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Medical and Behavioral Management of Functional Constipation in Pediatric Primary Care

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Disclosures

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- No potential conflicts of interest

Objectives

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By the end of this session, you will be able to

- Identify and distinguish the differential diagnoses of constipation
- Differentiate between functional constipation and organic constipation
- Describe both medical and behavioral treatment strategies for functional constipation

Epidemiology

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- Functional constipation (FC) is a disorder characterized by infrequent and/or painful defecation, fecal incontinence (FI), and abdominal pain (Tabbers et al., 2014).
- 15% of all pediatric clinic visits, 3% of primary care pediatric clinics (Tabbers et al., 2014)
- 80% of these children with FI (Mallon et al., 2015; Nurko & Zimmerman, 2014)
- Approximately 1-4% of school aged children experience FI = about 3% of all primary care visits (Cushing et al., 2016)

CME

Evaluation and Treatment of Functional Constipation in Infants and Children: Evidence-Based Recommendations From ESPGHAN and NASPGHAN

M.M. Tabbers, C. DiLorenzo, M.Y. Berger, C. Faure, M.W. Langendam, S. Nurko, A. Staiano, Y. Vandenplas, and M.A. Benninga

ABSTRACT

Background: Constipation is a pediatric problem commonly encountered by many health care workers in primary, secondary, and tertiary care. To assist medical care providers in the evaluation and management of children with functional constipation, the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition and the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition were charged with the task of developing a uniform document of evidence-based guidelines.

Methods: Nine clinical questions addressing diagnostic, therapeutic, and prognostic topics were formulated. A systematic literature search was performed from inception to October 2011 using Embase, MEDLINE, the Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Clinical Trials, and PsychInfo databases. The approach of the Grading of Recommendations Assessment, Development and Evaluation was applied to evaluate outcomes. For therapeutic questions, quality of evidence was assessed using the Grading of Recommendations, Assessment, Development, and Evaluation system. Grading the quality of evidence for the other questions was performed according to the

Results: This evidence-based guideline provides recommendations for the evaluation and treatment of children with functional constipation to standardize and improve their quality of care. In addition, 2 algorithms were developed, one for the infants <6 months of age and the other for older infants and children.

Conclusions: This document is intended to be used in daily practice and as a basis for further clinical research. Large well-designed clinical trials are necessary with regard to diagnostic evaluation and treatment.

Key Words: children, constipation, encopresis, enema, evidence-based, fecal incontinence, fecal soiling, functional constipation, guideline, infants, laxative

(*JPGN* 2014;58: 258–274)

INTRODUCTION

Rome IV Criteria for the Diagnosis of Functional Constipation in Children

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Infants and toddlers up to 4 years old
At least 2 of the following present for at least 1 month:
2 or fewer defecations per week
History of excessive stool retention
History of painful or hard bowel movements
History of large-diameter stools
Presence of a large fecal mass in the rectum
In toilet-trained children, the following additional criteria may be used:
At least 1 episode/week of incontinence after the acquisition of toileting skills
History of large-diameter stools that may obstruct the toilet

Children and adolescents (developmental age ≥4 years)
At least 2 of the following present at least once per week for at least 1 month:*
2 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
The symptoms cannot be fully explained by another medical condition

Normal Frequency of Bowel Movements

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Age	Bowel movements per week[a]	Bowel movements per day[b]
0–3 Months		
Breast-fed	5–40	2.9
Formula-fed	5–28	2.0
6–12 months	5–28	1.8
1–3 years	4–21	1.4
More than 3 years	3–14	1.0

Adapted from Fontana M. Bianch C, Cataldo F, et al. Bowel frequency in healthy children. *Acta Paediatr Scand* 1987;78:682–4.

[a]Approximately mean ± 2 SD.

[b]Mean.

Medical Work-Up

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Functional Constipation

History

Physical Examination

+ Red Flags

PE: DRE (empty rectum, gush of air/liquid stool)

- Labs:
  - Serum calcium
  - TSH/Free T4
  - Celiac panel (serum IgA, tTG IgA) 3.25% of children with FC
  - Lead level
  - CBC
  - CMP allergy testing? Conflicting evidence
- Imaging
- Manometry

