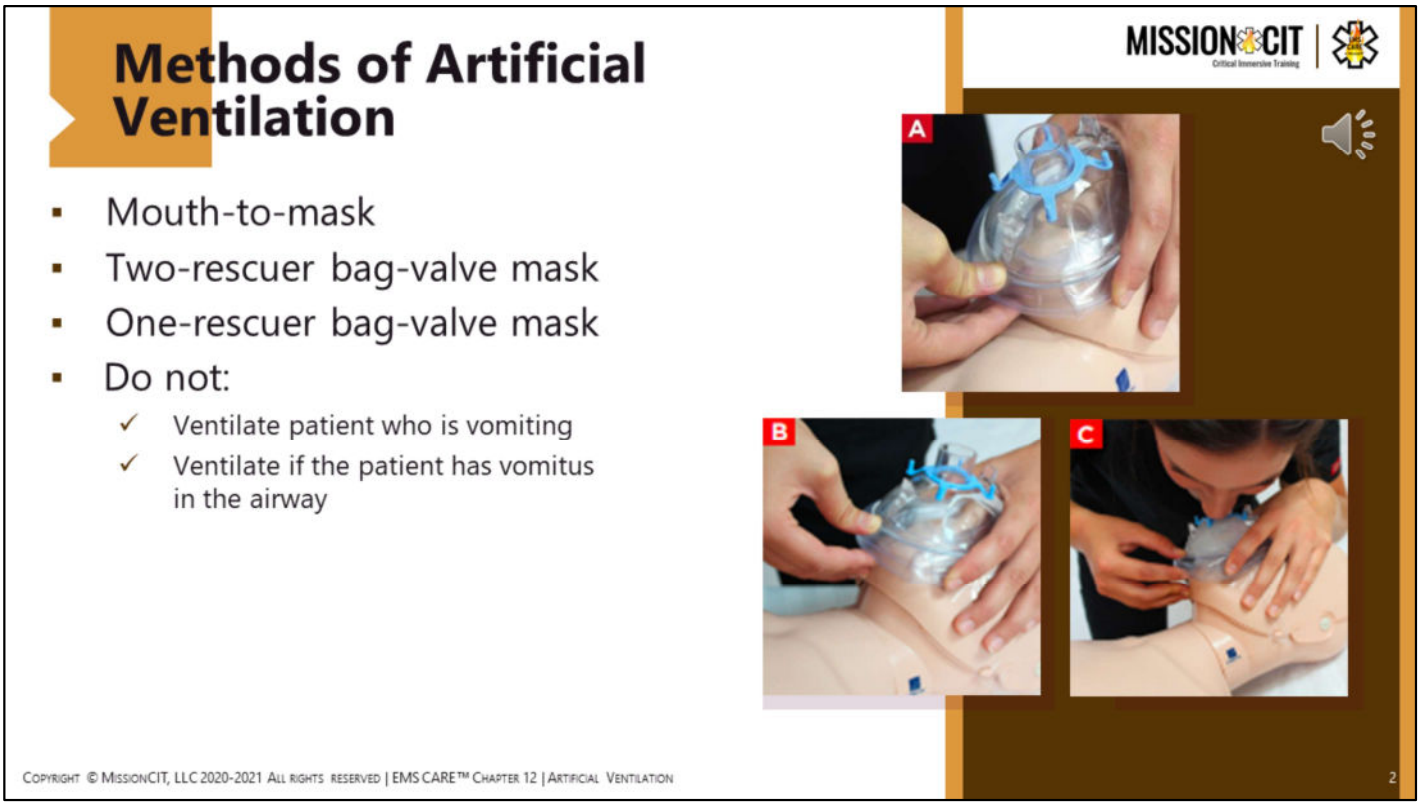


Thank you Justin! Welcome to this lesson where we talk about positive pressure ventilation. It describes the process of either using a mask or, more commonly, a ventilator to deliver breaths and to decrease the work of breathing in a critically ill patient. Positive pressure ventilation is delivered in one of two forms: non-invasive positive pressure ventilation (either through a mask) or invasive positive pressure ventilation, which requires delivering breaths either through an endotracheal tube or a tracheostomy tube. Positive pressure relies on a force that is exactly the opposite of the force the body normally uses.



