

Introduction to Airway Suctioning Curriculum



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Curriculum Structure

This curriculum and the accompanying simulator will help participants learn about suctioning a patient's airway.

The Introduction to Suctioning Curriculum is composed of the following lessons. Approximate lesson times are included.

Lesson	Title	Approximate Time
One	FOCUS: Developing Awareness of Patient-Focused Care	10 minutes
One	LEARN: Suctioning Slide Presentation	20 minutes
One	REVIEW: Practice and Assessment of Suctioning	30 minutes
	Total	1 hour

Lesson Structure

Each lesson begins with a Lesson Overview, Lesson Objectives, and a Lesson at a Glance table which lists the lesson activities, materials required, suggested preparation steps, and approximate class time.

Lesson Sections

The actual lesson follows the overview, which will contain some of the sections described below. Most lessons are designed to be completed within 45 minutes.

FOCUS

Every lesson begins with a FOCUS activity intended to capture participants' attention. This may be in the form of a small or large class discussion, a game, a review of previous lesson information, or a demonstration. During this activity, participants are introduced to the topic of the lesson.

LEARN

The LEARN activity in each lesson varies in its presentation mode. It may be a slide presentation, group activity, or demonstration.

REVIEW

The majority of lessons end with a REVIEW activity intended to briefly review the lesson's key messages or main points.

Lesson One – Introduction to Airway Suctioning

Lesson Overview

In this lesson, participants will learn how to perform proper airway suctioning procedures on a patient.

Lesson Objectives

After completing this lesson, participants will be able to:

- Understand terminology related to suctioning
- Identify reasons for suctioning
- Identify desired results for suctioning
- Demonstrate proper and safe suctioning techniques

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• <i>Airway Suctioning (Focus on Communication)</i> worksheet • <i>Airway Suctioning (Focus on Communication)</i> Instructor Resource	1. Print/photocopy <i>Airway Suctioning (Focus on Communication)</i> worksheet (one per participant)	10 minutes
LEARN	• <i>Introduction to Airway Suctioning</i> slide presentation • Airway Suction Trainer • Stethoscope • Monitoring equipment • Bag resuscitation mask and Venturi mask • Complete suction unit with oxygen source • Catheter kit • Soft suction catheter • Rigid suction catheter • Clean gloves • Sterile gloves • Specimen collection cup • Lubricant	1. Prepare <i>Introduction to Airway Suctioning</i> slide presentation for viewing	20 minutes
REVIEW	• Airway Suction Trainer • <i>Airway Suctioning Check-Off</i> worksheet • <i>Airway Suctioning Check-Off</i> (Instructor Resource) • <i>Airway Suctioning Quiz</i> • <i>Airway Suctioning Quiz – Answer Key</i> Supplies: • Stethoscope • Monitoring equipment • Bag resuscitation mask • Venturi mask • Complete suction unit with oxygen source • Catheter kit • Rigid suction catheter • Clean gloves • Specimen collection cup • Lubricant	1. Print/photocopy <i>Airway Suctioning Check-Off</i> worksheet and <i>Airway Suctioning Quiz</i> (one per participant)	30 minutes

Lesson One – Introduction to Airway Suctioning

FOCUS: Developing Awareness of Patient-Focused Care

10 minutes

Purpose:

To help participants develop awareness of patient-focused care.

Materials:

- *Airway Suctioning (Focus on Communication) worksheet*
- *Airway Suctioning (Focus on Communication) Instructor Resource*

Facilitation Steps:

1. Distribute the *Airway Suctioning (Focus on Communication) worksheet* to participants prior to or at the start of the class.
2. Have the *Airway Suctioning (Focus on Communication) Instructor Resource* available for reference.
3. Instruct participants to read through the information and complete the worksheet.
4. Pair up participants upon completion and have them share and discuss their answers.

Name: _____ Class: _____

Airway Suctioning (Focus on Communication)

READ the following:

A 32-year-old female patient was admitted with a traumatic brain injury and a newly placed tracheostomy to the neuro unit that you work on. The night shift nurse tells you that the patient refused all interventions and acted distressed. The nurse explains that she is behind on charts and hasn't pursued the patient any further. When you enter the patient's room, the family notifies you that no one discussed her care plan or described the treatments with the patient or the family.

