
بسم الله الرحمن الرحیم
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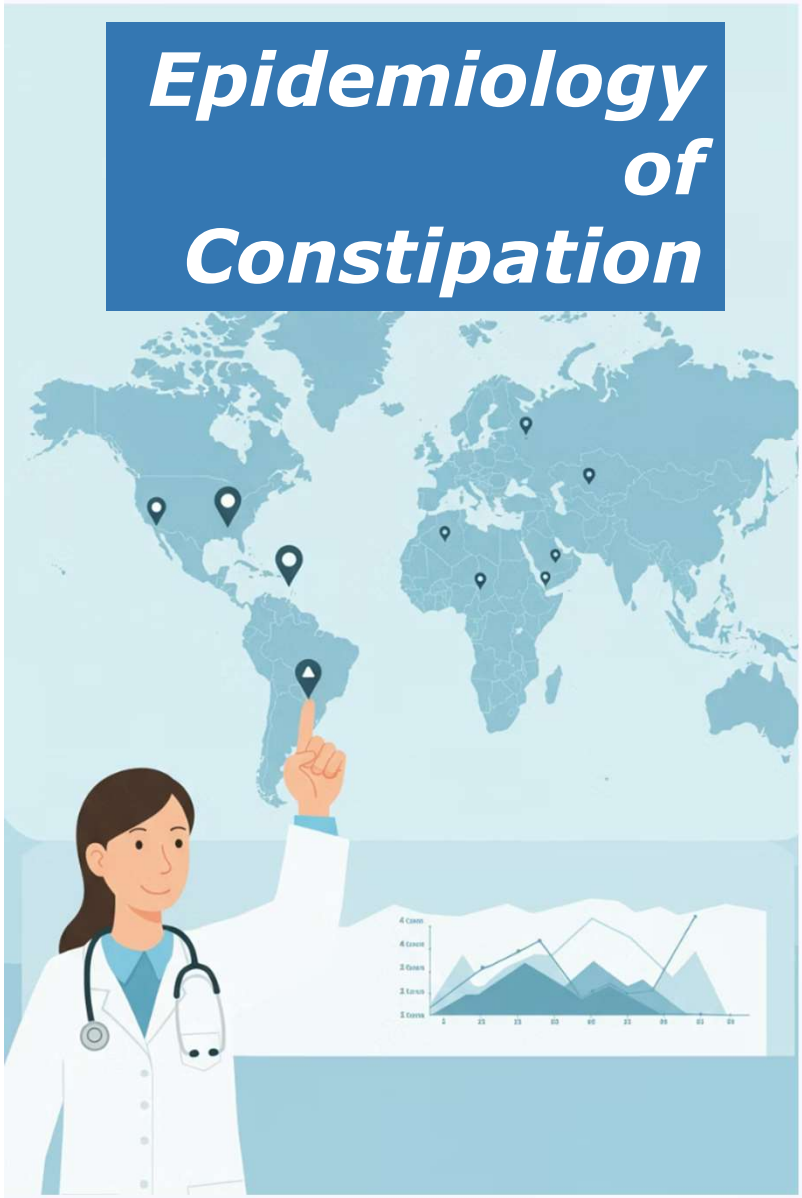
CONSTIPATION AND FECAL INCONTINENCE



Epidemiology of Constipation

۳-۱۰%

General Pediatric Visits

Percentage of visits related to constipation

۲۵%

Gastroenterology Visits

Percentage of pediatric GI visits

۰٫۷-۲۹٫۶%

Worldwide Prevalence

Varies by region and diagnostic criteria

criteria

Organic Causes of Constipation Constipation

Intestinal causes	Hirschsprung's disease, Anorectal malformation, Neuronal intestinal dysplasia
Neuropathic conditions	Spinal cord abnormalities, Spinal cord cord trauma, Neurofibromatosis
Metabolic/endocrine causes	Hypothyroidism, Diabetes mellitus, Hypercalcemia
Drugs	Opioids, Anticholinergics, Antidepressants
Other causes	Anorexia nervosa, Sexual abuse, Cystic fibrosis

TABLE 11-1
CAUSES AND RISK FACTORS OF CONSTIPATION

Intestinal causes	Hirschsprung's disease
	Anorectal malformation
	Neuronal intestinal dysplasia
Neuropathic conditions	Spinal cord abnormalities
	Spinal cord trauma
	Neurofibromatosis
	Static encephalopathy
	Tethered cord
Metabolic, endocrine causes	Hypothyroidism
	Diabetes mellitus
	Hypercalcemia
	Hypokalemia
	Vitamin D intoxication
Drugs	Opioids
	Anticholinergics
	Antidepressants
Other causes	Anorexia nervosa
	Sexual abuse
	Scleroderma
	Cystic fibrosis
	Dietary protein allergy

Pediatric Constipation and Fecal Incontinence

Constipation and fecal incontinence are common childhood problems that cause emotional and physical distress. Though rarely life-threatening, these conditions significantly impact quality of life for children and their families.

