

Safe Insertion of a Chest Drain

Dr. Richard Morris

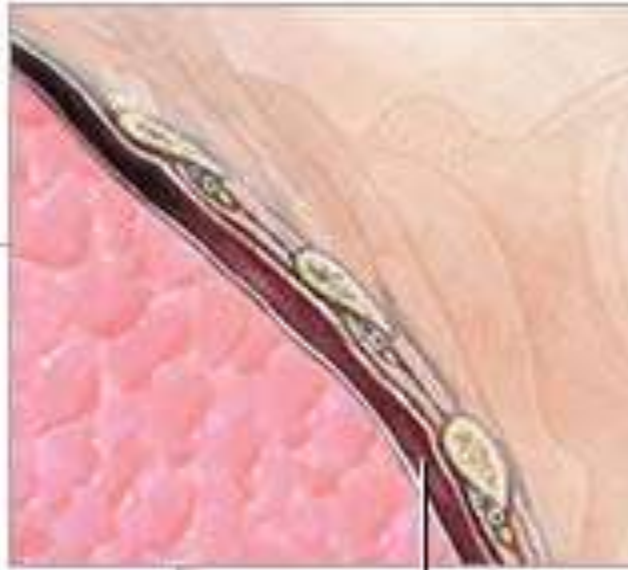
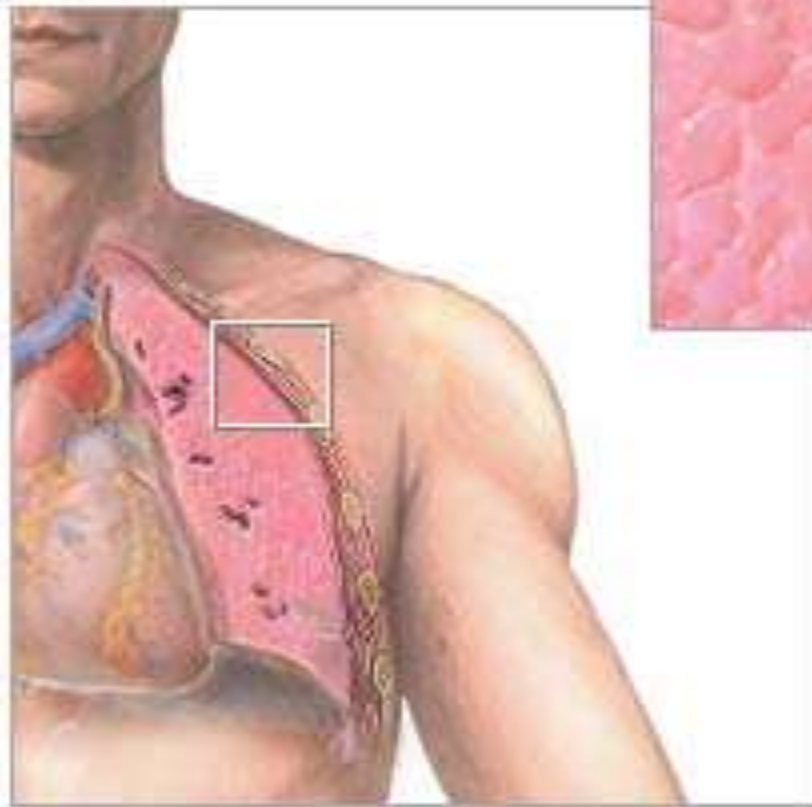


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Acknowledgements:

- A lot of people including:
 - Mary Dunford
 - Craig Herbert
 - Richard Morris
 - Ben Siggers
 - Caesar Ursic
 - Helen Ward

Some Anatomy & Physiology



Pleural Pressures [cmH₂O]

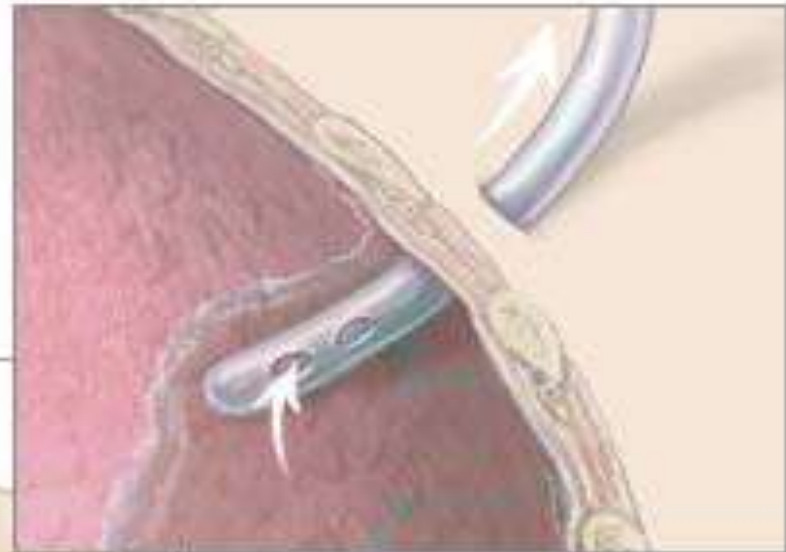
	Inspiration	Expiration
Spont	-10	-5
IPPV	+10	-5

Pathological Fluids:

Air

Blood

Effusions



Chest tube
drains fluid from
pleural space

Pneumothorax

- Closed
 - Tear or bleb in lung
 - Can reabsorb or tension [esp. IPPV]
- Open
 - Connects to outside
 - SV: lung collapses
 - IPPV: lung OK
- Tension
 - Pleural air under pressure
 - Subcut. emphysema, deviated trachea
 - Distorts mediastinum
 - Causes circulatory collapse
 - Urgent to convert to open or drain it.

Blood, Pus & Effusions

- Haemothorax
 - Need a large drain
 - Operate when:
 - >1000 mls loss
 - >200 mls/hr X2
- Empyema
 - Pneumonia, TB
 - May be loculated
- Effusions
 - Can use small drain
 - Transudate
 - bilateral
 - low protein
 - CCF, chirosis, renal
 - Exudate
 - unilateral
 - high protein
 - infections, cancer, inflammatory.

