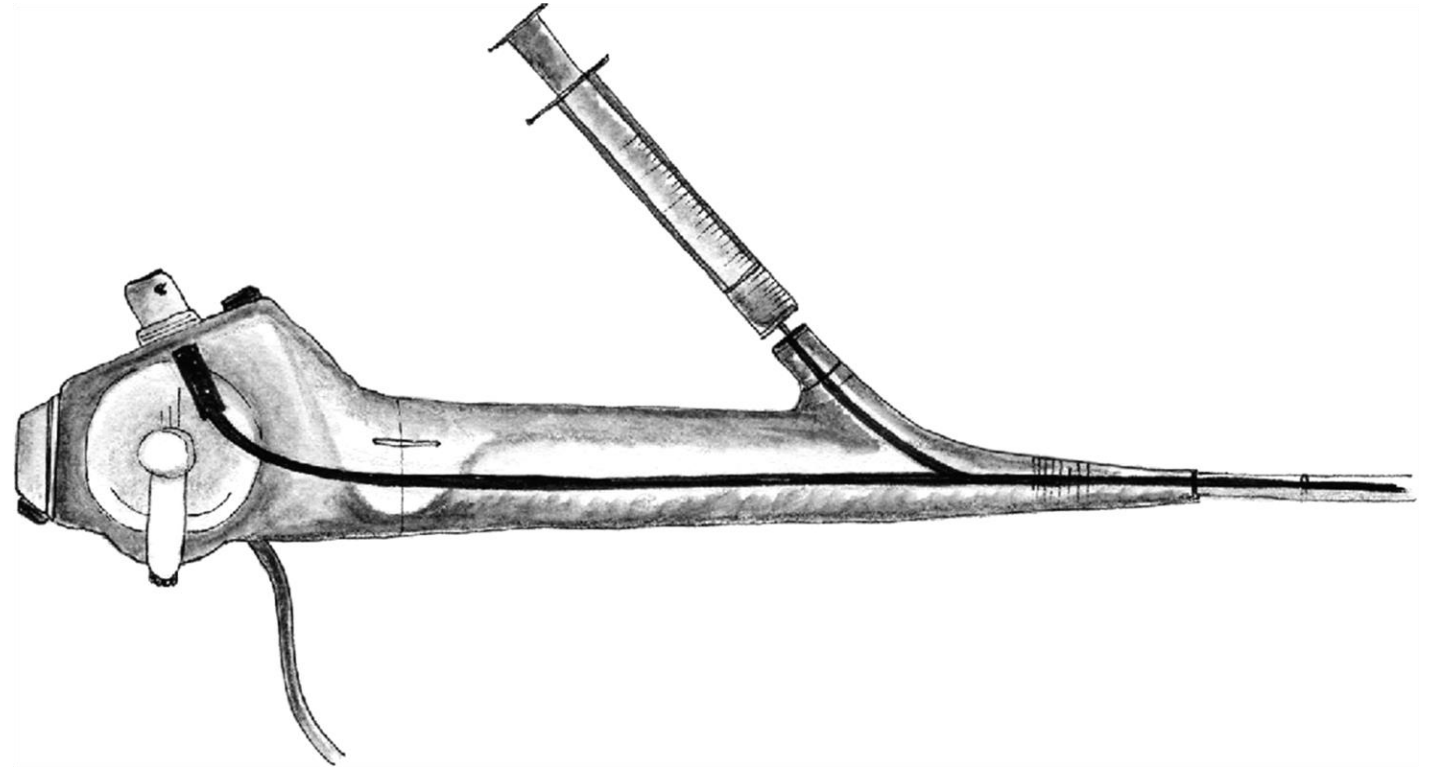
- Retroflexion



# Mechanics of bronchoscopy

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- Advance/retract



# Mechanics of bronchoscopy

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- Spatial awareness
- Progression of skill
- Muscle memory

# Inspection of the airways

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- Orientation guides
  - Position of cartilaginous v/s membranous part of airway walls
  - Position of scope relative to the 'clock'

