

# Instruction, Timeliness, and Medical Influences Affecting Toilet Training

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Contemporary toilet training derives from two accepted models: child-oriented gradual training and structured-behavioral, endpoint-oriented training. The former approach views toilet training as a process by which a parent systematically responds to a child's signals of toilet "readiness," whereas the latter views toilet training as a process of eliciting a specific chain of independent toileting behaviors. Practically speaking, contemporary theoretic constructs of toileting behavior diverge with respect to training endpoints (ie, defined differently or deemphasized altogether), emphasis on self-esteem, development of goals, and timing of initiation. A scientific basis cannot be established for a universal timeline for toilet training, because each method has its own definition of the toilet training process. It remains unclear, for example, how long children must remain bowel- and bladder-continent to be considered trained, and to what extent children should be able to toilet themselves independently of caregivers.<sup>1</sup>

Both child-oriented gradual and structured-behavioral approaches to toilet training evolved in the United States during the past 40 years within a scientific milieu that came to accept toilet training as a developmental milestone requiring a child's active participation. This common view of toilet training as a developmental process has provided clinically useful overlapping concepts of mature toileting behavior. The child-oriented gradual method, proposed by T. Berry Brazelton in 1962, defined the parameters of toilet readiness; a decade later, N.H. Azrin and R.M. Foxx designed a structured-behavioral method that detailed the components of independent toileting. Widespread acceptance of readiness and independent toileting have since been supported by clinical experience and resulted in agreement that a child should be ready to participate in toilet training at approximately 18 months of age and be trained completely by 2 or 3 years old. Global trends continue to support this concept despite technologic advance-

ments and conveniences such as diapers, which have enabled delayed training.

Toilet readiness is a powerful conceptual tool and requires an objective look both at a child's willingness to begin and progress with training and at the parent's preparedness for training the child. In addition to readiness, it is important for the practitioner to recognize other extenuating issues and conditions that can complicate the toilet training process. These may include the child being separated from the parent for many hours each day, such as when in day care, or health conditions such as developmental delays, chronic illness, or disabilities.

The clinical community (including physicians, pediatric nurse practitioners, child psychologists, and other child care experts) concedes that although no one theory or method can address every toilet training problem, the individual practitioner who becomes familiar with a child and family situation can effectively advise parents during the process. Objective guidance from the care provider therefore requires an understanding of toilet training theories and methods, as well as the practical issues surrounding the timing of toilet training. Establishing each child's best "window of opportunity" can be crucial for toilet training success.

## CHILD-ORIENTED THEORY AND DEFINITION OF TOILET READINESS

Child-oriented gradual training was designed in 1962 on the recommendation of T. Berry Brazelton<sup>2</sup> and still is the standard of practice for the majority of children. Brazelton took the position that toileting behavior emerges from physiologic attainment of bladder and bowel control and sufficient neurologic maturity for the child to voluntarily accept the responsibility to participate in toilet training. This maturational/behavioral model of toileting behavior was developed after World War II, at which time toilet training research and technologic advances prompted researchers to revisit the passive approach to toilet training that had been introduced at the turn of the century; this passivity was discarded in favor of a rigid, parent-centered approach to training in the 1920s and 1930s.<sup>3-5</sup> By the 1940s, attitude changes had led pediatric experts including Benjamin Spock to reject absolute rules for toilet training on the theory that rushed, rigid training may fail and may even cause behavioral problems.<sup>4</sup> Also at this time, professional advice to parents introduced observance of signs of readiness in the child before training was to start.<sup>4</sup>

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Child-oriented gradual training focuses on toilet readiness, advising parents that a child should be allowed to experiment and become comfortable with different aspects of independent toileting behavior as the child's interest and ability allow.<sup>2</sup> Intuitive support of child-oriented gradual training has derived from observations that most children trained in this way eventually become independent toileters without experiencing major problems. Brazelton conducted the largest toilet training survey in the United States in a retrospective chart audit for the 10-year period, 1951–1961, on 1170 children of well-educated parents in Boston, MA.<sup>2</sup> In reviewing the children's records, Brazelton reported that 26% of the parents said that their children achieved daytime continence by age 24 months and 52.5% by age 27 months. By age 30 months, this figure rose to 85.3%, with 98% of the children reportedly trained by age 36 months. Initial success (defined as an understanding of the use of the toilet rather than full mastery of toileting) reportedly was achieved with bowel training first in 12.3%, and with bladder training first in 8.2% of the children, with the remainder achieving initial success in both systems simultaneously.<sup>2</sup> The high rates of success of this method compared with those from earlier studies were associated with a fairly rapid training time (average ages of initiation and completion of training were 24 and 33 months, respectively) as well as by a low long-term regression rate (1.4% at age 5 years).<sup>2</sup> These results must be balanced with the fact that many parents underestimate the age at which a child completes toilet training as well as the amount of time it takes to become completely continent.<sup>6,7</sup>

