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Poor weight gain in infants and children

INTRODUCTION — During infancy and childhood, children gain weight and grow more rapidly than at any other time in life. However, some children do not gain weight at a normal rate, either because of expected variations in growth related to genetic potential, being born prematurely, or because of undernutrition, which may occur for a variety of reasons. Undernutrition is sometimes called a growth deficit or failure to thrive.

It is important to recognize and treat children who are not gaining weight normally because it may be a sign of undernutrition or an underlying medical problem that requires treatment. Undernutrition can have complications, such as a weakened immune system, shorter than normal height, or difficulties with learning. These complications are more common in children who are undernourished for a long period of time.

HOW IS POOR WEIGHT GAIN DEFINED? — Poor weight gain is defined as gaining weight at a slower rate than other children who are the same age and sex. "Normal" ranges for weight and height are based upon the weight and height of thousands of children. In the United States, standard growth charts are published by the National Center for Health Statistics (NCHS); these charts are available for boys and girls and are appropriate for all races and nationalities.

Weight gain normally follows a predictable course from infancy through adolescence. However, some children do not gain weight normally from birth, while other children gain weight normally for a while, then slow or stop gaining weight. Weight gain usually slows before the child slows or stops growing in length.

CAUSES — Poor weight gain is not a disease, but rather a symptom, which has many possible causes. The causes of poor weight gain include the following:

- Not consuming an adequate amount of calories or not consuming the right combination of protein, fat, and carbohydrates
- Not absorbing an adequate amount of nutrients
- Requiring a higher than normal amount of calories
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Poor weight gain can occur as a result of a medical problem, a developmental or behavioral problem, lack of adequate food, a social problem at home, or most frequently, a combination. Common causes of poor weight gain for each age group are described below:

- Prenatal — Small for age at birth (called intrauterine growth restriction); prematurity; prenatal infection, birth defects; exposure to medications/toxins that limit growth during pregnancy (eg, anticonvulsants, alcohol).
- Neonatal (<1 month) — Poor quality of suck (whether breast- or bottle-fed), incorrect formula preparation; breastfeeding problems; inadequate number of feedings; poor feeding interactions (eg, infant gags or vomits during feedings and parent assumes child is full); neglect; birth defects that affect the child's ability to eat or digest normally
- Three to six months — Underfeeding (sometimes associated with poverty or not understanding dietary needs of infants); improper formula preparation; milk protein intolerance; problems with child's mouth/throat; medical problems that affect absorption of nutrients (celiac disease; cystic fibrosis); medical problems that increase the number of calories needed (congenital heart disease), gastroesophageal reflux.
- Seven to 12 months — Feeding problems (eg, struggles between the child and parent about what will be eaten; problems with the child's mouth that make it hard to adapt to textured foods, not introducing solids by six months of age; refusal to eat new foods when first offered, and then not offering the food again); intestinal parasites.
- Over 12 months — Easily distracted at meal time; illness; new stress at home (divorce, job loss, new sibling, death in the family, etc.); social issues (underfeeding related to fear of overfeeding, limiting food choices, poverty).

DIAGNOSIS — If an infant or child slows or stops gaining weight, it is important to try to determine and treat the underlying cause. The first step is a complete medical history and physical examination. Most children will not require blood testing or imaging tests, although testing may be recommended in certain situations.

The parent(s) should mention if the child has any of the following:

- Vomiting, diarrhea, or rumination (swallowing, regurgitating, then re-swallowing food)
- Avoids foods with particular textures (eg, hard or crunchy), which may be a sign of a problem with chewing/swallowing
- Avoids types or groups of food (eg, milk, wheat), which can be a sign of a food allergy or intolerance
- Drinks large amounts of low-calorie liquids or fruit juices. Drinking these beverages may prevent the child from eating solid foods, which contain more calories.
- Follows a restricted diet (vegetarian, wheat or lactose free, etc.)

Parents should also mention if they have eliminated foods from the child's diet due to concern about the effects of these foods (eg, abdominal pain, diarrhea, "hyperactivity").

The provider may also ask about the child's household, including who lives in the child's house, if there have been recent changes or stresses (eg, divorce, illness, death, new sibling), or if anyone in the house has a medical or psychiatric illness. The provider may also ask about the food supply (eg, if there have been days when anyone in the family went hungry because there was not enough money for food). Although these questions can be difficult to answer, it is important to be honest.

