

# Advances, Trends, and Challenges for Tube Feeding in a School Environment

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Suzanne Alfors, MSN, CPNP

Amy Painter MSN, FNP-BC, PNP-AC

Aerodigestive Center



**Children's**<sup>SM</sup>  
Healthcare of Atlanta  
*Dedicated to All Better*

# Objectives

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- Briefly discuss Aerodigestive Center
- Discuss the history and future of tube feeding
- Reasons that children may require tube feeding
- Discuss importance of timing, method of administration, and monitoring for patient being tube fed
- Know the types of permanent enteral access and be familiar with common brands used
- Step-wise approach to troubleshooting a G-tube



# Who are Aerodigestive Patients?

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- Children with disorders involving the upper digestive tract, ear-nose-throat and pulmonary systems
  - Examples include:
    - GERD with lung complications or sleep apnea
    - Aspiration syndromes of liquids or food going into lungs
    - Congenital malformations of heart, trachea, esophagus and larynx
    - Vascular anatomy that constricts the trachea and impedes breathing
- 2+ ADA disabilities (cannot eat, breath, or sleep)
- Most travel from outside the metro Atlanta area (>90 miles away from the hospital)



# Common Diagnoses

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- Obstructive sleep apnea
- Dysphagia/Aspiration
- Asthma
- Chronic cough
- Congenital abnormalities of airway
- Croup
- Tracheoesophageal fistula and/or esophageal atresia
- Eosinophilic esophagitis
- Feeding tube dependent
- Laryngomalacia
- Tracheomalacia
- Recurrent Pneumonia
- Stridor
- Wheezing
- Tracheal Stenosis
- Genetic Syndromes



# Reasons for Tube Feeding

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- Neurological impairment preventing someone from swallowing properly
- Anatomical abnormality where airway is not properly protected from food entering from the esophagus
- Failure to consume enough calories by mouth to support growth and proper nutrition
- Inability to consume enough fluid by mouth to support proper hydration



# History of Formulas

Around 3000  
BC

- first “tube feeds” using reeds and animal bladders in Egypt and Greece Around 3000 BC. The “formula” was a mixture of wine, milk, whey, broth that was fed rectally

18<sup>th</sup>-19<sup>th</sup>  
Century

- Oro-gastric feedings using whale bone covered in eel skin. Fed mixtures of jellies, beaten eggs, sugar, milk and wine.

1960-1970's

- Introduction of commercial standardized formulas

21<sup>st</sup> Century

- Interest in “holistic” approach and returning to natural foods



# Basics of Tube Feeding in Schools

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- Timing of bolus and meal times
- If the child is able to eat by mouth, are we allowing them to eat food BEFORE administering bolus?
- If allowing child to drink formula or water by mouth how long should we allow before putting the rest through a feeding tube?
- What challenges do you face as a school in administering feedings to children?



# WHAT Is In a Complete Formula?

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- Pediasure/Nutren Jr.
  - Pediasure Peptide/Peptamin Jr.
  - Elecare/Neocate/PurAmino
  - Liquid Hope
  - Real Food Blends
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- All have complete nutrition meaning they provide 100% of the complete needs of the child if prescribed properly





# WHAT do Supplemental Feeds Mean?

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- When a child can eat some food or liquid by mouth but requires supplemental GT feeds to have adequate nutrition
- These children may have trouble swallowing liquids of various texture or may not be able to eat enough by mouth



# WHAT is Dysphagia?

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- When a child has trouble swallowing liquids by mouth and some of the liquid may go into their lungs
- They may not be able to eat/drink anything by mouth
- Or they may need thickened liquids (several brands of cornstarch thickener on the market Simply Thick, Thick-It etc)
  - Nectar thick
  - Honey thick
  - Pudding thick



# WHAT is the Big Deal if they drink?

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- If they drink what they are not suppose to, then liquid can go into their lungs
- This can cause
  - No symptoms “silent aspiration”
  - Pneumonia
  - Coughing
  - Fever
  - Long term lung damage/scarring “bronchiectasis”
  - Hospitalization / Death



