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How to manage gastroenterological and nutritional problems in children with neurological impairment

A short guide based on the 2017 European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) Consensus Guidelines[1]

The need for the ESPGHAN consensus

Children with neurological impairment (NI) frequently have feeding and swallowing problems which can be associated with undernutrition, growth failure, micronutrient deficiencies, osteopenia, and nutritional comorbidities. Prior to this ESPGHAN consensus, there was a lack of systematic approach to the care of children with NI.

Assessing nutritional status

A multidisciplinary team (MDT) is recommended to perform nutritional evaluation and management. An ideal MDT includes a physician, dietitian, nurse, speech therapist, physical therapist, psychologist, and occupational therapist.

How to assess nutritional status

Routine nutritional assessments by MDT

Weight and height measurements should not be solely relied on

Knee height or tibial length should be measured to assess linear growth when height cannot be measured

Measurement of **fat mass by skinfold** thickness should be a routine component of the nutritional assessment

Anthropometry should be checked at least every **6 months**

Laboratory assessments

- Assess micronutrient status (e.g. vitamin D, iron status, calcium, phosphorus) as part of nutritional assessment
- Micronutrients should be checked annually

How to identify undernutrition

Undernutrition should be assessed based on the interpretation of anthropometric data.

Standard growth charts are not helpful as growth patterns vary from the general pediatric population. Cerebral palsy specific growth charts may not be recommended to identify undernutrition.

Red flag warning signs to identify undernutrition:

- Physical signs of undernutrition such as decubitus skin problems and poor peripheral circulation
- Weight-for-age z-score <-2
- Triceps skinfold thickness <10th percentile for age and sex
- Mid-upper arm fat or muscle area <10th percentile
- Faltering weight and/or failure to thrive

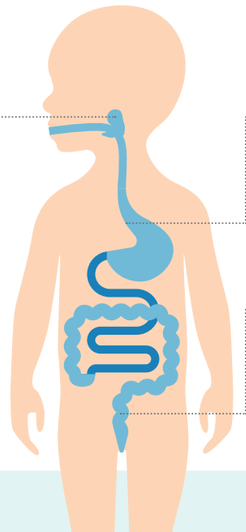
Nutritional requirements

	Requirements	How to assess requirements
Energy	• **Energy requirements are difficult to define in children with NI** • Energy requirements must be **individualized** to take into account mobility, muscle tone, activity level, altered metabolism, and growth • Immobile patients dependent on a **wheelchair require only 60–70% of the energy** of typically developing children • Children with NI who can **walk or have athetosis** have **higher energy requirements**	• Energy needs can be estimated using Dietary Reference Intake (DRI) for basal energy expenditure for normally developing children
Protein	• Problems with protein intake may arise when calorie needs are low • Only use supplementary protein in specific clinical situations, such as decubitus ulcers, or in children with low energy requirements	• DRIs can be used, as protein requirements are similar to healthy children
Fluid	• **High risk of dehydration** caused by inability to communicate thirst, drooling or unsafe swallowing • **Excessive salivary secretion** is a clinical symptom of children with NI	• Monitor hydration status closely
Micronutrients	• **Micronutrient deficiency** is common, particularly where nutritional supplements are not being received • Children who are **tube-fed** may develop **nutritional deficiencies** as nutritional formulas provide adequate micronutrients only when **sufficient volumes are consumed**	• DRI for micronutrients in typically developing children can be used to estimate the appropriate micronutrient intake for children with NI • Vitamin D supplements may be required

Gastrointestinal issues

Oropharyngeal dysfunction (OPD) >90% prevalence

- Feeding history taken from early infancy and direct visual assessment of feeding by appropriately trained professionals is recommended
- Consider OPD in all patients even with no obvious clinical signs or symptoms
- OPD is a risk factor for undernutrition
- Growth and nutritional status should be monitored regularly



Gastroesophageal reflux disease (GORD) 70% incidence

- Consider modifying enteral nutrition (thickening of liquid enteral formulas) and the use of whey-based formulas as options for the management of GORD

Constipation

- Consider increasing fluid and fiber intake in addition to other therapeutic options for constipation

Dietetic management and monitoring

Which type of diet?

1st choice:

- Oral feeding is preferred in all children when it is nutritionally sufficient, safe, stress-free, and feeding time is not prolonged
- Follow-up period of 1–3 months when trialling oral feeding, but more frequently in infants and severely malnourished patients

Consider switching to enteral tube feeding if:

- Severe OPD (dysphagia, unsafe swallow) has associated repeated pulmonary aspirations, pneumonias, dehydration, and/or life-threatening events
- Total oral feeding time exceeds 3 hours per day
- Where inadequate oral intake manifests as insufficient weight gain or a decrease in height velocity

Ethical consideration: Parents and/or caregivers should always be involved in decision-making including about gastrostomy feeding.

Enteral feeding – which type of enteral product?