PATHOPHYSIOLOGY

- Genetic predisposition,
- Environmental factors,
- Life stress,
- Psychologic state,
- Coping,
- Social support, and
- Interactions between physiologic and psychological factors

Risk Factors for Constipation

Genetic Predisposition

Family history increases risk

Nutritional Factors Factors

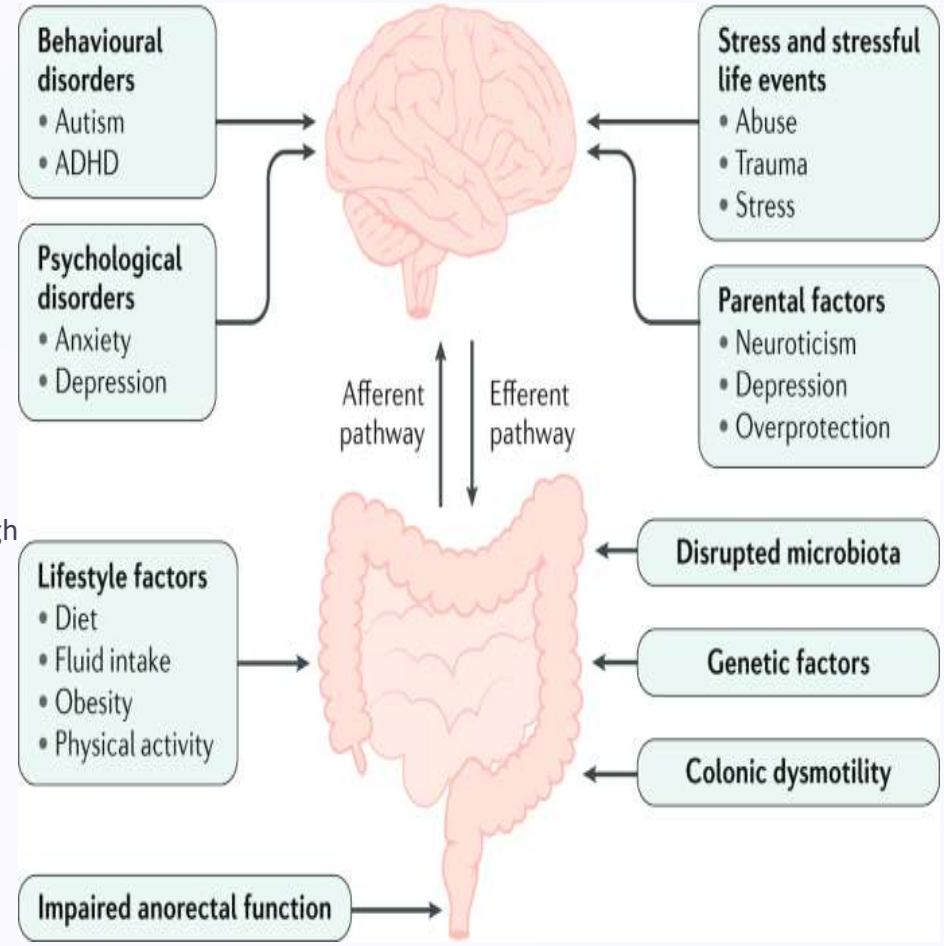
Low fiber, milk protein allergy

Obesity

Associated with high risk

Behavioral Factors Factors

Autism, ADHD, anxiety, anxiety, depression



FUNCTIONAL CONSTIPATION IN INFANTS AND TODDLERS

Pathogenesis of Constipation

١

Painful Defecation

Child experiences painful bowel movement

2

Fear Development

Fear leads to withholding behavior

3

Stool Withholding

Child contracts pelvic floor instead of relaxing

٤

Rectal Distension

Retained stool becomes harder and more difficult to pass

5

Vicious Cycle

Leads to megarectum and overflow incontinence

Diagnostic Criteria for Functional Constipation in Neonates and Toddlers[9]

At least 2 of the following symptoms must occur for at least 1 month:

- <2 defecations per week
- >1 episode per week of incontinence after the acquisition of toileting skills
- History of excessive stool retention
- History of painful or hard bowel movements
- Presence of a large fecal mass in the rectum, and
- History of large-diameter stools that may obstruct the toilet

FUNCTIONAL CONSTIPATION IN CHILDREN AND ADOLESCENTS

Diagnostic Criteria for Functional Constipation in Children and Adolescents[10]

Symptom must occur at least once per week for at least 2 months and include 2 or more of the following in a child with a developmental age of >4 years with insufficient criteria for diagnosis of irritable bowel syndrome:

- Two or fewer defecations in the toilet per week
- At least 1 episode of fecal incontinence per week
- History of retentive posturing or excessive volitional stool retention
- History of painful or hard bowel movements
- Presence of a large fecal mass in the rectum
- History of large diameter stools that may obstruct the toilet

Normal Stooling Patterns

١ Newborns

More than four stools per day during first week of life.