A crucial way in which child-oriented gradual training deviated from previous toilet training approaches was to delay training onset until age 18 months. Brazelton proposed using a group of physical and behavioral parameters of toilet readiness that included voluntary control over bowel and bladder reflex actions (expected to emerge at age 9 months), ability to cooperate with training (expected to emerge at age 18–24 months), and sufficient neurologic development to transfer some of the developmental energy required for walking and other gross motor tasks to be used in the mastery of toileting behavior (expected to emerge at age 18 months).<sup>2</sup> Brazelton traced the notion of "sufficient neurologic development" to the complete myelination of the pyramidal tracts; a subsequent review qualified that although it is impossible to assess myelination directly, this probably is present by the time a child walks (normally by age 18 months).<sup>8</sup>

The readiness parameters designed by Brazelton have been widely accepted as a convenient base on which the practitioner can encourage and support the child's goal and parent's expectations. These insights have been supported over the years by continued informal observations that have shown signs of maturational toilet readiness after 18 months. Furthermore, signs of fully developed bowel and bladder continence were not recognized until 2 to 3 years of age, regardless of when toilet training was initiated.<sup>8</sup> In a 1993 sampling of 1192 American children,

Bloom reported a similar mean age (2.4 years) for achieving bowel and bladder control, as described by Brazelton.<sup>7</sup>

### STRUCTURED-BEHAVIORAL THEORY AND THE CONCEPT OF INDEPENDENT TOILETING

Structured-behavioral training first emerged during the 1960s and 1970s and has been accepted as a viable approach to toilet training.<sup>9</sup> This approach was popularized in 1971 by the Azrin-Foxx method for teaching bladder control, which appeared as a series of research articles on toilet training a population of institutionalized mentally disabled adults and, later, normal children. They subsequently published outcome research on the treatment of nocturnal enuresis in the same population.<sup>10</sup>

In 1974, Azrin and Foxx published a full protocol description in the spuriously titled popular book, *Toilet Training in Less Than a Day*.<sup>11</sup> The book was based on empirical observations gained from the authors who toilet trained 34 normal, healthy children. The children were trained within a mean time of 3.9 hours, with a 97% decrease in accidents during the first posttraining week.<sup>12,13</sup> Although the book's title emphasized the speed of training, there were numerous cautionary statements throughout the book that alerted readers to circumstances that might not permit a speedy, successful response.

The Azrin-Foxx method derives from an applied behavior analysis of toilet training in which they identified a number of component skills that could be taught to a toddler. Using this approach, a child would be toilet trained once all the component skills were learned.<sup>11,12,14</sup> Although Azrin and Foxx's protocol is a parent-oriented approach that is specific to bladder training a child. The principles behind it have been applied successfully to bowel training as well.<sup>15</sup> The theoretic antecedent of structured-behavioral training was the applied behavior-analysis movement of the 1960s and 1970s, an approach that became popular when the then-dominant model for training a wide variety of behaviors was extrapolated to toilet training. The applied behavior-analysis model was a vast improvement over the conditioned stimulus response or operant-conditioning model that emphasized strictest regularity and made no allowances for deviations or failures.<sup>4</sup>

Modern structured-behavioral theory emphasizes active participation by the child in learning to distinguish appropriate elimination stimuli. The now widely popularized method of applied behavior analysis has been compared favorably with other methods and has been used to document the efficacy of the component approach more than any other method.<sup>14,16–20</sup> However, all these versions use the same four basic protocols: increased fluid intake, regularly scheduled toilet times, positive reinforcement for correct elimination, and overcorrection for accidents.<sup>14</sup>

