

What is the effectiveness of voiding school on symptom reduction in children with lower urinary tract symptoms (LUTS)?

Sinda Baatout, Hanne Bolckmans and Lisa Demets

Thesis supervisor: Prof. Dr. Cristine Van den Broeck

Co-supervisor: Bieke Samijn

A dissertation submitted to Ghent University in partial fulfillment of the requirements for the degree of Master in Rehabilitation sciences and Physiotherapy

Academic year: 2019-2020

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LIST OF ABBREVIATIONS AND SYMBOLS

Symbols

/ = no data available

≤ = is smaller than or equal to

≥ = is larger than or equal to

< = is smaller than

Abbreviations

ADHD = attention deficit hyperactivity disorder

DCD = developmental coordination disorder

DI = daytime incontinence

DVSS = dysfunctional voiding symptom score

EBC = expected bladder capacity

EN = enuresis

ICCS = International Children's Continence Society

LUTS = lower urinary tract symptoms

MVV = maximum voided volume

NUP = nocturnal urine production

PIN-Q = pediatric incontinence quality of life score

PFMT = pelvic floor muscle training

QoL = quality of life

RCT = randomized controlled trial

SD = standard deviation

SPSS = statistical package for the social sciences

VS = voiding school

y = years

ABSTRACT

Background: Lower urinary tract symptoms (LUTS) are quite common in the pediatric population. These children experience various symptoms such as sudden urine loss, urgency and hesitancy. Apart from the physical symptoms, they also face numerous psychosocial problems. For instance low self-esteem, anxiety and feelings of embarrassment have been established in several cases. Persisting lower urinary tract symptoms (LUTS) are associated with negative consequences like urethral reflux, renal scarring and behavioural disorders. Therefore, it is important to diagnose and treat these children at a young age.

Objective: The first objective of this study is to investigate the clinical characteristics of children referred to a voiding school (VS) program. The second objective is to examine the effectiveness of voiding school (VS) on symptom reduction in children with lower urinary tract symptoms (LUTS).

Study design: Retrospective cohort study

Method: Twelve children, between six and ten, who had been referred to a voiding school (VS) program were enrolled in this study. They were asked to fill in voiding diaries before and after voiding school (VS). These contain information on several voiding variables such as voiding frequency, voided volume, amount of wetting accidents, fluid intake and bowel movements. For this study, data was obtained retrospectively from the medical records with patient authorization.

Results: Before voiding school (VS) 66,7% suffered from combined day- and nighttime incontinence and 33,3% of the children had enuresis (EN). After voiding school (VS) 12,5% had combined day- and nighttime incontinence, 75% had enuresis (EN) and 12,5% became completely dry. For maximum voided volume (MVV), a significant increase was found after voiding school (VS). Decreased bladder capacity was seen in 18,2% of the children after voiding school compared to 27,3% at baseline. No significant results were found regarding voiding frequency, amount of wet nights a week, nocturnal urine production (NUP) and fluid intake. However the five patients of whom data was available all reached the norm regarding fluid intake after the voiding school (VS) program.

Conclusion: Voiding school (VS), consisting of standard urotherapy, applied right after the first consultation can be beneficial for children suffering from lower urinary tract symptoms (LUTS). If this is insufficient, specific additional interventions can be applied.

Key words: voiding school, children, incontinence, urotherapy, lower urinary tract symptoms

Achtergrond: Lagere urinewegsymptomen (LUTS) zijn vaak voorkomend bij kinderen. Deze kinderen ervaren diverse symptomen zoals ongewild urineverlies, urgentie en een moeilijke initiatie van het plassen. Naast de fysieke symptomen, worden ze ook geconfronteerd met verschillende psychosociale problemen zoals een laag zelfbeeld, angstgevoelens en schaamte. Aanhoudende lagere urinewegsymptomen (LUTS) worden geassocieerd met negatieve gevolgen zoals urethrale reflux, littekens ter hoogte van de nier en gedragsstoornissen. Bijgevolg is het belangrijk om deze kinderen op jonge leeftijd te diagnosticeren en te behandelen.

