FECAL INCONTINENCE

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Functional Fecal Incontinence in Children: Epidemiology, Pathophysiology, Evaluation, and Management

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fecal incontinence (FI):

1-the passage of stools into the underwear, either as an unintentional seepage of small amounts of liquid stools (generally referred to as “soiling” or “leakage”) or

2- the complete evacuation of formed stools after the age of 4 years.

FI in children is classified into two major groups:

1-functional FI

A: retentive:The volume of stool that leaks out is small and most of the time just stains the underwear. Incontinence of feces can occur both during the day and at night.

B:nonretentive: children with FNRFI pass stools in inappropriate places without evidence of stool retention. The majority of them have
complete evacuation of bowel, not just staining of the underwear as in
retentive incontinence

2-organic FI

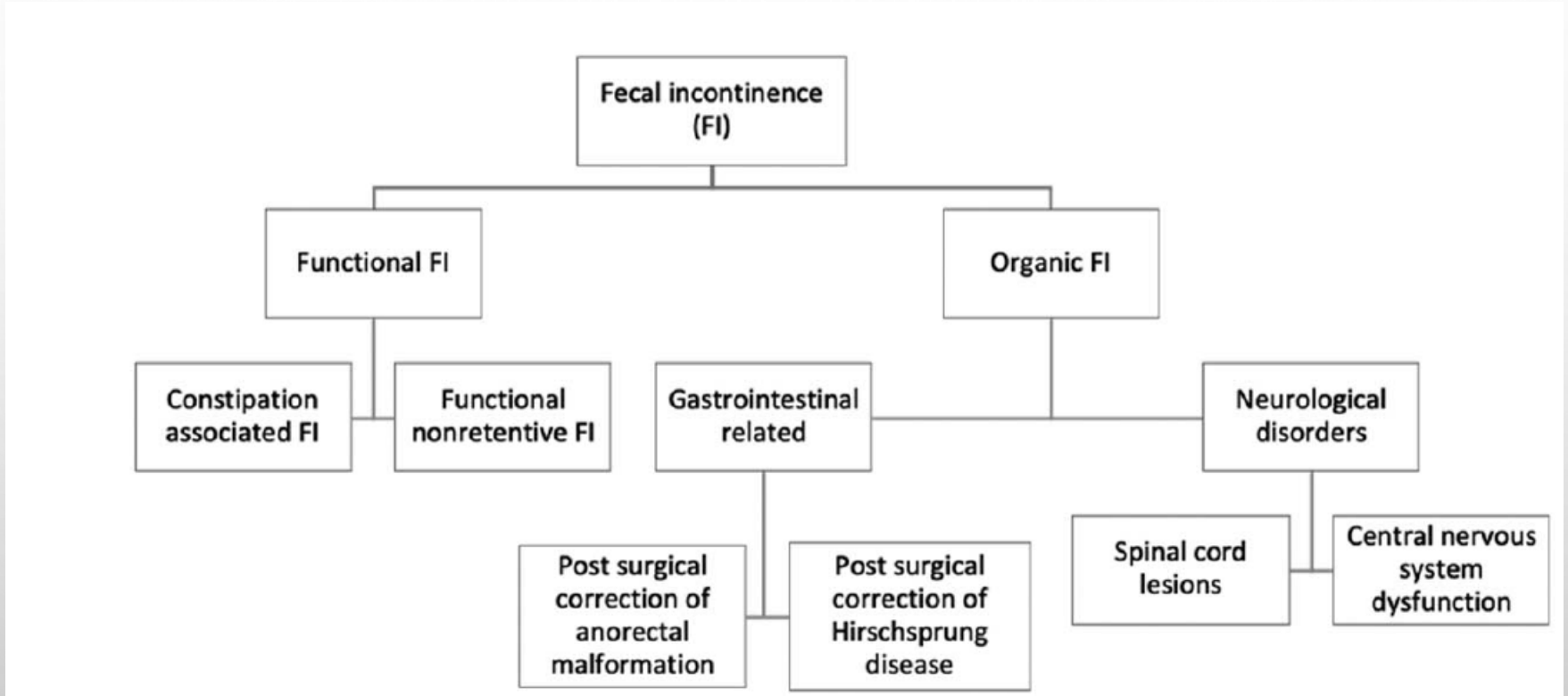


FIGURE 1. Classification of fecal incontinence.

