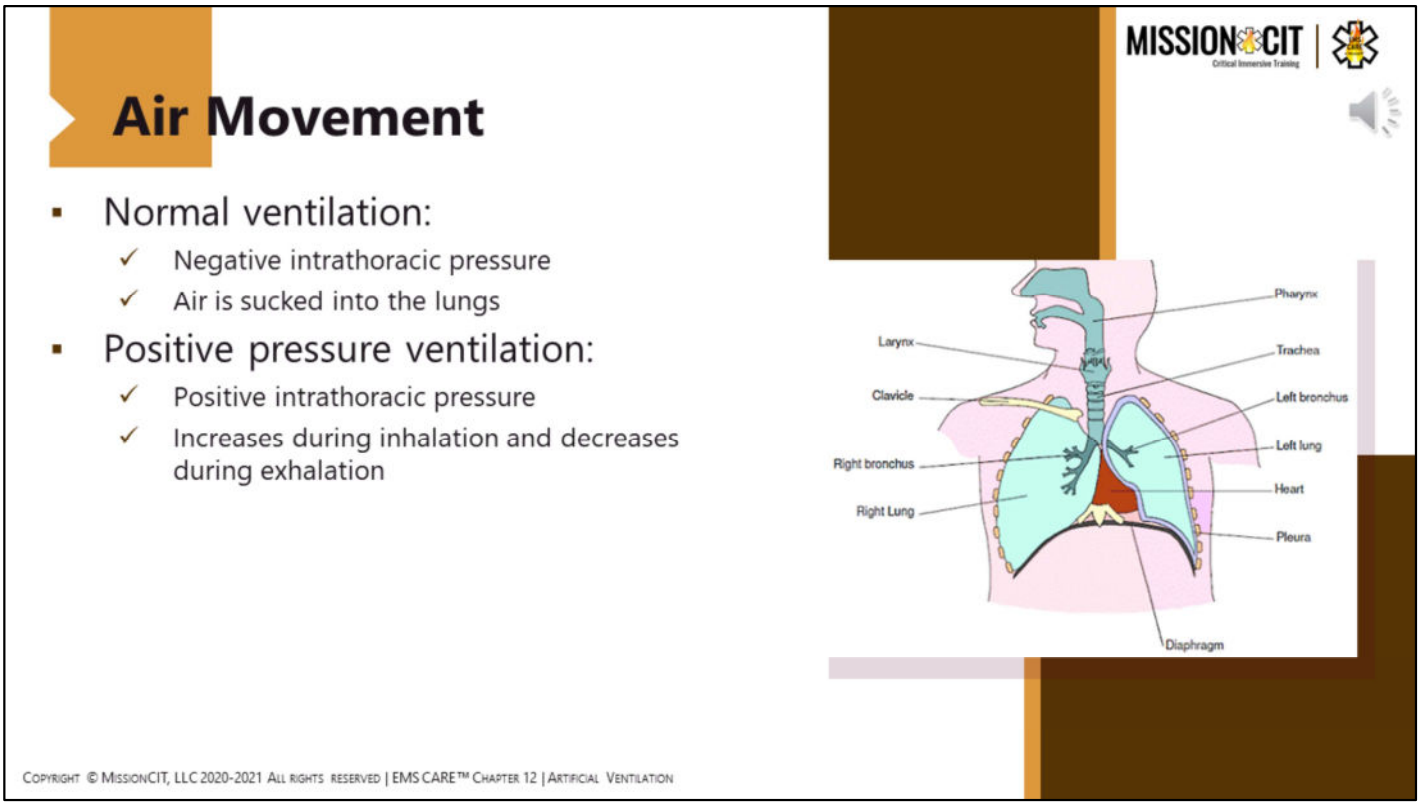



Thank you, Justin!

Positive pressure ventilation is a form of respiratory therapy that involves the delivery of air or a mixture of oxygen combined with other gases by positive pressure into the lungs. In this lesson, we will discuss the difference between normal and positive pressure ventilation.




