Increasing Independence: An evaluation of a Reinforcement-Based Toilet Training Procedure using the Picture Exchange Communication System

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Background

- Toileting skills are among the most desired self care skills to teach children with developmental disabilities (Baker & Brightman 2004).
- Toilet training using a combination of positive reinforcement and punishment based interventions have demonstrated to be the most effective teaching strategy (Azrin & Foxx 1971; Ando 1977)
- However, researchers have questioned the use of a punishment component within the toileting training literature (Bettison 1978, Lancioni 1980, Tierny 1973).
- Studies that have reported success have lacked details about initiation training procedure when taught and the current communication system/level of participants who are non-verbal (Luiselli 1997; Cicero &Pdfat 2002; Post and Kirkpatrick 2004).

Azrin & Foxx (1971)- Rapid Toilet Training (RTT)

- Azrin and Foxx's procedure was the most widely accepted.
- Population: Institutionalized adults with lowest IQ of 30; range 20 to 62 yrs.
- Toilet training program shows rapid acquisition (median=4 days; mean of 6 days)
- The first to use urine sensor and alarm which was placed in the participants underwear.
- Effective components included positive reinforcement, habit-training, graduated guidance, positive practice, overcorrection and fading.

Cicero and Pdfat (2002)

- Demonstrated that rapid self-initiation toileting can be gained through reinforcement based approached in the absence of a punishment based component.
- 3 Participants: 6, 4 and 4 yrs. All diagnosed with autism. 1 was non-verbal and used an electronic talking device and 2 used one-two word phrases.
- Effective components include positive reinforcement, graduated guidance, scheduled practice trials and forward prompting.
- Results were all 3 participants had self-initiated requests to use the toilet and 0 toileting accidents achieved within 7-11 days.

Purpose

- In the present study we sought to replicate the reinforcement-based toilet training procedure by Cicero & Pfadt (2002) and extend the current literature by expanding the teaching procedure of the picture exchange to request the toilet.

Participants

- Nicole, six year old with a dual diagnosis of Down syndrome and Autism.
- Marco, six year old with a diagnosis of Autism
- Nicole attended IBI program for 6 hours a day 4 days a week.
- Marco attended IBI program for 6 hours a day 5 days a week.
- Both Non-verbal and communicated through the use of PECS-phase 4.
- Both met the prerequisite skills for toilet training as outlined by Baker and Brightman (1997), which includes the ability to sit or at least 5 minutes, hold urine for 1.5 hr, follow simple directions and basic dressing skills.

Setting

- Throughout training Nicole and Marco were restricted to the second floor classroom and gym which was next to the washroom and continued with their routine and programs.
- The washroom used had 1 toilet and 1 sink and a stepstool to reach the sink. A tv and dvd player remained in the washroom to avoid delay in access to reinforcement.

Procedure

Baseline

- 3 consecutive days of data were collected.

Therapist training

- Prior to implementing the toilet training intervention, all therapists received supplemental training on the intervention.
- The training was conducted by the Supervisor and consisted of group presentation, role-play and in vivo practice and feedback.
- Daily observations were conducted in order to ensure adherence to the treatment protocol.

Preference Assessment

- A multiple stimulus preference assessment without replacement was conducted (DeLeone & Iwata 1996) to identify items to use as a reinforcer. These items were reserved for toilet training only.

Communication System

- Nicole and Marco used PECS to communicate and used some vocal approximations to words. At start of intervention both participants were in PECS phase 4.

Preparation of Participant

- Upon arrival was taken to the washroom where diapers and excess clothing were removed.
- Nicole and Marco were given free access to liquids during morning session. A variety of liquids were made available and they were encouraged to drink. Liquid intake was limited in the afternoon session.

Toilet Training Procedure

- A timer was set for 30 minute intervals. Every 30 minutes, the participant was physically prompted to request the use of the washroom through a picture exchange and eventually faded to a gestural prompt.

Request Training using PECS

- Nicole and Marco were taught to construct a sentence using the carrier phrase “I want”. They were prompted from behind to construct the sentence strip, hand it over the therapist and point to the pictures from left to right. The therapist read aloud “I want pee pee” as they touched the picture.
- This sentence construction, exchange and point was consistent with both participants current skill level in PECS phase 4 (Bondy & Frost 2001).

Nicole’s book

The sentence strip

Constructing the sentence

Exchanging the sentence strip

Pointing to the sentence strip

- Once the participant was prompted to request the toilet they were encouraged to sit on the toilet for 1-3 min. If urination occurred they were prompted to stand up from toilet, wipe (Nicole only), redress and flush the toilet. A combination of behaviour specific verbal praise and tangible was delivered at that time.
- If urination did not occur, they were prompted to stand and redress. A verbal statement was delivered in a neutral tone such as “Ok, you don’t have to pee”. No verbal praise or tangible item was given.
- A graduated guidance from behind procedure for wiping, flushing and redressing was used to teach these daily living skills.

Accidents

- Immediately upon noticing the start of a urination accident, the therapist would make a statement that startled them “WAIT, pee in the toilet” and simultaneously bring the participant to the washroom using a forward prompt.
- The therapist would lower the underwear encourage the participant to finish urination into the toilet.
- If the participant finished urination in the toilet they were prompted to stand up from toilet, wipe (Nicole only), redress and flush the toilet. A combination of behaviour specific verbal praise and tangible reinforcement was delivered at that time.
- If urination did not resume, the participant was prompted to stand and redress. Request training was not provided during these trials.

