Author/s:
Trajanovska, M;King, SK;Gibb, S;Goldfeld, S

Title:
Children who soil: A review of the assessment and management of faecal incontinence

Date:
2018-10-01

Citation:
Trajanovska, M., King, S. K., Gibb, S. & Goldfeld, S. (2018). Children who soil: A review of the assessment and management of faecal incontinence. Journal of Paediatrics and Child Health, 54 (10), pp.1136-1141. https://doi.org/10.1111/jpc.14173.

Persistent Link:
https://hdl.handle.net/11343/284585

Review Article

Children who soil: a review of the assessment and management of faecal incontinence

Authors:
Misel Trajanovska [a,b], PhD, Sebastian K. King [c,d,e], MBBS FRACS PhD,
Susan Gibb [f,g,h], MBBS FRACP, Sharon Goldfeld [a,b,e], MBBS FRACP FAFPHM PhD

Affiliations:
[a] Centre for Community Child Health, The Royal Children's Hospital, Parkville Victoria 3052, Australia
[b] Population Health, Murdoch Children's Research Institute, Parkville Victoria 3052
[c] Department of Paediatric Surgery, The Royal Children's Hospital, Parkville Victoria 3052
[d] Surgical Research, Murdoch Children's Research Institute, Parkville Victoria 3052
[e] Department of Paediatrics, The University of Melbourne, Parkville Victoria 3052
[f] Departments of Neurodevelopment and Disability and General Medicine, The Royal Children's Hospital, Parkville Victoria 3052
[g] Infection and Immunity, Murdoch Children's Research Institute, Parkville Victoria 3052
[h] Neurodevelopmental and Behavioural Paediatric Society of Australasia

Corresponding Author:
Professor Sharon Goldfeld
Deputy Director, Centre for Community Child Health, Royal Children's Hospital, 50 Flemington Road, Parkville Victoria 3052

Phone: +61 (3) 8341 6200
Fax: +61 (3) 8341 6212
Email: Sharon.Goldfeld@rch.org.au

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1111/jpc.14173

Key Points

• Soiling in childhood is mainly retentive and associated with functional constipation, but other conditions need to be excluded.

• Accurate diagnosis depends largely on history and examination, with “red flags” dictating the need for further investigation.

• Multi-modal management is recommended. Laxatives are an important aspect of the management plan. However, a regular toileting program is essential and follow-up is usually needed for months to years.

Abstract

Soiling is a common and distressing condition affecting children. In the vast majority of patients it is associated with constipation. Most constipation is functional and is best thought of as difficulty achieving adequate bowel emptying. In a small minority of patients there is no associated constipation, so called non-retentive faecal incontinence. The aetiology of this latter condition in children remains unclear.

The mainstay of management in all cases is a regular toileting program, together with laxatives as required. This must be individualised, considering the diagnosis, the age of the child, and the psychosocial factors affecting the child and family. The diagnosis is made with a thorough history and examination, supplemented in some cases with targeted investigations. Engaging the child and family in a long-term treatment program (at least 6 months to 2 years) is essential for treatment success.

The following clinical practice guideline and algorithm for the assessment and management for children who soil represents consensus opinion utilising available evidence.

Case Scenarios

1. A 2½ year-old boy, previously well, normally grown and developmentally appropriate, presents with a change in the frequency of his bowel actions. He previously had a daily stool but is now only passing bowel actions twice a week and he is crying and hiding behind the furniture. His mother says she sees him "straining".

   This child has typical withholding and is scared to poo. There may have been a preceding painful or frightening event that may be identified. The child is not straining but desperately trying not to poo. The treatment is to soften the stools but, most importantly, to deal with the distress using every technique available: stories, comfort, relaxation and rewarding all poos. Often it is slow desensitisation, with the child potentially spending longer times in the bathroom and toilet. Toilet training should be child-led and laxatives may be needed for some time until toilet training is established and the ambivalence has resolved. If this condition is not well managed early in life, long-standing symptoms including soiling may develop.

2. An 8 year-old girl presents with faecal soiling once a day in the afternoon. Her history was of normal bowel function and continence until an acute episode of constipation at 4 years of age following surgery for a femoral fracture. Her course has fluctuated since but she again has infrequent stools. Multiple laxatives have been given over the years but probably not consistently and her family are reluctant to give "medications".

