

The child with poor weight gain

Assessing and managing the child with poor weight gain.

D F WITTENBERG, MD FCP(SA)

Professor and Head, Department of Paediatrics and Child Health, University of Pretoria

Professor Wittenberg did his undergraduate and postgraduate training in Cape Town, and was awarded an MD degree from the University of Natal for studies on lactose maldigestion. His main interests lie in the fields of gastroenterology and nutrition.

Healthy newborn babies grow and progress almost visibly on a day-to-day basis. Indeed, the rate of weight gain and growth is never again as rapid as in the first year of life, during which the average baby will have trebled its birth weight and grown by almost half of its length at birth.

The first-contact health worker has to respond to a baby who is not growing at the expected rate, with enough knowledge and competence to be able to judge whether there is a problem, to identify babies who should be referred, and to give appropriate advice and to reassure mothers whose infants are growing at a slow but normal pace. Very frequently, the professional help of a nutritionist and feeding expert will be called in.

How to tell that a child is not gaining weight well enough

The only objective way of assessing a child's weight gain is to take repeated measurements on a reliable (or at least the same) scale. Just recording weight measurements may be very misleading, however. A child could actually be gaining weight at each visit and yet be failing to thrive. Table I shows an example of such a child, whose weight continued to increase at every clinic visit, but who nevertheless had a serious problem.

The 'growth monitoring' strategy of the WHO ('G' in GOBI-FFF) is not a health intervention *per se*, unless monitoring is accompanied by the decision as to whether weight gain is normal or not normal. It is not the monitoring that matters, but the plan of action undertaken following the diagnosis of a problem.

The Road-to-Health card is a patient-held record card that combines essential health information, such as birth details, immunisation

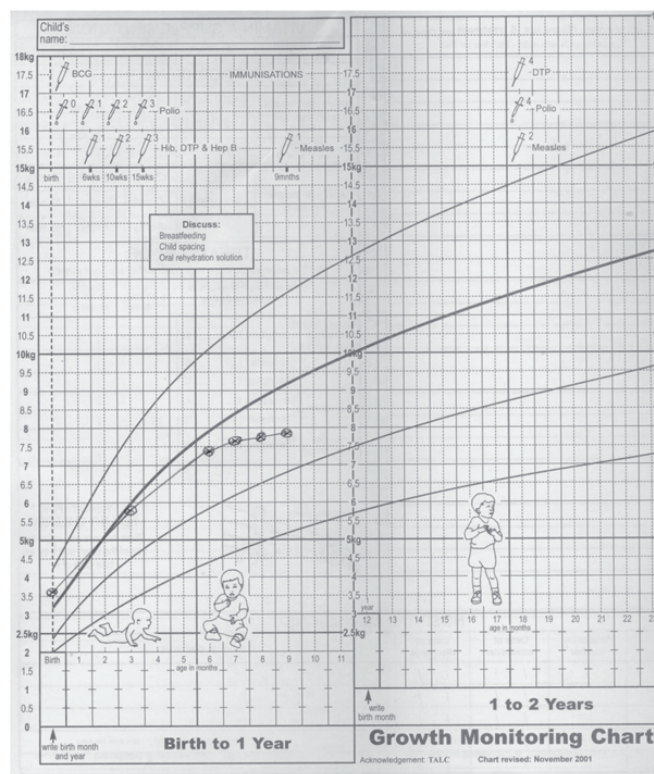


Fig. 1. Reverse side of the Road-to-Health card for the patient in Table I.

and notes of any clinic visits, with a composite graph of boys' and girls' centile charts of weight for age, to allow visual comparison of the growth progress with time (Fig. 1).

Weight can change acutely due to influences such as dehydration, illness or acute starvation, and catch-up can occur equally readily. Therefore a single measurement is not as informative as repeated measurements over time.

The rate of weight gain of a normal child depends on a number of factors such as birth weight, postnatal age, the type of early feeding (breastmilk or formula) and family growth patterns, and tends to 'track' around its own individual growth curve. Visual inspection of this trajectory allows the conclusion that weight gain is satisfactory or unsatisfactory. In the case of the growth curve illustrated in Fig. 1, weight gain is clearly not adequate. This can be determined even though the patient's weight has not yet dipped below the third percentile.

Inadequate weight gain is therefore defined as the failure to grow at the expected rate, rather than by a particular position at or below the third percentile. The younger the child, the more important it is to identify failure to thrive. Such a conclusion must be followed by

Table I. Weight measurements of a baby found to have a serious disorder

Age	Weight
Birth	3.6 kg
3 months	5.8 kg
4 months	6.2 kg
6 months	7.4 kg
7 months	7.6 kg
8 months	7.7 kg
9 months	7.8 kg

A child could actually be gaining weight at each visit and yet be failing to thrive.

a plan of action to identify the reason and to rectify the situation. Babies who do not grow well over a period of 1 month at age less than 6 months require intervention, whereas a period of up to 3 months' observation can be allowed in children older than 6 months. At the same time, any child with a weight of less than 60% of that expected for its age, must be evaluated immediately.

