Managing the "Other Breathing Tube"

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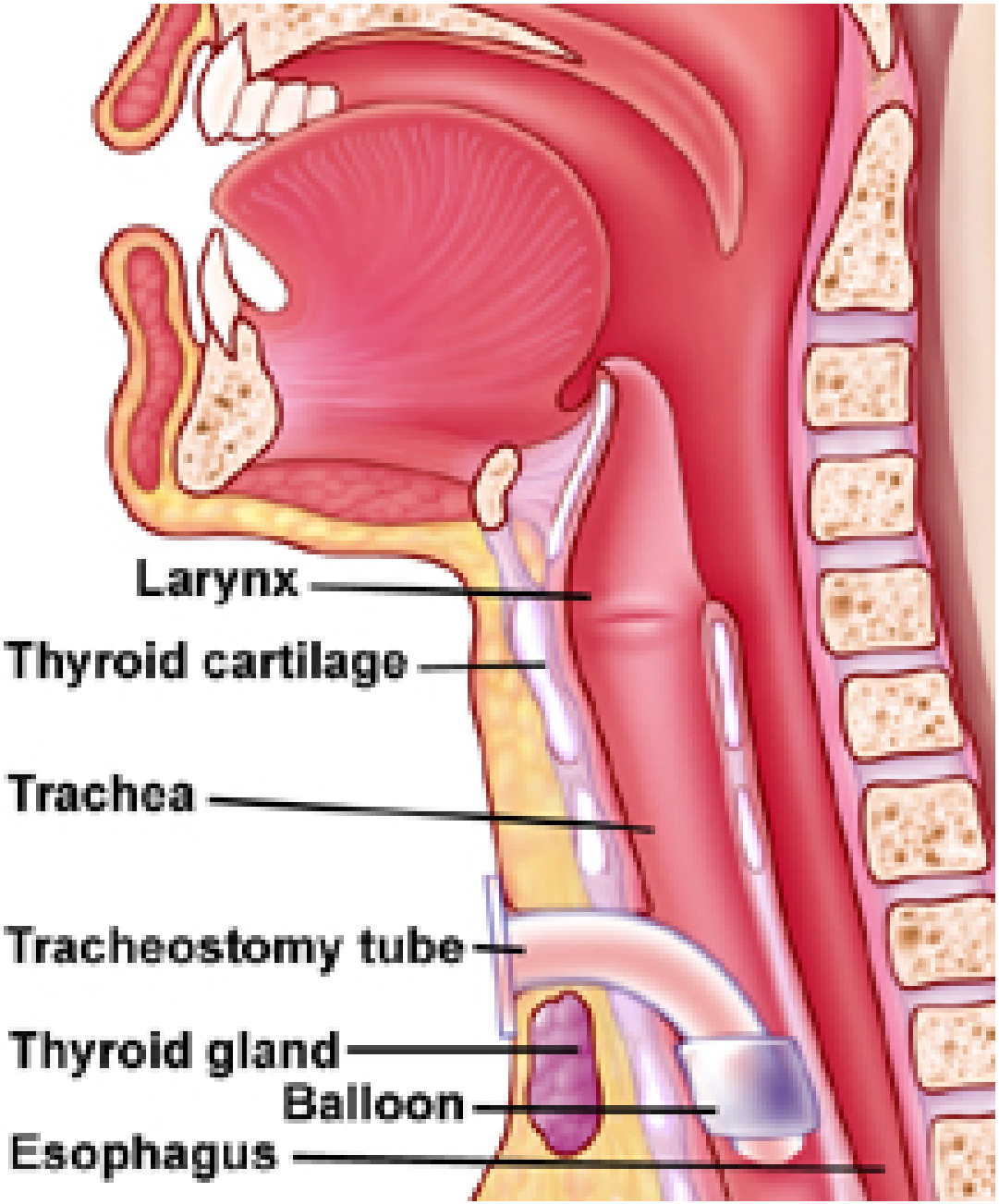
Objectives

- Learn how to assess and treat a patient with a Tracheostomy
- Learn how to suction a Tracheostomy
- Learn how to Change a Tracheostomy Tube
- Learn how to trouble shoot and change out an Inner Cannula

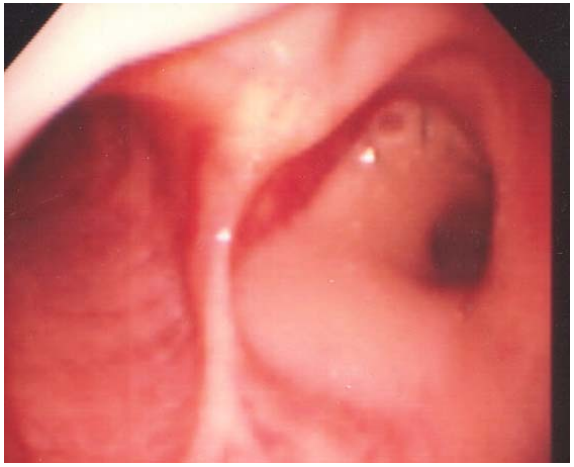
What is a Tracheostomy?

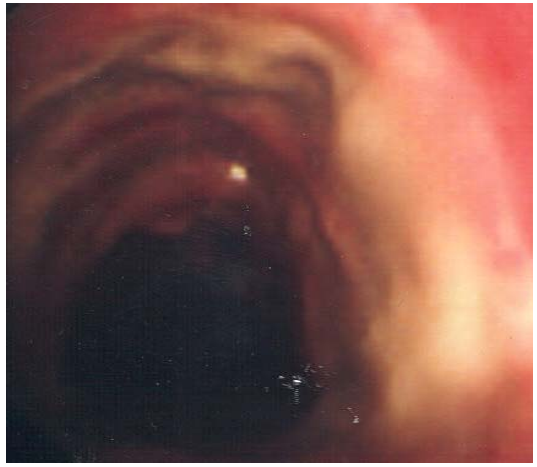
A surgical procedure in which an incision (Stoma) is made in the front of the neck and a breathing tube is placed into the trachea which is called a **Tracheostomy Tube.**



Aaron's Tracheostomy Page

Indications for a Tracheostomy





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To Relieve Upper Airway Obstruction

- Foreign Body
- Trauma
- Acute Infection
- Glottic Edema
- Vocal cord Paralysis
- Tumors of the larynx
- Congenital abnormality of the upper airway