Insertion Problems in Reviews

- Daly [3 in 164]
 - 1 subcutaneous, 1 postpleural space and 1 in lung
- Deneuveville [9 in 134]
 - 5 subcutaneous, 2 in lung, 1 diaphragm and 1 subclavian vein
 - All with trocar
- Bailey [0 in 57]
- Heng [0 in 211].

0 to 7%

Infection Problems in Reviews

- Daly [3 in 164]
- Deneuveville [3 in 134]
- Bailey [7 in 57]
- Heng [5 in 211]
- Careful aseptic technique is vital.

2% to 12%

Case Reports

- Cardiac tamponade secondary to chest tube placement
- Chest wall arteriovenous fistula: an unusual complication after chest tube placement
- Acute diaphragmatic paralysis caused by chest tube trauma to phrenic nerve
- Delayed perforation of the esophagus by a closed thoracostomy tube
- Silicone thorax: a complication of tube thoracostomy in the presence of mammary implants.

Incident Reporting

Australian Patient Safety Foundation

- Disconnection of tubes when moving patient
- Drains inadvertently pulled out
- Connections round the wrong way
- No water in the bottle
- Cap left on vent
- High suction used
- Drain left clamped till reviewed
- Non standard drainage systems failing.

Inserting a Chest Tube

Preparation:

- Confirm it is needed & safe
- Gain consent & premedicate
- Prepare the equipment
- Position the patient, confirm the side
- Use careful aseptic technique.

