

# About Tube Feeding



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# Tube Feeding: Definitions

- Tube feeding: providing nutrition by means (tubes) other than the oral route
  - Gavage feeding
  - Enteral feeding
- Feeding tubes: devices to provide nutrition classified by
  - Site of insertion
  - Location of where feeding is delivered
  - Intended use

# Why Do Some Children Need Tube Feeding?

- Can't feed
  - Can't protect airway and may aspirate
  - Structural or motor impediments to oral feeding
    - Oral or pharyngeal (throat) problems
    - Esophageal problems
    - Stomach or intestinal issues
- Won't feed
  - Neurologic and developmental (oral aversion)
  - Metabolic
  - Unpalatable diets

# Indications for Use

- Functional Abnormalities:
  - Gastroesophageal Reflux Disease (GERD)
  - Intestinal Dysmotility
  - Traumatic Injury of esophagus
- Developmental Issues:
  - Feeding aversion/refusal
  - FTT (or failure to thrive due to social and other causes)
- Chronic Illnesses:
  - Cystic Fibrosis
  - Chronic infections (AIDS)
  - Spinal Muscular Atrophy (SMA)
- Congenital Anomalies
  - Cleft Palate syndromes
  - Esophageal atresia
  - Intestinal anomalies

# Who commonly requires tube feeding?

- Preterm infants (at risk)
- Infants with congenital heart defects
- Cerebral palsy (dysphagia in 57-92% depending on type of CP)
- Infants and children requiring specialized diets
  - Digestive disorders
  - Genetic disorders
- Infants and children with digestive disorders requiring surgery

# Other considerations for tube feeding selection

- Temporary vs Permanent
  - Assess indications and prognosis
  - Evaluate ability to tolerate and increase oral feeding
    - Supplementary nutrition
- Need to bypass non-functioning area (stomach) to provide nutrition
- Need for venting or decompression of GI tract
  - Mechanical or functional obstruction
  - Prevention of aspiration, reflux, vomiting

# History of Tube Feeding

- Earliest feeding by rectal tube 3500 years ago
- Earliest feeding into stomach report: tube with bladder 1598 Capivacceus
- 17<sup>th</sup> and 18<sup>th</sup> century: leather or hollow tubes
- 19<sup>th</sup> Century: rubber tubes
- 1845 Sedillot: first report of gastrostomy
- 20<sup>th</sup> century (after 1950): development of formulas, better tubes (polyethylene, silastic) and pumps
- Chernoff R. Nutrition in Clinical Practice 21:408–410, August 2006



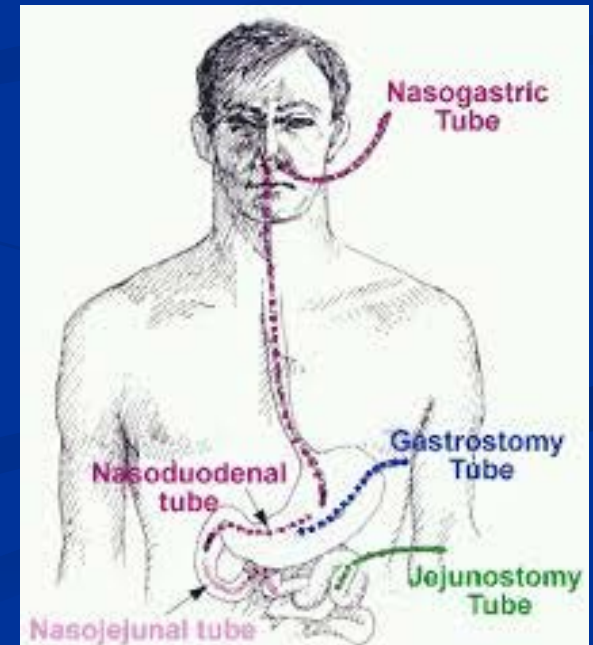
# Types of Tube Feeding

- Nasogastric/orogastric (NG/OG)
- Naso-jejunal (NJ)
- Gastrostomy (GT)
  - Percutaneous Endoscopic G-tube (PEG)
  - Surgical Gastrostomy
    - with/without Nissen Fundoplication
- Gastrojejunal (GJ)
- Jejunostomy (J)



