Functional constipation in children

Johanna C Meyer, BPharm, MSc(Med) Pharmacy, PhD (Pharmacy)
Tsakane Mashaba, BPharm
Letlhogonolo Makhele, BPharm
Mncengeli Sibanda, BPharm, MPharm, MSc Pharmacology, MBA
School of Pharmacy, Faculty of Health Sciences, Sefako Makgatho Health Sciences University
Correspondence to: Hannelie Meyer, e-mail: hannelie.meyer@smu.ac.za
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Abstract

Constipation is one of the most common digestive complaints that affects children. Often the exact cause is unknown and no obvious anatomical, biochemical or physiological abnormalities can be identified in the majority of cases. However, the symptoms of constipation may interfere with the quality of life of the child, as well as his/her family. This article provides an overview of functional constipation in children and the management thereof.

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Introduction

Constipation in children is a common problem, occurring in up to one third of children at some stage during their development, with functional constipation being the most common, accounting for 95% of cases.[1-4] It is considered a symptom rather than a disease or a sign.[3,5,6] However, it leads to emotional and physical suffering, decreasing the child's quality of life.[7]

In the hospital setting, constipation in children accounts for 3% of all referrals to paediatric practice and up to 25% of cases to paediatric gastroenterologists. It is one of the 10 most common problems seen by general paediatricians.[1,3,8,9]

Constipation in children is commonly defined as a delay or difficulty in defecation (two or fewer bowel movements per week), present for two or more weeks and sufficient to cause significant distress to the patient.[3,10] It is associated with abdominal pain, soiling, faecal impaction, a poor appetite, stool withholding and overflow incontinence, all of which have an impact on the child's development.[3] If these symptoms are present for less than four weeks, it is classified as "acute" constipation.[10] Symptoms of longer duration are classified as "chronic" functional constipation, if these symptoms cannot be explained by another condition.[10]

The Paris Consensus on Childhood Constipation Terminology (PaCCT) Group has proposed a simplified terminology that clearly defines the criteria for chronic constipation (Box 1), which also informs the Rome IV criteria for functional constipation and diagnosis (Figure 1).[1,11]

Box 1. Terminology for childhood constipation as recommended by the Paris Consensus on Childhood Constipation Terminology (PaCCT) Group[1,11]

Chronic constipation: Defined as the occurrence of two or more of the following characteristics during the last eight weeks:

- Frequency of bowel movements less than three times per week
- More than one episode of faecal incontinence per week
- Large stools in the rectum or palpable mass on abdominal examination
- Passing of stools so large that they may obstruct the toilet
- Retentive posturing and withholding behaviours
- Painful defecation

Faecal incontinence: Passage of stools in an inappropriate place

- **Organic faecal incontinence:** Faecal incontinence resulting from organic disease (for example neurological damage or anal sphincter abnormalities).
- **Functional faecal incontinence:** Non-organic disease which can be sub-divided into:
  - ***Constipation associated faecal incontinence:*** Functional faecal incontinence associated with the presence of constipation.
  - ***Non-retentive faecal incontinence:*** The passage of stools in an inappropriate place, occurring in children aged four years and older, with no evidence of constipation by history or examination.

Faecal impaction: Severe constipation with a large faecal mass in either the rectum or the abdomen, which is unlikely to be passed on demand. The faecal impaction can be shown by abdominal or rectal examination or other methods.

Pelvic floor dyssynergia: Inability to relax the pelvic floor when attempting to defecate.

Epidemiology

The prevalence rate for constipation in children varies between geographical regions, but is estimated to be between 0.7% and 29.6%, with a median of 12%.[7,12,13] Prevalence also varies according to age groups, with peak incidence between two and four years of age, usually when potty training starts.[7]

Some studies have reported no difference in the prevalence of constipation between girls and boys, while others found a significantly higher prevalence in girls.[6] A positive family history has been identified in 28–50% of constipated children and a

higher incidence reported in monozygotic than dizygotic twins, suggesting the role of genetic factors.[8]

Constipation and faecal incontinence are more prevalent in obese children. There is also a higher incidence of constipation among children with a birth weight under 750 g, associated with neurodevelopmental impairment.[14]

