
Problems with Toilet Training and Bed-Wetting (Nocturnal Enuresis)

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Abstract

Toilet training can be a difficult process for both parents and children. There are two main behavioural approaches to the toilet training process, which both show efficacy. These are the gradual child-oriented approach and the structured end point-oriented approach. The age of starting toilet training at the current time has been delayed in comparison to previous decades. It is thought family dynamics and the introduction of disposable diapers has encouraged this delay. Throughout training parental control over the child combined with the child's will to be in control can lead to anxiety and potentially to elimination disorders such as nocturnal enuresis. There is no known cause of this biobehavioural disorder, but many etiologic factors have been proposed. Behavioural interventions that include a urine alarm component have demonstrated efficacy in treating nocturnal enuresis.

Completing toilet training is an important developmental achievement for young children. It is a complex process that involves developmental, physiological, and behavioural factors. There are several different methods proposed for toilet training, and the two behavioural approaches with the strongest empirical support will be evaluated here. In past decades strict toilet training was the preferred method and children were trained earlier. There is now a trend towards later toilet training (Bakker & Wyndaele, 2000). Toilet training can be a stressful time, resulting in anxiety for and conflict between parents and children (Stadtler, Gorski, & Brazelton, 1999). It is thought that problems arise from inappropriate training efforts and increased parental pressure (Stadtler et al., 1999). Therefore it can be important to work with parents to develop appropriate expectations and provide information and guidance. Approximately 2 to 3 percent of children experience adverse outcomes from the training process (Klassen et al., 2006). These adverse outcomes can include children developing disordered elimination such as nocturnal enuresis. The efficacy of behavioural interventions for treating nocturnal enuresis in comparison to other common interventions will be discussed for both developmentally normal children and intellectually disabled children.

Definitions

Throughout the literature on toilet training there are inconsistent definitions of the training process, which makes it difficult to compare studies. There are no specifications of what particular behaviours are performed to begin toilet training or how long children must remain dry to be considered completely toilet trained. The use of consistent terminology would aid researchers in studying this important developmental process and clinicians in guiding parents through training (Vermandel, Van Kampen, Van Gorp, & Wyndaele, 2008).

Definitions of enuresis involve the inappropriate deposit of waste in terms of location, timing, or frequency (Williams, Jackson, & Friman, 2007). The Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition (DSM-IV) defines enuresis as the repeated voiding of urine into the bed or clothes which causes significant distress or impairment in important areas of functioning (American Psychiatric Association, 2000). The child needs to be of an age where continence is expected, for example, to be five years of age or have a mental age of five. In the present essay nocturnal enuresis (NE) will be discussed. NE refers to voiding urine during the night and in the bed only.

Toilet Training

Toilet training for developmentally normal children occurs earlier for girls than for boys (Brazelton et al., 1999; Vermandel et al., 2008). This involves parental expectations of each gender as well as innate gender differences in responding to socialisation (Brazelton et al., 1999). Girls appear to be more influenced by socialisation and boys by physical maturation. Maturation of the child is an important factor because if training is started before the child is ready the process can be prolonged (Vermandel et al., 2008).

There are different behavioural methods for toilet training. In the United States some of the most common methods include those promoted by the American Association of Paediatrics (AAP) guidelines, by Dr Spock (a gradual, passive approach), the gradual child-oriented approach, and the structured end point-oriented approach (Brazelton et al., 1999; Choby & George, 2008; Vermandel et al., 2008). These latter two approaches have the most empirical support. There is a lack of empirical research on toilet training approaches in the New Zealand literature.

The gradual child-oriented approach is guided by the child's readiness, and there have been several different lists of readiness signs published (Azrin, Sneed, & Foxx, 1974; Brazelton et al., 1999). Common readiness signs include both physical and behavioural elements, including voluntary control over bladder and bowel reflex actions (present at approximately nine months), the ability to cooperate with training, and sufficient neurological development to transfer energy for walking and other behaviours to toileting behaviours (present at approximately 18 months) (Azrin et al., 1974; Brazelton et al., 1999). When the gradual training approach was proposed it differed from previous methods in delaying the training until these specific physical and psychological milestones were reached. Both the parent and child are involved and the process gradually helps the child become

comfortable with the potty-chair, gain understanding of the toileting process, and eventually become confident with independent use of the chair (Choby & George, 2008).

