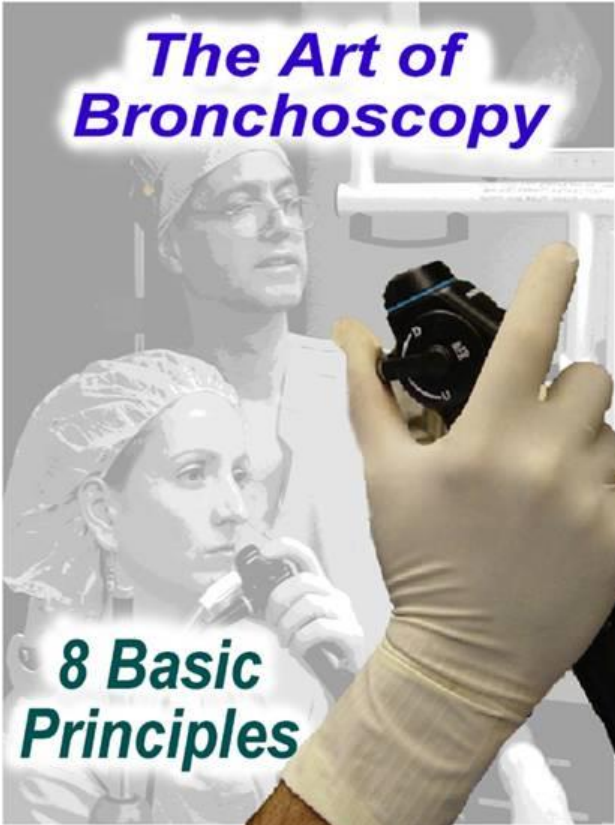


Flexible Bronchoscopy

Part 4C: Transbronchial lung biopsy VOLUME 3



***The Art of
Bronchoscopy***

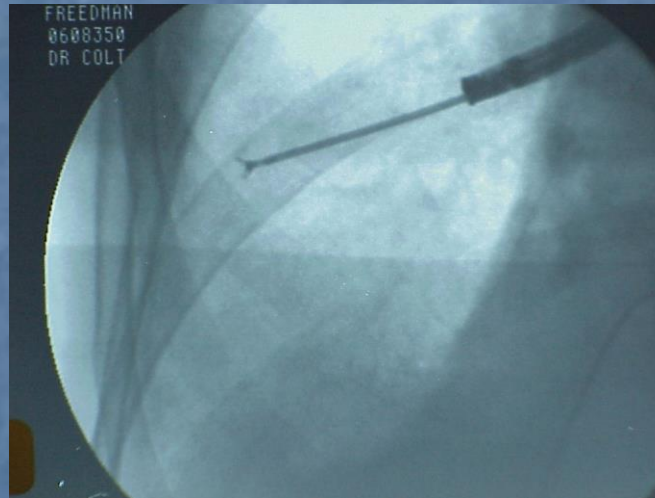
***8 Basic
Principles***

- 1. The bronchoscope wants to do the bronchoscopy*
- 2. Stay in the midline
(Get off the wall).*
- 3. Moderation in everything;
slow down, think, act.*
- 4. If you don't know where you are
you probably shouldn't be there*
- 5. Force is wrong. Return to what you
know; then move on and grow.*
- 6. Slow down to finish faster.*
- 7. Treasure basic values: peace,
harmony and kindness*
- 8. You and the bronchoscope are one*

Prepared By
Bronchoscopy International
Contact us at BI@bronchoscopy.org

Transbronchial lung biopsy (TBLB)

