

Approach to determining etiology of FTT

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There are several growth conditions that result in smaller than normal size but that are not due to calorie insufficiency.

constitutional delay

Asymmetrical SGA

Symmetrical SGA

Documentation of serial measurements

A detailed *feeding history* should start with *infant feeding*; dietary sources and growth patterns should be chronologically reviewed.

- Was the child breast- or formula-fed?
- If breast-fed, were there any problems with milk sufficiency?
- How did each parent feel about breast-feeding?
- Did the mother feel emotionally supported in her choice to breast-feed?
- If the child was formula-fed, what was the formula; how was it mixed; was there ever any reason to change formula?
- Was feeding a pleasurable or a difficult experience for the parent and child?

These questions may give insight into early parent-child interaction problems.

If the child is ***beyond infancy***,

- when and how were solid foods introduced?
- Were there any specific food refusals that might indicate an allergy or intolerance?
- How did the child accept solids?
- What are the child's food preferences?
- When did the child start to self-feed?
- Where does the child eat?
- Is there a high chair or secure place to eat?
- Are there family meals, or does the child eat alone?
- What is going on in the immediate environment when the child is eating?

*These questions can reveal **dysfunctional eating behaviors** that can affect the child's intake.*

The 24-hour recall is standard, although some authorities question its validity. Alternatively, the parent may keep a ***3-day food diary***.

- Medical History
- Family History



**FAILURE TO THRIVE
(AND WEIGHT LOSS)**

Perform H and P, accurate
documentation of serial measurements

Signs or symptoms suggestive of
developmental delay or
neuromuscular disorder present

YES

Carefully review
feeding history
Assess caloric intake
Consider TORCH titers,
microarray, speech
pathology consult

NO

Signs or symptoms
suggestive of an
organic etiology present

NO

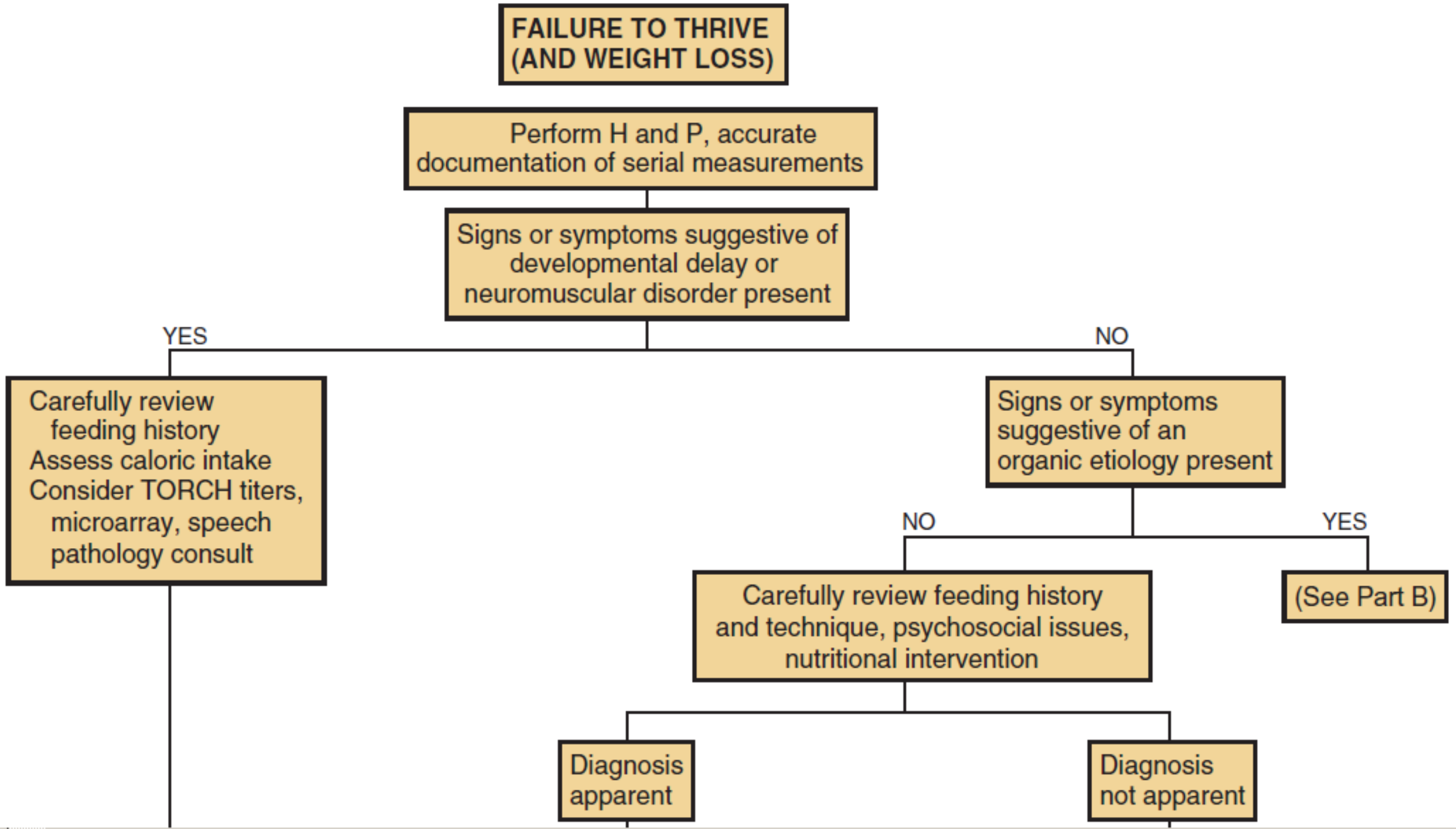
Carefully review feeding history
and technique, psychosocial issues,
nutritional intervention