# Inspection of the airways

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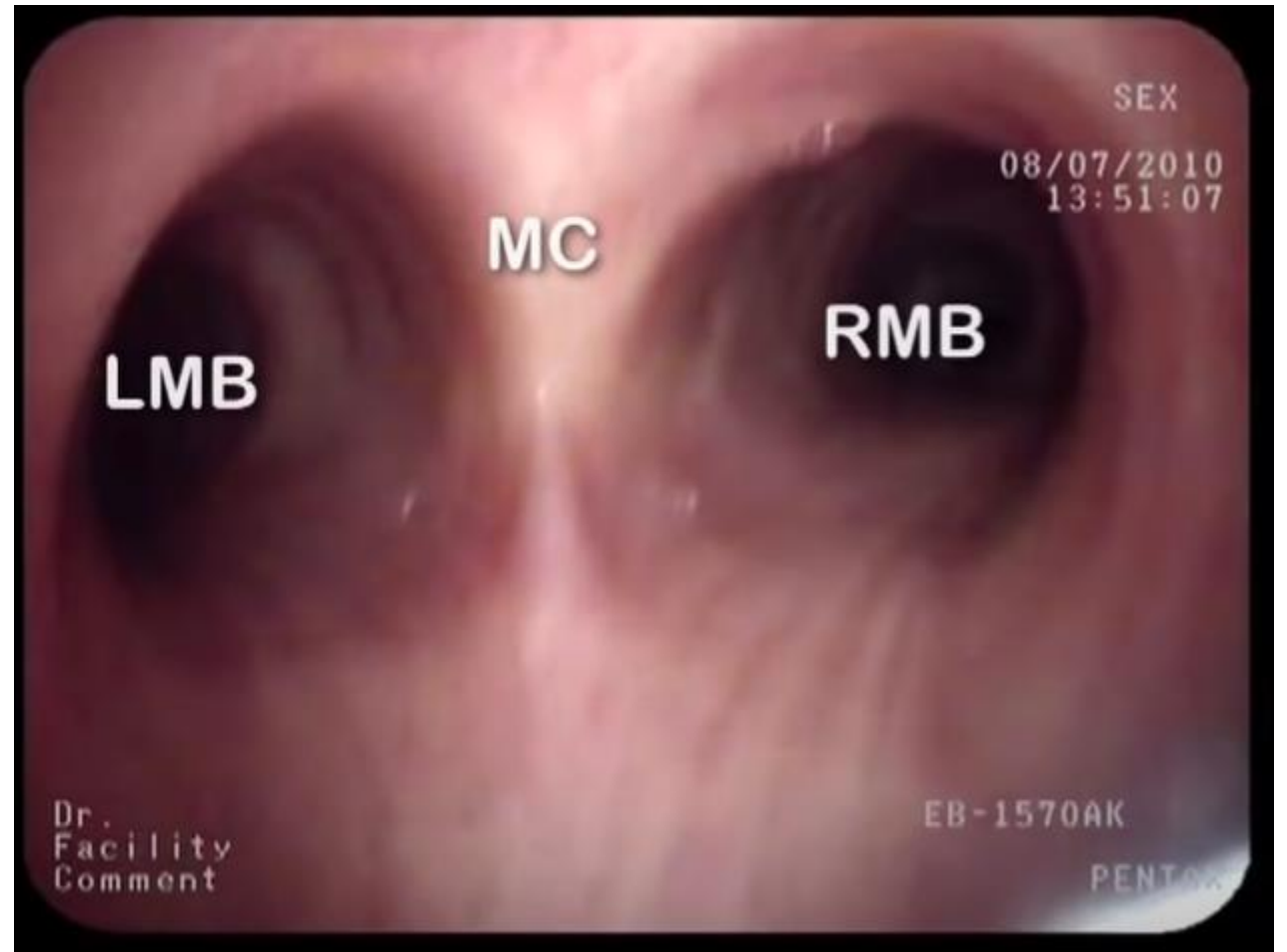
- Trachea
  - Anterior cartilaginous rings
  - Posterior muscular membrane



