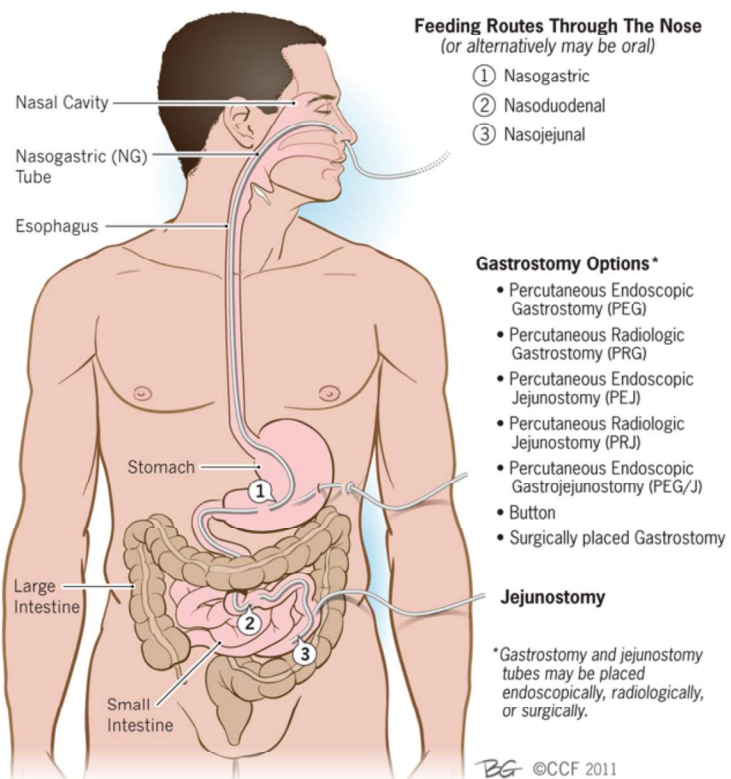


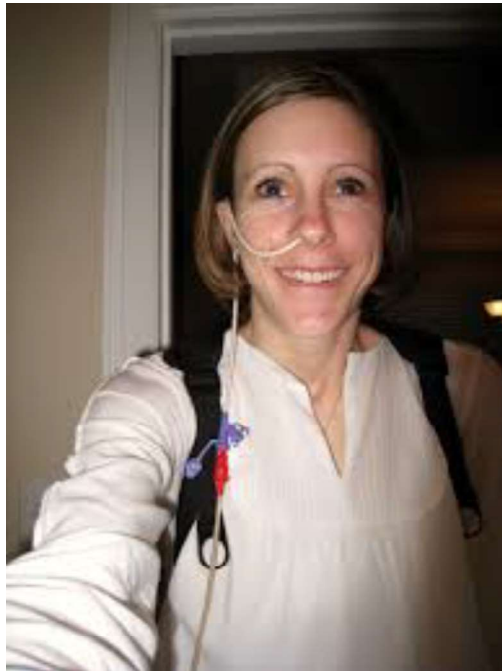
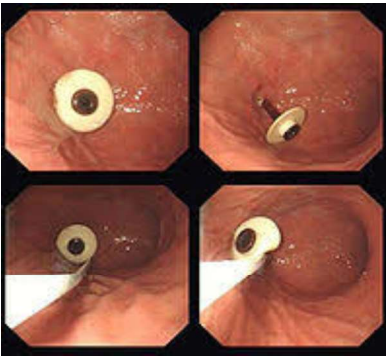
Enteral Nutrition via tubes

- Indications
 - Severe swallowing disorders:
 - CVA, neurological conditions
 - Impaired motility in the upper GI tract
 - GI obstructions and fistulas that can be bypassed with a feeding tube
 - Certain types of face, neck, or intestinal surgeries
 - Little or no intake for extended periods

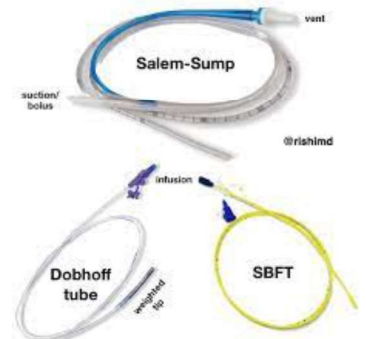
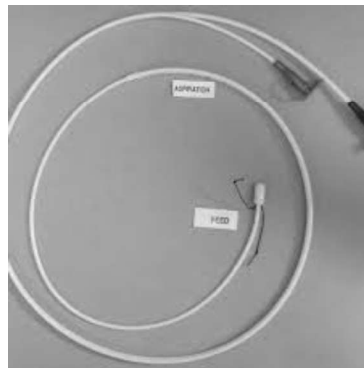
Factors of EN tubes

- Factors in selecting types of routes
 - Expected duration of feed
 - < 4-6 weeks: NG, NJ
 - > 4-6 weeks: PEG, PEJ
- Gastric feedings (nasogastric and gastrostomy routes)
 - Preferred whenever possible
 - Avoided in patients at high risk of aspiration





- Feeding tubes
 - Soft, flexible materials
 - Tube selection factors •
 - Patient's age and size, the feeding route, and the formula's viscosity
 - Outer diameter measured in French units •
 - 1 French unit = 1/3 mm; 12 French = 4 mm –
 - Double-lumen tubes
 - Intestinal feedings and gastric decompression
- Enteral feed formula
 - – GI function, Nutrient and energy needs, Fluid requirements, Need for fibre modifications, Individual tolerances (food allergies and sensitivities)



