Empirically Supported Treatments in Pediatric Psychology: Constipation and Encopresis

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Objective: To review the empirical research examining behavioral and medical treatments for constipation and fecal incontinence.

Method: Sixty-five articles investigating intervention efficacy were identified and reviewed. Twenty-three of the studies were excluded because they were case studies or were less well-controlled single-case designs. The intervention protocol for each study was identified and coded, with studies employing the same interventions matched and evaluated according to the Chambless criteria.

Results: From the literature base to date, no well-established interventions have emerged. However, four probably efficacious treatments and three promising interventions were identified. Two different medical interventions plus positive reinforcement fit the criteria for the probably efficacious category (one with fiber recommendation and one without). Three biofeedback plus medical interventions fit efficacy category criteria: one probably efficacious for constipation with abnormal defecation dynamics (full medical intervention plus biofeedback for paradoxical contraction), and two fit the promising intervention criteria for constipation and abnormal defecation dynamics (full medical intervention plus biofeedback for EAS strengthening, correction of paradoxical contraction and home practice; and biofeedback focused on correction of paradoxical contraction, medical intervention without fiber recommendation, and positive reinforcement). Two extensive behavioral interventions plus medical intervention also met efficacy criteria for constipation plus incontinence (medical intervention without laxative maintenance plus positive reinforcement, dietary education, goal setting, and skills building presented in a small-group format fits criteria for a promising intervention; and positive reinforcement and skills building focused on relaxation of the EAS during defecation, but without biofeedback, plus medical intervention meets the probably efficacious criteria).

Conclusions: A discussion of the current weaknesses in this research area follows. Specific recommendations for future research are made including greater clarity in treatment protocol and sample descriptions, reporting cure rates rather than success rates, utilization of adherence checks, and investigation of potential differential outcomes for subgroups of children with constipation and incontinence.

Key words: constipation; encopresis; fecal incontinence; intervention; biofeedback; efficacy.
The purpose of this article is to review the literature and determine standard interventions that have been shown to be efficacious in the treatment of constipation and incontinence and to evaluate their effectiveness over a number of studies. We will first present an overview of the importance of outcome research in this area and of the mechanisms involved in appropriate defecation. Then, we describe the process of categorizing the studies and our evaluation of the current status of the literature. Last, we discuss the implications of our review and future research that is needed.

Encopresis is a serious problem that affects between 1.5% and 7.5% of school children ages 6 to 12 (Doleys, 1983). It accounts for 3% of medical referrals and 3%-6% of psychiatric referrals (Levine, 1975; Olatawura, 1973). In addition to the 2–3 million physician visits per year, hundreds of millions of dollars are spent on over-the-counter laxatives per year by people self-treating constipation (Sonnemberg & Koch, 1990). Of children with fecal soiling, approximately 85% have concomitant constipation (Levine, 1975; Molnar, Taitz, Urwin, & Wales, 1983). However, of children with constipation, 35% of girls and 55% of boys reportedly have concomitant soiling (Staiano, Andreotti, Greco, Basile, & Auricchio, 1994). These two overlapping medical problems should be more clearly distinguished in the literature.

In addition to the cost and medical implications, fecal incontinence can have significant ramifications for a child’s emotional and social functioning. Parents have rated the child’s lack of self-esteem as the most important consequence of constipation and incontinence, and these children have been found to exhibit more emotional and behavioral difficulties than other children, thus demonstrating the impact on the child’s life (Bernard-Bonnin, Haley, Belanger, & Nadeau, 1993; Gabel, Hegedus, Wald, Chandra, & Chiponis, 1986).

The effects of constipation include abdominal pain, poor appetite, and enuresis, underscoring the physical discomfort and potential medical effects of this problem for children (Benninga, Buller, & Tambini, 1993). In fact, children report that pain is the worst consequence of constipation (Bernard-Bonnin et al., 1993). Moreover, chronic constipation can lead to megacolon, rectal bleeding, rectal fissures, or prolapse.

Recent studies have found that 3½ to 5 years after medical intervention, 52%-64% of medically treated children evidenced persistent constipation (Bernard-Bonnin et al., 1993; Staiano et al., 1994). The proportion of children who improved did not continue to increase over time, but was usually stable after 6–12 months. Thus, this problem can persist into adolescence and beyond for many of these children, and, despite common belief, constipation will not necessarily improve as the child gets older. There is evidence, however, that encopresis in general declines and plateaus to .75 % of children at 10 to 12 years of age (Bellman, 1966; Houts & Abramson, 1990). Given the high rate of continued difficulty and the impact of constipation and incontinence on children’s social and emotional development, the little well-controlled research in the literature is surprising.

**Diagnostic Criteria**

The diagnostic criteria for encopresis have gone through changes over the years. Generally, encopresis is considered to be defecation in inappropriate places over a given time span. In the Diagnostic and Statistical Manual for Mental Disorders (DSM-IIIR) (American Psychiatric Association, 1987), the requirement was soiling at least once a month for a 6-month period. In DSM-IV this was changed to at least once a month for 3 months (American Psychiatric Association, 1994). These new criteria also state that the child must be at least 4 years of age and the behavior must not be exclusively due to medications or physical problems other than constipation. The diagnosis of encopresis also requires a determination of whether the soiling is due to constipation or not (with constipation and overflow incontinence vs. without constipation and overflow incontinence) (American Psychiatric Association, 1994).

Incontinence with constipation has often been referred to as retentive encopresis. Another related diagnosis that has received some attention in the literature is constipation without incontinence. These are important distinctions, with emerging differences identified in the treatment literature. Even though studies have clearly shown that constipation and encopresis are not synonymous, intervention studies still often fail to clearly specify
that digestion and movement of the feces through the bowel (peristalsis) occurs most commonly once a day (although a range exists around this common defecation pattern). As feces accumulate and move into the rectum, the sensation to defecate is recognized through stretch receptors in the rectal tissue. This process results in the relaxation of the internal anal sphincter (IAS) so the feces can begin to move into the anal canal. The external anal sphincter (EAS) simultaneously contracts to temporarily maintain continence until defecation is appropriate. The EAS then relaxes to allow the feces to be evacuated (Whitehead, Orr, Engel, & Schuster, 1981).

Several behavioral responses within a social context interact with the physiology of digestion to lead to appropriate defecation. The child must have a sufficient diet (fiber and water intake) to promote movement of feces through the bowel. The child must attend and respond to bodily cues related to peristalsis rather than ignoring them. The child must learn to discriminate between an “appropriate” and an “inappropriate” place for defecation and must have the proper motivation to accept and act on these socially accepted standards. Children must also learn the necessary undressing skills for toileting, be able to perform valsalva (tightening the stomach and pushing out as though attempting to defecate) in order to initiate the void while on the toilet, and learn to clean themselves afterward.

The interaction between the physiology of defecation and behavioral responses needed for socially appropriate toileting can be interrupted and compromised if the learning experience is painful and thus aversive. Hence, the child must be unafraid and able to relax during this process and must be afforded the opportunities to experience the process with success and without fear, pain, or tension. One of the major etiological/maintenance factors of constipation with incontinence is the fear of painful defecation. Reports by children and parents reveal that fear of pain is a major factor in their constipation (Bernard-Bonnin et al., 1993; Partin, Hamill, Fischel, & Partin, 1992). Children report that the pain is the most important consequence of constipation: abdominal pain and pain on defecation (McGrath & Clawson, 1994). Approximately 68%-86% of children with constipation experience pain with defecation (Loening-Baucke, 1993).

As one can see, multiple mechanisms are involved in socially appropriate defecation. For ex-
ample, in the process of recognizing rectal fullness, sensation must not only be transmitted, but the stimulus must also be perceived in order to be acted upon. Thus, the presence or absence of appropriate neural pathways can influence sensation in the rectum (as in spina bifida, imperforate anus, hirschsprungs), stretching of the area (megarectum) can alter sensation (or the level of fullness required before the bolus touches rectal walls and is sensed), and habituation to chronic rectal fullness can cause the accurate sensation to be screened out or not perceived.

The abnormalities found in constipated children most frequently include the failure of the EAS to relax during defecation (paradoxic contraction or dysenergia [PC]). Abnormal defecation dynamics have been found in children with encopresis (Wald, Chandra, Gabel, & Chiponis, 1987). When only those children who have constipation are assessed, 45% to 70% evidence abnormal defecatory mechanisms (Loening-Baucke & Cruikshank, 1986; Weber, Ducrotte, Touchais, Roussignol, & Denis, 1987). The incontinence found in many of these children is often due to decreased sensation and weak EAS function. Thus, the role of maladaptive physical/behavioral patterns in constipation, with or without incontinence, is underscored.

Although there is considerable evidence that abnormal physiological mechanisms are present in constipated individuals, these physiological differences in responding may be the result of known conditioning mechanisms such as habituation and conditioned aversion. Although it has not been examined empirically, it is believed that for most children the paradoxical contraction of the EAS (PC) pattern develops in response to a painful bowel movement or when trying to control bowel movements during toilet training. The abnormal contraction may begin with the EAS playing a regulatory function. For example, it is known that the EAS controls whether the bolus of feces is retained or evacuated. However, it may also control the volume allowed to pass at any one time, a protective function that prevents pain and tissue damage. Therefore, when a large and hard bolus attempts to pass, the EAS contracts slightly in an attempt to let less feces pass through the anal canal by decreasing the diameter of the sphincter being stretched by the large stool. This may cause incomplete evacuation contributing to further constipation, the EAS contraction may become habitual, and the association of bowel movements and pain is conditioned: a conditioned aversion. Whether the initial paradoxical contraction of the EAS was voluntary due to fear/avoidance of pain, secondary to constipation, or a maladaptive attempt by the child to control defecation during initial attempts at toilet training, this conditioned, abnormal defecation pattern then contributes to the development of, or maintenance of, constipation.

Once this pattern begins, it is learned and maintained, causing further difficulty as feces are retained and build up in the colon. The child is typically unaware of this pattern and has difficulty altering the pattern without feedback. Poor rectal sensation and a weak sphincter are sometimes congenital or developmental. However, they are usually the result of chronic constipation (Meunier, Marechal, & de Beaujeu, 1979). Because of chronic colon fullness, stretching, which affects the ability of the bowel to move feces through peristalsis, can occur.

Dysmotility as a primary disease process that has constipation as a symptom has received much attention in the literature (Loening-Baucke, Anuras, & Mitros, 1987). Moreover, pancreatic polypeptide levels have been found to be higher in encopretic children than in normal controls, while the motilin response was lower in children with encopresis (Stern et al., 1995). This suggests that enzymes associated with digestion and motility are different in children with constipation. However, colonic dysmotility has been shown following voluntary suppression of defecation for 1 week in 12 normal men (Klauser, Voderholzer, Heinrich, Schindlbeck, & Muller-Lissner, 1990). Thus, colonic dysmotility may be conditioned through a feedback loop in children who continually suppress the urge to defecate. This study again highlights the interactive nature of physiology and behavior and points to behavioral interventions to alter these maladaptive patterns.