# Types of Tube Feeding

- Tubes placed through the nose
  - Into stomach: Nasogastric or NG tube
  - Into intestine: Nasoduodenal or ND tube
  - Into intestine: Nasojejunal or NJ tube
- Tubes placed through the mouth
  - Into stomach: Orogastric (OG)



# Types of Tube Feeding 2

- Directly through the skin into the:
  - Stomach or Gastrostomy tube (G tube)
  - Small intestine: or Jejunostomy tube (J tube)
  - Stomach then into jejunum: Gastrojejunal tube (GJ tube)

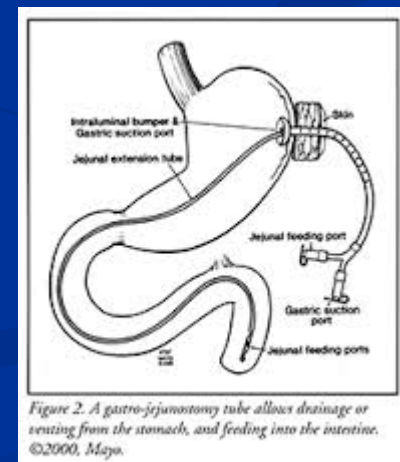
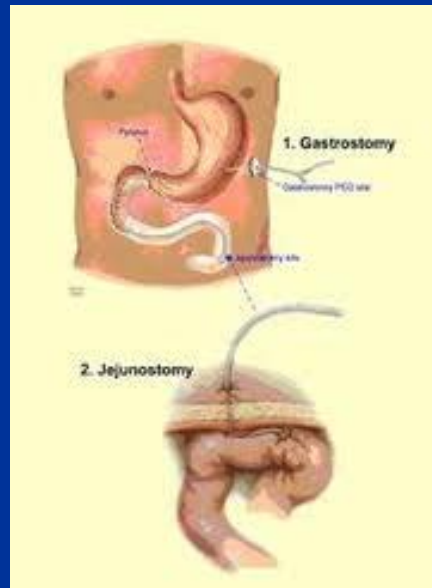


Figure 2. A gastro-jejunal tube allows drainage or venting from the stomach, and feeding into the intestine. ©2000, Mayo.

# Feeding Tubes: Pros and Cons

# Nasogastric tube feeding

## ■ Advantages

- Temporary: can remove if not needed
  - May take out during day, place at night
- Venting capability
- Does not require surgery

## ■ Disadvantages

- May impede feeding (in nose, throat)
- Placement discomfort and maintenance
- Sinusitis or trauma to nasal, throat, esophagus stomach tissues
- Risks of reflux, vomiting and aspiration

# Naso-Jejunal tube feeding

## ■ Advantages

- Bypass stomach if problems with feeding in stomach
  - Reflux, vomiting
  - Delayed gastric emptying
  - Aspiration
- Does not require surgery to place

## ■ Disadvantages

- Clogging
- Replacement difficult (fluoroscopy)
- Not useful for venting
- Diarrhea, malabsorption risk by bypassing stomach
- Sinusitis, tissue trauma
- May require continuous feeding

# Gastrostomy Tube Feeding

## ■ Advantages

- Easier to maintain (with proper training)
- Not in nose, throat and may improve feeding
- Useful for venting as well as feeding
- Secure access to stomach

## ■ Disadvantages

- Requires surgery (and associated risks)
- Risks of reflux, vomiting, aspiration
  - Consider fundoplication
- Problems of skin and tract to stomach

# Gastrojejunal Tube Feeding

## ■ Advantage

- Allows for venting and feeding at the same time
  - Decreased risk of reflux and aspiration
- No irritation or injury to tissue above the stomach

## ■ Disadvantage

- Maintenance: replacement requires fluoroscopy (anesthesia?) and expertise
- Clogging of jejunal tube
- Risk of diarrhea, malabsorption



# Jejunostomy tube feeding

## ■ Advantages

- Bypass stomach if problems with gastric feeds
  - Decreased risk of vomiting, reflux, aspiration
- Secure access to intestine
  - Easy to replace feeding tube in jejunostomy

## ■ Disadvantages

- Requires surgery
  - Risk of complications, anesthesia
- Risk of diarrhea, malabsorption
- May need continuous feeding
- Cannot use for venting