In some cases, the provider will ask the parent(s) to keep a record of everything the child eats and drinks for a few days. This can help to determine if the child is eating an adequate number and type of calories.

TREATMENT — The goal of treatment is to provide the child with adequate nutrition so that he or she can "catch up" to a normal weight. There is a range of normal weights for a particular age. Catch-up growth may require changes to the child's diet, feeding schedule, or feeding environment. The parent and healthcare provider should work together to develop a plan that meets the needs of both the child and the family.

The type of treatment needed depends upon the underlying cause of poor weight gain, any underlying medical problems, and the severity of the situation.

- Most children who are mildly to moderately malnourished can be managed at home with help from the child's healthcare provider, and in some cases, other specialty providers (eg, dietitian, occupational or speech therapist, social worker, nurse, developmental specialist, child-life worker, psychiatrist).
- Children who are severely malnourished are usually hospitalized initially. While in the hospital, the child's diet and weight can be monitored closely.

Nutritional therapy — Nutritional therapy is the primary treatment for children with poor weight gain. The goal of nutritional therapy is to enable "catch up" weight gain, which is usually two to three times the normal rate of weight gain for the child's age. The best way to increase calorie depends upon the child's age and nutritional status; individual recommendations should be determined by the child's healthcare provider or dietitian. A multivitamin supplement may be recommended in some cases.

For infants — The number of calories in breast milk can be increased by pumping the breast milk and adding a predetermined amount of formula powder or liquid concentrate. This combination is called fortified human milk. (See "Patient information: Breast pumps"). This treatment should be undertaken with the supervision of a healthcare provider or dietitian.

The number of calories in infant formula can be increased by adding less water to powder or liquid concentrate, or by adding a calorie supplement, such as polycose or corn oil. As above, this treatment should be undertaken with the supervision of a healthcare provider or dietitian. Infants between zero and four months require frequent feedings, typically eight to 12 per day; older infants typically require four to six feedings per day. In older infants, calorie intake can be increased by adding rice cereal or formula powder to pureed foods.

For older children — In older children, calorie intake can be increased by using high-calorie milk drinks instead of milk, or adding cheese, butter, or sour cream to vegetables. Other ideas are provided in table 1 .

During catch-up growth, the amount of calories and protein that a child eats is more important than the variety of foods eaten. For example, if a child is willing to eat chicken nuggets and pizza, but refuses all vegetables, this is acceptable. At meal and snack time, solid foods should be offered before liquids. Fruit juice should be limited to four to eight ounces of 100 percent juice per day.

The older child should eat often (every two to three hours, but not constantly). The child should have three meals and three snacks on a consistent schedule. Snacks should be timed so that the child's appetite for meals will not be spoiled (eg, snack time should not occur within one hour of meal time; snacks should not be offered immediately after an unfinished meal). Examples of healthy snacks include crackers, peanut butter, cheese, hard boiled eggs, pudding, yogurt, fresh fruit or vegetables, or pretzels. A multivitamin and mineral supplement may be recommended in some cases.

Eating environment — Changes to the area where the child eats may help the child to eat more. All members of the child's household should be aware of the importance of these changes.

- The child should be positioned so that the head is up and the child is comfortable. The child should be allowed to feed him/herself (eg, by holding a bottle or eating finger foods), but may need to be fed soft foods with a spoon. A certain amount of messiness is to be expected as the child learns to feed him/herself. Allow the child to finish eating before cleaning up.
- Meal time distractions, such as tv, phone calls, and loud music, should be minimized.
- Make meal time routines consistent, no matter who feeds the child.
- Meal time should be relaxed and social; eating with other family members and pleasant conversation (not related to how much the child eats) are encouraged. Eating with others allows the child to observe how others make food choices, hopefully encouraging healthy eating habits.
- Do not be discouraged if the child refuses a new food. New foods may need to be offered multiple times (even up to 10) before they are accepted.
- Meal time should be free of battles over eating; caretakers should encourage, but not force, the child to eat; food should not be withheld as punishment. In addition, food should not be offered as a reward.
- The child should be praised when he or she eats well, but not punished when he or she does not.