Approach to the child with poor weight gain (Fig. 2)

It is useful to consider the issues of nutrient intake, uptake and utilisation separately, although there is often considerable overlap in practice.

Food quantity and frequency relate to problems of feeding. It is not true that children will always eat as much as they need if food is placed before them, especially if the caregiver does not give and maintain her attention. Feeding time can and should be experienced as a pleasant social activity, but should not be allowed to degenerate into a battleground with the food as the ammunition. Left alone, children may take in too little food because they are developmentally not yet able to fully feed themselves, or they may be distracted by environmental cues that are much more interesting than eating. The taste, consistency or temperature may not be to their liking, or there may be physiological or behavioural reasons for true anorexia.

Even when eating well, the small stomach capacity of a young child means that it will not get enough if it is fed only 2 - 3 times a day. This is the basis for the usual advice to

children on mainly liquid diets including milk must consume large quantities to achieve an adequate intake.

Vomiting and regurgitation may lead to a loss of food even after the child has eaten. The occasional child with severe gastro-oesophageal reflux or pyloric obstruction fails to thrive on the basis of insufficient intake.

Nutrient uptake

A history of chronic diarrhoea or of malodorous or abnormal stools is usually suggestive of maldigestion or malabsorption. Chronic or persistent diarrhoea has nutritional consequences. If chronic diarrhoea is associated with weight loss or failure to thrive, the child should be referred for evaluation. A large number of possible diseases must be considered, ranging from post-infectious gut mucosal damage with malabsorption, to food allergy, coeliac disease and cystic fibrosis.

The child who fails to thrive despite a good appetite may have pancreatic malabsorption. A sweat test helps to confirm cystic fibrosis, the commonest cause of failure to thrive in Caucasian children. Management of these patients with pancreatic substitution therapy is best directed from a specialised centre.

Children with small gut disease are typically anorexic. Wasted buttocks and 'pot belly' suggest coeliac disease but are also found in other forms of malabsorption. The management of such patients aims to re-establish weight gain by avoidance of food items that are not tolerated or absorbed, and planned substitution with progressively more modified or elemental foods. This is best achieved in a rational way if a formal diagnosis can be established. Haphazard food changes should be avoided because of the risk of nutritional inadequacy and confusion.

Nutrient utilisation

Growth falters in chronic disease of virtually all organ systems. Energy may be diverted from growth because of increased requirements, there may be inefficient utilisation of energy or substrate, or there may be a disturbance involving metabolic or endocrine functions and homeostatic control. In effect, the patient is at risk of relative undernutrition in chronic disease.

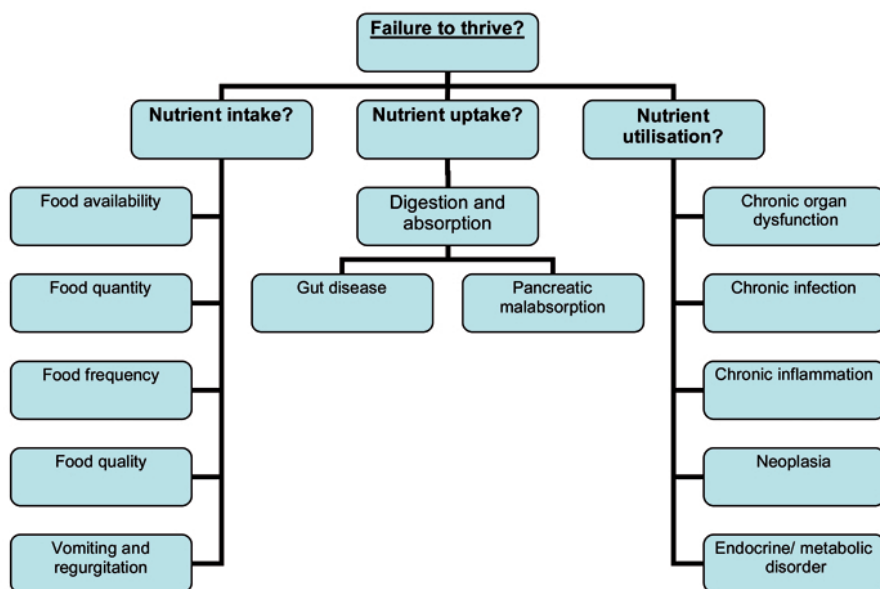


Fig. 2. Approach to the problem of failure to thrive.