٢ Infants

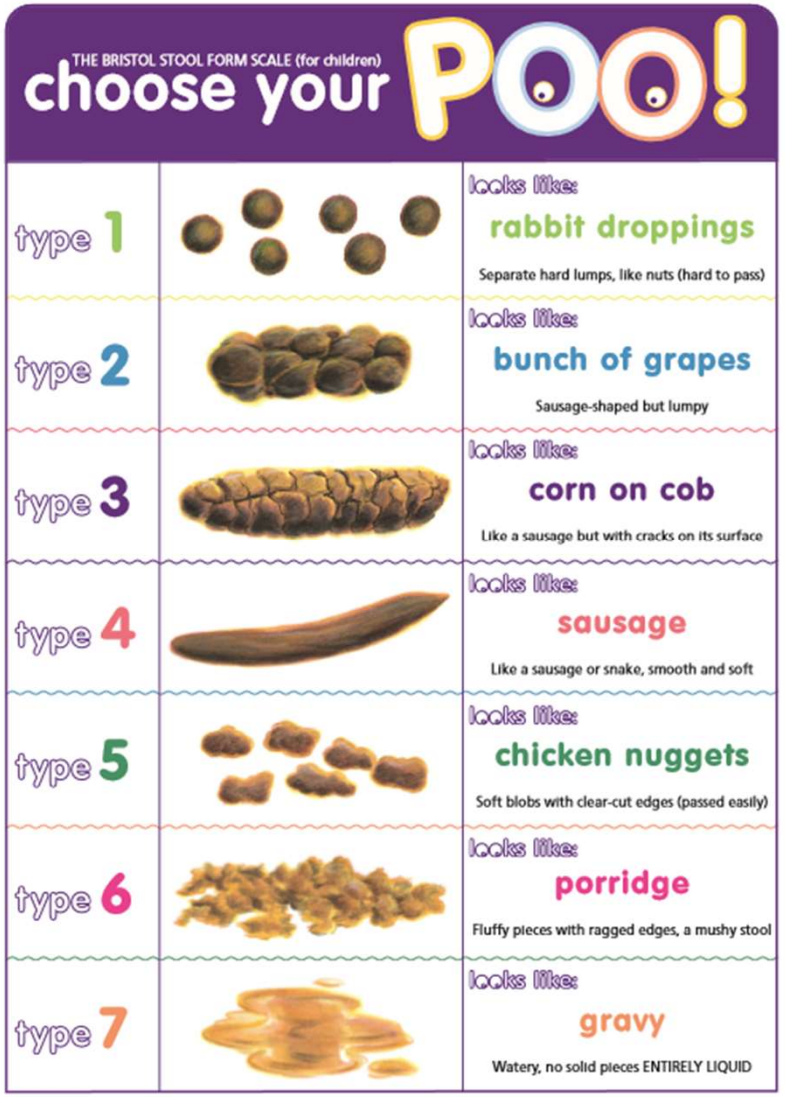
Breast-fed infants have more frequent, softer, yellow-colored stools than stools than formula-fed infants.

٣ Age ۴+

Stool frequency gradually declines to one to two stools per day.

۴ Age ۵+

Most children pass stools daily or every other day without straining. straining.