More about biopsy techniques and prevention of procedure-related complications

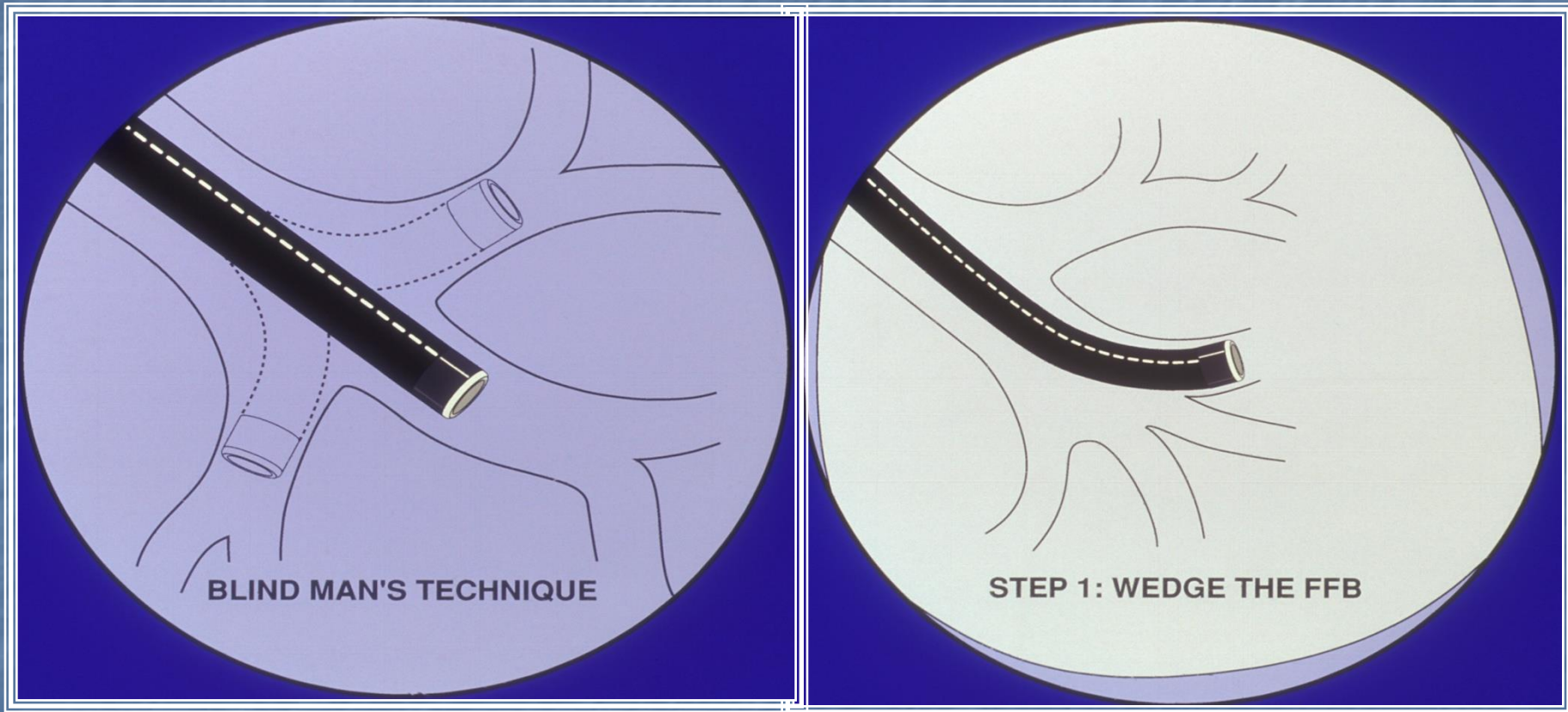


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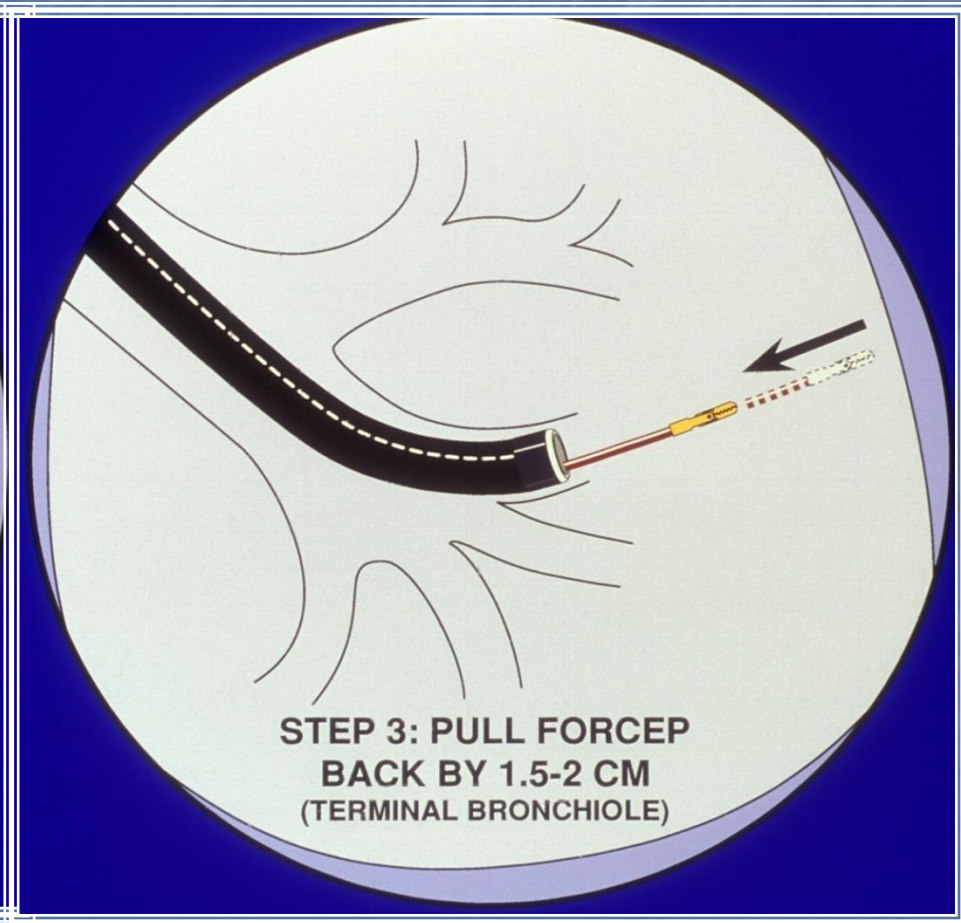
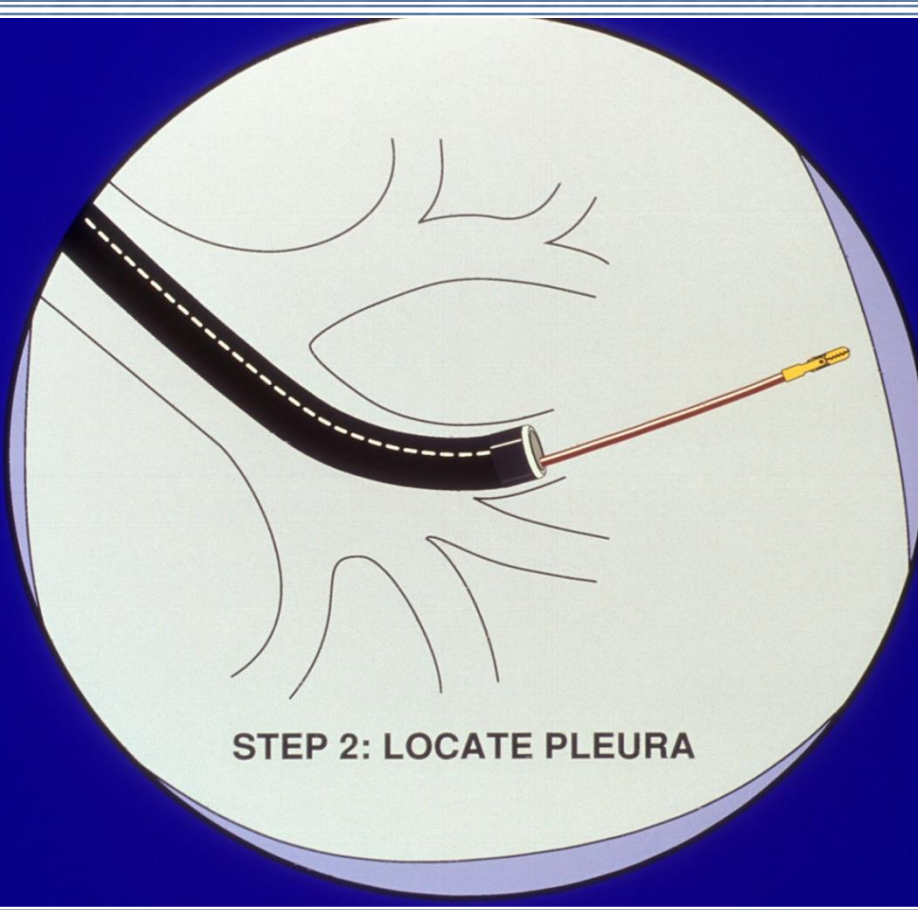
Manipulating the bronchoscope during TBLB