REFLECT on the situation.

What emotions do you think the patient and her family are feeling?

What are some ways that you can help a patient or their family to communicate about their situation?

SHARE your thoughts with a peer.

Airway Suctioning (Focus on Communication)

Instructor Resource

READ the following:

A 32-year-old female patient was admitted with a traumatic brain injury and a newly placed tracheostomy to the neuro unit that you work on. The night shift nurse tells you that the patient refused all interventions and acted distressed. The nurse explains that she is behind on charts and hasn't pursued the patient any further. When you enter the patient's room, the family notifies you that no one discussed her care plan or described the treatments with the patient or the family.

REFLECT on the situation.

What emotions do you think the patient and her family are feeling?

Fear, anger, confusion, concern, anxiety

What are some ways that you can help a patient or their family to communicate about their situation?

Ask open-ended questions

Don't interrupt the patient when speaking

Engage in focused active listening

Provide explanations to their concerns in a language they understand

Don't respond to their concerns with statements like, "Everything will be okay."

SHARE your thoughts with a peer.

Lesson One – Introduction to Airway Suctioning

LEARN: Introduction to Airway Suctioning Slide Presentation

20 minutes

Purpose:

Participants will learn about the purpose, indicators, supplies, and proper procedure surrounding suctioning.

Materials:

- *Introduction to Airway Suctioning* slide presentation
- Airway Suction Trainer
- Stethoscope
- Monitoring equipment
- Bag resuscitation mask and Venturi mask
- Complete suction unit with oxygen source
- Catheter kit
- Soft suction catheter
- Rigid suction catheter
- Clean gloves
- Sterile gloves
- Specimen collection cup
- Lubricant

Facilitation Steps:

1. Share the following information with participants as you show them the *Introduction to Airway Suctioning* slide presentation.

Slide 1: Title slide.

Slide 2: Suctioning is the mechanical removal of secretions through the mouth, nose, or tracheal tube (tracheostomy tube or endotracheal tube) to clear the airway and improve breathing. Patients who have ineffective coughing, are intubated or ventilated, or have other certain conditions will require suctioning.

Slide 3: The procedures are slightly different depending on whether the patient has a natural or artificial airway. The purpose of suctioning is to remove secretions or obstructions from the airway, prevent tube occlusion, improve oxygenation, or obtain a sputum sample.

Secretions will build up in the lungs and airway if a patient is unable to remove mucus and foreign materials by coughing forcefully. A blockage in the airway can prevent the lungs from receiving adequate oxygen and cause difficulty breathing.

Tracheostomy or endotracheal tube suctioning clears the trachea and lower airway. Tracheostomies cause more secretion accumulation and require frequent suctioning to maintain an open airway and prevent obstruction.

Slide 4: Suctioning has many advantages and disadvantages, but the benefits must outweigh the risks. An advantage of suctioning is that it allows visualization of the cords during intubation by removing secretions (blood, mucus, saliva, and vomit) to establish an airway easier. Successful secretion removal eliminates the possibility of intubation and infection.

However, suctioning is an invasive procedure, and trauma or irritation to the airway can cause increased secretions or bleeding. The process is often painful or uncomfortable. Hypoxemia can occur as a result of suctioning but can be limited by oxygenating the patient both before and after the procedure. Tracheal suctioning may trigger vagal stimulation causing dysrhythmias and hypotension.

Slide 5: A review of the medical record may identify potential contraindications or complications. Most contraindications are relative to the risk of developing adverse effects or condition deterioration. The decision to refrain from suctioning to prevent adverse effects could be fatal.

A patient with recent head or neck injuries cannot receive oral suctioning. Mouth sutures, sores, or sensitive tissues are avoided to prevent further damage.

Slide 6: Suctioning has the potential to create infection and many other adverse effects on the respiratory, cardiovascular, and neurological systems. Decreased lung volumes, hypoxia, alveolar collapse, or trauma to the trachea can affect the respiratory system. Cardiac dysrhythmias, bradycardia, hypotension, hypertension, increased intracranial pressure, or decreased cerebral blood flow are possible suctioning complications. Trauma, irritation, or bleeding in the airway can occur if secretions are not present. Excessive tracheostomy suctioning can result in blood-streaked secretions. Unnecessary suctioning can cause trauma to the mucosal lining and initiate bronchospasm. The patient must be monitored for complications before, during, and after suctioning.