Another version of this developmentally-focused gradual approach to toilet training has been proposed by Stadtler et al. (1999). This approach is a staged system of toilet training that involves behavioural components. The system begins with the child becoming comfortable with a suitably sized potty chair and sitting on it with his or her clothes on. Parents can then show the function of the chair by putting dirty diapers into the chair. Some important behavioural components within this process are the use of reinforcement and reminders. Based on times of the day when urination is most probable (e.g., on awakening), parents can place the child on the potty chair and reinforce appropriate use of the chair. It is recommended that a range of appropriate toileting behaviours be provided and reinforced by the parents in this process. The child will be developing a sense of competence as he or she achieves each stage of the process, and parental support is very important to encourage this growth of the child's self-esteem (Stadtler et al., 1999).

The structured end point-oriented approach originated in the applied behaviour research of the 1960s and 1970s, and was first developed with an intellectually disabled population, although it is now also used with developmentally normal children. The approach is more focused on the parent. One popular method, "toilet training in a day", involved a number of component skills that could be taught to the child (Foxx & Azrin, 1972). This approach used rewards to establish proper toileting behaviours and punishment or decreased positive attention for accidents (Choby & George, 2008). In one study of this method, toilet training was accomplished by 34 children in an average of 3.9 hours, and accidents remained near zero during a four month follow-up (Foxx & Azrin, 1972). A modern structured

behavioural approach involves teaching the child to discriminate stimuli that are appropriate to the elimination process. These structured interventions involve similar behavioural components to the initial Foxx and Azrin (1972) method, including increasing fluid intake, regularly scheduling toilet times, positive reinforcement for correct elimination, and overcorrection. Overcorrection involves both restitution and positive practice (Matson, Horne, Ollendick, & Ollendick, 1979). Restitution requires the child to return their bedding to the way it was before (i.e., change the sheets) and positive practice requires the child to practice the appropriate behaviour of urinating in the toilet several times. The component approach has been found to have greater efficacy than other behavioural methods, including conditioned stimulus response and operant conditioning models that have stricter routines (Howe & Walker, 1992; Mellon & McGrath, 2000). A meta-analysis of 26 observational studies and 8 controlled trials found that the Foxx and Azrin method seems to result in rapid success rates which are maintained over time (Klassen et al., 2006).

Although the structured model is effective it is not without problems. When the "toilet training in a day" procedure was implemented by parents alone it did not work as efficiently and effectively as when implemented by the experimenters. Children also displayed aggressive and negative behaviours during the procedure (Brazelton et al., 1999). Another problem is that if elimination is enforced too quickly it can lead to regression as the child may not want to face failure or conflict. Regression can also occur after a stressful family event, for example, the birth of a new sibling (Stadtler et al., 1999). Parental anxiety over the set back can then exacerbate the situation. It has been recommended that positive parent-child interactions in other areas should then be increased to help the child gain positive self-esteem again and a break from toilet training can sometimes be helpful (Stadtler et al., 1999). A further problem is that when

overcorrection is unsupervised it can escalate and this can be dangerous in situations where there is a chance of abuse (Brazelton et al., 1999).

Bakker and Wyndaele (2000) found that the age of starting toilet training over the last 60 years has become significantly higher. In the eldest group (over 60 years) the majority of training was initiated before 18 months whereas in the youngest group (20 to 40 years) most children began toilet training after 18 months. There was no significant change in the length of toilet training. They also found that parental attitudes to toilet training have changed. Younger parents (20 to 40 years) used more methods than older parents (over 60 years) who had stricter toilet training schedules which involved bladder "drilling". "Drilling" refers to strict toilet training starting once the child has attained a particular bladder capacity, usually determined by the presence of a dry afternoon nap. Bakker and Wyndaele hypothesise that this was a way of avoiding later bladder dysfunction and that current toileting problems in children may be a result of this change in toileting methods. More research is required to determine whether this is an accurate hypothesis.

One reason for delaying toilet training in the current generation could be that both parents are more likely to have jobs and may not have time to initiate toilet training earlier. The introduction of disposable diapers may also be a reason for the delay as they make the diaper changing process easier and cleaner. However, there are several disadvantages to starting toilet training at a later stage. There can be problems of hygiene and there is an increased risk of the spread of infectious diarrhoea and hepatitis in day care centres (Bakker & Wyndaele, 2000; Simon & Thompson, 2006). There is also an increased financial cost to the family if they are purchasing disposable diapers, and there are increased environmental costs due to the nonbiodegradable materials of the diapers

(Bakker & Wyndaele, 2000; Simon & Thompson, 2006).