[Video of TBLB](#)

Techniques of TBLB without Fluoroscopy



Advance the forceps until gentle resistance is met.
Then pull back. Patient may have pain if forceps is
out too far



Advance the open forceps again until gentle resistance is met. After closing the forceps, pull back immediately without entering the bronchoscope. Keep the scope wedged.



Diagram illustrating Step 4: Open the forceps during inspiration. A bronchoscope is shown wedged against the bronchial wall. The forceps are open, and the airway is dilated during inspiration.

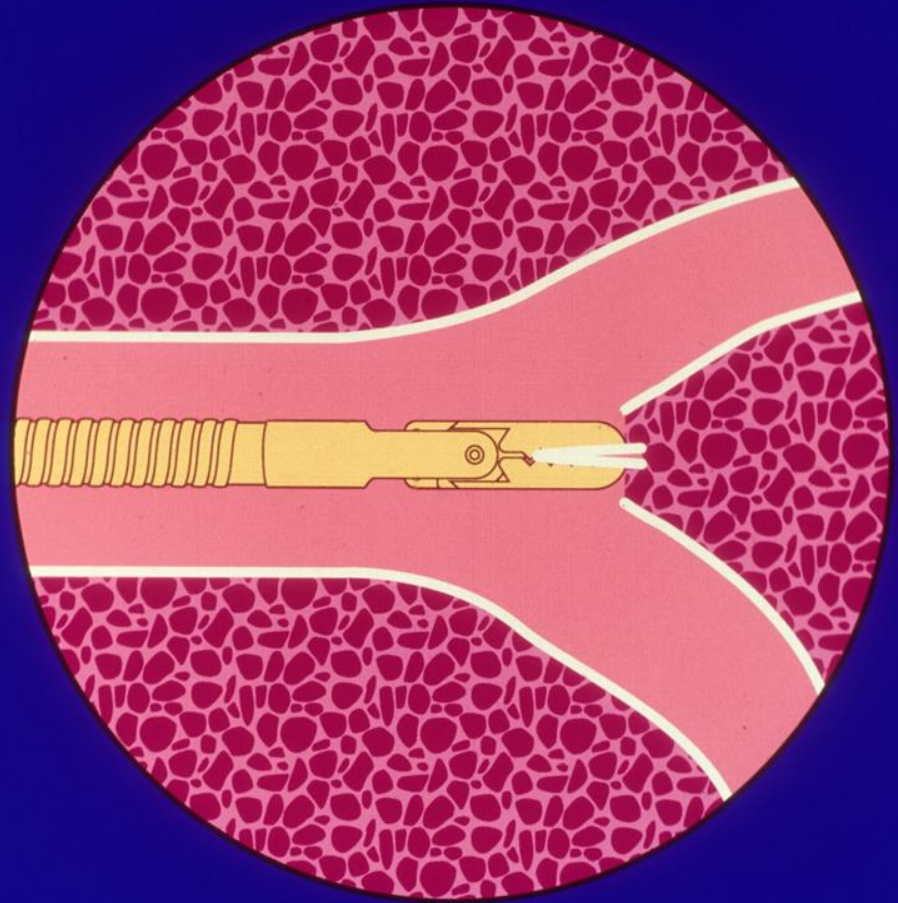
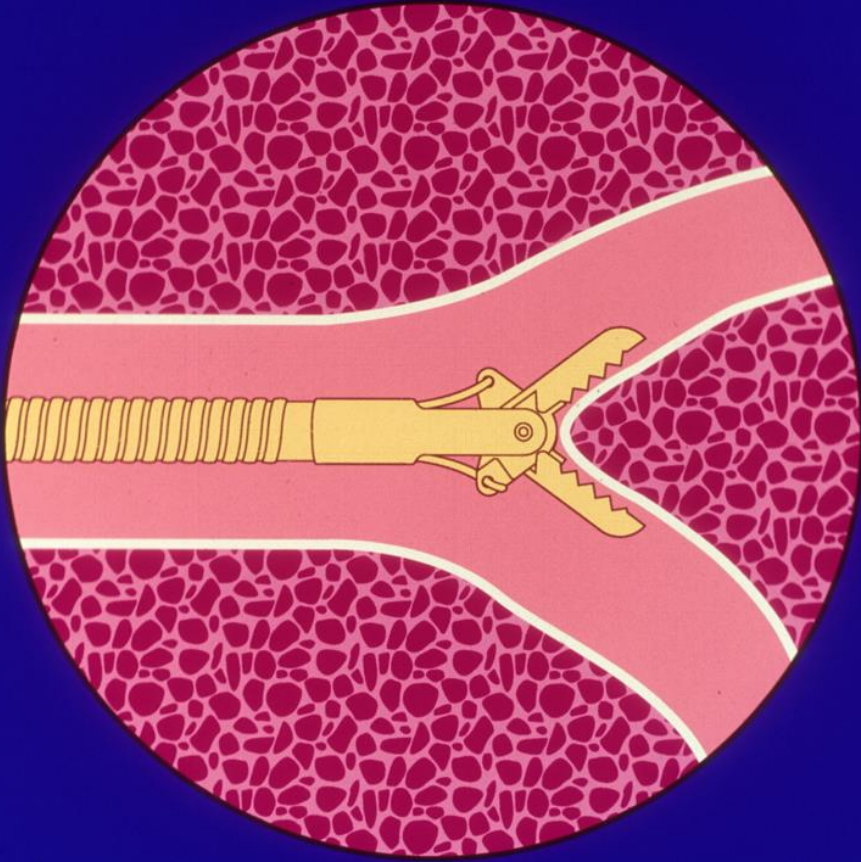
**STEP 4: OPEN THE FORCEPS
DURING INSPIRATION**



Diagram illustrating Step 5: Advance forcep during Exhalation. The forceps are closed, and the airway is narrowed during exhalation. An arrow indicates the direction of advancement.

