



Jacqui Lowdon
Paediatric
Dietitian - Team
Leader Critical
Care, Therapy &
Dietetics, RMCH

Presently team leader for Critical Care and Burns, Jacqui previously specialised in gastroenterology and cystic fibrosis. Although her career to date has focused on the acute sector, Jacqui has a great interest in paediatric public health.

FALTERING GROWTH

Faltering growth (once referred to as failure to thrive) describes a significant event or a variation from the usual pattern of the expected rate of growth, usually during early childhood, when compared to children of a similar age and sex. It tends to be applicable to young children, especially babies and toddlers, rather than older children/adolescents. It is a descriptive term and not a disease or condition and any underlying cause must be considered.

Using the 2009 UK-World Health Organisation (WHO) growth standards, an infant or child's weight, length/height and head circumference can be plotted to provide a visual representation of their growth over time. Epidemiological studies have shown that healthy children usually progress relatively consistently along a growth centile. This is still the best marker for diagnosis.¹

It is suggested that using these growth charts, a sustained drop of weight through two or more centiles is not a normal pattern and so requires careful assessment.² Less than 2% of infants show a sustained drop through two or more weight centile spaces on the new UK-WHO charts.

Accurate measurement of length/height in young babies and toddlers can be difficult, so successive measurements can show a wide variation. It is, therefore, important not to place too much reliance on single measurements or apparent changes in centile position between just two measurements. If there are concerns about growth, it is better to measure

on a number of occasions to try to get a sense of the child's average centile. Healthy children will generally show a stable average position over time. If there does appear to be a consistent change in centile position by more than one centile space for height, the child should be assessed in more detail.

All children below the 0.4th centile should be assessed by a paediatrician at some stage, even if apparently growing steadily.² Height centile should also be compared to parental height.

Other patterns of faltering weight, suggesting under nutrition, have also been identified (Table 1).

Head circumference is particularly useful in the first two years. The centile position can show some variation over time, but most measurements track within one centile space. Less than 1% of infants drop or rise through more than two centile spaces after the first few weeks. Mid upper arm circumference (MUAC) is also a useful measure <5.0 years of age. It indirectly assess nutritional status by estimating body fat and muscle mass (Table 2 overleaf).

Table 1: Patterns of faltering weight (Clinical Paediatric Dietetics 4th Edition)

Sustained weight falling through two or more centiles
Weight noted to be <C 2nd
Plateauing and further centile weight loss
Sawtooth pattern of fluctuating weights on lower centiles, where weights cross and re-cross centiles
Discrepancy between height and weight >2.0 centiles

Table 2: Mid upper arm circumference (MUAC) one to five years³

<14.0cm - Very likely to be a significantly malnourished child
14.0-15.0cm - May be malnourished, likelihood greater if age nearer to five years than one year old
>15.0cm - Nutrition likely to be reasonable

Table 3: Organic factors contributing to growth faltering

Inability to digest/absorb nutrients, e.g. cystic fibrosis
Excess loss of nutrients, e.g. chronic diarrhoea
Increased requirements due to underlying disease state, e.g. cardiac/respiratory failure
Reduced intake, e.g. swallowing difficulties
Inability to fully utilise nutrients, e.g. metabolic disease

Table 4: Factors contributing to faltering growth

Delayed/problematic introduction of complementary foods
Early feeding difficulties
Poor appetite post illness
Negative parental attitudes towards food and eating
Behavioural difficulties, such as force feeding
Poor parenting skills
Poor parent education around feeding/nutrition
Poor parental health
Family dysfunction, e.g. no mealtime routine, chaotic lifestyle
Neglect

As well as growth, there are other features that might be linked with poor growth: (Clinical Paediatric Dietetics 4th Edition)

- muscle wasting
- poor skinfold thickness
- thin, wispy hair
- prominent bones, e.g. pointed chin in a baby
- pale complexion, e.g. iron deficiency
- poor sleep pattern

In practice, infants and preschool children are often identified by routine growth monitoring, with others being identified through concern expressed by parents or healthcare professionals.

CONTRIBUTORY FACTORS

Faltering growth can occur when a child's energy requirement is not met by their nutritional intake. Under nutrition is recognised as the primary

cause of poor weight gain in infancy,⁴ with only 5% of cases having an underlying medical diagnosis (Table 3).

EARLY FEEDING PROBLEMS

In early childhood faltering growth may be associated with persisting problems with appetite and feeding.⁵ Feeding difficulties are the most commonly given reason.⁶ It often occurs around the introduction to complementary foods, when oro-motor skills are developing and new tastes and textures are being introduced. However, behavioural feeding problems can occur at any age, with many contributory factors.⁷ Table 4 lists possible contributory factors.

MANAGEMENT

For those children with faltering growth who do not have any specific underlying cause other

Table 5: Infant feeding: observations and questions for assessment

Babies/infants
Does the infant appear content with the feed, or dissatisfied and craving more, or uninterested?
Note how the mother interacts with the child. Is she caring and concerned or cold and distant?
Ask about the frequency of wet and dirty nappies.
Ask about the nature of the stool; remember that it is highly variable in quality and quantity in small babies, especially if breastfed.
If bottle fed, is the feed made up properly?
Toddlers/older children
Where is the child positioned to the parent when being fed?
Is the child interested in its own food or others?
Ask about quantity/texture/type of food offered – is it appropriate for the child?
Does the child prefer to feed themselves? Can they feed themselves? What are the child's oro-motor/self-feeding skills?
Is the parent responsive to the child's cues, verbal and non-verbal?
Is there any +ve communication between the child and parent?
How long does the mealtime last for?
Ask about the frequency of food offered and the mealtime routine
Ask whether mealtimes are stressful; what is the atmosphere/emotion at mealtimes?
Who else feeds the child and how does the child respond with them?

than under nutrition, initial management is often community based. This can be managed by advice and support given to the family by a health visitor, with support from the community paediatric dietitian. The role of the dietitian is to assess nutritional adequacy and clarify any dietary concerns. If faltering growth continues, then a referral to a multidisciplinary team is advocated.⁸

Dietary Assessment

A complete picture of all aspects that affect the child's feeding is required. This will include dietary recall or completion of a food diary, as well as observation of feeding, a complete feeding history, shopping habits and food preparation. Table 5 includes suggested questioning/observations around feeding.

