CRENSHAW
COMMUNITY HOSPITAL

Education Department

LPN NG-Tube Insertion

Welcome to Crenshaw Community Hospital. We want all our nurses to be comfortable in the skills they may need to perform at our facility. The following study guide will help you understand our LPN NG-Tube Insertion policy. Please study the guide as you will be tested on this material. We require all LPNs to become certified in NG-Tube Insertion if you are being hired for a role in a unit where you may be required to perform NG-Tube Insertion. There is an initial certification process that includes a checkoff sheet that you need to print (included in this study guide), and you will need to recertify annually. If you have any questions, please consult with your department manager.

Thank you!

Tim Hopper
Director of Education

Crenshaw Community Hospital

INITIAL / ANNUAL

Skills Competency: Nasogastric Tube Placement

Circle One

Name:_____ **Date:** _____

Unit: ☐ED ☐Med/Tele ☐Surgery **Preceptor:**_____

	Yes	No	Preceptor
1. Medical indication and contraindication of NG tube placement			
2. Risks and benefits of the procedure			
3. Related anatomy and physiology			
4. Steps in performing the procedure			
5. Documentation of the procedure			
6. Process for placement verification			
	Employee	**Date**	
1. Initial observation of supervising physician or certified nurse inserting nasogastric tube			
2. Initial insertion of nasogastric tube under direct supervision of physician or certified nurse			
3. Second insertion of nasogastric tube under direct supervision of physician or certified nurse			
4. Third insertion of nasogastric tube under direct supervision of physician or certified nurse			

_____
Employee Signature

_____
Annual Evaluator Signature

_____
Observation Preceptor Signature

_____
Insertion #1 Preceptor Signature

_____
Insertion #2 Preceptor Signature

_____
Insertion #3 Preceptor Signature

Crenshaw Community Hospital Policies and Procedures	Policy Number MS.900.0090	Effective Date 01/1983
	Revision Date 2/12/2023	Review Date
Manual: Nursing Title: Insertion of Gastrointestinal Tube (NG)	_____ Chief Of Staff _____ Administrator	

INSERTION OF GASTROINTESTINAL TUBE (NG)

Purpose:
A means of removing stomach contents (fluid or gas) or introducing matter into the stomach.

Qualified Staff: Any Registered Nurse that has had training for NG Tube insertion. LPNs must be initially certified and observed by a Physician or three certified Registered Nurses before they are allowed to insert NG Tubes. In addition, LPNs must recertify annually, which includes passing the required training course and again began observed in three insertions by a Registered Nurse.

Equipment:
NG tube (Salem sump or Levine), over bed tray, curved basin, 60ml catheter tipped syringe, adhesive tape, glass of chipped ice or water with spoon or straw, towel, safety pin, rubber band, lubricant (KY jelly), tincture of Benzoin

Procedure:
1. Check patency of NG tube.
2. Check nostrils before attempting to insert tube for any blockages.
3. Measure length of tube to be used by placing tube from nose to ear to xyphoid process. Note length by markers on tube.
4. Place patient in desired position. High Fowler's is preferred.
5. Allow patient to take sip of water to moisten throat.
6. Lubricate tube with generous amounts of KY or other water-based lubricant.
7. As gently as possible, insert tip of tube into either nostril. Warn patient of discomfort and gagging.
8. Have patient swallow. As patient swallows, insert tube as quickly as possible. If patient is unable to swallow, have patient sip water in mouth to swallow when prompted, but use caution if patient is at risk for aspiration.
9. If patient is coughing or having trouble breathing after insertion, you may have the tube in the airway instead of gastric target. Remove the tube and re-insert.
10. Confirm placement with:
    a. Aspiration of stomach contents.
    b. Inject no more than 30ml of air into tube while auscultating stomach with a stethoscope.
11. Secure with tape. Benzoin to the face may help the tape stick better. Avoid pressing the tubing against the nostril or crossing the tube in front of the eyes.
12. **Placement of NG tube must be confirmed with X-RAY prior to any use. Do not use the NG Tube until you have confirmation by X-RAY.**
13. Connect NG to suction or clamp as determined by the physician.

Documentation:

1. Time
2. Type and size of tube
3. Patient tolerance of procedure
4. Method of placement confirmation, including X-RAY
5. Name of licensed staff inserting tube

NURSING PRACTICE & SKILL

Nasogastric Tube: Insertion and Placement Verification in the Adult Patient

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What is Involved in Inserting and Verifying Placement of a Nasogastric Tube in the Adult Patient?

A nasogastric tube (NGT) is a flexible tube that provides access to the stomach through the nose. The focus of this paper is about inserting and verifying placement of the two most commonly used types of NGTs: the Levin tube, which has a single lumen, and the Salem-sump, which has two lumens–one for drainage and the second, a smaller tube that is left open to the atmosphere to provide ventilation (Figures 1, 2). For information about the types of NGTs, see *Nursing Practice & Skill: Nasogastric Tubes: an Overview*

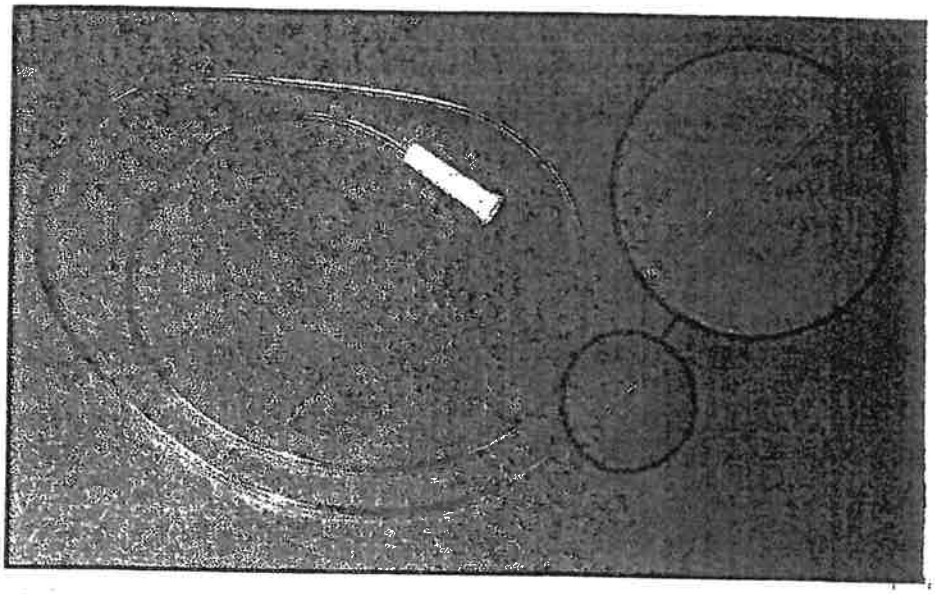

Figure 1: Levin nasogastric tube

- *What*: Although inserting an NGT is a commonly performed procedure, it is not without significant risk if done improperly. Inserting an NGT in the adult patient involves assessing the patient to confirm he or she meets the criteria for placement (see *What You Need to Know Before Inserting and Verifying*