Slide 7: Administering a bronchodilator before suctioning maximizes the diameter of airways and suctioning of secretions. Sedation or pain relief may be administered to patients when necessary and if urgent suctioning is not prolonged. Using normal saline to loosen and remove secretions is not recommended for use with an artificial airway. Instillation of normal saline before tracheal suctioning can affect oxygenation saturation, increase the potential risk for aspiration, and push particles into the lower airway.

Slide 8: Suctioning units are available in mounted and portable units. Mounted units are attached to walls and readily available in each room of medical facilities. A portable suction unit allows emergency medical providers to transfer from initial contact with the patient to the connection of a mounted unit without interruption of availability. Mounted suction units provide more suction power than portable units.

A negative pressure vacuum creates suction from a compressor. Negative pressure should be set at 80-120 mmHg, but adjusted for pediatric patients or thick secretions. However, suction pressure that is set too high can cause tissue damage. Tubing is attached with connection tubing to the machine that pulls out mucus and other secretions through a Yankauer or soft

suction catheter, and then deposited into a collection container.

Slide 9: Suction catheters are available in two forms, an open suction catheter system and a closed suction system (in-line suctioning). Suctioning an endotracheal tube or a tracheostomy can use both open and closed systems. An open suction catheter system requires a ventilator disconnection before suctioning, while a closed suctioning system involves a device that facilitates ventilator directed oxygenation.

Suction catheters can be rigid or soft. Rigid catheters (e.g. Yankauer) are used for oral and oropharynx suctioning, but cannot be used to clear deep secretions. A soft catheter is for suctioning the nasopharynx, tracheal tube, or during situations where a rigid catheter is not appropriate. The correct catheter size must be used to ensure that it will pass smoothly and does not cause trauma to the airway. A 12 or 14 Fr sized catheter is appropriate when performing nasotracheal suctioning.

The oral suction catheter is available in many sizes. The suction catheter must be less than half the diameter of the tracheal tube. The measurement between the tip of the nose to the earlobe should be the catheter's length.

Slide 10: Personal protection equipment such as gloves, a self-inflating bag, and an oxygen source for resuscitation (if needed) are additional supplies needed when suctioning. A Venturi mask is necessary to oxygenate the patient as compensation during suctioning. A lubricant is needed when performing nasotracheal suctioning to allow the catheter to pass without difficulty.

Slide 11: Before suctioning, verify the identity of the patient with current physician orders or the medical chart. Provide detailed instructions of the procedure to the patient when possible before suctioning to help ease anxiety and promote understanding. All information must be repeated each time a suctioning event occurs, as some patients may not remember previous instructions. Instructions must include the reason that suctioning is needed, consequences for not suctioning, and the

effects. Inform the patient that suctioning is uncomfortable but brief and necessary. Also, more than one attempt may be required. Ensure that all essential equipment is monitoring the patient. Place the patient in a semi-Fowler's position with their head in a neutral position, unless contraindicated. Perform an assessment before, during, and after suctioning to monitor for complications or contraindications.

Slide 12: Stand on the side of the patient, hyperoxygenate for 1 minute using a Venturi mask. Insert the tip of the catheter without applying suction into the oral cavity and advance the catheter towards the oropharynx by gently pushing the tongue down. Apply suction by placing a finger over the catheter side opening while moving the tip of the catheter around the mouth until secretions are clear.

Demonstrate for participants on the Airway Suction Trainer.

Slide 13: Stand on the side of the patient, place a Venturi mask over the tracheostomy tube or endotracheal tube to hyperoxygenate for 1 minute using a non-sterile gloved and nondominant hand. Hold the catheter with the dominant sterile gloved hand to insert the catheter into the tube without applying suction. Once resistance is felt, pull the catheter back 1-2 cm. Place and remove a finger over the catheter side opening intermittently to apply suction while withdrawing the catheter from the tube between 10-15 seconds. Reapply the Venturi mask with the nondominant hand to reoxygenate for 1 minute.

Demonstrate for participants on the Airway Suction Trainer.

