Al Mustaqbal University

College of Health and Medical Techniques

Department of Anesthesia

Practical Anesthetic Equipment

Stage Three

Course 1 Lecture 2

Endotracheal Tubes

By Lectures

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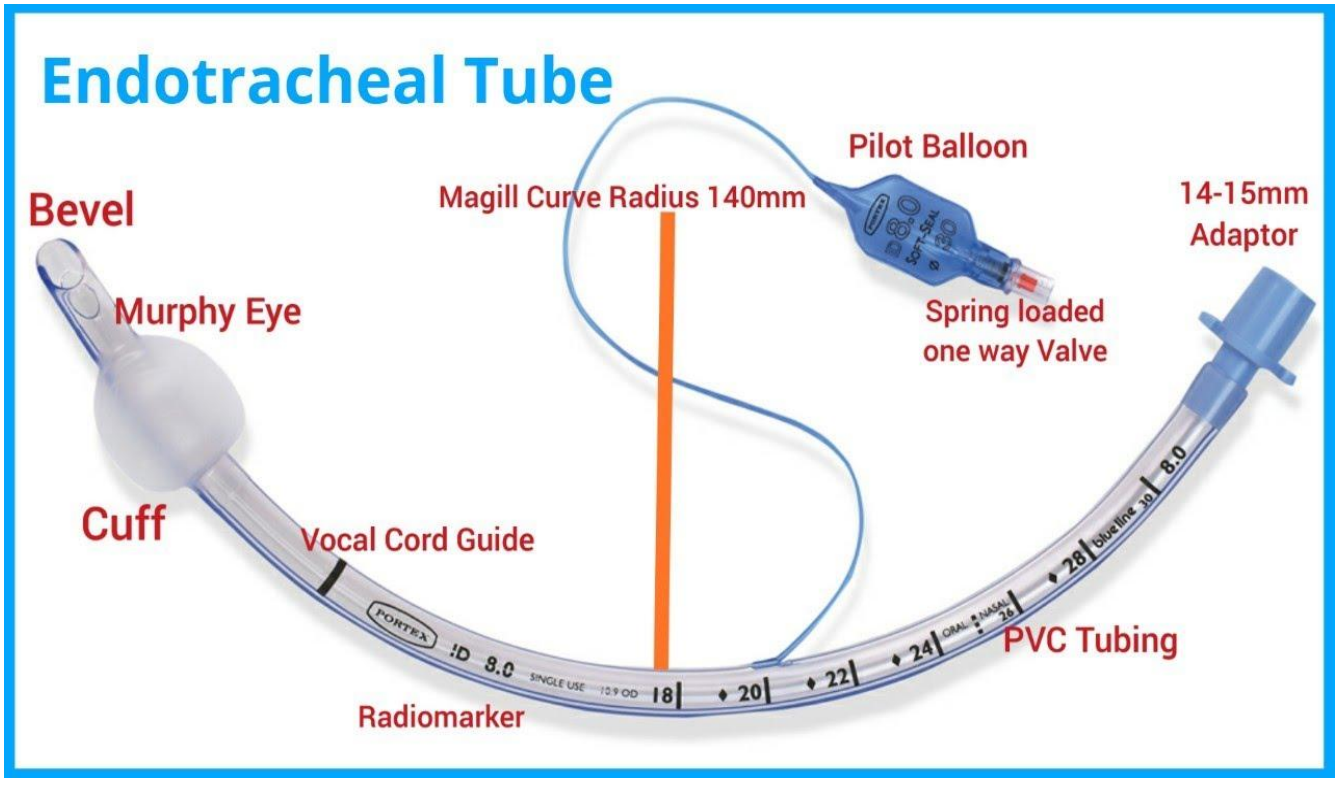
Endotracheal tube

Endotracheal tube is a flexible plastic tube that is placed through the mouth or nose into the trachea to help a patient breathe and provide a means of securing the patient's airway. In the past, tracheal tubes were made of rubber, allowing them to be reused after cleaning and autoclaving.