Finally, constant rectal pressure and fullness can stretch the rectal area or cause habituation to the sensation of fullness, alter thresholds of detection, and weaken the external anal sphincter. Once regular evacuation of the bowel is achieved for several months, sensation, peristalsis, and sphincter strength are hypothesized to return to normal (Callaghan et al., 1964). This is why most authors in this literature consider fiber and/or laxative therapy important for recovery of function.
Identification of Treatment Studies

Literature searches were conducted on medical and psychological databases to identify articles on the treatment of constipation and encopresis. From these articles, further studies were obtained from their reference lists. Finally, previous reviews in this area were obtained and reference comparisons were made to ensure that all intervention studies in the literature were obtained and reviewed. Sixty-five intervention articles were summarized and categorized by interventions used. Twenty-three of the studies were excluded from the final analysis and from this article because they were case studies or less well-controlled single-case designs that did not contribute significantly to the review. Single-case designs that include comparisons between treatment components are included. In the final analysis of the studies presented here and in Appendixes I and II, 42 articles were utilized, 13 of which are single-case designs that would meet criteria to help in determination of an efficacy category.

Once all of the relevant intervention studies were obtained, the treatment protocol was identified and coded, and the studies employing the same intervention protocol were matched and evaluated according to the Chambless criteria (Chambless et al., 1996).

Treatment Protocol Determination and Coding

Because the literature has primarily involved interventions that have not been standardized and replicated, we attempted to classify the interventions into groups that employ similar interventions. The current review attempts a more granular analysis than most previous reviews, piecing together specific subcategories of treatment components to construct a treatment protocol for each study. Table I provides a detailed description of the intervention categories and subcategories used to describe each study. The categorization scheme was divided into four major areas: Medical Recommendations/Interventions (M), Biofeedback Interventions (BF), Psychotherapeutic Interventions (P), and Behavioral Interventions (B). Each area has several subcategories of intervention that further elaborate their characteristics. For example, under the medical intervention category, subcategories are listed consisting...
of use of purgatives and laxatives for initial clean-out, use of purgatives and laxatives for ongoing treatment, dietary recommendations, and sitting schedule recommendation. Similarly, under the behavioral interventions category, subcategories of reinforcement, punishment, classical conditioning techniques, skills-building techniques, and awareness techniques have been distinguished.

The alpha-numeric code used to describe the treatment protocol under the Design heading of Appendices I and II describes the intervention subcategories used in each of the studies. Although the interpretation of such a complex alphanumeric coding system can be cumbersome, it is provided so that researchers and clinicians can understand how we grouped studies by intervention type, leading to the determination of an efficacy category for the different treatments. For example, the alpha-numeric code “B1” would indicate the use of the operant technique of reinforcement, the first subcategory under the behavioral interventions category.

Many of the studies included in the tables did not have an exact match in terms of the treatment component subcategories utilized. For example, a study that utilized medical intervention alone but only included laxative use for cleanout and maintenance (M1 and M2 subcategories) would not match exactly a study that used laxatives and a sitting schedule (M1, M2, and M4) and would not match a study that used laxatives for cleanout but not for ongoing treatment (M1 but not M2). Different subcategories of medical intervention are used and this would not meet the criterion of an exact match of the treatment protocol (see Appendix I).

**Determination of Efficacy Categories**

Forty-two studies were included in the final analysis and are included in Appendix I and II; those without an exact match are not discussed in detail because they do not meet the Chambless criteria. Although this is a high percentage to initially exclude from the pool of intervention studies that might meet the Chambless criteria, further broadening the subcategories used would yield nonequivalent interventions being grouped. The purpose of this analysis of the literature is to determine standard interventions that have been shown to be efficacious in the treatment of encopresis. Thus, only a small number of studies had a match in terms of the intervention protocol employed; these will be discussed in detail.

The Chambless criteria established minimum efficacy standards in order to categorize an intervention as well-established, probably efficacious, or a promising intervention. A well-established treatment must have two good between-group design studies \((N < 30\) allowable in SPP modifications of criteria), or a large series of single-case designs, demonstrating it is superior to a placebo or alternative treatment or that it is equivalent to an already established treatment (Chambless et al., 1996). Additionally, the studies must clearly specify the client characteristics and the effects must have been demonstrated by more than one investigator. The task force for the Society of Pediatric Psychology, recognizing that research with pediatric populations is still in its youth as compared to the status of intervention literature for adults, modified the Chambless criteria mandating manualized treatments for determining efficacy, requiring only that the treatment protocol be specific (Spirito, 1999). To meet the probably efficacious criteria, an intervention must have two studies demonstrating the treatment is more effective than a waiting list control group or one or more studies meeting the well-established criteria but not conducted by different investigators. Promising interventions must evidence one well-controlled study and one less rigorously controlled study by separate investigators, or two or more well-controlled studies either with small numbers or by the same investigator (Spirito, 1999).

The inherent limitations of categorizing treatments from article descriptions must be recognized. In-depth descriptions are not typically provided and implementation of treatment components that ostensibly appear the same may be quite varied. Furthermore, the person who is implementing the various treatment components may vary across studies with technicians, physicians, nurses, psychologists, nutritionists, and a host of students in training potentially implementing the interventions in the different studies so that comparisons across studies are not precise comparisons of a specific component implemented the same way and by a person of equal background and skill. For example, there is a difference between behavioral recommendations and behavioral therapy. The context of therapy allows behavioral analysis to tailor interventions for optimal impact, allows adherence to be monitored and facilitated, and allows problem solving and alteration in treatment as needed to increase efficacy and encourage generalization and maintenance. In the literature to date, adequate dis-
tinnings have typically not been made, with behavioral intervention including behavioral therapy and behavioral recommendations implemented by a variety of professionals with varied intensity.

**Review of the Efficacy of Treatments**

Studies that included equivalent subcategories of interventions were grouped and compared. The similar studies were then evaluated according to the Chambless criteria to determine whether they fit any of the efficacy categories. The relevant studies for each intervention combination are described in detail and a brief summary of that combination follows. Where available, a cure rate is reported. The cure rate is the proportion of participants who achieved full recovery: no accidents and/or a full remission of constipation. When the cure rate cannot be determined, the proportion of participants who achieved different levels of improvement as reported by the author is listed as a success rate.

**Comprehensive Medical Intervention**

Four studies compared comprehensive medical intervention (i.e., cleanout with laxative maintenance, dietary recommendations, and sitting schedule recommendations) to biofeedback plus medical intervention (Cox, Sutphen, Borowitz, Dickens, & Singles, 1994; Loening-Baucke, 1990; van der Plas, Benninga, Buller, et al., 1996; van der Plas, Benninga, Redekop, et al., 1996). Two of the studies found no differences between the groups (van der Plas, Benninga, Buller, et al., 1996; van der Plas, Benninga, Redekop, et al., 1996) and two found medical intervention (M) plus biofeedback (BF) to be superior to medical intervention alone (Cox et al., 1994; Loening-Baucke, 1990). Because biofeedback is not yet an established treatment, medical intervention must be shown to be superior to medical plus biofeedback in order to meet criteria for an efficacy category. Several mitigating factors such as subject selection deserve further consideration. One issue in subject selection involves whether participants experience constipation only, constipation and incontinence, or incontinence alone. Another difference across these studies is the proportion of participants who demonstrate abnormal defecation dynamics. These will be discussed in detail.

The subjects in three of the studies were constipated (Cox et al., 1994; Loening-Baucke, 1990; van der Plas, Benninga, Buller, et al., 1996). Additionally, Loening-Baucke (1990) required demonstration of abnormal defecation dynamics. One of the studies included only subjects who experienced incontinence without constipation (van der Plas, Benninga, Redekop, et al., 1996). Although the intervention components comprising the medical treatment protocol in these studies are the same, the varied findings may be the result of the different subject populations across the studies.

Of those studies that include a group that received all components of the medical intervention category, a cure rate of 40% (range: 5%–59%) was achieved by 16–18-month follow-up. The low cure rate for traditional medical management (5%) in Loening-Baucke (1990) may be due to the inclusion criteria of demonstrated abnormal defecation dynamics. This resulted in a homogeneous sample of children, 100% of whom evidenced abnormal defecation dynamics, whereas two of the remaining studies reported a mean rate of abnormal defecation dynamics of 44% (38% and 55%) (one study did not report pretreatment percentage of subjects with abnormal defecation dynamics). Traditional medical management may be less effective if a child has abnormal defecation dynamics (Loening-Baucke, 1990).

**Biofeedback Plus Medical Intervention**

Three of the studies discussed above used the same biofeedback components (training focused on correction of paradoxical contraction) and all medical intervention category components in a between-groups evaluation (Loening-Baucke, 1990; van der Plas, Benninga, Buller, et al., 1996; van der Plas, Benninga, Redekop, et al., 1996). One study found biofeedback plus medical to be superior to medical intervention alone (Loening-Baucke, 1990). Thus, biofeedback with training focused on correcting paradoxical contraction plus medical management (including bowel cleanout with laxative maintenance, fiber recommendation, and a sitting schedule) meets the criteria for a probably efficacious intervention. Because of the highly selective inclu-
sion criteria of this study, the efficacy categorization should be qualified as probably efficacious for children with constipation who have abnormal defecation dynamics.

Six other between-groups studies employed biofeedback intervention but do not match the other studies reviewed in terms of the specific treatment components used in the protocol (Benninga et al., 1993; Cox et al., 1994; Cox, Sutphen, Borowitz, Kovachev, & Ling, 1998; Cox, Sutphen, Ling, Quillian, & Borowitz, 1996; Nolan, Catto-Smith, Coffey, & Wells, 1998; Wald et al., 1987). One of these studies included all components of the medical intervention category (bowel cleanout, laxative therapy, fiber recommendation, and a sitting schedule) plus biofeedback (focused on EAS contraction, home practice of EAS contraction, and correction of paradoxical contraction) and found medical management plus biofeedback to be superior to medical intervention alone for children with constipation and incontinence (Cox et al., 1994). Although this was a between-groups study, this intervention is in the promising intervention category for constipation because of the small number of subjects included in the study.

Similarly, Wald et al. (1987) reported that in children with constipation and abnormal defecation dynamics, treatment including biofeedback training that focused on correction of paradoxical contraction was superior to medical intervention alone (67% cured vs. 44% at 6 months and 67% vs. 33% at 12 months), although no significant differences in outcome were noted for the children who did not evidence abnormal defecation dynamics. Although this study is similar to the three studies considered previously and reports similar findings to Loening-Baucke (1990), it does not use the same medical intervention components, resulting in separate consideration for efficacy categorization. Hence, the treatment combination including biofeedback training focused on correction of paradoxical contraction plus medical intervention (without fiber recommendation) plus positive reinforcement meets the criteria for a promising intervention for children with constipation and abnormal defecation dynamics.