Internet Photo

Respiratory Paralysis

- Catastrophic Head Injury
- Neuromuscular diseases
- Tetanus

To improve respiratory function

- Assistance with secretion removal
- Prolonged mechanical ventilation
- Facilitates weaning from a mechanical ventilator
  - Chronic bronchitis and emphysema
  - COPD
  - Head Injury

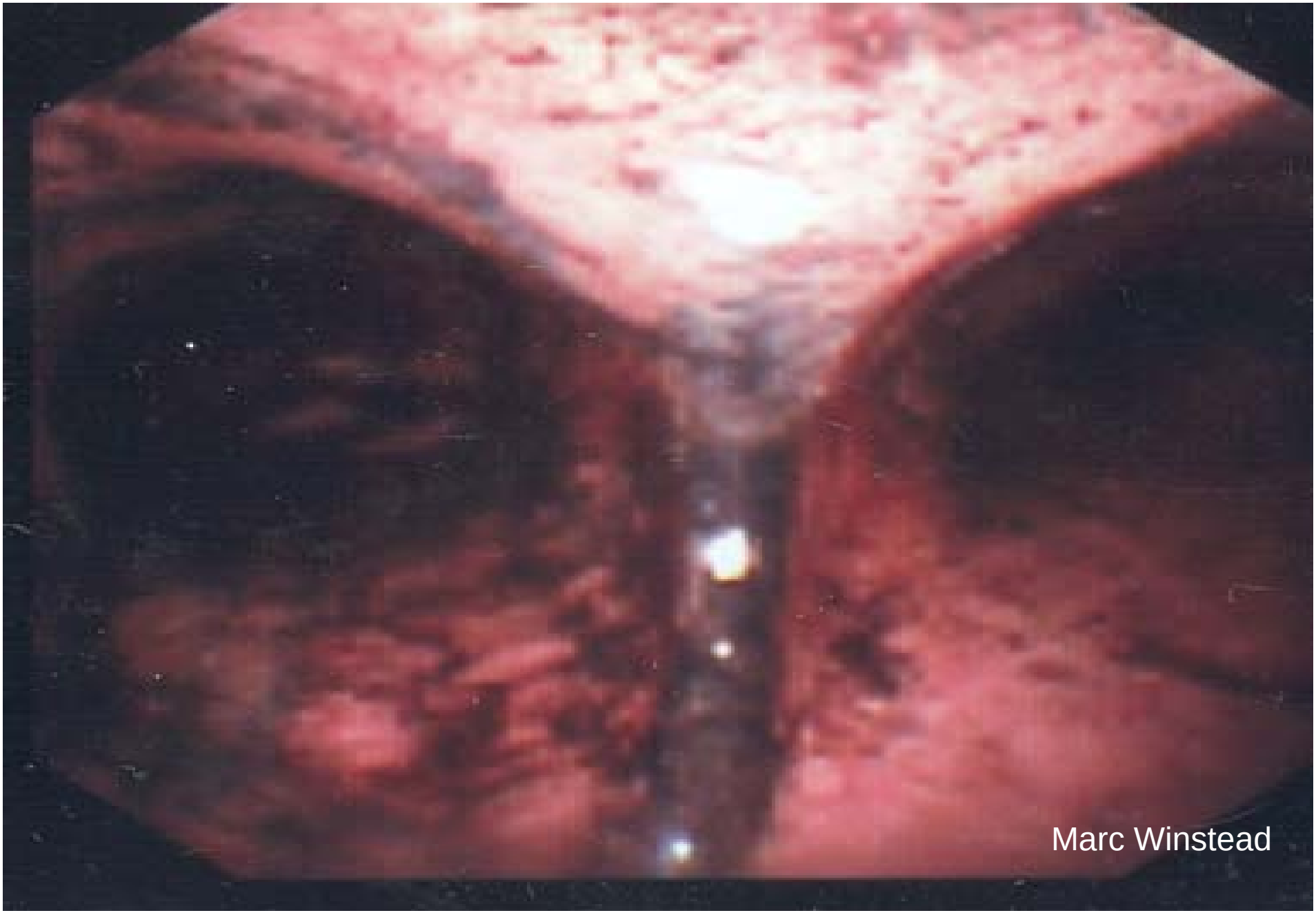
Types of Tracheostomies

Open Surgical

- Surgical opening in skin
- Section of trachea is removed

Percutaneous

- Surgical opening in skin
- Staged dilators are inserted to dilate space between tracheal rings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Immediate Complications