The three common methods of artificial ventilation are:

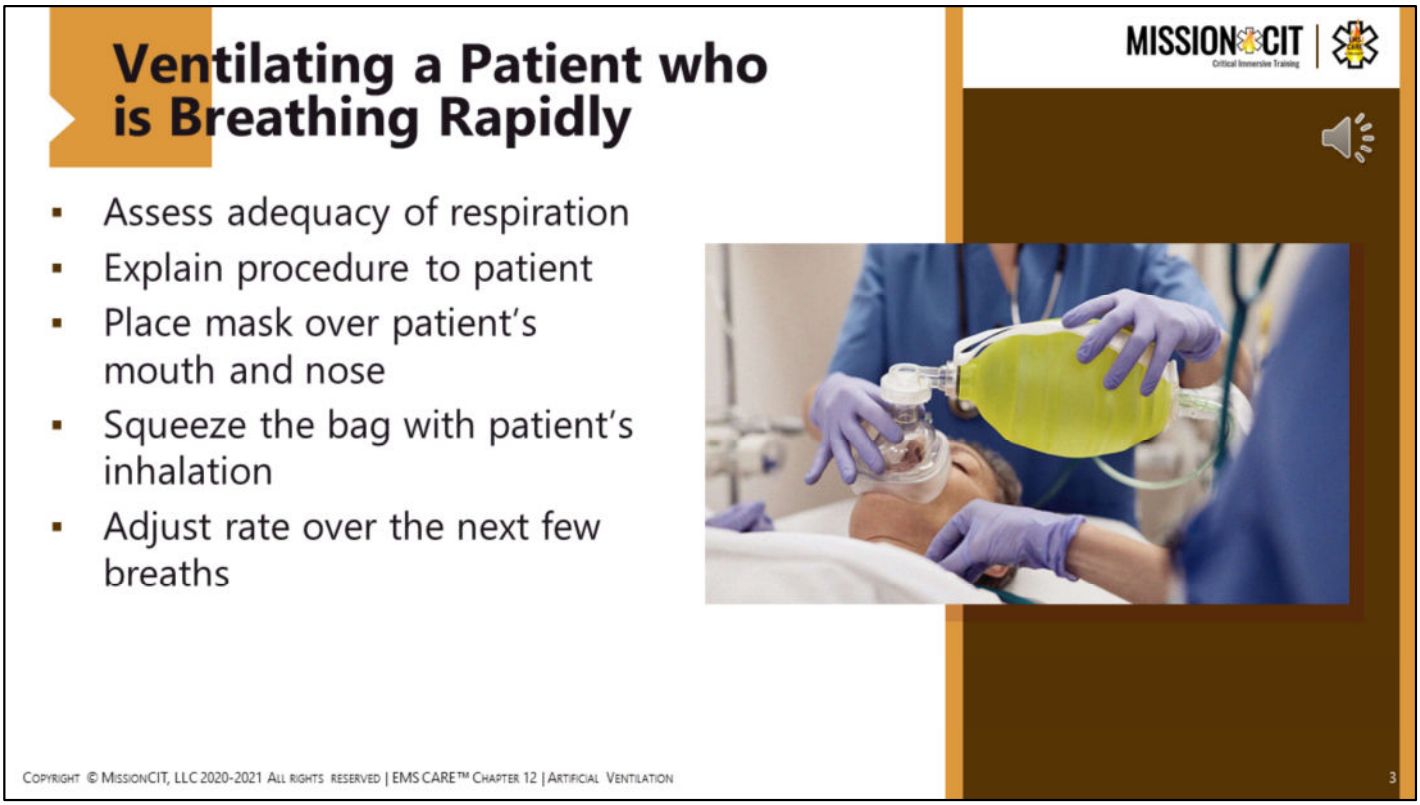
- Mouth-to-mask
- Two-rescuer bag-valve mask
- One-rescuer bag-valve mask