Although these components have some advantages in gradual training, they are not as favorable in the structured-behavioral model.<sup>12</sup> Quick elimination of inappropriate toileting behaviors could reduce compulsive parental pressure, but if enforced too

quickly or strongly, it could lead the child to regress rather than face failure or conflict. Moreover, the overcorrection component is unsuitable for unsupervised caretakers, particularly with very young children or where there is a likelihood of physical abuse.<sup>15</sup> Structured-behavioral training presents obvious practical barriers for children who cannot tolerate increased fluid intake, such as those with heart or renal disease, and may be impractical in situations where a specialized trainer is not readily available.<sup>14</sup> Because the Azrin-Foxx method is based on a stimulus-control model, there is always a risk of inadvertently conditioning the child to perform incorrect behaviors, such as when a child learns to avoid the toilet (because it might be a foreign sensation to the skin) or learns the wrong behavior (eg, wetting in clothing or on the floor) simply because it happens more often than does the correct behavior.<sup>14</sup> Variants of the Azrin-Foxx method utilizing systematic manipulation of the positive discriminative stimulus for accidents (eg, the underpants) may be the most logical way to train children with mental disabilities or behavior problems, or in other settings that make learning toilet skills difficult.<sup>14</sup>

In addition to widespread acceptance of the method itself, the Azrin-Foxx model has made an important contribution to the contemporary concept of mature toileting. Clinical recommendations since midcentury, primarily in response to the momentum created when Spock, Brazelton, and other authorities first advocated the concept of readiness, have been to pace toilet training according to the child's capacity for independent toileting. Azrin and Foxx were among the first researchers to draw on these earlier insights used to define the components of independent toileting. The impetus for this effort was the recognition that in addition to evaluating when to begin training, it also is important to evaluate when a child can carry out complex discriminations and motor patterns that go beyond simply eliminating at the proper times.<sup>9</sup> Parents might define completed toilet training as the child's ability to avoid bowel and bladder accidents most of the time, but Western culture also requires that children restrict elimination to socially acceptable sites, adopt proper postures for eliminating (including dressing and undressing and closing the bathroom door), and use appropriate sanitary measures, including flushing toilets, using toilet tissue, and washing hands.<sup>9</sup> The chronologic disparity between initial success and toilet mastery may be reflected in the fact that parents tend to misjudge the age at which a child completes training as well as the amount of time required for toilet training (which averages 5.8 months and 6.4 months for bladder training in females and males, respectively, and 6.3 and 6.9 months for bowel training).<sup>6,7,21</sup> It also was widely recognized by the 1970s that a child's cognitive ability to assimilate the learning tasks for independent toileting compensates for the lack of full bladder maturation, which usually does not appear until age 4 years.<sup>1,22</sup>

Thus, it became important to describe how children prepare for independent toileting behavior as well as to define the components of independent

toileting. In 1973, MacKeith and colleagues suggested a developmental timeline over which children undergo this priming process.<sup>23</sup> Their work reported that 15-month-olds became aware of their accidents and demanded to be changed; 18- to 24-month-olds called attention to soiled diapers and began to verbally distinguish between urine and feces. At age 2, children also announced their need to urinate, although often not in time to go to the toilet. By age 2.5 to 3 years, children held their elimination and requested assistance in time to be taken to the toilet. Children at this age also may go to the toilet unattended, but they may become distracted and forget to urinate. By age 4, children exhibited essentially the adult pattern of toileting behavior, including using the bathroom appropriately and keeping the door closed.

