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Later toilet training is associated with urge incontinence in children

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Abstract *Objective:* The objective of this study was to determine if later toilet training is associated with urge incontinence in children.
Methods: We used a case—control study design to yield level 2 evidence.
Results: Initiation of toilet training after 32 months of age was associated with urge incontinence ($P = 0.02$).
Conclusion: For children who display signs of toilet-training readiness, training should be initiated prior to 32 months of age to reduce the risk for urge incontinence.

Introduction

The debate regarding early versus later toilet training has been ongoing since the 1930s [1—8]. More parents may be initiating training later since studies indicate that age at toilet training is increasing worldwide [2]. In 1980, the mean toilet-trained age was 26 months compared to 36.8 months in 2003 [2]. It has been suggested that later toilet training may be associated with the subsequent development of dysfunctional voiding, but this hypothesis has never been tested [3].

The potential relationship between dysfunctional voiding and later toilet training is important to clarify since the incidence of later toilet training is increasing, and dysfunctional voiding can result in UTIs, pyelonephrititis, and, in its most severe form, renal damage [4—6]. In this study, we utilized a case—control study design to determine if urge incontinence is related to later initiation of toilet training.

Methods

The Robert Wood Johnson Medical School Institutional Review Board approved the study protocol. Cases consisted of children between the ages of 4 and 12 years who presented for pediatric urology consultation for urge incontinence. Controls were recruited from a general pediatric practice in the same geographic area and consisted of healthy children without a history of urge incontinence. Patients with anatomic malformations of the urinary tract,

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Table 1 Characteristics of study subjects ($N = 215$).

Variable	Cases ($N = 58$)		Controls ($N = 157$)		P
	n	Mean (SD)	n	Mean (SD)	
Age (years)	58	7.76 (2.401)	157	7.94 (2.279)	0.605[a]
Gender					
Male	33	68.2	107	56.9	0.124[b]
Female	25	31.8	50	43.1	
Race					
White	47	81.0	102	65.0	0.138[c]
Black	3	5.2	15	9.6	
Asian	6	10.3	18	11.5	
Hispanic/Latino	2	3.4	19	12.1	
Other/Unknown	0	0.0	3	1.9	
Household income					
<$20,000	1	1.7	6	3.8	0.439[d]
$20,000–$40,000	3	5.2	6	3.8	
>$40,000	34	58.6	106	67.5	
Unknown	20	34.5	39	24.8	
Mother's education					
High School	13	22.4	26	16.6	0.499[e]
College	29	50.0	92	58.6	
Advanced Degree	16	27.6	37	23.6	
Unknown	0	0.0	2	1.3	

Variable	Cases ($N = 58$)		Controls ($N = 157$)		P
	n	%	n	%	
Mother working					
No	21	36.2	46	29.3	0.633[f]
Part-time	11	19.0	36	22.9	
Full-time	26	44.8	73	46.5	
Unknown	0	0.0	2	1.3	
Toilet-training method					
Parent-oriented	29	50.0	88	56.1	0.186[g]
Child-oriented	17	29.3	54	34.4	
Both	9	15.5	11	7.0	
Unknown	3	5.2	4	2.5	

	n	Mean (SD)	n	Mean (SD)	
Children in household	58	1.21 (0.767)	157	1.40 (0.953)	0.165[h]
Mean age toilet training began (months)[k]	57	31.70 (9.481)	155	28.70 (8.504)	0.028[i]
Mean weaning age (months)[k]	57	5.47 (6.890)	156	6.07 (7.739)	0.609[j]

[a] $t = -0.518$, $df = 213$.
[b] $\chi^2 = 2.362$, $df = 1$.
[c] $\chi^2 = 6.952$, $df = 4$.
[d] $\chi^2 = 2.706$, $df = 3$.
[e] $\chi^2 = 2.373$, $df = 3$.
[f] $\chi^2 = 1.717$, $df = 3$.
[g] $\chi^2 = 4.811$, $df = 3$.
[h] $\chi^2 = 1.916$, $df = 2$.
[i] $t = -1.395$, $df = 213$.
[j] $t = 2.208$, $df = 210$.
[k] Tally in this section reflects missing data.