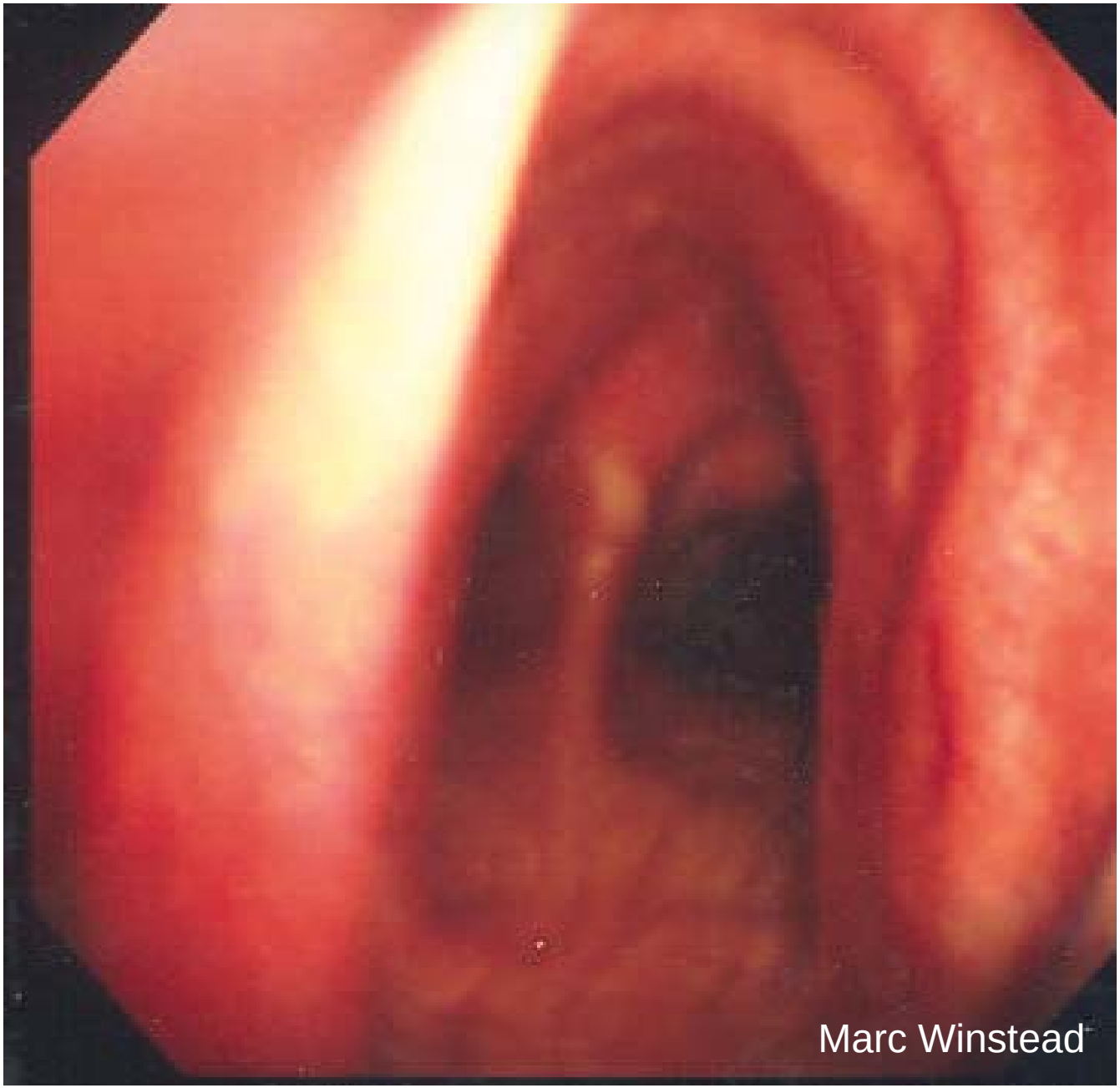
- Hemorrhage
- Surgical trauma: esophagus, laryngeal nerve
- Pneumothorax
- Bleeding

Intermediate Complications

- Tracheal erosion
- Tube displacement
- Tube obstruction
- Subcutaneous emphysema
- Aspiration

Late Complications

- Persistent Tracheo-cutaneous fistula
- Laryngeal and tracheal stenosis
- Tracheomalacia
- Tracheo-esophageal fistula
- Erosion of innominate artery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Tracheostomy Tube Sizes

- Neonatal
- Pediatric
- Adult

Tracheostomy Tube Designs

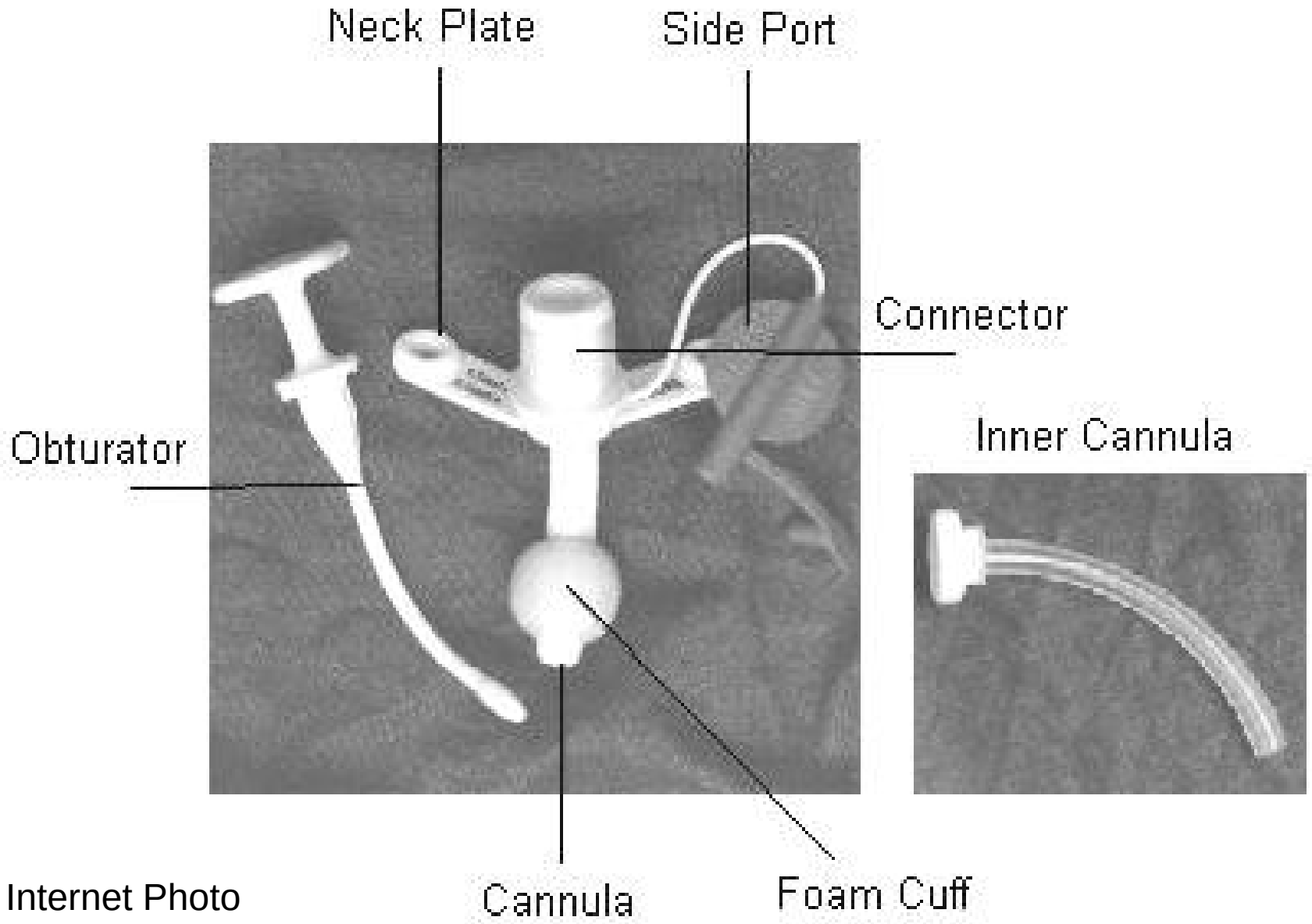
- CFS: Cuffless
- DCT: Disposable Cannula Low Pressure Cuff
- SCT: Single Cannula Cuffed
- CFN: Cuffless Fenestrated