# Deciding Which Tube Feeding to Use

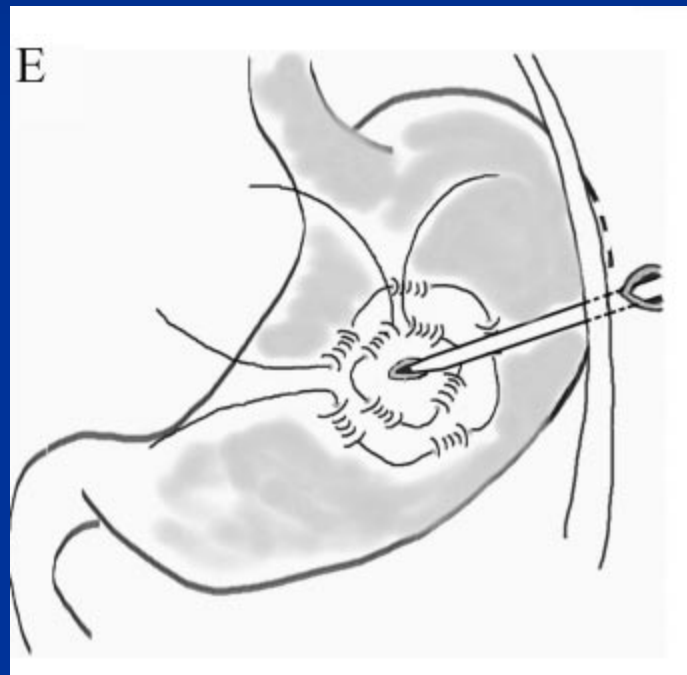
- NG for temporary use in patients without significant vomiting, reflux, aspiration risk
- G tube for patients expected to be chronically dependent on alternate feeding without significant vomiting, reflux or aspiration
- GJ tube for patients expected to have chronic need for enteral feeding who are at risk for reflux and aspiration
- Jejunostomy: same as GJ but don't need venting

# Tube Feeding Improvements: Gastrostomy Placement

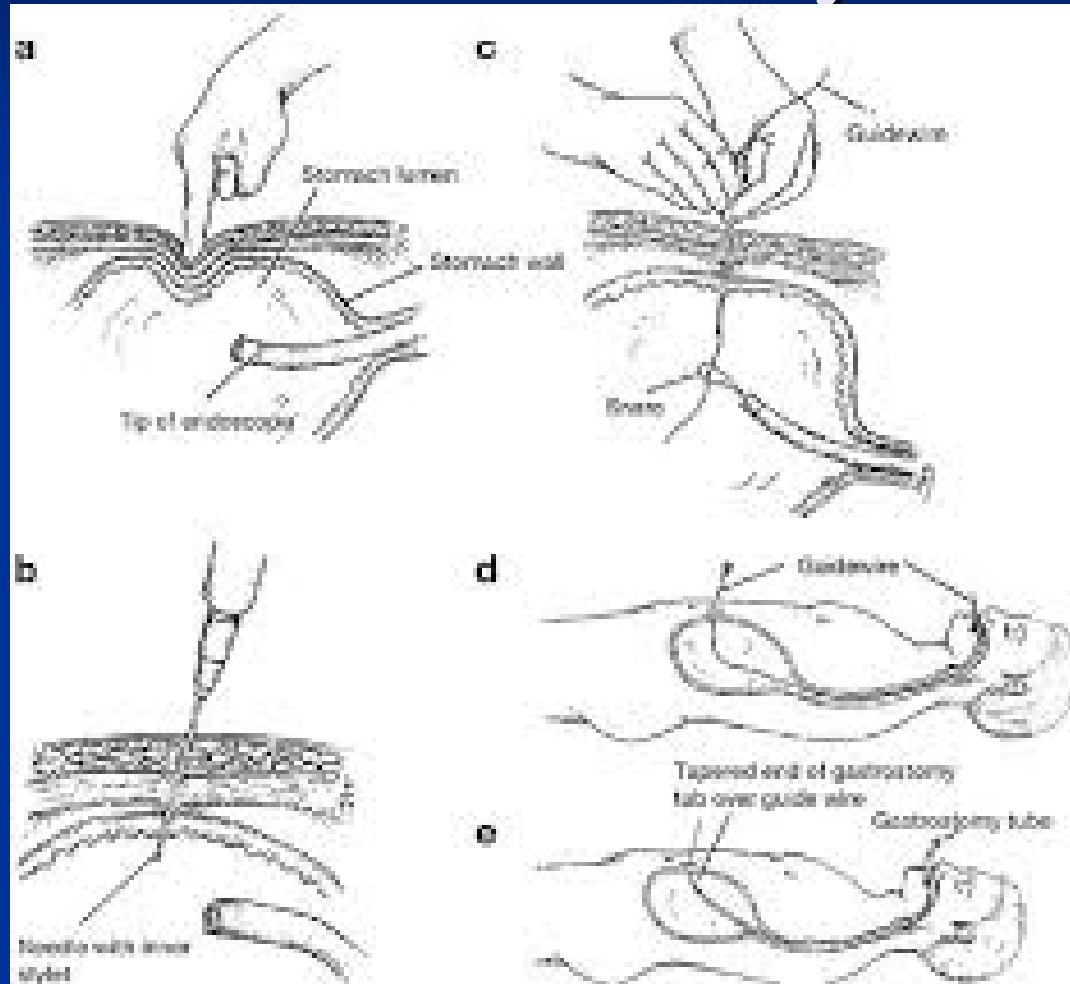
- Open Gastrostomy
  - With fundoplication
- Percutaneous Gastrostomy
  - Endoscopic
  - Interventional radiology
- Laparoscopic Gastrostomy