Cox et al. (1996, 1998) examined the additive effects of medical management, behavioral intervention (positive reinforcement and skills training), and biofeedback intervention (focused on EAS contraction, correction of paradoxical contraction, and home practice of EAS tightening and relaxation) across three groups. In both studies behavioral plus medical (71% significantly improved in study 1, 85% in study 2) and behavioral plus biofeedback plus medical intervention (69% significantly improved in study 1, 61% in study 2) were superior to medical management alone (19% study 1, and 45% study 2) 3 months after the initiation of treatment. Follow-up data are not provided and the percentage of subjects with complete elimination of symptoms is not reported. In one study behavioral plus medical was superior to behavioral plus medical and biofeedback (Cox et al., 1998) whereas in the other study these two treatments were not significantly different (Cox et al., 1996). Thus, this biofeedback intervention did not meet criteria for an efficacy category.

Like van der Plas and colleagues in 1996, Nolan et al. (1998) found no differences between medical intervention and biofeedback plus medical intervention. Encopretic children who had failed previous treatment attempts were randomized to either medical intervention (enemas and laxative maintenance) or the same medical treatment plus biofeedback training focused on correction of paradoxical contraction. Results revealed the biofeedback group evidenced a higher number of subjects who improved across weeks 9 through 24. However, by week 26 and at 6-month follow-up, no differences between the groups were found (medical = 13% cure rate, medical and biofeedback = 14% cure rate). Thus, this treatment combination does not meet criteria for an efficacy category.

Finally, Benninga, Buller, and Taminiau (1993) classified 29 children into three groups (constipation only, constipation and incontinence, incontinence only) utilizing a treatment protocol of biofeedback training (focused on tightening and relaxing the EAS and correction of paradoxical contraction) along with medical management (laxative) across all groups. No significant differences were noted, and 55% were cured across groups. No data for separate groups are reported. The separation of these symptom groups is important as there are often differences in symptom targets, physiologic presentation, and anorectal dynamics abnormalities. Although not evident in this study, interventions may yield differential response of these groups to the various treatments utilized. The acknowledgment of these differences and division of the groups based on symptomatology would facilitate analysis of the literature.

In a subsequent report, Loening-Baucke (1995) reported that long-term follow-up of children com-
bined across two studies revealed that biofeedback was not superior to medical intervention. At a mean of 4 years following treatment, 62% of medically treated children were reported recovered, whereas 44% of biofeedback children were recovered. Such findings would seem to argue against the use of biofeedback. However, two-thirds of the biofeedback group were treated in their medical group for 6 months before they were considered treatment failures and provided the biofeedback intervention. Thus, the medically treated group has an inflated recovery rate, as those who failed to respond were then transferred to the biofeedback group. This is also evident in the significant differences in severity of constipation and of anorectal dysfunction between the two groups (Loening-Baucke, 1995).

Several important issues need to be addressed in attempting to synthesize the biofeedback literature. First, subject selection makes generalization across studies into an efficacy category difficult. Second, biofeedback interventions vary according to the types of training provided and the methods for conducting the training. We discuss these issues further below.

Subject selection is again a challenge. The need to separate and specify the precise symptom presentation (constipation, incontinence, or constipation plus incontinence) has already been discussed. Review of the studies in this area highlights this diagnostic issue. The subjects in three of the studies were constipated (Cox et al., 1994; Loening-Baucke, 1990; van der Plas, Benninga, Buller, et al., 1996) and in one study 94% evidenced constipation (Wald et al., 1987); in another study subjects experienced incontinence without constipation (van der Plas, Benninga, Redekop, et al., 1996) and Cox et al. (1996, 1998) report that the children were diagnosed with encopresis and had failed previous treatment attempts. Additionally, Loening-Baucke (1990) required demonstration of abnormal defecation dynamics, resulting in a homogeneous group, 100% of whom evidenced abnormal defecation dynamics. The separation of these symptom presentations and detailed descriptions provided in the majority of these studies allow initial considerations of which specific treatments work best for specific types of symptomatology. Unfortunately, because few of the treatment protocols in this area have been replicated, further research is needed before firm recommendations can be made.

Similarly, biofeedback studies must be carefully evaluated because of the various methods of, and targets of, training. It is interesting to note that two of the studies with constipated children with abnormal defecation dynamics found the combined biofeedback and medical treatment to be superior to medical treatment alone (55% vs. 5% and 67% vs. 33%) (Loening-Baucke, 1990; Wald et al., 1987). Unfortunately, these studies used different medical treatment components. Thus, the treatment protocols must be considered separately when determining efficacy categories. Logically, however, these two studies seem to support the addition of biofeedback to medical management for children with constipation and abnormal defecation dynamics.

In Cox et al. (1996, 1998), it is interesting to note that the addition of biofeedback over behavioral intervention did not increase efficacy. However, the behavioral intervention included a form of “feedback” in terms of educating the child regarding letting the EAS relax, observing the child on a portable toilet, and providing feedback regarding proper relaxation during defecation and the relaxation of observable muscle groups such as the legs that might indicate a lack of EAS relaxation. It is unclear whether a relaxed body posture observable to another person is correlated with EMG recording of the EAS; however, it would be less intrusive and more cost-effective to provide feedback regarding the correction of abnormal defecation dynamics through observation of body posture as compared to direct EMG recording of the EAS if future studies confirm that these two interventions are comparable.

The abnormality of focus in biofeedback training (increasing EAS strength, correcting paradoxical contraction) is hypothesized to be a major etiological contributor to the constipation or encopresis. Thus, these studies investigate changes in these targets of biofeedback and look for corresponding improvement in soiling and constipation. The studies reviewed have found different success rates in documenting such correspondence. For example, whereas several studies found the addition of biofeedback to medical management (slightly different medical components and different biofeedback methods across the studies) increased effectiveness for children who evidenced abnormal defecation dynamics (Cox et al., 1994; Loening-Baucke, 1990; Wald et al., 1987), van der Plas, Benninga, Buller, et al. (1996) reported no correspondence between improved defecation dynamics and the percentage of children who were cured.

These findings highlight the difficulty of evalu-
ating the efficacy of biofeedback in the treatment of encopresis. Often treatment failures are included in biofeedback intervention samples but are not randomized to the comparison groups, resulting in nonequivalent groups (Loening-Baucke, 1995; van der Plas, Benninga, Taminiau, & Buller, 1997). The number of biofeedback sessions varies widely, as does the type of biofeedback provided. The equipment used to provide biofeedback also varies widely across studies (manometric equipment, surface EMG for the EAS, rectal probe EMG for the EAS, EMG assessment of abdominal muscle activity during valsalva) as does the target of biofeedback (EAS contraction, correction of paradoxical contraction, sensory threshold training, etc.). Moreover, differences in who administers the biofeedback likely account for some of the differential outcome findings (behavioral therapists, physicians, medical assistants). Clearer documentation of these variables and standardization of administration across studies would help elucidate the most effective administration of biofeedback and allow better analysis of treatment efficacy for biofeedback intervention.

**Summary.** Three biofeedback interventions meet efficacy criteria. For children with constipation and abnormal defecation dynamics, two studies utilizing different treatment protocols found biofeedback plus medical intervention to be superior to medical management alone. First, the treatment combination including all components of the medical intervention category plus biofeedback focused on paradoxical contraction meets the criteria for a probably efficacious intervention for children with constipation who have abnormal defecation dynamics. The treatment combination including biofeedback training focused on correction of paradoxical contraction plus medical intervention (without fiber recommendation) plus positive reinforcement meets the criteria for a promising intervention for children with constipation and incontinence. Although the treatment protocols differ and must be considered separately for efficacy category determination, logically these two studies support the addition of biofeedback to medical management for children with constipation and abnormal defecation dynamics. Finally, medical intervention plus biofeedback focused on EAS contraction, home practice of EAS contraction, and correction of paradoxical contraction meets the promising intervention criteria for children with constipation and incontinence.

**Extensive Behavioral Intervention Plus Medical Intervention**

Two behavioral and medical interventions meet efficacy criteria. The first is a comprehensive behavioral group intervention focused on fiber education, contracting, and positive reinforcement (promising intervention), and the second is a behavioral intervention focused on training EAS relaxation during defecation (probably efficacious).

Two single-group studies use a group intervention format to deliver the combined medical and behavioral intervention consisting of initial cleanout, dietary education, recording bowel activity and goal-setting, a sitting schedule, reinforcement, and skills-building techniques (Stark et al., 1990; Stark et al., 1997). This intervention is manualized and the second study was a replication of the first with a larger sample. These two single-group studies have yielded positive outcomes and place this intervention combination in the promising intervention category for constipation and incontinence. This intervention protocol did not meet criteria for a probably efficacious treatment because there are no between-groups studies and both studies were conducted by the same investigator.

In the first study, 16 of 18 children with constipation and incontinence had no soiling at the end of treatment (89% cured) and at 6-month follow-up 14 children maintained these gains (Stark et al., 1990). The replication with 52 children evidencing constipation and incontinence did not provide enough data to calculate cure rates and no follow-up was obtained. However, 86% of the children had one or fewer soiling accidents per week at the end of treatment. Across the two studies, soiling decreased 84%.

Although these studies have not been comparative treatment studies, they are important for several reasons. This is the first group intervention reported in the literature and one of the only replications of a manualized intervention. Group interventions are likely to be more cost-efficient if shown to be effective and are feasible for many types of settings, including school systems. Moreover, as in Houts, Mellon, and Whelan (1988), Mellon, Houts, and Lazar (1996), and Houts and Peterson (1986), the Stark et al. (1990) intervention quantified dietary changes, set specific goals for fiber and water intake during treatment, and made dietary change a focused target of the intervention. These studies have illustrated a systematic approach
to behavioral targets, which indicates that dietary change is a viable treatment target that responds to behavioral intervention and appears to be an important component in a comprehensive treatment package for constipation and incontinence.

As already discussed in the biofeedback section, Cox et al. (1996, 1998) examined the additive effects of medical management, behavioral intervention, and biofeedback intervention across three groups. In both studies behavioral plus medical (71% significantly improved in study 1, 85% in study 2) and behavioral plus biofeedback plus medical intervention (69% significantly improved in study 1, 61% in study 2) were superior to medical management alone (19% study 1, and 45% study 2) 3 months after the initiation of treatment. Because two studies have found this intervention superior to medical intervention and one also found it superior to behavioral, medical, and biofeedback (Cox et al., 1998), this behavioral and medical intervention meets criteria for a probably efficacious intervention.

The Houts, Mellon, and Whelan (1988), Houts and Peterson (1986), and later, Mellon, Houts, and Lazar (1996) studies are important for the contribution to dietary education, data collection, and goal-setting using a fiber point rating system. These are the first studies reported in the literature of such focus on dietary intake and quantification of the change in diet. Although diet recommendations had been made routinely throughout the literature, no study specifically targeting this aspect of the intervention for behavior change had been reported. Whereas these studies emphasize the potential efficacy of comprehensive behavioral intervention focused on toilet training, stimulus control, and fiber intervention, a large series of single-case designs is required for meeting efficacy criteria. Because these studies do not match precisely on the treatment protocol utilized, and the between-groups study did not find significant differences between the groups, these interventions do not meet criteria for an efficacy category.