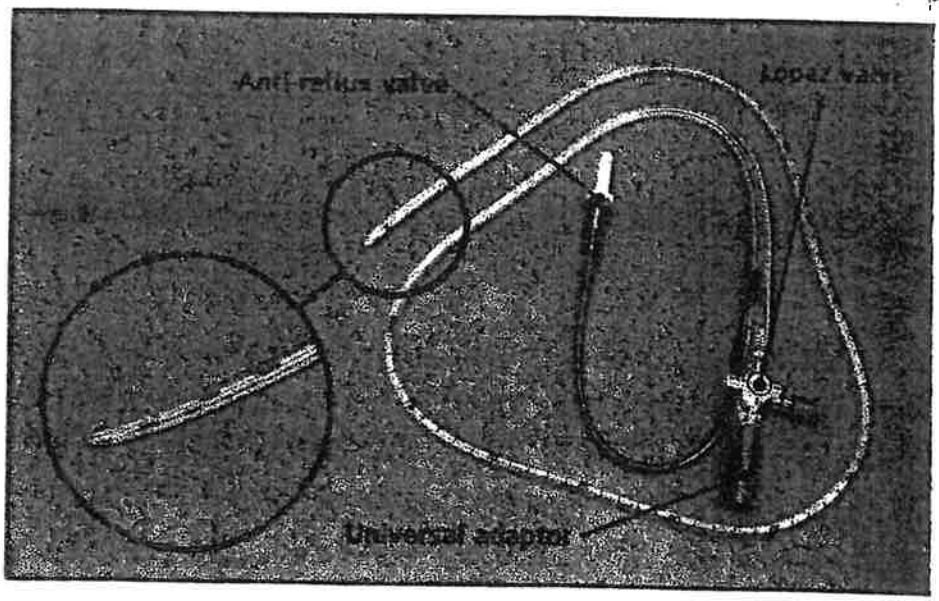

Figure 2: Salem-sump nasogastric tube with anti-reflux valve attached to the vent lumen and a Lopez adaptor set in the instillation/suction lumen

Placement of a Nasogastric Tube in the Adult Patient, below), teaching the patient about the procedure and what is expected of him/her during the NGT insertion, measuring the NGT for insertion, inserting the NGT, confirming placement, and monitoring the patient for complications following insertion

- *How*: Insertion of an NGT is usually a "blind" procedure (i.e., inserted without direct observation) using clean, not sterile, technique. Insertion involves passing the tube through the nose, along the nasal floor, through the pharynx and down the esophagus until the proximal tip of the tube rests in the patient's stomach. The nurse is responsible for verifying the NGT has been placed properly prior to the initial use of the NGT and before each use thereafter. Standard precautions should be observed throughout each of the steps
- *Where*: NGTs are used in all patient care settings. However, they are found most frequently in inpatient facilities because NGTs are used primarily as a short-term method of providing nutrition or following surgery to reduce the risk of vomiting
- *Who*: Typically, NGTs are inserted and removed by registered nurses, physicians, and registered dietitians. Registered nurses are principally responsible for providing the daily care of NGTs, as well as the administration of nutritional formulas and the instillation of medication and other substances. Due to the invasive nature of the placement process, it is generally not advisable to have visitors present during placement or removal of the NGT

What is the Desired Outcome of Nasogastric Tube Insertion and Removal in the Adult Patient?

- The desired outcome of using an NGT is to establish safe and effective enteral access. The tube is removed when its therapeutic function is no longer needed

Why is Inserting and Removing a Nasogastric Tube in the Adult Patient Important?

- Use of the NGT is important to
  - provide nutrition to patients with functional GI tracts who cannot meet their nutritional needs through the oral route
    - Candidates for nasogastric feeding include patients with impaired swallowing; altered level of consciousness (see *Red Flags*, below); limited oral intake due to disease-related symptoms such as anorexia, early satiety, or fatigue; or other medical conditions that prevent safe and adequate oral intake
    - Inadequate nutrition is associated with increased morbidity and mortality (e.g., infection, poor skin integrity, delayed wound healing, impaired catabolic response), and increased length of hospital stay
    - Compared with parenteral nutrition, NGT feeding has been linked to favorable clinical outcomes, including
      - maintaining GI structure and function, which reduces the risk of GI atrophy during disuse
      - moderating metabolic response
      - preventing bacterial translocation (i.e., passage of viable indigenous bacteria from the intestinal tract through the epithelial mucosa to the mesenteric lymph nodes, and then to systemic circulation)
      - supporting blood flow to abdominal organs
      - enhanced absorption and digestion of nutrients
      - decreased infections
      - cost savings
  - administer fluids, medication, and other substances (e.g., activated charcoal, radiological contrast agents) when oral administration is not viable
  - remove stomach contents (e.g., in cases of gastrointestinal bleeding, gastric lavage ["stomach pump" or washing] for medication overdose)
  - decompress the stomach to prevent aspiration of stomach contents when peristalsis is impaired
  - treat gastric or esophageal hemorrhage
  - manage patients with vomiting refractory to medical management or severe pancreatitis—suctioning acidic gastric fluid can result in reduced pancreatic secretions
  - aid in diagnosis (e.g., diaphragmatic rupture, collect gastric contents for analysis)

Facts and Figures

- Contrary to common understanding that the greater the size of the syringe, the lower the pressure generated thereby, investigators reported that smaller sized syringes (< 50 mL) exert less vacuum pressure on NGTs and carry less risk of tube rupture and damage to gastric mucosa than syringes > 50 mL (Knox et al., 2009)
- The reported error rate in NGT placement—in which the tube is misplaced into the bronchi, inserted through the lung parenchyma into the intrapleural space, or the tube knots or coils upward—varies between 0.3–20% of insertion attempts (Peter et al., 2009)
- Investigators in a research study conducted in 2008 concluded that a pH measurement of gastric aspirate ≤ 4.0 is sufficient to verify correct NGT placement (Stock et al., 2008); however, the American Association of Critical-Care Nurses (AACN) endorses the practice of confirming the position of NGTs by X-ray. Observing this recommendation is critical if the patient is using proton pump inhibitors or acid-reducing medications or is receiving ongoing enteral feeding, all of which can alter the pH of gastric contents (Metheny, 2009)

Investigators who conducted a recent meta-analysis of 9 published studies concluded the use of capnography or colorimetric capnometry to measure the absence of end-tidal carbon dioxide emissions from the NGT to be an effective method to confirm that the NGT has not been placed in the lungs (Chau et al., 2011)

What You Need to Know Before Inserting and Verifying Placement of a Nasogastric Tube in the Adult Patient

- Prior to inserting or removing an NGT, the clinician should be familiar with the following:
  - Anatomy and physiology of the nose, nasal cavity, and pharynx, including the nasopharynx and laryngopharynx (Figure 3)

