



# Station 4: Lung isolation techniques

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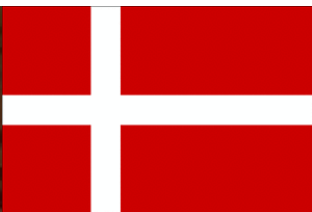


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- Deputy Head of the Department of Cardiothoracic Anaesthesia and Intensive Care
- Senior consultant at the Department of Anaesthesia, University Hospital Lausanne
- Deputy President of the “Fondation Latine des Voies Aériennes” that organizes difficult airway management courses in Switzerland
- Special interests: DA, OLV, bronchoscopy simulation, ...







# Niels Eric Ove Andersen MD



- Head of Pediatric Thoracic Anesthesia, Department of Cardiothoracic Anesthesia, Copenhagen University Hospital



- Special interests:  
Difficult airway and one lung ventilation, special in newborn and small children.

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# Lung isolation techniques – Indications

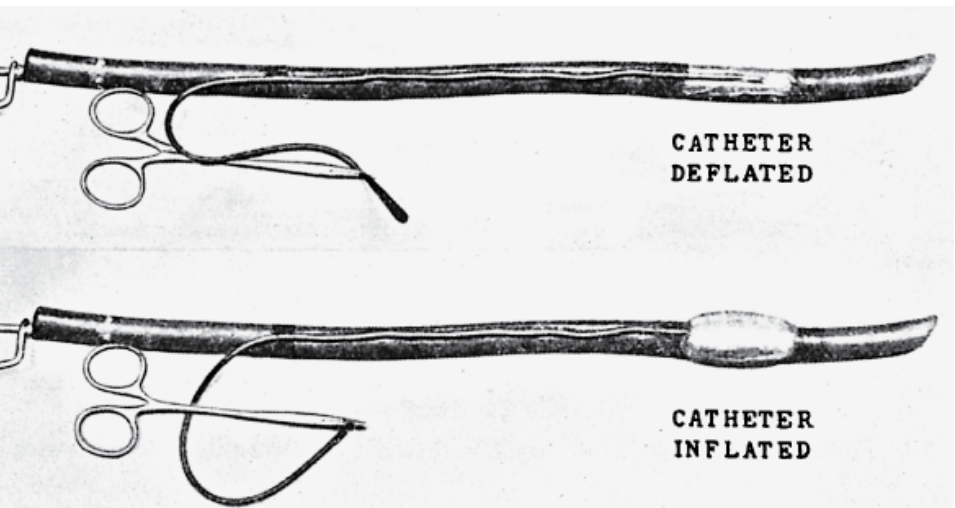
- **One lung ventilation (OLV)** (thoracic, mediastinal, cardiac, aortic, orthopedic (spine) or esophageal procedures)
- **Protection:** preventing from contralateral contamination of a healthy lung (pus, blood, ...)
- Provide **differential lung ventilation** in unilateral thoracic disorders (lung contusion, bronchopleural fistula, ...)

Licker M et al. Trends in Anaesthesia and Critical care 2014; 4:47-54.