Tracheostomy Tube Designs

- Cuffed versus Uncuffed Tubes
- Single Cannula versus Double Cannulas
- Metal tubes
- Fenestrated Tubes

Parts of a Tracheostomy Tube

- Neck
- Connector: 15mm which attaches BVM Resuscitator / Ventilator
- Pilot Balloon
- Cuff
- Obturator



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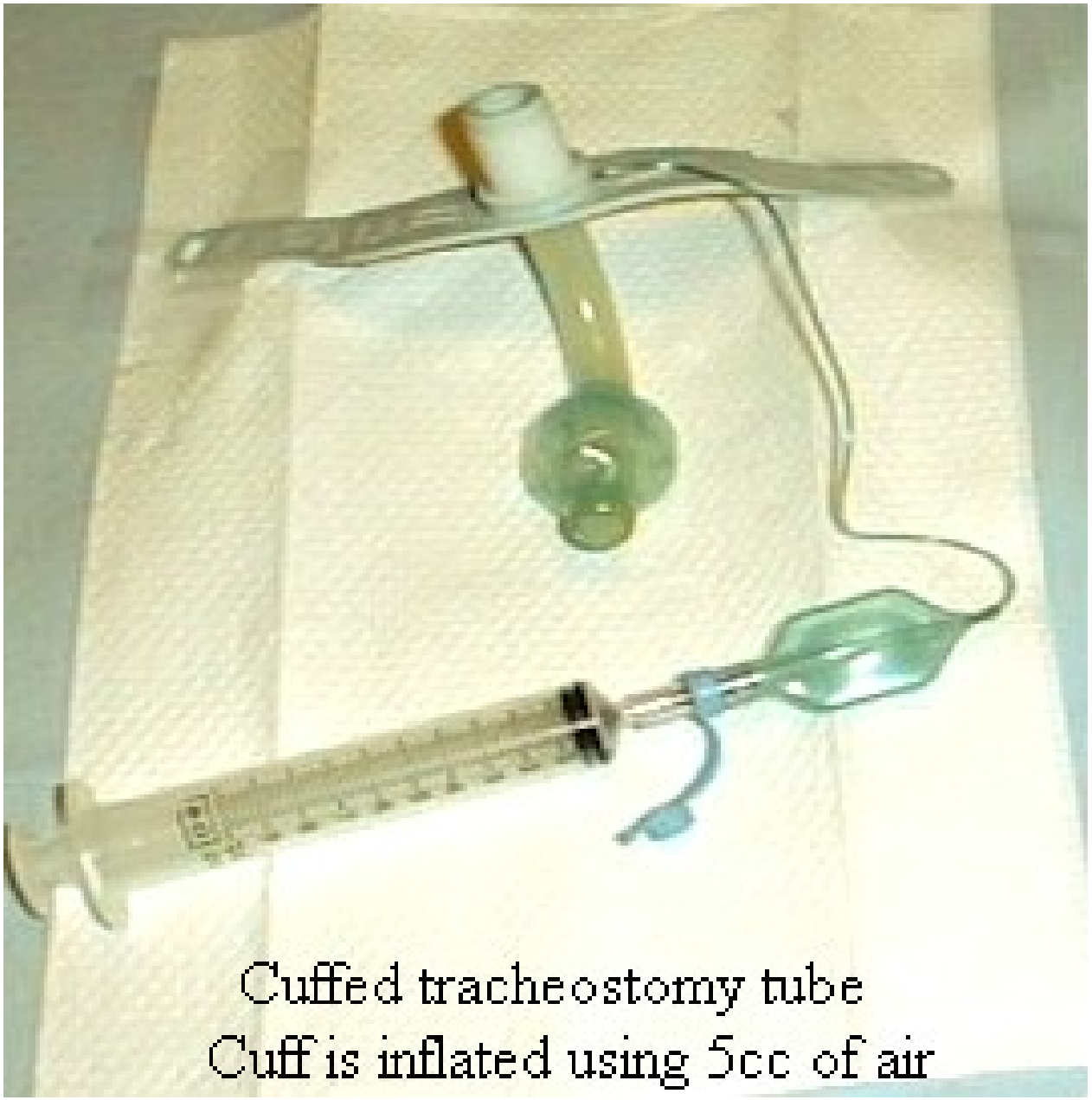