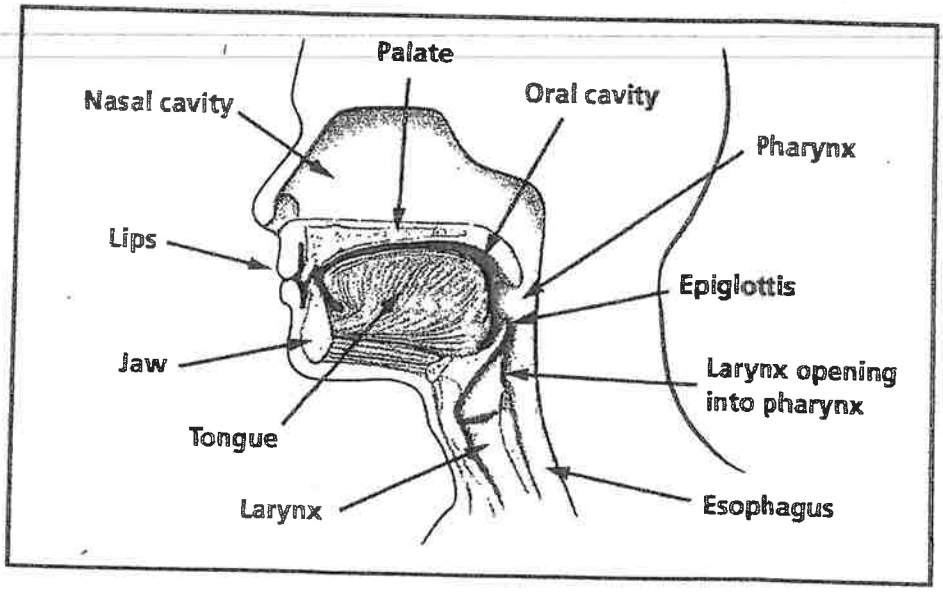

Figure 3: Nose, nasal cavity, and pharynx

- The anterior nares form the exterior opening to the nasal cavity. Usually one nare is larger than the other. A septum, comprised of bone and cartilage, divides the right and left nasal cavities
- The nasal floor is parallel to the roof of the mouth. The end of the nasal cavity is narrow and ends at the juncture of several bones, including a portion of the cribriform plate, which is a very thin bone that, if fractured, could provide a direct portal into the brain. Use great care when placing an NGT into patients in whom head trauma is suspected
- The nasopharynx is a muscular passageway at the beginning of the pharynx, located behind the nasal cavity. It curves to extend behind the oral cavity to become the oropharynx
- The epiglottis is a cartilaginous flap of connective tissue located at the entrance to the larynx. During swallowing, the larynx moves upward and the epiglottis bends forward to close over the glottis to prevent aspiration of food and fluid into the trachea. Many clinicians exploit this natural movement during NGT insertion by asking patients to swallow ice chips or water once the NGT passes beyond the oropharynx (back of the oral cavity)—the movement of larynx (rising and falling of the larynx) and the opening and closing of the epiglottis can assist passage of the NGT beyond the laryngopharynx (i.e., portion of the throat that connects to the esophagus at approximately the 4th to 6th cervical vertebrae) toward the esophagus

- Physical assessment skills for the nose, lungs, and abdomen
  - Be especially alert to *hyperactive* borborygmi sounds (i.e., stomach "growling" caused primarily by contractions of the muscles of the stomach and small intestine). Physical obstruction can be suspected if the sounds are particularly prominent and are accompanied by cramping abdominal pain
- Levin and Salem-sump NGTs
  - In general, NGTs are typically made of silastic and polyethylene compounds that are sufficiently flexible to avoid injury to the patient—the larynx, esophagus, and stomach are vulnerable to tearing during tube insertion. Some tubes include graduated markings at 10 cm/4 inch intervals on the lumen that permit the clinician to measure the length of the tubing being inserted into the patient and monitor the tubing to verify the length has not been altered, which can indicate a change in placement—monitoring the length alone is not sufficient to confirm original placement because the tip of the tube can knot or coil upward. The proximal (gastric) end of most NGTs includes multiple drainage holes (perforations) and a radiopaque line that permits radiographic confirmation of the tube's position
  - Levin tube, the most commonly used NGT, which has a single lumen, is typically 90–110 cm/35–43 inches long, and is available in sizes 12 Fr (small) to 18 Fr (large) for adults. Smaller sizes are available for pediatric patients (for more information, see *Nursing Practice & Skill: Nasogastric Tube: Insertion and Placement Verification in the Pediatric Patient*). Caution must be observed when suction is applied to this tube because the negative air pressure can create a vacuum (if the proximal tip of the tube rests against tissue) and injure the stomach lining through trauma or erosion—intermittent suction < 40 mm Hg is commonly ordered
  - Salem-sump, also called the gastric sump or ventral tube, is the second most commonly used NGT. It has two lumens: the smaller lumen, which is left open to the atmosphere for ventilation (usually blue in color), and the sump or larger lumen, which is used for suction or instillation of oral agents. The two-lumen design permits continuous suction because the smaller lumen vents the tube to atmospheric pressure, which reduces the risk that a vacuum will form within the stomach and cause the tube to adhere to the gastric mucosa (invagination). Although the Salem-sump NGT permits continuous suction, many clinicians prefer to use intermittent suction at levels ≤ 120 mm Hg. The recommended maximum suction for continuous vacuum is 30–40 mm Hg with slight increases until flow is observed

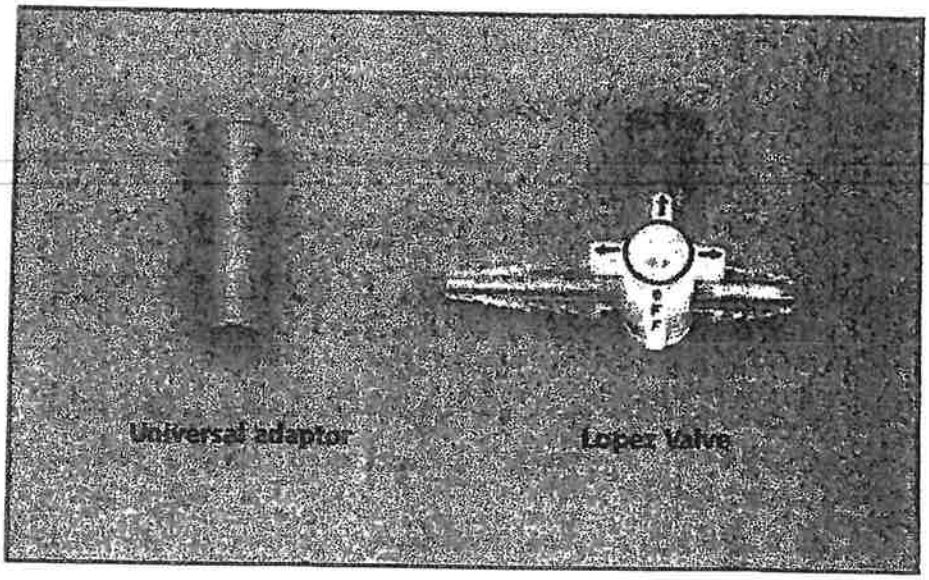

Figure 4: Lopez valve with universal adaptor

- Typically, the Salem-sump is packaged with an anti-reflux valve that should be seated firmly in the vent lumen—the blue end of the valve is inserted into the blue port. This valve prevents excess fluid from being ejected through the vent lumen
- The Salem-sump usually contains a 5-in-1 adaptor that should be fitted into the instillation/suction lumen and the suction tubing. Many facilities utilize a stopcock-type valve (e.g., Lopez valve) instead of the 5-in-1 adaptor (for more information, see discussion below)
- The Salem-sump is most commonly used for evacuation due to its larger caliber and relative stiffness

