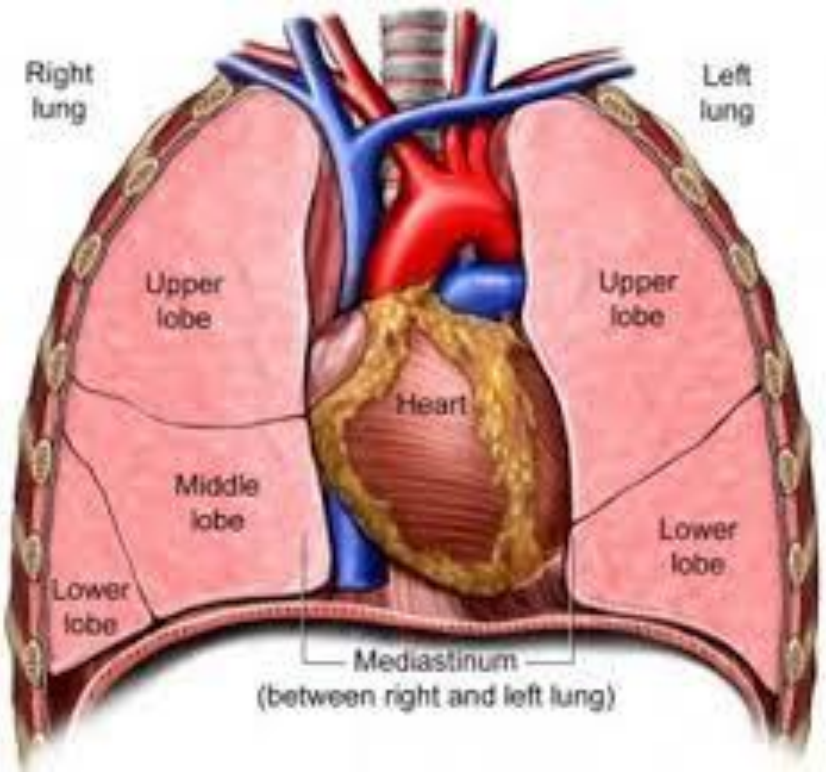
Chest tube & bottles

Dr Montazer


Right lung
Left lung
Upper lobe
Upper lobe
Heart
Middle lobe
Lower lobe
Lower lobe
Mediastinum
(between right and left lung)

1. Under normal conditions, intrapleural pressure is about 4-5 cm H2O below atmospheric pressure during expiration and about 8-10 cm H2O pressure below atmospheric pressue during inspiration.

2. If the intrapleural pressure equals the atmospheric pressure, the lungs will collapse.

- 1. Chest tubes are inserted between the visceral and parietal pleura to remove air or blood that has caused the lungs to collapse.

- 2. Usually 2 tubes are used the upper one for air and the lower one for fluid. Tubes are sutured and covered with Vaseline impregnated gauze and a tension dressing.

