

Enhanced Primary Care Pathway: Childhood CONSTIPATION

Focused summary of childhood constipation relevant to primary care

Definition. Constipation is the subjective complaint of passage of **abnormal stool**: dry, hardened feces that may be accompanied by straining and/or pain and/or less frequently than expected for age.

Pathophysiology. Over 95% of childhood constipation cases are due to **disorganized function and interaction of the colon, rectum, or pelvic floor musculature**, and classified as “functional”. In up to 60% of cases, especially among young children, it is caused by the **voluntary withholding** of feces due to fear of painful defecation or other triggers. Repeated painful bowel movements establish a pain-retention-pain cycle. Continuing retention can then result in **soiling accidents/encopresis**, due to formed, soft, or liquid stools bypassing the fecal mass, and/or involuntary external sphincter relaxation. Chronic rectal distension may also lessen sensation, preventing recognition of rectal fullness with a normal-sized stool. Developmental changes and behavioral factors, i.e. some children may not recognize the urge to defecate (inattention, attention deficit disorders, developmental stage), play a major role in the pathophysiology of functional constipation and must be recognized and addressed for successful treatment.

Management. As the etiology (Table 3) is unlike the one in adults, childhood constipation requires different management. Appropriate management should **start right away to prevent** chronic constipation (more than 8 weeks) that can lead to fecal incontinence, abdominal pain, anorexia, and enuresis affecting family dynamics, school/social dysfunction, and lowering the child’s self-esteem.

All three components are required:

- family **education** regarding pathophysiology of functional constipation **with a verification of the family’s understanding** of the concepts (see resources on Family and Community Resource Center website (www.fcrc.albertahealthservices.ca) and in the local libraries);
- **child’s and parental behavior modification** aimed at correcting the child’s maladaptive response to defecation signals through toilet training or “bowel retraining”; and
- **disimpaction** (if appropriate) and **maintenance therapy of appropriate length** with laxatives.

Poor dietary fibre intake in children may contribute to constipation; however **increased fibre should not be used as the initial treatment**, especially in younger children. Dietary fluid and fibre may be used for maintenance of a healthy bowel routine once constipation is resolved.

Evaluation requires a detailed history, medication review, and physical examination. Routine laboratory testing or abdominal radiograph are generally not recommended in pediatric patients with chronic constipation. Patients presenting with **alarm features and red flags** require further diagnostic work up with an appropriate specialist (Pediatrician, Surgeon or Pediatric Gastroenterologist).

Outcomes. On average, only about 50% of children treated for constipation will recover and will be without laxatives after 1 year, while the remaining patients require long term treatment (up to 10 years) or remain symptomatic despite laxatives. **Anticipatory guidance** to the families about long term treatment required for successful behavioral modification, return of rectal tone and sensation is necessary to prevent disappointment, improve long term compliance, and prevent early discontinuation of therapy leading to symptom recurrence.

Table 1. Checklist to guide your in-clinic review of this patient with constipation

- Is the history and exam consistent with constipation?
- Are there any red flags to indicate underlying disorder? If Yes – refer as indicated
- Are there contributing risk factors that may require modification of management and a referral to a Community Pediatrician?
 - Developmental delay
 - Behavioral or mental health problems
 - Comorbidities
 - Social impact
- Are there any triggering events identified, including lifestyle factors?
- Is there evidence of fecal impaction or functional fecal retention? – If Yes – disimpaction

Table 2. Links to additional resources for physicians

1. Diagnosis and management of idiopathic childhood constipation: Summary of NICE guidance www.jstor.org/stable/40701843
2. AHS Nutrition Guideline: Healthy Infants and Young Children. GI Function: Management of Constipation (2015). <https://www.albertahealthservices.ca/assets/info/nutrition/if-nfs-ng-healthy-infants-gi-function-management-constipation.pdf>

