Medical Indications for Gastrostomy tubes

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What is a Gastrostomy?

- A tube or opening placed directly into the stomach to provide feeds, fluids or medication.
Why put in a gastrostomy?

- When feeds, fluids or medication can’t be reliably and safely provided by mouth, and

- There is a long-term need, so that a naso-gastric tube would be inappropriate
Gastrostomy Placement

Diagram showing the components of a gastrostomy tube and their locations within the body.
Who is likely to need one?

- Children who
  - Can’t swallow easily
    - neurological injury, muscle weakness, CP
    - radiation or chemotherapy (malignancy)
  - Can’t keep up with enough feeds
    - Too weak, tired or breathless (heart disease)
    - Cystic fibrosis, renal failure
  - Need access to the small bowel if they can’t safely be fed into the stomach (jejunal feeds)
Gastrostomy placement
Catto-Smith, Jimenez. J Gastro Hepatol 2006

Gastrostomies at RCH 1990-97
N=173

Surgical gastrostomy
N=26

PEG
N=147

Neurologic disability
N= 104

Other N=43
(CF 20, malignancy 4,
RF 3, liver 3…)
The Gastrostomy/Enteral Nutrition Program at RCH

- Active since 1991
- 40-50 new PEGs each year
- 200-300 replacements in theatre each year
- Age range 2 months to 18 years
- Approx 400 current gastrostomates
Types of gastrostomy (1)

- “Surgical”
  - Stomach held with stitches
Types of gastrostomy (2)

- Percutaneous Endoscopic Gastrostomy (PEG)
  - Uses a gastroscope passed through the oesophagus to introduce a thread with which to pull a gastrostomy tube down the mouth and out through a hole in the stomach
  - Does not use stitches
Endoscope (gastroscope) passed down the oesophagus
Needle with thread inserted through skin into stomach
Snare passed down gastroscope to catch thread
Thread pulled out through oesophagus and mouth with snare
Thread tied to new gastrostomy tube
New gastrostomy tube pulled down through the oesophagus and out through the stomach

Skin retention flange slid down to skin level

Feeding adapter inserted
New initial type PEG in place
What else happens?

- **Pain**
  - The tube is put in during a general anaesthetic, but the site starts to hurt as this wears off
  - Local anaesthetic and strong intravenous painkillers are used

- **Infection**
  - Prevented by using one dose of an antibiotic during the procedure

- **Feeds**
  - Started slowly and built up gradually

- **Stomal therapy, Dietetics, Nursing staff, Pain team, Surgeon, Gastroenterologist**
And then...?

- Ensure education complete
- Discharge after about 2-3 days
- Collect all supplies
- Follow-up after about a month
  - Ensure tube OK technically
  - Leaking
  - Infection
  - Need for alternate types of tube
  - Feeding adequacy
  - Growth
- Initial type PEG tube lasts 2-12 months
  - initial replacement will require a GA
1990-7 group with neurologic disability

- N=104, but complete information in 98
- Median age 3.5 yr (60d-20y)
- 63M, 35F
Early Complications

- Fever
- Cellulitis
- Distension
- Peritonism
- Aspiration
- Vomiting
- Ileus
- Bleeding
Other types of tubes?

- **Length**
  - Long or Short (skin level)

- **Gastric retention flange**
  - Balloon or Plastic flange

- **Type of plastic**
  - Polyurethane or Silicone
<table>
<thead>
<tr>
<th>Plastic flange</th>
<th>Balloon</th>
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<tbody>
<tr>
<td><strong>Long</strong></td>
<td><img src="image1.png" alt="Image" /></td>
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<tr>
<td><strong>Short</strong></td>
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Short (low profile) devices
Gastrostomy Button

- Shaft
- Decompression Tube
- Anti-Reflux Valve
Cubby
MIC Key

- Extension Set Feeding Port
- Extension Set Medication Port
- SECUR-LOK Extension Tube
- MIC-KEY Feeding Port
- Silicone Retention Balloon
- MIC-KEY Feeding Port Cover
- Extension Set Locking Adapter
Long tubes
Balloon retention
Initial type PEG
Why do they wear out?

- Deterioration of plastic
  - Candida (thrush)
  - Hardening
  - Tears

- Tissue Growth
Silicone deterioration
Trevisani et al. Dig Dis Sci 50 (3) 463-9, 2005

Fig 1. SEM examination of the inner surface of PEG tubes. (a) New PEG tube. The surface shows a regular, slightly corrugated pattern. (Original magnification, 5000x.) (b) PEG tube used for 96 weeks. The inner surface shows two holes. (Original magnification, 12,500x.)

Fig 2. SEM examination of the cryogenically fractured surface. (a) New PEG tube. The fractured surface is regular, without holes or crevices, as is the inner surface of the tube. (b) PEG tube used for 96 weeks. The fractured surface shows a crevice originating from a hole. The inner surface of the tube is quite irregular. (Original magnifications, 502x.)
Formation of biofilm

Trevisani et al. Dig Dis Sci 50 (3) 463-9, 2005
Nutritional impact
Catto-Smith, Jimenez. J Gastro Hepatol 2006

- Body weight at PEG insertion
  - Median 11.33 kg
  - Interquartile range 7.33-17.69 kg
  - Min 3.14 kg, max 50.2 kg

- Weight for age z-score
  - At insertion −3.52 (SD 3.33)
  - 6 mo later mean change +1.05
    - Males +1.09 (SD 1.36); Females +0.97 (SD 1.84)
GORD after PEG

- 14/98 required fundoplication after PEG

- Predictors?

  - Microscopic oesophagitis at PEG did not predict need for fundoplication
  - Abnormal 24hr oesophageal pH did not predict need for fundoplication
Mortality after PEG

Survival after PEG for children with neurological disability
Mortality after PEG

- 5 yr survival 61%
- Mortality
  - Not influenced by gender
  - Slight increased risk in older children
    - (30% < 3.5 yr, 49% ≥ 3.5 yr; p=0.064)
  - Not influenced by history of GOR or oesophagitis
  - Not influenced by degree of malnutrition
  - Possibly related to severity of neurological injury and concurrent aspiration
Are they a good thing?
Heine, Reddihough, Catto-Smith. Dev Med Child Neuro 1995

- **Aim**
  - Outcome of PEG on feeding and reflux in 30 children with severe neurological impairment with PEG 1990 to 1993

- **Method**
  - Questionnaire, clinical history, examination, 24-hr pH and endoscopy

- **Results**
  - Gastrostomy placement significantly reduced feeding time, feed-related choking episodes and frequency of chest infections
  - Family stress was significantly reduced in two-thirds of cases
  - Significant weight-gain occurred
  - The clinical severity of GOR was significantly increased in eight patients

- **Conclusion**
  - PEG effectively provides nutrition, improves feed-related stresses, but may exacerbate GOR
Acknowledgements

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Gastrostomies: all you need to know 3rd edition 2006!