Summary. For the treatment combination including the combined medical and behavioral intervention consisting of initial cleanout, dietary education, recording bowel activity and goal-setting, a sitting schedule, reinforcement, and skills-building techniques, two single-group studies have yielded positive outcomes. This places the intervention combination in the promising intervention category for constipation and incontinence because there are no between-groups studies and both studies were conducted by the same investigator.

For the treatment combination including behavioral (positive reinforcement and skills training focused on EAS relaxation during defecation) and full medical intervention, two between-groups studies conducted by the same investigator found the treatment superior to medical management and, in one study, superior to biofeedback, behavioral, and medical intervention, placing this intervention in the probably efficacious category.

Positive Reinforcement and Medical Intervention

Two between-groups studies and one single-group study use treatment consisting of a bowel cleanout followed by laxative maintenance, dietary recommendations, a sitting schedule recommendation, and positive reinforcement (Loening-Baucke, 1989; Nolan, Debeille, Oberklaid, & Coffey, 1991; Taitz, Wales, Urwin, & Molnar, 1986). In the between-groups studies, this combined intervention was found to be superior to a sitting schedule with reinforcement and dietary recommendations (Nolan et al., 1991), placing this treatment in the probably efficacious category for children with constipation and incontinence. The cure rates reported range from 43% to 51%, with a mean of 47%.

It is important to note that while positive reinforcement was included in the treatment protocol, the two components added to the more effective treatment were bowel cleanout and laxative therapy (51% cure rate). In contrast, the same combined intervention was found to be no different in cure rate from combined laxative and positive reinforcement program plus parent support and child play therapy: the combined groups yielded a cure rate of 48% after a mean of 8 months in treatment (Taitz et al., 1986). This suggests that traditional psychotherapy did not add to the efficacy of traditional medical management plus positive reinforcement. Finally, the single-group study reported a recovery rate of 43% in children with constipation and incontinence (Loening-Baucke, 1989).

Summary. For the treatment combination consisting of a bowel cleanout followed by laxative maintenance, dietary recommendations, a sitting schedule recommendation, and positive reinforcement, one between-groups study found the intervention superior to a medical intervention that
included no cleanout and no laxative therapy for constipation with incontinence. This treatment combination is probably efficacious.

**Positive Reinforcement and Medical Intervention (Without Fiber Recommendation)**

Four studies have investigated the efficacy of a medical intervention with initial cleanout and laxative maintenance, a sitting schedule, and positive reinforcement but without fiber recommendation. Three were single-group studies (Levine & Bakow, 1976; Lowery, Stour, Whitehead, & Schuster, 1985; Young, 1973) while one was a between-groups design comparing this medical intervention plus reinforcement with the medical intervention plus reinforcement and biofeedback focused on correcting paradoxical contraction (Wald et al., 1987). The Wald et al. study, discussed in detail in the biofeedback section, found medical intervention without fiber plus positive reinforcement to be superior to the same medical intervention plus biofeedback (71% cured vs. 40% cured) for the total group of 50 children (94% evidenced constipation). One of the single-group studies included children with constipation and incontinence and reported a cure rate of 75% at 1-year follow-up (Young, 1973). Thus, this treatment meets criteria for the probably efficacious category.

**Summary.** For the treatment combination of medical intervention (without fiber recommendation) plus positive reinforcement, one between-groups study found it to be superior to medical management plus biofeedback for paradoxical contraction if children evidenced constipation but did not have abnormal defecation dynamics, and one single-group study reported a cure rate of 75% in children with constipation. This places this treatment combination in the probably efficacious category.

**Discussion**

Even though research in constipation and incontinence has burgeoned over the last decade, more is needed to clarify which intervention works best for the various subpopulations of the encopresis diagnosis. Because this is a complex, multiply determined problem, the research has not yielded a well-established treatment thus far. The number of well-controlled studies has increased since the mid-1980s, with the majority of between-groups studies published in the 1990s. This promising trend will allow greater analysis of this important and difficult intervention area.

From the literature base to date, four probably efficacious treatments and three promising interventions have emerged. Two different medical interventions plus positive reinforcement fit the criteria for the probably efficacious category for constipation and incontinence, yielding an average cure rate of 55.63% (medical intervention without fiber recommendation plus positive reinforcement = 73%, Wald et al., 1987; Young, 1973; and full medical intervention plus positive reinforcement = 51%, Nolan et al., 1991). Note that although positive reinforcement was included in the Nolan et al. (1991) treatment protocol, the two components added to the more effective treatment (bowel cleanout and laxative therapy) may be an important part of an effective treatment program.

Three biofeedback interventions plus medical management fit category criteria, with two meeting criteria for children with constipation and abnormal defecation dynamics (average cure rate = 67%). Comprehensive medical intervention plus biofeedback for paradoxical contraction met criteria for a probably efficacious treatment for children with constipation and abnormal defecation dynamics (55% cure rate, Loening-Baucke, 1990). Similarly, the same intervention components without fiber recommendation plus positive reinforcement met criteria for a promising intervention for children with constipation and abnormal defecation dynamics (67% cure rate, Wald et al., 1987). Finally, for children evidencing constipation and incontinence and who had failed previous medical intervention, biofeedback (EAS strengthening, correction of paradoxical contraction, and home practice of biofeedback learned skills) plus full medical intervention and behavioral skills training met criteria for a promising intervention (79% cure rate, Cox et al., 1994).

Two comprehensive behavioral interventions plus medical management met the efficacy criteria with an average success rate of 82.75%. First, a small-group intervention including medical intervention (without laxative maintenance) plus positive reinforcement, dietary education, recording bowel activity and goal-setting, and skills building met promising intervention criteria for children with constipation and incontinence who had previously failed medical management (87.5% success rate, Stark et al., 1990, 1997). Second, an intervention including behavioral (positive reinforcement,
Toileting skills training focusing on relaxation of the EAS during defecation attempts, and EAS contraction) and medical components met criteria for a probably efficacious intervention for children with encopresis who had failed previous treatment attempts (78% success rate, Cox et al., 1996, 1998). Interestingly, the addition of biofeedback to this treatment protocol did not increase efficacy.

The wide disparity in efficacy with these interventions may be due to the reporting of success rates rather than cure rates in some studies. The quality of research at this time does not allow for clear conclusions about the differential efficacy between these types of interventions or between different symptom presentations. However, we are beginning to see pieces of the puzzle come together, and future research will need to address differential efficacy across diagnostic subtypes of constipation and encopresis. To date, these data would suggest that the addition of biofeedback and/or behavioral intervention increases the efficacy of a standard medical intervention. In particular, when children evidence constipation and abnormal defecation dynamics, biofeedback appears to increase efficacy. In children diagnosed with encopresis or with constipation and incontinence (defecation dynamics were not assessed), behavioral intervention appears to increase efficacy. Medical treatment components are a part of almost all interventions in the literature, serving as the starting point for building treatment protocols, and initial bowel cleanout and laxative therapy appear to increase the efficacy of medical interventions. Although several recent studies have not found biofeedback superior to other interventions, further research is needed to clarify the efficacy of the various interventions that demonstrate promise in the treatment of constipation and encopresis. The experimental methodology employed by Cox et al. (1996), if applied systematically to different diagnostic subcategories, including cure rate reports and follow-up, would allow clarification of which combination of behavioral, biofeedback, and medical intervention is most efficacious for different symptom presentations.

In the analysis of this literature, several other interesting clinical questions arise in addition to research directions. First, clinicians regularly face treatment decisions involving the time frame in which a treatment should prove effective. The length of time for treatment gains to be seen, or before alternative interventions or further assessment should be considered, is discussed through analysis of the studies reviewed. Second, from the current analysis, concern is raised that adding more intervention components to a treatment protocol may not improve outcomes but may instead decrease the efficacy of treatment. Last, challenges in synthesis of this area of research are discussed and recommendations for future research are made.

**Time Frame for Re-Evaluation of Intervention Strategy**

Because encopresis is considered a developmental disorder, it is often believed that a child will “grow out of it.” In fact, no maturing out effect has been documented, with symptoms persisting 3 1/2 to 5 years following medical intervention in many children (Bernard-Bonnin et al., 1993; Staiano et al., 1994). Moreover, complete elimination of symptoms has been found to be related to a shorter duration of symptoms (Lowery et al., 1985). One interpretation of these findings would indicate that parents and professionals should not wait to aggressively pursue treatment of constipation and encopresis to see if the child “grows out of it,” but should instead pursue earlier intervention to increase the chances of complete elimination of symptoms. Furthermore, if treatment does not bring significant change early in the process, a re-evaluation of intervention is warranted.

Whereas some studies note continued improvement up to 12 months following treatment, others do not find continued improvement after 6 to 12 months (Bernard-Bonnin et al., 1993; Staiano et al., 1994), and failure to improve during the first 2 weeks of intervention has been found to predict treatment nonresponders at 3 months (Cox et al., 1996). Furthermore, increases in success and cure rates between 6 months and 12 months is minimal: 7 of the 24 group studies reviewed in this analysis report data between these time points, 3 report an average 4% increase in success, 2 report a 12% relapse rate, and 2 report no change (Benninga et al., 1993; Lowery et al., 1985; Nolan et al., 1991; van der Plas, Benninga, Buller, et al., 1996; van der Plas, Benninga, Redelop, et al., 1996; Wald et al., 1987, Young, 1973). This suggests that when a child has not evidenced complete elimination of symptoms by 6 months after treatment, a different intervention, or more intensive intervention, should be considered. However, research with sufficient follow-up data is needed to clarify this issue and to guide medical decision making.
Is More Better?

Analysis across the treatments reviewed yields a trend that warrants further examination. Primarily, concern is raised that adding more intervention components to a treatment protocol does not improve outcomes but may instead decrease the efficacy of the intervention. We discuss three examples.

First, positive reinforcement plus medical intervention without a fiber recommendation yielded better cure rates than studies in which a fiber recommendation was included. The average cure rates reported were 47% (range: 43% to 51%) and 64.25% (range: 51% to 75%), respectively. There are many possible explanations for this difference including research design differences, sample differences, and differences in implementation of the subcategories of intervention. However, it is surprising that the addition of a fiber recommendation appeared to lower the cure rate over a number of studies. Yet diet, when addressed systematically with goal setting and recording, appears to be an important component of the treatment in other studies (Houts et al., 1988; Houts & Peterson, 1986; Stark et al., 1990; Stark et al., 1997). Thus, dietary recommendations that do not target how the family might systematically implement them may not be helpful. Alternatively, patients whose symptom presentation would not indicate a need for a fiber recommendation may experience decreased treatment effectiveness from the addition of a nonessential treatment component.

