

Relationship Between Age at Initiation of Toilet Training and Duration of Training: A Prospective Study

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ABSTRACT. *Objective.* To study the relationship between age at initiation of toilet training, age at completion of toilet training, and the duration of toilet training.

Methods. A total of 406 children seen at a suburban private pediatric practice were enrolled in a study of toilet training between 17 and 19 months of age, and 378 (93%) were followed by telephone interviews with the parents every 2 to 3 months until the child completed daytime toilet training. Information obtained at follow-up interviews included how often parents were asking their child to sit on the toilet or potty and where the child urinated and defecated. Parents were considered to have initiated toilet training when they first took out a potty chair and discussed some aspect of training with the child. Intensive toilet training was defined as asking the child to use the toilet or potty >3 times per day.

Results. Age of initiation of toilet training correlated with age of completion of training ($r = 0.275$). The correlation between age at initiation of intensive training and age at completion was even stronger ($r = 0.459$). Younger age at initiation of intensive toilet training was not associated with constipation, stool withholding, or stool toileting refusal. However, age at initiation of intensive toilet training was negatively correlated with duration of toilet training ($r = -0.481$), indicating that initiation of training at younger ages was associated with a longer duration of training. In addition, the correlation between age at initiation of intensive toilet training and age at completion of training was not significant for those who began intensive training before 27 months of age ($r = 0.107$).

Conclusions. Early initiation of intensive toilet training correlates with an earlier age at completion of toilet training but also a longer duration of toilet training. Although earlier toilet training is not associated with constipation, stool withholding, or stool toileting refusal, initiation of intensive training before 27 months does not correlate with earlier completion of toilet training, suggesting little benefit in beginning intensive training before 27 months of age in most children. *Pediatrics* 2003;111:810–814; toilet training, preschool age children, parenting.

ABBREVIATION. REEL, Receptive-Expressive Emergent Language Scale.

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Previous studies have suggested that an earlier age at initiation of toilet training is associated with an earlier age at completion of toilet training. For example, Taubman¹ found that when toilet training was introduced before 24 months of age, 68% of children were toilet trained before 3 years of age, whereas when toilet training was introduced after 24 months, only 54% were toilet trained before 3 years of age. In a study from Belgium, Bakker and Wyndaele² also reported that earlier initiation of training was associated with earlier achievement of daytime bladder control. In contrast, there has been concern that early toilet training may be coercive and lead to later difficulties with constipation or encopresis.^{3–5} However, much of the literature that describes this association is almost 50 years old and relates to parents' beginning toilet training before 18 months and often before 12 months of age.^{4,5} This is much earlier than most parents currently begin toilet training.⁶ Thus, it is not clear that these reports would apply to toilet training within the context of a child-oriented approach to training.

If parents correctly judge when their child is ready to toilet train, then one might expect that earlier initiation of training would be associated with earlier completion and one would not expect an association with toilet training problems. If parents are not good judges of when their child is ready, then there are 2 possibilities. If parents overestimate the skills necessary for training (or wait until after the child is ready for cultural or other reasons), then one would also expect to find that earlier parental efforts toward training would be associated with earlier completion. In contrast, if parents initiate training before the child is ready, then one might expect earlier initiation of training to be associated with prolonged training and, possibly, an increased incidence of toilet training problems. In this article, we report the relationship between when parents initiated toilet training measured as the age at the first step toward training or when parents began more intensive training and both when children completed training and how long it took them to train. We also investigated whether earlier initiation of intensive training was associated with toilet training problems such as constipation, stool withholding, and stool toileting refusal.

METHODS

Sample

Families of 408 consecutive 17- to 19-month-old children from the private pediatric practice of 1 of the authors (B.T.) were asked

to participate in a study designed to investigate factors related to age of completion of toilet training and to study an intervention to decrease stool toileting refusal. 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, or gastrointestinal tracts were excluded. Twenty-seven families were lost to follow-up or stopped participation in the study before the completion of toilet training. One child was dropped from the study because of global developmental delays not apparent at the time of enrollment. A total of 378 (93%) were followed until they completed daytime toilet training and are the subject of this article. The study was approved by the Institutional Review Board of Children's Hospital of Philadelphia.

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 standard deviation Hollingshead score⁷ was 52.4 ± 10.8 , which is near the top of social strata IV of the 5-category index. At enrollment, the Receptive-Expressive Emergent Language Scale (REEL),⁸ a parent report measure of language development, was administered. The REEL provides an age level for the child language skills, and results are presented as developmental quotients (developmental quotient = REEL language age/child's chronological age \times 100). National norms for the REEL are not available, but in 3 validity studies, children's mean language ages have been found to be at or slightly above their chronological age.⁸ Children in this sample had a mean developmental quotient of 130.4 ± 20.4 (range: 69–175).