Components of ETT



Surgical indications for endotracheal intubation

1. Patients for surgery who have full stomachs.
2. Patients requiring IPPV.
3. All head and neck procedures with compromised airway.
4. Surgery for a long time also no supine position.
5. Abdominal, thoracic, and neurosurgical procedures.
6. Double lumen tubes for intrathoracic surgery.

Nonsurgical indications for endotracheal intubation

1. Cardiopulmonary resuscitation.
2. Conscious or semiconscious patients unable to protect the airway.
3. Inadequate or gasping respiration.
4. Tracheobronchial toilet for retained secretions.

Contraindications for Endotracheal intubation

No absolute contraindications, but difficult intubation in.

1. Severe airway trauma.
2. Cervical spine injury.
3. Laryngeal edema.

How do we measure the size of the endotracheal tube?

The size of a tracheal tube refers to its internal diameter which is marked on the outside of the tube in millimeters. Narrower tubes increase the resistance to gas flow. Usually, a size 8.5–9-mm internal diameter tube is selected for an average size adult male and a size 7.5- 8-mm internal diameter tube for an average size adult female. Pediatric sizes are determined based on age and weight.

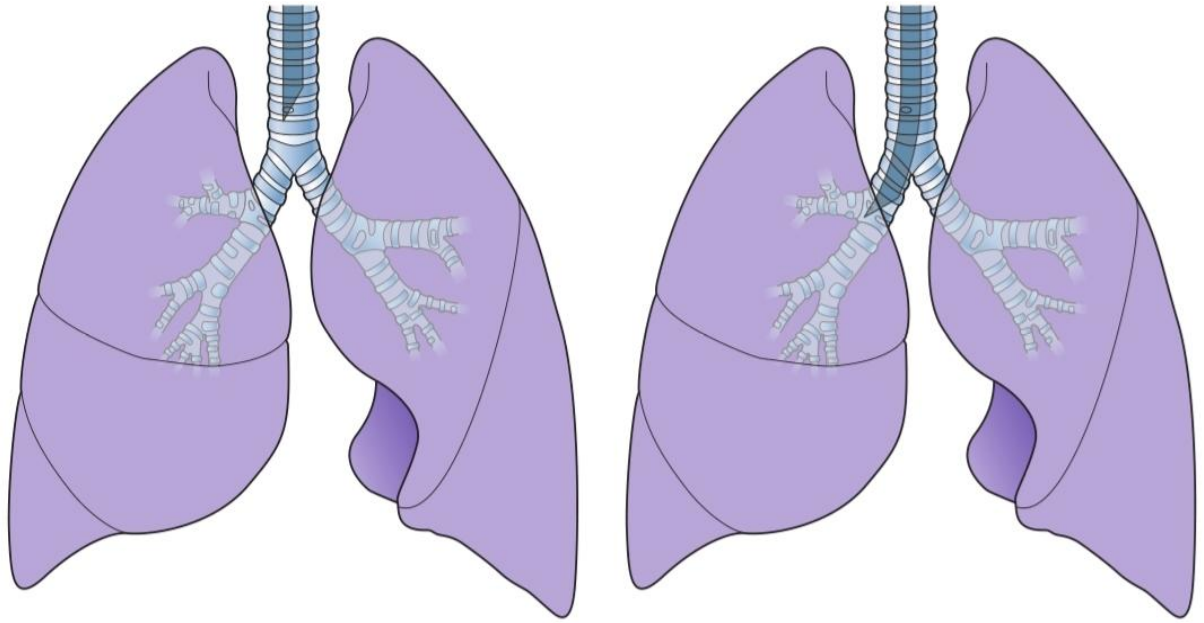
The largest possible internal diameter should be used. This is especially important during spontaneous ventilation where the patient's respiratory effort must overcome the tube resistance. A size 4-mm tracheal tube has 16 times more resistance to gas flow than a size 8-mm tube.