Similarly, the addition of biofeedback to medical plus positive reinforcement was found to decrease the effectiveness of the intervention for a mixed sample of children with encopresis (from 71% cured to 40% cured), although if the child had abnormal defecation dynamics, medical plus biofeedback was superior (Wald et al., 1989). Again, additional treatment components for patients whose symptom presentation does not seem to warrant those components apparently may decrease the effectiveness of the treatment. For children who require that treatment component, however, treatment is enhanced.

Finally, the addition of biofeedback to behavioral and medical intervention also resulted in decreased efficacy, with a significant difference between the groups (61% and 85%, respectively) (Cox et al., 1998). The addition of biofeedback to the treatment protocol increased the number of sessions by a half session; thus, the process of biofeedback may have taken time and focus away from the behavioral intervention, decreasing efficacy (Cox et al., 1998). Because the percentage of subjects evidencing abnormal defecation dynamics is not reported, it is possible, once again, that the addition of a treatment component not tailored to the specific needs of the child may decrease efficacy.

Challenges in the Literature and Recommendations for Future Research

The large variability in outcome measures and the reporting of these data across studies make it difficult to compare studies and findings. For example, many studies fail to report data so that cure rates can be determined. Many studies report information in terms of significant improvement instead of 100% improvement, which makes comparison across studies difficult. Moreover, each study determines its own criteria for success in such cases, which limits our ability to draw firm conclusions regarding efficacy. Reporting of cure rates, as well as success rates/significant improvements, should be standardized in future intervention studies.

Future research should also more clearly describe treatment components. There is a difference between behavioral recommendations and behavioral therapy. The context of therapy allows behavioral analysis to tailor interventions for optimal impact, allows adherence to be monitored and facilitated, and allows problem solving and alteration in treatment as needed to increase efficacy and encourage generalization and maintenance. The lack of operational definitions in research that includes “medical management and behavioral intervention” obscures the true effects of both the medical and behavioral interventions. For example, medical treatments that include behavioral management typically define the behavioral intervention as a sitting program or a positive reinforcement recommendation to the parent without a specific plan, analysis to tailor the plan to the family and child, or detailed follow-up regarding the implementation. Thus, the literature on the efficacy of behavioral therapy is obscured by the lack of specificity and subsequent misrepresentation of behavioral interventions. Consumers might inadvertently conclude that behavioral recommendations are not effective when, in the context of meeting with a behavioral therapist, the opposite would be true. Studies frequently do not indicate the level of clinical
training of those delivering the behavioral intervention, and thus, the intervention may be inadequate for this reason. This further underscores the importance of physicians collaborating with well-trained pediatric psychologists.

Many articles do not adequately document the proportion of subjects in their studies who evidence the various symptoms: incontinence, constipation, constipation and incontinence, or other specific characteristics such as abnormal defecation dynamics. Thus, there is not enough information for consumers to determine differential efficacy for primary versus secondary encopresis; constipation only, constipation and incontinence, or incontinence only; abnormal or normal defecation dynamics. Yet each of these distinctions has already been shown to have differential outcomes with the same intervention. Future research needs to clarify these distinctions and conduct research to evaluate the efficacy of interventions across these groups.

In addition to clarifying the most efficacious treatments for different symptom presentations, research is needed to clarify etiological and maintenance factors contributing to constipation and incontinence. The similar findings across a number of seemingly different interventions may indicate a common mechanism of action: all of the interventions include some component that serves to allow practice of defecation without pain, that is, exposure to the aversive stimulus. Thus, conditioned aversion may play an important role in the etiology and maintenance of constipation, and extinction of the aversion may be important in treatment. When descriptions are provided, most medical and all behavioral interventions require a sitting schedule that allows exposure to the toilet and other stimuli associated with defecation and to which the aversion may have generalized. All interventions require medication or fiber to increase the frequency of bowel movements and soften the stool to lessen pain. Moreover, the increased frequency facilitates the rapidity with which the extinction of the conditioned aversion occurs. Thus, exposure to stimuli that would likely be lower in the fear evoked, decrease or elimination of discomfort or pain, and increased frequency of exposure is indirectly a component of most interventions.

Biofeedback is thought by some to be intrusive, yet studies have not revealed that it is painful or anxiety-provoking. In fact, it may be perceived as no different from the typical exams and procedures a child endures (rectal exams, enemas, suppositories, manometry, sigmoidoscopy). In fact, only 1 patient of 50 reported it was painful or uncomfortable (following radiation proctitis) (Cerulli, Nikoomanesh, & Schuster, 1979). Nevertheless, it is important to document that children are not fearful, in pain, or traumatized by biofeedback procedures.

Although encopresis has been researched for decades, no studies have included an adherence check with the intervention by the child and parents, although it has been hypothesized as a major contributor to treatment failures (Rappaport, Landman, Fenton, & Levine, 1986; Stark et al., 1990). Although an intervention strategy is recommended, it is not clear in the majority of studies whether the recommendation is followed and to what degree. This means we do not know the “dosage” received of each component; therefore, drawing conclusions about treatment efficacy is difficult. One may assume that the treatment was ineffective when in fact the treatment was not followed or not effectively implemented. Because of the private nature of the problem, self-report data for checking adherence and accurate implementation would likely be the most widely accepted method by patients. Recording techniques that track appropriate and inappropriate defecation can be utilized to quantify treatment adherence as well, with the child and parent recording separately for reliability checks and to increase validity. The recording techniques used in some of the studies (Houts et al., 1988; Houts & Peterson, 1986; Stark et al., 1990) to track nutrition changes are one such example. Cox et al. (1996) documented the effectiveness of detailed, daily recording of data via telephone, which can be used to document treatment adherence. Calendar records of the number of toilet sitting episodes, with or without defecation, can also be used to assess the degree to which one complies with a sitting schedule as well as serving as the place for recording medication usage, reinforcement, biofeedback home practice, and other intervention components. Simple codes for recording these intervention components can be used and the family can be trained to use these codes easily at the beginning of treatment (McGrath, Ciocco, Sullivan, & Schenck, 1995).

Clearly, well controlled between-groups studies need to be conducted with larger samples. As this research area evolves, research questions should become more focused and consider all of the variables previously mentioned: unambiguous reporting of subject characteristics and their prediction of differential outcomes; operational definitions of inter-
ventions; objective documentation of adherence to intervention components; and reporting outcome with standardized dependent variables. Moreover, these studies should report data so that the number of sessions and number of weeks to remission can be determined. Reporting severity and duration data so that their relation to outcome can be determined will also become increasingly important. Finally, the research in this area should move toward clarification of which treatments are effective for children with different diagnostic presentations.

Appendix I

Studies Discussed in Review of Efficacy


Subjects. n = 29, ages 5–16 yrs with encopresis &/or constipation; comparison group for biofeedback: 13 healthy children, 8 males, 5 females, ages 8–16 yrs, mean age = 12 yrs.

Dx Criteria. Constipation. 2 or fewer BM per week. Encopresis—loss of fecal material in underwear 2 or more times per week. No other medical problems.

Baseline. No baseline recording, parent report of soiling & BMs.

Design. Pre-post multiple grps across diagnoses. 3 grps: 1: constipation; 2: constipation & encopresis; 3: encopresis. BF1, BF2, M2.

Measures. Parental recording of accidents, BMs, laxative use. EMG & manometry assessment of defecation dynamics (DD).

Treatment. 5 biofeedback sessions, 35 to 45 minutes using manometry & surface EMG electrodes. EAS strengthening. Correct paradoxical contraction.

Outcome. Across all groups, laxative use decreased from 68% to 24%. 16 (55%) cured. All groups: Normal DD increased from 45% to 90%, similar to controls. Normal DD pre-post: Grp 1: 60%–80%; Grp 2: 39%–92%; Grp 3: 46%–91%. Accidents per week pre-post: Grp 2: 8.1–0.9; Grp 3: 7.5–3. BMs per week pre-post: Grp 1: 2.6–5.6, Grp 2: 1.1–5.5.

Follow-up. 12 mos: results maintained. Accidents per week: Grp 2 = 0.4, Grp 3 = 0.4. BMs per week: Grp 1 = 4, Grp 2 = 5.1, Grp 3 = 10.4.


Subjects. n = 26. Grp 1: Biofeedback grp: 9 males, 4 females, mean age = 7.5 yrs, standard medical treatment failed. Grp 2: 9 males, 4 females, mean age = 7.1 yrs, standard medical treatment successful. All had experienced constipation since toilet training.

Dx Criteria. Constipation: 1 no organic dis. 2 Paradoxical contraction of EAS.

Baseline. Parental recall of laxative use, soiling, & painful BM. No pretreatment data on Grp 2.

Design. Between groups; groups matched on age & sex. Group 1: M1, M2, M3, M4, BF1, BF2, BF4, B4. Group 2: M1, M2, M3, M4.

Measures. Biofeedback grp: parents were given pre-treatment & follow-up questionnaires to rate symptoms & improvement. SMC group: Follow-up questionnaire only.


Outcome. Actual improvement in # of soils & appropriate BMs cannot be determined based on data provided. Posttreatment data are only reported for biofeedback measures. Reduction in paradoxical contraction of EAS demonstrated.

Follow-up. At 16 months: Rating of elimination of soiling: Grp 1: 79% reported complete elimination. Grp 2: 49% reported complete elimination. Rating of elimination of constipation: Grp 1: 75% complete elimination. Grp 2: 47% complete elimination.


Subjects. n = 87, ages 6–15 yrs.
Dx Criteria. Encopresis for at least 1 year; no MR, neuromuscular or gastrointestinal dysfunctions. Physician referred; failure of other therapies.

Baseline. 14 days. Toilet behavior recorded by parent on voice mail.

Design. Between groups. Group 1: M1, M2, M3, M4. Group 2: M1, M2, M3, M4, B1, B4. Group 3: M1, M2, M3, M4, B1, B4, BF1, BF2, BF4.

Measures. Number of soiling per day recorded on voice mail.

Treatment. Grp 1: Initial cleanout, laxative maintenance, stool softener administered to get 1 soft stool. If 2 days of no BM, then enema or suppository + fluids & fiber. Grp 2: Laxative treatment, sitting schedule, education, +R. Therapist described proper defecation techniques, toilet sitting for 12 minutes after meals. Grp 3: Biofeedback: LAX & ETT, surface EMG biofeedback for correction of paradoxical contraction of EAS, parental prompting & reminders, contraction & relaxation of EAS though never trained with biofeedback.

Outcome. From baseline to 3 mos: Average % change: Grp 1: 21.2%, Grp 2: 76.2%, Grp 3: 65.6%. % with sign. change deemed successful: Grp 1: 45%, Grp 2: 85%, Grp 3: 61%.

Follow-up. None reported.

Cox, D. J., Sutphen, J., Ling, W., Quillian, W., & Borowitz, S. (1996)

Subjects. n = 44, ages 6–15 yrs. Random assignment to grps.

