KING ABDULLAH BIN ABDULAZIZ UNIVERSITY HOSPITAL

EMERGENCY DEPARTMENT/ ADULT INTENSIVE CARE UNIT
SELF STUDY MODULE
VERSION 1
OCTOBER 2017

PREPARED BY:

RONALD MARTIN CARCILLAR, BSN, RN, MANc
NURSING EDUCATION UNIT

TABLE OF CONTENTS

TITLE	#
Care of patient with Tracheostomy	3
Nasogastric Tube Insertion, feeding, care and removal	16
External Defibrillation	34
Transcutaneous Pacing	43
Synchronized Cardioversion	53
Urinary Catheterization- Female, straight and indwelling, specimen collection	64
Central Venous Catheter Insertion	81
Central Venous Pressure Monitoring	97
Assisting in Arterial Line Insertion	99
Oral Hygiene (Conscious patients)	117
Oral Hygiene (unconscious patients and debilitated)	127
Chest Tube insertion, monitoring and care	136
Chest tube: Closed Drainage Systems	146
Management of PEG, Gastrostomy and Jejunostomy	161
Cervical Collar Application	172
Application of Skin Traction	182
Assisting in Intubation	195
Assisting in Intraosseous Insertion	210
Assisting in lumbar puncture	

Originating Department	Nursing Education Unit	Module No.	1-2017
Title	**CARE OF PATIENT WITH TRACHEOSTOMY**		
Author/s	**Ronald Martin Carcillar-CRN-ICU**		
Original Date	October, 2017	Revision Date	

1. ALERT

To reduce the risk of infection, perform tracheostomy care using sterile technique.

Suction the patient's tracheostomy tube only as clinically indicated and not as a routine, fixed-schedule treatment.

Limit each suction pass to less than 15 seconds.

Immediately withdraw the catheter and provide additional oxygen if the patient develops respiratory distress, cardiac decompensation, or any adverse effects during the procedure.

2. OVERVIEW

A tracheostomy is a surgical opening in a patient's neck. A plastic or metal tube, called a tracheostomy tube, is inserted through the opening to maintain a patent airway in patients who require long-term airway management because of airway obstruction, airway clearance needs, and long-term intubation. Some patients with tracheostomy tubes are able to cough secretions out of the tube; others are only able to cough secretions into the tube.

Tracheostomy tubes may have one or two lumens. A single-lumen tube consists of a single cannula, and a double-lumen tube consists of an inner cannula and an outer cannula. The inner cannula can quickly be removed if the cannula becomes obstructed, making the system safer for patients with significant secretion problems. Single-lumen tubes provide a larger internal diameter for airflow, so airflow resistance is reduced, and the patient can breathe through the tube with greater ease. A tracheostomy tube also has a flange that fits against the patient's neck. In addition, the tracheostomy tube may have an inflatable cuff that surrounds the outer cannula An inflation tube and valve connect to the cuff for inflation. The pilot balloon expands and contracts on inflation and deflation. While the patient is on a ventilator, the cuff of the tube is kept inflated; when the patient is not on a ventilator, the cuff is usually deflated to avoid cuff pressure issues in the trachea. When the patient no longer needs to be placed on a ventilator, the tracheostomy tube may be replaced with a one without a cuff.

When the cuff is inflated, the patient is unable to speak. The cuff prevents normal airflow over and vibration of the vocal cords. When caring for a patient with a tracheostomy tube, using nonverbal communication skills is important. Alphabet charts, pen and paper, slates, chalkboards, magnetic pen doodle boards, and computer tablets are some common communication tools.

One type of tracheostomy tube is fenestrated, which means that the outer cannula has precut openings.This tube is often used in weaning a patient who is nearing decannulation. The openings allow the patient to breathe and cough through his or her upper airway again. When used with a fenestrated inner cannula or the inner cannula is removed and the cuff is deflated, a patient can speak.

To provide safe, effective care for the patient with a tracheostomy tube, the nurse must develop a comprehensive plan that includes properly securing the tube, inflating the cuff to an appropriate pressure, maintaining patency by suctioning, and performing oral hygiene.

3. SUPPLIES

- Bedside table
- Towel
- Tracheostomy suction supplies
- Sterile tracheostomy care kit, if available (collect supplies not available in kit), or two sterile 4 × 4-inch (10.2 × 10.2-cm) gauze pads
  - Sterile cotton-tipped applicators
  - Sterile tracheostomy dressing (precut and sewn surgical dressing)
  - Sterile basin
  - Normal saline solution
  - Small sterile brush (or disposable inner cannula)
  - Roll of twill tape, tracheostomy ties, or tracheostomy holder
  - Scissors
- PPE (gloves, sterile gloves, mask, eye protection, face shield)

4. PATIENT AND FAMILY EDUCATION

- Provide the patient and family with an explanation of the equipment and the procedure.
- Explain that some tracheostomy tubes have rigid faceplates and some do not. Instruct caregivers not to lift up rigid faceplates because doing so dislodges the tube.
- Explain that some commercial tracheostomy tube holders require removal of excess tie material for a proper fit.
- If long-term placement of the tracheostomy tube is anticipated, teach the patient and family tracheostomy care.
- Explain that the patient may have bloody secretions after initial placement of the tube and after each tracheostomy tube change.
- Explain to the patient and family that suctioning may be uncomfortable, causing temporary shortness of breath or coughing.
- Encourage questions and answer them as they arise.

5. ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene before patient contact.
2. Verify the correct patient using two identifiers.

3. Determine when the patient was last suctioned and tracheostomy care was last performed.
4. Observe the patient for signs and symptoms that tracheostomy care is needed.
   a. Excess peristomal or intratracheal secretions
   b. Soiled or damp tracheostomy ties
   c. Soiled or damp tracheostomy dressing
5. Observe the patient for signs and symptoms that suctioning is needed.
   a. Diminished airflow through the tracheostomy tube
   b. Adventitious breath sounds (crackles, rhonchi, or wheezes)
   c. Presence of secretions
6. Assess hydration status, humidity delivered to the airway, signs of possible infection, nutritional status, and ability to cough.
7. Assess vital signs, oxygen saturation, lung sounds, and ability to clear the airway.
8. Assess the patient's understanding of tracheostomy care and the appropriateness of the patient performing tracheostomy care.

Preparation

1. Assist the patient to a position that allows safe access to the tracheostomy tube and minimizes the break in sterile technique (usually the supine or semi-Fowler position).
2. Place a towel across the patient's chest.
3. Place the patient on a pulse oximeter.
4. If changing the tracheostomy tube ties, have another person assist with the procedure.
5. Use the following formula to determine the correct-size catheter needed:
   (internal tracheostomy tube size ÷ 2) × 3 = size of French catheter needed.

6. PROCEDURE

Suctioning

1. Perform hand hygiene and don gloves, gown, mask, and eye protection or face shield.
2. Verify the correct patient using two identifiers.
3. Connect one end of the connecting tubing to the suction machine.
4. Turn the suction device on and adjust the vacuum regulator to less than 150 mm Hg.
   a. Normally a pressure between 80 and 120 mm Hg is used.
   b. If more viscous secretions are present, additional suction may be required.
      Rationale: Use only the amount of suction necessary to remove secretions effectively.
      High negative-pressure settings may increase tracheal mucosal damage.
5. Check the negative pressure of the suction apparatus by occluding the end of the suction tubing before attaching it to the suction catheter.
6. If indicated, increase the supplemental oxygen therapy to 100% or as prescribed. Encourage the patient to take a few deep breaths.
   Rationale: Hyperoxygenation must be considered if the patient has experienced a clinically significant reduction in oxygen saturation with suctioning, has high oxygen requirements, or compromised cerebral circulation.

7. Prepare the disposable suction catheter.
    a. Using aseptic technique, open the sterile catheter package on a clean surface, using the inside of the wrapping as a sterile field; open the package just enough to expose the connecting end and connect the catheter to the suction tubing.
    b. If a sterile drape is available, place it across the patient's chest or on the over-bed table. Do not allow the suction catheter to touch nonsterile surfaces.
    Rationale: The sterile drape provides a sterile surface on which to lay the catheter between passes.
    c. Unwrap or open the sterile basin and place on the bedside table. Be careful not to touch the inside of the basin. Fill the basin with sterile normal saline solution or sterile water.
8. If the patient has a fenestrated tracheostomy tube with a fenestrated inner cannula in place, remove it, and replace it with a nonfenestrated inner cannula.
9. Remove gloves, perform hand hygiene, and don sterile gloves.
10. Connect the suction catheter to the connecting tubing.
    a. With the dominant hand, pick up the suction catheter, taking care to avoid touching any nonsterile surfaces.
    b. Wrap the suction catheter around the sterile dominant hand to help prevent inadvertent contamination of the catheter.
    c. With the nondominant hand, pick up the connecting tubing and connect it to the suction catheter.
    d. Ensure that the dominant hand does not come in contact with the connecting tubing.
11. Check the equipment for proper functioning by suctioning a small amount of sterile solution from the container.
12. With the dominant hand, gently but quickly insert the catheter into the artificial airway with the control vent of the suction catheter open.
    Do not apply suction during insertion.
    a. In patients at high risk for suction-related complications, insert the catheter into the tracheostomy tube until it emerges out of the end of the airway.[2]
    b. In patients not at risk for suction-related complications, insert the catheter into the tracheostomy tube until resistance is met and then pull back 1 to 2 cm.[2]
13. Using the nondominant thumb, depress the control vent of the suction catheter to apply continuous suction while completely withdrawing the catheter.
    Ensure that each suction pass does not last longer than 15 seconds[1,2] to minimize decreases in oxygen saturation. Do not instill normal saline routinely before suctioning.
14. Perform one additional pass of the suction catheter if secretions remain in the airway and the patient is tolerating the procedure. Allow a minimum of 20 to 30 seconds between passes for the patient to recover before the next pass.[4]
15. Consider hyperoxygenating the patient between each pass of the suction catheter.[5] At the completion of the suctioning procedure, hyperoxygenate with 100% oxygen for 30 seconds.[1]
16. Return supplemental oxygen to the baseline level.
17. Assess the volume, consistency, and color of the airway secretions. Notify the practitioner of changes in the airway secretions.

18. Wrap the catheter around the dominant hand after the upper-airway suctioning is complete. Pull the sterile glove off the dominant hand inside out; the catheter remains in the glove. Pull the other glove off in the same fashion.
19. Remove gloves, perform hand hygiene, and don gloves.
20. If the patient has a fenestrated tracheostomy tube, remove the nonfenestrated inner cannula and replace it with a fenestrated inner cannula.
21. Discard supplies, remove personal protective equipment (PPE), and perform hand hygiene.
22. Document the procedure in the patient's record.

Tracheostomy Care

1. Perform hand hygiene and don gloves, gown, mask, and eye protection or face shield.
2. Verify the correct patient using two identifiers.
3. Remove the soiled dressing from around the stoma and discard in an appropriate receptacle.
4. Observe the skin surrounding the tracheostomy for evidence of irritation or infection.
5. Perform hand hygiene.
6. Prepare the sterile field on the bedside table and arrange the equipment.
    a. Open the sterile tracheostomy kit.
    b. Open two 4 × 4-inch (10.2 × 10.2-cm) gauze packages using aseptic technique. Pour normal saline solution on one package; leave the second package dry.
    c. Open two cotton-tipped swab packages and pour normal saline solution on one package. Do not recap the normal saline container.
    d. Open the sterile tracheostomy dressing package.
    e. Unwrap the sterile basin and pour a small amount of normal saline solution into it.
    f. Open the small sterile brush package and aseptically place it in the sterile basin.
    g. Prepare a length of twill tape that can go around the patient's neck two times. Cut the ends on a diagonal. Lay it aside in a dry area.
    Rationale: Cutting the ends on a diagonal aids in inserting the tie through the eyelet.
    h. If using a commercially available tracheostomy tube holder, open the package according to the manufacturer's directions.
7. Hyperoxygenate the patient to maintain oxygen saturation levels above 90%. If desaturation occurs during the procedure, apply an oxygen source loosely over the tracheostomy. Perform hand hygiene, don gloves, and position the tracheostomy collar or T-piece oxygen source loosely over tracheostomy for ease of reattaching if needed.
8. Remove gloves.
9. Perform hand hygiene and don sterile gloves. Keep the dominant hand sterile throughout the procedure.
10. Clean or replace the inner cannula.
    a. Nondisposable inner cannula
        i. While touching only the outer aspect of the tube, unlock and remove the inner cannula with the nondominant hand.

ii. Drop the inner cannula into the normal saline basin to loosen secretions.
iii. Replace the tracheostomy collar or T-piece oxygen source over the outer cannula, if possible.
Rationale: These actions maintain the supply of oxygen to the patient as needed.
Attaching the T-piece oxygen source to the outer cannula when the inner cannula is removed may not be possible. If this is the case, apply it loosely to provide an oxygen source.
iv. To prevent oxygen desaturation in affected patients, quickly pick up the inner cannula and use a small brush to remove secretions from inside and outside the cannula.
v. To facilitate the removal of secretions, hold the inner cannula over the basin and rinse with normal saline solution, using the nondominant hand to pour normal saline solution.
vi. Replace the inner cannula and secure the locking mechanism.
vii. Reapply the oxygen source to the patient, if needed.

b. Disposable inner cannula
i. Remove the new cannula from the manufacturer's packaging.
ii. Withdraw the inner cannula while touching only the outer aspect of the tube and replace with the new cannula. Lock it into position.
iii. Dispose of the contaminated cannula in an appropriate receptacle and apply an oxygen source as appropriate.

11. Clean the exposed outer cannula surfaces and stoma under the faceplate.
a. Clean the area extending in all directions from the stoma.
b. Use normal saline-saturated cotton-tipped swabs and 4 × 4-inch (10.2 × 10.2-cm) gauze pads.
c. Clean in circular motion from the stoma outward, using the dominant hand to handle sterile supplies.
Rationale: This technique aseptically removes secretions from the stoma site. Moving in an outward circle pulls mucus and other contaminants from the stoma to the periphery.

12. Dry the skin and exposed outer cannula surfaces by patting lightly with a dry 4 × 4-inch (10.2 × 10.2-cm) gauze pad.
Rationale: Dry surfaces reduce formation of moist environment for microorganism growth and skin denudation.

13. Secure the tracheostomy tube.
a. Tracheostomy tie method
i. Instruct the assistant, if available, to don gloves and securely hold the tracheostomy tube in place. With the assistant holding the tracheostomy tube, cut the old ties.
Rationale: Holding the tracheostomy tube prevents accidental decannulation.
The assistant must not release the tracheostomy tube until the new ties are firmly tied. If working without an assistant, do not cut old ties until new ties are securely in place.
ii. Take the prepared tie and insert one end through faceplate eyelet and pull the ends even.
iii. Slide both ends of the tie behind the head and around the neck to the other eyelet and insert one tie through the second eyelet.

iv. Pull snugly to secure the tracheostomy tube.
v. Tie the ends securely in a double square knot, allowing space for only one loose or two snug finger widths.
Rationale: One loose finger width or two snug finger widths of slack prevent the ties from being too tight when the tracheostomy dressing is in place.
vi. Insert a fresh tracheostomy dressing under the clean ties and faceplate.
Rationale: The dressing absorbs drainage and reduces pressure on the clavicle heads.

b. Tracheostomy tube holder method
i. Instruct the assistant, if available, to don gloves and securely hold the tracheostomy tube in place.
Rationale: Holding the tracheostomy tube prevents accidental decannulation.
If working without an assistant, leave the old tracheostomy tube holder in place until the new device is secure.
ii. Align the strap under the patient's neck. Be sure that the hook-and-loop fastener attachments are on either side of the tracheostomy tube.
iii. Place the narrow end of the ties under and through the faceplate eyelets. Pull the ends even and secure with hook-and-loop fastener closures.
iv. Verify that there is space for only one loose or two snug finger widths under the neck strap.

14. Position the patient comfortably and assess respiratory status.
Rationale: Some patients may require suctioning after the tracheostomy tube ties are changed.
15. Replace any oxygen delivery sources.
16. Discard supplies, remove PPE, and perform hand hygiene.
17. Document the procedure in the patient's record.

7. MONITORING AND CARE

1. Compare assessment findings before and after tracheostomy care.
2. Assess the fit of the new tracheostomy ties and ask the patient if the tube feels comfortable.
Rationale: Tracheostomy ties may be uncomfortable and place the patient at risk for injury if they are too loose or too tight.
3. Inspect the inner and outer cannulas for secretions.
Rationale: The presence of secretions on the cannulas indicates the need for more vigorous tracheostomy care.
4. Assess the stoma for inflammation, edema, signs of infection, skin breakdown, and discolored secretions.
Rationale: Broken skin places the patient at risk for infection. Stoma infection requires a change in the tracheostomy skin care plan.
5. Assess, treat, and reassess pain.

8. EXPECTED OUTCOMES

- Inner cannula and outer cannula are free of secretions; ties are clean, secured snugly, and tied in a double square knot.
- Stoma site is pink, does not bleed, and is free of secretions.
- Skin around tracheostomy tube shows no signs of breakdown.
- Patient tolerates procedure without discomfort.
- Patient demonstrates no signs of respiratory distress.

9. UNEXPECTED OUTCOMES

- Excessively loose or tight tracheostomy ties or holder
- Inflammation of the stoma
- Evidence of tissue injury related to pressure from the dressing or device
- Accidental decannulation
- Respiratory distress from a mucous plug in the cannula
- Impaired skin integrity

10. DOCUMENTATION

- Respiratory assessments before and after care
- Type and size of tracheostomy tube
- Frequency and extent of care
- Type, color, and amount of secretions
- Patient tolerance and understanding of procedure
- Unexpected outcomes and related nursing interventions
- Patient and family education
- Appearance of stoma and surrounding skin before and after procedure

11. PEDIATRIC CONSIDERATIONS

- Children generally have shorter necks, making the stoma more difficult to clean.

12. GERONTOLOGICAL CONSIDERATIONS

- Some older adults may have more fragile skin and are more prone to skin breakdown from excess secretions or pressure.
- For older adults with impaired nutritional status, healing may be delayed. These individuals should be monitored more closely for risks of skin breakdown and infection.

13. NURSING EDUCATION UNIT MEMBERS

- ARIEL AGUSTIN, BSN, RN- Nurse Manager
- RONALD MARTIN CARCILLAR, BSN, RN, MANc
- DIOVEL BRYAN GANAC, BSN, RN
- CHARMAINE T. CO, BSN, RN, MAN
- JERELYN JEAN DONGALLO, BSN, RN, MAN
- ROVIN B. RAMIREZ, BSN, RN, MANc

REFERENCES

1. American Association for Respiratory Care (AARC). (2010). AARC Clinical Practice Guidelines. Endotracheal suctioning of mechanically ventilated patients with artificial airways 2010. *Respiratory Care, 55*(6), 758-764. (Level VII)
2. Chaseling, W. and others. (2014). Suctioning an adult ICU patient with an artificial airway: a clinical practice guideline (2nd ed.). Chatswood, NSW, Australia: Agency for Clinical Innovation. Retrieved July 25, 2016 http://www.aci.health.nsw.gov.au/__data/assets/pdf_file/0010/239554/ACI14_Suction_2-2.pdf (Level VII)
3. Credland, N. (2016). How to suction via a tracheostomy. *Nursing Standard, 30*(28), 36-38. doi:10.7748/ns.30.28.36.s46
4. Nance-Floyd, B. (2011). Tracheostomy care: An evidence-based guide to suctioning and dressing changes. *American Nurse Today, 6*(7), 14-16.
5. Schreiber, M. (2015). Tracheostomy: Site care, suctioning and readiness. *Medsurg Nursing, 24*(2), 121-124.

ADDITIONAL READINGS

Mitchell, R.B. and others. (2013). Clinical consensus statement: Tracheostomy care. *Otolaryngology—Head and Neck Surgery, 148*(1), 6-20. doi:10.1177/0194599812460376 (Level IV)

Özden, D., Görgülü, R.S. (2012). Development of standard practice guidelines for open and closed system suctioning. *Journal of Clinical Nursing, 21*(9-10), 1327-1338. doi:10.1111/j.1365-2702.2011.03997.x (Level IV)

Adapted from Perry, A.G., Potter, P.A., Ostendorf, W.R. (2014). *Clinical nursing skills & techniques* (8th ed.). St. Louis: Mosby.

NURSING EDUCATION UNIT

COMPETENCY-BASED CHECK OFF TOOL

Title:	**CARE OF PATIENTS WITH TRACHEOSTOMY**
Competency Statement:	**The nurse demonstrates acceptable level of competence in the performance of tracheostomy care**
Standards:	**1. Infection Control and Patient Safety Compliance** **2. Equipment Preparation and Manipulation** **3. Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

1. Provide all the information needed in this check off tool.
2. Use the scale below by ENCIRCLING your most appropriate response
   4= Very Good (Performs competently without assistance and supervision)
   3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
   2= Poor (Performs inconsistently/incompletely with assistance and supervision)
   1= Very Poor (Cannot perform even with directions; procedural step omitted)
3. Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
4. Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
5. Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
6. Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
A. Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1
5	Educates patient and family / caregiver (where appropriate).	4	3	2	1
B. Psychomotor Skills					

1	Performed hand hygiene before patient contact.	4	3	2	1
2	Verified the correct patient using two identifiers.	4	3	2	1
3	Determined when the patient was last suctioned and tracheostomy care was last performed.	4	3	2	1
4	Observed the patient for signs and symptoms that tracheostomy care was needed.	4	3	2	1
5	Observed the patient for signs and symptoms that suctioning was needed.	4	3	2	1
6	Assessed hydration status, humidity delivered to the airway, signs of possible infection, nutritional status, and ability to cough.	4	3	2	1
7	Assessed vital signs, oxygen saturation, lung sounds, and ability to clear the airway.	4	3	2	1
8	Assessed the patient's understanding of tracheostomy care and the appropriateness of the patient performing tracheostomy care.	4	3	2	1
9	Assisted the patient to a position that allowed safe access to the tracheostomy tube and minimized the break in sterile technique.	4	3	2	1
10	Placed a towel across the patient's chest.	4	3	2	1
11	Placed the patient on a pulse oximeter.	4	3	2	1
12	If changing the tracheostomy tube ties, had another person assist with the procedure.	4	3	2	1
13	Used the following formula to determine the correct-size catheter needed: (internal tracheostomy tube size ÷ 2) × 3 = size of French catheter needed.	4	3	2	1
Suctioning					
1	Performed hand hygiene and donned gloves, gown, mask, and eye protection or face shield, as appropriate.	4	3	2	1
2	Connected one end of the connecting tubing to the suction machine.	4	3	2	1
3	Turned the suction device on and adjusted the vacuum regulator to less than 150 mm Hg.	4	3	2	1
4	Checked the negative pressure of the suction apparatus by occluding the end of the suction tubing before attaching it to the suction catheter.	4	3	2	1
5	If indicated, increased the supplemental oxygen therapy to 100% or as prescribed. Encouraged the patient to take a few deep breaths.	4	3	2	1
6	Prepared the disposable suction catheter.	4	3	2	1
7	If the patient had a fenestrated tracheostomy tube with a fenestrated inner cannula in place, removed it and replaced it with a nonfenestrated inner cannula.	4	3	2	1
8	Removed gloves, performed hand hygiene, and donned sterile gloves.	4	3	2	1
9	Connected the suction catheter to the connecting tubing.	4	3	2	1
10	Checked the equipment for proper functioning by suctioning a small amount of sterile solution from the container.	4	3	2	1
11	With the dominant hand, gently but quickly inserted the catheter into the artificial airway with the control vent of the suction catheter open. Used shallow suctioning to minimize trauma.	4	3	2	1
12	Using the dominant thumb, depressed the control vent of the suction catheter to apply continuous suction while completely withdrawing the catheter. Ensured that each suction pass did not last longer than 15 seconds. Did not instill normal saline routinely before suctioning.	4	3	2	1

13	Performed one additional pass of the suction catheter if secretions remained in the airway and the patient was tolerating the procedure. Allowed a minimum of 20 to 30 seconds between passes for the patient to recover before the next pass.	4	3	2	1
14	Considered hyperoxygenating the patient between each pass of the suction catheter. At the completion of the suctioning procedure, hyperoxygenated with 100% oxygen for 30 seconds.	4	3	2	1
15	Returned supplemental oxygen to the baseline level.	4	3	2	1
16	Assessed the volume, consistency, and color of the airway secretions. Notified the practitioner of changes in the airway secretions.	4	3	2	1
17	Wrapped the catheter around the dominant hand after the upper-airway suctioning was complete. Pulled the sterile glove off the dominant hand inside out; the catheter remained in the glove. Pulled the other glove off in the same fashion.	4	3	2	1
18	Removed gloves, performed hand hygiene, and donned gloves.	4	3	2	1
19	If the patient had a fenestrated tracheostomy tube, removed the nonfenestrated inner cannula and replaced it with a fenestrated inner cannula.	4	3	2	1
20	Discarded supplies, removed PPE, and performed hand hygiene.	4	3	2	1
21	Documented the procedure in the patient's record.	4	3	2	1
Tracheostomy Care					
1	Performed hand hygiene and donned gloves, gown, mask, and eye protection or face shield, as appropriate	4	3	2	1
2	Removed the soiled dressing from around the stoma and discarded in an appropriate receptacle.	4	3	2	1
3	Observed the skin surrounding the tracheostomy for evidence of irritation or infection.	4	3	2	1
4	Performed hand hygiene.	4	3	2	1
5	Prepared the sterile field on the bedside table and arranged the equipment.	4	3	2	1
6	Hyperoxygenated the patient to maintain oxygen saturation levels above 90%. If desaturation occurred during the procedure, applied an oxygen source loosely over the tracheostomy. Performed hand hygiene, donned gloves, and positioned the tracheostomy collar or T-piece oxygen source loosely over tracheostomy for ease of reattaching if needed.	4	3	2	1
7	Removed gloves.	4	3	2	1
8	Performed hand hygiene and donned sterile gloves. Kept the dominant hand sterile throughout the procedure.	4	3	2	1
9	Cleaned or replaced the inner cannula.	4	3	2	1
10	Cleaned the exposed outer cannula surfaces and stoma under the faceplate	4	3	2	1
11	Dried the skin and exposed outer cannula surfaces by patting lightly with a dry 4 × 4-inch (10.2 × 10.2-cm) gauze pad.	4	3	2	1
12	Secured the tracheostomy tube.	4	3	2	1
13	Positioned the patient comfortably and assessed respiratory status.	4	3	2	1
14	Replaced any oxygen delivery sources.	4	3	2	1
15	Assessed, treated, and reassessed pain.	4	3	2	1
16	Discarded supplies, removed PPE, and performed hand hygiene.	4	3	2	1
17	Documented the procedure in the patient's record.	4	3	2	1

C. Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1
D. Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse's Comments/Recommendations for Improvement:

Originating Department	Nursing Education Unit	Module No.	1-2017
Title	NASOGASTRIC TUBE INSERTION, FEEDING, CARE and REMOVAL		
Author/s	Ronald Martin Carcillar-CRN-ICU		
Original Date	October, 2017	Revision Date	

1. ALERT

If unable to insert a nasogastric (NG) tube in either naris, stop the procedure and notify the practitioner.

Do not reposition the NG tube of a patient who has undergone gastric surgery because that could rupture the suture line.

When feasible, investigate alternatives to NG placement (e.g., endoscopic or intraoperative placement, orogastric placement) in patients with basilar skull fracture or craniofacial injuries.

If using a sump tube, do not clamp the air vent; connect the tube to suction, or use it for irrigation.

Remember to route tubes and catheters having different purposes in different, standardized directions (e.g., IV lines routed toward the head; enteric lines toward the feet). This is especially important in the care of neonates.

Never use standard Luer syringes for oral medications or enteral feedings; use oral syringes for oral liquid medications or enteral feedings until enteral syringes with the new connector are available.

To enhance patient safety and prevent tubing misconnections, a new industry-wide design standard for enteral feeding connectors is being adopted. The ENFit™ connector is being phased in for feeding tubes, feeding syringes, and feeding administration sets.

2. OVERVIEW

NG tubes are used for the removal of gastric contents or the delivery of nutrition, water, and medications. Frequently these tubes are placed by nurses at the bedside without a direct view (blindly) of the gastrointestinal (GI) tract.

The Levin tube and the Salem Sump™ tube are the most common types of tubes used for stomach decompression.

- A *Levin tube* is a single-lumen tube with holes near the tip. The tube is connected to a drainage bag or an intermittent suction device to drain stomach secretions.
- The *Salem Sump tube* has two lumens: the main lumen for removal of gastric contents and the secondary lumen, which provides an air vent, preventing suctioning of gastric mucosa into holes at the distal tip of the tube. A blue pigtail is the air vent that connects with the second lumen. When the sump

tube's main lumen is connected to low constant suction, the air vent permits free drainage of secretions through the main lumen.

An NG tube is inserted using clean technique. For patient comfort, the nurse should select the tube with the smallest lumen that is effective for the intended use. There is a lack of research to support the best method to determine the tube length required to reach the stomach for decompression. External means to assess internal anatomy are subject to error based on normal physiologic differences among patients. Therefore, using sound clinical judgment, the nurse should be aware of the potential to place the tube and its side holes too high (or too low) to adequately decompress the stomach.

When a patient is unable to take food safely by mouth, a regular NG tube may be used to initiate enteral feedings; however, the softer, small-bore feeding tube is generally preferred. In some cases, an NG tube is left in place for gastric decompression while a small-bore feeding tube is inserted to deliver enteral feeding into the small bowel.

Supportive nursing care includes changing soiled tape or securement devices, ensuring that the tube has not become dislodged or changed position, making sure that the tube is functioning adequately, keeping the naris lubricated and clean, and providing frequent mouth care to minimize drying of the oral mucosa.

3. SUPPLIES

- Large catheter-tipped syringe
- Clamp
- Drainage bag or suction machine with pressure gauge (if using wall suction)
- Emesis basin
- Facial tissues
- Flashlight
- Glass of water with straw
- Gloves
- Hypoallergenic tape or commercial fixation device
- Lidocaine gel or spray to numb naris if deemed necessary (requires an order)
- NG tube (the smallest size that will accomplish the intended purpose)
- pH test strips
- Purified water (sterile for irrigation) or saline, or clean, freshly obtained water for irrigation per the organization’s practice and as appropriate for the patient’s condition
- Safety pin and rubber band
- Suction equipment including oral suction device
- Tincture of benzoin or skin-preparation agent (optional)
- Tongue blade
- Towel
- Transparent dressing (optional)
- Water-soluble lubricating gel

4. PATIENT AND FAMILY EDUCATION

- Explain the procedure and the equipment to the patient and family.

- Explain to the patient and family that tubes used for decompression help relieve distention, nausea, and vomiting.
- Explain to the patient and family that tubes are also temporarily used for feeding when patients are unable to safely consume an oral diet.
- Explain that the patient may experience a temporary gagging sensation as the tube is passed through the back of the throat.
- Encourage questions and answer them as they arise.

5. ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene before patient contact.
2. Verify the correct patient using two identifiers.
3. Inspect the condition of the patient's nasal and oral cavities.
4. Review the patient's record for a history of nasal surgery, congestion, deviated septum, allergies, or nosebleeds in either naris.
5. Auscultate for bowel sounds.
6. Palpate the patient's abdomen for distention, pain, and rigidity.
7. Assess the patient's level of consciousness and ability to follow instructions. If the patient is confused, disoriented, or unable to follow commands, consider consulting an experienced nurse to assist with tube placement.

Preparation

1. Verify the practitioner's order for the type and purpose of the NG tube and whether to connect it to suction or use it for enteral feeding.
2. If the tube insertion is anticipated to be very uncomfortable in the naris and there is no allergy to lidocaine, consider obtaining an order for lidocaine gel or spray. Keep in mind that the selected anesthetic may take a few minutes to anesthetize the naris.
3. Choose the smallest tube possible depending on its purpose.
4. Have an emesis basin within reach.

6. PROCEDURE

Inserting the NG Tube

1. Perform hand hygiene and don gloves.
2. Verify the correct patient using two identifiers.
3. Place the patient in the high-Fowler position as tolerated, with pillows behind the head and shoulders. Raise the bed to a comfortable working level.
   Rationale: The high-Fowler position promotes the patient's ability to swallow during the procedure; however, an NG tube may be inserted with the patient in a supine position if necessary. Good body mechanics prevent injury to the nurse and patient.
4. Place a clean towel over the patient's chest and provide facial tissues. Allow the patient to blow his or her nose if necessary.
   Rationale: Tube insertion through nasal passages may cause tearing and coughing, as well as increased salivation.
5. Clean the bridge of the patient's nose with soap and water or an alcohol swab.
   Rationale: Cleaning the nose removes oils, allowing the tape to adhere and secure the tube after it is placed.
6. Explore comfort or distraction measures, such as something the patient can use as a focal point while the tube is being placed.

7. Instruct the patient to relax and breathe normally while occluding one nostril. Select the nostril with greater airflow for tube placement. If airflow is equal bilaterally, ask the patient which nostril he or she prefers.
8. Estimate the length of the tube to be inserted.
    a. Measure the distance from the tip of the nose to the earlobe, then from the earlobe to the xiphoid process.
9. Note markings on the tube where it should exit the naris. If necessary, place a small piece of tape on the tube to mark the length of tube to be inserted.
10. Lubricate the tip of the tube with water-soluble gel.
    Rationale: Lubrication minimizes friction against the nasal mucosa and aids tube insertion. If aspirated, water-soluble lubricant is less toxic than oil-soluble lubricant.
11. Alert the patient when the procedure is about to begin.
12. Have the patient position his or her head forward in a chin-tuck position (i.e., “look at your toes”) to facilitate passage of the tube into the esophagus.
    Rationale: The chin tuck (to the chest) better positions the patient for esophageal intubation.
13. Explain to the patient that swallowing may facilitate tube advancement. If drinking water is not contraindicated and the patient prefers, provide small sips of water along with encouragement to swallow as the tube is inserted and advanced.
    Rationale: If swallowing fluids can be done safely, swallowing water may reduce gagging or choking while the tube is advanced.
14. Insert the NG tube gently through the naris at an angle parallel to the floor of the nasal canal, not upright. If the tip has a curved end, point it downward.
    Rationale: This method of passing the tube facilitates its initial passage through the naris and maintains an open naris.
15. Ask the patient to swallow and continue to pass the tube along the floor of the nasal passage, aiming down toward the patient's ear. If resistance is felt, pull the tube tip back slightly, angle it more downward to find the opening to the nasopharynx, and then advance the tube.
    Rationale: Guiding the tube along the floor of the nasal passage minimizes discomfort caused by the tube rubbing against the upper nasal turbinates. Guiding the tube downward helps curl it around the corner of the nasopharynx.
16. If resistance continues, try to rotate the tube and then advance it. If resistance persists, withdraw the tube, allow the patient to rest, relubricate the tube, and insert it into the other naris.
    Never use force when placing an NG tube. Do not force past resistance, which causes trauma to the mucosa.
17. With the tube just above the oropharynx, ensure that the patient's head is tipped forward.
    Rationale: Flexing the head forward closes off the upper airway into the trachea and opens the esophagus.
18. If swallowing is considered safe and the patient is able to cooperate, ask him or her to take a small sip of water and swallow. Advance the tube as the patient swallows. If fluids are not permitted, instruct the patient to swallow and advance the tube during the swallowing motion.
    Rationale: Swallowing closes the epiglottis over the trachea and helps move the tube into the esophagus. Water will be suctioned from the stomach after insertion is completed.

Patients who are unable to cooperate with the procedure, have an artificial airway, or are sedated are at high risk for the NG tube entering the trachea and causing damage to the pulmonary tree (e.g., pneumothorax, hemothorax).

19. If the patient begins to cough, gag, or choke, withdraw the tube to the nasopharyngeal area and stop advancement. Encourage the patient to breathe easily and relax.
    Rationale: The cough reflex may be initiated if the tube accidentally enters the larynx. Withdrawing the tube reduces the risk for laryngeal entry.
20. If the patient continues to cough during insertion, pull the tube back slightly. If vomiting occurs, help the patient clear his or her airway. Perform oral suctioning as needed.
    Rationale: Vomiting increases the risk of aspiration.
21. If the patient continues to gag and cough or reports that the tube feels as if it is coiling in the throat, check the back of the oropharynx using a flashlight and tongue blade. Withdraw any coiled tube until the tip is again in the oropharynx and reinsert it as the patient swallows.
    Rationale: The NG tube may coil around itself in the back of the throat and stimulate the gag reflex.
22. Encourage the patient to relax and continue to advance the tube while he or she swallows. Advance it until reaching the tape or mark on the tube that signifies that it is inserted the desired distance.
    Rationale: For proper decompression, the tip and all of the side holes of the NG tube must be within the body or distal portion of the stomach.
23. Open the patient's mouth and ensure the tube is not coiled in the posterior pharynx.
24. Anchor the tube to the patient's cheek with tape.
    Rationale: Anchoring the tube prevents accidental displacement while placement is verified.
25. Verify placement of the NG tube per the organization's practice. Multiple methods (e.g., observation of gastric contents, pH testing, capnography) may be used to assess tube placement, though none is as accurate as x-ray confirmation. NG placement should be confirmed by x-ray before administering any fluids, nutrition, or medications.[2]
    Do not rely on the presence of an audible air bolus alone to ascertain proper placement of a nasal or an orogastric tube.
    a. Observation of gastric contents: Attach a syringe to the end of the tube and aspirate gently to obtain gastric contents, observing color and volume. In most cases, gastric contents are cloudy and green, but they may be off-white, tan, brown, or bloody.
       Rationale: Aspirating gastric contents provides an approximate means to determine tube placement in the GI tract. Yellow or bile-stained aspirate may indicate duodenal placement; if the tube is in the esophagus, saliva-appearing aspirate may be present. Easy aspiration of gastric contents indicates that the tube tip is in a pool of gastric fluid.
    b. Testing pH of gastric aspirate: Attach a syringe to the end of the tube and gently aspirate gastric contents. Using a color-coded pH indicator strip measure the pH of the aspirate.
       Rationale: Gastric aspirate has a decidedly acidic pH value, typically 5 or less, compared with the pH of intestinal aspirate, which is usually greater

than 6, or respiratory secretions, which in many cases have a pH greater than 6.
Measure the gastric pH whenever possible before initiating medications that reduce stomach acid, because these agents are intended to produce an alkaline pH.
Quality control measures may be required when doing bedside testing; follow the organization's practice.

c. Testing for carbon dioxide by capnography.
Rationale: Capnography may help detect inadvertent placement in the trachea.
   i. Firmly attach the bellows device to the carbon dioxide detector to the feeding tube using the barbed connector. Seat the device with a quarter turn.
   ii. Attach the bellows (provided in the package) to the barbed connector on the carbon dioxide detector.
   iii. Cap the stylet and all other open ports (the vent lumen on a Salem Sump tube can remain open).
   iv. Squeeze and release the bellows to clear the lumen and draw air into the carbon dioxide detector. If inserting a nasogastric tube, this should be done once after the tube has been inserted to at least a depth of 30 to 35 cm (12.8 to 13.8 inches).
   v. Observe for color changes on the carbon dioxide device. If a color change is detected, the tube should be removed immediately.
   Rationale: A change in color indicates the presence of carbon dioxide, which indicates that the tip of the tube is in the trachea or lungs.
   Carbon dioxide detectors have a limited life span once activated or removed from the packaging. Check the manufacturer's packaging or product insert for specific time limits.

26. Clamp the tube.
27. Obtain a radiograph of the abdomen as ordered or per the organization's practice before instilling fluids, nutrition, or medications into the tube.[1]
Rationale: A radiograph provides the best verification for confirmation of tube placement.
28. If the tip or any of the suction eyelets or side holes of the tube are in the esophagus, advance the tube the length recommended by the radiologist who read the radiograph and repeat the steps to check tube position.
Rationale: The side holes of the tube must be well within the stomach to provide adequate decompression. The radiologist may suggest a length to advance the tube based on the radiograph findings.

Securing the NG Tube

29. Once the placement of the NG tube has been verified, secure it to the patient's face.
   a. Optional: Apply a small amount of tincture of benzoin or skin-preparation agent to the lower end of the patient's nose and let it dry before taping the tube to the nose (*optional*).
   Rationale: Benzoin or skin-preparation agent helps prevent the tape from loosening.

b. Tape the tube to the patient's nose in a way that avoids pressure on the internal or external aspect of the naris. Securely apply prepared tape to the nose, leaving split ends free. Carefully wrap two split ends of tape around the tube.
Rationale: Taping in this manner helps prevent tissue necrosis; tissue breakdown may result if the tube is taped snugly against the naris.
Be aware that NG tubes can be inadvertently removed; ensure that the tube is well secured and as comfortable for the patient as possible.
c. Apply a tube-securement device using an adhesive patch.
d. Fasten a small, soft NG tube to the patient's cheek with transparent dressings from the tube exit site and across the cheek instead of taping it to the naris if adequate securement can be obtained this way.
    i. If this is not possible, try securing the tube to the cheek after securing it to the naris.
    ii. If indicated, apply tincture of benzoin or a skin-preparation agent to the cheek and wait until it is dry and tacky before placing a securement device to help keep the dressing in place.

30. Fasten the end of the NG tube to the patient's neck or shoulder area with tape pinched to the tube, then to the skin, allowing adequate head rotation. *Alternative method*: Loop a rubber band around the tube in a slipknot and then pin the distal aspect of the tube to the patient's gown.
Rationale: Securing the tube as described reduces pressure on the naris if the tube moves and provides slack for movement without dislodging the NG tube. If the tube can be adequately secured to the cheek, this securement method prevents pressure to the naris and patient discomfort caused by the tube hanging from the naris.
31. Mark the tube with indelible marker where it exits the naris to help detect tube displacement. Measure the external distance from the naris to the end of the tube and note this measurement in the patient's record.
Rationale: The mark on the tube or tape is a guide to assess for tube displacement and should be monitored frequently. Documenting the external tube length provides a means of ongoing comparison to detect tube displacement.[3]
32. Connect the tube to suction or an enteral feeding system.
    a. Do not force connections and avoid workarounds per the organization's practice.[8]
    Rationale: Forced connections or workarounds could indicate that the connection should not be made.
    b. Check vital signs immediately after making any connection per the organization's practice.[8]
    c. Keep the air vent of the sump tube above the patient's stomach level.
    Rationale: Positioning the air vent above stomach level promotes air exchange for the tube's sump effect.
    d. For labeling feeding tubes, follow the organization's practice.
33. Unless otherwise prescribed, elevate the head of the bed 30 degrees.
Rationale: Elevating the head of the bed helps prevent esophageal reflux.
34. Discard supplies, remove gloves, and perform hand hygiene.
35. Document the procedure in the patient's record.

Irrigating the NG Tube

1. Perform hand hygiene and don gloves.
2. Verify the correct patient using two identifiers.
3. Place a clean towel under the NG tube and tubing connection.
4. Trace tubing or catheter from the patient to point of origin (1) before connecting or reconnecting any device or infusion, (2) at any transition (e.g., new setting), and (3) as part of the hand-off process.
5. Verify that the tube is still in the stomach.Ensure that the tape or mark indicating where the tube exits the nose is still in place and that the length of the tube from the naris to the connector has not changed.
   Rationale: These measures confirm that the tube is still appropriately positioned.
6. Draw up the amount and type of irrigant prescribed by the practitioner or per the organization's practice into a catheter-tip or ENFit syringe.[2] If using a bottled solution such as normal saline or sterile water for irrigation, ensure that the patient's personal bottle is properly labeled (e.g., with patient name, date, and time opened).
   Rationale: The acutely or chronically ill patient may be at higher risk from exposure to nonsterile products including water, especially contaminated water. Purified water (sterile for irrigation) or saline is preferred for use as a diluent or flush solution over other fluids (including tap water), especially for a patient who is immunocompromised. However, if sterile solutions are used, they can quickly become sources of contamination if not properly handled and stored.
   Use a large syringe designed for NG tube irrigation (catheter tip, ENFit) and do not use excessive force to overcome resistance; excessive force or pressure from a small syringe could cause the tube to rupture.[2]
7. Clamp the NG tube and disconnect it from the connecting tubing. Lay the end of the connection tubing on a clean towel.
   Rationale: A towel reduces soiling of the patient gown and bed linen and keeps the ends of the NG tube and connecting tube as clean as possible.
8. If a plunger is present, remove it and insert the tip of the catheter or syringe into the end of the NG tube and unclamp the tube. Holding the syringe with the tip securely fitted into the NG tube and pointing downward, pour irrigation fluid slowly and evenly.
   Do not force the solution.
   Rationale: Solution introduced under pressure may cause gastric trauma.
   Do not inject fluid through the blue pigtail air vent of a Salem Sump tube. Do not force connections and avoid workarounds per the organization's practice.[8]
   Rationale: Forced connections or workarounds could indicate that the connection should not be made.
9. If resistance is met, assess for kinks in or clamps on the tubing. Turn the patient onto the left side. Report persistent resistance to the practitioner.
   Rationale: Resistance can be caused by the tube tip lying against the stomach lining. Repositioning the patient on the left side may move the tube away from the stomach lining. An NG tube that does not drain properly allows secretion buildup and results in abdominal distention and vomiting.
   Ensure the correct tubing is used. Do not use IV tubing or IV pumps for enteral feedings.

10. Reconnect the NG tube to drainage or suction and record the amount and type of fluid instilled.
    Rationale: Irrigation clears the tubing and helps maintain patency. A record of irrigant intake and output is necessary for accurate measurement of cumulative fluid balance.
11. Fill a syringe with a small amount of air and flush the blue pigtail.
    Rationale: Flushing the air vent with air maintains patency.
12. Discard supplies, remove gloves, and perform hand hygiene.
13. Document the procedure in the patient's record.

Removing the NG Tube

1. Perform hand hygiene and don gloves.
2. Verify the correct patient using two identifiers.
3. Place the patient in semi-Fowler or high-Fowler position as tolerated. Raise the bed to a comfortable working level.
4. Place a clean towel over the patient's chest and provide facial tissues.
5. Clamp the NG tube.
    a. If connected to suction, turn off suction and disconnect the NG tube from it.
    b. If connected to an enteral feeding system, turn off the feeding pump and disconnect the NG tube from the tubing.
6. Instill a small amount of air into the lumen of the NG tube (enough to clear the tube).
    Rationale: Flushing with air clears gastric fluid from the tube, helping to prevent aspiration of contents or soiling of clothing and bedding.
7. Remove any tape or securement device.
8. Instruct the patient to take and hold a breath.
    Rationale: Some patients wish to blow their nose after the tube is removed. A towel prevents the gown from becoming soiled. Temporary airway obstruction occurs during tube removal; a deep breath helps prevent a sensation of loss of breath.
9. Grasp the tube and then pull it out steadily and smoothly.
10. Instruct the patient to breathe normally.
11. Inspect the tube to ensure that it is intact.
12. Measure the amount of drainage and evaluate the character of the contents.
13. Remove gloves, and perform hand hygiene. Don clean gloves.
14. Position the patient comfortably and explain the procedure for drinking fluids if not contraindicated.
15. Clean the naris and provide mouth care.
16. Lower the bed to the lowest level.
17. Instruct the patient to notify the nurse of nausea or other discomfort.
18. Discard supplies, remove gloves, and perform hand hygiene.
19. Document the procedure in the patient's record.

7. MONITORING AND CARE

1. Once initial placement has been verified, confirm correct tube placement at least once each shift and before administering any fluid or medication into the tube.[3]
    a. Assess the mark on the tube at the naris or compare the length of the tube outside the naris to the original outer lengths, or both.

   b. If the tube is dislodged or must be repositioned, assess and obtain radiologic confirmation before restarting feedings.
2. Ascertain that the tube is draining or decompressing the stomach via suction by assessing output and comparing it with the patient's symptoms and physical assessment.
   a. If adequate suction is uncertain, try suctioning a small amount of fluid with the suction tubing.
   b. If tube patency is uncertain, instill air or a small amount of fluid into the tube to assess patency.
3. Observe the amount and character of contents draining from the NG tube. Ask the patient if he or she feels nauseated or otherwise uncomfortable.
   Rationale: Assessing drainage amount and patient symptoms helps determine if the tube is decompressing the stomach and removing gastric contents.
4. Auscultate for presence of bowel sounds. Clamp the tube or turn off the suction while auscultating.
   Rationale: The sound of the suction apparatus may be misinterpreted as bowel sounds.
5. Palpate the patient's abdomen. Note any distention, pain, or rigidity.
   Rationale: Palpating helps determine the success of abdominal decompression and the return of peristalsis.
6. Inspect the condition of the naris and nose, watching for signs of pressure on the surrounding tissue. Routinely assess the condition of the naris and mucosa for skin breakdown, inflammation, and excoriation.
   Rationale: Assessing for the onset of skin and tissue irritation prevents complications. Taping the NG tube to the naris can cause skin irritation, which may lead to breakdown.
7. Ensure that the tube is well secured without undue pressure on the naris or other tissue.
   Rationale: Assessing securement prevents tube displacement as well as undue tension on the nasal structures, which can lead to pressure necrosis.
8. Maintain feeding tube patency.
   a. If the tube becomes obstructed, instill 5 ml of warm sterile water for 1 minute. Use a 30-ml syringe to gently attempt to aspirate and flush the tube.
   b. For children, use a smaller syringe as appropriate.
   c. Notify the practitioner if the obstruction is not relieved.
9. Ask the patient if he or she feels throat soreness or irritation in the pharynx.
10. Assess, treat, and reassess pain.
    Rationale: NG tubes can be quite uncomfortable. Provide comfort as possible and consult with the practitioner to remove the NG tube as soon as it is no longer necessary.

8. EXPECTED OUTCOMES

- NG tube is correctly placed.
- Stomach becomes or remains soft, nontender, and without distention.
- Patient discomfort is adequately managed.
- Naris and surface of the nose remain clear, without abrasions or excoriation.
- Nasal mucosa remains moist and intact.
- Patient exhibits no signs or symptoms of pulmonary aspiration.

9. UNEXPECTED OUTCOMES

- NG tube is incorrectly placed upon insertion or becomes dislodged.
- Abdomen is distended and painful.
- Patient has sore throat from dry, irritated mucous membranes.
- The skin around the naris becomes irritated or ulcerated.
- Patient shows signs and symptoms of pulmonary aspiration (i.e., fever, shortness of breath, or pulmonary congestion).

10. DOCUMENTATION

- Length, size, and type of NG tube inserted
- Nostril in which tube was inserted
- Length of tube outside naris (Document or post this information in a location easily accessible for ongoing reference.)
- Patient's tolerance of procedure
- Confirmation of tube placement
- Method used to confirm tube placement
- Character of gastric contents and their pH value
- Whether NG tube is clamped or connected to drainage or to suction
- Amount of suction applied
- Amount and type of solution instilled
- Amount of gastric aspirate removed
- Amount and character of contents draining from NG tube every shift
- Removal of intact NG tube
- Final amount and character of drainage when NG tube is removed
- Patient and family education
- Unexpected outcomes and related nursing interventions
- Pain assessment and management

11. GERONTOLOGICAL CONSIDERATIONS

- For the older adult's safety and comfort during NG tube insertion, check for and remove ill-fitting dentures.
- Oral and nasal mucosal drying may occur in some older adults. Adequately lubricate the tube for insertion and provide frequent oral care.

12. NURSING EDUCATION UNIT MEMBERS

- ARIEL AGUSTIN, BSN, RN- Nurse Manager
- RONALD MARTIN CARCILLAR, BSN, RN, MANc
- DIOVEL BRYAN GANAC, BSN, RN
- CHARMAINE T. CO, BSN, RN, MAN
- JERELYN JEAN DONGALLO, BSN, RN, MAN
- ROVIN B. RAMIREZ, BSN, RN, MANc

12. REFERENCES

1. American Association of Critical-Care Nurses (AACN). (2016). AACN practice alert: Initial and ongoing verification of feeding tube placement in adults. *Critical Care Nurse, 36*(2), e8-e13. doi:10.4037/ccn2016141
2. Bankhead, R. and others. (2009). Enteral nutrition practice recommendations. *JPEN: Journal of Parenteral and Enteral Nutrition, 33*(2), 122-167. doi:10.1177/0148607108330314 (classic reference)* (Level VII)
3. Bourgault, A.M. and others. (2014). Factors influencing critical care nurses' adoption of the AACN practice alert on verification of feeding tube placement. *American Journal of Critical Care, 23*(2), 134-144. doi:10.4037/ajcc2014558 (Level VI)
4. Covidien. (n.d.). Kangaroo™ CO_2 detector for gastric tube placement. Retrieved June 7, 2016, from http://www.medtronic.com/covidien/products/enteral-feeding/enteral-access
5. Ellett, M.L. and others. (2012). Comparing methods of determining insertion length for placing gastric tubes in children 1 month to 17 years of age. *Journal for Specialists in Pediatric Nursing, 17*(1), 19-32. doi:10.1111/j.1744-6155.2011.00302 (Level II)
6. Halloran, O., Grecu, B., Sinha, A. (2011). Methods and complications of nasoenteral intubation. *JPEN: Journal of Parenteral and Enteral Nutrition, 35*(1), 61-66. doi:10.1177/0148607110370976
7. Irving, S.Y. and others. (2014). Nasogastric tube placement and verification in children: Review of the current literature. *Nutrition in Clinical Practice, 29*(3), 267-276. doi:10.1177/0884533614531456 (Level V)
8. Joint Commission, The. (2014). Sentinel alert event 53: Managing risk during transition to new ISO tubing connector standards. Retrieved June 7, 2016, from http://www.jointcommission.org/assets/1/6/SEA_53_Connectors_8_19_14_final.pdf (Level VII)
9. Marcason, W. (2013). What is the protocol used to unclog an enteral feeding tube? *Journal of the Academy of Nutrition and Dietetics, 113*(4), 612. doi:10.1016/j.jand.2013.01.021
10. Metheny, N.A., Frantz, R.A. (2013). Head-of-bed elevation in critically ill patients: A review. *Critical Care Nurse, 33*(3), 53-66. doi:10.4037/ccn2013456
11. Simons, S.R., Abdallah, L.M. (2012). Bedside assessment of enteral tube placement: Aligning practice with evidence. *The American Journal of Nursing, 112*(2), 40-46. doi:10.1097/01.NAJ.0000411178.07179.68
12. Taylor, S.J. and others. (2014). Nasogastric tube depth: The "NEX" guideline is incorrect. *British Journal of Nursing, 23*(12), 641-644. doi:10.12968/bjon.2014.23.12.641 (Level III)
13. Uri, O. and others. (2011). Lidocaine gel as an anesthetic protocol for nasogastric tube insertion in the ED. *The American Journal of Emergency Medicine, 29*(4), 386-390. doi:10.1016/j.ajem.2009.10.011 (Level IV)

*In these skills, a "classic" reference is a widely cited, standard work of established excellence that significantly affects current practice and may also represent the foundational research for practice.

Adapted from Perry, A.G., Potter, P.A., Ostendorf, W.R. (2014). *Clinical nursing skills & techniques* (8th ed.). St. Louis: Mosby.