Measures and Procedures

At enrollment, an intake form was completed to obtain demographic data and families were randomized to receive 1 of 2 intervention handouts. Both handouts emphasized a child-oriented approach to toilet training.³ The intervention handout provided the additional recommendation to increase praise for defecating and not refer to stool in negative terms (eg, stinky). The effects of the intervention on stool toileting refusal are described elsewhere (Taubman B, Blum NJ, Nemeth N. The effect of an intervention targeting parental behavior on stool toileting refusal: a prospective study. Submitted for publication). Follow-up telephone interviews were conducted every 2 to 3 months until the parents reported that the child had completed daytime toilet training at 2 consecutive interviews.

Follow-up Interviews

Information obtained at follow-up interviews included whether parents believed that they were trying to toilet train their child, how often parents asked or reminded the child to use the potty, and the presence and frequency of constipation or painful defecation during the interval since the last interview. In addition, information on toilet training behaviors such as where the child urinated and defecated and how many accidents the child had was collected.

We defined the age of initiation of toilet training as the age at which parents took out a potty chair and began discussing some aspect of toilet training with the child. We defined the age of intensive toilet training as the age at which parents asked their child to use the toilet or potty >3 times a day. Duration of intensive toilet training was defined as the age at completion of toilet training minus the age at initiation of intensive training. Children were coded as being frequently constipated when they were treated by the pediatrician for constipation or when parents

stated that their child was constipated more than once a week at any follow-up telephone call or once a week at 2 or more follow-up interviews. Daytime toilet training was scored as completed when parents reported that the child wears underwear during the day and urinates and defecates in the toilet or potty with <4 urine accidents per week and 2 or fewer episodes of fecal soiling per month. Stool toileting refusal was scored as occurring when a child refused to defecate in the toilet or potty for longer than 1 month after meeting the criteria for daytime toilet training for urine.

Statistics

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS version 9.0; SPSS Inc, Chicago, IL). Pearson product-moment correlations were calculated to evaluate the relationship between age at initiation of training and both age at completion of toilet training and duration of training. The presence of toilet training problems for those who initiated intensive training before 27 months was compared with those who began later using the χ^2 statistic. Between-group comparisons for continuous data were made using the *t* test for independent variables.

RESULTS

Children in this sample completed daytime toilet training at a mean of 36.8 ± 6.1 months (range: 22–54 months). The 197 boys in the study completed training later than the 181 girls (38.0 ± 5.6 vs 35.8 ± 6.6 months; $P < .001$). Parents reported initiating toilet training at a mean of 20.9 ± 2.6 months (1 parent reported asking the child to sit on the toilet or potty before enrollment in the study to 34 months). A total of 297 (78.6%) parents reported asking their child to use the toilet or potty >3 time per day at some point during the toilet training process and thus met our criteria for beginning intensive training. The mean age at initiation of intensive training was 28.7 ± 5.6 months. The 81 children whose parents never reported meeting our criteria for intensive toilet training began toilet training at the same time as the rest of the sample (20.9 ± 2.8 vs 20.9 ± 2.6 months). However, this group completed training at a mean of 34.0 ± 5.8 months, which was significantly earlier than the rest of the sample (37.7 ± 6.0 months; $P < .001$).

As shown in Table 1, there was a direct correlation between age at initiation of toilet training and age at completion of toilet training. The correlation was even stronger between age at initiation of intensive training and age at completion. However, earlier initiation of intensive toilet training did also correlate negatively with duration of training, indicating that earlier initiation led to a longer duration of training. Graphs demonstrating these relationships are shown in Figs 1 and 2. These relationships were consistently found in both the 195 children in the intervention

TABLE 1. Correlation of Age at Initiation of Toilet Training With Both Age at Completion of Training and Duration of Training for Entire Sample, Intervention, and Control Groups

	Age at Completion of Toilet Training			Duration of Intensive Toilet Training		
	Full Sample	Intervention	Control	Full Sample	Intervention	Control
Age at initiation of toilet training	0.275*	0.328*	0.216†	-0.141†	-0.079‡	-0.212†
Age at initiation of intensive toilet training	0.459*	0.500*	0.414*	-0.481*	-0.481*	-0.504*

* $P < .001$.

† $P < .02$.

‡ $P > .10$, not significant.

Fig 1. Mean and 95% confidence interval for age at completion of toilet training based on age at initiation of intensive training.