Nutritional management requirements

A useful formula to predict energy requirements to improve weight gain has been proffered:⁹

$$\text{Kcal/kg} = \frac{120 \times \text{ideal weight for height (kg)}}{\text{actual weight (kg)}}$$

Achieving requirements

The main objectives are to improve energy and protein intake, optimise growth and correct nutritional deficiencies, e.g. iron deficiency, zinc deficiency. Table 6 provides some treatment strategies.

Supplements

Dietary supplements are not normally recommended for children with no medical cause for faltering growth as there is the risk that they will medicalise the problem. However, they can be of use for children who are unable to meet their requirements from food alone. Their use can also provide reassurance for the parents, whilst working on the behavioural issues. The advice given in Table 6 overleaf still applies.

PROGNOSIS

As a rule of thumb, if small babies double their birth weight in four months and triple it in a year, they will generally catch up. A systematic review concluded that the long-term outcome of faltering growth is a reduction in IQ of

Table 6: Treatment strategies for toddlers/older children

Dietary	Behavioural
Regular three meals and two snacks/day (Young children do not have large enough stomachs to cope with big meals).	Parents should eat at the same time as the child.
Increase number and variety of foods offered.	Offer meals at regular times with other family members.
Use energy dense foods.	Limit a meal's time to 30 minutes.
Increase energy density of food, e.g. add cheese/margarine/cream.	Praise when food is eaten, but ignore when not.
Limit milk intake to 500ml/day.	The child should never be force-fed.
Avoid excessive intake of fruit juice and squash (can cause toddler diarrhoea and make the child feel too full).	Mealtime conflict should be avoided.

about three points, which is not of clinical significance.¹⁰ However, nutrition in the early years is crucial for long-term health.¹¹ Poor growth is also an important marker for an intervention where there is neglect, a medical condition, developmental problems, or feeding issues.¹²

SUMMARY

Childhood nutrition is a balance between the high energy and nutrient requirements required for optimal growth and developing and establishing a healthy eating pattern for future health. The routine and appropriate use of growth charts is essential to allow for early identification and intervention. Many factors contribute towards faltering growth. The mainstay of management is to provide

support and advice to increase calorie intake and manage challenging feeding behaviour.

Further reading

- The Healthy Child Programme describes standards of care for screening and providing advice during pregnancy and the first five years of life. It includes broad recommendations on monitoring growth in infants and children.
- The NICE guideline on Maternal and Child Nutrition make recommendations for growth monitoring in infants and children.
- NICE guideline scope: *Faltering growth in children: recognition and management*. The guideline is expected to be published in October 2017.

References

- 1 Raynor P, Rudolf M Anthropometric indices of failure to thrive Arch Dis Child, 2000, 82 364-5
- 2 The Royal College of Paediatrics and Child Health UK - WHO growth charts, 2009. www.growthcharts.rcpch.ac.uk. Accessed April 2016
- 3 Hobbs CJ, Hanks HGI, Wynne JM. Child Abuse and Neglect: A Clinician's Handbook. Edinburgh: Churchill Livingstone, 1999
- 4 Skuse D. Non organic failure to thrive: a reappraisal. Arch Dis Child, 1985, 60 173-8
- 5 Blissett J, Harris J, Cunningham J et al. Faltering growth: a case study and recommendations for practice Community Practitioner, 2002, 11 424-7
- 6 Wright C, Birks E. Risk factors for failure to thrive: a population-based survey. Child Care Health Dev, 2000, 26 5-16
- 7 Harris G, Booth IW. The nature and management of eating disorders in pre-school children. In: Cooper P, Stein A (Eds) Monographs in Clinical Paediatrics: Feeding Problems and Eating Disorders. Chur, Switzerland: Harwood Academic, 1991
- 8 Hobbs C, Hanks HGI. A multidisciplinary approach for the treatment of children with failure to thrive. Child Care Health Dev, 1996, 22 273-84. Blithoney WG, McJunkin J, Michalek J et al. The effect of a multidisciplinary team approach on weight gain in non-organic failure to thrive children. Dev Behav Pediatr, 1991, 12 254-8
- 9 Maclean WC, Lopez de Romana G, Massa E et al. Nutritional management of chronic diarrhoea and malnutrition: primary reliance on oral feeding. J Paediatr, 1990, 97 316-23
- 10 What is the long-term outcome for children who fail to thrive? A systematic review. Arch Dis Child. 2005 Sep; 90 (9): 92 Rudolf MC, Logan S. 5-31. Epub 2005 May 12
- 11 Barker DJP. The fetal and infant origins of adult disease. Br Med J, 1990, 301 1111
- 12 Black MM, Dubowitz H, Krishnakumar A et al. Early intervention and recovery among children with failure to thrive: follow-up at age 8. Pediatrics, 2007, 120 59-60