Normal ventilation:

During normal spontaneous breathing, intrathoracic pressure is negative throughout the ventilatory cycle. Intrapleural pressure varies from about −5 cm $H_2O$ during exhalation to −8 cm $H_2O$ during inhalation. Alveolar pressure fluctuates from +1 cm $H_2O$ during exhalation to −1 cm $H_2O$ during inhalation. The decrease in intrapleural pressure during inhalation facilitates lung inflation and venous return.

During normal ventilation,

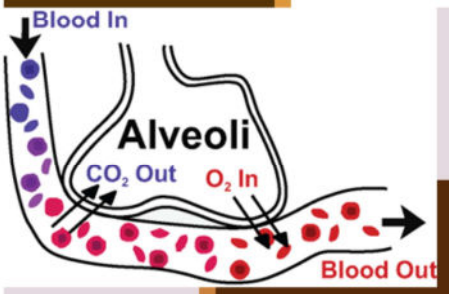
- Intrathoracic pressure is negative
- Air is sucked into lungs

Positive pressure ventilation:

Intrathoracic pressure fluctuations during positive-pressure ventilation are opposite to those that occur during spontaneous breathing. During positive-pressure ventilation, intrathoracic pressure is usually positive. Intrathoracic pressure increases during inhalation and decreases during exhalation.

# Blood Movement

- Normal ventilation:
  - ✓ Blood return happens naturally
  - ✓ Blood is pulled back to the heart
- Positive pressure ventilation:
  - ✓ Venous return is decreased
  - ✓ Reduced amount of blood pumped out of the heart



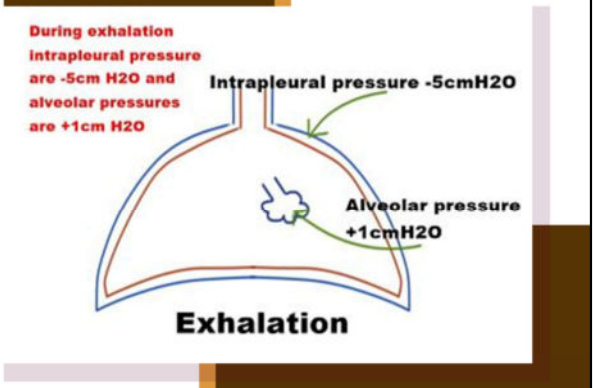

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During normal ventilation, the blood return from the body happens naturally. Blood is pulled back to the heart during normal breathing.

During positive pressure ventilation, venous return is decreased during lung inflation and the amount of blood pumped out of the heart is reduced.