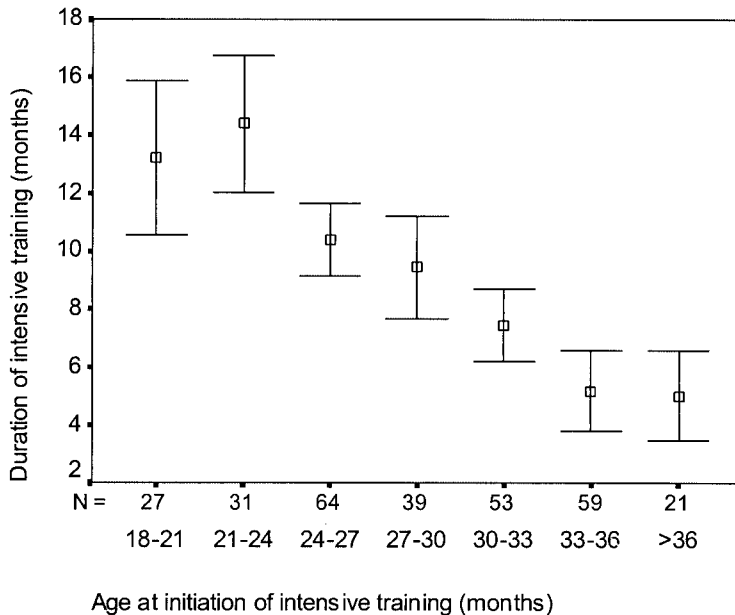
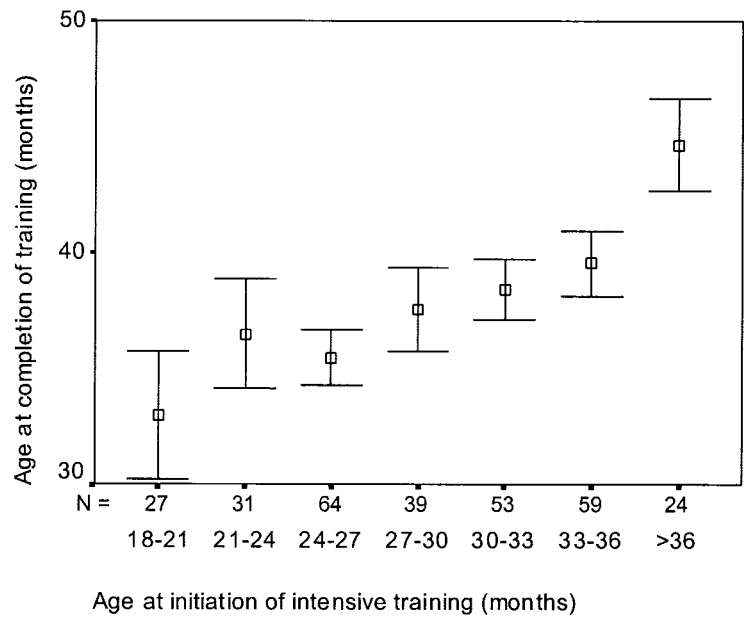


Fig 2. Mean and 95% confidence interval for duration of intensive toilet training based on age at initiation of intensive training.

group and the 183 children in the control group (Table 1). In addition, when analyzed separately, both boys and girls demonstrated similar correlations of age at initiation of intensive training with both age at completion of training (boys, $r = 0.446$, $P < .001$; girls, $r = 0.447$, $P < .001$) and duration of intensive toilet training (boys, $r = -0.532$, $P < .001$; girls, $r = -0.430$, $P < .001$).

To determine whether the early initiation of intensive toilet training was associated with more toilet training problems, we compared children whose parents began intensive toilet training before 27 months of age with those who began intensive toilet training at 27 months of age or later. There was no difference in the percentage with frequent constipation (before 27 months versus after 27 months, 16% vs 20%; $P > .10$), percentage with stool toileting refusal (26% vs 29%; $P > .10$), percentage with stool withholding

(22% vs 30%; $P > .10$), or percentage who hid during training (22% vs 30%; $P > .10$). However, as shown in Table 2, there was no significant correlation between age at initiation of intensive training and age at completion when the group that began before 27 months of age was evaluated alone, whereas the correlation for those who began after 27 months was almost as high as it was for the whole sample. In contrast, the correlation between age at initiation of intensive training and duration of training was present for both groups.

DISCUSSION

This study makes a significant contribution to the literature on toilet training by providing data on the relationship between age at initiation of intensive toilet training and both age at completion of toilet training and duration of toilet training. We found

TABLE 2. Correlation of Age at Initiation of Intensive Toilet Training With Both Age at Completion of Training and Duration of Training for Those Beginning Intensive Training Before 27 Months and Those Beginning After 27 Months of Age

	Age at Completion of Toilet Training	Duration of Intensive Toilet Training
Initiated intensive training at <27 mo	0.107*	-0.278†
Initiated intensive training at ≥27 mo	0.434†	-0.268†

* $P > .10$, not significant

† $P < .001$.

that the age at initiation of intensive toilet training correlates strongly with the age at completion of toilet training. However, this correlation is not present when the group that began intensive training between 17 and 27 months is evaluated alone. Other studies have also found that age of initiation of toilet training is an important predictor of age at attainment of bladder control² or completion of daytime training¹ but have not reported data on this relationship at different ages of initiation or on the relationship between age at initiation and duration of toilet training. A study that examined the relationship between parental pressure to train and age at completion of training in a sample that often began training before 18 months found no relationship between parental pressure to train and age of completion of toilet training.⁹ Our study suggests that there is little benefit to beginning intensive training before 27 months of age, although we could not find any toilet training problems, other than a longer duration of training, that were associated with earlier initiation of intensive training.