Main causes and risk factors

In over 90% of paediatric constipation cases, there is a functional rather than organic cause, hence only 5–10% of childhood constipation has an underlying organic cause. Organic causes relate to anatomical malformations, metabolic or endocrine causes, gastrointestinal, neuropathic conditions, intestinal nerve or muscle disorders, abnormal abdominal musculature, connective tissue disorder and drugs.[3,6] Hirschsprung's disease, cystic fibrosis, anorectal abnormalities, and metabolic conditions such as hypothyroidism are rare organic causes of childhood constipation.[14]

Although there is no evidence for a difference between bottle-fed and breastfed babies, it is generally accepted that bottle-fed babies are more at risk of relative water deficiency while breastfed babies frequently have delays of many days between passing normal stools.[14]

Many constipated children have functional constipation resulting from intentional withholding of stool. An unpleasant event may have been the precipitating factor for the desire to withhold stool in some children. Forceful toilet training in a toddler not ready for toilet training may lead to withholding of stool resulting in passage of dry hard stools with discomfort. In older children, unpleasant toilet facilities at school or anal pain resulting from streptococcal anusitis or sexual abuse, precipitate the tendency to withhold due to discomfort and inconvenience.[5]

Recognised risk factors of childhood constipation include psychological stress, parental rearing style, dietary factors such as cow's milk protein, diet low in fibre, fast food consumption and not having regular meals with parents, as well as a lack of physical activity, obesity, abuse, either physical, sexual or emotional, familial predisposition and psychological co-morbidities.[15]

Diagnosis

Constipation is diagnosed by clinical history and examination (Figure 1). History should include a detailed exploration of symptoms and look for 'red flags' to exclude any organic cause. A physical examination should include an abdominal examination to assess the degree of faecal loading, as well as neurological assessment of the spine and lower limbs. With perianal examination, perianal cellulitis and anorectal anomalies can be identified. Constipation should be considered as a differential diagnosis in all children presenting with abdominal pain.[8]

Rome IV criteria have been used widely and updated by international societies for diagnosis of functional constipation (Figure 1). In infants and children up to a developmental age of four years, these symptoms must be present for at least one month; in children over four years old, symptoms should be present for at least two months, with insufficient criteria for the diagnosis of irritable bowel syndrome.

Management of constipation in children

A thorough history and physical examination of the infant or child with constipation is essential, to be able to recommend an appropriate treatment approach (Figure 2). Furthermore, it is important to manage acute constipation or intervene as soon as it is observed, to prevent this from getting worse or leading to chronic constipation.[17] A follow-up plan is essential to ensure that the constipation has been resolved and the child presents with regular bowel movement and faecal continence.[17]

The overall management process for children with constipation is divided into three stages of therapy, i.e. disimpaction, maintenance therapy and behavioural modification (Figure 2).[18] The basic principles applied during this process, include evacuation of the colon, elimination of pain and establishing regular bowel habits, using pharmacological treatment (Table I) as well as dietary modification.[10,19]

Disimpaction

Severe constipation can result in a solid, immobile large faecal mass in either the rectum or the abdomen which may require disimpaction.[10] Colon evacuation or disimpaction would be the first step in the management of constipation where faecal impaction is present.[19] Disimpaction involves the use of one or more different treatment regimens using orally or rectally administered medication.[20]

In infants, disimpaction can be done through the use of glycerine suppositories. In addition, juices that contain sorbitol (e.g. prune, pear, or apple) and stool softeners (Barley malt extract, corn syrup, lactulose, or sorbitol) can also be used.[20] Rectal disimpaction with enemas in infants is not recommended. Although the onset of enemas is rapid, they are also invasive and possibly traumatic for the infant.[20] Mineral oils and stimulant laxatives should be avoided in infants.[20] In older children, rectal disimpaction can be managed through the use of oral or rectal medication, including enemas. Osmotic laxatives (such as lactulose and magnesium hydroxide) are safe and effective.[20] Senna and bisacodyl (stimulant laxatives) can be useful in selected patients who are more difficult to treat. Low dosage polyethylene glycol electrolyte solution is recommended for constipation that is difficult to manage.[20]

Maintenance therapy

Removal of pain-associated defaecation: In most cases, chronic laxative therapy is required to ensure one to two soft stools daily, which might necessitate large doses of laxatives. Caregivers need to be reassured that long-term laxative use is safe. It is also essential, especially in young children, to remove any pain associated with the passage of bowel movements. Short-term topical application

