

Psychomotor approach in children affected by nonretentive fecal soiling (FNRFS): a new rehabilitative purpose

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Background: According to the Rome III criteria, encopresis without constipation was defined as nonretentive fecal soiling (FNRFS) with not yet well understood etiology. Treatment approaches reported in the literature with varying results include biofeedback, hypnosis, reflexology, and Internet-based educational programs. In developmental age, another behavioral treatment could be identified in the psychomotor approach, which is called psychomotricity in the European countries, or is also known as play therapy. The aim of the present study was to verify the safety and efficacy of play therapy plus toilet training in a small sample of prepubertal children affected by FNRFS.

Materials and methods: Twenty-six patients (group 1; 16 males, mean age of 5.92 ± 0.84 years) underwent a psychomotor approach therapy program in association with toilet training for 6 months, and the other 26 subjects (group 2; 17 males, mean age of 5.76 ± 0.69) underwent the sole toilet training program for 6 months. During the observational time period (T0) and after 6 months (T1) of both treatments, the patients were evaluated for FNRFS frequency and for the behavioral assessment.

Results: At T0, the FNRFS mean frequency per month for group 1 was 20.115 episodes/month (standard deviation [SD] ± 3.024) and for group 2 was 20.423 (SD ± 1.879) ($P = 0.661$). At T1 the mean frequency per month was 6.461 (SD ± 1.333) episodes/month and 12.038 (SD ± 1.341), respectively ($P < 0.001$). Moreover, the delta percent average of the frequency between T0 and T1 was 67.121 ± 8.527 for group 1 and 40.518 ± 9.259 for group 2 ($P < 0.001$). At T1, a significant improvement in scores on the behavioral scale was identified.

Conclusion: Our preliminary results show the importance of a multidisciplinary approach, and suggest the positive effect of an additional psychomotor approach, as this holds a new and interesting rehabilitative purpose for children in a toilet training program, even if further research is necessary.

Keyword: encopresis, psychomotricity, children, toilet training, rehabilitation

Introduction

The ability to maintain urinary and fecal continence cannot be considered as achievable in all children by a certain age. Voiding control is a complex process, with no full comprehension of all steps and factors involved,¹ even if most typically-developing children are dry and clean between 2 years and 4 years of age.² Furthermore, these milestones are identified as important developmental accomplishments and, when delayed, are often related to a host of other childhood difficulties.

In fact, constipation and encopresis (fecal soiling) could be considered as common childhood disorders that may lead to significant functional global impairment, even if their etiology and course are not well defined and well established.³

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Many children may experience symptoms of chronic constipation and/or encopresis that are only partially responsive to conventional medical therapy, and complementary/alternative therapies can offer assistance in the treatment of constipation/encopresis and are well accepted by children and their families.³

In general, fecal incontinence (FI) seems to affect 0.8%–4.1% of children in Western societies,⁴ while in Asian countries 2% to 7.8% of children are affected.^{5–8}

According to the Rome III criteria for the age group of 0–4-year-olds⁹ and for the 4–18-year-old age group,¹⁰ encopresis without constipation was defined as nonretentive fecal soiling (FNRFS) with not yet well-understood etiology¹¹ and, except for a shorter duration of 2 months, these criteria can be considered as being remarkably similar to that of the *Diagnostic and Statistical Manual*, fourth edition.¹²

Conversely, the treatment approaches for FNRFS most commonly reported in the literature are derived from the medical/physiologic understanding of encopresis and commonly involve cathartic procedures (ie, enemas and laxatives to clear the colon of impacted stool, high fibers, and high fluid diet, as well as a reduction of dairy products).¹³

In addition, the behavioral interventions commonly known as “toilet training” such as toilet sitting schedules, rewards for toilet sitting, sticker charts, and mild punishments for soiling (ie, having the child clean soiled clothing) are typically suggested.^{14–19} Toilet training (potty training) is the process of training a young child to use the toilet for urination and defecation, and is based on three approaches: (1) intensive toilet training; (2) child-oriented toilet training; and (3) assisted infant toilet training.²⁰ On the other hand, the involvement of family educational interventions to address parental misconceptions, such as believing that constipation is caused by a physical disorder or that the child is having accidents on purpose, is strongly recommended.^{18,21}

Other treatment approaches that have been reported in the literature with varying results include biofeedback, hypnosis, reflexology, and Internet-based educational programs,^{14,22–25} even if with results that are inconclusive.

During childhood, another behavioral treatment could be identified in the psychomotor approach, which is called psychomotricity in European countries, and which is also known as play therapy.^{26–29} In general, the psychomotor approach is a term used to indicate a European approach for education, prevention, and therapy, which was created by Aucouturier and Lapierre.³⁰ The approach focused on the development of how children process information through movement during play sessions. Moreover, the psychomotor approach has been

successfully used for many years to facilitate the transition from preschool to elementary school, and also to improve the children’s cognitive learning skills. In fact, the main goals of this approach can be summarized as the development of awareness of personal space, respecting other’s personal space, and sharing a common space during play situations; this will consequently increase children’s attention levels, help them gain emotional safety while developing social interactions, and help them enjoy the practice of gross motor skills through activities such as balancing, jumping, pushing, pulling, rolling, sliding, and so on. This approach is based on the general concept of movement and mind integration, of thinking and doing, of communicating and creating – all of which supports the child’s global development during the play therapy sessions, contributing to enhancing their self-esteem, their sensory–motor coordination, their creativity sources, their social skills and, in general, their cognitive functioning, according to the learning theory of Piaget.^{31,32}

On the other hand, the importance of playing in the social development of children is actually undisputed.³³ In fact, through play, children are learning how things work, how to use their bodies, how to solve problems, and how to get along with others. Moreover, playing is an avenue through which children can express their emotions, build relationships with others, and master difficult experiences. Thus, playing is such an important aspect of childhood that the United Nations Convention on the Rights of the Child in 1989 included the right “to engage in play and recreational activities appropriate to the age of the child” as one of the inalienable rights of children.³⁴