Mouth-to-mask ventilation with supplemental oxygen:

- Take appropriate Body Substance Isolation precautions.
- Instruct a helper to manually stabilize the patient's head for in-line immobilization if there is suspected cervical spinal injury.
- Connect the one-way valve to the face mask.
- Kneel beside the patient's head. Open the airway using the head-tilt/chin-lift maneuver or if suspected cervical spinal injury use the jaw-thrust maneuver.
- Insert an OPA or NPA.
- Place the face mask on the patient's face assuring that the top of the mask is over the bridge of the patient's nose and the bottom is in the groove between the lower lip and the chin.

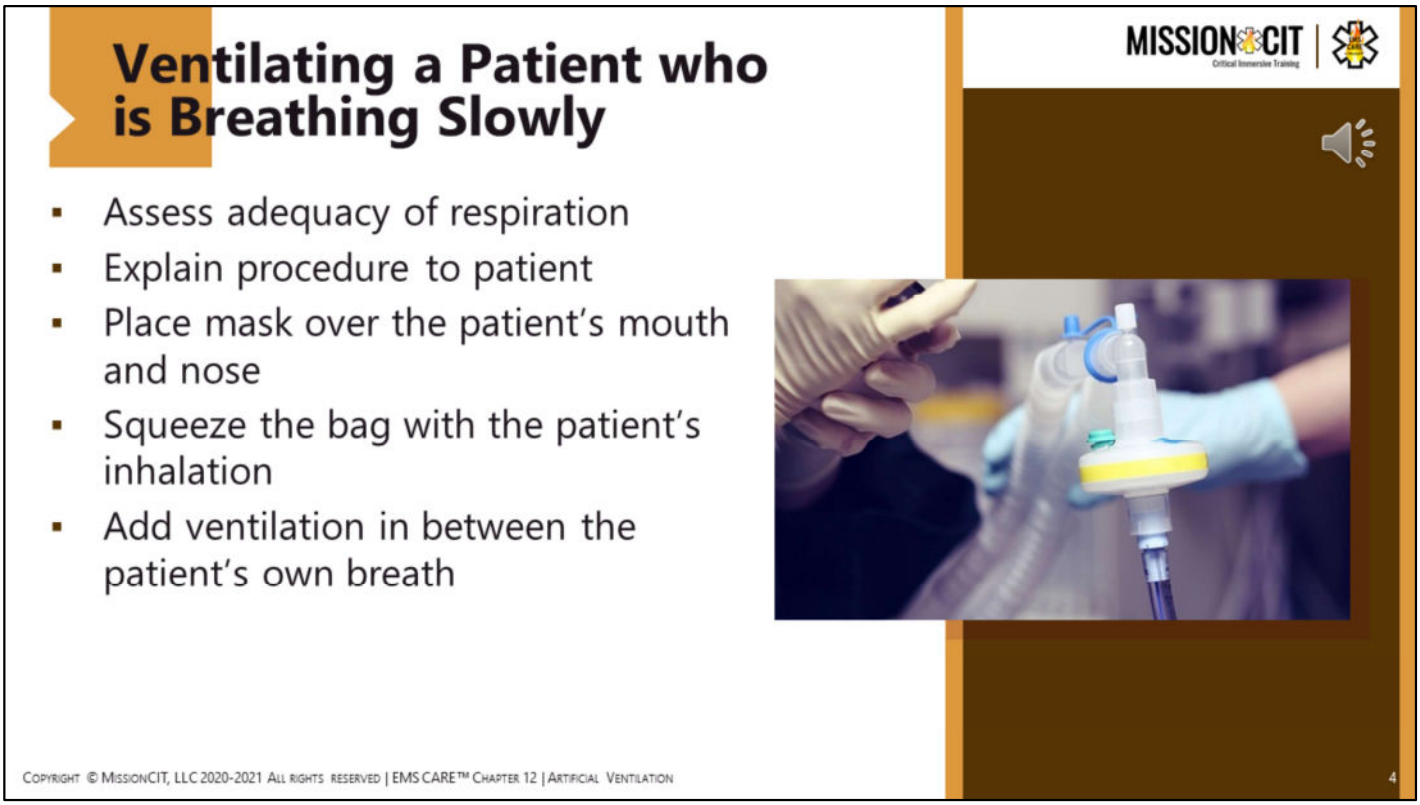
- Maintain an upward and forward pull on the lower jaw with your fingers to keep the airway open. Maintain a proper face to mask seal using the two-handed technique.
- Take a deep breath and exhale through the open port of the on-way valve. Exhale slowly into the mask for 1 ½ to 2 seconds in duration. Watch for the patient's chest to rise accordingly.
- Remove your mouth and watch for the patient's chest to fall during exhalation. You need to allow for adequate exhalation between ventilations.
- Ventilate the patient at the proper rate.
- After 30 seconds of ventilations attach oxygen to the face mask if the mask has an oxygen port.
    - Connect the oxygen tubing to the oxygen inlet on the face mask
    - Connect the other end of the oxygen tubing to the oxygen tank/regulator
    - Turn on the oxygen tank and set the regulator to 15 LPM
- Reposition the face mask on the patient, open the airway, and maintain a proper face to mask seal using the two-handed technique as completed above.
- Continue to ventilate the patient at the proper rate.