It has been argued that diapers exert stimulus control over accidents as there is no consequence for discriminating the need to urinate nor for inhibiting urination (Williams et al., 2007). One study investigated the effects of undergarment type on the urinary continence of toddlers (Simon & Thompson, 2006). They followed five toddlers who attended full-time care programs. A multiple baseline design was employed for all participants and a reversal design for two participants. There was a diaper condition, a pull-on condition (lighter than a diaper) and an underwear condition. Underwear alone increased continence of two of the five toddlers and decreased incontinent episodes. The other children had mixed results with some increases in continence but no decrease in incontinent accidents or vice versa. This provides some initial support for the idea that undergarment type can affect the toilet training process, but the variable results suggest that an individualised approach is needed for toilet training.

An important issue raised by Stadtler et al. (1999) is that toilet training can create fears in children, for example of being flushed away. One way to combat this can be to make the flushing fun by saying bye-bye or involving one of the child's toys to help. Having children use equipment that is the appropriate size for them may lessen these fears of being flushed away and make the process more comfortable for them. Such equipment will also ensure the children assume the correct posture, which will make elimination easier for the child. A normal toilet is hard for young children to use as the seat will be too large for them and their feet will not be able to reach the floor. Bakker and Wyndaele (2000) found there was a decline in the past 60 years of the use of baby chairs with holes in the seats and the use of a normal toilet has replaced this chair, perhaps adding to the increase in problems relating to toilet training.

Nocturnal Enuresis

NE is one problem that can arise from the toilet training process. Night time bladder training usually takes longer than daytime training as the sleep cycle needs to mature to allow the child to awaken in time to urinate (Hjalmas et al., 2004). There are gender differences in the incidence of NE, with a greater number of males than females having the disorder (Brazelton et al., 1999; Caldwell, Edgar, Hodson, & Craig, 2005). NE can cause serious problems in the child's life. Performance at school may be affected and there can be social problems; the child may not want to attend sleep overs with friends or other overnight activities (Blum, 2004). There can be interpersonal problems and NE can also affect later sexual activity (Caldwell et al., 2005; Stadtler et al., 1999). It has been hypothesised that children with NE have lower self-esteem (Stadtler et al., 1999), although there is no conclusive evidence of this to date (Blum, 2004; Hjalmas et al., 2004).

There is strong evidence for hereditary links in NE. Approximately 75% of children with NE have a first-degree relative who has the disorder (American Psychiatric Association, 2000; Christophersen & Purvis, 2001). In addition, there is greater concordance for NE in monozygotic children than in dizygotic children (American Psychiatric Association, 2000). In a New Zealand study, children took longer to gain nocturnal bladder control when either one or both of their parents had had enuresis compared to children with neither of their parents having had enuresis (Fergusson, Horwood, & Shannon, 1986).

Initial screening for a medical condition is necessary to determine whether the child's elimination disorder has an organic or behavioural cause. Organic causes of enuresis include urinary tract infections and anomalies, deficiencies in antidiuretic hormone (ADH) secretion, and small bladder capacity (Hjalmas et al., 2004; Williams et al., 2007). Behavioural causes include faulty training habits and an

inadequate learning history. If the cause is a medical condition then behavioural treatments such as scheduled voiding can provide an accompanying role in the intervention (Mellon & McGrath, 2000). When the problem is behavioural it is very unlikely there will be one causal factor. Functional assessment is a way of determining which factors are contributing to the problem and also leads to interventions that are functionally related to the elimination disorder (Williams et al., 2007). A thorough history and physical examination are recommended when assessing children with wetting problems (Caldwell et al., 2005).

There are a variety of ways to treat NE, some of which include behavioural components. Hypnosis and psychotherapy have been used but empirical support comes mostly from case studies (Blum, 2004). These interventions do not include behavioural components. Pharmacological interventions are available and can be helpful to achieve short term continence, for example if the child has a school camp. However these interventions do not teach continence and there is a very high relapse rate (approximately $\frac{3}{4}$ of children) after the medication is stopped (Williams et al., 2007). Desmopressin is the most commonly prescribed medication for NE and combining this with the urine alarm (discussed below) can address the delayed response to conditioning treatment that sometimes occurs (Houts, Liebert, & Padawer, 1983).

