WOC Nursing Management: Tubes and Drains

R. B. TURNBULL JR. MD WOC NURSING EDUCATION PROGRAM

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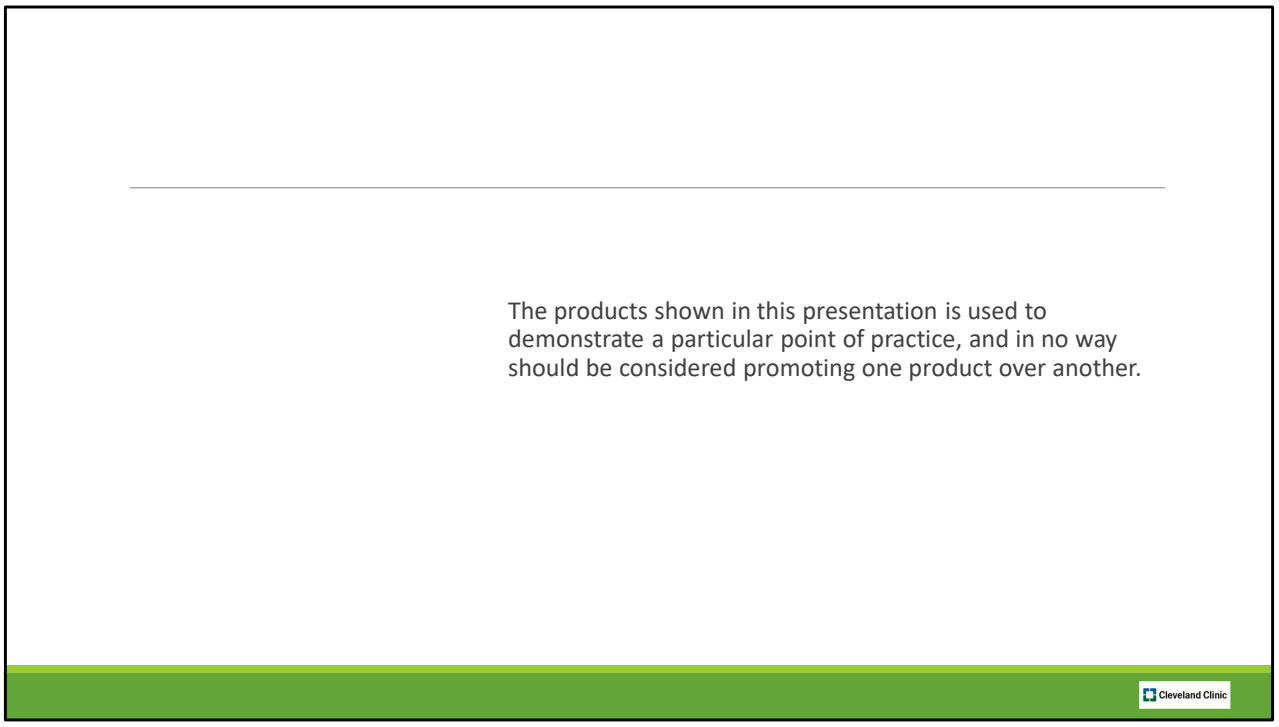

In order to better demonstrate care, a variety of product will be shown in this presentation. This in no way should be considered promoting one product over another. Each clinician should follow organization policies and procedures in the selection of product and how that will apply to the patient populations served.

- Describe tubes and drains according to anatomical location and specific function.
- Apply nursing assessment and management techniques to address the care needs of a patient with percutaneous tubes.

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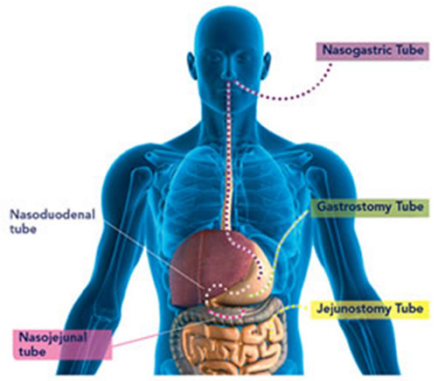
Our learning objectives for this presentation are focused on describing a variety of tube/drain types and affected anatomical locations, and applying nursing assessment and management techniques to the care needs of a patient with a percutaneous tube.

Why Tubes or Drains?

- Promote drainage from wound or body cavity
- Decompression
- Medication administration
- Nutritional support