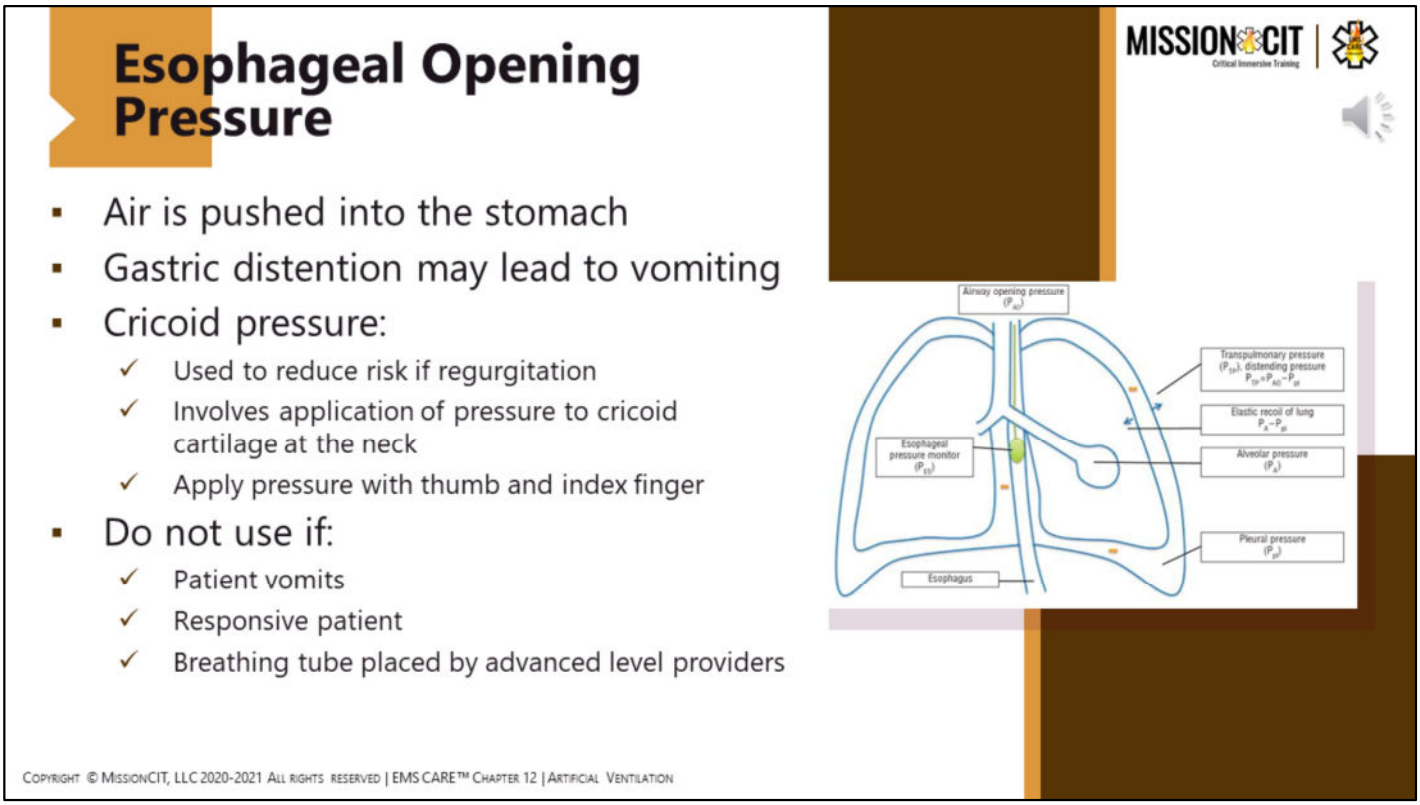
# Airway Wall Pressure

- Positive pressure ventilation:
  - ✓ Walls pushed out of normal anatomical shape
  - ✓ More volume is required to have the same effect as normal breathing




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During positive pressure ventilation, the walls are pushed out of normal anatomical shape. More volume is required to have the same effect as normal breathing.