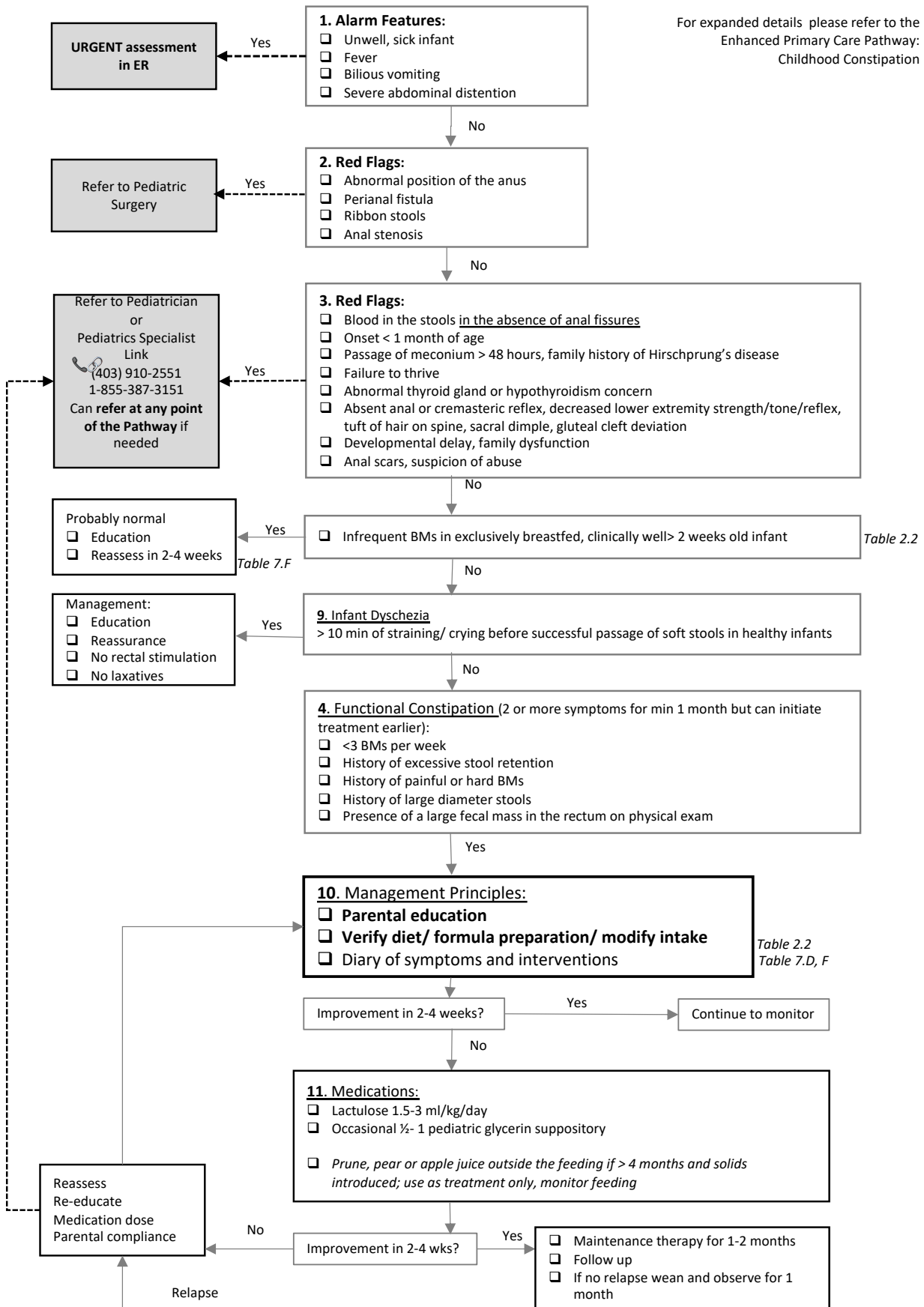
Clinical flow diagram

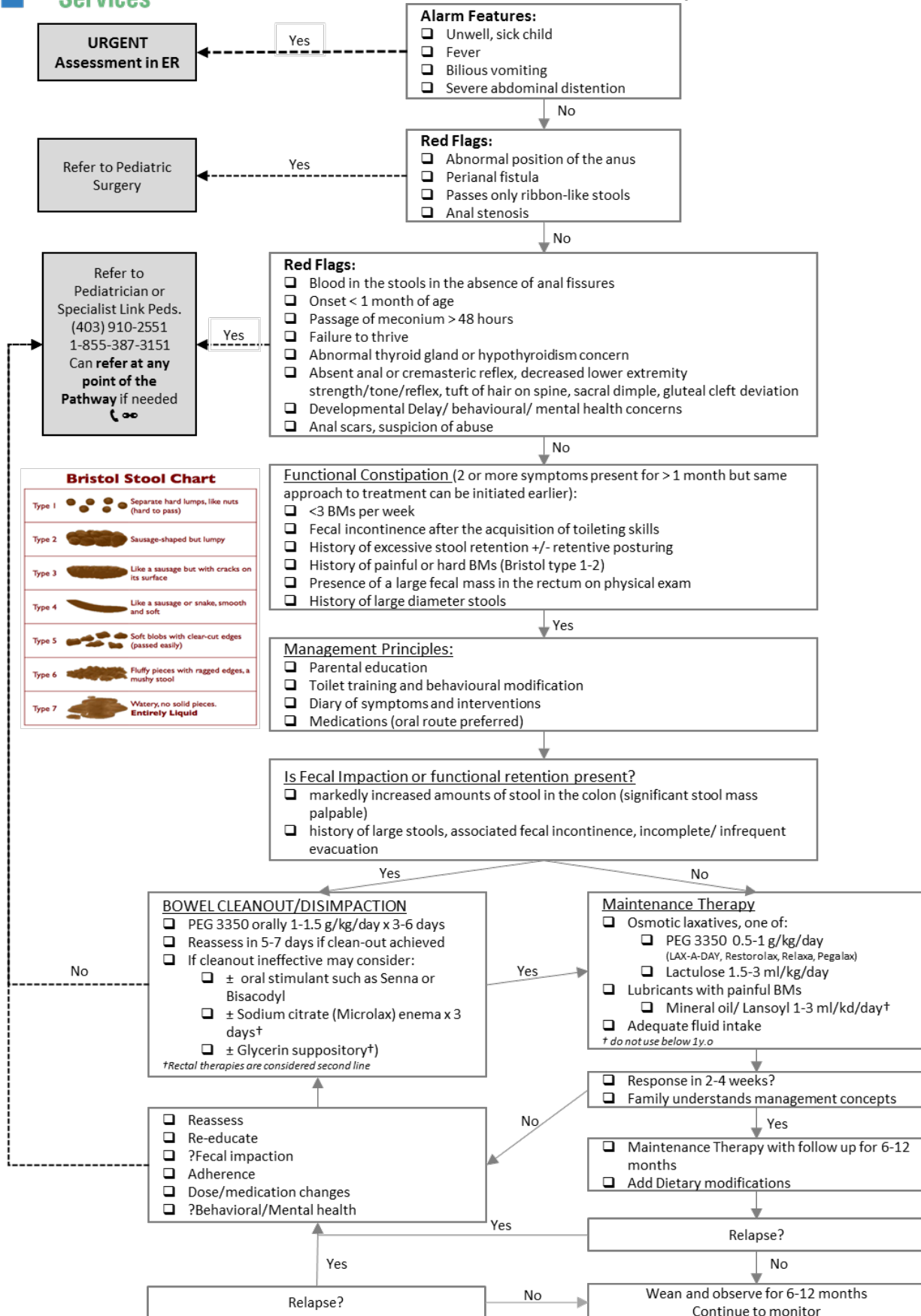
This AHS Calgary Zone pathway incorporates the most current evidence-based clinical guidelines for diagnosis and management of childhood constipation. The following is a best-practice clinical pathway for management of childhood constipation in the primary care medical home.