Several behavioural interventions that have demonstrated efficacy are available for treating NE. Hjalmas et al. (2004) have discussed a first line intervention they believe should be implemented before other interventions. It involves providing a baseline measure of the problem, making information about the problem accessible for the family, and conducting counselling with the family. Counselling can ensure the child is receiving the appropriate developmental levels of sleep and that the

family does not eat or drink large amounts in the hours before bedtime. The counselling also involves some behavioural components. These include a routine being put in place with regular voiding for the child during the day and before bedtime and using positive reinforcement for dry nights and appropriate toileting behaviours. Hjalmas et al. have found that the combination of a motivated child and cooperative family gives the best outcomes in treating NE.

Other simple interventions may initially be put in place such as lifting and night awakening of the child before the parents go to bed. Lifting refers to the process of taking the child to urinate without fully awakening them. Night awakening refers to fully awakening the child and taking them to urinate before they would normally wet the bed (Blum, 2004). The frequency of awakenings can gradually be reduced once the child becomes dry on the awakening schedule. The efficacy of these interventions has not been fully evaluated, but in one study night awakening was found to be more effective than lifting (Butler, 1998, as cited in Blum, 2004). Retention control training is another behavioural intervention that can be used, although the research on the efficacy of this is mixed. This intervention aims to increase the functional bladder capacity of the child through increasing fluid intake and lengthening the holding time before voiding (Blum, 2004). It is thought that this intervention is most effective for children with small bladder capacities.

The standard behavioural treatment for NE over the past four decades has been the urine alarm or bell-and-pad procedure (Christophersen & Purvis, 2001). There is a high level of evidence for using an alarm to treat NE and this has well-supported efficacy (Mellon & McGrath, 2000), which increases with the duration of therapy (Hjalmas et al., 2004). These two main alarm types are available in New Zealand. The bell-and-pad alarm sounds an alarm when

any liquid is in the bed, which wakes the child. The child then gets up and finishes voiding in the toilet and changes the bedding (Christophersen & Purvis, 2001). The personal alarm can be clipped onto the child's clothing and is also activated when liquid is present. Both are equally effective (Caldwell et al., 2005).

Initial studies using an alarm alone resulted in respondent extinction with a 35 % relapse rate (Williams et al., 2007). Intermittent reinforcement with the alarm sounding on only some instances of urination significantly reduced this relapse rate (Williams et al., 2007). The average success rate of children with NE cured using the basic urine alarm treatment is 77% (Mellon & McGrath, 2000). One study in which children were between the ages of 8 and 14 were treated for primary NE (the child is never consistently dry at night) using a urine alarm found a 69% cure rate, and also found significant improvements in self-concept, popularity, physical appearance, and school performance (Moffat, Kato, & Pless, 1987). Comparisons were made between the treatment group and a waitlist control group.

The exact mechanisms of the alarm treatment are not known and there have been differing behavioural explanations. Mowrer (1938, as cited in Williams et al., 2007) proposed a Pavlovian conditioning explanation. In this model the full bladder is seen as a neutral stimulus that is paired with the alarm (unconditioned stimulus). The full bladder becomes the conditioned stimulus, eventually causing awakening. This prevents the conditioned response of bed wetting. Another behavioural explanation involves negative reinforcement. In this model releasing the sphincter muscles, which results in wetting, activates the alarm, an aversive stimulus. Tightening the sphincter muscles becomes an escape behaviour. Therefore this model proposed sphincter contraction as the conditioned response. (Williams et al., 2007).

There are interventions for the treatment of NE that utilise the urine alarm and also add other behavioural components. One of these is based on operant conditioning and is known as the "dry-bed" method (Azrin et al., 1974). In this model, staying dry becomes an escape behaviour. This intervention involves intensive training for one night and includes an alarm in both the child's and the parents' room. The child is given increased fluids before bed and is required to practice going to the bathroom from their bed 20 times before sleeping. The child is then awakened hourly and asked to inhibit their urination either until the next hourly awakening or for as long as they can at that time. Praise is given for the bed being dry and if the alarm is activated, disapproval is given and the child is required to change his or her bedclothes and practice going to the bathroom and urinating 20 times again (Azrin et al., 1974; Williams et al., 2007). This dry-bed method was found to be effective in several studies (Azrin et al., 1974; Caldwell et al., 2005; Mellon & McGrath, 2000). However, there is some evidence that taking the urine alarm out of the dry-bed method reduces the effectiveness of the procedure (Mellon & McGrath, 2000) and, similar to the Foxx and Azrin (1972) toilet training method, concerns have been raised over the positive practicing element and the effects of this intensive training on the family (Mellon & McGrath, 2000).

