Failure to thrive (FTT) or weight faltering or growth faltering

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Learning objectives:

- Define the term of FTT or growth faltering.
- Evaluation of a child with FTT.
- Managements and out come

Failure to thrive (FTT) or weight faltering is a descriptive term given to malnourished infants and young children who fail to meet expected standards of growth is commonly used to describe a lack of adequate weight gain in children. Healthy children's weight will fluctuate, but it will usually progress within one centile space (the distance between two major centile lines on the growth chart).

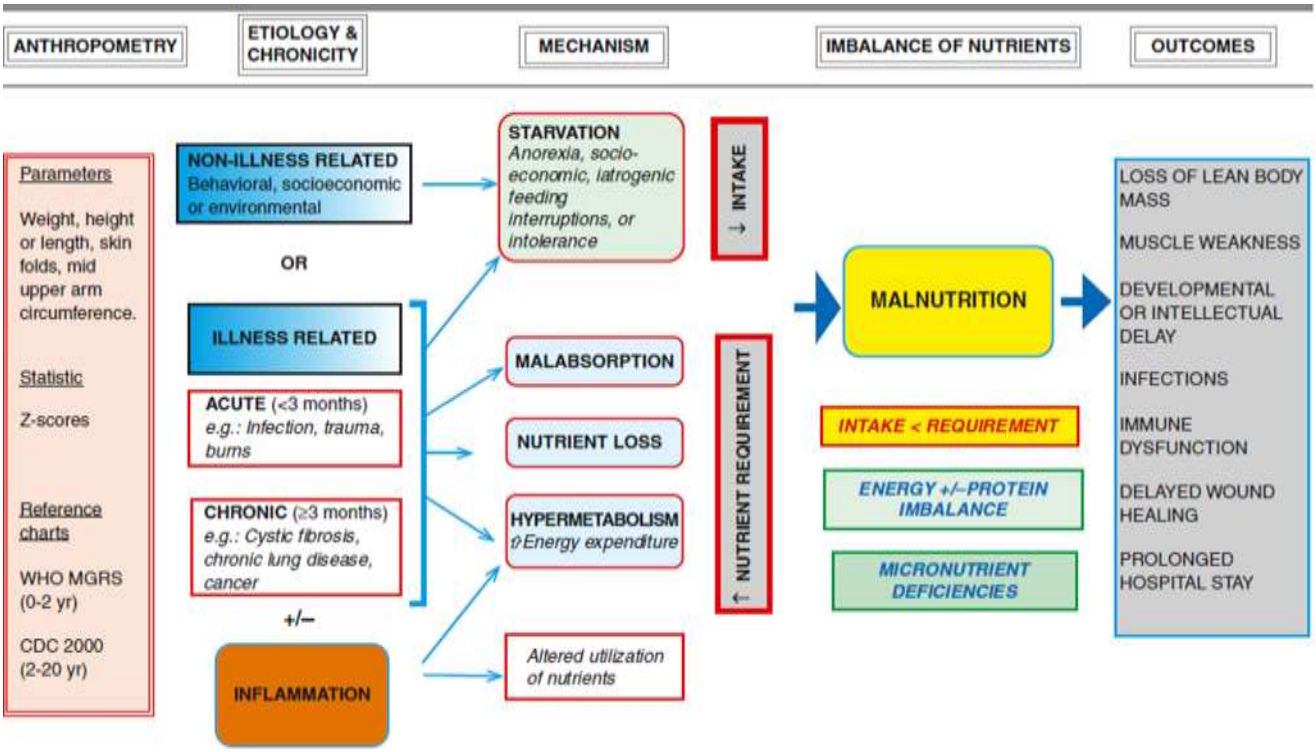
Weight faltering describes a sustained drop down two centile spaces or suboptimal weight gain in infants or young children, If it is prolonged and severe, it will result in reduction in height or length **(stunting**) and reduction in head growth and may be associated with delayed development.