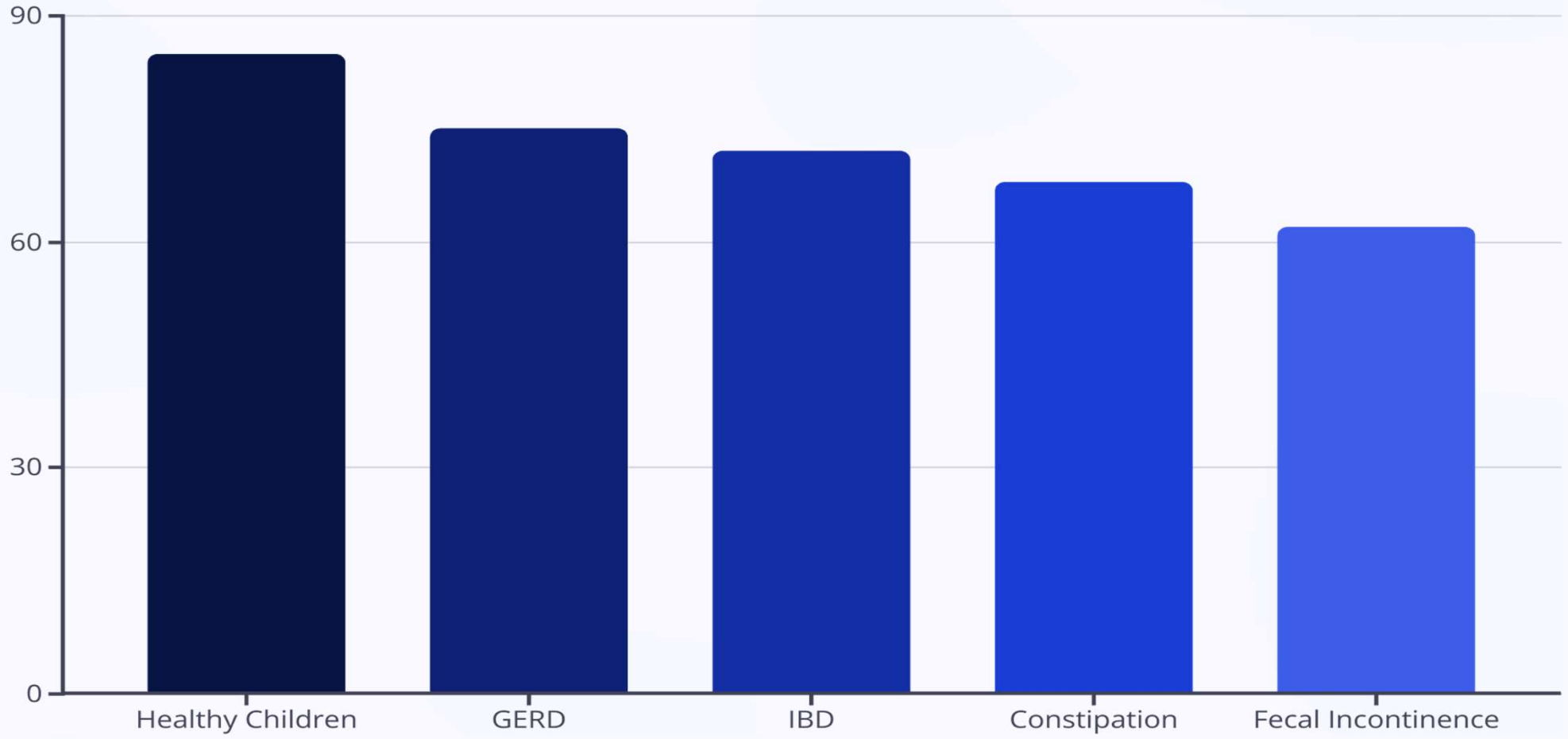


COMPLICATIONS OF CONSTIPATION

TABLE 12-3. **Complications of Constipation**

- Fecal incontinence
- Pain:
  - Abdominal pain
  - Anal or rectal pain
- Anorexia
- Urinary complications:
  - Daytime urinary incontinence
  - Nighttime urinary incontinence
  - Urinary tract infection
  - Vesicoureteral reflux
  - Urinary retention
  - Megacystis
  - Ureteral obstruction
- Rarely, life-threatening events such as shock or toxic megacolon
- Social exclusion by siblings, parents, peers, and teachers

Impact on Quality of Life



Children with constipation and fecal incontinence have lower health-related quality of life scores than healthy children and even those with other GI conditions.

TABLE 12-4. **Clinical Features of Constipation With Fecal Incontinence**

- Difficulties with defecation began early in life, in 50% of children before 1 year of age
- Passage of enormous stools
- Obstruction of the toilet by stool
- Symptoms due to the increasing accumulation of stool:
  - Retentive posturing
  - Fecal incontinence
  - Abdominal pain and irritability, anal or rectal pain
  - Anorexia
  - Urinary symptoms:
    - Daytime urinary incontinence
    - Nighttime urinary incontinence
    - Urinary tract infection
- Unusual behaviors in an effort to cope with the fecal incontinence:
  - Nonchalant attitude regarding the fecal incontinence
  - Hiding of dirty underwear
  - Lack of awareness of an incontinence episode
- Dramatic disappearance of most symptoms following the passage of a huge stool

Vulnerable Phases for Constipation

Infancy

Introduction of solids and weaning from from breast milk can trigger constipation. constipation.

Toddler Years

Toilet training period may lead to control control issues and withholding behavior. behavior.

School Age

Children may avoid using school bathrooms, bathrooms, leading to withholding and constipation.