Dx Criteria. Encopresis for at least 1 year; no MR, neuromuscular or gastrointestinal dysfunctions. Physician referred; failure of other therapies.

Baseline. 14 days. Toilet behavior recorded by parent on voice mail.

Design. Between groups. Group 1: M1, M2, M3, M4. Group 2: M1, M2, M3, M4, B1, B4. Group 3: M1, M2, M3, M4, BF1, BF2, BF4, B1, B4.

Measures. Number of soiling per day recorded on voice mail.

Treatment. Grp 1: Initial cleanout, laxative maintenance, stool softener administered to get 1 soft stool. If 2 days of no BM, then enema or suppository + fluids & fiber. Grp 2: Laxative treatment, sitting schedule, education, +R. Therapist described proper defecation techniques, toilet sitting for 12 minutes after meals. Grp 3: Biofeedback: LAX & ETT, surface EMG biofeedback for correction of paradoxical contraction of EAS, parental prompting & reminders, contraction & relaxation of EAS though never trained with biofeedback.

Outcome. Reduction in soiling from baseline to 3 mos: ETT & BF were equivalent & more effective than LAX. Unable to determine % cured by group based on data provided. Grp 1: 19% significantly improved. Grp 2: 71% significantly improved. Grp 3: 69% significantly improved.

Follow-up. None reported.


Subjects. n = 3 males ages 6–11, 8–3, 7–4.

Dx Criteria. DSM-III-R criteria for functional encopresis & all had constipation. 1 primary encopresis, 2 secondary encopresis.

Baseline. 6, 10, & 14 weeks.

Design. Multiple baseline across subjects. M2, M4, B1, B2, B3, B4, B5.

Measures. Parent record of soiling, appropriate toileting, & food intake.

Treatment. Pants checks, dietary modification (increase fiber & water) through a point contingency (praise); sitting schedule with limited contingent use of suppositories; manipulation check, compliance check of high fiber. Also included stimulus control (gastro-colic reflex).

Outcome. All attained 4 consecutive accident-free weeks; only one required limited use of suppositories.

Follow-up. 3, 6, 12 months, effects maintained.

Houts, A. C., & Peterson, J. K. (1986)

Subjects. n = 1 male, age 7 yrs, primary retentive encopresis; previous tmt with laxatives & suppositories unsuccessful.

Dx Criteria. No organicity

Baseline. 4 weeks.

Measures. Parents kept daily record of soiling, continent BMs, & food intake.

Treatment. Length of tmt = 11 weeks. Sitting schedule; +R for continent BMs & clean pants. B = contingency management: +R for continent BM & soil-free day, cleanliness training; C = diet & stimulus control: points for fiber, water, & loss of points for refined sugar & dairy; sitting schedule.

Outcome. Baseline = 13 soilings per week; 0 BMs in toilet. B phase: 11 soilings per week; 1 continent BM in 4 weeks; C phase: 6 soilings per week; 10 continent BMs across 4 weeks; prior to diet mod, fiber avg = 10.29 & was up to 131.50 during diet mod. BC phase: 0 soilings with continued increase in continent BMs.

Follow-up. At 1 & 3 months effects maintained.

**Levine, M., & Bakow, H. (1976)**

Subjects. n = 17, mean age = 8 yrs 2 mos (SD = 2 yrs 2 mos), 87% males, 13% females, 39% primary encopresis.

Dx Criteria. Over age four; regularly soiled.

Baseline. No baseline recording, parent report of soiling.


Treatment. Information session, initial cleanout, laxative maintenance, sitting schedule, +R for sitting. Monitoring & support: Physician available for a.m. phone calls. Children seen 3 weeks after initial cleanout & every 4–8 weeks after that for physical exam & discussion of progress.

Outcome. One year outcome data: 56 (51%) remission, 30 (27%) marked improvement, 15 (14%) some improvement, 9 (8%) unchanged. 17 unavailable for follow-up.

Follow-up. None reported.

**Loening-Baucke, V. A. (1989)**

Subjects. Treatment: n = 97, 69 males, 28 females, ages 5–14.5 yrs, mean age = 9 yrs. Normals: n = 16, 11 males, 5 females, ages 6.5–12.8 yrs, mean age = 10.3 yrs.

Dx Criteria. Chronic constipation with overflow incontinence.

Baseline. Parent recall of soiling, BM, & laxative use.


Measures. Children asked to defecate 30, 50, & 100 ml balloon. EMG surface electrodes & anorectal manometry performed simultaneously to evaluate EAS & IAS pressure change. Parent report of soiling, continent BM, & laxative use.

Treatment. Laxatives used to induce 1 to 2 BMs per day, high fiber diet, sitting schedules, positive reinforcement. Monthly visits for 12 mos, then every 3 mos.

Outcome. 43% recovered, 57% did not. Recovered children could defecate 30, 50, & 100 ml balloon significantly more frequently than nonrecovered. Recovered children were significantly less frequently able to relax EAS than controls but could do so sig more frequently than nonrecovered. Subjects with abnormal contractions had more often never been toilet trained.

Follow-up. None reported.
patients in the biofeedback group were able to learn to relax the EAS. At 7 months only one in Grp 1 recovered (5%) while 12 (55%) in Grp 2 were cured.

Follow-up. None reported.


Subjects. n = 43, ages 4–16 yrs, 74% male, 10% African American. Developmental delay or behavior problems in 17%. 14% enuretic.

Dx Criteria. Referral to division of digestive diseases with encopresis secondary to chronic constipation.

Baseline. No baseline recording, parent report of soiling & BMs.


Measures. Parent report of constipation & soiling.

Treatment. Habit Training: 1) Enema. 2) Sitting schedule 10 min after meal(s), 3) If no BM on 2 successive days, then enema. 4) +R (praise, small rewards if necessary) for continent BMs & clean pants. Soiling treated nonpunitively. 5) Stool softeners for few with hard stools. 4 visits over 21.4 weeks.

Outcome. 60% were continent, 23% staining only. Those still incontinent averaged 90% decrease in freq of incontinence. 26% dropped out after first visit. Those cured had shorter duration of encopresis.

Follow-up. Avg of 3 yrs. 51% cured, 10% staining only. Those still incontinent averaged 89% fewer soilings than pre tmt. 3 years: 74% reached for follow-up.


Subjects. n = 25, 23 males, 2 females. Grp 1 mean age = 8.4 yrs. Grp 2 mean age = 8.1 yrs.

Dx Criteria. DSM-IV diagnosis of functional encopresis & 2 mos or more of constipation, 2 or more soilings a day, duration of soiling for six mos or more.

Baseline. 1 week. Parent recorded dietary & bowel habits.

Design. Between groups randomly assigned; pre-test, post-test. Group 1: M1, M3, M4, B1, B3, B4. Group 2: M1, M2, B1, B5.

Measures. Parent record of dietary & bowel habits completed weekly.

Treatment. Treatment duration = 18 weeks. Grp 1: Dietary fiber increase with praise from parent & therapist. 10 min toilet sitting 15 min after breakfast. If no BM during toilet sitting: in 1st week, glycerin suppository; remainder of treatment, additional toilet sitting later in day. Grp 2: Mineral oil two times each day. +R consisted of star chart for each BM & weekly reward for 5 stars.

Outcome. Both groups had significant decreases in soiling & significant increases in appropriate BM. During the first 6 wks of treatment, Grp 2 had significantly more soilings & appropriate BMs than Grp 1, but for the remainder of treatment, the two groups did not differ. Success = 4 weeks with no soiling & regular BM during treatment. No differences between groups in number successful, time to reach success, dropouts, or relapse.

Follow-up. 6 mos: 58% of sample soil free.


Subjects. n = 29, ages 4–14 yrs. Grp 1 = 15, Grp 2 = 14.

Dx Criteria. Encopresis; paradoxical contraction of EAS, failure of previous treatment or laxative dependence, no known structural defect. Primary encopresis: Grp 1 = 9, Grp 2 = 12

Baseline. No baseline recording. Parent report of soiling & laxative or enema use.

Design. Between groups randomly assigned. Group 1: M1, M2. Group 2: M1, M2, BF2.

Measures. Parental report of soiling and daily diary record.

Treatment. Both groups: monthly telephone monitoring by research assistant. Grp 1: Enemas & laxative maintenance. Grp 2: Enemas & laxative maintenance; up to 4 sessions of BF in consecutive weeks, monthly meetings with pediatrician, manometry & surface EMG electrode.

Outcome. Weeks 9–24, BF group has higher rate of improvement. By week 24, the number of improved subjects converges. By week 26 4/14 BF group improved and 5/15 medical treatment group improved.
Follow-up. 6 mos: Laxative free remission: Grp 1 = 13%, Grp 2 = 14% Improvement: Grp 1 = 27%, Grp 2 = 14%.


*Subjects.* *n* = 169, ages 4–16 yrs. Grp 1 = 83, Grp 2 = 86.

*Dx Criteria.* Encopresis; stool on abdominal radiograph; no organic cause; no purgatives 2 wks before baseline; no hospitalizations for cleanout. Primary encopresis: Grp 1 = 44%, Grp 2 = 47%. Secondary encopresis: Grp 1 = 6%, Grp 2 = 53%.

*Baseline.* No baseline recording. Parent report of soiling, BMs & laxative use.


*Measures.* Parent record of program compliance, continent BM freq, adverse effects of laxatives.

*Treatment.* Both groups: education, +R (praise & star chart) for appropriate BM, daily cleanliness, toilet sitting after meal, diet advice. Grp 1: laxative therapy: 3 day cycles of Microlax enemas then Agarol to maintain daily BM. Clinic visits at 2, 6, 14, 30, & 52 weeks.

*Outcome.* Success = 4 weeks with no soiling. Success: 3 mos: Grp 1 = 39%. Grp 2 = 12%.


*Subjects.* *n* = 52, mean age = 7 yrs 5 mos, 95% Caucasian, 5% Hispanic. All failed previous medical treatment. Their parents also participated.

*Dx Criteria.* Chronic constipation by parent report & fecal impaction by medical exam.

*Baseline.* 2 weeks.

*Design.* Single group study. M1, M3, M4, B1, B4, B5.

*Measures.* Parent record of soiling, continent BMs, fiber intake.

*Treatment.* Six, 1-hr weekly group sessions. Parents & children’s groups were based on same content. Medical cleanout. +R for fiber & successful BMs, goals set for each. Fiber education. Taught relaxation to use during enemas.

*Outcome.* From baseline increased fiber intake of 40% overall. Not significant for younger children. From baseline, appropriate BMs increased 116% (p < .05); soiling decreased 83% (p < .05). 16/18 had no soiling at the end of treatment (89%). 2 required further individual & GI intervention.

**Follow-up.** At 6 mos, 14 children maintained mean levels of continent BMs & soiling. Unable to determine relapse from data provided.


*Subjects.* *n* = 46, referred by physicians.