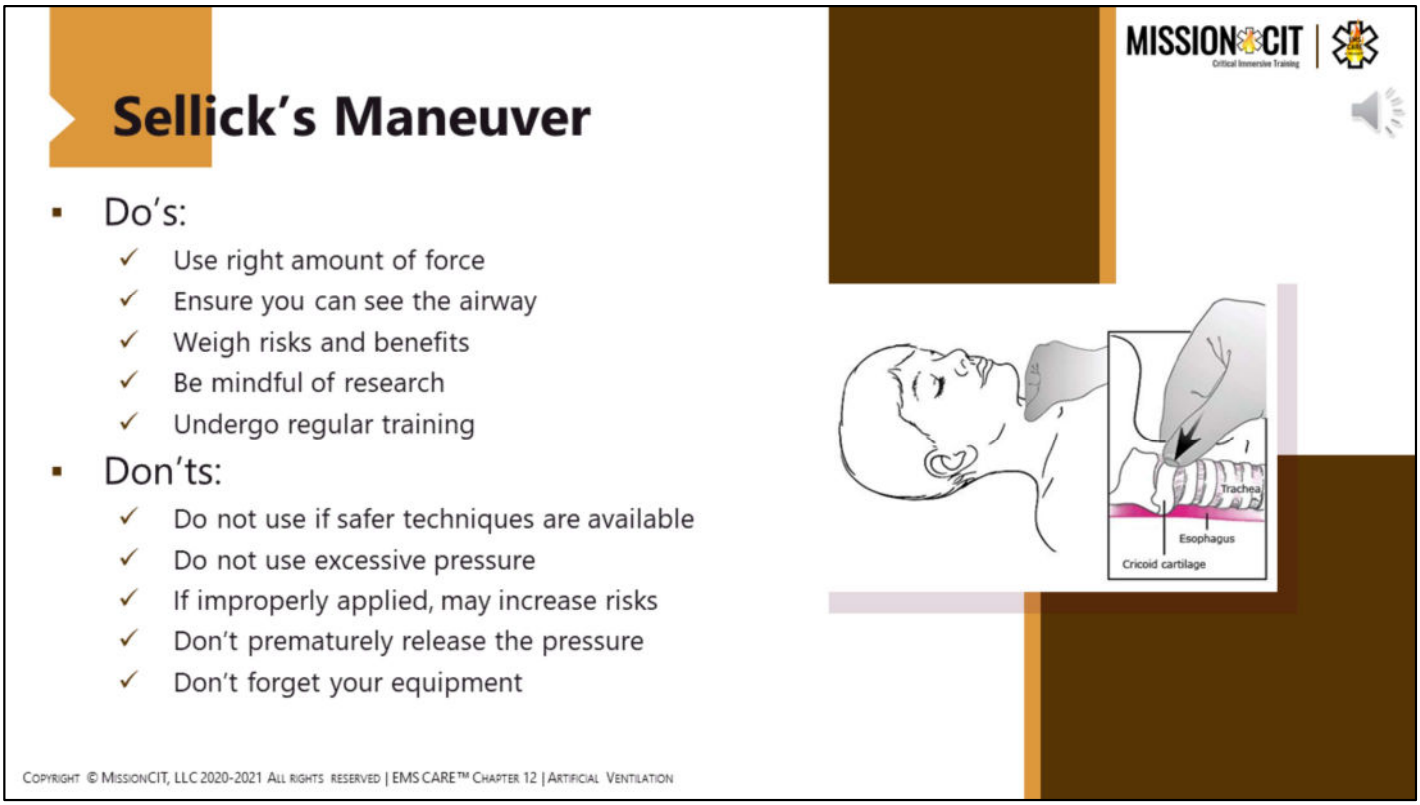



Air is pushed into the stomach during positive pressure ventilation. Gastric distention may lead to vomiting.

Cricoid pressure, also known as the Sellick manoeuvre or Sellick maneuver, is a technique used in endotracheal intubation to try to reduce the risk of regurgitation. The technique involves the application of pressure to the cricoid cartilage at the neck, thus occluding the esophagus which passes directly behind it. Apply firm backward pressure to cricoid cartilage with thumb and index finger.

Do not use if:

- Patient is vomiting or starts to vomit
- Patient is responsive
- Breathing tube has been placed by advanced level providers




Sellick Maneuver Do's

The following strategies can increase the effectiveness of the Sellick maneuver:

- Use the right amount of force.
- Ensure that you can see the airway. Excessive cricoid pressure may make it more difficult to visualize the airway, increasing the risk of ventilation difficulties.
- Weigh the risks and benefits. When cricoid pressure is risky or difficult, consider alternative strategies such as the head-up tilt.
- Be mindful of ongoing research on the Sellick maneuver.
- Undergo regular training. Cricoid pressure is a precision technique that demands precision training.