# Lung isolation techniques – History of OLV

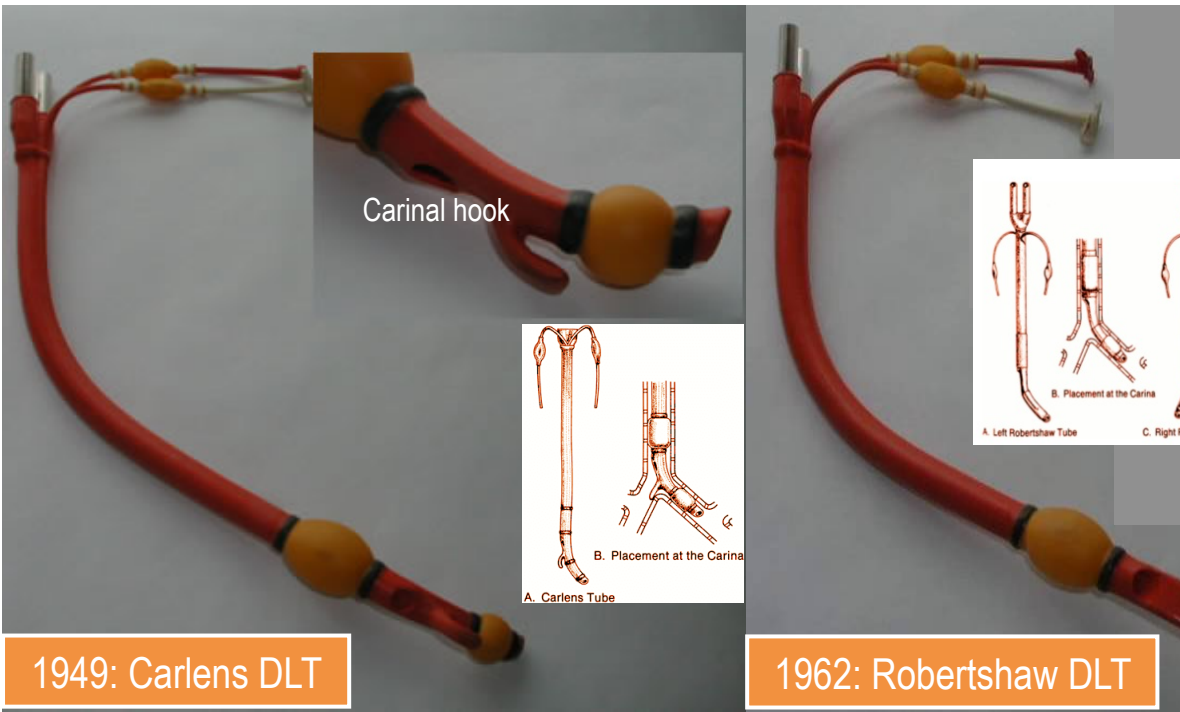
**1931:** first selective endobronchial intubation in thoracic surgery (cuffed single lumen tube)



Barbeito A, Shaw AD, Grichnik K: *Thoracic Anesthesia*: [essanesthesiology.com](http://www.essanesthesiology.com)

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JW, Waters RM. Closed endobronchial anesthesia in thoracic surgery. *Thorac Surg.* 1931;1:432-7



1949: Carlens DLT

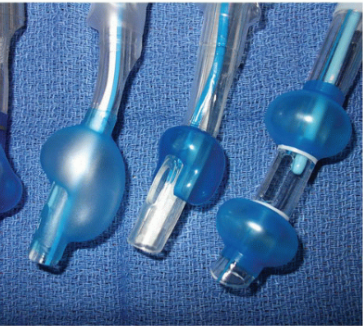
Bjork VO, Carlens E. *J Thorac Surg.* 1950;20:151-7.

1962: Robertshaw DLT

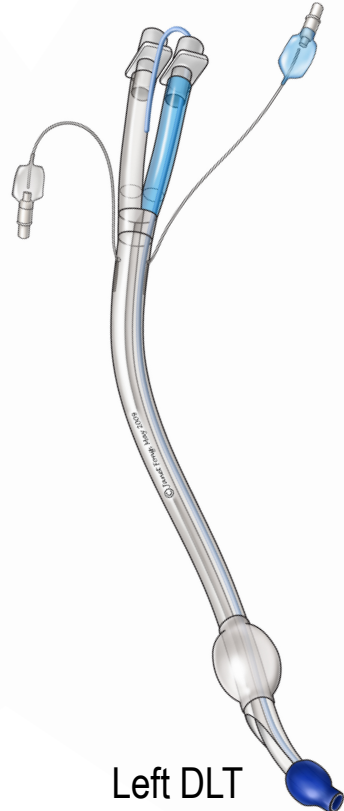
Robertshaw FL. *Br J Anaesth.* 1962;30:30-3