Internet Photo

Reusable Cuffed Trach Tube: DCT

Portex

Reusable Cuffless Trach: CFS

Portex

Disposable Cuffed Trach Tube: DCT

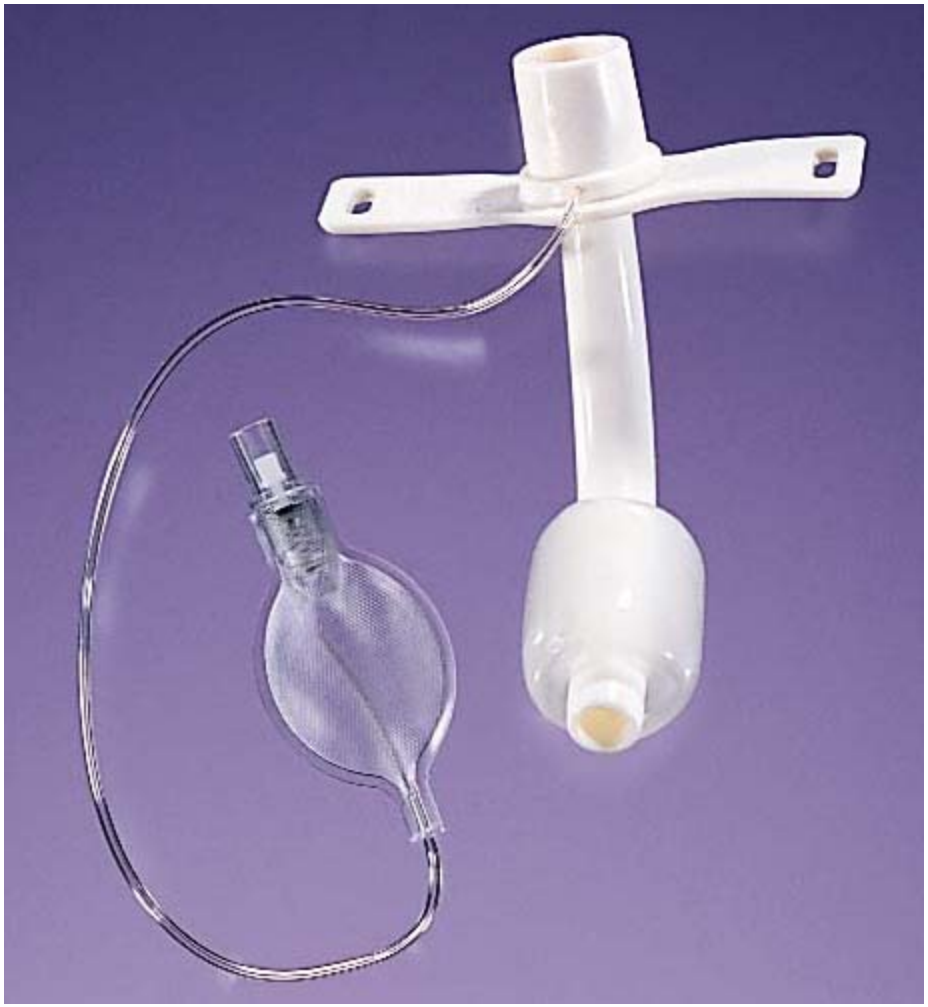
Disposable Cuffless Trach Tube: CFS

Portex

Disposable Inner Cannula: DIC

Portex

Single Cannula Tracheostomy Tube



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Percutaneous Trach

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Extended-Length Tracheostomy Tubes

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Extended-Length Tracheostomy Tubes

- Choose extra length in the proximal portion of the shaft to accommodate patients with full or thick necks who have increased skin-to-tracheal-wall distances. Choose extra length in the distal portion to compensate for conditions requiring extra length, such as tracheal stenosis or malacia.

Pediatric Single Cannula Trach Tubes

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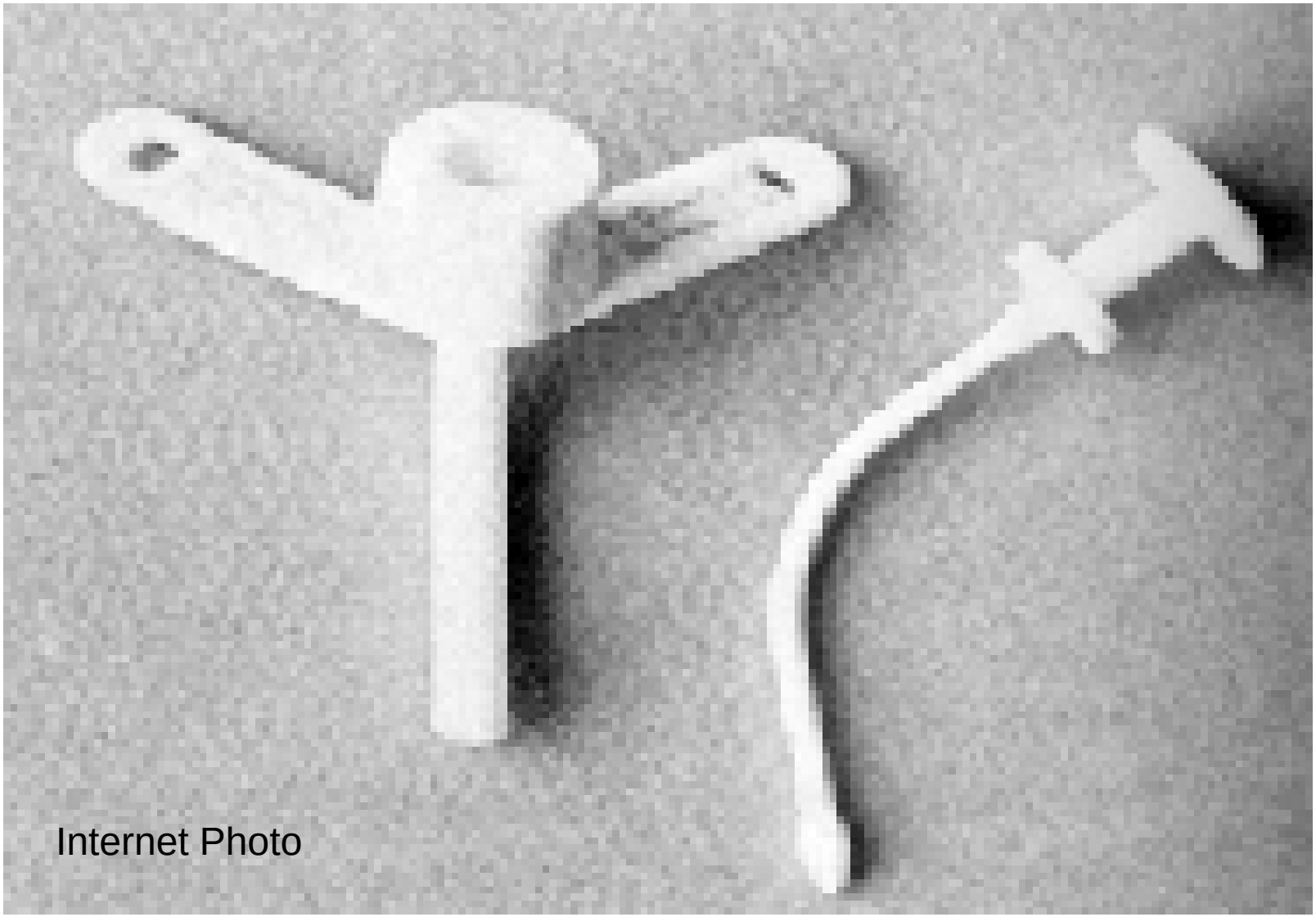
Neonatal Tracheostomy Tube



Jackson Trach (Metal)