   This is also a common scenario of insufficient treatment and hence relapsing constipation and soiling. The onset with a bout of acute constipation is not

uncommon but focusing treatment on laxatives alone has meant persistence of rectal hyposensitivity with rectal distension and incomplete resolution of "constipation". It may take 6 months for return of sensation, even after a relatively acute episode of distension and, until then, the risk for relapse of soiling is high. Children at this age may still have a high level of ambivalence towards resolving the problem. Treatment should always focus on regular toileting in addition to laxatives, and for children and families to understand the reason for the long treatment time. Engaging with the child in regard to the importance and need for regular toileting is critical. It is helpful to ask the child about their awareness of the need to defaecate and where they feel the sensation as this may guide whether they still need active management.

Introduction

These case scenarios are very familiar in paediatrics and illustrate typical presentations. Soiling in children is a common and distressing condition, affecting up to 4.2% of children over 4 years of age.[1] In the majority (up to 84%) of cases it is associated with constipation.[2] Soiling is defined as the passage of stool in an inappropriate place, after the age of 4 years, occurring at least once per month over a three-month period.

Recent parent-reported data on the prevalence of constipation in the Australian population[3] found 4% of children affected at age 8. Other studies, depending upon the definition used and the study methodology, have found as many as 26% of children affected.[4] These children warrant sensitive management and long-term follow up.

Despite being an extremely common condition, there remains a paucity of high quality evidence regarding treatment efficacy. In addition, considerable practice variation exists when it comes to managing children who soil. As part of a wider quality improvement

project to redevelop our tertiary services for children with bowel and bladder dysfunction we have systematically evaluated published guidelines.[5-8] This has led to the development of a locally relevant best practice treatment algorithm (Figure 1).

The outcome for children presenting with soiling is sobering, with as many as 25% having persistent constipation in adulthood.[9] If practice is standardised and outcome data systematically collected, then it is hoped that novel treatments for those who are more resistant may be developed.

Assessment

A clinical practice guideline[10] informed the treatment algorithm illustrated in Figure 1, and begins with history and examination. Constipation is largely functional, although rarely (5% in some series) may have an organic cause.[11] Distinguishing this subgroup depends upon a thorough history and physical examination. The presence of "red flags" should prompt further investigation. Organic causes that need to be considered are neurological, structural and inflammatory conditions. Red flags in the history include delayed passage of meconium beyond 48 hours, onset of constipation in the first month of life, the passage of ribbon stools, and vomiting, which may all be suggestive of a structural cause. Hirschsprung disease needs to be excluded, with a surgical referral made for possible rectal biopsy in these infants. Cows' milk allergy should be considered in those <12 months old in whom the onset of constipation coincides with introduction of cows' milk protein, particularly if there are other suggestive features such as pain.[12]

The Rome IV Criteria are the current best-practice standards for the diagnosis of Functional Constipation (FC)[13] (Box 1). The history should be targeted to elicit this information. It is vital to gather information from the child and their carer. Parents do not necessarily know the bowel habits of their school-aged children and involving the child from the outset will help to establish a therapeutic relationship. The Bristol stool chart, developed by KW Heaton and

SJ Lewis, Bristol University, is helpful to document stool consistency and ensure clinicians and families share a vocabulary to describe what they see.[14]

It is useful to identify any possible precipitating events, such as anal fissures or other painful perianal conditions. It is important to clarify the presence of soiling and to ask about associated evidence of bladder dysfunction, including urinary incontinence and enuresis. In a study of 234 children with chronic constipation and soiling, 29% were found to have urinary incontinence and 34% suffered from enuresis.[15] Often these conditions resolve with successful treatment of the constipation, including a tendency for recurrent urinary tract infections.

Physical examination will identify other possible concerns. Particular attention should be paid to lower limb motor function, abdominal examination, perianal inspection, and examination of the spine, lumbosacral region and gluteal muscles. Children with significant abdominal distension, neurological signs, an abnormally appearing anus, or growth faltering warrant further assessment.

A digital rectal examination (DRE) is not routinely indicated and should only be undertaken by an experienced senior clinician if the results will change subsequent management. Children with soiling in whom the diagnosis is uncertain, or in whom treatment failure occurs, may undergo DRE as part of a subsequent work-up. In some centres, the availability of bedside ultrasound to assess rectal diameter may be an alternative. The evidence for the use of ultrasound is growing and consensus is that it may be a useful adjunct. In recent studies, ultrasound was found to have a higher specificity than abdominal radiograph in the identification of faecal loading, with good agreement with DRE findings.[16,17.] An ultrasound rectal diameter >25-30mm is thought to be indicative of rectal distension and retention of faeces.