FUNCTIONAL FECAL INCONTINENCE

- Constipation-Associated Fecal Incontinence
- Functional Nonretentive Fecal Incontinence

Diagnostic Criteria for Functional Non-Retentive Fecal Incontinence[10]

Once a week or more for the preceding 2 months in a child of a developmental age > 4 years, a history of:

- Defecation into places inappropriate to the social context
- No evidence of an inflammatory, anatomic, metabolic or neoplastic process considered likely to be an explanation for the subject's symptoms
- No evidence of fecal retention

INVESTIGATIONS

- History
- Physical Examination
- Laboratory Investigation

History	Physical Examination
Complete with special attention to: Stooling habits: Character of stools in toilet Character of stools in underwear Stool withholding maneuvers Age of onset of constipation/ fecal incontinence Abdominal pain Urinary symptoms: Day wetting Bed wetting Urinary tract infections Dietary habits	Complete with special attention to: Abdominal examination Anal inspection Rectal digital examination Neurologic examination, including perianal sensation testing

Clinical Evaluation: History Taking

First Bowel Movement

Delayed meconium passage (>۲۴h) may suggest Hirschsprung's disease.

Stool Patterns

Frequency, consistency, size, pain, blood presence, and incontinence episodes.

Associated Symptoms

Abdominal pain, appetite, weight changes, urinary issues, behavioral problems.

Life Events

Family changes, school problems, or trauma that might affect behavior.

Physical Examination

Growth Assessment

Measure weight and height to identify growth issues or obesity.

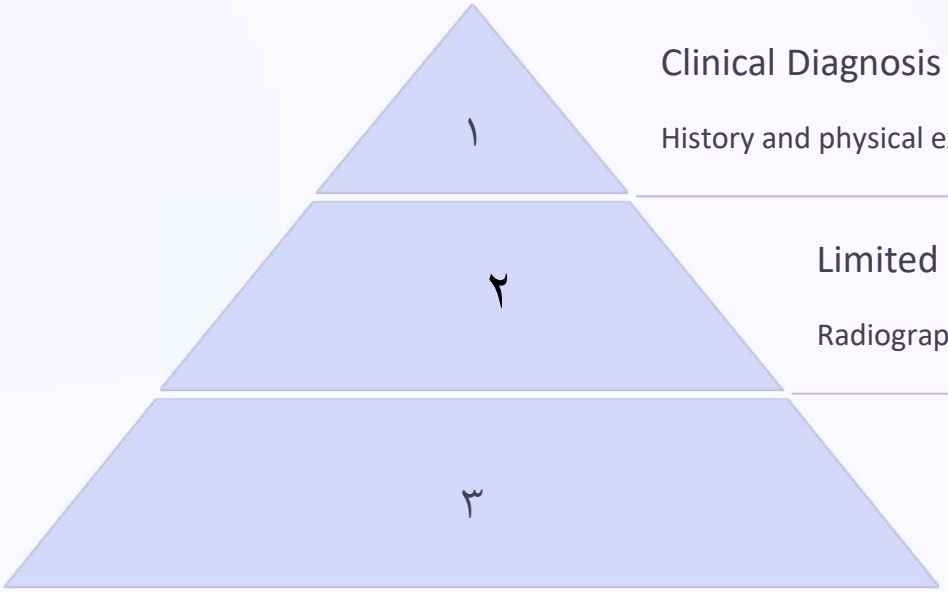
Abdominal Exam

Palpate for fecal masses, present in ۵۰% of of constipated children.

Neurological Signs

Check lumbosacral area for dimples, hair hair tufts, or asymmetry suggesting spina spina bifida.

Diagnostic Testing



Clinical Diagnosis

History and physical exam are usually sufficient

Limited Testing

Radiography only when rectal exam not possible

Specialized Tests

Only with alarm symptoms or treatment failure

Constipation is primarily a clinical diagnosis. Routine laboratory testing for hypothyroidism, celiac disease, and hypercalcemia is not is not recommended without alarm symptoms. Only ١٫ ٧% of constipated children are diagnosed with celiac disease and ٠٫ ٤% with ٠٫ ٤% with hypothyroidism.