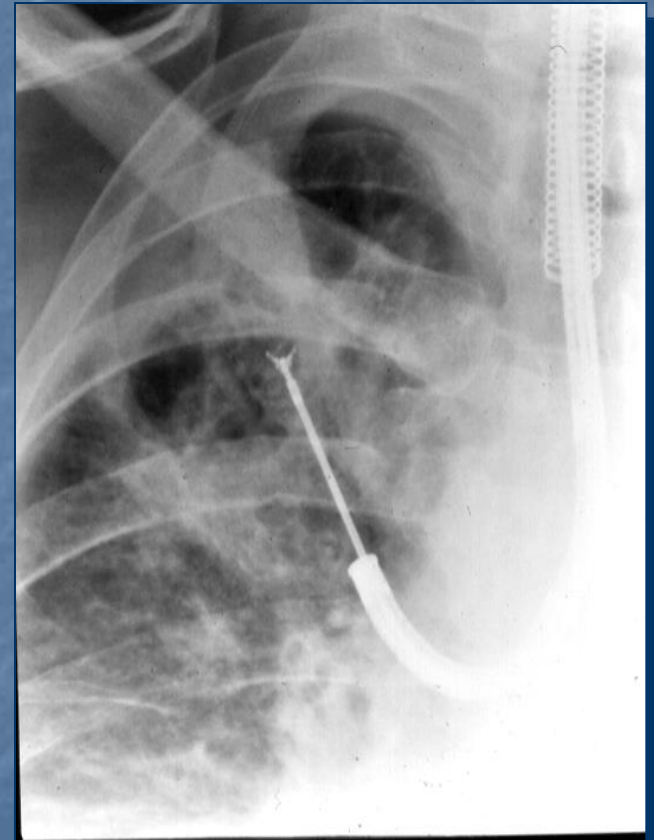
**STEP 5: ADVANCE FORCEP DURING
Exhalation**

Anchor Forceps at Bifurcation of Respiratory Bronchioles



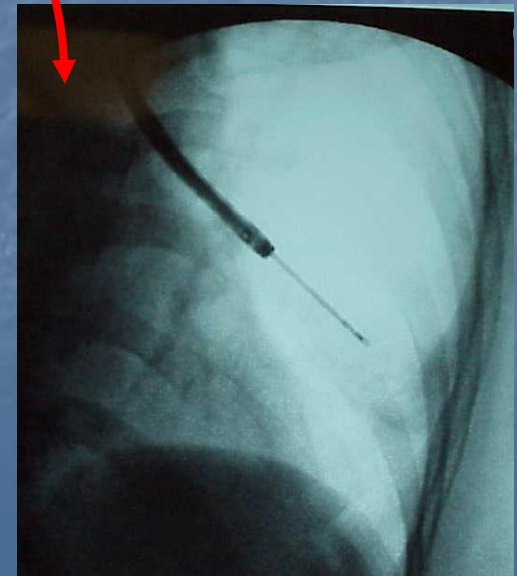
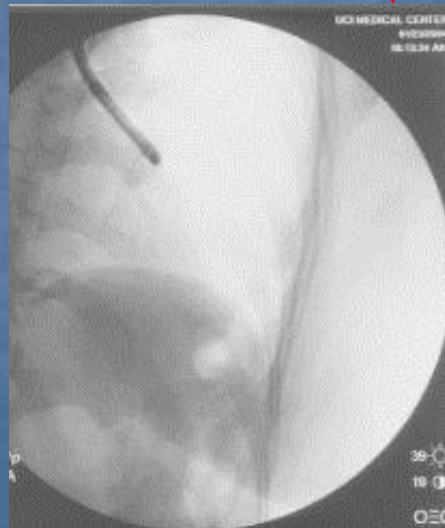
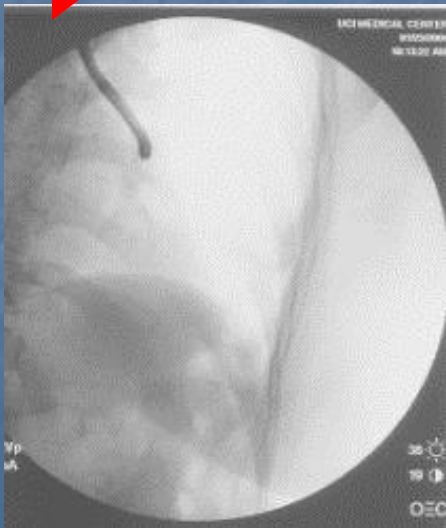
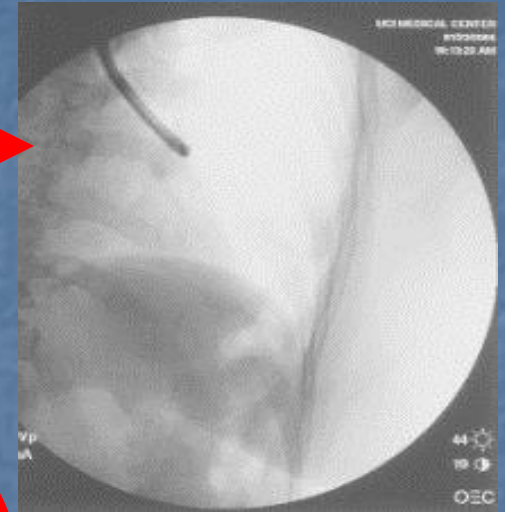
Similar technique is used under fluoroscopic guidance