NURSING EDUCATION UNIT

COMPETENCY-BASED CHECK OFF TOOL

Title:	**NASOGASTRIC TUBE INSERTION, IRRIGATION AND REMOVAL**
Competency Statement:	**The nurse demonstrates acceptable level of competence in the performance of NGT insertion, feeding/irrigating and removal**
Standards:	• **Infection Control and Patient Safety Compliance** • **Equipment Preparation and Manipulation** • **Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

- Provide all the information needed in this check off tool.
- Use the scale below by ENCIRCLING your most appropriate response
  4= Very Good (Performs competently without assistance and supervision)
  3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
  2= Poor (Performs inconsistently/incompletely with assistance and supervision)
  1= Very Poor (Cannot perform even with directions; procedural step omitted)
- Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
- Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
- Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
- Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
C. Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1

5	Educates patient and family / caregiver (where appropriate).	4	3	2	1
D. Psychomotor Skills					
1	Performed hand hygiene before patient contact.	4	3	2	1
2	Verified the correct patient using two identifiers.	4	3	2	1
3	Inspected the condition of the patient's nasal and oral cavities.	4	3	2	1
4	Reviewed the patient's record for a history of nasal surgery, congestion, deviated septum, allergies, or nosebleeds in either naris.	4	3	2	1
5	Auscultated for bowel sounds.	4	3	2	1
6	Palpated the patient's abdomen for distention, pain, and rigidity.	4	3	2	1
7	Assessed the patient's level of consciousness and ability to follow instructions. If the patient was confused, disoriented, or unable to follow commands, considered consulting an experienced nurse to assist with tube placement.	4	3	2	1
8	Verified the practitioner's order for the type and purpose of the NG tube and whether to connect it to suction or use it for enteral feeding	4	3	2	1
9	If the tube insertion was anticipated to be very uncomfortable in the naris and there was no allergy to lidocaine, considered obtaining an order for lidocaine gel or spray. Waited for the selected anesthetic to anesthetize the naris.	4	3	2	1
10	Chose the smallest tube possible depending on its purpose.	4	3	2	1
11	Had an emesis basin within reach	4	3	2	1
Inserting an NG tube					
1	Performed hand hygiene and donned gloves.	4	3	2	1
2	Placed the patient in the high-Fowler position as tolerated, with pillows behind the head and shoulders. Raised the bed to a comfortable working level.	4	3	2	1
3	Placed a clean towel over the patient's chest and provided facial tissues. Allowed the patient to blow his or her nose if necessary.	4	3	2	1
4	Cleaned the bridge of the patient's nose with soap and water or an alcohol swab.	4	3	2	1
5	Explored comfort or distraction measures, such as something the patient could use as a focal point while the tube was placed.	4	3	2	1
6	Instructed the patient to relax and breathe normally while occluding one nostril. Selected the nostril with greater airflow for tube placement. If airflow was equal bilaterally, asked the patient which nostril he or she preferred.	4	3	2	1
7	Estimated the length of tube to be inserted. a. Measured the distance from the tip of the nose to the earlobe, then from the earlobe to the xiphoid process. b. Added 10 cm.	4	3	2	1
8	Noted markings on the tube where it should exit the naris. If necessary, placed a small piece of tape on the tube to mark the length of the tube to be inserted.	4	3	2	1
9	Lubricated the tip of the tube with water-soluble gel.	4	3	2	1
10	Alerted the patient when the procedure was about to begin.	4	3	2	1
11	Had the patient position his or her head forward in a chin-tuck position.	4	3	2	1
12	Explained to the patient that swallowing might facilitate tube advancement. If drinking water was not contraindicated and the patient	4	3	2	1

	preferred, provided small sips of water along with encouragement to swallow as the tube was inserted and advanced.				
13	Inserted the NG tube gently through the naris at an angle parallel to the floor of the nasal canal, not upright. If the tip had a curved end, pointed it downward.	4	3	2	1
14	Asked the patient to swallow and continue to pass the tube along the floor of the nasal passage, aiming down toward the patient's ear. If resistance was felt, pulled the tube tip back slightly, angled it more downward to find the opening to the nasopharynx, and then advanced the tube.	4	3	2	1
15	If resistance continued, tried to rotate the tube and then advanced it. If resistance persisted, withdrew the tube, allowed the patient to rest, relubricated the tube, and inserted it into the other naris. Never used force when placing the NG tube. Did not force past resistance, which could have caused trauma to the mucosa.	4	3	2	1
16	With the tube just above the oropharynx, ensured that the patient's head was tipped forward.	4	3	2	1
17	If swallowing was considered safe and the patient was able to cooperate, asked him or her to take a small sip of water and swallow. Advanced the tube as the patient swallowed. If fluids were not permitted, instructed the patient to swallow and advanced the tube during the swallowing motion.	4	3	2	1
18	If the patient began to cough, gag, or choke, withdrew the tube to the nasopharyngeal area and stopped advancement. Encouraged the patient to breathe easily and relax.	4	3	2	1
19	If the patient continued to cough during insertion, pulled the tube back slightly. If vomiting occurred, helped the patient clear his or her airway. Performed oral suctioning as needed.	4	3	2	1
20	If the patient continued to gag and cough or reported that the tube felt as if it was coiling in the throat, checked the back of the oropharynx using a flashlight and tongue blade. Withdrew any coiled tube until the tip was again in the oropharynx and reinserted it as the patient swallowed.	4	3	2	1
21	Encouraged the patient to relax and continued to advance the tube while he or she swallowed. Advanced it until reaching the tape or mark on the tube that signified that the tube was inserted the desired distance.	4	3	2	1
22	Opened the patient's mouth and ensured the tube was not coiled in the posterior pharynx.	4	3	2	1
23	Anchored the tube to the patient's cheek with tape.	4	3	2	1
24	Verified placement of the nasogastric tube per the organization's practice. a. Multiple methods may be used to assess tube placement, though none is as accurate as x-ray confirmation. b. NG placement should be confirmed by x-ray before administering any fluids, nutrition, or medications. Did not rely on the presence of an audible air bolus alone to ascertain proper placement of a nasal or an orogastric tube.	4	3	2	1
25	Clamped the tube.	4	3	2	1
26	Obtained a radiograph of the abdomen as ordered or per the organization's practice before instilling fluids, nutrition, or medications into the tube.	4	3	2	1

27	If the tip or any of the suction eyelets or side holes of the tube were in the esophagus, advanced the tube the length recommended by the radiologist who read the radiograph and repeated the steps to check tube position.	4	3	2	1
Securing the NG Tube					
1	Once the placement of the NG tube was verified, secured it to the patient's face.	4	3	2	1
2	Fastened the end of the NG tube to the patient's neck or shoulder area with tape pinched to the tube, then to the skin, which allowed adequate head rotation. *Alternative method*: Looped a rubber band around the tube in a slipknot and then pinned the distal aspect of the tube to the patient's gown.	4	3	2	1
3	Marked the tube with indelible marker where it exited the naris to help detect tube displacement. Measured the external distance from the naris to the end of the tube and noted this measurement in the patient's record.	4	3	2	1
4	Connected the tube to suction or an enteral feeding system. a. Did not force connections and avoided workarounds per the organization's practice. b. Checked vital signs immediately after making any connection per the organization's practice. c. Kept the air vent of the sump tube above the patient's stomach level. d. For labeling feeding tubes, followed the organization's practice.	4	3	2	1
5	Unless otherwise prescribed, elevated the head of the bed 30 degrees.	4	3	2	1
Irrigating the NG tube					
1	Performed hand hygiene and donned gloves.	4	3	2	1
2	Verified the correct patient using two identifiers	4	3	2	1
3	Placed a clean towel under the NG tube and tubing connection.	4	3	2	1
4	Traced tubing or catheter from the patient to point of origin (1) before connecting or reconnecting any device or infusion, (2) at any transition (e.g., new setting), and (3) as part of the hand-off process.	4	3	2	1
5	Verified that the tube was still in the stomach. Ensured that the tape or mark indicating where the tube exited the nose was still in place and that the length of the tube from the naris to the connector had not changed	4	3	2	1
6	Drew up the amount and type of irrigant prescribed by the practitioner or per the organization's practice into a catheter-tip or ENFit syringe. If using a bottled solution such as normal saline or sterile water for irrigation, ensured that the patient's personal bottle was properly labeled (e.g., with patient name, date, and time opened). Used a large syringe designed for NG tube irrigation (catheter tip, ENFit) and did not use excessive force to overcome resistance; excessive force or pressure from a small syringe could have caused the tube to rupture.	4	3	2	1
7	Clamped the NG tube and disconnected it from the connecting tubing. Laid the end of the connection tubing on a clean towel.	4	3	2	1
8	If a plunger was present, removed it and inserted the tip of the catheter or ENFit syringe into the end of the NG tube and unclamped the tube. Holding the syringe with the tip securely fitted into the NG tube and pointing downward, poured irrigation fluid slowly and evenly. Did not force the solution. Did not inject fluid through the blue pigtail air vent of a Salem	4	3	2	1

	Sump tube. Did not force connections and avoided workarounds per the organization's practice.				
9	If resistance was met, assessed for kinks in or clamps on the tubing. Turned the patient onto the left side. Reported persistent resistance to the practitioner. Ensured the correct tubing was used. Did not use IV tubing or IV pumps for enteral feedings.	4	3	2	1
10	Reconnected the NG tube to drainage or suction and recorded the amount and type of fluid instilled.	4	3	2	1
11	Filled a syringe with a small amount of air and flushed the blue pigtail.	4	3	2	1
12	Discarded supplies, removed gloves, and performed hand hygiene	4	3	2	1
13	Documented the procedure in the patient's record.	4	3	2	1
Removing the NG tube					
1	Performed hand hygiene and donned gloves.	4	3	2	1
2	Verified the correct patient using two identifiers	4	3	2	1
3	Placed the patient in semi-Fowler or high-Fowler position as tolerated. Raised the bed to a comfortable working level.	4	3	2	1
4	Placed a clean towel over the patient's chest and provided facial tissues.	4	3	2	1
5	Clamped the NG tube. a. If connected to suction, turned off suction and disconnected the NG tube from it. b. If connected to an enteral feeding system, turned off the feeding pump and disconnected the NG tube from the tubing.	4	3	2	1
6	Instilled a small amount of air into the lumen of the NG tube.	4	3	2	1
7	Removed any tape or securement device.	4	3	2	1
8	Instructed the patient to take and hold a breath.	4	3	2	1
9	Grasped the tube and then pulled it out steadily and smoothly.	4	3	2	1
10	Instructed the patient to breathe normally.	4	3	2	1
11	Inspected the tube to ensure that it was intact.	4	3	2	1
12	Measured the amount of drainage and evaluated the character of the contents.	4	3	2	1
13	Removed gloves and performed hand hygiene. Donned clean gloves. Positioned the patient comfortably and explained the procedure for drinking fluids if not contraindicated.	4	3	2	1
14	Cleaned the naris and provided mouth care.	4	3	2	1
15	Lowered the bed to the lowest level.	4	3	2	1
16	Instructed the patient to notify the nurse of nausea or other discomfort.	4	3	2	1
17	Discarded supplies, removed gloves, and performed hand hygiene.	4	3	2	1
18	Documented the procedure in the patient's record.	4	3	2	1
C. Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1
D. Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse's Comments/Recommendations for Improvement

Title	EXTERNAL DEFIBRILATION		
Author/s	Ronald Martin Carcillar-CRN-ICU		
Original Date	October, 2017	Revision Date	

1. ALERT

Ensure electrical safety during defibrillation.

Self-adhesive defibrillation pads are preferred to defibrillator paddles because they reduce transthoracic impedance.

2. OVERVIEW

External defibrillation is used for life-threatening ventricular fibrillation (VF) and pulseless ventricular tachycardia (VT). Early emergent defibrillation is the treatment of choice to reestablish normal electrical activity and coordinated contractile activity in the heart, thus restoring cardiac output, tissue perfusion, and oxygenation. The earlier defibrillation occurs, the more likely it is that the patient will survive.

The electrical current delivered with defibrillation depolarizes the myocardium, terminating all electrical activity and allowing the heart's normal pacemaker to resume electrical activity. Defibrillator pads or paddles are placed on the patient's exposed chest in the anterior-lateral position. Acceptable alternative positions are anterior-posterior (for paddles or pads) and apex-posterior (for pads).

Self-adhesive defibrillation pads are more effective than paddles because they decrease transthoracic impedance, which enhances the effectiveness of the shock.[1] Defibrillation pads can be used for monitoring, and they allow fast delivery of a shock. Paddles and prepacked gelled conductive pads should be used only if self-adhesive pads are not available.

Defibrillators deliver energy in waveform patterns. Delivered energy levels may differ among different types of defibrillators. Various types of monophasic waveforms are used in older defibrillators. Biphasic waveforms were designed more recently and are currently used in implantable cardioverter-defibrillators (ICDs), automated external defibrillators (AEDs), and most manual defibrillators.

Monophasic defibrillators deliver energy in one direction through the heart from one paddle or pad to the other. Biphasic defibrillators deliver energy in two directions. The energy travels through the heart in a positive direction, and then it reverses itself and flows back through the heart in a negative direction. Researchers have found that biphasic defibrillators are able to decrease the amount of current needed to terminate the arrhythmia and may produce a higher rate of success after the first shock.[3]

Biphasic defibrillators measure and compensate for transthoracic impedance before the delivery of the shock, allowing the defibrillator to deliver the actual amount of energy selected by the rescuer.[3] Repetitive lower-energy biphasic waveform shocks

have equal or higher success rates for eradicating VF than defibrillators that increase the current with each shock.

The American Heart Association (AHA) recommends an initial shock of 360 J when monophasic waveforms are used. The ideal initial shock for biphasic waveforms has yet to be established, but the AHA advises following the manufacturer's recommendations. Biphasic defibrillation for VF or pulseless VT begins at 120 to 200 J. If the manufacturer's recommendations are unknown, defibrillation at the maximum dose is initiated.

The key to successful defibrillation is accurate and immediate identification of arrhythmias requiring defibrillation. Time is crucial because survival rates decline by 7% to 10% for every minute after cardiac arrest without cardiopulmonary resuscitation (CPR) or defibrillation.

3. SUPPLIES

- Defibrillator
- ECG cable, leads, and electrodes
- Self-adhesive defibrillation pads or defibrillator paddles with conductive defibrillator gel, or prepackaged conductive gel pads
- Bag-mask oxygen delivery device (manual resuscitation bag)
- Flowmeter and oxygen source
- Intubation equipment
- Suction equipment
- Blood pressure monitoring equipment
- Pulse oximeter
- Electric infusion devices
- Back board
- Emergency medications

4. PATIENT AND FAMILY EDUCATION

- Provide the patient and family with an explanation of the procedure and the equipment, if time permits.
- Explain to the patient and family the signs and symptoms of hemodynamic compromise associated with preexisting cardiac arrhythmias.
- Discuss with the patient and family the possible need for long-term pharmacologic support or placement of an ICD.
- Encourage questions and answer them as they arise.

5. ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene before patient contact.
2. Verify the correct patient using two identifiers.
3. Assess the patient's electrocardiogram (ECG) for VF or pulseless VT.
4. If possible, ask pastoral care personnel or another designated health care provider to provide support for family members during the procedure.

Preparation

1. Summon help and call for the defibrillator.

2. Place a back board under the patient. If the patient is in a specialty bed, place the bed in CPR mode, if available.
3. Initiate basic life support (BLS) while the defibrillator is brought to the bedside, set up, and attached to the patient. Do not stop until the defibrillator is fully charged and ready to be discharged.

6. PROCEDURE

1. Perform hand hygiene and don gloves.
2. Verify the correct patient using two identifiers.
3. Remove transdermal medication patches from the patient's chest or ensure that they do not interfere with defibrillator pad placement.
4. Ensure that the patient is in a dry environment. If the patient's chest is wet, dry it.
5. Apply self-adhesive defibrillator pads to the patient in the appropriate locations per the manufacturer's instructions. Paddles can be used if self-adhesive pads are not available. Place conductive gel pads on the patient in the appropriate locations if using paddles. If conductive gel pads are not available, conductive defibrillator gel may be used. Do not place pads or paddles over lead wires or an implantable venous access port.

   If conductive gel pads appear to be drying out, replace them. Ensure that conductive defibrillator gel is evenly dispersed on the defibrillator paddles and adequately covers the surface. Use only conductive gel that is approved for use with a defibrillator.

   a. Anterior-lateral placement.
      i. Place one pad or paddle below the right clavicle over the right second intercostal space and the other just to the left of the nipple at the midaxillary line over the sixth left intercostal space.[2]
      ii. In women, place the left pad or paddle lateral to or underneath the left breast.

      Avoid placement over a woman's breast to reduce transthoracic resistance.

   b. Anterior-posterior placement.
      i. Place one pad or paddle in the anterior left precordial area and the other behind the heart in the right or left infrascapular area.
      ii. As an alternative, place one pad or paddle in the right infraclavicular area and the other in the left infrascapular position.

   c. Placement for a patient with an ICD or pacemaker
      i. Use either anterior-lateral or anterior-posterior placement to defibrillate a patient with an ICD or pacemaker.
      ii. Do not place pads or paddles over the device. Place the pad or paddle at least 8 cm (3 inches) from the position of the device generator.[2]

      Rationale: Defibrillation over an implanted ICD or pacemaker may impair the passage of current to the patient and cause the device to malfunction or become damaged.

      If the ICD is delivering shocks to the patient, wait 1 minute before defibrillating with the manual defibrillator.Do not touch the patient if the ICD is firing.

6. Turn on the defibrillator and start continuous ECG recordings per the organization's practice.
   Rationale: Continuous recordings display the patient's current ECG, verify the response to the intervention, and provide a permanent record of the response to the defibrillation. Some defibrillators allow the information to be stored and printed or downloaded later, making continuous recording unnecessary.
7. Charge the defibrillator as prescribed or in accordance with AHA advanced cardiac life support (ACLS) guidelines or per the organization's practice.
   The AHA recommends delivering 360 J when using a monophasic device on an adult.[1] Biphasic energy recommendations are device specific. The AHA recommends selecting the biphasic energy level per the manufacturer's recommendations followed by equal or higher doses for subsequent shocks. Biphasic energy levels begin at 120 to 200 J.[1]
8. Disconnect the oxygen source during defibrillation.
   Rationale: Disconnecting the oxygen source decreases the risk of combustion in the presence of electrical current.
   Arcing of electrical current in the presence of oxygen could cause an explosion and subsequent fire hazard.
9. If using paddles, apply firm pressure to decrease transthoracic resistance.
   Rationale: Applying pressure improves the flow of electrical current across the axis of the heart.
10. Verify that the patient is still in VF or pulseless VT.
11. State "Clear. Shocking." and look at the patient while talking to verify that no one is in contact with the patient, bed, or equipment.
    Rationale: Electrical current can be conducted from the patient to another person if contact occurs.
12. Press the discharge button on the defibrillator to deliver the shock.
    If using paddles, depress the buttons on the paddles simultaneously and hold until the defibrillator fires. In the defibrillation mode, an electric charge is immediately released.
13. Immediately resume CPR.
14. Apply the ECG electrodes and connect ECG monitoring lead wires from the defibrillator to the patient.
15. While the defibrillator is charging, perform 2 minutes of CPR and analyze the rhythm. Then reshock if indicated. Repeat this sequence until resolution.
16. When the patient no longer requires defibrillation, disinfect the defibrillator with an organization-approved cleaning wipe, restock the supplies, and return it to its assigned storage space.
17. Discard supplies, remove gloves, and perform hand hygiene.
18. Document the procedure in the patient's record.

MONITORING AND CARE

1. Monitor the patient's airway and pulmonary status.
   Rationale: The goal is to support cardiac and pulmonary function to optimize tissue perfusion to the vital organs, especially the brain.

Reportable conditions: Changes in respirations or breath sounds, decreased oxygen saturation as measured by pulse oximetry, abnormal arterial blood gas results

2. Evaluate the patient's neurologic status. Reorient the patient as necessary to person, place, and time.
   Rationale: An altered level of consciousness may occur after cardiac arrest.
   Reportable condition: Change in the patient's level of consciousness
3. Monitor vital signs, oxygen saturation, and cardiac rhythm immediately after the return of a perfusing rhythm.
   Rationale: Vital signs should stabilize after a normal heart rate and rhythm is achieved. Postdefibrillation arrhythmias may occur.
   Reportable conditions: Hypotension, hypertension, arrhythmias
4. Administer IV fluids or medications to maintain normal blood pressure as prescribed.
   Rationale: The goal is to support cardiac and pulmonary function to optimize tissue perfusion to vital organs, especially the brain.
   Reportable conditions: Hypotension, hypertension
5. Assess the patient for burns.
   Rationale: Erythema at pad or paddle sites may result from local hyperemia in the current pathway.
   Reportable condition: Skin burns
6. Consider possible causes of VF or pulseless VT.
   Rationale: Interventions may be aimed at correcting the underlying pathophysiology and preventing the recurrence of lethal arrhythmias.
7. Assess, treat, and reassess pain.

7. EXPECTED OUTCOMES

- Return of a rhythm compatible with life
- Hemodynamic stability

8. UNEXPECTED OUTCOMES

- Continued VF
- Cardiopulmonary arrest
- Asystole
- Respiratory complications
- Cerebral anoxia and brain death
- Systemic embolization
- Hypotension
- Pacemaker or ICD dysfunction
- Skin burns
- Inability to resuscitate

9. DOCUMENTATION

- Neurologic, pulmonary, and cardiovascular assessments
- Vital signs and oxygen saturation
- Interventions to prepare the patient for defibrillation
- Number of joules used and number of defibrillation attempts
- ECG tracings

- Patient's response to defibrillation
- Condition of the skin of the chest wall
- Unexpected outcomes and related nursing interventions
- Patient and family education
- Pain assessment and management

10. NURSING EDUCATION UNIT MEMBERS

- ARIEL AGUSTIN, BSN, RN- Nurse Manager
- RONALD MARTIN CARCILLAR, BSN, RN, MANc
- DIOVEL BRYAN GANAC, BSN, RN
- CHARMAINE T. CO, BSN, RN, MAN
- JERELYN JEAN DONGALLO, BSN, RN, MAN
- ROVIN B. RAMIREZ, BSN, RN, MANc

11. REFERENCES

1. American Heart Association (AHA). (2016). Part 5: ACLS cases: VF/Pulseless VT. In *Advanced cardiovascular life support provider manual* (pp. 92-105). Dallas, TX: AHA. (Level D)
2. Australian New Zealand Council on Resuscitation (ANZCOR). (2016). ANZCOR Guideline 11.4 – Electrical therapy for adult advanced life support. Retrieved July 26, 2016, from http://www.nzrc.org.nz/assets/Uploads/Guidelines/Adult-ALS/ANZCOR-Guideline-11.4-Elect-Jan16.pdf (Level D)
3. Monteleone, P.P., Borek, H.A., Althoff, S.O. (2012). Electrical therapies in cardiac arrest. *Emergency Medicine Clinics of North America, 30*(1), 51-63. doi:10.1016/j.emc.2011.09.007

12. ADDITIONAL READINGS

American Heart Association (AHA). (2015). Highlights of the 2015 American Heart Association. Guidelines update for CPR and ECC. Retrieved July 26, 2016, from https://eccguidelines.heart.org/wp-content/uploads/2015/10/2015-AHA-Guidelines-Highlights-English.pdf (Level D)

Adapted from Wiegand, D.L. (2011). *AACN procedure manual for critical care* (6th ed.). St. Louis: Saunders.

NURSING EDUCATION UNIT

COMPETENCY-BASED CHECK OFF TOOL

Title:	**EXTERNAL DEFIBRILLATION**
Competency Statement:	**The nurse demonstrates acceptable level of competence in the performance of Defibrillating a patient.**
Standards:	**1. Infection Control and Patient Safety Compliance** **2. Equipment Preparation and Manipulation** **3. Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

- Provide all the information needed in this check off tool.
- Use the scale below by ENCIRCLING your most appropriate response
  4= Very Good (Performs competently without assistance and supervision)
  3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
  2= Poor (Performs inconsistently/incompletely with assistance and supervision)
  1= Very Poor (Cannot perform even with directions; procedural step omitted)
- Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
- Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
- Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
- Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1
5	Educates patient and family / caregiver (where appropriate).	4	3	2	1

Psychomotor Skills					
1	Summoned help and called for the defibrillator.	4	3	2	1
2	Performed hand hygiene and donned gloves.	4	3	2	1
3	Placed a back board under the patient. If the patient was in a specialty bed, placed the bed in CPR mode, if available.	4	3	2	1
4	Initiated BLS while the defibrillator was brought to the bedside, set up, and attached to the patient. Did not stop until the defibrillator was fully charged and ready to be discharged.	4	3	2	1
5	Removed transdermal medication patches from the patient's chest or ensured that they did not interfere with defibrillator pad placement.	4	3	2	1
6	Ensured that the patient was in a dry environment. If the patient's chest was wet, dried it.	4	3	2	1
7	Applied self-adhesive defibrillator pads to the patient in the appropriate locations per the manufacturer's instructions. Used paddles if self-adhesive pads were not available. Placed conductive gel pads on the patient in the appropriate locations if using paddles. If conductive gel pads were not available, used conductive defibrillator gel. Did not place pads or paddles over lead wires or an implantable venous access port. If conductive gel pads appeared to be drying out, replaced them. Ensured that conductive defibrillator gel was evenly dispersed on the defibrillator paddles and adequately covered the surface. Used only conductive gel that was approved for use with a defibrillator. a. Anterior-lateral placement i. Placed one pad or paddle below the right clavicle over the right second intercostal space and the other just to the left of the nipple at the midaxillary line over the sixth left intercostal space. ii. In women, placed the left pad or paddle lateral to or underneath the left breast. Avoided placement over a woman's breast to reduce transthoracic resistance. b. Anterior-posterior placement i. Placed one pad or paddle in the anterior left precordial area and the other behind the heart in the right or left infrascapular area. ii. As an alternative, placed one pad or paddle in the right infraclavicular area and the other in the left infrascapular position. c. Placement for a patient with an ICD or pacemaker i. Used either anterior-lateral or anterior-posterior placement to defibrillate a patient with an ICD or pacemaker. ii. Did not place pads or paddles over the device. Placed the pad or paddle at least 8 cm (3 inches) from the position of the device generator. iii. If the ICD was delivering shocks to the patient, waited 1 minute before defibrillating with the manual defibrillator. Did not touch the patient if the ICD was firing.	4	3	2	1
8	Turned on the defibrillator and started continuous ECG recordings per the organization's practice.	4	3	2	1
9	Charged the defibrillator as prescribed or in accordance with AHA ACLS guidelines or per the organization's practice.	4	3	2	1

10	Disconnected the oxygen source during defibrillation.	4	3	2	1
11	If using paddles, applied firm pressure to decrease transthoracic resistance.	4	3	2	1
12	Verified that he patient was still in VF or pulseless VT.				
13	Stated “Clear. Shocking.” and looked at the patient while talking to verify that no one was in contact with the patient, bed, or equipment.	4	3	2	1
14	Pressed the discharge button on the defibrillator to deliver the shock. If using paddles, depressed the buttons on the paddles simultaneously and held until the defibrillator fired.	4	3	2	1
15	Immediately resumed CPR.	4	3	2	1
16	Applied the ECG electrodes and connected ECG monitoring lead wires from the defibrillator to the patient.	4	3	2	1
17	While the defibrillator was charging, performed 2 minutes of CPR and analyzed the rhythm. Then reshocked if indicated. Repeated this sequence until resolution.	4	3	2	1
18	Monitored vital signs, oxygen saturation, and cardiac rhythm immediately after the return of a perfusing rhythm.	4	3	2	1
19	Disinfected the defibrillator with an organization-approved cleaning wipe, restocked the supplies, and returned it to its assigned storage space.	4	3	2	1
20	Assessed, treated, and reassessed pain.	4	3	2	1
21	Discarded supplies, removed gloves, and performed hand hygiene.	4	3	2	1
22	Documented the procedure in the patient’s record.	4	3	2	1
Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1
Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse’s Comments/Recommendations for Improvement:

Originating Department	Nursing Education Unit	Module No.	1-2017
Title	**TRANSCUTANEOUS PACING**		
Author/s	**Ronald Martin Carcillar-CRN-ICU**		
Original Date	October, 2017	Revision Date	

1. ALERT

There is no research indicating that transcutaneous pacing (TCP) improves outcomes in pulseless patients, and it is not recommended as a routine intervention during cardiac arrest.

The American Heart Association (AHA) does not recommend the use of TCP for severe hypothermia.

Check the manufacturer's guidelines regarding the length of time the pacing electrodes may be used for continuous pacing.

Never cut the pacing electrode pads.

2. OVERVIEW

TCP is also known as *noninvasive cardiac pacing*, *external cardiac pacing*, *precordial cardiac pacing*, *temporary pacing*, and *external transthoracic pacing*.

TCP, along with medication administration, is considered the mainstay of stabilizing treatment for symptomatic bradycardia.

- In patients with bradycardia, studies indicate that treatment with pharmacologic therapy (such as atropine) and treatment using TCP have similar survival rates; therefore, because medication is less uncomfortable for patients, pharmacotherapy should be used initially and TCP should be reserved for patients who do not respond to medications.
- Symptomatic bradycardia is defined as an abnormally slow heart rate associated with signs of inadequate perfusion, such as hypotension, acutely altered mental status, signs of shock, ischemic chest discomfort, or acute heart failure.
- TCP is also considered an appropriate treatment for patients with symptomatic atrioventricular blocks.

TCP is not recommended by the AHA for treatment in patients who have bradyasystolic cardiac arrest.

TCP is performed to increase heart rate in patients with a myocardial infarction who may present with bradycardia-dependent, life-threatening ventricular rhythms. The use of TCP to provide overdrive pacing may also be considered in patients with supraventricular and ventricular tachycardias who do not respond to pharmacologic therapy and electrical cardioversion.

3. SUPPLIES

- Gloves (if needed)
- Defibrillator with transcutaneous pacemaker capability
- Multifunction cable or pacing cable
- Multifunction or pacing electrode pads
- ECG electrodes and cable
- Strip chart recorder and paper
- Supplies and equipment for resuscitation (i.e., a crash cart)
- Pulse oximeter
- Sedatives or analgesics as prescribed

4. PATIENT AND FAMILY EDUCATION

- Inform the patient and family about the procedure for TCP, its purpose, and the anticipated sensations. Explain that the sensation at low-current levels has been described as a superficial tingling and at high-current levels as a deep thumping.
- Inform the patient that TCP may be uncomfortable and instruct him or her to report increasing discomfort (pain, itching, stabbing sensations) related to the pacing impulses.
- Explain that touching the patient during TCP does not cause any harm. A small shock hazard does exist, and the pacing energy may be felt.
- Explain that some pacing devices continue to deliver pacing energy when the pacing electrodes are removed from the patient. As with touching the patient during TCP, there is a shock hazard, but there is no risk of harm to the user.
- Encourage questions and answer them as they arise.

5. ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene before patient contact and don gloves if needed.
2. If time permits, verify the correct patient using two identifiers.
3. Obtain baseline vital signs, including oxygen saturation.
4. Assess the patient for the presence of the following conditions:
    a. Acute myocardial infarction (AMI)
    b. Heart failure
    c. Pulmonary edema
5. Assess for signs and symptoms of hemodynamic instability.
    a. Dizziness
    b. Exertional symptoms
    c. Weakness
    d. Hypotension
    e. Abnormal heart rate (tachycardia or bradycardia)

Preparation

1. Connect the patient to a cardiac monitor.
2. Obtain a standard 12-lead electrocardiogram (ECG) if the patient's condition permits.
3. Establish IV access in case IV medications are necessary.
4. Remove any dirt or debris from the skin with soap and water.
    Rationale: Removing skin oils and lotion with soap and water, and then drying the skin completely, improves electrode adherence and maximizes delivery of pacing energy through the chest wall.

5. Clip (rather than shave) excessive chest hair, if time allows.
   Rationale: Shaving causes microabrasions and increases the likelihood of skin irritation during pacing.
6. Remove gloves (if donned) and perform hand hygiene.
   Rationale: Gloves are not needed for TCP and also may stick to electrode pads.

PROCEDURE

1. Perform hand hygiene.
2. If time permits, verify the correct patient using two identifiers.
3. Administer atropine, if prescribed, before initiating TCP for symptomatic bradycardia. Other drugs that may be considered include dopamine, epinephrine, and isoproterenol. If pharmacologic therapy is unsuccessful, initiate TCP. Simultaneously seek out and treat underlying causes of bradycardia (e.g., drug toxicity, hypovolemia) when possible.
4. If necessary, reposition the ECG electrodes on clean, dry skin as far as possible from the intended sites for the pacing electrode pads.
   Rationale: Positioning the ECG electrodes away from the pacing electrodes may reduce the signal distortion.
5. Place the multifunction or pacing electrode pads in an anterior-anterior or anteroposterior position.
   a. *Anterior-anterior (sternum-apex) position* Place the anterior pacing electrode to the right of the upper third of the sternum, below the clavicle; place the apex pacing electrode to the left of the nipple line below the axilla.
   b. *Anteroposterior position* (Place the anterior pacing electrode over the precordium, and place the posterior pacing electrode behind the heart at the left scapular line, at the inferior angle of the scapula.
6. Roll the pacing electrode pads onto the skin. Press firmly on the adhesive area around the periphery and gently on the gelled area to remove any trapped air. If a female patient has large breasts, place the pacing electrode over the apex of the heart, under the left breast.
   Rationale: Good adhesion and proper placement of pacing electrode pads improves electrical conduction.
   To prevent interference with conduction of the electrical impulse to the heart, do not place the pacing electrode pads over wires, drains, dressings, ECG electrodes, or medication patches.
   Ideally, place the patches a minimum of 8 cm (3 in) away from either an internal cardiac defibrillator or an implanted pacemaker.[4]
7. Obtain a hard copy strip of the baseline rhythm (note that lead II on the ECG gives a clearer picture of the pacing artifact).
8. Ensure that the ECG cable is connected to the pacemaker and the ECG electrodes are placed on the patient.
   Some models pace asynchronously if the ECG leads are not attached along with the pacing pads.
9. Select the pacing mode (*demand* or *asynchronous*).
   In some pacemakers, the mode is automatically *demand* if the ECG cable is attached. It switches to *asynchronous* when the cable or ECG electrodes are removed.

a. *Demand mode:* Use the demand mode when the patient has an underlying rhythm. The pacemaker delivers a pacing stimulus only when the patient's intrinsic heart rate falls below the preset rate. Ensure correct sensing of the intrinsic R wave. Some pacemakers mark each sensed R wave, whereas others flash a symbol each time an R wave is sensed. The sensitivity is increased by increasing the ECG gain until all intrinsic R waves are seen.
   i. Undersensing occurs when the pacemaker does not sense an intrinsic QRS complex and delivers a pacing spike. Failure to sense is recognized by competition between the pacing rhythm and the intrinsic rhythm, and by a short interval between the native QRS complex and the pacing spike. If the pacer fails to recognize all of the intrinsic QRS complexes, it operates as if it were in the asynchronous mode.
   ii. Oversensing is due to an inappropriate inhibition of the pacing by electrical signals from outside the heart .Extracardiac electrical signals include muscle artifact (e.g., movement) and electromagnetic signals in the environment (e.g., from magnetic resonance imaging). These may be corrected by decreasing the ECG size. This will also decrease the size of extracardiac signals, with the intent being that the pacemaker will not recognize the smaller extracardiac signals but may still recognize the QRS complexes. If the problem persists, the pacemaker may need to operate in the asynchronous mode to obtain reliable pacing.
      Rationale: Correct sensing of the intrinsic R wave must be confirmed for proper demand pacing.

b. *Asynchronous mode:* Use the asynchronous (fixed rate) mode only in emergency situations when ECG electrodes are not available or the pacemaker oversenses (recognizes electrical artifacts other than QRS complexes and fails to fire in the synchronous mode). In this mode, the pacemaker disregards the patient's intrinsic rhythm and delivers a pacing stimulus at the preset rate.
   There is a risk that a lethal arrhythmia may be generated if the pacing energy occurs during the vulnerable period of ventricular repolarization.[1]

10. Set the pacing rate per the organization's practice or the practitioner's order. Generally, the heart rate on the pacemaker is started at the patient's normal intrinsic rate (if known). Overall, a rate of 60 to 70 bpm is adequate for perfusion.[1]
11. Set the output in milliamperes (mA) to zero and turn on the pacemaker. Turn the output up until electrical capture is noted (indicated by a wide QRS complex—and a broad T wave following each pacing spike) Note the threshold, which is the mA level at which 100% capture is achieved.
    Rationale: Failure to capture is evidenced by pacing spikes that do not induce the wide QRS complex of an electrical capture.
12. Set the output slightly higher than the threshold.
    Rationale: Setting the output slightly higher than the threshold decreases the risk of losing capture because of movement and chest wall impedance but does not create unnecessary discomfort for the patient.

Improper pacing electrode placement, large patient size, barrel-shaped chest, large amounts of intrathoracic air, scarring associated with previous thoracotomy, pericardial effusion, and tamponade may lead to higher capture thresholds.
Anticipate difficulty in identifying electrical capture in the presence of ECG signal distortion (The pacing artifact increases in size as the current is increased.

13. Assess the patient for mechanical capture by palpating a femoral pulse or observing cardiac motion using a bedside ultrasound.[1]
    Palpate the femoral pulse because muscle contractions secondary to TCP may make carotid or upper-extremity pulse palpation difficult.
14. If distortion occurs, change the lead to see if another lead decreases the distortion.
15. Assess the patient's comfort level and administer analgesics, sedatives, or both, as prescribed.
    Rationale: The higher the output that is required to achieve threshold, the more likely the patient is to experience discomfort.
16. Prepare for the insertion of a transvenous pacemaker or prepare to transfer the patient to the unit where a pacemaker will be inserted.
    Rationale: TCP is a temporary measure until more definitive treatment, such as transvenous pacemaker insertion, can be completed.
17. Discard supplies and perform hand hygiene.
18. Document the procedure in the patient's record.

6. MONITORING AND CARE

1. Provide continuous cardiac monitoring.
   Rationale: Evaluates pacemaker function and monitors for deterioration of cardiac rhythm. Capture threshold may change over time and should be determined at prescribed intervals when the patient is dependent on a TCP.
2. Assess, treat, and reassess pain. Sedatives may also be indicated, especially if prolonged pacing or a high mA output is necessary.
3. Obtain vital signs frequently, as indicated by the patient's condition.
4. Evaluate pacemaker function (sensing and capture) with any change in the patient's condition and any repositioning of the patient.
5. Monitor for resolution of arrhythmia by assessing the underlying rhythm; this may require turning the pacemaker off briefly. Some devices have an intermittent pacing feature that allows assessment of underlying rhythm without turning the pacemaker off completely.
6. Monitor the skin under the pacing electrodes frequently, and follow the manufacturer's instructions for the length of time pacing electrode pads should be used.
   Rationale: Prolonged TCP or high mA levels may be uncomfortable for the patient and may result in either irritation under the pacing pads or even minor burns.

7. EXPECTED OUTCOMES

- Adequate tissue perfusion as indicated by hemodynamic stability (normal blood pressure, normal mental status, absence of signs of shock or heart failure, and freedom from ischemic chest pain)

8. UNEXPECTED OUTCOMES

- Failure to capture
- Undersensing or failure to sense
- Oversensing
- Loss of the ECG monitoring, causing the pacing device to default to asynchronous mode and potentially lethal arrhythmias
- Patient discomfort, irritation under the pacing pads, or minor burns

9. DOCUMENTATION

- Signs, symptoms, and underlying rhythm necessitating the use of TCP
- Time at which the TCP was initiated, pacemaker settings (rate, mA setting), the electrical capture with a rhythm strip, and vital signs
- Evidence of mechanical capture
- Patient's comfort level and interventions needed to reduce discomfort
- Skin integrity at onset of procedure and when pacing electrodes are changed and per the organization's practice
- Unexpected outcomes and related nursing interventions
- Patient and family education
- The placement of pacing electrode pads on a child does not differ from an adult.[2] The pacing electrode pads should not touch; use of the smaller pacing electrode pads or an anteroposterior position may be necessary to ensure that this does not occur in infants and small children.
- Children are at a higher risk for skin breakdown when undergoing TCP for longer than 30 minutes. In neonates and infants, the area under the pads should be inspected regularly for signs of thermal damage to the skin.

10. NURSING EDUCATION UNIT MEMBERS

- ARIEL AGUSTIN, BSN, RN- Nurse Manager
- RONALD MARTIN CARCILLAR, BSN, RN, MANc
- DIOVEL BRYAN GANAC, BSN, RN
- CHARMAINE T. CO, BSN, RN, MAN
- JERELYN JEAN DONGALLO, BSN, RN, MAN
- ROVIN B. RAMIREZ, BSN, RN, MANc

11. REFERENCES

1. Bessman, E.S. (2014). Chapter 15: Emergency cardiac pacing. In J.R. Roberts and others (Eds.), *Roberts & Hedges' clinical procedures in emergency medicine* (6th ed., pp. 277-297). Philadelphia: Saunders.
2. de Caen, A.R. and others. (2015). Part 12: Pediatric advanced life support: 2015 American Heart Association guidelines update for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation, 132*(18 Suppl.

2), S526-S542. doi:10.1161/CIR.0000000000000266 Retrieved July 25, 2016, from http://circ.ahajournals.org/content/132/18_suppl_2/S526.full (Level VII)
3. Lavonas, E.J. and others. (2015). Part 10: Special circumstances of resuscitation: 2015 American Heart Association guidelines update for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation, 132*(18 Suppl. 2), S501-S518. doi:10.1161/CIR.0000000000000264 Retrieved July 25, 2016, from http://circ.ahajournals.org/content/132/18_suppl_2/S501.full (Level VII)
4. Link, M.S. and others. (2015). Part 7: Adult advanced cardiovascular life support: 2015 American Heart Association guidelines update for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation, 132*(18 Suppl. 2), S444-S464. doi:10.1161/CIR.0000000000000261 Retrieved July 25, 2016, from http://circ.ahajournals.org/content/132/18_suppl_2/S444.full (Level VII)
5. O'Gara, P.T. and others. (2013). 2013 ACCF/AHA guideline for the management of ST-elevation myocardial infarction: A report of the American College of Cardiology Foundation/American Heart Association task force on practice guidelines. *Journal of the American College of Cardiology, 61*(4), e78-e140. doi:10.1016/j.jacc.2012.11.019 (Level VII)
6. Ortman, M., Russo, A.M. (2014). Chapter 5: Cardiac pacing. In J.E. Parrillo, R.P. Dellinger (Eds.), *Critical care medicine: Principles of diagnosis and management in the adult* (4th ed., pp. 59-81). Philadelphia: Saunders.
7. Phillips Medical. (2013). Non-invasive transcutaneous pacing. Andover, MA: Phillips Medical. Retrieved August 8, 2016, from http://incenter.medical.philips.com/doclib/enc/fetch/2000/4504/577242/577243/577245/577817/577869/Non-Invasive_Transcutaneous_Pacing.pdf%3fnodeid%3d8615795%26vernum%3d-2
8. Samii, S.M. (2015). Indications for pacemakers, implantable cardiovertor-defibrillator and cardiac resynchronization devices. *Medical Clinics of North America, 99*(4), 795-804. doi:10.1016/j.mcna.2015.02.008
9. Zoll Medical. (2010). *Zoll M series operator's guide.* Chelmsford, MA: Zoll Medical. (classic reference)*

*In these skills, a "classic" reference is a widely cited, standard work of established excellence that significantly affects current practice and may also represent the foundational research for practice.

NURSING EDUCATION UNIT

COMPETENCY-BASED CHECK OFF TOOL

Title:	**TRANSCUTANEOUS PACING**
Competency Statement:	**The nurse demonstrates acceptable level of competence in the performance in TCP.**
Standards:	**1. Infection Control and Patient Safety Compliance** **2. Equipment Preparation and Manipulation** **3. Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

7. Provide all the information needed in this check off tool.
8. Use the scale below by ENCIRCLING your most appropriate response
   4= Very Good (Performs competently without assistance and supervision)
   3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
   2= Poor (Performs inconsistently/incompletely with assistance and supervision)
   1= Very Poor (Cannot perform even with directions; procedural step omitted)
9. Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
10. Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
11. Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
12. Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1
5	Educates patient and family / caregiver (where appropriate).	4	3	2	1
Psychomotor Skills					

1	Performed hand hygiene before patient contact and donned gloves if needed.	4	3	2	1
2	If time permitted, verified the correct patient using two identifiers.	4	3	2	1
3	Obtained baseline vital signs, including oxygen saturation.	4	3	2	1
4	Assessed the patient for the presence of AMI, heart failure, pulmonary edema.	4	3	2	1
5	Assessed for signs and symptoms of hemodynamic instability.	4	3	2	1
6	Connected the patient to a cardiac monitor.	4	3	2	1
7	Obtained a standard 12-lead ECG if the patient's condition permitted.	4	3	2	1
8	Established IV access.	4	3	2	1
9	Clipped excessive chest hair, if time allowed.	4	3	2	1
10	Removed gloves (if donned) and performed hand hygiene.	4	3	2	1
11	Administered prescribed medications before initiating TCP. If pharmacologic therapy was unsuccessful, initiated TCP. Simultaneously sought and treated underlying causes of bradycardia.	4	3	2	1
12	Administered prescribed medications before initiating TCP. If pharmacologic therapy was unsuccessful, initiated TCP. Simultaneously sought and treated underlying causes of bradycardia.	4	3	2	1
13	Attached the multifunction or pacing electrode pads in an anterior-anterior or anteroposterior position.	4	3	2	1
14	Rolled the pacing electrode pads onto the skin. Pressed firmly on the adhesive area around the periphery and gently on the gelled area to remove any trapped air. If a female patient had large breasts, placed the apex pacing electrode under the left breast.	4	3	2	1
15	Ensured that the ECG cable was connected to the pacemaker and the ECG electrodes were placed on the patient.	4	3	2	1
16	Selected the pacing mode (*demand* or *asynchronous*).	4	3	2	1
17	Set the pacing rate per the organization's practice or the practitioner's order	4	3	2	1
18	Set the output in mA to zero and turned on the pacemaker. Turned the output up until electrical capture was noted and noted the threshold.	4	3	2	1
19	Set the output slightly higher than the threshold.	4	3	2	1
20	Assessed the patient for mechanical capture by palpating a femoral pulse or observing cardiac motion using a bedside ultrasound.	4	3	2	1
21	If distortion occurred, changed the lead to see if another lead decreased the distortion.	4	3	2	1
22	Assessed the patient's comfort level and administered analgesics, sedatives, or both, as prescribed.	4	3	2	1
23	Prepared for the insertion of a transvenous pacemaker or prepared to transfer the patient to the unit where a pacemaker would be inserted.	4	3	2	1
24	Provided continuous cardiac monitoring.	4	3	2	1
25	Assessed, treated, and reassessed pain. Administered sedatives as prescribed	4	3	2	1
26	Obtained vital signs frequently, as indicated by the patient's condition.	4	3	2	1
27	Evaluated pacemaker function with any change in the patient's condition and any repositioning of the patient.	4	3	2	1
28	Monitored for resolution of arrhythmia by assessing the underlying rhythm, turning the pacemaker off briefly as needed unless the device	4	3	2	1

	had an intermittent pacing feature that allowed assessment of underlying rhythm without turning the pacemaker off completely.				
29	Monitored the skin under the pacing electrodes frequently, and followed the manufacturer's instructions for the length of time pacing electrode pads should be used.	4	3	2	1
30	Discarded supplies and performed hand hygiene.	4	3	2	1
31	Documented the procedure in the patient's record.	4	3	2	1
Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1
Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse's Comments/Recommendations for Improvement:

Originating Department	Nursing Education Unit	Module No.	1-2017
Title	SYNCHRONIZED CARDIOVERSION		
Author/s	Ronald Martin Carcillar-CRN-ICU		
Original Date	October, 2017	Revision Date	

1. ALERT

Do not perform cardioversion as the first-line treatment of stable atrial fibrillation and atrial flutter in a patient with onset of the arrhythmia more than 48 hours prior because there is a risk of embolization of a mural thrombus.

Activate the synchronized mode on the defibrillator during cardioversion to prevent inadvertent delivery of a shock in the relative refractory period (during the T wave). Delivering a shock during the relative refractory period may cause the patient to go into ventricular fibrillation.

There are times when the defibrillator used for cardioversion is unable to synchronize because of very rapid heart rates or unusual electrical activity. In these cases, deliver unsynchronized shocks (i.e., defibrillation).

2. OVERVIEW

Synchronized cardioversion is also known as *cardioversion*, *direct-current synchronized shock*, and *electrical synchronized shock therapy*. The goal of synchronized cardioversion is to deliver an electrical shock during the QRS complex (the absolute refractory period) and avoid the relative refractory period, with a goal of converting tachyarrhythmias to more stable rhythms.[5]

Cardioversion is performed using a defibrillator; some defibrillators deliver monophasic waveforms, whereas others deliver biphasic waveforms. Knowing which type of waveform the equipment delivers is important because the recommended joules (J) for cardioversion are different for monophasic and biphasic waveforms.

The American Heart Association (AHA) recommends emergent synchronized cardioversion for the following conditions:[5]

- Unstable supraventricular tachycardia
- Unstable atrial fibrillation
- Unstable atrial flutter
- Unstable monomorphic (regular) ventricular tachycardia

“Unstable” is defined as one or more of the following: acute altered mental status, ischemic chest discomfort, acute heart failure, hypotension, or other signs of shock that are likely to be secondary to the tachyarrhythmia.

If the patient is stable, a 12-lead electrocardiogram (ECG), oxygen therapy, expert consultation, and pharmacologic therapy should be considered before synchronized cardioversion. For patients with atrial fibrillation of greater than 48 hours duration, treatment options include rate control with medication, consultation with the patient’s primary care practitioner, or delayed cardioversion after anticoagulation therapy and performance of transesophageal echocardiography to ensure the absence of a left atrial thrombus.[5]

If the patient's heart rate is less than 150 bpm and a regular rhythm,[5] he or she probably has an underlying noncardiac condition, such as sepsis or fever, that is unlikely to respond to synchronized cardioversion. Treatment should instead focus on correcting the causative condition.[5]

3. SUPPLIES

- Gloves (if needed)
- Defibrillator with synchronization capability
- Paddles or multifunction or defibrillation electrode pads with a multifunction or defibrillation cable
- Defibrillation gel (for use with paddles)
- ECG electrodes and cable
- Strip chart recorder and paper
- Supplies and equipment for resuscitation (i.e., a crash cart)
- Pulse oximeter
- Sedatives or analgesics as prescribed and reversal agents (as appropriate)

4. PATIENT AND FAMILY EDUCATION

- Explain the procedure as the delivery of a small electrical impulse to the heart. Advise the patient that multiple attempts may be necessary.
- Inform the patient that this procedure is performed while he or she is awake (unless general anesthesia is used), but that in most cases, sedation with medication produces a relaxed and drowsy state.
- Explain that some patients report a brief, very sharp pain but that the sedative usually results in amnesia for the procedure and the pain.
- Explain that after the procedure, there may be redness of the skin and minimal soreness of the chest wall.
- Instruct the patient who is discharged from the emergency department to seek emergency care promptly if he or she experiences chest pain, shortness of breath, lower-extremity swelling, dizziness, weakness, or changes in vision or speech.
- Encourage questions and answer them as they arise.

5. ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene before patient contact and don gloves if needed.
2. If time permits, verify the correct patient using two identifiers.
3. Assess the patient's history for the following conditions:
    a. Acute myocardial ischemia or infarction
    b. Heart failure
    c. Pulmonary edema
    d. Tachyarrhythmia
4. Assess for signs and symptoms of hemodynamic instability.
    a. Dizziness
    b. Exertional symptoms
    c. Weakness

d. Hypotension
e. Abnormal heart rate (tachycardia or bradycardia)

Preparation

Synchronized cardioversion must be performed immediately in a life-threatening situation. Comply with Universal Protocol only if it does not delay the procedure.

1. If the patient's condition permits, perform the following steps:
   a. Comply with Universal Protocol: Use a standardized list to verify that all required items, including informed consent, are available.
   b. Obtain a standard 12-lead ECG. If this is not possible, obtain a hard-copy rhythm strip.
   c. Establish IV access.
   d. If the patient is stable, obtain electrolyte levels (including potassium and magnesium), and correct electrolyte imbalances before performing synchronized cardioversion.[8]
      Be sure to correct hypokalemia, which may predispose the patient to postshock arrhythmias such as ventricular fibrillation.[6]
   e. Obtain a digoxin level. If possible, digoxin should be withheld on the day of treatment with synchronized cardioversion.
      Ensure that the patient does not have digoxin toxicity, which may cause transient arrhythmias after cardioversion.
   f. Allow the patient access to the bathroom to empty his or her bladder.
   g. Remove dentures to prevent them from obstructing the patient's airway.
2. Remove the patient from any wet or metallic surfaces.
   Prevent burns and inappropriate transmission of current by keeping the patient away from wet or metallic surfaces, which are excellent conductors of electrical current.[5]
3. Remove any transdermal medication ointment or patches, which may block electricity and may cause skin burns.
4. Remove any dirt or debris from the skin with soap and water.
   Rationale: Removing skin oils and lotion with soap and water, and then drying the skin completely, improves electrode adherence and maximizes delivery of pacing energy through the chest wall.
5. Clip (rather than shave) excessive chest hair, if time allows.
   Rationale: The use of clippers or scissors rather than shaving prevents microscopic skin tears that may lead to infection.
6. Preoxygenate the patient if indicated.
   Rationale: Preoxygenation decreases the risk of cardiac instability.
7. Premedicate with sedative and analgesic medications as prescribed.
   Rationale: Cardioversion may be painful and terrifying for patients. Sedation increases comfort, decreases anxiety, and may produce amnesia for the event.
8. Reassess the patient's sedation level and pain status, allowing for sufficient onset of action per medication, route, and the patient's condition.
9. Continuously monitor hemodynamic status.
   Rationale: Sudden deterioration of the patient's condition may warrant rapid synchronized cardioversion or an unsynchronized shock if the patient becomes pulseless and converts to ventricular fibrillation or ventricular tachycardia.
10. Remove gloves (if donned) and perform hand hygiene.

Rationale: Gloves are not needed for synchronized cardioversion and also may stick to electrode pads.

6. PROCEDURE

1. Perform hand hygiene.
2. If time permits, verify the correct patient using two identifiers.
3. If time permits, comply with Universal Protocol: Perform a time-out to verify correct patient, correct site, and correct procedure.
4. Turn on the cardioversion-defibrillation function of the defibrillator.
5. Attach the monitor leads and confirm the patient's rhythm is displayed properly.
6. Depress the SYNC button to activate the synchronized ("sync") mode.
   Note whether the defibrillator can be set so that it reverts to sync mode after each attempt, or whether it needs to be reset each time to deliver a subsequent synchronized shock.
7. Look for markers on the QRS complex indicating that the defibrillator is in sync mode.
8. Adjust the R wave gain on the monitor to ensure that synchronization markers occur on each QRS complex.
   Rationale: Ensuring that synchronization markers occur on each QRS complex avoids a delay or failure to deliver the shock in sync mode and prevents delivery of the shock during the relative refractory period. Delivery of the shock during the relative refractory period may result in ventricular tachycardia or fibrillation, especially if the current is delivered while superimposed on a T wave.
9. Place the multifunction or defibrillation electrode pads or paddles in an anterior-anterior (sternum-apex), anteroposterior, or alternate position as directed. For atrial arrhythmias, if indicated, consider applying firm pressure to the defibrillation electrodes with paddles that have been disconnected from the defibrillator.
   a. *Anterior-anterior (sternum-apex) position*. Place the anterior defibrillation electrode to the right of the upper third of the sternum, below the clavicle; place the apex defibrillation electrode to the left of the nipple line below the axilla.
   b. *Anteroposterior position*. Place the anterior defibrillation electrode over the precordium, and place the posterior defibrillation electrode behind the heart at the left scapular line, at the inferior angle of the scapula.
   c. *Modified paddle or defibrillation electrode placement:* If the maximum recommended energy level is delivered and fails to convert the rhythm, change the paddle or defibrillation electrode placement to alternative sites (anteroposterior or axillary-axillary).
      For atrial arrhythmias, a cardiologist may prefer alternate electrode or paddle locations; place defibrillation electrodes or paddles as directed.
      Do not place the defibrillation electrode pads or paddles over wires, drains, dressings, ECG electrodes, or medication patches.
      If a patient has either an internal cardiac defibrillator (ICD) or an implanted pacemaker, ensure that the electrodes are placed a minimum of 8 cm (3 in) from the implanted device.

d. Defibrillation electrode pads
   Rationale: Defibrillation electrode pads provide hands-free delivery of electrical energy.
   i. Roll the defibrillation electrode pads onto the skin.
   ii. Press firmly on the adhesive area around the periphery and gently on the gelled area to remove any trapped air.
   Rationale: Good adhesion and proper placement of the defibrillation electrode pads improves electrical conduction.
   iii. If a female patient has large breasts, place the defibrillation electrode over the apex of the heart, under the left breast.
e. Paddles
   i. Apply a conductive gel to them and rub the paddles together to spread the gel over the surfaces of both paddles.
   Rationale: Burns may occur if there is insufficient or excessive conductive medium.
   ii. Make sure the paddles are placed correctly, ensuring that no path of gel lies between the paddles.
   Rationale: A path of gel or incomplete paddle contact may cause an energy arc to occur.
   iii. Press firmly to ensure full contact between the paddle and the chest wall.
   Rationale: Maximal contact between the chest wall and the paddle decreases transthoracic impedance. Proper pressure applied to the paddles and proper positioning decrease the risk of burns.
   iv. If a female patient has large breasts, place the paddle at the apex of the heart, under the left breast.