Laboratory Investigation

- T^{3},T^{4},TSH,Na/K,Ca/P,Adrenal,Anti TTG,EMA,U/C
- Occult Blood Testing
- Abdominal Radiographs
- Barium Enema Study
- Colonic Transit Study
- Anorectal Manometry
- Colonic Motility Study

TREATMENT

- Functional Constipation in Infants and Toddlers
  - Educate the parents
  - Diet and Fiber
  - Laxative
- Functional Constipation With and Without Fecal Incontinence in Children and Adolescents
  - Education
  - Disimpaction
  - Prevention of Reaccumulation of Stools (Maintenance Therapy)
  - Withdrawal of the treatment

TABLE 12-7. Suggested Medications and Dosages for Maintenance Therapy of Constipation

Medication	Age	Dose
For Long-Term Treatment (Years):		
Polyethylene glycol		
3350 (MiraLax)	>1 month	0.7 g/kg body weight/day[16,30] or 0.4 g/kg body weight/day[54]
3350+electrolytes (Movicol)		13.8-40 g/day[40,41]
4000 (Forlax)	>6 months	0.5 g/kg body weight/day[43]
Lactulose or sorbitol	>1 months	1-3 mL/kg body weight/day, divide in 1-2 doses
Milk of magnesia	>1 month	1-3 mL/kg body weight/day, divide in 1-2 doses
Mineral oil	>12 months	1-3 mL/kg body weight/d, divided in 1-2 doses
For Short-Term Treatment (Months):		
Senna (Senokot) syrup/tablets	1-5 years	5 mL (1 tab) with breakfast, max. 15 mL/d
	5-15 years	2 tablets with breakfast, maximum 3 tablets/d
Glycerin enemas	> 10 years	20-30 mL/day (1/2 glycerin and ½ normal saline)
Bisacodyl suppositories	>10 years	10 mg daily

۱gr/kg=۷cc/kg

۰/۵gr=۳/۵cc

TABLE 12-8. **Suggested Medications for Fecal Disimpaction**

Medication	Age	Dose
Slow Oral Disimpaction		
Polyethylene 3350 without electrolytes (for 3 days)[42]		1.5 g/kg body weight/day ١٠cc/kg
Polyethylene 3350 with electrolytes (for 6 days)[41]	2- to 4-year-olds	52 g/day
	5- to 11-year-olds	78 g/day
Milk of magnesia (for 7 days)		2 mL/kg body weight twice/day
Mineral oil (for 7 days)		3 mL/kg body weight twice/day
Lactulose or sorbitol (7 days)		2 mL/kg body weight twice/day
Rapid Rectal Disimpaction		
Glycerin suppositories	Infants and toddlers	
Phosphate enema	<1 year	60 mL
	>1 year	6 mL/kg body weight, up to 135 mL twice

- قاشق اندازه‌گیری به قاشق‌هایی گفته می‌شود که در هنگام آشپزی برای اندازه‌گیری مقادیر کم موادغذایی بخصوص چاشنی غذا به کار می‌روند. جنس این قاشق‌ها از پلاستیک یا فلز است.
- ۱.در صورتی که سری قاشق شش‌تایی باشد، بزرگترین قاشق یا قاشق غذاخوری علامت اختصاری TBS آن گنجایش ۱۵ میلی‌لیتر را دارد.
- ۲.از نظر بزرگی قاشق دوم، یا قاشق یک دوم غذاخوری گنجایش ۷ و نیم میلی‌لیتر را دارد.
- ۳.از نظر بزرگی قاشق سوم، یا قاشق چایخوری علامت اختصاری TSP گنجایش ۵ میلی‌لیتر را دارد.
- ۴.از نظر بزرگی قاشق چهارم، یا قاشق یک دوم چایخوری گنجایش ۲ و نیم میلی‌لیتر را دارد.
- ۵.از نظر بزرگی قاشق پنجم، یا قاشق یک چهارم چایخوری نصف قاشق چهارم گنجایش دارد.
- ۶.از نظر بزرگی قاشق ششم، یا قاشق یک هشتم چایخوری نصف قاشق پنجم گنجایش دارد.

- این قاشق‌ها برای اندازه‌گیری گرم نیست زیرا وزن مواد مختلف با وجود حجم یکسان با یکدیگر متفاوت است.


1
TBS
1/2 OZ
1/2
TBS
1
TSP
1/2
TSP
1/4
TSP
1/8
TSP

Prevention of Reaccumulation of Stools (Maintenance Therapy)

- Behavior Modification
- Fiber
- Laxatives
- Psychological Treatment

TABLE 7. *Medications for use in treatment of constipation*

Laxatives	Dosage	Side effects	Notes
Osmotic			
Lactulose[a]	1–3 mL/kg/day in divided doses; available as 70% solution.	Flatulence, abdominal cramps; hypernatremia has been reported when used in high dosage for hepatic encephalopathy; case reports of nontoxic megacolon in elderly.	Synthetic disaccharide. Well tolerated long term.
Sorbitol[a]	1–3 mL/kg/day in divided doses; available as 70% solution.	Same as lactulose.	Less expensive than lactulose.
Barley malt extract[a]	2–10 mL/240 mL of milk or juice		Unpleasant odor. Suitable for infants drinking from a bottle.
Magnesium hydroxide[a]	1–3 mL/kg/day of 400 mg/5 mL; available as liquid, 400 mg/5 mL and 800 mg/5 mL, and tablets.	Infants are susceptible to magnesium poisoning. Overdose can lead to hypermagnesemia, hypophosphatemia and secondary hypocalcemia.	Acts as an osmotic laxative. Releases cholecystokinin, which stimulates gastrointestinal secretion and motility. Use with caution in renal impairment.
Magnesium citrate[a]	<6 Years, 1–3 mL/kg/day; 6–12 years, 100–150 mL/day; >12 years, 150–300 mL/day; in single or divided doses. Available as liquid, 16.17% magnesium.	Infants are susceptible to magnesium poisoning. Overdose can lead to hypermagnesemia, hypophosphatemia and secondary hypocalcemia.	
PEG 3350	Disimpaction: 1–1.5 g/kg/day for 3 days Maintanence 1 g/kg/day		Superior palatability and acceptance by children Safety studies necessary before widespread use is recommended in infants.
Osmotic enema			
Phosphate enemas	<2 Years old: to be avoided; ≥2 years old: 6 mL/kg up to	Risk of mechanical trauma to rectal wall, abdominal distention or vomiting. May	Some of the anion is absorbed, but if kidney is normal, no toxic

Lavage			
Polyethylene glycol-electrolyte solution	For disimpaction: 25 mL/kg/hr (to 1000 mL/hr) by nasogastric tube until clear or 20 mL/kg/hr for 4 hr/day. For maintenance: (older children): 5–10 mL/kg/per day.	Difficult to take. Nausea, bloating, abdominal cramps, vomiting, and anal irritation. Aspiration, pneumonia, pulmonary edema, Mallory–Weiss tear. Safety of long-term maintenance not well established.	Information mostly obtained from use for total colonic irrigation. May require hospital admission and nasogastric tube.
Lubricant			
Mineral oil[a]	<1 Year old; not recommended. Disimpaction: 15–30 mL/yr of age, up to 240 mL daily. Maintenance: 1–3 mL/kg/day.	Lipoid pneumonia if aspirated. Theoretical interference with absorption of fat–soluble substances, but there is no evidence in the literature. Foreign-body reaction in intestinal mucosa.	Softens stool and decreases water absorption. More palatable if chilled. Anal leakage indicates dose too high or need for clean-out.
Stimulants		Abdominal pain, cathartic colon (possibility of permanent gut, nerve, or muscle damage).	Increased intestinal motility.
Senna	2–6 years old: 2.5–7.5 mL/day; 6–12 years old: 5–15 mL/day. Available as syrup, 8.8 mg of sennosides/5 mL. Also available as granules and tablets.	Idiosyncratic hepatitis, Melanosis coli, Hypertrophic osteoarthropathy, analgesic nephropathy.	Melanosis coli improves 4–12 mo after medications discontinued.
Bisacodyl	≥2 Years old: 0.5–1 suppository 1–3 tablets per dose. Available in 5-mg tablets and 10-mg suppositories.	Abdominal pain, diarrhea and hypokalemia, abnormal rectal mucosa, and (rarely) proctitis. Case reports of urolithiasis.	
Glycerin suppositories		No side effects.	

Follow-up Visits and Weaning From Medication

What Can Go Wrong in the Treatment?

Treatment of Nonretentive Fecal Incontinence

Treatment of Functional Non-Retentive Retentive Fecal Incontinence

1. **Education**
   Explain condition to child and family
2. **Bowel Diary**
   Track incidents and patterns
3. **Toilet Training**
   Four times daily after meals
4. **Behavioral Therapy**
   Reward system for compliance

Unlike constipation-associated incontinence, FNRFI responds poorly to laxatives. Laxatives may even Laxatives may even worsen symptoms by softening stools. Behavioral therapy is the cornerstone of cornerstone of treatment.

Surgical Interventions for Refractory Cases

١

Maximal Medical Therapy

Exhaust all medication options first

٢

Antegrade Continence Enema

Allows regular colon evacuation

٣

Colonic Resection

For mega-rectum or mega-sigmoid

Surgical interventions are reserved for the small percentage of children with intractable symptoms not responding to conventional therapy. conventional therapy. Success rates vary, and complications can include stoma stenosis, granulation tissue, and leakage.

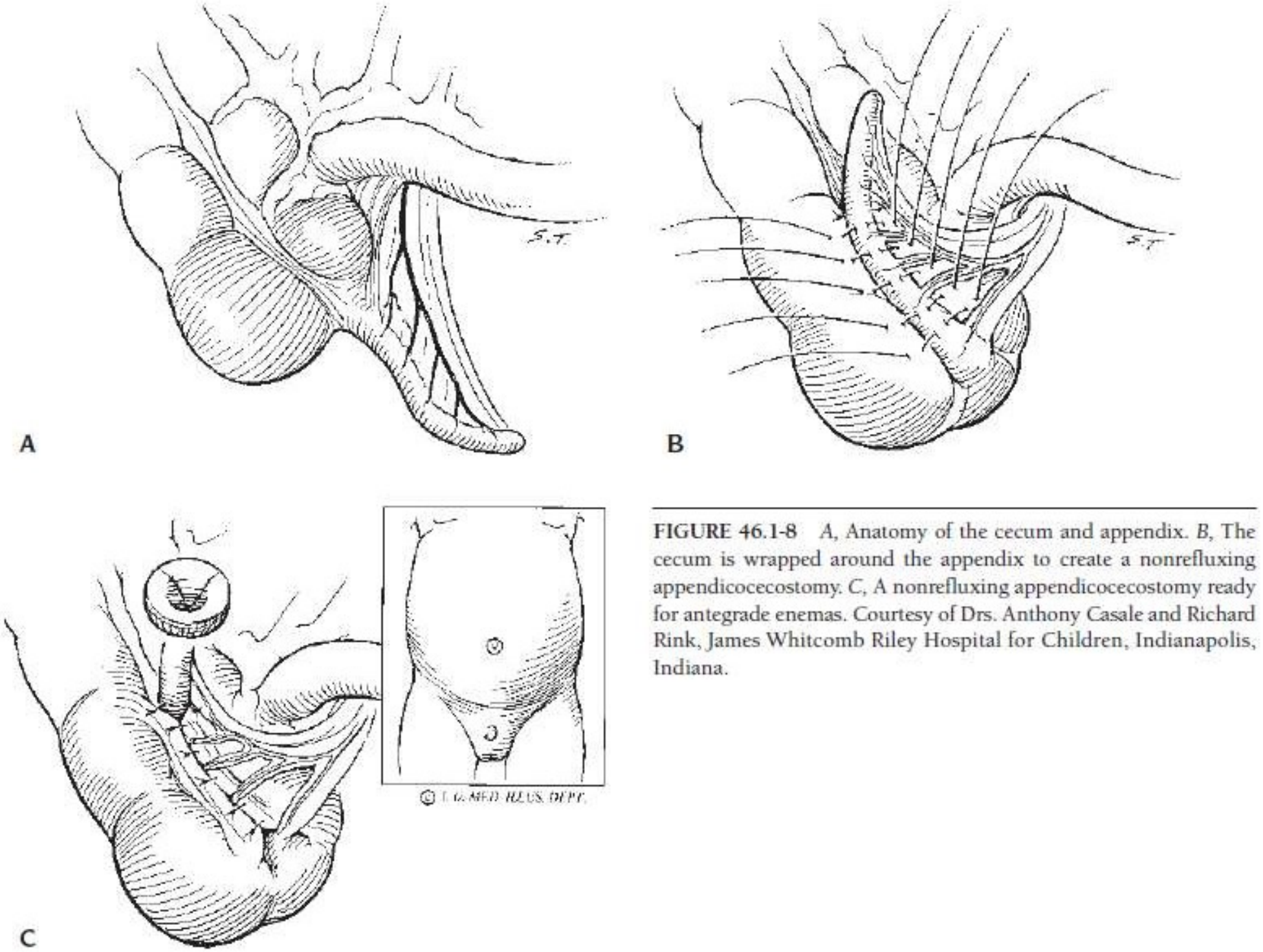


FIGURE 46.1-8 *A*, Anatomy of the cecum and appendix. *B*, The cecum is wrapped around the appendix to create a nonrefluxing appendicocecostomy. *C*, A nonrefluxing appendicocecostomy ready for antegrade enemas. Courtesy of Drs. Anthony Casale and Richard Rink, James Whitcomb Riley Hospital for Children, Indianapolis, Indiana.

Surgical Treatment

- Anorectal myectomy
- Proctocolectomy
- The Malone appendicocecostomy for antegrade colonic enemas (MACE procedure)
- Colectomy
- Hemicolectomy
- Ileostomy

Prognosis and Follow-Up

Prognosis and Follow-Up

۵۰%

Recovery Rate

Children free of laxatives after ۶- ۱۲ months

۶- ۲۴

Treatment Duration

Months of maintenance therapy typically typically needed

۸۵%

FNRFI Resolution

Percentage symptom-free by age ۱۸

Constipation is not self-limiting. Regular follow-up is essential to provide support, assess support, assess progress, and adjust medication. Early onset and family history predict predict persistence. Relapses are common, requiring resumption of treatment.


Sometimes dreams
are wiser than waking.
Thanks for your attention