Causes of growth faltering:

1. **Inadequate intake due to:**
   a. **Environmental conditions**
   - Inadequate availability of food, lack of exclusive breastfeeding, insufficient breast milk or poor technique, incorrect preparation of formula, or inadequate complementary feeding practices.
     • Insufficient or unsuitable food offered.
     • famine, emergency setting, poverty and low socioeconomic status.

   b. **Psychosocial deprivations**
     • Poor maternal–infant interaction, Maternal depression, Poor maternal education, Neglect or child abuse.

   c. **Underlying pathology:**
   - **Impaired suck/swallow** neurological disorder (cerebral palsy, Cleft palate)
   - **Chronic illness leading to anorexia:** Crohn disease, chronic kidney disease, cystic fibrosis, liver disease, etc.
   - Vomiting, severe gastro-oesophageal reflux.
2. **Malabsorption:** Coeliac disease, cystic fibrosis, cow's milk protein allergy, cholestatic liver disease.
3. **Failure to utilize nutrients:** Chromosomal disorders, e.g. Down syndrome, intrauterine growth restriction (IUGR) or extreme prematurity, congenital infection, metabolic disorders.
4. **Increased requirements**: Thyrotoxicosis, malignancy, chronic infection (HIV, immune deficiency), congenital heart disease, chronic kidney disease.



Management of growth faltering:

- **FTT is often determined by weight that falls or remains below the 3rd percentile for age; Or decreases, crossing two major percentile lines on the growth chart over time; or is less than 80% of the median weight for the height of the child**.

The first rule for managing patients with FTT is to identify the underlying cause and correct it. The causes have been divided into 'organic' and 'nonorganic' causes. However, organic causes are only found in 5% to10%, and there are almost always symptoms and signs pointing to the underlying disease.

1. **Detailed history**

- Detailed dietary history (type of feeding, preparation of formula, the quantity, quality and frequency of meals) **.**
- **Three-day food diary** Having parents write down the types of food and amounts a child eats over three-day period is one way of quantifying caloric intake. In some instances, it can make parents aware of how much the child is or is not eating.
- Prenatal and past history.
- Family history.
- Documentation of child and caregiver interaction.
- Developmental history language, motor, cognitive, and social development.
- further information regarding the onset of the growth failure.

2. **Physical examination:**

a) Dysmorphic features.
b) Signs of chronic medical illness (CHD, chronic respiratory disease, …etc.)
c) Assessment for signs of possible child abuse.

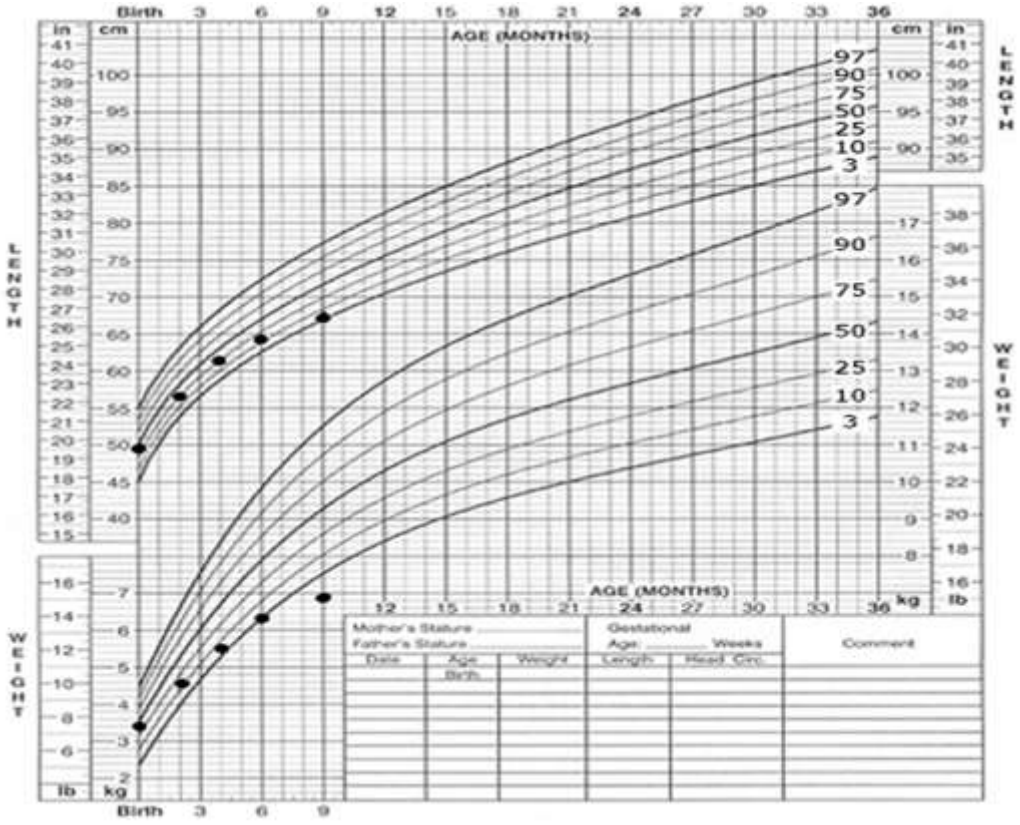
d) **Growth Measures and assessment of nutritional states :** Nutritional status is often assessed in terms of anthropometry