10. Select the energy level based on the type of rhythm and whether the defibrillator delivers a monophasic or biphasic waveform. Initial recommended doses are as follows:[5]
    a. Narrow and regular QRS complexes: 50 to 100 J
    b. Narrow but irregular QRS complexes: 120 to 200 J for biphasic waveform, or 200 J for monophasic waveform
    c. Wide and regular QRS complexes: 100 J
    d. Wide but irregular QRS complexes: Requires defibrillation (nonsynchronized)
11. Perform the following steps immediately before delivering the shock:
    a. Charge the defibrillator and state “Clear” loudly.
    b. Visually confirm that no personnel have direct or indirect contact with the patient.
    Rationale: Bystanders in contact with the patient during cardioversion may receive a mild shock or burns.
    c. If oxygen from a face mask or bag mask is blowing directly on the patient’s chest, remove the oxygen device from this area.
    d. Check the cardiac monitor one last time to verify that the patient is still experiencing tachyarrhythmia and that the defibrillator is in sync mode (as evidenced by synchronization marks on each R wave).
12. Deliver a shock by depressing the discharge button until the energy is delivered; this may take several milliseconds as the defibrillator seeks the next R wave. When using paddles, depress both of the discharge buttons simultaneously and hold them down until discharge occurs.

Look at the patient when depressing the discharge button(s) to ensure that no one is touching him or her.

13. Reassess the patient and check the rhythm after every shock.
    a. If the tachyarrhythmia persists, increase the energy level in a stepwise manner and deliver another shock.
    Check that sync mode is active after each attempt.
    b. If ventricular fibrillation results, immediately deliver an unsynchronized shock at 360 J or a clinically equivalent biphasic shock (120 to 200 J).[5] Be sure that sync mode is turned off or there may be a delay in delivering the defibrillation shock.
14. Discard supplies and perform hand hygiene.
15. Document the procedure in the patient's record.

7. MONITORING AND CARE

1. If synchronized cardioversion is successful, perform the following tasks:
    a. Record the vital signs.
    b. Obtain a hard copy of the postshock rhythm.
    c. Repeat the 12-lead ECG.
2. Continue to monitor vital signs, cardiac rhythm, and neurologic and pulmonary status hourly or more frequently, as indicated by the patient's condition or per the organization's practice, until the patient is admitted or discharged home.
   Rationale: Transient hypotension may occur after synchronized cardioversion.
3. If the patient has an implanted pacemaker or ICD, facilitate interrogation of the device after the cardioversion.
   Rationale: Interrogation of the device after cardioversion verifies the functionality of the pacemaker or ICD.
4. Assess, treat, and reassess pain.

8. EXPECTED OUTCOMES

- Restoration of an organized electrical waveform generated by the sinoatrial node
- Adequate perfusion as indicated by normal mental status, absence of shortness of breath, absence of chest pain, resolution of dizziness, and signs of adequate tissue perfusion
- Possible outcomes experienced by some patients:
    - Muscle soreness
    - Transient elevations in creatine phosphokinase (CPK) and lactate dehydrogenase (more specific cardiac markers, such as creatine phosphokinase-MB [CPK-MB] and troponin, are rarely abnormal)
    - Transient ST-segment elevation
    - Continued arrhythmias

9. UNEXPECTED OUTCOMES

- Inappropriate sensing of the QRS complex, resulting in improper timing of the discharge of current
- Burns from insufficient or excessive conductive medium or multiple shocks
- Pulmonary embolus (rare)
- Embolic cerebrovascular event

- Transient hypotension
- Inadvertent injuries to bystanders

10. DOCUMENTATION

- Vital signs
- Either an ECG or a rhythm strip, or both before and after each synchronized cardioversion attempt
- Time and amount of energy used for each cardioversion attempt, and the patient's response
- Neurologic and pulmonary status hourly or more frequently, as indicated by the patient's condition or the organization's practice, until the patient is admitted or discharged home
- Condition of the skin on the chest wall before and after cardioversion
- Time-out procedure, including verification of correct patient, correct procedure, and correct site (if performed)
- Patient and family education
- Unexpected outcomes and related nursing interventions
- If using hard paddles for a child, enough pressure should be applied to the paddles to ensure complete contact with the chest wall.
- Neonates and children may be propped on their side so that an anteroposterior paddle placement can be used.

10. NURSING EDUCATION UNIT MEMBERS

- ARIEL AGUSTIN, BSN, RN- Nurse Manager
- RONALD MARTIN CARCILLAR, BSN, RN, MANc
- DIOVEL BRYAN GANAC, BSN, RN
- CHARMAINE T. CO, BSN, RN, MAN
- JERELYN JEAN DONGALLO, BSN, RN, MAN
- ROVIN B. RAMIREZ, BSN, RN, MANc

11. REFERENCES

1. Beinart, S.C. (2014). Synchronized electrical cardioversion. Retrieved July 25, 2016, from http://emedicine.medscape.com/article/1834044-overview
2. Camm, A.J. and others. (2012). 2012 focused update of the ESC Guidelines for the management of atrial fibrillation: An update of the 2010 ESC Guidelines for the management of atrial fibrillation. Developed with the special contribution of the European Heart Rhythm Association. *Europace, 14*(10), 1385-1413. doi:10.1093/europace/eus305 (Level VII)
3. de Caen, A.R. and others. (2015). Part 12: Pediatric advanced life support: 2015 American Heart Association guidelines update for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation, 132*(18 Suppl. 2), S526-S542. doi:10.1161/CIR.0000000000000266 Retrieved July 25, 2016, from http://circ.ahajournals.org/content/132/18_suppl_2/S526.full (Level VII)
4. Escudero, C., Carr, R., Sanatani, S. (2013). Overview of antiarrhythmic drug therapy for supraventricular tachycardia in children. *Progress in Pediatric Cardiology, 35*(1), 55-63. doi:10.1016/j.ppedcard.2012.11.008

5. Link, M.S. and others. (2015). Part 7: Adult advanced cardiovascular life support: 2015 American Heart Association guidelines update for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation, 132*(18 Suppl. 2), S444-S464. doi:10.1161/CIR.0000000000000261 Retrieved July 25, 2016, from http://circ.ahajournals.org/content/132/18_suppl_2/S444.full (Level VII)
6. Maruyama, M. and others. (2014). Hypokalemia promotes late phase 3 early after depolarization and recurrent ventricular fibrillation during isoproterenol infusion in Langendorff-perfused rabbit ventricles. *Heart Rhythm, 11*(4), 697-706. doi:10.1016/j.hrthm.2013.12.032
7. Mick, N.W. (2013). Chapter 19: Pediatric cardiac disorders. In J.G. Adams (Ed.), *Emergency medicine: Clinical essentials* (2nd ed., pp. 159-166). Philadelphia: Saunders.
8. Minczak, B.M. (2014). Chapter 12: Defibrillation and cardioversion. In J.R. Roberts and others (Eds.), *Roberts & Hedges' clinical procedures in emergency medicine* (6th ed., pp. 228-247). Philadelphia: Saunders.
9. Samii, S.M. (2015). Indications for pacemakers, implantable cariodvertor-defibrillator and cardiac resynchronization devices. *Medical Clinics of North America, 99*(4), 795-804. doi:10.1016/j.mcna.2015.02.008
10. Verdino, R.J. and others. (2001). Successful external cardioversion of atrial fibrillation in patients referred to an electrophysiologist for internal cardioversion. *Clinical Cardiology, 24*(7), 500-502. doi:10.1002/clc.4960240716 (classic reference)* (Level VI)
11. Vetter, V.L. (2014). Arrhythmias in pediatric population. In D.P. Zipes, J. Jalife (Eds.), *Cardiac electrophysiology: From cell to bedside* (6th ed., pp. 1073-1086). Philadelphia: Saunders.
12. Zoll Medical. (2010). *Zoll M series operator's guide*. Chelmsford, MA: Zoll Medical. (classic reference)*

*In these skills, a "classic" reference is a widely cited, standard work of established excellence that significantly affects current practice and may also represent the foundational research for practice.

NURSING EDUCATION UNIT
COMPETENCY-BASED CHECK OFF TOOL

Title:	**SYNCHRONIZED CARDIOVERSION**
Competency Statement:	**The nurse demonstrates acceptable level of competence in the performance of CARDIOVERTING A PATIENT.**
Standards:	• **Infection Control and Patient Safety Compliance** • **Equipment Preparation and Manipulation** • **Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

13. Provide all the information needed in this check off tool.
14. Use the scale below by ENCIRCLING your most appropriate response
    4= Very Good (Performs competently without assistance and supervision)
    3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
    2= Poor (Performs inconsistently/incompletely with assistance and supervision)
    1= Very Poor (Cannot perform even with directions; procedural step omitted)
15. Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
16. Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
17. Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
18. Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1
5	Educates patient and family / caregiver (where appropriate).	4	3	2	1
Psychomotor Skills					
1	Performed hand hygiene before patient contact and donned gloves if needed.	4	3	2	1

2	If time permitted, verified the correct patient using two identifiers.	4	3	2	1
3	Assessed the patient's history for acute myocardial ischemia or infarction, heart failure, pulmonary edema, and tachyarrhythmia.	4	3	2	1
4	Assessed for signs and symptoms of hemodynamic instability.	4	3	2	1
5	If the patient's condition permitted, performed the following steps: a. Complied with Universal Protocol: Used a standardized list to verify that all required items, including informed consent, were available. b. Obtained a standard 12-lead ECG or a hard-copy rhythm strip. c. Established IV access. d. If the patient was stable, obtained electrolyte levels and corrected electrolyte imbalances. e. Obtained a digoxin level. f. Allowed the patient to use the bathroom. g. Removed dentures.	4	3	2	1
6	Removed the patient from any wet or metallic surfaces.	4	3	2	1
7	Removed any transdermal medication ointment or patches.	4	3	2	1
8	Removed any dirt or debris from the skin with soap and water.	4	3	2	1
9	Clipped excessive chest hair, if time allowed.	4	3	2	1
10	Preoxygenated the patient if indicated.	4	3	2	1
11	Premedicated with sedative and analgesic medications as prescribed.	4	3	2	1
12	Reassessed the patient's sedation level and pain status, allowing for sufficient onset of action per medication, route, and the patient's condition.				
13	Continuously monitored hemodynamic status.	4	3	2	1
14	Removed gloves (if donned) and performed hand hygiene.	4	3	2	1
15	If time permitted, complied with Universal Protocol: Performed a time-out to verify correct patient, correct site, and correct procedure.	4	3	2	1
16	Turned on the cardioversion-defibrillation function of the defibrillator.	4	3	2	1
17	Attached the monitor leads and confirmed the patient's rhythm was displayed properly.	4	3	2	1
18	Depressed the SYNC button to activate the synchronized ("sync") mode	4	3	2	1
19	Looked for markers on the QRS complex indicating that the defibrillator was in sync mode.	4	3	2	1
20	Adjusted the R wave gain on the monitor to ensure that synchronization markers occurred on each QRS complex.	4	3	2	1
21	Positioned the defibrillation electrode pads or paddles on the patient as directed.	4	3	2	1
22	Placed defibrillation electrode pads or paddles as follows: a. Self-adhesive, defibrillation electrode pads i. Rolled the defibrillation electrode pads onto the skin. ii. Pressed firmly on the adhesive area around the periphery and gently on the gelled area to remove any trapped air. iii. If a female patient had large breasts, placed the defibrillation electrode at the apex of the heart, under the left breast. b. Paddles i. Applied a conductive gel to them and rubbed the paddles together to spread the gel over the surfaces of both paddles. ii. Made sure the paddles were placed correctly, ensuring that no path of gel lay between the paddles.	4	3	2	1

	iii. Pressed firmly to ensure full contact between the paddle and the chest wall. iv. If a female patient had large breasts, placed the paddle at the apex of the heart, under the left breast.				
23	Selected the energy level based on the type of rhythm and whether the defibrillator delivers a monophasic or biphasic waveform. Used the appropriate initial dose.	4	3	2	1
24	Performed the following steps immediately before delivering the shock: a. Charged the defibrillator and stated “Clear” loudly. b. Visually confirmed that no personnel had direct or indirect contact with the patient. c. If oxygen from a face mask or bag mask was blowing directly on the patient’s chest, removed the oxygen device from this area. d. Checked the cardiac monitor one last time to verify that the patient was still experiencing tachyarrhythmia and that the defibrillator was in sync mode.	4	3	2	1
25	Delivered a shock by depressing the discharge button until the energy was delivered. When using paddles, depressed both of the discharge buttons simultaneously and held them down until discharge occurred.	4	3	2	1
26	Reassessed the patient and checked the rhythm after every shock. a. If the tachyarrhythmia persisted, increased the energy level in a stepwise manner and delivered another shock. b. If ventricular fibrillation resulted, immediately delivered an unsynchronized shock at 360 J or a clinically equivalent biphasic shock (120 to 200 J). Ensured that sync mode was turned off.	4	3	2	1
27	If synchronized cardioversion was successful, recorded the vital signs, obtained a hard copy of the postshock rhythm, and repeated the 12-lead ECG.	4	3	2	1
28	Continued to monitor vital signs, cardiac rhythm, and neurologic and pulmonary status hourly or more frequently, as indicated by the patient’s condition or per the organization’s practice, until the patient was admitted or discharged home.	4	3	2	1
29	If the patient had an implanted pacemaker or ICD, facilitated interrogation of the device after the cardioversion.	4	3	2	1
30	Assessed, treated, and reassessed pain.	4	3	2	1
31	Discarded supplies and performed hand hygiene.	4	3	2	1
32	Documented the procedure in the patient’s record.	4	3	2	1
Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1
Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse’s Comments/Recommendations for Improvement:

Originating Department	Nursing Education Unit	Module No.	1-2017
Title	URINARY CATHETERIZATION-FEMALE STRAIGHT AND INDWELLING SPECIMEN COLLECTION		
Author/s	Ronald Martin Carcillar-CRN-ICU		
Original Date	October, 2017	Revision Date	

1. ALERT

Using the smallest size catheter possible minimizes trauma to the urethra, promotes adequate drainage, and decreases the risk of infection.

If contamination or a break in sterile technique occurs before or during catheter insertion, restart the procedure with a new catheter.

Indwelling urinary catheters are not recommended for extended use; discontinue use after surgery or when no longer needed.

Remember to route tubes and catheters having different purposes in different, standardized directions (e.g., IV lines routed toward the head; enteric lines toward the feet). This is especially important in neonates.

2. OVERVIEW

Urinary catheters are flexible tubes inserted into the urinary bladder. For female patients, they include straight and indwelling catheters . A catheter is inserted to obtain specimens for specific laboratory tests, relieve bladder distention, or infuse substances into the bladder.

A *straight*, or intermittent catheter, is a single-lumen catheter inserted into the bladder through the urethra to empty the bladder, or in some cases, to instill medication—and is then removed. This type of catheter is used on either a one-time basis (e.g., to determine the amount of residual urine in the bladder) or intermittently, when the patient cannot urinate because of a urinary obstruction or a neurologic disorder, such as a spinal cord injury. Patients can learn how to insert straight catheters using clean insertion technique in the home setting. In an acute-care setting, sterile technique is required for insertion of urinary catheters to help minimize the risk of hospital-associated infections.

Patients who require self-catheterization may use a *hydrophilic catheter*, a single catheter prepackaged in a sterile saline solution that serves as a lubricant. Also, self-contained systems, which consist of a catheter prepackaged in sterile saline with a preconnected drainage bag, are available. Intermittent catheterization is becoming the gold standard for the management of bladder-emptying dysfunctions and management after surgical interventions. One advantage of intermittent catheterization is a lower risk of catheter-associated urinary tract infections.

An *indwelling* catheter (also referred to as a Foley catheter) is inserted via the urethra and has a sterile preassembled closed drainage system that acts as a reservoir for urine drained from the bladder. An indwelling catheter has a separate

lumen to inflate a balloon that holds the catheter in the bladder for short- or long-term use. Closed drainage systems and preassembled drainage systems may help reduce the incidence of catheter-associated urinary tract infections. Examples of appropriate indications for an indwelling catheter include

- Acute urinary retention or bladder outlet obstruction
- Accurate measurements of urinary output in critically ill patients
- Perioperative use for selected surgical procedures
    - Urologic surgery or other surgery on contiguous structures of the genitourinary tract
    - Anticipated prolonged duration of surgery (catheter should be removed in the post-anesthesia care unit.)
    - Anticipation of large-volume infusions or diuretics during surgery
    - Need for intraoperative monitoring of urinary output
- Healing of open sacral or perineal wounds in incontinent patients
- Prolonged immobilization (e.g., potentially unstable thoracic or lumbar spine, multiple traumatic injuries such as pelvic fractures)
- Improved comfort for end of life care

3. SUPPLIES

- Additional lighting as needed (e.g., flashlight or procedure light)
- Bath blanket or sheet
- Bladder scanner (if available)
- Catheter kit containing the following sterile items:
    - Antiseptic cleansing agent (e.g., povidone-iodine)
    - Appropriate sterile specimen container
    - Cotton balls or sterile antiseptic swabs
    - Forceps or tweezers
    - Lubricant
    - Prefilled syringe with sterile water (to inflate balloon of indwelling catheter only)
    - Proper-size urinary catheter with preassembled drainage system
    - Sterile gloves (extra pair optional)
    - Sterile urine collection system
    - Waterproof drapes (including one that is fenestrated [has an opening in the center of drape])
- Sterile gloves (optional, extra pair)
- Gloves, basin with warm water, soap, washcloth, and towel for perineal care
- Catheter securement device
- Waterproof absorbent pad
- Towels

4. PATIENT AND FAMILY EDUCATION

- Explain the procedure and equipment to the patient and family. Include the reason for catheter placement, the anatomy of the genitourinary tract, and the steps of catheter insertion.
- Explain to the patient and family how the patient can participate during the procedure.

- Explain to the patient that burning or pressure sensations during catheter insertion are normal.
- Teach the patient how to position the catheter tubing while in bed.
  - When the patient is in the side-lying position facing the drainage system, the tubing should drape over the thigh.
  - When the patient is in the side-lying position facing away from the drainage system, the tubing should extend between the legs.
- Explain care of the catheter and drainage system. Adequate fluid intake is necessary to keep the urine diluted and to prevent catheter encrustations and subsequent blockage.
- Teach the patient and family techniques to minimize catheter-associated urinary tract infections, such as performing proper hand hygiene and keeping the urinary drainage bag below the level of the bladder.
- Encourage questions and answer them as they arise.

5. ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene before patient contact.
2. Verify the correct patient using two identifiers.
3. Review the patient's record for any pathologic condition that may impair passage of the catheter (e.g., surgical history, genitourinary tract abnormalities).
4. Assess the patient's clinical status.
   a. Time of last urination
   b. Intake and output (I&O)
   c. Level of awareness or developmental stage
   d. Mobility and physical limitations
   e. Age
   f. Allergies (specifically to latex or povidone-iodine)
5. Assess the patient's bladder for fullness (a distended bladder is palpable above the symphysis pubis) or use a bladder scanner.
6. Perform hand hygiene and don gloves.
7. Assess the perineal anatomic landmarks and evaluate the region for erythema, drainage, and odor.
8. Remove gloves and perform hand hygiene.

Preparation

1. Arrange for extra health care personnel to assist as necessary.
   Rationale: Obtain assistance to position and support obese, weak, frail, or confused patients.

6. PROCEDURE

Catheter Insertion

1. Perform hand hygiene and don gloves.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient and ensure that she agrees to treatment.
5. Raise the bed to an appropriate working height.
   Rationale: Adjusting the bed height promotes proper ergonomics.

a. Facing the patient, stand on the left side of the bed if right handed and on the right side if left handed.
b. If side rails are in use, raise the side rail on the opposite side of the bed and lower the side rail on the working side.
Rationale: Positioning side rails in this manner promotes patient safety.

6. Place a waterproof pad under the patient.
7. Position the patient.
   a. Assist the patient to a dorsal recumbent position (supine with knees flexed).
   b. Ask the patient to relax her thighs to externally rotate the hip joints.
   Rationale: Correct positioning provides a good view of perineal structures. This position is optimal because it minimizes the risk of contamination by fecal material.
   c. If the patient cannot be supine, position her in a side-lying (Sims) position with her upper leg flexed at knee and hip.
      i. Take extra precautions to cover the rectal area with a drape during the procedure to reduce the risk of cross-contamination.
      ii. Support the patient with pillows if necessary to maintain her position.
      Rationale: Pillow support provides joint protection if the patient cannot abduct her leg at the hip joint (e.g., if the patient has arthritic joints). In addition, this position is often more comfortable for the patient.
8. Cover the patient with a bath blanket or sheet. Place the blanket or sheet in a diamond-shape configuration over the patient with one corner at the patient's neck, the side corners over each arm and side, and the last corner over the perineum.
   Rationale: Draping in this manner keeps the patient's legs and lower abdomen covered when the nurse exposes the perineum.
9. Wash the perineal area with soap and water, locate the urinary meatus, and dry the area. Have an assistant hold an alternative light source to illuminate the perineum as needed.
   Rationale: Washing minimizes contamination in the area before catheter insertion. An alternative light source is helpful because seeing the urinary meatus of a female patient may be difficult because of the patient's distinct anatomy.
10. Discard used supplies, remove gloves, and perform hand hygiene.
11. Obtain an indwelling catheterization kit or intermittent catheterization kit.
    a. Open the outer wrapping of the kit by tearing the designated edge of the plastic wrap.
    b. Place the empty outer plastic wrap near the end of the bed and use it for waste disposal.
    c. Place the inner wrapped box on an easily accessible, clean bedside table or place it between the patient's legs. The patient's size and positioning dictate the exact placement.
    Rationale: Placing the catheter kit as described provides easy access to supplies and maintenance of aseptic technique during the procedure. Placement of the catheter tray between the patient's legs works best with flexible, average-size patients.

12. Open the sterile inner package containing the catheter supplies. Using sterile technique, open the top flap outward to the far side of the kit. Then open the side flaps without bringing the arms back over the sterile packaging. Open the last flap toward yourself. Note that the tray is now sitting open on its own sterile field.[1]
13. Place a waterproof sterile drape or fenestrated drape appropriately.
    a. Sterile drape
        i. If sterile gloves are packed as the first item, don them and apply the drape.
        ii. Remove the square sterile drape from the tray, touching the outer edges only. To maintain sterility, do not touch other items in the kit.
        iii. Maintain sterility of the drape and let it unfold. Fold the top edge of the drape away from the patient to form a cuff over both hands.
        iv. Have the patient lift her hips. If the patient is unable to lift her hips, have an assistant lift the patient's hips.
        v. Slide the sterile drape with the plastic (shiny) side down under the patient's buttocks.
        Rationale: The sterile drape provides a sterile field over which the nurse will work during catheterization.
    b. Fenestrated drape
        i. Don sterile gloves.
        ii. Lift the fenestrated sterile drape out of the tray. Allow it to unfold without touching a nonsterile surface.
        iii. Form a cuff from the edges to protect the sterile gloves.
        iv. Place the drape over the perineum, exposing the labia; do not touch any contaminated surface.
        Rationale: Draping in this manner creates a sterile field around the perineum.
14. Move the tray or box on the sterile field closer to the patient and organize the remaining items on the sterile field. Form a continuous sterile field with the sterile wrap under the tray or box and the drape under the patient.
    Rationale: Organizing items prevents the need to reach over the nonsterile area when manipulating the sterile catheter.
15. Prepare items for an indwelling catheter with a preassembled closed urine drainage system. (A straight catheterization kit does not contain a drainage bag.)
    Do not test the balloon unless specified by the manufacturer's instructions. Testing of the balloon is associated with an increased risk of infection.
    a. Check for a secure connection at the tubing and catheter connection site.
    b. Loosen the lid on the sterile specimen container if a urine specimen is required. Otherwise, discard the container into a waste-disposal bag.
    c. Open the package of sterile antiseptic solution and pour solution over the sterile cotton balls. If the kit contains sterile antiseptic swabs instead of solution, open the package with the "stick" ends up for access.
    d. Open the packet containing lubricant; squeeze the lubricant onto the sterile field. If the lubricant is provided in a prefilled syringe, remove the protective cap and spread the lubricant onto the sterile tray.

16. Place the catheter tip into lubricant.
    Rationale: Lubricating the catheter minimizes urethral trauma and discomfort during insertion.
17. Cleanse the urethral meatus.
    a. With the nondominant hand
        i. Fully expose the urethral meatus by spreading the labia.
        The nondominant hand is no longer considered sterile.
        ii. Have an assistant use a flashlight if unable to view the meatus with the available lighting.
        iii. Maintain the position of the nondominant hand throughout the procedure.
        Rationale: The nondominant hand provides the optimal view of the urethral meatus. Fully spreading the labia helps prevent contamination of the urethral meatus during cleansing.
        iv. If unable to view the urethra, place one finger of the gloved, nondominant hand inside the vagina and apply gentle pressure upward to support and straighten the urethra. This may open the urethral meatus, creating a better view.
        v. Locate the urethral meatus just above the finger and below the clitoris.
        vi. Ensure that the patient understands what you are doing.
    b. With the dominant hand
        i. Grasp an antiseptic-soaked cotton ball with forceps or pick up an antiseptic swab stick.
        ii. Clean the perineal area, wiping front to back from the clitoris toward the anus.
        iii. Use a new cotton ball or swab for each area cleansed.
        iv. Wipe the far labial fold first, the near labial fold next, and then directly over center of the urethral meatus.
        Rationale: The dominant gloved hand remains sterile. Cleansing follows the principles of medical asepsis and reduces the number of microorganisms at the urethral meatus, decreasing the likelihood that flora on the skin is introduced into the urethra or bladder.
        If the labia are allowed to close during cleansing, the cleaning procedure must be repeated because the area is contaminated.
18. With the sterile dominant hand, pick up the catheter. Hold the distal end of the catheter loosely coiled in the palm of the dominant hand.
    Rationale: Holding the catheter near the tip allows easier manipulation during insertion into the urethral meatus and prevents the distal end of the catheter from touching any contaminated surface.
19. Insert the indwelling or straight catheter.
    a. Ask the patient to bear down gently as if to void. Then slowly insert the catheter through the urethral meatus.
    Rationale: Relaxation of the external sphincter aids catheter insertion.
    b. Advance the catheter until urine flows through the tubing.
    c. After visual confirmation of urine return into the tubing, continue to advance the catheter.

Rationale: The female urethra is short. The appearance of urine indicates that the catheter tip is in the bladder or lower urethra. Advancing the catheter ensures that the inflation balloon is in the bladder and not the urethra.

Do not inflate the balloon until urine flow appears; early inflation may injure the urethra.

If no urine appears, the catheter may be misplaced in the vagina. If this occurs, leave the catheter temporarily in the vagina as a landmark indicating where not to insert the next catheter and insert another sterile catheter.

d. Do not force the catheter against resistance.
e. Release the labia and hold the catheter securely with the nondominant hand.
Rationale: Bladder or sphincter contraction may cause accidental catheter expulsion.

Straight Catheterization and Urine Specimen Collection

1. When the catheter is in the bladder, as indicated by the flow of urine, allow urine to drain out of the end of the catheter into the sterile urine receptacle. Do not release the catheter.
Rationale: The aim is to drain the bladder fully and to maintain the catheter in the bladder as long as necessary. Holding the catheter securely with the nondominant hand throughout the procedure prevents early removal.
2. Collect a urine specimen as needed.
   a. Fill the specimen cup with the correct amount of urine required for the ordered laboratory tests by holding the end of the catheter in the dominant hand over the cup.
   b. After collection, allow the remaining urine to flow into a container.
   c. Use a sterile container if additional urine is needed for culture analysis.
3. When urine drainage diminishes, withdraw the catheter slowly and smoothly, while gently palpating over the patient's bladder with the nonsterile (nondominant) hand.
Rationale: Palpation allows the nurse to assess the bladder for complete emptying.
4. Pour the urine from the receptacle into a graduated cylinder to obtain an accurate measurement of output.
5. In the presence of the patient, label the specimen per the organization's practice.
6. Prepare the specimen for transport.
   a. Place the labeled specimen in a biohazard bag.
   b. If the specimen requires ice for transport, place the specimen in a biohazard bag then place the bag with the specimen into a second biohazard bag filled with ice slurry.
   Rationale: Placing the specimen in a separate bag protects the label from being damaged.
7. Immediately transport the specimen to the laboratory.
Rationale: Sending the specimen immediately to the laboratory helps ensure accurate results.
8. Remove gloves and perform hand hygiene.
9. Assist the patient to a comfortable position. Lower the bed and return the side rails to the original position.

10. Discard supplies and perform hand hygiene.
11. Document the procedure in the patient's record.

Securing the Indwelling Catheter

1. Inflate the balloon of the indwelling catheter with sterile water to the volume indicated by the manufacturer's instructions.
   Do not inflate the balloon until urine flow appears; early inflation may injure the urethra.
   a. While holding the catheter with the nondominant hand at the urethral meatus, take the distal end of the catheter with the dominant hand and place the catheter between the first two fingers of the nondominant hand. Maintain a secure hold on the catheter with the nondominant hand.
      Rationale: Holding on to the catheter before inflating the balloon prevents catheter expulsion from the urethra.
   b. With the free dominant hand, connect the inflation syringe to the end of the catheter at the inflation valve and slowly inject the required amount of fluid.Follow the manufacturer's instructions regarding the amount of fluid to use for balloon inflation.
      If resistance occurs when inflating the balloon or the patient expresses pain or shows nonverbal signs of pain, the balloon may not be entirely in the bladder. Stop inflation, gently aspirate the fluid into the syringe, and advance the catheter slightly before reattempting inflation.
   c. After inflating the balloon, pull gently on the catheter tubing until resistance is felt.
      Rationale: Pulling until resistance is met ensures that the catheter tip is anchored and is positioned at the bladder neck.
2. Place the drainage bag below the level of the bladder .Do not place the bag on the side rails of the bed or the floor and ensure that the tubing has no dependent loops.
   Rationale: Correct positioning of the drainage bag prevents urine reflux into the bladder and ensures proper drainage by gravity. Dependent loops prevent the urine from draining. Placement on the side rails increases the risk of tension on the catheter and of the bag being inadvertently raised above the level of the bladder.
3. Allow the bladder to empty unless the organization's practice restricts the maximum volume of urine drained with each catheterization.
   Rationale: Complete emptying relieves bladder distention. Some organizations limit the amount of urine that may be drained. However, no definitive evidence indicates that limiting the maximum volume drained is beneficial.
4. Trace tubing or catheter from the patient to point of origin (1) before connecting or reconnecting any device or infusion, (2) at any transition (e.g., new setting), and (3) as part of the hand-off process.
5. Anchor the catheter.
   a. Secure the catheter tubing to the upper medial aspect of the patient's inner thigh with a securement device following the manufacturer's instructions.
      Rationale: Securing the catheter minimizes accidental catheter dislodgment. It also minimizes the risk of bleeding, trauma, meatal necrosis, and bladder spasms from pressure and traction.

   b. Allow sufficient slack in the catheter tubing so movement does not create tension on the catheter.
   c. Clip the drainage tubing to the edge of the mattress.
6. Ensure that the tubing has no obstructions or kinks. Coil excess tubing on the bed and fasten it to the bottom sheet with a clip from the kit.
7. Remove gloves and perform hand hygiene.
8. Assist the patient to a comfortable position. Lower the bed and return the side rails to the original position.
9. Discard supplies and perform hand hygiene.
10. Document the procedure in the patient's record.

7. MONITORING AND CARE

1. Palpate the patient's bladder for distention or use a bladder scanner.
2. Assess the patient for bladder or urethral spasms.
3. Observe the characteristics and amount of urine in the drainage system.
4. Check for urine leaking from the catheter or tubing connections. Replace the catheter and the drain system using aseptic technique if leakage occurs.
5. Maintain the indwelling catheter and drainage system as a closed system. Do not open the drainage system. Replace the catheter and the drainage system using aseptic technique if a disconnection occurs.
6. Keep the drainage bag below the level of the bladder at all times; do not place the bag on the floor.
7. Keep the catheter and collecting tube free from kinks and obstruction.
8. Empty the drainage bag regularly using a separate collecting container for each patient. Avoid touching the draining spigot to the collecting container.
9. Assess, treat, and reassess pain.

8. EXPECTED OUTCOMES

- Catheter is inserted without complications.
- Bladder is not palpable.
- Catheter tip and balloon (if included) are in the bladder.
- Patient expresses minimal pain during procedure.
- Adequate urine is obtained.
- Urine remains clear and without sediment.
- Patient expresses relief from bladder discomfort.
- Skin under the anchoring device remains intact.
- Catheter remains patent, and urine continues to drain.

9. UNEXPECTED OUTCOMES

- No urine in catheter drainage bag
- Anaphylaxis secondary to latex allergy
- Bladder discomfort despite catheter patency, indicating urethral or bladder spasm
  - Bladder perforation
  - Urethral tear
- Cloudy urine or sediment in the urine
- Inability to advance the catheter
- Inability to inflate the balloon

- Pain during catheterization
- Skin breakdown at urethral meatus

10. DOCUMENTATION

- Amount of fluid used to inflate the balloon
- Amount of urine drained (for I&O recording)
- Characteristics of urine: color, clarity, odor
- Patient and family education
- Clinical indications for catheterization
- Specimen collection, if performed
- Patient's response to procedure
- Type, size, and length of catheter inserted
- Unexpected outcomes and related nursing interventions
- Pain assessment and management

11. NURSING EDUCATION UNIT MEMBERS

- ARIEL AGUSTIN, BSN, RN- Nurse Manager
- RONALD MARTIN CARCILLAR, BSN, RN, MANc
- DIOVEL BRYAN GANAC, BSN, RN
- CHARMAINE T. CO, BSN, RN, MAN
- JERELYN JEAN DONGALLO, BSN, RN, MAN
- ROVIN B. RAMIREZ, BSN, RN, MANc

12. GERONTOLOGICAL CONSIDERATIONS

- Catheter-associated infections are more common in older adults.
- Ensuring adequate oral fluid intake and assisting the older adult with toileting on a regular timed basis helps bladder retraining and minimizes the need for excessive catheterization.
- Attached equipment, such as a catheter, may make ambulation more difficult, increasing the risks associated with decreased mobility.

REFERENCES

1. Association of periOperative Registered Nurses (AORN). (2016). Guideline for sterile technique. In *Guidelines for perioperative practice* (pp. 65-93). Denver: AORN, Inc. (Level VII)
2. Gould, C.V. and others. (2009). Guideline for prevention of catheter-associated urinary tract infections 2009. Retrieved March 7, 2017, from https://www.cdc.gov/hai/pdfs/cautiguideline2009final.pdf (classic reference)* (Level VII)
3. Gould, C.V. (2015). In pursuit of appropriate urinary catheter indications: Details matter. *Annals of Internal Medicine, 162*(Suppl. 9), S35-S36. doi:10.7326/M14-1610
4. Hockenberry, M.J. (2015). Chapter 5: Pain assessment and management in children. In M.J. Hockenberry, D. Wilson (Eds.), *Wong's nursing care of infants and children* (10th ed., pp. 152-192). St. Louis: Mosby.

5. Joint Commission, The (TJC). (2014). Sentinel event alert 53: Managing risk during transition to new ISO tubing connector standards. Retrieved March 8, 2017, from http://www.jointcommission.org/assets/1/6/SEA_53_Connectors_8_19_14_final.pdf (Level VII)
6. Lo, E. and others. (2014). Strategies to prevent catheter-associated urinary tract infections in acute care hospitals: 2014 Update. *Infection Control and Hospital Epidemiology, 35*(5), 464-479. doi:10.1086/675718 (Level VII)
7. Nicolle, L.E. (2014). Catheter associated urinary tract infections. *Antimicrobial Resistance and Infection Control, 3*, 23. doi:10.1186/2047-2994-3-23

*In these skills, a "classic" reference is a widely cited, standard work of established excellence that significantly affects current practice and may also represent the foundational research for practice.

Adapted from Perry, A.G., Potter, P.A., Ostendorf, W.R. (2018). *Clinical nursing skills & techniques* (9th ed.). St. Louis: Elsevier.

NURSING EDUCATION UNIT

COMPETENCY-BASED CHECK OFF TOOL

Title: Competency Statement: Standards:	**URINARY CATHETERIZATION-FEMALE STRAIGHT AND INDWELLING SPECIMEN COLLECTION** **The nurse demonstrates acceptable level of competence in the performance of Defibrillating a patient.** • **Infection Control and Patient Safety Compliance** • **Equipment Preparation and Manipulation** • **Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

19. Provide all the information needed in this check off tool.
20. Use the scale below by ENCIRCLING your most appropriate response
    4= Very Good (Performs competently without assistance and supervision)
    3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
    2= Poor (Performs inconsistently/incompletely with assistance and supervision)
    1= Very Poor (Cannot perform even with directions; procedural step omitted)
21. Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
22. Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
23. Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
24. Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1

5	Educates patient and family / caregiver (where appropriate).	4	3	2	1
Psychomotor Skills					
1	Performed hand hygiene before patient contact.	4	3	2	1
2	Verified the correct patient using two identifiers	4	3	2	1
3	Reviewed the patient's record for any pathologic condition that may impair passage of the catheter.	4	3	2	1
4	Assessed the patient's clinical status.	4	3	2	1
5	Assessed the patient's bladder for fullness or used a bladder scanner.	4	3	2	1
6	Performed hand hygiene and donned gloves.	4	3	2	1
7	iv. Assessed the perineal anatomic landmarks and evaluate the region for erythema, drainage, and odor.	4	3	2	1
8	Removed gloves and performed hand hygiene.	4	3	2	1
9	Arranged for extra health care personnel to assist as necessary.	4	3	2	1
CATHETER INSERTION					
1	Performed hand hygiene and donned gloves	4	3	2	1
2	Introduced self to the patient.				
3	Verified the correct patient using two identifiers.	4	3	2	1
4	Explained the procedure to the patient and ensured that she agreed to treatment.	4	3	2	1
5	Raised the bed to an appropriate working height. a. Facing the patient, stood on the left side of the bed if right handed and on the right side if left handed. b. If side rails were in use, raised the side rail on the opposite side of the bed and lowered the side rail on the working side.	4	3	2	1
6	Placed a waterproof pad under the patient.	4	3	2	1
7	Positioned the patient. a. Assisted the patient to a dorsal recumbent position (supine with knees flexed). b. Asked the patient to relax her thighs to externally rotate the hip joints. c. If the patient could not be supine, positioned her in a side-lying (Sims) position with her upper leg flexed at knee and hip. i. Took extra precautions to cover the rectal area with a drape during the procedure to reduce the risk of cross contamination. ii. Supported the patient with pillows if necessary to maintain her position.	4	3	2	1
8	Covered the patient with a bath blanket or sheet. Placed the blanket or sheet in a diamond-shape configuration over the patient with one corner at the patient's neck, the side corners over each arm and side, and the last corner over the perineum.	4	3	2	1
9	Washed the perineal area with soap and water, located the urinary meatus, and dried the area. Had an assistant hold an alternative light source to illuminate the perineum as needed.	4	3	2	1
10	Obtained an indwelling catheterization kit or intermittent catheterization kit. a. Opened the outer wrapping of the kit by tearing the designated edge of the plastic wrap.	4	3	2	1

	b. Placed the empty outer plastic wrap near the end of the bed and used it for waste disposal. c. Placed the inner wrapped box on an easily accessible, clean bedside table or placed it between the patient's legs.				
11	Opened the sterile inner package containing the catheter supplies. Using sterile technique, opened the top flap outward to the far side of the kit. Then opened the side flaps without bringing the arms back over the sterile packaging. Opened the last flap toward self. Noted that the tray was now sitting open on its own sterile field.	4	3	2	1
12	Placed a waterproof sterile drape or fenestrated drape appropriately. a. Sterile drape i. If sterile gloves were packed as the first item, donned them and applied the drape. ii. Removed the square sterile drape from the tray, touching the outer edges only. To maintain sterility, did not touch other items in the kit. iii. Maintained sterility of the drape and let it unfold. Folded the top edge of the drape away from the patient to form a cuff over both hands. iv. Had the patient lift her hips. If the patient was unable to lift her hips, had an assistant lift the patient's hips. v. Slid the sterile drape with the plastic (shiny) side down under the patient's buttocks. b. Fenestrated drape i. Donned sterile gloves. ii. Lifted the fenestrated sterile drape out of the tray. Allowed it to unfold without touching a nonsterile surface. iii. Formed a cuff from the edges to protect the sterile gloves. iv. Placed the drape over the perineum, exposing the labia; did not touch any contaminated surface.	4	3	2	1
13	Moved the tray or box on the sterile field closer to the patient and organized the remaining items on the sterile field. Formed a continuous sterile field with the sterile wrap under the tray or box and the drape under the patient.	4	3	2	1
14	Prepared items for an indwelling catheter with a preassembled closed urine drainage system. a. Checked for a secure connection at the tubing and catheter connection site. b. Loosened the lid on the sterile specimen container if a urine specimen was required. Otherwise, discarded the container into a waste-disposal bag. c. Opened the package of sterile antiseptic solution and poured solution over the sterile cotton balls. If the kit contained sterile antiseptic swabs instead of solution, opened the package with the "stick" ends up for access. d. Opened the packet containing lubricant; squeezed the lubricant onto the sterile field. If the lubricant was provided in a prefilled syringe, removed the protective cap and spread the lubricant onto the sterile tray.	4	3	2	1
15	Placed the catheter tip into lubricant.	4	3	2	1

16	Cleaned the urethral meatus. a. With the nondominant hand i. Fully exposed the urethral meatus by spreading the labia. ii. Had an assistant use a flashlight if unable to view the meatus with the available lighting. iii. Maintained the position of the nondominant hand throughout the procedure. iv. If unable to view the urethra, placed one finger of the gloved, nondominant hand inside the vagina and applied gentle pressure upward to support and straighten the urethra. v. Located the urethral meatus just above the finger and below the clitoris. vi. Ensured that the patient understood what was being done. b. With the dominant hand i. Grasped an antiseptic-soaked cotton ball with forceps or pick up an antiseptic swab stick. ii. Cleaned the perineal area, wiping front to back from the clitoris toward the anus. iii. Used a new cotton ball or swab for each area cleansed. iv. Wiped the far labial fold first, the near labial fold next, and then directly over center of the urethral meatus.	4	3	2	1
17	With the sterile dominant hand, picked up the catheter. Held the distal end of the catheter loosely coiled in the palm of the dominant hand.	4	3	2	1
18	Inserted the indwelling or straight catheter. a. Asked the patient to bear down gently as if to void. Then slowly inserted the catheter through the urethral meatus. b. Advanced the catheter until urine flowed through the tubing. c. After visual confirmation of urine return into the tubing, continued to advance the catheter. d. Did not force the catheter against resistance. e. Released the labia and held the catheter securely with the nondominant hand.	4	3	2	1
STRAIGHT CATHETERIZATION AND URINE SPECIMEN COLLECTION					
1	When the catheter was in the bladder, as indicated by the flow of urine, allowed urine to drain out of the end of the catheter into the sterile urine receptacle. Did not release the catheter.	4	3	2	1
2	Collected a urine specimen as needed. a. Filled the specimen cup with the correct amount of urine required for the ordered laboratory tests by holding the end of the catheter in the dominant hand over the cup. b. After collection, allowed the remaining urine to flow into a container. c. Used a sterile container if additional urine was needed for culture analysis.	4	3	2	1
3	When urine drainage diminished, withdrew the catheter slowly and smoothly, while gently palpating over the patient's bladder with the nonsterile (nondominant) hand	4	3	2	1
4	Poured the urine from the receptacle into a graduated cylinder to obtain an accurate measurement of output.	4	3	2	1
5	In the presence of the patient, labeled the specimen per the organization's practice.	4	3	2	1

6	Prepared the specimen for transport. a. Placed the labeled specimen in a biohazard bag. b. If the specimen required ice for transport, placed the specimen in a biohazard bag then placed the bag with the specimen into a second biohazard bag filled with ice slurry.	4	3	2	1
7	Immediately transported the specimen to the laboratory.	4	3	2	1
8	Removed gloves and performed hand hygiene.	4	3	2	1
9	Assisted the patient to a comfortable position. Lowered the bed and returned the side rails to the original position.	4	3	2	1
10	Assessed, treated, and reassessed pain	4	3	2	1
11	Discarded supplies and performed hand hygiene.	4	3	2	1
12	Documented the procedure in the patient's record	4	3	2	1
SECURING THE INDWELLING CATHETER					
1	Inflated the balloon of the indwelling catheter with sterile water to the volume indicated by the manufacturer's instructions. a. While holding the catheter with the nondominant hand at the urethral meatus, took the distal end of the catheter with the dominant hand and placed the catheter between the first two fingers of the nondominant hand. Maintained a secure hold on the catheter with the nondominant hand. b. With the free dominant hand, connected the inflation syringe to the end of the catheter at the inflation valve and slowly injected the required amount of fluid. Followed the manufacturer's instructions regarding the amount of fluid to use for balloon inflation. c. After inflating the balloon, pulled gently on the catheter tubing until resistance was felt.	4	3	2	1
2	Placed the drainage bag below the level of the bladder. Did not place the bag on the side rails of the bed or the floor and ensured that the tubing had no dependent loops.	4	3	2	1
3	Allowed the bladder to empty unless the organization's practice restricted the maximum volume of urine drained with each catheterization.	4	3	2	1
4	Traced tubing or catheter from the patient to point of origin (1) before connecting or reconnecting any device or infusion, (2) at any transition (e.g., new setting), and (3) as part of the hand-off process.	4	3	2	1
5	Anchored the catheter. a. Secured the catheter tubing to the upper medial aspect of the patient's inner thigh with a securement device following the manufacturer's instructions. b. Allowed sufficient slack in the catheter tubing so movement did not create tension on the catheter. c. Clipped the drainage tubing to the edge of the mattress.	4	3	2	1
6	Ensured that the tubing had no obstructions or kinks. Coiled excess tubing on the bed and fastened it to the bottom sheet with a clip from the kit.	4	3	2	1
7	Removed gloves and performed hand hygiene.	4	3	2	1
8	Assisted the patient to a comfortable position. Lowered the bed and returned the side rails to the original position.	4	3	2	1
9	Assessed, treated, and reassessed pain.	4	3	2	1
10	Discarded supplies and performed hand hygiene.	4	3	2	1

11	Documented the procedure in the patient's record.	4	3	2	1
Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1
Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse's Comments/Recommendations for Improvement:

Originating Department	Nursing Education Unit	Module No.	1-2017
Title	**CENTRAL VENOUS CATHETER INSERTION**		
Author/s	**Ronald Martin Carcillar-CRN-ICU**		
Original Date	October, 2017	Revision Date	

1. ALERT

Monitor the patient for signs and symptoms of a pneumothorax during the insertion procedure.

Use insertion techniques with the fewest steps (i.e., Seldinger or modified Seldinger) to reduce the risk of complications (e.g., air embolism, bleeding).

Remember to route tubes and catheters having different purposes in different, standardized directions (e.g., IV lines routed toward the head; enteric lines toward the feet). This is especially important in the care of neonates.

This procedure is performed by an advanced practice registered nurse (APRN).

2. OVERVIEW

Central venous catheters (CVCs) are inserted to monitor right atrial pressure and central venous pressure (CVP) and to administer medication.

CVP can guide treatment after major surgery and during active bleeding, and it can help differentiate right ventricular failure from left ventricular failure. CVP is commonly elevated during or after right ventricular failure, ischemia, or infarction. CVP provides information regarding right-side filling pressure and right ventricular function and volume. The normal CVP value is 2 to 6 mm Hg.

The components of the CVP waveform—the *a, c,* and *v* waves—provide valuable information. The *a* wave reflects right atrial contraction, the *c* wave reflects closure of the tricuspid valve, and the *v* wave reflects right atrial filling during ventricular systole.

Catheter site choice should be based on the patient's condition. The subclavian site is preferred for adults without chronic kidney disease because of lower infection rates. The femoral vein should be used as a site of last resort because of an increased risk of infection.

Complications may occur during or after CVC insertion. The patient's need for a CVC should be assessed daily. A CVC should be removed when it is no longer necessary to decrease the risk of infection.

3. SUPPLIES

- CVC insertion kit
- CVC of choice (single-, dual-, or triple-lumen), usually supplied with insertion needle, dilator, syringe, scalpel, and guidewire
- Large sterile drapes or towels

- Anesthetic, plus equipment for administration
- Needles sized for selected insertion site
- Large package of 4 × 4-in (10.2 × 10.2-cm) sterile gauze sponges
- Suture kit (hemostat, scissors, needle holder)
- Sutures with curved needle
- Three-way stopcock
- Syringes, multiple sizes
- PPE (gloves, mask, head covering, eye protection [shield and mask combination may be used], sterile gloves, sterile gown)
- Skin protective pad or swabsticks
- Dressing supplies
- Waterproof underpad
- Antiseptic solution
- Saline flush syringes

Additional equipment includes the following:

- Hemodynamic monitoring system
- Sutureless catheter securement device
- IV solution and administration set for IV infusion
- Bedside monitor and oscilloscope with pulse oximetry
- Supplemental oxygen supplies
- Emergency equipment
- Package of alcohol pads or swabsticks
- Package of antiseptic pads or swabsticks (povidone-iodine or 2% chlorhexidine)
- Heparin flushes
- Needleless caps
- Arm board

4. PATIENT AND FAMILY EDUCATION

- Explain the equipment and the procedure, the need for CVC insertion, the alternatives to the procedure, the implications of not having the procedure, the likelihood of success, and the potential complications to the patient and family.
- Explain that the patient must remain still and quiet during the procedure.
- Explain the need for sterile technique, which may require covering the patient's face.
- Educate the patient and family about central line-associated bloodstream infection prevention.
- Encourage questions and answer them as they arise.

5. ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene before patient contact.
2. Verify the correct patient using two identifiers.
3. Determine the patient's medical history, including a history of anomalous veins.
4. Assess the patient's condition to determine the most appropriate insertion site.

   a. In adults, the subclavian site is preferred to the jugular and femoral sites to reduce infection risk.
   b. If the patient is obese or muscular, the preferred site is the internal jugular vein or subclavian vein.
5. Assess the patient's cardiac and pulmonary status.
6. Assess vital signs and oxygen saturation.
7. Assess the patient for a heparin sensitivity or allergy.
8. Review the patient's medication profile for current anticoagulation therapy.
9. Review the patient's laboratory profile, including complete blood count (CBC), platelet count, prothrombin time (PT), bleeding time, international normalized ratio (INR), and partial thromboplastin time (PTT).

Preparation

1. Obtain informed consent for central line insertion.
2. Ensure that the patient has patent IV access.
3. Prescribe an analgesic, a sedative, or both if needed.
   a. Reassess the patient's pain and sedation status, allowing for sufficient onset of action per medication, route, and the patient's condition.
   b. If a sedative is administered, follow the organization's practice for procedural sedation.
4. Use a catheter checklist, standardized supply cart or kit, and standardized protocol for insertion.
5. Comply with Universal Protocol.
   a. Use a standardized list to verify that all required items, including informed consent, are available.
   b. Mark the procedure site when required.
6. Choose an appropriate-size catheter based on the site and the patient.

6. PROCEDURE

Subclavian Vein

1. Perform hand hygiene.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient and ensure that he or she agrees to treatment.
5. Comply with Universal Protocol: Perform a time-out to verify the correct patient, correct site, and correct procedure.
6. Use maximal sterile barrier precautions for central lines during insertion.[6,11]
7. Place a moisture-proof pad under the selected insertion site. Place the patient in a 15- to 30-degree Trendelenburg position with a small towel between the shoulder blades.[1]
   Rationale: The Trendelenburg position helps decrease the risk of air embolism. A small towel between the shoulder blades helps engorge the veins, aiding identification of the correct site.
8. Use an ultrasound to guide proper catheter placement.
   Rationale: Ultrasound guidance improves insertion success, reduces needle puncture attempts, and decreases insertion complications.
9. Open the CVC insertion kit and drop the sterile items onto the sterile field.
10. Perform hand hygiene and don sterile gloves, sterile gown, mask, head covering, and eye protection or face shield.

Rationale: CVCs are placed using strict sterile technique.

11. Cleanse the area of insertion from the shoulder to the contralateral nipple line and from the neck to the nipple line.
    a. If the skin needs cleansing, use soap and water first, then allow to dry completely.
    b. Prepare the insertion site with greater than 0.5% chlorhexidine in alcohol solution using a back-and-forth motion for at least 30 seconds and allow to dry completely.
    Use chlorhexidine cautiously because it may cause skin irritation and chemical burns in infants less than 2 months old or infants with compromised skin integrity (premature infants).
12. Consider using a local anesthetic adjacent to the insertion site.
    Rationale: A local anesthetic provides comfort for the patient, helps him or her cooperate, and eases insertion.
13. Identify the junction of the middle and medial thirds of the clavicle. Needle insertion should be 1 to 2 cm (0.4 to 0.8 in) lateral to the junction.
    Rationale: The junction of the middle and medial thirds of the clavicle is a landmark for catheter placement.
    Access the site from the right side to avoid inadvertent puncture of the thoracic duct.
14. Depress the area 1 to 2 cm (0.4 to 0.8 in) beneath the junction with the thumb of the nondominant hand and depress the area 2 cm (0.8 in) above the sternal notch with the index finger.
    To avoid the subclavian artery, select a puncture site away from the most lateral course of the vein; do not aim too posteriorly.
15. Instruct the patient to turn his or her head away from the insertion site. Assist the patient as necessary.
    Rationale: Turning the head helps to decrease the risk of air embolism. It also helps engorge the veins for easier identification of the correct site.
16. Administer a local anesthetic. If injecting an anesthetic, aspirate before infiltration.[1]
    Rationale: Aspiration helps determine if a blood vessel has been entered inadvertently.
17. Use the Seldinger technique to place the catheter.

    Rationale: The Seldinger technique is the preferred method of CVC placement.

    a. Use a 20- or 22-G needle attached to a syringe.
    Rationale: These needle sizes ensure that the guidewire can be advanced through the needle.
    b. Puncture the skin and advance the needle while maintaining slight negative pressure until a free flow of blood appears.
    c. If a free flow of blood does not appear, remove and redirect the needle 5 to 10 degrees more laterally.
    d. After a free flow of blood appears, detach the syringe and insert a soft-tipped guidewire through the needle 10 to 15 cm (4 to 6 in).
    Rationale: A free flow of blood indicates that the vessel has been accessed.
    e. Remove the needle.
    f. Wipe the guidewire with a sterile 4 × 4-in (10.2 × 10.2-cm) gauze pad.

Rationale: Wiping the guidewire eases manipulation of it.

g. Instruct the patient to breathe normally.
h. With a No. 11 surgical blade, knife edge up, make a small (2- to 3-mm) stab wound at the insertion site.
Rationale: A stab wound eases the insertion of the dilator through the skin.
i. Insert the dilator through the skin over the guidewire until 10 to 15 cm (4 to 6 in) of wire extends beyond the dilator. Remove the dilator.
Rationale: The dilator enlarges the vessel and skin opening, easing insertion of the catheter.
j. Insert the catheter over the guidewire until 10 to 15 cm (4 to 6 in) of wire extends beyond the catheter. Remove the guidewire. Advance the catheter. Note the catheter length at the insertion site.
Rationale: The catheter length helps identify the location of the distal tip.

