

What is the Procedure for Feeding Tube Irrigation?

- › Feeding tube (FT) is the general term used for a tube placed in the gastrointestinal (GI) tract for the purpose of delivering enteral nutrition (EN), hydration, or medication
 - *What:* FT irrigation, also known as flushing the FT, is a procedure that clears the internal lumen of residue to maintain or restore patency when the intraluminal pathway becomes occluded by medication or enteral feeding solution. The purpose of this paper is to provide detailed information about performing FT irrigation. For more information about FTs, see the series of *Nursing Practice & Skill* papers about FTs, particularly *Nursing Practice & Skill ... Enteral Feeding: an Overview*
 - *How:* Typically, FT irrigation is a routine procedure that involves flushing a patient's FT with clean or sterile water. In general, the nurse clinician must perform the following tasks when irrigating a FT:
 - Verify placement of the patient's FT, per facility/unit protocol
 - Ensure the patient is properly positioned to reduce the risk of aspiration (i.e., upper body elevated at least 30°, preferably 45°)
 - Irrigate the FT in accordance with facility/unit protocols and the treating clinician's orders
 - Complete ongoing patient assessments to monitor for the desired response to and for any complications of using a FT (e.g., observe for abdominal distention, firmness, and discomfort)
 - *Where:* FTs are irrigated in all environments in which they are used, including inpatient, outpatient, and home care settings
 - *Who:* Nurses, physicians, and other trained clinical professionals are permitted to perform FT irrigation. In the home care setting, patients, family members, and other caregivers can be taught to irrigate FTs

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What is the Desired Outcome of Irrigating a Feeding Tube?

- › The desired outcome of irrigating a FT is maintenance or restoration of intraluminal patency

Why is Irrigating a Feeding Tube Important?

- › Proper use and care of FTs is important to prevent complications that could
 - interrupt enteral access
 - result in injury to the patient
 - result in damage to the FT, requiring the need for replacement

Facts and Figures

- › Estimates of small-bore FT occlusion rates range from 23% to 37% (Han-Geurtset al., 2007)
- › Intraluminal caliber is not the only factor to be considered when assessing the risk of FT occlusion: the acidity of gastric secretions is cited as the reason why FTs inserted in the stomach occlude more frequently than similarly sized FTs placed in the small intestine (Simon et al., 1999)

- › Despite the publication in 2009 of evidence-based guidelines for safe administration of medication through enteral FTs by the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) and A.S.P.E.N. Practice Recommendations, surveys of nurses continue to reveal that nursing practices continue to differ from published recommendations (Bankhead et al., 2009; Boullata, 2009; Institute for Safe Medication Practices [ISMP], 2010). For more information regarding the issues associated with administering medications through FTs, see *Nursing Practice & Skill ... Administration of Medications: Nasogastric Tube* and *Nursing Practice & Skill ... Administration of Medications through Enteral Feeding Tubes*
 - Despite recommendations to the contrary, surveys of nurse clinicians indicate that only
 - 5–43% irrigate FTs before or between medications
 - 32–51% administer drugs separately from each other
 - 44–64% dilute liquid medication
- › Researchers in a nationwide survey of patients with FTs in rural and urban long-term care facilities documented obstruction rates in FTs ranging from 3.9% to 6.4%. They reported the rate of occluded tubes increased significantly when 3 or more inappropriate administration techniques (i.e., techniques that differed from those recommended by A.S.P.E.N.) were used (Seifert et al., 2005)

What You Need to Know Before Irrigating a Feeding Tube

- › Prior to using a FT, the nurse clinician should be familiar with the following:
 - Anatomy of the GI system. The sites most commonly used to place the terminus (proximal tip) of FTs are the stomach, duodenum, jejunum (**Figure 1**), and, following head and neck surgery, the mid-cervical esophagus or pharyngeal area

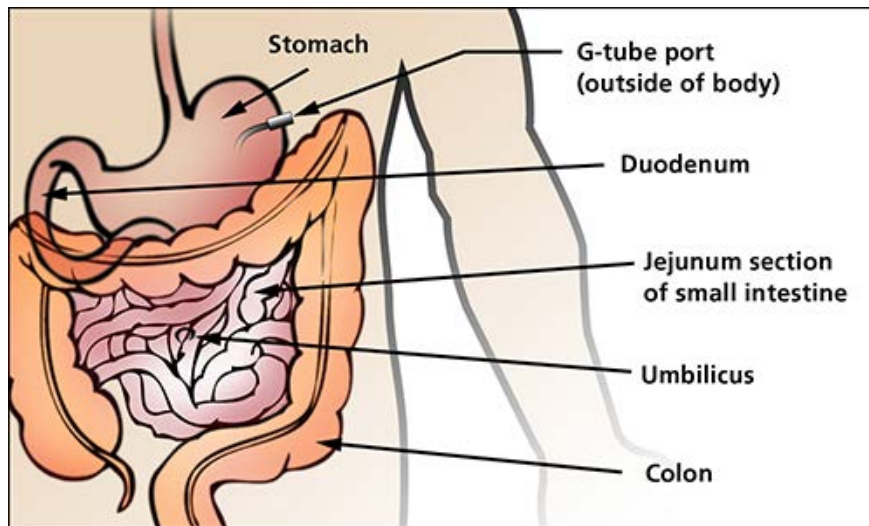


Figure 1: Anatomical image of the gastrointestinal system, highlighting common access sites for placement of enteral feeding tubes. This image is in the public domain

- Physical assessment skills for the abdomen. For detailed information about performing an abdominal assessment, see *Nursing Practice & Skill ... Physical Assessment of the Abdomen in Adults: Performing*
 - 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 should be suspected if the sounds are particularly prominent and are accompanied by patient complaints of cramping abdominal pain
- Familiarity with the type of FT to be irrigated. The size of the internal lumen of FTs ranges from the smallest (3.5 French [FR]) to the wide-bore gastric tubes (40 Fr). The most commonly used gastric tube for adults is the 18 Fr Levin nasogastric tube (NGT) (**Figure 2**). One French unit equals 0.33 mm, which means the internal lumen of the 18 Fr Levin NGT is only 5.94 mm/0.23 inches



Figure 2: Levin nasogastric tube. Copyright© 2014, EBSCO Information Services.

–For detailed information about some of the many types of FTs (e.g., Salem-sump nasogastric tube [\[Figure 3\]](#) , orogastric tube [small bore tubes that are commonly used for pediatric patients [\(Figure 4\)](#)], gastric tube [\[Figure 5\]](#) , small-bore FT with weighted proximal tip [Dobhoff tube [\(Figure 6\)](#)], duodenal tube, and jejunal tube [\[Figure 7\]](#)), see the specific *Nursing Practice & Skill* papers about enteral FTs

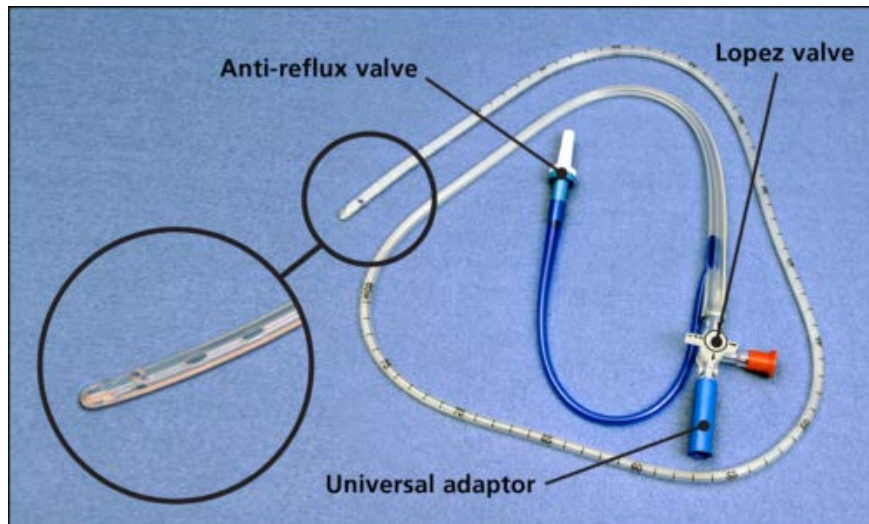


Figure 3: Salem-sump nasogastric tube with antireflux valve attached to the vent lumen and a Lopez adaptor set in the instillation/suction lumen. Copyright© 2014, EBSCO Information Services.

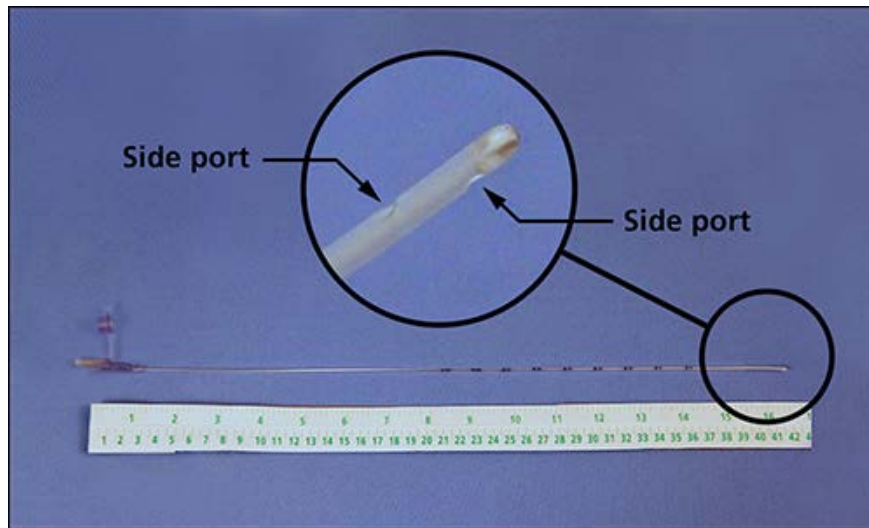


Figure 4: Enteral feeding tube 3.5 Fr. Copyright© 2014, EBSCO Information Services.

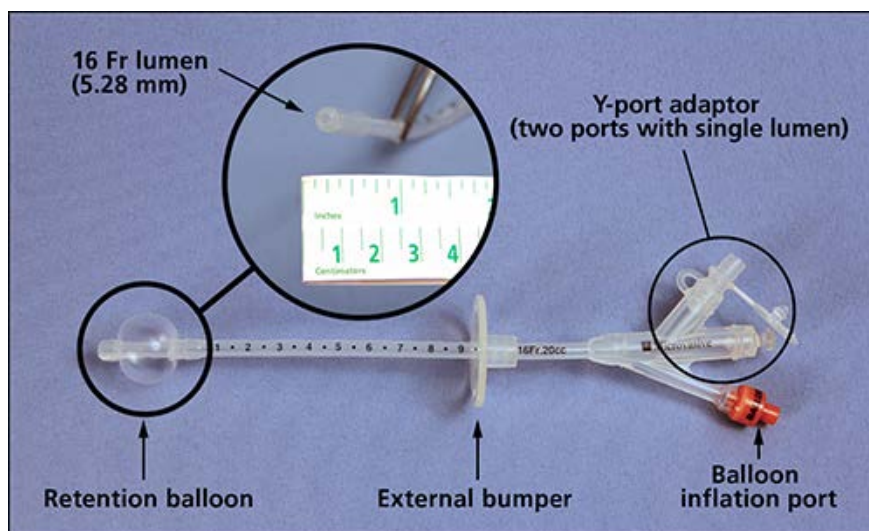


Figure 5: Gastric tube (G tube) is passed through the abdominal wall into the stomach. Copyright© 2014, EBSCO Information Services.

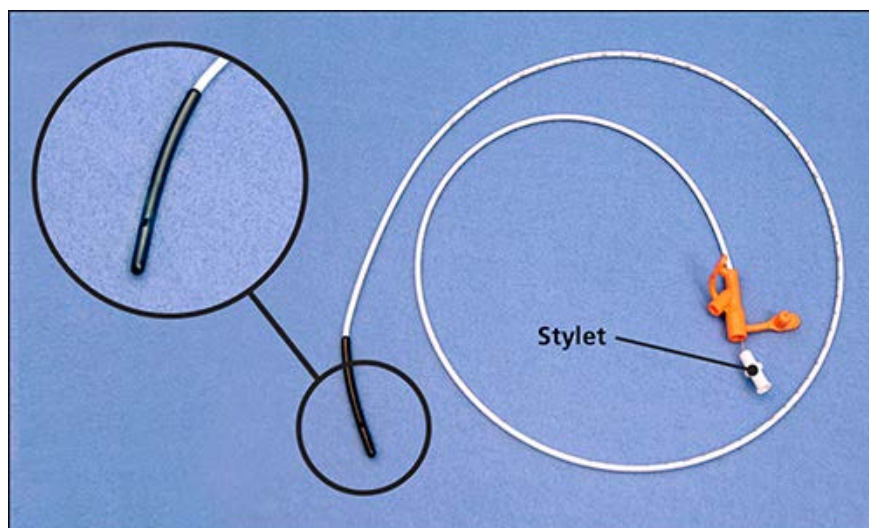


Figure 6: Dobhoff (nasoenteric) feeding tube Fr 8 with stylet. Copyright© 2014, EBSCO Information Services.

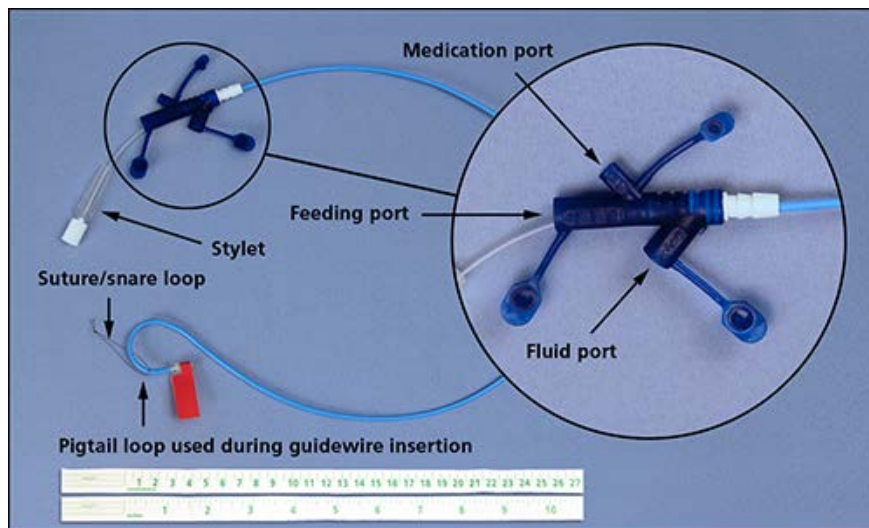


Figure 7: Jejunostomy tube (J tube) is passed through the abdominal wall directly into the jejunum. Copyright© 2014, EBSCO Information Services.

- The importance of verifying placement of the proximal tip of the FT prior to instilling fluid. FT dislodgement from its intended location within the GI tract can result in patient discomfort (e.g., nausea, abdominal distention), injury (e.g., aspiration, bronchopulmonary perforation) and death
 - A.S.P.E.N. guidelines advise that the position of the proximal tip of an enteral FT be confirmed by radiograph immediately following insertion and prior to initial use. Placement should also be confirmed prior to instillation of fluids, periodically in accordance with facility/unit protocol, and as indicated by physical assessment. Although radiographic examination showing the full course of the FT and location of all ports is the most definitive method for placement verification, it is impractical due to the time and effort required for repeated X-rays, dangerous (due to the risk for overexposure to radiation), and too costly for use each time a FT is accessed. The American Association of Critical-Care Nurses (AACN) recommends that radiographic confirmation be used for initial tube placement and that a variety of methods (e.g., patient assessment for signs of abdominal distention, capnography, colorimetric capnometry, and observation of visual characteristics and pH of gastric/intestinal aspirate) be used to confirm placement following initial X-ray confirmation (Bourgault et al., 2009). For more information about alternative methods for confirming the placement of the proximal tip of a FT, see *Nursing Practice & Skill ... Enteral Feeding Tubes: an Overview*, referenced above, and *Nursing Practice & Skill ... Feeding Tube Placement: Verifying*
- Recommendations for irrigating enteral FTs. Flushing the FT before and after administering medications and intermittent feedings and periodically during continuous feeding to reduce the buildup of residue is crucial to maintaining patency
 - A.S.P.E.N. practice recommendations for FT irrigation are as follows (Bankhead et al., 2009):
 - For the adult patient, flush the FT with 30 mL
 - every 4 hours during continuous feeding
 - before and after intermittent feeding
 - before and after administration of each medication
 - after residual volume measurements
 - For pediatric patients,
 - routine irrigation is not recommended except for nasojejunal tubes
 - flush volumes for nasogastric tubes in patients older than 1 month of age should be restricted to 3–5 mL or the lowest volume necessary to clear the FT
 - For neonatal patients,
 - flush volumes for nasogastric tubes should be restricted to 1–3 mL or the lowest volume necessary to clear the FT
 - Sterile, purified water (i.e., sterile, solute-free, nonpyrogenic water free of chemical or microbial contaminants), or tap water can be used for hydration and for FT irrigation in the majority of adult and pediatric patients; however, sterile water should be used for all enteral purposes for infants, immunocompromised patients, and critically ill patients, particularly when the safety of tap water cannot be confirmed. Sterile water should be used to reconstitute powdered formulas and as diluent for medications

- Sterile water (volume unspecified) is recommended as a flush solution before and after medication administration in adult, neonatal, and pediatric patients (for more information, see *Nursing Practice & Skill ... Administration of Medications through Enteral Feeding Tubes*, referenced above)
- Alternative irrigant solutions
 - Normal saline (NS; i.e., 0.9% sodium chloride in sterile water) can be used as a diluent or flush solution in place of water if approved by the treating clinician and in accordance with facility/unit protocol
 - Do not use
 - distilled (i.e., vaporized and recondensed) water for reconstitution of powdered formulas or as a diluent for medication because distilled water often contains dissolved or suspended matter
 - cranberry juice or carbonated beverages for irrigation, unless approved by the treating clinician and in accordance with facility/unit protocol
- Typically, an oral/enteral syringe ≥ 30 mL in size should be used to flush enteral FTs in adult patients to prevent increased pressure, which could rupture the FT. Smaller volume syringes (e.g., 3–5 mL) are used for the smaller caliber FTs typically used for neonatal and pediatric patients
- Special nursing considerations associated with irrigating FTs
 - Patient positioning. Patients who are receiving fluids through an enteral FT should remain in a semi-Fowler's position (i.e., with the upper body elevated to a minimum of 30° , preferably 45°), unless medically contraindicated, in order to reduce the risk of aspiration of enteral contents. A reverse Trendelenburg position can be used for patients who cannot tolerate back elevation or hip flexion. Other recognized contraindications to a semirecumbent position are an unstable spine, prone positioning, and hemodynamic instability. Positioning devices (e.g., specialized pillows) can be used to support upper body elevation for infants and children, who shift out of position easily; close monitoring is required to maintain the infant/child in a safe position during instillation of fluid through FTs
 - Infection control
 - Although the act of accessing a FT is generally considered to be a clean, not aseptic, procedure because some of the supplies and equipment (e.g., FT, reconstituted formula) cannot be considered sterile, certain steps (e.g., changing administration sets, irrigating the FT) require general aseptic non-touch technique (ANTT; i.e., ensuring that sterile items do not make contact with nonsterile items prior to insertion into the patient) to minimize exposure of the FT to microorganisms (Ukleja et al., 2010)
 - Irrigation trays (i.e., supply sets that typically consist of a 500 mL graduated container, 1,200 mL tray, and either a 60 mL bulb syringe or 60 mL piston syringe [Figure 8]) should be changed at least every 8 hours (Bankhead et al., 2009)



Figure 8: Irrigation tray with piston syringe and bulb syringe. Copyright© 2014, EBSCO Information Services.

- › Preliminary steps that should be performed prior to irrigating a FT include the following:
 - Review the facility/unit protocol for irrigating a FT, if one is available
 - Review the treating clinician's order for FT irrigation to determine if they differ from published guidelines
 - Review the patient's history/medical record for
 - information about any hepatic, renal (e.g., fluid volume overload/deficit), pulmonary, metabolic (e.g., hyperglycemia), immune, or GI disorders that might impact the type or volume of irrigant to be administered
 - any allergies (e.g., to latex); use alternative materials, as necessary

- baseline weight and I & O records
- the length of the tube extending from the patient (this information should have been noted in the patient’s medical record at the time initial placement of the FT was confirmed)
- information about bowel movements—confirm the patient has had a bowel movement within the previous 3 days
- › Gather the necessary supplies, which typically include the following (Note: It is assumed that the FT is in place and initial placement has been confirmed by X-ray):
 - Nonsterile gloves; additional personal protective equipment (PPE; e.g., eye protection, gown, and mask) may be needed depending on the patient’s condition or if exposure to body fluids is anticipated
 - Stethoscope
 - Protective barrier for the patient, such as a towel or waterproof linen-saver pad
 - Irrigation tray, including piston or bulb syringe and graduated container
 - Facility-approved irrigant (e.g., tap water or sterile water) at room temperature
 - Clamp
 - Clean cap for administration set or sterile gauze

How to Irrigate a Feeding Tube

- › Perform hand hygiene and don nonsterile gloves and other PPE as necessary
- › 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 and family member(s), if present; explain your clinical role; assess the coping ability of the patient and family and for knowledge deficits and anxiety regarding irrigation of the FT
 - Determine if the patient/family requires special considerations regarding communication (e.g., due to illiteracy, language barriers, or deafness); make arrangements to meet these needs if present
 - Use a professional certified medical interpreter, either in person or via phone, when a language barrier exists
 - Explain the procedure and its purpose; answer any questions and provide emotional support as needed
 - Obtain the patient’s verbal consent prior to beginning the procedure
- › Observe standard precautions and use ANTT throughout the procedure
- › Position the patient in bed in a way that promotes privacy, comfort, and accessibility. Unless medically contraindicated, the patient should remain in a semi-Fowler’s position (i.e., with the upper body elevated to a minimum of 30°, preferably 45°) to reduce the risk of aspiration
 - Raise the bed to a height that offers optimal access to the FT
 - Lower the bed’s side rail for greater access
 - Remove the patient’s gown/clothing as necessary to expose the area around the insertion site only (e.g., appropriate for gastric, duodenal, or jejunal tubes that have been inserted transabdominally); drape the patient for privacy so that only the area around the insertion site is exposed
 - Place a towel or waterproof pad over the patient and bedding to absorb any spills
- › Assess the patient’s general health status, including his/her level of pain using a facility-approved pain assessment tool
 - Assess the patient’s abdomen (i.e., use inspection, auscultation, palpation, and percussion), noting whether the abdomen is tender, tense, or distended; absent or abnormal bowel sounds; and any abnormalities that necessitate modification to the irrigation procedure. Abdominal assessment should include the following steps:
 - Auscultation of bowel sounds over the four abdominal quadrants; for the purposes of the physical assessment, the abdomen is divided into the right lower quadrant (RLQ), right upper quadrant (RUQ), left upper quadrant (LUQ), and left lower quadrant (LLQ), with the umbilicus as the midpoint. Auscultating in this order tracks the path of the large intestine from the ascending colon to the transverse colon to the descending colon and sigmoid colon
 - Palpation for tenderness and distention
 - If distention is noted, use percussion to determine if it is due to gas or fluids: fluid collection will cause dull notes to be heard; gas buildup will yield tympanic sounds on percussion
 - Confirmation that the patient has had a bowel movement within the previous 3 days
 - Assess the skin at the nare where the FT exits the body at least once daily
 - Assess for pain/tenderness, drainage, signs or symptoms of infection, edema, and skin irritation/erosion
 - Verify that the tube is securely anchored. Avoid applying undue pressure to facial tissue in order to reduce the risk of skin breakdown and necrosis
- › Confirm the position of the FT prior to instilling any fluids according to facility/unit protocol

- Measure the length of the visible portion of the inserted tube. Compare this measurement with the measurement recorded in the patient's medical record immediately after initial radiographic confirmation of placement. Note any change in length (e.g., advancement into or from the patient), but recognize that because the tube could become coiled internally without changing the external length of the tube, this technique must not be used as the sole indicator of proper tube position
- Assess gastric/intestinal contents
 - Visual inspection—gastric secretions typically appear clear and colorless or pale yellow or green, while small bowel secretions are often brown or yellow due to bile
 - pH analysis
 - Aspirate 5–10 mL of gastric/intestinal contents
 - Gently mix the aspirate in the syringe
 - Apply some of the aspirate to pH strip (or dip the pH strip into a medicine cup containing aspirate, according to the test manufacturer's instructions)
 - Compare the color on the pH strip with the color on the chart provided by the manufacturer
 - The normal pH of gastric secretions ranges from 1.0–4.0 unless the patient is receiving proton pump inhibitors (PPIs) or H₂ receptor antagonists. Enteral feeding formula can elevate the pH of gastric secretions to 5.0–6.0. A pH > 6.0 suggests the tube lies in the esophagus or small bowel. For further information, see *Nursing Practice & Skill ... Feeding Tube Placement Verification*, referenced above
 - If pH evaluation suggests that tube displacement has occurred, notify the treating clinician before administering medication and hold all nutritional feedings until placement is confirmed
 - Return the aspirate to the stomach/small intestine if dictated by facility/unit protocol
- If EN has been infusing continuously, it is necessary to clear the tubing prior to checking gastric/intestinal contents. Draw 30 mL of air into the FT and flush the tube with air prior to aspirating fluid. Avoid excessive insufflation of air

› Irrigate the FT **(Figure 9)**



Figure 9: Insert the catheter-tipped syringe into the feeding tube and flush the tube using smooth, *gentle* pressure. Copyright© 2014, EBSCO Information Services.

- Use a “push-pull” method to flush the FT in order to create an intraluminal turbulence that is designed to remove the buildup of residue from EN formulas and medication
- For the patient whose FT is clamped (no fluids are being instilled),
 - use the syringe to aspirate the appropriate volume of irrigant. (Note: Consider the patient's volume status when determining the volume of irrigant (e.g., the volume of flush solution when administering medications should be less for pediatric doses, using a minimum ratio of 1:1 [medication: diluent]). The minimum volume for non–fluid-restricted patients is 5 mL
 - remove the cap or plug from the distal tip of the FT
 - insert the syringe into the FT and flush the tube using smooth, *gentle* pressure. Do not force the irrigant through the FT. Take care to avoid instilling an excessive volume of air into the tubing, which can cause painful abdominal distention. If additional pressure is needed, elevate the syringe and tubing to increase the flow of the irrigant
 - following instillation of the irrigant, remove the syringe and replace the cap or plug

- For the patient who is receiving an infusion through the FT,
 - use the syringe to aspirate the appropriate volume of irrigant
 - pause the infusion (e.g., clamp the administration set, pause the infusion pump)
 - clamp the FT
 - disconnect the administration set from the FT and cover the proximal end of the administration set tubing with a clean cap or place on sterile gauze
 - attach the syringe with irrigant to the distal end of the FT
 - remove the clamp from the FT
 - use smooth, *gentle* pressure to flush irrigant through the tube. Do not force the irrigant through the FT. Take care to avoid instilling an excessive volume of air into the tubing, which can cause painful abdominal distention. If additional pressure is needed, elevate the syringe and tubing to increase the flow of the irrigant
 - following instillation of the irrigant, reclamp the FT and remove the syringe
 - reattach the administration set to the FT and resume infusion, as appropriate
- › Assess the patient for discomfort and reposition if necessary; remove the towel or waterproof pad
- › Rinse the medicine cup, graduated container, and syringes with tap water; allow to air dry. Replace the irrigation tray in accordance with facility/unit protocol
- › Document the instillation of irrigant as “free water” in the patient’s I & O record, update the patient’s plan of care, and document FT irrigation in the patient’s medical record, including the following information:
 - Date and time of the irrigation
 - Volume and type of irrigant used
 - Information about the patient’s
 - abdominal assessment
 - tolerance of the procedure
 - Any unexpected patient events or outcomes (e.g., ease or difficulty of flushing the irrigant through the FT), interventions performed, and whether the treating clinician was notified
 - Patient/family education, including topics presented, response to education provided/discussed, plan for follow-up education, and details regarding any barriers to communication and/or techniques that promoted successful communication

Other Tests, Treatments, or Procedures That Can Be Necessary Before, During, or After Irrigating a Feeding Tube

- › If the FT becomes occluded, follow facility/unit protocol to remove the obstruction
 - Some clinicians attempt to restore patency by flushing the FT with a moderate volume of warm irrigant and using a “push-pull” technique
 - The efficacy of using a solution of Viokase (i.e., a mixture of pancreatic enzymes) and sodium bicarbonate (combined pH 7.9) to dissolve clotted EN formula in FT were reviewed in the background discussion that accompanies the A.S.P.E.N. practice recommendations. Investigators in one study reported that use of the Viokase solution for 30 minutes each week was effective in preventing FTs from clogging (Bankhead et al., 2009; Lord, 2003)

What to Expect After Irrigating a Feeding Tube

- › The patient’s FT will remain patent

Red Flags

- › When irrigating a FT, avoid use of extreme pressure, which can cause the FT to rupture
- › In order to minimize painful abdominal bloating, avoid excessive insufflation of air through the FT during irrigation procedures

What Do I Need to Tell the Patient/Patient’s Family?

- › Describe the purpose of FT irrigation and what to expect during the procedure
- › Reinforce the need for FT irrigation in order to promote or restore FT patency
- › Before patient is discharged home with an FT, provide written instructions on how to perform FT irrigation
 - Advise patient or family member to call the treating clinician or go to the closest emergency medical facility, if the
 - FT remains clogged after 4–6 attempts to unclog it by instilling warm irrigant and using a push-pull technique with the syringe

–patient develops abdominal pain, abdominal distention, severe nausea, or vomiting

Note

› Recent review of the literature has found no updated research evidence on this topic since previous publication on July 18, 2014

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