Moreover, play therapy is widely used to treat children’s emotional and behavioral problems because of its responsiveness to their unique and varied developmental needs, even if most of the children below the age of 11 years lack a fully-developed capacity for abstract thought, which is a prerequisite to meaningful verbal expression and an understanding of complex issues, motives, and feelings.³⁵ Thus, unlike adults who communicate naturally through words, children more naturally express themselves through the concrete world of play and activity. In fact, during the play therapy sessions, play is viewed as the vehicle for communication between the child and the therapist on the assumption that children will use play materials to directly or symbolically act out feelings, thoughts, and experiences that they are not able to meaningfully express through words.^{36–40}

Conversely, the psychomotor approach or play therapy approach is widely used for a variety of disorders in developmental age, such as for separation anxiety,^{41,42} maltreatment,⁴³

and physical abuse.⁴⁴⁻⁴⁷ Playing allows children to bridge the chasm between their experiences and understanding, thereby providing the means for insight, learning, problem solving, coping, and mastery.⁴⁰

The vast majority of studies were conducted either in a school or in an outpatient clinic; however, play therapy conducted in residential settings produced significantly larger treatment effects than did therapy conducted in school and clinic locations, even if the children in residential settings showed the greatest benefits.⁴⁰

Moreover, as reported by Bongers et al,¹¹ behavioral therapy (toilet training in combination with a rewards system and diminishing toilet phobia) in combination with cognitive therapy (psychotherapy, family therapy, or educational support) acts to lower the level of distress, restore normal bowel habits by positive reinforcement, and reestablish self-respect for the child. Even if the method proposed by Bongers et al¹¹ cannot be considered as properly comparable to the psychomotor approach, it can suggest the utility of a behavioral intervention for FNRFS. In fact, behavioral therapy has been shown to be effective in reducing episodes of FI when combined with intense medical management.⁴⁸

To date, there are no specific reports about the effect of a psychomotor approach in combination with a toilet training program for the FNRFS therapy. Therefore, the aim of the present study was to verify the safety and efficacy of play therapy plus toilet training when compared to an exclusive toilet training approach in a small sample of prepubertal children affected by functional FNRFS.

Materials and methods

The study population was composed of 52 children (33 males, mean age of 5.87 ± 0.85 years) randomly selected at the Clinic of Child and Adolescence Neuropsychiatry at the Second University of Naples by pediatric gastroenterologists and/or pediatric surgeons for FNRFS between July 2012 and May 2013. The observational period (T0) took place over the course of 2 months.

Children were considered eligible if they responded to the Rome III criteria for the diagnosis of FNRFS,¹⁰ and if any treatment or any other regular medication (ie, laxative drugs) for gastroenteric, neurological, or psychiatric disorders (such as constipation, Hirschsprung's disease, epilepsy, behavioral problems, attention deficit hyperactivity disorder, neuromuscular diseases, or mental retardation) were absent.

More specifically, the exclusion criteria were: gastroenteric disorders (constipation or Hirschsprung's disease); allergies; endocrinological problems (ie, diabetes); preterm

birth;^{49,50} neurological (ie, epilepsy, primary headaches)⁵¹⁻⁶⁶ or psychiatric symptoms (attention deficit hyperactivity disorder, depression, or behavioral problems); mental retardation (intelligence quotient [IQ] ≤ 70); borderline intellectual functioning (IQ ranging from 71 to 84);^{67,68} overweight (body mass index ≥ 85 th percentile) or obesity (body mass index ≥ 95 th percentile);^{69,70} sleep disorders;⁷¹⁻⁷³ primary nocturnal enuresis;⁷⁴⁻⁷⁷ anticonvulsant^{78,79} or psychoactive drug administration; or any other regular medication (ie, laxative drugs).

After the T0 of 2 months, 26 patients who were randomly selected (group 1) (16 males; mean age of 5.92 ± 0.84 years) underwent a psychomotor approach therapy program in association with toilet training for 6 months, and the other 26 subjects were randomly selected (group 2) (17 males; mean age of 5.76 ± 0.69 years) and underwent the sole toilet training program for 6 months.

The psychomotor approach was administered by trained child therapists in residential settings twice per week, with the same therapist for each child; all therapists shared the same protocol. The standard psychomotor session length was 45 minutes.

According to the treatment guidelines for primary nonretentive encopresis and stool toileting refusal,⁸⁰ the toilet training approach was made using prompted toilet sits during times when the child is likely to defecate. These sits were scheduled up to five times daily for 3 minutes to 5 minutes each. A portable timer was terminated at the end of each prompted sit. The time at which the prompted sits were scheduled was 20 minutes after each meal. The toilet training program was made at home and was supervised by parents for all children.

At T0 and after 6 months (T1) of both treatments, the patients were evaluated for FNRFS frequency and for the behavioral assessment. Each patient kept a journal to record the frequency of encopretic episodes.

To verify the efficacy of the two treatments, we tested the starting frequency (T0) of FNRFS after T1, and we then calculated the encopresis frequency delta percentage to express the decrease in monthly frequency. As previously reported,⁶¹⁻⁶³ the encopresis frequency delta percentage was calculated at T0 and T1 according to the following formula:

$$\Delta = 100 - [(T1/T0) \times 100] \quad (1)$$

All children in the study population were recruited from the Clinic of Child and Adolescent Neuropsychiatry of the Second University of Naples.

All parents gave written informed consent during the first screening visit.

The reported investigation has been carried out in accordance with the principles of the Declaration of Helsinki.⁸¹ The Departmental Ethics Committee of the Second University of Naples approved the study. No important changes to the described method after trial commencement have been verified.