Nutrient intake

This explores the question whether the child is getting enough food.

The issue of food availability relates to the question of poverty. This applies even to babies who are fully breastfed, because severely malnourished mothers are less able to produce sufficient volumes of breastmilk.

Mothers may become very defensive when questioned about their children's food, thinking they are being accused of neglect. Many will report what they believe the doctor wants to hear. A tactful history may include an enquiry whether the child's food is in any way different from the usual family diet and what that entails.

give 3 meals a day plus additional snacks in between.

Food quality relates to the nutrient balance and energy content of the food. A history of food faddism and very restricted diets helps predict the possibility of nutrient deficiency or malnutrition. Liquids generally have a lower energy density than solid foods, and

Mothers may become very defensive when questioned about their children's food, thinking they are being accused of neglect.

Weight can change acutely due to influences such as dehydration, illness or acute starvation, and catch-up can occur equally readily. Therefore a single measurement is not as informative as repeated measurements over time.

Catabolic states include chronic infection, immune inflammation and neoplasia, and are mediated by pro-inflammatory cytokines. Children with disturbances such as renal tubular disorders or defects of intermediary metabolism may fail to thrive despite sometimes looking otherwise well. The only pointer may be an abnormal finding on routine biochemical testing.

Therefore, it is mandatory in every child who appears to be losing weight or whose weight gain is faltering, to do a thorough medical evaluation by means of careful history, detailed physical examination and relevant investigations to rule out chronic or silent disease.

The clinical examination must include evaluation of the nutritional state, pallor, oedema, lymphadenopathy, clubbing, bone and joint deformity, status of liver and spleen, as well as the pulse and respiratory rate and careful examination of the chest and heart. The side-room tests should include a tuberculin test and urinalysis. Routine haematology and biochemistry will demonstrate anaemia, elevated erythrocyte sedimentation rate (ESR) and white cell count, and screen renal and liver functions. A chest X-ray will help in the search for possible tuberculosis. Appropriate serological and microbiological tests help to identify chronic infection, including HIV. Consider auto-immune and malignant diseases where infection is not confirmed.

A weak nutritional state and failure to thrive are early warning signals of organic disease that will remain present until the underlying condition is successfully treated. In that way, weight gain is also a monitoring tool to assure ongoing response to management.

Management of the child with inadequate weight gain (Fig. 3)

The main problem will have been allocated to one of two main categories: insufficient food intake or an organic condition leading to failure to thrive.

Insufficient food intake

Two aspects merit consideration: the issue of food supply in adequate quantity and quality, and of caretaker skills in feeding the child.

The breastfed baby

During the first few weeks, lactation and the important breastfeeding reflexes have to be established as a pattern of mutual

a short-term period of slow growth,¹ and the long-term advantages of breastmilk are potentially so important that doctors and nurses should not advise weaning in cases of lactational feeding difficulties. The most important issue is usually to maintain the mother's motivation and confidence while she is being helped to overcome the problem.

Apparent failure to thrive after a few months of lactation may only indicate the slower pattern of growth of breastfed babies compared with that seen in bottle-fed babies.^{2,3} Provided the baby is found to be healthy on a careful medical evaluation, and the mother has a satisfactory nutritional and health state herself, there is no cause for alarm.

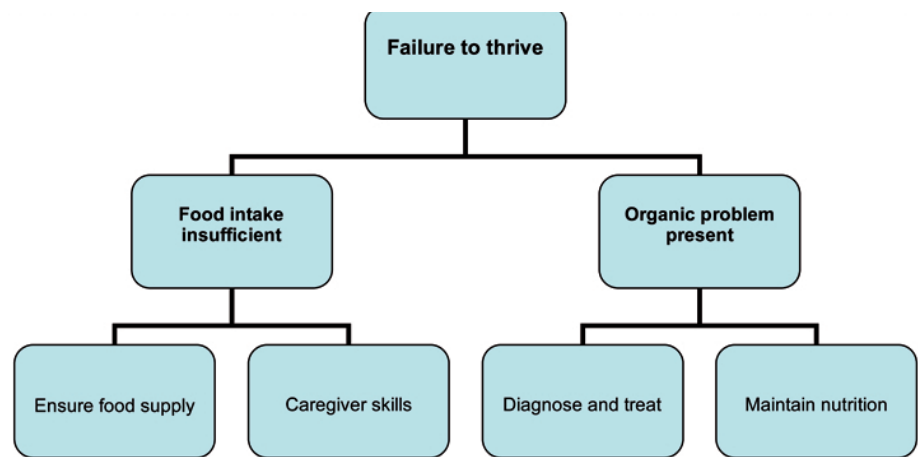


Fig. 3. Components of management: failure to thrive.

interaction between mother and baby. During this time, lactation-onset difficulties with the let-down or prolactin reflexes may lead to the baby getting too little and failing to thrive. The problem is not with the supply or quality of breastmilk but reflects a learning phase for both mother and baby.