Tracheal tubes have both internal diameter (ID) and outside diameter (OD) markings. There are various methods or formulae used to determine the size of pediatric tracheal tubes. A commonly used formula is: **Internal diameter in mm= (age in years / 4)+4**

Guide to the size and length of oral tracheal tubes used in pediatric practice:

Age	Weight (kg)	Size (ID mm)	Length (cm)
Neonate	2–4	2.5–3.5	10–12
1–6 months	4–6	4.0–4.5	12–14
6–12 months	6–10	4.5–5.0	14–16
1–3 years	10–15	5.0–5.5	16–18
4–6 years	15–20	5.5–6.5	18–20
7–10 years	25–35	6.5–7.0	20–22
10–14 years	40–50	7.0–7.5	22–24

- ✓ The tube is advanced until the mark at the proximal end of the cuff lies at the vocal cords.
- ✓ The tube is fixed at the anterior incisors at 23 cm in adult males and 21 cm in females. In nasotracheal intubation, 5 cm more is added to this length.



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Tracheal Tube Cuffs:

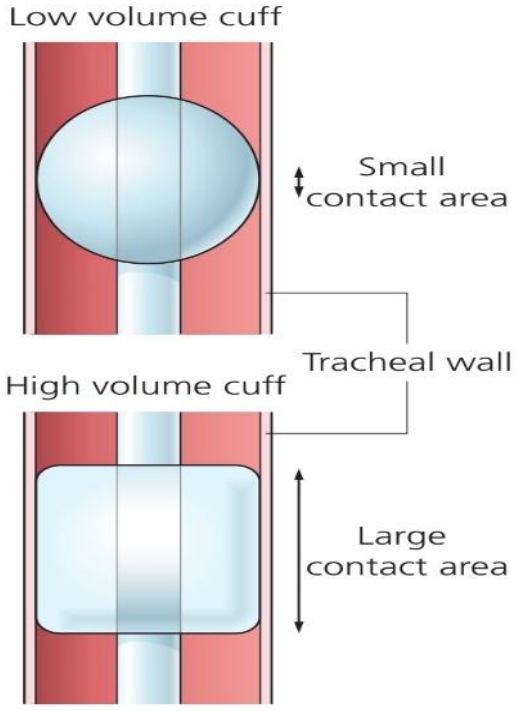
To achieve enough contact with the tracheal wall and a good seal, relative over-inflation was required, with the result that the high pressure within the cuff was transmitted to the tracheal wall. This readily leads to a reduction of mucosal pressure to critical levels (capillary perfusion pressure is usually about 35 mm Hg) and could lead to mucosal ischemia, development of tracheal scarring, and tracheal stenosis in case of prolonged use.

High-pressure/low-volume cuffs

1. These can prevent the passing of vomitus, secretions, or blood into the lungs.
2. At the same time, they exert high pressure on the tracheal wall. If left in position for long periods, they may cause necrosis of the tracheal mucosa.

Low-pressure/high-volume cuffs

1. They are less capable of preventing the aspiration of vomitus or secretions. This is due to the possibility of wrinkles forming in the cuff.
2. These exert minimal pressure on the tracheal wall as the pressure equilibrates over a wider area. This allows the cuff to remain inflated for longer periods.