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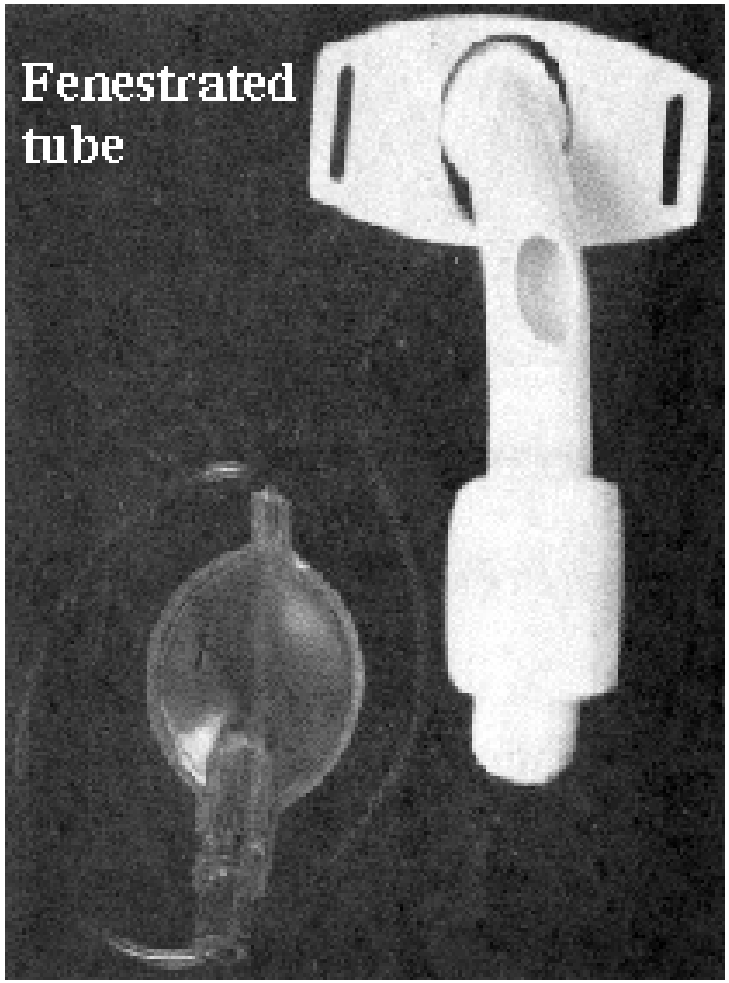
Fenestrated Trach Tube: FEN



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Cuffed versus Uncuffed Tubes

- Will the patient require mechanical ventilation?

- Is the patient at risk for aspiration?

Single versus Double Cannulas

- Single cannulas have a smaller outside diameter (OD)

- Single cannulas potentially have a greater risk for mucous plugging, if the diameter of the tube is decreased by half, the Work of Breathing is increased 16 times

Single versus Double Cannulas

- The inner cannula is removable to facilitate cleaning
- The inner cannula is reusable or disposable
- Double cannula tubes tend to have larger Outside Diameter (O.D.)
- The 15mm/22mm connector is located on the inner cannula, and ventilation is impossible if the inner cannula is absent

Cuff Pressure

- Cuff pressure must be maintained somewhere between allowing air to escape past the Trach cuff, and so much pressure that stops capillary perfusion of the tissues in the trachea.
- Capillary Arterial Perfusion Pressure (CAPP) is estimated to be 30 to 32 cm H_2O in a patient with a normal blood pressure

Cuff Pressure

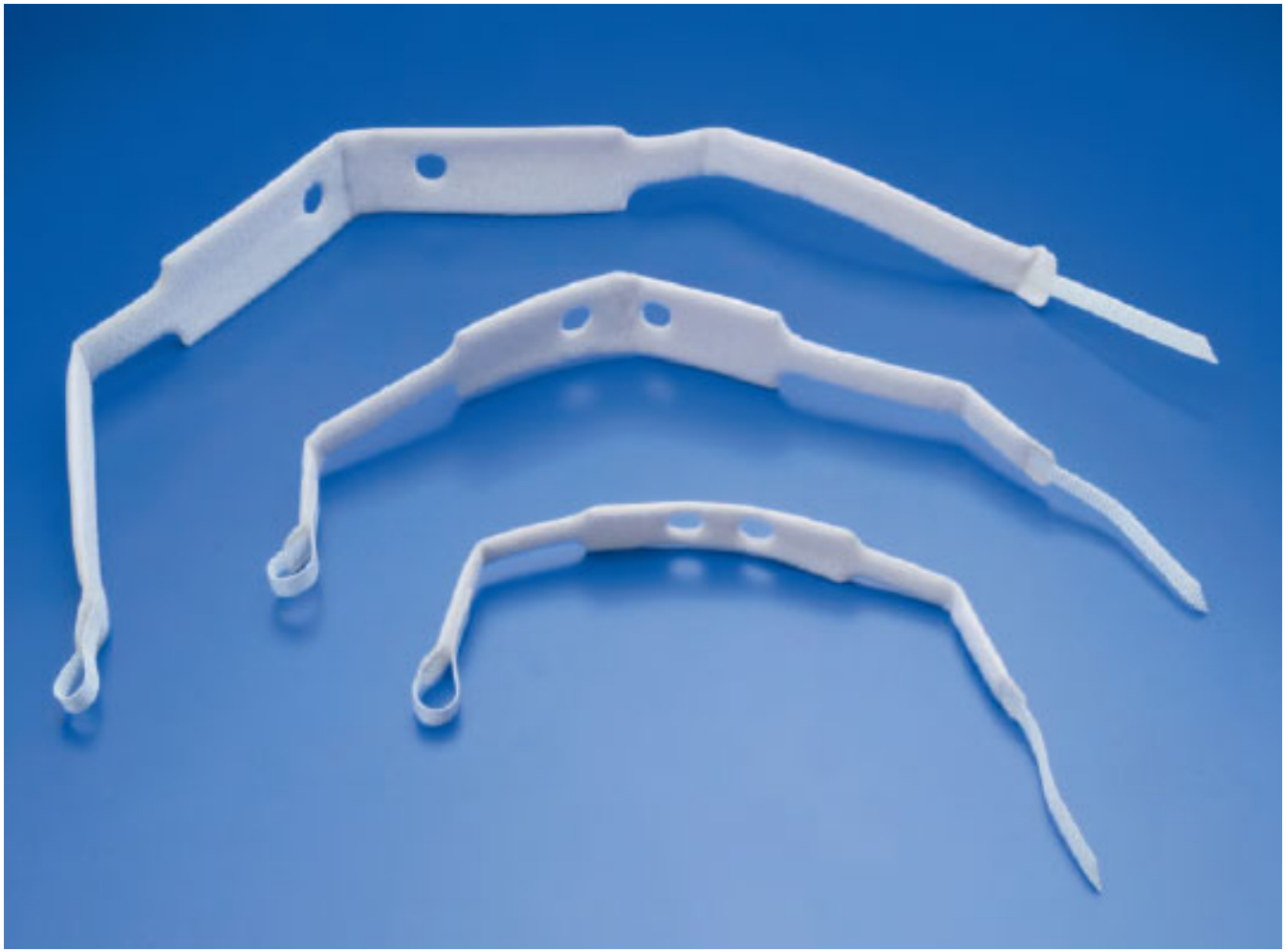
- Ischemic Injury progression:
  - Ulceration
  - Hemorrhage
  - Necrosis formation
  - Trachea dilation
  - Granuloma and Scar formation
  - Exsanguination from Innominate artery
  - Suffocation