Behavioral assessment

As previously reported,⁸² to assess the psychological and social competence of children, we used the Italian version of the Child Behavior Checklist questionnaire (CBCL).⁸³ The CBCL is the most well-developed, empirically-derived behavior rating scale available for assessing psychopathology and social competence in children. It is a parent-completed survey assessing behavior in children between the ages of 6 years to 18 years. Parents/caregivers are instructed to answer questions about their child's behavior during the past 6 months. Items are scored as follows: 0 = not true (as far as you know); 1 = somewhat or sometimes true; or 2 = very true or often true. This questionnaire yields eight factors: withdrawn; somatic complaints; anxious/depressed; social problems; thought problems; attention-hyperactive; rule-breaking behavior; and aggressive behavior. In addition, there are three global scores for externalizing and internalizing behaviors and a total behavior score. The CBCL was also scored on competence scales for activities, social relations, school, and total competence.

By definition, T-scores of ≥ 70 (≥ 98 th percentile) are in the clinical range, less than < 65 (< 93 rd percentile) are in the normal range, and between 65 and 70 (93rd–98th percentile) are in the borderline clinical range.⁸³ In this study, the CBCL was administered only to the mother, as she is the parent who usually spends more time with the children.

Statistical analysis

In order to compare the all examined variables, *t*-tests and Chi-square tests, where appropriate, were applied. *P*-values < 0.05 were considered statistically significant.

All data were coded and analyzed using the commercially available STATISTICA 6.0 package for Windows (StatSoft, Inc, Tulsa, OK, USA).

Results

Two study groups were matched for age ($t = 0.751$; $P = 0.456$) and gender (Chi-square < 0.001 ; $P = 1.000$).

At T0, the FNRS mean frequency per month for group 1 was 20.115 episodes/month (standard deviation [SD] ± 3.024) and for group 2 was 20.423 episodes/month (SD ± 1.879) ($t = 0.441$; $P = 0.661$). At T1, the FNRS mean frequency per month was 6.461 episodes/month (SD ± 1.333) and 12.038 episodes/month (SD ± 1.341), respectively ($t = -15.036$; $P < 0.001$). Moreover, the delta percent average of the frequency between T0 and T1 was 67.121 ± 8.527 for group 1 and 40.518 ± 9.259 for group 2 ($t = 10.776$; $P < 0.001$). No significant differences were found between the two groups in terms of the behavioral assessment at T0, as shown in Table 1.

At T1, group 1 showed significantly lower scores in all CBCL problem items (somatic complaints, anxious/depressed, attention, delinquent, aggressive, internalizing, externalizing, and total problems, $P < 0.001$; withdrawn and thought problems, $P = 0.001$; and social problems $P = 0.020$), and significantly higher scores in many competency items (total competence, $P = 0.041$; social relations, $P = 0.004$; and school competence, $P = 0.011$) than group 2 (Table 2).

Table 1 CBCL results of both groups at T0

	Group 1 at T0 N = 26	Group 2 at T0 N = 26	t	P
Activities competence	31.231 \pm 7.638	29.077 \pm 7.025	1.058	0.295
Social relations	39.577 \pm 9.542	37.846 \pm 7.998	0.709	0.482
School competence	39.885 \pm 5.552	40.269 \pm 7.400	-0.212	0.833
Competence total	32.423 \pm 8.154	30.615 \pm 7.117	0.852	0.398
Withdrawn	68.462 \pm 8.999	66.731 \pm 7.650	0.747	0.458
Somatic complaints	70.077 \pm 7.249	72.346 \pm 6.431	-1.194	0.238
Anxious/depressed	71.538 \pm 10.455	70.538 \pm 7.306	0.400	0.691
Social problems	66.423 \pm 10.335	65.731 \pm 10.006	0.245	0.807
Thought problems	62.269 \pm 7.102	60.538 \pm 7.627	0.847	0.401
Attention-hyperactive	68.423 \pm 6.445	68.808 \pm 6.267	-0.218	0.828
Delinquent	61.308 \pm 6.485	61.615 \pm 6.500	-0.171	0.865
Aggressive	63.000 \pm 7.365	64.731 \pm 7.555	-0.836	0.407
Internalizing problems	73.385 \pm 5.967	73.308 \pm 3.876	0.055	0.956
Externalizing problems	62.769 \pm 6.218	64.154 \pm 6.214	-0.803	0.426
Total problems	71.538 \pm 3.301	72.192 \pm 2.843	-0.765	0.448

Notes: Table 1 shows the comparisons between the group treated with toilet training plus the psychomotor approach (group 1) and the group treated with toilet training alone (group 2) at T0 regarding the behavioral assessment results obtained by CBCL analysis. A *t*-test analysis was applied. $P < 0.05$ was considered statistically significant.

Abbreviations: CBCL, Child Behavior Checklist questionnaire; T0, starting time; N, total sample.

Table 2 CBCL results of both groups at T1

	Group 1 N = 26	Group 2 N = 26	t	P
Activities competence	32.692 ± 6.886	30.186 ± 6.842	1.874	0.194
Social relations	41.808 ± 5.920	36.428 ± 6.918	2.030	0.004
School competence	45.115 ± 5.799	39.996 ± 8.014	2.628	0.011
Competence total	35.269 ± 6.372	31.065 ± 7.982	2.484	0.041
Withdrawn	58.423 ± 7.617	65.946 ± 8.283	-3.924	0.001
Somatic complaints	61.885 ± 6.849	72.696 ± 6.851	-5.678	<0.001
Anxious/depressed	57.385 ± 6.093	71.062 ± 7.901	-7.050	<0.001
Social problems	60.077 ± 8.831	66.308 ± 9.814	-2.160	0.020
Thought problems	54.346 ± 5.837	61.085 ± 8.024	-3.287	0.001
Attention-hyperactive	56.154 ± 7.614	69.093 ± 7.026	-6.543	<0.001
Delinquent	53.385 ± 4.622	62.003 ± 6.841	-5.262	<0.001
Aggressive	53.808 ± 4.454	65.214 ± 8.036	-6.350	<0.001
Internalizing problems	59.538 ± 6.707	73.015 ± 4.379	-9.064	<0.001
Externalizing problems	51.154 ± 7.209	65.537 ± 6.892	-6.965	<0.001
Total problems	57.577 ± 5.427	71.995 ± 3.069	-12.164	<0.001

Notes: Table 2 shows the comparisons between the group treated with toilet training plus the psychomotor approach (group 1) and the group treated with the toilet training alone (group 2) at T1 regarding the behavioral assessment results obtained by CBCL analysis. A *t*-test analysis was applied. *P* < 0.05 was considered statistically significant.