# Types of Feeding: Continuous

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- Feeding over 16-24 hours at slow rate usually 1-5ml/kg
- Video: <https://youtu.be/ZtTo9b16RM8>



# Types of Feeding: Bolus

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- Feeding over 1 hour at fast rate usually 15-30ml/kg
- Video: <https://youtu.be/mW38bBwfiYM>



# Types of Pumps: 2 major brands

- Kangaroo – has to be upright or on a pole; heavy; less expensive.
  - Product Manual: <http://www.covidien.com/imageServer.aspx?contentID=35727&contenttype=application/pdf>
- Infinity – lighter and easier to carry for kids; more expensive
  - Product Manual: <http://www.infinityfeedingpump.com/pdf/operators-manual-eng-fr.pdf>

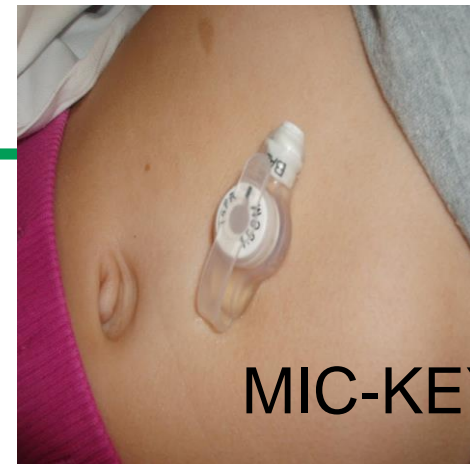


# Feeding Tubes

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# G-tube Types





# G-tube Types

**MIC Tube**



**Mickey Button**



**AMT Mini Button**



**AMT Mini Nonballoon**



**PEG Tube**



**Adaptor for PEG Tube**



**Mickey GJ Tube**



**AMT GJ Tube**



# Extension Sets

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If extension sets are in use, then they should be secured to child's body with tape in order to prevent tube dislodgement.

**90 Degree Angle:** Connects at a 90 degree angle lying flat against the body; smaller diameter tube; Better for continuous or bolus feeds via pump. May be used for giving medications by gravity if flushed well.

**Straight:** Connects straight into the button and sticks straight out; has a larger diameter tubing to accommodate larger volumes and thicker formulas; best for bolus by gravity feeds, giving medications by gravity and venting.



# Extension Sets

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**Length: 12" or 24 "** are standard

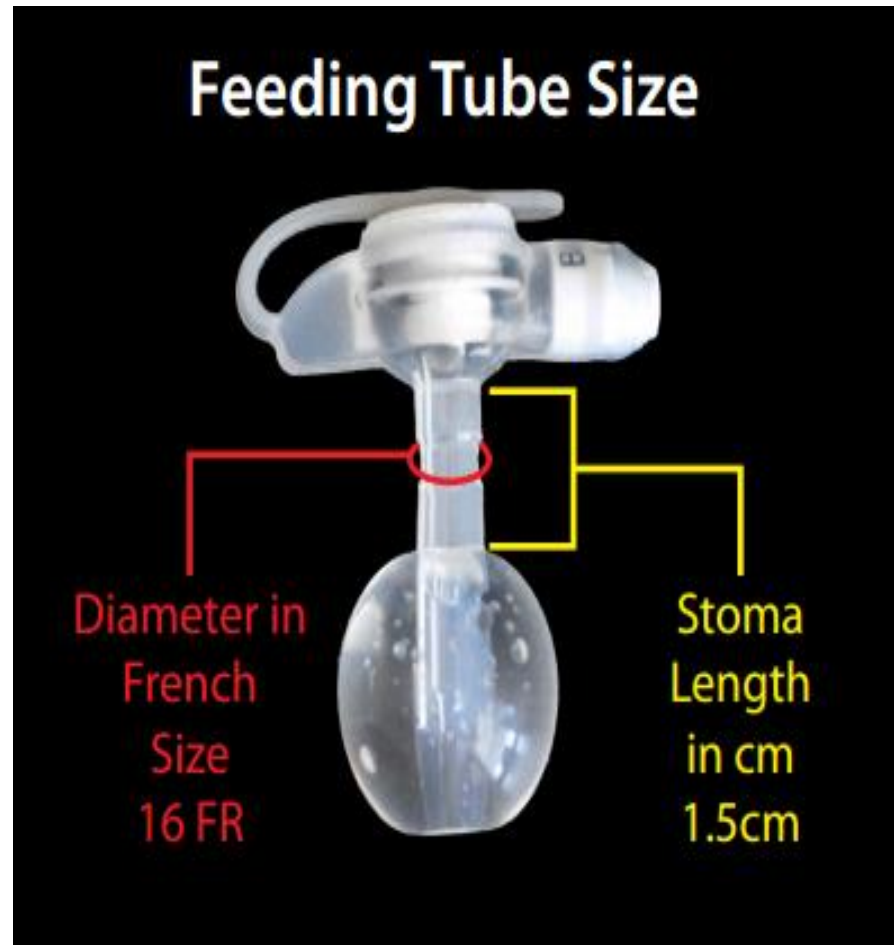
**12"** shorter and are better for short bolus type feeds or small patients