*Dx Criteria.* Encopresis with or without constipation, no organic bowel disease or neurological problems.

*Baseline.* None reported.

*Design.* Between groups. Group 1: M1, M2, M3, M4, B1. Group 2: M1, M2, M3, M4, P1, P3, B1.
Treatment. Behavior recommendations by pediatrician: star chart for sitting, clean days, & eating bran; seen at 6 week intervals for 3 mos to 1 yr. If 4 visits with no chart, treatment discontinued. Psychotherapy by child psychiatrist: monthly sessions for 2 to 12 mos. Each visit: mother for 15 minutes; child for 15–30 minutes play therapy mother & child. Both groups: constipation managed by inpatient clean-out with laxative maintenance.

Outcome. Results between groups did not differ. 16 (35%) nonresponders, 8 (17%) improved, 22 (48%) cured in average of 8 mos.

Follow-up. None reported.


Subjects. n = 192, ages 5–16 yrs. 94 in Grp 1, 98 in Grp 2.

Dx Criteria. Pediatric constipation; at least 5 yrs old; previously one month of unsuccessful laxative tmt; no pathological causes of constipation, <3 BM/week, >2 soils/week.

Baseline. No baseline recording, parent report of soiling & continent BMs.

Design. Between groups, random assignment. Group 1: M1, M2, M3, M4. Group 2: M1, M2, M3, M4, BF2.

Measures. Diary of soiling & continent BMs.

Treatment. 6 week intervention. Grp 1: Five 30 min visits: cleanout enema with laxative maintenance, high fiber diet, sitting schedule after meals, diary of bowel habits. Grp 2: same as Grp 1 + five biofeedback training sessions; manometric focusing on correction of paradoxical contraction. Success = laxative-free defecation & less than 2 soiling episodes per month.

Outcome. Normal defecation dynamics increased from 41% to 52% (p = .06) in Grp 1 & from 38% to 86% (p = .001) in Grp 2. more children in Grp 2 achieved normal defecation dynamics (p < .001). No significant differences between the grps. Cure rates: Grp 1 6 weeks: 33%; 6 mos: 52%. Grp 2 6 weeks: 32%; 6 mos: 47%.

Follow-up. 1 yr: Grp 1 = 59%, Grp 2 = 50%. (p = .24). 1½ yrs: Results same. No relationship between normal defecation dynamics & success.


Subjects. n = 50, 40 males, 10 females ages 6–15 yrs. 47 had a history of chronic constipation. mean age: Grp 1 = 8.4 yrs, Grp 2 = 8.3 yrs.

Dx Criteria. Encopresis, no constipation (stool freq ≥ 3/week, no large stool passage, no abdominal or rectal mass), at least 5 yrs, no organicity, no MR. Primary encopresis: Grp 1 = 41%, Grp 2 = 42%. Special Education: Grp 1 = 38%, Grp 2 = 32%.

Baseline. Parent report of soiling, continent BMs, pain.

Design. Between groups pre-post randomized design. Group 1: M1, M2, M3, M4. Group 2: M1, M2, M3, M4, BF2.

Measures. Diary of soiling & continent BMs.

Treatment. 6 week intervention. Grp 1: Five 30 min visits: cleanout enema with laxative maintenance, high fiber diet, sitting schedule after meals, diary of bowel habits. Grp 2: same as Grp 1 + five biofeedback training sessions; manometric focusing on correction of paradoxical contraction. Success = laxative-free defecation & less than 2 soiling episodes per month.

Outcome. Results between groups did not differ. 16 (35%) nonresponders, 8 (17%) improved, 22 (48%) cured in average of 8 mos.

Follow-up. None reported.
**Measures.** Parental record of soiling, continent BMs.

**Treatment.** Grp 1: Sitting schedule, star for acc. free days, mineral oil following initial enema cleanout. Grp 2: Biofeedback-manometric equipment focused on correcting abnormal defecation dynamics. Four 30-min sessions.

**Outcome.** Abnormal defecation dynamics in 36% of the children. Typical med management better if no abnormal def. dynamics (Bio = 40%, MM = 71%).

**Follow-up.** If child had abnormal defecation dynamics, bio was better at 6 mos (67% vs. 44% improved) & at 12 mos (67% vs. 33% improved).

**Young, G. C. (1973)**

**Subjects.** $n = 24$, ages 4–12 yrs, 20 males, 4 females, 14 primary encopresis.

**Dx Criteria.** Retentive encopresis.

**Baseline.** No baseline recording, parent report of soiling.

**Design.** Single group, pretest, posttest. M1, M2, M4, B1.

**Measures.** Parent report of soiling.

**Treatment.** Cleanout & laxative maintenance. Warm food or drink upon awakening followed 20–30 minutes later by toilet sitting for 10 minutes, +R (approval) for BM.

**Outcome.** Success = 28 consecutive clean days, absence of feces in rectum, closing of IAS. 92% cured. 19 within 12 mos (mean 5.4, range 2–11), 3 in more than 12 mos (mean 17.3), 2 failures.

**Follow-up.** 29 mos: 4 (18%) relapsed.

### Appendix II

**Studies Without An Exact Match or That Did Not Meet Criteria for an Efficacy Category**

**Ashkenazi, Z. (1975)**

**Subjects.** $n = 18$, ages 3–12 yrs. Gender: NR Grp 1 reaction to toilet. Grp 2 unable to detect urge.

**Dx Criteria.** Over 2½ yrs; problem duration 3 mos to 7 yrs, mean = 8.5 mos. Primary & secondary encopresis.

**Baseline.** No baseline recording, parent report of soiling & BMs.

**Design.** 2 nonequivalent groups, pre-post tests. B1, B3, M2.

**Measures.** Parent record of BM & soiling.

**Treatment.** Grp 1: Systematic desensitization. Both groups: Glycerin suppositories after meals; praise & small reward for continent BM & no soiling. Number of sessions varied 3–9 weeks. Mean # of weeks to success = 4.56. # of sessions not reported. Grp 1 = 4.29 weeks. Grp 2 = 4.78 weeks.

**Outcome.** Encopresis was eliminated in 16 subjects within 2 mos, (3–9 weeks) 2 oldest boys (11 & 12) unsuccessful. Overall 89% success rate. Grp 1 = 100%, Grp 2 = 81.81%.

**Follow-up.** 6 mos (25.8 weeks) 0% relapse.


**Subjects.** 40 completed the study. Mean age = 7.9 yrs. Gender: NR

**Dx Criteria.** Diagnosis by a pediatrician of uncomplicated encopresis.

**Baseline.** 2 weeks baseline diary of soils & BMs.


**Measures.** Pre-post parent rating of severity of soiling, use of the toilet, frequency of continent BMs.

**Treatment.** Behavior therapy every 2 weeks for 3 months. +R of BM & clean pants & a sitting schedule. Grp 1 received Senokot. Grp 2 received placebo. Grp 3 received no medication.

**Outcome.** Significant decrease in severity of soiling among all three groups. 40% cured across all groups. No significant group differences. Grp 1: 35% (5/14), Grp 2: 18% (2/11), Grp 3: 60% (9/15).

**Follow-up.** Re-tmt of failures after 3 mos. with Senokot & behavioral treatment. Grp 1: no change in # cured at 6 or 12 mos. Grp 2: 6 mos. 3 more children
cured & 12 mos. 1 more. Grp 3: # cured decreased at 6 and 12 mos. (7, 6 resp.).


**Subjects.** n = 1 male, age 10 yrs.

**Dx Criteria.** Secondary retentive encopresis since age 5.

**Baseline.** 3 weeks

**Design.** ABAB reversal design. M2, B1.

**Measures.** Parental recording of soiling & continent BMs.


**Outcome.** Cured.

**Follow-up.** 1 yr no relapse.


**Subjects.** n = 1 Caucasian male, age 9 yrs. Diagnosed with anxiety & conditioned aversion to toilet.

**Dx Criteria.** No apparent concomitant medical intervention. Secondary encopresis.

**Baseline.** 3 weeks.

**Design.** n = 1, ABAB reversal design. M4, paradoxical instruction.

**Measures.** Parent recording of soiling & continent BMs.

**Treatment.** Paradoxical instruction I: 3 weeks sitting schedule only, do not have BM on toilet. Baseline 2 for 2 weeks. Paradoxical instruction II: 8 weeks, sitting with paradoxical instruction. Fading began in 4th week.

**Outcome.** No soiling during 1st week of tmt.

**Follow-up.** Effects maintained at 1 yr.


**Subjects.** n = 6, 2 females (3 yrs 8 mos & 4 yrs 6 mos), 4 males (5 yrs 7 mos to 12 yrs 3 mos), 2 primary encopresis, retentive; 2 primary encopresis, nonretentive; 1 secondary encopresis, retentive; 1 unclassified, retentive encopresis.

**Dx Criteria.** Complete physical exams. No organicity.

**Baseline.** 1–2 office visits followed by phone contact, unspecified length.

**Design.** Single group, pre-test, post-test. M2, M3, M4, B1, B2, B3, B4, B5.

**Measures.** Parental recording of soiling, continent BM, enema & suppository use.

**Treatment.** Clean pants check, /H11001 R for proper sitting, toileting (praise & time with parents) & clean pants (praise), cleanliness training, wiping training. Paired suppository use with sitting & breakfast if unable to defecate on own.

**Outcome.** 3 (50%) were cured & had 10 weeks of no soiling. 3 were still in tmt.

**Follow-up.** Varied per client. (2, 7, 12 mos) no relapse.

**Crowley, C. P., & Armstrong, P. M. (1977)**

**Subjects.** n = 3 males, ages: 5, 7, 12 yrs, bladder trained by age 3.

**Dx Criteria.** Unclear. Subjects were referrals to mental health clinic.

**Baseline.** 1 week.


**Measures.** Self-report of soiling & continent BMs confirmed by parents.

**Treatment.** Overcorrection, positive practice, & behavior rehearsal. Sitting schedule with praise. Skills building = explanation of contracting & relaxing EAS, rehearsal & role play in session. Negative R & +R.

**Outcome.** All cured within 9 weeks.

**Follow-up.** Variable follow-up points (2, 3, & 6 mos) indicated 0% relapse for all 3 subjects. At 18 mos. all were having no accidents.


**Subjects.** n = 3 males, ages 4 yrs 8 mos, 9 yrs, 8 yrs 8 mos. All of average or better IQ.

**Dx Criteria.** Organicity ruled out by medical exam. 2 subjects had nocturnal enuresis. 1 primary, 2 secondary.
Baseline. Variable across subjects.

Design. Multiple baseline across subjects. M4, B1, B2, B5.

Measures. Parental recording of pants checks & observation of proper toileting.

Treatment. Periodic pantchecks &/or toileting. Over-correction, full cleanliness training contingent upon soiling, +R for appropriate toileting behavior.

Outcome. 8 weeks of treatment all 3 not soiling for 4–8 consecutive weeks.