- Usually 4-5 specimens are obtained
- Lung parenchyma is obtained by tearing the respiratory bronchioles
- Forceps too distal may cause pneumothorax
- Forceps too proximal may cause bleeding



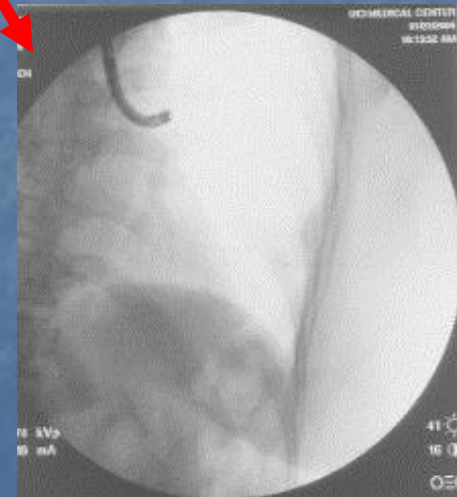
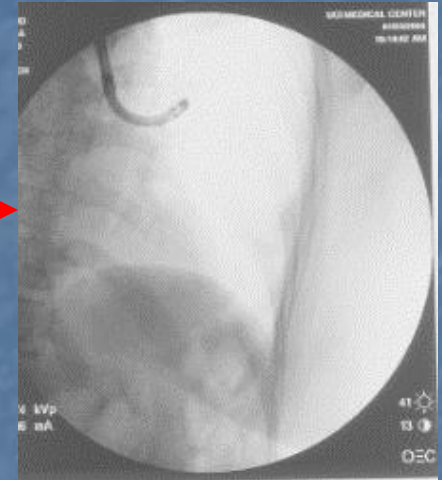
Left lower lobe fluoroscopic guidance

- Anterobasal LB 8
- Lateral basal LB 9
- Posterior basal LB 10
- Superior segment LB 6



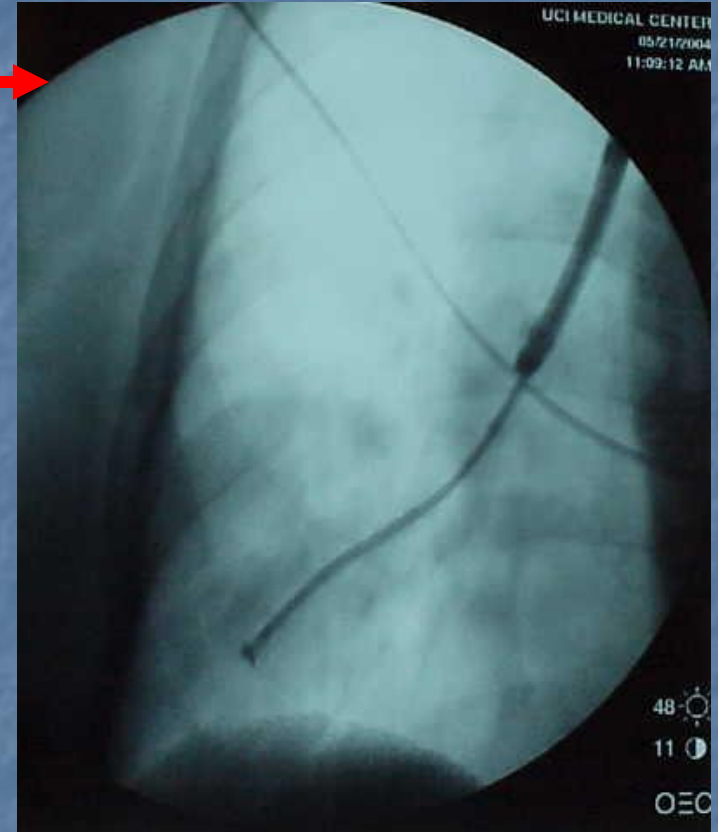
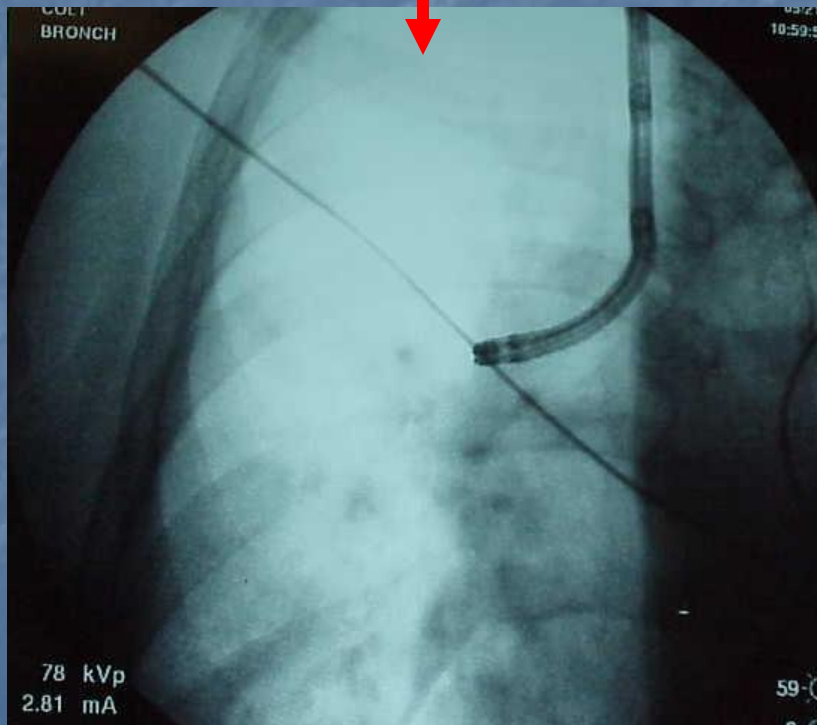
Left upper lobe fluoroscopic guidance