**24 "** are longer and better for long continuous feeds or patients that need more length



# Sizing

- Gastrostomy tubes sizes:
  - Diameter - French scale
  - Length of the tube's stem





# Anatomy of G tube

## Balloon Valve

The balloon is inflated and deflated by inserting a slip tip syringe into the balloon valve. **Do NOT attempt to feed through the balloon valve.** The recess in the valve can trap foreign material, such as lint or spilled formula. The balloon valve must be kept clean to function properly.

## External Bolster

The external bolster maintains tube position. A properly fitted device should not fit tightly against the skin. Instead, a 1/8 inch (3mm) gap between the external base and the skin surface is recommended to provide room for air circulation and cleaning of the stoma site.

**The recommended amount of water to place into the balloon is printed on top of the fill valve.**

## Feeding Port

Used for administering food and medication, and for decompression. The feeding port should remain sealed by the safety plug when the device is not being used.

## Safety Plug

The safety plug should be closed when not in use.

## Lot Number

The lot number is etched (laser engraved) on side of device.

## Anti-Reflux Valve/One Way Valve

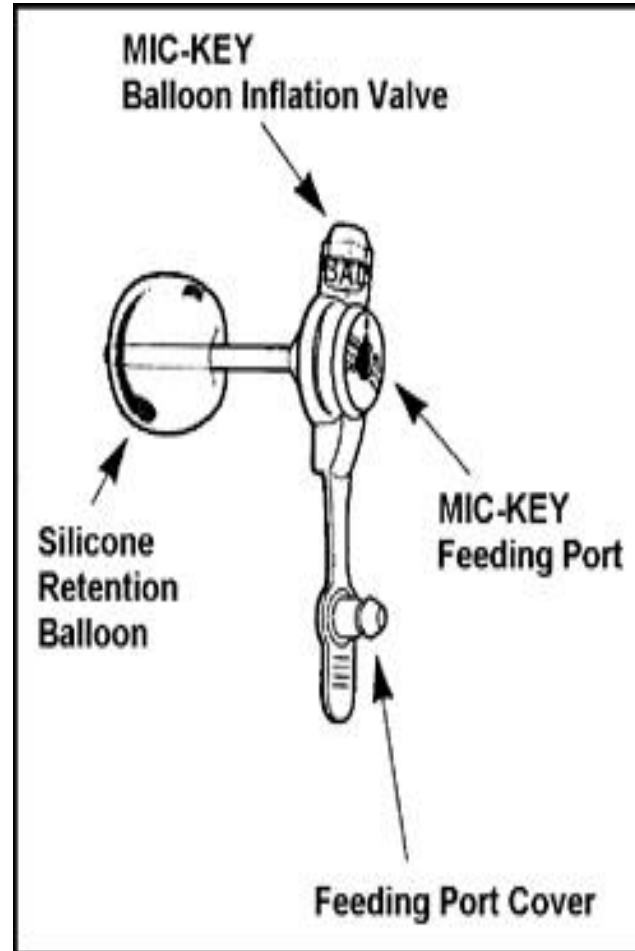
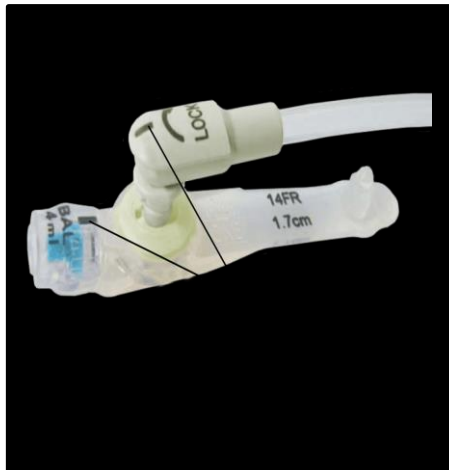
A valve is located in the bottom of the feeding port to prevent stomach contents from leaking out of the tube. The valve is opened when the feeding set adapter is in place.

