

Oral nutritional supplementation: a user's guide

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Abstract

Oral nutritional supplements (ONS) are substances taken by mouth as an addition to the child's usual diet. They can benefit a child who does not manage to ingest and absorb sufficient nutrients to grow and develop in the usual way. ONS can be used in the management of a wide range of medical conditions such as neurodevelopmental disorders with associated dysphagia, intestinal inflammatory disorders e.g. Crohn's disease and non-IgE slow onset food allergies (when a protein hydrolysate or amino-acid based ONS is usually needed) major organ failure or in areas of food insecurity to avoid starvation. Appropriate use at the earliest opportunity may preclude or postpone the need to insert an artificial feeding device. Once on treatment children need to be reviewed at least 6-monthly by a dietitian as well as a paediatrician.

Keywords child; faltering growth; intestinal failure; macronutrients and micronutrients; oral nutritional supplement

Definition

A nutritional supplement is any food substance that can be added to the diet to provide macro and/or micro nutrients. Oral Nutritional Supplements (ONS) are taken by mouth. They are made up in the form of sterile liquids, semi-solids or powders. ONS use must be approved by the Advisory Committee on Borderline Substances (ACBS). ONS are used to achieve and/or preserve nutritional status and support normal growth when the child is unable to do so from their diet alone. The term ONS is usually used for a supplement containing a combination of nutrients such as protein and/or energy macronutrients and may also contain micronutrients - vitamins and minerals. The concentration of each nutrient varies between ONS. Most ONS are not nutritionally complete and should be used as a supplement rather than the sole source of nutrition. In some children individual nutrients such as vitamin D or iron given to treat a specific nutrient deficiency may be required alone or in combination with other nutrients. ONS are used on a world-wide basis. [Table 1](#) indicates some of the conditions in which they are used.

Pathology

Children in need of ONS will usually have faltering growth. Good nutritional intake is essential for maintaining health and well-being. In childhood sufficient nutrients are also needed for

Abbreviations: IBD, Inflammatory Bowel Disease; NG, Nasogastric tube; ONS, Oral nutritional supplement; SBS, Short Bowel Syndrome.

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Diagnoses of children with faltering growth and gastrointestinal symptoms* who may benefit from an ONS

Allergic or atopy-related gastrointestinal disease
 Cardiac disease
 Chronic kidney disease
 Coeliac disease
 Cystic Fibrosis
 Dysphagia & feeding difficulties
 Endocrine and metabolic disorders
 Fabricated/induced illness
 Genetic related e.g. certain clinical syndromes
 Inflammatory bowel disease
 Malabsorption – other
 Malignancy
 Neurodevelopmental disorders
 Orthopaedic/spinal disease or injury
 Premature infant
 Short bowel syndrome (SBS)
 Starvation related mal/undernutrition
 Surgery: Pre-operative preparation and post-operative recovery of undernourished patients

*Disease related malnutrition (chronic/acute) should be excluded before starting longer term treatment with an ONS.

Table 1

physical growth and development. Nutritional needs are greatest in infancy with the fastest physical growth during the first two years of life. Growth rate then slows down to 6 cm or 2.5 inches/year in mid-childhood and increases again with the adolescent growth spurt. During adolescent growth spurts boys grow at an average of 10.4 cm per year (4.1 inches) and girls grow at 8.9 cm per year (3.5 inches). Half the expected adult weight is gained during adolescence. Some children who fail to gain weight and grow at the expected rate may need an ONS.

Short-term conditions

The inability to maintain a good nutritional state with oral diet alone may be associated with an acute disorder, for example acute infection, trauma or burns injury that rapidly resolves. Probably the most common use of an ONS is oral rehydration solution in the management of acute gastroenteritis. Other children may benefit from an ONS after an acute episode of catabolism, e.g. major trauma, burn or acute starvation in order to regain an anabolic state. If a child is in a poor nutritional state prior to under-going a surgical procedure, ONS may provide a nutritional boost to achieve a better nutritional state with a more rapid recovery post-operatively.

An ONS can be required in the short term in the neonatal period. A commercial multi-nutrient breast milk fortifier is recommended for the breast fed premature infant of less than 33 weeks gestation rather than attempting to offer individual nutrients.

Chronic conditions

Other children have chronic difficulties with feeding or absorption that are usually related to an underlying medical disorder.

Please see [Table 1](#) and section below on diagnoses that may benefit from ONS.