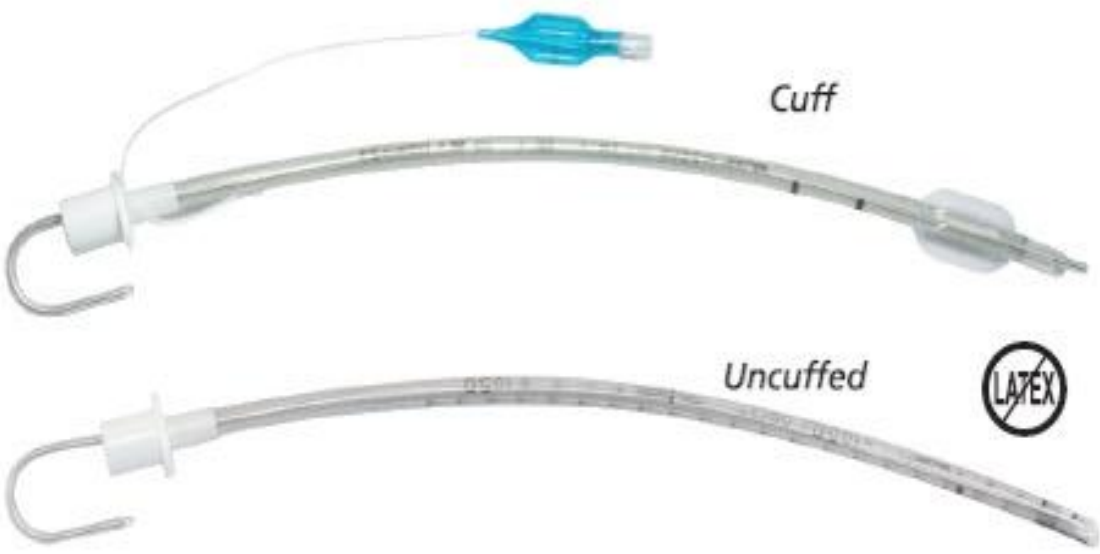
Cuffed versus uncuffed tube Cuffed tubes are routinely used in adults and uncuffed tracheal tubes are preferred in young children. In recent years, cuffed tracheal tubes have been used more often in small children.

The advantages of cuffed tubes include

1. Decreased risk of aspiration
2. Ability to use high inflation pressures and low fresh gas flows.
3. Accurate monitoring of end-tidal gases, and tidal volume.

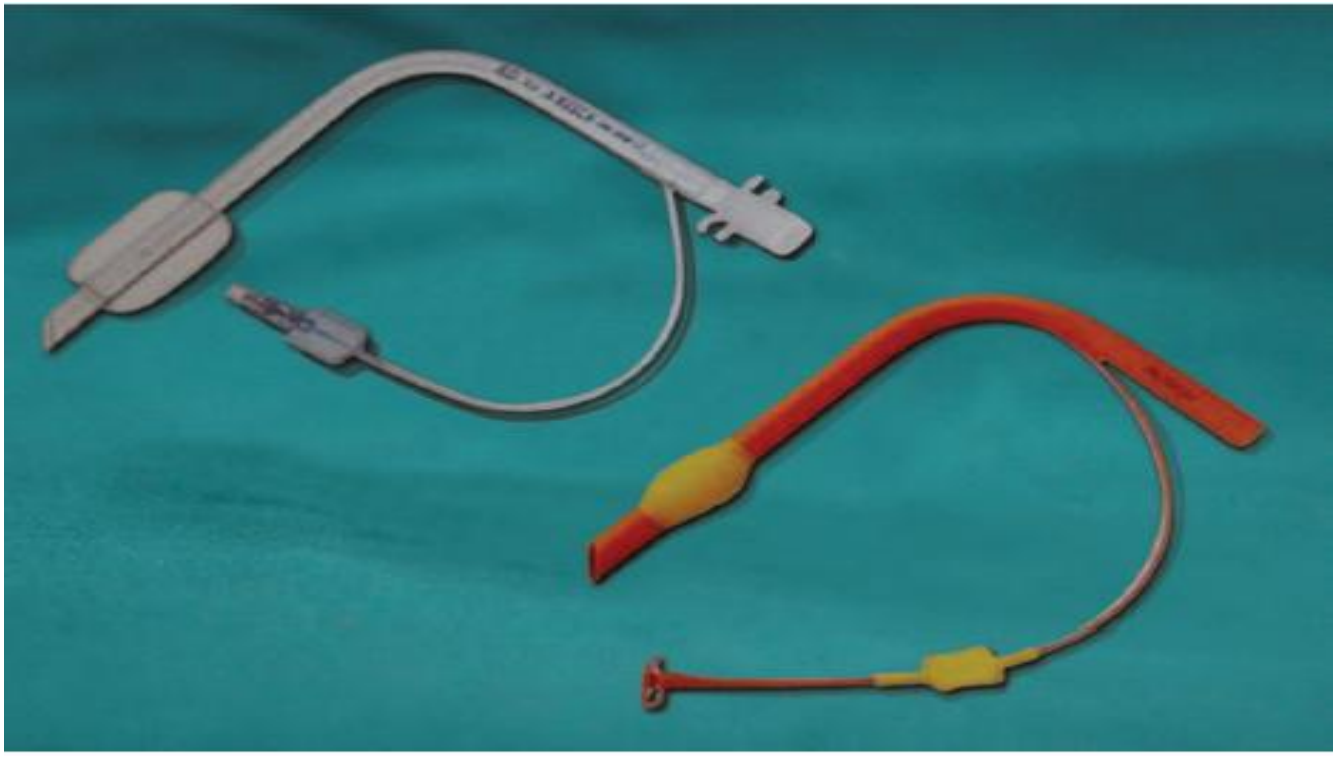
Disadvantages of using a cuffed tube in children include