# Open Surgical Gastrostomy

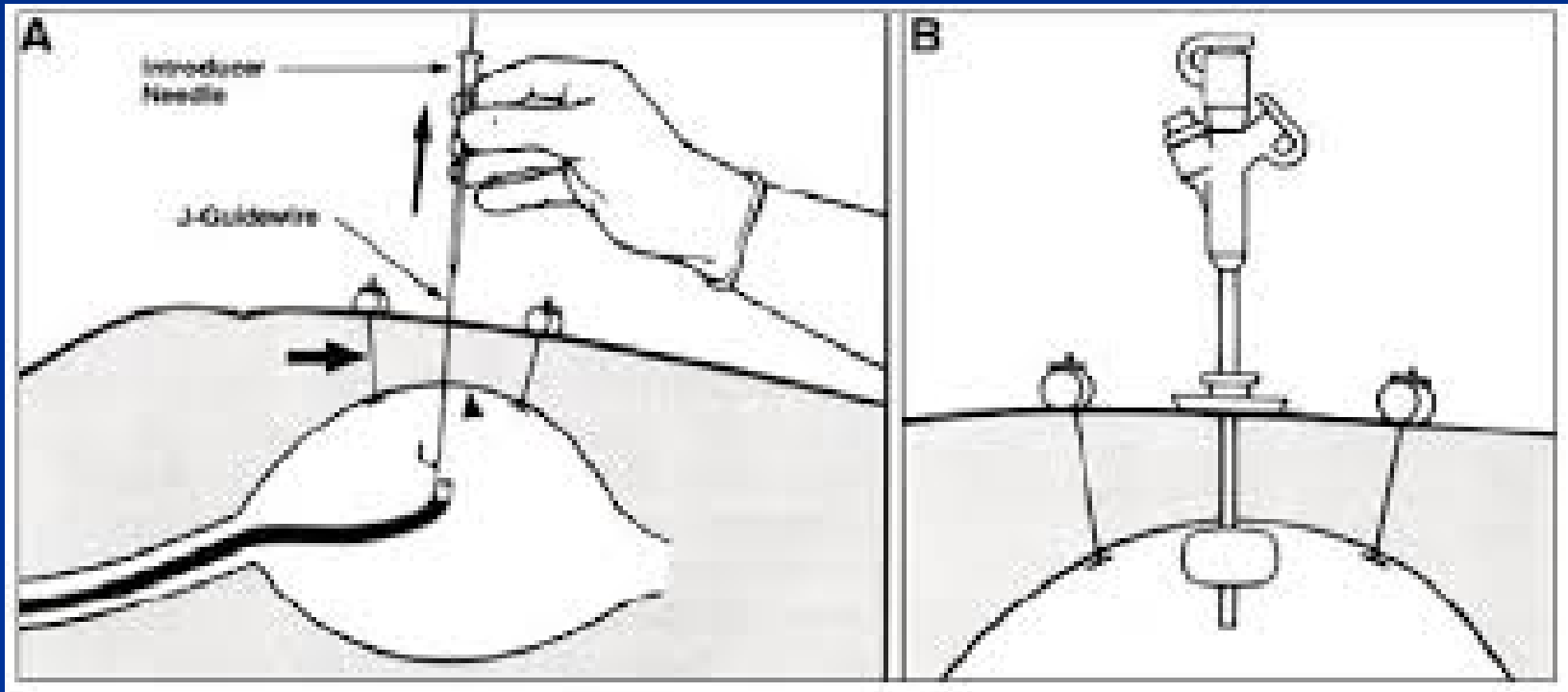
- Open Gastrostomy: Stamm Gastrostomy 1894



