

Effects of different methods of treatment of primary enuresis on psychologic functioning in children

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Sixty-two children with primary nocturnal enuresis were assigned randomly to one of two groups. Group 1 was treated with imipramine hydrochloride, and group 2 received a course of treatment with the Mozes Detector. Seventeen children from group 1 and 18 from group 2 were tested with the age-appropriate form of the Cattell personality questionnaire on three occasions: at the time of entry into the study, 2 months later and at follow-up, an average of 16 months later. The patients in group 2, who were older, had a higher rate of cure than did the patients in group 1. They also had significantly higher levels of extroversion and significantly lower levels of neuroticism at follow-up than did those in group 1. These findings indicate that better results are seen with the Mozes Detector than with imipramine in older children with primary nocturnal enuresis.

L'étude porte sur 62 enfants présentant une énurésie nocturne primaire. On les distribue au hasard en deux groupes. Ceux du groupe 1 sont traités au chlorhydrate d'imipramine; ceux du groupe 2, munis d'un appareil "Mozes Detector", et dont l'âge moyen est plus élevé que celui du groupe 1, montrent un plus haut taux de guérison. Chez 17 enfants du groupe 1 et 18 du groupe 2 on a posé le "Cattell personality questionnaire", sous la forme correspondant à l'âge de chaque enfant, à trois reprises: au début de l'expérience, au bout de 2 mois, et au moment du contrôle post-traitement. Celui-ci survient en moyenne 16 mois après le début; on y trouve significativement plus d'indices d'extraversion et significativement moins d'indices névrotiques chez les enfants du groupe 2 que chez les autres. Le tout suggère que l'appareil de Mozes donne un meilleur résultat que l'imipramine chez les enfants plus âgés souffrant d'une énurésie nocturne primaire.

Primary nocturnal enuresis, which occurs in about 10% to 15% of children, is commonly treated by either imipramine hydrochloride or waking devices.¹ While a number of studies have evaluated these two forms of treatment,^{2,3} few have compared the psychologic benefits

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or disadvantages associated with each.⁴ Our study examined changes in personality reported by children with primary enuresis who were treated with either imipramine or a waking device.

Methods

The study included 62 children aged 6 to 12 years who had primary enuresis. The children were randomly assigned to one of two groups: the 31 children in group 1 were treated with imipramine hydrochloride (Tofranil), and the 31 in group 2 were treated with the Mozes Detector.

The Mozes Detector (Mozes Detector, Don Mills; Ont.) is similar to most waking devices, with one exception. With the passage of a few drops of urine a buzzer is triggered and an electrical impulse is delivered to the anterior abdominal wall through three electrodes that are attached to a waistband worn by the child. The electrical stimulus is provided by six penlight 1.5-V batteries capable of delivering 5, 10 or 16 μ A in a pulsed signal (on for 20 ms, off for 480 ms).

All the patients had been referred to the enuresis clinic of the Hospital for Sick Children, Toronto. On entry into the study the children received a comprehensive medical examination, including urinalysis. At the same time the children between the ages of 8 and 12 years were tested with the Children's Personality Questionnaire⁵ and the children aged under 8 years were tested with the Early School Personality Questionnaire.⁶ These tests (both part of the Cattell Personality Questionnaire series) measure the levels of anxiety (defined in terms of excitability and apprehension), extroversion (defined by outgoingness and liveliness) and neuroticism (defined by troubled worrying). The age-appropriate form of the test was readministered to every child 2 months after entry into the study and again at follow-up, an average of 16 months later. Seventeen patients in group 1 and 18 in group 2 were tested on all three occasions. Most of the patients who dropped out of the study had failed to keep their appointments for the final assessment.

Results

Clinical and demographic characteristics

On entry into the study the two groups did not differ in sex, ethnic origin, social class or history of enuresis as defined by the duration, frequency and type of voiding. They did differ significantly ($p < 0.05$) in age, however, the children in group 2 being older (mean age 10.7 years) than those in group 1 (mean age 9.0 years). The patients in groups 1 and 2 who completed the study also differed significantly ($p < 0.001$) in age, their mean

ages being 8.7 and 11.1 years respectively. To control for this factor in our examination of the personality data we used analyses of covariance with age as the covariate.

Personality

The variables on the personality tests were examined by two-way repeated analyses of covariance (group \times test occasion). There were no significant differences in the anxiety scores of the two groups on any of the three occasions of testing, nor was there any interaction between group and test occasion. An analysis of covariance with the first test result as a covariate, to control for any difference in anxiety levels before treatment, was also done. This too produced no significant differences.