## Internal Retention Balloon

A balloon is inflated inside the stomach to hold the tube in place. Once the tube is inserted, the balloon is filled with the prescribed amount of water. It is recommended to check the balloon volume as directed by your physician. See page 11 for complete instructions on how to check fill volume.



# The Balloon Button: MIC-KEY and AMT



# The Non Balloon Button

## AMT Non Balloon G tube

- No balloon to fail, so replacements occur less often.
- Great for patients whose balloons break frequently due to caustic medications; patients concerned about frequent pullouts of balloons, wounds that prevent a balloon placement, or small stomach (infant) where a balloon can contribute to gastroparesis
- Capsule design dramatically reduces pain during insertion
- Button shaft is as narrow as that of a balloon button, and the capsule is self-lubricating for easy insertion
- Easy to use pull-away tether releases capsule to deploy internal bolster
- For removal: Removal tool distends bolster to a smaller profile
- Ideal for people who don't tolerate balloon buttons
- Internal bolster is smaller than a balloon (less likely to block the pylorus)
- Internal dome provides more holes/openings for better feeding and venting



Non-deployed bolster for ease of insertion



Deployed bolster—note the internal bolster that distends to a smaller profile during placement and removal

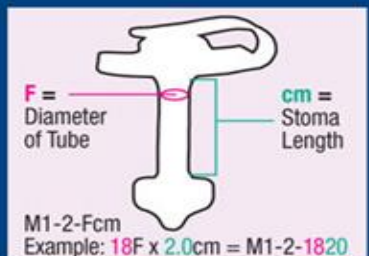
Each kit contains:



Device is inserted

Note: Capsule is self lubricating and will begin to dissolve as soon as lubricant is applied. Lubricate capsule only immediately before placement.

### How to Order



Toll-Free: 800-869-7382  
Email: [cs@appliedmedical.net](mailto:cs@appliedmedical.net)