Abbreviations: CBCL, Child Behavior Checklist questionnaire; T1, 6 months after treatment; N, total sample.

Table 3 Group 1 behavioral results at T0 and at T1

	Group 1 at T0 N = 26	Group 1 at T1 N = 26	t	P
Activities competence	31.231 ± 7.638	32.692 ± 6.886	-0.725	0.472
Social relations	39.577 ± 9.542	41.808 ± 5.920	-1.013	0.316
School competence	39.885 ± 5.552	45.115 ± 5.799	-3.322	0.002
Competence total	32.423 ± 8.154	35.269 ± 6.372	-1.402	0.167
Withdrawn	68.462 ± 8.999	58.423 ± 7.617	4.342	0.000
Somatic complaints	70.077 ± 7.249	61.885 ± 6.849	4.189	0.000
Anxious/depressed	71.538 ± 10.455	57.385 ± 6.093	5.964	0.000
Social problems	66.423 ± 10.335	60.077 ± 8.831	2.380	0.021
Thought problems	62.269 ± 7.102	54.346 ± 5.837	4.394	0.000
Attention-hyperactive	68.423 ± 6.445	56.154 ± 7.614	6.272	0.000
Delinquent	61.308 ± 6.485	53.385 ± 4.622	5.073	0.000
Aggressive	63.000 ± 7.365	53.808 ± 4.454	5.446	0.000
Internalizing problems	73.385 ± 5.967	59.538 ± 6.707	7.865	0.000
Externalizing problems	62.769 ± 6.218	51.154 ± 7.209	6.221	0.000
Total problems	71.538 ± 3.301	57.577 ± 5.427	11.207	0.000

Notes: Table 3 shows the comparisons between the group treated with toilet training plus the psychomotor approach (group 1) at T0 and at T1 regarding the behavioral assessment results obtained by CBCL analysis. A *t*-test analysis was applied. *P* < 0.05 was considered statistically significant.

Abbreviations: T0, starting time; T1, 6 months after treatment; N, total sample; CBCL, Child Behavior Checklist questionnaire.

Table 3 showed the differences found in group 1 between T0 and T1 among CBCL performance. At T1, group 1 obtained a reduction across all CBCL problems scores (withdrawn, somatic complaints, anxious/depressed, thought, attention, delinquent, aggressive, internalizing, externalizing, and total problems, *P* < 0.001; and social problems, *P* = 0.021), and a significant increase in school competence (*P* = 0.002) (Table 3).

Regarding group 2, no significant differences were found between T0 and T1 CBCL scores (Table 4).

Discussion

The main finding of the present research could be summarized in terms of the double effect of both the reduction in FNRFS episodes and in the general behavioral improvement, which resulted from a brief double rehabilitative program (psychomotor approach plus toilet training) in an exclusive toilet training program.

In fact, from a developmental perspective, voiding dysfunctions may be not considered as only sphincteric/

elimination problems because they are accompanied by many other comorbidities such as learning and visuomotor integration difficulties,^{76,77} sleep troubles,⁷⁵ and behavioral abnormalities,⁸⁴⁻⁸⁷ as confirmed by the CBCL results in our sample.

On the other hand, voiding dysfunction could be a distinct function of the general developmental delay presented by subjects with mental retardation. In fact, in 2007, Joinson et al⁸⁸ reported few differences between children based on IQ for daytime encopresis or soiling.

Alternatively, FNRFS may be considered as a relevant pediatric gastroenterological problem with profound and important personal and family effects;⁸⁹ it consists of voluntary and/or involuntary passage of stools into the underwear,⁹⁰ and is associated with stigmatization, rejection, and bullying risk at school, which subsequently results in school avoidance and social withdrawal, probably due to the characteristic aroma of feces. In this light, the reduction of withdrawn problem levels, thought problem levels (*P* = 0.001), social problem levels (*P* = 0.020), internalizing problem levels, externalizing

Table 4 Group 2 behavioral results at T0 and T1

	Group 2 at T0 N = 26	Group 2 at T1 N = 26	t	P
Activities competence	29.077 ± 7.025	30.186 ± 6.842	<0.000	0.567
Social relations	37.846 ± 7.998	36.428 ± 6.918	<0.000	0.497
School competence	40.269 ± 7.400	39.996 ± 8.014	<0.000	0.899
Competence total	30.615 ± 7.117	31.065 ± 7.982	<0.000	0.831
Withdrawn	66.731 ± 7.650	65.946 ± 8.283	<0.000	0.724
Somatic complaints	72.346 ± 6.431	72.696 ± 6.851	<0.000	0.850
Anxious/depressed	70.538 ± 7.306	71.062 ± 7.901	<0.000	0.805
Social problems	65.731 ± 10.006	66.308 ± 9.814	<0.000	0.835
Thought problems	60.538 ± 7.627	61.085 ± 8.024	<0.000	0.802
Attention-hyperactive	68.808 ± 6.267	69.093 ± 7.026	<0.000	0.878
Delinquent	61.615 ± 6.500	62.003 ± 6.841	<0.000	0.835
Aggressive	64.731 ± 7.555	65.214 ± 8.036	<0.000	0.824
Internalizing problems	73.308 ± 3.876	73.015 ± 4.379	<0.000	0.799
Externalizing problems	64.154 ± 6.214	65.537 ± 6.892	<0.000	0.451
Total problems	72.192 ± 2.843	71.995 ± 3.069	<0.000	0.811

Notes: Table 4 shows the comparisons between the group treated with toilet training alone (group 2) at T0 and at T1 regarding the behavioral assessment results obtained by CBCL analysis. A t-test analysis was applied. $P < 0.05$ was considered statistically significant.