Slide 14: Return oxygen to the previously prescribed rate immediately after tracheal suctioning is complete. A respiratory assessment is completed after each event to monitor changes, improvement, or side effects. Increased difficulty in breathing, hypoxia, discomfort, worsening vital signs, and bloody sputum are adverse effects to monitor and address appropriately. Document all actions of the procedure immediately in the patient's chart.

Slide 15: Gloves, gown, mask, goggles, and/or a face mask are worn with droplet and airborne precautions if secretions are likely to splash or if an aggressive cough is stimulated. Tracheal suctioning is performed before oral or nasal suctioning, after which the catheter is discarded. A new and separate suction catheter is used for oral and nasal suctioning to prevent contamination and infection of the lower airways. A tracheostomy tube with an inner cannula will remain in place to prevent the collection of secretions.

Slide 16: Record in the patient's chart immediately after the procedure. Document the date, time, size and type of catheter, preparation and description of procedure, assessment throughout each stage of the procedure, tolerance, effectiveness, administration of medication or oxygen, characteristics of secretions, and whether a sputum sample was collected.

Lesson One – Introduction to Airway Suctioning

REVIEW: Practice and Assessment of Airway Suctioning

30 minutes

Purpose:

Participants will practice suctioning on the Airway Suction Trainer and then complete a quiz to assess mastery.

Materials:

- Airway Suction Trainer
- *Airway Suctioning Check-Off* worksheet
- *Airway Suctioning Check-Off* (Instructor Resource)
- *Airway Suctioning Quiz*
- *Airway Suctioning Quiz – Answer Key*

Supplies:

- Stethoscope
- Monitoring equipment
- Bag resuscitation mask and
- Venturi mask
- Complete suction unit with oxygen source
- Catheter kit
- Soft suction catheter
- Rigid suction catheter
- Clean gloves
- Sterile gloves
- Specimen collection cup
- Lubricant

Facilitation Steps:

1. Give participants the *Airway Suctioning Check-Off* worksheet.
2. Access the *Airway Suctioning Check-Off* (Instructor Resource). Follow the steps to demonstrate suctioning on the Airway Suction Trainer.
3. Have participants follow the steps on the *Airway Suctioning Check-Off* worksheet to practice suctioning on the Airway Suction Trainer.

4. Hand out the *Airway Suctioning Quiz* to participants. Give them a couple of minutes to complete it.
5. Have participants self-check or peer-check their answers as you share the correct answers from the *Airway Suctioning Quiz – Answer Key*.

Airway Suctioning Check-Off

Practice suctioning on the Airway Suction Trainer using the following steps:

1. Verify the order for suctioning from the healthcare provider.	
2. Gather all supplies and ensure the equipment is set up properly.	
3. Confirm the identity of the patient.	
4. Perform hand hygiene and apply the appropriate PPE.	
5. Administer medications, if necessary.	
6. Perform a baseline assessment unless the need for suctioning is urgent.	
7. Provide the patient with instructions of the procedure.	
8. Place the patient in a semi-Fowler's position with their head supported in a neutral position if not contraindicated.	
9. ORAL SUCTIONING: Measure the catheter from the tip of the nose to the earlobe to determine length.	
10. Preoxygenate with 100% oxygen for 1 minute before suctioning.	
ORAL SUCTIONING	TRACHEAL SUCTIONING
11. Remove a rigid catheter (Yankauer) from its packaging and attach it to the connection tubing.	11. Open a suction catheter kit and don sterile gloves. The dominant hand must remain sterile. Pour sterile water/normal saline into the basin in the kit tray. Squeeze lubricant onto a separate basin of tray.
12. Do not discard the packaging. The packaging will be used to store the catheter for reuse.	12. Pick up a catheter from the kit with the dominant hand without touching non-sterile surfaces.
13. Open the mouth, looking at the throat to verify the condition of the airway.	13. Pick up the connection tubing with the non-dominant hand. Connect and secure the catheter to the connection tubing.
14. Ask the conscious patient to cough, if able.	14. Check proper suctioning function by suctioning a small amount of normal saline from the basin.
15. Gently insert the tip of the catheter into the patient's mouth and advance the catheter towards the oropharynx by gently pushing the tongue down.	15. Open the mouth with the non-dominant hand, looking at the throat to verify the condition of the airway.
16. Stimulate the cough reflex if the patient does not cough naturally.	16. Remove any visible surface secretions before inserting the catheter deep into the patient's nare, mouth, tracheostomy tube, or endotracheal tube with normal saline.