18. Aspirate and flush the ports with normal saline solution.
Rationale: Flushing the ports prevents clotting in the catheter.
19. Ask the assisting nurse to connect the catheter to the hemodynamic monitoring system and to IV fluid. Apply a needleless connector to any unused ports and instill locking solution per the organization's practice.
Rationale: Connecting the catheter to a monitoring system is necessary to monitor pressure and maintain catheter patency.
20. Trace tubing or catheter from the patient to point of origin (1) before connecting or reconnecting any device or infusion, (2) at any transition (e.g., new setting), and (3) as part of the hand-off process.
21. Label the tubing at the connection site closest to the patient and at the connection site closest to the source when there are different access sites or several bags.
Rationale: Tubing should be labeled to reduce the chance of misconnection, especially in circumstances where multiple IV lines or devices are in use.
22. Do not force connections and avoid workarounds per the organization's practice.
Rationale: Forced connections or workarounds could indicate that the connection should not be made.
23. Secure the catheter in place. Consider using a sutureless stabilization device as an alternative to tape and sutures.
24. Apply a sterile dressing to the site.
    a. Apply a chlorhexidine-impregnated sponge per the organization's practice.
    b. Use either a transparent, semipermeable dressing alone or a gauze dressing with tape. If the patient is diaphoretic or if the site is bleeding or oozing, use a gauze dressing.
25. Label the dressing per the organization's practice with the date and time of application and initial it.
26. Return the patient to a neutral or head-up position.
Rationale: Repositioning the patient provides comfort.
27. Check the catheter for proper placement, using waveforms and a chest radiograph.
28. Due to the increased risk of antibiotic resistance, reserve the use of a combined antibiotic and heparin flushing or antibiotic and locking solutions for

patients at high risk or for settings where the baseline vascular access device (VAD) infection rates are high (greater than 15%).
Rationale: Antibiotic lock therapy should be considered only if the patient is already at high risk for infection or if catheter-related infection is diagnosed. Antibiotics used for lock therapy should be determined based on culture and sensitivity results. Frequency of antibiotic lock, length of dwell time, or discarding or flushing a lock solution volume is based on the organization's practice.

29. Discard supplies, remove personal protective equipment (PPE), and perform hand hygiene.
30. Document the procedure in the patient's record.

Internal Jugular Vein

1. Perform hand hygiene.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient and ensure that he or she agrees to treatment.
5. Comply with Universal Protocol: Perform a time-out to verify the correct patient, correct site, and correct procedure.
6. Use maximal sterile barrier precautions for central lines during insertion.
7. Place a moisture-proof pad under the selected insertion site. Place the patient in a 15- to 30-degree Trendelenburg position with a small towel between the shoulder blades.
   Rationale: The Trendelenburg position helps decrease the risk of air embolism. A small towel between the shoulder blades helps engorge the veins, aiding identification of the correct site.
8. Use an ultrasound to guide proper catheter placement.
   Rationale: Ultrasound guidance improves insertion success, reduces needle puncture attempts, and decreases insertion complications.
9. Open the CVC insertion kit and drop the sterile items onto the sterile field.
10. Perform hand hygiene and don sterile gloves, sterile gown, mask, head covering, and eye protection or face shield.
    Rationale: CVCs are placed using strict sterile technique.
11. Cleanse the area of insertion from the midclavicle to the opposite border of the sternum and from the ear to a few inches above the nipple line.
    a. If the skin needs cleansing, use soap and water first, then allow to dry completely.
    b. Prepare the insertion site with greater than 0.5% chlorhexidine in alcohol solution using a back-and-forth motion for at least 30 seconds and allow to dry completely.
       Use chlorhexidine cautiously because it may cause skin irritation and chemical burns in infants less than 2 months old or infants with compromised skin integrity (premature infants).
12. Consider using a local anesthetic adjacent to the insertion site.
    Rationale: A local anesthetic provides comfort for the patient, helps him or her cooperate, and eases insertion.
13. Locate the carotid artery by palpation.
    Rationale: Locating the carotid artery helps prevent placing the introducer in the carotid artery.
14. Identify the jugular vein and mark it if necessary.

Rationale: Locating and marking the jugular vein identifies the intended insertion site.

15. Instruct the patient to turn his or her head away from the insertion site. Assist the patient as necessary.
    Rationale: Having the patient turn the head helps identify the landmarks.
16. Administer a local anesthetic. If injecting an anesthetic, aspirate before infiltration.[1]
    Rationale: Aspiration helps determine if a blood vessel has been entered inadvertently.
17. Identify the internal jugular vein in the triangle formed by the medial aspect of the clavicle, the medial aspect of the sternal head, and the lateral head of the sternocleidomastoid muscle. The internal jugular vein is 3 to 4 cm (1.2 to 1.6 in) above the medial clavicle and 1 to 2 cm (0.4 to 0.8 in) within the lateral border of the sternocleidomastoid muscle.
    Rationale: A high entry can be made from a posterior approach, a lateral approach, an anterior approach, or a central approach.
    Use the midanterior approach in an obese patient. The posterior approach may present a slightly higher risk.
18. Use the Seldinger technique to place the catheter.
    Rationale: The Seldinger technique is the preferred method of CVC placement.
    a. Use a 20- or 22-G needle attached to a syringe.
       Rationale: These needle sizes ensure that the guidewire can be advanced through the needle.
    b. Puncture the skin and advance the needle while maintaining slight negative pressure until a free flow of blood appears.
    c. If a free flow of blood does not appear, remove and redirect the needle 5 to 10 degrees more laterally.
    d. After a free flow of blood appears, detach the syringe and insert a soft-tipped guidewire through the needle 10 to 15 cm (4 to 6 in).
       Rationale: A free flow of blood indicates that the vessel has been accessed.
    e. Remove the needle.
    f. Wipe the guidewire with a sterile 4 × 4-in (10.2 × 10.2-cm) gauze pad.
       Rationale: Wiping the guidewire eases manipulation of it.
    g. Instruct the patient to breathe normally.
    h. With a No. 11 surgical blade, knife edge up, make a small (2- to 3-mm) stab wound at the insertion site.
       Rationale: A stab wound eases the insertion of the dilator through the skin.
    i. Insert the dilator through the skin over the guidewire until 10 to 15 cm (4 to 6 in) of wire extends beyond the dilator. Remove the dilator.
       Rationale: The dilator enlarges the vessel and skin opening, easing insertion of the catheter.
    j. Insert the catheter over the guidewire until 10 to 15 cm (4 to 6 in) of wire extends beyond the catheter. Remove the guidewire. Advance the catheter. Note the catheter length at the insertion site.
       Rationale: The catheter length helps identify the location of the distal tip.
19. Aspirate and flush the ports with normal saline solution.
    Rationale: Flushing the ports prevents clotting in the catheter.

20. Ask the assisting nurse to connect the catheter to the hemodynamic monitoring system and to IV fluid. Apply a needleless connector to any unused ports and instill locking solution per the organization's practice.
    Rationale: Connecting the catheter to a monitoring system is necessary to monitor pressure and maintain catheter patency.
21. Trace tubing or catheter from the patient to point of origin (1) before connecting or reconnecting any device or infusion, (2) at any transition (e.g., new setting), and (3) as part of the hand-off process.
22. Label the tubing at the connection site closest to the patient and at the connection site closest to the source when there are different access sites or several bags.
    Rationale: Tubing should be labeled to reduce the chance of misconnection, especially in circumstances where multiple IV lines or devices are in use.
23. Do not force connections and avoid workarounds per the organization's practice.
    Rationale: Forced connections or workarounds could indicate that the connection should not be made.
24. Secure the catheter in place. Consider using a sutureless stabilization device as an alternative to tape and sutures.
25. Apply a sterile dressing to the site.
    a. Apply a chlorhexidine-impregnated sponge per the organization's practice.[7]
    b. Use either a transparent, semipermeable dressing alone or a gauze dressing with tape. If the patient is diaphoretic or if the site is bleeding or oozing, use a gauze dressing.
26. Label the dressing per the organization's practice with the date and time of application and initial it.
27. Return the patient to a neutral or head-up position.
    Rationale: Repositioning the patient provides comfort.
28. Check the catheter for proper placement, using waveforms and a chest radiograph.
29. Due to the increased risk of antibiotic resistance, reserve the use of a combined antibiotic and heparin flushing or antibiotic and locking solutions for patients at high risk or for settings where the baseline VAD infection rates are high (greater than 15%).
    Rationale: Antibiotic lock therapy should be considered only if the patient is already at high risk for infection or if catheter-related infection is diagnosed. Antibiotics used for lock therapy should be determined based on culture and sensitivity results. Frequency of antibiotic lock, length of dwell time, or discarding or flushing a lock solution volume is based on the organization's practice.
30. Discard supplies, remove PPE, and perform hand hygiene.
31. Document the procedure in the patient's record.

Femoral vein

1. Perform hand hygiene.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient and ensure that he or she agrees to treatment.

5. Comply with Universal Protocol: Perform a time-out to verify the correct patient, correct site, and correct procedure.
6. Use maximal sterile barrier precautions for central lines during insertion.
7. Place a moisture-proof pad under the selected insertion site. Place the patient a supine or the Trendelenburg position if tolerated to better visualize the site.
8. Use an ultrasound to guide proper catheter placement.
   Rationale: Ultrasound guidance improves insertion success, reduces needle puncture attempts, and decreases insertion complications.
9. Open the CVC insertion kit and drop the sterile items onto the sterile field.
10. Perform hand hygiene and don sterile gloves, sterile gown, mask, head covering, and eye protection or face shield.
    Rationale: CVCs are placed using strict sterile technique.
11. Cleanse an ample square section in the femoral area.
    a. If the skin needs cleansing, use soap and water first, then allow to dry completely
    b. Prepare the insertion site with greater than 0.5% chlorhexidine in alcohol solution using a back-and-forth motion for at least 30 seconds and allow to dry completely.

    Do not use the femoral vein in adult patients who are obese unless other sites are not viable.
    Use chlorhexidine cautiously because it may cause skin irritation and chemical burns in infants less than 2 months old or infants with compromised skin integrity (premature infants).
12. Consider using a local anesthetic adjacent to the insertion site.
    Rationale: A local anesthetic provides comfort for the patient, helps him or her cooperate, and eases insertion.
13. Identify the femoral artery.
    Use the acronym NAVEL (Nerve, Artery, Vein, Empty space, Ligament) to remember the anatomy of the femoral area, moving from lateral to medial.
    For an adult patient, do not insert the catheter into the femoral vein unless other sites are unavailable.
14. Administer a local anesthetic. If injecting an anesthetic, aspirate before infiltration.
    Rationale: Aspiration helps determine if a blood vessel has been entered inadvertently.
15. Use the Seldinger technique to place the catheter.
    Rationale: The Seldinger technique is the preferred method of CVC placement.
    a. Use a 20- or 22-G needle attached to a syringe
       Rationale: These needle sizes ensure that the guidewire can be advanced through the needle.
    b. Puncture the skin and advance the needle while maintaining slight negative pressure until a free flow of blood appears.
    c. If a free flow of blood does not appear, remove and redirect the needle 5 to 10 degrees more laterally.
    d. After a free flow of blood appears, detach the syringe and insert a soft-tipped guidewire through the needle 10 to 15 cm (4 to 6 in).
       Rationale: A free flow of blood indicates that the vessel has been accessed.

e. Remove the needle.
f. Wipe the guidewire with a sterile 4 × 4-in (10.2 × 10.2-cm) gauze pad.
Rationale: Wiping the guidewire eases manipulation of it.
g. Instruct the patient to breathe normally.
h. With a No. 11 surgical blade, knife edge up, make a small (2- to 3-mm) stab wound at the insertion site.
Rationale: A stab wound eases the insertion of the dilator through the skin.
i. Insert the dilator through the skin over the guidewire until 10 to 15 cm (4 to 6 in) of wire extends beyond the dilator. Remove the dilator.
Rationale: The dilator enlarges the vessel and skin opening, easing insertion of the catheter.
j. Insert the catheter over the guidewire until 10 to 15 cm (4 to 6 in) of wire extends beyond the catheter. Remove the guidewire. Advance the catheter. Note the catheter length at the insertion site.
Rationale: The catheter length helps identify the location of the distal tip.

16. Aspirate and flush the ports with normal saline solution.
Rationale: Flushing the ports prevents clotting in the catheter.
17. Ask the assisting nurse to connect the catheter to the hemodynamic monitoring system and to IV fluid. Apply a needleless connector to any unused ports and instill locking solution per the organization's practice.
Rationale: Connecting the catheter to a monitoring system is necessary to monitor pressure and maintain catheter patency.
18. Trace tubing or catheter from the patient to point of origin (1) before connecting or reconnecting any device or infusion, (2) at any transition (e.g., new setting), and (3) as part of the hand-off process.
19. Label the tubing at the connection site closest to the patient and at the connection site closest to the source when there are different access sites or several bags.
Rationale: Tubing should be labeled to reduce the chance of misconnection, especially in circumstances where multiple IV lines or devices are in use.
20. Do not force connections and avoid workarounds per the organization's practice.
Rationale: Forced connections or workarounds could indicate that the connection should not be made.
21. Secure the catheter in place. Consider using a sutureless stabilization device as an alternative to tape and sutures.
22. Apply a sterile dressing to the site.
    a. Apply a chlorhexidine-impregnated sponge per the organization's practice.
    b. Use either a transparent, semipermeable dressing alone or a gauze dressing with tape. If the patient is diaphoretic or if the site is bleeding or oozing, use a gauze dressing.
23. Label the dressing per the organization's practice with the date and time of application and initial it.
24. Return the patient to a neutral or head-up position.
Rationale: Repositioning the patient provides comfort.
25. Check the catheter for proper placement, using waveforms and a chest radiograph.

26. Due to the increased risk of antibiotic resistance, reserve the use of a combined antibiotic and heparin flushing or antibiotic and locking solutions for patients at high risk or for settings where the baseline VAD infection rates are high (greater than 15%).
    Rationale: Antibiotic lock therapy should be considered only if the patient is already at high risk for infection or if catheter-related infection is diagnosed. Antibiotics used for lock therapy should be determined based on culture and sensitivity results. Frequency of antibiotic lock, length of dwell time, or discarding or flushing a lock solution volume is based on the organization's practice.
27. Discard supplies, remove PPE, and perform hand hygiene.
28. Document the procedure in the patient's record.

7. MONITORING AND CARE

The nurse or APRN may perform the following steps:

1. Perform cardiovascular, peripheral vascular, and hemodynamic assessments immediately before and after the procedure and as the patient's condition requires.
   Rationale: These assessments determine if the patient has signs or symptoms of complications. Restlessness may indicate an air embolism. A decreased level of consciousness can occur if the catheter is advanced into the carotid artery. Changes in CVP may indicate a change in volume status. Changes in the CVP waveform may indicate a change in right ventricular function or catheter migration.
   Reportable conditions: Change in level of consciousness; abnormal vital signs, waveforms, or pressures
2. Assess heart and breath sounds before and after the procedure.
   Rationale: Abnormal heart or breath sounds may indicate cardiac tamponade, pneumothorax, chylothorax, or hemothorax.
   Reportable conditions: Diminished or muffled heart sounds, absent or diminished breath sounds unilaterally
3. Monitor the patient for complications of catheter insertion (e.g., pneumothorax, hemorrhage, hematoma).
4. Assess, treat, and reassess pain.
5. Assess the need for the CVC daily.
   a. CVCs should be removed when no longer necessary to decrease the risk of infection.
      Reportable conditions: Signs or symptoms of catheter infection
   b. Routine changing of lines is not recommended. Change the line if infection is suspected. Do not remove the line based on fever alone; exercise judgment to determine if another source of infection is likely. Guidewire exchanges are not recommended because of the risk of infection.

8. EXPECTED OUTCOMES

- CVC is successfully placed.
- The *a*, *c*, and *v* waves are identified if hemodynamic monitoring is used.
- CVP measurements are obtained.

9. UNEXPECTED OUTCOMES

- Complications (e.g., pneumothorax, hemothorax, infection, arrhythmias, air embolus, pulmonary infarction, pulmonary rupture)
- Misplacement (e.g., carotid artery, subclavian artery)

10. DOCUMENTATION

- Informed consent
- Time-out procedure including verification of correct patient, correct procedure, and correct site
- Patient and family education
- Completion of informed consent
- Procedure details, including insertion site, catheter type, and catheter size
- Initial CVP measurements
- Centimeter marking at the skin
- Patient's response to the procedure
- Confirmation of placement (e.g., chest radiograph)
- Date and time of dressing change per the organization's practice
- Unexpected outcomes and related nursing interventions
- Pain assessment and management
- Procedural sedation assessment and management (if a sedative is administered)

11. REFERENCES

1. Aponte-Feliciano, A. and others. (2014). Chapter 2: Central venous catheters. In R.S. Irwin, C.M. Lilly, J.M. Rippe (Eds.), *Irwin & Rippe's manual of intensive care medicine* (6th ed., pp. 9-16). Philadelphia: Lippincott Williams & Wilkins.
2. Camp-Sorrell, D., Matey, L. (Eds.). (in press). *Access device standards of practice for oncology nursing.* Pittsburgh: Oncology Nursing Society. (Level D)
3. Infusion Nurses Society (INS). (2016). Infusion therapy standards of practice. Standard 22: Vascular visualization. *Journal of Infusion Nursing, 39*(Suppl. 1), S44-S45. (Level D)
4. Infusion Nurses Society (INS). (2016). Infusion therapy standards of practice. Standard 27: Site selection. *Journal of Infusion Nursing, 39*(Suppl. 1), S54-S57. (Level D)
5. Infusion Nurses Society (INS). (2016). Infusion therapy standards of practice. Standard 32: Local anesthesia for vascular access device (VAD) placement and access. *Journal of Infusion Nursing, 39*(Suppl. 1), S63. (Level D)
6. Infusion Nurses Society (INS). (2016). Infusion therapy standards of practice. Standard 33: Vascular access site preparation and device placement. *Journal of Infusion Nursing, 39*(Suppl. 1), S64-S67. (Level D)
7. Infusion Nurses Society (INS). (2016). Infusion therapy standards of practice. Standard 41: Vascular access device (VAD) assessment, care, and dressing changes. *Journal of Infusion Nursing, 39*(Suppl. 1), S81-S83. (Level D)
8. Infusion Nurses Society (INS). (2016). Infusion therapy standards of practice. Standard 49: Infection. *Journal of Infusion Nursing, 39*(Suppl. 1), S106-S107. (Level D)
9. Joint Commission, The. (2014). Sentinel event alert 53: Managing risk during transition to new ISO tubing connector standards. Retrieved September 18,

2016,
from http://www.jointcommission.org/assets/1/6/SEA_53_Connectors_8_19_14_final.pdf (Level D)

10. McGee, W.T., Headley, J.M., Frazier, J.A. (Eds.). (2014). *Edwards critical care education: Quick guide to cardiopulmonary care* (3rd ed.). Irvine, CA: Edwards Lifesciences. Retrieved September 18, 2016, from http://ht.edwards.com/scin/edwards/sitecollectionimages/products/pressuremonitoring/ar11206-quickguide3rded.pdf (Level M)
11. O'Grady, N.P. and others. (2011). Guidelines for the prevention of intravascular catheter-related infections, 2011. Centers for Disease Control and Prevention. Retrieved September 18, 2016, from http://www.cdc.gov/hicpac/pdf/guidelines/bsi-guidelines-2011.pdf (Level D)

ADDITIONAL READINGS

Joint Commission, The. (2012). Preventing central line–associated bloodstream infections: A global challenge, a global perspective. Retrieved September 18, 2016, from http://www.jointcommission.org/assets/1/18/clabsi_monograph.pdf

Adapted from Wiegand, D.L. (2011). *AACN procedure manual for critical care* (6th ed.). St. Louis: Saunders.

NURSING EDUCATION UNIT

COMPETENCY-BASED CHECK OFF TOOL

Title: Competency Statement: Standards:	**CENTRAL VENOUS CATHETER INSERTION (ASSISTING, SETUP AND CARE)** **The nurse demonstrates acceptable level of competence in the performance of MANAGING PATIENTS FOR CENTRAL VENOUS CATHETER INSERTION.** • **Infection Control and Patient Safety Compliance** • **Equipment Preparation and Manipulation** • **Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

25. Provide all the information needed in this check off tool.
26. Use the scale below by ENCIRCLING your most appropriate response
    4= Very Good (Performs competently without assistance and supervision)
    3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
    2= Poor (Performs inconsistently/incompletely with assistance and supervision)
    1= Very Poor (Cannot perform even with directions; procedural step omitted)
27. Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
28. Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
29. Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
30. Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1

5	Educates patient and family / caregiver (where appropriate).	4	3	2	1
Psychomotor Skills					
1	Identify the patient.	4	3	2	1
2	Performed hand hygiene before patient contact.	4	3	2	1
3	Verified the correct patient using two identifiers.	4	3	2	1
4	Assessed the patient's vital signs and oxygen saturation	4	3	2	1
5	Assessed the patient for a heparin sensitivity or allergy.	4	3	2	1
6	Reviewed the patient's medication profile for current anticoagulation therapy	4	3	2	1
7	Reviewed the patient's laboratory profile.	4	3	2	1
8	Administered the prescribed sedatives and analgesics. Reassessed the patient's pain status, allowing for sufficient onset of action per medication, route and the patient's condition.	4	3	2	1
9	(Circulating/Charge Nurse) Used the CLABSI BUNDLE CHECKLIST, utilize the Surgical Safety Checklist and supply cart and standardized protocols for insertion.	4	3	2	1
10	Marked the procedure site when required.	4	3	2	1
11	Set up and primed a single pressure disposable transducer system. Replaced all the port caps with sterile non-vented caps.	4	3	2	1
12	Performed hand hygiene.	4	3	2	1
13	Complied with Universal protocol, performed time-out to verify the correct patient, correct site, and correct procedure.	4	3	2	1
14	Wear surgical mask and googles if potential exists for blood or body fluids to splash (App-1-110104-039(1)	4	3	2	1
15	Note: Used subclavian site rather that the jugular or femoral site in adult patients shall be preferred to minimize infection risk for no tunneled central venous catheter placement (APP 1-110104-039)	4	3	2	1
16	Placed the patient in a slight Trendelenburg position per PHYSICIAN/ PRACTITIONER preference. Placed a moisture-proof pad under the selected insertion site.	4	3	2	1
17	Used sterile barrier precautions during insertion.	4	3	2	1
18	Performed hand hygiene and donned sterile gloves, gown, mask, head covering, and eye protection or face shield.	4	3	2	1
19	Cleansed the area of insertion as per hospital policy. CLORAPREP (2% Chlorhexedine gluconate, 70 % isoprophyl alcohol) (APP 1-110104-039 (1).	4	3	2	1
20	Draped the patient using a large full body drape.	4	3	2	1
21	Assisted the practitioner as needed with inserting the catheter.	4	3	2	1
22	After the catheter was placed and blood return was ensured, assisted with flushing the lumens with normal saline and connecting the IV line and hemodynamic pressure monitoring system to the catheter.	4	3	2	1
23	Applied the needles connector to any unused ports and instilled locking solution per organization practice.	4	3	2	1
24	Assisted the practitioner with applying a sterile occlusive dressing.	4	3	2	1
25	For CVP monitoring- initiated hemodynamic monitoring	4	3	2	1
26	Repositioned the patient in comfortable position	4	3	2	1
27	Assisted as needed with obtaining a chest radiograph.	4	3	2	1
28	Assessed, treated, and reassessed pain.	4	3	2	1
29	Discarded supplies, removed PPE, and performed hand hygiene.	4	3	2	1

C. Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1
D. Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse's Comments/Recommendations for Improvement:

NURSING EDUCATION UNIT

COMPETENCY-BASED CHECK OFF TOOL

Title:	**CENTRAL VENOUS CATHETER MONITORING**
Competency Statement:	**The nurse demonstrates acceptable level of competence in the performance of MONITORING CVP LINE.**
Standards:	• **Infection Control and Patient Safety Compliance** • **Equipment Preparation and Manipulation** • **Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

31. Provide all the information needed in this check off tool.
32. Use the scale below by ENCIRCLING your most appropriate response
    4= Very Good (Performs competently without assistance and supervision)
    3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
    2= Poor (Performs inconsistently/incompletely with assistance and supervision)
    1= Very Poor (Cannot perform even with directions; procedural step omitted)
33. Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
34. Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
35. Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
36. Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1
5	Educates patient and family / caregiver (where appropriate).	4	3	2	1

Psychomotor Skills					
1	States indication of CVP monitoring	4	3	2	1
2	States normal CVP ranges	4	3	2	1
3	Positions the patient either supine or with head elevated to measure CVP	4	3	2	1
4	Levels the transducer to phlebostatic axis and zero balances the system	4	3	2	1
5	Assesses the quality of waveforms and corrects accordingly.	4	3	2	1
6	Compares CVP reading with previous readings and the patient's clinical status.	4	3	2	1
7	Documents pertinent information on ICU DAILY NURSING RECORD. (Nursing Care Plan)	4	3	2	1
C. Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1
D. Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse's Comments/Recommendations for Improvement:

Originating Department	Nursing Education Unit	Module No.	1-2017
Title	**ASSISTING IN ARTERIAL LINE CATHETER INSERTION**		
Author/s	**Ronald Martin Carcillar-CRN-ICU**		
Original Date	October, 2017	Revision Date	

1. ALERT

Do not administer medications through an arterial line.

Ensure that the arterial line transducer is connected to the patient and the monitor and that the alarms are activated.

Remember to route tubes and catheters having different purposes in different, standardized directions (e.g., IV lines routed toward the head; enteric lines toward the feet). This is especially important in the care of neonates.

2. OVERVIEW

Arterial pressure represents the forcible ejection of blood from the left ventricle into the aorta and out into the arterial system. Arterial catheters are used to monitor blood pressure continuously, titrate vasoactive agents, and obtain serial blood gas or other laboratory specimens in critically ill patients. Arterial catheters also provide arterial pressure-based cardiac output monitoring.

Candidates for arterial pressure monitoring include patients experiencing hemodynamic instability (e.g., acute hypotension, hypertensive crisis), cardiac arrest, or shock from any cause (e.g., hemorrhagic, septic); patients requiring continuous infusion of vasoactive medications or frequent arterial blood gas measurements (e.g., patients requiring ventilator support, critically ill patients); patients with nonpulsatile blood flow (e.g., those receiving ventricular assist device therapy or extracorporeal membrane oxygenation therapy); patients undergoing intraaortic balloon pump therapy, coronary interventional procedures, or major surgical procedures (e.g., neurologic, abdominal, cardiac, thoracic, vascular, trauma); and patients with obstetric emergencies.

Contraindications include a compromise of circulation distal to the site (e.g., Raynaud phenomenon or thromboangiitis), an infection at the insertion site, traumatic injury proximal to the site (e.g., full-thickness or partial-thickness burns), and a vascular graft.

The insertion site must be comfortable for the patient and allow easy access for procedures and nursing care. Larger arteries provide more accurate measurements, increased collateral circulation, and decreased risk of thrombus formation. The preferred artery for arterial catheter insertion is the radial artery because of the ease of cannulation and the low rate of complications. The femoral, axillary, brachial, posterior tibial, and dorsalis pedis arteries also may be used. The brachial, posterior tibial, and dorsalis pedis arteries are preferred to the femoral artery (even though it is easily accessible, large, and pulsatile) and the axillary site because of the risks of infection. The radial and femoral arteries are used the majority of the time.

If intraaortic balloon pump therapy is required, arterial pressure may be directly monitored from the tip of the balloon in the aorta. When arterial pulse waveforms are recorded from a peripheral site (instead of a central site), the waveform morphology changes. The anacrotic limb becomes more peaked and narrowed and has increased amplitude because the systolic pressure in peripheral sites is higher than the systolic pressure in a central site. In addition, as the peripheral diastolic pressure decreases, the diastolic downslope may demonstrate a secondary wave, and the dicrotic notch is less prominent.

Arterial lines must be removed when no longer indicated because of the risks of thrombosis, cerebral embolism, ischemia, infection, and pseudoaneurysm.[1]The risk of thrombosis increases with the following factors: age greater than 65 years, diabetes, hypercoagulability, tobacco abuse, female sex, small wrist diameter, autoimmune disease, catheter in place more than 20 hours, and vasoactive drug use.[9]

The catheter should not be changed routinely or removed based on fever alone. The practitioner and nurse must exercise clinical judgment to determine if another source of infection is likely.

Dressing change frequency depends on the type of dressing. Transparent, semipermeable dressings are replaced every 5 to 7 days; gauze dressings are replaced every 2 days. Both types of dressing are changed when site assessment or cleansing is needed or the dressing becomes loose.[3]

3. SUPPLIES

- Requested size catheter, will vary based on arterial line location, or prepackaged kit with catheter, introducer, and guidewire
- Antiseptic solution
- Disposable pad
- PPE (face shield or eye protection, gown, head covering, gloves, and sterile gloves)
- Full sterile drape
- Nonvented caps for stopcock
- Single-pressure transducer system, including the following: flush solution recommended according to the organization’s practice, pressure bag or device, pressure tubing with flush device, transducer, and monitor cable
- Sterile towels
- Standardized supply cart or kit
- Transducer holder
- Pressure bag
- Ultrasound machine with transmission gel
- Monitoring equipment consisting of a connecting cable, monitor, oscilloscope display screen, and recorder
- Sterile gauze pads
- Securement device or suture material
- 1% lidocaine without epinephrine
- 5-ml syringe or smaller with 25-G needle
- Full sterile drape
- Tape

- Dressing supplies
- Chlorhexidine-impregnated sponge, or chlorhexidine-impregnated gel dressing
- An ultrasound device, a sterile probe cover kit including a sterile cover (sheath) for the probe, and sterile gel if ultrasound-guided arterial access procedure is performed

4. PATIENT AND FAMILY EDUCATION

- Explain the equipment and the procedure, including alarms, dressings, and length of time the catheter is expected to be in place.
- Explain that the patient must remain still and quiet during the procedure.
- Explain the reason for the procedure, the alternatives to the procedure, the implications of not having the procedure, the likelihood of success, and the potential complications.
- Instruct the patient to report any warmth, redness, pain, or wet feeling at the insertion site at any time, including after catheter removal.
- Educate the patient and family about central line-associated bloodstream infection (CLABSI) prevention.
- Encourage questions and answer them as they arise.

5. ASSESSMENT AND PREPARATION

Assessment

Assisting with Insertion

1. Perform hand hygiene before patient contact.
2. Verify the correct patient using two identifiers.
3. Review the patient's medical record for a history of coagulopathies, vascular abnormalities, peripheral vascular disease, peripheral neuropathies, vascular grafts, arterial vasospasm, thrombosis or embolism, and atrioventricular fistulas or shunts.
4. Review the patient's medication profile for current anticoagulation therapy and the laboratory profile, including complete blood count (CBC), platelet count, prothrombin time (PT), bleeding time, international normalized ratio (INR), and partial thromboplastin time (PTT).
5. Assess the neurovascular and peripheral vascular status of the affected extremity including the color, temperature, capillary refill, and motor and sensory function (compared with the contralateral extremity). Also, assess the extremity for the presence of a bruit (in larger arteries such as the femoral artery) and the presence and fullness of pulses.
   A modified Allen test may be performed before cannulation of the radial artery.

Removing an Arterial Catheter

1. Perform hand hygiene before patient contact.
2. Verify the correct patient using two identifiers.
3. Review the patient's medication profile for current anticoagulation therapy and the laboratory profile, including CBC, platelet count, PT, bleeding time, INR, and PTT.

Preparation

Assisting with Insertion

1. Perform hand hygiene before patient contact.
2. Verify the correct patient using two identifiers.
3. Use a catheter checklist, standardized supply cart or kit, and standardized protocol for insertion.
4. Comply with Universal Protocol.
   a. Use a standardized list to verify that all required items, including informed consent, are available.
   b. Mark the procedure site when required.
5. Prepare and prime a single-pressure disposable transducer system. Consider using a blood conservation arterial line system.
   Air is more easily removed from the hemodynamic tubing when the system is not under pressure.
   a. When preparing the flush solution, follow the organization's practice for adding heparin to the IV bag, if heparin is not contraindicated. Label the flush bag with the date and time the solution was hung and initial it.
      Rationale: The patency of arterial catheters is greater when heparin is infused. The decision to use heparin should be based on the organization's practice, clinical risk of occlusion, and patient factors such as heparin sensitivities.
   b. Turn the stopcock toward the port. Place an occlusive sterile cap or a sterile needleless cap on the top port of the stopcock.
      Rationale: Turning the stopcock off and placing a cap on the top port prepares the system for monitoring and maintains sterility.
   c. Apply and maintain pressure in the pressure bag or device at 300 mm Hg.[8]
   d. Label the pressure tubing with the date and time and initial it.

6. PROCEDURE

Assisting with Insertion

1. Perform hand hygiene and don sterile gloves, head covering, gown, and face shield or eye protection.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient and ensure he or she agrees to treatment.
5. Comply with Universal Protocol: Perform a time-out to verify correct patient, correct site, and correct procedure.
6. Place the patient in the supine position for cannulation. Pad the pressure points.
   a. If using the radial artery, place the arm with the wrist and palm up and adequately exposed. Dorsiflex the wrist and maintain this position with a towel under the back of the wrist. Avoid hyperdorsiflexion, which occludes the radial artery. Hold or tape the hand in place to maintain proper alignment.
   b. If using the brachial artery, elevate and hyperextend the patient's arm. Support the arm with a pillow.
   c. If using the femoral artery, position the patient with the hip slightly externally rotated to make the femoral area easily accessible.

Rationale: These positions facilitate insertion and may prevent laceration of the vessel wall during insertion. Padding pressure points prevents skin breakdown.

Administer sedation as prescribed if the patient is restless or combative or if the extremity cannot be stabilized sufficiently.

7. Use maximal sterile barrier precautions during insertion.
8. Cleanse the area of insertion.
   a. If the skin needs cleansing, use soap and water first, then allow to dry completely.[3]
   b. Prepare the insertion site with greater than 0.5% chlorhexidine in alcohol solution using a back-and-forth motion for at least 30 seconds and allow to dry completely.

      Use chlorhexidine cautiously because it may cause skin irritation and chemical burns in infants less than 2 months old or infants with compromised skin integrity (premature infants).
9. Assist the practitioner with inserting the arterial catheter as needed.
10. When the catheter is in place, connect the primed arterial line pressure tubing to the catheter.
11. Trace tubing or catheter from the patient to point of origin (1) before connecting or reconnecting any device or infusion, (2) at any transition (e.g., new setting), and (3) as part of the hand-off process.
12. Label the tubing at the connection site closest to the patient and at the connection site closest to the source when there are different access sites or several bags.

    Rationale: Tubing should be labeled to reduce the chance of misconnection, especially in circumstances where multiple IV lines or devices are in use.
13. Check vital signs immediately after making any connection per the organization's practice.
14. Do not force connections and avoid workarounds per the organization's practice.[7]

    Rationale: Forced connections or workarounds could indicate that the connection should not be made.

    Hold the catheter in place while the connections are made.
15. Secure the catheter in place with tape or adhesive strips and apply an impregnated sponge and an occlusive sterile dressing over the site. Use a transparent, semipermeable dressing alone or, if moisture is present, use a gauze dressing with tape.
16. Label the dressing per the organization's practice with the date and time of application and initial it.
17. Apply an arm board and joint stabilization device, as appropriate.

    Rationale: An arm board and joint stabilization device ensure the correct position to achieve an optimal waveform, prevent catheter dislodgment, and maintain device patency.
18. Connect the transducer cable to the bedside monitor.
19. Set the scale.

    The scale setting for the arterial pressure is based on the patient's blood pressure and the monitoring system.

20. Level the arterial air-fluid interface (zeroing stopcock port) to the phlebostatic axis at the midaxillary line and fourth intercostal space just above the nipple line.
    Rationale: Leveling ensures that the air-fluid interface of the monitoring system is level with a reference point on the body. Ideally, the reference point is the phlebostatic axis because it more accurately reflects central arterial pressure.
21. Zero the system connected to the arterial catheter by turning the stopcock off to the patient, opening the stopcock to air, and zeroing the monitoring system.
    Rationale: Zeroing prepares the monitoring system so arterial pressure can be obtained.
    To confirm that the system is zeroed, take off the cap, squeeze the transducer, and look for fluid coming out of the port.
22. Observe the waveform and perform a dynamic response test (square wave test).
    Rationale: Test results indicate whether the system is overdamped or underdamped.
23. Set the alarm limits according to the patient's current blood pressure and the organization's practice.
24. Run a waveform strip and record the patient's baseline arterial pressure.
25. Record the manual (noninvasive) blood pressure and compare it with the arterial (invasive) blood pressure.
    Rationale: The comparison provides baseline data.
    Noninvasive and invasive blood pressure do not have a direct relationship because noninvasive techniques measure blood flow and invasive techniques measure pressure.
26. Discard supplies, remove personal protective equipment (PPE), and perform hand hygiene.
27. Document the procedure in the patient's record.

Troubleshooting an Overdamped Waveform

1. Perform hand hygiene and don gloves and a face shield or eye protection.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient and ensure that he or she agrees to treatment.
5. Identify the overdamped waveform. If the arterial waveform seems to be overdamped, perform a dynamic response test.
   An overdamped waveform results in a falsely low systolic pressure and a falsely high diastolic pressure.
   Assess overdamping immediately to ensure waveform accuracy and prevent clotting of the catheter.
6. Compare the patient's status with the arterial pressure waveform.
   Rationale: A sudden hypotensive episode can look like an overdamped waveform.
7. If the waveform is overdamped, perform the following steps:
   a. Make sure the transducer is at the phlebostatic axis.
      Rationale: Repositioning the patient or raising or lowering the bed can change the position of the transducer.
      Rationale: A transducer not positioned at the phlebostatic axis is one of the most common causes of an overdamped waveform.

b. Check the catheter position at the insertion site.
   Rationale: Wrist movement at the radial site or leg flexion at the femoral site can cause catheter kinking or dislodgment, resulting in an overdamped waveform.
c. Check the tubing system for leaks or disconnections and correct problems.
d. Check the system for air bubbles and eliminate bubbles.
   Rationale: Air bubbles can cause an overdamped system as well as emboli.
e. Ensure that the flush bag has fluid and that pressure is maintained at 300 mm Hg.[8]
   Rationale: An empty flush bag or a pressure of less than 300 mm Hg may result in an overdamped system.
f. Attempt to aspirate and flush the catheter.
   Rationale: Aspirating and flushing the catheter helps withdraw air in the tubing or clots that may be at the catheter tip.
   Always aspirate before flushing a catheter with an overdamped waveform. Using the fast-flush device or flushing with a syringe first may force a clot at the catheter tip into arterial circulation.
   i. Remove the nonvented cap from the blood sampling port and attach an empty syringe to the top port of the stopcock closest to the patient.
   ii. Turn the stopcock off to the flush solution.
      Rationale: Turning the stopcock off to the flush solution opens the system from the patient to the syringe.
   iii. Gently attempt to aspirate; if resistance is felt, reposition the extremity and reattempt aspiration. If resistance is still felt, stop and notify the practitioner.
      Rationale: Aspiration assesses catheter patency. Normally, blood should be aspirated into the syringe without difficulty.
   iv. If blood is aspirated, remove the minimal amount to clear any clotted material in the catheter. Turn the stopcock off to the patient and discard the sample.
   v. Fast flush the remaining blood from the stopcock onto a sterile gauze pad or into another syringe and remove the syringe.
      Rationale: Flushing removes blood residue from the stopcock, where it could be a reservoir for bacterial growth, and prevents blood clotting in the blood sampling port.
   vi. Turn the stopcock off to the blood sampling port and place a new sterile nonvented cap on the port.
      Rationale: Turning off and capping the blood sampling port maintains sterility and a closed system.
   vii. Use the fast-flush device to clear the line of blood.
      Rationale: Clearing the line of blood prevents the arterial line from clotting.
8. Discard supplies, remove PPE, and perform hand hygiene.
9. Document the procedure in the patient's record.

Troubleshooting an Underdamped Waveform

1. Perform hand hygiene and don gloves and a face shield or eye protection.
2. Introduce yourself to the patient.

3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient and ensure that he or she agrees to treatment.
5. Identify the underdamped waveform.
6. Compare the patient's status with the arterial pressure waveform. Check for sudden hypotension, hypertension, or no change.
7. Perform a dynamic response test.
8. Make sure the transducer is at the phlebostatic axis.
   An underdamped waveform results in a falsely high systolic pressure and a falsely low diastolic pressure.
9. Check the system for air bubbles and eliminate bubbles.
   Rationale: Air bubbles can contribute to underdamping and cause emboli.
10. Check the length of the pressurized tubing system.
    Rationale: Additional tubing results in inaccurate pressures.
11. Discard supplies, remove PPE, and perform hand hygiene.
12. Document the procedure in the patient's record.

Changing an Arterial Line Dressing

1. Perform hand hygiene and don gloves.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient and ensure that he or she agrees to the treatments.
5. Gently remove the dressing and chlorhexidine-impregnated sponge (if present) without placing tension on the arterial catheter.
6. Observe the site for signs of infection.
7. Remove gloves and perform hand hygiene. Don sterile gloves.
8. Cleanse the insertion site with greater than 0.5% chlorhexidine in alcohol solution using a back-and-forth motion for at least 30 seconds, and allow to dry completely.
9. Apply a new chlorhexidine-impregnated sponge to the site per organization's practice.
10. Apply a new sterile dressing to the site. Use a transparent, semipermeable dressing alone or, if moisture is present, use a gauze dressing with tape.
11. Label the dressing per the organization's practice with the date and time of application and initial it.
12. Discard supplies, remove gloves, and perform hand hygiene.
13. Document the procedure in the patient's record.

Removing an Arterial Catheter

1. Perform hand hygiene and don gloves, gown, and face shield or eye protection.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient and ensure that he or she agrees to treatment.
5. Turn off the arterial monitoring alarms.
6. Depressurize the pressure bag.
7. Remove the dressing and chlorhexidine-impregnated sponge, if present.
8. Remove the stabilizing device or clip the sutures.
9. Turn the stopcock off to the flush solution.
10. Apply pressure one to two finger widths above the insertion site.

Rationale: Application of pressure prepares for catheter removal. The arterial puncture site is above the skin puncture site because the catheter enters the skin at an angle.

11. Pull out the arterial catheter in one smooth movement, using a sterile 4 × 4-in (10.2 × 10.2-cm) gauze pad to cover the site as the catheter is removed.
    Rationale: Covering the site with a gauze pad prevents blood splashing.
12. Continue to maintain proximal pressure and immediately apply firm pressure over the insertion site as the catheter is removed. Maintain pressure until hemostasis is achieved.
13. Apply a sterile dressing to the insertion site. Consider using a hemostatic pad as well.
    To prevent ischemia, ensure that the dressing does not encircle the extremity.
14. Assess the site frequently after catheter removal.
    Rationale: Frequent assessment verifies the absence of hematoma formation and the closure of the site.
15. Assess the circulatory status of distal areas after catheter removal.
16. Discard supplies, remove PPE, and perform hand hygiene.
17. Document the procedure in the patient's record.

8. MONITORING AND CARE

1. Assess the neurovascular and peripheral vascular status of the cannulated extremity immediately after catheter insertion and per the organization's practice. Assess more often if bleeding or hematoma develops.
   Rationale: Assessment validates adequate peripheral vascular and neurovascular integrity. Changes in sensation, motor function, pulses, color, temperature, or capillary refill may indicate ischemia, arterial spasm, or neurovascular compromise.
   Reportable conditions: Diminished or absent pulses; pale, mottled, or cyanotic appearance of the extremity; an extremity that is cool or cold to the touch; capillary refill time of more than 2 seconds; diminished or absent sensation; diminished or absent motor function
2. Check the arterial line flush system to maintain patency and prevent backflow of blood into the catheter and tubing.
3. Look for overdamped or underdamped waveforms.
   Rationale: An optimally damped system provides an adequate waveform with appropriate blood pressure readings.
   Reportable conditions: Overdamped or underdamped waveform that cannot be corrected with troubleshooting procedures
4. Perform a dynamic response test when the system is opened to air and when the accuracy of readings is in question.
   Rationale: An optimally damped system provides an accurate waveform.
   Reportable conditions: Overdamped or underdamped waveform that cannot be corrected with troubleshooting procedures
5. Zero the transducer if disconnection occurs between the transducer and the monitoring cable, if disconnection occurs between the monitoring cable and the monitor, if the values obtained do not fit the clinical picture, and per the organization's practice and manufacturer's instructions.

Rationale: Frequent zeroing of the transducer ensures accuracy of the hemodynamic monitoring system.

6. Recheck leveling whenever the patient's position changes.
   Rationale: Rechecking the leveling at a position change ensures an accurate reference point for the phlebostatic axis.
7. Assess the patient for signs and symptoms of infection, including redness and drainage at the insertion site, increased temperature, and increased white blood cell count.
   Rationale: Suspected infected catheters must be assessed as soon as possible to determine if removal is appropriate.
   Reportable conditions: Redness at the site, purulent drainage, tenderness or pain at the site, elevated temperature, elevated white blood cell count
8. Change the components (transducer, pressure tubing, stopcocks, flush bag and tubing, and continuous flush device) no more frequently than every 96 hours and when contamination or compromise of the system integrity is suspected.[4] The flush solution bag may need to be changed more frequently.
9. Run an arterial pressure strip and obtain arterial pressure measurements during end-expiration on a routine basis.
   Rationale: Obtaining measurements at the end of expiration eliminates the effect of the respiratory cycle on the arterial pressure waveform.
10. Obtain an arterial waveform strip per the organization's practice and when the waveform changes.
    Rationale: The printed waveform allows assessment of the adequacy of the waveform, damping, or respiratory variation.
11. Assess the need for continued use of the catheter daily.
    Rationale: Arterial catheters should be removed when they are no longer needed for the plan of care.
12. Minimize access to the arterial line to reduce the chance of infection.
13. Assess, treat, and reassess pain.

9. EXPECTED OUTCOMES

- Adequate circulation to the extremity
- Adequate sensory and motor function to the extremity
- No infection at the catheter site
- Catheter removed intact

10. UNEXPECTED OUTCOMES

- Pain or discomfort at the arterial catheter insertion site
- Impaired peripheral tissue perfusion (e.g., edema, coolness, pain, paleness, or slow capillary refill of fingers or toes of cannulated extremity)
- Redness, warmth, edema, or drainage
- Impaired sensory or motor function of the extremity

11. DOCUMENTATION

- Time-out procedure including verification of correct patient, correct procedure, and correct site
- Patient and family education

- Peripheral vascular and neurovascular assessment before, during, and after the insertion and after the catheter is removed
- Date and time of insertion
- Size of catheter placed
- Site of placement
- Patient's response to the procedure
- Date and time of arterial catheter removal
- Unexpected outcomes and related nursing interventions
- Pain assessment and management

12. REFERENCES

1. Faris, K. (2014). Chapter 3: Arterial line placement and care. In R.S. Irwin, C.M. Lilly, J.M. Rippe (Eds.), *Irwin and Rippe's manual of intensive care medicine* (6th ed., pp. 17-24). Philadelphia: Lippincott Williams & Wilkins.
2. Infusion Nurses Society (INS). (2016). Infusion therapy standards of practice. Standard 33: Vascular access site preparation and device placement. *Journal of Infusion Nursing, 39*(Suppl. 1), S64-S67. (Level D)
3. Infusion Nurses Society (INS). (2016). Infusion therapy standards of practice. Standard 41: Vascular access device (VAD) assessment, care, and dressing changes. *Journal of Infusion Nursing, 39*(Suppl. 1), S81-S84. (Level D)
4. Infusion Nurses Society (INS). (2016). Infusion therapy standards of practice. Standard 42: Administration set change. *Journal of Infusion Nursing, 39*(Suppl. 1), S84-S85. (Level D)
5. Infusion Nurses Society. (2016). Infusion therapy standards of practice. Standard 44: Vascular access device (VAD) removal. *Journal of Infusion Nursing, 39*(Suppl. 1), S91-S95. (Level D)
6. Infusion Nurses Society. (2016). Infusion therapy standards of practice. Standard 49: Infection. *Journal of Infusion Nursing, 39*(Suppl. 1), S106-S108. (Level D)
7. Joint Commission, The (TJC). (2014). Sentinel event alert 53: Managing risk during transition to new ISO tubing connector standards. Retrieved May 30, 2016, from http://www.jointcommission.org/assets/1/6/SEA_53_Connectors_8_19_14_final.pdf (Level D)
8. McGee, W.T., Headley, J.M., Frazier, J.A. (Eds.). (2014). *Edwards critical care education: Quick guide to cardiopulmonary care* (3rd ed.). Irvine, CA: Edwards Lifesciences. Retrieved May 30, 2016, from http://ht.edwards.com/scin/edwards/sitecollectionimages/products/pressuremonitoring/ar11206-quickguide3rded.pdf (Level M)
9. Mendoza, K.C. (2012). Radial artery catheterism for invasive monitoring: Preventing complications, a challenge in anesthesia. *Colombian Journal of Anesthesiology, 40*(4), 262-265. doi:10.1016/j.rcae.2012.05.007
10. O'Grady, N.P. and others. (2011). Guidelines for the prevention of intravascular catheter-related infections. Centers for Disease Control and Prevention. Retrieved May 30, 2016, from http://www.cdc.gov/hicpac/pdf/guidelines/bsi-guidelines-2011.pdf (Level D)

ADDITIONAL READINGS

McGhee, B.H., Bridges, E.J. (2002). Monitoring arterial blood pressure: What you may not know. *Critical Care Nurse, 22*(2), 60-79. (classic reference)*

*In these skills, a “classic” reference is a widely cited, standard work of established excellence that significantly affects current practice and may also represent the foundational research for practice.

Adapted from Wiegand, D.L. (2011). *AACN procedure manual for critical care* (6th ed.). St. Louis: Saunders.