# GJ & NJ Tubes

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## Indications

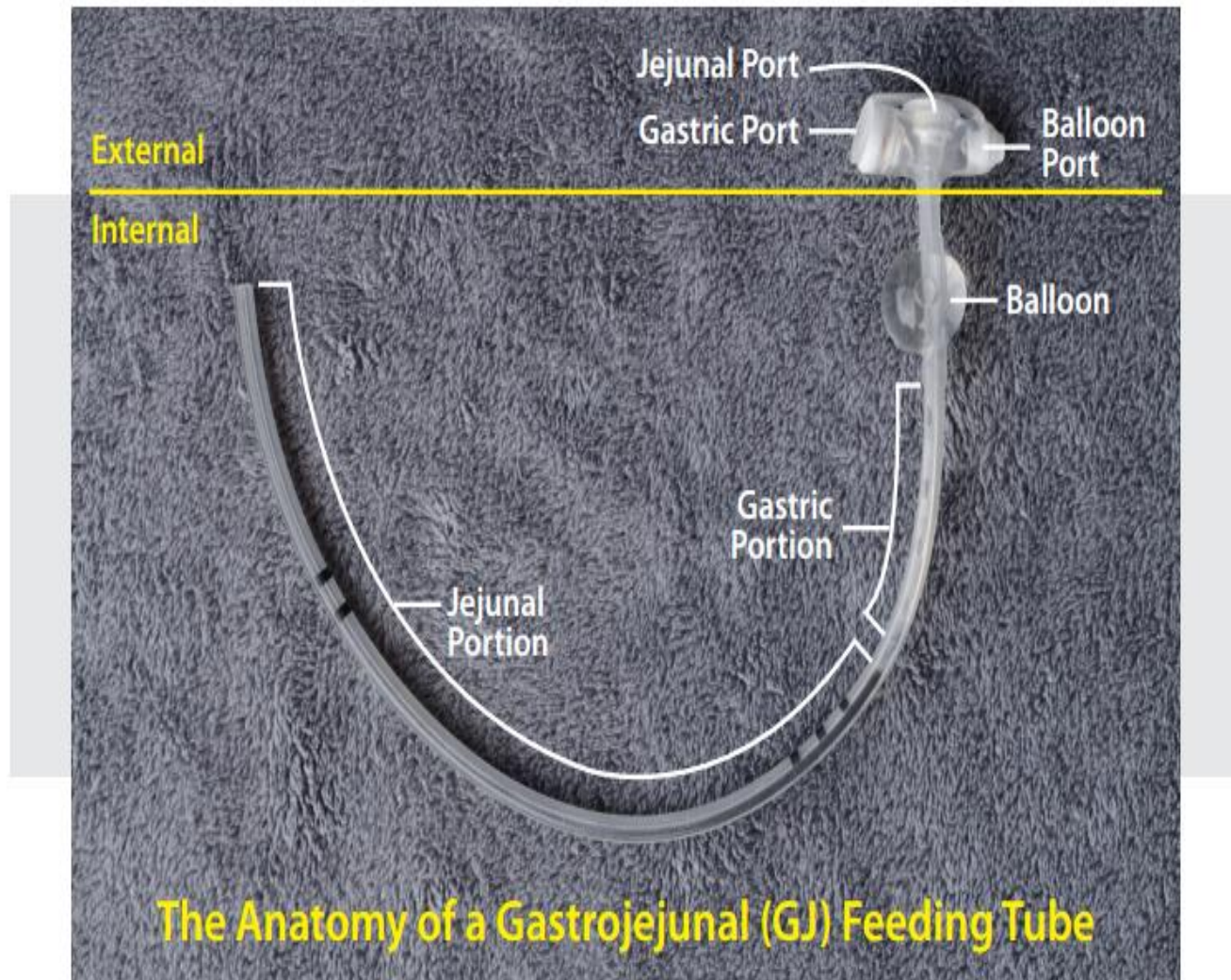
- poor stomach function or motility
- chronic vomiting
- respiratory problems from reflux
- alternative to Nissen Fundoplication
- Require continuous venting (GJ) and continuous feeds over 16-24 hours through the J port.
- Typically meds, water and feeds through J port
- Venting and some water through G port





# Gastrojejunal Feeding Tube

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# GJ Tube Brands



# The Leaky Tube

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- Check the balloon, refill to manufacturer's setting 2.5-5ml typically
- Confirm the size is correct



# The Clogged Tube

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- Flush, flush, flush
- Use a plunging motion with smallest syringe
- May try lukewarm water or carbonated beverage
- Replace the tube
  - If you have a protocol to
  - Call the family/caregiver to
  - If emergent, consider ER
  - For GJ tubes IR must replaced at hospital.  
ER/Hospital that day



# The Missing Tube

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- **SAVE THE STOMA!**
  - Place the largest catheter that will easily pass
  - Ex: your patient has a 12F tube, start with 12 or 10F catheter
  - Tape in place and proceed to call parent expecting them to go to ER if GT cannot be placed easily
  - This may prevent a surgery!!!





# How to change a GT: Video

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- <https://youtu.be/prmnhVqbeJY>



# Sample Procedure for Temporary Stoma Catheter: Equipment

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1. Catheter (Foley, NG, Suction etc)
2. (1) 10ml syringe
3. Lubricant (water soluble)
4. Piston/Cath tip syringe (optional).
5. Supplies for gastrostomy tube site care.
6. 4x4's unsterile ok
7. Gloves
8. Underpad (Optional)
9. Perform hand hygiene. Put on gloves.