In 1974, Azrin and Foxx detailed the specific components involved in independent toileting and the behavioral and physiologic components of readiness for executing these behaviors.<sup>11</sup> From a practical standpoint, this provided pediatricians with additional empirical standards for tracking a child's progress toward toilet mastery.<sup>15</sup> Extensive commentary on this work has delineated Azrin and Foxx's two major components of independent-toileting readiness: physiologic readiness (bladder continence and physical development) and psychological readiness (instructional skills).<sup>11</sup> Further breaking down this definition, bladder readiness is defined as conscious control over bladder contractions and the external urinary sphincter. "Bladder-ready" toddlers therefore void large amounts at a time, remain dry for several hours at a stretch, and are aware of their need to void.<sup>15</sup> Physiologic readiness also connotes sufficient muscle tone to carry out the physical components of independent toileting, ie, the ability to walk from room to room, pick up small objects, get dressed and undressed, and sit upright for 5 to 10 minutes at a time.<sup>11</sup> Psychological criteria of toilet readiness include the cognitive ability to follow simple instructions and adopt mature toileting skills, as well as the motivation to use these skills. In their book, Azrin and Foxx described a method to test instructional readiness by observing whether a child can perform at least 8 of 10 predefined simple actions on command.<sup>11,15</sup> Some of these actions include pointing to body parts; sitting, standing, and walking to a particular place with a caretaker; imitating a simple task; and manipulating familiar objects in a designated manner. This was the first use of objective criteria that parents could use to observe their children in determining readiness for toilet training.

#### PRACTICAL CONSIDERATIONS IN READINESS

Theoretical constructs of independent toileting and readiness suggest that no two children train on the same physiologically "correct" timetable, and that there are predictable physical and behavioral clues to detect when a child is ready to toilet train. Guiding parents to identify and act appropriately on these clues requires the health care professional to consider the individual child's response to training, in the context of the child's age, as well as level of

cooperation with reasonable parental requests. It can be reasonably expected that children will not show a desire to cooperate or an ability to play an active role in achieving toilet training until they are at least 15 to 18 months old.<sup>2,5</sup> However, there may be signs that a child has not begun to attain bladder and bowel control and that an attempt to toilet train is probably premature regardless of age.<sup>11</sup> If a child is not ready for toilet training by age 20 months, one practical approach is to wait an additional 3 months.<sup>24</sup> This hiatus from training ostensibly provides a buffer against parent–child power struggles that arise from premature demands for independent toileting, which in turn would prevent or attenuate the sorts of behavioral cycles (eg, chronic stool withholding and constipation) that tend to resist correction and block future progress.

Pragmatic research extensions were possible as a result of Azrin and Foxx's research, because it taught other researchers to include children who were developmentally disabled or often absent from their primary caregiver (as is the case today with the widespread use of day care facilities). For example, one review pointed out that some developmentally disabled children do not achieve independent toileting even after the most complex endpoint-oriented training programs, and that furthermore, these children frequently regress when they leave a specialized training environment and are returned to their normal living conditions.<sup>20</sup> Moreover, a normal child who has achieved toileting skills still may have accidents. Reasons for this could be that the toilet is too distant; clothing is complicated to remove; a younger sibling in diapers is present; an acute illness exists; or acute stressors are created by situations external to the toilet learning process, such as a family move, a new school or child care environment, or a family crisis. In such cases, it would be inappropriate to intensify training efforts to elicit desired toileting behaviors; rather, a lapse from training or "a simpler training program, which merely rearranges the natural contingencies for toilet use and accidents" may be all that is necessary.<sup>20</sup>

### Gender Differences

Parental expectations for toilet training also reflect differences in socialization and parent–child relationships between boys and girls as well as innate gender differences in a child's ability to respond to social expectations.<sup>25</sup> Longitudinal data on the age of toilet training onset and completion suggest that the age at which initial readiness signs appear (ie, voluntary sphincter control and at least some degree of interest in eliminating on the toilet or potty chair) is similar for boys and girls.<sup>25</sup> However, it has been shown consistently that girls tend to complete toilet training sooner than do boys.<sup>7,11,25</sup> Parental pressure equally determines when boys and girls start training, but for final mastery of toileting skills, the motivation differs by gender. Girls are more influenced by socialization, whereas boys depend more on physiologic maturation.<sup>25</sup> It is speculated that girls who start training earlier finish earlier, because girls can compensate for immaturity (ie, limited control

over sphincter muscles) as an adaptation to additional parental pressure for social continence.<sup>25</sup> In boys, however, toileting mastery seems to be tied more closely to maturation of sleep cycles (ie, the child's ability to awaken in time to void), such that earlier onset of training because of parental pressure does not guarantee earlier completion of training. This could be supported in light of the male preponderance among bed-wetters<sup>15</sup> and may reflect more complex anatomic and behavioral requirements (eg, adoption of separate postures for elimination) that need to develop in boys.<sup>25</sup>

### Child With Chronic Illness

Objective empirical evaluation of a child's toilet readiness becomes particularly critical when parents have real or perceived lack of control over the toilet training process and the child's achievement in this area. In some of these instances, a child theoretically meets many readiness criteria for toilet mastery but has a chronic health problem that affects parental expectations of the child and/or impairs parents' ability to commit fully to training. Typically, parental judgment with respect to the right time to toilet train is affected by feelings of sympathy for the child, ie, training is one more ordeal that the "poor little thing" should not have to endure.<sup>26</sup> In some cases, the possibility of toilet training does not even occur to parents burdened with the many details of the child's illness.