Doelstelling: Het eerste doel van deze studie is het onderzoeken van de klinische karakteristieken van patiënten die doorverwezen zijn voor de plasklas. Het tweede doel is om de effectiviteit van de plasklas te onderzoeken op vlak van symptoomreductie.

Onderzoeksdesign: Retrospectief cohortonderzoek

Methode: twaalf kinderen die werden doorverwezen naar de plasklas hebben deelgenomen aan de studie. Ze zijn allemaal tussen de zes en tien jaar oud. Er werd hen gevraagd om een plaskalender in te vullen zowel voor als na de plasklas. Deze bevat informatie over verschillende parameters waaronder plasfrequentie, plasvolume, aantal plasaccidentjes, vochtinname en stoelgang. De verzamelde data bestond uit retrospectieve gegevens die werd verkregen vanuit het medische dossier van de patiënt mits hun toestemming.

Resultaten: Aanvankelijk leed 66,7% aan gecombineerde dag- en nachtincontinentie en 33,3% van de kinderen had enuresis. Na de plasklas had 12,5% gecombineerde dag- en nachtincontinentie, 75% had enuresis en 12,5% werd volledig droog. Voor het maximaal plasvolume (MVV), werd een significante stijging gevonden na de plasklas. Een verminderde blaascapaciteit werd gevonden bij 18,2% van de kinderen na de plasklas in vergelijking met 27,3% bij aanvang. Er werden geen significante resultaten gevonden met betrekking tot plasfrequentie, aantal natte nachten per week, nachtelijke urineproductie (NUP) en vochtinname. De vijf patiënten waarvoor gegevens beschikbaar waren omtrent vochtinname, bereikten echter allemaal wel de norm na de plasklas.

Conclusie: De plasklas, bestaande uit standaard urotherapie, toegepast direct na de eerste consultatie kan gunstige effecten hebben voor kinderen die lijden aan lagere urinewegsymptomen (LUTS). Als dit onvoldoende blijkt, kunnen aanvullende specifieke interventies worden toegepast.

Trefwoorden: plasklas, kinderen, incontinentie, urotherapie, lagere urinewegsymptomen

1. INTRODUCTION

Every parent remembers potty training their children. It is not an easy process and some children seem to have more trouble with getting dry than others. In some cases an underlying lower urinary tract condition will influence this process negatively and medical assistance may be necessary to resolve the problem (1).

When the bladder function is disturbed symptoms such as sudden urine loss, urgency, hesitancy and incomplete voiding will occur. These various symptoms are also known as lower urinary tract symptoms (LUTS) (2, 3). They can be classified into storage symptoms caused by an excess of bladder contractions during filling and voiding symptoms originating from sphincter contractions during voiding (4). Other reasons for a disturbed bladder function are an underactive bladder or an obstructed urinary tract. It is important to note that these symptoms are only deemed pathological from the age of five since younger children have not yet achieved bladder control (3). Nevertheless, current numbers state that the prevalence of LUTS in children from six to fourteen years old is ranging between 6% and 26%, showing that this medical problem is very common in the pediatric population (5-8).

In addition to the physical symptoms, children with bladder dysfunctions experience more psychosocial problems such as bullying, low self-esteem, high anxiety levels and feelings of embarrassment. The combination of physical and psychosocial problems causes a clear decrease in quality of life (QoL) compared to their peers (9, 10).

Furthermore it seems that LUTS are often associated with bowel disorders, intellectual disabilities and neurodevelopmental disorders like autism or attention deficit hyperactivity disorder (ADHD) (11-15). Certain social factors such as fear of public restrooms or voiding postponement as well as environmental factors such as poor fluid intake or unavailability of toilets may also increase the risk of LUTS (16-18).

Persisting symptoms can lead to negative consequences like urinary tract infections, vesico-urethral reflux, bladder wall thickness, renal scarring and behavioural disorders. These complications become more pronounced as the children get older and make it more challenging to find an adequate medical approach (4, 19). Therefore, it is important to diagnose these children at a young age.