NURSING EDUCATION UNIT

COMPETENCY-BASED CHECK OFF TOOL

Title: Competency Statement: Standards:	**ARTERIAL LINE INSERTION (ASSISTING, SETUP AND CARE)** **The nurse demonstrates acceptable level of competence in the performance of MANAGING PATIENTS FOR ARTERIAL VENOUS CATHETER INSERTION.** • **Infection Control and Patient Safety Compliance** • **Equipment Preparation and Manipulation** • **Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

37. Provide all the information needed in this check off tool.
38. Use the scale below by ENCIRCLING your most appropriate response
    4= Very Good (Performs competently without assistance and supervision)
    3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
    2= Poor (Performs inconsistently/incompletely with assistance and supervision)
    1= Very Poor (Cannot perform even with directions; procedural step omitted)
39. Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
40. Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
41. Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
42. Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1

5	Educates patient and family / caregiver (where appropriate).	4	3	2	1
Psychomotor Skills					
1	Performed hand hygiene before patient contact.	4	3	2	1
2	Verified the correct patient using two identifiers	4	3	2	1
3	Reviewed the patient's medical record for a history of coagulopathies, vascular abnormalities, peripheral vascular disease, peripheral neuropathies, vascular grafts, arterial vasospasm, thrombosis or embolism, and atrioventricular fistulas or shunts.	4	3	2	1
4	Reviewed the patient's medication profile for current anticoagulation therapy and the laboratory profile, including CBC, platelet count, PT, bleeding time, INR, and PTT.	4	3	2	1
5	Assessed the neurovascular and peripheral vascular status of the affected extremity including the color, temperature, capillary refill, and motor and sensory function (compared with the contralateral extremity). Also, assessed the extremity for the presence of a bruit (in larger arteries such as the femoral artery) and the presence and fullness of pulses.	4	3	2	1
6	Used a catheter checklist, standardized supply cart or kit, and standardized protocol for insertion.	4	3	2	1
7	Complied with Universal Protocol. a. Used a standardized list to verify that all required items, including informed consent, were available. b. Marked the procedure site when required.	4	3	2	1
8	Prepared and primed a single-pressure disposable transducer system. Considered using a blood conservation arterial line system. a. When preparing the flush solution, followed the organization's practice for adding heparin to the IV bag, if heparin was not contraindicated. Labeled the flush bag with the date and time the solution was hung and initialed it. b. Turned the stopcock toward the port. Placed an occlusive sterile cap or a sterile needleless cap on the top port of the stopcock. c. Applied and maintained pressure in the pressure bag or device at 300 mm Hg. d. Labeled the pressure tubing with the date and time and initialed it.	4	3	2	1
9	Performed hand hygiene and donned sterile gloves, head covering, gown, and face shield or eye protection.	4	3	2	1
10	Introduced yourself to the patient.	4	3	2	1
11	Verified the correct patient using two identifiers.	4	3	2	1
12	Explained the procedure to the patient and ensured he or she agreed to treatment.	4	3	2	1
13	Complied with Universal Protocol: Performed a time-out to verify correct patient, correct site, and correct procedure.	4	3	2	1
14	Placed the patient in the supine position for cannulation. Padded the pressure points. a. If using the radial artery, placed the arm with the wrist and palm up and adequately exposed. Dorsiflexed the wrist and maintained this position with a towel under the back of the wrist. Avoided hyperdorsiflexion, which occludes the radial artery. Held or taped the hand in place to maintain proper alignment.	4	3	2	1

	b. If using the brachial artery, elevated and hyperextended the patient's arm. Supported the arm with a pillow. c. If using the femoral artery, positioned the patient with the hip slightly externally rotated to make the femoral area easily accessible.				
15	Used maximal sterile barrier precautions during insertion.	4	3	2	1
16	Cleansed the area of insertion. a. If the skin needed cleansing, used soap and water first, then allowed to dry completely. b. Prepared the insertion site with greater than 0.5% chlorhexidine in alcohol solution using a back-and-forth motion for at least 30 seconds and allowed to dry completely.	4	3	2	1
17	Assisted the practitioner with inserting the arterial catheter as needed.	4	3	2	1
18	When the catheter was in place, connected the primed arterial line pressure tubing to the catheter.	4	3	2	1
19	Traced tubing or catheter from the patient to point of origin (1) before connecting or reconnecting any device or infusion, (2) at any transition (e.g., new setting), and (3) as part of the hand-off process.	4	3	2	1
20	Labeled the tubing at the connection site closest to the patient and at the connection site closest to the source when there were different access sites or several bags.	4	3	2	1
21	Checked vital signs immediately after making any connection per the organization's practice.	4	3	2	1
22	Did not force connections and avoided workarounds per the organization's practice.	4	3	2	1
23	Secured the catheter in place with tape or adhesive strips and applied an impregnated sponge and an occlusive sterile dressing over the site. Used a transparent, semipermeable dressing alone or, if moisture was present, used a gauze dressing with tape.	4	3	2	1
24	Labeled the dressing per the organization's practice with the date and time of application and initialed it.	4	3	2	1
25	Applied an arm board and joint stabilization device, as appropriate.	4	3	2	1
26	Connected the transducer cable to the bedside monitor.	4	3	2	1
27	Set the scale.	4	3	2	1
28	Leveled the arterial air-fluid interface (zeroing stopcock port) to the phlebostatic axis at the midaxillary line and fourth intercostal space just above the nipple line.	4	3	2	1
29	Zeroed the system connected to the arterial catheter by turning the stopcock off to the patient, opening the stopcock to air, and zeroing the monitoring system.	4	3	2	1
30	Observed the waveform and performed a dynamic response test (square wave test).	4	3	2	1
31	Set the alarm limits according to the patient's current blood pressure and the organization's practice.	4	3	2	1
32	Ran a waveform strip and recorded the patient's baseline arterial pressure.	4	3	2	1
33	Recorded the manual (noninvasive) blood pressure and compared it with the arterial (invasive) blood pressure.	4	3	2	1
34	Assessed, treated, and reassessed pain.	4	3	2	1

35	Discarded supplies, removed PPE, and performed hand hygiene.	4	3	2	1
36	Documented the procedure in the patient's record.	4	3	2	1
Troubleshooting an Overdamped Waveform					
1	Performed hand hygiene and donned gloves and a face shield or eye protection.	4	3	2	1
2	Introduced yourself to the patient.	4	3	2	1
3	Verified the correct patient using two identifiers.	4	3	2	1
4	Explained the procedure to the patient and ensured he or she agreed to treatment.	4	3	2	1
5	Identified the overdamped waveform. If the arterial waveform seemed to be overdamped, performed a dynamic response test.	4	3	2	1
6	Compared the patient's status with the arterial pressure waveform.	4	3	2	1
7	If the waveform was overdamped, performed the following steps: a. Made sure the transducer was at the phlebostatic axis. b. Checked the catheter position at the insertion site. c. Checked the tubing system for leaks or disconnections and corrected problems. d. Checked the system for air bubbles and eliminated bubbles. e. Ensured that the flush bag had fluid and that pressure was maintained at 300 mm Hg. f. Attempted to aspirate and flush the catheter. i. Removed the nonvented cap from the blood sampling port and attached an empty syringe to the top port of the stopcock closest to the patient. ii. Turned the stopcock off to the flush solution. iii. Gently attempted to aspirate; if resistance was felt, repositioned the extremity and reattempted aspiration. If resistance was still felt, stopped and notified the practitioner. iv. If blood was aspirated, removed the minimal amount to clear any clotted material in the catheter. Turned the stopcock off to the patient and discarded the sample. v. Fast flushed the remaining blood from the stopcock onto a sterile gauze pad or into another syringe and removed the syringe. vi. Turned the stopcock off to the blood sampling port and placed a new sterile nonvented cap on the port. vii. Used the fast-flush device to clear the line of blood.	4	3	2	1
8	Assessed, treated, and reassessed pain.	4	3	2	1
9	Discarded supplies, removed PPE, and performed hand hygiene.	4	3	2	1
10	Documented the procedure in the patient's record.	4	3	2	1
Troubleshooting an Underdamped Waveform					
1	Performed hand hygiene and donned gloves and a face shield or eye protection.	4	3	2	1
2	Introduced yourself to the patient. Verified the correct patient using two identifiers	4	3	2	1
3	Explained the procedure to the patient and ensured he or she agreed to treatment.	4	3	2	1
4	Identified the underdamped waveform.	4	3	2	1

5	Compared the patient's status with the arterial pressure waveform. Checked for sudden hypotension, hypertension, or no change.	4	3	2	1
6	Performed a dynamic response test.	4	3	2	1
7	Made sure the transducer was at the phlebostatic axis.	4	3	2	1
8	Checked the system for air bubbles and eliminated bubbles.	4	3	2	1
9	Checked the length of the pressurized tubing system.	4	3	2	1
10	Assessed, treated, and reassessed pain.	4	3	2	1
11	Discarded supplies, removed PPE, and performed hand hygiene.	4	3	2	1
12	Documented the procedure in the patient's record.	4	3	2	1
Changing an Arterial Line Dressing					
1	Performed hand hygiene and donned sterile gloves.	4	3	2	1
2	Introduced yourself to the patient.	4	3	2	1
3	Verified the correct patient using two identifiers.	4	3	2	1
4	Explained the procedure to the patient and ensured he or she agreed to treatment.	4	3	2	1
5	Gently removed the dressing and chlorhexidine-impregnated sponge (if present) without placing tension on the arterial catheter.	4	3	2	1
6	Observed the site for signs of infection.	4	3	2	1
7	Remove gloves and perform hand hygiene. Don sterile gloves.	4	3	2	1
8	Cleanse the insertion site with greater than 0.5% chlorhexidine in alcohol solution using a back-and-forth motion for at least 30 seconds, and allow to dry completely.	4	3	2	1
9	Applied a new chlorhexidine-impregnated sponge to the site per organization's practice.	4	3	2	1
10	Applied a new sterile dressing to the site. Used a transparent, semipermeable dressing alone or, if moisture was present, used a gauze dressing with tape.	4	3	2	1
11	Labeled the dressing per the organization's practice with the date and time of application and initialed it.	4	3	2	1
12	Assessed, treated, and reassessed pain	4	3	2	1
13	Discarded supplies, removed gloves, and performed hand hygiene.	4	3	2	1
14	Documented the procedure in the patient's record.	4	3	2	1
Removing an Arterial Catheter					
1	Performed hand hygiene before patient contact	4	3	2	1
2	Verified the correct patient using two identifiers.	4	3	2	1
3	Reviewed the patient's medication profile for current anticoagulation therapy and the laboratory profile, including CBC, platelet count, PT, bleeding time, INR, and PTT.	4	3	2	1
4	Performed hand hygiene and donned gloves, gown, and face shield or eye protection.	4	3	2	1
5	Introduced yourself to the patient.	4	3	2	1
6	Verified the correct patient using two identifiers.	4	3	2	1
7	Explained the procedure to the patient and ensured he or she agreed to treatment.	4	3	2	1
8	Turned off the arterial monitoring alarms.	4	3	2	1
9	Depressurized the pressure bag.	4	3	2	1
10	Removed the dressing and chlorhexidine-impregnated sponge, if present.	4	3	2	1
11	Removed the stabilizing device or clipped the sutures.	4	3	2	1

12	Turned the stopcock off to the flush solution.	4	3	2	1
13	Applied pressure one to two finger widths above the insertion site.	4	3	2	1
14	Pulled out the arterial catheter in one smooth movement, using a sterile 4 × 4-in (10.2 × 10.2-cm) gauze pad to cover the site as the catheter was removed.	4	3	2	1
15	Continued to maintain proximal pressure and immediately applied firm pressure over the insertion site as the catheter was removed. Maintained pressure until hemostasis was achieved.	4	3	2	1
16	Applied a sterile dressing to the insertion site. Considered using a hemostatic pad as well.	4	3	2	1
17	Assessed the site frequently after catheter removal.	4	3	2	1
18	Assessed the circulatory status of distal areas after catheter removal.	4	3	2	1
19	Assessed, treated, and reassessed pain.	4	3	2	1
20	Discarded supplies, removed PPE, and performed hand hygiene.	4	3	2	1
21	Documented the procedure in the patient's record.	4	3	2	1
C. Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1
D. Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse's Comments/Recommendations for Improvement:

Originating Department	Nursing Education Unit	**Module No.**	1-2017
Title	**ORAL HYGIENE (CONSCIOUS PATIENTS)**		
Author/s	**Ronald Martin Carcillar-CRN-ICU**		
Original Date	October, 2017	**Revision Date**	

1. ALERT

Frequency of oral care should be based on the condition of the patient's oral cavity and his or her level of comfort.

2. OVERVIEW

During illness, many factors influence the need for oral hygiene. The nurse should offer patients oral hygiene assistance as required, from preparing needed supplies to brushing a patient's teeth. The nurse's responsibility also is to determine how frequently patients require oral hygiene.

Maintaining daily oral hygiene, including brushing, flossing, and rinsing, is essential for preventing and controlling plaque-associated oral diseases. In addition to preventing inflammation and infection, oral hygiene promotes comfort, nutrition, and verbal communication.

- Brushing cleanses the teeth of food particles, plaque (the cause of dental caries), and bacteria. Brushing also massages the gums and relieves discomfort from unpleasant odors and tastes.
- Flossing removes tartar that collects at the gumline.
- Rinsing removes dislodged food particles and excess toothpaste.
- Rinsing with mouthwash may be used to freshen breath, help prevent or control tooth decay, reduce plaque, prevent or reduce gingivitis, and reduce tartar formation on teeth. There are two types of mouthwashes:
  - *Therapeutic mouthwashes* may help reduce plaque, gingivitis, cavities, and bad breath; those that contain fluoride help prevent or reduce tooth decay.
  - *Cosmetic mouthwashes* may temporarily freshen bad breath and leave a pleasant taste, but they don't help reduce plaque, gingivitis, or cavities or kill bacteria that cause bad breath.

The nurse should notify the family's dentist if they use bottled water or water that is not fluoridated. The dentist may provide a prescription for fluoride dietary supplements. The dentist will evaluate their need for professionally applied topical fluoride treatments or fluoride-containing mouth rinse and brush-on gels or pastes.

3. SUPPLIES

- Soft-bristle toothbrush
- Nonabrasive fluoride toothpaste or dentifrice
- Dental floss
- Tongue depressor
- Water glass with cool water
- Straw (optional)

- Therapeutic mouthwash product that carries the ADA seal of acceptance (optional)
- Emesis basin
- Towel
- Paper towels
- Gloves

4. PATIENT AND FAMILY EDUCATION

- Provide the patient and family with an explanation of the equipment and the procedure and discuss preferences regarding use of hygienic aids.
- Educate the patient and family about methods to prevent tooth decay by practicing good oral hygiene:
  - Brush teeth twice a day with a soft-bristle brush (hard toothbrushes damage enamel and gums).
  - Use toothpaste that contains fluoride.
  - Clean between the teeth once a day with floss or another interdental cleaner.
  - Rinse the mouth thoroughly with water or an antimicrobial mouth rinse.
  - Replace the toothbrush every 3 to 4 months.
- Advise the patient to eat a balanced diet, limit between-meal snacks, and reduce intake of carbohydrates, especially sweet sticky snacks between meals.
- Advise the patient how to maintain adequate intake of water and other fluids.
- Tell the patient to visit a dentist regularly for professional cleaning and oral examination, commonly once or twice per year, although frequency may vary as recommended by the dentist or medical practitioner. The patient should not delay dental visits until pain or concerns about the mouth and teeth arise.
- Advise the patient to quit smoking if applicable.
- Encourage questions and answer them as they arise.

5. ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene before patient contact.
2. Verify the correct patient using two identifiers.
3. Assess the patient's risk for oral hygiene problems.
   a. Dehydration
   b. Inability to take fluids or food by mouth
   c. Presence of nasogastric or oxygen tubes
   d. Mouth breathing
   e. Chemotherapy drugs and other medications (e.g., antihistamines, phenytoin, antibiotics)
      Rationale: Chemotherapy drugs may cause mouth sores; antihistamines contribute to dry mouth; and phenytoin may cause gingival overgrowth and enlargement, resulting in more pain, bleeding of gums, tooth movement, tooth decay, and periodontal disease.
   f. Radiation therapy to head and neck
   g. Coagulation disorders (e.g., leukemia, aplastic anemia)
   h. Oral surgery; trauma to mouth

i. Advanced age
j. Chemical injury
k. Diabetes mellitus
l. Artificial airway

4. Determine the patient's oral hygiene practices and willingness to attend to hygiene needs.
   a. Frequency of toothbrushing and flossing
   b. Type of toothpaste used
   c. Last dental visit
   d. Frequency of dental visits
   e. Type of mouthwash used
5. Assess the patient's ability to hold and manipulate the toothbrush.

Preparation

1. Place paper towels on the over-bed table, and arrange other equipment within easy reach.

6. PROCEDURE

1. Perform hand hygiene and don gloves.
2. Verify the correct patient using two identifiers.
3. Raise the bed to a comfortable working position.
   a. Raise the head of the bed, if permitted, and lower the side rail.
      Rationale: Semi-Fowler position helps prevent choking or aspirating.
   b. Move the patient, or help him or her move closer to the side of the bed or assume a side-lying position.
4. Place a paper towel over the patient's chest.
5. Using a tongue depressor, inspect the integrity of lips, teeth, buccal mucosa, gums, palate, and tongue, and check for the gag reflex. Instruct the patient not to bite down.
6. Assess the patient for pain during inspection of the oral cavity.
7. Identify the presence of common oral problems:
   a. *Dental caries*: Chalky white discoloration of tooth or presence of brown or black discoloration
   b. *Gingivitis*: Inflammation of gums
   c. *Periodontitis*: Receding gumlines, inflammation, gaps between teeth
   d. *Halitosis*: Bad breath
   e. *Cheilosis*: Cracking of lips
   f. *Stomatitis*: Inflammation (may include mucositis and infection) of the oral tissue, including dentition, mucosa, and periodontium
   g. *Oral mucositis*: Inflammation of oral mucosa from chemotherapy or radiation therapy administration
   h. *Leukoplakia*: White or gray patches on the tongue, inside of the cheek, or on the floor of the mouth caused by long-term irritation
   i. *Xerostomia*: Dry mouth
8. Apply toothpaste to brush bristles, holding the brush over the emesis basin. Pour a small amount of water over the toothpaste.
   Rationale: Moisture helps distribute toothpaste over tooth surfaces.
9. Brush the patient's teeth, or assist the patient in brushing.
   a. Hold the toothbrush bristles at a 45-degree angle to the gumline. Make sure the tips of the bristles rest against and penetrate under the gumline.

b. Clean the biting surfaces of the teeth by holding the top of the bristles against them and brushing gently back and forth.
c. Brush inner and outer surfaces of the upper and lower teeth by brushing from the gum to the crown of each tooth.
d. Brush the sides of the teeth by moving bristles back and forth.
Rationale: A 45-degree angle allows the brush to reach all tooth surfaces and to clean under the gumline where plaque and tartar accumulate. Back-and-forth motion loosens food particles caught between the teeth and along the chewing surfaces.

10. Have the patient hold the brush at a 45-degree angle and lightly brush over surface and sides of the tongue. Caution him or her to avoid initiating the gag reflex.
Rationale: Microorganisms collect and grow on the tongue's surface and contribute to bad breath. Gagging may cause aspiration of toothpaste.
11. Allow the patient to rinse the mouth thoroughly with water.
a. Have the patient take several sips of water (or use a straw), swish water across all tooth surfaces, and spit into the emesis basin.
b. Use this time to teach the patient the importance of brushing teeth twice a day.
Rationale: Rinsing removes food particles. The American Dental Association (ADA) recommends brushing the teeth twice a day with fluoride toothpaste.
12. Allow the patient to floss between all teeth. Assist the patient as necessary.
a. Direct the patient to insert the floss between two teeth and hold it against each tooth while moving it up and down against the sides of the tooth.
b. Instruct the patient on the importance of daily flossing.
Rationale: Flossing removes plaque and prevents gum disease. The ADA recommends flossing once daily to remove decay-causing bacteria between teeth and under the gumline.
13. Have the patient rinse the teeth with therapeutic mouth rinse, then spit the rinse into the emesis basin.
Rationale: ADA-accepted therapeutic mouth rinse is effective in diminishing dental plaque, gingivitis, cavities, bad breath, and gum disease.
14. Assist in wiping the patient's mouth.
15. Assist the patient to a comfortable position.
16. Remove the emesis basin and the over-bed table, raise the side rail if appropriate, and lower the bed to its original position.
17. Wipe the over-bed table and return equipment to the proper place.
18. Discard supplies, remove gloves, and perform hand hygiene.
19. Document the procedure in the patient's record. Report any abnormal findings to the practitioner.

7. MONITORING AND CARE

1. Ask the patient whether any area of the mouth feels uncomfortable or irritated.
Rationale: Pain indicates a chronic problem.
2. Ask the patient to describe proper oral hygiene techniques and recommended frequency.
3. Assess, treat, and reassess pain.

8. EXPECTED OUTCOMES

- Patient expresses a feeling of oral cleanliness.
- Oral cavity structures have normal characteristics.
  - Oral mucosa is moist, intact, and of normal color.
  - Gums are pink, firm, and adherent to neck of teeth.
  - Teeth are clean, smooth, and shiny.
  - Tongue is pink and without secretions or coating.
- Patient describes correct oral hygiene techniques and necessary frequency.
- Patient makes choices regarding hygiene procedure and assists by flossing and brushing.

9. UNEXPECTED OUTCOMES

- Mucosa is dry and inflamed. Tongue has a thick coating.
- Gum margins are retracted from the teeth, with localized areas of inflammation.
- Bleeding occurs around gum margins.

10. DOCUMENTATION

- Patient's tolerance of the procedure
- Condition of oral cavity
- Bleeding, pain, or presence of lesions
- Patient and family education
- Unexpected outcomes and related nursing interventions
- Pain assessment and management

11. PEDIATRIC CONSIDERATIONS

- Clean an infant's gums with warm water and gauze or a soft infant toothbrush—even before teeth are formed.
- Because tooth decay is a disease that may begin with cavity-causing bacteria being passed from the mother (or caregiver) to the infant, teach the following points:
  - Try not to share saliva with the infant through common use of feeding spoons or licking pacifiers.
  - After each feeding, wipe the infant's gums with a clean, damp gauze pad or washcloth.
- Use no more than a "smear" or "rice-size" amount of fluoridated toothpaste for children less than 3 years old and a "pea-size" amount of fluoridated toothpaste for children between 3 and 6 years old; young children are unable to spit and are likely to swallow the toothpaste.
- Teach parents or caregivers that an infant should not be put to bed with a bottle filled with milk or liquids containing sugar; a bottle with anything other than water contributes to tooth decay.
- Encourage healthy eating habits and limiting between-meal snacks.
- Notify the family's dentist if they use bottled water or water that is not fluoridated.

- Caution the family that oral care requires adult supervision of children until at least 8 years of age because preschoolers and young school-age children do not have fine motor skills to remove plaque
- Inform the family that children should have their first dental examination by a pediatric dentist at 1 year old.

12. GERONTOLOGICAL CONSIDERATIONS

- A number of normal age-related changes occur in the oral cavity.
  - Thinning of the oral mucosa and decreased vascularity of the gingivae predispose older adults to injury and periodontal disease.
  - Loss of tissue elasticity and decreased mass and strength of the muscles make chewing more difficult.
  - Loss of the alveolar bone mass may loosen natural teeth.
- The number of taste buds declines with advancing age. In an attempt to enhance the taste of food, some older adults choose salty and sugary foods, which erode tooth enamel and expose dentin.
- Plaque retention is a problem in older adults, worsened by existing tooth restorations, missing teeth, gingival recession, and wearing of removable prosthetic devices (e.g., dentures, bridges, partial plates).
- The ADA recommends regular dental checkups (at least once a year) and advises against waiting until the older person experiences pain.
- Some older adults may experience difficulty with maintaining good oral hygiene with flossing and brushing because of decreasing dexterity and vision.
- Older adults may experience an increase in cavities because of dry mouth, which is not a normal part of aging, but rather a side effect of many medications.[3] The nurse should institute strategies to help relieve dry mouth.
- Many factors contribute to poor oral health among nursing home residents, but lack of daily oral care is a significant factor. Delivery of daily oral care requires an integrated approach to education, provisions of resources, an oral hygiene champion, leadership support, and adherence to the organization's practice

13. HOME CARE CONSIDERATIONS

- During the initial visit, the nurse should document the condition of the patient's mouth, teeth, and gums. This provides a baseline for assessing the patient's ability to comply with special diets and fluid intake and to carry out oral hygiene practices.

14. REFERENCES

1. American Academy of Pediatric Dentistry (AAPD). (2014). Guideline on fluoride therapy. *AAPD Reference Manual, 37*(6), 176-179. (Level VII)
2. American Academy of Pediatric Dentistry (AAPD). (2014). Policy on early childhood caries (ECC): Classifications, consequences, and preventive strategies. *AAPD Reference Manual, 37*(6), 50-52. (Level VII)
3. American Dental Association (ADA). (n.d.). Brushing your teeth. Retrieved January 29, 2017, from http://www.mouthhealthy.org/en/az-topics/b/brushing-your-teeth
4. American Dental Association (ADA). (n.d.) Mouthwash. Retrieved January 29, 2017, from http://www.mouthhealthy.org/en/az-topics/m/mouthwash

5. Bissett, S., Preshaw, P. (2011). Guide to providing mouth care for older people. *Nursing Older People, 23*(10), 14-21. (classic reference)* doi:10.7748/nop2011.12.23.10.14.c8837
6. Blevins, J.Y. (2013). Status or oral health care in hospitalized children. *MCN: American Journal of Maternal and Child Nursing, 38*(2), 115-119. doi:10.1097/NMC.0b013e318269daac
7. McNally, M. and others. (2015). Implementing oral care practices and policy into long-term care: The brushing up on mouth care project. *Journal of the American Medical Directors Association, 16*(3), 200-207. doi:10.1016/j.jamda.2014.08.018 (Level VI)
8. Thomas, M.H. (2015). Chapter 9: Health care delivery settings and older adults. In S.E. Meiner (Ed.), *Gerontologic nursing* (5th ed., pp. 153-179). St. Louis: Mosby.

ADDITIONAL READING

Institute of Medicine (IOM). (2011). *Advancing oral health in America*. Washington, DC: The National Academies Press.

*In these skills, a "classic" reference is a widely cited, standard work of established excellence that significantly affects current practice and may also represent the foundational research for practice.

Excerpted and adapted from Perry, A.G., Potter, P.A., Ostendorf, W.R. (2014). *Clinical nursing skills & techniques* (8th ed.). St. Louis: Mosby.

NURSING EDUCATION UNIT

COMPETENCY-BASED CHECK OFF TOOL

Title:	**ORAL CARE FOR CONSCIOUS AND ABLE PATIENTS**
Competency Statement:	**The nurse demonstrates acceptable level of competence in the performance of ORAL CARE.**
Standards:	• **Infection Control and Patient Safety Compliance** • **Equipment Preparation and Manipulation** • **Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

43. Provide all the information needed in this check off tool.
44. Use the scale below by ENCIRCLING your most appropriate response
    4= Very Good (Performs competently without assistance and supervision)
    3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
    2= Poor (Performs inconsistently/incompletely with assistance and supervision)
    1= Very Poor (Cannot perform even with directions; procedural step omitted)
45. Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
46. Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
47. Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
48. Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1
5	Educates patient and family / caregiver (where appropriate).	4	3	2	1
Psychomotor Skills					

1	Performed hand hygiene before patient contact.	4	3	2	1
2	Verified the correct patient using two identifiers.	4	3	2	1
3	Assessed the patient's risk for oral hygiene problems. a. Dehydration b. Inability to take fluids or food by mouth c. Presence of nasogastric or oxygen tubes d. Mouth breathing e. Chemotherapy drugs and other medications (e.g., antihistamines, phenytoin, antibiotics) f. Radiation therapy to head and neck g. Coagulation disorders (e.g., leukemia, aplastic anemia) h. Oral surgery; trauma to mouth i. Advanced age j. Chemical injury k. Diabetes mellitus l. Artificial airway	4	3	2	1
4	Determined the patient's oral hygiene practices and willingness to attend to hygiene needs. a. Frequency of toothbrushing and flossing b. Type of toothpaste used c. Last dental visit d. Frequency of dental visits e. Type of mouthwash used	4	3	2	1
5	Assessed the patient's ability to hold and manipulate the toothbrush.	4	3	2	1
6	Placed paper towels on the over-bed table, and arranged other equipment within easy reach.	4	3	2	1
7	Performed hand hygiene and donned gloves.	4	3	2	1
8	Raised the bed to a comfortable working position. a. Raised the head of the bed, if permitted, and lowered the side rail. b. Moved the patient, or helped him or her move closer to the side of the bed or attain a side-lying position.	4	3	2	1
9	Placed a paper towel over the patient's chest.	4	3	2	1
10	Using a tongue depressor, inspected the integrity of lips, teeth, buccal mucosa, gums, palate, and tongue, and checked for the gag reflex. Instructed the patient not to bite down.	4	3	2	1
11	Assessed the patient for pain during inspection of the oral cavity.	4	3	2	1
12	Identified the presence of common oral problems: a. *Dental caries*: Chalky white discoloration of tooth or presence of brown or black discoloration b. *Gingivitis*: Inflammation of gums c. *Periodontitis*: Receding gumlines, inflammation, gaps between teeth d. *Halitosis*: Bad breath e. *Cheilosis*: Cracking of lips f. *Stomatitis*: Inflammation (may include mucositis and infection) of the oral tissue, including dentition, mucosa, and periodontium g. *Oral mucositis*: Inflammation of oral mucosa from chemotherapy or radiation therapy administration h. *Leukoplakia*: White or gray patches on the tongue, inside of the cheek, or on the floor of the mouth caused by long-term irritation	4	3	2	1

	i. *Xerostomia*: Dry mouth				
13	Applied toothpaste to brush bristles, holding the brush over the emesis basin. Poured a small amount of water over the toothpaste.	4	3	2	1
14	Brushed the patient's teeth, or assisted the patient in brushing. a. Held the toothbrush bristles at a 45-degree angle to the gumline. Was sure the tips of the bristles rested against and penetrated under the gumline. b. Cleaned the biting surfaces of the teeth by holding the top of the bristles against them and brushing gently back and forth. c. Brushed inner and outer surfaces of the upper and lower teeth by brushing from the gum to the crown of each tooth. d. Brushed the sides of the teeth by moving bristles back and forth.	4	3	2	1
15	Had the patient hold the brush at a 45-degree angle and lightly brush over surface and sides of the tongue. Cautioned him or her to avoid initiating the gag reflex.	4	3	2	1
16	Allowed the patient to rinse the mouth thoroughly with water. a. Had the patient take several sips of water (or use a straw), swish water across all tooth surfaces, and spit into the emesis basin. b. Used this time to teach the patient the importance of brushing teeth twice a day.	4	3	2	1
17	Allowed the patient to floss between all teeth. Assisted the patient as necessary. a. Directed the patient to insert the floss between two teeth and hold it against each tooth while moving it up and down against the sides of the tooth. b. Instructed the patient on the importance of daily flossing.	4	3	2	1
18	Had the patient rinse the teeth with therapeutic mouth rinse, then spit the rinse into the emesis basin.	4	3	2	1
19	Assisted in wiping the patient's mouth.	4	3	2	1
20	Assisted the patient to a comfortable position.	4	3	2	1
21	Removed the emesis basin and the over-bed table, raised the side rail if appropriate, and lowered the bed to its original position.	4	3	2	1
22	Wiped the over-bed table and returned equipment to the proper place.	4	3	2	1
23	Assessed, treated, and reassessed pain.	4	3	2	1
24	Discarded supplies, removed gloves, and performed hand hygiene.	4	3	2	1
25	Documented the procedure in the patient's record. Reported any abnormal findings to the practitioner.	4	3	2	1
C. Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1
D. Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse's Comments/Recommendations for Improvemen

Originating Department	Nursing Education Unit	Module No.	1-2017
Title	ORAL HYGIENE FOR UNCONSCIOUS OR DEBILATED PATIENTS		
Author/s	Ronald Martin Carcillar-CRN-ICU		
Original Date	October, 2017	Revision Date	

1. ALERT

If the patient has an impaired gag reflex, determine the type of suction apparatus needed at the bedside to protect the airway from aspiration.

Never place fingers in the mouth of an unconscious or a debilitated patient. The normal response is to bite down.

2. OVERVIEW

Unconscious or debilitated patients have the same risk factors for oral problems as other patients, including dehydration, mouth breathing, chemical injury to the mucosa, and oral trauma. Optimal oral care should focus on plaque removal and stimulation of salivary flow.

If the patient's mouth is too sore for brushing or if the patient has no teeth, cleansing with a water-moistened foam stick applicator is an option, although swab sticks do not remove plaque as effectively as a toothbrush. Dependent adult patients have experienced improved oral health (e.g., reductions in tartar, swollen or bleeding gums, ulcerations, debris, and severe halitosis) after detailed staff or caregiver education and implementation of an oral care protocol using soft-bristle, small-headed toothbrushes and not using sponge swabs. Studies show that powered toothbrushes remove plaque and reduce gingivitis more effectively than manual toothbrushing in the short and long term. Chlorhexidine rinse is an antimicrobial solution widely accepted for safe and effective use in oral care, yet research results have been inconclusive regarding which population is most likely to benefit and at what dose.

Unconscious patients are susceptible to drying of mucous-thickened salivary secretions because they are unable to eat or drink, frequently breathe through the mouth, and often receive oxygen therapy. Proper oral hygiene requires keeping the oral mucosa moist and removing secretions that lead to infection. The unconscious patient cannot swallow salivary secretions that accumulate in the mouth. These secretions commonly contain gram-negative bacteria that cause pneumonia if aspirated into the lungs. Routine suctioning of the mouth and pharynx may be required to manage oral secretions to reduce the risk of aspiration.

Many patients have no gag reflex as a result of altered consciousness or neurologic injury. While providing oral hygiene to an unconscious patient, the nurse should protect him or her from choking and aspiration by removing fluid from the mouth and minimizing additional fluid accumulation. Having two people involved may simplify care: One cleanses the patient's mouth while the other suctions secretions.

The nurse should evaluate the level and frequency of oral care daily during assessment of the patient's oral cavity. Oral care should be done at least twice daily; some debilitated patients may require more frequent oral care until the mucosa returns to normal. The American Dental Association recommends the following:

- Routine brushing of teeth with fluoride toothpaste and a soft-bristle toothbrush twice a day followed by daily flossing of teeth or use of an interdental cleanser to prevent dental plaque.
- Use of alcohol-free antiseptic oral rinse or therapeutic mouthwash to help reduce plaque and prevent gingivitis and tooth decay.

Lemon and glycerin swabs are discouraged because they dry the oral mucosa. Application of a water-based mouth moisturizer may help maintain the integrity of the oral mucosa if the debilitated or unconscious patient has a persistent dry mouth.

3. SUPPLIES

- Small soft-bristle toothbrush or a foam stick applicator
- Antimicrobial rinse (e.g., chlorhexidine)
- Fluoride toothpaste
- Water-based mouth moisturizer
- Small bulb syringe or suction equipment (optional)
- Oral airway
- Water-soluble lip lubricant
- Glass with cool water
- Face towel
- Paper towels
- Emesis basin
- Gloves

4. PATIENT AND FAMILY EDUCATION

- Explain the procedure and the equipment to the patient and family. Do not assume that an unconscious person is unable to hear.
- Instruct family members who care for a debilitated patient at home on mouth care so they understand how to protect the patient from aspirating while thoroughly cleansing the oral cavity. Include the patient in the education session.
- Observe the family caregivers performing mouth care.
- Encourage questions and answer them as they arise.

5. ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene before patient contact.
2. Verify the correct patient using two identifiers.
3. Assess the patient for risk factors for oral hygiene problems.
    a. Dehydration
    b. Inability to take fluids or food by mouth
    c. Ill-fitting dentures or partial plates

d. Nasogastric or oxygen tubes
e. Mouth breathing
f. Medications
    i. Chemotherapy drugs can cause mouth sores.
    ii. Antihistamines contribute to dry mouth.
    iii. Phenytoin can cause gingival overgrowth and enlargement, resulting in more pain, gum bleeding, tooth movement, tooth decay, and periodontal disease.
    iv. Antibiotics can contribute to oral yeast infections (thrush).
g. Radiation therapy to the head and neck
h. Blood-clotting disorders (e.g., leukemia, aplastic anemia)
i. Oral surgery, trauma to the mouth
j. Chemical injury
k. Diabetes mellitus
l. Nutritional disorders[1]

Preparation

1. Raise the bed to the appropriate height and lower the side rail.
2. Unless contraindicated (e.g., head injury, neck trauma), position the patient on his or her side (Sims position) with his or her head turned well toward dependent side and the head of the bed lowered.
3. Place a towel under the patient's head and an emesis basin under his or her chin.
4. If needed, turn on the suction machine and connect the tubing to the suction catheter.

6. PROCEDURE

1. Perform hand hygiene and don gloves.
2. Verify the correct patient using two identifiers.
3. Assess the patient's mouth for signs of tartar, swollen or bleeding gums, ulcerations, debris, and severe halitosis. Remove the patient's dentures or partial plates, if present, and safely store them for proper cleaning in an appropriate container labeled with the patient's name.
4. Insert an oral airway if the patient is unconscious. Insert the airway upside down, then turn it sideways and position it over the tongue to keep the teeth apart. Do not use force.
5. Clean the mouth and teeth using a small, soft-bristle toothbrush moistened in water if the patient can tolerate brushing. Use a water-moistened foam stick applicator if the patient has sensitive gums.
   Rationale: Small, soft-bristle toothbrushes are most effective for plaque removal.
   Foam swabs are not effective for plaque removal.
    a. Apply toothpaste or use an anti-infective solution first to loosen crusts.
    b. Clean chewing and inner tooth surfaces first and outer tooth surfaces next, using a gentle up-and-down motion.
    c. Use the toothbrush or foam stick applicator to clean the roof of the mouth, gums, and inside of the cheeks. Gently brush the tongue but avoid stimulating the gag reflex.
    d. Rinse with water and repeat as needed.

e. Moisten the toothbrush with antimicrobial mouth rinse and cleanse the oral cavity, ensuring contact of the antimicrobial rinse with all oral cavity structures.
f. Repeat antimicrobial rinsing several times if needed.
g. Use the toothbrush or foam stick applicator to apply a water-based mouth moisturizer.
Do not use lemon and glycerin swabs.

6. Suction secretions as they accumulate, if necessary.
Rationale: Using suction to remove secretions and fluid that collect in the posterior pharynx reduces the risk of aspiration.
7. Apply a thin layer of water-soluble moisturizer to the patient's lips.
8. Inform the patient that the procedure is completed. Ask a debilitated patient whether his or her mouth feels clean.
9. Reposition the patient comfortably, lower the bed, and raise the side rail.
10. Discard supplies, remove gloves, and perform hand hygiene.
11. Report any unusual findings to the practitioner.
12. Document the procedure in the patient's record.

7. MONITORING AND CARE

1. Inspect the patient's oral cavity regularly to determine the efficacy of cleaning and check for problems. Report any unusual findings to the practitioner to prompt an order for an oral health professional consultation.[1]
Rationale: After thick secretions are removed, underlying inflammation or lesions may be revealed.
2. Assess the patient's respirations on an ongoing basis.
Rationale: Frequent assessment ensures early recognition of aspiration.
3. Assess, treat, and reassess pain.

8. EXPECTED OUTCOMES

- Buccal mucosa, gums, and tongue are pink, moist, and intact.
- The tongue does not have a coating.
- Teeth are clean, smooth, and shiny.
- Lips are moist and smooth and have no cracks.
- Patient expresses a feeling of cleanliness.
- Oral pharynx remains clear of secretions.

9. UNEXPECTED OUTCOMES

- Secretions or crusts remain on mucosa, tongue, or gums.
- Patient has localized inflammation or bleeding of gums, mucosa, or both.
- Lips are cracked or inflamed.
- Patient aspirates secretions.

10. DOCUMENTATION

- Patient's ability to cooperate
- Patient's tolerance of the procedure
- The need for suction for oral care

- Pertinent observations (e.g., presence of gag reflex, bleeding gums, dry mucosa, ulcerations, and crusts on tongue)
- Patient and family education
- Unexpected outcomes and related nursing interventions
- Pain assessment and management

11. GERONTOLOGICAL CONSIDERATIONS

- Pharmocokinetics of medications are altered in older adult patients, and interactions among antihypertensives, antidepressants, and other medications are unpredictable and may cause issues with oral integrity.
- Older adults have high rates of untreated dental caries, periodontal disease, and missing teeth. Anticipate compromised oral integrity and a deterioration of overall health during the initial clinical assessment.

12. HOME CARE CONSIDERATIONS

- Encourage the primary caregiver to cleanse the patient's mouth at least twice a day. If the patient breathes through his or her mouth, frequent use of a moistened soft-bristle toothbrush followed by the application of a water-soluble moisturizer to the lips helps keep the mouth moist and fresh.
- If the patient has difficulty handling secretions, instruct the primary caregiver on the use of a small bulb syringe or suction catheter system to protect the patient from aspiration.

13. REFERENCES

1. Academy of Nutrition and Dietetics. (2013). Position of the Academy of Nutrition and Dietetics: Oral health and nutrition. *Journal of the Academy of Nutrition and Dietetics, 113*(5), 693-701. doi:10.1016/j.jand.2013.03.001
2. American Dental Association (ADA). (2014). Brushing your teeth. Retrieved June 30, 2016, from http://www.mouthhealthy.org/en/az-topics/b/brushing-your-teeth (Level VII)
3. American Dental Association (ADA). (2014). Mouthwash. Retrieved June 30, 2016, from http://www.mouthhealthy.org/en/az-topics/m/mouthwash (Level VII)
4. American Dental Association (ADA). (2014). Oral health. Retrieved June 30, 2016, from http://www.mouthhealthy.org/en/az-topics/o/oral-health (Level VII)
5. Dyck, D. and others. (2012). Improving oral care practice in long-term care. *Canadian Nurse, 108*(9), 20-24.
6. Lam, O.L. and others. (2013). Effect of oral hygiene interventions on opportunistic pathogens in patients after stroke. *American Journal of Infection Control, 41*(2), 149-154. doi:10.1016/j.ajic.2012.02.020 (Level II)
7. O'Connor, L.J. (2012). Oral healthcare in aging: Nursing standard of practice protocol: Providing oral health care to older adults. Retrieved June 30, 2016, from https://consultgeri.org/geriatric-topics/oral-healthcare (Level VII)
8. Sharif-Abdullah, S.S. and others. (2016). The effect of chlorhexidine in reducing oral colonisation in geriatric patients: A randomised controlled trial. *Singapore Medical Journal, 57*(5), 262-266. doi:10.11622/smedj.2016091 (Level II)

9. van der Putten, G.J. and others. (2014). Poor oral health, a potential new geriatric syndrome. *Gerodontology, 31*(Suppl. 1), 17-24. doi:10.1111/ger.12086
10. Yaacob, M. and others. (2014). Powered versus manual toothbrushing for oral health. *Cochrane Database of Systematic Reviews, 6*, Art.No.:CD002281. doi:10.1002/14651858.CD002281.pub3 (Level I)

Adapted from Perry, A.G., Potter, P.A., Ostendorf, W.R. (2014). *Clinical nursing skills & techniques*(8th ed.). St. Louis: Mosby.

NURSING EDUCATION UNIT

COMPETENCY-BASED CHECK OFF TOOL

Title:	**ORAL CARE FOR UNCONSCIOUS OR DEBILITATED PATIENTS**
Competency Statement:	**The nurse demonstrates acceptable level of competence in the performance of ORAL CARE.**
Standards:	• **Infection Control and Patient Safety Compliance** • **Equipment Preparation and Manipulation** • **Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

- Provide all the information needed in this check off tool.
- Use the scale below by ENCIRCLING your most appropriate response
  4= Very Good (Performs competently without assistance and supervision)
  3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
  2= Poor (Performs inconsistently/incompletely with assistance and supervision)
  1= Very Poor (Cannot perform even with directions; procedural step omitted)
- Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
- Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
- Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
- Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1
5	Educates patient and family / caregiver (where appropriate).	4	3	2	1
Psychomotor Skills					

1	Performed hand hygiene before patient contact.	4	3	2	1
2	Verified the correct patient using two identifiers.	4	3	2	1
3	Assessed the patient for risk factors for oral hygiene problems.	4	3	2	1
4	Raised the bed to the appropriate height and lowered the side rail.	4	3	2	1
5	Unless contraindicated, positioned the patient on his or her side (Sims position) with his or her head turned well toward dependent side and the head of the bed lowered.	4	3	2	1
6	Placed a towel under the patient's head and an emesis basin under his or her chin.	4	3	2	1
7	If needed, turned on the suction machine and connected the tubing to the suction catheter.	4	3	2	1
8	Performed hand hygiene and donned gloves.	4	3	2	1
9	Inserted an oral airway if the patient was unconscious. Inserted the airway upside down, then turned it sideways and positioned it over the tongue to keep the teeth apart. Did not use force.	4	3	2	1
10	Cleaned the mouth and teeth using a small, soft-bristle toothbrush moistened in water if the patient could tolerate brushing. Used a water-moistened foam stick applicator if the patient had sensitive gums. a. Applied toothpaste or used an anti-infective solution first to loosen crusts. b. Cleaned chewing and inner tooth surfaces first and outer tooth surfaces next, using a gentle up-and-down motion. c. Used the toothbrush or foam stick applicator to clean the roof of the mouth, gums, and inside of the cheeks. Gently brushed the tongue but avoided stimulating the gag reflex. d. Rinsed with water and repeated as needed. e. Moistened the toothbrush with antimicrobial mouth rinse and cleansed the oral cavity, ensuring contact of the antimicrobial rinse with all oral cavity structures. f. Repeated antimicrobial rinsing several times if needed. g. Used the toothbrush or foam stick applicator to apply a water-based mouth moisturizer.	4	3	2	1
11	Suctioned secretions as they accumulated, if necessary.	4	3	2	1
12	Applied a thin layer of water-soluble moisturizer to the patient's lips.	4	3	2	1
13	Informed the patient that the procedure was completed. Asked a debilitated patient whether his or her mouth felt clean.	4	3	2	1
14	Repositioned the patient comfortably, lowered the bed, and raised the side rail.	4	3	2	1
15	Assessed, treated, and reassessed pain	4	3	2	1
16	Discarded supplies, removed gloves, and performed hand hygiene.	4	3	2	1
17	Reported any unusual findings to the practitioner.	4	3	2	1
18	Documented the procedure in the patient's record.	4	3	2	1
C. Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1
D. Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare.	4	3	2	1

	Documents date and time of therapy initiated;				
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse's Comments/Recommendations for Improvement:

Originating Department	Nursing Education Unit	Module No.	1-2017
Title	**CHEST TUBE INSERTION, MONITORING AND CARE**		
Author/s	**Ronald Martin Carcillar-CRN-ICU**		
Original Date	October, 2017	Revision Date	

1. ALERT

A failure to relieve a simple pneumothorax can result in life-threatening tension pneumothorax.

Remember to route tubes and catheters having different purposes in different, standardized directions (e.g., IV lines routed toward the head; enteric lines toward the feet). This is especially important in the care of neonates.

2. OVERVIEW

Under normal conditions, the thoracic cavity is a closed air space. Any disruption results in the loss of negative pressure in the intrapleural space, allowing air or fluid to enter, resulting in collapse of the lung. Such disruptions result from disease, injury, surgery, or iatrogenic causes. Chest tubes are used to drain air or fluid to prevent severe complications, such as cardiac arrest.

A pneumothorax (the collection of air in the pleural space) is a common indication for chest tube insertion. A pneumothorax may be classified as open, closed, or tension.

- Open pneumothorax: The chest wall and pleural space are penetrated, allowing air to enter the pleural space. An open pneumothorax may be referred to as a sucking wound. Common causes include penetrating injury or trauma, surgical incision in the thoracic cavity (i.e., thoracotomy), and iatrogenesis occurring as a complication of surgical treatment (e.g., unintentional puncture during an invasive procedure, such as placement of a central line).
- Closed pneumothorax: The integrity of the pleural space is compromised, but the chest wall is intact, allowing air to enter the pleural space from the lung. These injuries may be small or large. A closed pneumothorax occurs without apparent injury and can be spontaneous or caused by trauma. A closed pneumothorax is seen in many patients with a chronic lung disorder (e.g., emphysema, cystic fibrosis, tuberculosis, necrotizing pneumonia) and in young, tall males who have a greater than normal height-to-width chest ratio. Common causes include blunt or barotraumatic injury or iatrogenesis (e.g., intermittent positive-pressure breathing, mechanical ventilation with positive end-expiratory pressure). If left untreated, a simple, closed pneumothorax leads to tension pneumothorax.
- Tension pneumothorax: Air leaks into the pleural space through a tear in the lung and has no means of escape, creating a one-way valve effect. With each breath the patient takes, air accumulates and pressure in the pleural space increases until the lung collapses. This collapse causes the mediastinal structures (i.e., heart, great vessels, trachea) to be compressed and shift to the unaffected side of the chest. Venous return and cardiac output are impeded, and the unaffected lung may collapse. Signs and symptoms include distended neck veins, tracheal deviation to the unaffected side, and muffled

heart sounds. Tension pneumothorax is a life-threatening emergency that requires prompt recognition and intervention.

Other indications for chest tube insertion include hemothorax (a collection of blood in the pleural space), pleural effusion, and other conditions that cause fluid accumulation in the pleural or mediastinal spaces. Chest tubes can also be used to instill anesthetic solutions and sclerosing agents.

Chest tubes are sterile, flexible vinyl or silicone, nonthrombogenic catheters that vary in size from 6 to 42 Fr.[3] The size of the tube and its location are determined by the patient's condition and the indication. A small-bore chest tube (SBCT) is 14 Fr or smaller; a large-bore chest tube (LBCT) is larger than 14 Fr. In the past, SBCTs were used to evacuate air, and LBCTs were used to evacuate fluid. Recently, there has been a shift to using SBCTs for evacuating air and fluid because fewer complications are associated with them.[4] When clogging is a concern, as with a massive hemothorax or empyema, an LBCT should be used. The tube is placed near the apex of the lung (second intercostal space [ICS]) to drain air and near the base of the lung (fourth or fifth ICS) to drain fluid.

When the chest tube is in place, it is sutured to the skin to prevent displacement, and an occlusive dressing is applied.The chest tube is connected to a chest-drainage system to remove air and fluid from the pleural space and facilitate reexpansion of the collapsed lung. All connection points are secured to ensure that the system remains airtight.

Immediately upon insertion, the water-seal chamber should bubble gently during expiration and with coughing. Continuous bubbling in this chamber indicates a leak in the patient or in the chest-drainage system. If the patient is breathing spontaneously, the water level in the water-seal chamber should rise during inhalation and fall during expiration. If the patient is receiving mechanical ventilation, the pattern of fluctuation is the opposite. If suction is being applied, it must be disconnected temporarily to assess fluctuations in the water-seal chamber.

3. SUPPLIES

- Antiseptic solution (e.g., chlorhexidine or povidone-iodine)
- PPE (caps, masks, sterile gloves, sterile gown, head covering, mask, and eye protection or face shield)
- Local anesthetic per practitioner order
- Tube thoracotomy insertion tray
- Thoracotomy tube(s) (12 to 40 Fr) as appropriate
- Closed chest-drainage system
- Suction source as appropriate
- Suction connector and connecting tubing
- Absorbent pad
- Sterile drapes
- Tape to secure the chest tube to the chest-drainage system
- Dressing materials
    - Gauze pads
    - Slit drain sponges
    - Foam or similar all-direction water-resistant tape for dressing
    - Tape for securing tube to patient’s chest or commercial securing device

4. PATIENT AND FAMILY EDUCATION

- Explain the procedure and the reason for it if the patient's condition and circumstances allow.
- Explain that the patient must remain as immobile as possible and perform relaxed breathing during the procedure.
- After the procedure, instruct the patient to sit in a semi-Fowler position (unless contraindicated).
- Instruct the patient to turn and change position frequently. Explain that the patient may lie on his or her side with the chest tube but should keep the tubing free of kinks.
- Instruct the patient to cough and breathe deeply, splinting the affected side.
- Encourage active or passive range-of-motion exercises of the arm on the affected side.
- Instruct the patient and family to keep the drainage system below the level of the chest during patient activity.
- Inform the patient about the availability of prescribed analgesics and other pain-relief strategies.
- Encourage questions and answer them as they arise.

5. ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene before patient contact.
2. Verify the correct patient using two identifiers.
3. Determine the patient's history, including chronic lung disease, spontaneous pneumothorax, hemothorax, pulmonary disease, therapeutic procedures, and mechanism of injury.
4. If the patient's condition does not require immediate intervention, evaluate diagnostic test results, including chest radiograph, coagulation laboratory work, and arterial blood gas analysis.
5. Assess the baseline cardiopulmonary status for signs and symptoms requiring chest tube insertion, including tachypnea, decreased or absent breath sounds on the affected side, dyspnea, asymmetric chest excursion, tracheal deviation, and other signs of respiratory distress.

Preparation

1. Comply with Universal Protocol.
    a. Use a standardized list to verify that all required items, including informed consent, are available.
    b. Mark the procedure site when required.
2. Position the patient for comfort and privacy and access to the chest tube insertion site. If the patient has a pneumothorax, place him or her in a lateral supine position. If the patient has a hemothorax, assist him or her to a semi-Fowler position.
3. Place an absorbent pad under the patient on the side of the procedure.
4. Ensure that the patient has patent IV access.
5. Administer analgesics and sedatives as prescribed.
    a. Reassess the patient's pain and sedation status, allowing for sufficient onset of action per medication, route, and the patient's condition.

b. If sedation is induced, follow the organization's practice for procedural sedation.

6. PROCEDURE

1. Perform hand hygiene and don sterile gloves, sterile gown, cap, mask, and eye protection or face shield.
   Chest tube insertion is a sterile procedure and requires full surgical attire.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient and ensure that he or she agrees to treatment.
5. Comply with Universal Protocol: Perform a time-out to verify the correct patient, correct site, and correct procedure.
6. Open the chest tube insertion tray using sterile technique.
7. Assist the practitioner with preparing the equipment.
   Touch only nonsterile areas and items. The practitioner should handle only the sterile equipment.
8. Assist the practitioner with preparing the insertion site.
   The incision site is one rib below insertion site. To remove air, the practitioner inserts the tube at the right or left second ICS.[3] To remove fluid, the practitioner inserts the tube at the right or left fourth or fifth ICS at the midaxillary line.
9. After tube insertion, connect the chest tube to the closed chest-drainage system and check for rising and falling (tidaling) of the water column. Apply the prescribed amount of suction.
   Rationale: Normal tidaling confirms that the chest-drainage system is functioning properly and the tube is properly positioned.
10. Trace tubing or catheter from the patient to point of origin (1) before connecting or reconnecting any device or infusion, (2) at any transition (e.g., new setting), and (3) as part of the hand-off process.
    Rationale: Tubing should be labeled to reduce the chance of misconnection, especially in circumstances where multiple IV lines or devices are in use.
11. Check vital signs immediately after making any connection per the organization's practice.
12. Do not force connections and avoid workarounds per the organization's practice.
    Rationale: Forced connections or workarounds could indicate that the connection should not be made.
13. After the practitioner sutures the tube in place, assist him or her with applying an occlusive dressing.
    a. Place split drain sponges around the chest tube, one from the top and one underneath.
    b. Cover them with a gauze dressing. Apply foam or a similar all-direction stretch water-resistant tape over the dressing.
       Rationale: Applying an occlusive dressing provides an airtight seal around the chest tube
       Historically, a petroleum gauze dressing was used, but research shows that it reduces suture strength.

c. Label the dressing per the organization's practice.

14. Secure the connection sites.
15. Assist the practitioner as needed with taping the chest tube to the drainage system tube. Apply the tape in a motion similar to a candy cane stripe to allow a view inside the tube.
    Rationale: Taping the chest tube to the drainage system tube creates an airtight system. Airtight connections prevent air leaks into the pleural space.
16. Secure the tube to the patient's skin below the dressing, using a commercial securing device or tape.
    Rationale: Having the tube secured below the dressing acts as a strain relief, preventing tube and dressing dislodgment.
17. Ensure that a chest radiograph is obtained.
    Rationale: A chest radiograph confirms the placement of the tube, expansion of the lung, and the removal of fluid or air.
18. Discard supplies, remove personal protective equipment (PPE), and perform hand hygiene.
    Allow the practitioner to dispose of any sharps before removing supplies.
19. Document the procedure in the patient's record.

7. MONITORING AND CARE

1. After chest tube insertion, assess cardiopulmonary status, level of consciousness, vital signs, and oxygen saturation by pulse oximetry (SpO_2) every 15 minutes until the patient's respiratory status improves. When the patient's condition stabilizes, check vital signs every 2 hours or as necessary.[2]
   Rationale: Cardiopulmonary status and vital signs provide baseline and ongoing data on the patient's condition. Abnormalities can indicate a recurrence of the condition that required chest tube insertion. Depending on the patient's clinical condition, more frequent monitoring may be needed.
   Reportable conditions: Tachypnea, decreased or absent breath sounds, hypoxemia, tracheal deviation, subcutaneous emphysema, neck vein distention, muffled heart sounds, tachycardia, hypotension, arrhythmias, fever, change in level of consciousness, absence of fluctuations in the water-seal chamber with respiratory distress
2. Monitor the amount and type of drainage per the organization's practice or practitioner's order. Note the color and amount of chest tube drainage. Do not strip or milk the tubing to remove clots. If clots are present, squeeze them in the direction of the drainage container.
   Rationale: Monitoring output provides data for diagnosis. Higher drainage amounts require more frequent assessment. Depending on the patient's clinical condition, output may need to be checked more frequently.
   Reportable conditions: Excess bloody drainage, sudden cessation of drainage, change in the character of drainage
3. Assess, treat, and reassess pain.
   Rationale: Pain interferes with deep breathing. Excessive pain at the insertion site, particularly with inspiration, may indicate improper tube placement.
   Reportable condition: Excessive pain at the insertion site
4. Check the function of the chest tube and chest tube drainage system on insertion and with vital signs and changes in the patient's condition.

Rationale: The water level normally rises and falls with respiration until the lung is expanded. Bubbling immediately after insertion signifies that air is being removed from the pleural space. Bubbling with exhalation and coughing are normal. Persistent bubbling indicates an air leak either in the patient's lung or in the chest-drainage system.
Reportable conditions: Absence of tidaling, persistent bubbling

5. With each dressing change, assess the insertion site for subcutaneous emphysema (crepitus) and signs of infection or inflammation. Assess the skin around the dressing daily for signs of skin irritation.
   Rationale: Subcutaneous emphysema may indicate chest tube obstruction or improper tube position. Skin integrity is altered during insertion and can lead to infection.
   Reportable conditions: Fever, redness around the insertion site or dressing, purulent drainage, new or increasing subcutaneous emphysema
   a. Change the dressing when it becomes loose or soiled per the organization's practice or practitioner's order.
   b. Place split drain sponges around the chest tube, one from the top and one underneath.
   c. Cover them with a gauze dressing. Apply foam or similar all-direction water-resistant tape over the dressing.
      Rationale: Applying an occlusive dressing provides an airtight seal around the chest tube.[2]
      Historically, a petroleum gauze dressing was used, but research shows that it reduces suture strength.[5]
   d. Label the dressing per the organization's practice.
6. If the chest tube inadvertently becomes dislodged at the insertion site, place a sterile dressing on the site and tape it on three sides. To prevent increased tension in the lung, do not tape the fourth side. Notify the practitioner and monitor the patient's vital signs and oxygenation.
   Reportable condition: Dislodgment of chest tube at insertion site
7. If the tubing inadvertently becomes disconnected at any point below the insertion site, place the end of the tubing in a cup of sterile water to reestablish a water seal until a new drainage system is set up. Notify the practitioner and monitor the patient's vital signs and oxygenation.
   Reportable condition: Disconnected tubing at any point below insertion site

8. EXPECTED OUTCOMES

- Removal of air, fluid, or blood from the pleural space
- Relief of respiratory distress
- Reexpansion of the lung (confirmed by chest radiograph)
- Restoration of negative pressure in the pleural space

9. UNEXPECTED OUTCOMES

- Hemorrhage, shock, or cardiopulmonary arrest
- Increasing respiratory distress
- Infection
- Damage to intercostal nerve, resulting in neuropathy or neuritis

- Incorrect tube placement
- Chest tube kinking, clogging, or dislodgment from chest wall
- Subcutaneous emphysema

10. DOCUMENTATION

- Reason for chest tube insertion
- Respiratory and vital sign assessment before and after insertion
- Description of procedure, including tube size, date and time of insertion, insertion site, and complications associated with the procedure
- Type and amount of drainage
- Presence of fluctuation and bubbling
- Amount of suction
- Patient's tolerance of procedure
- Postinsertion chest radiograph results
- Unexpected outcomes and related nursing interventions
- Pain assessment and management
- Procedural sedation assessment and management (if sedation is induced)
- Time-out procedure including verification of correct patient, correct procedure, and correct site
- Date and time of dressing change per the organization's practice
- Patient and family education

11. REFERENCES

1. Joint Commission, The. (2014). Sentinel event alert 53: Managing risk during transition to new ISO tubing connector standards. Retrieved August 30, 2016, from www.jointcommission.org/assets/1/6/SEA_53_Connectors_8_19_14_final.pdf (Level D)
2. Kane, C.J., York, N.L., Minton, L.A. (2013). Chest tubes in the critically ill patient. *Dimensions of Critical Care Nursing, 32*(3), 111-117. doi:10.1097/DCC.0b013e3182864721
3. Kirsch, T.D., Sax, J. (2014). Chapter 10: Tube thoracostomy. In J.R. Roberts and others (Eds.), *Roberts & Hedges' clinical procedures in emergency medicine* (6th ed., pp. 189-211). Philadelphia: Saunders.
4. Mahmood, K., Wahidi, M.M. (2013). Straightening out chest tubes: What size, what type, and when. *Clinics in Chest Medicine, 34*(1), 63-71. doi:10.1016/j.ccm.2012.11.007
5. Muffly, T.M. and others. (2012). Effect of petroleum gauze packing on the mechanical properties of suture materials. *Journal of Surgical Education, 69*(1), 37-40. doi:10.1016/j.jsurg.2011.06.012 (Level B)

12. ADDITIONAL READINGS

Frazer, C.A. (2012). Managing chest tubes. *MedSurg Matters, 21*(1), 9-12.