1. Croffie JMB, Fitzgerald JF. Hypomotility disorders. In: Walker A, editor. Paediatric Gastrointestinal Disease. 3. Ontario: Decker Inc; 2000
2. Bardisa-Ezcurra Lauren, Ullman Roz, Gordon Jenny, Guideline Development Group. Guidelines: Diagnosis and management of idiopathic childhood constipation: summary of NICE guidance. BMJ: British Medical Journal 2010;340(7758):1240-1242.
3. Benninga M, Candy DC, Catto-Smith AG, Clayden G, Loening-Baucke V, Di Lorenzo C, et al. The Paris Consensus on Childhood Constipation Terminology (PACCT) Group. J Pediatr Gastroenterol Nutr. 2005;40(3):273-5.
4. Loening-Baucke V. Chronic constipation in children. Gastroenterology. 1993;105(5):1557-64.
5. Yeung Alfred K, Di Lorenzo Carlo. Medical Management and Prevention of Chronic Constipation in Children. Constipation in Children: Diagnosis and Treatment. Chapter 11:225-252.



For expanded details please refer to the Enhanced Primary Care Pathway: Childhood Constipation





Acknowledgements
 Bristol Stool Chart originally published in: Heaton K. Understanding your bowels. Family Doctor Publications; 1999. ISBN 1-903-474310.

Clinical flow expanded detail

Evaluation. Every child must be carefully assessed for the presence of **alarm features and red flags** (Table 4), requiring further assessment by Pediatric Surgeon or a Pediatrician for an underlying organic etiology. A **careful history** should include:

- symptoms of systemic disease, fever, growth-failure, underlying anatomic obstruction, Hirschprung's disease, or spinal problems
- time of onset of constipation (within first month of age has a higher likelihood of being caused by an underlying disorder or congenital anomaly)
- **triggering factors:** although a child may develop functional constipation at any time, it happens most commonly during the following transition times:
 - dietary changes in infancy (breast milk to cow's milk, or liquid to solids, altering stool consistency leading to stool withholding);
 - toilet training (if attempted when the child is not ready, physiologically or psychologically, may result in anxiety around toileting, conflict with parents, and emotional trauma leading to the inability to relax pelvic floor for defecation, and lead to subsequent stool retention);
 - start of school (changes in routines, avoidance of school bathroom due to lack of privacy and poor hygiene, and inability to use the bathroom when needed resulting in dysfunctional toileting behavior).
- identification of **risk factors:**
 - developmental delay, behavioral or mental health problems;
 - home and school related psychological stress (separate parental households, poor parenting skills, family dysfunction);
 - dietary problems (diet low in fiber, junk food consumption, lack of regular meals with parents);
 - obesity;
 - child maltreatment (physical, sexual or emotional abuse, civil unrest and exposure to war).

Physical examination after the red flags have been excluded:

- assessment of the size of the rectal fecal mass by bimanual abdominal palpation on either side of the rectus sheath to judge its height above the pelvic brim;
- inspection of the perineum - presence of anal fissure (frequently explains presence of small amounts of blood that is alarming to the caregivers but strongly suggestive of fecal retention); and
- digital rectal examination – may not be initially necessary unless there is a concern of anatomic problem, and even then, may be left to a specialist to whom the child is referred.

Investigations

- **Routine laboratory testing** for hypothyroidism, celiac disease, and hypercalcemia is not recommended in the absence of other features of underlying organic disease during clinical evaluation. **Abdominal radiography**, plain X-ray or barium enema are not required to evaluate for fecal impaction unless the physical exam is unreliable.

Clinical diagnosis of functional constipation can be made if the history and physical examination are consistent with Rome IV criteria (Table 5), when the symptoms cannot be attributed to another medical condition, and are insufficient for diagnosis of irritable bowel syndrome.

Management should start right away in the medical home to prevent complications, significant psychosocial morbidity, and family discord. To be successful all three elements are necessary: family **education** and **behavioral modification, disimpaction** if appropriate, and **maintenance therapy** with laxatives.