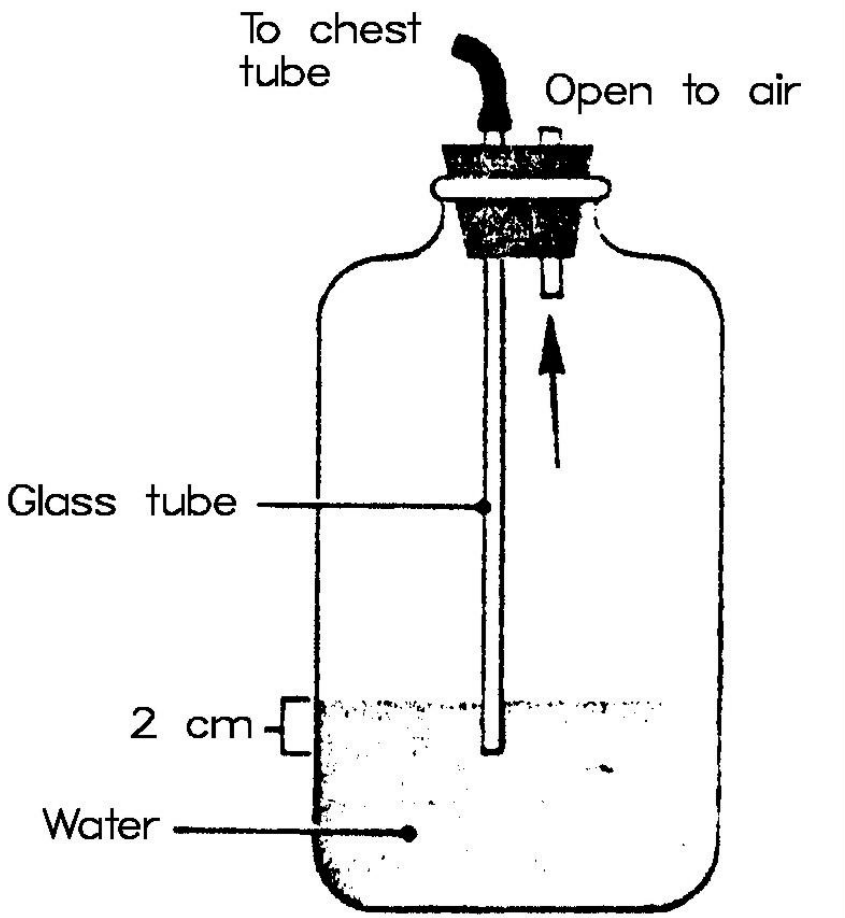
Water Seal Drainage

1. The chest tube is connected to a glass tube placed in a bottle containing water.

2. The glass tube extends below the water level, therefore, the name sealed drainage.

3. The water seal prevents air from getting back into the chest.

4. As the client inhales, the chest cavity expands, pushing air and drainage from the chest, into the tubes, and ultimately into the bottle.


To chest tube
Open to air
Glass tube
2 cm
Water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- 1. The chest tube is connected to a glass tube submerged 2cm below the water level in a capped, covered bottle.

- 2. The rubber cap fits tightly around the two glass tubes to prevent air from getting into the system.

- 3. There is always an air vent in the top of the bottle to allow air to escape. Never cover the air vent in any system.

- 4. A one bottle uses gravity only. It is never hooked up to a suction machine.

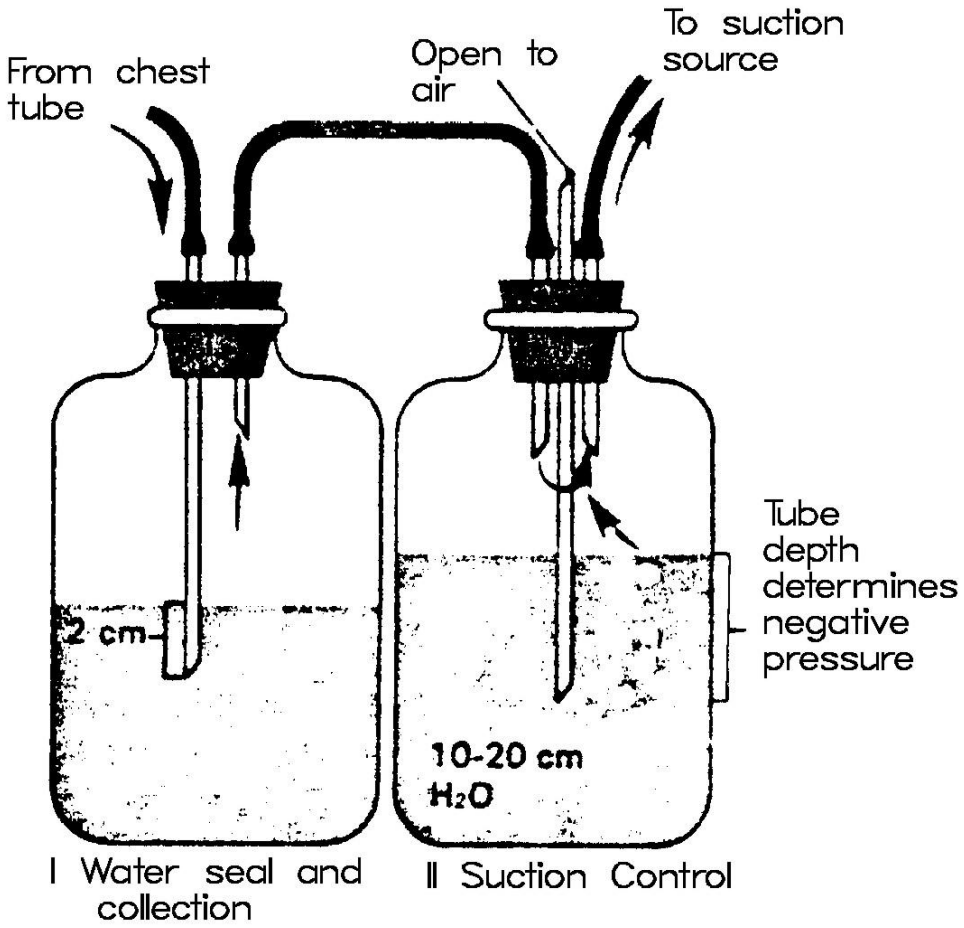
1. Inspiration forces air through the chest tube, so therefore, a few bubbles are seen coming up through the water.