Additional tips are provided in table 2 (show table 2).

Medical treatment — Children who have an underlying medical problem that is limiting weight gain are usually managed by their primary healthcare provider (eg, pediatrician, family practitioner) in addition to a specialist (eg, an allergist for a child with food allergies, a gastroenterologist for a child with gastroesophageal reflux). These specialists can provide guidance regarding the need to eliminate certain foods. Foods and groups of food (eg, milk products) should not be eliminated without the advice of a knowledgeable healthcare provider because this can further increase a child's risk of undernutrition.

Children who are undernourished are at risk for complications, including an increased risk of developing common infections, such as colds. Normal infection prevention techniques, such as handwashing and avoiding exposure to sick friends or family, are encouraged. However, it is not usually necessary to take additional precautions (eg, by preventing the child from attending day care or school). Childhood vaccinations should continue to be given on schedule; immunizations that have been missed should be updated. (See "Patient information: Immunizations for infants and children age 0 to 6 years" and see "Patient information: Immunizations for children age 7 to 18 years").

Developmental and behavioral treatment — Developmental and behavioral problems can increase a child's risk of being underweight. For example, if a child has difficulty chewing or swallowing food, he or she may not be able to consume an adequate number of calories.

In the United States, early intervention programs can provide developmental stimulation and physical and occupational therapy when needed. Some children also benefit from seeing a developmental behavioral pediatrician or behavioral psychologist for further assistance. These clinicians have specialized training in the medical, psychologic, and social aspects of childhood developmental and behavioral problems.

Psychosocial issues — In some situations, the child's poor weight gain is related to issues at home, such as not having an adequate amount of food in the house, parental concerns about feeding the child certain types of food (eg, foods with fat), or medical or psychiatric problems in the parents (eg, alcohol/drug abuse).

In these situations, treatment includes measures to improve conditions at home, ensure that there is enough food for all family members, and educate parents about the importance of adequate nutrition. This may involve:

- Home visits by a nurse, social worker, or other clinician to provide education, support, and guidance to parents
- Referral to programs that provide supplemental food (eg, Commodity Supplemental Food Program (www.fns.usda.gov/fdd/programs/csfp/), Supplemental Nutrition for Women, Infants, and Children (WIC, www.fns.usda.gov/wic), and food stamps (www.ssa.gov/pubs/10101.html).
- Referral to programs for parents, including assistance locating child care, housing, job training, or alcohol/drug abuse treatment. A social worker can usually help to connect a family with these programs.

FOLLOW UP — Children who are underweight are usually seen by their healthcare provider on a regular basis after treatment begins; the frequency of visits (weekly to monthly) depends upon the individual situation. During these visits, the child will be weighed and measured and the provider will talk to the parent(s) (and child, if applicable) about any new or ongoing questions or concerns. These frequent visits are usually continued until the child's weight is near normal and increasing regularly. If the child is able to take in an adequate amount of calories, catch up weight gain is usually complete within three to six months.
Many parents wonder how poor weight gain will affect the child's height and weight as an adult. A child's size as an adult depends upon several factors, including genetics, the age at which the child was underweight (eg, as young infant versus toddler), the severity of the malnutrition, the presence of underlying medical problems, and how successfully the child's weight and medical problems were managed.

WHERE TO GET MORE INFORMATION — Your child's healthcare provider is the best source of information for questions and concerns related to your child's medical problem. Because no two patients are exactly alike and recommendations can vary from one person to another, it is important to seek guidance from a provider who is familiar with your child's situation.
This discussion will be updated as needed every four months on our web site (www.uptodate.com/patients). Additional topics as well as selected discussions written for healthcare professionals are also available for those who would like more detailed information.
A number of web sites have information about medical problems and treatments, although it can be difficult to know which sites are reputable. Information provided by the National Institutes of Health, national medical societies and some other well-established organizations are often reliable sources of information, although the frequency with which they are updated is variable.

- National Library of Medicine (www.nlm.nih.gov/medlineplus/ency/article/000991.htm, available in Spanish)
- The Nemours Foundation (www.kidshealth.org/parent/nutrition_fit/nutrition/failure_thrive.html, available in Spanish)