Most patients do not required routine investigations. However, investigation for coeliac disease and hypothyroidism may be indicated from history or examination findings or in cases of treatment resistance. Radiological examination is not recommended. Plain abdominal radiographs have little or no value to confirm or refute a diagnosis of constipation, and should not be considered routine. In a systematic review, the specificity of abdominal radiographs was only 43% and history was found to be more accurate than an abdominal radiograph to diagnose constipation in an emergency department study from Toronto.[18-20]

The pathophysiology of soiling associated with retention is, most likely, a cycle that starts with withholding of faeces. Avoidance of defaecation most likely leads to accumulation in the rectum and progressive distension, with reduced peristalsis and sensation. Soiling occurs without awareness as a result of overflow or rectal dysfunction. The pathophysiology of non-retentive faecal incontinence is less well understood and sometimes the condition is not recognised initially. Less than 1% of patients with non-retentive soiling will have an identifiable organic cause, but infectious diarrhoea should be considered.

In treatment-resistant cases, further investigation may be warranted to determine the cause. An intestinal nuclear transit study may be helpful in specialist assessment in these circumstances, but there is insufficient evidence to recommend its routine use. It may be one way to try to identify previously unrecognised non-retentive faecal incontinence, as these children will typically have normal intestinal transit times and no evidence of retention.

Many characteristics of patients with non-retentive soiling overlap with those seen in children with constipation. These patients tend to have daily stools of normal consistency, a normal appetite and an absence of pain. There will be no palpable mass and an association

with disorders of bladder function is uncommon. Laxatives will be largely ineffective and may even worsen the problem in this group. Both groups have a high incidence of behavioural comorbidities, so this does not help in distinguishing the subgroups. Sometimes investigations may be required to make the distinction.

Management

Following initial assessment, multi-modal management is recommended. Children and their families need to understand their condition and the treatments proposed. It may be useful to employ a variety of tools for education, including booklets, videos, and online resources. Box 2 includes some useful websites and links.

A good therapeutic relationship with the child and their parent or carer will be essential from the outset in enhancing motivation, discussing ineffective interventions and providing alternatives and developing an individualised plan of care.

1. Disimpaction

   Assessment needs to be made from the history and examination as to whether there is a faecal mass unlikely to pass spontaneously. If this is the case, disimpaction is the first stage of treatment. Initial treatment should be polyethylene glycol derivatives, e.g. PEG 3350 with electrolytes given according to age over a 2-week period as an outpatient (Box 3). Inpatient treatment may be required for treatment resistance or difficulties with adherence. Second line treatments include alternative laxative regimes, e.g. stimulants and rectal enemas. Consideration should be given to appropriate sedation for such procedures in hospital. Although studies have shown enemas to be effective for disimpaction, all children showed fearful behaviours associated with this treatment, precluding their routine use.[21]

2. Toileting Program

This is the most important aspect of the therapy, whether there is constipation or not in a child with soiling, and needs to start from the beginning of the treatment program.
It is challenging to deliver and maintain such a program and families need regular review and support to continue. It must be non-punitive and carefully designed with the child to ensure the rewards are appropriate and motivating and continue to develop over time. The program design needs to consider the physical surrounds, the child's age and behaviour, their emotional health and the family system.

The starting point is to encourage sitting on the toilet for 5 minutes after meals to harness the gastro-colic reflex and to teach the child to sit so that they may relax and allow passage of stools. Younger children will need to have their feet on a step, and all children should be encouraged to sit well supported, leaning slightly forward with a straight back. Various strategies may assist with relaxation of the anal sphincter, including bulging the abdomen and controlled breathing.

A diary should be kept to record progress, with rewards focused upon effort (e.g. sitting on the toilet) not results. Tracking the numbers of successful bowel actions, any soiling episodes, and whether there are spontaneous bowel actions will help to ascertain progress and the need for any modifications to the plan. Children and families may not appreciate small gains in these areas until they are pointed out at review visits and this may really help with their motivation to continue the program. It is important to remember that rewards are always for following the plan and not contingent on having clean pants.

A toileting program should continue until the child has spontaneous bowel actions

most days and no soiling. Ideally they should be able to describe rectal sensation of the need to pass stool. Initially this may be quite sudden (urgency) and is a good sign of progress.