1. The need to choose a slightly smaller tube. It will increase resistance and work of breathing; inadvertent overinflation of the cuff will result in excessive mucosal pressure and the risk of injury to the vocal cords. Relatively small amounts of inflated air lead to rapid increases in cuff pressure and volume.

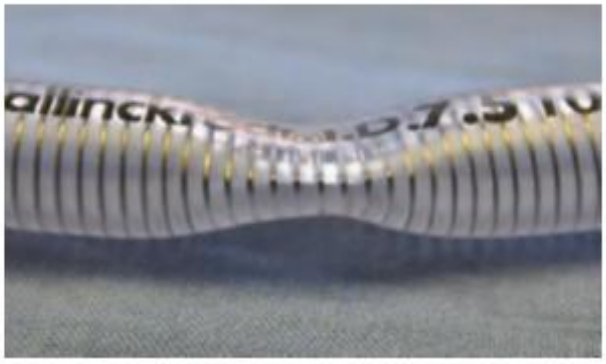


Types of endotracheal tubes

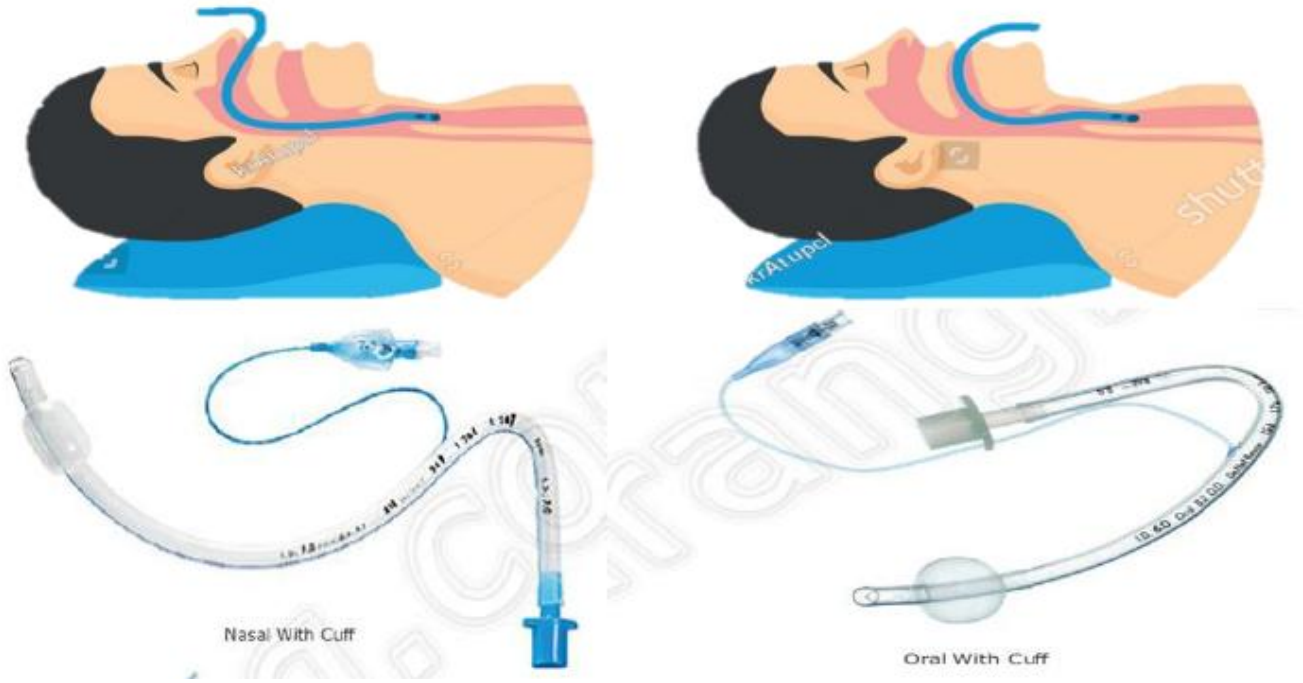
1. Oxford tube.