# Inspection of the airways

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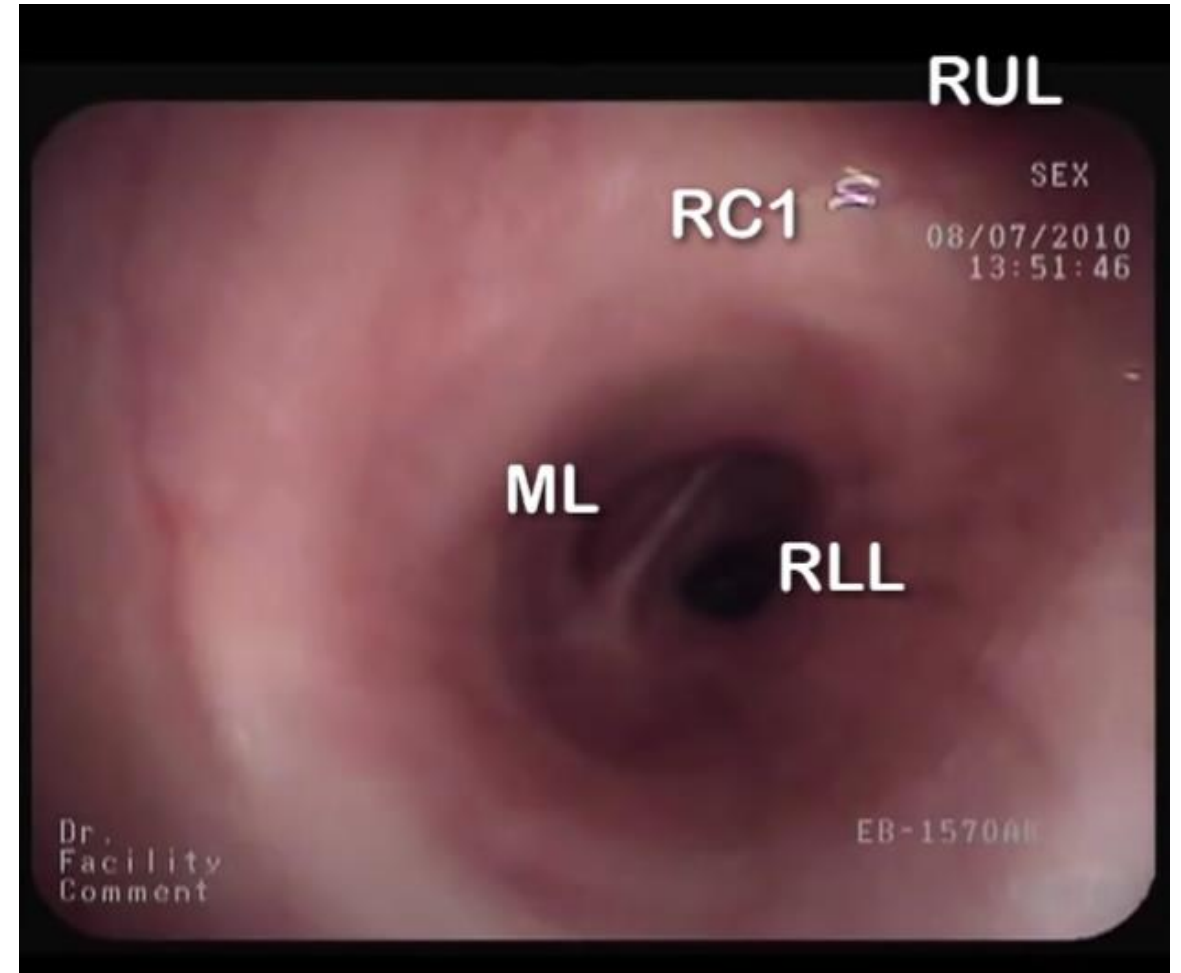
- Main carina
  - Splits into right main bronchus (RMB) and left main bronchus (LMB)
  - Most helpful landmark to reorient