Adapted from Wiegand, D.L. (2011). *AACN procedure manual for critical care* (6th ed.). St. Louis: Saunders.

COMPETENCY-BASED CHECK OFF TOOL

Title:	**ASSISTING IN CHEST TUBE INSERTION**
Competency Statement:	**The nurse demonstrates acceptable level of competence in the performance of ASSISTING PRACTITIONER IN CHEST TUBE INSERTION.**
Standards:	• **Infection Control and Patient Safety Compliance** • **Equipment Preparation and Manipulation** • **Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

- Provide all the information needed in this check off tool.
- Use the scale below by ENCIRCLING your most appropriate response
  4= Very Good (Performs competently without assistance and supervision)
  3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
  2= Poor (Performs inconsistently/incompletely with assistance and supervision)
  1= Very Poor (Cannot perform even with directions; procedural step omitted)
- Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
- Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
- Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
- Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1
5	Educates patient and family / caregiver (where appropriate).	4	3	2	1
Psychomotor Skills					
1	Performed hand hygiene before patient contact.	4	3	2	1
2	Introduced self to the patient.	4	3	2	1

3	Verified the correct patient using two identifiers.	4	3	2	1
4	Determined the patient's history, including chronic lung disease, spontaneous pneumothorax, hemothorax, pulmonary disease, therapeutic procedures, and mechanism of injury.	4	3	2	1
5	If the patient's condition did not require immediate intervention, evaluated diagnostic test results, including chest radiograph, coagulation laboratory work, and arterial blood gas analysis.	4	3	2	1
6	Assessed the baseline cardiopulmonary status for signs and symptoms requiring chest tube insertion, including tachypnea, decreased or absent breath sounds on the affected side, dyspnea, asymmetric chest excursion, tracheal deviation, and other signs of respiratory distress.	4	3	2	1
7	Complied with Universal Protocol. a. Used a standardized list to verify that all required items, including informed consent, were available. b. Marked the procedure site when required.	4	3	2	1
8	Positioned the patient for comfort and privacy and access to the chest tube insertion site. If the patient had a pneumothorax, placed him or her in a lateral supine position. If the patient had a hemothorax, assisted him or her to a semi-Fowler position.	4	3	2	1
9	Placed an absorbent pad under the patient on the side of the procedure.	4	3	2	1
10	Ensured that the patient had patent IV access.	4	3	2	1
11	Administered analgesics and sedatives as prescribed. a. Reassessed the patient's pain and sedation status, allowing for sufficient onset of action per medication, route, and the patient's condition. b. If sedation was induced, followed the organization's practice for procedural sedation.	4	3	2	1
12	Performed hand hygiene and donned sterile gloves, sterile gown, cap, mask, and eye protection or face shield.	4	3	2	1
13	Explained the procedure to the patient and ensured that he or she agreed to treatment.	4	3	2	1
14	Complied with Universal Protocol: Performed a time-out to verify the correct patient, correct site, and correct procedure.	4	3	2	1
15	Opened the chest tube insertion tray using sterile technique.	4	3	2	1
16	Assisted the practitioner with preparing the equipment. Touched only nonsterile areas and items.	4	3	2	1
17	Assisted the practitioner with preparing the insertion site.	4	3	2	1
18	After tube insertion, connected the chest tube to the closed chest-drainage system and checked for rising and falling (tidaling) of the water column. Applied the prescribed amount of suction.	4	3	2	1
19	Traced tubing or catheter from the patient to point of origin (1) before connecting or reconnecting any device or infusion, (2) at any transition (e.g., new setting), and (3) as part of the hand-off process.	4	3	2	1
20	Checked vital signs immediately after making any connection per the organization's practice.	4	3	2	1

21	Did not force connections and avoided workarounds per the organization's practice.	4	3	2	1
22	After the practitioner sutured the tube in place, assisted him or her with applying an occlusive dressing. a. Placed split drain sponges around the chest tube, one from the top and one underneath. b. Covered them with a gauze dressing. Applied foam or a similar all-direction stretch water-resistant tape over the dressing. c. Labeled the dressing per the organization's practice.	4	3	2	1
23	Secured the connection sites.	4	3	2	1
24	Assisted the practitioner as needed with taping the chest tube to the drainage system tube. Applied the tape in a motion similar to a candy cane stripe to allow a view inside the tube.	4	3	2	1
25	Secured the tube to the patient's skin below the dressing, using a commercial securing device or tape.	4	3	2	1
26	Ensured that a chest radiograph was obtained.	4	3	2	1
27	Assessed, treated, and reassessed pain.	4	3	2	1
28	Discarded supplies, removed PPE, and performed hand hygiene. Allowed the practitioner to dispose of any sharps before removing supplies.	4	3	2	1
28	Documented the procedure in the patient's record	4	3	2	1
C. Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1
D. Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse's Comments/Recommendations for Improvement:

Originating Department	Nursing Education Unit	Module No.	1-2017
Title	**CHEST TUBE: CLOSED DRAINAGE SYSTEMS**		
Author/s	**Ronald Martin Carcillar-CRN-ICU**		
Original Date	October, 2017	Revision Date	

1. ALERT

In general, do not clamp a chest tube because of the increased risk of a tension pneumothorax. In certain situations, some organizations allow chest tubes to be clamped briefly.

Stripping the entire length of the chest tube is contraindicated because it produces transient high negative pressure in the pleural space, which can damage tissues in the pleural space.

2. OVERVIEW

A closed chest-drainage system (CDS) is used to facilitate the evacuation of fluid, blood, and air from the pleural space, the mediastinum, or both; to restore negative pressure to the pleural space; and to promote reexpansion of a collapsed lung.

Anatomy and physiology of the pulmonary system must be understood before this procedure is performed. Normal intrapleural pressure measures approximately –4 cm H_2O to –10 cm H_2O during exhalation and inhalation respectively.

The types of CDSs include dry suction with a traditional water seal, dry suction with a one-way valve, and wet suction with a traditional water seal. These systems use gravity, suction, or both to restore negative pressure and remove air, fluid, and blood from the pleural space or the mediastinum. In addition, CDSs use a one-way mechanism created by a water seal, permitting air and fluid to be removed while preventing backflow into the chest. A CDS requires that the pressure in the chest be greater than the pressure in the system. This pressure difference is accomplished by keeping the drainage unit 0.3 to 0.6 m (1 to 2 ft.) below the chest tube insertion site and by keeping the tubing free of dependent loops and obstructions, which prevent the contents from siphoning back into the pleural cavity.

Although differences in flow rates and the accuracy of delivered negative pressure levels occur in CDSs, these differences are not likely to be clinically important.

A water seal alone is effective for most patients with a pneumothorax and a small air leak. Recent studies found no difference in the duration of air leaks with or without suction. However, if the pneumothorax or air leak is large, expanding, or persistent, suction is recommended to lower the pressure in the water-seal chamber. The most common amount of suction pressure is –20 cm H_2O. High levels of suction may cause reexpansion pulmonary edema, which is usually unilateral and occurs when the lung is rapidly reexpanded by active evacuation of large amounts of air or fluid from the pleural space.

A disposable CDS is similar to a three-bottle drainage system with collection, water-seal, and suction control chambers positioned side by side in a molded plastic disposable unit. Disposable CDSs include the Pleur-evac®, the Thora-Klex, the Argyle™, the Atrium systems, and digital thoracic drainage systems.

Disposable CDSs contain a positive-pressure relief valve used to prevent a tension pneumothorax if the suction tubing accidentally becomes occluded or the suction source fails. In addition, automatic and manual pressure relief valves vent air under excessive negative pressure that may occur during deep inspiration or chest tube milking. Some systems have replaceable collection chambers, which can be removed when filled and replaced with new ones without changing the entire unit. Latex-free tubing is used in many disposable drainage units. Disposable systems have self-sealing ports or collection tubes for aspirating drainage samples and removing excess chamber fluid. Some systems have accessories that may be used to convert them to autotransfusion units.

Some CDSs use dry suction with a traditional water seal and either a regulator or a restricted orifice mechanism. Water is added to the water-seal chamber but not to the suction chamber. Instead, the suction (usually via a wall regulator) is increased until an indicator appears.

Some waterless CDSs, called dry-dry drains, have a one-way valve that eliminates the need to fill any chambers (except an air-leak indicator zone, as needed). A valve opens on expiration, allowing air from the patient to exit, then closes to prevent atmospheric air from entering during inspiration. This one-way valve feature allows the system to be used in the vertical or horizontal position without losing the seal, making these systems safe if accidentally tipped. The amount of suction delivered is regulated by an adjustable dial.

The advantages of dry suction are quietness, ease of setup, and ease of application if higher and more precise levels of suction are needed.

Tidaling, or fluctuation in the water-seal chamber, occurs with respirations. The water level should rise with inspiration and fall with expiration. These fluctuations indicate the pressure changes in the pleural space. Loss of fluctuations can mean the lung has reexpanded or the system may not be functioning properly. If tidaling stops, the patient should be assessed. Assessment of the CDS should include looking for kinked tubing or other obstructions.

Except for the exit vent, an airtight system is required to help maintain negative pressure in the pleura and to prevent air entrapment in the pleural space. In general, clamping of chest tubes is contraindicated. Clamping a chest tube in a patient with a pleural air leak may cause a tension pneumothorax. Some organizations allow chest tubes to be clamped briefly for the following reasons:

- To locate the source of an air leak
- To replace the CDS
- To prevent reexpansion pulmonary edema
- To test for an air leak before chest tube removal

Solid research on chest dressings is lacking. Historically, petroleum gauze has been used for chest tube dressings. Recent research indicates potential negative effects of petroleum gauze on suture integrity. Knots exposed to petroleum broke at significantly lower tensile strength than those exposed to saline. However, the findings of this in vitro study may or may not translate directly to chest tube dressings.

3. SUPPLIES

Disposable setup (wet and dry systems):

- Bottle of sterile water or normal saline (for systems that use water)
- Irrigation syringe (if not supplied with unit) for systems that use water
- Connecting tubing
- Disposable closed chest-drainage unit
- PPE (gloves, gown, mask, eye protection or face shield)
- Suction source and regulator
- Tape to secure the chest tube to the CDS
- Dressing materials
    - Gauze pads
    - Split drain sponges
    - Foam or similar all-direction water-resistant tape for dressing

4. PATIENT AND FAMILY EDUCATION

- Explain the equipment and the procedure to the patient and family.
- After chest tube insertion, instruct the patient to sit in a semi-Fowler position (unless contraindicated).
- Instruct the patient to turn and reposition to facilitate drainage and prevent atelectasis and pressure injuries.
- Instruct the patient to lie on his or her side with the chest tube, ensuring that the tubing is free of kinks.
- Instruct the patient to cough and breathe deeply, splinting the affected side or the sternum (if he or she has a mediastinal tube).
- Encourage the patient to perform active or passive range-of-motion exercises of the arm on the affected side.
- Instruct the patient and family about activity as prescribed while maintaining the drainage system below the level of the chest.
- Encourage the patient to ambulate when the CDS is not attached to wall suction.[4]
- Instruct the patient and family about the availability of prescribed analgesic medication and other pain-relief strategies.
- Encourage questions and answer them as they arise.

5. ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene before patient contact.
2. Verify the correct patient using two identifiers.

3. Review the patient's record for a significant medical history or injury, including chronic lung disease, spontaneous pneumothorax, pulmonary disease, therapeutic procedures, and mechanism of injury.
4. Assess the patient's baseline cardiopulmonary status and vital signs. Look for signs of respiratory distress, including tachypnea, tachycardia, hypertension or hypotension, shortness of breath, anxiety, and a change in the level of consciousness.
5. Assess the patient's pain level using an appropriate, organization-approved pain scale.
6. Review the patient's diagnostic test results, including chest radiographs and arterial blood gases values.

6. PROCEDURE

Disposable Dry Suction CDS

1. Perform hand hygiene and don gloves. Don a gown, mask, and eye protection or face shield if a large amount of drainage is anticipated.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient and ensure that he or she agrees to treatment.
5. Open the sterile packages.
6. Stabilize the unit by hanging it from the bed frame or placing it on a floor stand. If the system has an inline connector, move the patient's tube clamp down next to it.

   Rationale: Keeping the clamp visible helps prevent inadvertent clamping.
   Clamping a chest tube may cause air trapped in the pleural space to accumulate, resulting in a tension pneumothorax.

7. Set up the CDS according to the manufacturer's instructions.
   a. Dry suction with a traditional water seal: Remove the connector cap from the short tubing of the water-seal chamber and use the funnel provided, a prefilled sterile water container, or a syringe to add sterile water or normal saline to the desired level per the manufacturer's recommendation.

      Rationale: Prefilled containers provide the amount of sterile water or sterile saline needed to establish a water seal; the water seal passively allows fluid and air to escape the chest cavity by gravity drainage.

   b. Dry suction with a one-way valve: Fill the air-leak monitor zone.
8. Ensure that the unit is hanging below the level of the patient's chest.

   Rationale: The drainage unit must be kept below the level of the chest to promote gravity drainage and prevent backflow of drainage into the pleural space and interference with lung expansion.

9. Connect the long tubing from the drainage collection chamber to the chest tube, avoiding dependent loops. Secure the connection with tape. Apply the tape in a pattern similar to a candy cane stripe to allow observation of the inside of the tube.

    Rationale: Connecting the long tubing from the drainage collection chamber to the chest tube creates the closed-chest system. Dependent loops can fill with fluid and effectively seal the drain. Taping the chest tube to the tube of the drainage system creates an airtight system. Airtight connections prevent air leaks into the pleural space.

10. For gravity drainage, leave the suction-control chamber open to the air.

    Rationale: Leaving the suction-control chamber open to the air creates the vent for air.
    Clamping a chest tube may cause air trapped in the pleural space to accumulate, resulting in a tension pneumothorax.

11. For suction, connect the short tubing from the suction control chamber to the suction source and dial the prescribed amount of suction. Then increase the suction until the indicator mark appears according to the manufacturer's instructions.

    Rationale: Adding suction assists with draining fluid or air. The practitioner orders the amount of suction, usually –20 cm H_2O. The amount of suction is determined by the height of the water in the suction control chamber, not the amount of the vacuum pressure or the amount of bubbling in the suction chamber.

12. Discard supplies, remove personal protective equipment (PPE), and perform hand hygiene.
13. Document the procedure in the patient's record.

Disposable Wet Suction CDS

1. Perform hand hygiene and don gloves. Don a gown, mask, and eye protection or face shield if a large amount of drainage is anticipated.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient and ensure that he or she agrees to treatment.
5. Open the sterile packages.
6. Stabilize the unit by hanging it from the bed frame or placing it on a floor stand. If the system has an inline connector, move the patient's tube clamp down next to it.

    Rationale: Keeping the clamp visible helps prevent inadvertent clamping.
    Clamping a chest tube may cause air trapped in the pleural space to accumulate, resulting in a tension pneumothorax.

7. Remove the connector cap from the short tubing of the water-seal chamber and use the funnel provided, a prefilled sterile water or saline container, or a 50-ml syringe to add sterile water or normal saline to the appropriate level per the manufacturer's recommendation.

   Rationale: The water-seal chamber allows air to leave the intrapleural space on exhalation while acting as a one-way valve and preventing air from reentering on inhalation.[6]

8. Leave the short tubing from the suction control chamber open to the air or turn the stopcock to the *Open* or *On* position for gravity drainage.

   Rationale: Leaving the short tubing from the suction control chamber open to air creates the vent for air.
   Clamping or occluding the exit vent may cause air to remain trapped in the pleural space, resulting in a tension pneumothorax.

9. Fill the suction control chamber with sterile water or normal saline to the prescribed level per the manufacturer's directions for a wet suction CDS.

   Rationale: Suction is regulated by the suction control for dry suction CDS or by the height of the solution level in this chamber for wet suction CDS.
   Refill the chamber as necessary to the prescribed amount to replace solution lost through evaporation. Remove excess fluid as necessary via a self-sealing grommet.

10. Ensure that the unit is hanging below the level of the patient's chest.

    Rationale: The drainage unit must be kept below the level of the chest to promote gravity drainage and prevent backflow of drainage into the pleural space and interference with lung expansion.

11. Connect the long tubing from the drainage collection chamber to the chest tube and secure the connection with tape. Apply the tape in a pattern similar to a candy cane stripe to allow observation of the inside of the tube.

    Rationale: Connecting the long tubing from the drainage collection chamber to the chest tube creates the drainage collection system. Taping the chest tube to the tube of the drainage system creates an airtight system. Airtight connections prevent air leaks into the pleural space.

12. Turn the suction source on, if prescribed, to elicit gentle, constant bubbling. Leave the stopcock between the CDS and the suction source fully open and adjust the force of the bubbling at the suction source to decrease the risk of pneumothorax.

    Rationale: The amount of suction is determined by the suction control for dry suction CDS or by the height of the water in the suction control

chamber for wet suction CDS, not the amount of the vacuum pressure or the amount of bubbling in the suction chamber.
Some systems have a suction control stopcock that is designed to regulate the vacuum pressure when the chest tube is attached to an unregulated suction source. When using a regulated suction source, keep the stopcock fully in the *Open* or *On* position.

13. Discard supplies, remove PPE, and perform hand hygiene.
14. Document the procedure in the patient's record.

7. MONITORING AND CARE

1. After chest tube insertion, assess cardiopulmonary status, level of consciousness, vital signs, and oxygen saturation by pulse oximetry (SpO_2) every 15 minutes until the patient's respiratory status improves. When the patient's condition has stabilized, check vital signs every 2 hours or as necessary.

   Rationale: Assessing level of consciousness, cardiopulmonary status, vital signs, and SpO_2 provides baseline and ongoing evaluations of the patient's condition.
   Reportable conditions: Tachypnea, decreased or absent breath sounds, hypoxemia, tachycardia, arrhythmia, hypotension, change in level of consciousness, muffled heart sounds, tracheal deviation, subcutaneous emphysema (crepitus), neck vein distention, fever, absence of fluctuations in the water-seal chamber with respiratory distress

2. Monitor the amount and type of drainage per the organization's practice or the practitioner's order. Note the color and amount of chest tube drainage. Do not strip or milk the tubing to remove clots. If clots are present, squeeze them in the direction of the drainage container.

   Rationale: Drainage should gradually decrease and change from bloody to pink to straw colored. A sudden flow of dark bloody drainage that occurs with a position change is often old blood. Decreased or absent drainage associated with respiratory distress may indicate obstruction; decreased or absent drainage without respiratory distress may indicate lung reexpansion. Excessive chest tube output is an indication for surgical intervention. Reexpansion pulmonary edema occurs when the lung is rapidly reexpanded by active evacuation of large amounts of air or fluid from the pleural space.
   Reportable conditions: Drainage amount per the organization's practice or with any sudden increase, decrease, or absence of drainage; change in characteristics of drainage, such as unexpectedly bloody, cloudy, or milky; new onset of clots

3. Check the function of the chest tube and CDS on insertion, with vital signs, and with any change in the patient's condition.

a. Ensure that the chest tubes are patent. Do not routinely perform chest tube stripping or milking.[5]

   Rationale: Obstruction of drainage from the chest tube interferes with lung reexpansion or may cause cardiac tamponade. **Stripping the entire length of the chest tube is contraindicated because it results in transient high negative pressure in the pleural space, which may damage tissues in the pleural space.[7] No evidence indicates that chest tube manipulation is more effective than suction alone.[7] Reportable conditions: Inability to establish patency, excessive drainage**

b. Ensure that the drainage tubing is free of dependent loops by placing the tube horizontally on the bed and down into the collection chamber or coiling the tubing on the bed. If a dependent loop cannot be avoided, lift and drain the tubing.

   Rationale: Dependent or fluid-filled loops may create back pressure. A filled tube may seal the drain. **Reportable condition: Loops or kinks that cannot be removed**

c. Monitor fluid levels in the CDS chambers by briefly turning the suction off.
   i. Ensure the level of the water in the water-seal chamber is at the manufacturer-recommended level.
   ii. Ensure the level of the water in the suction control chamber is at the manufacturer-indicated level for the prescribed amount of suction.
   iii. Add or remove water as needed.

   Rationale: The water-seal chamber and suction control chamber are effective only when they have the recommended amounts of water.

   Reportable conditions: Inability to maintain a water seal or keep the suction at the prescribed level

d. Assess the patient and the system for air leaks. If the system is connected to suction, briefly turn the suction off and troubleshoot.
   i. To determine the source of an air leak, briefly clamp the chest tube close to the patient; if the bubbling stops, the air is from the patient's chest. If the bubbling continues, briefly clamp at intervals along the length of the tubing. When the bubbling stops, the air leak is between the clamp and the patient.
   ii. Check all connections to ensure that they are airtight.
   iii. Check for an accidentally dislodged chest tube or protrusion of the eyelets of the chest tube from the patient's chest. If the tube is concealed under a dressing, remove the dressing to make this

observation. If such dislodgment or protrusion is observed, contact the surgeon or practitioner because the tube may need to be reinserted.

Rationale: Assessing the patient and the system for an air leak is one way to determine whether the patient is experiencing a pneumothorax. Bubbling when the suction is initially turned on occurs because air is displaced by fluid drainage in the collection chamber, the system has loose connections, or the patient has an air leak in the pleural space. With a minor air leak, bubbling may occur only with coughing when airway pressure reaches its peak.[1] An airtight system is required to help reestablish negative pressure in the pleural space.
Replace the CDS if the bubbling does not stop with an occlusion examination. The chest-drainage unit should be changed if there is a suspected crack or leak in the system.
Reportable conditions: New or increasing air leaks in the chest or around the chest tube insertion site, new or increased bubbling in the water-seal chamber, system knock-over, changing of the closed drainage system

e. Assess the water-seal chamber for tidaling with respirations. If a suction source has been added, momentarily turn the suction off or pinch the suction tubing to assess the chamber for tidaling.

Rationale: Tidaling up and down or back and forth indicates effective communication between the pleural space and drainage system and provides an indication of lung expansion. When the pneumothorax resolves, the tidaling may cease. Suction must be turned off to assess the chamber for tidaling.
Reportable condition: Absence of tidaling

f. If the CDS is equipped with a float valve, assess it for increases in the patient's negative intrathoracic pressure. Inspect the water-seal chamber for increased levels, especially after milking chest tubes or when decreasing the level of suction. First, ensure the CDS is operating on suction and then temporarily depress the filtered manual vent until the float valve releases and the water column lowers.

Rationale: Changes in the patient's intrathoracic pressure are reflected by the height of the water in the water-seal column.
Do not lower the water-seal column when the suction is not operating or when gravity drainage is being used. Resume suction before lowering the water-seal column. If suction is not operative or if the system is operating on gravity drainage, depress the high-negative relief valve to reduce negative pressure in the collection chamber to zero.

Reportable condition: Sustained increase in negative pressure

g. Monitor the fluid levels in the collection chamber. Assess the integrity of the CDS system. Change the CDS when it is almost full or the system's integrity is disrupted.
   i. Assess and monitor the patient's cardiopulmonary status, vital signs, and SpO_2 before, during, and after the procedure.
   ii. Prepare a new CDS according to the manufacturer's instructions.
   iii. Cross-clamp the chest tube close to the patient's chest, disconnect the old tubing, attach the new system, unclamp the chest tube, check the connections, and assess the function of the drainage system. Ensure that the chest tube is clamped as briefly as possible.

Rationale: Clamping the chest tube poses a risk of a tension pneumothorax.
Reportable conditions: Respiratory distress during or after the procedure, changes in breath sounds after the procedure, a nonfunctioning CDS

4. When a patient who has gravity drainage is transported, ensure that the CDS is upright and below the chest tube insertion site and that the short tubing port from the suction chamber is open to air or that the suction control stopcock is in the *On* or *Open* position. Do not clamp the chest tube during transport.

Rationale: Leaving the port or stopcock open allows air to exit and minimizes the possibility of a tension pneumothorax.
Reportable conditions: Inadvertent clamping or capping of the suction line

5. To obtain a drainage specimen from a CDS, consult the manufacturer's instructions for accessing the system.
   a. Form a dependent loop in the fluid collection tubing to obtain enough fluid for the specimen.
   b. Cleanse the sampling site with alcohol and use a syringe to withdraw the specimen.
   c. In the presence of the patient, label the specimen per the organization's practice.
   d. Prepare the specimen for transport.
      i. Place the labeled specimen in a biohazard bag.
      ii. If the specimen requires ice for transport, place the specimen in a biohazard bag then place the bag with the specimen into a second biohazard bag filled with ice slurry.

Rationale: Placing the specimen in a separate bag protects the label from being damaged.

   e. Immediately transport the specimen to the laboratory.

Rationale: Sending the specimen immediately to the laboratory ensures accurate results.
Reportable condition: Inability to obtain a specimen

6. If the chest tube inadvertently becomes dislodged at the insertion site, place a sterile dressing on the site and tape it on three sides. Do not tape the fourth side to prevent increased tension in the lung. Notify the practitioner and monitor the patient's vital signs and oxygenation.

   Reportable condition: Dislodgment of chest tube at the insertion site

7. If the tubing inadvertently becomes disconnected at any point below the insertion site, place the end of the tubing in a cup of sterile water to reestablish a water seal. Notify the practitioner and monitor the patient's vital signs and oxygenation.

   Reportable condition: Disconnected tubing at any point below the insertion site

8. Assess, treat, and reassess pain.

8. EXPECTED OUTCOMES

- Removal of air, fluid, or blood from the chest cavity
- Tidaling noted in the water-seal chamber (until lung is reexpanded)
- Breath sounds auscultated in all lobes
- Symmetric lung expansion, stable or improved SpO_2, nonlabored respirations
- Reexpansion of the collapsed lung as validated by chest radiograph

9. UNEXPECTED OUTCOMES

- Tension pneumothorax
- Absence of drainage and tidaling or presence of continuous bubbling in the water-seal chamber with continued respiratory distress
- No evidence of lung reexpansion
- Fever, purulent drainage, and redness around the insertion site or purulent drainage in the chest tube
- Dislodgment of the chest tube
- Damage to the diaphragm and internal organs
- Subcutaneous emphysema

10. DOCUMENTATION

- Patient and family education
- Cardiopulmonary and vital sign assessment
- Type of drainage system
- Amount of suction, fluctuation, or tidaling
- Type and amount of drainage
- Date and time of dressing change per the organization's practice

- Absence, presence, severity, and resolution of any air leak
- Unexpected outcomes and related nursing interventions
- Pain assessment and management

11. REFERENCES

1. Brunelli, A. and others. (2011). Consensus definitions to promote an evidence-based approach to management of the pleural space. A collaborative proposal by ESTS, AATS, STS, and GTSC. *European Journal of Cardio-Thoracic Surgery, 40*(2), 291-297. doi:10.1016/j.ejcts.2011.05.020 (classic reference)* (Level D)
2. Chakraborty, P.P., Chakraborty, S. (2012). Reexpansion pulmonary edema. *Indian Journal of Surgery, 74*(2), 174-176. doi:10.1007/s12262-011-0258-x (Level E)
3. Coughlin, S.M., Emmerton-Coughlin, H.M., Malthaner, R. (2012). Management of chest tubes after pulmonary resection: A systematic review and meta-analysis. *Canadian Journal of Surgery, 55*(4), 264-270. doi:10.1503/cjs.001411 (Level A)
4. Danitsch, D. (2012). Benefits of digital thoracic drainage systems. *Nursing Times, 108*(11), 16-17.
5. Getinge Group. (2016). Evidence-based care of patients with chest tubes. Retrieved September 20, 2016, from http://www.atriummed.com/EN/chest_drainage/Documents/NTI%202016.pdf
6. Kane, C.J., York, N.L., Minton, L.A. (2013). Chest tubes in the critically ill patient. *Dimensions of Critical Care Nursing, 32*(3), 111-117. doi:10.1097/DCC.0b013e3182864721
7. Karimov, J.H. and others. (2013). Incidence of chest tube clogging after cardiac surgery: A single-centre prospective observational study. *European Journal of Cardio-Thoracic Surgery, 44*(6), 1029-1036. doi:10.1093/ejcts/ezt140 (Level C)
8. Kwiatt, M. and others. (2014). Thoracostomy tubes: A comprehensive review of complications and related topics. *International Journal of Critical Care Illness and Injury Science, 4*(2), 143-155. doi:10.4103/2229-5151.134182
9. Muffly, T.M. and others. (2012). Effect of petroleum gauze packing on the mechanical properties of suture materials. *Journal of Surgical Education, 69*(1), 37-40. doi:10.1016/j.jsurg.2011.06.012 (Level B)
10. Stacy, K.M. (2014). Chapter 17: Pulmonary anatomy and physiology. In L.D. Urden, K.M. Stacy, M.E. Lough (Eds.), *Critical care nursing: Diagnosis and management* (7th ed., pp. 467-487). St. Louis: Mosby.

Adapted from Wiegand, D.L. (2011). *AACN procedure manual for critical care* (6th ed.). St. Louis: Saunders.

NURSING EDUCATION UNIT

COMPETENCY-BASED CHECK OFF TOOL

Title:	**CHEST TUBE: CLOSED DRAINAGE SYSTEM (WATER SEALED CHAMBER)**
Competency Statement:	**The nurse demonstrates acceptable level of competence in the performance of MAINTAINING SUCTION.**
Standards:	• **Infection Control and Patient Safety Compliance** • **Equipment Preparation and Manipulation** • **Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

- Provide all the information needed in this check off tool.
- Use the scale below by ENCIRCLING your most appropriate response
  4= Very Good (Performs competently without assistance and supervision)
  3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
  2= Poor (Performs inconsistently/incompletely with assistance and supervision)
  1= Very Poor (Cannot perform even with directions; procedural step omitted)
- Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
- Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
- Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
- Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1
5	Educates patient and family / caregiver (where appropriate).	4	3	2	1
Psychomotor Skills					

1	Performed hand hygiene before patient contact.	4	3	2	1
2	Introduced self to the patient.	4	3	2	1
3	Verified the correct patient using two identifiers.	4	3	2	1
4	Reviewed the patient's record for a significant medical history or injury, including chronic lung disease, spontaneous pneumothorax, pulmonary disease, therapeutic procedures, and mechanism of injury.	4	3	2	1
5	Assessed the patient's baseline cardiopulmonary status and vital signs. Looked for signs of respiratory distress, including tachypnea, tachycardia, hypertension or hypotension, shortness of breath, anxiety, and a change in the level of consciousness.	4	3	2	1
6	Assessed the patient's pain level using an appropriate, organization-approved pain scale.	4	3	2	1
7	Reviewed the patient's diagnostic test results, including chest radiographs and arterial blood gases values.	4	3	2	1
8	Performed hand hygiene and donned gloves. Donned a gown, mask, and eye protection or face shield if a large amount of drainage was anticipated.	4	3	2	1
9	Explained the procedure to the patient and ensured that he or she agreed to treatment.	4	3	2	1
10	Opened the sterile packages.	4	3	2	1
11	Stabilized the unit by hanging it from the bed frame or placing it on a floor stand. If the system had an inline connector, moved the patient's tube clamp down next to it.	4	3	2	1
12	Removed the connector cap from the short tubing of the water-seal chamber and used the funnel provided, a prefilled sterile water or saline container, or a 50-ml syringe to add sterile water or normal saline to the appropriate level per the manufacturer's recommendation.	4	3	2	1
13	Left the short tubing from the suction control chamber open to the air or turned the stopcock to the *Open* or *On* position for gravity drainage.	4	3	2	1
14	Filled the suction control chamber with sterile water or normal saline to the prescribed level per the manufacturer's directions for a wet suction CDS.	4	3	2	1
15	Ensured that the unit was hanging below the level of the patient's chest.	4	3	2	1
16	Connected the long tubing from the drainage collection chamber to the chest tube and secured the connection with tape. Applied the tape in a motion similar to a candy cane stripe to allow observation of the inside of the tube.	4	3	2	1
17	Turned the suction source on, if prescribed, to elicit gentle, constant bubbling. Left the stopcock between the CDS and the suction source fully open and adjusted the force of the bubbling at the suction source to decrease the risk of pneumothorax.	4	3	2	1
18	Assessed, treated, and reassessed pain.	4	3	2	1
19	Discarded supplies, removed PPE, and performed hand hygiene.	4	3	2	1
20	Documented the procedure in the patient's record.	4	3	2	1
C. Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1

D. Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse's Comments/Recommendations for Improvement:

Originating Department	Nursing Education Unit	Module No.	1-2017
Title	MANAGEMENT OF PEG, GASTROSTOMY AND JEJUNOSTOMY		
Author/s	Ronald Martin Carcillar-CRN-ICU		
Original Date	October, 2017	Revision Date	

1. ALERT

If a gastrostomy tube is dislodged or removed before the tract is established, place sterile gauze over the site until the tube can be replaced. Notify the practitioner as soon as possible.

Catheters or tubes not intended for enteral feeding, such as urinary drainage or gastrointestinal (GI) drainage tubes, should not be inserted because they lack an external anchoring device. Using these alternative tubes may lead to stomach injury or tube migration, which may cause obstruction of the pylorus or small bowel.

Remember to route tubes and catheters having different purposes in different, standardized directions (e.g., IV lines routed toward the head; enteric lines toward the feet).

Change in Practice Alert: To enhance patient safety and prevent tubing misconnections, a new industry-wide design standard for enteral feeding connectors is being adopted. The ENFit connector is being phased in for feeding tubes, feeding syringes, and feeding administration sets.

Never use standard Luer syringes for oral medications or enteral feedings. Use only clean enteral syringes (greater than or equal to 20 ml with ENFit device) to administer medication through an enteral access device (EAD) or use oral syringes until enteral syringes with the new connector are available.

2. OVERVIEW

Long-term enteral feeding tubes include gastrostomy (G) tubes, jejunostomy (J) tubes, and gastrojejunostomy (GJ) tubes. Patients who cannot have enteral tubes passed orally or nasally because of anatomy or surgery and those who require long-term supplemental enteral nutrition (EN) support for longer than 4 to 6 weeks should be considered candidates for long-term enteral access.[2]

A percutaneous G tube is inserted into the stomach through the abdominal wall. The G tube can be inserted by the oral or abdominal route; the procedure may be performed surgically, endoscopically, or radiologically with image guidance. A percutaneous J tube is inserted into the second loop of the jejunum through the abdominal wall. A percutaneous gastrostomy with a jejunal extension (PEG-J) tube is a combination tube that includes a G tube, which is positioned in the stomach, and a J tube extension, which extends distally past the Treitz's angle.[7]

The most commonly used long-term enteral feeding tube is the percutaneous endoscopic gastrostomy (PEG) tube. PEG tubes are large-bore catheters that have a mushroom-shaped curved end in the stomach and a two-port distal end through

which EN, medications, and fluids are instilled. The bumper on the PEG tube is perpendicular to the tube; its purpose is to hold the device close to the skin and lessen shifting of the tube in and out of the skin.

Practitioners use different techniques to insert PEG tubes. All of the techniques require the stomach to be in close contact with the abdominal wall. One technique involves the use of a local anesthetic (e.g., lidocaine) at the abdominal puncture site, where a guidewire is threaded through the abdominal wall into the stomach and then pulled up the esophagus and out the mouth using an endoscope. The PEG tube is then threaded over the wire and pulled through the oropharynx and esophagus into the stomach and out through the abdominal wall puncture site. The tapered end of the PEG tube is brought out through the abdominal wall until the mushroomed end of the tube is set against the stomach wall. A bumper (also called a disk) on the tube is moved up to the exterior abdominal wall to stabilize the tube and keep it in place. An adapter for infusion of feedings is attached to the end of the tube.

Instead of a mushroom-shaped end, some G tubes have a balloon, which is inflated with sterile water, to prevent dislocation. The distal end has both an infusion port and a port for inflating the balloon.

J tubes are indicated for patients at risk for aspiration or for those who are unable to tolerate enteral feedings in the stomach. Most J tubes do not have balloons; they are sutured in place to prevent dislodgement. Compared to G tubes, most J tubes are smaller bore and therefore more prone to clogging, kinking, or retrograde migration into the stomach.

If a G tube or J tube is inadvertently removed, reinsertion should be done by a skilled practitioner who is familiar with the patient and the type of tube. If the tract and stoma are well formed, tubes may be safely reinserted at the bedside. However, tube replacement should be performed using endoscopic or image guidance if the tract has not matured because the stomach and anterior abdominal wall may separate from each other, resulting in infection or peritonitis.[5]

Because these tubes all enter through the abdominal wall, skin care at the site of insertion is important for skin integrity and infection prevention.

3. SUPPLIES

- Gloves
- Gauze pads or hydrogel dressing
- Cotton-tipped applicators
- Alcohol-free skin protective barrier wipe or spray
- Protective skin barrier (e.g., pectin-based powder, paste)
- Silk tape or paper tape if patient has a sensitivity to silk tape
- Commercial horizontal or vertical stabilization device

4. PATIENT AND FAMILY EDUCATION

- Explain the purpose of the tube.

- Explain the reason for skin assessment, skin care, and tube maintenance.
- Stress the importance of not pulling the tube.
- Explain that oral nutrition is possible with the long-term enteral access catheter.
- Explain that a long-term enteral access catheter can be removed when oral intake meets the patient's needs.
- Explain that aspiration is an ongoing risk, especially when the patient is lying flat because gastric fluid can reflux and create a risk of pulmonary aspiration.
- Encourage questions and answer them as they arise.

5. ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene before patient contact.
2. Verify the correct patient using two identifiers.
3. Assess GI function.
4. Evaluate the skin condition at the feeding tube stoma. Look for signs and symptoms of infection, which include site redness or edema, warmth, purulent drainage, pain or tenderness, and fever.
5. Assess for feeding tube migration.
    a. Review the patient's record for information regarding the numeric marking at the exit site when the tube was inserted or the external length of the tube.
    b. Observe the numeric markings on the tube at the exit site or measure the external length of the tube.
    c. Compare the lengths to see if the tube has migrated inward or outward.
    d. Notify the practitioner if a discrepancy exists.

Preparation

1. Use enteral devices (tubes, syringes, administration and extension sets) with enteral connectors that comply with ISO standard 80369-3 (ENFit).
2. Use purified or sterile water for flushing and medication preparation. Use sterile water for reconstituting powdered formula and for all procedures that involve immunocompromised patients.
3. If the practitioner has just inserted the feeding tube, mark it at the exit site with an indelible marker for future reference.

6. PROCEDURE

1. Perform hand hygiene and don gloves.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient and ensure that he or she agrees to treatment.
5. Trace tubing or catheter from the patient to point of origin (1) before connecting or reconnecting any device or infusion, (2) at any transition (e.g., new setting), and (3) as part of the hand-off process.[4]
6. For labeling feeding tubes, follow the organization's practice.[4]
7. Check vital signs immediately after making any connection per the organization's practice.[4]
8. Do not force connections, and avoid workarounds per the organization's practice.[4]

Rationale: Forced connections or workarounds could indicate that the connection should not be made.

9. Moisten gauze pads and cotton-tipped applicators with soap and warm water.
   Rationale: Mild soap and water will cleanse the skin surface at the stoma.
   Do not use hydrogen peroxide because it can irritate the skin and is cytotoxic to human cells
10. Wipe the area closest to the tube (the stoma) with cotton-tipped applicators and wipe the proximal skin with moistened gauze. Rinse with water.
11. Loosen the bumper to ensure cleansing and drying next to the skin at the stoma.
    Rationale: Moisture under the bumper can erode skin at the tract.
12. Verify that the bumper is not too tight against the skin.
    Rationale: For the first 4 days after PEG placement, the bolster should be left adjacent to the skin surface.[1,5] After 4 days, allowing approximately 0.5 to 1.5 cm (0.2 to 0.6 in) between the external bolster and the skin maintains the proper tension while decreasing the possibility of skin erosion, buried bumper syndrome, and infection.[1,5]
13. Dry the skin and stoma thoroughly with a dry gauze pad.
    Rationale: Drying prevents chafing and skin maceration.
14. If the site is leaking, evaluate it for evidence of infection, ulceration, or a buried bumper.[1]
15. If significant moisture is on the skin around the stoma, use cotton-tipped applicators to apply a protective skin barrier (e.g., a commercial topical moisture barrier product, such as pectin-based powder or a paste) in a circular motion around the stoma.
    Rationale: Protective barrier ointment, powder, or paste provides a moisture barrier for skin and aids wound healing. Increased moisture can cause a fungal infection, which can be treated topically.
    Notify the practitioner if a local fungal skin infection is suspected. Administer topical fungal agents as prescribed.
16. Apply a sterile dressing around the tube.

    Rationale: In the immediate postinsertion period, a sterile dressing should cover the site until healing takes place. The dressing absorbs moisture from the stoma.

    a. Use a foam or glycerin hydrogel dressing if available, rather than gauze, to help reduce local skin irritation caused by gastric contents.[1]
       Rationale: Foam dressings lift the drainage away from the skin; gauze tends to trap it. Hydrogel dressings have been shown to decrease the number of peristomal infections, and the frequency of dressing change can be extended to 7 days.[1]
    b. If foam or hydrogel dressing is not available, apply a split-gauze sponge around the tube and secure it with tape along the edges.
    c. Do not use an occlusive dressing.
       Rationale: Occlusive dressings can lead to peristomal skin maceration and breakdown.
17. Place dressing over, rather than under, the external bumper to avoid excessive tension to the gastrostomy site.
18. Label the dressing per the organization’s practice.

19. Ensure that the dressing stays clean and dry. If no drainage is present, the dressing may be left off.
20. Once healing of the insertion site has occurred, anchor the tube to the skin by applying a tube securement device.

    Rationale: Anchoring devices reduce traction on the tube and minimize tube movement more effectively than tape alone.

    Tubes may have an external bolster or flange that rests on the surface of the abdomen. Ensure that the bolster is snug but not too tight to avoid creating a device-related ulcer.

    a. Apply a protective barrier to the skin around the tube to help prevent irritation.[1]
    b. Alternate securement sites to avoid skin damage from the adhesive.
21. Initiate enteral feedings as prescribed.

    Rationale: Enteral feedings should be started once tube placement has been confirmed and there are no signs of immediate complications, such as bleeding, abdominal pain, nausea, or vomiting. Several studies have reported that feeding within 4 hours of PEG placement is safe and effective with no increase in complications of wound infection, melena, vomiting, leakage, stomatitis, or aspiration pneumonia.[2] Currently, there is a lack of evidence to guide optimal timing for initiation of feeding for other types of G tubes.

    a. Ensure that the correct tubing is used.
    Do not use IV tubing or IV pumps for enteral feedings.[4]
    b. Identify and confirm the EN label.[2]
    Rationale: A 3-in-1 parenteral nutrition admixture can appear similar to an EN formulation bag.
    c. Label commercial enteral containers “Not for IV Use” to decrease the risk for an enteral misconnection.[2]
22. Elevate the head of the bed to a minimum of 30 degrees, but preferably to 45 degrees, when feedings are infusing.[2]
    Rationale: Elevating the head of the bed minimizes the risk of aspiration.
23. Flush the feeding tube.[2]
    a. Following the administration of medications or formula, clear the tube by flushing with a minimum of 15 ml of purified or sterile water.
    b. Flush with 30 ml of water after gastric residual volume measurements.
    c. Flush with a minimum volume of 30 ml of water before and after feedings and every 4 hours during continuous feedings.
24. Discard supplies, remove gloves, and perform hand hygiene.
25. Document the procedure in the patient’s record.

7. MONITORING AND CARE

1. Assess skin integrity and the quality of drainage from the stoma.
   Rationale: Intact skin is the first line of prevention against infection.

Reportable conditions: Stoma erosion; change in drainage; increased volume of foul-smelling, purulent drainage from around the stoma; redness or pain at the stoma

2. Ensure that the PEG tube has the external disk or bumper properly positioned approximately 0.5 to 1.5 cm (0.2 to 0.6 in) above the skin.
   a. Ensure that the bumper is moving freely without pressure on the skin.[1,5]
   b. Gently rotate the external tube daily and then weekly once the stoma has fully healed.
   Rationale: The bumper helps prevent excess movement of the tube in and out of the skin. However, unrestricted movement or excessive pressure between the gastrostomy internal and external bolsters is associated with higher infection rates and can lead to mucosal ulceration, increased leakage, or buried bumper.
   Reportable conditions: Pressure injury adjacent to the stoma, removal of the tube by the patient, clogging of the device, buried bumper
3. Ensure that the patient does not remove the long-term enteral feeding tube.
   a. If a tube is removed before the tract is established, apply a dry sterile dressing to the site and immediately notify the practitioner to determine the urgency of replacement.
   b. If a tube is removed after the tract is established, replace the tube, as ordered, with one of a comparable size and length.
   Rationale: G tubes with an immature tract should be replaced by the practitioner as soon as possible, using endoscopy or image guidance. G tubes with established tracts can be replaced by skilled nurses at the bedside, using a tube of comparable size and length.
   Do not insert catheters or tubes that are not intended for enteral feeding, such as urinary drainage or GI drainage tubes, because they lack an external anchoring device.[2]
4. Monitor the tract for the J tube.
   Rationale: Replacement of a J tube is a medical procedure that requires radiographic confirmation of placement, particularly if the tube has been in place less than 4 weeks. The tract for a J tube can close quickly, and radiographic confirmation should include contrast injection.[5]
   Removal of a tube before the tract is established or a delay in recognizing the dislodgment is a potential surgical emergency and may require an immediate return to the operating room for repair and replacement.
5. Evaluate the condition of the tube with ongoing use. Follow the organization's practice or manufacturer protocols for replacement.[2]
   Rationale: Routine tube change is not indicated. Changing the tube is indicated with device failure, persistent peristomal infection, nonhealing ulcer formation, colocutaneous or gastrocolic fistula formation, or tube degradation.
   Reportable condition: Tube degradation; nonhealing ulcer near stoma site; abnormal fistula formation; tube failure or occlusion
6. If necessary, take steps to unclog the enteral feeding tube.
   a. Instill warm water into the EAD using a 30- or 60-ml syringe, and apply a gentle back-and-forth motion with the plunger of the syringe.2 For children, use a smaller syringe as appropriate.

b. If water flush does not resolve the clog, use an uncoated pancreatic enzyme solution.
   i. Crush one uncoated pancreatic enzyme tablet and one 325-mg sodium bicarbonate tablet mixed in 5 ml of water.
   ii. Add the solution to the clog and clamp the feeding tube for at least 30 minutes.
   iii. If the clog is not cleared within 30 minutes, remove the solution from the tube and replace with a fresh mixture.
c. If water flush does not resolve the clog, use an enzyme-containing declogging kit or mechanical declogging device.[2]
   Report to the practitioner if the obstruction is not relieved.

7. Consult with an ostomy nurse to optimize skin site care.[2]
8. Assess, treat, and reassess pain.

8. EXPECTED OUTCOMES

- Skin at stoma of long-term EAD is intact.
- Long-term enteral access for enteral feeding and fluid administration remains patent.

9. UNEXPECTED OUTCOMES

- Infection or ulceration at the stoma
- Peristomal leakage or irritation
- Inadvertent tube removal or accidental dislodgment with patient's movement
- Buried bumper syndrome
- Fistulas
- Peritonitis
- Aspiration
- Gastric ulcer or hemorrhage
- Gastric outlet obstruction
- Jejunal volvulus or small bowel perforation (specific to direct jejunostomy placement)
- Clogged tube

10. DOCUMENTATION

- Patient and family education
- Condition of stoma
- Treatment related to site complications
- Tube patency
- Type of tube
- Length of external tube
- Unexpected outcomes and related nursing interventions
- Pain assessment and management

11. REFERENCES

1. Blumenstein, I., Shastri, Y.M., Stein, J. (2014). Gastroenteric tube feeding: Techniques, problems, and solutions. *World Journal of Gastroenterology, 20*(26), 8505-8524. doi:10.3748/wjg.v20.i26.8505
2. Boullata, J.I. and others. (2017). ASPEN safe practices for enteral nutrition therapy. *JPEN: Journal of Parenteral and Enteral Nutrition, 41*(1), 15-103. doi:10.1177/0148607116673053 (Level D)
3. Friginal-Ruiz, A.B., Lucendo, A.J. (2015). Percutaneous endoscopic gastrostomy: A practical overview on its indications, placement conditions, management, and nursing care. *Gastroenterology Nursing, 38*(5), 354-366. doi:10.1097/SGA.0000000000000150
4. Joint Commission, The. (2014). Sentinel event alert 53: Managing risk during transition to new ISO tubing connector standards. Retrieved April 29, 2017, from http://www.jointcommission.org/assets/1/6/SEA_53_Connectors_8_19_14_final.pdf (Level D)
5. Miller, K.R. and others (2014). A tutorial on enteral access in adult patients in a hospitalized setting. *JPEN: Journal of Parenteral and Enteral Nutrition, 38*(3), 282-295. doi:10.1177/0148607114522487
6. Simons, S., Remington, R. (2013). The percutaneous endoscopic gastrostomy tube: A nurse's guide to PEG tubes. *Medsurg Nursing, 22*(2), 77-83.
7. Toussaint, E. and others. (2015). Enteral access in adults. *Clinical Nutrition, 34*(3), 350-358. doi:10.1016/j.clnu.2014.10.009

Adapted from Wiegand, D.L. (Ed.). (2017). *AACN procedure manual for high acuity, progressive, and critical care* (7th ed.). St. Louis: Elsevier.

NURSING EDUCATION UNIT

COMPETENCY-BASED CHECK OFF TOOL

Title:	**PEG, GASTROSTOMY AND JEJUNOSTOMY CARE**
Competency Statement:	**The nurse demonstrates acceptable level of competence in the performance maintaining feeding tube integrity.**
Standards:	• **Infection Control and Patient Safety Compliance** • **Equipment Preparation and Manipulation** • **Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

- Provide all the information needed in this check off tool.
- Use the scale below by ENCIRCLING your most appropriate response
  4= Very Good (Performs competently without assistance and supervision)
  3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
  2= Poor (Performs inconsistently/incompletely with assistance and supervision)
  1= Very Poor (Cannot perform even with directions; procedural step omitted)
- Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
- Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
- Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
- Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1
5	Educates patient and family / caregiver (where appropriate).	4	3	2	1
Psychomotor Skills					

1	Performed hand hygiene before patient contact.	4	3	2	1
2	Introduced self to the patient.	4	3	2	1
3	Verified the correct patient using two identifiers.	4	3	2	1
4	Assessed GI function.	4	3	2	1
5	Evaluated the skin condition at the feeding tube stoma. Looked for signs and symptoms of infection.	4	3	2	1
6	Assessed for feeding tube migration and notified the practitioner if it appeared that the tube had migrated.	4	3	2	1
7	Used enteral devices (tubes, syringes, administration and extension sets) with enteral connectors that complied with ISO standard 80369-3 (ENFit).	4	3	2	1
8	Used purified or sterile water for flushing and medication preparation. Used sterile water for reconstituting powdered formula and for all procedures that involved immunocompromised patients.	4	3	2	1
9	If the practitioner had just inserted the feeding tube, marked it at the exit site with an indelible marker for future reference.	4	3	2	1
10	Performed hand hygiene and donned gloves	4	3	2	1
11	Explained the procedure to the patient and ensured that he or she agreed to treatment.	4	3	2	1
12	Traced tubing or catheter from the patient to point of origin (1) before connecting or reconnecting any device or infusion, (2) at any transition, and (3) as part of the hand-off process.	4	3	2	1
13	Checked vital signs immediately after making any connection per the organization's practice.	4	3	2	1
14	Did not force connections, and avoided workarounds per the organization's practice.	4	3	2	1
15	Moistened gauze pads and cotton-tipped applicators with soap and warm water.	4	3	2	1
16	Wiped the area closest to the tube with cotton-tipped applicators and wiped the proximal skin with moistened gauze. Rinsed with water.	4	3	2	1
17	Loosened the bumper to ensure cleansing and drying next to the skin at the stoma.	4	3	2	1
18	Verified that the bumper was not too tight against the skin.	4	3	2	1
19	Dried the skin and stoma thoroughly with a dry gauze pad.	4	3	2	1
20	If the site was leaking, evaluated it for evidence of infection, ulceration, or a buried bumper.	4	3	2	1
	If significant moisture was on the skin around the stoma, used cotton-tipped applicators to apply a protective skin barrier in a circular motion around the stoma. Notified the practitioner if a local fungal skin infection was suspected. Administered topical fungal agents as prescribed.	4	3	2	1
	Applied a sterile dressing around the tube. a. Used a foam or glycerin hydrogel dressing if available, rather than gauze. b. If foam or hydrogel dressing was not available, applied a split-gauze sponge around the tube and secured it with tape along the edges. c. Did not use an occlusive dressing.	4	3	2	1
Critical Thinking Skills					

1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1
Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse's Comments/Recommendations for Improvement:

ED & A-ICU Study Module

Originating Department	Nursing Education Unit	**Module No.**	1-2017
Title	**APPLICATION OF CERVICAL COLLAR (pediatrics)**		
Author/s	**Ronald Martin Carcillar-CRN-ICU**		
Original Date	October, 2017	**Revision Date**	

1. ALERT

Placing a cervical collar can result in excessive flexion of the cervical spine because of the relatively large size of a child's occiput. Although the use of a cervical collar is better than no immobilization, collars do not effectively reduce motion in unstable cervical spine injuries.

This skill is performed by health care professionals with additional knowledge, skills, and demonstrated competence, and in accordance with the professional's regulatory scope of practice and the organization's practice.

2. OVERVIEW

When a child has a suspected cervical spine injury, the motion of the cervical spine should be restricted, and traction or movement of the head or neck should be avoided until a spinal injury is excluded. A rigid cervical collar is placed to stabilize the cervical spine that has sustained an actual or suspected injury or to provide postoperative support. The goal of rigid cervical collar placement is to maintain the alignment of the spine in a neutral position and prevent new or further injury. A rigid cervical collar alone does not provide spinal immobilization. If full spinal immobilization is necessary, the child must be appropriately secured to a backboard after the collar is placed. A spinal board with a head well or elevation of the child's torso with padding is recommended for maintenance of a neutral position because children have relatively larger heads than bodies.

An appropriate-size cervical collar is essential to prevent spinal cord injury and airway compromise. A collar that is too large may push the jaw backward, leading to airway obstruction. A collar that is too small does not provide the appropriate alignment and may cause airway compromise from constriction. A cervical collar fits the child properly if the collar sits between the point of the chin and the suprasternal notch, resting on the clavicles and supporting the lower jaw.

Application of a cervical collar requires:

- Knowledge of child development as it relates to clinical assessment and cervical collar application
- Knowledge of the anatomy and biomechanics of the cervical spine
- Skill in manual spinal precautions, cervical spine stabilization, and log roll maneuver

A cervical collar should not be used for spinal motion restriction for blunt trauma because of increased adverse effects. Significant neck swelling from tracheal injury

or hemorrhage may also limit the use of the cervical collar. Complications of rigid cervical collar placement may include:

- Airway compromise (e.g., upper airway obstruction from an inappropriate-size collar)
- Increased agitation, especially in toddlers and preschoolers
- Increased aspiration risk
- Increased intracranial pressure (ICP)
- Skin breakdown

Multiple treatment options are available for cervical spine injuries based on the type and location of the injury and the specific characteristics of the injured child. Clinical clearance remains the standard in awake, alert children who have trauma without a neurologic deficit or distracting injury and who have no neck pain or tenderness with full range of motion. A cervical collar should be removed as soon as feasible.