# Double-Lumen tubes – types and sizes

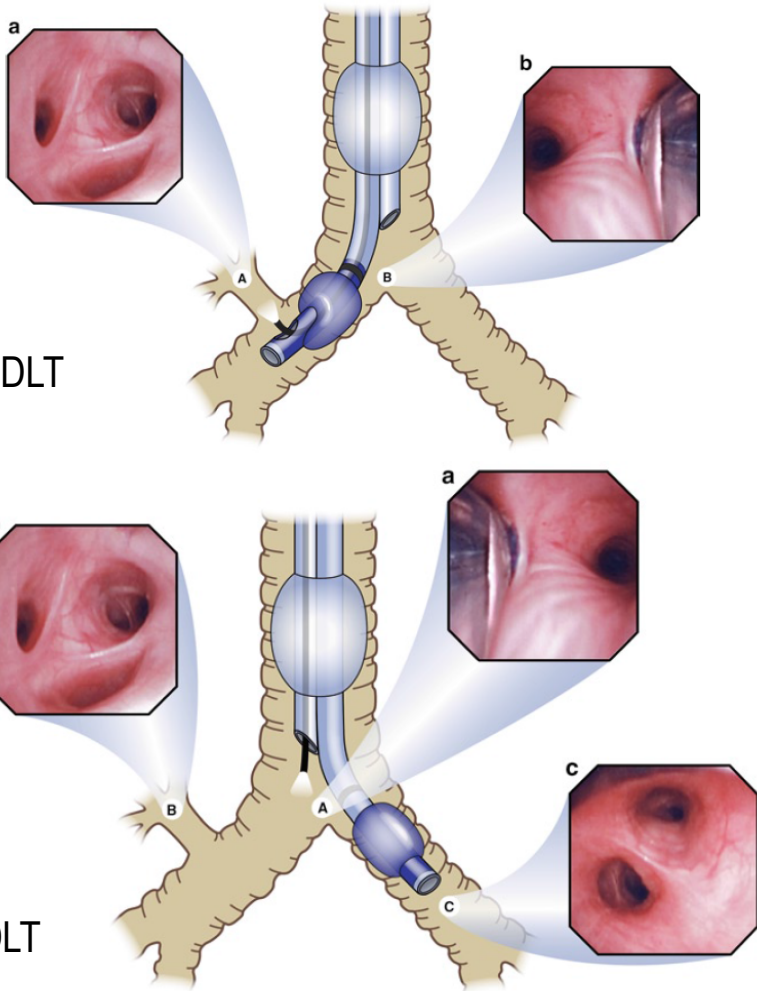
Left vs Right DLT  
 Different sizes  
 (6 to 41 Fr)  
 Different brands  
 and design



[www.esa-key.com/double-lumen-endotracheal-tubes/](http://www.esa-key.com/double-lumen-endotracheal-tubes/)



# Double-Lumen tubes: position control



Flexible bronchoscopic control is highly recommended



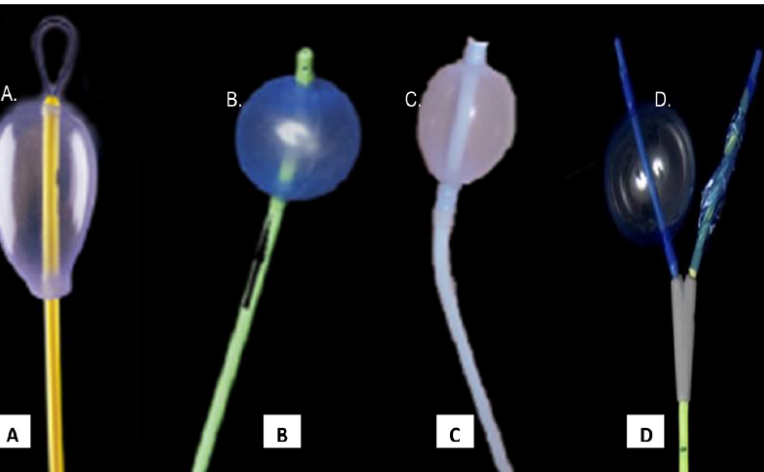
VivaSight-DL<sup>®</sup> (with integrated high-resolution camera at the tip of the tracheal lumen)