BTS guidelines for the insertion of a chest drain

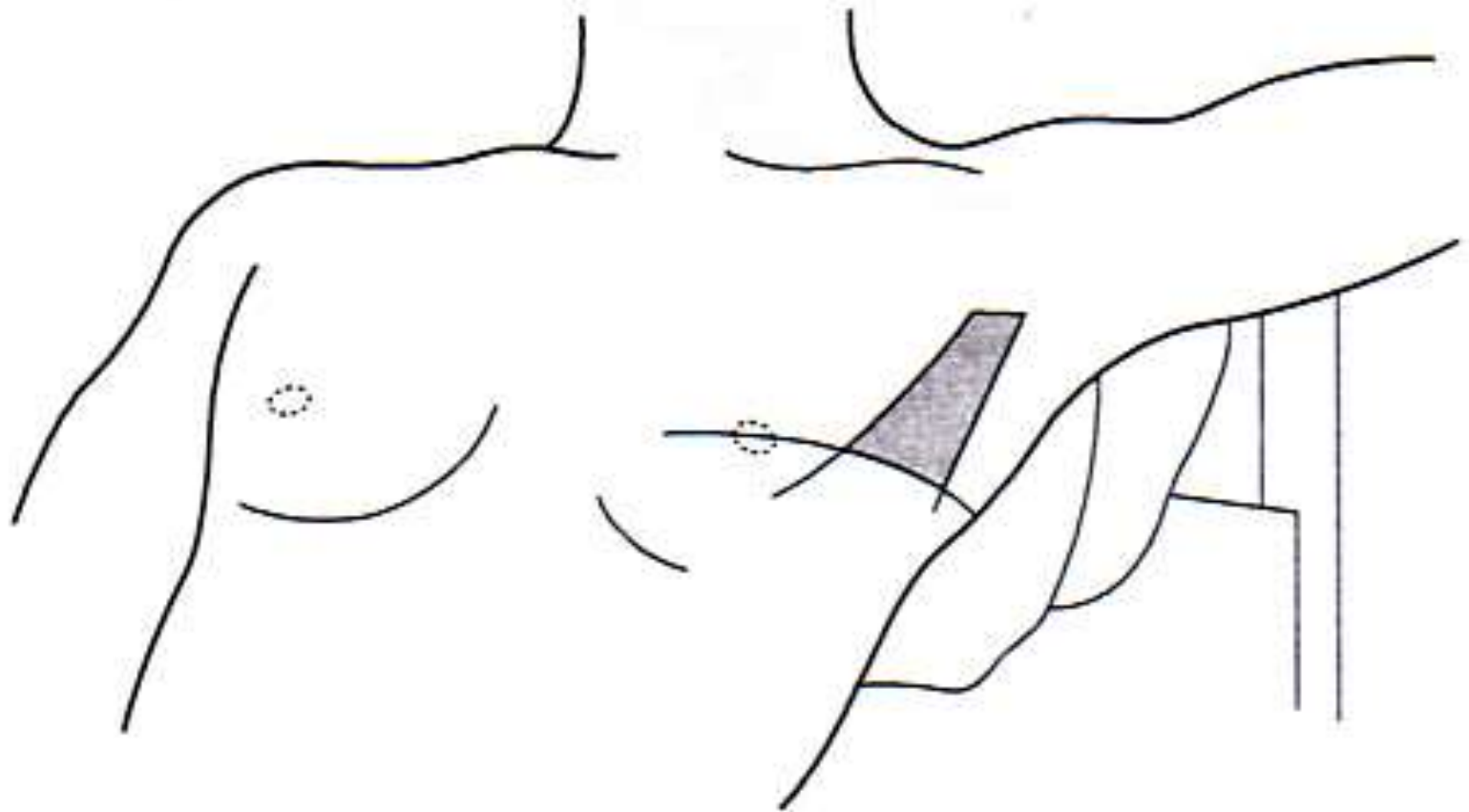