- **Education** to families regarding normal intestinal function and the pathophysiology of functional constipation is essential to facilitate successful management. A verification of the family's understanding of the concepts following any of the educational modalities is as important as providing resources. The following strongly recommended resources are available to families through the Family and Community Resource Centre website or your local library (Table 7):
 - *"The Ins and Outs of Poop"* – an excellent, easy to read book by T.R. DuHamel
 - GIKids Constipation Care Package, including *"The Poo in You"* video clip
 - UpToDate® Patient Education
 - *Family Education Pathway (currently in development)*
- **Behavioral modification** includes appropriate toilet training and positive parental reinforcement. The following strongly recommended resources are available to families through the Family and Community Resource Centre website (Table 7):
 - Constipation Teaching Module #2 – *"How to make it happen"*
 - *"The Ins and Outs of Poop"* by T.R. DuHamel.

Toilet training/ bowel retraining aims at correcting the child's maladaptive response to defecation signals.

- Encourage a positive and supportive parental attitude throughout treatment, to reduce the child's anxiety and toileting avoidance. Identify reasons for toilet avoidance. Punishment is unwarranted and counterproductive.
- Educate parents about helping their child to recognize the urge to defecate. Parents need to learn about the "stool withholding behaviors" as signaling "the urge to go" to properly react. When the urge to defecate occurs, it must become a habit for the child to use the toilet.
- A regular toileting schedule should be instituted (trying to defecate for 5 minutes on the toilet within 30 minutes of a meal) to take advantage of the gastrocolic response. This routine allows the gradual reestablishment of normal bowel habits.
- Proper positioning - child must feel safe and comfortable on the toilet seat or potty. No dangling feet! Placing the feet on a footrest (or a squatty potty) for support helps to flatten the anorectal angle and facilitate stool expulsion.
- Children may need to learn the sequence of abdominal wall straining and pelvic floor relaxation required for normal defecation. Recommend activities that promote relaxation, generate an increase in intra-abdominal pressure, and show the child how to Valsalva in a coordinated fashion, e.g. have the child gently blow air using bubble wands, party noise makers, a pin wheel or playing harmonica while seated on the toilet.
- A calendar or diary of stool type and frequency helps to monitor progress and as positive reinforcement.
- A reward system using stickers or small gifts may be helpful.
- **Disimpaction or clean out** is recommended in:
 - fecal impaction – lower quadrant mass or dilated rectum with hard stool;
 - functional fecal retention – large diameter stools as determined by caregiver or BMs less than twice per week and retentive behaviors; or
 - excessive stool in colon on abdominal radiograph as determined by radiologist or treating physician, although routine use of abdominal radiograph to diagnose stool retention is not recommended.

Orally administered osmotic laxative PEG 3350 has superior outcomes as first-line treatment for disimpaction (high-dose) and maintenance. If PEG alone fails, oral stimulants like Bisacodyl or Senna may be added. These are less invasive than rectal therapies (enemas and suppositories) that

may compound the problem of uncomfortable defecation that often is at the heart of functional constipation.

- **Maintenance** therapy consists of consistent behavioral intervention and laxatives. Dietary changes are usually required to prevent recurrence.

Laxatives (Table 6). Lubricant or osmotic laxatives with polyethylene glycol (PEG) are the mainstay of initial treatment due to ease of administration, palatability, fewer side effects and superior outcomes. The family should adjust doses to induce a daily soft bowel movement (Bristol chart, type 3 or 4) for at least 1-2 months when “bowel retraining” is undertaken, and then slowly taper over several months after the toilet re-training has been successful. Over time, soft stools allow children to lose the fear of defecation. A stimulant laxative (preferably oral) may be added if the desired effect is not obtained.

- *Osmotic laxatives* are poorly absorbed substances that draw water into the intestinal lumen through an osmotic gradient. They include non-toxic organic polymers (PEG), poorly absorbed sugars (lactulose, sorbitol), and inorganic salts (magnesium compounds).
- *Lubricant laxatives*: Mineral oil functions primarily as a lubricant, but is less effective than PEG. It is worth considering if defecation is painful. It is not recommended for children < 1 year of age or children unable to protect their airways due to the risk of aspiration.

Other medications. Lubiprostone, linaclotide and prucalopride should not be used in children for initial treatment. They have been found to be effective in constipated adults, but no randomized studies have been published for lubiprostone in children. Prucalopride was shown to be ineffective.

Dietary recommendations

- **Infants <6 months:** Breast fed infants should continue to breast feed on demand. If the infant is formula fed, ensure that the formula is being prepared according to directions. Iron fortified formula does not cause constipation and is important to prevent iron deficiency anemia (Tables 2 and 7).
- **Children >6 months:** Poor dietary fibre intake in children may contribute to constipation; however increased fibre should not be used as the initial treatment, especially in younger children. Dietary fibre may be used for a maintenance of a healthy bowel routine once constipation is resolved. Increased fluid and fibre, in the form of vegetables, fruits, and whole grains, may prevent recurrence of constipation. Fibre should be introduced gradually into the diet as a sudden increase can cause discomfort, bloating, and gas (Table 7).

Diet changes are most successful when the entire family makes these healthy choices.

Outcomes. On average, only about 50% of children treated for constipation will recover and will be without laxatives after 1 year, while the remaining patients require long term treatment (up to 10 years) or remain symptomatic despite laxatives. **Anticipatory guidance** to the families about long term treatment is necessary to prevent disappointment, improve long term compliance, and prevent early discontinuation of therapy leading to symptom recurrence. Required elements:

- the **length of treatment** must be of sufficient duration for behavior modification, return of rectal tone, and sensation. This can range from a few months to several years;
- **high risk of recurrence** - reminders of susceptible periods when symptoms can recur to prompt the family to define preventative strategies and focus on early intervention.

A long term effective therapeutic relationship in the patient’s medical home is necessary for a successful treatment outcome; periodic patient follow-up and coaching improves the chance of successful outcome.

Stooling difficulties in infants.

Infant dyschezia can affect up to 3% of infants up to 9 months of age. They have straining, screaming, crying, and turn red or purple in the face when trying to defecate (for up to 10-20 minutes) followed by passing soft stools. Although it causes parental concern it represents lack of coordination between increased intra-abdominal pressure and pelvic floor relaxation and resolves spontaneously. Medical intervention is not necessary and especially rectal stimulation should be avoided, instead reassurance is important.

Constipation in the vast majority of infants less than 1 year of age is functional in nature. Stool frequency can vary tremendously in infants depending on their diet (Tables 2 and 7). Reassurance, with close follow-up, is required in infants without alarm features or red flags. Careful evaluation to rule out underlying disorders must be considered if red flags are identified (Table 3).

Therapeutic intervention is warranted if constipation persists or becomes troublesome despite expectant management with appropriate breast/ formula feeding and formula preparation.

- Increased intake of sorbitol-containing juices (prune, pear, or apple), while maintaining a healthy balanced diet, can be used as initial therapy in infants > 4 months of age.
- Barley malt extract is another acceptable dietary stool softener.
- Honey (particularly raw and pasteurized) should be avoided, due to the risk of *Clostridium botulinum* spores and infant botulism.

If dietary interventions are insufficient, osmotic laxatives such as lactulose, magnesium hydroxide, and PEG3350 without electrolytes have been shown to be safe and effective in infants. Glycerin suppositories can also be a useful treatment option in infants without any notable adverse effects. Use of stimulant laxatives, phosphate enemas, and mineral oil is not recommended, due to potential adverse effects in this age group.

Table 3. Etiology of childhood constipation

Anatomic	Neuromuscular	Systemic	Drugs	Toxins
Imperforated anus	Hirschprung's disease	Celiac disease	Antidepressants	Lead poisoning
Anal stenosis	Anal achalasia	Hypothyroidism	Chemotherapy	Botulism
Pelvic mass (sacral teratoma)	Spinal cord anomalies/ trauma	Hypercalcemia/ hypokalemia	Opiates	
	Colonic inertia	Diabetes	Anticholinergics	
	Pseudo-obstruction	Dietary protein allergy	Vit. D intoxication	
	Abnormal abdominal musculature	Multiple endocrine neoplasia		
		Cystic fibrosis		

Table 4. Alarm features and red flags

ER	<input type="checkbox"/> Unwell, sick child <input type="checkbox"/> Fever	<input type="checkbox"/> Bilious vomiting <input type="checkbox"/> Severe abdominal distention
Surgery	<input type="checkbox"/> Abnormal position of the anus <input type="checkbox"/> Perianal fistula	<input type="checkbox"/> Ribbon stools only <input type="checkbox"/> Anal stenosis
Pediatrics	<input type="checkbox"/> Blood in the stools in the absence of anal fissures <input type="checkbox"/> Onset <1 month <input type="checkbox"/> Passage of meconium >48 hours <input type="checkbox"/> Family history of Hirschprung's Disease <input type="checkbox"/> Failure to thrive <input type="checkbox"/> Absent anal or cremasteric reflex <input type="checkbox"/> Abnormal thyroid / hypothyroidism	<input type="checkbox"/> Gluteal cleft deviation <input type="checkbox"/> Decreased lower extremity strength/tone/reflex <input type="checkbox"/> Tuft of hair on spine <input type="checkbox"/> Anal scars <input type="checkbox"/> Sacral dimple <input type="checkbox"/> Suspicion of abuse

Table 5. Rome IV (2016) criteria for functional constipation in infants, children and adolescents

Age	Infants and toddlers up to 4 years of age (<i>developmental age</i>)	Children above 4 years of age (<i>developmental age</i>) and adolescents <i>with insufficient criteria for IBS diagnosis</i>
Must include	2 or more symptoms present for > 1 month:	2 or more symptoms present for > 1 month at least 1/week:
	<input type="checkbox"/> Two or fewer defecations per week <input type="checkbox"/> History of excessive stool retention <input type="checkbox"/> History of painful or hard bowel movements <input type="checkbox"/> History of large-diameter stools <input type="checkbox"/> Presence of a large fecal mass in the rectum	<input type="checkbox"/> Two or fewer defecations in the toilet per week <input type="checkbox"/> History of retentive posturing or excessive volitional stool retention <input type="checkbox"/> History of painful or hard bowel movements <input type="checkbox"/> History of large diameter stools which may obstruct the toilet <input type="checkbox"/> Presence of a large fecal mass in the rectum <input type="checkbox"/> At least 1 episode/week of fecal incontinence
	Additional criteria that may be used in toilet trained children <input type="checkbox"/> At least 1 episode/week of fecal incontinence after acquisition of toileting skills <input type="checkbox"/> History of large-diameter stools that may obstruct the toilet	

Table 6. Laxatives - Please include this completed form/information with your referral

Generic Name	Trade Name	Dosage	Dose Used/Length of Treatment
Oral Osmotics			
Lactulose	Lactulose	1-2 g/kg/day (=1.5-3 ml/kg) in 1-2 doses <i>*Adjust dose according to response</i>	
PEG 3350 (polyethylene glycol)	LAX-A-DAY® Restoralax® Relaxa®	<u>Fecal Disimpaction:</u> 1-1.5 g/kg/day (max 6 consecutive days) <u>Maintenance:</u> 0.5-1.0 g/kg/day <i>*Adjust dose according to response</i>	
Magnesium hydroxide	Milk of Magnesia®	2-5 yrs: 0.4-1 g/day in 1-2 doses 6-11 yrs: 1-2.4 g/day in 1-2 doses 12-18 yrs: 2.4-4.8 g/day in 1-2 doses	
Lubricants			
Mineral Oil	Mineral Oil® Lansoyl®	1-18yrs: 1-3mL/kg/day, in 1-2 doses; max 90mL/day <i>***Do not use in children < 1 yr or children unable to protect their airways or with GER</i>	
Oral Stimulants			
Bisacodyl	Dulcolax® Bisacodyl	3-10 yrs: 5mg/day >10 yrs: 5-10 mg/day 4-18 yrs: 5-20 mg once daily	
Senna	Senokot® Ex-Lax®	2-6 yrs: 2.5- 5 mg/day (up to 10 mg) 6-12 yrs: 7.5-10 mg/day (up to 15 mg) >12 yrs: 15-20 mg/day	
Sodium picosulfate/Mg oxide/citric acid	Pico-Salax® Purg-Odan®	1 mo- 4 yrs: 2.5-10 mg once/day 4-18 yrs: 2.5-20 mg once/day	
Rectal Enemas			
Bisacodyl	Dulcolax® supp. Bisacodyl supp.	2-10 yrs: 5mg once/day >10 yrs: 5-10 mg once/day	
Sodium lauryl sulfoacetate	Microlax™	1 mo-1 yr: 2.5 ml/dose (0.5 enema) 1-18 yrs: 5 ml/dose (1 enema)	
Mineral oil	Fleet Oil®	2-10 yrs: 30-60 mL once/day >11 yrs: 60-150 ml/day	
Sodium phosphate	Fleet Enema®	1-18 yrs: 2.5mL/kg, max 133 mL/dose	
NaCl	Fleet Saline Enema®	Neonate < 1 kg: 5 mL; >1kg: 10 mL >1 yr: 6 mL/kg once or twice per day	

Table 7. Constipation Resources for Children and Families

The following resources provide information to support you and your child when managing constipation at home.

General Information
A. Go to “Constipation Care Package” on gikids.org for Constipation and Encopresis information, educational video “The Poo in You” and toilet training tips. http://www.gikids.org/content/50/en/constipation
B. Alberta Children’s Hospital GI Clinic’s Constipation Teaching Modules <ul style="list-style-type: none">➤ “How to Make it Happen” (#2),➤ “Fibre FAQs” (#3),➤ “Parenting Strategies for Children with Constipation” http://frcr.albertahealthservices.ca/health-information/library/information-prescriptions/
C. “The Ins and Outs of Poop: A Guide to Treating Childhood Constipation”. Thomas R. DuHamel, 2 nd edition; Maret Publishing; Feb 2018. Available to borrow at the Family & Community Resource Centre or through your local library.
D. UpToDate® <i>Beyond the Basics</i> “Patient education: Constipation in infants and children” http://www.uptodate.com/contents/constipation-in-infants-and-children-beyond-the-basics?source=search_result&search=constipation&selectedTitle=2%7E56
E. ERIC - The Children’s Bowel & Bladder Charity. https://www.eric.org.uk/ . UK website with lots of information and downloadable resources on childhood bowel and bladder problems. Search for “Constipation”. Visit “Videos about wee and poo”, read “Pirate Pete & the Fearsome Skids” and many other resources.
F. Alberta Health Services Constipation in Babies and Children https://www.albertahealthservices.ca/assets/info/nutrition/if-nfs-constipation-in-babies-and-children.pdf
G. Toilet training – great information for parents including many additional resources (books, websites and apps) http://www.uptodate.com/contents/toilet-training-beyond-the-basics?source=see_link
Medications
H. Pediatric constipation and PEG 3350 - American Academy of Pediatrics RadioMD podcast, “Pooping Problems: Is Your Child Troubled with Constipation?” PEG (Miralax) specific information is from 4:24 to 8:00 http://radiomd.com/show/healthy-children/item/25626-is-your-child-troubled-with-constipation
I. PEG 3350 (Trade names: Restorolax/ Lax-A-Day/Clear-Lax/ Miralax) information sheet https://www.gikids.org/files/PEG_3350_FAQ_formatted.pdf
Diet and Fiber Facts
J. Alberta Health Services Fiber Facts – handout https://www.albertahealthservices.ca/assets/info/nutrition/if-nfs-fibre-facts.pdf

Please visit <http://frcr.albertahealthservices.ca/health-information/library/information-prescriptions/constipation> for links to all resources.