Child psychologists concur, nonetheless, that toilet training perhaps is a more crucial developmental milestone for the child with chronic illness than it is for the healthy child, and that it is equally important to identify the best time for toilet training for chronically ill children as for their peers. Based on normative timetables, it is generally recommended that all cognitively ready children who have no physical or anatomic conditions that block toileting directly begin training near the age at which full bowel and bladder control start to evolve (normally around 2.5 to 3 years).<sup>1,7,26</sup> Basic toilet-readiness parameters are similarly assessed for chronically ill as for other children, whereas the presence of extended periods of bowel and bladder continence, voluntary bowel and bladder sphincter control, awareness of wetting/soiling, and appropriate instructional and language skills are considered when determining readiness.<sup>11,26</sup>

Although the empirical parameters of toilet readiness are the same for chronically ill and normal children, the special demands of chronic illness require that the care provider ascertain the degree to which the particular child is hampered in toilet training and, also, the degree to which the parents are prepared to begin the process.<sup>26</sup> Moreover, a chronically ill child may require additional time to learn and more consideration and patience from the care provider and parents in the event of regression. In assessing child and parental toilet training readiness, the health care provider needs to consider the many indirect and direct ways in which chronic illness can interfere with appropriate timing and consistency of training.<sup>26</sup> For example, diuretics and certain antibiotics that cause diarrhea and frequent urination re-

sult in obvious problems with continence, whereas muscle relaxants, sedatives, analgesics, and nerve blockers can be subtle but significant causes of constipation or urinary retention and/or may hamper a child's sensorium or overall ability to cooperate with training.<sup>26</sup> Other treatments, hospitalizations, and/or periods of bed rest also can cause missed opportunities for reinforcing the child's success with components of toilet training.<sup>26</sup> The illness itself may cause infections, weakness, polyuria/high-output incontinence, fatigue, nausea, or pain—particularly during its acute exacerbation or periods of instability—that can distract both the child and the parents greatly. Additionally, the chronically ill child may have anomalies that prevent training in one system or preclude normal assessments of readiness, such as in the child with a new renal transplant who has never known the sensation of bladder fullness.<sup>26</sup> Furthermore, chronically ill children often have developmental delays in motor skills, physical growth, psychosocial or cognitive development, as well as other physical disabilities, that can affect independent toileting.<sup>26,27</sup> In identifying objectively the best time to train chronically ill children, the health care practitioner needs not only to take into account social and adaptive delays associated with chronic illness, but also to evaluate the child's positive need to develop independent self-care skills at the appropriate time, particularly if the illness impedes developmental achievement in other areas such as gross motor activities and physical strength.<sup>26</sup>

#### INSTITUTIONALIZED DAY CARE

Institutionalized day care settings compound practical issues with respect to accountability for, commitment to, and control over the toilet training process.<sup>28–30</sup> According to a report released by the US Census Bureau in late 1994, outside caregivers participate in toilet training. According to this report, 77% of American children younger than age 5 years regularly receive nonparental care, of which >80% is conducted outside of the home.<sup>31</sup> Institutionalized day care, which includes churches and other non-profit/government tertiary child care facilities as well as formal, for-profit day care centers, encompasses millions of young children. This group not only is the fastest growing in institutionalized care but also one that demands more individualized, intensive, and consistent adult supervision than do older groups of children.<sup>32</sup>