3. Laxatives

The role of laxative treatment is to facilitate the passage of stools when undertaking the toileting program. There is limited evidence for the relative efficacy of different laxatives but the best evidence exists for polyethylene glycol (PEG). In a systematic review, compared to all other laxatives, PEG achieved more treatment success (pooled relative risk (RR): 1.47; 95% CI 1.23 to 1.76).[22] Lactulose was less than or equally effective in increasing the defaecation frequency compared with all other laxatives investigated.

Consensus opinion is that PEG 3350 should be first-line treatment if tolerated and, if ineffective, adding a stimulant laxative should be considered. Recommended dosage regimens for maintenance therapy are included in Box 4. Studies have shown that the PEG preparations, with and without electrolytes, are similar with respect to both effectiveness and patient acceptance.[23]

The best laxative, however, will always be the one that the child will take!

It is important from the outset to emphasise that treatment will be required for many months and that there will need to be ongoing monitoring for re-accumulation of stool and for adherence to treatment. Laxative weaning may occur as stool frequency and consistency improve.

Treatment resistance and co-morbidities

Treatment needs to be continually reviewed and optimised. Poor response to therapy warrants re-exploration of a possible organic diagnosis and attention to adherence and laxative dosage. If after 3 to 6 months of optimal treatment there is ongoing constipation, then referral for specialist investigation is recommended. Other interventions, such as neuromodulation and physiotherapy with attention to defaecation dynamics, may be warranted. An intestinal nuclear transit study might be arranged to further refine treatment.

Co-morbidities may affect treatment response and should be actively co-managed. There are documented increases in the incidence of separation anxiety, specific phobias, generalised anxiety[24], attention deficit hyperactivity disorder[25] and oppositional defiant disorder in children with soiling.[26]

The Avon longitudinal study has been helpful in identifying trajectories and associations with soiling, albeit with the bias associated with relying on maternal report.[27] They have identified that the male sex, the presence of hard stools at age 2½ years, and developmental delays are risk factors, together with maternal depression and anxiety and an infant temperament with low adaptability. These factors persist, even after adjustment for other indices of social adversity.

Quality of life for both children and their families is adversely affected by constipation and soiling. It is affected by pain, embarrassment and stress associated with soiling, and the disruption to family and peer relationships that often occurs. Symptom severity and duration determines the effect size. In one study the impact on quality of life was more significant than that seen in conditions such as Type 1 diabetes and cardiac disease.[28] Successful treatment has been associated with an improvement in quality of life in children,

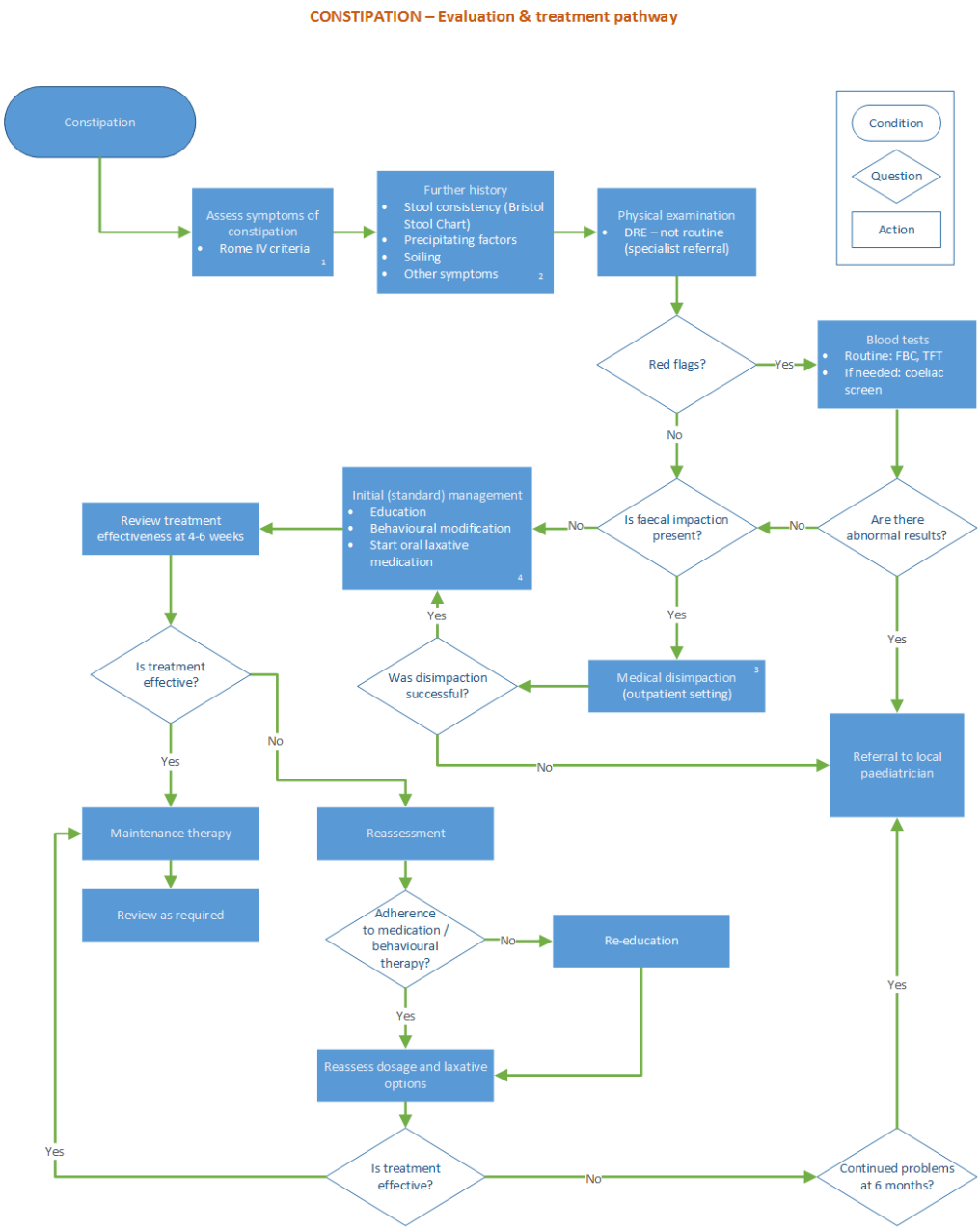
but the results for parent quality of life are less consistent.[26]

Unfortunately, despite treatment, problems may persist into teenage and adult life. Poor treatment outcomes have been documented in a systematic review.[9] Constipation persists into adulthood for 25% of those with chronic constipation in childhood. The outlook is slightly better for children who have non-retentive soiling: 49% were still soiling at age 12, but only 15% were still affected at age 18. [29]

Conclusions

Soiling is a common paediatric condition and management requires consideration of the subtype, associated conditions and the family. The mainstay of treatment is an individualised toileting program which needs to continue until the child may independently manage their continence with good awareness.

Figure 1: Management algorithm for constipation [see guideline[10]]



Box 1

Rome IV criteria for functional constipation age 4 to 18 years [13]
Two or more of the following at least once a week for a minimum of 1 month
• ≤2 stools/week • History of painful or hard bowel movements • History of large-diameter stools that can obstruct the toilet • At least one episode per week of soiling after the acquisition of toileting skills • History of retentive posturing or excessive volitional stool retention • Presence of a large faecal mass in the rectum

Box 2

Resources for parents and clinicians

https://www.rch.org.au/clinicalguide/guideline_index/Constipation/

http://raisingchildren.net.au/articles/constipation.html

https://www.rch.org.au/kidsinfo/fact_sheets/Constipation/

Box 3

Dosage recommendations for disimpaction[30]

	PEG 3350 + E (PAEDIATIC/JUNIOR formula – sachets)						
Age	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Day 7**
1-12 months	½ - 1	½ - 1	½ - 1	½ - 1	½ - 1	½ - 1	½ - 1
1-6 years	2	4	4	6	6	8	8
6-12 years	4	6	8	10	12	12	12

PEG = polyethylene glycol (Macrogol)

Box 4

Dosage recommendation for maintenance therapy[30]

PEG 3350 + E (PAEDIATIC/JUNIOR formula – sachets)		
	Initial daily dose	**Maximum daily dose**
1-12 months	½ - 1 sachet	
1-6 years	1 sachet	4 sachets
6-12 years	2 sachets	4 sachets

PEG = polyethylene glycol (Macrogol)

Multiple Choice Questions

1. Which ONE of the following statements about a disimpaction regimen for a child presenting with soiling is the most accurate?
    a. It is routine practice and should always precede a maintenance treatment program
    b. There is evidence that first line management should only be with macrogol 3350 with electrolytes
    c. Enemas should be used as they are the most effective treatment modality
    d. Inpatient treatment will be required if there is no response to home laxative treatment in 3 days
    e. The main indication is the presence of a faecal mass unlikely to pass spontaneously

2. Red flags for a referral for a surgical opinion include all of the following, except:
    a. Passage of meconium on day 3 of life
    b. Buttock asymmetry
    c. Poor growth
    d. Rectal prolapse
    e. Abdominal distension with vomiting

3. Which ONE characteristic is most helpful to distinguish non-retentive faecal incontinence from soiling associated with constipation?
    a. Additional behavioural /emotional problems
    b. A normal rectal diameter on bedside ultrasound assessment
    c. Poor response to laxatives
    d. Daily bowel actions
    e. Soft stools

Answers to MCQs

1: e. Disimpaction is recommended to clear a faecal mass and should result in a more rapid response to the maintenance treatment. Some children do not have significant evidence on either history or examination of impaction and if this is the case disimpaction would not be indicated. There is evidence that other laxatives are also effective and in particular there is not a discernible difference in efficacy for Macrogol 3350 without electrolytes compared to the product with added electrolytes. Whilst enemas are efficacious they cause considerable distress and are therefore not considered as appropriate first line treatment. Disimpaction takes time and the practice recommendation is for 14 days treatment prior to considering inpatient management.

2: c. Poor growth suggests a medical cause, such as coeliac disease or the possibility of non-organic failure to thrive, rather than a structural condition. The other symptoms and signs might indicate Hirschsprung disease, anorectal malformation, bowel obstruction or sacral agenesis and spinal dysraphism.
A delayed diagnosis of Hirschsprung disease may be associated with growth failure but in the absence of other suggestive features medical conditions should be excluded initially.

3: b. Evidence that shows there is no retention of faeces is the way to distinguish the two conditions. If available in skilled hands this may be a helpful adjunct to clinical history and examination in making the diagnosis.
Children with soiling have a high incidence of behavioural and emotional problems compared to a control population and this does not help to distinguish the two subtypes of faecal incontinence. Children with constipation may share many characteristics with those without retention, making the conditions often difficult to distinguish at initial assessment. Soft daily stools may occur in children with faecal retention and a poor response to laxatives has many causes, including those related to adherence, dose and the presence of

comorbidities, both medical and psychosocial.

References

1. Van der Wal MF, Benninga MA, Hirasing RA. The prevalence of encopresis in a multicultural population. *J. Pediatr. Gastroenterol. Nutr.* 2005; **40**: 345–8.

2. Bongers MEJ, Benninga MA. Functional fecal incontinence in children. *Ann. Nestlé*. 2007; **65**: 81–8.

3. Liu T, Lingam R, Lycett K, et al. Parent-reported prevalence and persistence of 19 common child health conditions. *Arch. Dis. Child*. 2018; **103**: 548–56.

4. Mugie SM, Benninga MA, Di Lorenzo C. Epidemiology of constipation in children and adults: A systematic review. *Best Pract. Res. Clin. Gastroenterol*. 2011; **25**: 3–18.

5. Tabbers MM, DiLorenzo C, Berger MY, et al. Evaluation and treatment of functional constipation in infants and children: Evidence-based recommendations from ESPGHAN and NASPGHAN. *J. Pediatr. Gastroenterol. Nutr.* 2014; **58**: 258–81.

6. Bardisa-Ezcurra L, Ullman R, Gordon J, Guideline Development Group. Diagnosis and management of idiopathic childhood constipation: summary of NICE guidance. *BMJ*. 2010; **340**: c2585–5.

7. Felt B, Wise CG, Olson A, Kochhar P, Marcus S, Coran A. Guideline for the management of pediatric idiopathic constipation and soiling. *Arch. Pediatr. Adolesc. Med*. 1999; **153**: 380–5.

8. NICE. Constipation in children and young people: diagnosis and management. Clinical guideline [CG99] Published: May 2010. Last updated: July 2017. Available at: www.nice.org.uk/guidance/cg99 (accessed 17/7/18).

9. Pijpers M, Bongers M, Benninga MA, Berger MY. Functional constipation in children: A systematic review on prognosis and predictive factors. *J. Pediatr. Gastroenterol. Nutr.* 2010; **50**: 256–68.

10. Royal Children's Hospital Melbourne. Clinical Practice Guidelines. Constipation. Available at: https://www.rch.org.au/clinicalguide/guideline_index/Constipation/ (accessed 17/7/18).

11. Hyams JS, Di Lorenzo C, Saps M, Shulman RJ, Staiano A, van Tilburg M. Childhood functional gastrointestinal disorders: Child/adolescent. *Gastroenterol*. 2016; **150**: 1456–1468.e2.

12. Vandenplas Y, Gottrand F, Wauters GV, et al. Gastrointestinal manifestations of cow's

milk protein allergy and gastrointestinal motility. *Acta Paediatrica*. 2012; **101**: 1105–9.

13. Rome IV. Chap 7: Functional Bowel Disorders: Irritable Bowel Syndrome and Functional Constipation. In: Heidelbaugh J, Hungin P (eds). Rome IV Functional Gastrointestinal Disorders. Raleigh, NC USA: The Rome Foundation; 2017.

14. Lewis SJ, Heaton KW. Stool form scale as a useful guide to intestinal transit time. *Scand. J. Gastroenterol*. 1997; **32**: 920-4.

15. Loening-Baucke V. Urinary incontinence and urinary tract infection and their resolution with treatment of chronic constipation of childhood. *Pediatrics* 1997; **100**: 228–32.

16. Doniger SJ, Dessie A, Latronica C. Measuring the transrectal diameter on point-of-care ultrasound to diagnose constipation in children. *Pediatr. Emerg. Care* 2018; **34**: 154-9.

17. Burgers R, de Jong TPVM, Benninga MA. Rectal examination in children: Digital versus transabdominal ultrasound. *J. Urol.* 2013; **190**: 667–72.

18. Freedman SB, Thull-Freedman J, Manson D, et al. Pediatric abdominal radiograph use, constipation, and significant misdiagnoses. *J. Pediatr.* 2014; **164**: 83–88.e2.

19. Pensabene L, Buonomo C, Fishman L, Chitkara D, Nurko S. Lack of utility of abdominal X-rays in the evaluation of children with constipation: comparison of different scoring methods. *J. Pediatr. Gastroenterol. Nutr.* 2010; **51**: 155–9.

20. Reuchlin-Vroklage LM, Bierma-Zeinstra S, Benninga MA, Berger MY. Diagnostic value of abdominal radiography in constipated children: A systematic review. *Arch. Pediatr. Adolesc. Med*. 2005; **159**: 671–8.

21. Bekkali NL, Dijkgraaf MG, van den Berg MM, et al. Rectal fecal impaction treatment in childhood constipation: enemas versus high doses oral PEG. *Pediatrics* 2009; **124**: e1108-15.

22. Candy DCA, Belsey J. Macrogol (polyethylene glycol) based laxatives in children with functional constipation and faecal impaction: A systematic review. *Arch. Dis. Child*. 2008; **94**: 156–60.

23. Llerena E, Varea Calderón V, Pujol Muncunill G, et al. Comparison of the effectiveness and safety of polyethylene glycol with and without electrolytes in the treatment of chronic constipation. *An. Pediatr*. 2016; **85**: 34–40.

24. Riordan DM, Singhal D. Anxiety related disorders: an overview. *J. Paediatr. Child Health* 2018; **54**:

25. Efron D. ADHD: Some challenging clinical scenarios. *J. Paediatr. Child Health* 2018; **54**:

26. Kovacic K, Sood MR, Mugie S, Di Lorenzo C, Nurko S, Heinz N, et al. A multicenter study on childhood constipation and fecal incontinence: Effects on quality of life. *J. Pediatr*. 2015; **166**: 1482–1487.e1.

27. Joinson C. Psychological differences between children with and without soiling problems. *Pediatrics*. 2006; **117**: 1575–84.

28. Belsey J, Greenfield S, Candy D, Geraint M. Systematic review: impact of constipation on quality of life in adults and children. Aliment. Pharmacol. Ther. 2010; **31**: 938–49.

29. Bongers ME, Tabbers MM, Benninga MA. Functional nonretentive fecal incontinence in children. *J. Pediatr. Gastroenterol. Nutr.* 2007; **44**: 5–13.

30. Australian Medicines Handbook (AMH). Children's Dosing Companion. January 2018. Available at: https://childrens.amh.net.au (accessed 17/7/18).