BOX 11.1 Rome IV Criteria for Pediatric Functional Constipation

Diagnostic criteria must include:

Two or more criteria for at least 1 month in infants up to 4 years

1. Two or fewer defecations per week
2. History of excessive stool retention
3. History of painful or hard bowel movements
4. History of large diameter stools
5. Presence of a large fecal mass in the rectum
6. At least one episode of fecal incontinence per week after the acquisition of toileting skills
7. History of large-diameter stools that may obstruct the toilet in toilet trained children

Two or more symptoms at least once per week for at least 1 month in children at least 4 years

1. Two or fewer defecations per week
2. At least one episode of fecal incontinence per week
3. History of retentive posturing or excessive stool retention
4. History of painful or hard bowel movements
5. Presence of a large fecal mass in the rectum
6. History of large-diameter stool that may obstruct the toilet
7. Additional criteria: without fulfilling irritable bowel syndrome criteria

BOX 11.2 Rome IV Criteria for Pediatric Functional Nonretentive Fecal Incontinence

Diagnostic criteria must include all of the following in children at least 4 years of age, for at least 1 month prior to diagnosis

1. Defecation into places inappropriate to the social context
2. The fecal incontinence cannot be explained by another medical condition after appropriate medical evaluation
3. No evidence of fecal retention

EPIDEMIOLOGY:

-The worldwide prevalence of fecal incontinence is estimated between 0.8% and 7.8%.

-Fecal incontinence is more common in boys, with a male-to-female ratio ranging from 3:1 to 6:1.

-studies from Asia report prevalence of FFI in Iran,South Korea, and Sri Lanka, ranging from 2.6% to 7.8%.

-There is a negative correlation between the prevalence of functional incontinence and age.

- Several studies have shown that the majority of children either presenting to the hospital (75–90%) or in the community (80%) have FI due to fecal retention

-In contrast to constipation-associated fecal incontinence, FNRFI is rare and affects approximately 0.4% (range 0% to 1.8%) of children.

PATHOPHYSIOLOGY:

-Constipation-Associated (Retentive) FI:

1-Inadequate toilet training

2-withholding behavior

-Functional Nonretentive FI:

-are not entirely clear.

-these children have normal physiological function of the anorectal unit

-Children with FNRFI commonly report that they either have no time to go to the toilet or reluctant to leave activities they are engaged with,for example, computer games.

-it is hypothesized that they deny or neglect the normal urge to defecate.

Risk factors:

1-low socioeconomic background
2-unhygienic toilets
3-living in an urban area or war-affected zone
4-hospitalization of the child for another illness
5-bullying at school
-Psychological and behavioral abnormalities such as aggressive behavior, social withdrawal, anxiety, depression, disruptive and oppositional behavior, and poor school and social performances were frequently noted in children with functional fecal incontinence.

CLINICAL EVALUATION:

-Detailed description of bowel habits.

-A child with constipation-associated FI has a defecation frequency of <2
per week with hard and painful stools whereas children with FNRFI have regular stools every day in the toilet and occasional (at least once a week) passage of stools into the underwear.

-amount of stools noted in underwear is also crucial;a small amount of liquid type stools is most likely due to constipation-associated FI whereas children with FNRFI usually pass a large(r) amount of stools into the underwear.

-the nocturnal loss of feces supports severe constipation, whereas children with FNRFI tend to have incontinence towards the afternoon

physical examination:

-the presence of an abdominal mass indicates constipation-associated FI.

-Examination of the lower spine should note asymmetry of the gluteal region, and presence of a sacral dimple, a tuft of hair as well as scars of repaired myelomeningocele.

-Anal inspection may note fissures suggestive of associated constipation.

-Digital examination of the rectum is not needed; however, in cases of diagnostic uncertainty,it should be performed.

The presence of a large fecal mass helps to differentiate between constipation-associated FI and FNRFI.