Toilet training efforts of institutional caregivers have not been able to keep up with the increased infusion of nontilet-trained children into these systems because of staff fluctuations and training gaps, long operating hours, and staff-to-child ratios that often are greater than the recommended 1:3 to 1:4 for toddler groups.<sup>30,32,33</sup> A typical large day care facility, for example, may see many children who are toilet training simultaneously, but who do not receive adequate supervision and assistance during their training. Nowhere is the logistic inability to manage toilet training in day care more obvious or urgent than in the almost inevitable outbreaks of respiratory and enteric diseases, particularly in light of epidemio-

logic evidence that nontilet-trained, young children are the common factor in these outbreaks across the socioeconomic spectrum of institutional child care settings.<sup>28,29,34</sup>

In many cases, however, peer-to-peer interaction can be a powerful enough influence on toilet readiness as to make formalized, guided training almost superfluous in all kinds of institutionalized settings. As children respond to parental pressure, so do they respond to peer pressure to toilet training and, as with parental influence, peer influence has been observed directly to override maturational factors. In the most common scenario, children who are in 2-year-old groups have an ideal opportunity to observe peers who are nearly 3 and therefore are likely to imitate and master many toileting skills. However, day care authorities acknowledge that some children may need specialized attention with toilet training, as in the case of the older child who does not demonstrate readiness to the same degree as do other children of the same age.

Parents of children in institutional day care respond differently to mixed messages about parental control versus contribution to the toilet training process. Some parents attempt to rush training, particularly if their child needs to remain in day care, a situation that can foster incongruous home and center toilet training practice and thereby prevent the child from adapting to any practice. For example, parents may put a child in training pants at home although the child only wears diapers in day care, or parents may expect the child to use the toilet at home even although the child is given access to a potty chair in day care. In this case, the child may not become trained on either. Other parents may abdicate too much training responsibility to caregivers. From the day care provider's perspective, parental withdrawal precludes many opportunities for appropriate timing of toilet training. To avoid such a delay, the parents and the caregivers need to communicate achievements or issues with the child's toileting abilities and together, plan next steps.

One popular training strategy used by many parents is to allow the child to become aware of self-soiling and wetting accidents. Such a strategy is impractical, however, for day care providers whose first concern is to avoid contamination via dirty clothing and soiled bathroom facilities. Regulations are particularly stringent with regard to isolation and containment of soiled clothing and training pants, and as such, caregivers favor keeping children in disposable diapers to avoid the potential exchange of stool leakage and children undressing themselves of dirty clothing. Consequently, caregivers typically deny children the opportunity to become self-aware of their soiling and wetting accidents.

Limited parental involvement in toilet training can also lead to inadequate communication with caregivers and thereby obscure subtle problems. For example, both parties may incorrectly assume that the child defecates only at home or only at the center, and the child may, as a result, develop stool-withholding and chronic constipation. Therefore, when parents stay involved with their child's toilet

training and communicate with the day care provider, confusion can be avoided.

### CONCLUSION

In finding a child's best "window of opportunity" for toilet training, the health care practitioner is armed with useful concepts of toilet readiness and independent toileting, concepts that are based on two widely accepted theoretical approaches to training and supported by decades of clinical experience. However, many practical considerations from family, social, cultural, and economic influences also weigh heavily on parents and potentially have variable effects on training timing and outcome. The health care professional needs to recognize these considerations from the child's, parents', and caregiver's perspectives, and provide advice for appropriate toileting behavior within that context to the parents. Objective guidance on toilet readiness is an integral component of guiding choices and actions for successful toilet training for children.