Abbreviations: T0, starting time; T1, 6 months after treatment; N, total sample; CBCL, Child Behavior Checklist questionnaire.

problem levels, and total problem levels (for each scale, $P < 0.001$) after 6 months of play therapy associated with toilet training observed in our sample could confirm the relevant role of the behavioral aspects in FNRFS of children

Therefore, children with FNRFS could develop behavioral, emotional, and upbringing problems, learning difficulties, and depression, and they can also be frequently subject to maltreatment,⁸ which could be prevented by an early psychomotor approach intervention associated with the toilet training program.

Conversely, playing can be considered essential for the correct development of children's general abilities,^{91–93} such as their motor skills, visuomotor integration, behavioral control, and rule acquisition.^{94–96} In this light, the psychomotor approach could allow the child to better manage his or her body control (both voluntary and involuntary), internalize rules and, finally, to gain greater confidence in recognizing and responding to his or her own needs, even those that are physical.

Obviously, our finding cannot rebut the positive effect of toilet training on FNRFS symptoms, but would suggest a new

approach that is more accepted by children because it was integrated with and alternated by playing during the week. In this light, the psychomotor approach could be considered as child-centered and useful tool used to improve maturation in all aspects of a child's life.

In fact, children with FNRFS seem to present with more emotional/behavioral problems and with poorer social competence than comparisons,⁹⁷ but surprisingly, only about one-third of the parents who reported the problem had sought treatment for their children.⁹⁸

However, previous studies^{99,100} have shown that after treatment, the FNRFS children experienced a significant decrease in behavioral and emotional problems, and they exhibited a significant improvement in social competence with levels more like the comparisons.¹⁰¹ Accordingly, our study showed an improvement in all of the behavioral aspects examined in children treated with the psychomotor approach when compared to children treated only with toilet training.

Moreover, psychological disturbances accompanying encopresis seem to be reduced when encopresis frequency is diminished, which pointed to the idea that the behavioral and emotional problems of children with encopresis may be the result of the psychological disturbance, not its cause,¹⁰² which is exactly the case for primary nocturnal enuresis.^{56,74–77}

Among the relaxation therapies, there is no evidence that biofeedback training could add benefit to conventional treatment in the management of functional FI in children, but there is evidence that highlights that behavioral interventions plus laxative therapy, rather than laxative therapy alone, tends to improve continence in children with FNRFS.¹⁰³

Our findings demonstrated the effectiveness and safety of a naturalistic, child-centered approach for this neglected problem in pediatric ages. On the other hand, we have to take into account the limitations of the present study, which included the small sample size of children, and the lack of longitudinal evaluation of long-term results.

In conclusion, our preliminary results show the importance of a multidisciplinary approach, and suggest the positive effect of an additional psychomotor approach in a new and interesting rehabilitative program for children in toilet training, even if further research is necessary.

Disclosure

The authors report no conflicts of interest in this work.

References

1. Nijman RJ. Diagnosis and management of urinary incontinence and functional fecal incontinence (encopresis) in children. *Gastroenterol Clin North Am.* 2008;37(3):731–748, x.