A second example of a multi-component intervention that utilises the urine alarm is the "full spectrum home training" approach (Houts et al., 1983). The components include retention control training with monetary rewards, cleanliness training, self-monitoring of wet/dry nights, and a graduated overlearning procedure. There has been research showing that the combination of all components and the urine alarm gives faster results than when each component is individually paired with the alarm (Houts et al., 1983). The full spectrum home training intervention was also found to have significantly lower relapse rates than the

other pairings. This multi-component approach is less strenuous for the family than the dry-bed procedure. While the procedure has demonstrated efficacy it is classed as “probably efficacious” because it has only been studied by one research group (Mellon & McGrath, 2000).

Another type of intervention available for NE is known as the “Self-Control Dual Intervention Model” (SCDIM) (Ronen & Rosenbaum, 2001). The intervention is based on the assumption that NE is maintained by deficiencies in self-control (Ronen, Rahav, & Wozner, 1995) and the aim is to develop independent functioning by applying self-control skills. These self-control skills include cognitive restructuring to identify that the problem depends on the child; problem analysis which trains the child to notice the link between thoughts and behaviours; attentional focus which increases the child’s sensitivity to his or her body, and behaviour and self-control practice to change automatic processes to mediated ones (Ronen & Rosenbaum, 2001). Although this is a cognitive intervention, behavioural components are involved. These are outlined in a case study of a 10-year-old boy with primary NE who was treated with the SCDIM (Ronen & Rosenbaum, 2001). Alongside therapy to develop the self-control skills described above, the boy was required to monitor the problem behaviour of wetting and use restitution (changing and washing his sheets himself). Positive reinforcement from the therapist and the boy’s parents was also used.

Intellectual Disabilities

The discussion thus far has been related to toilet training and NE in developmentally normal children. For children with intellectual disabilities toilet training is perhaps an even more important developmental milestone (Brazelton et al., 1999). Toilet training with this population presents different challenges as there may be communication difficulties, physical deficits and impaired processing of sensory

information (Klassen et al., 2006). Variants of operant conditioning programs have been utilised with children with intellectual disabilities, and it has been found that self-initiated toileting increased and the majority of children were successfully toilet trained (see Klassen et al., 2006, for review).

The “dry-bed” procedure (Azrin et al., 1974) was initially designed for people with severe intellectual impairments. These people were institutionalised and suffered from NE. As described earlier, the procedure involved one intensive night of training followed by use of the urine alarm for approximately one week. This procedure showed great success and bedwetting ceased within 2 to 3 days (Azrin et al., 1974). However, because there is a wide range of functionality within this population, individualised and flexible programs will need to be implemented. Parents and caregivers should be aware that while the process may take longer than expected and setbacks may occur, children with intellectual disabilities can gain at least partial, if not full, success with toilet training (Klassen et al., 2006).

Conclusions

Direct comparison between the two behavioural approaches discussed for toilet training has not been conducted (Choby & George, 2008), as the approaches differ in terms of endpoints, goal development, and the emphasis placed on the child’s self-esteem (Klassen et al., 2006). Both approaches seem capable of producing effective toilet-training results in developmentally normal children and clinicians and parents will need to decide which approach fits their situation best. The structured end point-oriented approach requires more intensive training but gives quicker results. The gradual, child-oriented approach requires fewer resources but generally takes longer. Both approaches have supporting empirical evidence. For children with intellectual disabilities the structured end point-oriented approach appears to be the most effective. More individualised and complex behavioural

interventions may be necessary when children are delayed in their toilet training (Mellon & McGrath, 2000).

NE needs to be treated early to encourage normal psychosocial development, and a biobehavioural approach is necessary to take into account both the physiological and behavioural elements of the disorder (Williams et al., 2007). The most successful interventions for NE include the urine alarm as an important component. This is evident from research showing interventions that include an alarm are more effective than those that do not (Houts et al., 1983; Mellon & McGrath, 2000).

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