2. The water in the glass tube oscillates during the respiratory cycle. It should rise on inspiration and fall on expiration (up on in, down on out).

3. All chest bottle systems must be will secured so that they are not knocked over and must always remain below the level of the client's chest.

4. This system is used primarily with pneumothorax where a lot of drainage is not expected. If the bottle fills up with drainage, it will require more effort for the client to expel air and fluid from the pleural cavity.To demonstrate this, take a straw and put it in the bottom of a full glass of liquid. Now blow bubbles through the straw. Take and move the straw to one inch below the surface liquid, now blow bubbles. More effort is needed to blow bubbles when the straw is at the bottom of the glass.

Two Bottle System



1. If the client has blood or fluid in the pleural space he may need suction to help reexpand the lung.

2. In a two bottle system, the first bottle still provides the water seal and collects the drainage.

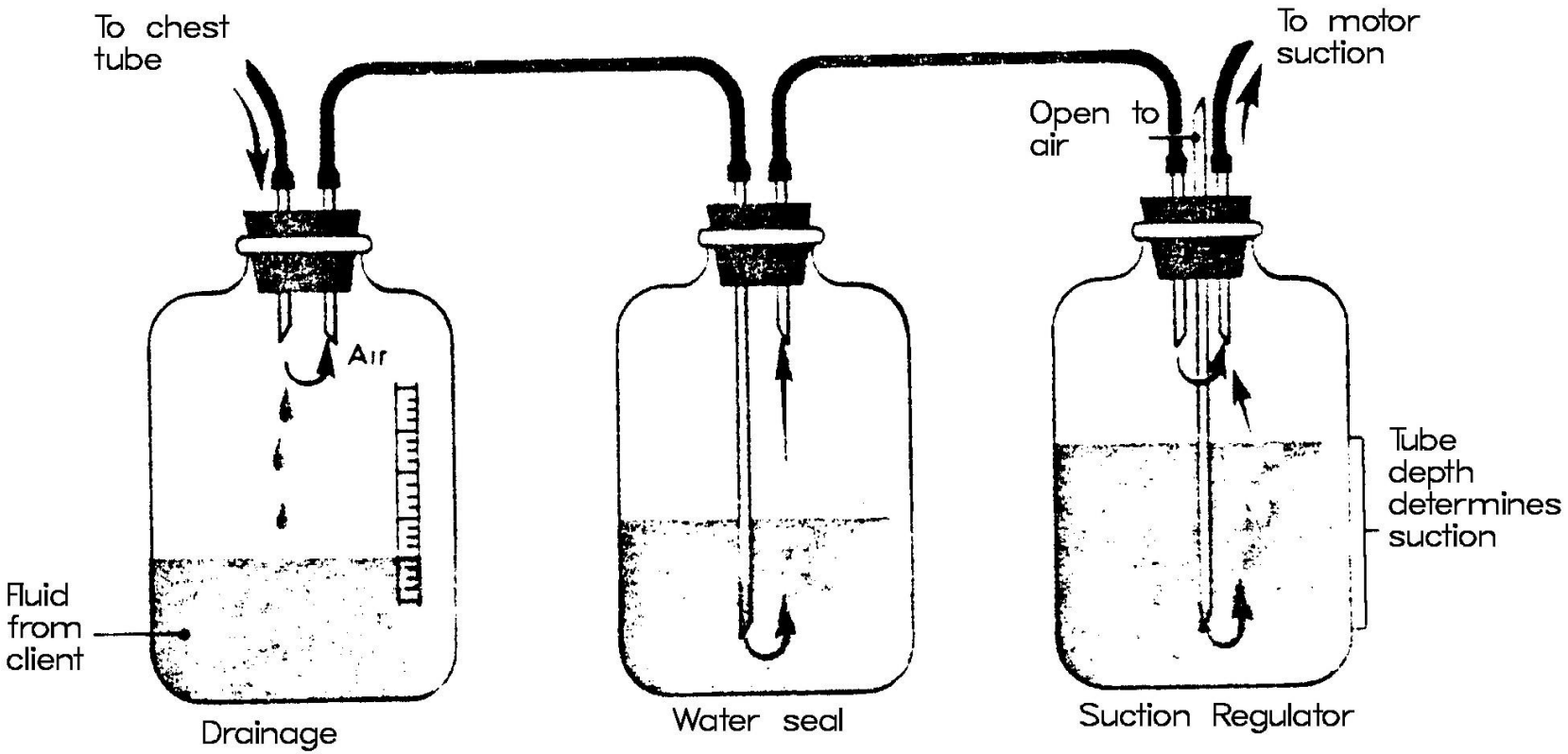
3. If the second bottle is attached to a suction source. This second bottle controls the amount of suction (negative pressure), the suction machine exerts.