# Sample Procedure for Temporary Stoma Catheter: Process

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- Perform hand hygiene. Put on gloves.
- When using a M.I.C. tube slide Secure Lok ring up and down the tube to make it moves easily.
- Place underpad under patient. Rinse GT site well with water, and dry thoroughly.
- To remove Foley or M.I.C catheter, deflate balloon and gently withdraw. To remove NG or other catheter you can just gently withdraw. If there is difficulty in removing any catheter please notify the clinical provider.
- Place a small amount of lubricant on the tip of the catheter.
- Grasp the catheter approximately 3 inches from the tip. Hold like a pencil and gently insert into the gastrostomy opening, using a slight twisting motion. Advance the catheter 1-2 cm past the balloon into the stomach. (If resistance is met when the tube is reinserted, DO NOT FORCE THE TUBE. Remove tube and call the clinical provider. Check for gastric contents by aspirating with a syringe.
- While holding the catheter firmly in place, gently insert the volume of water necessary to inflate the balloon into the balloon port. (3-5 ml for Foley, 5-10 ml for M.I.C.). Quickly detach the syringe to prevent backflow of water into syringe. Not applicable for NG tubes or catheters.
- Gently pull-back on the catheter until resistance is met. The balloon should be against the wall of stomach. Slide the secure lock ring of M.I.C. tube, flush with abdomen. Not applicable for NG tubes or catheters. Clamp the MIC tube, Foley, NG or other catheters so that gastric contents do not come out.
- Secure tube as appropriate and remove gloves and perform hand hygiene.  
Do not use tube. Await replacement of standard GT unless otherwise ordered by clinical provider.
- Anticipate patient needing alternative forms of hydration i.e IV fluids while waiting. Standard tube should be replaced in <1 hour.





# Sample Procedure for GT Button replacement: Equipment

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1. New GT to be placed (MIC Tube, GT Low profile button (Mickey/Mini)). *Nonballoon GT should only be placed/removed with additional education. See <http://www.appliedmedical.net/gi-products/minione/non-balloon/>*
2. 10ml Leurlock or slip tip syringe
3. Up to 10ml of filtered, sterile or distilled water or sterile normal saline
4. Lubricant (water soluble)
5. Piston/Cath tip syringe (Optional).
6. Supplies for gastrostomy tube site care. Clean 2x2 or 4x4
7. Underpad (Optional)
8. Gloves
9. Silver Nitrate (if ordered for granulation tissue)
10. GT measuring kit (optional)



# Sample Procedure for GT Button replacement: Process

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- This is a clean procedure, not sterile. Please use standard precautions such as gloves and wash your hands before and after with soap and water.
- If GT size is unknown – use GT Measuring Kit (separate) to measure length. If there are questions about what size should be used please contact Clinical Provider.
- Inspect new GT Kit for damage. Do not use if sterile seal is broken or contents are damaged.
- Inflate the new GT's balloon to the recommended fill volume with water/normal saline as above. This is typically printed on fill valve. Inspect balloon and port for signs of leakage while filled. Deflate the balloon after inspection and keep water-filled syringe inserted in new GT for easy placement.
- Apply water soluble lubricant to the tip and sides of the new GT stem. Do not use oils or petroleum jelly as a lubricant.
- Draw up fill volume of filtered, distilled, sterile water or normal saline in syringe included in packet and attach to the new GT balloon port. The fill volume should be between 2.5-6ml and is included on the GT. If unknown use 5ml.