Diagnosis in children requiring an ONS

A child who needs an ONS is highly likely to have low weight. *Taking anthropometric measurements and plotting them on an age-appropriate UK/WHO centile chart is essential.* Sequential plots will almost certainly be falling through the weight centile for age. To decide whether the child is in a poor nutritional state it is essential to plot the height centiles as well. If the height centile is at least two centiles above the weight centiles the child is significantly under-nourished.

History

A full medical history needs to be obtained including any weight loss. Information on gastrointestinal symptoms any acute illnesses needs to be gained. For example a chronic condition such as coeliac disease may be precipitated by an acute illness. However, bear in mind that a pre-existing chronic condition may be exacerbated by an acute illness.

Past medical history should include birth history, whether or not the child was breastfed, history of infantile colic or need to change to different infant milk formulations (suggestive of non-IgE mediated slow onset food allergy) and feeding history e.g. slow feeding and dislike of lumpy food (suggestive of gastro-oesophageal reflux).

Physical examination

Anthropometric measurement is essential. The diagnosis of faltering growth is made when repeated measurements of height/length and weight demonstrate that the child is falling through the centiles or that the weight is more than two centiles below the height centile. A thorough physical examination should be done to check for any physical abnormalities suggestive of chronic disease. The common important sequelae of poor nutrition or relevant chronic diseases include nail changes (clubbing, colour and texture changes), presence of lanugo hair, peripheral oedema and/or buttock wasting.

Investigations

If a child is considered to need an ONS by a health professional, s/he should be referred for specialist paediatric assessment and investigation of possible underlying diseases. If faltering growth is apparent ONS may still be needed, but additional treatment may also benefit the child and bring them more rapidly back to full health. For example, if coeliac disease is diagnosed and treatment with a gluten free diet started the child's condition may improve rapidly within a few weeks. In contrast if a diagnosis of cystic fibrosis is made nutritional supplements may be required in the longer term. A suggested list of investigations is summarized in [Box 1](#).

Measurement of bone age is sometimes helpful. If the bone age is very delayed it is possible that the child was gaining weight and growing at the appropriate rate even before the ONS treatment was commenced and that with time the child will gain weight and grow appropriately. If in an older child the bone age has reached 16 years and the epiphyses are fused no amount of nutritional improvement can change the height achieved. An ONS to give extra calories should be stopped.

General Investigations for a child requiring ONS

1. Plot the growth

When attending any health appointment for any condition (in primary or secondary care) it is good practice to check the weight height and if under 2 years old, head circumference and plot on the centile chart in the child's hand held health record. If the child is acutely unwell, e.g. in intensive care the most recent height from out-patient notes or requested from parents should be used.

2. Check the urine

Urinary microscopy, culture and sensitivity for urinary tract infection. Urine dipstick for protein, leucocytes, blood and glucose.

3. Useful blood tests

Full blood count (FBC), ESR and CRP, urea, electrolytes, creatinine, liver function tests, thyroid function tests and coeliac screen.

Investigations sometimes useful according to patient's history

- Bone age
- Faecal calprotectin (suspected intestinal inflammation)
- Faecal elastase (suspected pancreatic insufficiency)
- Radiological cine-contrast study to check for possible aspiration of fluids with speech therapist observation to check for an 'unsafe' swallow with liquids (videofluoroscopy)
- Upper intestinal contrast study (suspected intestinal malrotation or stricture/web)
- Sweat test (suspected cystic fibrosis)
- Upper intestinal endoscopy with mucosal biopsies (suspected eosinophilic oesophagitis, gastritis or small intestinal enteropathy)
- 24-hour oesophageal pH/impedance study (suspected gastro-oesophageal reflux)
- Radionuclear labelled liquid and/or semi-solid meal to assess gastric emptying
- Genetic screening and specialist genetic review
- Hospital admission for observation e.g. if fabricated or induced illness is suspected.

Box 1

Specific pathologies that may benefit from an ONS

The following conditions benefit from treatment with an ONS in certain circumstances:

Atopic disease & food sensitive enteropathy

A proportion of children with eczema and asthma have food related symptoms. Many of these children have an enteropathy associated with non-IgE 'slow-onset' food allergies. An ONS that excludes the offending antigen/s (most commonly cow's milk, soya, egg and/or wheat protein) is required if nutritional intake is poor. In children with inadequate weight gain when given an alternative to cow's milk, e.g. rice, soya or nut based milk a protein hydrolysate (usually derived from cow's milk, pork or other protein sources) or elemental ONS is needed.

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