Cervical collars come in a variety of sizes and types, with a relatively uniform design. Anteriorly, the collar is designed to prevent the child's chin from dipping down toward the chest. The posterior section of the collar holds the anterior section in place; it wraps around the posterior neck and is anchored in place with fasteners. Single-unit collars are generally for short-term use. Two-piece collarshave additional padding and are often used for longer periods of time. The manufacturer's instructions should be consulted for specifics of collar application and use.

There are many manufacturers of cervical collars. Familiarity with the organization-specific type of collar used is necessary. Cervical collars are a single-use disposable system.

3. SUPPLIES

- Gloves
- Correct-size cervical collar
- Pad to elevate torso if needed, based on child's size
- Length-based resuscitation tape or selection chart supplied by manufacturer

4. CHILD AND FAMILY EDUCATION

- Provide individualized, developmentally appropriate education to the family and child based on desire for knowledge, readiness to learn, and overall neurologic and psychosocial state.
- Provide information to the family and child about the cervical collar and the application process.
- Explain to the child the need to be still during the application process, if developmentally appropriate.
- Instruct the child and family about the need to wear the collar at all times, except when the collar is removed for cleaning of the skin and the device. Include information about how the cervical spine is stabilized when the collar is off.
- Encourage questions and answer them as they arise.

5. ASSESSMENT AND PREPARATION

Child and Family Assessment

1. Perform hand hygiene before patient contact.
2. Verify the correct child using two identifiers.
3. Assess whether the child needs pain control.
4. Assess the child's developmental level and ability to interact.
5. Determine the child's size and age.
6. Assess the child's neurologic status and vital signs.
7. Assess the child's and family's understanding of the reasons for and the risks and benefits of the procedure.
8. Assess the child for skin injuries, especially in the neck and upper torso.
9. Assess the family's desire to be present during the procedure.

Preparation

1. Administer pain medication as indicated and prescribed.
2. Reassess the child's pain status, allowing for sufficient onset of action per medication, route, and the child's condition.
3. For a child or adolescent who will wear the collar in the postoperative period, consider sizing the child before the surgery.

6. PROCEDURE

1. Perform hand hygiene and don gloves.
2. Introduce yourself to the child and family.
3. Verify the correct child using two identifiers.
4. Explain the procedure to the child and family and ensure that they agree to treatment.
5. Use spinal precautions and the log roll technique throughout the entire procedure.

   Rationale: The child with a known or suspected cervical spine disorder or injury is at risk for serious neurologic injury if spinal precautions and the log roll technique are not used.

   Ensure that adequate staff support is available to assist with the initial collar application.

6. Have an assistant positioned at the child's head to initiate manual cervical spine immobilization. Position the child with arms at his or her side and head at midline. Have the assistant place his or her thumbs on the mandible, palms over ears, and fingers on the occipital ridge.

   Rationale: Proper positioning initiates stabilization and control of the cervical spine and prevents further injury.

7. Position the child supine without anything under the head.
8. Select the appropriate collar based on the child's age, height, and weight.

a. For a younger child, measure the child with a length-based resuscitation tape according to the manufacturer's recommendations.

   Rationale: Proper sizing is critical for optimal spinal motion restriction and comfort. Age guidelines are based on normal growth and development. Manufacturers often provide size recommendations based on the different age ranges.

b. For an older child or adolescent, select the appropriate collar with the size-check method of using fingers to measure the vertical chin-to-shoulder distance.

   Rationale: The vertical chin-to-shoulder distance correlates with the distance from the top of the securing strap to the bottom edge of the plastic on the collar selected.

c. If the child or adolescent falls between two sizes, start with the smaller size.

9. Remove the selected collar from the packaging and ensure that the padding is secure. Separate and identify the anterior and posterior parts of the collar.

   Do not apply the collar without the padding in place.

10. As the assistant maintains spinal precautions, slide the posterior portion of the collar behind the child's neck.

    Ensure that the collar is centered and the padding extends beyond the plastic edges if appropriate.

11. As the assistant maintains spinal precautions, flare the edges of the anterior portion of the collar out, slide it up the chest wall, and scoop it into place snugly under the neck, ensuring that it is centered. Release the sides of the collar so they bend around toward the posterior portion of the collar.

    Ensure that the sides are off the trapezius muscles and the ears are free.

12. As the assistant maintains spinal precautions, hold the collar securely and curl the ends (flaps) of the collar so they are snug against the child's neck. (This is the final position before the straps are secured.)

    If the child can slip his or her chin inside the collar, or if the collar rests on the trapezius and the ears are not free, the collar is not snug enough. Remove the collar as the assistant maintains spinal precautions, and select a new collar for application.

13. Fasten the straps one side at a time to equal lengths; ensure that no gaps are present.

    Rationale: If the straps are not fastened equally, the collar does not provide the spinal motion restriction and comfort needed.

Replace the collar with a better-fitting one if the collar moves out of position or the straps are not approximated with half the surface of the hook-and-loop fastener.

14. Perform a neurologic examination.

    Rationale: A neurologic examination establishes a baseline that is compared with the neurologic examination performed before the cervical collar is applied.

15. Obtain radiologic imaging per the prescribing practitioner's order or the organization's practice, or per the child's neurologic condition.

    Rationale: A spinal x-ray assesses and provides documentation of cervical spine alignment after the cervical collar is applied. In evaluating a child with a suspected cervical spine injury, a radiograph may be supplemented with a computed tomography scan or magnetic resonance imaging (MRI).[1] Routine use of radiographs in children with cervical spine pain may not be the best imaging modality to evaluate for ligamentous injury (LI). MRI has more sensitivity and specificity to evaluate for LI in children with normal radiographs.[4]

16. Remove gloves and perform hand hygiene.
17. Document the procedure in the child's record.

7. MONITORING AND CARE

1. Assess the fit of t he cervical collar at every shift and any time the collar is manipulated.

   Rationale: If the collar is not fitted correctly, increased movement of the cervical spine may occur, which may result in further cervical spine injury.

   Reportable conditions: Incorrect-size cervical collar, incorrectly applied cervical collar

2. Monitor for complications of cervical collar placement, including upper airway obstruction from incorrect-size collar or other respiratory complications, changes in neurologic status, and increased aspiration risk.

   Reportable conditions: Respiratory compromise, nausea and vomiting, increase in ICP after manipulation of cervical collar

3. Assess the child's tolerance of the cervical collar; if the child removes the collar, institute spinal precautions immediately.

   Rationale: Removal of the cervical collar can cause the child further cervical spine injury.

Reportable conditions: Child attempts to remove or removes the collar, increased agitation from presence of cervical collar

4. Monitor vital signs and neurologic status per the organization's practice.

   Rationale: Monitoring vital signs and neurologic status facilitates the early recognition of deterioration in the child's status.

   Reportable conditions: Unstable or deteriorating vital signs, decrease in level of consciousness, deterioration in sensorimotor function, loss of sensation or function

5. Assess the skin, ears, clavicles, occiput, anterior neck, and lateral neck for erythema, breakdown, or rash.

   Rationale: If the skin breaks down, the child is at risk for infection.

   Reportable conditions: Skin breakdown, inability to provide skin care because of child's anxiety or agitation

6. Assess, treat, and reassess pain.

8. EXPECTED OUTCOMES

- Cervical collar is correct size and fit.
- Child's cervical spine is in anatomic position or stabilized.
- Child's neurologic status after collar placement is consistent with preprocedure examination results.
- Child's safety is maintained.
- Child has acceptable level of comfort.

9. UNEXPECTED OUTCOMES

- Improperly placed cervical collar allows movement of the head and neck.
- Collar is too large or too small and allows movement of the head and neck.
- Collar is too tight or too small and results in airway compromise or increased ICP.
- Cervical spine is unstable or in an incorrect position that results in neurologic injury.
- Neurologic examination reveals deterioration after placement of collar.
- Child has skin irritation or breakdown.
- Child experiences unmanaged pain or anxiety.

10. DOCUMENTATION

- Child's level of comfort
- Child's neurologic examination results before and after placement or manipulation of cervical collar
- Child's tolerance of collar

- Date and time, type, model and size of cervical collar that was applied and individual who fitted and applied the collar
- Medications administered for sedation or analgesia and child's response if used
- Skin assessment of area around and under collar at time of placement
- Unexpected outcomes and related nursing interventions
- Child and family education

11. REFERENCES

1. Adelgais, K.M. and others. (2014). Cervical spine computed tomography utilization in pediatric trauma patients. *Journal of Pediatric Surgery, 49*(2), 333-337. doi:10.1016/j.jpedsurg.2013.10.006 (Level C)
2. Leonard, J.R. and others. (2014). Cervical spine injury patterns in children. *Pediatrics, 133*(5), e1179-e1188. doi:10.1542/peds.2013-3505 (Level C)
3. Meckler, G., Leonard, J., Hoyle, J. (2014). Pediatric patient safety in emergency medical services. *Clinical Pediatric Emergency Medicine, 15*(1), 18-27. doi:10.1016/j.cpem.2014.01.003
4. Moore, J.M. and others. (2017). Utility of plain radiographs and MRI in cervical spine clearance in symptomatic non-obtunded pediatric patients without high-impact trauma. *Child's Nervous System, 33*(2), 249-258. doi:10.1007/s00381-016-3273-1 (Level C)
5. Rozzelle, C.J. and others. (2013). Management of pediatric cervical spine and spinal cord injuries. *Neurosurgery, 72*(Suppl. 2), 205-226. doi:10.1227/NEU.0b013e318277096c
6. Singletary, E.M. and others. (2015). Part 15: First aid: 2015 American Heart Association and American Red Cross guidelines update for first aid. *Circulation, 132*(18 Suppl. 2), S574-S589. doi:10.1161/CIR.0000000000000269 Retrieved February 15, 2017, from http://circ.ahajournals.org/content/132/18_suppl_2/S574.full (Level D)
7. Sundstrøm, T. and others. (2014). Prehospital use of cervical collars in trauma patients: A critical review. *Journal of Neurotrauma, 31*(6), 531-540. doi:10.1089/neu.2013.3094

ADDITIONAL READINGS

Leonard, J.C. (2013). Cervical spine injury. *Pediatric Clinics of North America, 60*(5), 1123-1137. doi:10.1016/j.pcl.2013.06.015

NURSING EDUCATION UNIT

COMPETENCY-BASED CHECK OFF TOOL

Title:	**APPLICATION OF CERVICAL COLLAR**
Competency Statement:	**The nurse demonstrates acceptable level of competence in the performance of cervical collar application.**
Standards:	• **Infection Control and Patient Safety Compliance** • **Equipment Preparation and Manipulation** • **Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

49. Provide all the information needed in this check off tool.
50. Use the scale below by ENCIRCLING your most appropriate response
    4= Very Good (Performs competently without assistance and supervision)
    3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
    2= Poor (Performs inconsistently/incompletely with assistance and supervision)
    1= Very Poor (Cannot perform even with directions; procedural step omitted)
51. Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
52. Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
53. Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
54. Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1
5	Educates patient and family / caregiver (where appropriate).	4	3	2	1

Psychomotor Skills					
1	Performed hand hygiene before patient contact.	4	3	2	1
2	Introduced self to the child and family.	4	3	2	1
3	Verified the correct child using two identifiers.	4	3	2	1
4	Assessed whether the child needed pain control.	4	3	2	1
5	Assessed the child's developmental level and ability to interact.	4	3	2	1
6	Determined the child's size and age.	4	3	2	1
7	Assessed the child's neurologic status and vital signs.	4	3	2	1
8	Assessed the child's and family's understanding of the reasons for and the risks and benefits of the procedure.	4	3	2	1
9	Assessed the child for skin injuries, especially in the neck and upper torso.	4	3	2	1
10	Assessed the family's desire to be present during the procedure.	4	3	2	1
11	Administered pain medication as indicated and prescribed.	4	3	2	1
12	Reassessed the child's pain status, allowing for sufficient onset of action per medication, route, and the child's condition.	4	3	2	1
13	For a child or adolescent who would wear the collar in the postoperative period, considered sizing the child before the surgery.	4	3	2	1
14	Performed hand hygiene and donned gloves.	4	3	2	1
15	Explained the procedure to the child and family and ensured that they agreed to treatment.	4	3	2	1
16	Used spinal precautions and the log roll technique throughout the entire procedure. Ensured that adequate staff support was available to assist with the initial collar application.	4	3	2	1
17	Had an assistant positioned at the child's head to initiate manual cervical spine immobilization. Positioned the child with arms at his or her side and head at midline. Had the assistant place his or her thumbs on the mandible, palms over ears, and fingers on the occipital ridge.	4	3	2	1
18	Positioned the child supine without anything under the head.	4	3	2	1
19	Selected the appropriate collar based on the child's age, height, and weight. a. For a younger child, measured the child with a length-based resuscitation tape according to the manufacturer's recommendations. b. For an older child or adolescent, selected the appropriate collar with the size-check method of using fingers to measure the vertical chin-to-shoulder distance. c. If the child or adolescent fell between two sizes, started with the smaller size.	4	3	2	1
20	As the assistant maintained spinal precautions, slid the posterior portion of the collar behind the child's neck. Ensured that the collar was centered and the padding extended beyond the plastic edges if appropriate.	4	3	2	1
21	Removed the emesis basin and the over-bed table, raised the side rail if appropriate, and lowered the bed to its original position.	4	3	2	1
22	As the assistant maintained spinal precautions, flared the edges of the anterior portion of the collar out, slid it up the chest wall, and scooped it into place snugly under the neck, ensuring that it was centered. Released	4	3	2	1

	the sides of the collar so they bent around toward the posterior portion of the collar. Ensured that the sides were off the trapezius muscles and the ears were free.				
23	As the assistant maintained spinal precautions, held the collar securely and curled the ends of the collar so they were snug against the child's neck. If the collar was not snug enough, removed it as the assistant maintained spinal precautions, and selected a new collar for application.	4	3	2	1
24	Fastened the straps one side at a time to equal lengths; ensured that no gaps were present. Replaced the collar with a better-fitting one if the collar moved out of position or the straps were not approximated with half the surface of the hook-and-loop fastener.	4	3	2	1
25	Performed a neurologic examination.	4	3	2	1
26	Obtained radiologic imaging per the prescribing practitioner's order or the organization's practice, or per the child's neurologic condition.	4	3	2	1
27	Assessed, treated, and reassessed pain.	4	3	2	1
28	Removed gloves and performed hand hygiene.	4	3	2	1
29	Documented the procedure in the child's record.	4	3	2	1
C. Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1
D. Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse's Comments/Recommendations for Improvement:

Originating Department	Nursing Education Unit	**Module No.**	1-2017
Title	**APPLICATION OF SKIN TRACTION**		
Author/s	**Ronald Martin Carcillar-CRN-ICU/ED**		
Original Date	October, 2017	**Revision Date**	

1. ALERT

Do not place skin traction over irritated areas or at sites with skin breakdown.

Ensure that there is no pressure on the peroneal nerve as a result of bandages or the traction boot because this can cause foot drop.

2. OVERVIEW

Skin traction is one of the two basic types of traction used to treat fractured bones and correct orthopedic abnormalities. The child's recovery is facilitated through immobilization and alignment of body parts. Skin traction applies pull to an affected body structure by straps attached to the skin around the structure.

Newer technology has produced orthopedic fixation devices that allow full or partial mobility, thus preventing long-term immobility and its consequences. The goal is to return to preinjury function as soon as possible with the minimum amount of intervention.

Goals for skin traction include:

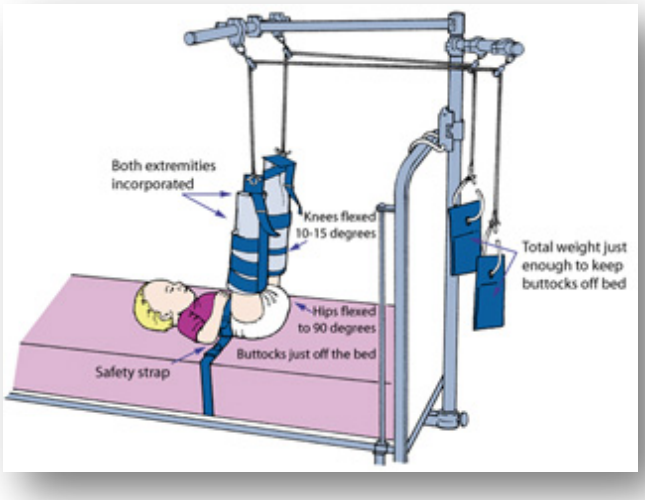
- ***Maintaining the established line of pull.***
  - This line is along the axis of the bone. Weights hang freely, not hitting the bed or resting on the floor. The position of the weights should be rechecked if the level of the bed is altered. Health care personnel must use caution to avoid bumping against the weights when walking near the bed and must allow the weights to sway. They must also educate family and visitors in the child's room to be aware of the free-hanging weights. Movement of the bed or weights causes pain for the child in traction. It is preferred that the weights do not hang over the child.
- ***Maintaining the traction equipment.***
  - The traction rope rests in the groove of the pulley and moves easily. The rope should be monitored for fraying. The knots in the traction rope should be tied securely, and the rope ends taped well. The rope knots are not lodged against the pulley because this interferes with the line of pull. For the same reason, the pulley, spreader bar, and foot plate should not rest against the foot of the bed.
- ***Maintaining countertraction.***
  - To provide traction, countertraction should be maintained by the weight of the child's body, the pull of the weights in the opposite direction, or the elevation of the bed. For instance, the feet of a child in Buck traction should not touch the foot of the bed.
- ***Maintaining continuous traction unless ordered otherwise.***

- To change the child's position in bed, the weights should not be lifted or adjusted if traction is continuous. The correct amount of weight should be used. For intermittent traction, the weights should be gently placed and slowly removed; jerking or suddenly moving the weights, which could jar the child, should be avoided.

- ***Maintaining correct body alignment.***
  - The child must have correct body alignment while lying centered in the bed. The child should be instructed regarding any restricted positions. The child should not angle his or her body or lean off the side of the bed because the line of traction pull would then be changed or interrupted.
- ***Preventing friction to the skin.***
  - Skin traction should be removed and reapplied daily. With any traction, the skin should be monitored for evidence of redness, bruising, or skin breakdown. Friction or pressure from the equipment should be avoided.

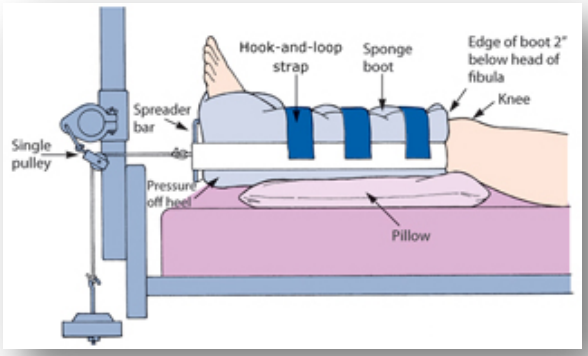
Recovery is facilitated through immobilization and alignment of body parts. The following are the major forms of skin traction with some variation per type:

- ***Bryant traction*** is a vertically held type of bilateral traction to the legs (This type of traction is typically used for femur fractures in children who weigh less than 12 kg (26.5 lb). Adhesive strips are applied to the lateral surfaces of each leg and wrapped with elastic bandages to secure them in place. This type of traction is used infrequently because of the alteration in perfusion as a result of gravitational forces and the circumferential bandages.

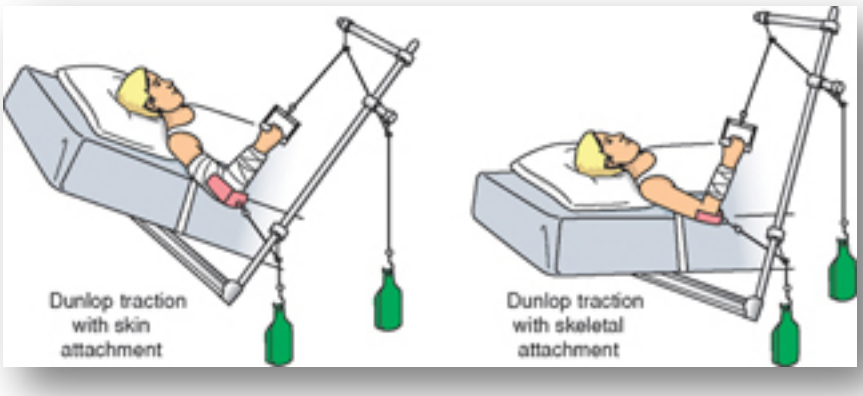


- ***Buck extension*** is horizontally applied unilateral or bilateral traction. Buck traction is applied in one of two ways: Adhesive strips are applied to the lateral surfaces of the limb or limbs (usually one leg or forearm) and wrapped with elastic bandages or a commercially prepared foam boot with hook-and-loop straps is applied. A spreader bar is attached to the adhesive strips as in Bryant traction or to the foam boot and then to ropes, pulleys, and weights.

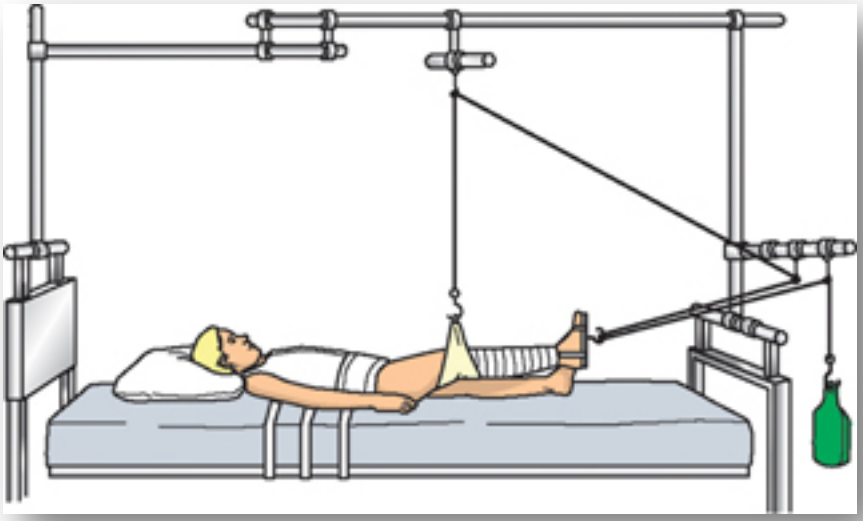
Buck extension provides temporary immobilization of hip fracture until open reduction and internal fixation can be performed. It is also used to reduce muscle spasms, contractures, and dislocations.



- ***Dunlop traction*** is a simultaneous horizontal form of Buck extension to the humerus with an accompanying vertical Buck extension to the forearm .The horizontal Buck extension is the “treating” traction for fractures of the humerus, whereas the vertical Buck extension is primarily used to maintain the forearm in the desired position relative to the humerus.



- ***Russell traction*** is a modification of Buck extension using Newton’s third law of motion (for each force in one direction there is an equal force in the opposite direction) to double the amount of pull through the arrangement of ropes, pulleys, and weights. Russell traction may also be used in skeletal traction.



Because skin tissues and subcutaneous attachments cannot tolerate great amounts of weight without losing strength and continuity, skin traction uses weights depending on the child's body weight and injury.

Each form of skin traction mentioned above has a usual or "classic" position used for the majority of children in that traction. Variations may be needed to treat a specific injury or condition.

3. SUPPLIES

- Ropes, pulleys, weights, weight holder (weight sizes vary [heavier weights for pelvic traction—have several of each weight])
- Bed frame for attachment of traction or portable frames that attach to bed
- One or more spreader bars
- Adhesive-backed moleskin
- Elastic bandages
- Heel or elbow protectors (optional)
- Knee sling for Russell traction, traction boot for Buck extension, or pelvic belt or sling
- Wastebasket with plastic bag liner
- Shock blocks for bed positioning (as needed)

4. CHILD AND FAMILY EDUCATION

- Provide individualized, developmentally appropriate education to the family and child based on the desire for knowledge, readiness to learn, and overall neurologic and psychosocial state.
- Ensure that the child and family understand the procedure.
- When traction time is decreased or discontinued, teach the child to ambulate slowly within medical guidelines with physical therapy assistance, gradually

increasing the length of time out of bed and the distance walked, as developmentally appropriate.
- Instruct the child and family to notify the practitioner of undesirable signs, such as a marked increase in pain, muscle spasms, and an increased numbness that may signify reinjury or insufficient healing.
- Verify that the child and family understand mobility restrictions.
- Encourage questions and answer them as they arise.

5. ASSESSMENT AND PREPARATION

Child and Family Assessment

1. Perform hand hygiene before patient contact.
2. Verify the correct child using two identifiers.
3. Assess the child's and family's understanding of the reasons for and the risks and benefits of skin traction.
4. Assess the child's overall health, including degree of mobility and current medical conditions, such as diabetes, malnutrition, or other disease processes affecting bone or skin integrity.
5. Assess the condition of specific tissues to be placed in traction; note skin condition, excessive hair, bruises, rash, varicose veins, ulcers, dermatitis, or other lesions.

   Do not place skin traction over irritated or broken skin.

   a. *Bryant traction*: Assess both legs.
   b. *Buck extension:* Assess one or both legs.
   c. *Dunlop traction:* Assess the arm and forearm.
   d. *Russell traction:* Assess the lower limbs.
6. Assess the child's level of pain using a developmentally appropriate and organization-approved pain scale.
7. Assess the child's neurovascular status.

Preparation

1. Administer analgesia for pain and a muscle relaxant for spasms in advance of traction application.
2. Reassess the child's pain status, allowing for sufficient onset of action per medication, route, and the child's condition.

6. PROCEDURE

1. Perform hand hygiene.
2. Introduce yourself to the child and family.
3. Verify the correct child using two identifiers.
4. Explain the procedure to the child and family and ensure that they agree to treatment.
5. Assess the child for pain.
6. Prepare the area of the body to be in traction.

a. *Bryant traction*: Wash both legs gently if necessary (change an infant's diaper if necessary).

   Rationale: Cleansing prevents irritation under the traction strips and bandages.

b. *Buck extension:* Wash the affected leg (or legs) very gently and dry carefully. Do not shave legs.

   Rationale: Shaving may create microabrasions that could become inflamed under the traction strips.

c. *Dunlop traction*: Wash the arm and forearm gently as needed.

   Rationale: Cleansing prevents irritation under the straps and bandages.

d. *Russell traction:* Wash the lower extremity to the knee gently as needed.

   Rationale: Cleansing prevents irritation under the bandages.

7. Position the child per the practitioner's request and type of traction.

   Rationale: Position varies with the part of the body to be placed in traction, as well as the effects of weight and gravity. Body parts should be kept anatomically aligned.

   a. *Bryant traction*: Child flat on his or her back
   b. *Buck extension*: Child on his or her back with the head of the bed flat or slightly elevated
   c. *Dunlop traction*: Child flat on his or her back
   d. *Russell traction*: Child on his or her back with the head of the bed slightly elevated

8. Assist with applying specific adhesive strips, elastic bandages, and Buck traction, as needed. If required, hold the child in the desired position or apply strips or elastic bandages while the practitioner and other assistants hold the body part(s) in the desired position.
   a. For the lower extremity, apply adhesive strips beginning below the head of the fibula on the lateral surface of the leg to avoid pressure over the peroneal nerve and ensure proper alignment of body parts.

      Ensure that there is no pressure on the peroneal nerve as a result of the bandages or traction boot because this can cause foot drop.

   b. Apply elastic bandages from distal to proximal to promote venous return.
   c. Ensure that the boot size is correct.

Rationale: The traction boot should fit snugly (not too tight or too loose). A boot that is too tight places pressure on the skin, peroneal nerve, and vascular structures. A boot that is too loose causes slipping and lack of traction force.

d. Ensure that the heel is properly seated in the traction boot. Do not pad the area at the heel. Cut the heel section out of the foam boot if necessary.

   Rationale: Cutting the heel section out prevents pressure over the heel.

e. Do not apply the traction boot over pneumatic compression devices. Foot pumps may be used.

9. Assist with attaching the spreader bars, ropes, and pulleys. Ensure that the ropes are tied securely in knots, passed in grooves of the pulleys to the weights, and are not frayed.

   Rationale: The spreader bars, ropes, and pulleys provide the proper weighted traction for extremity alignment.

10. When all traction materials and spreader bars are in place, place the weights on the weight holder and attach the holder to the loop in the rope.
    a. Lower the weights slowly and gently until the rope is taut.
    b. Ensure that the practitioner writes orders for specific traction weights, bed position, and a turning regimen when pertinent.

       Rationale: Traction should be slowly established to avoid involuntary muscle spasms or pain. Weight should be sufficient to create enough pull to overcome muscle spasms but not cause distraction or a marked increase in pain.

11. Before the practitioner leaves, assess the child's position and ask about additional permissible positions for the child and the bed. Make sure to assess the child's pain.

    Rationale: Assessing the child's position ensures his or her safety and position for effective traction.

    a. *Bryant traction*: An infant or child must stay on his or her back at all times; the buttocks are held slightly off the bed if the traction weight is the correct amount.

       Rationale: The child cannot turn to the side or onto his or her abdomen because the traction would be ineffective and reinjury could occur.

    b. *Buck extension*: The child is primarily on his or her back but may be allowed to turn to the unaffected side for brief periods.

       Rationale: Positioning on the side permits back care and rest to tissues.

c. *Dunlop traction*: The child must lie on his or her back. The bed may be tilted on low shock blocks toward the side opposite the traction. The head of the bed is kept flat.

   Rationale: Tilting uses the body for some countertraction.

d. *Russell traction*: The child lies on his or her back. The head of the bed may be elevated, depending on the injury.

   Rationale: The low-Fowler position creates the most effective traction pull.

12. For safety, raise the upper side rails as appropriate.
13. Discard supplies and perform hand hygiene.
14. Document the procedure in the child's record.

7. MONITORING AND CARE

1. Assess neurovascular status per the practitioner's order.

   Rationale: A neurovascular assessment provides objective data concerning peripheral perfusion to tissues. If skin traction is applied too tightly, then pressure is applied to nerves and vascular structures, resulting in a potentially irreversible deficit.

2. Assess, treat, and reassess pain.
   a. Ask the child to rate his or her pain using a developmentally appropriate and organization-approved pain scale.
   b. Ask the child if he or she is experiencing spasms or muscle burning.
   c. For a nonverbal child, assess for behavioral cues of pain or discomfort (e.g., restlessness, crying).

   Rationale: Restlessness and crying are indications of pain and possible misalignment of bones or muscle spasms. The initial reaction may be a slight increase in soreness or pain until the child is able to relax and allow the traction to perform as designed.

3. Observe the child's participation in self-care if developmentally appropriate.

   Rationale: The child may refrain from activity unnecessarily or may try to do too much.

4. Assess the condition of the skin around the traction straps or bandages. Assess the skin under the child for small misplaced objects such as toys.

   Rationale: Small items that may be placed inside the cast or lodged under the child should be kept away from him or her. The added pressure of a toy against the skin causes irritation and skin breakdown.

5. Inspect the entire traction setup and assess whether it is functioning properly.

a. Observe all knots and ropes in the pulleys.
b. Ensure that the correct weights are on the weight holder and that the apparatus is hanging freely and not resting on the floor.
c. Ensure that the sling, belt, and other materials for specific traction are positioned correctly.
d. Make sure bedclothes are not interfering with the traction apparatus.
e. Ensure proper body alignment.

Rationale: Reassessments are necessary to determine whether the traction is functioning as designed or desired or to make needed adjustments. Malfunctioning traction interferes with healing.

6. Release skin traction per the practitioner's order to assess skin condition and provide care. Wash, pat dry, and lubricate the skin before reapplying traction.

8. EXPECTED OUTCOMES

- Child and family participate in bathing and feeding.
- Skin around straps and moleskin, halter, boot, or sling remains intact and without irritation.
- Radiographic studies confirm satisfactory alignment of fracture fragments with or without evidence of beginning callus formation if child is in traction for a fracture.
- Child and family describe purpose of traction and follow activity restrictions.
- Child and family verbalize or express increase in comfort after traction application and rate pain as low on an organization-approved pain scale.
- As a result of being in one specific type of skin traction, one of the following occurs:
    - *Bryant traction*: Child is able to maintain positioning with distraction by family.
    - *Buck extension*: Child is able to maintain leg in alignment.
    - *Dunlop traction*: Same result occurs as with Buck extension (used for upper extremity).
    - *Russell traction*: Child notes lessening of pain in the hip area (if traction is for hip trauma), relief of muscle spasms, and ease in ability to maintain more normal anatomic position of leg and thigh.

- Sufficient time in traction elicits symptom relief.
- Neurovascular status remains stable. Distal skin tissue remains warm and of a normal color with brisk capillary refill. Child verbalizes or expresses no abnormal sensations and is able to move fingers or toes distal to the fracture site.
- Child and family verbalize understanding of procedure, including traction setup and mobility restrictions.

9. UNEXPECTED OUTCOMES

- Child in Bryant traction continues to turn to abdomen and disrupt traction.
- Child experiences increased pain, soreness, or stiffness from pull applied to injured tissues.

- Child experiences muscle spasms from muscle irritation.
- Child experiences displaced alignment (evident on radiograph film) if fracture is present.
- Child experiences sense of claustrophobia or being “held down” in one or another type of traction.
- *Bryant traction*: Child experiences edema of feet, or peripheral pulses are not palpable, or child experiences vasospasm and avascular necrosis.
- *Buck extension*: Child develops pressure area on heel or inability to dorsiflex or evert foot in traction if traction boot, adhesive straps, or elastic bandages exert pressure over head of fibula.
- *Dunlop traction*: Child experiences pressure on elbow, or child is unable to approximate thumb to rest of fingers or experiences feeling of numbness of thumb or tingling along sides of thumb and index finger, or delayed capillary refill. Younger child is not able to grab a toy and close hand.
- *Russell traction*: Child has pain behind knee or nonpalpable popliteal pulse.
- Child experiences burning, weeping, or drainage under adhesive strips or moleskin because of possible allergy or hypersensitivity.

10. DOCUMENTATION

- Results of skin assessment underneath traction apparatus
- Interventions to maintain skin integrity
- Neurovascular assessment of bilateral body parts
- Length of time child is in or out of specific traction
- Child and family education
- Child’s progress toward goals
- Complications and related nursing interventions

11. REFERENCES

1. Drummond, A., Curry, M.R. (2017). Chapter 29: The child with musculoskeletal or articular dysfunction. In M. Hockenberry, D. Wilson, C. C. Rodgers (Eds.), *Wong’s essentials of pediatric nursing* (10th ed., pp. 943-957). St. Louis: Elsevier.
2. Shilt, J., Li, Y. (2015). Chapter 14: Fractures of the femoral shaft. In G.A. Mencio, M.F. Swiontkowski (Eds.), *Green’s skeletal trauma in children* (5th ed., pp. 365-389). Philadelphia: Saunders.

COMPETENCY-BASED CHECK OFF TOOL

Title:	**APPLICATION OF SKIN TRACTION** • **Bryant Traction** • **Buck Extension** • **Dunlop Traction** • **Russell Traction**
Competency Statement:	**The nurse demonstrates acceptable level of competence in the performance of traction application.**
Standards:	• **Infection Control and Patient Safety Compliance** • **Equipment Preparation and Manipulation** • **Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

55. Provide all the information needed in this check off tool.
56. Use the scale below by ENCIRCLING your most appropriate response
    4= Very Good (Performs competently without assistance and supervision)
    3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
    2= Poor (Performs inconsistently/incompletely with assistance and supervision)
    1= Very Poor (Cannot perform even with directions; procedural step omitted)
57. Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
58. Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
59. Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
60. Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1

5	Educates patient and family / caregiver (where appropriate).	4	3	2	1
Psychomotor Skills					
1	Performed hand hygiene before patient contact.	4	3	2	1
2	Introduced self to the child and family.	4	3	2	1
3	Verified the correct child using two identifiers.	4	3	2	1
4	Assessed the child's and family's understanding of the reasons for and the risks and benefits of skin traction.	4	3	2	1
5	Assessed the child's overall health, including degree of mobility and current medical conditions, such as diabetes, malnutrition, or other disease processes affecting bone or skin integrity.	4	3	2	1
6	Assessed the condition of specific tissues to be placed in traction; note skin condition, excessive hair, bruises, rash, varicose veins, ulcers, dermatitis, or other lesions. Did not place skin traction over irritated or broken skin. a. *Bryant traction*: Assessed both legs. b. *Buck extension*: Assessed one or both legs. c. *Dunlop traction*: Assessed the arm and forearm. d. *Russell traction*: Assessed the lower limbs.	4	3	2	1
7	Assessed the child's level of pain using a developmentally appropriate and organization-approved pain scale.	4	3	2	1
8	Assessed the child's neurovascular status.	4	3	2	1
9	Administered analgesia for pain and a muscle relaxant for spasms in advance of traction application.	4	3	2	1
10	Reassessed the child's pain status, allowing for sufficient onset of action per medication, route, and the child's condition.	4	3	2	1
11	Performed hand hygiene.	4	3	2	1
12	Explained the procedure to the child and family and ensured that they agreed to treatment.	4	3	2	1
13	Assessed the child for pain.	4	3	2	1
14	Prepared the area of the body to be in traction. a. *Bryant traction*: Washed both legs gently if necessary (changed an infant's diaper if necessary). b. *Buck extension*: Washed the affected leg (or legs) very gently and dried carefully. Did not shave legs. c. *Dunlop traction*: Washed the arm and forearm gently as needed. d. *Russell traction*: Washed the lower extremity to the knee gently as needed.	4	3	2	1
15	Positioned the child per the practitioner's request and type of traction.	4	3	2	1
16	Assisted with applying specific adhesive strips, elastic bandages, and Buck traction, as needed. If required, held the child in the desired position or applied strips or elastic bandages while the practitioner and other assistants held the body part(s) in the desired position. a. For the lower extremity, applied adhesive strips beginning below the head of the fibula on the lateral surface of the leg to avoid	4	3	2	1

	pressure over the peroneal nerve and ensure proper alignment of body parts. Ensured that there was no pressure on the peroneal nerve as a result of the bandages or traction boot because this could cause foot drop. b. Applied elastic bandages from distal to proximal to promote venous return. c. Ensured that the boot size was correct. d. Ensured that the heel was properly seated in the traction boot. Did not pad the area at the heel. Cut the heel section out of the foam boot if necessary. e. Did not apply the traction boot over pneumatic compression devices. Foot pumps may have been used.				
17	Assisted with attaching the spreader bars, ropes, and pulleys. Ensured that the ropes were tied securely in knots, passed in grooves of the pulleys to the weights, and were not frayed.	4	3	2	1
18	When all traction materials and spreader bars were in place, placed the weights on the weight holder and attached the holder to the loop in the rope. a. Lowered the weights slowly and gently until the rope was taut. b. Ensured that the practitioner wrote orders for specific traction weights, bed position, and a turning regimen when pertinent.	4	3	2	1
19	Before the practitioner left, assessed the child's position and asked about additional permissible positions for the child and the bed. Made sure to assess the child's pain.	4	3	2	1
20	For safety, raised the upper side rails as appropriate.	4	3	2	1
21	Discarded supplies and performed hand hygiene.	4	3	2	1
22	Documented the procedure in the child's record.	4	3	2	1
C. Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1
D. Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse's Comments/Recommendations for Improvement:

Originating Department	Nursing Education Unit	Module No.	1-2017
Title	**ASSISSTING IN INTUBATION**		
Author/s	**Ronald Martin Carcillar-CRN-ICU/ED**		
Original Date	October, 2017	Revision Date	

1. ALERT

Preoxygenate with 100% oxygen (≥15 L/min) for 3 to 5 minutes before intubation using a self-inflating resuscitation bag mask with a tight-fitting face masdsk. Intubation attempts should take no longer than 15 to 20 seconds

Use pulse oximetry during intubation so that oxygen desaturation can be detected quickly. If the saturation is inadequate, stop the attempt and start ventilation by bag mask. In a patient with a suspected spinal cord injury, inline cervical immobilization of the head must be maintained during endotracheal (ET) intubation. .

Only trained and qualified personnel should assist with this skill.

2. OVERVIEW

ET intubation is performed to establish and maintain a patent airway, facilitate oxygenation and ventilation, reduce the risk of aspiration, and assist with the clearance of secretions.

Indications for ET intubation include the following:

- Altered mental status (e.g., head injury, drug overdose)
- Anticipated airway obstruction (e.g., facial burns, epiglottitis, major facial or oral trauma) or actual upper airway obstruction (e.g., secondary to swelling, trauma, tumor, bleeding)
- Apnea or respiratory distress
- Ineffective clearance of secretions (i.e., inability to maintain or protect the airway adequately)
- High risk for aspiration
- Vital capacity less than 10 to 15 ml/kg of ideal body weight
- Mean inspiratory pressure (MIP) less than or equal to –20 cm H_2O
- Acute increase in partial pressure of carbon dioxide ($PaCO_2$) from normal or patient's baselines
- Alveolar–arterial oxygen difference ($A\text{-}aDO_2$) more than 350 mm Hg on 100% oxygen
- Pulmonary shunt more than 20% to 25%
- Dead space-tidal volume (VD-VT) ratio greater than 60%
- Partial pressure of arterial oxygen (PaO_2) less than 60 mm Hg on a fraction of inspired oxygen (FIO_2) of 100%
- PaO_2/FIO_2 ratio less than 200 mm Hg

Oxygen saturation by pulse oximetry (SpO_2) monitoring should be used during intubation to detect oxygen desaturation quickly. Preoxygenation with 100% oxygen

should be performed for 3 to 5 minutes before intubation using a bag mask with a tight-fitting face mask. Intubation attempts should take no longer than 15 to 20 seconds. If more than one intubation is required, ventilation with 100% oxygen should be performed for 3 to 5 minutes before each attempt using a manual resuscitation bag with a tight-fitting face mask. If unable to intubate after multiple attempts, other airway options should be considered, such as a laryngeal mask airway (LMA).

ET tube size reflects the size of the internal diameter of the tube. Tubes range in size from 2.0 mm for neonates to 10.0 mm for large adults. Typically, females require a 7.0- to 8.0-mm tube and males require an 7.5- to 9.5-mm tube with a 15-mm connector. The tube should be large enough to facilitate airflow and small enough to pass the vocal cords without damaging them.

ET intubation can be done via the nasal or oral routes. The skill of the practitioner performing the intubation and the patient's clinical condition determine the route used. Nasal intubation is relatively contraindicated in a trauma patient with facial fractures or suspected fractures at the base of the skull, or postoperatively after cranial surgeries, such as a transsphenoidal hypophysectomy. For a patient with suspected spinal cord injuries, inline cervical immobilization of the head must be maintained during ET intubation. Improper intubation technique may result in trauma to the teeth, soft tissues of the mouth or nose, vocal cords, and posterior pharynx.

Video laryngoscopy, which involves a small camera and monitor, may be used during intubation to assist with placement of the ET tube when intubating via the oral route. Video laryngoscopy results in fewer esophageal intubations and fewer difficult intubations compared with direct observation.[2]

Primary and secondary confirmation of ET intubation must be performed.[3] Primary confirmation of proper ET tube placement includes seeing the tube passing through the vocal cords, the absence of gurgling over the epigastric area, auscultation of bilateral breath sounds, bilateral chest rise and fall during ventilation, and mist in the tube. Secondary confirmation of proper ET tube placement is necessary to protect against unrecognized esophageal intubation. Methods include the use of disposable end-tidal carbon dioxide ($ETCO_2$) detectors, continuous $ETCO_2$ monitors, and esophageal detection devices. Final confirmation of ET tube placement should be performed via a radiograph. The ET tube is typically visible 3 to 7 cm above the carina.

$ETCO_2$ monitoring devices have been shown to be reliable indicators of expired carbon dioxide in a patient with perfusing rhythms. During cardiac arrest (nonperfusing rhythms), there may not be sufficient expired carbon dioxide due to low pulmonary blood flow. If carbon dioxide is detected using an $ETCO_2$ detector, it is a reliable indicator of proper tube placement. If carbon dioxide is not detected, the use of an esophageal detector device or ultrasound performed by an experienced operatory is recommended.

Many methods can be used to secure an ET tube, including tape and commercial devices. The nurse should secure the tube in place immediately after insertion to prevent unplanned extubation.

3. SUPPLIES

- PPE (gloves, mask, eye protection)
- 10-ml syringe for cuff inflation
- Bite block or oropharyngeal airway
- Commercially available ET tube holder or tape
- Confirmation device: disposable $ETCO_2$ detector, continuous $ETCO_2$ monitoring device, or esophageal detection device
- ET tube with intact cuff
- Flexible stylet
- Hydrocolloid dressing
- Laryngoscope blades (straight and curved)
- Laryngoscope handle with fresh batteries
- Manual resuscitation bag mask with face mask
- Medications for intubation as indicated (e.g., sedation, paralyzing agents, lidocaine, atropine)
- Monitoring equipment: continuous SpO_2 and cardiac rhythm and blood pressure
- Oxygen source and connecting tubes
- Rigid pharyngeal suction-tip catheter
- Spare bulb for laryngoscope blades
- Stethoscope
- Suction apparatus (portable or wall)
- Suction catheters
- Water-soluble lubricant

Additional equipment (to have available depending on patient's need or practitioner's preference) includes the following:

- Anesthetic spray or local anesthetic jelly (nasal approach)
- Magill forceps (nasal approach)
- Ventilator
- Video laryngoscope

4. PATIENT AND FAMILY EDUCATION

- Assess the patient's and family's level of understanding about the patient's condition and rationale for ET intubation.
- Explain the procedure and the reason for intubation if the clinical situation permits. If the clinical situation does not permit, explain the procedure and the reason for the intubation after the procedure is completed.
- Explain the patient's role in assisting with insertion of the ET tube if indicated and the clinical situation permits.
- Explain that the patient will be unable to speak while the ET tube is in place but that other means of communication will be provided.
- Explain that the patient's hands may be immobilized to prevent accidental dislodgment of the tube.
- Encourage questions and answer them as they arise.

5. ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene and don gloves before patient contact.
2. Verify the correct patient using two identifiers.
3. Assess the patient's immediate history of trauma when a spinal cord injury is suspected or when he or she has had cranial surgery.
4. Assess nothing-by-mouth (NPO) status, the use of a self-inflating resuscitation bag mask before intubation, and signs of gastric distention.
5. Assess level of consciousness, level of anxiety, and respiratory difficulty.
6. Assess the oral cavity for presence of dentures, loose teeth, or other possible obstructions and remove if appropriate.
7. Assess vital signs.
8. Assess the patient for the following:
    a. Tachypnea
    b. Dyspnea
    c. Shallow respirations
    d. Cyanosis
    e. Apnea
    f. Altered level of consciousness
    g. Tachycardia
    h. Cardiac arrhythmias
    i. Hypertension
    j. Headache
9. Collaborate with the practitioner to determine the appropriate-size ET tube and type of laryngoscope blade needed for the procedure.
10. Assess the patient's need for premedication.

Preparation

1. Attach the patient to a pulse oximeter, cardiac monitor, and blood pressure monitoring device.
2. Ensure that the patient has IV access.
3. Notify the respiratory therapy department of impending intubation so that a ventilator can be set up, as appropriate.
4. Set up the suction apparatus and connect the rigid suction-tip catheter to the tubing.

    Rationale: Connecting the catheter to the tubing prepares for oropharyngeal suctioning as needed.

5. Assist the practitioner with checking the equipment.
    a. Use a 10-ml syringe to inflate the cuff on the tube and assess for leaks. Deflate the cuff completely.

        Rationale: Inflating and deflating the cuff verifies that the tube cuff is patent without leaks and prepares the tube for insertion.

b. Insert the stylet into the ET tube, ensuring that the tip of the stylet does not extend beyond the end of the ET tube.

   Recess the stylet from the distal end of the tube so that it does not protrude beyond the end of the tube, resulting in damage to the vocal cords and trachea.

c. Connect the laryngoscope blade to the handle and check the bulb for brightness.
d. Gather video laryngoscope and related supplies if being used.

6. PROCEDURE

1. Perform hand hygiene and don clean gloves, mask, and eye protection or face shield.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient and ensure that he or she agrees to treatment.
5. Assist the practitioner with positioning the patient's head by flexing the neck forward and tilting the head (sniffing position [only if neck trauma is not suspected]). If necessary, place a small towel under the patient's occiput to elevate it, allowing for proper neck flexion.

   Rationale: The sniffing position allows for viewing of the vocal cords by aligning the axes of the mouth, pharynx, and trachea.
   Do not flex or extend the neck if there is a suspected spinal cord injury; ensure that the head is maintained in a neutral position with inline cervical spine immobilization.

6. Check the mouth for dentures and remove them if the practitioner is attempting oral intubation. Suction the mouth and pharynx as needed.

   Remove dentures before attempting oral intubation; however, they may remain in place for nasal intubation.

7. Insert an oropharyngeal airway as indicated.

   Rationale: An oral airway assists in maintaining upper airway patency.
   Use only in an unconscious patient without a gag reflex.

8. Preoxygenate for 3 to 5 minutes with 100% oxygen via a nonrebreather face mask if ventilations are adequate or via a manual resuscitation bag with a face mask connected to 100% oxygen source (≥15 L/min)[4] if the patient is not ventilating adequately. Provide frequent and gentle breaths.

   Rationale: Preoxygenating helps prevent hypoxemia. Gentle breaths reduce the incidence of air entering the stomach (leading to gastric distention), decrease airway turbulence, and distribute ventilation within the lungs more evenly.

Adequate ventilation causes a visible chest rise only. Do not hyperventilate a breathing or nonbreathing patient, even if he or she is acidotic. Hyperventilation can cause serious problems, including gastric aspiration, increased intrathoracic pressure, and decreased cardiac output. Bag-mask ventilation and overinflation can produce complications, such as regurgitation, aspiration, pneumonia, an elevated diaphragm, restricted lung movement, and decreased respiratory system compliance.

9. Premedicate the patient as ordered.
10. Have a manual resuscitation bag with a face mask connected to a 100% oxygen source ready for hyperoxygenation and manual ventilation.

    Rationale: The patient must be hyperoxygenated and ventilated between intubation attempts.

11. Inflate the cuff with air until a leak is no longer heard.

    Rationale: Inflation volumes vary depending on the manufacturer, the tube size, and the size of the patient's airway.

12. Assist with tube placement confirmation while bagging with 100% oxygen.

    Rationale: Once an advanced airway is inserted, the practitioner should immediately perform a thorough assessment to ensure that the tube is properly positioned.
    Confirm presence of bilateral breath sounds and absence of breath sounds over the stomach as preliminary confirmation of tube placement.

    a. Auscultate over the epigastrium.

       Rationale: Auscultating over the epigastrium determines whether air is entering the stomach instead of the lungs.
       If air movement or gurgling is heard, esophageal intubation has occurred. The tube must be pulled and intubation reattempted. Improper insertion may result in hypoxemia, gastric distention, vomiting, and aspiration.

    b. Auscultate lung bases and apices for bilateral breath sounds. Equal breath sounds indicate proper placement of the ET tube.

       Rationale: This process assists in verification of correct tube placement into the trachea. A main stem bronchus intubation results in diminished breath sounds on the opposite side.

    c. Observe for symmetric chest wall movement, which assists in verification of correct tube placement.

The absence of symmetric chest wall movement may indicate right main stem or esophageal intubation

d. Measure $ETCO_2$ using one of the following methods:
   i. Attach a disposable $ETCO_2$ detector. Watch for a color change indicating the presence of carbon dioxide.

      Rationale: Detection of carbon dioxide confirms proper ET tube placement into the trachea. In most cases, carbon dioxide detectors are placed between the self-inflating resuscitation bag mask and the ET tube. Carbon dioxide detectors should be used in conjunction with physical assessment findings. If carbon dioxide is not detected, use of an esophageal detector device is recommended.
      During cardiac arrest (nonperfusing rhythms), there may not be sufficient expired carbon dioxide due to low pulmonary blood flow.

   ii. Attach a continuous $ETCO_2$ monitor and watch for detection of carbon dioxide.

      Rationale: Detection of carbon dioxide confirms proper ET tube placement into the trachea. If carbon dioxide is not detected, use of an esophageal detector device is recommended.
      During cardiac arrest (nonperfusing rhythms), there may not be sufficient expired carbon dioxide due to low pulmonary blood flow.

   iii. Consider using an esophageal detection device in cardiac arrest.
e. Evaluate SpO_2 by noninvasive pulse oximetry.

   Rationale: SpO_2 should stabilize with successful tracheal intubation. A decreasing SpO_2 may indicate improper tube placement, but SpO_2 may not decrease in a right main bronchus placement of the ET tube.
   SpO_2 findings should be used in conjunction with physical assessment findings.

13. If carbon dioxide detection, assessment findings, or SpO_2 reveal that the tube is not correctly positioned, assist the practitioner with immediate deflation of the cuff and removal of the tube. Ventilate and hyperoxygenate with 100% oxygen for 3 to 5 minutes and then reattempt intubation.

    Rationale: Esophageal intubation results in gas flow diversion and hypoxemia.

14. If breath sounds are absent on the left or right, deflate the cuff and assist the practitioner with withdrawal of the tube 1 to 2 cm. Assist the practitioner with reevaluating for correct tube placement.

Rationale: Absence of breath sounds on the left may indicate right main stem intubation, which is common as a result of the anatomic position of the right main stem bronchi.

15. Connect the ET tube to the oxygen source, manual resuscitation bag mask, or mechanical ventilator.
16. For oral intubation only, insert a bite block along the ET tube.

    Rationale: A bite block prevents the patient from biting down on the ET tube. **Secure the bite block separately from the tube to prevent tube dislodgment.**

17. Assist the practitioner with securing the ET tube per the organization's practice.

    Rationale: Securing the ET tube prevents inadvertent dislodgment of the tube.

    a. Commercially available ET tube holder: Apply according to the manufacturer's directions.
    b. Adhesive tape:
        i. Prepare the tape.
        ii. Consider using a hydrocolloid dressing on the patient's cheeks because it helps protect the skin.
        iii. Secure the tube by wrapping the double-sided tape around the patient's head and the torn tape edges around the ET tube.
18. Reevaluate for correct tube placement.

    Rationale: Reevaluating correct tube placement verifies that the tube was not inadvertently repositioned when securing it.

19. For oral intubation, note the position of the tube at the teeth or gums; for nasal intubation, note the position of the tube at the nostril (use centimeter markings on the tube).

    Rationale: Noting the position of the tube provides a reference point to assess for possible tube dislodgment in the future. Common tube placement at the teeth is 21 cm for women and 23 cm for men.

20. Suction the ET tube and pharynx as needed.

    Rationale: Suctioning removes secretions that may obstruct the tube or accumulate on top of the cuff.

21. Assist with obtaining a chest radiograph to confirm the correct tube position.

    Rationale: Chest radiographs document actual tube location (distance from the carina). Correct placement is typically 3 to 7 cm above the carina. **The trachea and esophagus overlay each other, so a chest radiograph may not always confirm that the tube is in the trachea and not the**

esophagus. An ET tube placed bronchoscopically may not require chest radiograph verification (follow the organization's practice).

22. Discard supplies, remove personal protective equipment (PPE), and perform hand hygiene.
23. Document the procedure in the patient's record.