One potential explanation for the relationship between age at initiation of intensive training and age at completion of training is that parents correctly judge when their child is ready to be trained and initiate training at that time. If the explanation for this finding is that parents begin training when they correctly judge that their child is ready, then the duration of toilet training should be relatively short and of consistent duration regardless of the age at which parents begin intensive training. However, this is not what we found. Instead, the earlier parents initiated intensive training, the longer it took to train, and at the younger ages it took a mean of >12 months for toilet training to be completed. Furthermore, at the younger ages, earlier intensive training was not associated with earlier completion of training. Thus, it seems likely that despite the widespread acceptance of a child-oriented approach to toilet training, many parents have difficulty judging when their child is ready for training.

There is nearly universal agreement that the assessment of child readiness for toilet training should include an assessment of motor skills and evidence of sphincter control and that in typically developing children these signs of readiness will be achieved by 18 months of age.^{3,10-12} After 18 months, the decision to toilet train will usually be based on social-emotional readiness. There is no consensus or empirical data to support specific signs of social-emotional readiness.¹³ In his original paper describing a child-oriented approach to toilet training, Brazelton³ sug-

gested that showing interest in imitating the parents and mastering impulses were signs of social-emotional readiness. Recent recommendations¹² suggest showing an interest in toilet training by following parents into the bathroom, demonstrating independence by saying "no," imitation of the parents, and a desire to put things where they belong are signs of readiness. Azrin and Foxx¹⁰ suggested that children who complied with 8 of 10 specific verbal instructions were ready. Parents often use criteria different from any of these recommendations to decide when a child is ready.¹⁴ A recent study that assessed when children achieved 11 different readiness skills found that the earliest achieved readiness skill (stays bowel movement-free overnight) occurred at a median of 22 months in girls and almost 25 months in boys.⁶ The skill that was achieved the latest (pulls training pants or underwear up by oneself) was not achieved until a median of 29.5 months in girls and 33.5 months in boys.⁶ Given the wide range of recommended skills to assess and the large age range over which these skills occur, it should not be surprising that parents have a difficult time judging when their child is ready to toilet train. Additional research is needed to determine whether there are specific readiness skills that best identify children who are ready to train.

The results in this study should be considered in the context of the following limitations. The results apply to a primarily white, suburban, upper-middle-class population. Factors that influence toilet training are likely to be different in other populations.^{13,15} All of the information in this study was collected by parent report. We attempted to minimize recall bias by interviewing parents every 2 to 3 months, but our results were still dependent on parents' recall and report of their toilet training practices and results. In considering these potential biases, it is noteworthy that the age at completion of toilet training in this study is consistent with that reported in another recent study from the United States.¹⁶ Finally, we do not have much information about the 81 children whose parents never met our criteria for intensive training. These children trained earlier than the rest of the sample, but we do not know whether this reflects a group of children who are particularly easy to toilet train or that these parents used other, more effective means of toilet training their children. Our only measure of the intensity of toilet training was how frequently parents ask a child to sit on the toilet, but some parents may use other verbal or nonverbal signals to influence the toilet training process.

This study suggests that intensive toilet training

before 27 months of age is not likely to be associated with an earlier completion of toilet training, and early toilet training is likely to take much longer. After 27 months of age, there is a strong association between the age at initiation of intensive training and age at completion of training, but even at this age, earlier training is likely to take longer. Clearly, these data should not be interpreted to indicate that 27 months is the correct age to begin training as we do not propose that there is a specific physiologic or developmental event that occurs at this age. There is significant individual variation in the age of readiness for training. However, there are essentially no data on which readiness skills should guide parents in determining when to begin training. Thus, we believe that these data may be useful in helping parents to think about when to begin training.

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PERPETUAL ERROR

“... Credulity: life is short, opportunities of knowing rare; our senses are fallacious, our reasonings uncertain; man therefore struggles with perpetual error from the cradle to the coffin. He is necessitated to correct experiment by analogy and analogy by experiment.

Even so, no one should rest satisfied in the belief of facts until experiments could be repeated or confirmed by others. Ignorance and credulity had always marched together. . . and had ‘mised and enslaved mankind.’”

—Erasmus Darwin