# Endobronchial blockers

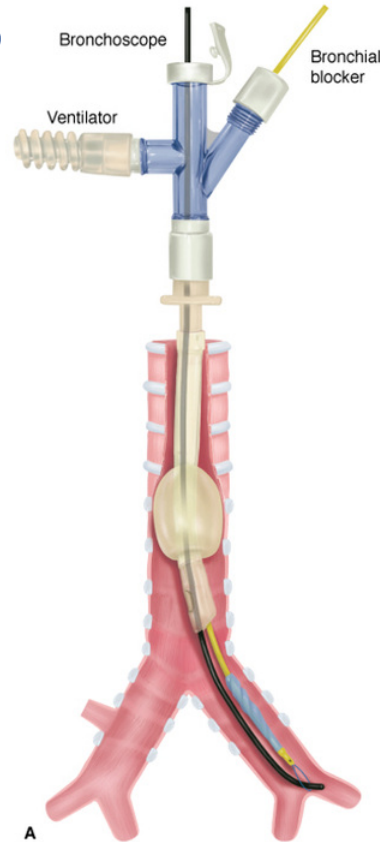
Difficult airways, abnormal tracheobronchial anatomy  
 Already intubated patient or tracheostomy in place  
 Selective endolobar blockade

on wire loop      Flexing tip      Torque control      Y-shaped tip  
 around FOB      wheel device      preshaped tip      bi-blocker

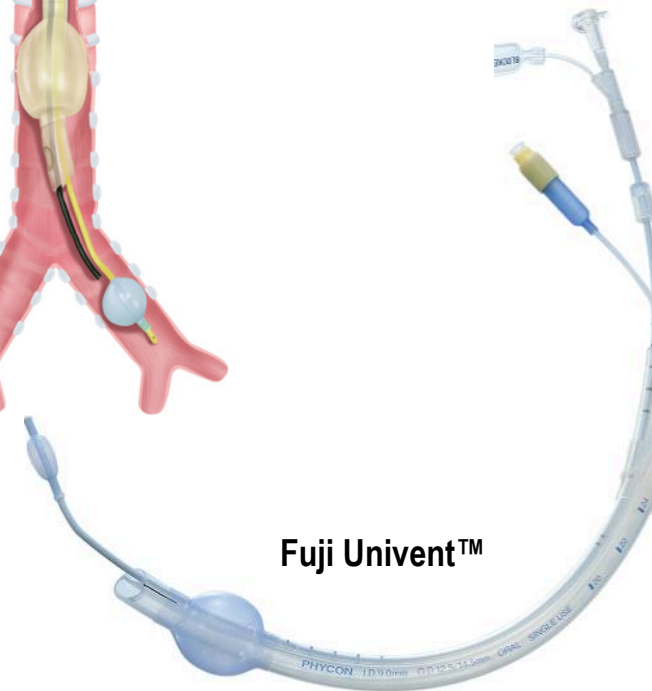
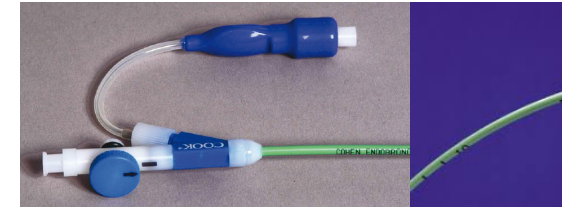


- A. Arndt™
- B. Cohen™
- C. Fuji Uniblocker™
- D. EZ Blocker™

ker M et al. Trends in Anaesthesia and Critical care 2014; 4:47-54.