Air Leaks

- Air loss may be:
  - From around the cuff as a result of patient position changes
  - From the cuff itself
  - From a faulty one way valve on the pilot balloon
  - From a cracked or broken inflation line

Complications Associated with Cuffs

- Erosion and ischemic damage may occur if the cuff pressure is higher than capillary arterial perfusion pressure.
- Over inflation of the cuff may cause tracheal dilation resulting in a tracheoesophageal fistula
- Vascular injury may present as profuse bleeding if erosion of the innominate artery occurs



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Commercial Grade Trach Tie

Accidental Decanulation

- All Trach patients should have spare Trachs, one the same size and one smaller
- Replace existing tube into stoma using Obturator, inflate cuff, and re-secure around neck, Check Breath Sounds
- If you can't replace the existing tube, then replace with one a size smaller,
- If you do not have a smaller size, obtain several Endotracheal tubes, one the same size, and one a size larger, and place it into the stoma, taking care not to right main stem the tube (check breath sounds)

Accidental Decanulation

- If you have a problem passing the Trach you might try:
- Surgi-lube, Surgi-lube, Surgi-lube
- Passing a suction catheter without the whistle tip, then passing the Trach over the catheter using it as a guide.
- Use a tube changer

Stoma

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Granuloma at Stoma Site

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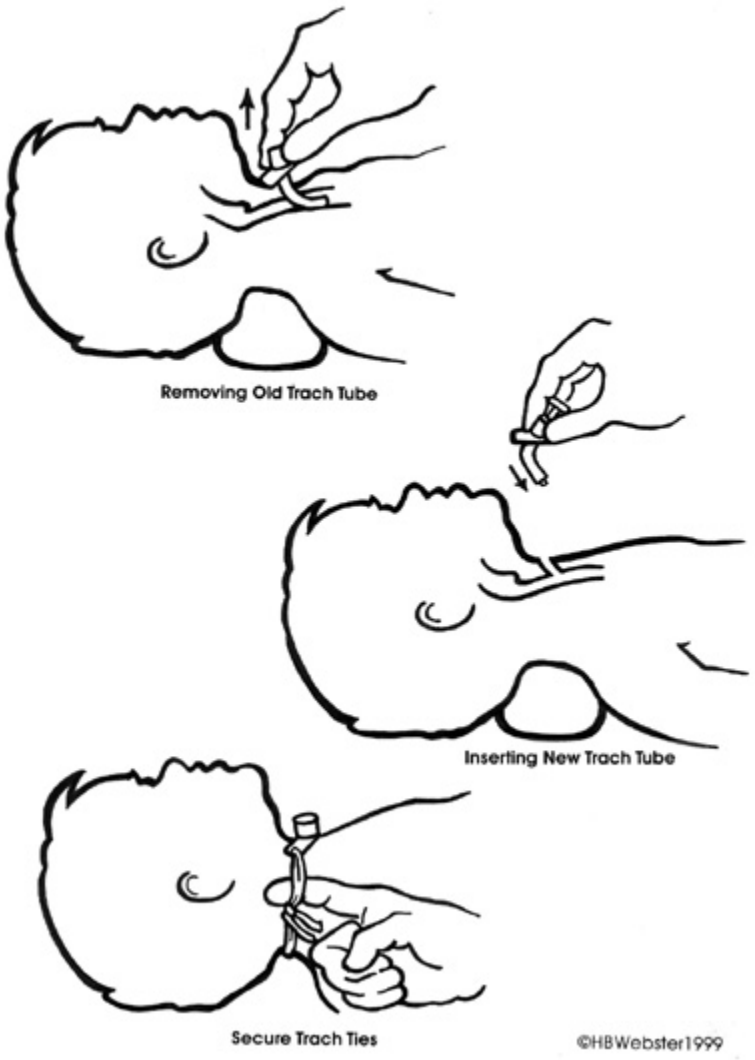
Stoma

http://flickr.com/photos/pricedawna/2006703482/

Replacing a Trach Tube



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Suctioning

- One of the most common procedure performed in the intensive care setting
- Purpose: to remove secretions from the airway
- Patient needs to be hyper-oxygenated / hyperventilated prior to suctioning
- Remember—suctioning not only removes secretions, but usable oxygen/air

Suctioning

INDICATIONS

- Junky breath sounds
- Visual presence of secretions in tube
- Increase in airway pressures
- Difficulty breathing or other indications of Respiratory Distress

Suctioning

COMPLICATIONS FROM SUCTIONING

- Cardiac dysrhythmias
- Hypoxemia
- Cardiac arrest
- Bleeding
- Vagal stimulation
- Mucosal trauma
- Infection
- Increased intracranial pressure

Suction Catheter Design

- **Tip design: Should have multiple “eyes” to help reduce the incidents of tracheal trauma**
- **Type of Material : Plastic vs. Rubber**

  Plastic is stiffer resulting in more trauma than rubber, but rubber catheter costs about 4 times as much, so most home settings will have plastic or a reusable system such as a catheter in a sleeve.

Suction Catheter Design

- **Catheter size: Should be about half the size of the Inner Diameter (ID) of the tube….14 ft. sx cath is 4 mm in width.**
- **Catheter Design: Multiple "Eyes"**

Common sizes

- **18 fr = 5.14 mm**
- **14 fr = 4.00 mm**
- **10 fr = 2.85 mm**
- **8 fr = 2.28 mm**
- **6 fr = 1.71 mm**

Heat Moisture Exchangers

AKA “Artificial Nose”

An artificial nose traps warmth and moisture when the patient breaths out, and the puts that moisture back when the patient breathes in.