1. Height for age (or length-for-age for children <2 years) is a measure of linear growth. and a deficit represents the cumulative impact of adverse events, usually in the first 1,000 days from conception, that result in *stunting,* or chronic undernutrition(≥3 months) Stunting is defined as being too short for age (height or length *z* score less than −2)

2. Weight-for-age is the most commonly used index of nutritional status, although a low value has limited clinical significance because it does not differentiate between wasting and stunting. Weight-for-age has the advantage of being somewhat easier to measure than indices that require height measurements.

3. weight-for-height: Wasting is defined as being too thin for height (weight for length *z* score less than −2). *wasting*, usually indicates acute malnutrition. Conversely, a high weight-for-height indicates *overweight.*

4. Mid-upper arm circumference MUAC is used as a screening tool to identify wasted children. is related to skeletal muscle mass and is independent of age in children aged 6 months to 5 years, It is colour coded; amber colour is moderate malnutrition 115-125mm, while red is severe (<115 mm).



3. **Investigation:** In most instances (non-organic type), no investigations are required. But If the history or physical examination pointed upon underlying organic cause ,laboratory evaluation, imaging ,echo study or other investigations should be done accordingly.

Box 13.4 Investigations to be considered in weight faltering in a child with worrying signs or symptoms of disease

Investigation	Interpreting result
Full blood count and differential white cell count	Anaemia, neutropenia, lymphopenia (immune deficiency)
Serum creatinine, urea, electrolytes, acid–base status, calcium, phosphate	Renal failure, renal tubular acidosis, metabolic disorders, William syndrome
Liver function tests	Liver disease, malabsorption, metabolic disorders
Thyroid function tests	Hypothyroidism or hyperthyroidism
Acute phase reactant, e.g. CRP (C-reactive protein)	Inflammation
Ferritin	Iron-deficiency anaemia
Immunoglobulins	Immune deficiency
IgA tTG (IgA tissue transglutaminase antibodies)	Coeliac disease
Urine microscopy, culture, and dipsticks	Urinary tract infection, renal disease
Stool microscopy, culture, and elastase	Intestinal infection, parasites, elastase decreased in pancreatic insufficiency
Karyotype in girls	Turner syndrome
Sweat test, chest X-ray	Cystic fibrosis, other respiratory disorders

- **Treatment:**
- Most children with FTT can be managed on outpatients bases. **Hospitalization** may be necessary when 1. the safety of the child is a concern 2.outpatient management has failed for 2-3 months, 3. the FTT is severe. 4. In young infants under 6 months of age with severe weight faltering for active refeeding.
- Two principles are important irrespective of the etiology are that all children with FTT need **a high-calorie diet for catch-up growth, and close follow-up.**
- ***Dietary managment:*** Children with FTT may require more than 1.5 times the expected calorie and protein intake based on their **expected, not actual, weight** for their age for catch-up growth. In infants, this may be accomplished by concentrating formula or adding rice cereal to pureed foods, for older children offering three meals and two snacks each day, increase number and variety of foods offered, increase energy density of foods (cheese, margarine, cream), limit milk intake to 500 ml/day, and avoid excessive intake of fruit juice(Fruit juice is an important contributor to poor growth by providing relatively empty carbohydrate calories and diminishing a child's appetite for nutritious meals, leading to decreased caloric intake)
- ***Behavioural managments:*** Offer meals at regular times with other family members, Praise when food is eaten, ignore when not, Limit mealtime to 30 minutes, Eat at same time as child, Avoid mealtime conflict, Never force feed.
- **Outcomes:** Children with FTT are at risk for adverse outcomes such as short stature, behavior problems, and developmental delay. To decrease the risk of adverse effects, it is important to recognize and treat FTT promptly.

References:

1. Nelson text book of pediatric22 edition.
2. Nelson essentials Textbook of Paediatrics , 7th edition.
3. Illustrated text book of paediatrics 5th edition.
4. Training course on management of severe acute malnutrition (WHO).

4. Mid-upper arm circumference MUAC