The Hierarchy of Evidence

The Hierarchy of evidence is based on summaries from the National Health and Medical Research Council (2009), the Oxford Centre for Evidence-based Medicine Levels of Evidence (2011) and Melynyk and Fineout-Overholt (2011).

I	Evidence obtained from a systematic review of all relevant randomised control trials.
II	Evidence obtained from at least one well designed randomised control trial.
III	Evidence obtained from well-designed controlled trials without randomisation.
IV	Evidence obtained from well designed cohort studies, case control studies, interrupted time series with a control group, historically controlled studies, interrupted time series without a control group or with case- series
V	Evidence obtained from systematic reviews of descriptive and qualitative studies
VI	Evidence obtained from single descriptive and qualitative studies
VII	Expert opinion from clinicians, authorities and/or reports of expert committees or based on physiology

Melynyk, B. & Fineout-Overholt, E. (2011). *Evidence-based practice in nursing & healthcare: A guide to best practice (2nd ed.).* Philadelphia: Wolters Kluwer, Lippincott Williams & Wilkins.

National Health and Medical Research Council (2009). *NHMRC levels of evidence and grades for recommendations for developers of guidelines* (2009). Australian Government: NHMRC. http://www.nhmrc.gov.au/_files_nhmrc/file/guidelines/evidence_statement_form.pdf

OCEBM Levels of Evidence Working Group Oxford (2011).*The Oxford 2011 Levels of Evidence*. Oxford Centre for Evidence-Based Medicine. http://www.cebm.net/index.aspx?o=1025

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Reference *(include title, author, journal title, year of publication, volume and issue, pages)*	Evidence level (I-VII)	Key findings, outcomes or recommendations
Jabbar, A & McClave, S A. Pre-Pyloric versus post-pyloric feeding. Clinical Nutrition (2005) 24, 719-726	VII	- Review both the benefits and risks of pre-pyloric and post-pyloric feeding - Early enteral feeding favourably impacts patient outcome by reducing infectious morbidity and shortening hospital length of stay - Controversy exists over the true risks and benefit of pre-pyloric versus post-pyloric feeding - Post-pyloric feeding associated with fewer interruptions once EN has been started, may reach goal calorie provision sooner, and may reduce the risk of gastroesophageal reflux and aspiration - Minimal overall differences between the two methods of feeding
Ferrie S., et al (2018). Nutrition Support Interest group. Enteral nutrition manual for adults in health care facilities. Dietitians Association of Australia	VII	Indications for jejunal feeding tube: Patients who have impaired gastric emptying or who are at risk of oesophageal reflux, patients post upper GI surgery (jejunal feeding bypasses the surgical site) Advantages: Can be used for early enteral feeding, eg: 4-6 hours after trauma Reduces risk of oesophageal reflux and/or pulmonary aspiration Disadvantages: Potential gastrointestinal intolerance (bloating, cramping, diarrhoea) due to lack of reservoir capacity in jejunum; likely to need pump to control feed rate; unable to use tube aspirates to indicate feeding tolerance; no gastric acid barrier against bacteria Placement: Placement of tubes into the small bowel for nasoduodenal/nasojejunal feeding can be difficult, sometimes requiring endoscopic or radiologically-guided placement.
ASPEN Safe Practices for Enteral Nutrition Therapy. Boullata J I. et al. Journal of Parenteral and Enteral Nutrition. Volume 41 Number 1. January 2017 15–103	VII	Radiographs are the "gold standard" for placement verification, but it is not practical to do frequent x-rays on most patients simply to confirm the position of the tip of the tube. Suggested methods of checking enteral tube placement include marking the point where the feeding taspenube enters the nares or penetrates the abdominal wall (in the case of a gastrostomy or jejunostomy tube) and then assessing whether the mark shifts, or measuring and documenting the visible tube length. Although this technique can give some information, it does not verify the position of the tip of the tube Jejunostomy and gastrojejunal tubes should not be rotated

Gastric vs Post-pyloric feeding: Relationship to Tolerance, pneumonia risk, and Successful Delivery of Enteral Nutrition. Ukleja A and Sanchez-Fermin P, Current Gastroenterology Reports, 2007, 9:309-316	VI	Post pyloric feeding should be considered in pts with gastric intolerance, high risk of aspiration and severe GER, following gastric surgery. Also beneficial if gastric motility is compromised and prokinetics are not successful. Limited evidence. Advantages: Less interruption in nutrient delivery if GRVs not measured. Can achieve EER earlier. Good for pts with acute pancreatitis. Disadvantages: Access is the biggest issue – e.g. passing the tube past the stomach can be difficult if there is dysmotility. Radiologically placed tubes can be time consuming and experienced staff might not be available.
Enteral Feeding in patients with major burn injury: the use of nasojejunal feeding after the failure of nasogastric feeding. Sefton et al, 2002, Burns, 28:386-390	IV	Large percentage of patients with burns are unable to tolerate NGT feeds. Protocol developed to put all pts failing NGT feeds onto NJT feeds prior to PN. NJT attempted in 10pts and deemed successful for meeting requirements and more successful than NGT feeds. No adverse affect on length of feeding when NJT inserted NJT reported to be safer than PN due to increased risk of infection. Difficulties with securing tubes to the face. Siting of NJT can be difficult.