- Apical posterior LB 1+2
- Anterior segment LB 3
- Lingula LB 4+5

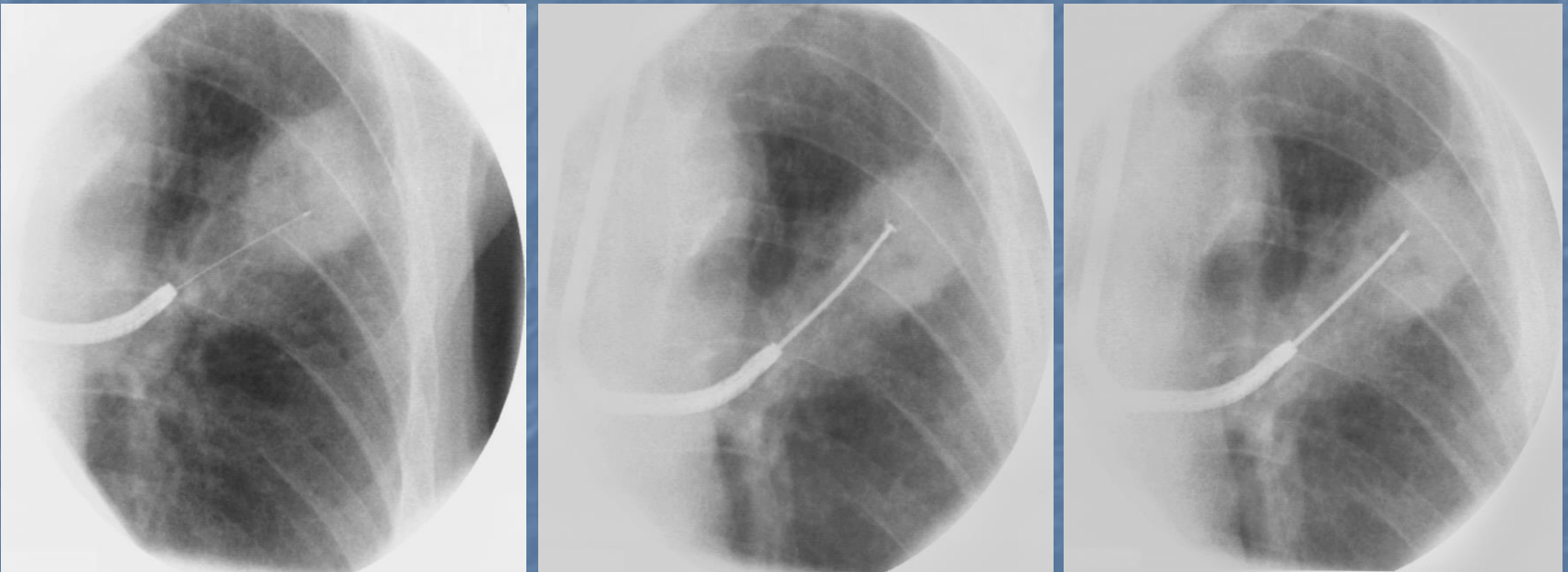


Right lower lobe fluoroscopic guidance

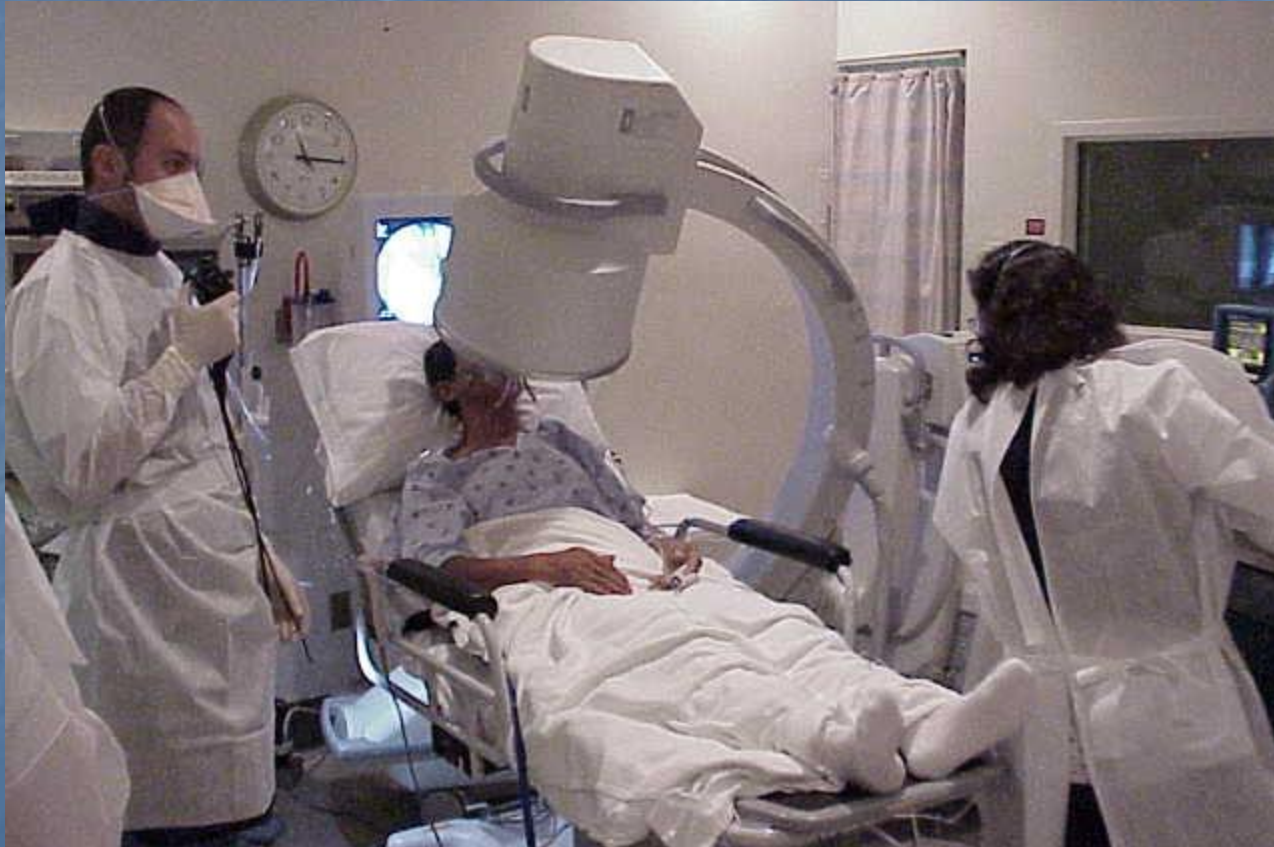
- Anterior basal RB 8
- Lateral basal RB 9



