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During Toilet Training, Constipation Occurs Before Stool Toileting Refusal

Nathan J. Blum, MD*; Bruce Taubman, MD‡; and Nicole Nemeth, MD§

ABSTRACT. *Background.* Previous studies demonstrated that constipation and painful defecation are associated with stool toileting refusal (STR), but whether they are the result of STR or occur before this behavior is not known.

Objective. To determine whether constipation and painful defecation occur as a result of STR or occur before STR.

Methods. Three hundred eighty children between 17 and 19 months of age participated in a prospective longitudinal study of toilet training. Children were monitored with telephone interviews every 2 to 3 months until the completion of daytime toilet training. Information obtained in follow-up interviews included parents' reports on the presence and frequency of hard bowel movements, painful defecation, and child toilet training behaviors. Children were defined as completing daytime toilet training when they were experiencing <4 urine accidents per week and ≤ 2 episodes of fecal soiling per month. Children were defined as having frequent hard bowel movements if the parents reported a hard bowel movement approximately once per week in ≥ 2 follow-up telephone interviews or more than once per week in 1 follow-up telephone interview.

Results. The mean age at the completion of daytime toilet training was 36.8 ± 6.1 months (range: 22–54 months). Ninety-three children (24.4%) developed STR. Parents of children who developed STR, in comparison with the rest of the sample, were more likely to report that the child had experienced hard bowel movements (67.7% vs 50.9%), frequent hard bowel movements (29.0% vs 14.3%), and painful defecation (41.9% vs 27.9%). Of the children who experienced both STR and hard bowel movements, 93.4% demonstrated constipation before the onset of STR. In that group, parents reported hard bowel movements at almost one-half of all follow-up telephone interviews before the onset of STR. Of the children who experienced both STR and painful defecation, 74.4% experienced the first episode of painful defecation before the onset of STR. Children with frequent hard bowel movements demonstrated a longer duration of STR (9.0 ± 6.5 vs 4.8 ± 3.0 months).

Conclusions. When hard bowel movements or painful defecation is associated with STR, the first episode of constipation usually occurs before the STR. The fact that hard bowel movements frequently occur before the onset

of STR suggests that for many of these children constipation is a chronic problem that is not being treated effectively. Therefore, hard bowel movements and painful defecation are factors that potentially contribute to the STR and for the majority of children are not caused solely by the STR behavior. Additional studies are needed to determine whether earlier and more effective treatment of constipation could decrease the incidence of STR. *Pediatrics* 2004;113:e520–e522. URL: <http://www.pediatrics.org/cgi/content/full/113/6/e520>; *toilet training, constipation, stool toileting refusal*.

ABBREVIATIONS. STR, stool toileting refusal.

Previous studies documented associations between a variety of toilet training problems and constipation. For example, Schonwald et al¹ noted that constipation occurred for 82% of children who were difficult to toilet train but only 53% of a comparison group. Constipation was reported to occur for 54% of children with stool toileting refusal (STR), compared with 7% of a toilet-trained group.² Constipation during toilet training was reported for 30% of individuals with primary encopresis, compared with only 19% of those with secondary encopresis,³ and painful defecation before 3 years of age was reported for more than one-half of children with encopresis.⁴ When considered together, these studies suggest a strong association between constipation and toilet training difficulties. However, all of those studies were cross-sectional and retrospective. Therefore, they are subject to potential recall bias, and the direction of the association cannot be determined. The association could be interpreted as indicating that children with constipation are more likely to develop toilet training problems or that children with toilet training problems are more likely to develop constipation. To better understand the relationship between constipation and STR, we prospectively evaluated whether hard bowel movements and painful defecation are most likely to occur before the onset of STR or after the onset of STR.