- Adaptors are commonly used when NGTs are used for multiple purposes in order to avoid the need to disconnect the distal end of the NGT
  - The Lopez valve is a 3-way stop-cock device that permits access to the enteral system (for delivery of oral agents and for suction) without disconnecting the instillation/suction lumen. Some Lopez valves include a cap that is tethered to the device (Figure 4)
  - Other types of adaptors that can be inserted into the instillation/suction lumen include "Y"-adaptors with several flexible ports that can be clamped when not in use (e.g., Viasys Y-adaptor, Kangaroo Y-site adaptor, GiENTRI port with selector knobs that permit suction, irrigating, and medicating through a single closed port)
- Use of vasoconstrictive agents and topical anesthetic agents
  - Vasoconstrictive sprays (e.g., phenylephrine hydrochloride 1%, oxymetazoline) are commonly used to reduce the size of the nasal mucosa, especially the inferior turbinate and nasal septum, prior to insertion. Temporarily shrinking the superficial blood vessels in these areas increases the size of the nasal passageway and reduces the risk of epistaxis
  - Anesthetizing medication (e.g., benzocaine or tetracaine/benzocaine/butyl spray, 2% viscous lidocaine either applied to the tube itself or ~ 10 mL via syringe into the more patent nostril and asking the patient to sniff and swallow) is used to decrease patient discomfort during NGT insertion
    - Lidocaine 4% nebulized through a face mask ($\leq$ 4 mg/kg, not to exceed 200 mg per dose in adults)
    - Be aware that airway protection (e.g., gag reflex, cough) can be compromised by excess topical anesthesia
    - See *Red Flags*, below, regarding information about the risk of methemoglobinemia (i.e., blood disorder characterized by production of an abnormally high level of methemoglobin, a form of oxidized hemoglobin that is unable to bind with and transport oxygen) when using benzocaine topical sprays

- Prior to placing an NGT, the patient should be assessed to determine if he or she meets the criteria for NGT placement
  - Check for absence of nasal injuries or anatomy-related conditions that impair insertion of the NGT, such as patients
    - with a severely deviated septum—orogastric insertion may be necessary
    - who have sustained maxillofacial trauma that may have fractured the cribriform plate
    - at risk for elevated intracranial pressure—the insertion of an NGT can exacerbate the condition
    - esophageal pathology (e.g., recent ingestion of caustic substance, strictures, varices)
  - If the NGT will be used for feeding, the patient should have
    - an intact gag response—an intact gag response is critical because a diminished cough or gag reflex increases the risk of tracheobronchial aspiration
    - no esophageal reflux
    - normal gastric emptying
    - a functional stomach uninvolved in primary disease

Complications associated with use of an NGT range from minor (e.g., nasal irritation, epistaxis, sinusitis) to more severe, which include

- placement related issues:

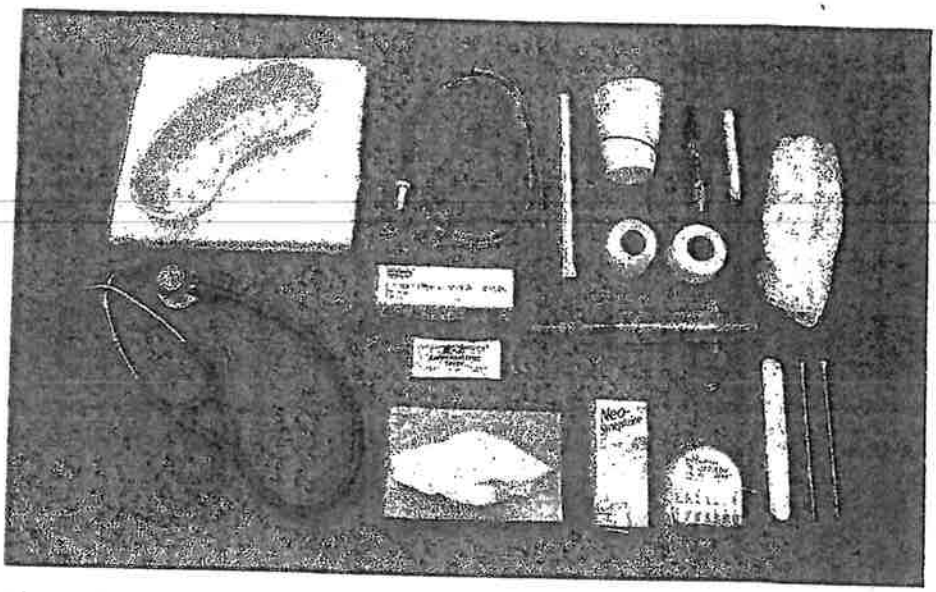

Figure 5: Supplies required for inserting a nasogastric tube

  - Inadvertent placement in the trachea leading to pleural injury, pneumothorax, or tracheobronchial aspiration, pneumonia, and death if fluids or other agents are infused—although some coughing and brief choking are normal responses for some patients when an NGT is inserted (especially if they have a sensitive gag reflex), these symptoms in addition to the inability to speak or breathe are indicative of airway placement
  - Esophageal perforation—evidenced by neck and chest pain, dysphagia, dyspnea, subcutaneous emphysema, hematemesis (i.e., bloody vomiting)
  - Inadvertent intracranial placement through a fractured cribriform plate—NGT placement in patients with maxillofacial injuries should not be done blindly, direct visualization using fluoroscopy should be employed
  - Knotting of the NGT around an endotracheal tube, the proximal tip curving upward through the esophagus
- trauma to the nares or larynx, esophagus, and/or stomach during insertion
- trauma to or erosion of gastric mucosa, which is more common if gastric suctioning is prolonged