17. Apply suctioning while moving the tip of the catheter around the mouth until secretions are clear. Place a finger over the catheter side opening to create suction.	17. Ask the conscious patient to cough, if able.
	18. NASOPHARYNGEAL: Apply lubrication on the distal end of the catheter before inserting in the nares.
	19. Gently insert the suction catheter into the patient's airway without applying suction. Withdraw the catheter 1-2 cm once resistance is felt. Do not force the catheter if inserting is difficult; remove and reinsert.
	20. Stimulate the cough reflex if the patient does not cough naturally.
	21. Place a finger on the catheter side opening to apply suction while withdrawing the catheter in a circular motion intermittently for 10-15 seconds. TRACHEAL: Catheter does not need to be rotated when using an in-line/closed suction system.
22. Reoxygenate the patient for 1 minute with 100% oxygen.	
23. Observe the aspirated secretion for amount, color, consistency, or any blood.	
24. If ordered, collect a sample of the secretions and place them into a collection cup.	
25. Rinse the catheter with normal saline to remove secretions. EMS: Catheter irrigation is not needed, and the catheter can be disposed of once suctioning is complete.	
26. Repeat suctioning if needed until the airway is clear with a maximum of 3 attempts. TRACHEAL: Suction oropharynx when tracheal suctioning is complete.	
27. Allow 30 seconds to 1 minute between suctioning attempts to monitor patient vitals, allow the patient to rest, and determine the effectiveness or possible complications.	
28. ORAL: Place the catheter in the original packaging or in a clean and dry area to reuse later.	28. TRACHEAL: Return the oxygen to the prescribed liter flow.
29. Discard any disposable supplies appropriately.	
30. Monitor the patient's vitals for potential complications, perform a respiratory assessment, and determine the effectiveness of suctioning.	
31. Document the procedure in the patient's chart.	

Airway Suctioning Check-Off

(Instructor Resource)

PREPARATION:

Supplies:

- Airway Suction Trainer
- Stethoscope
- Monitoring equipment
- Bag resuscitation mask and Venturi mask
- Complete suction unit with oxygen source
- Catheter kit
- Soft suction catheter
- Rigid suction catheter
- Clean gloves
- Sterile gloves
- Specimen collection cup
- Lubricant

After the demonstration, have participants practice suctioning on the Airway Suction Trainer using the following steps:

Optional: Evaluate the participant's ability to complete intubation using the following steps. You may score via points or "satisfactory/unsatisfactory."

1. Verify the order for suctioning from the healthcare provider.	
2. Gather all supplies and ensure that the equipment is set up properly.	
3. Confirm the identity of the patient.	
4. Perform hand hygiene and apply the appropriate PPE.	
5. Administer medications, if necessary.	
6. Perform a baseline assessment unless the need for suctioning is urgent.	
7. Provide the patient with instructions of the procedure.	
8. Place the patient in a semi-Fowler's position with their head supported in a neutral position if not contraindicated.	
9. ORAL SUCTIONING: Measure the catheter from the tip of the nose to the earlobe to determine length.	
10. Preoxygenate with 100% oxygen for 1 minute before suctioning.	
ORAL SUCTIONING	TRACHEAL SUCTIONING
11. Remove a rigid catheter (Yankauer) from its packaging and attach it to the connection tubing.	11. Open a suction catheter kit and don sterile gloves. The dominant hand must remain sterile. Pour sterile water/normal saline into the basin in the kit tray. Squeeze lubricant onto a separate basin of tray.
12. Do not discard the packaging. The packaging will be used to store the catheter for reuse.	12. Pick up a catheter from the kit with the dominant hand without touching non-sterile surfaces.