METHODS

Sample

The sample and design of this study were described previously.^{5,6} Briefly, families of 408 consecutive 17- to 19-month-old children from the private pediatric practice of one of us (B.T.) were asked to participate in a study designed to investigate factors related to toilet training. Parents of 406 children gave written informed consent to participate in the study. Children with global developmental delays or structural abnormalities of the spinal cord, genitourinary tract, or gastrointestinal tract were excluded.

From the *Division of Child Development and Rehabilitation and ‡Division of Gastroenterology, Children's Hospital of Philadelphia, University of Pennsylvania, School of Medicine, Philadelphia, Pennsylvania; and §Pediatric Physicians of Burlington County, Lumberton, New Jersey.

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Address correspondence to Nathan J. Blum, MD, Children's Seashore House of Children's Hospital of Philadelphia, 3405 Civic Center Blvd, Philadelphia, PA 19104. E-mail: blum@email.chop.edu
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Three hundred eighty children (93.6%) were monitored until they developed STR or completed daytime toilet training. Twenty-five families were lost to follow-up monitoring or ceased participation in the study before either of these end points was reached, and 2 families were lost to follow-up monitoring after the development of STR but before the completion of daytime toilet training. One child was removed from the study because of global developmental delays that were not apparent at the time of enrollment. The pediatric practice is in the suburbs of a major metropolitan area and serves predominately middle- and upper middle-class families. More than 90% of the families are white, and the mean \pm SD Hollingshead score⁷ was 52.4 ± 10.8 , which is near the top of social strata IV of the 5-category index. The study was approved by the institutional review board of the Children's Hospital of Philadelphia.

Study Design

The investigation was designed to study an intervention to prevent STR. The intervention involved providing to parents an instructional sheet that recommended increased praise for defecation and not referring to stool in negative terms (eg, stinky). The intervention was described in more detail previously⁶ and was not successful in decreasing the incidence of STR. Because there was no difference in the incidences of STR between the group that received the intervention and the group that did not, only data from the whole sample are reported here. Demographic data were obtained at enrollment. Follow-up telephone interviews were conducted every 2 to 3 months until the parents reported at 2 consecutive interviews that the child had completed daytime toilet training.

Information obtained in follow-up interviews included the following: whether the child was urinating on the toilet or potty almost always, sometimes, or never and, if almost always, how many accidents per week the child had; and whether the child was having bowel movements on the toilet or potty almost always, sometimes, or never and, if almost always, how many accidents the child had had in the past month. Separate questions were asked about hard bowel movements and painful bowel movements; parents were asked whether these occurred never, once or twice, about once per week, or more than once per week since the last interview.

We categorized children's hard bowel movements in the following ways. Children whose parents never reported a hard bowel movement in any follow-up telephone call were categorized as never having hard bowel movements. Children whose parents reported a hard bowel movement in at least 1 follow-up telephone call were categorized as ever having hard bowel movements. Children whose parents reported hard bowel movements about once per week in ≥ 2 telephone calls or more than once per week in at least 1 call were categorized as frequently having hard bowel movements. We recorded whether the first episode of hard bowel movements occurred before STR, at the same time as STR, or after STR. To obtain an estimate of the chronicity of the problem before STR, we also recorded the percentage of telephone calls in which hard bowel movements were reported before STR. Painful bowel movements were coded as occurring ever or never.

Daytime toilet training was scored as completed when parents reported that their child was wearing underwear during the day and urinating and defecating in the toilet or potty with < 4 urine accidents per week and ≤ 2 episodes of fecal soiling per month. STR was scored as occurring when a child refused to defecate in the toilet or potty for > 1 month after meeting the criteria for daytime toilet training for urine.

Statistical Analyses

Statistical analyses were performed with the Statistical Package for the Social Sciences (version 9.0; SPSS, Chicago, IL). Means for continuous variables were compared by using the *t* test for independent variables. Dichotomous variables were compared between late toilet trainers and the rest of the sample by using the χ^2 statistic.