Fluoroscopy is especially useful in case of focal disease



Fluoroscopy can be performed using C-arm with patient supine or sitting



Indications for fluoroscopy

- To localize abnormalities
- TO help prevent pneumothorax
- TO extract foreign bodies
- TO perform biopsy or brushing of solitary pulmonary nodules
- To improve diagnostic yield
- To detect pneumothorax

If necessary, forceps can be advanced into various segments. Position is verified using fluoroscopy before biopsies are obtained

[Video of forceps probing basal segments](#)

However, TBLB is “safe” without fluoroscopy

- Andres G et al, Chest 1988;94:557
 - TBLB: 122 with & 135 without Fluoroscopy
Diagnostic yield higher for focal diseases with Fluoro (pre-CT era), complication rate same
- Mulligan S et al, ARRD 1988; 137:486
 - N=168, Retrospective, AIDS & PCP, yield and complications same
- Puar HS, Chest 1985: 87:303
 - N=68, Sarcoidosis, Yield 76%, 1 Pneumo
- Computed tomography scans can help avoids need for double image fluoroscopy

Complications after TBLB

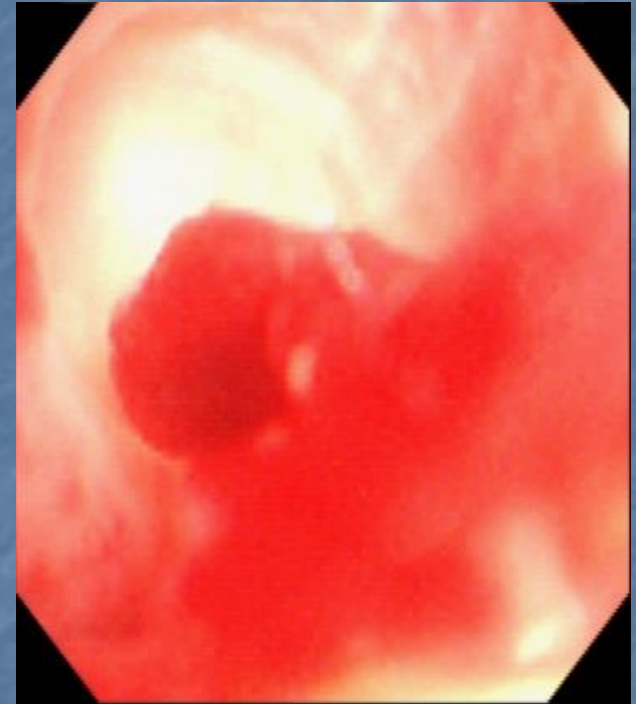
- Review of 22 prospective studies of BLB (1974-1991)*
- Fluoroscopy employed in 19 studies

■	BLB	PTX	Bleed	Death
■ Total (n)	4,252	167	89	5
■ Percent		4.0	2.1	0.1

* Courtesy: Villeneuve and Kvale in: Textbook of Bronchoscopy
Editors: Feinsilver and Fein, Williams & Wilkins, 1995, page 64

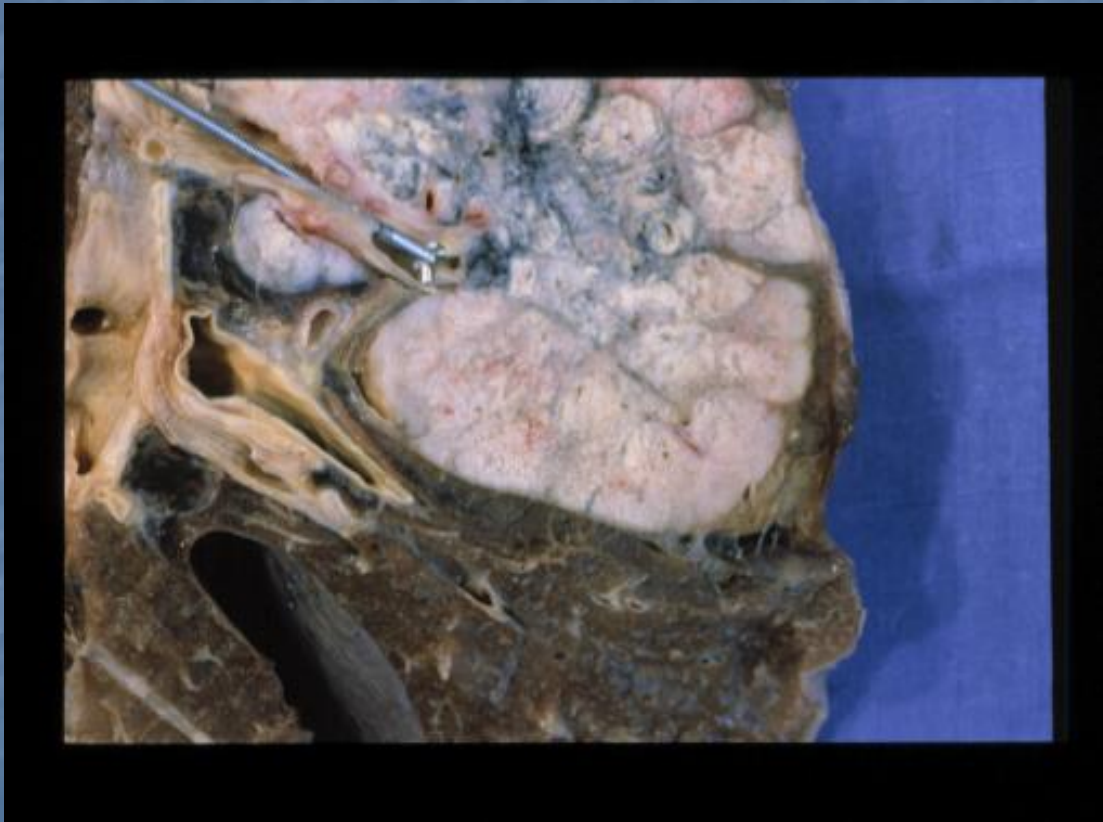
Preventing bleeds during and after TBLB

- Avoid biopsy in bleeding diatheses.
- Maintain wedge position after biopsy.
- Avoid excessive suction after biopsy. Instead, use gentle brief suction to assess degree of bleeding.
- If bleeding is excessive: gently instill 5-10 ml iced-saline through FFB, wait for 30 sec, then suction gently.
- Epinephrine, 1:10,000 (1-3 ml) via FFB is usually not useful if bleeding is distal



