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
- 17th and 18th century: leather or hollow tubes
- 19th Century: rubber tubes
- 1845 Sedillot: first report of gastrostomy
- 20th century (after 1950): development of formulas, better tubes (polyethylene, silastic) and pumps
Types of Tube Feeding

- Nasogastric/orogastic (NG/OG)
- Naso-jejunal (NJ)
- Gastrostomy (GT)
  - Percutaneous Endoscopic G-tube (PEG)
  - Surgical Gastrostomy
    - with/without Nissen Fundoplication
- Gastrojejunual (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)
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