Differential Diagnoses of Constipation

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- Celiac disease (fam hx, growth/dev delay)*
- Hypothyroidism (fam hx, growth/dev delay), hypercalcemia, hypokalemia*
- Dietary protein allergy (personal/fam hx, eczema)*
- Drugs, toxics
- Vitamin D intoxication*
- Botulism
- Cystic fibrosis* (respiratory problems, FTT)
- Hirschsprung disease*
- Anal achalasia*
- Anatomic malformations (imperforate anus*, anal stenosis*)
- Diabetes mellitus∫
- Colonic inertia∫
- Multiple endocrine neoplasia type 2B ∫
- Pelvic mass (sacral teratoma)
- Spinal cord anomalies, trauma, tethered cord*
- Abnormal abdominal musculature (prune belly, gastroschisis, Down syndrome)*
- Pseudo obstruction (birth/1st weeks of life, FTT, abdominal distension, bilious vomiting, urinary bladder distension)

*More likely in the younger child
∫More likely in the older child
(Tabbers, et al., 2014)

Functional Constipation

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Infant/Toddler

- Starts after a few weeks to months of life
- Obvious precipitating factors
- Normal passage of meconium
- Generally well, weight/height WNL
- Normal growth
- Normal appearance of anus and surrounding area
- Soft abdomen
- Normal appearance of skin/anatomical structures of lumbosacral/gluteal regions
- Normal gait, tone strength, and reflexes of lower limbs
- Toilet phobia

Child/Adolescent

- Starts after a few weeks to months of life
- Sometimes precipitating factors coinciding with start of symptoms
- Normal passage of meconium
- Generally well, weight/height WNL, fit and active
- Normal growth
- Normal appearance of anus and surrounding area
- Soft abdomen (palpable fecal mass possible)
- Normal appearance of skin/anatomical structures of lumbosacral/gluteal regions
- Normal gait, tone strength, and reflexes of lower limbs

Diagnosis

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- If history and physical examination findings are NOT consistent with organic disease, functional constipation can be diagnosed.

Pathogenesis & Mechanism of Functional Constipation

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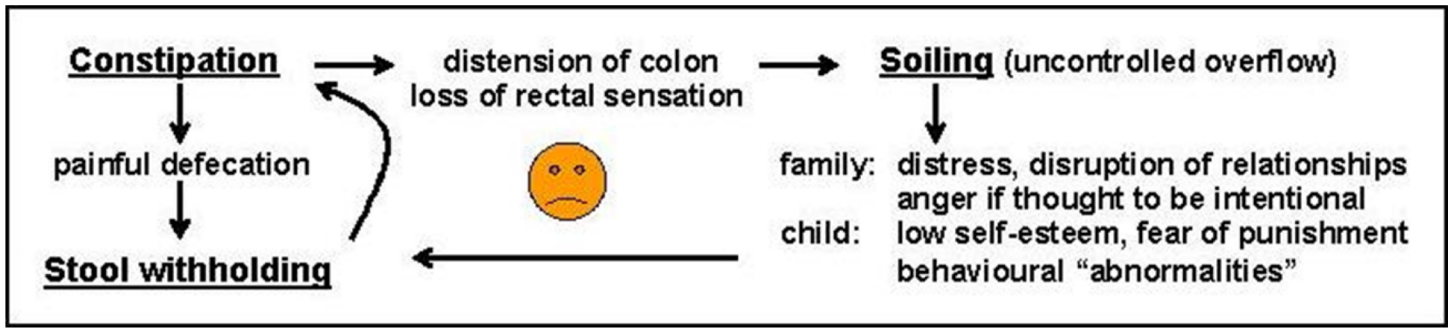
- Causes:
  - Decrease in propulsive force
  - Impaired rectal sensation
  - Functional outlet obstruction
  - Behavioral withholding

- Constipation Cycle:



Fecal Incontinence/Encopresis/ Fecal Overflow/Incontinence/Soiling

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Incontinence of stool NOT resulting from organic defect/illness

Four main groups of children present with fecal incontinence:

- (1) children who have functional fecal retention with overflow soiling,
- (2) children with functional nonretentive fecal soiling,
- (3) children with anorectal malformations, and
- (4) children with spinal problems.

- Mean age: 7.4-9 years of age
- Male/Female: 2:1 (1:1 JHH)
- Parents often do not understand why their child is soiling themselves

Di Lorenzo & Benninga (2004). Pathophysiology of pediatric fecal incontinence. Gastroenterology, 126, S33-S40.

Treatment of Functional Constipation & Fecal Retention

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DISIMPACTION

- Oral medications: mineral oil, polyethylene glycol, lactulose
- Rectal disimpaction: phosphate soda enemas, saline enemas, mineral oil enemas
- Manual disimpaction

MAINTENANCE THERAPY

- Diet: increase fluids; balanced diet with whole grains, fruits, vegetables, chia, flax seed
- Behavior modification: regular toilet sitting, reward system, possible psychology referral
- Laxatives

Disimpaction Protocol (JHH)

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1. Choose a day for the colon cleanse when your child will be at home and close to a bathroom.
2. In the morning, upon awakening, start by taking the Ex-Lax® Chocolate Squares or Dulcolax Laxatives® as indicated below.
3. Three hours later, begin PEG/Miralax® in the dosage described below.
4. Total volume of PEG/Miralax® solution should be consumed within 1 hour.
5. Three hours later, please give an additional dose of PEG/Miralax®, it should be 1/2 of the dose given previously.
6. For the colon cleanse, please place child on liquid diet (broth, popsicles, Jell-O, no milk) until stool looks like water or chicken broth, then they can resume their normal diet.

- ____ 8-10 kg- Give 1 capful of Miralax® in 1 cup of non-carbonated beverage or water.
- ____ >10-15 kg- Give 2 capfuls of Miralax® in 2 cups of non-carbonated beverage or water + 1/2 square of Ex-Lax Chocolate®.
- ____ >15-20 kg- Give 2 1/2 capfuls of Miralax® in 2 1/2 cups of non-carbonated beverage or water + 1 square Ex-Lax Chocolate®.
- ____ >20-25 kg- Give 3 capfuls of Miralax® in 3 cups of non-carbonated beverage or water + 1 1/2 squares of Ex-Lax Chocolate®.
- ____ >25-30 kg- Give 4 capfuls of Miralax® in 4 cups of non-carbonated beverage or water + 1 1/2 squares of Ex-Lax Chocolate®.
- ____ >30 kg-Give 8 capfuls of Miralax® in 8 cups (64 oz.) of non-carbonated beverage or water + 20 mg of Dulcolax Laxative® (4 x 5 mg tablets) (Bisacodyl).

Dosages of Most Frequently Used Oral Laxatives (Maintenance)

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Osmotic Laxatives	Dosages
Lactulose	1-2 g/kg, once or twice/day
PEG 3350/PEG 4000 (Miralax®)	0.2-0.8 g/kg/day
Milk of Magnesia (magnesium hydroxide)	2-5 y: 0.4-1.2 g/day, once or divided 6-11 y: 1.2-2.4 g/day, once or divided 12-18 y: 2.4-4.8 g/day, once or divided
Fecal Softeners	
Mineral oil	1-18 y: 1-3 mL/kg/day, once or divided, max 90 mL/day
Stimulant laxatives	
Bisacodyl	3-10 y: 5 mg/day >10 y: 5-10 mg/day
Senna	2-6 y: 2.5-5 mg once or twice/day 6-12 y: 7.5-10 mg/day >12 y: 15-20 mg/day

Non pharmacologic Treatments

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Fiber:

- Limited evidence that additional fiber improves constipation compared with placebo and that increased fiber intake is not as effective as lactulose (Tabbers, et al.)

- Pooled weighted standardized mean difference was 0.35 bowel movements per week in favor of fiber = neither statistically significant nor clinically relevant (Pijpers, et al.)

Fluid: Increasing oral fluid intake has not been shown to be beneficial

108 children comparing 3 groups-50% increase in water intake, hyperosmolar supplemental fluid, and normal fluid intake-Found similar stool frequency at 3 weeks for the 3 groups (Young, et al.)

Length of Medical Therapy?

- No RCTs have investigated the optimal duration of medical treatment in children with functional constipation
- Based on expert opinion, maintenance treatment should continue for at least 2 months
- ALL symptoms of constipation symptoms should be resolved for at LEAST 1 month before discontinuation of treatment
- Treatment should be decreased gradually
- In the developmental stage of toilet training, medication should only be stopped once toilet training is achieved

Prognosis of Functional Constipation in Children

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- Pediatric GI referrals, 50% will recover (≥3 BMs/week without fecal incontinence) and be without laxatives after 6-12 months
- An additional 10% are well while taking laxatives
- 40% will still be symptomatic despite use of laxatives
- A total of 50% and 80% of the children are recovered after 5 and 10 years respectively with the vast majority of patients no longer taking laxatives
- ***A delay in initial medical treatment for >3 months from symptom onset correlates with longer duration of symptoms***

Medical Alone (TAU) vs. Medical/Behavioral Treatment

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Medical

- Education (including info aimed at altering parents' perceptions of the origin of fecal incontinence)
- Disimpaction
- Maintenance therapy

Medical + Behavioral

- Scheduled toileting / bowel diary
- Positive reinforcement of target behaviors
- Differential attention

(e.g., Freeman et al., 2014; McGrath et al., 2000; Stark et al. 1997; Van Everdingen-Faasen et a., 2008)

JHH Pediatric Multidisciplinary Chronic Constipation Clinic Outcomes (Hankinson et al., 2017)

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- Significant ***decrease*** in:
  - Bowel accident frequency
  - Abdominal pain
  - Use of diapers
  - Parent perception of constipation
- Most patients benefited from single clinic visit
- Patients with more severe clinical presentation at baseline (e.g., bowel accidents) benefited from multiple visits to achieve optimal outcomes

Behavioral Treatment of Constipation and Fecal Incontinence

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- What is behavioral health/pediatric psychology?
- Rationale for behavioral interventions for fecal incontinence/constipation and brief overview of research findings
- Tips for implementing behavioral techniques as medical providers
- Case examples

Pediatric Psychology

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- Specialized training and experience in treatment of behavioral/emotional considerations involved in acute and chronic medical conditions in children
- Can contribute to better outcomes for medically ill children
- Adherence to medical & medication regimens
- Pain management training
- Coping/adjustment or specific mental health problems
- Behavioral management training to parents

Behavioral/Emotional Factors in Constipation and Fecal Incontinence

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- Stool withholding, toileting refusal, poor cooperation with medication/treatment
- Anxiety - fear of pain, stooling, public restrooms
- Increased rates of internalizing and externalizing problems and lower quality of life than children comparison groups (e.g., IBD)
  - (Van Everdingen-Faasen et al., 2008; Van Dijk et al., 2008)

Psychosocial Consequences of Fecal Incontinence

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- Caregivers perceive as purposeful behavior - blame or punish child for accidents
- Negative parent-child interactions/relationships
- Social stigmatization, fear of bullying, & peer rejection
- School avoidance/refusal
- Development of hostility, low self-esteem, learned helplessness (Campbell, Cox, & Borowitz, 2009)

Role of Parenting

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- **Parents play key role in development and maintenance of all behavior!**
- *Parental beliefs*:
  - Constipation
  - Toileting behaviors
  - Medical constipation management
  - General child development
- *Parenting practices*:
  - Monitoring of symptoms, medication management, and toileting behaviors
  - Clarity of behavioral expectations for toileting behaviors
  - Use of structured routines
  - Frequency/delivery of reminders and prompts
  - Consistency of follow-through

Practical Implications for Medical Providers

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- Provide brief education to parents regarding fecal incontinence and defecation anxiety
  - Accidents are NOT in the child's control
  - Kids can be constipated even if they are stooling everyday / multiple times a day → not fully evacuating
  - Meds to help with stool consistency and evacuation
  - Wean off medications (vs stopping cold turkey)

https://www.youtube.com/watch?v=SgBj7Mc_4sc

Practical Implications for Medical Providers: Basic Behavioral Plan

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- Identify 2 - 3 convenient/appropriate times per day when parent can prompt child to sit on toilet for 5-10 minutes (after meals)
- Recommend parents reward child for cooperation with:
  - Producing bowel movements, if withholding
  - Scheduled toilet sits
  - Medication adherence
  - Avoid rewarding for being accident-free (not in child's control)
- Remain neutral and have child assist with cleaning up when soiled (in a developmentally appropriate way)

Tips for Effective Scheduling and Reinforcement Plans

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- Keep schedules simple and realistic
- Target behavior (e.g., sitting on toilet, bowel movement, cooperation with laxative) should be objective and attainable
- Consider gradual “shaping” of behavior
- Rewards should be immediate, tangible, strong, and salient to child’s interests
- Restrict access to reward outside of plan!

When to Refer to Pediatric Psychologist

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- Lack of success with basic behavioral plan (from parent or child)
  - Poor adherence/compliance with regimen
- Parenting challenges, such as poor limit-setting, obvious pattern of highly negative parent-child interactions
- Psychiatric Comorbidity
  - Untreated ADHD/ Current inattention/ impulsivity
  - Generalized behavior problems/ oppositionality
  - Significant anxiety problems with toileting
- Problems in the school setting (school refusal, bullying)
- Signs of mood dysfunction: increased irritability or dysphoric mood, changes in sleep, decreased academic performance, decreased interests

Case Example #1

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- 4 y/o male with no significant PMH, passed meconium <24 hrs. of life, 25th-50th percentile for Ht/Wt, mother with history of IBS, PE with hard stool palpated in rectum
- Constipation issues began with toilet training around 2.5 yrs. of age
- Painful defecation with crying and irritability, withholding by standing straight and holding onto table
- Some BMs on toilet but more consistently goes in pull-up at naptime, urinates in toilet without difficulty
- PCP prescribed Miralax® but used inconsistently, i.e. stopped once he passed “large blockage”

Treatment Plan

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- Disimpaction colon cleanse
- Maintenance on 1 capful Miralax® daily (1g/Kg/day)
- Toileting protocol
  - Sits on toilet for urination and defecation every 2 hours (4 minutes; 1 min per year of age up to age 5)
  - Tangible reward immediately following sit
  - Extra reward for having BM on toilet
- Relaxation strategies (blowing bubbles, reading books) while on toilet
- Visual timer to track length of sit

Follow-up: 2nd Clinic Visit

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- Assessment:
  - Urinating and defecating consistently on toilet
  - 2-3 BMs/week, smaller amounts, Bristol stool scale #3, stool palpated on right side of abdomen
  - Some smearing twice weekly
  - No longer wearing pull-ups during the day
  - Self-initiating more so backed off on scheduled sits
- Recommendations:
  - Repeat bowel cleanse due to stool palpated in abdomen
  - Miralax® daily
  - Reinitiate structured sits
  - Reward system

Case example #2

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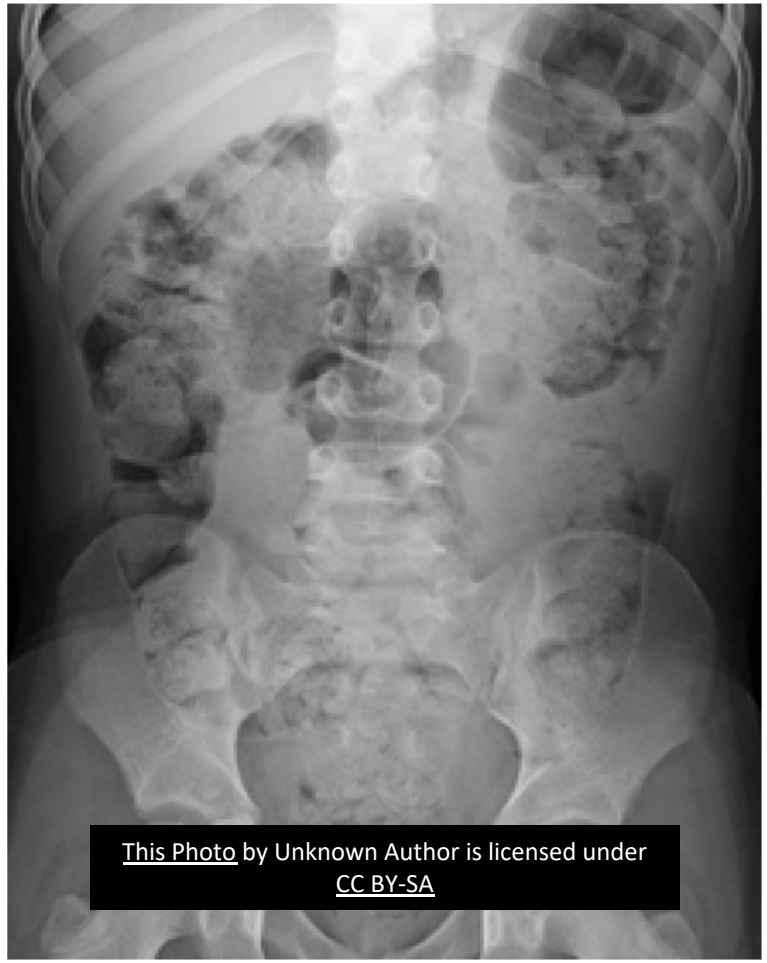
- 10 y/o male with PMH of ADHD treated with Concerta 27 mg daily, evaluated by outside peds GI with encopresis onset about 2 years ago.
- Pediatric GI provider recommended multiple colon cleanses at home and ½ capful of Miralax® daily which patient often refused to drink
- Due to abdominal adiposity and refusal for a rectal examination, KUB radiograph was performed which demonstrated an abundant amount of stool in the colon, consistent with constipation
- Refuses to use public bathrooms (i.e., school)



Treatment Plan

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- Disimpaction colon cleanse
- Maintenance on 2 capfuls Miralax® + 1-2 squares of Sennosides nightly (Ex-Lax® Chocolate Squares)
- Behavioral plan:
  - Scheduled bowel sits (urination and defecation) every 2 hours including plan for sit schedule at school
  - Earn points towards Amazon gift cards for compliance with sits and Miralax®
  - Extra points for having BM on toilet
- Ongoing involvement with psychologist: monitor plan

Follow-up

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- At 2nd clinic visit:
  - Consistently having 1 BM/day (including school)
  - No accidents (since colon cleanse)
  - More self-initiation
- Recommendations:
  - Continue with treatment plan (weaned off of Ex-Lax®)
  - Monitor stools
  - Continue reward system to maintain motivation
  - Follow-up in 3 months

Thank You!

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