- Patients who have an NGT tend to breathe through their mouths, which makes oral care and nasal hygiene more important than usual, with focus on keeping the oral mucous membranes moist to prevent infection (e.g., parotitis). Provide lubricant for lips and the external nares. Check to confirm the NGT is not pressing against tissue that could lead to skin breakdown
- Preliminary steps to be taken before caring for a patient with a NGT include the following:
  - Review the facility/unit specific protocol for caring for inserting and verifying placement of an NGT, if one is available
  - Review the treating clinician's orders regarding the NGT
    - Note the type and size of the NGT to be inserted and the purpose for which it has been ordered (e.g., suction; administration of nutrition, medication, or other agents)
  - Familiarize yourself with the manufacturer's instructions for the type of NGT to be inserted
  - Verify completion of facility informed consent documents, if appropriate. Typically, the general consent for treatment that is executed by patients at the outset of admission to a healthcare facility includes standard provisions that encompass insertion and use of an NGT
  - Review the patient's medical record for
    - history of any related surgery or injury to the nose, nasal cavity, pharynx, esophagus, stomach, or head
    - any allergies (e.g., to latex, medications, or other substances); use alternative materials if appropriate
    - laboratory test results to check for coagulopathies or blood dyscrasias (e.g., CBC, PTT if the patient is receiving heparin, or PT if the patient is using warfarin)
      - Advise the treating clinician if the laboratory test results indicate the patient is at increased risk for bleeding
- Gather the supplies necessary for inserting the NGT, which typically include (Figure 5):
  - Nonsterile gloves. Other personal protective equipment (PPE; e.g., eye protection, gown, and mask) may be necessary if exposure to body fluids is anticipated. Consider that the patient may gag or vomit during the procedure
  - Stethoscope
  - Prescribed medication (e.g., vasoconstrictive spray, topical anesthetic)
  - NGT of the appropriate type and diameter
  - Water-soluble lubricant. Note: Some NGTs are manufactured with water-activated lubricant; however, many clinicians prefer to use additional lubricant to ease passage of the tube through the nare. Although most NGTs are manufactured of medical-grade polyurethane instead of a latex-based material, be alert to the contraindication of using petroleum-based lubricant with latex products—petroleum-based gel can cause deterioration in latex material
  - Tongue blade
  - 60 mL syringe (e.g., catheter tip or bulb) or irrigation set

- Hypoallergenic tape 2.5 cm/1 inch wide (e.g., paper [Micropore], silk [Durapore], or breathable elastic [Transpore]). Cut two strips of tape: one strip ~ 7.5–10 cm/3–4 inches and the second strip ~ 3.5 cm/1-1/2 inches. Cut the longer strip by tearing it vertically for one-half the length of the tape (splitting one end in half ~ 3.5 cm/1-1/2 inches). The split tape will be placed over the bridge of the patient's nose and the ends ("tails") wrapped around the NGT in opposite directions (for more details and illustrations, see Figure 11 below)
- Benzoin or other skin preparation, optional
- Emesis basin
- Facial tissues or cotton-tipped swabs (for clearing the nares)
- Cup of water with straw or cup with ice chips and spoon, optional depending on patient's dietary status and level of consciousness
- Protective barrier for the patient, such as a towel or waterproof linen-saver pad
- pH paper
- Pen with permanent ink to mark the length of the NGT to be inserted—a strip of tape can also be used for this purpose
- Safety pin and rubber band, optional

How to Insert and Verify Placement of a Nasogastric Tube in an Adult Patient

- Perform hand hygiene and don nonsterile gloves
- Identify the patient according to facility protocol
- Establish privacy by closing the door to the patient's room and/or drawing the curtain surrounding the patient's bed
- Introduce yourself to the patient; explain your clinical role; assess the coping ability of the patient and for knowledge deficits and anxiety regarding insertion of the NGT
  - Determine if the patient requires special considerations regarding communication (e.g., due to illiteracy, language barriers, or deafness); make arrangements to meet these needs if they are present
    - Use professional certified medical interpreters, either in person or via phone, when language barriers exist
  - Explain the procedure and its purpose; answer any questions and provide emotional support as needed
    - Advise the patient that he or she may feel some discomfort as the tube moves through the nose, but that the tube will be lubricated to ease its passage. In addition, topical anesthetic and nasal vasoconstriction will be administered (if ordered)
    - Explain that he or she will be given a cup of water to sip or ice chips to swallow once the tube reaches the pharynx. The swallowing action will facilitate passage of the tube and minimize the natural tendency to gag
    - Ask the patient to identify a signal he or she will use to communicate with you if it is necessary to stop briefly during the insertion
- Observe standard precautions throughout the procedure
- Assess the patient to determine if the patient meets the criteria for NGT placement (see *What You Need to Know Before Inserting or Verifying Placement of a Nasogastric Tube*, above). Also assess
  - for mental status (Will the patient be able to cooperate with the tube placement?)
  - the patient's nares
    - Use a penlight to inspect for anatomical abnormalities
    - Ask the patient to breathe through his or her nose and occlude one nostril at a time to determine patency
    - Clinical Tip: In most patients, one nare is usually larger than the other—select the larger nare to ease insertion. Examine each nare in order to determine the most patent opening and check for lesions or obstruction, examine each nare and ask the patient to occlude each nostril separately and advise which permits greater air flow during respiration
- Check the condition of the NGT for defects (e.g., rough edges); use the catheter to flush water through the lumen to verify it is intact and patent
  - Clinical Tip: The flexibility of the tube can be adjusted by placing it in ice water (if it is too soft) or in warm water (if it is too rigid). This can be particularly useful if the curve of the NGT doesn't track the natural curve of the nasopharyngeal passage
- Because you will use your dominant hand to insert the tube, stand on the patient's right side if you are right-handed or on the patient's left side if you are left-handed
- Obtain the patient's verbal consent prior to beginning the procedure
- Position and drape the patient for privacy and accessibility
  - If possible, the patient should be placed in a high-Fowler's position or, at minimum, the patient's upper body should be elevated at a 45° angle
  - Assist the patient in positioning his or her head in a neutral position, neither tilted forward nor backward
  - Place a towel or waterproof linen-saver across the patient's chest as a protective barrier and place the emesis basin and facial tissues within the patient's reach
- Clear the nares. Ask the patient to gently blow his or her nose. Alternatively, use the cotton-tipped swabs to remove debris
- There are two methods commonly used to measure the length of the NGT to be inserted into the patient
  - Method #1: Use the distance from the nares to the tragus (lower tip) of the earlobe to the xiphoid process (i.e., the pointed cartilage attached to the lower end of the breastbone or sternum) to determine the insertion length: While holding the gastric end of the NGT next to the tip of the patient's nose, extend the tube to the tip of the patient's earlobe. Hold the tube at the earlobe and extend the tube downward to the xiphoid process (Point X). Mark this distance (Point X), plus another inch or two (2.5–5.1 cm), on the tube with a permanent marker or use the smaller strip of precut tape to indicate how far the tube should be inserted (Figures 6, 7)
  - Method #2: Measure 50 cm/19.7inches from the gastric end of the NG tube (Point A). Repeat the steps of Method #1, above. Mark Point A, the distance of the tube to be inserted into the patient, which is the midpoint between Point A and Point X (Figure 8)
  - Note: The length of the tube inserted into the patient should be recorded in the patient's chart in the event the tube becomes dislodged or there is suspicion that the tube has migrated out of the stomach