13. Open the mouth, looking at the throat to verify the condition of the airway.	13. Pick up the connection tubing with the non-dominant hand. Connect and secure the catheter to the connection tubing.	
14. Ask the conscious patient to cough, if able.	14. Check proper suctioning function by suctioning a small amount of normal saline from the basin.	
15. Gently insert the tip of the catheter into the patient's mouth and advance the catheter towards the oropharynx by gently pushing the tongue down.	15. Open the mouth with the non-dominant hand, looking at the throat to verify the condition of the airway.	
16. Stimulate the cough reflex if the patient does not cough naturally.	16. Remove any visible surface secretions before inserting the catheter deep into the patient's nare, mouth, tracheostomy tube, or endotracheal tube with normal saline.	
17. Apply suctioning while moving the tip of the catheter around the mouth until secretions are clear. Place a finger over the catheter side opening to create suction.	17. Ask the conscious patient to cough, if able.	
	18. NASOPHARYNGEAL: Apply lubrication on the distal end of the catheter before inserting in the nare.	
	19. Gently insert the suction catheter into the patient's airway without applying suction. Withdraw the catheter 1-2 cm once resistance is felt. Do not force the catheter if inserting is difficult; remove and reinsert.	
	20. Stimulate the cough reflex if the patient does not cough naturally.	
	21. Place a finger on the catheter side opening to apply suction while withdrawing the catheter in a circular motion intermittently for 10-15 seconds. TRACHEAL: Catheter does not need to be rotated when using an in-line/closed suction system.	
22. Reoxygenate the patient for 1 minute with 100% oxygen.		
23. Observe the aspirated secretion for amount, color, consistency, or any blood.		
24. If ordered, collect a sample of the secretions and place them into a collection cup.		

Introduction to Airway Suctioning Curriculum

25. Rinse the catheter with normal saline to remove secretions. EMS: Catheter irrigation is not needed, and the catheter can be disposed of once suctioning is complete.		
26. Repeat suctioning if needed until the airway is clear with a maximum of 3 attempts. TRACHEAL: Suction oropharynx when tracheal suctioning is complete.		
27. Allow 30 seconds to 1 minute between suctioning attempts to monitor patient vitals, allow the patient to rest, and determine the effectiveness or possible complications.		
28. ORAL: Place the catheter in the original packaging or in a clean and dry area to reuse later.	28. TRACHEAL: Return the oxygen to the prescribed liter flow.	
29. Discard any disposable supplies appropriately.		
30. Monitor the patient's vitals for potential complications, perform a respiratory assessment, and determine the effectiveness of suctioning.		
31. Document the procedure in the patient's chart.		

Name: _____ Class: _____

Airway Suctioning Quiz

Fill in the blanks with the correct answer.

1. Hypoxia can be prevented by restricting suctioning time to between _____ to _____ seconds.
2. _____ suction catheters can only be used to suction the oropharynx.
3. Using _____ during tracheal suctioning can affect oxygen saturation and puts the patient at risk for aspiration.
4. Oxygenate the patient with 100% oxygen for _____ before and after suctioning.
5. The catheter must be pulled back _____ to _____ cm once resistance has been felt when inserting the catheter for deep suctioning.

Airway Suctioning Quiz – Answer Key

Fill in the blanks with the correct answer.

1. Hypoxia can be prevented by restricting suctioning time to between **10** to **15** seconds.
2. **Rigid** suction catheters can only be used to suction the oropharynx.
3. Using **normal saline** during tracheal suctioning can affect oxygen saturation and puts the patient at risk for aspiration.
4. Oxygenate the patient with 100% oxygen for **1 minute** before and after suctioning.
5. The catheter must be pulled back **1** to **2** cm once resistance has been felt when inserting the catheter for deep suctioning.

Sources

1. ACLS Certification Institute. (2019). *Endotracheal Aspiration (ETA) of Intubated Patients*. Retrieved from <https://acls.com/free-resources/knowledge-base/respiratory-arrest-airway-management/basics-of-suctioning>
2. Agency for Clinical Innovation (ACI). (2014). *Suctioning an Adult ICU Patient with an Artificial Airway: A Clinical Practice Guideline*. Retrieved from https://www.aci.health.nsw.gov.au/_data/assets/pdf_file/0010/239554/ACI14_Suction_2-2.pdf
3. Nowak, Tim (2018, April 10). *3 Training Scenarios for Suctioning the Upper Airway*. Retrieved from <https://www.ems1.com/ems-products/medical-equipment/articles/3-training-scenarios-for-suctioning-the-upper-airway-r0vE1Rg3ddDebreF/>
4. Sinha, V., Fitzgerald, B. M. (2018, December 2). *Surgical Airway Suctioning*. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK448077/>