# Inspection of the airways

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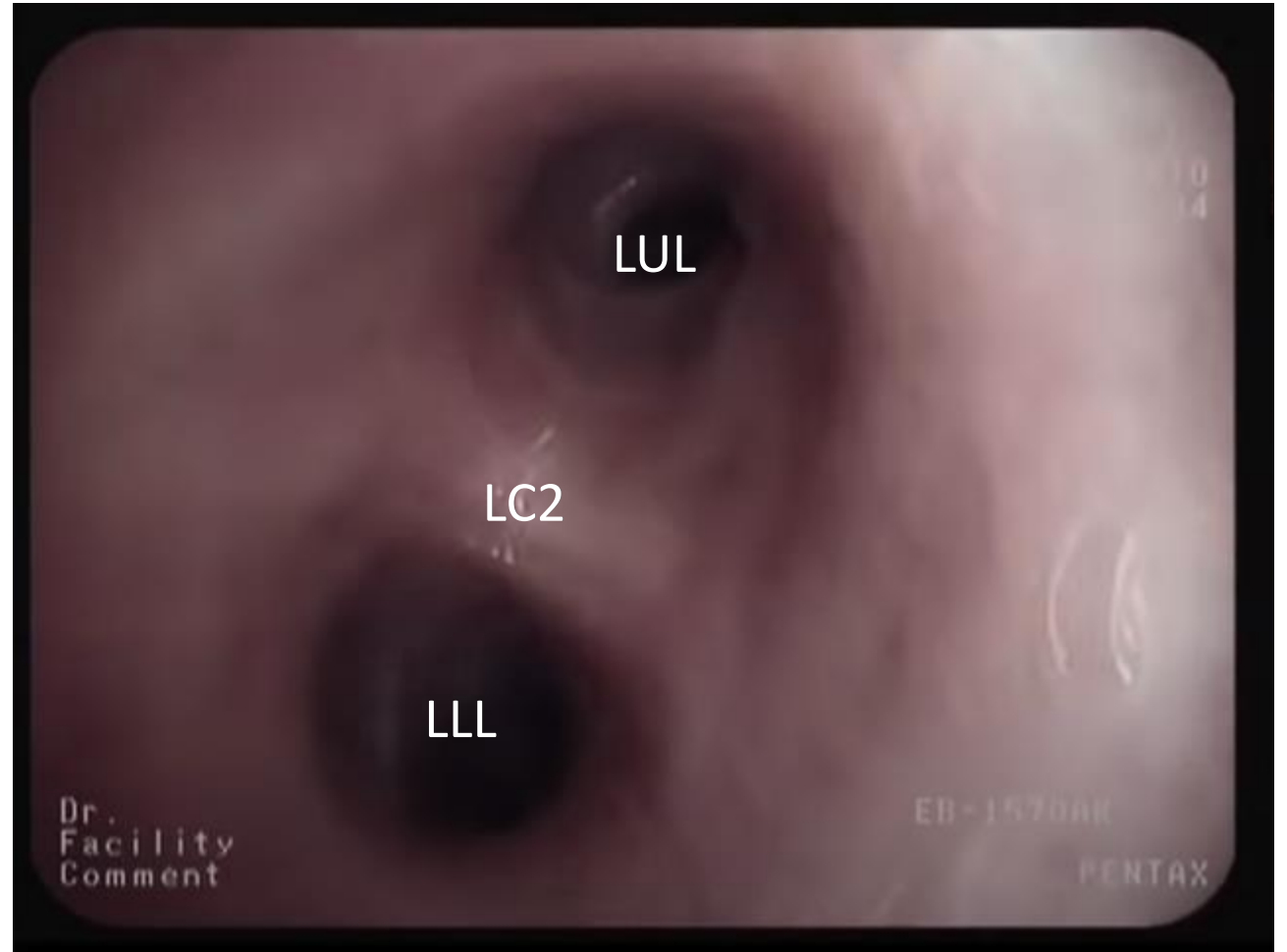
- Distal RMB
  - Splits into right upper lobe and BI (bronchus intermedius)
  - Separated by RC1
  - BI splits into RML and RLL



# Inspection of the airways

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- Distal LMB
  - Splits into LUL and LLL
  - Separated by LC2