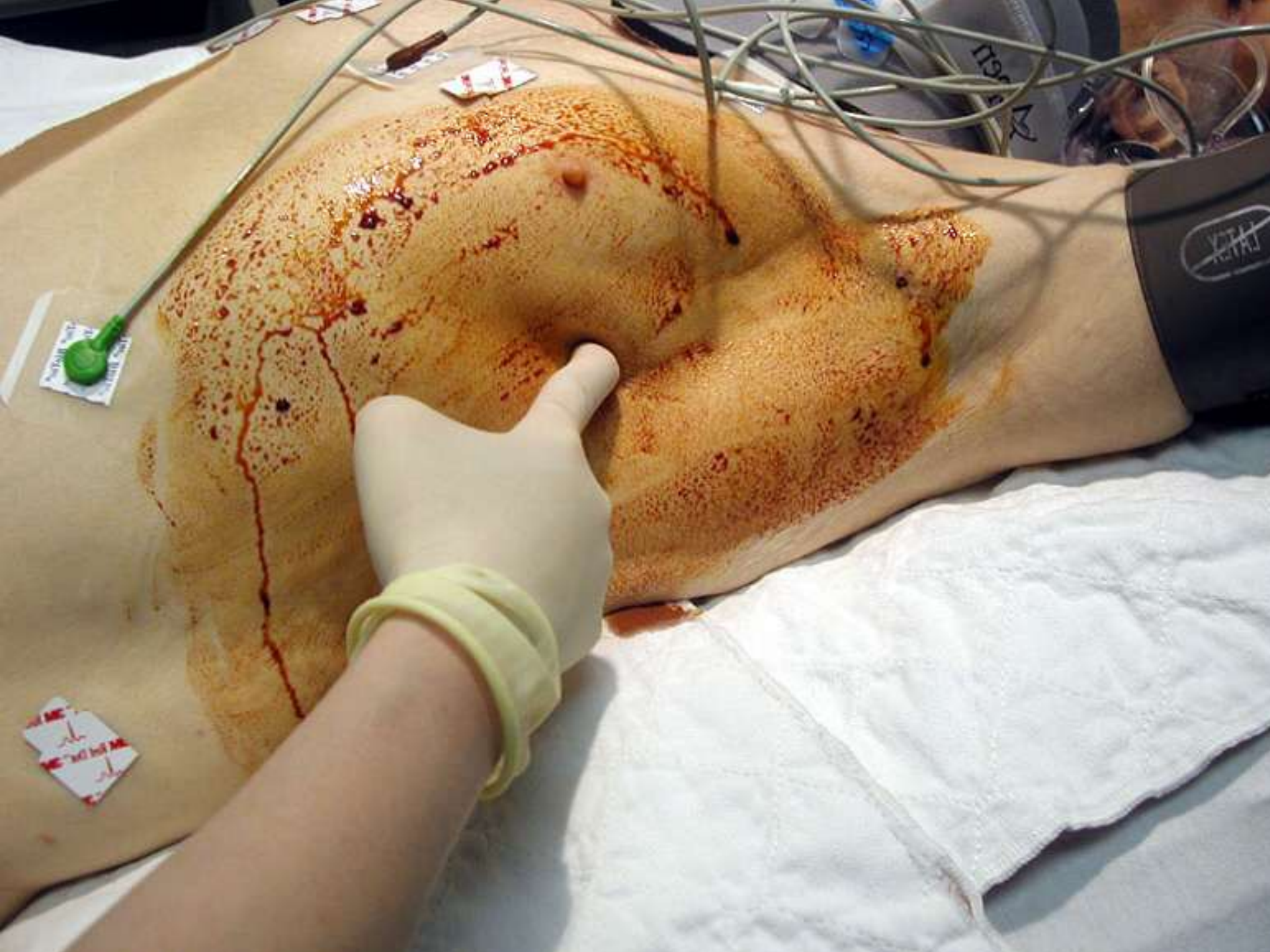
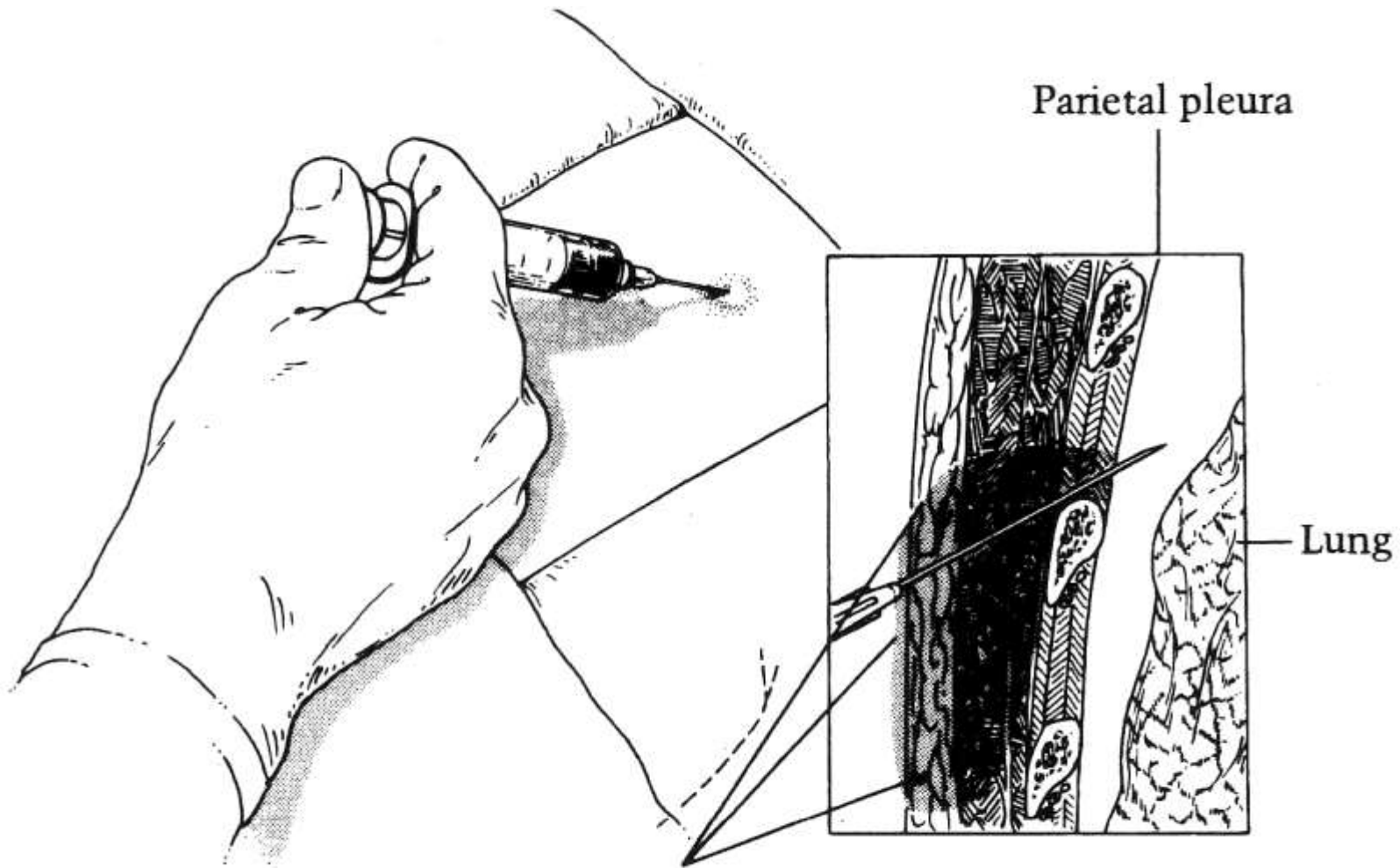