# Sample Procedure for GT Button replacement: Process

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- Remove the Tube or Temporary Catheter:
  - If the patient has a temporary catheter gently remove it. To remove Foley or M.I.C. catheter, deflate balloon and gently withdraw the catheter. To remove a NG or other catheter withdraw. If there is difficulty in removing notify the clinical provider.
  - On the GT in the patient, deflate the water filled balloon by inserting a Leurlock or slip tip syringe into the balloon port (on side) and withdrawing all water. It may have 2- 10 ml of water in it. If a Leurlock syringe doesn't fit, use a slip tip syringe.
  - If the GT in the patient doesn't have a balloon port it is a non-balloon tube. Please contact a clinician trained to remove these as a special device is used to insert or extract. (These are stocked in the GI section of the OR).
- Remove the tube: Grasp the GT firmly and pull up gently removing the device with slow, steady pressure. Gastric contents may start flowing out of the stoma. You may use a clean 2x2 or 4x4 to prevent drainage.
- If patient has granulation tissue, cauterize now or after GT insertion with silver nitrate.
- Place the new GT: take the new GT which is lubricated, deflated, and has water to fill balloon ready. Some GT's may have a stiffener/introducer which can be inserted in the top of the GT to stiffen the tip. Gently place the new GT in the center of the stoma and gently press or twist so it slips into the stoma into the stoma stopping when the external base of button reaches the patient's skin. If placement is difficult or traumatic stop and call a clinical provider to assess and place the tube.



# Sample Procedure for GT Button replacement: Process

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- Remove introducer if used. Hold the new GT in place with one hand and inflate the balloon to the prescribed fill volume with water. If acute pain is noted, deflate balloon and tape GT in place. Call a clinical provider to come and assess placement/length of GT.
- Gently pull up on the new GT to make sure the balloon is filled and positioned against the stomach wall. Clean the stoma site to remove any excess lubricant or drainage with clean gauze, soap and/or water.
- Ensure that the tube is positioned properly by attaching a feed set and syringe and pulling back on syringe until stomach contents are visible.
- Check for leakage around the stoma site. If leakage is observed add an additional 0.5ml-1ml water until the leaking stops. Do not exceed the balloons maximum fill volume.
- If there is any question about the proper placement of the tube, Clinical Provider should assess the patient.



# Summary

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- Most common brands
  - MIC-KEY
  - AMT
- The leaky tube
  - Check the balloon and size
  - Farrell bags
- The clogged tube
  - Clog Zapper
- The missing tube
  - Save the stoma