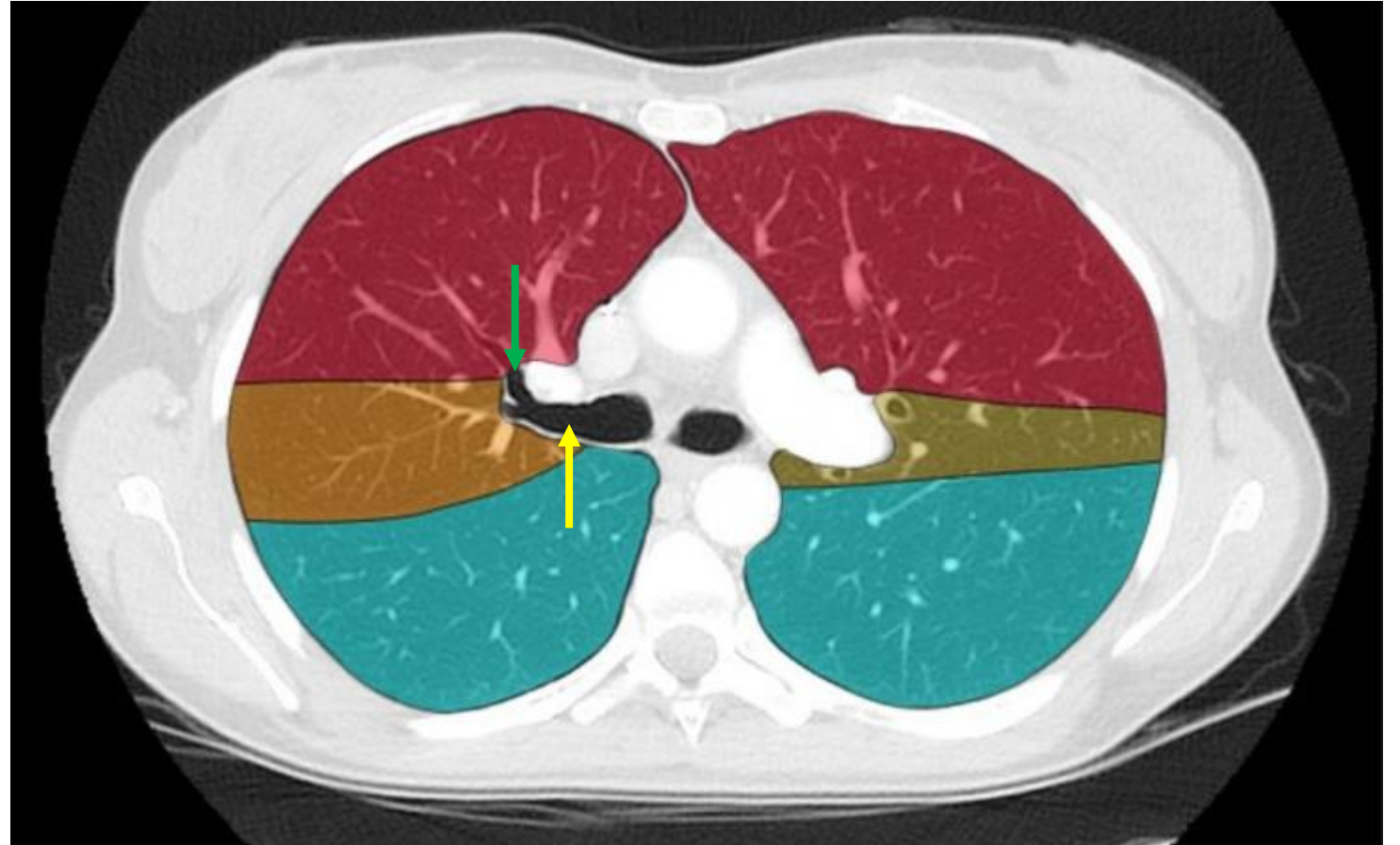
# Bronchoalveolar lavage (BAL)