Follow-up. At 48 weeks subject 1 had 2 accidents. Subjects 2 & 3 maintained continence at 12 & 36 weeks, respectively.

Edelman, R. I. (1971)

Subjects. n = 1 female, age 12 yrs.

Dx Criteria. Primary encopresis.

Baseline. 16 weeks.


Measures. Patient recording of soiling with reliability check by mother via pants check.

Treatment. Punishment for soiling (30 min time out) 10 weeks; then punishment plus −R (no washing dishes) 14 weeks for absence of soiling 25 weeks.

Outcome. 6.31 soiling freq per week dropped to .93.

Follow-up. 3 months no more soiling.

Fireman, G., & Koplewicz, H. S. (1992)

Subjects. n = 52, ages 3–17 yrs. 49 males, mean age = 7.6 yrs. 3 females mean age = 10.3 yrs. 41 completed the study. All had primary encopresis. 30% nocturnal enuresis. 15% diurnal enuresis.

Dx Criteria. Inappropriate functional primary encopresis with no organic cause (soiling at least once a week). 44 constipated; 13 impacted. All but 4 had previous medical treatment.

Baseline. 2 weeks.


Measures. Parental & patient recording of toileting & soiling behavior.

Treatment. 1 visit with pediatric gastroenterologist. 1 visit with psychiatrist. 3 sessions with behavior therapist followed by weekly phone contact. Standardized protocol for behavior therapy focusing on nutrition, sitting schedule, clean soiled clothes & punishment for soiling. Laxatives or supp if unable to defecate. Mean time to no soiling = 28 days. Total treatment time 108.8 days. 2 cases family therapy. 3 cases other psychotherapy.

Outcome. 84.6% 0 accidents over 2 weeks.

Follow-up. At 1 year 14 of 15 telephoned cured.

Knell, S. M., & Moore, D. J. (1990)

Subjects. n = 1 male, 5 yrs 3 mos, primary functional nonretentive encopresis. Avg IQ. Developmental language disorders.

Dx Criteria. No organicity. No history of constipation.

Baseline. 12 days. Pants checks by parents 4 times daily.

Design. AB single case design. M2, P1, B1, B2, B4.

Measures. Parent record of soiling from pants checks.

Treatment. Weekly cog-beh play therapy. Parent training in beh management: +R (stickers) for clean pants & appropriate toilet use, sitting schedule, clean his own pants after soiling. −R paradigm at week 8 enema if no BM in toilet & +R verbal & small toys.

Outcome. Baseline child soiled 77% of the time. No soiling found after 14th session. After 12th session child toileted regularly on his own for BMs.

Follow-up. At 8 & 45 mos, continence maintained.


Subjects. n = 38, 28 males, 10 females, ages 6–15 yrs, mean age = 9.4 yrs. Control group: n = 16, 11 males & 5 females, ages 6.5–12.8 yrs, mean age = 10.3 yrs.

Dx Criteria. Abnormal defecation dynamics & persistent chronic constipation & encopresis; failure to respond to laxative treatment. No other medical diagnosis. ≥ 1 soiling episode per week. Evidence of fecal impaction.

Baseline. No baseline recording, parent report of soiling & continent BMs.

Design. Single group pre-test, post-test.

M2, M3, M4, BF2.
Measures. Parent report of soiling & BMs.

Treatment. Education, laxatives, sitting schedule, increase fiber, manometry, & surface EMG to correct paradoxical contraction.

Outcome. Cure rate of 37%. 76% learned relaxation of the EAS during defecation. Nine (24%) subjects were unable to learn to relax the EAS in 6 sessions & 0 were cured. Of the 29 who learned EAS relaxation, 14 recovered (48% of those successful at learning biofeedback). The 15 who were not cured evidenced lower levels of rectal responsiveness to distension than those cured.

Follow-up. None reported.


Subjects. n = 1 male, age 8 yrs, MMR, encopresis since age 4 at start of early childhood handicapped program.

Dx Criteria. No organicity.

Baseline. 10 school days fecal odor used to measure soiling. Teacher & aide recorded times, places, & situations of the soiling.


Outcome. Soiled 8/10 days during baseline, 1/11 days during phase I, & 1/9 days during phase II. Completely continent during phase III.

Follow-up. Continence maintained at 5 months.


Subjects. n = 4 males; ages: 4–5 yrs, 3 primary diurnal encopresis & one primary diurnal & nocturnal encopresis.

Dx Criteria. Physical exam with primary encopresis diagnosis.

Baseline. 5–10 days.

Design. Multiple-baseline across subjects ABC. M1, M2, M3, M4, B1, B2, B4, B5.

Measures. Parent record of continent BMs, soiling, independent toiletings, & cathartic use. Questionnaire to assess parent understanding of tmt.

Treatment. Replications of Christophersen & Rainey (1977); Treatment B: Bowel cleanout. Suppository if no BM. Sitting schedule. Pants checks. Simple correction. +R for BM. Wiping training. Treatment C: Punishment for acc. Correction 10 pos prac trials. 5 min. time out. 6 hourly toilet sits. (For 2 boys who continued soiling.)

Outcome. Cured in 8–39 weeks, 2 boys responded to Treatment B in 8 & 11 weeks. 2 boys required Treatment C & responded in 32 and 39 weeks.

Follow-up. At least 7 months later, 3 boys maintained treatment levels.


Subjects. n = 50, 10 imperforate anus, ages 4–18 yrs, 40 chronic constipation & soiling, ages 4–15 yrs, problem duration 3–15 yrs, previous treatments had failed.

Dx Criteria. Imperforate anus or functional constipation.

Baseline. No baseline recording, parent report of soiling & BMs.


Treatment. Education; manometric biofeedback for strengthening EAS; practice contracting EAS on toilet at home 10–15 min/day; high fiber, no milk diet; no purgatives; sitting schedule, 2–5 biofeedback sessions.

Outcome. Imperforate anus: 6 (60%) cured; 1 (10%) regular BM, minor soiling. Functional constipation: 24 (60%) cured; 14 (35%) regular BM, minor soiling.

Follow-up. None reported.

Propp, L. (1985)

Subjects. n = 2 males, ages 8 yrs & 6 yrs, Caucasians, referred to community mental health clinic for primary encopresis & enuresis.

Dx Criteria. Primary encopresis with no organicity.

Baseline. Parent recall of soiling.
Design. AB multiple baseline design. P4, B1, B4.

Measures. Patient record of number of accidents per week; number of continent BMs per week.

Treatment. During the charting, the boys were instructed not to change anything, simply to record the data. +R (praise & encouragement) for the boys’ participation & for completing charts.

Outcome. Subject 1 completed treatment in 11 weeks & subject 2 in 3 weeks.

Follow-up. Treatment levels were maintained at 6 months.


Subjects. n = 1 female, age 12 yrs, problem duration 5 yrs, BM 1/wk, soiled every night.

Dx Criteria. Secondary retentive encopresis.

Baseline. 6 days.

Design. Multiple baseline & tmt reversal. ABCADAD. B1, B2, B3, B4, M4.

Measures. Mother inspected underwear 10 times daily recording cleanliness & soiling. Mother checked each time child reported BM.

Treatment. B: DRO alone: 4 days—Awarded chocolate & a coupon for clean underwear. C: DRO overcorrection: 4 days. D: +R I: 5 days—toilet sitting for increasing lengths of time over the day until BM, then no more sitting that day.

Outcome. No soiling during D & 1 BM daily from day 4 of D. Soiling increased during reversals. Tmt D had immediate impact with no soils overall but 1 day once implemented.

Follow-up. Days 60, 75, 90, 95: No more toilet sitting needed from 60th session. Continent BMs. Effects maintained at 14 mos.

Scott, E. A. (1977)

Subjects. n = 1 male, age 8 yrs, severely deprived, MMR.

Dx Criteria. Medical exam. No organicity.

Baseline. 3 weeks.

Design. ABCD. M4, B1, B2.

Measures. Teacher record of soiling & continent BMs.


Outcome. Frequency of soiling dramatically decreased in tmt C & was maintained through tmt D. (From mean of 11 soils per week to .83 per week).

Follow-up. None.


Subjects. n = 54.

Dx Criteria. Mixed group of constipation & incontinence without constipation.

Baseline. Parent recall.


Measures. 6 week bowel diary following phase 1 intervention.

Treatment. Phase 1: Education, diet & toilet advice, referring physician's management, & bowel diary. Phase 2: Manometric biofeedback training.

Outcome. Cure defined as 3 BM or more/week; soiling <2/month; no laxatives. Phase 1: 8(15%) improved after 6 weeks. Phase 2: 6(13%) improved after 6 weeks.

Follow-up. 1 year (n = 53) Phase 1: 3 of 8 (9.4%) relapsed. Phase 2: 22 successfully treated; 49% cure rate; 47% cure for constipation; 55% cure for incontinence without constipation.


Subjects. n = 34.

Baseline. No baseline recording.


Measures. Parent report.

Treatment. Laxative maintenance, sitting schedule, +R, high fiber diet, clinic visits 2–3 times a week (tapered with progress), abdominal massage (parents trained to massage between visits), yoga exercises, hydrotherapy relaxation, play therapy for under 5 yrs.

Outcome. 24 (70.58%) cured.

Treatment. Fleet enema on first day. Morning routine: Child sits, then if no BM, glycerin suppository followed by breakfast. After breakfast if no BM, then Fleet enema. +R for continent BM & for clean days; punishment for soiling.

Outcome. Avg time to 10 soil-free weeks = 16.93 weeks with a range of 10 to 38 weeks. 100% cured.

Follow-up. Only 1 client relapsed to soiling at 6 mos. 93% cured.


Subjects. n = 76, ages 6–12 yrs, mean age = 8.97 yrs; Caucasian, all from same geographic area; mean SES = 4.4 of 7. Encopretic group: 38, 25 males, 13 females. Nonclinical comparison group matched for age, gender, SES, & academic performance.

Dx Criteria. Diagnosis of functional encopresis by physician in the PDGI clinic.

Baseline. No baseline recording, parent report of soiling & BMs.


Treatment. 2 to 8 biweekly sessions (mean = 4) of manometric biofeedback. Focus on sensory awareness, EAS contraction, & correction of paradoxical contraction, sitting schedule, home practice of biofeedback, enema if no BM in 2 days, +R for soil-free days.

Outcome. 15 cases recovered by 2 months. 1 dropped out after 1st session. 79% cured.

Follow-up. 13 maintained their gains of daily stools & no soiling at one year. 2 required 2 booster sessions at 6 mos.

Wright, L. (1975)

Subjects. n = 14 12 males, 2 females, ages 3–9 yrs, mean age = 6.3 yrs; all patients in pediatric outpatient clinic; 3 primary encopresis, 3 secondary encopresis.

Dx Criteria. Nonorganicity assured by physician.

Baseline. No baseline recording reported, 1 week parental recall of soiling.

Design. Pre-post single group study. M1, M2, M4, B1, B2, B3.

References