Before a diagnosis of LUTS can be granted, the clinician will have to get a complete view of the child and its symptoms by running through the following steps: history-taking, physical examination, evaluation of the voiding diary, assessment of symptoms and QoL, repeated

uroflowmetry with electromyography patterns and if necessary invasive urodynamic investigations (3, 4, 19, 20). For the evaluation of symptoms and QoL validated questionnaires such as the dysfunctional voiding symptoms score (DVSS) and pediatric incontinence quality of life score (PIN-Q) can be used (4). The aforementioned stepwise process allows clinicians to rule out other medical conditions that can cause incontinence in children as well (21). After assigning the diagnosis, an adequate treatment plan will be formulated for the child.

Different treatment options are possible. In most cases clinicians will opt for a conservative approach named urotherapy. The standard components of this type of therapy can be described as a bladder education and rehabilitation program where children are educated on the bladder function and receive lifestyle advice on how to decrease their incontinence (3, 4). Currently, urotherapy is given individually to patients but more and more facilities are experimenting with voiding school (VS) programs (22, 23). This is urotherapy given in small groups. It is believed that group therapy is less time- and cost-consuming than individual therapy. It may help children cope better with their feelings concerning the bladder dysfunction (24, 25).

Based on recent literature, individual urotherapy has been shown to improve the LUTS in children (24, 26, 27). For VS opinions differ. Some articles indicate that this treatment method is effective to reduce symptoms of incontinence (23, 28). At the same time, others are less positive (29, 30). For QoL only one article was found that compared individual urotherapy to VS. Here, the QoL was significantly higher after individual urotherapy while there were no significant effects after VS (24). However, in general articles on symptom reduction as well as articles concerning the QoL in children with LUTS before and after VS are very limited. Thus it is clear that further research on the effects of VS is recommended.

When children with LUTS are admitted to the hospital, they are asked to fill in a voiding diary. This way information on voiding and drinking habits can be collected to determine if VS may be beneficial (31).

In this article the first objective is to investigate the clinical characteristics of children referred to a VS program and to compare these findings with current literature. The second objective is to examine the effectiveness of VS on symptom reduction in children with LUTS and to compare these findings with current literature as well.

2. METHODS

2.1 Design

This study is a retrospective cohort study.

2.2 Participants

Children that have attended VS at the university hospital of Ghent were selected from a population of patients who have been treated by the co-supervisor of this study. To enrol in the VS program children had to be 5 to 12 years old, have LUTS and be able to understand the Dutch language. However, if neurological disorders, anatomical bladder abnormalities or diabetes was present then they were automatically excluded from further investigation. The parents of eligible children were called by the co-supervisor and informed on the research project. During the phone conversation they were also asked if the voiding diary data of their children could be used in the study. If they agreed, an informed consent form was sent. Consequently, the parents were then requested to fill in the form and send it back.

2.3 Study protocol

2.3.1 Data collection

The children enrolled in this study agreed to share their pre-and post-VS data. The co-supervisor of this study collected the needed data retrospectively from their medical records. Subsequently, the data was passed on to the researchers by the co-supervisor. Each child was given a number by the co-supervisor. This way the researchers could not identify who the child was. This ensured that data assessment happened in a blinded manner.

2.3.2 Tools of investigation

For all patients pre- and post-VS data was collected through voiding diaries. They were asked to fill in a daytime voiding diary for 3 days and a nighttime voiding diary for 14 nights. The voiding diaries contained information on voiding variables such as voiding frequency, voided volume, amount of wetting accidents, fluid intake and bowel movements (32-34).

2.3.3 Intervention

The VS program that these children had attended was a one-hour long session consisting of the following components: education on the normal bladder function and bladder dysfunctions, lifestyle advice for better drinking -and voiding habits, education on the right voiding posture and information on the consequences of bad voiding habits more specifically urinary tract infections and kidney damage (20, 32). During the session the children were asked to drink a

glass of water and to give a sign when they had to go to the bathroom to pee. They were then asked to pee on the uroflowmetry device, a toilet shaped instrument. This non-invasive diagnostic tool will visualize the voiding pattern through a uroflow curve. The shape of the curve can give insight on the type of bladder condition that is causing the clinical symptoms to arise (3, 35, 36). At the end of the session both the parents and the child were asked to follow the given advice and keep using their voiding diaries.

2.4 Data analysis

The researchers submitted the retrospective data in the statistical computer program Statistical Package for the Social Sciences (SPSS). In a first phase, the baseline data or pre-VS data of the children was described. This included gender, age, type of incontinence, LUTS and bowel symptoms that were reported by the children. The gender, type of incontinence as well as bladder and bowel related symptoms were represented using percentages. The age, frequency of incontinence and nocturnal urine production (NUP) were expressed by calculated mean and standard deviation (SD).

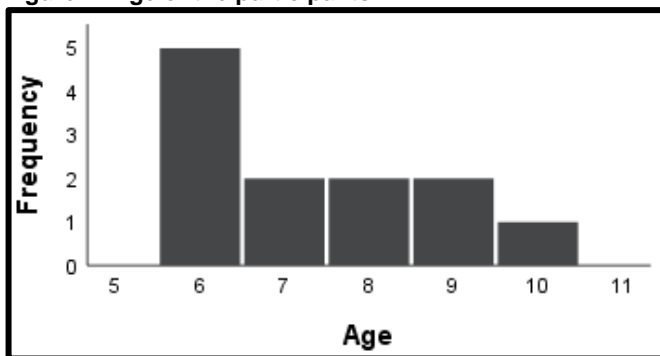
The next step was to compare pre-and post-VS data. The paired students t-test, with significance level (α) 0.05, was used to compare the amount of wet nights a week, the NUP, the MVV, the voiding frequency and the fluid intake before and after VS. Furthermore, the post-MVV was compared to the expected MVV for the respective age. In addition, researchers examined the amount of children who still had a decreased bladder capacity and reached the norm regarding fluid intake post-VS. These results were all described in percentages. Finally, the type of incontinence and the amount of children that were dry after VS were investigated as well. This was also reported using percentages.

3. RESULTS

3.1 Baseline data of the participants

This study contained retrospective data of twelve children who were enrolled in a VS program that consisted of standard urotherapy. 66,7% of the included children were male and the children had an average age of 7,3 years old (SD = 1,44). **Figure 1** gives a representation of the age of all the children. 66,7% of patients suffered from combined day and nighttime incontinence, the remaining 33,3% had isolated enuresis (EN).

Figure 1: Age of the participants



Legend: The bars indicate the number of children by age.

Among the clinical characteristics, various LUTS were established in the study population. For bladder capacity the data of eleven children showed that 27,3% of the children had a decreased MVV of lower than 65% of the expected bladder capacity (EBC) for their age. The children reached an overall average of 79.8% (SD = 26.72) of their expected MVV. Data on symptoms of urgency was available for six of the twelve children. 66,7% of them indicated that they experienced urgency. Based on the reported voiding frequency of ten of the twelve children 70% appeared to have a normal voiding frequency but 30% had an increased voiding frequency. None of the children had a voiding frequency of three times a day or lower. Concerning nocturnal polyuria data was collected from eleven patients. In 18,2% nocturnal polyuria was present. Based on the data of ten children fluid intake was examined as well. The researchers found that 50% had a fluid intake that was lower than the norm. Data on constipation was collected from nine participants. 44,9% of them complained of constipation. During the study two children were on medication. One of them was taking medication for an overactive bladder and nocturnal polyuria. The other one was only taking medication for an overactive bladder. One of the included children also had ADHD and Developmental Coordination Disorder (DCD) on top of the LUTS. **Table 1** shows the most important baseline characteristics of the patients.

