Physical Therapy for Fecal Incontinence in Children with Pelvic Floor Dyssynergia

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Objectives To determine the efficacy of physical therapy (PT) for fecal incontinence in children with pelvic floor dyssynergia (PFD).

Study design Retrospective chart review of children with PFD completing >1 PT session for fecal incontinence at a quaternary children's hospital. The frequency of fecal incontinence (primary outcome), constipation-related medication use, number of bowel movements (in those with <3 per week at baseline) and pelvic floor muscle (PFM) function were captured at baseline and at the final PT visit. Outcomes were categorized as excellent (complete continence), good (>50% decrease in fecal incontinence frequency), fair (not worsening but <50% fecal incontinence frequency decrease), and poor (more frequent fecal incontinence). Compliance with PT was determined by the percentage of attended PT appointments.

Results Children included met the following primary outcomes: 27 (42.2%) excellent, 24 (37.5%) good, 11 (17.1%) fair, and 2 (3.1%) poor. Factors associated with an excellent or good outcome included improved PFM functioning and good (≥70% PT attendance) compliance. Children with a history of surgically corrected tethered spinal cord were more likely to have a fair outcome ($P = .015$). Use of constipation-related medications decreased (1.9 ± 0.7 vs 1.5 ± 0.9, $P = .005$). Weekly bowel movement frequency increased (1.6 ± 0.6 vs 6.4 ± 4.8, $P < .001$) in those with infrequent bowel movements (n = 26) at baseline.

Conclusions Pelvic floor PT is effective in the majority of children with fecal incontinence related to PFD. Factors associated with PT efficacy include improved PFM functioning, good compliance with PT, and history of tethered cord. *(J Pediatr 2017;■■:■■-■■).*

Fecal incontinence or soiling refers to the repetitive, voluntary or involuntary, passage of stool in inappropriate places by children 4 years of age and older. Childhood fecal incontinence has an estimated global prevalence between 0.8% and 7.8%; it has a significant negative impact on quality of life.[1-4] In most children with fecal incontinence, the problem is associated with underlying constipation or stool retention. Of those with constipation, 95% of affected children have functional constipation, and the remaining 5% of children have organic etiologies such as anatomic abnormalities (eg, Hirschsprung and imperforate anus) or neurologic defects (eg, spinal defects).[5] Childhood functional constipation with fecal incontinence particularly is associated with behavioral (eg, attention deficit hyperactivity disorder), developmental (eg, autism), and psychological (eg, anxiety) factors.[6-8] Not all children with fecal incontinence, however, have evidence of excessive stool on physical or radiologic examination. Approximately 20% of children with fecal incontinence are characterized as having nonretentive fecal incontinence.[9]

There are several treatment options for childhood fecal incontinence, depending on the etiology and association with underlying constipation. These include dietary regimens, improved toileting habits, laxatives, behavioral interventions, surgical procedures, and physical therapy (PT).[10,11] Physical therapists specializing in treating pelvic floor muscles (PFMs) address pelvic floor dyssynergia (PFD). PFD is defined as an inadequate coordination of the PFMs, as well as other muscle groups (eg, abdominal muscles) during a bowel movement, and may occur in a subset of children with fecal incontinence.

PT that is focused primarily on PFM training is effective for adult fecal incontinence associated with PFD.[12-14] One study found PT to be effective in treating childhood functional constipation; however, PT was not superior to standard medical therapy in addressing fecal incontinence.[15] In addition, the same study did not identify whether subjects had PFD and excluded children with organic etiologies. Given the paucity of data regarding the effectiveness of PT for childhood fecal incontinence in those with PFD, the primary aim of our study was to ascertain the

HEP	Home exercise program
PFD	Pelvic floor dyssynergia
PFM	Pelvic floor muscle
PT	Physical therapy
s/p	Status post

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clinical efficacy of PT for fecal incontinence in children with PFD. In addition, we sought to identify clinical factors associated with PT efficacy in this population.

Methods

The study was approved by the Baylor College of Medicine institutional review board. A retrospective chart review (January 2010-August 2016) was conducted of all patients with a clinical diagnosis of fecal incontinence irrespective of etiology made by the patient's primary pediatric gastroenterologist who were referred to PT for PFD. Included subjects completed 2 or more PT visits. Data extracted from the medical records were captured systematically and included patient age; sex; presence of clinically determined symptoms/diagnoses, such as constipation, enuresis, abdominal pain, abdominal distention, and painful defecation; medical history, with careful attention to capture medical conditions such as Hirschsprung disease, imperforate anus, and spinal issues; medications; and number of PT visits, PT methods, and PT progress notes. The number of laxative medications used during the initial and last documented PT visit was captured.