7. MONITORING AND CARE

1. Assess the patient's respiratory status per the organization's practice.

   Reportable conditions: Absent, decreased, or unequal breath sounds, Rising arterial carbon dioxide tension, chest-abdominal dyssynchrony, patient-ventilator dyssynchrony, dyspnea, headache, restlessness, confusion, lethargy, rising (early sign) or falling (late sign) arterial blood pressure, activation of expiratory or inspiratory volume alarms on mechanical ventilator

2. Maintain tube stability using tape or a commercially available ET tube holder.

   Rationale: Securing the tube prevents tube movement and dislodgment.
   Reportable conditions: Unplanned extubation or tube movement from original position

3. Monitor and record the position of the tube at the teeth or nose (in reference to centimeter markings on the tube).

   Rationale: Monitoring and recording the tube's position assists with identifying tube migration.
   Reportable condition: Tube movement from original position

4. Measure ET tube cuff pressure every shift maintaining ET tube cuff pressure between 20 and 30 mm Hg (27 and 41 cm H_2O).[1]

   Rationale: Maintaining correct cuff pressure helps prevent tracheal injury and aspiration.
   Rationale: Measuring cuff pressure ensures adequate cuff inflation, which decreases the risk of aspiration and prevents the overinflation of the cuff to avoid tracheal damage.
   Reportable condition: Cuff pressure less than 20 mm Hg or greater than 30 mm Hg[1] or out of a range acceptable to the practitioner

5. Suction the ET tube, as needed.

   Rationale: Suctioning prevents tube obstruction and resulting hypoxemia.
   Reportable conditions: Inability to pass a suction catheter; copious, frothy, bloody secretions; significant change in amount or character of secretions

6. Inspect the nares or oral cavity per the organization's practice while the patient is intubated.

   Rationale: Inspecting the nares or oral cavity allows for the detection of skin breakdown and necrosis.
   Reportable conditions: Redness, necrosis, skin breakdown

7. Assess, treat, and reassess pain.

   Reportable condition: Inability to manage pain

8. EXPECTED OUTCOMES

- Placement of patent artificial airway
- Properly positioned and secured airway
- Improved oxygenation and ventilation
- Facilitation of secretion clearance

9. UNEXPECTED OUTCOMES

- Intubation of esophagus or right main stem bronchus (improper tube placement)
- Accidental extubation
- Cardiac arrhythmias because of hypoxemia and vagal stimulation
- Broken or dislodged teeth
- Leaking of air from ET tube cuff
- Tracheal injury at tip of tube or at cuff site
- Laryngeal edema
- Laryngospasm
- Vocal cord trauma
- Suctioning of gastric contents or food from ET tube (aspiration)
- ET tube obstruction
- Decreased perfusion or hypotension due to increased intrathoracic pressure from hyperventilation

10.DOCUMENTATION

- Patient and family education
- Vital signs and SpO_2 before, during, and after intubation
- Type of intubation (oral or nasal)
- Number of intubation attempts
- ET tube size
- Depth of ET tube insertion (centimeters at teeth, gums, or nose)
- Confirmation of tube placement, including chest radiograph (how placement was confirmed)
- Medications administered during procedure
- Measurement of cuff pressure
- Assessment of breath sounds
- Description of secretions
- Patient's response to procedure

- Ventilator settings
- Pain assessment and management
- Unexpected outcomes and related nursing interventions

11. REFERENCES

1. Altobelli, N. (2017). Chapter 36: Airway management. In R.M. Kacmarek, J.K. Stoller, A.J. Heuer (Eds.), *Egan's fundamentals of respiratory care* (11th ed., pp. 739-789). St. Louis: Elsevier.
2. Lakticova, V. and others. (2015). Video laryngoscopy is associated with increased first pass success and decreased rate of esophageal intubations during urgent endotracheal intubation in a medical intensive care unit when compared to direct laryngoscopy. *Journal of Intensive Care Medicine, 30*(1), 44-48. doi:10.1177/0885066613492641 (Level B)
3. Link, M.S. and others. (2015). Part 7: Adult advanced cardiovascular life support: 2015 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation, 132*(Suppl. 2), S444-S464. doi:10.1161/CIR0000000000000261 Retrieved October 17, 2016, from http://circ.ahajournals.org/content/132/18_suppl_2/S444.full (Level D)
4. Reardon, R.F., McGill, J.W., Clinton, J.E. (2014). Chapter 4: Tracheal intubation. In J.R. Roberts (Ed.), *Roberts and Hedges' clinical procedures in emergency medicine* (6th ed., pp. 62-106). Philadelphia: Saunders.
5. St. John, R.E., Seckel, M.A. (2014). Chapter 5: Airway and ventilatory management. In S.M. Burns (Ed.), *AACN essentials of critical care nursing* (3rd ed., pp. 119-158). New York: McGraw-Hill.

ADDITIONAL READINGS

Apfelbaum, J.L. and others. (2013). Practice guidelines for management of the difficult airway: An updated report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway. *Anesthesiology, 118*(2), 251-270. doi:10.1097/ALN.0b013e31827773b2

Mayglothling, J. and others. (2012). Emergency tracheal intubation immediately following traumatic injury: An Eastern Association for the Surgery of Trauma practice management guideline. *The Journal of Trauma and Acute Care Surgery, 73*(5 Suppl. 4), S333-S340. doi:10.1097/TA.0b013e31827018a5 (Level D)

Niven, A.S., Doerschug, K.C. (2013). Techniques for the difficult airway. *Current Opinion in Critical Care, 19*(1), 9-15. doi:10.1097/MCC.0b013e32835c6014

Adapted from Wiegand, D.L. (2011). *AACN procedure manual for critical care* (6th ed.). St. Louis: Saunders.

NURSING EDUCATION UNIT

COMPETENCY-BASED CHECK OFF TOOL

Title:	**ASSISTING IN INTUBATION**
Competency Statement:	**The nurse demonstrates acceptable level of competence in the performance of assisting a physician or RT during intubation**
Standards:	• **Infection Control and Patient Safety Compliance** • **Equipment Preparation and Manipulation** • **Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

- Provide all the information needed in this check off tool.
- Use the scale below by ENCIRCLING your most appropriate response
  4= Very Good (Performs competently without assistance and supervision)
  3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
  2= Poor (Performs inconsistently/incompletely with assistance and supervision)
  1= Very Poor (Cannot perform even with directions; procedural step omitted)
- Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
- Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
- Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
- Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1
5	Educates patient and family / caregiver (where appropriate).	4	3	2	1
Psychomotor Skills					
1	Performed hand hygiene and donned gloves before patient contact.	4	3	2	1
2	Introduced self to the patient.	4	3	2	1
3	Verified the correct patient using two identifiers.	4	3	2	1

4	Assessed the patient's immediate history of trauma when a spinal cord injury was suspected or when he or she had cranial surgery.	4	3	2	1
5	Assessed NPO status, the use of a self-inflating resuscitation bag mask before intubation, and signs of gastric distention.	4	3	2	1
6	Assessed level of consciousness, level of anxiety, and respiratory difficulty.	4	3	2	1
7	Assessed the oral cavity for presence of dentures, loose teeth, or other possible obstructions and removed if appropriate.	4	3	2	1
8	Assessed vital signs.	4	3	2	1
9	Assessed the patient for tachypnea, dyspnea, shallow respirations, cyanosis, apnea, altered level of consciousness, tachycardia, cardiac arrhythmias, hypertension, headache.	4	3	2	1
10	Collaborated with the practitioner to determine the appropriate-size ET tube and type of laryngoscope blade needed for the procedure.	4	3	2	1
11	Assessed the patient's need for premedication.	4	3	2	1
12	Attached the patient to a pulse oximeter, cardiac monitor, and blood pressure monitoring device.	4	3	2	1
13	Ensured that the patient had IV access.	4	3	2	1
14	Notified the respiratory therapy department of impending intubation so that a ventilator could be set up, as appropriate.	4	3	2	1
15	Set up the suction apparatus and connected the rigid suction-tip catheter to the tubing.	4	3	2	1
16	Assisted the practitioner with checking the equipment. a. Used a 10-ml syringe to inflate the cuff on the tube and assessed for leaks. Deflated the cuff completely. b. Inserted the stylet into the ET tube, ensuring that the tip of the stylet did not extend beyond the end of the ET tube. Recessed the stylet from the distal end of the tube so that it did not protrude beyond the end of the tube. c. Connected the laryngoscope blade to the handle and checked the bulb for brightness. d. Gathered video laryngoscope and related supplies if being used.	4	3	2	1
17	Performed hand hygiene and donned clean gloves, mask, and eye protection or face shield.	4	3	2	1
18	Explained the procedure to the patient and ensured that he or she agreed to treatment.	4	3	2	1
19	Assisted the practitioner with positioning the patient's head by flexing the neck forward and tilting the head. If necessary, placed a small towel under the patient's occiput to elevate it, allowing for proper neck flexion. Did not flex or extend the neck if there was a suspected spinal cord injury; ensured that the head was maintained in a neutral position with inline cervical spine immobilization.	4	3	2	1
20	Checked the mouth for dentures and removed them if the practitioner was attempting oral intubation. Suctioned the mouth and pharynx as needed. Removed dentures before attempting oral intubation; however, left them in place for nasal intubation.	4	3	2	1
21	Inserted an oropharyngeal airway as indicated. Used only in an unconscious patient without a gag reflex.	4	3	2	1

22	Preoxygenated for 3 to 5 minutes with 100% oxygen via a nonrebreather face mask if ventilations were adequate or via a manual resuscitation bag with a face mask connected to 100% oxygen source (≥15 L/min) if the patient was not ventilating adequately. Provided frequent and gentle breaths. Did not hyperventilate a breathing or nonbreathing patient, even if he or she was acidotic.	4	3	2	1
23	Premedicated the patient as ordered.	4	3	2	1
24	Had a manual resuscitation bag with a face mask connected to a 100% oxygen source ready for hyperoxygenation and manual ventilation.	4	3	2	1
25	Inflated the cuff with air until a leak was no longer heard.	4	3	2	1
26	Assisted with tube placement confirmation while bagging with 100% oxygen. Confirmed presence of bilateral breath sounds and absence of breath sounds over the stomach as preliminary confirmation of tube placement. a. Auscultated over the epigastrium. b. Auscultated lung bases and apices for bilateral breath sounds. c. Observed for symmetric chest wall movement, which assisted in verification of correct tube placement. d. Measured $ETCO_2$. Evaluated SpO_2 by noninvasive pulse oximetry and used findings in conjunction with physical assessment findings.	4	3	2	1
27	If carbon dioxide detection, assessment findings, or SpO_2 revealed that the tube was not correctly positioned, assisted the practitioner with immediate deflation of the cuff and removal of the tube. Ventilated and hyperoxygenated with 100% oxygen for 3 to 5 minutes and then reattempted intubation.	4	3	2	1
28	If breath sounds were absent on the left or right, deflated the cuff and assisted the practitioner with withdrawal of the tube 1 to 2 cm. Assisted the practitioner with reevaluating for correct tube placement.	4	3	2	1
29	Connected the ET tube to the oxygen source, manual resuscitation bag mask, or mechanical ventilator.	4	3	2	1
30	For oral intubation only, inserted a bite block along the ET tube. Secured the bite block separately from the tube to prevent tube dislodgment.	4	3	2	1
31	Assisted the practitioner with securing the ET tube per the organization's practice.	4	3	2	1
32	Reevaluated for correct tube placement.	4	3	2	1
33	For oral intubation, noted the position of the tube at the teeth or gums; for nasal intubation, noted the position of the tube at the nostril.	4	3	2	1
34	Suctioned the ET tube and pharynx as needed.	4	3	2	1
35	Assisted with obtaining a chest radiograph to confirm the correct tube position.	4	3	2	1
36	Assessed, treated, and reassessed pain.	4	3	2	1
37	Discarded supplies, removed PPE, and performed hand hygiene.	4	3	2	1
38	Documented the procedure in the patient's record.	4	3	2	1
Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1

Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse's Comments/Recommendations for Improvement:

Originating Department	Nursing Education Unit	Module No.	1-2017
Title	**ASSISTING IN INTAOSSEOUS INSERTION**		
Author/s	**Ronald Martin Carcillar-CRN-ICU**		
Original Date	October, 2017	Revision Date	

ALERT

Do not insert an intraosseous (IO) needle in a fractured extremity because of the risk for fluid and medication extravasation or infiltration into the surrounding tissue. To decrease the risk for infection, avoid placing the IO line through infected tissue or in tissue with vascular compromise. General contraindications include a previous significant orthopedic procedure at the site, a previous attempt in the same bone within 48 hours, an inability to locate anatomic landmarks, compartment syndrome in the local extremity, or local vascular compromise.

Bone disorders, such as severe osteoporosis and osteogenesis imperfecta, increase the risk for fractures in patients with some IO devices, but IO infusion may be used in extreme circumstances even in these cases.

Accessing the sternal site requires a specific device and is contraindicated in children younger than 12 years old and in patients with sternum or chest deformities.

OVERVIEW

IO infusion is indicated when access to the circulation for the administration of fluids or medications is needed, peripheral venous access is difficult, and lack of timely access could increase morbidity or mortality. IO needles are recommended for resuscitation in any age group. Some specific indications include:

- Administration of crystalloids or colloids
- Administration of medications
- Obtaining specimens for diagnostic studies, such as electrolytes, blood cultures, blood gases, and hemoglobin, although these studies are not primary indications for this procedure
- Conditions that make obtaining IV access difficult (e.g., battlefield, rescue operations)

The manufacturer's recommendations should be followed for insertion sites specific to the IO device. Possible insertion sites include:

- The proximal tibia (medial to the tibial tuberosity) is a common site for insertion of the needle because it does not interfere with cardiopulmonary resuscitation or management of the airway. This location is preferred because it is a relatively flat surface and there is very little overlying soft tissue, which facilitates stabilizing the needle.
- The distal tibia (medial malleolus) may also be used, although it is farther from the central circulation and its rounded bony prominences may make needle stabilization more difficult.
- The distal femur and the iliac crest are used in some cases, but they may be more difficult to access because of greater amounts of overlying tissue and

rounded bone. The needle should be inserted 2 to 3 cm (0.8 to 1.2 in) above the femoral condyles, angled cephalad 10 to 15 degrees from the vertical position.
- The manubrium below the sternal notch can be accessed for IO insertion with a specifically designed device in patients 12 years old or older.
- The greater tubercle of the proximal humerus, above the surgical neck; the humerus may be a superior site for flow rates, drug delivery, and management of infusion pain.

SUPPLIES

- Gloves
- Antiseptic solution
- Local anesthetic (optional, but may be used if the patient is conscious)
- IO needle of an appropriate type and length
- Syringe for aspiration
- Normal saline for irrigation
- Lidocaine for injection (optional, but may be used if the patient is conscious)
- Tape, an arm or leg board, or hemostats, for stabilization of the needle
- Dressing supplies
- IV tubing and a fluid bag or bottle
- Pressure infusion bag or IV pump

PATIENT AND FAMILY EDUCATION

- Explain the procedure and why it is being performed to the patient and family as time and the patient's condition allows.
- Instruct the patient to avoid unnecessary movements of the affected body part.
- Advise the patient to report any wetness felt at the site, any blood on the dressing, or any increased sense of pressure or pain at the insertion site.
- Encourage questions and answer them as they arise.

ASSESSMENT AND PREPARATION

Assessment
1. Perform hand hygiene before patient contact.
2. Verify the correct patient using two identifiers.
3. Assess the difficulty of obtaining standard peripheral IV access in light of the patient's condition and need for IV fluids or medications.

Preparation
1. Prime the IV tubing that will be attached to the IO device.

PROCEDURE

IO Access Device Insertion
1. Perform hand hygiene and don gloves.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient and ensure that he or she agrees to treatment.

5. Select the potential site and a needle of the proper type and length for the infusion. Consider the patient's age and size, site accessibility, and any other procedures that may be needed.
   Be sure to select the appropriate device and insertion site; different devices are appropriate for different age groups and anatomic locations.
6. Position the patient (depending on the insertion site), and stabilize the area for insertion.
7. Locate the insertion site using anatomic landmarks.
8. Cleanse the area of insertion.
   a. If the skin needs cleansing, use soap and water first, then allow to dry completely.
   b. Prepare the insertion site with greater than 0.5% chlorhexidine in alcohol solution using a back-and-forth motion for a minimum of 30 seconds, and allow to dry completely.
      Use chlorhexidine cautiously because it may cause skin irritation and chemical burns in infants less than 2 months old or infants with compromised skin integrity (premature infants).
      i. If chlorhexidine is contraindicated, use tincture of iodine, an iodophor, or 70% alcohol. Allow iodophors to dry a minimum of 90 to 120 seconds.
      ii. When using povidone-iodine for children with compromised skin integrity, allow it to dry completely, and then remove it with sterile normal saline wipes or sterile water.
9. Maintain aseptic no-touch technique.
10. Anesthetize the area as prescribed or indicated (this is not necessary in moribund or obtunded patients or with the use of certain IO access devices).
11. Reassess the patient's pain status, allowing for sufficient onset of action per medication, route, and the patient's condition.
12. Insert the needle using an appropriate method.
    a. For manual IO access insertion:
       i. Adjust the shield to the appropriate insertion depth (if applicable for the specific needle in use).
       ii. Point the needle perpendicular to the bone's long axis or slightly caudad,[1] puncture the skin, and use a rotary motion to push the needle into the bony cortex.
       Anticipate that manual IO placement in an adult patient may be difficult because of the thickness of the bony cortex.
       iii. Feel for a "pop." Look for the needle to be upright in the bone to allow fluid to flow freely through it without extravasation or infiltration.[1]
    b. For a specific IO access device, follow the manufacturer's instructions.
13. Assess the stability of the needle, ensuring that it is securely seated in the bone.[15]
14. Remove the stylet, and confirm the placement by aspirating bone marrow.
    Aspirating blood or bone marrow is not always possible in every patient, especially a dehydrated patient, even with proper placement of the IO needle. The ability to aspirate bone marrow or blood after insertion indicates proper placement, but the inability to aspirate bone marrow or blood does not rule out proper placement.[5]

Failure to aspirate marrow may be an indication of overpenetration of the bone with the needle sticking into the posterior cortex of the bone. If unusually high pressure is required to force fluid into the IO needle, consider this complication and withdraw the needle 1 to 2 mm, and attempt to withdraw bone marrow or blood a second time.[1]

15. Consider instilling a weight-based dose of preservative-free lidocaine before flushing, if the patient is responsive.
    Rationale: Pressurized fluid infusion is painful; preservative-free lidocaine is administered to promote the patient's comfort.
    a. Infuse the lidocaine very slowly so that the medication stays in the medullary space.
    b. Reassess the patient's pain status, allowing for sufficient onset of action per medication, route, and the patient's condition.
16. Irrigate the needle with a rapid normal saline flush per the manufacturer's instructions. If the needle flushes easily with no swelling at the site, connect the IV tubing, and ensure that the IV fluid is running steadily. Laboratory samples can be obtained from the bone marrow, if needed.
    Rationale: The rapid normal saline flush displaces the thick fibrin mesh that holds the bone marrow in place. Some resistance may be met as the mesh is being displaced.
    Failure to flush may result in absent or slow fluid flow.
17. Administer fluids under pressure using a pressure bag or IV pump for maximum flow rate.
18. Apply a sterile dressing, and stabilize the needle and the tubing.
    a. Stabilize the site with tape and dressings or hemostats according to the manufacturer's instructions.
    b. Label the dressing per the organization's practice with the date and time of application and initial it.
19. Discard supplies, remove gloves, and perform hand hygiene.
20. Document the procedure in the patient's record.

IO Device Removal

1. Perform hand hygiene and don gloves.
2. Introduce yourself to the patient.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient and ensure that he or she agrees to treatment.
5. Disconnect the IV tubing.
6. Stabilize the extremity.
7. Remove the device using an appropriate method.
    a. For removal of a manually inserted needle:
        i. Grasp the needle manually or attach a syringe to the hub.
        ii. Pull the needle straight back and out.
    b. For removal of a specific IO access device, follow the manufacturer's instructions.
8. Apply a dressing to the insertion site.
9. Discard supplies, remove gloves, and perform hand hygiene.
10. Document the procedure in the patient's record.

MONITORING AND CARE

1. Monitor needle placement and patency by assessing for:
   a. Extravasation or infiltration at the site
   b. Edema surrounding the insertion site
   c. Expanding hematoma with fluid infusion
   d. Dependent edema on the posterior aspect of an extremity (if extremity placement was used)
2. Assess, treat, and reassess pain.
3. Remove the IO device when it is no longer needed or per the manufacturer's recommendations.
   Rationale: Removing the IO device when it is no longer needed decreases the risk of infection.

EXPECTED OUTCOMES

- Patent IO catheter to deliver IV fluids and medications

UNEXPECTED OUTCOMES

- Delayed vascular access
  - Unsuccessful attempts to penetrate the bony cortex.
  - Needle bends from use of excessive force
- Puncture of posterior cortex from excessive pressure during needle insertion
- Fluid leakage from the infusion site
- Fluid extravasation or infiltration caused by insertion difficulties or both cortices being penetrated
- Compartmental syndrome (rare)
- Fat embolism, resulting from use of high-pressure volume infusions
- Osteomyelitis (rare)
- Clot formation in the bone marrow needle, causing a slow rate of infusion
- Fracture of target bone or other injuries

DOCUMENTATION

- Type and amount of fluid infused through catheter
- Insertion site
- Flow rate
- Size and type catheter or needle
- Time infusion starts and ends
- Patient's response to the IV fluid
- Ongoing patency of system
- Unexpected outcomes and related nursing interventions
- Patient and family education

PEDIATRIC CONSIDERATIONS

- IO access is widely recommended for use in children.
- The flush should be 2 to 5 ml for infants and small children; clinical judgment should be used to determine the amount, based on the child's weight and size.[16]
- Needle size for IO access is based on the child's age and size.

- Children have a higher risk of fluid extravasation and compartment syndrome because of their small bone size and variable needle lengths.[5] Careful assessment for proper placement and local fluid extravasation is essential.

REFERENCES

1. Deitch, K. (2014). Chapter 25: Intraosseous infusion. In J.R. Roberts and others (Eds.), *Roberts & Hedges' clinical procedures in emergency medicine*(6th ed., pp. 455-468). Philadelphia: Saunders.
2. Infusion Nurses Society (INS). (2016). Infusion therapy standards of practice. Standard 33: Vascular access site preparation and device placement. *Journal of Infusion Nursing, 39*(Suppl. 1), S64-S67. (Level VII)
3. Infusion Nurses Society (INS). (2016). Infusion therapy standards of practice. Standard 41: Vascular access device (VAD) assessment, care, and dressing changes. *Journal of Infusion Nursing, 39*(Suppl. 1), S81-S84. (Level VII)
4. Infusion Nurses Society (INS). (2016). Infusion therapy standards of practice. Standard 55: Intraosseous (IO) access devices. *Journal of Infusion Nursing, 39*(Suppl. 1), S120-S121. (Level VII)
5. Infusion Nurses Society (INS). (2016) Intraosseous access device: Placement, care, and maintenance. In *Policies and procedures for infusion therapy*(5th ed., pp. 206-210). Norwood, MA: INS. (Level VII)
6. Infusion Nurses Society (INS). (2016). Short peripheral catheter placement. In *Policies and procedures for infusion therapy* (5th ed., pp. 52-57). Norwood, MA: INS. (Level VII)
7. Infusion Nurses Society (INS). (2016). Therapeutic phlebotomy. In *Policies and procedures for infusion therapy* (5th ed., pp. 252-255). Norwood, MA: INS. (Level VII)
8. Iserson, K.V., Criss, E. (1986). Intraosseous infusions: A usable technique. *The American Journal of Emergency Medicine, 4*(6), 540-542. doi:10.1016/S0735-6757(86)80014-6 (classic reference)*
9. Miller, L.J. and others. (2012). 314 intraosseous vascular access in the 21st century: Improvement further reduce complication rates. *Annals of Emergency Medicine, 60*(4), S112. doi:10.1016/j.annemergmed.2012.06.292
10. O'Grady, N.P. and others. (2011). Guidelines for the prevention of intravascular catheter-related infections, 2011. Centers for Disease Control and Prevention. Retrieved April 27, 2017, from https://www.cdc.gov/infectioncontrol/pdf/guidelines/bsi-guidelines.pdf (classic reference)* (Level VII)
11. Pyng Medical Corp. (2011). FAST1® intraosseous infusion system: Training session. Retrieved April 27, 2017, from http://www.pyng.com/wp-content/uploads/2014/07/PM-101b-FAST1-Training-PowerPoint-Presentation.pdf
12. Pyng Medical Corp. (n.d.). Frequently asked questions: FAST1® intraosseous infusion system. Retrieved April 27, 2017, from http://www.pyng.com/fast1/fast1-frequently-asked-questions/
13. Teleflex® Incorporated. (2015). Arrow® EZ-IO® clinical resource: Care, maintenance, and removal. Retrieved April 27, 2017, from http://www.teleflex.com/en/usa/ezioeducation/documents/VA_IO_Arrow-EZ-IO-Care-Maint_AI_MC-000806.pdf

14. Tocantins, L.M., O'Neill, J.F. (1945). Complications of intra-osseous therapy. *Annals of Surgery, 122*(2), 266-277. (classic reference)*
15. Vidacare® Corporation. (2013). The science & fundamentals of intraosseous vascular access (2nd ed.). Retrieved April 27, 2017, from http://www.teleflex.com/en/usa/ezioeducation/documents/EZ-IO_SAFIOVA-M-607%20Rev%20B-PrintVersion.pdf
16. Vidacare® LLC. (2014). Arrow® EZ-IO®: EZ-IO® intraosseous vascular access needles: Instructions for use. Retrieved April 27, 2017, from http://www.teleflex.com/en/usa/ezioeducation/documents/8082_Rev_A_US_FDA_Intraosseous_Infusion_System_IFU.PDF

ADDITIONAL READINGS

PerSys Medical. (n.d.). How the NIO works. Retrieved April 27, 2017, from http://www.nio-pm.com/howitworks/

Pyng Medical Corp. (2015). FASTResponder™ sternal intraosseous device: Training session. Retrieved April 27, 2017, from http://www.pyng.com/wp-content/uploads/2015/06/PM-151c-FASTR-Training-PowerPoint.pdf

WaisMed, Ltd. (2008). How to use the adult BIG? Brief guidelines. Retrieved April 27, 2017, from http://waismed.com/Documents/Brochures/wwAdult%20reminder.pdf (classic reference)*

WaisMed, Ltd. (2008). How to use the pediatric BIG? Brief guidelines. Retrieved April 27, 2017, from http://waismed.com/Documents/Brochures/wwPaediatric%20reminder.pdf (classic reference)*

*In these skills, a "classic" reference is a widely cited, standard work of established excellence that significantly affects current practice and may also represent the foundational research for practice.

NURSING EDUCATION UNIT

COMPETENCY-BASED CHECK OFF TOOL

Title:	**ASSISTING IN INTRAOSSEOUS INSERTION**
Competency Statement:	**The nurse demonstrates acceptable level of competence in the performance of assisting a physician during a code blue or code purple.**
Standards:	• **Infection Control and Patient Safety Compliance** • **Equipment Preparation and Manipulation** • **Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

- Provide all the information needed in this check off tool.
- Use the scale below by ENCIRCLING your most appropriate response
  4= Very Good (Performs competently without assistance and supervision)
  3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
  2= Poor (Performs inconsistently/incompletely with assistance and supervision)
  1= Very Poor (Cannot perform even with directions; procedural step omitted)
- Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
- Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
- Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
- Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1
5	Educates patient and family / caregiver (where appropriate).	4	3	2	1

Psychomotor Skills					
1	Performed hand hygiene and donned gloves before patient contact.	4	3	2	1
2	Introduced self to the patient.	4	3	2	1
3	Verified the correct patient using two identifiers.	4	3	2	1
4	Assessed the difficulty of obtaining standard peripheral IV access in light of the patient's condition and need for IV fluids or medications.	4	3	2	1
5	Primed the IV tubing.	4	3	2	1
IO Access Device Insertion					
7	Performed hand hygiene and donned gloves.	4	3	2	1
8	Introduced self to the patient.	4	3	2	1
9	Verified the correct patient using two identifiers.	4	3	2	1
10	Explained the procedure to the patient and ensured that he or she agreed to treatment.	4	3	2	1
11	Selected the potential site and a needle of the proper type and length for the infusion. Considered the patient's age and size, site accessibility, and any other procedures that might be needed. Selected the appropriate device and insertion site based on the specific IO access device.	4	3	2	1
12	Positioned the patient appropriately, and stabilized the area for insertion.	4	3	2	1
13	Located the insertion site using anatomic landmarks.	4	3	2	1
14	Cleansed the area of insertion. a. If the skin needed cleansing, used soap and water first, then allowed to dry completely. b. Prepared the insertion site with greater than 0.5% chlorhexidine in alcohol solution using a back-and-forth motion for a minimum of 30 seconds, and allowed to dry completely. Used chlorhexidine cautiously. i. If chlorhexidine was contraindicated, used tincture of iodine, an iodophor, or 70% alcohol. Allowed iodophors to dry a minimum of 90 to 120 seconds. ii. When using povidone-iodine for children with compromised skin integrity, allowed it to dry completely, and then removed it with sterile normal saline wipes or sterile water.	4	3	2	1
15	Maintained aseptic no-touch technique.	4	3	2	1
16	Anesthetized the area as prescribed or indicated.	4	3	2	1
17	Reassessed the patient's pain status, allowing for sufficient onset of action per medication, route, and the patient's condition.	4	3	2	1
18	Inserted the needle using an appropriate method. a. For manual IO access insertion: i. Adjusted the shield to the appropriate insertion depth (if applicable). ii. Pointed the needle perpendicular to the bone's long axis or slightly caudad, punctured the skin, and used a rotary motion to push the needle into the bony cortex. Anticipated that manual IO placement in an adult patient might be difficult. iii. Felt for a "pop." Looked for the needle to be upright in the bone. b. For a specific IO access device, followed the manufacturer's instructions.	4	3	2	1

19	Assessed the stability of the needle, ensuring that it was securely seated in the bone.	4	3	2	1
20	Removed the stylet, and confirmed the placement by aspirating bone marrow, keeping in mind that aspirate blood or bone marrow is not possible in every patient. If unusually high pressure was required to force fluid into the IO needle, withdrew the needle 1 to 2 mm, and attempted to withdraw bone marrow or blood a second time.	4	3	2	1
21	If indicated, instilled a weight-based dose of preservative-free lidocaine before flushing, if the patient was responsive. a. Infused the lidocaine very slowly. b. Reassessed the patient's pain status, allowing for sufficient onset of action per medication, route, and the patient's condition.	4	3	2	1
22	Irrigated the needle with a rapid normal saline flush per the manufacturer's instructions. If the needle flushed easily with no swelling at the site, connected the IV tubing, and ensured that the IV fluid was running steadily.	4	3	2	1
23	Administered fluids under pressure using a pressure bag or IV pump for maximum flow rate.	4	3	2	1
24	Applied a sterile dressing, and stabilized the needle and the tubing. a. Stabilized the site with tape and dressings or hemostats according to the manufacturer's instructions. b. Labeled the dressing per the organization's practice with the date and time of application and initialed it.	4	3	2	1
25	Monitored needle placement and patency by assessing for extravasation or infiltration at the site, edema surrounding the insertion site, expanding hematoma with fluid infusion, and dependent edema on the posterior aspect of an extremity (if applicable).	4	3	2	1
26	Assessed, treated, and reassessed pain.	4	3	2	1
27	Removed the IO device when it was no longer needed or per the manufacturer's recommendations.	4	3	2	1
28	Discarded supplies, removed gloves, and performed hand hygiene.	4	3	2	1
29	Documented the procedure in the patient's record.	4	3	2	1
IO Device Removal					
31	Performed hand hygiene and donned gloves.	4	3	2	1
32	Introduced self to the patient.	4	3	2	1
33	Verified the correct patient using two identifiers.	4	3	2	1
34	Explained the procedure to the patient and ensured that he or she agreed to treatment.	4	3	2	1
35	Disconnected the IV tubing.	4	3	2	1
36	Stabilized the extremity.	4	3	2	1
37	Removed the device using an appropriate method. a. For removal of a manually inserted needle: i. Grasped the needle manually or attached a syringe to the hub. ii. Pulled the needle straight back and out. For removal of a specific IO access device, followed the manufacturer's instructions.	4	3	2	1
38	Applied a dressing to the insertion site.	4	3	2	1

39	Assessed, treated, and reassessed pain.	4	3	2	1
40	Discarded supplies, removed gloves, and performed hand hygiene.	4	3	2	1
41	Documented the procedure in the patient's record.	4	3	2	1
Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1
Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse's Comments/Recommendations for Improvement:

Originating Department	Nursing Education Unit	Module No.	1-2017
Title	**ASSISTING IN LUMBAR PUNCTURE**		
Author/s	**Ronald Martin Carcillar-CRN-ICU**		
Original Date	October, 2017	Revision Date	

ALERT

Brain herniation may occur after lumbar puncture (LP) in the presence of an intracranial mass lesion or increased intracranial pressure (ICP).[8]

Cautions include suspected aneurysmal subarachnoid hemorrhage and complete spinal blocks.[5,8]

OVERVIEW

An LP is performed to obtain a cerebrospinal fluid (CSF) sample, measure CSF pressure, drain CSF, or access the subarachnoid space for infusion of medications or contrast agents. Normal CSF pressure ranges from 5 to 20 cm H_2O, depending on the patient's position.[8]

Indications for LP include the following:[5,8]

- Suspected central nervous system infection
- Clinical examination suggestive of subarachnoid hemorrhage accompanied by negative computed tomography (CT) findings
- Suspected Guillain-Barré syndrome
- Suspected multiple sclerosis
- Intrathecal administration of medications
- Imaging procedures requiring infusion of contrast agents
- Measurement of CSF pressure
- CSF drainage for hydrocephalus, pseudotumor cerebri, or CSF fistula

Contraindications for LP include the following:[5,8]

- Increased ICP with mass effect
- Superficial skin infection localized to the site of entry
- Bleeding diathesis (relative contraindication)
- Platelet count less than 100 × 10^9/L; lower counts may be acceptable with hematology consultation[6]
- International normalized ratio (INR) greater than 1.5[5,6]
- Patient receiving anticoagulation (e.g., heparin, warfarin)
- Glasgow Coma Scale (GCS) score less than 13[5]
- Focal neurologic signs such as unequal, dilated, or poorly responsive pupils
- Abnormal posturing
- Bradycardia with hypertension

If CSF analysis is necessary, a patient with coagulation abnormalities may require pretreatment with fresh frozen plasma, platelets, cryoprecipitate, or the specific factor needed to correct a hematologic abnormality.[8]

Cautions against LP include patients suspected of having aneurysmal subarachnoid hemorrhage and patients with complete spinal blocks. In such cases, an LP may be

performed if the CT scan of the patient's head does not indicate signs of increased ICP, such as significant cerebral swelling, hematoma, intracranial tissue shifts, or brain herniation.[8]

The preferred position for an LP is the lateral decubitus with the neck, hips, and knees flexed (knees to chest); the axis of the hips vertical; the back close to the edge of the bed; the head of the bed flat; and no more than one small pillow under the head. If the LP is not successful in this position or if the patient cannot tolerate this position, the patient may sit on the side of the bed and lean over a bedside table or stand.[8] The procedure may also be performed under fluoroscopy for patients who are morbidly obese or have spinal deformities. Optimal positioning is required to avoid the risk of a dry tap or an unsuccessful puncture attempt. Proper positioning widens the interspinous process space and facilitates the passage of the needle.[5] Repeated puncture attempts increase the risk of infection and patient discomfort.[5]

The presence of meningeal irritation caused by either infectious meningitis or subarachnoid hemorrhage may cause discomfort when the patient is placed in the flexed, lateral decubitus position for the LP.

Normal CSF values include the following:[8]

- Opening pressure of 5 to 20 cm H_2O (elevated pressure, greater than 25 cm H_2O)
- White blood cells less than 5/mm^3
- Glucose, 60% to 70% of serum blood glucose
- Protein, 15 to 45 mg/dl
- Clear, colorless appearance
- Negative culture

Recommended CSF tests include the following:[8]

- Tube 1, biochemistry: glucose, protein, protein electrophoresis (if clinically indicated)
- Tube 2, bacteriology: Gram stain; bacterial culture; fungal culture, if clinically indicated (requires larger volume); tuberculosis culture, if clinically indicated (requires larger volume)
- Tube 3, hematology: cell count, differential
- Tube 4, optional studies as indicated: venereal disease research laboratory (VDRL) test, oligoclonal bands, myelin protein, cytology

SUPPLIES

Click here for a list of supplies.

PATIENT AND FAMILY EDUCATION

- Provide the patient and family with an explanation of the equipment and the procedure, including the positioning requirements.
- Explain the need for the patient to remain still and quiet in a lateral decubitus position with his or her neck, hips, and knees flexed (knees to chest); the axis

of the hips vertical; the back close to the edge of the bed; the head of the bed flat; and no more than one pillow under the head.[5]

- Explain that if the LP is not successful in the lateral decubitus position, or if this position cannot be tolerated, the patient may be positioned sitting on the side of the bed or leaning over a bedside table or stand.[5]
- Explain that the procedure may produce some discomfort, that a local anesthetic is injected to minimize pain, and that a mild analgesic and an anxiolytic may be given, if appropriate.
- Explain that the patient may find it helpful to lie flat for 1 to 4 hours after the LP.[5]
- Encourage questions and answer them as they arise.

ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene before patient contact.
2. Verify the correct patient using two identifiers.
3. Obtain the patient's vital signs, including oxygen saturation.
4. Review the patient's record, including the history of the present illness, mechanism of injury (if applicable), medical history, allergies, and current medical therapies.
5. Perform a neurologic assessment, including level of consciousness, pupil size and reactivity, motor and sensory function, and GCS score.
6. Assess the patient for signs and symptoms of increased ICP.
    a. Behavior changes
    b. Decreased consciousness
    c. Headache
    d. Lethargy
    e. Weakness or numbness
    f. Diplopia
    g. Seizures
    h. Vomiting
7. Review the patient's current laboratory profile, including complete blood count (CBC), platelet count, prothrombin time (PT), partial thromboplastin time (PTT), bleeding time, and INR.
8. Assess for coagulopathies, active treatment with heparin or warfarin, local skin infections in close proximity to the site, and pertinent medication or contrast material allergies.[5]
9. Assess the patient's ability to cooperate during the procedure.
10. Assess the patient for signs and symptoms of meningeal irritation.
    a. Nuchal rigidity
    b. Photophobia
    c. Brudzinski or Kernig signs
    d. Fever
    e. Headache
    f. Nausea
    g. Vomiting
11. Assess the patient's ability to cooperate during the procedure.

Preparation

1. Comply with Universal Protocol.

   a. Use a standardized list to verify that all required items, including informed consent, are available.
   b. Mark the procedure site when required.
2. Ensure that the patient has patent IV access.
3. Administer an analgesic, a sedative, or both if needed.
   a. Reassess the patient's pain or sedation status, allowing for sufficient onset of action per the medication, route, and the patient's condition.
   b. If sedation is administered, follow the organization's practice for procedural sedation.

PROCEDURE

1. Perform hand hygiene and don gloves.
2. Verify the correct patient using two identifiers.
3. Comply with Universal Protocol: Perform a time-out to verify correct patient, correct site, and correct procedure.
4. Position the patient according to the practitioner's preference.
   a. Place the patient in the lateral decubitus position near the side of the bed (Figure 1), with the neck, hips, and knees flexed (knees to chest).
      i. Ensure that the head of the bed is flat, and that there is no more than one small pillow under the head.[5]
      ii. If the patient needs help to maintain this position, place one arm behind the patient's head and the other arm around the knees.
   b. If difficulty is encountered, use an alternative position with the patient sitting on the edge of the bed and leaning over the bedside table.[5]
      Rationale: Correct positioning widens the intervertebral space, facilitating the entry of the spinal needle into the subarachnoid space.[5]
   c. If the patient is morbidly obese or has vertebral column deformities, an LP under fluoroscopy may be needed.[8]
5. Assist the practitioner as needed with identifying the appropriate anatomic site for puncture.
   a. An imaginary line is drawn vertically between the iliac crests, and a second imaginary line is drawn horizontally across the spinous processes.
   b. The imaginary line should intersect the L3-L4 area, and the puncture can be performed here or one level below at the L4-L5 interspace.[5,8]
      Rationale: An LP in an adult is performed below L3 to prevent damage to the spinal cord.
6. Remove gloves, perform hand hygiene, and don head covering, mask, eye protection or face shield, sterile gown, and sterile gloves.
7. Assist the practitioner as needed with setting up the sterile field, preparing the equipment, and draping the area with sterile drapes.
   a. Assist the practitioner with preparing the local anesthetic. Hold the medication vial for removal of the anesthetic to assist the practitioner in maintaining sterile technique. A commonly used anesthetic is 1% or 2% lidocaine solution.[2,5]
   b. Label all medications, medication containers, and other solutions, including those that are on a sterile field. The only exceptions are

medications that are still in their original container or medications that are administered immediately by the person who prepared them.[4]

8. Assist the practitioner as needed with skin preparation. Cleanse the area of insertion with an organization-approved antiseptic if requested. Allow the site to air-dry.
   Rationale: Antiseptic cleansing minimizes the risk for infection and protects the insertion site from recontamination.
   The product insert for chlorhexidine warns against its use before LP and to prevent contact with the meninges.[1] However, a number of studies have concluded that it is safe to use.[7] Total protein in the CSF can show a false high elevation from contamination by povidone-iodine using the benzethonium chloride (BZTC) or pyrogallol red (PGR) methods.[3]
9. Assist the practitioner with administering the local anesthetic. Initially, the skin is injected; then, a deeper injection of anesthetic is administered to the interspinous ligament.
10. Assist the practitioner with insertion of the spinal needle.
11. When the spinal needle is in place, instruct the patient to relax and breathe normally and to avoid holding his or her breath. Help the patient straighten the legs when indicated.[5,8]
    Rationale: Increased muscle tension or intrathoracic pressure may falsely elevate CSF pressure. Leg flexion can increase intrathoracic pressure.[5,8]
12. Using aseptic technique, assist the practitioner by holding the manometer in place as needed after it is attached to the spinal needle via a three-way stopcock.
13. Assist the practitioner with obtaining the CSF pressure measurement.
    Rationale: Normal CSF pressure readings taken at the lumbar area range from 5 to 20 cm H_2O.[8] The opening pressure in a traumatic tap will be within normal limits; the opening pressure in patients with subarachnoid hemorrhage and meningitis will be abnormal.
    The meniscus should show minimal fluctuation related to pulse and respiration.
14. Assist the practitioner with collecting CSF specimens for laboratory analysis as needed.
15. In the presence of the patient, label the specimens per the organization's practice. Label each tube in the order of collection with the type of specimen, the patient's name, and the order in which the specimens are collected (e.g., "number 1 of 3").
    Rationale: Numbering the specimens helps differentiate subarachnoid hemorrhage from a traumatic tap.[8]
16. Prepare the specimens for transport.
    a. Place the labeled specimens in a biohazard bag.
    b. If the specimens require ice for transport, place the specimens in a biohazard bag then place the bag with the specimens into a second biohazard bag filled with ice slurry.
       Rationale: Placing the specimens in a separate bag protects the label from being damaged.
17. Immediately transport the specimens to the laboratory.
    Rationale: Sending the specimens immediately to the laboratory ensures accurate results.

18. Assist the practitioner with applying a sterile dressing to the site.
19. Assist the patient with attaining a supine or prone position immediately after the procedure.[5]
    Rationale: In the supine position, the patient's weight acts as site pressure. In the prone position, the increased abdominal pressure transmits pressure to the site.[5]
    a. Some practitioners advocate placing the patient in a supine or prone position for 1 to 4 hours.[5]
    b. It remains unclear whether either the prone or supine position facilitates closure of the dura mater after LP. Neither the supine nor prone position has been shown to prevent postdural puncture headache (PDPH).[5,8]
20. Assess the puncture site, dressing, and linen for CSF leakage or bleeding. Change the dressing as needed per the organization's practice.
    Rationale: CSF leakage may indicate continued CSF loss.
21. Discard supplies, remove personal protective equipment (PPE), and perform hand hygiene.
22. Document the procedure in the patient's record.

MONITORING AND CARE

1. Monitor the patient's neurologic, respiratory, and cardiovascular status during the procedure.
   Rationale: Pain or abnormal sensation radiating down one or both legs may result from spinal nerve irritation, requiring a change in the patient's position or the needle's position. Changes in level of consciousness or pupil size and reactivity, motor or sensory changes, respiratory depression, and a change in vital signs may result from brain herniation[5,8] or analgesia and sedation.
   Reportable conditions: Respiratory depression, changes in level of consciousness, pupillary changes, motor or sensory changes, change in vital signs, bowel or bladder dysfunction
2. Assess vital signs and perform systematic neurologic assessments every 30 minutes for 2 hours and then every hour for the next 4 hours.[5] Report any changes per the organization's practice.
   Rationale: A change in vital signs or neurologic assessment findings could indicate brain herniation, acute hematoma formation at the puncture site, injury to a spinal nerve, or infection.[8]
   Reportable conditions: Change in vital signs, motor or sensory changes, changes in level of consciousness
3. Monitor the needle puncture site.
   Rationale: Persistent drainage may indicate an unresolved CSF leak.[8]
   Reportable conditions: Drainage from the LP site, dural tear requiring patch or closure
4. Instruct the patient to remain supine or prone in bed for the length of time prescribed.[5] Monitor the effectiveness of measures taken to prevent PDPH.[5,8]
   Rationale: Headache has been reported to occur in up to 40% of patients after LP.[5,8] Additional treatment measures may be necessary to manage postprocedure headache. Although recent studies do not support either the prone or supine position to prevent PDPH, lying in one of these positions may relieve the headache once it develops.[8]

Reportable condition: Intractable postprocedure headache

5. Ensure adequate oral or IV fluid intake.[5] Caffeine can be used either orally or intravenously to increase cerebral arterial vasoconstriction, which results in decreased blood volume in the brain, reducing the risk of headache.[5]
   Rationale: Adequate oral or IV fluid intake may facilitate repletion of CSF. Caffeine has been found to be effective for PDPH.[5]
   Reportable conditions: Intravascular fluid overload or deficit
6. Assess, treat, and reassess pain.

EXPECTED OUTCOMES

- LP completed
- CSF samples obtained.
- Patient's vital signs and level of consciousness stable before, during, and after the procedure
- Puncture site clean and dry
- PDPH (up to 40% of patients undergoing LP[5,8])
- No neck stiffness, local pain at puncture site, leg spasms, or elevated temperature related to the procedure
- No change in neurologic status after the procedure

UNEXPECTED OUTCOMES

- Significant change in vital signs (respiratory changes, bradycardia, or increased systolic blood pressure)
- Deterioration in neurologic status or signs of brain herniation, including decreased level of consciousness, pupillary changes, motor or sensory impairment, and change in vital signs[8]
- Inability to void spontaneously (if able before procedure)
- Abnormal CSF results
- CSF not obtained
- Inability to complete procedure
- Prolonged headache, stiff neck, photophobia, and acute increase in temperature related to the procedure[8]
- Excessive drainage at the puncture site[8]
- New, persistent complaints of pain, numbness, tingling, weakness, or paralysis in the legs[5]
- Spinal or paraspinal abscess
- Hematoma formation[5]
- Implantation of epidermal tumors[5]
- Vasovagal syncope
- Seizure
- Pneumocephalus
- Infectious meningitis[6]

DOCUMENTATION

- Patient and family education
- Date and time of procedure
- Time-out procedure, including verification of correct patient, correct procedure, and correct site

- Opening pressure
- Status of puncture site
- CSF specimens sent to the laboratory for analysis
- Amount of CSF obtained
- CSF appearance
- Patient's tolerance of the procedure
- Neurologic, cardiovascular, and respiratory assessments
- Vital signs, including oxygen saturation
- Unexpected outcomes and related nursing interventions
- Pain assessment and management
- Procedural sedation assessment and management (if sedation was administered)

REFERENCES

Levels of Evidence

1. CareFusion. (2015). CHLORAPREP ONESTEP (chlorhexidine gluconate and isopropyl alcohol solution) (CareFusion 213 LLC) package insert. Retrieved July 6, 2016, from http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=c15766f7-e6ab-4d9e-bf90-deabab2c7b20 (Level M)
2. Doherty, C.M., Forbes, R.B. (2014). Diagnostic lumbar puncture. *The Ulster Medical Journal, 83*(2), 93-102.
3. Gounden, V., Sacks, D., Zhao, Z. (2015). Interference of cerebrospinal fluid total protein measurement by povidone-iodine contamination. *Clinica Chimica Acta, 440*, 3-5. doi:10.1016/j.cca.2014.10.008 (Level B)
4. Joint Commission, The. (2016). National patient safety goals: Hospital accreditation program. Retrieved July 6, 2016, from http://www.jointcommission.org/assets/1/6/2016_NPSG_HAP.pdf (Level D)
5. Matata, C. and others. (2012). Lumbar puncture: Diagnosing acute central nervous system infections. *Nursing Standard, 27*(8), 49-56. doi:10.7748/ns2012.10.27.8.49.c9364
6. Solomon, T. and others. (2012). Management of suspected viral encephalitis in adults–Association of British Neurologists and British Infection Association National Guidelines. *Journal of Infection, 64*(4), 347-373. doi:10.1016/j.jinf.2011.11.014 (Level D)
7. Sviggum, H.P. and others. (2012). Neurologic complications after chlorhexidine antisepsis for spinal anesthesia. *Regional Anesthesia and Pain Medicine, 37*(2), 139-144. doi:10.1097/AAP.0b013e318244179a (Level B)
8. Wright, B.L., Lai, J.T., Sinclair, A.J. (2012). Cerebrospinal fluid and lumbar puncture: A practical review. *Journal of Neurology, 259*(8), 1530-1545. doi:10.1007/s00415-012-6413-x

ADDITIONAL READINGS

Ziai, W.C., Lewin, J.J. (2008). Update in the diagnosis and management of central nervous system infections. *Neurologic Clinics, 26*(2), 427-468. doi:10.1016/j.ncl.2008.03.013 (classic reference)*

*In these skills, a “classic” reference is a widely cited, standard work of established excellence that significantly affects current practice and may also represent the foundational research for practice.

Adapted from Wiegand, D.L. (2011). *AACN procedure manual for critical care* (6th ed.). St. Louis: Saunders.

NURSING EDUCATION UNIT

COMPETENCY-BASED CHECK OFF TOOL

Title:	**ASSISTING IN LUMBAR PUNCTURE**
Competency Statement:	**The nurse demonstrates acceptable level of competence in the performance of assisting IN LUMBAR PUNCTURE.**
Standards:	• **Infection Control and Patient Safety Compliance** • **Equipment Preparation and Manipulation** • **Multi-disciplinary support, Placement and Aftercare**

Name of Nurse: _____ Date: _____
Employee Number: _____ Unit Assignment: _____
Clinical Resource Nurse: _____ Employee Number: _____

General Directions:

- Provide all the information needed in this check off tool.
- Use the scale below by ENCIRCLING your most appropriate response
  4= Very Good (Performs competently without assistance and supervision)
  3= Good (Performs within an acceptable level of standards but with some degree of assistance and supervision)
  2= Poor (Performs inconsistently/incompletely with assistance and supervision)
  1= Very Poor (Cannot perform even with directions; procedural step omitted)
- Allow fluidity in the performance of the entire procedure (unless assistance or supervision is needed.
- Allocate time for question and answer section either before or after procedural performance on discretion of the evaluator.
- Evaluator must provide necessary feedback for improvement at the end of the check-off and plan for further education and training, if needed.
- Evaluation results will be based on the following percentage distribution; Communication skills and interpersonal skills (10%); Psychomotor Skills (50%); Critical Thinking Skills (30%); Documentation (10%)

No.	Performance Criteria	Evaluation Scale			
Communication and Interpersonal Skills					
1	Acknowledges the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights).	4	3	2	1
2	Introduces her/himself to the patient using AIDET	4	3	2	1
3	Verbalizes the reason for the procedure/intervention.	4	3	2	1
4	Explains the duration and outcome of the procedure	4	3	2	1
5	Educates patient and family / caregiver (where appropriate).	4	3	2	1
Psychomotor Skills					

1	Performed hand hygiene and donned gloves before patient contact.	4	3	2	1
2	Verified the correct patient using two identifiers.	4	3	2	1
3	Obtained the patient's vital signs, including oxygen saturation.	4	3	2	1
4	Reviewed the patient's record, including the history of the present illness, mechanism of injury (if applicable), medical history, allergies, and current medical therapies.	4	3	2	1
5	Performed a neurologic assessment, including level of consciousness, pupil size and reactivity, motor and sensory function, and GCS score.	4	3	2	1
6	Assessed the patient for signs and symptoms of increased ICP.				
7	Reviewed the patient's current laboratory profile, including CBC, platelet count, PT, PTT, bleeding time, and INR.	4	3	2	1
8	Assessed for coagulopathies, active treatment with heparin or warfarin, local skin infections in close proximity to the site, and pertinent medication or contrast material allergies.	4	3	2	1
9	Assessed the patient's ability to cooperate during the procedure.	4	3	2	1
10	Assessed the patient for signs and symptoms of meningeal irritation.	4	3	2	1
11	Complied with Universal Protocol. a. Used a standardized list to verify that all required items, including informed consent, were available. b. Marked the procedure site when required.	4	3	2	1
12	Ensured that the patient had patent IV access.	4	3	2	1
13	Administered an analgesic, a sedative, or both if needed. a. Reassessed the patient's pain or sedation status, allowing for sufficient onset of action per the medication, route, and the patient's condition. b. If sedation was administered, followed the organization's practice for procedural sedation.	4	3	2	1
14	Performed hand hygiene and donned gloves	4	3	2	1
15	Complied with Universal Protocol: Performed a time-out to verify correct patient, correct site, and correct procedure.	4	3	2	1
16	Positioned the patient according to the practitioner's preference.	4	3	2	1
17	Assisted the practitioner as needed with identifying the appropriate anatomic site for puncture.	4	3	2	1
18	Removed gloves, performed hand hygiene, and donned head covering, mask, eye protection or face shield, sterile gown, and sterile gloves.	4	3	2	1
19	Assisted the practitioner as needed with setting up the sterile field, preparing the equipment, and draping the area with sterile drapes. a. Assisted the practitioner with preparing the local anesthetic. Held the medication vial for removal of the anesthetic to assist the practitioner in maintaining sterile technique. b. Labeled all medications, medication containers, and other solutions, including those that were on a sterile field.	4	3	2	1
20	Assisted the practitioner as needed with skin preparation. Cleansed the area of insertion with an organization-approved antiseptic if requested. Allowed the site to air-dry.	4	3	2	1
21	Assisted the practitioner with administering the local anesthetic.	4	3	2	1
22	Assisted the practitioner with insertion of the spinal needle.	4	3	2	1

23	When the spinal needle was in place, instructed the patient to relax and breathe normally and to avoid holding his or her breath. Helped the patient straighten the legs when indicated.	4	3	2	1
24	Using aseptic technique, assisted the practitioner by holding the manometer in place as needed after it was attached to the spinal needle via a three-way stopcock.	4	3	2	1
25	Assisted the practitioner with obtaining the CSF pressure measurement.	4	3	2	1
26	Assisted the practitioner with collecting CSF specimens for laboratory analysis as needed.	4	3	2	1
27	In the presence of the patient, labeled the specimens per the organization's practice. Labeled each tube in the order of collection with the type of specimen, the patient's name, and the order in which the specimens were collected.	4	3	2	1
28	Prepared the specimens for transport. a. Placed the labeled specimens in a biohazard bag. b. If the specimens required ice for transport, placed the specimens in a biohazard bag then placed the bag with the specimens into a second biohazard bag filled with ice slurry.	4	3	2	1
29	Immediately transported the specimens to the laboratory.	4	3	2	1
30	Assisted the practitioner with applying a sterile dressing to the site.				
31	Assisted the patient with attaining a supine or prone position immediately after the procedure.	4	3	2	1
32	Assessed the puncture site, dressing, and linen for CSF leakage or bleeding. Changed the dressing as needed per the organization's practice.	4	3	2	1
33	Assessed, treated, and reassessed pain.	4	3	2	1
34	Discarded supplies, removed PPE, and performed hand hygiene.	4	3	2	1
Critical Thinking Skills					
1	Responds appropriately to scenario and questions presented.	4	3	2	1
2	Provides accurate rationalization of the procedures taken when asked.	4	3	2	1
3	Explains the concept of holistic care as related to the patient.	4	3	2	1
Documentation Skills					
1	Documents the procedure in the patient's record using TrakCare. Documents date and time of therapy initiated;	4	3	2	1
2	Utilize forms and assessment tools associated with the procedure correctly and completely.	4	3	2	1

Clinical Resource Nurse's Comments/Recommendations for Improvement: