

# The Effects of a Multidisciplinary Approach to Pediatric Functional Constipation with or without Fecal Incontinence

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## Introduction

Functional constipation (FC) is a common and challenging childhood problem characterized by infrequent and/or painful defecation, fecal incontinence (FI), and abdominal pain. In the United States, 3% of children presenting to primary care clinics are diagnosed with FC, and 80% of these patients experience FI. Constipation in children also causes emotional distress to the child and family. Although behavioral modification therapy has been shown to be helpful in decreasing the episodes of FI, it is not clear if a multidisciplinary approach with concurrent medical therapy has an additive therapeutic benefit.

## Objectives

Compare the clinical effectiveness of a multidisciplinary approach (including behavioral psychology and concurrent medical therapy) to conventional therapy (CT) alone in improving the quality of life and stooling behaviors of children with functional constipation.

### Aims

1. Increase the number of bowel movements produced on a weekly basis over four to six weeks;
2. Decrease the number of episodes of stool in the underwear on a weekly basis over four to six weeks
3. Improve pediatric quality of life (QOL) by decreased total scores of Bright Futures Pediatric Symptom Checklist (PSC) and the Parental Opinions of Pediatric Constipation (POOPC) over four to six weeks.

We also examined outcome measures of abdominal pain, hard/painful bowel movements, large bowel movements, stool withholding, and the use of daytime/nighttime pull-ups (toilet trained).

## Methods

### Study Design

Quasi-experimental to measure the effects of medical intervention with or without behavioral psychology on pediatric FC with or without FI

### Setting

Mid-Atlantic, urban, pediatric subspecialty clinic in an academic hospital

Demographics	CT (n=18)	BT (n=29)	N	P
Age, mean (SD), years	6.7 (3.1)	6.6 (3.6)	47	0.911
Males, n (%)	10 (55.6)	17 (58.6)	47	0.836
<b>Primary outcome measures</b>				
Defecation frequency per week, mean (SD)	4.6 (3.8)	4.2 (3.8)	47	0.784
Fecal incontinence per week (toilet trained), mean (SD)	2.3 (2.5)	3.1 (5.5)	37	0.569
PSC total score, mean (SD)	15.9 (12.2)	12.6 (7.1)	47	0.243
POOPC total score, mean (SD)	66.4 (18.3)	67.5 (17.4)	47	0.841
<b>Secondary outcome measures</b>				
Abdominal pain, median (IR)	3 (2)	3 (3)	47	0.462
Hard/painful bowel movements, median (IR)	3 (2)	2 (1)	47	0.752
Large bowel movements, median (IR)	2 (2)	2 (2)	47	0.703
Stool withholding behavior, median (IR)	3.5 (4)	3 (4)	47	0.792
Daytime pull-ups (toilet trained), median (IR)	1 (2)	1 (0)	37	0.621
Nighttime pull-ups (toilet trained), median (IR)	1 (4)	2.5 (4)	37	0.426

1= Never; 2= 2 times a month; 3= 1-2 times a week; 4= 2-3 times a week; 5= Almost every day  
Interquartile Range (IR)

### Cohort

Convenience sampling recruited 47 children (2 to 18 years) with FC who were given appointments in either the multidisciplinary chronic constipation clinic (BT) or CT with a gastroenterology provider

Outcome measures were defecation frequency, FI frequency, QOL, abdominal pain, pain during bowel movements, large bowel movements, stool withholding, and daytime/nighttime diaper use (toilet trained). Outcomes were evaluated 4-6 weeks after the initial clinic appointment.

Baseline characteristics are presented in Table 1.

### Study Variables

A paper questionnaire including:

- Validated Rome III criteria for the definition of functional constipation (including number of weekly bowel movements and number of episodes of FI weekly),
- Validated Pediatric Symptom Checklist (PSC) which measures youth psychosocial adjustment
- Parental Opinions of Pediatric Constipation (POOPC) which assesses constipation condition-specific health-related quality of life (HRQL).

The questionnaire was handed to the parent/guardian of every new patient in both BT and CT groups meeting inclusion criteria and at every 4-6 week follow up appointments.