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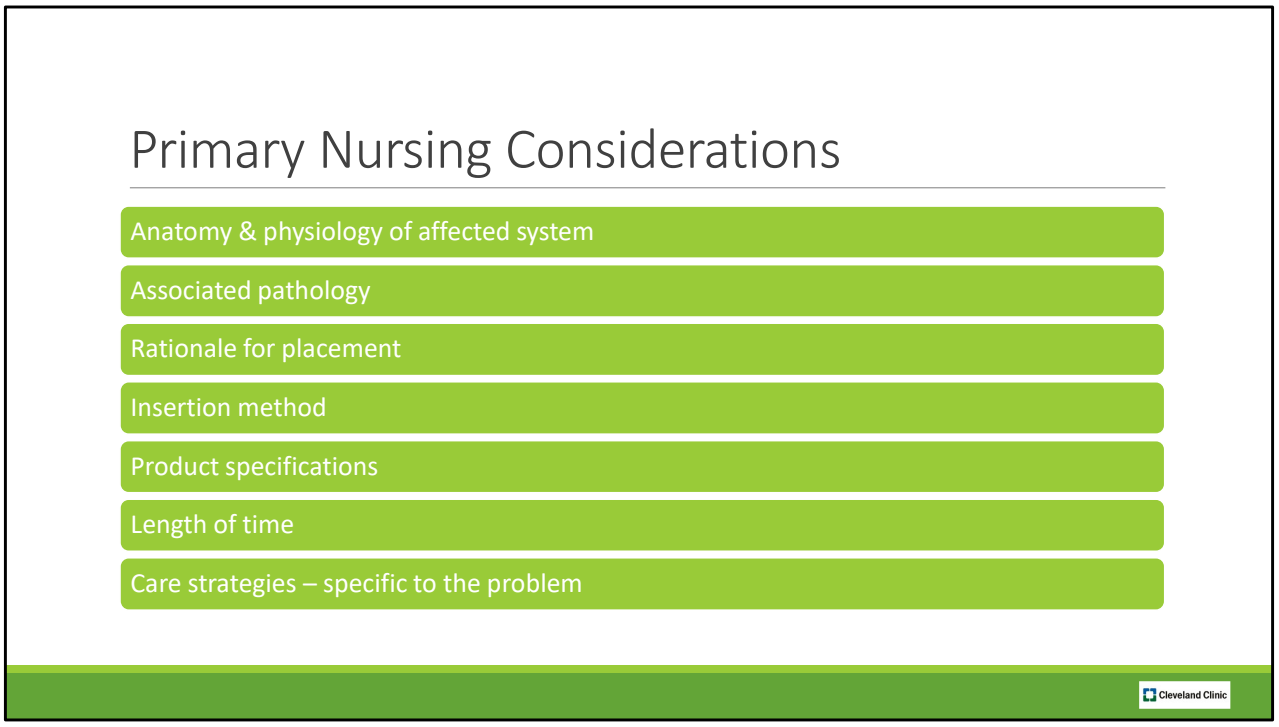
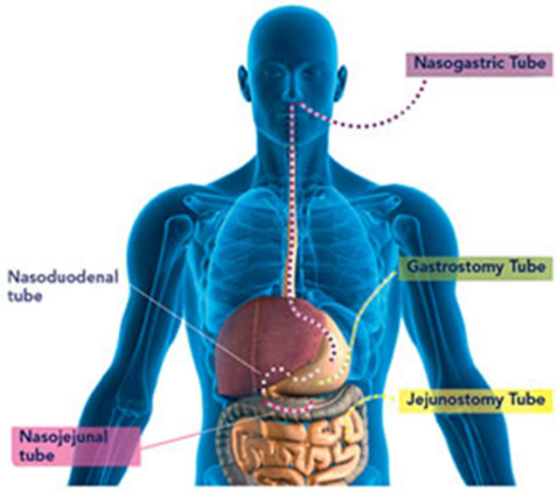
Tubes and drains are used for a variety of disease and post-surgical situations where drainage promotion from a wound or body cavity is needed to prevent a complication, decompression, medication administration, or nutritional support. This can be a temporary or a permanent situation, depending on the nature of a particular patient's needs.



In caring for patients with different tubes and drains. The nurse needs to know the reason for the tube, pt's condition and rationale for the tube/drain.
Knowledge and understanding of the different techniques to place a tube is important when assessing and trouble shooting problems with the tube. There are many types and options of enteral tubes available. Managing complications can be a challenge and the WOC nurse can demonstrate knowledge, experience and skill in providing interventions to address the problems.



Common GI & Urinary Tube Types

- Biliary
- Nephrostomy
- Cystostomy
- Nasogastric
- Gastrostomy
- Jejunostomy

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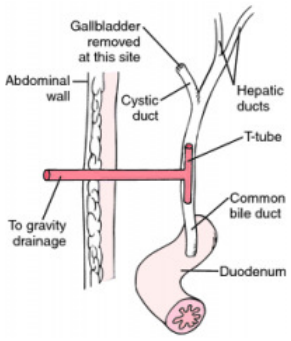
The following tubes will be addressed in the next slides.

Tube Types: Biliary

- Drain bile from hepatobiliary system
- Relieve blockages caused by tumors, strictures, gallstones
- Blocked bile ducts causes bile buildup in liver
  - Jaundice, nausea, vomiting, itching, fever, dark urine, infection

Tube is placed in the liver/bile duct.



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Biliary tubes are needed as an alternative method to drain bile from the hepatobiliary system and relieve blockages caused by tumors, strictures, or gallstones. The blocked bile ducts cause bile buildup in the liver which manifests in patients as jaundice, nausea, vomiting, itching, fever, dark urine, or infection (Fellows, 2022). The thin tube is placed percutaneously via interventional radiology then connected to a small drainage bag. The procedure is AKA percutaneous transhepatic cholangiogram.

Managing Biliary Tubes

- Secure the tube
- Tube flushing (per physician order)
  - B.I.D. 10ml N.S.
- Dressing changes
  - Weekly & as needed
- Patient/caregiver education

Maintain drainage bag to below waist

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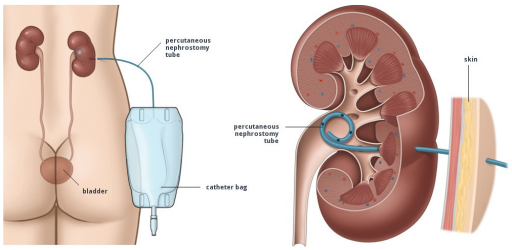
Securing and stabilizing the tube is an important part of care to prevent kinking or dislodgement. Many times flushing the tube is needed, usually twice a day with 10 mls of N.S with MD orders. . It is important to NOT force the saline during this process and notify the physician when unable to instill the saline, pain, or for leaking around the tube. Patients and caregivers should be educated in the management including catheter care, checking for catheter integrity, s/s infection, s/s blockage (e.g. fever, chills, nausea, jaundice). In most instances, dressing changes will be enough to manage the peritube skin, however, if the skin does become irritated, consider an alcohol free liquid skin barrier to protect from the drainage.

Tube Types: Nephrostomy

- Inserted per-cutaneously into renal pelvis of kidney
- Facilitated urine drainage from partial or full obstruction (e.g. tumors, strictures, stones)
- Exits through flank & connected to extension tubing then connected to gravity drainage bag



Percutaneous Nephrostomy Tubes

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Percutaneous nephrostomy tubes are inserted percutaneously into renal pelvis of kidney to facilitated urine drainage from partial or full obstruction (e.g. tumors, strictures, stones). It exits through flank & connected to extension tubing then connected to gravity drainage bag. Nephrostomy tubes are usually changed every 2 to 3 months (Fellows, 2022).

Nursing management considerations include stabilizing the tube to prevent pulling, kinking, or dislodgement, or even leakage around the tube. Preventing skin irritation is also important in cases where urine does leak around the tube. Tube stabilization can be accomplished through a variety of commercial catheter holders, or tape can be used if the appropriate device is not available. Ensure that the angle of tube is taken into consideration when stabilizing.

In some situations tube flushing may be ordered such as absence of urine, persistent flank pain, or the presence of clots, debris, or sediment. General skin care includes dressing changes as needed (based on the facility or physician protocol) , and monitoring for skin complications. The use of an non-alcohol based liquid skin barrier can be used to protect the skin. In some cases, leaking around the tube can lead to fungal infections, necessitating the use of an antifungal powder; cream or ointment

are not recommended (Fellows, 2022).

Placement Techniques

1894 Stamm

- Involves laparotomy incision
- Stomach sutured to abdominal wall to prevent intraperitoneal leak
- Requires anesthesia + one night stay
- Malecot, MIC, Ross tubes generally used

1980's Witzel

- Tunneling of serosa and abdominal wall

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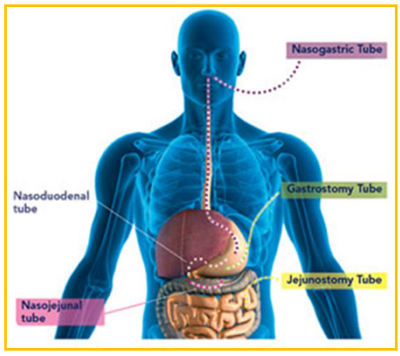
From a historical perspective, tubes and drains have been used for centuries with the first known description in about the 13th century. In 1837, the first documented tube placement occurred as a planned procedure to manage a patient complication. In 1849, documentation appear that demonstrated positive outcomes. In the late 19th century, Dr. Martin Stamm developed a surgical procedure for placing the tube directly into the stomach; a procedure still used today. The standard Stamm gastrostomy involves the use of circumferential purse-string sutures to stabilize the tube within the lumen of the stomach an affix the stomach to the anterior abdominal wall. The Witzel technique developed by Dr. Witzel in which a serosal tunnel and abdominal wall is created to pass the tube through. This is particularly useful in cases where the stomach has been altered so that it cannot be secured to the abdominal wall such as after gastric bypass surgery or resection for esophageal cancer (Fellows, 2022). Variations on these procedures remain today for feeding or decompression

Placement Techniques: Present Day



- Percutaneous tubes
- Endoscopy
- Interventional radiology

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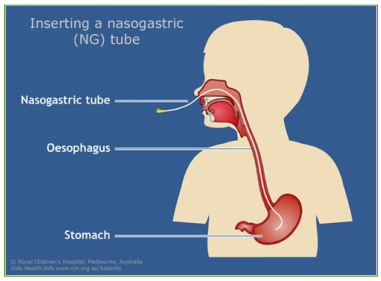
In the 1980's the PEG (percutaneous endoscopic gastrostomy) technique was introduced. Interventional radiology method was later introduced. Interventional radiology technique is considered when endoscopic or surgical procedures are not possible. The percutaneous radiological gastrostomy is the least invasive compared to other techniques. Both these techniques will be explained in other slides.

Tube types: Nasogastric



- Nasogastric decompression: inserted through the mouth or nares
- Check for placement
- Secure tube
- Short term

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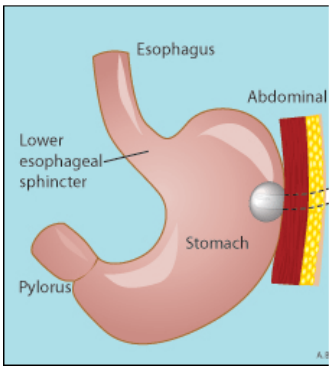
NG, or nasogastric tubes, are the simplest of the tubes to insert into the GI tract and the least invasive. On the other hand, they do carry significant risk for dislodgement and aspiration leading to pneumonia. In cases where longer term feeding or decompression is needed (e.g. more than a few weeks), a percutaneous gastrostomy tube is generally inserted.

Tube Types: Gastrostomy

- Percutaneous tube into stomach
- Placement Techniques
  - PEG (endoscopy)
  - Surgical
  - Interventional radiology



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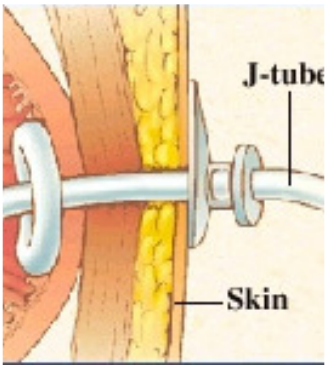
The gastrostomy tube can be placed by three different methods: surgical, endoscopy or radiology. These procedures have previously been described. The procedure of choice for enteral access is determined by the patients underlying medical conditions. Both the endoscopy and radiology methods are considered simple, fast, no anesthesia needed and do not require a hospital stay.

Tube Types: Jejunostomy



- A *jejunostomy* is an alternative to a gastrostomy feeding *tube*
- Can be used with simultaneous gastric compression
- The advantage over a gastrostomy is its low risk of aspiration due to its distal placement
- May require elemental feeding
  - Smaller molecular weight amino acids

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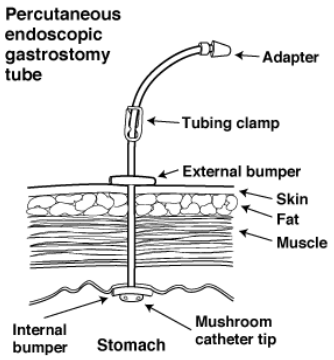
Jejunostomy is inserted when a tube cannot be placed in the stomach . This allows direct feeding into the small bowel. A percutaneous endoscopy is the common method for placement of a jejunostomy tube (PEJ). Radiologic procedure can also be used to place the tube. Jejunal feedings are recommended in cases of aspiration due to gastroesophageal reflux disease, esophageal cancer and refractory vomiting.

Endoscopy (PEG)

- Percutaneous endoscopic gastrostomy
- Doesn't require laparotomy
- Endoscope through mouth to stomach
- Stomach distended with air
- Allows anterior gastric wall to come in contact with abdominal wall
- Stab wound made, tube pulled through mouth then through gastric & abdominal wall



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There are many advantages to the PEG vs. surgical placement. Anesthesia is not required, only sedation. The start of feedings are not delayed and the procedure is performed in a out-pt. setting with no need to be hospitalized . The slide reviews the steps of the procedure.

Radiologic Percutaneous

- NG placed to inflate stomach
- Puncture site identified by fluoroscopy
- Using 19 gauge needle, retention suture brings anterior gastric wall to abdominal wall
- Guide wire taken through needle; tract enlarged over needle to size of tube
- Low-profile balloon-inflated G tube can be placed 6 weeks post-op

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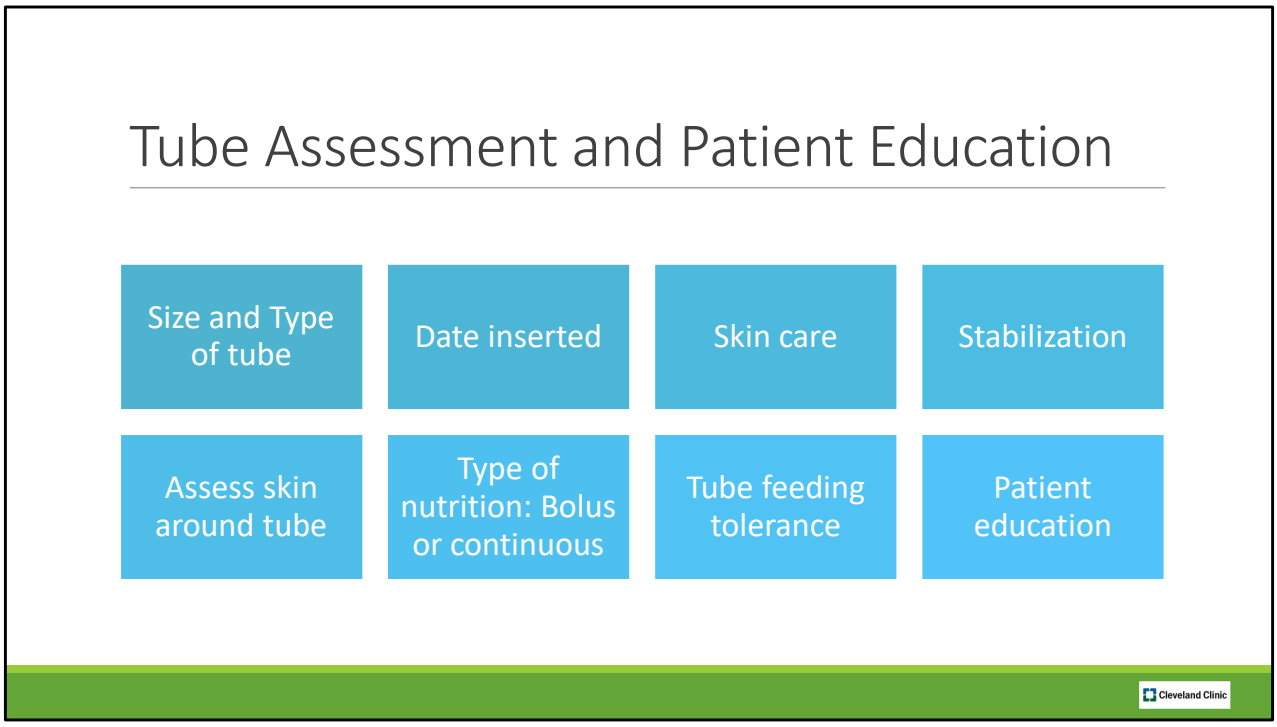
Radiologic placement is considered when a PEG cannot be placed. This slide reviews the steps of the procedure. With radiologic there is no risk upper tract trauma from endoscope (Fellows, 2022).



Assessment of a patient with a enteral feeding tube needs to include: the type of tube, tube stabilization, peritubular skin, type of nutrition, tolerance of feedings, administration of medications . The nurse also needs to document the type and size of the tube, date inserted (or changed) and stabilization method. Patient and caregiver education includes: skin care, administration of feedings & medications, flushing of the tube, daily rotation of tube and weekly checking volume in balloon (not all tubes have a balloon) and what to report to WOC nurse/physician. The patient should be given written instructions and the type & size of tube they have.

Skin Care

- Routine site care daily: clean site with water. Clean under external bumper or disc.
- If crusted, dry drainage use water moisten cotton-tip applicator
- No dressing is required
- Assess peri-tubular skin for complications

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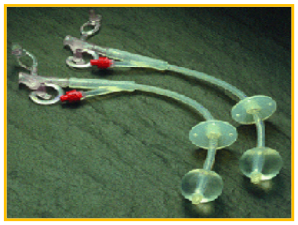
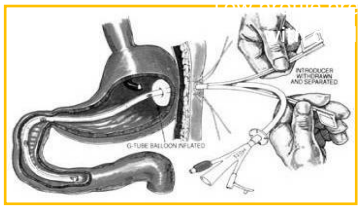
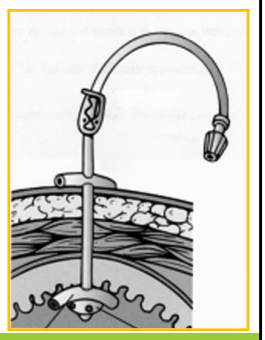
The patient or caregiver needs to be educated on daily skin care around the tube. Daily assessment of the insertion site and peritublar skin is important. Signs of infection: inflammation, pain, drainage should be reported. Gently cleansing with warm water and drying of the peritublar skin needs to be done daily. If any dry, crusted drainage is observed, a water moisten cotton-tip applicator should be gently used. Occlusive dressings are not required. If there is a some drain age, a thin fenestrated foam or gauze dressing could be used.

Types of Enteral Tubes







Mic-key™ Products

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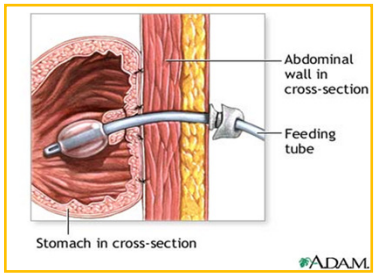
The left hand upper photo shows examples GT. In the center photo is an example of a low profile tube. The Mic-key™ is a type of a low profile tube.
Low profile tubes are commonly used now for adults, who need long term enteral feeding therapy. These tubes were originally developed for the pediatric patients to prevent tubes from being pulled out. The photo in the right lower side of the slide shows a PEG tube with a internal and external bumper (stabilizer) and there is no balloon.

Appropriate Device

- Select according to patient assessment
- Have a spare on hand



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There are many types and companies that provide enteral feeding tubes. Selection of the appropriate tube should be based on the patient's condition and type of placement. The nurse should assess the location, type and size of the tube and balloon. Also the type of the stabilizer. This is noted in the photo in the upper right of the slide, as a external bumper. This photo also points out the location of the tube based on the graduated markings. This should be recorded in the pt's record and education material. It is recommended that a patient should have a spare tube available, in case the tube falls/pulls out or is obstructed.

What about using a urinary catheter?

- Look at the design of the catheter compared to a commercial enteral tube.
- What do you see different?

Sterimed®

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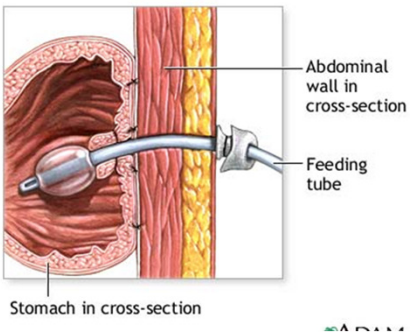
Urinary catheter may sometimes be used if no enteral feeding tube is available. However they should be replaced with the correct tube as soon as possible as they are not designed for use of a gastrostomy tube. Urinary catheters have no stabilizing device, that can result in migration of the tube causing gastric outlet obstruction. There is no port for administering medications or feeding. The material of the catheter and balloon can decay from gastric acid. Silicone-based replacement gastrostomy tubes are preferred. Also the commercial enteral tube has three ports and the catheter has measuring marks to note how far it was inserted. If the tube migrates out should be noted and documented.

Tube Stabilization

- Considerations
- Prevention of skin erosion
- Promote/ facilitate drainage/feeding



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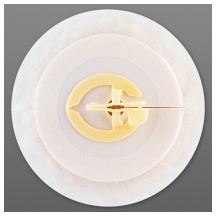
Stabilization is critical to prevent migration, leakage and skin complications. Internal stabilization is achieved by a bumper, balloon , positioned snugly against the anterior wall of the stomach. The external stabilizer (skin level) is achieved with a commercial tube stabilizer. See the next 2 slides that provide various tube stablizers.

Stabilization Options



Hollister, Inc.

Hollister, Inc.

Hollister, Inc.

Baby bottle nipple

ConvaTec* Ostomy Flange

Nu-Hope®
Laboratories

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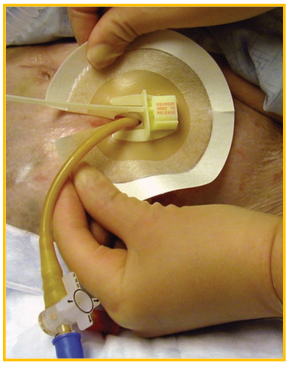
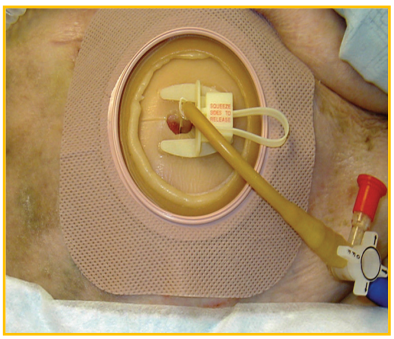
This slide shows several different methods/devices to stabilize a tube. The baby bottle nipple method is an old method but is still used in different settings.

Tube Attachment Device



Hollister, Inc.



Hollister, Inc. with ostomy flange

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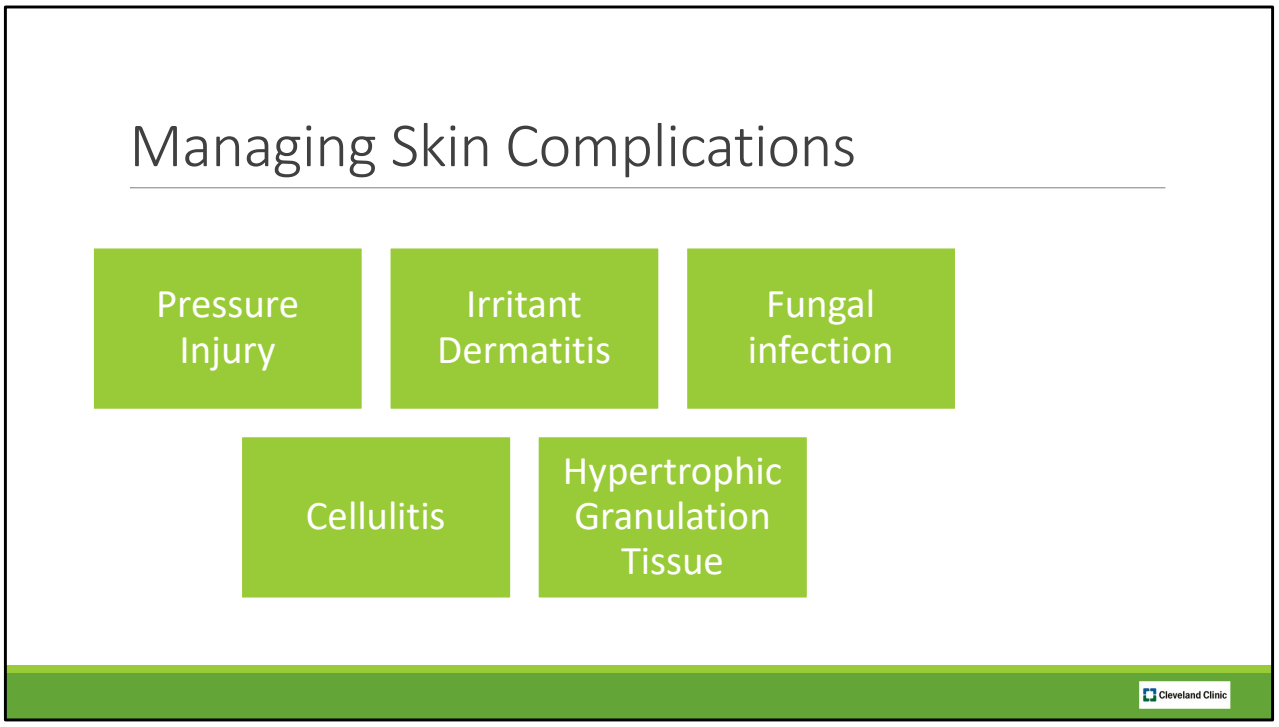
This device by Hollister ™ can accommodate different size tubes/drains. The device stabilizes the tube and also protects the skin as it has a pectin barrier.
The device can stay on 5-7 days (based on the facilities polices) . This should not be used if there is moderate to large amount of drainage



We will be discussing each of these complications in the following slides.

Device Related Pressure Injury

Contributing Factors	Management
Excess tension of bumper against the skin	Reduce tension of bumper on skin
Failure to rotate bumper against the skin following initial insertion	Rotate bumper daily if appropriate
Location of tube in a skin fold	Eliminate bumper & instead stabilize with tube anchoring device?
Weight gain or increased girth	Treat ulcer with skin barrier powder, sheet hydrocolloid, or other absorptive dressing
Sutured bumpers	Could sutures be removed?

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Pressure injury, medical device related injury can be caused by tension of the bumper on the skin, location of the tube in a skin fold, weight gain and sutures bumper(Fellows, 2022). In order to prevent excess tension of the stabilizer, the pt. or caregiver needs adjust the stabilizer. Rotation of the bumper must be done daily. Sutures of a tube used to be a method of tube stabilization . However the commercial enteral tubes do not need this intervention. The nurse should ask to have the sutures removed as they cause pain, inflammation and can lead to a superficial wound.

Irritant Dermatitis

Contributing Factors	Management
Leaking around tube	Check balloon inflation if balloon tip
Tube displacement	Check balloon volume weekly
Improper tube inflation	Tube stabilization
Inadequate tube stabilization	Barrier ointment
Recent weight loss	Non-alcohol skin sealant
Presence of tissue hyperplasia	Light gauze or foam dressing
Delayed gastric motility	Pouching with access device

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A common cause of irritant dermatitis is leakage around the tube. Gastric secretions are caustic to the skin, causing pain and inflammation. Other contributing factors are tube displacement, improper balloon inflation and inadequate stabilization. The skin can be treated with zinc based barrier ointment. If a dressing is needed based on drainage, a thin foam or light gauze can be applied. If leakage is excessive, the tube will need to be pouched, to contain leakage and protect the skin. (This method is discussed later). The balloon volume needs to be checked weekly and correct amount of fluid instilled and the tube repositioned. The external stabilizer should be adjusted by gently pulling the tube up so the bumper or balloon is against the stomach wall. Then slide the stablizer down to rest on the skin without tension (Fellows, 2022). Leakage may also be the result of bolus feedings. If a decision is made to change the tube, the size **should not** be increased.

Tube Migration & Irritant Dermatitis

- Note missing external stabilizing device & increase size of fistula opening.
- Permits tube migration with peristalsis & leakage of gastric contents onto the peritubular skin.

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Note missing external stabilizing device. Permits tube migration with peristalsis and leakage of gastric contents onto the skin causing irritant dermatits.

Fungal Infection

Contributing Factors	Management
Chronic moisture around tube area	Keep skin dry
Deep skin fold around the tube	Moisture barrier creams or non-alcohol liquid skin barrier
Systemic antibiotics	Topical antifungal powder
Immunosuppressant meds.	Systemic treatment if doesn't clear

Cleveland Clinic

Fungal infection can occur at the tube site from chronic moisture and/or the tube is located in a deep skin fold . This can also occur with immunosuppressant medications and systemic antibiotics. The skin can be treated with antifungal powder for 2 weeks until the rash is resolved (Fellows, 2022). The goal is to keep the skin dry!

Cellulitis

Contributing Factors	Management
Invasive procedure	Observe peristomal skin for erythema, induration, purulent drainage
Immunosuppression	Assess pain with palpation
Diabetes	Systemic antibiotic if indicated
Inappropriate/excessive handling of tube	
Chronic steroid use	

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Cellulitis at the tube site can present in the immunosuppression or diabetic. There will be pain on palpation of the skin and induration, erythema and purulent drainage. Systematic antibiotics are recommended along with skin and pain management.

Hypertrophic Granulation Tissue

Assessment	Management
Moist friable tissue at the site where the tube enters abdomen	Ensure tube stabilization
Tissue composed of connective tissue & blood vessels	Consider use of silver nitrate cauterization, steroid cream, antimicrobial foam
Bleeds easily	

Note: matured fistula track with mucosa

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Hypertrophic granulation also know as hyperplasia. Moist friable tissue, that bleeds easily, occurs at the tube site. This may occur form poor stablization of the tube or migration of the tube. Poor fitting low-profile GT can cause tissue overgrowth (Fellows, 2022). This may be painful. There are several treatment options: silver nitrate cautery, topical steroids, antimicrobial foam or surgical removal..

Other Considerations

- Tube patency
- Medication administration
- Leakage

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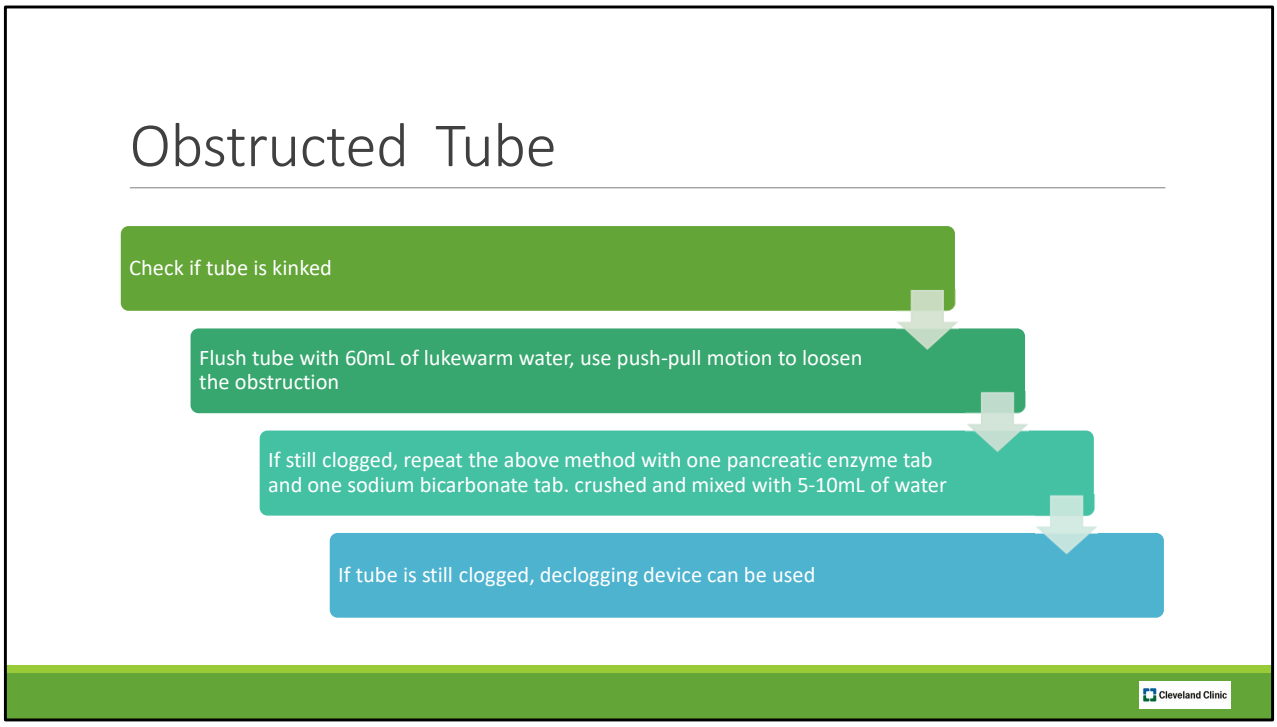
Let’s consider some other factors in tube and drain care



If the tube becomes obstructed, follow the steps on the slide. It is important to first assess the tube to be sure it is not kinked. When attempting to flush with warm water, repeat this several times using the push-pull method. When using the pancreatic enzyme solution, instill the solution and let sit for a while before checking patency. This solution can be made by the hospital pharmacist. There are declogging devices (ClogZapper™) available but should only be used by experience clinicians. **Do not use** soda or cranberry juice as they may cause more obstruction (Fellows, 2022). It is importnat to know your facilities policy/procedure.

Medication administration

.

Hydration & medication management considerations.

- Use only liquid, crushed options
- Don't use time release or enteric coated options

- Water flushes before & after each medication: 15mL
- Water flushes before and after each: 30mL
- Water flush for continuous feedings every 4- 6 hours: 30mL

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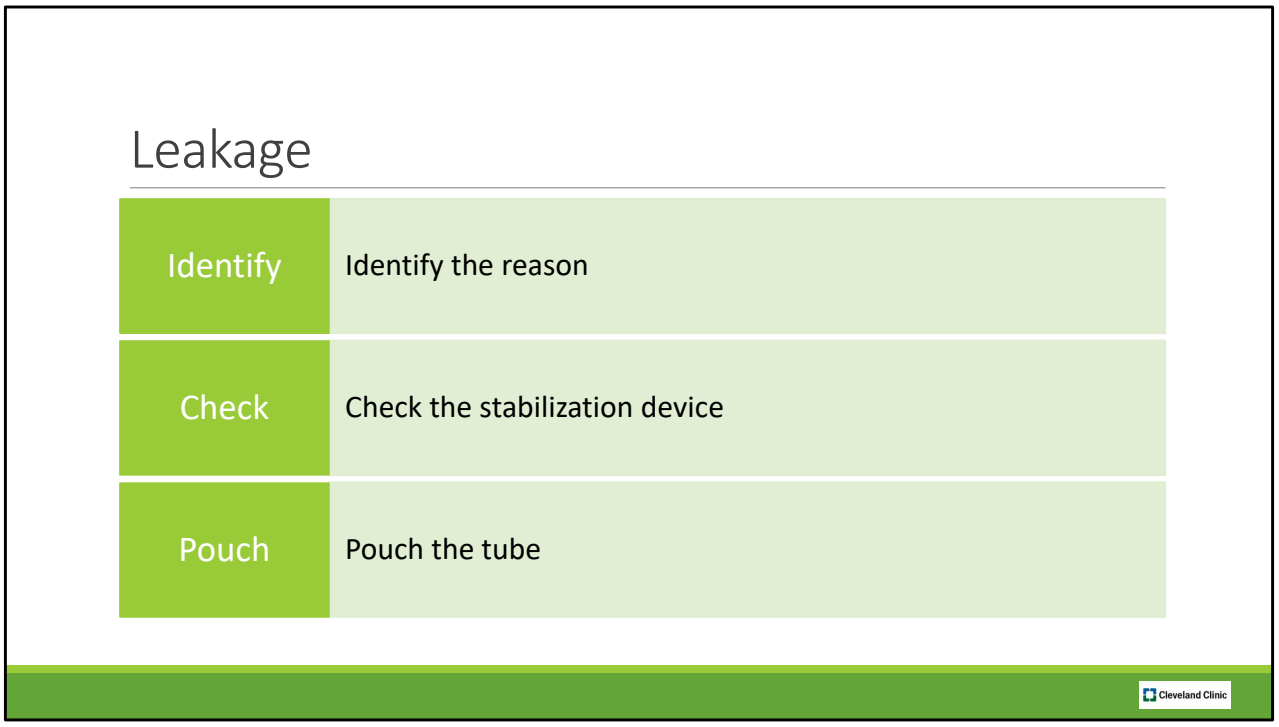
To prevent a clogged tube, the tube needs to be flushed with 30mL of water before and after each bolus feeding and every 4-6 hours with continuous feedings. With medication administration: 15mL water before and after each medication . Each medications must be administered separately and not mixed in the enteral feeding (Fellows, 2022). Use only liquid medications. The pharmacist should be consulted to discuss medications that are not available in liquid form. Enteric coated medication and time release medications should not be crushed/used.



Leakage around a enteral tube needs to be assessed and corrected as continual leakage will cause pain and skin destruction (irritant dermatitis) .
The stabilization device may not be adequate and another method of securing/stablizing the tube is needs. This has been discussed in previous slides.
Pouching of the tube should be considered to contain the drainage and protect the skin. A pouching system is cost effective, contain and measure the drainage as well as skin protection. The following slides discus the procedure and show pouching a tube with a ostomy pouch and catheter port.

Drain/Tube pouching

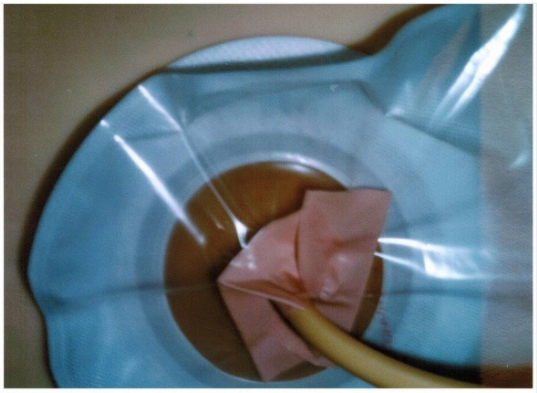
- Pouching can be accomplished using a variety of product options
  - Prior to pouching: determine amount of drainage, frequency of dressing changes and skin complications.
  - Pouch must be appropriate for: site, size, capacity, cost effective, identification of drainage and provide skin protection.

Cleveland Clinic

The next 2 slides show methods to pouch the tube and collect the drainage and protect the skin.

Pouching with Placement through Ostomy Appliance Secured with Tape

- Tube is brought through pouch via a slit cut into the plastic
- Secured by water proof tape
- Through normal wear, this pouch will tear and leak



ConvaTec* One Piece Drainable Ostomy Pouch

A hole is cut into appliance bag to allow drain to fit through and then opening is secured with tape.

Drain placement through ostomy appliance; Wound, Ostomy and Continence Nurses Society, (2013)

Cleveland Clinic

ConvaTec* One Piece Drainable Ostomy Pouch is used in this photo. A urostomy pouch should be used for ease in emptying. If the drainage is thick it may be necessary to open the antireflux valve in the urostomy pouch. A pouch system average wear time can be 4 -7 days.

*See chapter 37, Box 37-1 Procedure for pouch application around the gastrostomy tube in the *WOCN® core curriculum: Wound management (2nd ed., pp. 819-820)* .

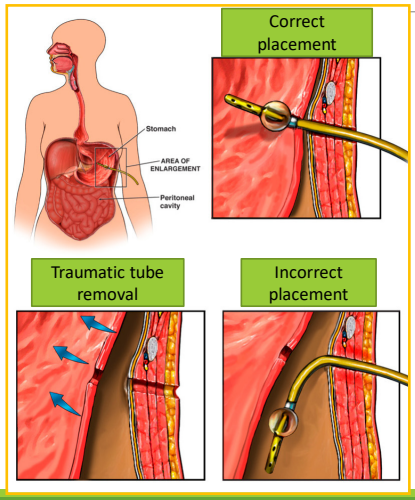
Using the Access Port

NuHope* pouch

Cleveland Clinic

The catheter access port (Hollister, Inc.) is attached to the pouch, the tube can exit the wall of the pouch through the port, which allows for feeding or gravity drainage.

If the Tube Falls out…

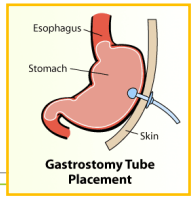


What if the tube falls out or is dislodged?

Consider having a spare on hand

Requires urgency to prevent closure of the tract … can occur w/in hours

Risk for stomach separation from abdominal wall in early post-op period



Gastrostomy Tube Placement

Cleveland Clinic

Enteral tubes can fall out or be pulled out. Pts. and caregivers should be provided information on what to do. The site should be covered with a dry gauze. Notify physician or proceed to the emergency room. If the patient lives a distance from an acute care setting or it is a hardship to transport the pt. , a caregiver should be taught how to replace the tube. A replacement tube should always be kept in the home. If the pt.i s on homecare service, the nurse should be able to replace the tube.

Replacing/Changing the Tube

- Place pt. with HOB elevated 30^0
- Test balloon & bumper on new tube
- Deflate balloon from old tube then gently remove (noting length from skin level to tube tip) Cleanse the site with NS and dry
- Lubricate end of new tube then insert into stoma opening a couple of cm past length of previous tube then inflate new tube balloon
- Pull tube up to resistance against stomach wall
- Slide bumper down to only 2-3 mm space between bumper and skin level
- Affirm placement

Cleveland Clinic

The slide provides the steps to replace or change a GT. The commercial enteral feeding tubes come in a kit with the needed supplies. If replacing the tube, have the pt. hold the feedings until the tube is replaced. When removing the old tube, there will be gastric content that will come out. The facility policy for checking placement of the tube needs to be followed.
The nurse needs to document; the type of tube, size, amount of fluid in the balloon, measurement of the tube exiting the site , placement checked and how the pt. tolerated the procedure .

Pediatric Considerations

- Use of a low profile tube helps reduce the complications
- Use smaller amounts water flushes
- Family education imperative
- Need a replacement tube in the home

Mic-Key™ Low Profile Tube

Cleveland Clinic

Enteral feeding tubes are widely used for children to meet nutritional needs when the GI tract is dysfunctional. Pediatric patients with a enteral feeding tube are not without complications: leakage, peristomal skin irritation, tube dislodgement and hypergranulation tissue. These complications are treated the same as previously been identified. The low profile tube is recommended to prevent the child from pulling or dislodging the tube. When replacing the tube, a measuring device is required to check the size of the tube needed. As a child gains weight and becomes older the size will change. There is a measuring kit available through the company that manufacturers the tubes.

Keys to Successful Management

- Stabilization
- Appropriate device
- Patent device
- Nutrition/Hydration
- Management of complications
- Nursing assessment
- Patient & Caregiver education

Cleveland Clinic

This is a review of these topics that have been discussed.

Summary

- Method to insert tubes
- Types of tubes
- Purpose of the tube/drain
- Routine care of tubes
- Prevention and management of complications
- Replacing a GT
- Pediatric considerations
- Patient education

Cleveland Clinic

References

Fellows, J. & Rice, M. (2022). Nursing management of the patient with percutaneous tubes. In L. L. McNichol, C. R. Ratliff, & S. S. Yates (Eds.), *Wound, Ostomy, and Continence Nurses Society core curriculum: Wound management* (2nd ed., pp. 814-825). Wolters Kluwer.

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