# Percutaneous Endoscopic Gastrostomy

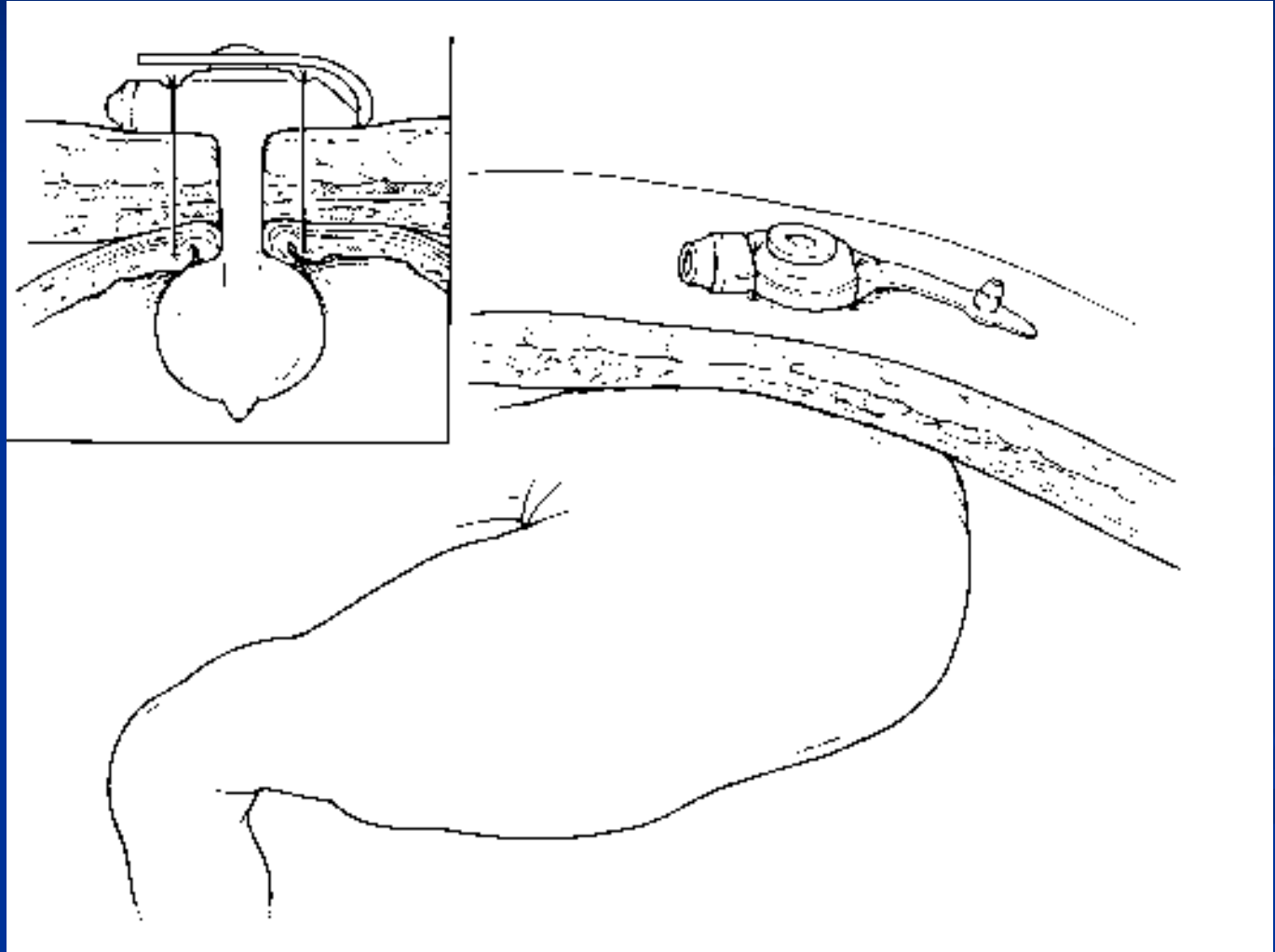


# Percutaneous Gastrostomy by Interventional Radiology



# Surgical Placement of GT

## LAPAROSCOPIC

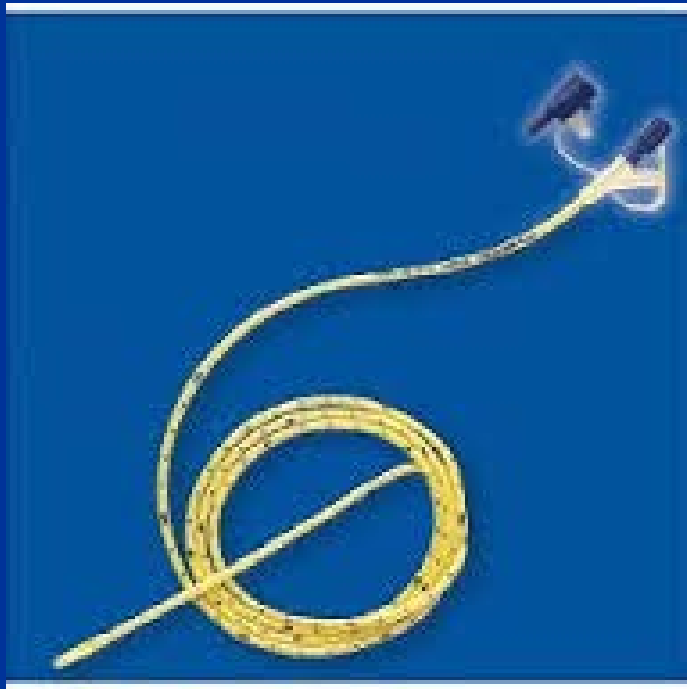




# Improvements in Tubes for Tube Feeding or Venting

# Nasogastric or Nasojejunal Feeding Tubes

Not Stiff: Polyurethane, Silastic or Silicone composition



# Types of decompression tubes

Stiff composition to avoid collapse with suction

Some with 2 channels to allow continuous suction without getting stuck on the mucosa of the stomach or intestine



•Andersen®



•Replogle®

## Sample Photo of Bubble-Trap System Set-Up for gravity drainage



NICU RNs  
will learn on  
floor

# G-Tube Venting

## Farrell Bag

Suspended syringe

Y-Connector

G-tube



# Various Types of Gastrostomy Tubes

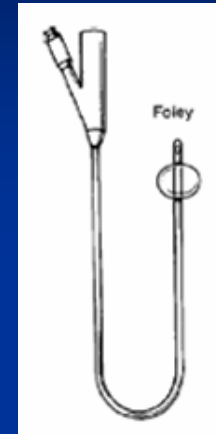
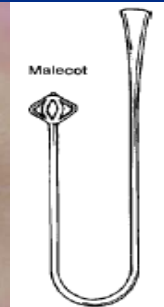
## HIGH PROFILE (ONE PIECE) GTs