Iced saline via scope
wedged into segmental
bronchus

True or False: A chest radiograph should always be performed after TBLB



False. Chest radiographs are not always necessary after TBLB

- Fluoroscopy can reveal lung collapse
- Pneumothorax occurs in < 3 % of patients.
- Chest 2006;129:1561-1564
 - Among 350 consecutive biopsies, chest radiograph within 2 hours after procedure revealed pneumothorax in 10 patients, 7 of whom were symptomatic
- Chest radiographs are probably indicated only in symptomatic patients.

TBLB in special circumstances

- Pulmonary arterial hypertension
- Renal failure
- Antiplatelet agents

TBLB in Pulmonary arterial hypertension

- TBLB is not a primary diagnostic test for PAH.
- Bleeding following TBBX is from bronchial artery circulation which carry systemic pressures.
- In patients with supra-systemic PAH, bronchoscopy itself is high risk because of severe hypoxemia.
- As of 2007, a single animal study has shown safety of TBLB when MPA pressure were high (33 mm Hg).

TBLB in Renal Failure

Check INR & platelet count

Bleeding time can be misleading

Dialysis within 24 hrs prior to procedure with TBLB

Correct INR and platelet count if necessary (<1.5 , $>50,000$)

Desmopressin (DDAVP) $3\mu\text{g/kg}$, IV 30 min prior to the procedure costs \$ 1000, potential use of DDAVP analogues, estrogen, Cryoprecipitate)

Risk of bleeding is about 8%

Mehta N, JOB, 2005; 12(2): 81-83

Mannucci, NEJM 1983;308:3

Clopidogrel should be discontinued at least 5 days before TBLB

- N=604 patients,
- Clopidogrel = 18
- Clopidogrel + aspirin = 12
- Control = 574

Bleeding frequency:

- Clopidogrel = 16/18 (89%)
- Clopidogrel + aspirin = 12/12 (100%)
- Control group = 20/574 (3.4%)

Aspirin itself need not be stopped before TBLB

Other antiplatelet agents and Anticoagulants

- Aspirin ⁽¹⁾ , Ticlopidine need not be discontinued
- Warfarin (Coumadin) should be discontinued until INR <1.5
(or INR corrected using Fresh Frozen Plasma or Vitamin K)
- I.V. Heparin should be stopped 2-6 hrs prior to biopsy. Check PTT.
- Low molecular weight heparin should be held 12 hrs (hold previous dose).
- S.Q. Heparin is safe and can be continued.
- Follow recommendations for all other newer anti-coagulants and other agents.

(1) Herth F, Chest 2002;122;1461

Prepared with the expert assistance of Udaya Prakash M.D. (Mayo Clinic, USA), and Atul Mehta M.D. (Cleveland Clinic, USA), and John Conforti M.D. (Wake Forrest, USA)



Udaya Prakash



Atul Mehta

This presentation is part of a comprehensive curriculum for Flexible Bronchoscopy. Our goals are to help health care workers become better at what they do, and to decrease the burden of procedure-related training on patients.

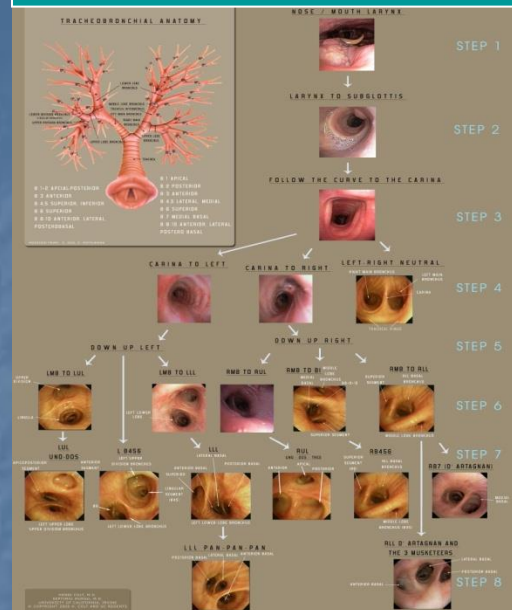
The Essential Bronchoscopist



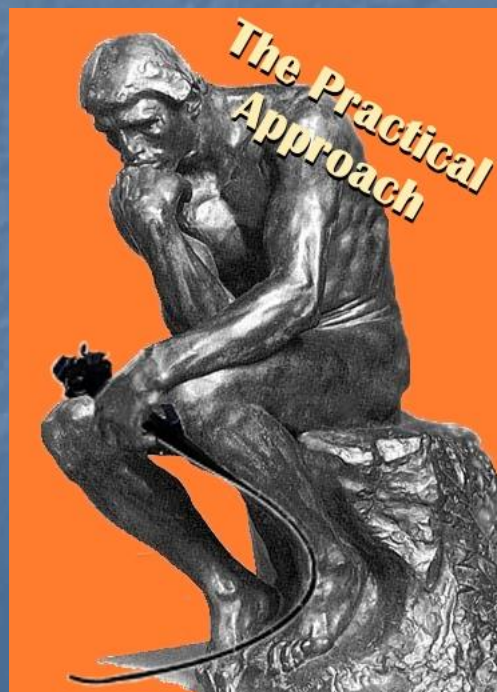
MODULE 1



Step by Step©



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The Art of Bronchoscopy

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Thank you