Diagram to illustrate the "safe triangle".

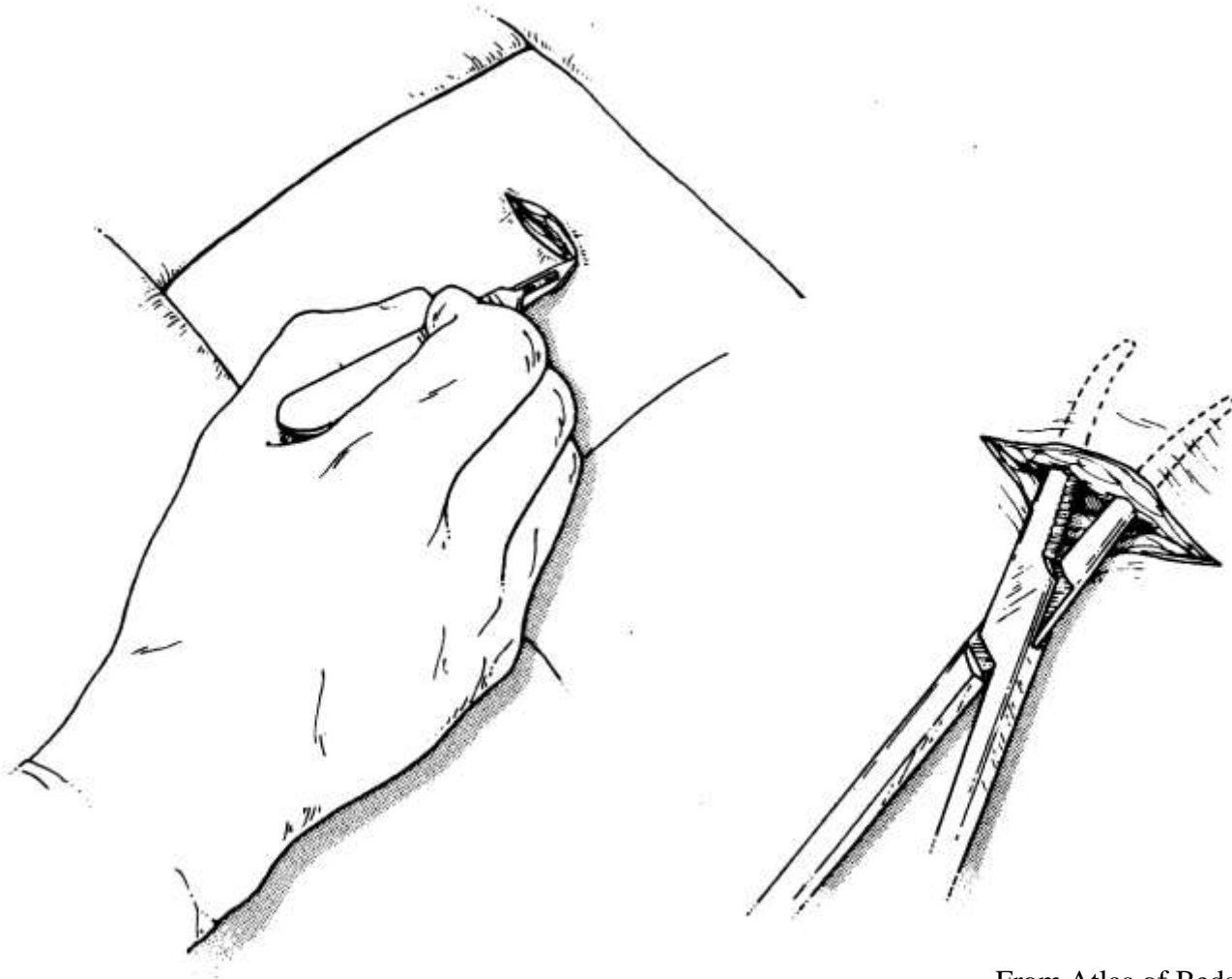


Infiltrate, check position

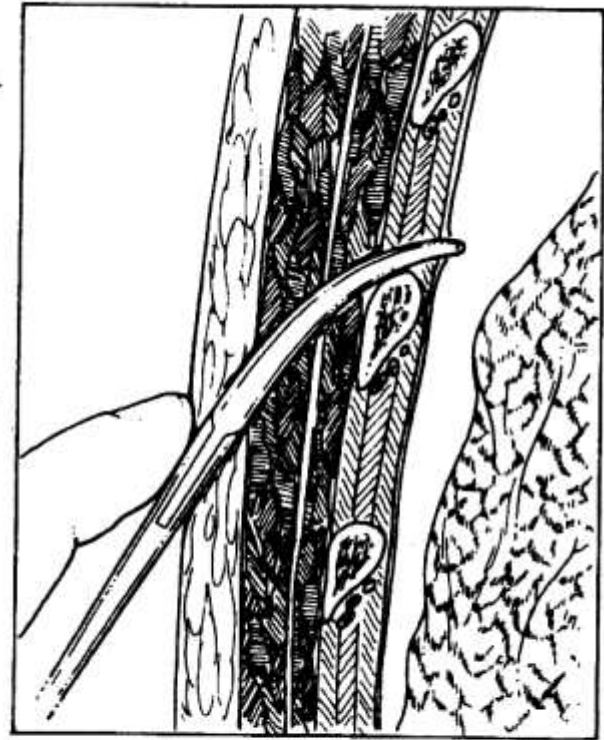
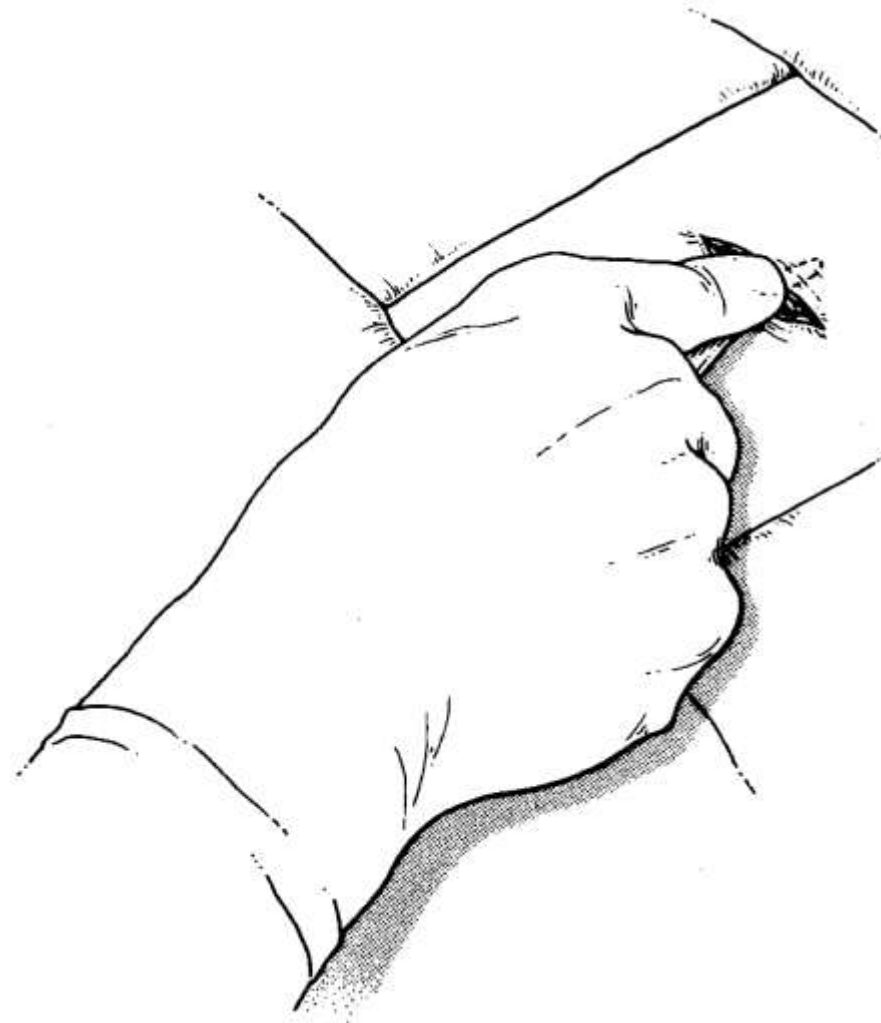