## Intervention

In the BT clinic, a behavioral psychologist met with each patient for approximately 30 minutes. Assessment included information regarding compliance with medical regimen, toileting behavior (e.g., frequency and length of bowel sits, withholding behavior), and use of incentives to reinforce medication and behavioral compliance. Psychoeducation about the rationale for combined medical and behavioral components of constipation, behavioral methods for skill building and motivation, including toilet sit schedules, differential reinforcement, relaxation/pain management, and goal setting were provided.

## Statistical Analysis

General linear model repeated measures analyses for each primary outcome variable to evaluate for significant change over time while accounting for treatment group. In each analysis, two time points (i.e., baseline and follow-up) were used as repeated measures of the dependent variable. Group (i.e., BT or CT) were entered as a between-subjects factor to examine interaction effects between outcome variables and group from baseline to follow-up. Wilcoxon Signed Rank was used to evaluate differences in means from baseline to follow-up for both the BT and CT groups, individually.

Variable	Initial Visit		Follow-up Visit		P
	BT	CT	BT	CT	
<b>Defecation frequency per week, mean (SD)</b>	4.5 (4.000)	4.7 (4.163)	8.5 (5.437)	9.1 (5.054)	0.843
<b>Fecal incontinence per week (toilet trained), mean (SD)</b>	3.7 (5.911)	2.8 (2.741)	1.7 (2.567)	1.1 (1.912)	0.878
<b>PSC total score, mean, (SD)</b>	11.6 (7.180)	14.8 (12.641)	10.5 (7.633)	10.5 (12.4)	0.204
<b>POOPC total score, mean (SD)</b>	65.5 (16.968)	67.2 (18.741)	48.6 (20.857)	53.8 (20.524)	0.574

POOPC scores were normally distributed and a paired t-test was conducted to evaluate difference in means from baseline to follow-up for both the BT and CT groups, individually.

All analyses performed using IBM® SPSS Statistics 24 software

## Results

BT demonstrated no statistical significant advantage over CT in the outcome measures. Despite non-significant changes *between* groups, both BT and CT demonstrated statistically significant changes *within* groups related to weekly bowel movement production (BT, P=0.002; CT, P=0.036) and significantly improved scores on QOL (BT, P=0.000; CT, P=0.017) at follow-up.

## Summary

The results indicate that a multidisciplinary approach (BT) has no statistical significant advantage over conventional medical therapy alone (CT) in increasing the number of bowel movements produced on a weekly basis; decreasing the number of episodes of stool in the underwear on a weekly basis; or improvement of pediatric QOL with decreased total scores of PSC and the POOPC. Additionally, outcome measures of abdominal pain, hard/painful bowel movements, large bowel movements, stool withholding, and the use of daytime/nighttime pull-ups (toilet trained) were evaluated. We found no differences between BT and CT in these six outcome measures.

## Conclusions

This pilot study demonstrated significant findings of increased bowel movement production and improved HRQL scores on the POOPC questionnaire *within* both BT and CT groups at follow up. There was no significant difference between groups. Although, future studies with an increased sample size with multiple follow-up time points may demonstrate significant differences between groups, one cannot underscore or measure the potential benefit that patients within the BT group may receive thorough psychoeducation in addressing the underlying psychopathology associated with functional constipation.

Variable	CT	P	BT	P
<b>Defecation frequency per week, mean (SD)*</b>				
Follow-up	9.1 (5.1)	0.036	8.5 (5.4)	0.002
<b>Fecal incontinence per week (toilet trained), mean (SD)*</b>				
Follow-up	1.1 (1.9)	0.076	1.7 (2.6)	0.124
<b>PSC total score, mean, (SD)*</b>				
Follow-up	10.5 (12.4)	0.241	10.5 (7.6)	0.090
<b>POOPC total score, mean, (SD)+</b>				
Follow-up	13.3 (16.4)	0.017	16.9 (18.2)	0.000

\*Wilcoxon Signed Rank  
+ Paired t-test



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