Fading Procedure

- Once spontaneous requesting was observed, followed by urination on the toilet, the prompted schedule component of the procedure was discontinued.
- Reinforcement continued to be delivered for urination on the toilet and forward prompting to the toilet was continued in response to accidents.
- When spontaneous initiations were observed for 3 days and 0 accidents, other components of the training procedure were quickly faded.
  - Liquid intake returned to typical amounts.
  - Full clothing was reintroduced.
- All reinforcement and forward prompting procedures continued to be implemented throughout the fading process.

Data Collection

- Data were collected daily during centre hours. Therapists recorded the frequency of urination accidents and spontaneous requests.
- An accident was defined as any release of urine outside of the toilet.
- An accident was recorded as an accident regardless if they finished in the toilet and was denoted with an asterisk.
- A spontaneous request was defined by any picture request in the absence of prompts followed by successful urination in the toilet.

Results

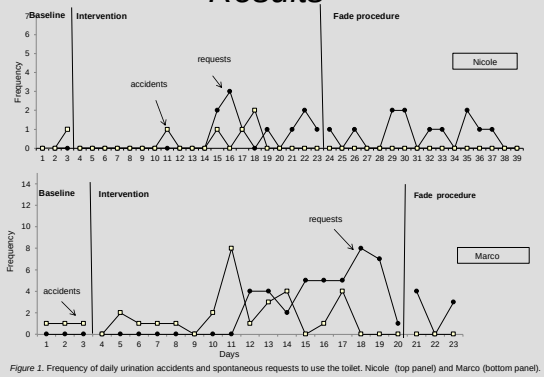

Figure 1. Frequency of daily urination accidents and spontaneous requests to use the toilet. Nicole (top panel) and Marco (bottom panel).

Results Nicole

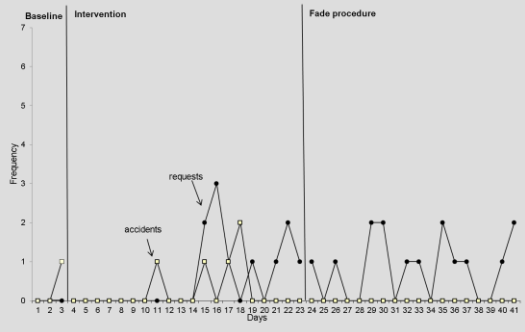

Figure 1. Frequency of daily urination accidents and spontaneous requests to use the toilet.

Results Marco

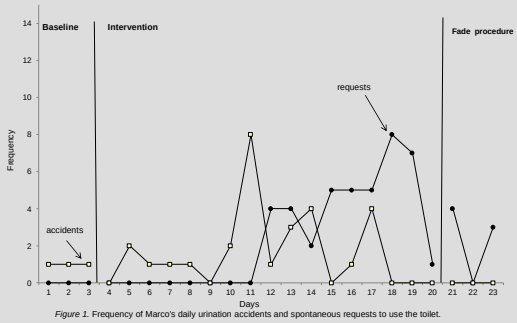

Figure 1. Frequency of Marco's daily urination accidents and spontaneous requests to use the toilet.

Results Nicole

- During baseline, frequency of accidents was 1 per school day. On day 4 toilet training intervention was initiated. Spontaneous requests were observed on day 15 (prompting to toilet was stopped). Urination accidents dropped to 0 by day 19. On day 21 independent requests to use the toilet was at an acceptable level (between 1 and 2 requests per 6 hour day) and accidents maintained at 0.
- On day 24 flooding was stopped and liquid intake returned to baseline measures.
- On day 28 full clothing resumed.
- The home environment reports that initiations to use the toilet have transferred to home.

Results Marco

- During baseline, Marco's frequency of accidents was 1 per school day. On day 4 toilet training intervention was initiated. Spontaneous requests were observed on day 12 (prompting to toilet was stopped). Urination accidents dropped to 0 by day 18. By day 20 independent requests to use the toilet was at an acceptable level (average 5 requests per 6 hour day) and accidents maintained at 0.
- On day 21 flooding was stopped and liquid intake returned to baseline measures; and full clothing resumed.
- The home environment reports that initiations to use the toilet have transferred to home.

Discussion

- The results of this study indicate that self-initiated requests to use the toilet was achieved in 14-16 days. While accidents maintained at 0.
- The data indicate that the present procedure was effective to teach initiations to use the toilet when positive reinforcement was combined with PECS.
- An issue raised in the current investigation regarding the speed of skill acquisition. Cicero and Pdfat (2002) results took 7-11 training days to achieve self-initiated requests and 0 accidents.
- It is important to note that the present procedure was implemented for 6-hr 4or5 days a week. Cicero and Pdfat had a 5.5-hr 5 days a week and Azrin and Foxx (1971) recommended 8-hr training day for maximum effectiveness

Discussion

- The current intervention may be seen as more acceptable by parents and service providers because the punishment component questioned in earlier research is removed. In an applied setting, not restricting clients to the bathroom for the duration of the training day is more appealing to parents and clinicians.
- The current intervention expands and extends Cicero and Pdfat's (2002) teaching procedure by using the teaching format of PECS to teach initiations. This added component will likely increase procedural integrity for future replication.

Discussion

- Several limitations to the present study
  - First, simple AB design can be seen as having some threats to internal validity than an experimental design.
  - Second, formal data was not collected on generalization in the home environment.
- Other area for future research is to replicate with other PEC users and/or other participants with dual diagnoses.
- Future research could include a parent training component to formally assess generalization to the home environment.

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