Lidocaine infiltration

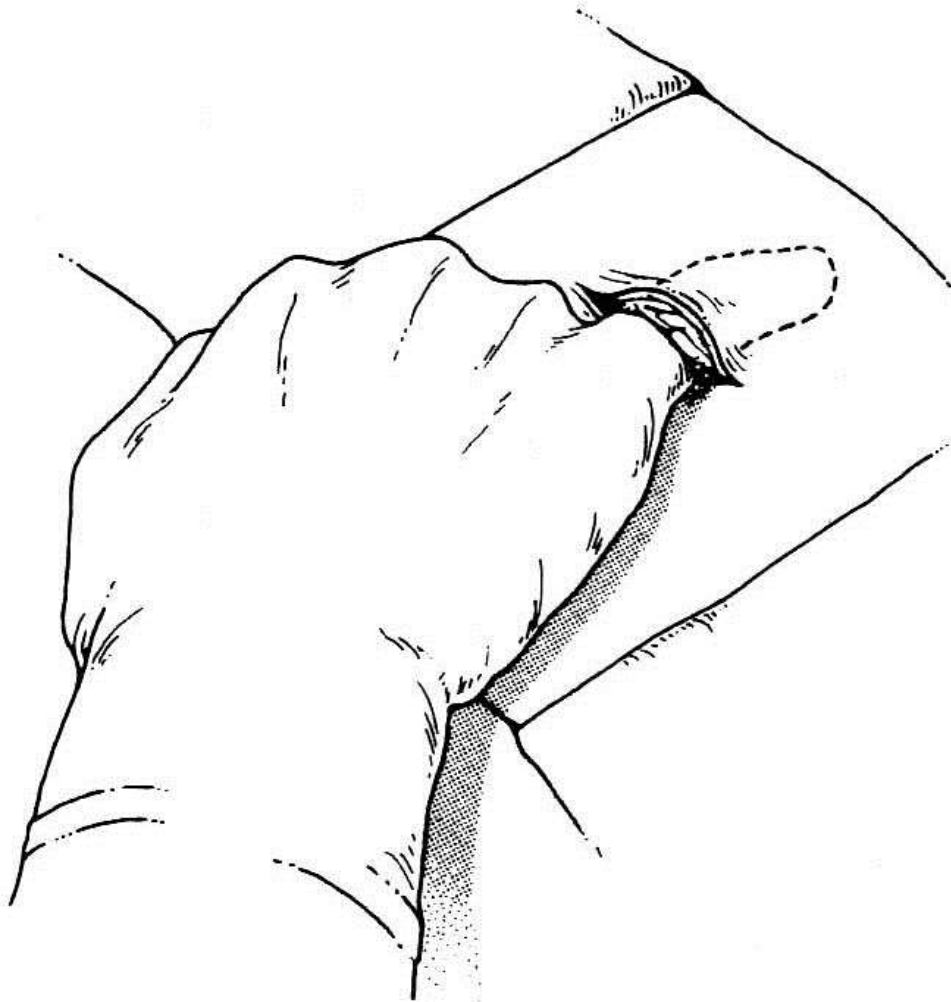
Cut skin, blunt dissect tissues

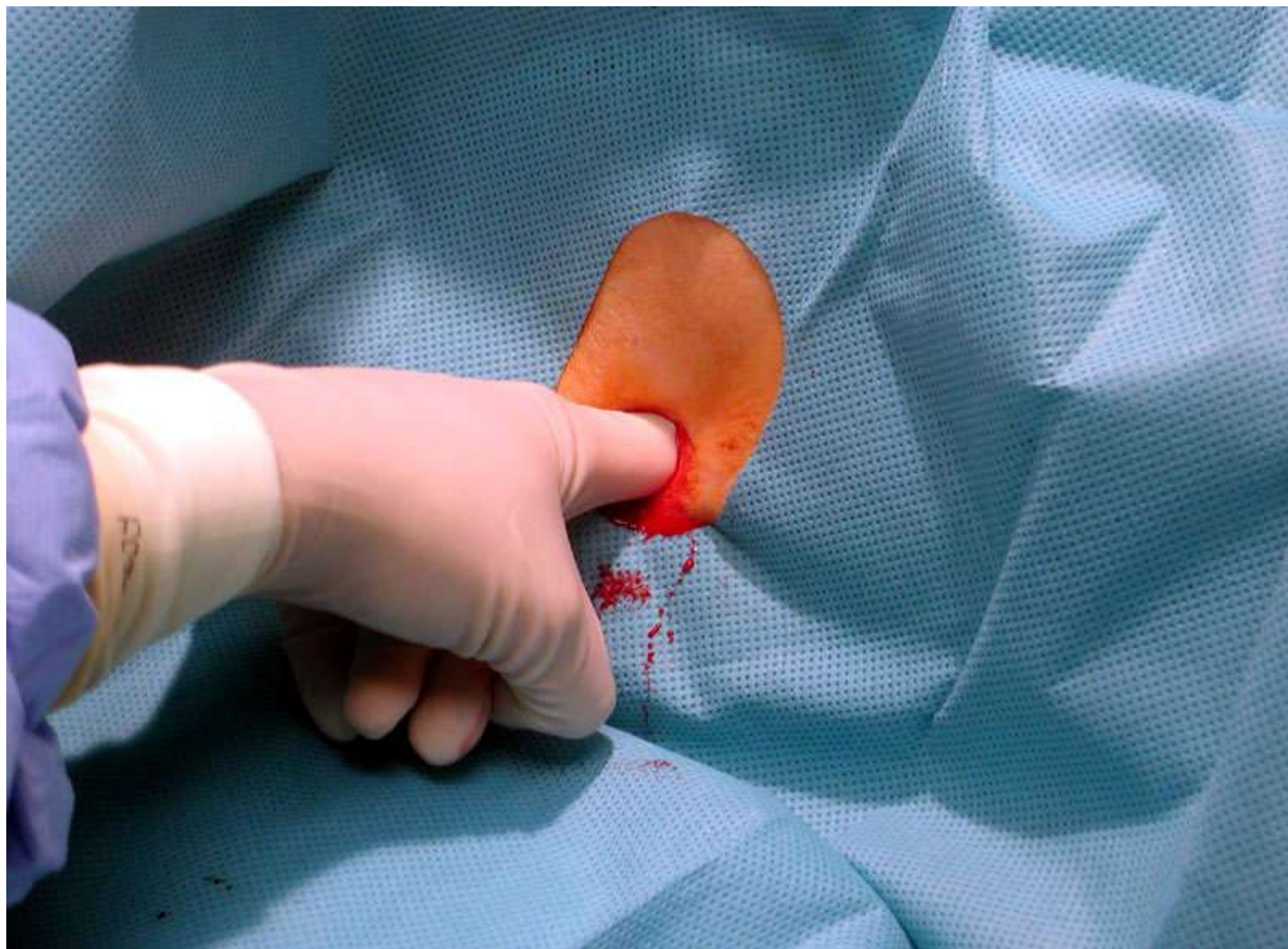


Enter pleural cavity