Post Pyloric Feeding, Niv E, Fireman Z and Viasman N, World Journal of Gastroenterology, 2009, March 21, 15(11): 1281-1288	VII	Indication is that post pyloric feeding is preferred to TPN which increases the risk of infection especially in critically ill patients. Post pyloric feeding reduces the likelihood of aspiration and GORD. PPF is Indicated for use in gastroparesis and pancreatitis as does not stimulate pancreatic secretions. NJT feeding is more cost effective than TPN Can use polymeric formulas NJT should be confirmed in place radiologically. Should not use air via the tube to check placement as is used in nasogastric tube placement as it is difficult to distinguish where the tube is placed. Describes placement of jejunostomies. Complications: NJT tend to be blocked as they are longer and of a finer bore. Susceptible to blockage by crushed medications, viscous feeds and inadequate flushing. Recommend flushing every 4-6 hours, before and after feeds. Dense feeds should be avoided. Recommends warm water, coca-cola or pancreatic enzymes to unblock No evidence to support elemental or semi-elemental feeds.
Shaw V (2015) Clinical Paediatric Dietetics, 4th Edition. Oxford, Wiley Blackwell	VII	Indications for feeding into jejunum: • congenital gastrointestinal anomalies • Gastric dysmotility • Severe vomiting resulting in faltering growth • Children at risk of aspiration Feeds delivered into the jejunum should be given slowly via continuous infusion. Jejunal tubes require regular flushing to maintain patency and it is recommended that sterile water always be used

Beckwith et al. A Guide to Drug Therapy in Patients with Enteral Feeding Tubes: Dosage Form Selection and Administration Methods. Hospital Pharmacy, 2004, 39 (3): 225-237	VII	Administering oral medications through the enteral feeding tube can lead to complications like tube clogging or decreased drug activity. Medications may be given via feeding tube if necessary however, clinicians must first evaluate tube type, tube location in the GI tract, site of drug action and absorption, and the effects of food on drug absorption.
Dandeles LM and Lodolce AE. Efficacy of Agents to Prevent and Treat Enteral Feeding Tube Clogs. The Annals of Pharmacotherapy, 2011 ;45:676-80.	IV	Water flushes have been shown to be the most effective method in preventing enteral feeding tube clogging. If an occlusion does occur, sterile water should be used first. Further trials are required to establish the role, dosage and formulation of pancreatic enzymes in treating such clogs.
Scott, R. and Elwood, T. GOSH guideline: Nasojejunal (NJ) and orojejunal (OJ) management. 2015.	V	Indications for jejunal feeding – absent gag reflex, severe GOR, delayed gastric emptying, persistent vomiting. Do not aspirate the NJT as it can cause collapse and recoil of the tube. The tube should be flushed with 3-5ml of sterile water (1-2mls for neonates) using a turbulent flush: pre/post feeds, pre/post medications, 4 hourly if the tube is not in use. When feeding directly into the small bowel, feeds must be delivered continuously via a feeding pump. The small bowel cannot hold large volumes of feed.

The Use of Jejunal Tube Feeding in Children: A Position Paper by the Gastroenterology and Nutrition Committees of the European Society for Paediatric Gastroenterology, Hepatology, and Nutrition 2019. Broekaert I. et al. Journal of Paediatric Gastroenterology and Nutrition. 2019, 69(2): 239-258	IV	There is a lack of expert guidance regarding the indications and practical considerations to optimize its utility and safety in clinical practice. systematic literature search was performed from 1982 to November 2018. In the absence of evidence from randomized controlled trials, recommendations reflect the expert opinion of the authors. Most relevant to this guideline; ESPGHAN expert group recommends: - Radiological placement of an NJT should follow established protocols and training of clinical staff to reduce radiation exposure of patients. - Tip of jejunal tube should be placed beyond the ligament of Treitz to prevent retrograde - Jejunal feeds should be administered continuously via a feeding pump - Starting feeding with standard polymeric formula, and if this is not tolerated switching to a hydrolysed formula. Elemental formula and other hyperosmolar feeds should be used with caution. Thickened and fibre containing feeds should be used with caution due to risk of tube blockage. - Jejunal tube should not be used for administration of medication unless absolutely essential and/or delivery into the stomach is not possible - Perform gastric decompression and aspiration in children being fed via jejunal feeding tube who have high risk of GOR and pulmonary aspiration due to accumulation of gastric residue and abdominal distension - Flush jejunal feeding tube with small amounts of warm water before and after administration of EN and medication, or when changing the bag/bottle in the case of continuous jejunal feeds - Use a closed system for preparation of the feed to avoid infection and error - Monitor serum levels of copper, zinc, selenium, and iron for nutritional deficiencies in all patients who receive long term JTF.

A Natural History of Gastrojejunostomy Tubes in Children. Wilson RE. et al. Journal of Surgical Research. 2020, 245:461-466	IV	- GJ tubes offer a safe and effective feeding option in patients intolerant of gastric feeding. GJ tubes fail most commonly from intrinsic structural or mechanical issues, Exchange of tubes without anesthesia is a viable option. - Limited literature on the lifespan of GJ tubes, reasons for failure, and recommendations for optimal techniques and timing of replacement. Further studies can help define optimal timing for exchange of GJ tubes. - Further research is needed to help define which patients are best served with a GJ versus alternatives such as fundoplication in addition to the best timing for transition or conversion.