YES

(See Part B)

Diagnosis
apparent

Diagnosis
not apparent



Diagnosis
apparent

Diagnosis
not apparent

CBC, lead
Blood chemistry profile
UA and culture
Albumin and serum protein
Celiac panel (anti-tTG and IgA)
Review newborn screen results
Consider sweat chloride, free T₄, TSH

Normal results

Abnormal results

Continue nutritional intervention
Consider referral to a multidisciplinary
feeding program vs Inpatient observation

Diagnosis
apparent

Diagnosis
not apparent

Further consider
organic disorders
(See Part B)

Developmental delay
(multiple etiologies)
Inadequate calorie intake
Oral-motor dysfunction

Inadequate intake
Breastfeeding problems
Improper formula preparation
Improper feeding technique
Insufficient food offered (food
insecurity, inappropriate parental
knowledge or expectations)
Aversion (pain, sensory)
Other psychosocial factors

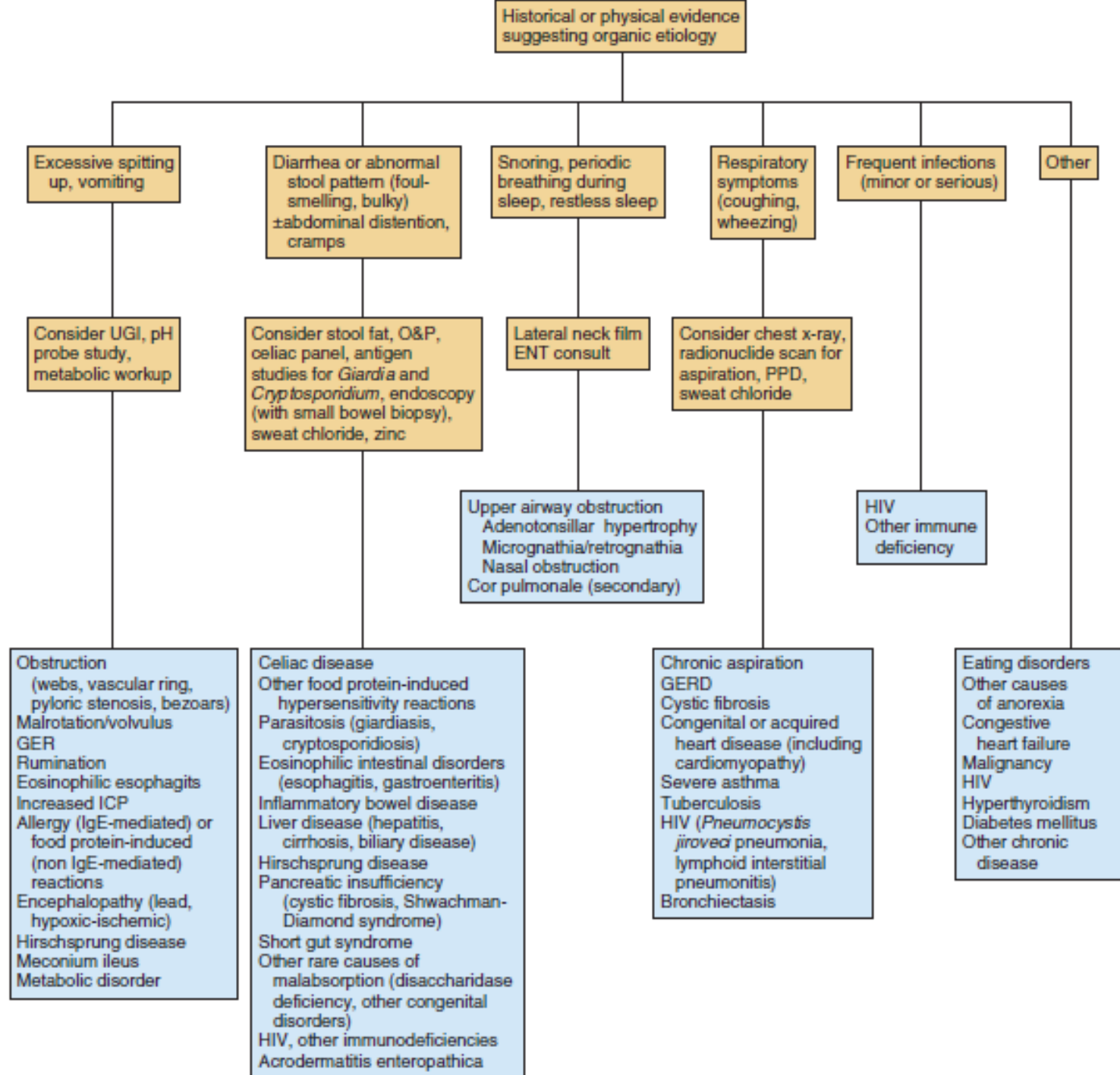
Continue nutritional intervention
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feeding program vs Inpatient observation