2. Reinforced tube.

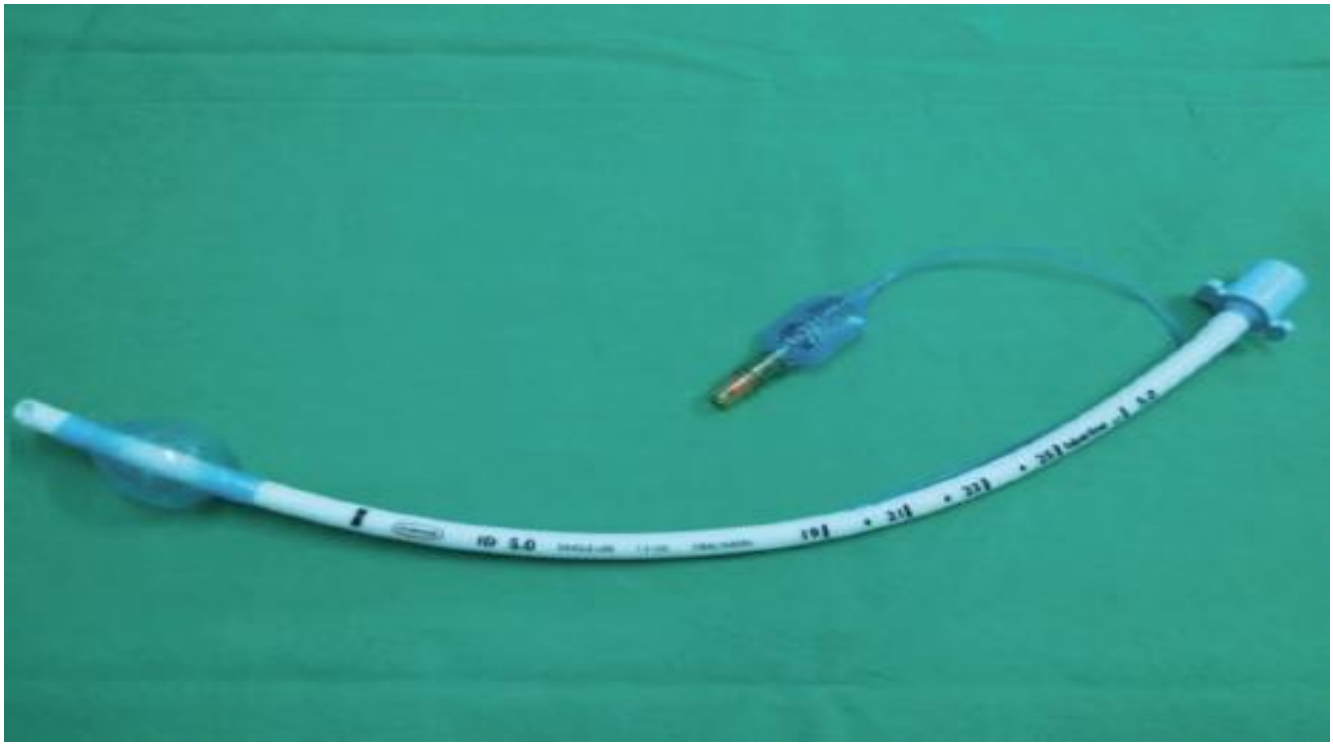


3. RAE tube

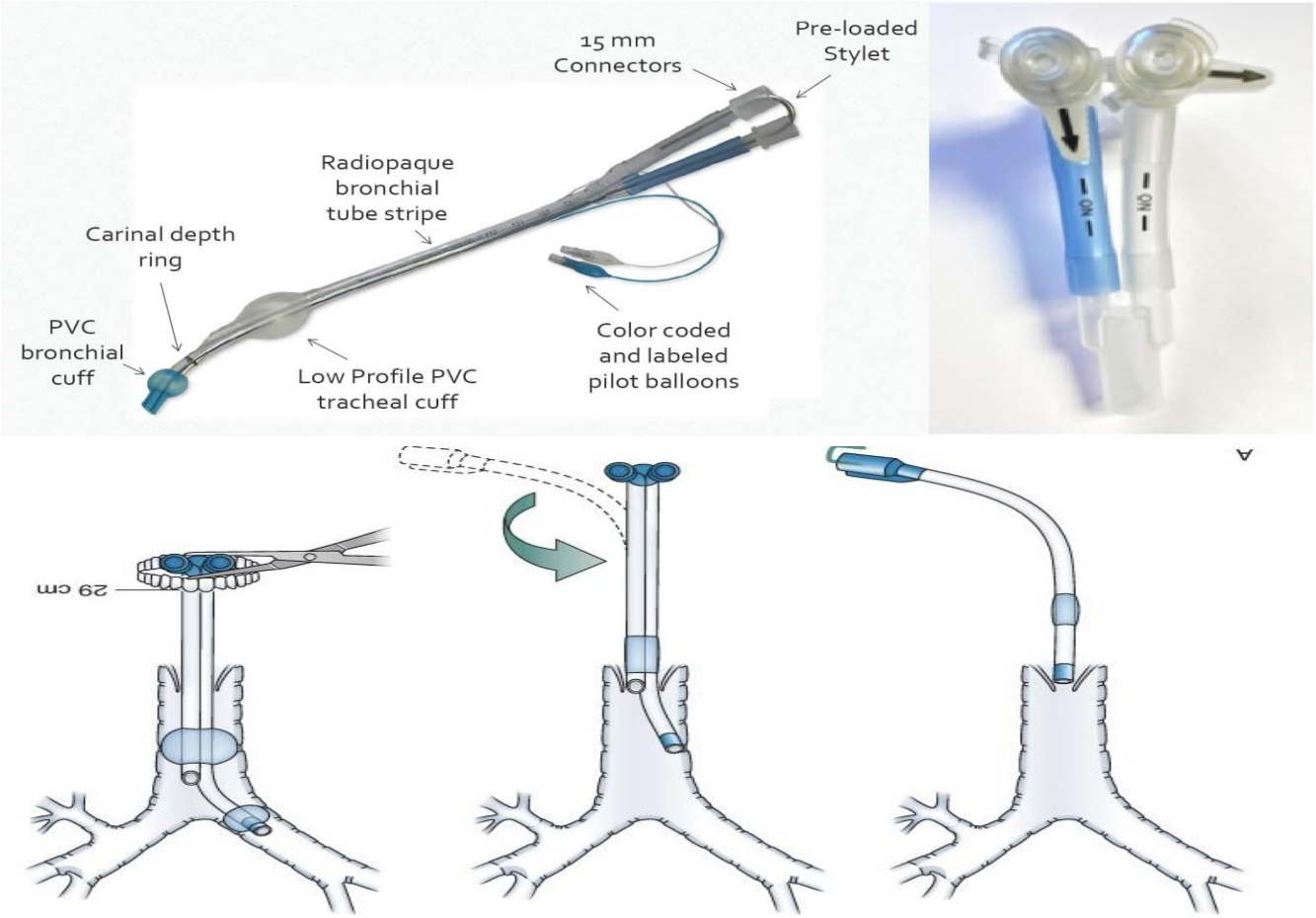


4. Laser tube.

5. Micro laryngeal tube.



6. Double lumen tube.



7. Tracheostomy tracheal tube.

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