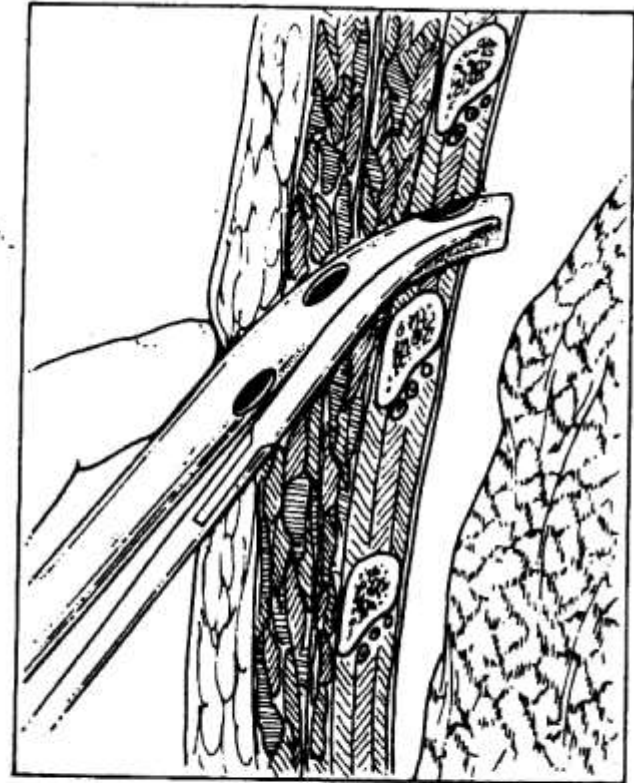
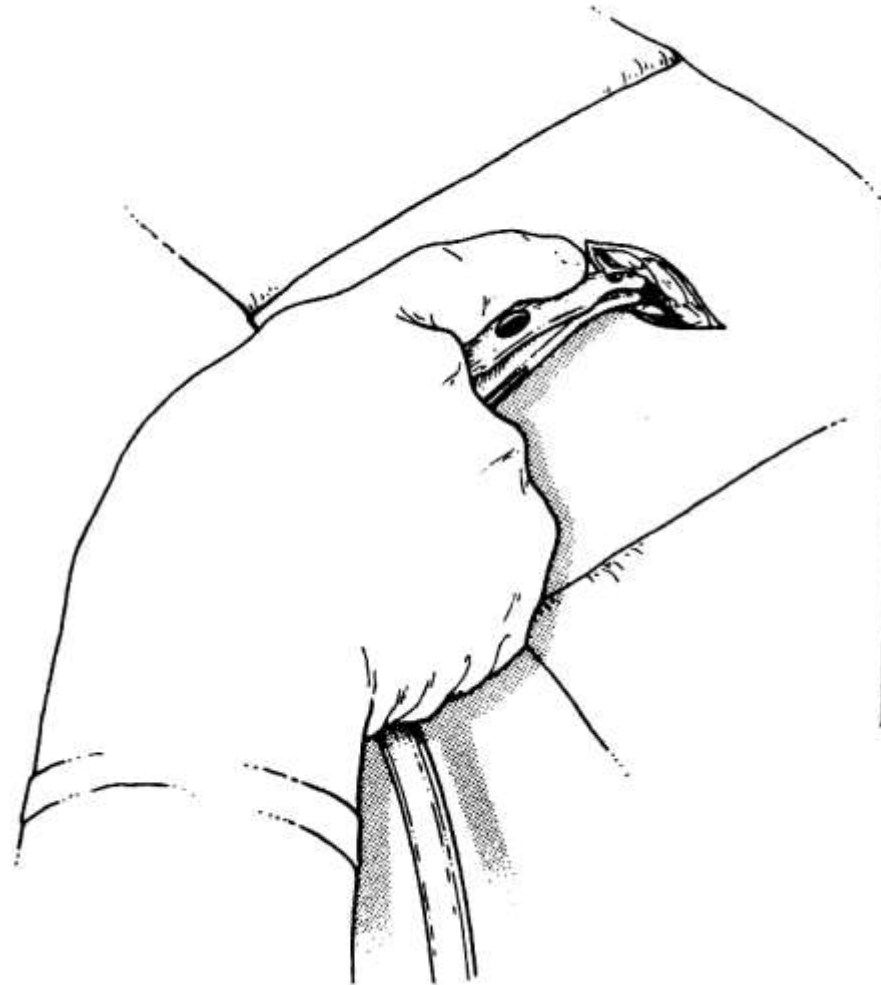


Check for adhesions





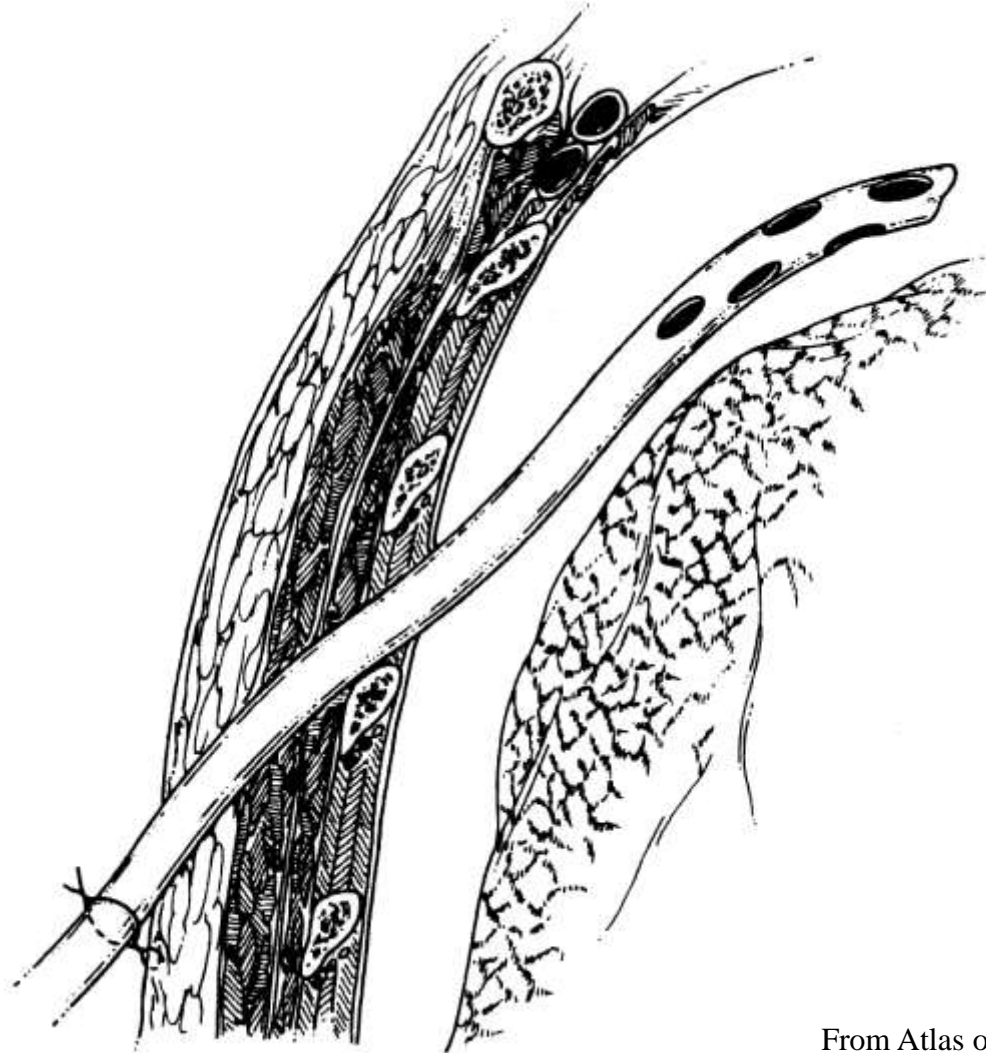
Guide tube in with clamp





Do Not
Use a
Trochar.