TABLE 1. Comparison between constipation-associated FI and FNRFI

Feature	Constipation-associated FI	Functional nonretentive FI
Boys	60%	85%
Nature of usual stools	Hard and lumpy	Normal formed stools
Amount of incontinent stools	Small amounts of either liquid or formed stools	Regular or usual amount of stools
Stool frequency	<2 stools per week	Normal frequency of stools
Large amount of stool	Frequent	Never
Pain during defecation	Frequent	Rare
Daytime fecal incontinence	Frequent	Always
Nighttime fecal incontinence	Frequently in severely constipated children	Never
	Frequent	Rare
Abdominal pain	May present	Not present
Urinary incontinence	Often	Often
Fecal masses in the abdomen and/or rectum		
Perianal examination	Perianal feces, redness of skin	Perianal feces, redness of skin
Colonic transit time	Usually prolonged	Normal
Anorectal manometry	High sensory threshold	Normal
	Dyssynergic defecation	
Colonic manometry	Low frequency of HAPC	Normal
	No meal-induced contractions	
Laxative treatment	Usually effective	Not effective

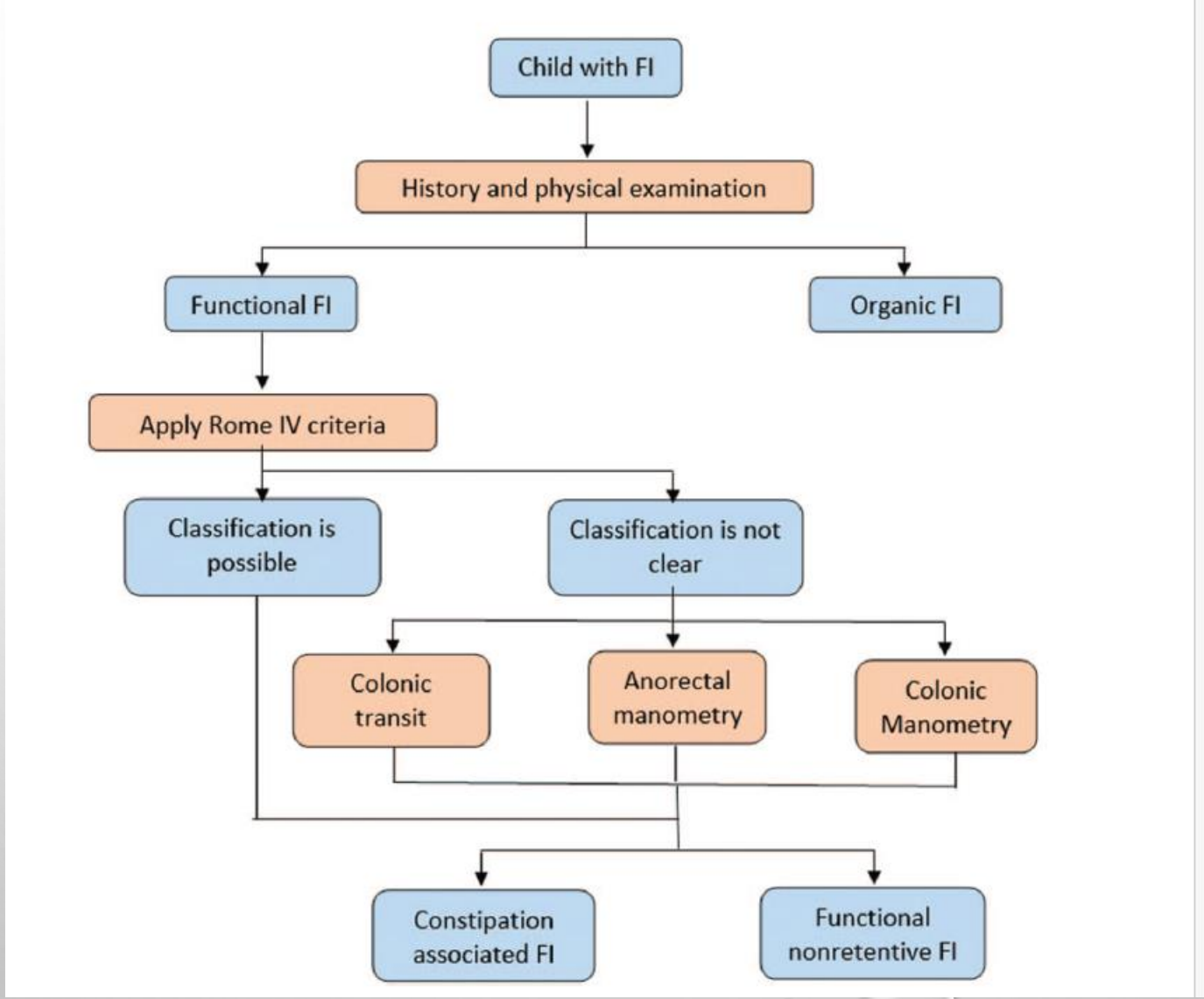
INVESTIGATIONS:

-Plain Abdominal X-ray :Neither the National Institute for Health and Care Excellence nor the European and North American Societies of Pediatric Gastroenterology , Hepatology, and Nutrition guidelines recommend using plain abdominal X-ray for evaluation of defecation disorders

-Colonic Transit Studies : is helpful in differentiating between constipation-associated FI and FNRFI when the diagnosis is uncertain, and the medical history is unreliable. CTT may be normal in up to 50% of children with constipation and in 90% of children with FNRFI.

-Anorectal Manometry : Children with constipation-associated FI have a higher threshold for rectal sensation than children with FNRFI with no difference in other parameters

-Colonic Manometry:children with severe constipation often reveals generalized colonic hypomotility and the absence of generating high-amplitude propagatory contraction. Children with FNRFI show no abnormalities on colonic manometry.
-MRI:is recommended only in children presenting with neurologic complaints or physical symptoms , such as gluteal cleft deviation, suggestive of spinal cord abnormalities.


Child with FI
History and physical examination
Functional FI
Organic FI
Apply Rome IV criteria
Classification is possible
Classification is not clear
Colonic transit
Anorectal manometry
Colonic Manometry
Constipation associated FI
Functional nonretentive FI

MANAGEMENT:

-General Considerations:

Families of children with FI often present to clinicians with a distress. The clinician must provide adequate time for both the children with FI and their families to express their concerns

-Dietary Interventions:

when the dietary assessment shows inadequate fiber intake(<0.5 g per kg per day), it is advisable to recommend increasing the fiber content. NASPGHAN,ESPGHAN does not recommend increasing fiber in children with constipation and sufficient fiber intake. Similarly, high fiber intake is not recommended for FNRFI.

-Toilet Training and Cognitive Behavioral Therapy:

child with functional FI to sit on the toilet three times a day, preferably after meals, for 5–10 minutes. Proper seating, relaxed posture, and foot support.

-Children with FNRFI should not only sit on the toilet after meals but should also train in the afternoon immediately after coming home from school,because the majority of these children has FI between 3 and 6 PM.

-Approximately 30% of children with functional FI has significant emotional and behavioral problems.