Mic-Gastrostomy



Malecot

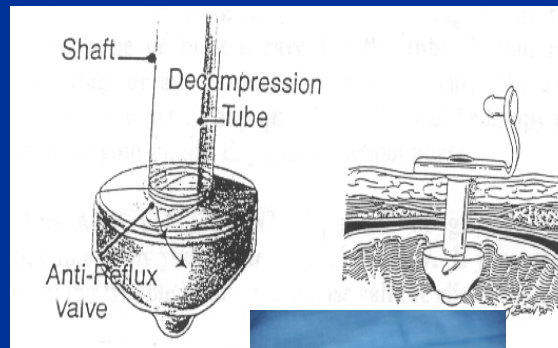


Foley

## LOW PROFILE (TWO PIECE) GTs



Mic-Key Button



BARD



AMT

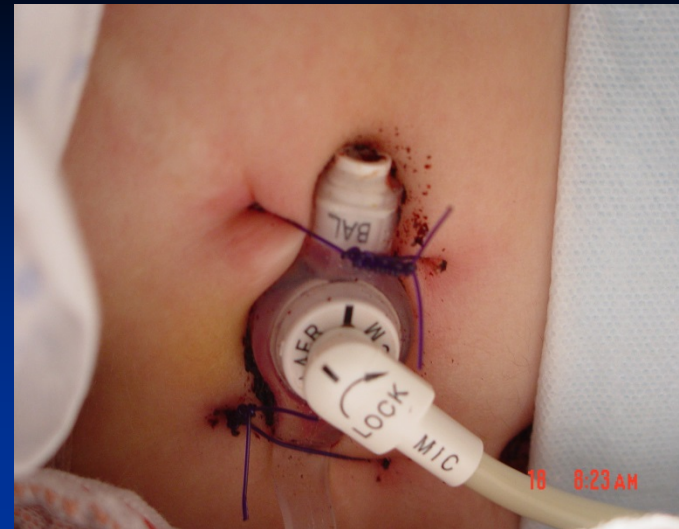


"Cubby"





MIC-GT (Pedi Surgery)



Newly placed MIC-Key button  
(Pedi Surgery)



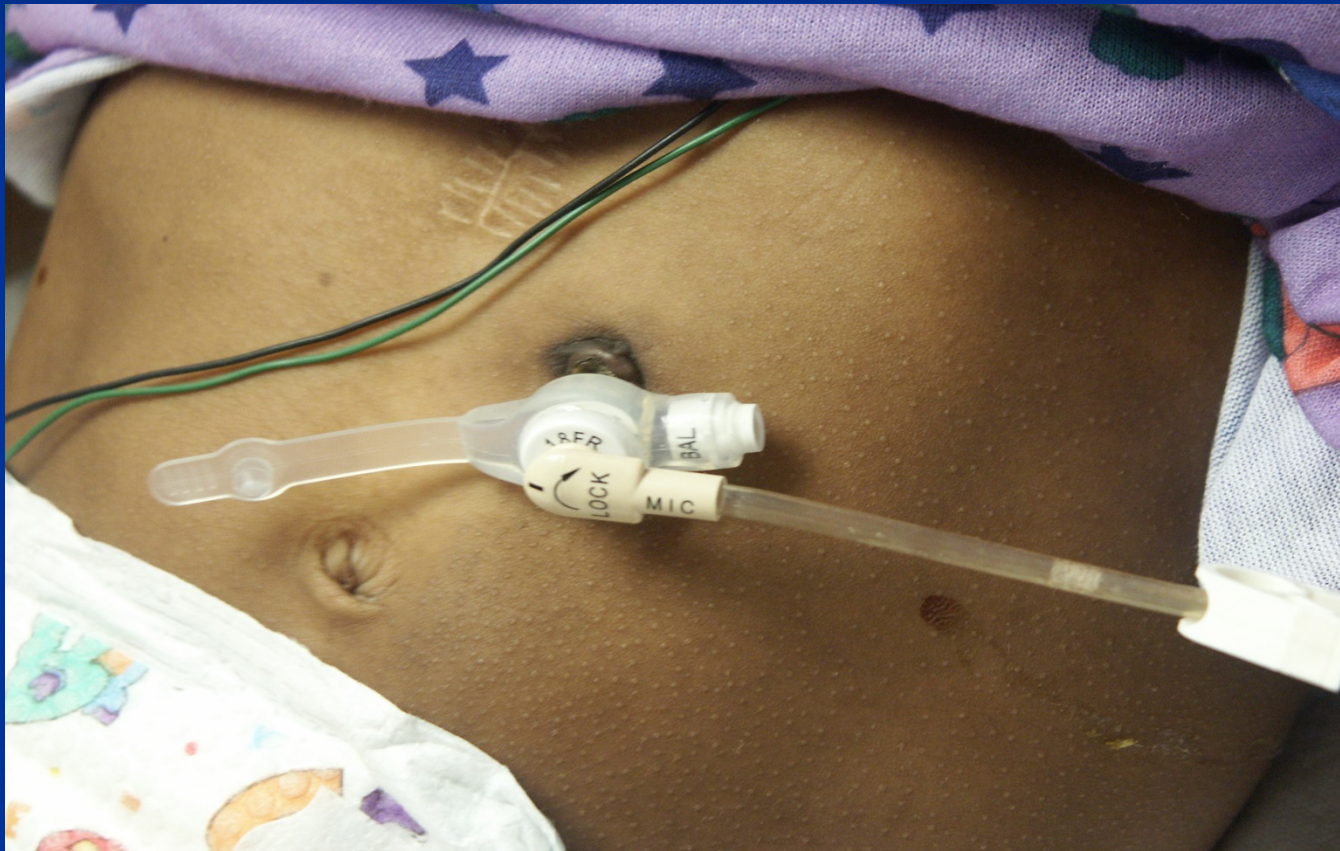
Percutaneous Endoscopic GT (PEG)  
(Pedi Gastroenterology)



MIC-Key Button with established track



# MIC-KEY button with extension tube



# Bolstering PEG with crossbar (no external fixation device)



Crossbar



Hydrocolloid skin barrier around tube, nipple to bolster PEG and tape to secure in place.