Source: Tobin MJ: Principles and Practice of Mechanical Ventilation, 3rd Edition: www.accessanesthesiology.com

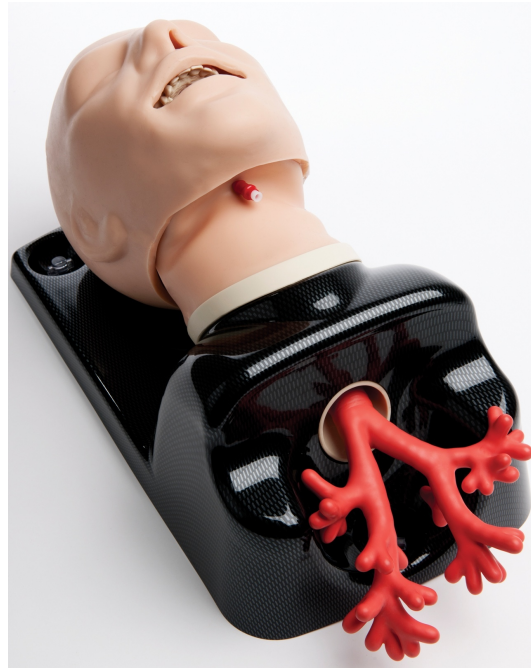


# Lung isolation techniques – training



A<sup>®</sup> bronchoscopy training manikin

bronchoscopy manikins



AirSim<sup>®</sup> Airway Bronchoscopy Training



Koken<sup>®</sup> bronchoscopy training model

Thoracicanesthesia.com Bronchoscopy Simulation

**BRONCHIAL TREE NAVIGATION MAP VIEW**

**BRONCHOSCOPE VIEW**

General Description

**LABELING CONTROLS**

- + Diagram Zoom
- Bronchial Tree Labels
- Bronchial Tree Diagram
- Bronchoscope View Labels
- Bronchoscope Indicator

[www.thoracic-anesthesia.com](http://www.thoracic-anesthesia.com)

Software solutions

# Lung isolation – Bronchoscopy VR simulation



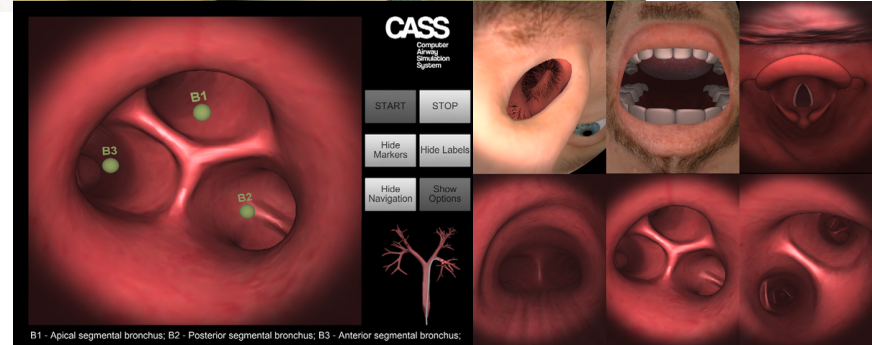
**ORsim**  
Operating Room Simulation



- wireless
- light
- affordable



Station 2B  
Flexible optic intubation - simulation



Casso G et al. Anesth Analg. 2018 Feb 23. Epub ahead of print

**CASS**  
Computer  
Airway  
Simulation  
System



European  
Society of  
Anaesthesiology



# Skill station 4: Lung isolation techniques



# Learning objectives



## Station 4: Lung isolation techniques

- 1. Right vs. Left Double-Lumen Tubes**
- 2. Size of Double-Lumen Tubes**
- 3. Placement of Double-Lumen Tubes**
- 4. Different Types of Bronchial Blockers**