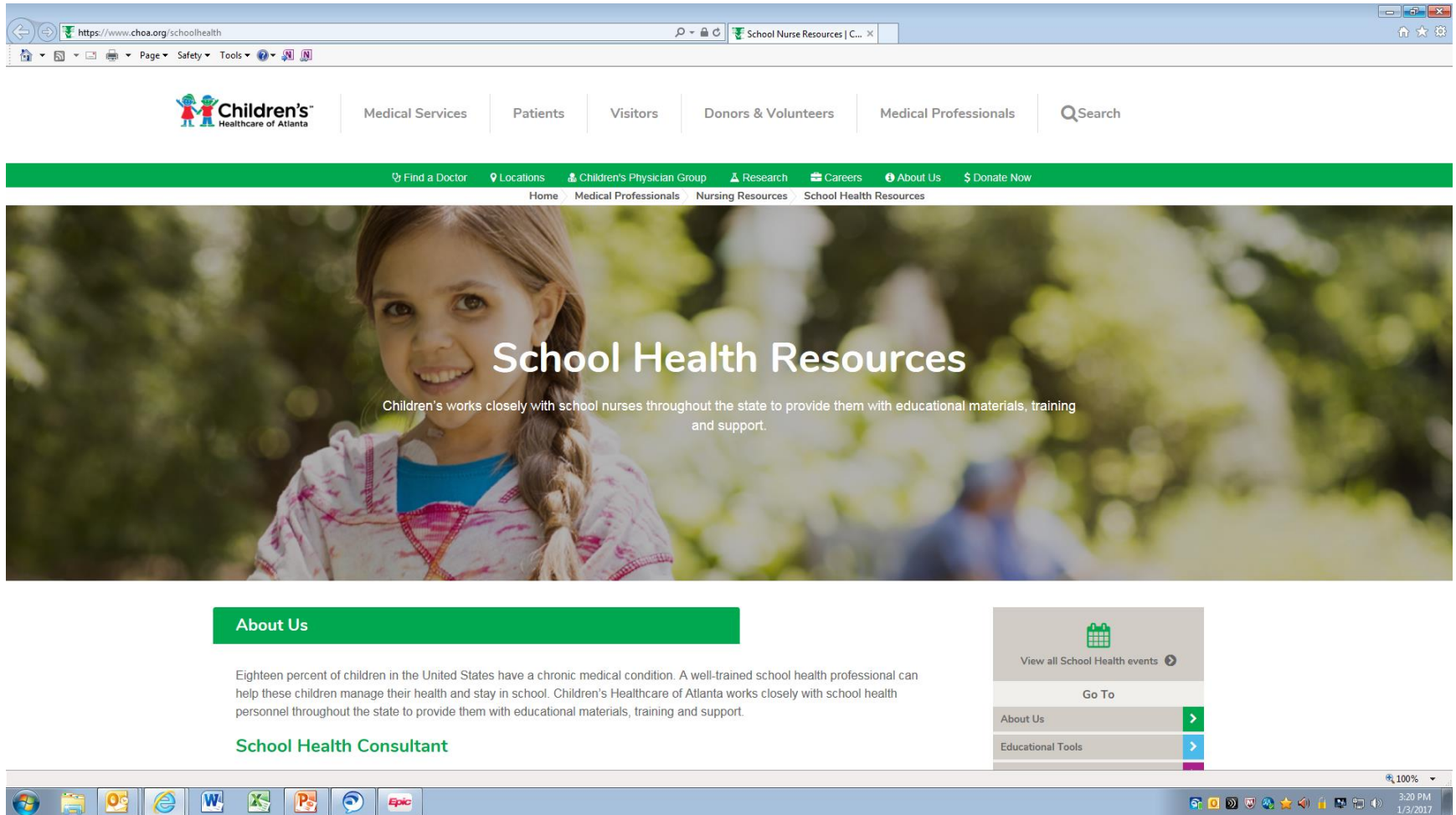
# School Health Resources

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- Children’s Healthcare of Atlanta (CHOA) is committed to overseeing the total well-being of children. Our mission is to make kids better today and healthier tomorrow. Because school nurses serve “ to advance the well-being, academic success and lifelong achievement and health of students” (NASN, 2010c), Children’s Healthcare of Atlanta has a Regional School Nurse Coordinator to serve as a resource for school health services in the state of Georgia.
- Children’s Regional School Nurse Coordinator provides the following services: School Nurse Updates and Webinars on clinical pediatric topics, staff education for school districts in metro Atlanta, reviews and revises the school health manual, and serves as a prime contact for school nurses to call to discuss programmatic needs and difficult cases.
- Gail Smith, B.S.N., R.N.
- <https://www.choa.org/schoolhealth>



# CHOA School Health Website



The screenshot shows a web browser window displaying the CHOA School Health website. The browser's address bar shows the URL <https://www.choa.org/schoolhealth>. The website's navigation menu includes links for Medical Services, Patients, Visitors, Donors & Volunteers, Medical Professionals, and a Search function. A secondary green navigation bar contains links for Find a Doctor, Locations, Children's Physician Group, Research, Careers, About Us, and Donate Now. Below this, a breadcrumb trail shows Home > Medical Professionals > Nursing Resources > School Health Resources. The main content area features a large image of a smiling young girl with braids. Overlaid on this image is the title "School Health Resources" and a sub-headline: "Children's works closely with school nurses throughout the state to provide them with educational materials, training and support." Below the image, there is a green "About Us" section with text stating that 18% of children in the US have chronic conditions and that CHOA works with school health professionals. To the right of the "About Us" text is a sidebar with a calendar icon and a "View all School Health events" link, followed by a "Go To" menu with options for "About Us" and "Educational Tools". The Windows taskbar at the bottom shows various application icons and the system clock indicating 3:20 PM on 1/3/2017.



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## Contact information:

Children's Healthcare of Atlanta Aerodigestive Center

404-785-1161

[www.choa.org/aerodigestive](http://www.choa.org/aerodigestive)

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NP: Suzanne Alfors

RN:

RN Case Manager: Jephania Cotton

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