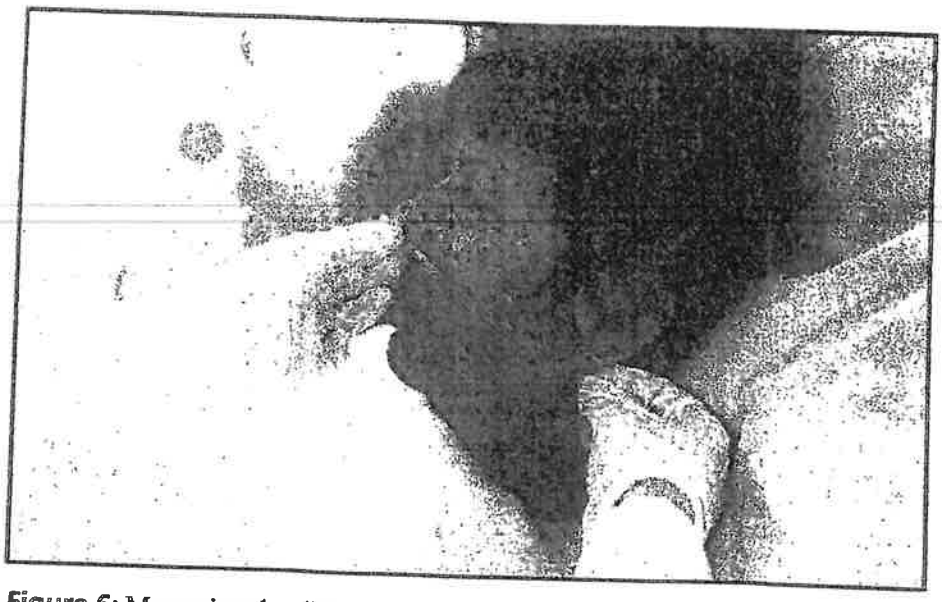

Figure 6: Measuring the distance from the tip of the earlobe (tragus) to the nare

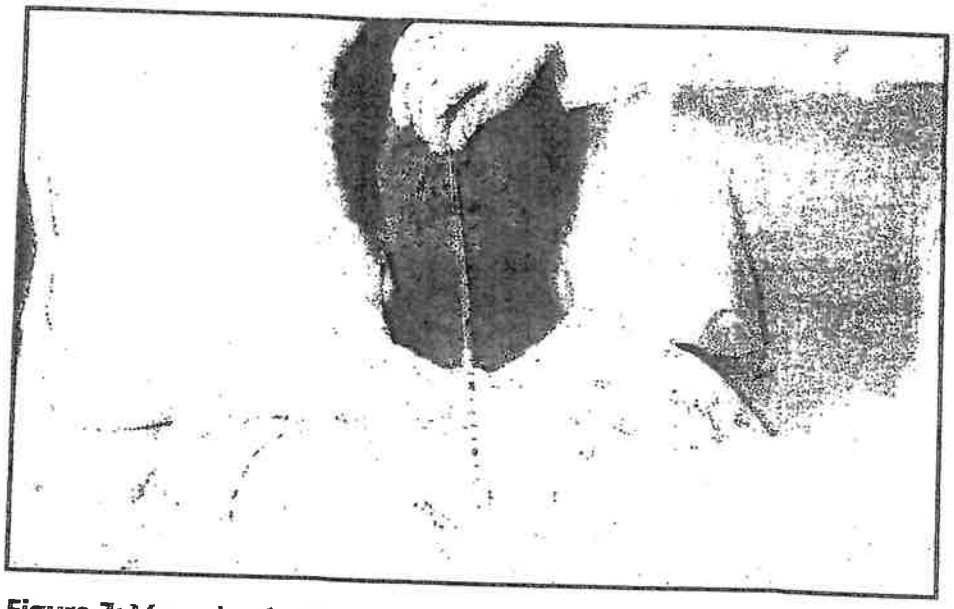

Figure 7: Measuring the distance from the tip of the nose to the xiphoid process

- Administer prescribed medication
  - Vasoconstrictive spray can be administered shortly before insertion
  - Anesthetic agents such as 2% lidocaine jelly via syringe (without a needle) or 4% lidocaine via an atomizer directed into the selected nares should be administered ~ 5–10 minutes prior to the procedure. If benzocaine spray is used, administer it into the oropharynx immediately prior to insertion
    - Although some clinicians apply the viscous lidocaine directly to the NGT, instilling the medication into the more patent nare and asking the patient to sniff (the medication into the back of the nose) and swallow (to coat the oropharyngeal area) will anesthetize the passage more completely
- Place the emesis basin within the patient's reach
- Apply water-soluble lubricant to the last 5–7.5 cm/2–3 inches of the proximal tip of the NGT or, if the tube is coated with lubricant, activate the coating by placing the tip of the tube in water and flushing with 10 mL water (to confirm patent lumen)
- Encourage the patient to hold his or her head upright; you may wish to support the patient's head with your nondominant hand while inserting the NGT
- Hold the NGT so that its curve (most tubes are curved when they are first removed from the packaging) follows the anatomical curve of the nasal cavity and nasopharynx
  - Clinical tip: The fluid/material in a patient's stomach is likely to pour out of the NGT immediately after it reaches the stomach. Many clinicians verify the anti-reflux valve is secured to the vent lumen (if using a Salem-sump) and add a Lopez valve (or other adaptor) or a 60 mL catheter syringe to other lumen prior to inserting the NGT