With age as the covariate an analysis of covariance of the extroversion data indicated that the two groups' scores changed differentially over the three test occasions, the group treated with the Mozes Detector becoming significantly more extroverted (group \times time: $F = 5.471$, $p = 0.005$) than the group treated with imipramine. An analysis of covariance with the first test score as the covariate also yielded significant results (group \times time: $F = 8.744$, $p = 0.005$) supporting the same conclusion (Table I).

With age as the covariate, analysis of covariance of the neuroticism scores of the two groups also showed a significant group \times test occasion interaction ($F = 8.913$, $p = 0.001$). This indicated that the group treated with the Mozes Detector had lower levels of neuroticism on the third test occasion than the group treated with imipramine. An analysis of covariance with the first test score as the covariate also gave significant results ($F = 14.143$, $p = 0.001$), indicating that the changes in the levels of neuroticism could not be attributed to differences between the groups before treatment (Table II).

Clinical outcome

Clinical outcome was assessed by tabulating the number of children in each group who were "cured", cure being defined as the absence of nocturnal enuresis for 2 months. Patients who did not meet this criterion were "not cured". There was a higher rate of cure for group 2 (61%) than for group 1 (27%) ($\chi^2 = 4.98$, $p < 0.05$) (Table III). However, because the two groups differed in age, an analysis of covariance with age as the covariate and "cured" versus "not cured" as the dependent variable was also carried out. This yielded an F value of 2.293 ($p = 0.068$, one-tail test), indicating that the patients treated with the Mozes Detector only tended to have a higher rate of cure than those treated with imipramine when age was controlled. The adjusted rates of cure were 57.9% and 27.8%.

Outcome and personality

Because the patients treated with the Mozes Detector tended to have a higher rate of cure and showed personality changes during treatment that were not seen in those treated with imipramine we examined the

relation between cure and personality in the two groups. This was done by means of two-way repeated analyses of variance ("cured" v. "not cured" \times test occasion) for each personality trait in each group. The only significant finding was that the neuroticism scores were lower in the group treated with the Mozes Detector on the third test occasion. There was no interaction with cure, which indicates that this change could not be ascribed to the success of the treatment. This issue was also examined by a series of analyses of covariance with the "cured" versus "not cured" status of each patient as a covariate. As with the previous findings, no significant change in the anxiety scores of the two groups was found. The covariance analysis of the neuroticism and extroversion data yielded the same group \times time interaction as before ($F = 8.913$, $p = 0.001$ and $F = 5.741$, $p = 0.005$ respectively). Therefore, the personality changes were unrelated to the failure of treatment.

Discussion

Our results indicate that children with primary nocturnal enuresis who are treated with a waking device show changes in personality throughout the course of treatment. The children in our series who were treated

Table I—Extroversion scores on three test occasions in patients with primary enuresis treated with imipramine or the Mozes Detector

Treatment group	Test occasion; score, mean \pm standard deviation (SD)		
	At entry into study	Two months later	Average of 16 months later
Imipramine (n=17)	5.39 \pm 1.57	6.18 \pm 1.89	4.69 \pm 1.45
Mozes Detector (n=18)	4.71 \pm 1.63	4.71 \pm 1.63	5.66 \pm 1.83

Table II—Neuroticism scores on three test occasions in the same two groups

Treatment group	Test occasion; score, mean \pm SD		
	At entry into study	2 months later	Average of 16 months later
Imipramine (n=17)	5.08 \pm 1.02	4.65 \pm 1.40	5.21 \pm 0.99
Mozes Detector (n=18)	5.53 \pm 0.75	5.54 \pm 0.76	4.75 \pm 1.00

Table III—Clinical outcome of the two groups

Outcome	Method of treatment; no. of patients	
	Imipramine	Mozes Detector
Cured	4	11
Not cured	13	7

with the Mozes Detector described themselves as more extroverted and had lower neuroticism scores at follow-up, changes that were not seen in the patients treated with imipramine. Although the Mozes Detector tended to be more effective than imipramine in achieving a "cure", there was no evidence that the personality changes were due to the therapeutic efficacy of the Mozes Detector.

Although our study suggests that the Mozes Detector has advantages over imipramine we do not recommend its use for all patients with enuresis. The younger children in our series were more apprehensive than the older children about using the Mozes Detector and were occasionally upset at not being able to switch the device off when they were wakened by it. Therefore, we advise against using the Mozes Detector for the initial treatment of young patients with enuresis. Indeed, we avoid using it for children under the age of 8 years. The case for using the device with older patients, however, is substantial. Earlier evidence of high rates of cure^{2,3} and the fact that the questionnaires we used in our study showed no adverse reactions support the use of the device for many older patients. It is conceivable that the patients in our series might have had personality changes that were not detected by our assessment procedure; however, the use of the Mozes Detector under medical supervision appears justified.

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