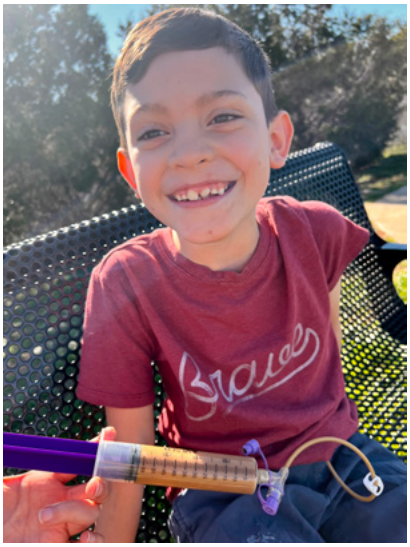
PRACTICE TOOL

Role of Enteral Nutrition in Managing Pediatric Malnutrition

Pediatric Malnutrition

Pediatric malnutrition or undernutrition is defined by ASPEN as an imbalance between nutrient requirement and intake, resulting in cumulative deficits of energy, protein, or micronutrients that may negatively affect growth, development, and other relevant outcomes.[1] It is underrecognized due to a lack of a uniform definition. Reported prevalence of illness-related malnutrition is 6%–51% in hospitalized children. In a recent survey of pediatric clinicians, they reported that 27% of all hospitalized children who screened positive went on to be assessed and diagnosed with malnutrition.[2]

Malnutrition is particularly concerning in pediatric patients with special needs, as disability and nutrition status interact in many ways. Feeding problems related to anatomic or motor impairments, nutrient malabsorption, or social exclusion are some of the factors in which an underlying disability can increase the risk of malnutrition.[3] Enteral nutrition (EN) is a vital component of therapy and allows for the delivery of nutrients to those who cannot maintain adequate intake by oral means alone.[4]



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Impact of Malnutrition on Health Outcomes

Pediatric malnutrition, despite the cause, can lead to impaired growth and delay in developmental milestones. In hospitalized children, it is associated with higher rate of infection, poor wound healing, longer lengths of stay, and increased cost.[1,5] More recently, in children who underwent heart surgery, it was found that being underweight was the strongest predictor of adverse outcomes.[6] A recent meta-analysis confirmed these findings in almost 35,000 PICU patients that undernutrition was independently associated with poor outcomes as compared to those with overnutrition.[7] These clinical outcomes included:

- ↑ **Risk of Mortality**
- ↑ **Need for and Duration of Mechanical Ventilation**
- ↑ **PICU and Hospital Length of Stay**

Use of Enteral Nutrition in the US

EN is a vital component of nutrition support used around the world. EN allows for delivery of nutrients to those who cannot maintain adequate nutrition by oral intake alone.[4]

A survey of hospital-based pediatric clinicians found that of the 27% of hospitalized children identified as malnourished, 25% of them did not have a nutrition intervention ordered.[1] According to 2010 HCUP data, only 7.6% of hospitalized children diagnosed with malnutrition received enteral nutrition.[5] In 2018, the reported rate of EN use in children with coded malnutrition had increased to 24.5%.[8]

When is EN Appropriate for Pediatric Patients?

EN is recommended for children who are unable to meet their nutritional requirements orally. When the gastrointestinal (GI) tract is functional and safely accessible, this preference is especially marked for several reasons:[9]

- Supports normal endocrine, paracrine, and neural function
- Improves mesenteric blood flow
- Decreases GI tract permeability and prevents structural and functional alterations of the gut barrier
- Promotes pancreatic and biliary secretions
- Lowers the risk of metabolic complications (glucose and electrolyte disturbances, aluminum toxicity) compared to PN
- Reduces infection risk
- Lowers cost
- Maintains gut-related immune system function
- Reduces rate of intensive care unit (ICU) mortality
- Decreases length of hospital stay
- May decrease mechanical ventilation time

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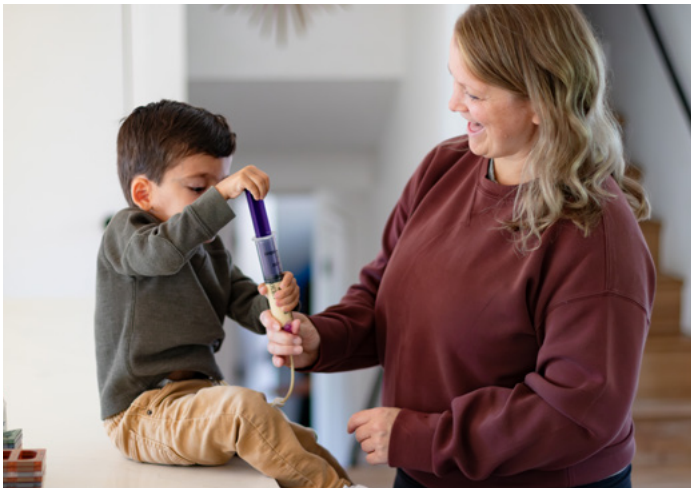
Indications

EN may be the appropriate therapy for infants and children with a variety of diagnoses, for short-term or long-term support. If the GI tract is functional, EN is indicated and would be the preferred mode of nutritional support. The use of EN should be considered after a number of other oral interventions have been attempted. In situations where the GI tract is not fully functional, EN supplemented by PN may be indicated.[10] The indications for EN generally fall into the following categories:[9]

- Inadequate oral intake such as from the following conditions or factors:[9]
  - medical (e.g., intubation/mechanical ventilation)
  - developmental (e.g., preterm infants, neurologic decline)
  - behavioral (e.g., feeding aversions, fatigue)
  - anatomical (e.g., malabsorption, cancer, burns, mucositis)
  - environmental (e.g., improper formula mixing)
- Swallowing dysfunction, perhaps from anatomical or developmental issues such as tracheoesophageal fistula or cerebral palsy
- Altered intestinal function such as with malabsorption, due to cystic fibrosis or short bowel syndrome

Contraindications

Contraindications can be absolute or relative. Contraindications may include ileus, perforation, obstruction, GI bleeding, hemodynamic instability, or inability to place a feeding tube safely. The ability to feed a child enterally needs to be taken on a case-by-case basis.[9]



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Timing

The timing may vary based on the child's condition.

- In critically ill children, the ASPEN guidelines suggest, early initiation of EN, within the first 24–48 hours after admission to the PICU, in eligible patients. They also suggest the use of institutional EN guidelines and stepwise algorithms that include criteria for eligibility for EN, timing of initiation, and rate of increase, as well as a guide to detecting and managing EN intolerance.[11]
- In non-critically ill patients who are malnourished and candidates for this therapy, begin EN once enteral access is established.[9]

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