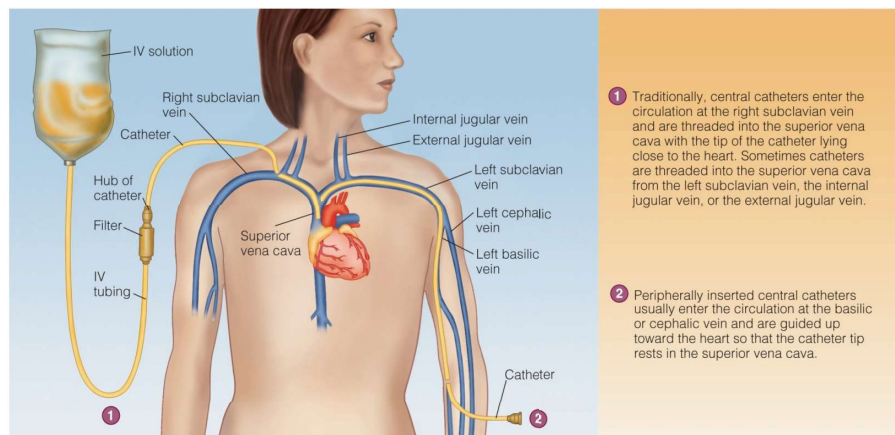
-
- What can you put through the tubes?
 - Feed
 - Fluid
 - Crushed medications: check with pharmacist
 - Complications
 - Types of tubes specific
 - Bleeding, infection, dislodge, aspiration, buried bumper, refeeding syndrome
 - Tube feeding discontinued when oral intake supplies $\sim 2/3$ of estimated nutrient needs

Parenteral Nutrition

- Supply of nutrients directly into the bloodstream via IV partially or completely provide nutritional requirements.
- Indication
 - Blockage of the gut (obstruction) or the gut failing to work
 - Perforations of the gut where feeding will result in worsening infections
 - Where a large part of the gut has been removed and the patient cannot absorb enough food (short bowel syndrome)
 - Where parts of the bowel are diseased and not able to absorb properly (functional short bowel)
 - Severe malnutrition and intolerant to EN



- Peripheral Parenteral Nutrition (PPN)
 - Peripheral venous access
 - Candidates: short term PN only, no high nutrition needs
- Total Parenteral Nutrition (TPN)
 - Central venous access
 - Candidates: long term PN requirement, nutrient dense solution



- What can you put through the tubes?
 - Customized PN: protein, carbohydrate, lipids, vitamins,...etc
 - Fluid
 - Medication added to the customized PN: check with pharmacist
- Discontinuing parenteral nutrition
 - Patient must have adequate GI function and minimal risk for aspiration
 - Discontinued when 60% to 75% of nutrient needs provided by other means
 - Suppressed appetite can make transition to an oral diet difficult

TABLE 15-3 Potential Complications of Parenteral Nutrition

Catheter-Related

- Air embolism
- Blood clotting at catheter tip
- Clogging of catheter
- Dislodgment of catheter
- Improper placement
- Infection, sepsis
- Phlebitis
- Tissue injury

Metabolic

- Electrolyte imbalances
- Gallbladder disease
- Hyperglycemia, hypoglycemia
- Hypertriglyceridemia
- Liver disease
- Metabolic bone disease
- Nutrient deficiencies
- Refeeding syndrome

Refeeding syndrome

- It was first described in far east prisoners of war after WWII. Eating after a period of prolonged starvation, seemed to precipitate cardiac failure. The pathophysiology of refeeding syndrome has now been established. Clinical symptoms are:
 - hypophosphataemia, hypopotassemia en hypomagnesemia;
 - glucose-intolerance;
 - thiamine (B1) deficiency;
 - Organ failure and oedema.
-
- The refeeding syndrome can occur with parenteral as well as enteral feeding. Patients with anorexia nervosa, cancer, alcoholism and some patients after operations have a high risk of refeeding syndrome. Also patients with neurological dysphagia who are being fed through a tube are at risk.

Refeeding syndrome prophylaxis

- be alert for the existence of the syndrome and recognise patients at risk;
- Screen and supplement phosphate and if necessary magnesium, potassium and thiamine before restarting nutrition
- Start with a caloric intake < 20 kcal / kg per day
- consult a dietician;
- when caloric intake increases;
- evaluate bodyweight daily in case of oedema;
- slowly increase the volume, monitor cardiac vital and fluid balance;
- monitor phosphate, potassium, magnesium and glucose

Case 1

- 60 year old man, John
- Head and Neck cancer
 - chemotherapy and surgery
- Significant weight loss: 80kg to 65kg in 3 months
- Malnutrition?
- Does he need nutritional support?
- If so, what type?



Case 2

- 50 year old man, Steven
- Motor Neuron Disease: Bulbar type
- Early sign of swallowing difficulties
- Weight: 70kg to 68kg in 12 months
- Does he need nutritional support?
 - What type?



Case 2

- Day 40, surrounding redness with discharge
- Ongoing leakage
- Antibiotics orally/PEG tube
 - No improvement.
- Fever.
- CT abdomen
- Admitted for IV antibiotics



Take home messages

- Early detection of malnutrition
- Appropriate nutritional support is crucial for better outcome
- Food and supplement are first options!
- Consider alternative
 - Assessed by dietician/gastroenterologist
- Watch out for complications