4. This suction control is achieved by the submission of a glass tube. If the tube is submerged 10 cm below the water and the suction is turned on, a negative pressure equal to 10 cm of suction will be applied to the pleural space. The greater the depth of the tube in the water, the greater the amount of suction.

5. As the suction machine exerts pressure, the water in the glass tube is pulled out of the glass tube and air is pulled in. When the air reaches the bottom of the glass tube, the air bubbles through the water and cuts off the machine, ending the negative pressure. Water refills the glass tube and the suction cycle begins again. The glass tube must always be open to the air.

6. Another variation of the two bottle system is when the first bottle is the drainage collection bottle and the second bottle is the underwater seal. This system is similar to a three bottle system except that there is no suction or suction control bottle

Three Bottle System



1. The first bottle is for drainage and air from the client. This is advantageous because the drainage is not mixed with the water seal, therefore, the characteristics of the drainage can be more accurately observed. In addition, the drainage does not increase the effort exerted by the client to expel air and drainage from the chest because the end of the tube is increasingly submerged deeper.

2. The second bottle is the water seal bottle.

3. The third bottle is the suction control bottle .

4. Plastic disposable units such as Pleuravac are designed as three bottle systems, but can be used as one or two bottle systems. Plastic units allow the client more mobility and decrease the risk of breaking the bottles.

Heimlich Valves

1. The valve is a collapsible rubber tube attached to the external end of the chest tube.

2. The valve opens whenever the pressure is greater than atmospheric and closes when the reverse occurs.

3. Heimlich valve functions as a water seal and is especially useful for transporting clients long distances.

Chest Tube Removal

- 1. Lung expansion is determined by a chest s-ray.
- 2. Sutures are removed and sterile petroleum gauze is used to cover the site.
- 3. Client is instructed to take a deep breath and exhale. During exhalation, the client bears down (Valsalva maneuver), and the tubes are removed.???
- 4. Site is covered with an air-tight dressing.

Care Feeding of Chest Tubes

1. Keep all tubing straight with no kinks.

2. Tape all connections and make sure they are tight with no air leaks.

3. Check water seal and suction control for appropriate water level. Add sterile water if needed.

4. Tape drainage bottle and mark amount of drainage as appropriate.

5. Observe for bubbling and fluctuations in the water seal tube. Bubbling should be intermittent and fluctuations should occur with inspiration and expiration. If there is no bubbling or fluctuations, the tube may be blocked or the lung may be re-expanded. If there iscontinuous bubbling, there may be an air leak in the system.

6. Never elevate the drainage system above the chest.

7. Secure bottle to metal stands of racks to prevent over-turning. Do not put system under the bed or side rail. Lowering the bed or side rails may crush the bottles.

8. Do not empty drainage bottles unless there is danger of over-flowing. Do not empty plastic units, change them.

9. If the bottles are over-turned and the water seal is broken, return the bottle to an upright position and have the client deep breathe and cough. Do not clamp.

10. Chest tubes may be clamped momentarily only to change the bottle or check for leaks.Physicians may order continuous clamping prior to removal after the lung has re-expanded.

The End