RESULTS

The mean age at the completion of toilet training in this sample was 36.8 ± 6.1 months (range: 22–54 months), and 24.4% of the sample met our criteria for

STR. Children with STR demonstrated increased incidences of ever having hard bowel movements, frequently having hard bowel movements, and having painful bowel movements, compared with children who did not develop STR (Table 1).

We examined when in the toilet training process constipation occurred among the children who developed STR (Table 2). We found that $> 90\%$ of the children had their first hard bowel movements before developing STR, and $> 70\%$ had painful bowel movements before developing STR.

We were interested in determining whether these were single episodes of hard bowel movements or represented a more persistent problem with constipation. In most cases of children with hard bowel movements and STR, the parents reported hard bowel movements in multiple follow-up telephone calls before the child developed STR. In this group, parents reported hard bowel movements in 48.5% of the follow-up telephone calls, on average, before the onset of STR. Forty percent of the parents reported hard bowel movements occurring at least once per week during a period before the development of STR. In addition, children who had frequent hard bowel movements before the onset of STR demonstrated a much longer duration of STR (Table 3).

DISCUSSION

This study confirms previous studies that indicated a strong association between constipation and STR. It extends those findings by demonstrating that, in most cases, hard bowel movements and, to a lesser extent, painful bowel movements occur before the onset of STR and thus are unlikely to be caused primarily by the STR behavior. Moreover, the constipation was reported at multiple interviews in many cases, suggesting that it was untreated or undertreated. This finding is consistent with the report that constipation among young children is often present for months before treatment is initiated.⁸

The fact that hard bowel movements occur before STR and are associated with a longer duration of STR suggests that earlier and more effective treatment of constipation may be a potential treatment option for decreasing the incidence and/or duration of STR. Previous research demonstrated that STR and constipation are predictors of late toilet training (after 42 months of age).⁹ If more effective treatment of constipation decreases the incidence of STR, then it also may decrease the incidence of late toilet training. Clearly, other family and social factors may also influence the age at the completion of toilet train-

TABLE 1. Incidence of Hard Bowel Movements and Painful Defecation Among Subjects With or Without STR

	Incidence (%)		<i>P</i>
	No STR (<i>n</i> = 287)	STR (<i>n</i> = 93)	
Ever had hard bowel movements	50.9	67.7	.006
Frequently had hard bowel movements	14.3	29.0	.003
Painful defecation	27.9	41.9	.014

TABLE 2. Timing of the First Episode of Constipation in Relation to the Onset of STR

	Incidence of First Reported Episode of Hard Bowel Movements or Pain (%)		
	Before STR	Concurrent with STR	After Onset of STR
Ever had hard bowel movements (<i>n</i> = 61)	93.4	1.6	4.9
Frequently had hard bowel movements (<i>n</i> = 27)	96.3	0	3.7
Painful defecation (<i>n</i> = 39)	74.4	7.7	17.9

TABLE 3. Duration of STR Among Subjects With or Without Constipation or Painful Bowel Movements

	Duration of STR (mo)	<i>P</i>
Ever had hard bowel movements		
Yes	6.3 ± 5.3	.47
No	5.6 ± 3.1	
Frequently had hard bowel movements		
Yes	9.0 ± 6.5	.001
No	4.8 ± 3.0	
Painful defecation		
Yes	7.1 ± 6.1	.108
No	5.3 ± 3.1	

ing.^{6,10} An intervention study would be needed to determine whether earlier treatment of constipation could influence the age at the completion of toilet training.

The results of this study should be considered in the context of the following limitations. First, the results of the study are based solely on parent reports from a relatively homogeneous sample in a

single pediatric practice. Second, although we attempted to minimize recall bias by making relatively frequent telephone calls, the results depend on parent recall of hard or painful bowel movements. Third, we focused on a single toilet training problem, although other problems may contribute to the onset of constipation. Nevertheless, we think that this study suggests that the question of whether early effective treatment of constipation could facilitate toilet training merits study.

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