Diagnosis
apparent

Diagnosis
not apparent

Further consider
organic disorders
(See Part B)

Renal disease
Obstructive uropathy
Reflux nephropathy
Renal tubular acidosis
Glomerulonephritis
Liver disease
Celiac disease
Cystic fibrosis
Other causes of
malabsorption



Some Causes of Failure to Thrive and Screening Tests

Environmental and Psychosocial

<i>Cause</i>	<i>Screening Tests</i>
Inadequate caloric intake	History; observation in hospital
Emotional deprivation and disruptions	History; observation in hospital
Rumination; chronic diarrhea, GERD	History; observation in hospital
Anorexia nervosa and bulimia	History; examination
Secondary to impact of organic disease	History and observation

Some Causes of Failure to Thrive and Screening Tests

Organic

<i>Cause</i>	<i>Screening Tests</i>
<u><i>Gastrointestinal system</i></u> Malabsorption, parasites cystic fibrosis , Celiac disease IBD Aganglionic megacolon Liver disease Food intolerance , EOE Gastroesophageal reflux,	Examination of stools: stool fat, ova and parasites , Elastase , Calprotectin Sweat test , CBC Tissue transglutaminase antibodies TG , Cholestrol , Liver function tests Barium study (swallow, Meal, Enema) Esophageal and intestinal biopsy ESR, food challenge
<u><i>Endocrine disorders</i></u>	Growth chart; thyroid function tests; bone age, cortisol level , GH testing

Investigations for Fat Malabsorption

The assessment of malabsorbed fat in stool can be either ***qualitative*** or quantitative.

The former method is usually done as a stain for fat globules (***Sudan stain***) which can differentiate between neutral intact triglyceride and FFAs with glycerol that develop following luminal digestion from pancreatic lipase.

The presence of ***excessive neutral fat*** in the stool is suggestive of ***exocrine pancreatic insufficiency***. However, since fat digestion and absorption is not 100%, some stools may have detectable qualitative fat that does not reflect maldigestion.

Investigations for Fat Malabsorption

A history of steatorrhea should prompt stool testing to quantify the fecal fat content. Despite the challenge of performing the test correctly, the **gold standard** is still considered a 3-day stool collection for fat **quantification** when dietary fat intake is strictly calculated by a nutritionist.

For fat, stool loss ***in excess of 6 g/day in children*** and 20 g/day in adults is thought to ***reflect abnormal loss***.

However, fecal fat excretion can be increased in a healthy subject with diarrhea without any apparent fat malabsorptive disorders, and values of up to 14 g/100 g of stool have been demonstrated in healthy subjects.

Coefficient of fat absorption= [(Fat intake – Fecal fat losses)/Fat intake] × 100

The ability to assimilate fat varies with age; a **premature infant** can absorb only **65–75%** of dietary fat, a full-term infant absorbs almost 90%, and an older child absorbs more than 95% of fat while on a ***regular diet***.