Pass tube up & back



Completing the Insertion

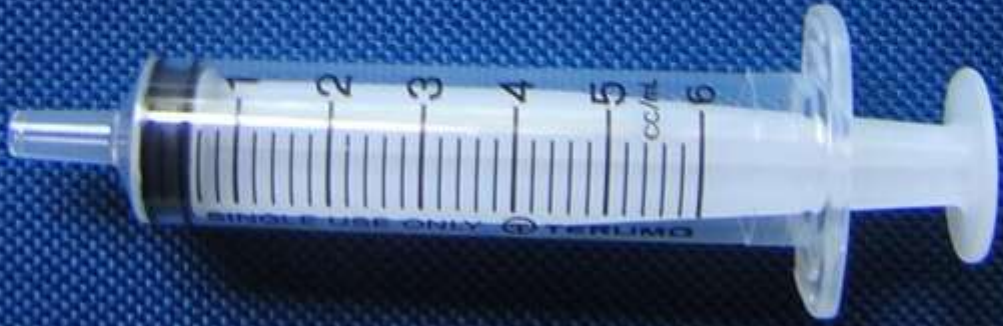
- Connect drainage system
- Put in sutures to close skin & secure tube.
- Put on the required dressing
- Check drain is working properly & CXR.





Small Bore Pigtail Catheters

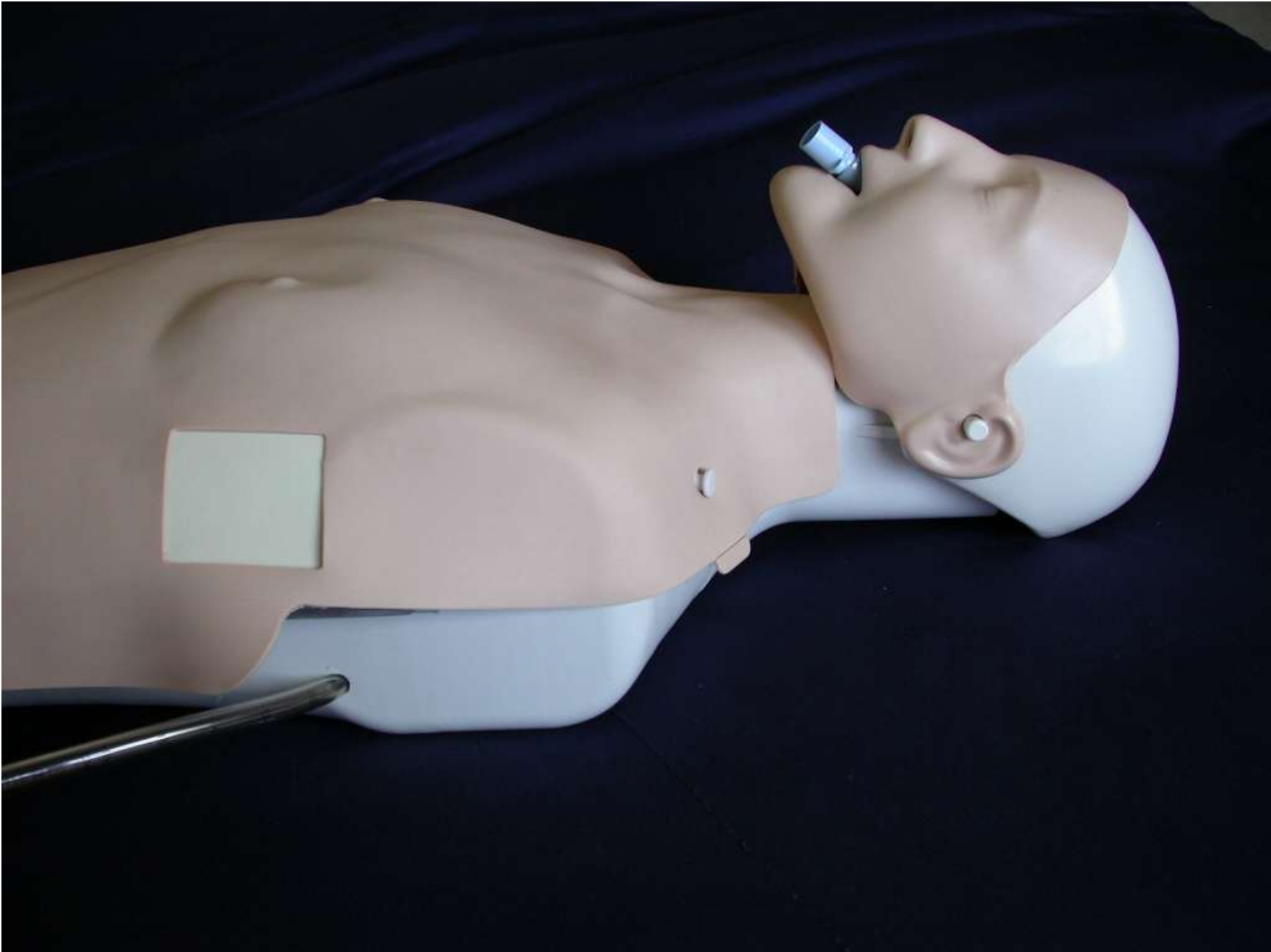
- Used for air & effusions
- Problems blocking with empyema & haemothorax
- Can be flushed with aseptic technique to unblock
- Easier to put in & more comfortable
- Popular with the physicians & patients.





Now let's have
some practice at inserting
a chest tube

We will use the SimCentral
chest drain simulator.



Your Mission

- Two people on each side of a manikin
- Use the instruments to insert the drain
- Put in local to start
- Suture it in at the end
- Apply an appropriate dressing
- Practice removal and wound closure.

To buy a chest drain simulator
visit:



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