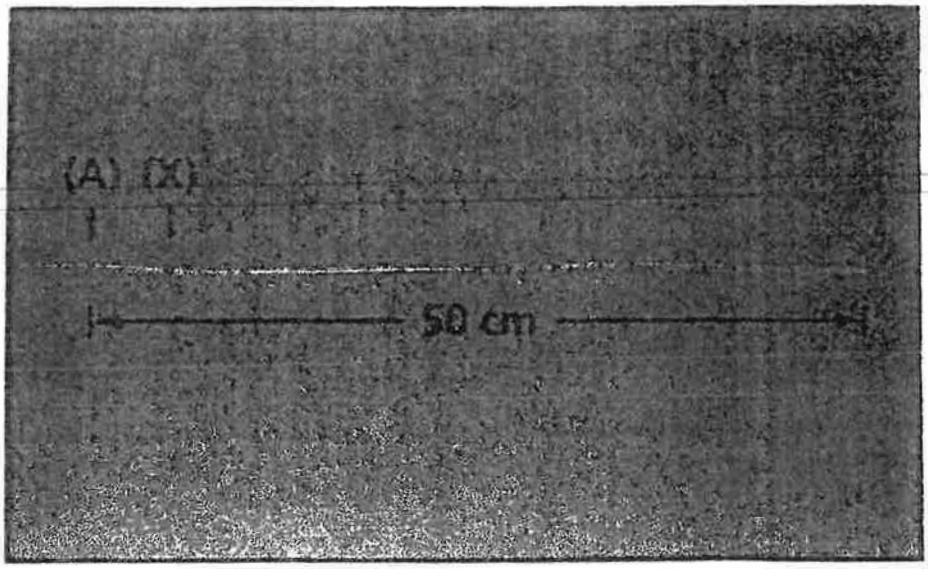

Figure 8: Measuring the length of the nasogastric tube for gastric placement

- Insert the gastric end of the NGT into the selected nostril. To avoid damaging the nasal turbinates (i.e., the spongy bones in the upper portion of the nasal passage), aim downward toward the tip of the ear—remember the passageway from the external nares to the nasopharynx is relatively flat and perpendicular to the patient's head (Figure 9). Many clinicians make the mistake of inserting the NGT upright, by following the angle of the exterior nose instead of maintaining a horizontal angle, parallel to the mouth. Inserting the NGT parallel to the nasal floor avoids damage to the spongy and well-vascularized nasal turbinates positioned above the nasal floor. Slowly guide the tip of the NGT into the nose until the tube appears at the back of the oral cavity (oropharynx)
  - If resistance is felt, it may help to change the direction of the tip of the tube slightly by rotating the tube
- You will feel resistance when the NGT reaches the nasopharynx because the passageway is curved to extend behind the oral cavity—it is common to feel some resistance when the NGT reaches the posterior pharyngeal wall, which is why it is important to insert the tube so that the bend in the tubing tracks the natural curve of the nasopharynx. Ask the patient to flex his or her head toward the chest to open the esophagus. Rotate the NGT to avoid entering the patient's mouth
- If the patient's diet permits and he or she sufficiently alert and oriented, offer the patient sips of water or ice chips. Gently advance the NGT with each patient swallow until the measured mark reaches the nare. If water or ice is contraindicated, ask the patient to swallow as you advance the NGT—feel for the characteristic tug on the tube as the epiglottis closes during swallowing (Figure 10)
  - If the patient appears cyanotic or begins coughing severely during advancement of the tube, pull the NGT back until normal breathing resumes. Severe coughing during tube insertion may indicate inadvertent pulmonary placement. Attempt to advance the tube once the patient begins breathing normally
  - Do not force the NGT to advance it

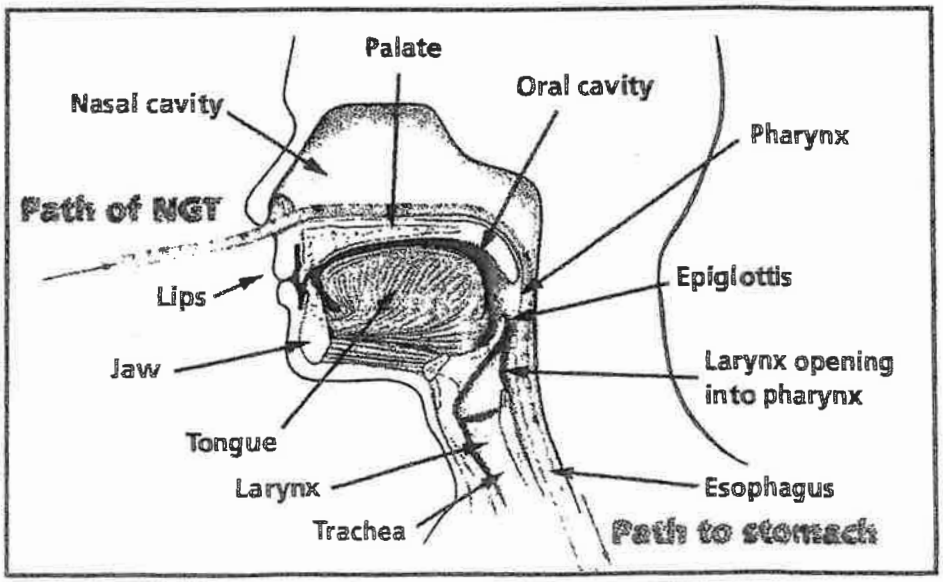

Figure 9: Aim the nasogastric tube downward toward the tip of the ear toward the nasopharynx

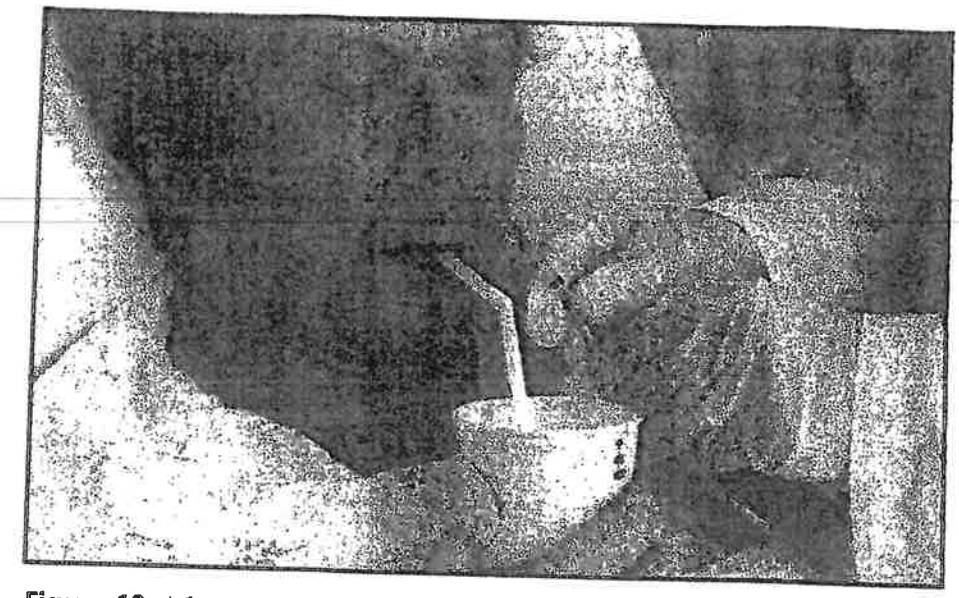

Figure 10: Advance the nasogastric tube with each swallow

- Following insertion, clean excess lubricant from the patient's skin and secure the NGT to the patient's nose. Some facilities use a specific device to secure the NGT to the patient's nose (e.g., nasal bridle [i.e., a device which anchors the NGT by nonadhesive tape that has been looped through one nostril and past the nasal septum before exiting the opposite nostril]); however, tape is most commonly used (Figure 11)
  - Verify the skin is clean and dry. If available, apply Benzoin or other type of skin preparation to stabilize and promote better tape adhesion to the skin
  - Using the strips of tape, place the intact half of the split strip over the bridge of the patient's nose
  - Wrap one of the split ends ("tails") in around the NGT ~ 1.3 cm/0.5 inches inch beyond exit point of the NGT as it exits the nare—wrap the tape so that it does not permit the NGT to press tightly against the nare tissue
  - Wrap the other tail in the opposite direction around the NGT
  - Place the other strip of tape over the bridge of the nose horizontally
    - When securing the NGT, use care to avoid applying undue pressure to facial tissue to reduce the risk of development of pressure ulcers in this area
- Assess the patient by
  - checking the mouth to confirm the NGT has not coiled in the esophagus—use the tongue blade and penlight to check the oropharynx (i.e., back of the mouth)
  - asking him or her to talk to check for normal respiration and to confirm the NGT has not entered the trachea
- Position the NGT so that the distal end is facing upward and attach it to the patient's gown or clothing using a rubber band and safety pin (Figure 12). Place the rubber band over the NGT. Wrap one end of the rubber band behind the NGT and up through the open half of the rubber band—continue to pull the end so that the band is tightened around the tube. Use the safety pin to attach the rubber band and NGT to the patient's gown