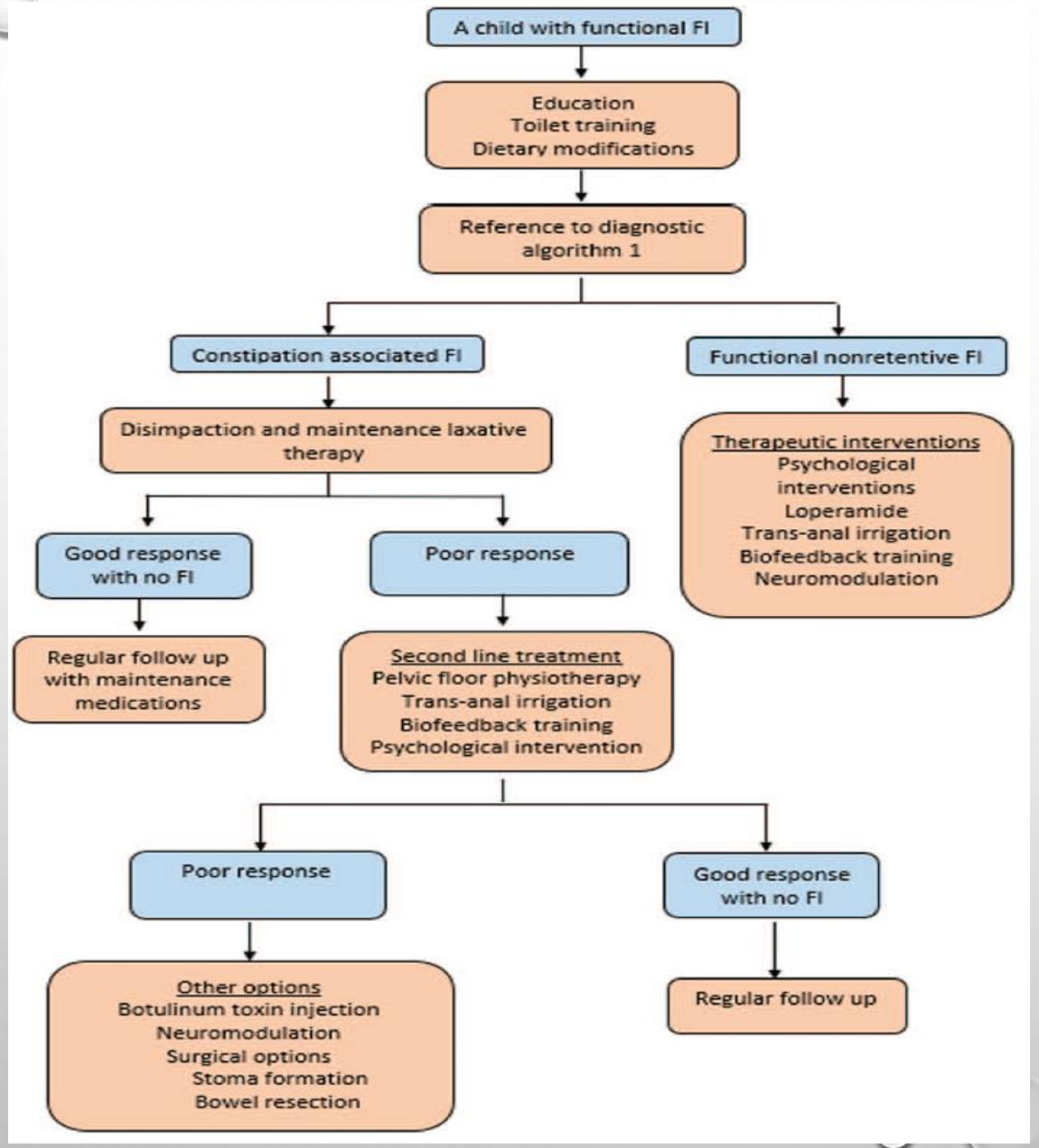
-Behavioral therapy of toilet training in combination with a reward system is the most important step in the management of FNRFI.

-Pharmacological Interventions:(Fecal Disimpaction , Maintenance Treatment to Prevent Re-Impaction ,Loperamide , Transanal Irrigation, Intrasphincteric Injection of Botulinum toxin)

-The softened stools may even worsen symptoms of fecal incontinence in FNRFI.

-Lopramide inhibits peristaltic movements and increases internal anal sphincter tone.In contrast to adults, experience with loperamide in childhood fecal incontinence is limited.

-Biofeedback Therapy
-Pelvic Floor Physiotherapy : further evidence is needed to support the use of this therapeutic modality for constipation-associated FI in children.
-Antegrade Continence Enema
-Bowel Resection
-Neuromodulation: A recent systematic review reported a significant improvement in bowel motions with sacral neuromodulation.
-more studies involving children in large multicenter RCTs are needed to evaluate the true value of neuromodulation in pediatric practice.


A child with functional FI
Education
Toilet training
Dietary modifications
Reference to diagnostic algorithm 1
Constipation associated FI
Functional nonretentive FI
Disimpaction and maintenance laxative therapy
Therapeutic interventions
Psychological interventions
Loperamide
Trans-anal irrigation
Biofeedback training
Neuromodulation
Good response with no FI
Poor response
Regular follow up with maintenance medications
Second line treatment
Pelvic floor physiotherapy
Trans-anal irrigation
Biofeedback training
Psychological intervention
Poor response
Good response with no FI
Other options
Botulinum toxin injection
Neuromodulation
Surgical options
Stoma formation
Bowel resection
Regular follow up

FNRFI:in a study among children who had intensive medical and behavioral treatment for 2 years,only 29% had resolved after two years of treatment,65% after 5 years,and approximately 90% after 10 years.