- BAL

A 'washout' of specific airways distal to and isolated by the bronchoscope

- Yellow arrow – RUL orifice

- Green arrow – RUL ant seg orifice

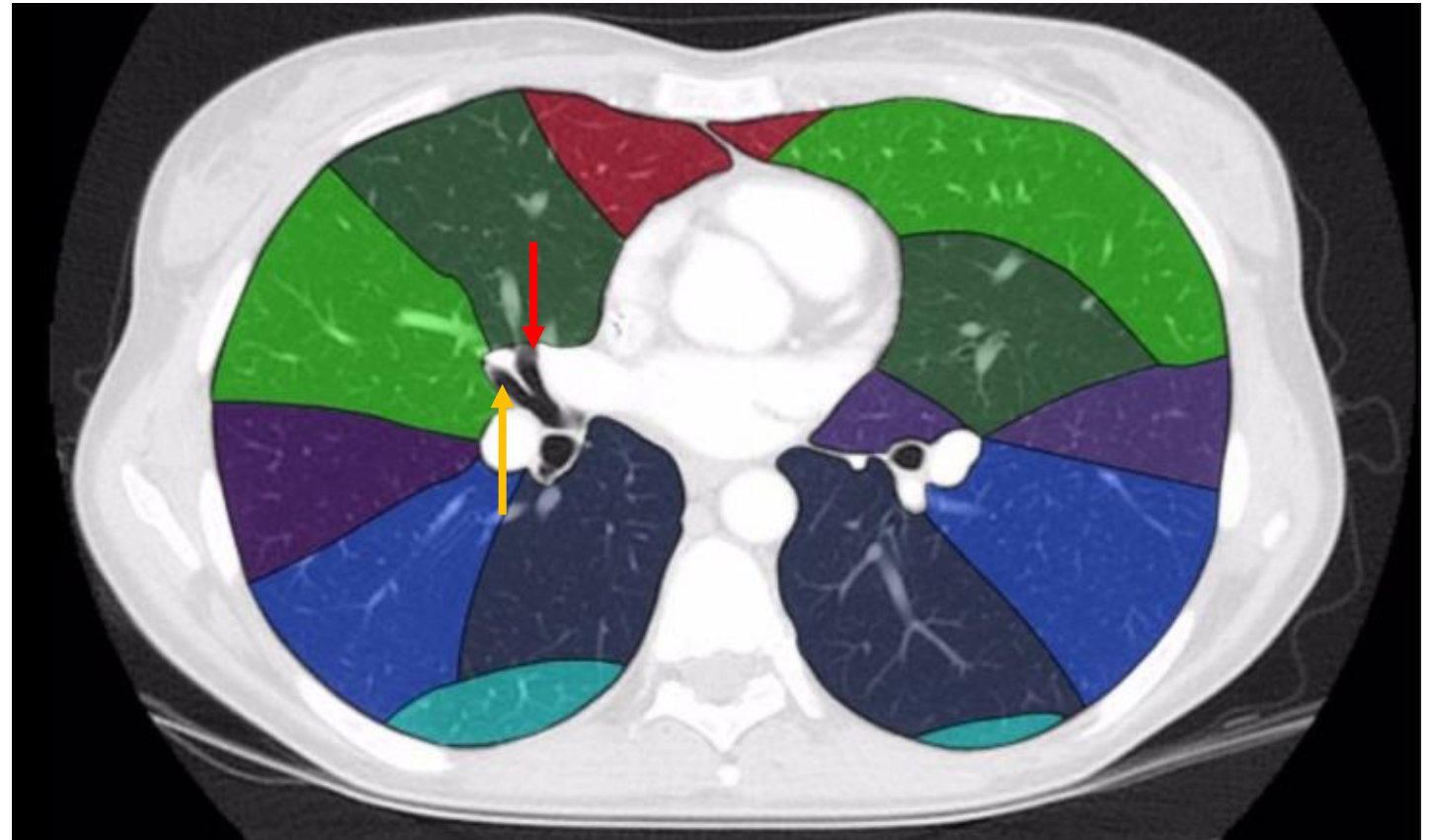


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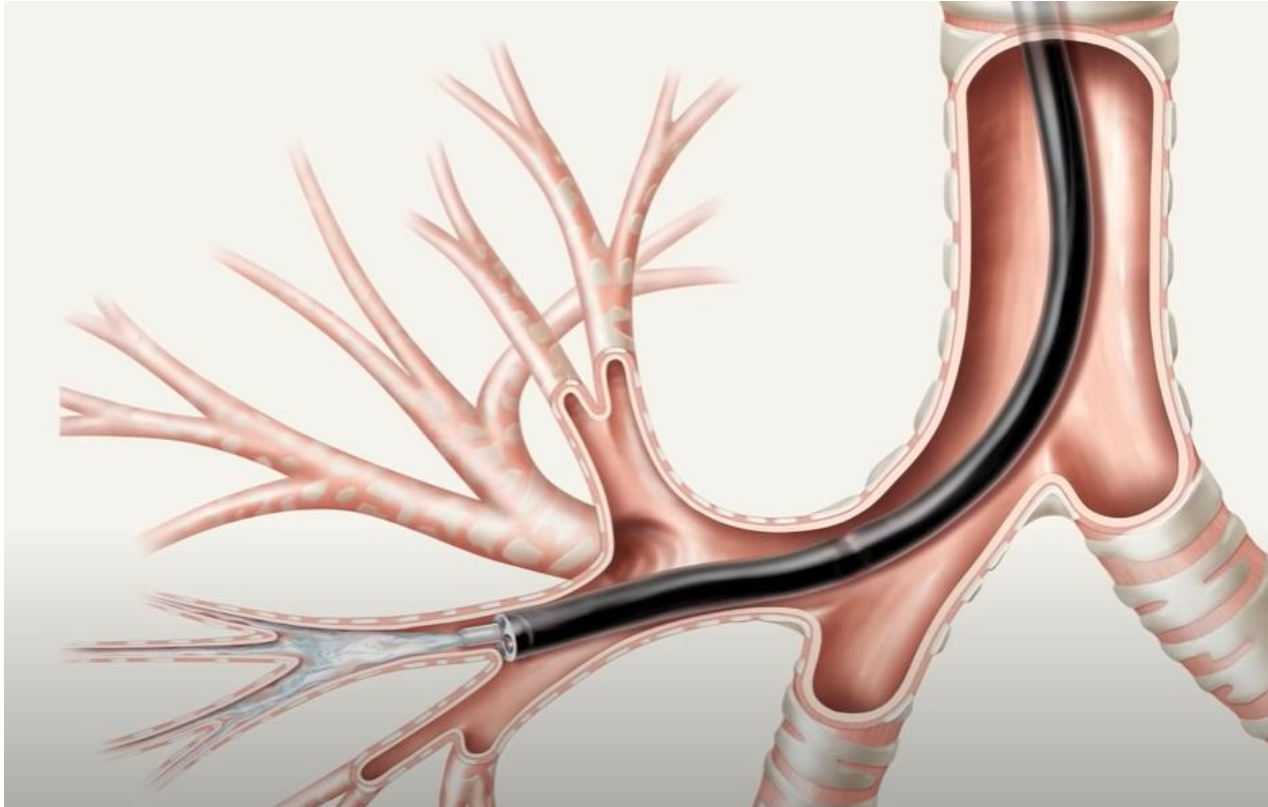
- Red arrow – RML med seg orifice
- Yellow arrow – RML lat seg orifice



# Bronchoalveolar lavage (BAL)

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- Identify the area of interest
- Advance and 'wedge'



[https://www.youtube.com/watch?v=EAmSDmrZWig&ab\\_channel=GlideScope](https://www.youtube.com/watch?v=EAmSDmrZWig&ab_channel=GlideScope)  
[https://www.youtube.com/watch?v=0jVGv\\_rNJ18&ab\\_channel=WesternTrust](https://www.youtube.com/watch?v=0jVGv_rNJ18&ab_channel=WesternTrust)

# Bronchoalveolar lavage (BAL)

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- Flush saline toward patient
- Then, aspirate lavage fluid toward bronchoscope
- **Do NOT SUCTION** while flushing saline toward the patient – saline will simply return without the lavage
- The injection port and suction ports **SHARE** the **SAME CHANNEL**



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# Bronchoalveolar lavage (BAL)

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Technically speaking

- Administer lavage fluid first (100cc)
- Then aspirate the effluent
- Aspiration using a syringe and the instrument port  
or
- Using the suction channel with an intervening trap



# Bronchoalveolar lavage (BAL)

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## Indications

- When the goal is acquiring cells, organisms (not histological sampling)
- E.g.
  - Rule in/out infection
  - Study cell count (ILD)
  - Evaluate for alveolar hemorrhage (sequentially bloody return)
  - Rare – suspect mucinous adenocarcinoma (diffuse involvement)

# Bronchoalveolar lavage (BAL)

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## Contraindications

- No definite contraindications
- But, principally...
  - Coagulopathy (PLT, drugs)
  - Hypoxia (existing or potential)



# Bronchoalveolar lavage (BAL)

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## Complications

- Generally a very safe procedure
  - Principal risk is hypoxia (less commonly from lavage fluid, more so from sedation)
  - Always a risk of scope trauma
  - Risk of bleeding
  - Attendant risks relating to type of sedation

Thank you – and good luck!