For a single rescuer, a bag-mask device can be difficult to maintain, as you have to hold the mask-to-face seal with one hand. So, two-rescuer bag-mask ventilation is preferred as the first rescuer uses two hands to maintain a good mask seal, while the second rescuer squeezes the bag. We will discuss the bag-valve mask method in the next lesson while we talk about the different types of artificial ventilation devices.



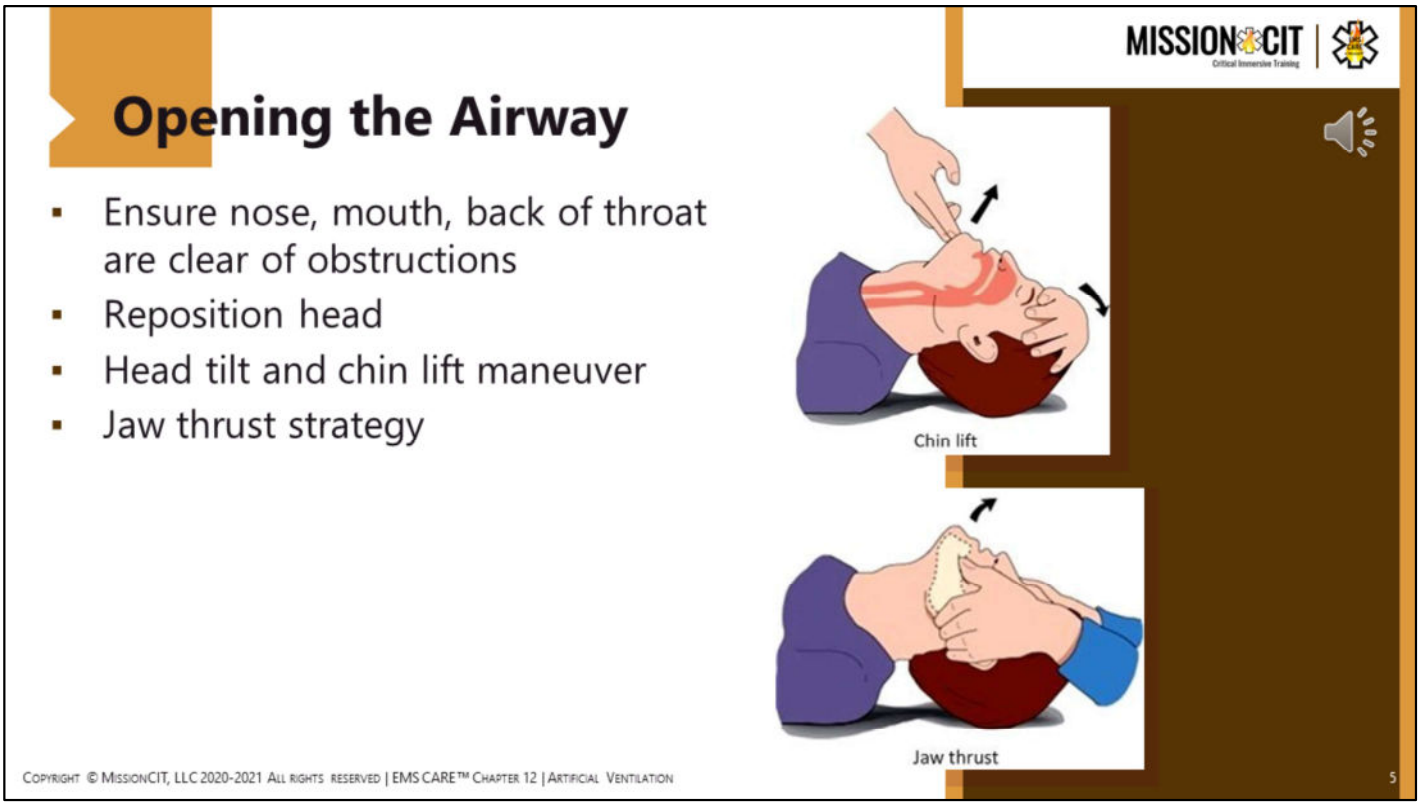
Ventilating a patient who is breathing rapidly:

- Carefully assess the adequacy of respiration
- Explain the procedure to the patient
- Place the mask over the patient's mouth and nose
- After sealing the mask on the patient's face, squeeze the bag with the patient's inhalation
- Adjust rate over the next few breaths to ventilate fewer times with greater volume



Ventilating a patient who is breathing slowly:

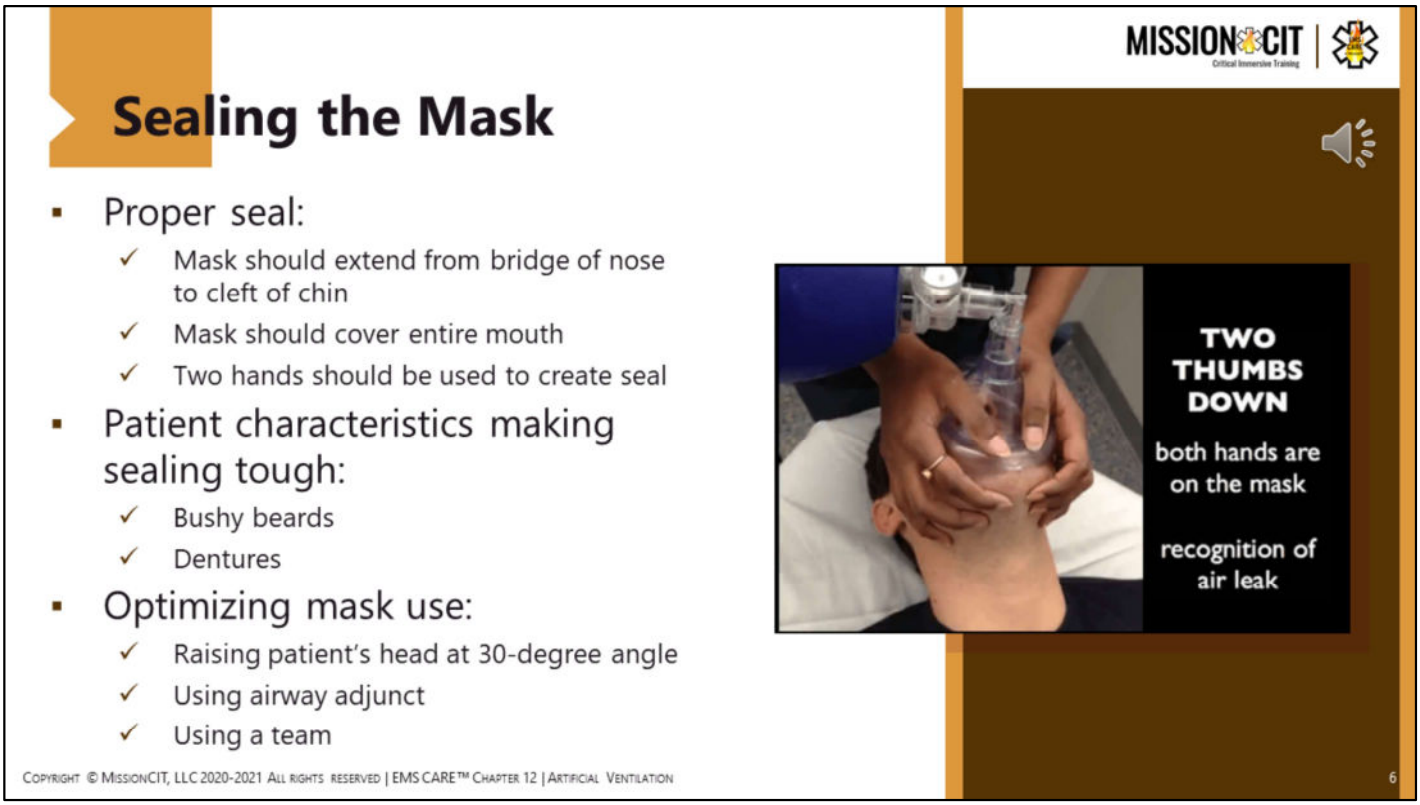
- Carefully assess the adequacy of respiration
- Explain the procedure to the patient
- Place the mask over the patient's mouth and nose
- After sealing the mask on the patient's face, squeeze the bag with the patient's inhalation
- Add ventilation in between the patient's own breath to increase the rate to 12 per minute



An important objective of rescue breathing is to open the patient's airway to ensure the free flow of oxygen and carbon dioxide. For this, ensure that the nose, mouth, back of the throat are clear of obstructions. Also, repositioning the head may open the airways.

Another well-known technique is the head tilt and chin lift maneuver. You can do this only on patients with no suspected neck or spine injury. In this technique, make sure the patient lifts his or her tongue away from the back of the throat as this allows air to flow when the patient breathes.

The next good option is the jaw thrust strategy where you position yourself at the patient's head. Place the index and middle fingers of each hand on either side at the angles of the jaw. Press your thumbs against the cheekbones, lift the jaw forward, and do not tilt or rotate the patient's head. Never do this on patients with neck or spine injuries.



A proper seal allows air to move into the lungs:

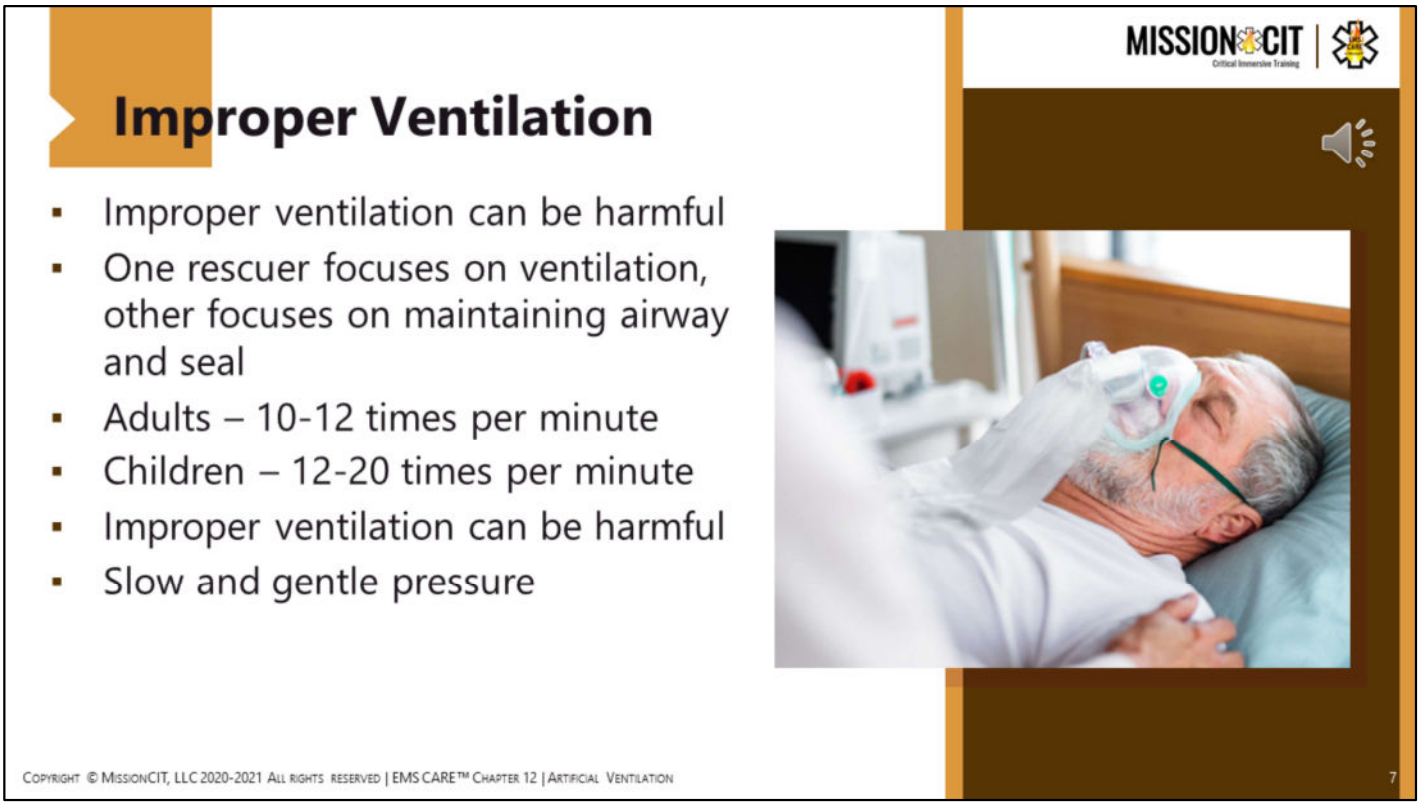
- The mask should extend from the bridge of the nose to the cleft of the chin
- The mask should be wide enough to cover the entire mouth
- Two hands should be used to create a seal

Patient characteristics that can make it hard to get a seal:

- Large, bushy beards should be wetted with water or water-soluble lubricant
- Dentures should be left in place

Several things can optimize mask use:

- Raising the patient's head at a 30-degree angle
- Using an airway adjunct
- Using a team to ventilate



Improper ventilation rates can harm the patient:

- Too slow can cause hypoventilation and hypoxia
- Too fast can cause hyperventilation and vasoconstriction

- If possible, one rescuer should focus on ventilation while the other focuses on maintaining the airway and seal
- Adults should be ventilated 10-12 times per minute
- Children should be ventilated 12-20 times per minute

Improper ventilation volume can also harm the patient:

- Too much pressure causes gastric distention
- Too much volume can cause lung tissue trauma

- Pressure should be slow and gentle

- One hand or 2-3 fingers can be used to squeeze
- Ventilations should be delivered over 1 second
- Ventilate only until the chest begins to move — do not ventilate to full expansion

This brings us to the end of this lesson and in the next one, Missah will talk about artificial ventilation devices.