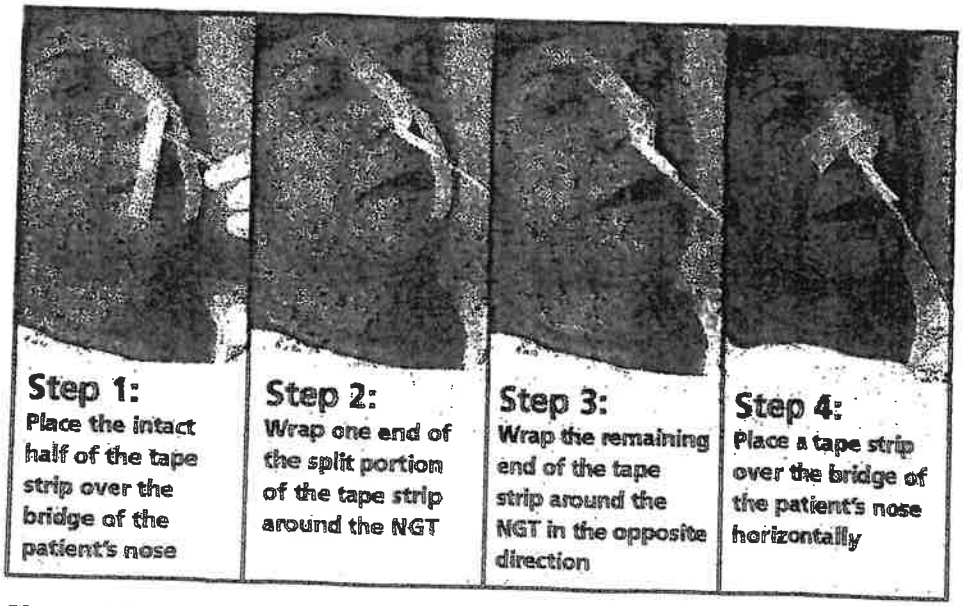

Figure 11: Secure the nasogastric tube to the patient's nose with tape

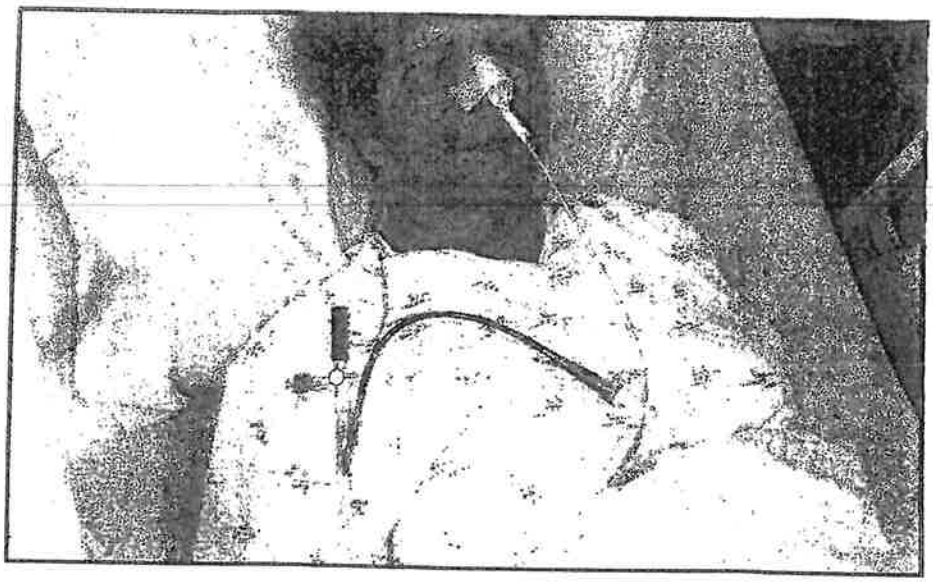

Figure 12: Secure the nasogastric tube to the patient's gown

- Follow facility/unit specific protocol to verify correct placement of the NGT. (Note: the guidelines for confirming NGT placement vary by facility/unit specific protocol). Some commonly used methods include:
  - Radiographic verification: Arrange for a chest/abdomen X-ray to verify correct position of the feeding tube. If a stylet was used for placement, leave it in place until placement is verified. Radiographic confirmation is the most definitive method of establishing placement but only if it shows the full course of the tube and the location of all the ports
    - Due to the expense of routine X-rays and the concerns regarding exposure to radiation, some facilities recommend several bedside methods for ongoing verification (prior to each instance of instilling fluids, medications, nutrition) after the initial radiological confirmation
  - Capnography and colorimetric capnometry are devices that measure the relative concentration of CO_2 in expired air. The devices can be adapted to connect to the ends of the NGTs to detect CO_2 to check for inadvertent airway cannulation. In several trials, both devices have demonstrated high agreement with radiological examination (Burns, n.d.; The Joanna Briggs Institute, 2010):
    - Capnography has been used to effectively distinguish between NGT located in the esophagus, bronchus, and stomach
    - Colorimetric capnometry is an effective method for use in differentiating between gastrointestinal and respiratory tube placement in adult patients
  - Aspiration for visual check and pH analysis: Attach the syringe to the drainage lumen of the NGT and attempt to aspirate stomach contents. Check gastric contents visually—gastric secretions typically appear clear and colorless or pale yellow or green, while small bowel secretions are often brown colored due to bile; a pH ≤ 4.0 is *usually* indicative of gastric acid unless the patient is receiving proton pump inhibitors, H2 receptor antagonists, or acid-reducing medications, or is receiving a continuous enteral feeding infusion. However, the pH of gastric contents can occasionally be elevated and respiratory and small bowel secretions are typically ≥ 6, all of which underscores the importance of radiographic confirmation of placement following blind insertion or whenever dislodgement is suspected
    - Clinical Tip: Reposition the patient to his or her left side to maximize potential for withdrawing gastric secretions into the catheter
    - If unable to aspirate gastric secretions, advance the NGT slightly and re-attempt aspiration
  - AACN recommends that a variety of methods (e.g., capnography, patient assessment for signs of respiratory distress, observe for visual characteristics and pH of gastric aspirate) be used to confirm NGT placement and that radiographic confirmation be obtained for all blindly inserted NGTs prior to initial use (Metheny, 2009)
  - While commonly used, the following two methods are unreliable and should not be used to confirm placement (Metheny, 2009)
    - Water bubbling method (i.e., the end of the NGT is placed in a cup below water level to check if bubbling occurs, which indicates the NGT has been incorrectly placed in the pulmonary system). Use of this method can result in the patient aspirating the water if the NGT rests in the trachea or in a bronchus during inhalation
    - Air auscultation method (i.e., using a stethoscope to auscultate over the abdomen while insufflating a bolus of 20–30 mL of air into the NGT with a syringe. A "swish" should be heard as air passes into the stomach) is the most widely practiced method. The reliability of this method is questionable because the auscultatory method cannot distinguish between NGT placement in the esophagus, stomach, or duodenum. Investigators in a 2006 study reported that practitioners were correct 34.4% of the time (odds comparable to chance alone) when the auscultation method was used to predict successful placement (Wilkes-Holmes, 2006)
- Once correct placement is confirmed according to facility/unit specific protocol,
  - the exit length of the tube should be documented in the patient's medical record in the event the tube becomes dislodged or there is suspicion that the tube has migrated from the stomach
  - begin using the NGT as ordered
- DO NOT instill any liquids through the NGT or connect it to suction until correct placement has been confirmed
- Dispose of used supplies and perform hand hygiene
- Assess the patient's status and comfort level; reposition as necessary