2. Heron J, Joinson C, Croudace T, von Gontard A. Trajectories of daytime wetting and soiling in a United Kingdom 4 to 9-year-old population birth cohort study. *J Urol*. 2008;179(5):1970–1975.
3. Culbert TP, Banez GA. Integrative approaches to childhood constipation and encopresis. *Pediatr Clin North Am*. 2007;54(6):927–947, xi.
4. Joinson C, Heron J, Butler U, von Gontard A; Avon Longitudinal Study of Parents and Children Study Team. Psychological differences between children with and without soiling problems. *Pediatrics*. 2006;117(5):1575–1584.
5. Sohrabi S, Nouraie M, Khademi H, Baghizadeh S, Nasser-Moghaddam S, Malekzadeh R. Epidemiology of uninvestigated gastrointestinal symptoms in adolescents: a population-based study applying the Rome II questionnaire. *J Pediatr Gastroenterol Nutr*. 2010;51(1):41–45.
6. Chung JM, Lee SD, Kang DI, et al; Korean Enuresis Association. An epidemiologic study of voiding and bowel habits in Korean children: a nationwide multicenter study. *Urology*. 2010;76(1):215–219.
7. Rajindrajith S, Devanarayana NM, Benninga MA. Constipation-associated and nonretentive fecal incontinence in children and adolescents: an epidemiological survey in Sri Lanka. *J Pediatr Gastroenterol Nutr*. 2010;51(4):472–476.
8. van der Wal MF, Benninga MA, Hirasing RA. The prevalence of encopresis in a multicultural population. *J Pediatr Gastroenterol Nutr*. 2005;40(3):345–348.
9. Hyman PE, Milla PJ, Benninga MA, Davidson GP, Fleisher DF, Tamini J. Childhood functional gastrointestinal disorders: neonate/toddler. *Gastroenterology*. 2006;130(5):1519–1526.
10. Rasquin A, Di Lorenzo C, Forbes D, et al. Childhood functional gastrointestinal disorders: child/adolescent. *Gastroenterology*. 2006;130(5):1527–1537.
11. Bongers ME, Tabbers MM, Benninga MA. Functional nonretentive fecal incontinence in children. *J Pediatr Gastroenterol Nutr*. 2007;44(1):5–13.
12. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 4th ed. Washington, DC: American Psychiatric Association; 2000.
13. Hardy LT. Encopresis: a guide for psychiatric nurses. *Arch Psychiatr Nurs*. 2009;23(5):351–358.
14. McGrath ML, Mellon MW, Murphy L. Empirically supported treatments in pediatric psychology: constipation and encopresis. *J Pediatr Psychol*. 2000;25(4):225–254; discussion 255–256.
15. Mellon MW. Enuresis and encopresis. In: Bear GG, Minke K, editors. *Children's Needs III: Development, Prevention, and Intervention*. Bethesda, MD: National Association of School Psychologists; 2006: 1041–1053.
16. Mellon MW, Whiteside SP, Friedrich WN. The relevance of fecal soiling as an indicator of child sexual abuse: a preliminary analysis. *J Dev Behav Pediatr*. 2006;27(1):25–32.
17. Secco L. Review: behavioural interventions plus laxatives are effective for defecation disorders in children, but biofeedback does not add benefit. *Evid Based Nurs*. 2002;5(3):76.
18. Van Dijk M, Benninga MA, Grootenhuys MA, Nieuwenhuizen AM, Last BF. Chronic childhood constipation: a review of the literature and the introduction of a protocolized behavioral intervention program. *Patient Educ Couns*. 2007;67(1–2):63–77.
19. von Gontard A. Elimination disorders: enuresis and encopresis. In: Gillberg C, Harrington R, Steinhausen HC, editors. *A Clinician's Handbook of Child and Adolescent Psychiatry*. Cambridge, UK: Cambridge University Press; 2006:625–654.
20. Hooman N, Safaai A, Valavi E, Amini-Alavijeh Z. Toilet training in Iranian children: a cross-sectional study. *Iran J Pediatr*. 2013;23(2): 154–158.
21. Philichi L. When the going gets tough: pediatric constipation and encopresis. *Gastroenterol Nurs*. 2008;31(2):121–130.
22. Bishop E, McKinnon E, Weir E, Brown DW. Reflexology in the management of encopresis and chronic constipation. *Paediatr Nurs*. 2003;15(3):20–21.
23. Croffie JM, Ammar MS, Pfeifferkorn MD, et al. Assessment of the effectiveness of biofeedback in children with dyssynergic defecation and recalcitrant constipation/encopresis: does home biofeedback improve long-term outcomes. *Clin Pediatr (Phila)*. 2005;44(1): 63–71.
24. Ritterband LM, Cox DJ, Walker LS, et al. An Internet intervention as adjunctive therapy for pediatric encopresis. *J Consult Clin Psychol*. 2003;71(5):910–917.
25. Thomson L. Hypnosis for children with elimination disorders. In: Wester WC, Sugarman LI, editors. *Therapeutic Hypnosis with Children and Adolescents*. Bethel, CT: Crown House Publishing; 2007: 387–415.
26. Cappellini AC, Mancini S, Zuffellato S, et al. Environmental effects on school age child psychomotricity. *Minerva Pediatr*. 2008;60(3): 277–284.
27. Canestrelli L. Psychomotricity and its essential attributes. *Arch Psicol Neurol Psichiatr*. 1952;13(4):349–371. Undetermined.
28. Knell SM. Cognitive-behavioral play therapy. *J Clin Child Psychol*. 1998;27(1):28–33.
29. von Gontard A, Lehmkuhl G. Play therapy – psychotherapy with play as the medium: II. New developments. *Prax Kinderpsychol Kinderpsychiatr*. 2003;52(2):88–97. German.
30. Aucouturier B, Lapiere A. La symbolique du mouvement. [The symbolic movement]. Psychomotricité et éducation. 1975 Paris.
31. Piaget J. Praxis in the child. *Rev Neurol (Paris)*. 1960;102:551–565. French.
32. Piaget J. Will and action. *Bull Menninger Clin*. 1962;26:138–145.
33. Cordier R, Bundy A, Hocking C, Einfeld S. A model for play-based intervention for children with ADHD. *Aust Occup Ther J*. 2009;56(5): 332–340.
34. General Assembly of the United Nations. Convention on the Rights of the Child. Art 31. 1989. Available from <http://www.loc.gov/law/help/child-rights/international-law.php>.
35. Piaget J. *Play, Dreams and Imitation in Childhood*. Gattengo C, Hodgson FM, trans. New York, NY: Norton; 1962.
36. Axline V. *Play Therapy*. New York, NY: Ballantine Books; 1947.
37. Landreth G. *Play Therapy: The Art of the Relationship*. 2nd ed. New York, NY: Brunner-Routledge; 2002.
38. Landreth G, Homeyer L, Bratton S, Kale A, Hilpl K. *The World of Play Therapy Literature*. 3rd ed. Denton, TX: University of North Texas Center for Play Therapy Press; 2000.
39. Schaefer C. Prescriptive play therapy. *International Journal of Play Therapy*. 2001;10(2):57–73.
40. Bratton SC, Ray D, Rhine T, Jones L. The efficacy of play therapy with children: a meta-analysis of treatment outcomes. *Prof Psychol: Res Pr*. 2005;36(4):376–390.
41. Loranger N. Play intervention strategies for the Hispanic toddler with separation anxiety. *Pediatr Nurs*. 1992;18(6):571–575.
42. Milos ME, Reiss S. Effects of three play conditions on separation anxiety in young children. *J Consult Clin Psychol*. 1982;50(3):389–395.
43. Reams R, Friedrich W. The efficacy of time-limited play therapy with maltreated preschoolers. *J Clin Psychol*. 1994;50(6):889–899.
44. Kapsch LA. A culture of one: case study of play therapy with an abused child. *J Pediatr Nurs*. 1991;6(6):368–373.
45. Rocha PK, do Prado ML. Child abuse and therapeutic play. *Rev Gaucha Enferm*. 2006;27(3):463–471.
46. Post CA. Play therapy with an abused child: a case study. *J Child Adolesc Psychiatr Ment Health Nurs*. 1990;3(1):34–36.
47. Saucier BL. The effects of play therapy on developmental achievement levels of abused children. *Pediatr Nurs*. 1989;15(1):27–30.
48. Borowitz SM, Cox DJ, Sutphen JL, Kovatchev B. Treatment of childhood encopresis: a randomized trial comparing three treatment protocols. *J Pediatr Gastroenterol Nutr*. 2002;34(4):378–384.
49. Guzzetta A, Pizzardi A, Belmonti V, et al. Hand movements at 3 months predict later hemiplegia in term infants with neonatal cerebral infarction. *Dev Med Child Neurol*. 2010;52(8):767–772.
50. Guzzetta A, D'Acunto MG, Carotenuto M, et al. The effects of preterm infant massage on brain electrical activity. *Dev Med Child Neurol*. 2011;53 Suppl 4:46–51.
51. Esposito M, Parisi P, Miano S, Carotenuto M. Migraine and periodic limb movement disorders in sleep in children: a preliminary case-control study. *J Headache Pain*. 2013;14(1):57.