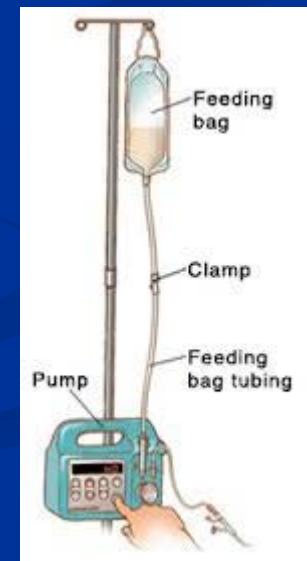
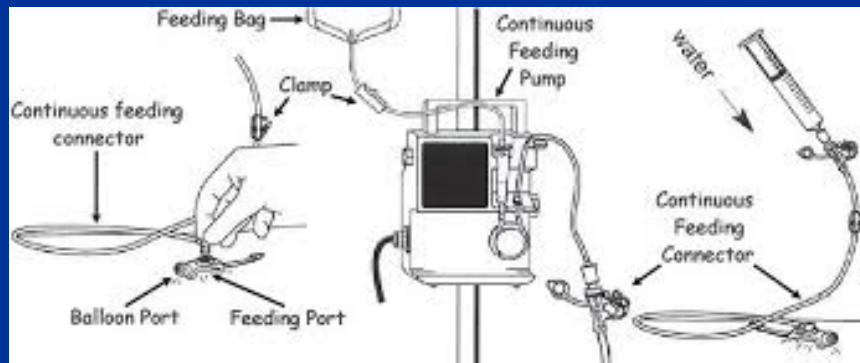
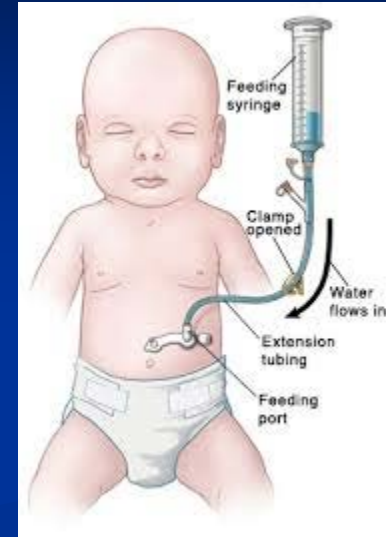
Kerlix gauze roll to bolster and Surgiflex to secure



Nipple with Surgiflex

# Tube Feeding Technique

- Bolus
  - Fast and efficient
- Continuous
  - Helpful in feeding disorders
  - May run overnight to get all feeds into pt





# Skin Care

- Assess skin around the GT daily
  - Normal: Slight redness, scant serous drainage, scant mucus
- Goal is to maintain skin around tube in same condition as rest of abdomen
- Good cleansing w/ soap & water is the key
- Secure GT and decrease tension on GT site
- Do not use Bacitracin as prophylaxis

# Oral Feeding

- Oral feeding aversion, sensory based is common in pediatrics
- Evaluate: gastroenterologic causes, neuro-developmental causes
  - Physical exam
  - Imaging: Modified Barium Swallow, Esophagram
- Refer for feeding therapy evaluation and treatment (OT, PT, Speech Pathology, Developmental Pediatrician)

# Oral Feeding Options

- Oral Stimulation: offer foods and liquids that are tolerated in small quantities
- Partial oral feedings: as tolerated
- Thickened liquids (Thick-It) when thin liquids and thickened liquids or purees are tolerated
  - Advised by feeding therapist and modified barium swallow

# Summary: About Tube Feedings

- Improve understanding about the:
  - Development of tube feeding
  - Types of tube feeding
  - Choice of tube feeding
- Importance of tube feeding
  - Correct malnutrition, dehydration
  - Maintain nutrition, hydration, medications
  - Must weigh risks and benefits in choice of tube feeding