When this happens, the help of a lactation consultant should be called in. Gentle, competent and confident reassuring advice and support is most important.

Complementary or supplementary feeds should not be given. Provided the baby continues to have wet nappies, he/she is getting enough fluid to maintain renal function. There appears to be no long-term risk for the baby who is experiencing

The weanling infant and child

Mothers or other caretakers do not necessarily know how much and how frequently food should be given to their weanling infants.

Recommendations on the food to be provided are based on tables of recommended daily intakes (RDI),⁴ but these must be adapted to the individual situation and the family's resources. One should estimate what type of gap might exist in respect of the energy, protein, vitamin, or mineral intake between the child's needs and actual intake. Nutritional advice for an increased energy intake may then emphasise an increase in the frequency of staple foods or the addition of available fat such as margarine or oil. If

Inadequate weight gain is therefore defined as the failure to grow at the expected rate, rather than by a particular position at or below the third percentile.

Poor weight gain

it seems that protein intake is insufficient, one might advise the addition of pulses such as beans, peas or lentils for added protein value, or skim milk powder 2 teaspoons/kg/day mixed with food will add approximately 1.5 g of protein per kg per day.

In discussing food, one should not forget to enquire about fluids. If breastfeeding can be continued, it adds great value to the diet. Otherwise, cow's milk (but not dairy blends or coffee creamers) is an excellent source of protein and calcium. Commercial food supplements often consist of milk with carbohydrates and vitamins/minerals added. These aim to improve intake in poor feeders by attractive sweetness and taste. Liquid supplements should, however, not take the place of a balanced diet.

The practical advice on type, amount and frequency of food and drink should be accompanied by a discussion of feeding habits and behaviours, particularly if the complaint is one of fussy or poor eating and distractibility. For many children, feeding should become a social ritual with its place, its participants (caregiver and child) and its own sequence. The caregiver's positive, calm and unhurried attention to feeding the child helps to keep it focused, while at the same time keeping an eye on the quantity

of food eaten. Outside distractions can be minimised, while some children have to be coaxed into an adequate intake, particularly during periods of illness.

Failure to thrive and the presence of an organic problem

When a child has an organic problem, two aspects must be managed in parallel: diagnose the underlying condition so that it can be treated and hopefully cured, and maintain the nutritional state during the illness.

In the first instance, emphasis must be on frequent feedings of easily digested foods to maintain and increase the total energy intake. Small feeds are more easily tolerated, but need to be given more frequently. Remember that ill children are frequently anorexic, so the taste and palatability of the food are important. For children in hospital, it is important to maintain accurate records of intake. Mothers should be encouraged to supply favourite foods. When children are too ill to chew and swallow, pureed foods and liquid feeds can be given by nasogastric tube. Frequent monitoring of weight is mandatory.

Where digestive, allergic or metabolic disease is suspected, modified foods may

be prescribed while an exact diagnosis is being worked out.

Conclusion

One of the tasks of childhood is to grow. Failure to thrive is one indicator of the child's overall health status that should be evaluated from the triple perspective of the nutrient supply, the caretaker's skill and confidence, and the child's functional capacity to assimilate and utilise nutrients and substrates.

References

1. Morley R, Lucas A. Randomized diet in the neonatal period and growth performance until 7.5 - 8 y of age in preterm children. *Am J Clin Nutr* 2000; 71(3): 822-828.
2. Dewey KG, Heinig MJ, Nommsen LA, *et al.* Growth of breast-fed and formula-fed infants from 0 - 18 months: the DARLING study. *Pediatrics* 1992; 89: 1035-1041.
3. Zadik Z, Borondukov E, Zung A, Reifen R. Adult height and weight of breast-fed and bottle-fed Israeli infants. *J Pediatr Gastroenterol Nutr* 2003; 37(4): 462-467.
4. Rollins N, Willumsen J. Feeding and nutrition. In: Coovadia HM, Wittenberg DF, eds. *Paediatrics and Child Health. A Manual for Health Professionals in Developing Countries*, 5th ed. Cape Town: Oxford University Press, 2004: 175-193.

In a nutshell

- Failure to gain weight in a normal way relates to problems of food intake, uptake and utilisation.
- Practically speaking, the problem is one of two main categories: insufficient food intake or an organic condition leading to failure to thrive.
- The health professional must distinguish between these in order to respond appropriately. The Road to Health card is an essential monitoring tool.