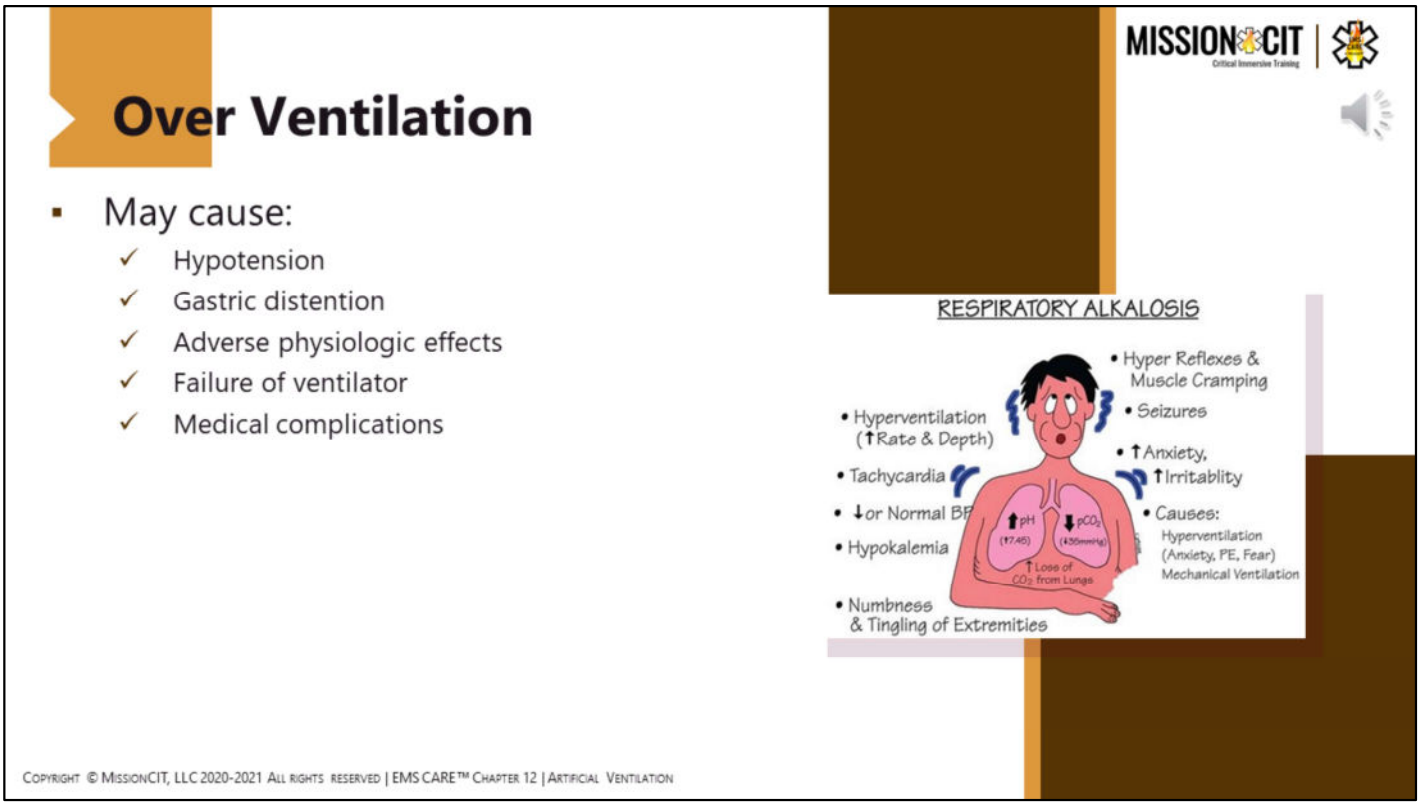
Sellick Maneuver Don'ts

The following tips can help you safely administer cricoid pressure:

- Do not use the Sellick maneuver when safer techniques are available, or when there is no indication that its use is necessary.
- Do not use excessive pressure. This can displace the esophagus and increase the risk of

airway difficulties.

- Don’t assume that cricoid pressure removes the risk of regurgitation or aspiration. When improperly applied, it may increase these risks.
- Don’t prematurely release the pressure. When applied only briefly, cricoid pressure becomes more dangerous, and may elevate the risk of complications.
- Don’t forget your equipment. Patients may still regurgitate or even aspirate. The Sellick maneuver is not a substitute for proper medical treatment, nor for having the right equipment available. Ensure that you have a suctioning machine ready to go in the event of aspiration. If the patient is actively bleeding or continuously vomiting — a potential side effect of this maneuver — be prepared to initiate suction-assisted laryngoscopy and airway decontamination (SALAD).




Over ventilation, either by rate or volume can be detrimental to the patient.

Positive pressure ventilation may cause:

- Hypotension: Positive pressure ventilation can reduce cardiac output which can result in hypotension
- Gastric distention: Severe ventilatory compromise due to gastric distention during pediatric cardiopulmonary resuscitation
- Among the potential adverse physiologic effects of positive-pressure ventilation are decreased cardiac output, unintended respiratory alkalosis, increased intracranial pressure, and impairment of hepatic and renal function
- Failure of the ventilator to cycle, of safety alarms to function properly, and of inspired gas to be properly heated or humidified are examples of equipment-related complications
- Perhaps most feared among medical complications occurring during mechanical ventilation are pneumothorax, bronchopleural fistula, and the development of nosocomial pneumonia

This brings us to the end of the fourth lesson. In the next lesson, Justin will talk about special situations you might face.