52. Esposito M, Pascotto A, Gallai B, et al. Can headache impair intellectual abilities in children? An observational study. *Neuropsychiatr Dis Treat*. 2012;8:509–513.
53. Esposito M, Verrotti A, Gimigliano F, et al. Motor coordination impairment and migraine in children: a new comorbidity? *Eur J Pediatr*. 2012;171(11):1599–1604.
54. Carotenuto M, Guidetti V, Ruju F, Galli F, Tagliente FR, Pascotto A. Headache disorders as risk factors for sleep disturbances in school aged children. *J Headache Pain*. 2005;6(4):268–270.
55. Carotenuto M, Esposito M, Precenzano F, Castaldo L, Roccella M. Cosleeping in childhood migraine. *Minerva Pediatr*. 2011;63(2):105–109.
56. Carotenuto M, Esposito M, Pascotto A. Migraine and enuresis in children: An unusual correlation? *Med Hypotheses*. 2010;75(1):120–122.
57. Esposito M, Roccella M, Parisi L, Gallai B, Carotenuto M. Hypersomnia in children affected by migraine without aura: a questionnaire-based case-control study. *Neuropsychiatr Dis Treat*. 2013;9:289–294.
58. Esposito M, Gallai B, Parisi L, et al. Maternal stress and childhood migraine: a new perspective on management. *Neuropsychiatr Dis Treat*. 2013;9:351–355.
59. Gallelli L, Avenoso T, Falcone D, et al. Effects of acetaminophen and ibuprofen in children with migraine receiving preventive treatment with magnesium. *Headache*. Epub June 28, 2013.
60. Verrotti A, Agostinelli S, D'Egidio C, et al. Impact of a weight loss program on migraine in obese adolescents. *Eur J Neurol*. 2013;20(2):394–397.
61. Carotenuto M, Esposito M. Nutraceuticals safety and efficacy in migraine without aura in a population of children affected by neurofibromatosis type I. *Neurol Sci*. Epub March 27, 2013.
62. Esposito M, Ruberto M, Pascotto A, Carotenuto M. Nutraceutical preparations in childhood migraine prophylaxis: effects on headache outcomes including disability and behaviour. *Neurol Sci*. 2012;33(6):1365–1368.
63. Esposito M, Carotenuto M. Ginkgolide B complex efficacy for brief prophylaxis of migraine in school-aged children: an open-label study. *Neurol Sci*. 2011;32(1):79–81.
64. Esposito M, Marotta R, Gallai B, Parisi L, et al. Temperamental characteristics in childhood migraine without aura: a multicenter study. *Neuropsychiatr Dis Treat*. 2013;9:1187–1192.
65. Esposito M, Roccella M, Gallai B, et al. Maternal personality profile of children affected by migraine. *Neuropsychiatr Dis Treat*. 2013;9. In press.
66. Esposito M, Gallai B, Parisi L, et al. Self-concept evaluation and migraine without aura in childhood. *Neuropsychiatr Dis Treat*. 2013;9:1061–1066.
67. Esposito M, Carotenuto M. Intellectual disabilities and power spectra analysis during sleep: a new perspective on borderline intellectual functioning. *J Intellect Disabil Res*. Epub March 21, 2013.
68. Esposito M, Carotenuto M. Borderline intellectual functioning and sleep: the role of cyclic alternating pattern. *Neurosci Lett*. 2010;485(2):89–93.
69. Carotenuto M, Santoro N, Grandone A, et al. The insulin gene variable number of tandem repeats (INS VNTR) genotype and sleep disordered breathing in childhood obesity. *J Endocrinol Invest*. 2009;32(9):752–755.
70. Carotenuto M, Bruni O, Santoro N, Del Giudice EM, Perrone L, Pascotto A. Waist circumference predicts the occurrence of sleep-disordered breathing in obese children and adolescents: a questionnaire-based study. *Sleep Med*. 2006;7(4):357–361.
71. Carotenuto M, Gallai B, Parisi L, Roccella M, Esposito M. Acupressure therapy for insomnia in adolescents: a polysomnographic study. *Neuropsychiatr Dis Treat*. 2013;9:157–162.
72. Carotenuto M, Gimigliano F, Fiordelisi G, Ruberto M, Esposito M. Positional abnormalities during sleep in children affected by obstructive sleep apnea syndrome: The putative role of kinetic muscular chains. *Med Hypotheses*. 2013;81(2):306–308.
73. Carotenuto M, Esposito M, Parisi L, et al. Depressive symptoms and childhood sleep apnea syndrome. *Neuropsychiatr Dis Treat*. 2012;8:369–373.
74. Carotenuto M, Esposito M, Pascotto A. Facial patterns and primary nocturnal enuresis in children. *Sleep Breath*. 2011;15(2):221–227.
75. Esposito M, Gallai B, Parisi L, et al. Primary nocturnal enuresis as a risk factor for sleep disorders: an observational questionnaire-based multicenter study. *Neuropsychiatr Dis Treat*. 2013;9:437–443.
76. Esposito M, Carotenuto M, Roccella M. Primary nocturnal enuresis and learning disability. *Minerva Pediatr*. 2011;63(2):99–104.
77. Esposito M, Gallai B, Parisi L, et al. Visuomotor competencies and primary monosymptomatic nocturnal enuresis in prepubertal aged children. *Neuropsychiatr Dis Treat*. 2013;9:921–926.
78. Coppola G, Auricchio G, Federico R, Carotenuto M, Pascotto A. Lamotrigine versus valproic acid as first-line monotherapy in newly diagnosed typical absence seizures: an open-label, randomized, parallel-group study. *Epilepsia*. 2004;45(9):1049–1053.
79. Coppola G, Licciardi F, Sciscio N, Russo F, Carotenuto M, Pascotto A. Lamotrigine as first-line drug in childhood absence epilepsy: a clinical and neurophysiological study. *Brain Dev*. 2004;26(1):26–29.
80. Kuhn BR, Marcus BA, Pitner SL. Treatment guidelines for primary nonretentive encopresis and stool toileting refusal. *Am Fam Physician*. 1999;59(8):2171–2178, 2184.
81. World Medical Association [webpage on the Internet]. World Medical Association Declaration of Helsinki – ethical principles for medical research involving human subjects. Ferney-Voltaire, France: World Medical Association, Inc; 2008. Available from: <http://www.wma.net/en/30publications/10policies/b3/>. Accessed April 25, 2013.
82. Carotenuto M, Esposito M, Di Pasquale F, De Stefano S, Santamaria F. Psychological, cognitive and maternal stress assessment in children with primary ciliary dyskinesia. *World J Pediatr*. 2013. In Press.
83. Achenbach TM. *Manual for the Child Behavior Checklist/4-18 and 1991 Profile*. Burlington, VT: University of Vermont Department of Psychiatry; 1991.
84. Abou-Khadra MK, Amin OR, Ahmed D. Association between sleep and behavioural problems among children with enuresis. *J Paediatr Child Health*. 2013;49(2):E160–E166.
85. Kanaheswari Y, Poulsaeman V, Chandran V. Self-esteem in 6- to 16-year-olds with monosymptomatic nocturnal enuresis. *J Paediatr Child Health*. 2012;48(10):E178–E182.
86. Unal F, Pehlivanlı B. Comorbid psychiatric disorders in 201 cases of encopresis. *Turk J Pediatr*. 2004;46(4):350–353.
87. Voskuil WP, van der Zaag-Loonen HJ, Ketel IJ, Grootenhuis MA, Derckx BH, Benninga MA. Health related quality of life in disorders of defecation: the Defecation Disorder List. *Arch Dis Child*. 2004;89(12):1124–1127.
88. Joinson C, Heron J, Butler R, et al. A United Kingdom population-based study of intellectual capacities in children with and without soiling, daytime wetting, and bed-wetting. *Pediatrics*. 2007;120(2):e308–e316.
89. Bernard-Bonnin AC, Haley N, Bélanger S, Nadeau D. Parental and patient perceptions about encopresis and its treatment. *J Dev Behav Pediatr*. 1993;14(6):397–400.
90. Weissenberg S. Über encopresis. *Zeitschrift für Kinderheilkunde*. 1926;40:674.
91. Baron-Cohen S. Autism and symbolic play. *Br J Dev Psychol*. 1987;5(2):139–148.
92. Stagnitti K. Chapter 12: Play intervention – The Learn to Play program. In: Cattanach A, Brown T, Drewes A, et al, editors. *Play as Therapy: Assessment and Therapeutic Interventions*. London, UK: Jessica Kingsley Publishers; 2009:176–186.
93. Vygotsky L. Play and its role in the mental development of a child. In: Bruner J, Jolly A, Sylva K, editors. *Play, Its Role in Development and Evolution*. Middlesex, UK: Penguin; 1976:537–554.
94. Latour AM. Psychosis and psychomotricity. *Soins Psychiatrie*. 1994; (170–171):20–24, 27. French.
95. Rivière J. Space perception and psychomotricity in infants with motor deficiency. *Pediatric*. 1993;48(11):757–758. French.
96. Bergeron M. Motor development and psychomotricity in the child and the adolescent. *Sem Hop*. 1950;26(84):4339–4344. Undetermined.