Artificial Nose

Internet Photo

Speaking Valves

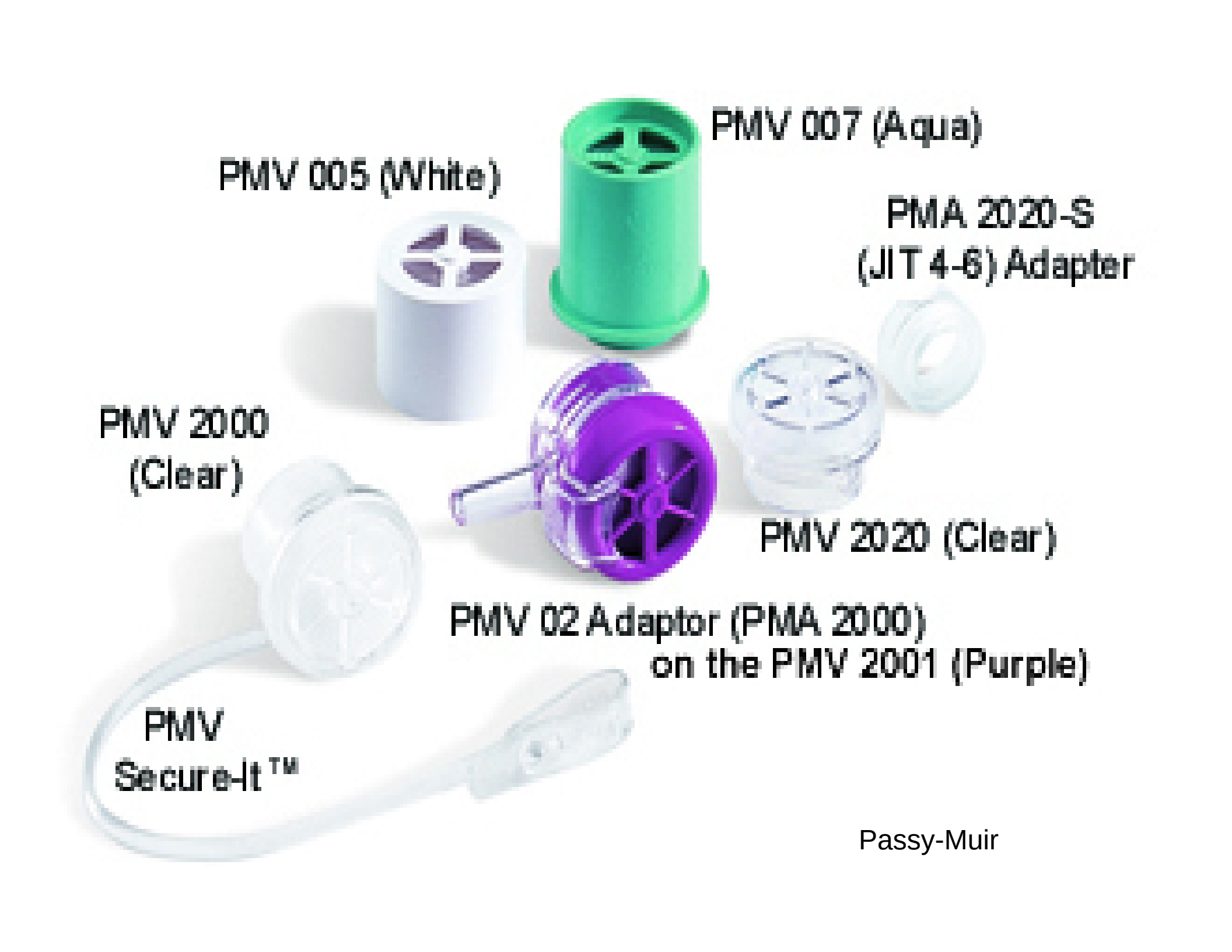
Unique One-way-valve that allows air to enter the Trach on inspiration and closes when the patient exhales, forcing air around the tube and up through the vocal cords thus allowing the vocal cords to vibrate producing speech.

Cuff must be deflated

Speaking Valve Contraindications

- Laryngeal stenosis
- Vocal cord paralysis
- Severe tracheal stenosis
- Airway obstruction
- Respiratory infections
- Heavy mucous production

Passy-Muir Speaking Valve


PMV 007 (Aqua)
PMV 005 (White)
PMA 2020-S
(JIT 4-6) Adapter
PMV 2000
(Clear)
PMV 2020 (Clear)
PMV 02 Adaptor (PMA 2000)
on the PMV 2001 (Purple)
PMV
Secure-It™

Passy-Muir

Passy-Muir Speaking Valve

Passy-Muir

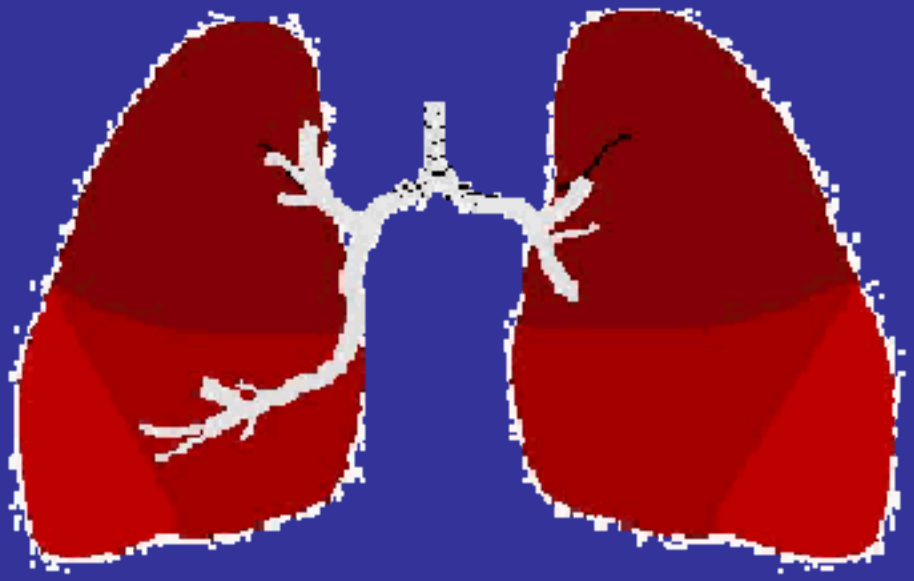
"Just One of the Boys"

Passy Muir

For Additional Information:

- Mallinckrodt Medical: 1-888-744-1414
- Nellcor: www.nellcor.com
- Shiley Trach Tube Info: www.dhmc.org/

Questions ?



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