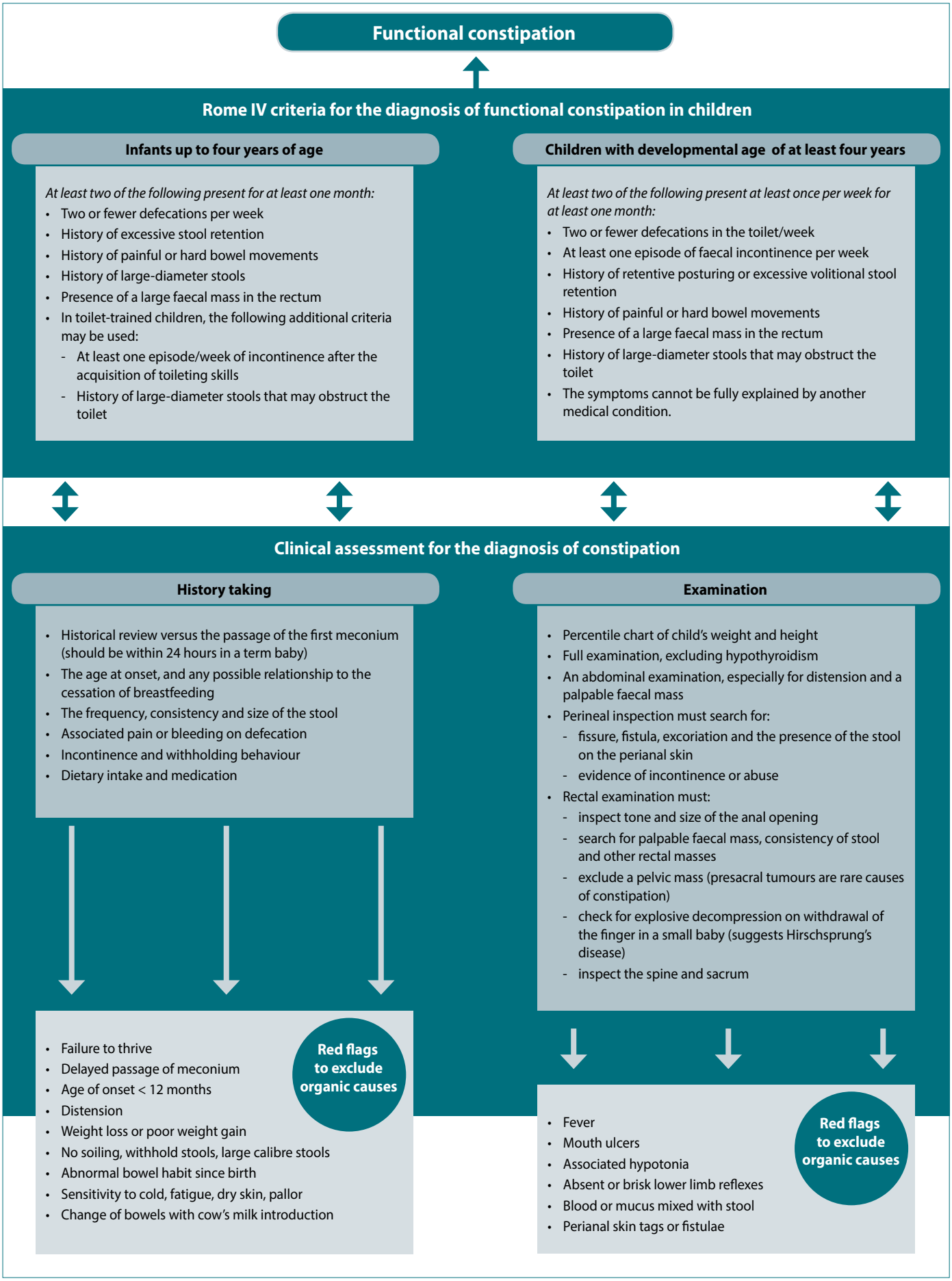
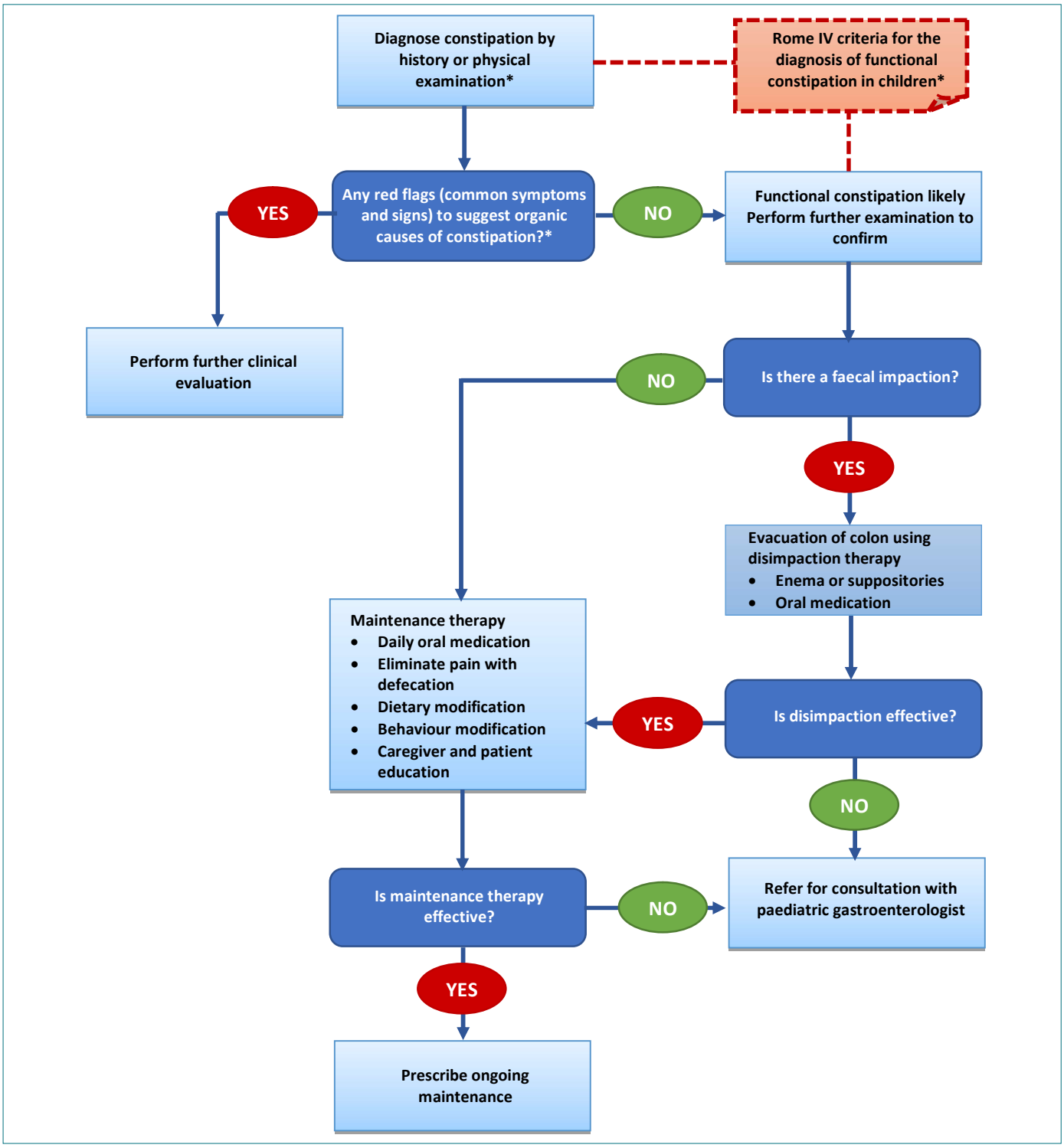


Figure 1. Clinical assessment for the diagnosis of functional constipation[3,8,16]



*See Figure 1 for more detailed information

Figure 2. Treatment of functional constipation in children[19,20]

of a local anaesthetic such as lidocaine may provide symptomatic relief in the case of anal fissures.[19]

Establish regular bowel movements: After disimpaction, it is necessary to avoid recurrence of faecal impaction through the use of stool softeners. The duration of the maintenance phase needs to be individualised and may vary from a few weeks to several months. Although there are a number of pharmacological treatment options available for the management of constipation in children (Table I), there is still a paucity of evidence in terms of the best maintenance therapy option for children.[20]

The main pharmacological agents used for maintenance are osmotic and stimulant laxatives given orally.[6,21] In infants, lactulose has been shown to be safe for maintenance therapy while older children can benefit from orally administered osmotic laxatives. Rescue therapy with short-term administration of stimulant laxatives can be useful in selected patients.[20]

Table I. Pharmacological treatment of constipation in children[21,22]

Class	Laxative	Dosage form	Examples	Dosage	Side-effects	Contraindications and special precautions
Osmotically acting laxatives	Lactulose	Oral, liquid	Aculax® Duphalac® Laxette® Lacson® Liquilax®	Under 1 year: 2.5 ml 2–5 years: 5 ml 6–12 years: 10 ml twice daily	Flatulence, abdominal distension and cramping at the outset of treatment	• Periodic serum electrolyte determinations when using for prolonged periods • *Contraindicated:* Galactosaemia
	Magnesium sulphate	Oral, liquid	Be-lax®	2–6 years: 2.5–5 ml daily 6–12 years: 5–15 ml daily	Abdominal pain, electrolyte disturbances	Adequate fluid intake should be encouraged to avoid dehydration
	Magnesium hydroxide	Oral, liquid	Phipps Milk of Magnesia®	2–12 years: 2.5–5 ml up to four times daily	Abdominal cramping	May interfere with absorption of certain medicines Take other medicines at least two hours before or after Milk of Magnesia®
	Polyethylene glycol (PEG) 3350	Oral, powder	Pegicol®	*Chronic constipation and faecal impaction:* 2–6 years: One sachet daily 7–11 years: Two sachets daily Increase to maximum 4 sachets/day *Faecal impaction:* Take up to 7 days, with number of sachets/day taken in divided doses, all consumed within a 12-hour period. Increase number of sachets per day as follows: 2–4 years: Day 1: 2 sachets; Days 2–7: 4, 4, 4, 6, 6, 8, 8 sachets/day; 5–11 years: Day 1: 4 sachets; Days 2–7: 6, 8, 10, 12, 12, 12 sachets/day Stop once disimpaction has occurred	*Common side-effects:* Abdominal pain, nausea, diarrhoea or loose stools, vomiting *Major adverse effects:* Rare but allergic reactions have been reported	• *Not recommended:* < 2 years; presence of abdominal pain, nausea or vomiting • *Contraindicated:* Intestinal perforation or obstruction due to structural or functional disorder of the gut wall; ileus; gastric retention; peptic ulceration; severe inflammatory disorders of the intestinal tract including Crohn's disease, ulcerative colitis and toxic mega-colon
	Sodium phosphate	Rectal, enema	Lenolax paediatric enema®	2–12 years: 64 ml or one enema rectally once	Electrolyte disturbances, abdominal cramping	*Contraindicated:* Nausea, vomiting or abdominal pain
	Glycerol	Rectal, suppositories	Lennon Glycerin suppositories for infants and children®	2–6 years: One suppository to one and a half paediatric suppositories inserted rectally in a single daily dose, when necessary	Abdominal cramps or bowel irritation	Allergy to glycerin
Stimulant laxatives	Bisacodyl	Oral, tablets	Dulcolax® Freshen Bisacodyl laxative®	Over 6 years: 5 mg daily	Abdominal cramps, electrolyte disturbances Long-term use may result in loss of normal bowel function	*Contraindicated:* Intestinal obstruction or undiagnosed abdominal pain Restrict to short-term use
		Rectal, suppositories	Dulcolax®	Under 2 years: 5 mg rectally Over 2 years: 5–10 mg rectally		
	Senna glycosides	Oral	Soflax®	Over 6 years: 1 tablet once daily		Restrict to short term use
Bulk-forming laxatives	Ispaghula	Granules seeds	Agiobulk®	Over 5 years: 1 medicine measure (1 hour before bedtime) swallowed unchewed with plenty of fluid	Abdominal distension, cramps, flatulence and borborygmi may occur initially	• *Contraindicated:* Intestinal obstruction, stenosis, ulceration or adhesions of the gastro-intestinal tract • May interfere with absorption of certain medicines. Take other medicines at least 3 hours before/after ispaghula
		Granular powder	Fybogel®	1 level medicine measure, stirred in a glass of water		

Dietary modification: The treatment plan for children with constipation commonly includes dietary modification such as an increase in fluid intake, dietary fibre and carbohydrates.[19,23] Dietary fibre, complex carbohydrates and unabsorbable sugars (e.g. sorbitol), increase the frequency of stools, by increasing faecal water content. These are found in many fruit juices e.g. prune, pear, apple.[19,23] It is important to increase fluid intake with increased fibre intake.[17]

A balanced diet that includes whole grains, legumes and nuts, fruits, vegetables, and plenty of fluids is common and considered appropriate for children with constipation. However, scientific evidence from randomised controlled trials, on the effects of these dietary changes on childhood constipation in improving treatment success, is not strong.[19,23]

Cow-milk proteins can precipitate constipation, hence it would be appropriate to remove cow-milk from the diet for a period of time, especially in infants and younger children.[19] Switching the child to a low-iron milk formula is not necessary, as evidence has shown that iron-supplemented formulas are not associated with an increased incidence of constipation.[19]

Behaviour modification: Long-term success in the management of constipation often depends on the ability of the child to establish regular and routine toilet times.[19] Behavioural modification for constipation is designed to normalise and sustain toilet routines, discourage stool withholding and improve understanding of defecation dynamics amongst the children and their caregivers.[6]

The following stepwise approach is recommended[19,24]:

- Promotion of successful defecation through the reduction of anxiety towards defecation by educating caregivers about the causes of constipation and the precipitating factors. This can be done by the use of pictograms and models.
- Bowel training which involves creating a schedule for trying to have a bowel movement (bowel chart). Encourage the child to attend the toilet twice daily for five to ten minutes, after breakfast and supper, to benefit from the gastrocolic reflex.
- Biofeedback with the teaching of straining techniques and posture, which encourages bowel movement.
- Reinforcing behavioural modification through motivation and a reward system so as to encourage regular toilet routine without avoidance.
- Sustenance, through encouraging a balanced diet containing whole grains, fruits, and vegetables.

Caregiver and patient education: Proper planning for maintenance treatment as well as education of the caregiver and age-appropriate education of the child should take place following a diagnosis of functional constipation.[20] Caregiver and patient education on the treatment of constipation mainly includes dietary management, particularly to include additional fibre and fluid intake for the rest of their lives. The prognosis in children for whom dietary changes have been implemented is very positive.[25]

Treatment of constipation often fails because of poor parental or caregiver education and a false expectation from them of the time to resolution.[20] Oral medication is often used only when necessary or only as rescue therapy when the child shows signs of faecal impaction. Hence, it is important to also explain the pathophysiology to the caregiver and emphasise the benefits of consistent maintenance therapy and behaviour modification.[20] Provide parents or caregivers with information about signs and symptoms which should alert them to seek medical assistance (Box 2).[26]

Box 2. Information for caregivers: When to seek help[26]

- Immediately (during the day or night): Severe abdominal or rectal pain
- No bowel movement within 24 hours of starting constipation treatment
- Infant (< 4 months) with no bowel movement within 48 hours of their normal pattern (e.g. if an infant who normally has a bowel movement every two days goes three days without a bowel movement). Call earlier in case of other symptoms such as vomiting or pain
- Infant (< 4 months) has hard (rather than soft or pasty) stools
- Infant or child does not want to eat or loses weight
- Blood in the child's bowel movement or diaper
- Repeated episodes of constipation
- Child complains of pain with bowel movements
- Questions or concerns about your child's bowel habits

Consultation

A paediatric gastroenterologist or paediatric surgeon should be consulted if an underlying organic cause of constipation is suspected, or if the child fails routine therapy or when management is complex.[19]

Long-term monitoring

Long-term assessment and monitoring of constipation is important to verify that prescribed treatment after disimpaction is effective. Once a regular routine has been maintained for weeks or months, without the child experiencing any difficulties, discontinuation of laxative therapy can be considered. Parents and caregivers should, however, be made aware that relapses are common, especially with a change in the child's routine or during times of stress.[19]

Conclusion

Functional constipation is a very common problem amongst children, and is associated with abdominal pain, soiling, faecal impaction, poor appetite, stool withholding and overflow incontinence, having a negative effect on the child's quality of life. Timely diagnosis using thorough history and physical examination is essential to facilitate an appropriate treatment approach. Overall management of functional constipation requires a staged approach with disimpaction, if necessary, as a first step, followed by maintenance therapy. Functional constipation normally requires long-term maintenance therapy including pharmacological treatment, behaviour modification and dietary modification.

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