### REFERENCES

1. Berk LB, Friman PC. Epidemiologic aspects of toilet training. *Clin Pediatr*. 1990;29:278-281
2. Brazelton TB. A child-oriented approach to toilet training. *Pediatrics*. 1962;29:121-128
3. Stendler CB. Sixty years of child training practices: revolution in the nursery. *J Pediatr*. 1950;36:122-134
4. Lieberman L. The changing ideology of socialization: toilet training, mass media, and society. *Int J Contemp Sociol*. 1972;9:179-199
5. Luxem M, Christophersen E. Behavioral toilet training in early childhood: research, practice, and implications. *J Dev Behav Pediatr*. 1994;15:370-378
6. Stephens JA, Silber DL. Experience and reason—briefly recorded. *Pediatrics*. 1974;54:493-495
7. Bloom DA, Seeley WW, Ritchey ML, McGuire EJ. Toilet habits and continence in children: an opportunity sampling in search of normal parameters. *J Urol*. 1993;149:1087-1090
8. Robson WLM, Leung AKC. Advising parents on toilet training. *Am Fam Physician*. 1991;44:1263-1266
9. Bettison S. Toilet training the retarded: analysis of the stages of development and procedures for designing programs. *Aust J Ment Retard*. 1978;5:95-100
10. Azrin NH, Bugle C, O'Brien F. Behavioral engineering: two apparatuses for toilet training retarded children. *J Appl Behav Anal*. 1971;4:249-253
11. Azrin NH, Foxx RM. *Toilet Training in Less Than a Day*. New York, NY: Simon & Schuster; 1974
12. Christophersen ER. Toileting problems in children. *Pediatr Ann*. 1991; 20:240-244
13. Foxx RM, Azrin NH. Dry pants: a rapid method of toilet training children. *Behav Res Ther*. 1973;11:435-442
14. Taylor S, Cipani E, Clardy A. A stimulus control technique for improving the efficacy of an established toilet training program. *J Behav Ther Exp Psychiatry*. 1994;25:155-160
15. Howe AC, Walker CE. Behavioral management of toilet training, enuresis, and encopresis. *Pediatr Clin North Am*. 1992;39:413-432
16. Sadler OW, Merkert F. Evaluating the Foxx and Azrin toilet training procedure for retarded children in a day training center. *Behav Ther*. 1977;8:499-500
17. Smith PS. A comparison of different methods of toilet training the mentally handicapped. *Behav Res Ther*. 1979;17:33-43
18. Lancioni GE. Teaching independent toileting to profoundly retarded deaf-blind children. *Behav Ther*. 1980;11:234-244
19. Lancioni GE, Ceccarani PS. Teaching independent toileting within the normal daily program: two studies with profoundly retarded children. *Behav Res Severe Dev Dis*. 1981;2:79-96
20. Bettison S. Behavioral approaches to toilet training for retarded persons. *Int Rev Res Ment Retard*. 1986;14:319-350
21. Stenhouse G. Toilet training in children. *N Z Med J*. 1988;101:150-151. Letter
22. Hutch JA, Shopfner CE. The lateral cystogram as an aid to urologic diagnosis. *J Urol*. 1985;99:292-296
23. Mac Keith R, Meadow R, Turner RK. How children become dry. In: *Bladder Control and Enuresis*. Philadelphia, PA: JB Lippincott Co; 1973: chap 1
24. Christophersen ER. *Little People. Guidelines for Commonsense Child Rearing*. 4th ed. Shawnee Mission, KS: Overland Press; 1998:107-113
25. Martin JA, King DR, Maccoby EE, Jacklin CN. Secular trends and individual differences in toilet-training progress. *J Pediatr Psychol*. 1984; 9:457-467
26. Frauman AC, Brandon DH. Toilet training for the child with chronic illness. *Pediatr Nurs*. 1996;22:469-472
27. Frauman AC, Myers JT. Cognitive, psychosocial, and physical development in infants and children with end-stage renal disease. *Adv Renal Replac Ther*. 1994;1:49-54
28. Sullivan P, Woodward WE, Pickering LK, DuPont HL. Longitudinal study of occurrence of diarrheal disease in day care centers. *Am J Public Health*. 1984;74:987-991
29. Pickering LK, Bartlett AV, Woodward WE. Acute infectious diarrhea among children in day care: epidemiology and control. *Rev Infect Dis*. 1986;8:539-547
30. Ford-Jones EL, Kim M-HM, Yaffe BA, et al. Infectious diseases in day-care centres: minimizing the risk. *Can Med Assoc J*. 1987;137: 105-107. Editorial
31. US Census Bureau. *Who's Minding Our Preschoolers?* Washington, DC: Department of Commerce; Fall 1994
32. American Academy of Child and Adolescent Psychiatry. Available at: <http://www.psych.med.umich.edu/web/aacap/>. Accessed Sept 16, 1998
33. BabyCenter Resource Center. BabyCenter Web site. Available at: <http://www.babycenter.com/refcap/49.html>. Accessed Sept 16, 1998
34. Hadler SC, Erben JJ, Francis DP, Webster HM, Maynard JE. Risk factors for hepatitis A in day-care centers. *J Infect Dis*. 1982;145:255-261

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