Children <1 year old:
Human milk, standard infant milk formula or nutrient-dense formula (1.0 kcal/mL) if clinically indicated

Children with increased energy requirements or poor volume tolerance:
High-energy density formula (1.5 kcal/mL) containing fiber. Must monitor hydration carefully

Children >1 year old:
Standard (1.0 kcal/mL) polymeric age-appropriate formula including fiber

Children with low energy needs:
Low-fat, low-calorie (0.75 kcal/mL), high-fiber and micronutrient-replete formula

Children with GORD or gagging and retching:
Whey-based formula

CAUTION: There are nutritional adequacy and safety concerns around puréed food for enteral tube feeding.

Bolus or continuous?

Consider using a combination of nocturnal continuous feeds with daytime bolus feeds in children with high-caloric needs or poor tolerance to volume.

Which type of tube?

Consider using a gastrostomy to provide intragastric access for long-term tube feeding.

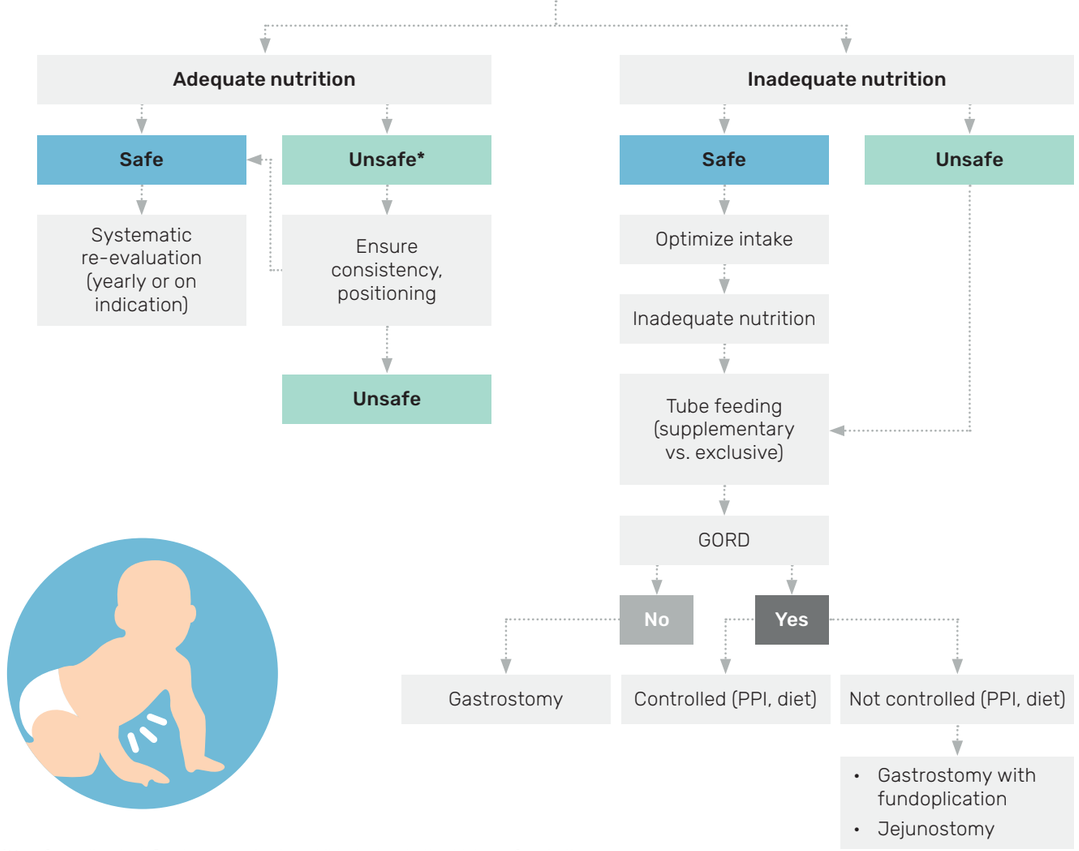
Consider using jejunal feeding in cases of aspiration due to GORD, refractory vomiting, retching and bloating.

Conclusion

- Nutritional evaluation and management should be performed by an MDT
- Accurate nutritional assessments should be carried out to monitor nutritional status
- Oral feeding is the preferred option in children with NI if it is nutritionally sufficient, safe, stress-free and feeding time is not prolonged
- Enteral tube feeding is recommended in cases of unsafe or inefficient oral feeding, preferably before the development of undernutrition
- Follow-up anthropometry is important and micronutrient markers should be checked annually
- Parents and/or caregivers should be involved in decision-making, especially around gastrostomy feeding

Multidisciplinary nutritional assessment of the neurologically impaired child:

- weight, length, triceps skinfold
- dietary history (e.g. meal duration)
- evaluation of oral motor function



*Unsafe swallow is defined as occurring in a child who has both a history of aspiration pneumonia (antibiotics or hospital admission for chest infection) and objective evidence of aspiration or penetration on contrast video fluoroscopy.

GORD: gastroesophageal reflux disease; PPI: proton pump inhibitor.

Reference

1. Romano C, et al. J Pediatr Gastroenterol Nutr. 2017;65(2):242-264.

This guide has been reproduced for Healthcare professional use only from the ESPGHAN Consensus Guidelines for the Evaluation and Treatment of Gastrointestinal and Nutritional Complications in Children with Neurological Impairment.

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