Patients referred to PT underwent an initial baseline evaluation. Physical assessment included general posture screen, lumbo-pelvic-hip range of motion, pelvic girdle, and lower extremity strength measures. Pelvic floor assessment included evaluation of strength, resting tone, presence or absence of anal wink, PFM contraction, relaxation, and bulge. Visual observation was used to assess pelvic floor excursion, including caudal elongation as well as external sphincter relaxation during attempted bulge.[16] The range of excursion was given a value ranging from 0 to 100%. The following descriptive categories were used to quantify visual assessment of PFM excursion: 0% absent excursion, 1%-25% poor excursion, 26%-50% fair excursion, 51%-75% good excursion, and ≥75% excellent excursion.

After the initial evaluation, PT sessions were initiated once or twice per week per the therapist's recommended plan of care with subsequent weaning of the frequency of PT visits. Each session lasted 60 minutes and was focused on assessment of functioning, therapeutic and manual therapy interventions, and progression of the plan of care. Abdominal assessment and manual work included myofascial release, colonic massage, soft-tissue massage, rib mobility, and skin rolling. Global strengthening, stretching, and coordination exercises were used. Therapeutic exercises were aimed to address isolated pelvic coordination and proprioception. In addition, both breathing coordination and appropriate use of intra-abdominal pressure were combined with PFM coordination. Toileting habits and body positioning were evaluated and addressed. External PFM training was included in therapy sessions if deemed appropriate by the therapist, with emphasis on improving coordination of contraction, relaxation, and bulge, in a variety of positions. A home exercise program (HEP) was created at the initial visit, tailored to each patient, and progressed as appropriate throughout progression of care. The HEP often included the following: at least twice-daily use of the routine meal, warm drink, abdominal massage, and toilet sitting to facilitate a bowel movement; gross motor strengthening and stretching; and fluid/dietary modifications to reduce constipation. Compliance with PT visits was classified into the following categories: good (subjects had ≤30% no-shows to PT visits); fair (subjects had 30%-50% no-shows to PT visits); poor (subject had frequent [>50%] no-shows to PT visits).

The primary outcome was based on fecal incontinence frequency reported at the time of the subject's last documented PT visit compared with fecal incontinence frequency at the initial baseline PT visit. Fecal incontinence frequency was defined as the number of fecal accidents per week. Fecal incontinence outcome was categorized as excellent (complete continence), good (>50% decrease in frequency of fecal incontinence), fair (not worsening but <50% improvement), and poor (more frequent fecal incontinence). Excellent and good outcomes were categorized as favorable, and fair or poor outcomes were categorized as being unfavorable. This was based primarily on expert recommendation that a ≥50% reduction in fecal incontinence episodes is a clinically meaningful outcome measure.[17]

Secondary outcomes included improvement in bowel movement frequency at the time of the last PT visit vs baseline (in those with <3 bowel movements per week at baseline), medication use at the last documented PT visit vs baseline, and PFM functioning at the time of the last PT visit vs baseline. For assessment of a change in bowel movement frequency, categories included excellent (doubling or more of frequency), good (>50%-99% increase), fair (not worsening but <50% increase in frequency), and poor (decreased frequency).

Statistical Analyses

Statistical analysis was performed with IBM SPSS software (version 23, Armonk, New York). Demographic data were described using frequencies, means, and SD. The Pearson χ^2 test was used when categorical variables were assessed. Paired sampled *t* tests and ANOVA were used to compare noncategorical variables. A *P* value of <.05 was considered as statistically significant.

Results

Sixty-four children with a mean age of 8.69 ± 3.19 (SD) years were included, of whom 43 (67.2%) were boys. Subjects had a mean of 11.5 ± 14.3 fecal accidents per week at baseline and 26 (40.6%) had ≤2 bowel movements per week. Subjects had a mean of 14 ± 12.9 PT visits over a time period of 8.5 ± 10.7 months. Twenty-eight (43.8%) had achieved continence at one point before starting PT. The cohort had a variety of organic, developmental, and behavioral characteristics (**Table I**).

The majority of children achieved a favorable (excellent or good) primary outcome: 27 (42.2%) excellent, 24 (37.5%) good, 11 (17.2%) fair, and 2 (3.1%) poor. The mean number of fecal incontinence episodes per week had decreased to 3.2 ± 5.7 ($P < .001$ vs baseline). There was a decrease in the number of constipation-related medications used (1.9 ± 0.7 vs 1.5 ± 0.9, $P = .005$). In those with infrequent bowel movements at base-

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