97. Young MH, Brennen LC, Baker RD, Baker SS. Functional encopresis: symptom reduction and behavioral improvement. *J Dev Behav Pediatr*. 1995;16(4):226–232.
98. Matson JL, LoVullo SV. Encopresis, soiling and constipation in children and adults with developmental disability. *Res Dev Disabil*. 2009;30(4): 799–807.
99. Steinmüller A, Steinhausen HC. Follow-up of encopresis in children. *Prax Kinderpsychol Kinderpsychiatr*. 1990;39(3):74–79. German.
100. Nolan T, Coffey C, Oberklaid F, et al. Beneficial behavioral effects of successful encopresis therapy. *Am J Dis Child*. 1992;146:484.
101. Levine MD, Mazonson P, Bakow H. Behavioral symptom substitution in children cured of encopresis. *Am J Dis Child*. 1980;134(7): 663–667.
102. Hultén I, Jonsson J, Jonsson CO. Mental and somatic health in a non-clinical sample 10 years after a diagnosis of encopresis. *Eur Child Adolesc Psychiatry*. 2005;14(8):438–445.
103. Brazzelli M, Griffiths PV, Cody JD, Tappin D. Behavioural and cognitive interventions with or without other treatments for the management of faecal incontinence in children. *Cochrane Database Syst Rev*. 2011;(12):CD002240.

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