Table 1: Baseline characteristics of participants

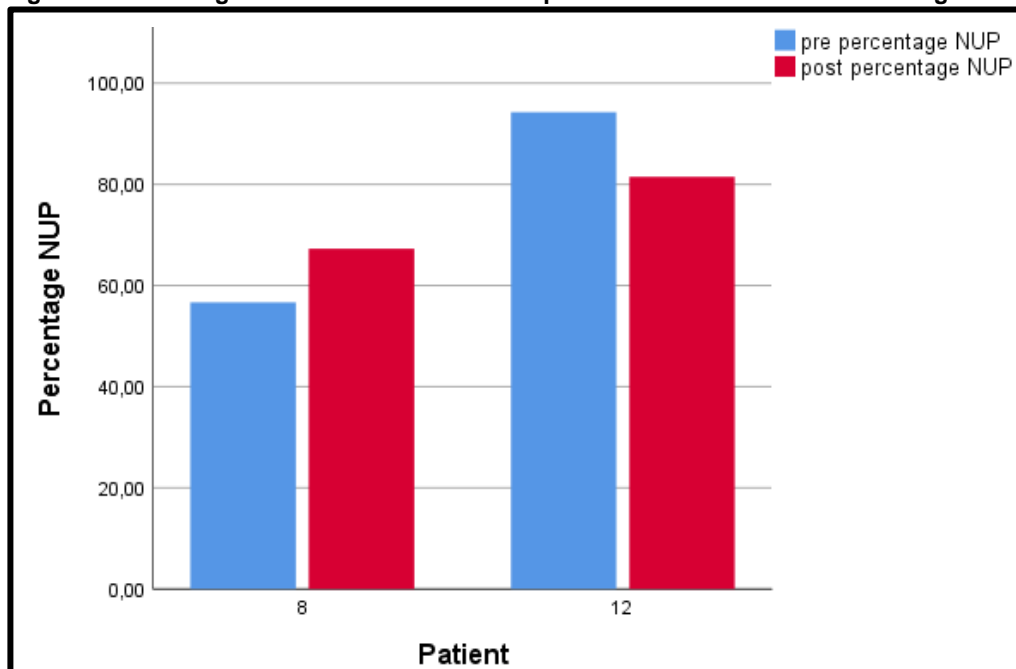
	Pre	Post
Demographic characteristics		
Boys	66,6% (8/12)	66,6% (8/12)
Girls	33,3% (4/12)	33,3% (4/12)
Age, mean	7.3y; SD= 1,44	7.3y; SD= 1,44
Type of incontinence		
Combined daytime and nighttime wetting	33,3% (4/12)	12,5% (1/8)
Enuresis	66,6% (8/12)	75% (6/8)
Dry	0%	12,5% (1/8)
Clinical characteristics:		
Low bladder capacity (< 65% EBC)	27,3% (3/11)	18,2% (2/11)
Mean bladder capacity (% of EBC)	79.8%; SD = 26,72 (11/12)	103.7%; SD = 33,42 (11/12)
Urgency	66,7% (4/6)	/
Urinary frequency		
○ High (≥ 8x/day)	• 30% (3/10)	• 100% (2/2)
○ Normal (4-7x/day)	• 70% (7/10)	• /
○ Low (≤ 3x/day)	• 0% (0/10)	• /
Mean nighttime wetting episodes	6,1 nights/week; SD= 1,29 (12/12)	/
Nocturnal polyuria	18,2% (2/11)	0% (2/2)
Mean nighttime urine production (% of EBC)	95,4%; SD = 24,99 (11/12)	96,7%; SD = 13,09 (2/12)
Urinary tract infections	20% (1/5)	/
Constipation	44,4% (4/9)	/

Legend: The numbers between brackets refer to the frequency of appearance in the study population compared to the number of patients whose data was available; SD= standard deviation; y= years; /= no data available

3.2 Comparison of data before and after voiding school

To be able to assess the effectiveness of a VS program on the symptoms in children with LUTS certain outcome measures were compared before and after VS. One of these outcome measures is the amount of wet nights a week. Based on the available data, seven children were included in the analysis. The results showed no significant difference ($p = 0,231$). Based on the data of two children the NUP was also compared before and after VS. No significant difference ($p = 0,941$) was found. As represented in Figure 2, one child showed an increase in NUP and the other one showed a decrease.

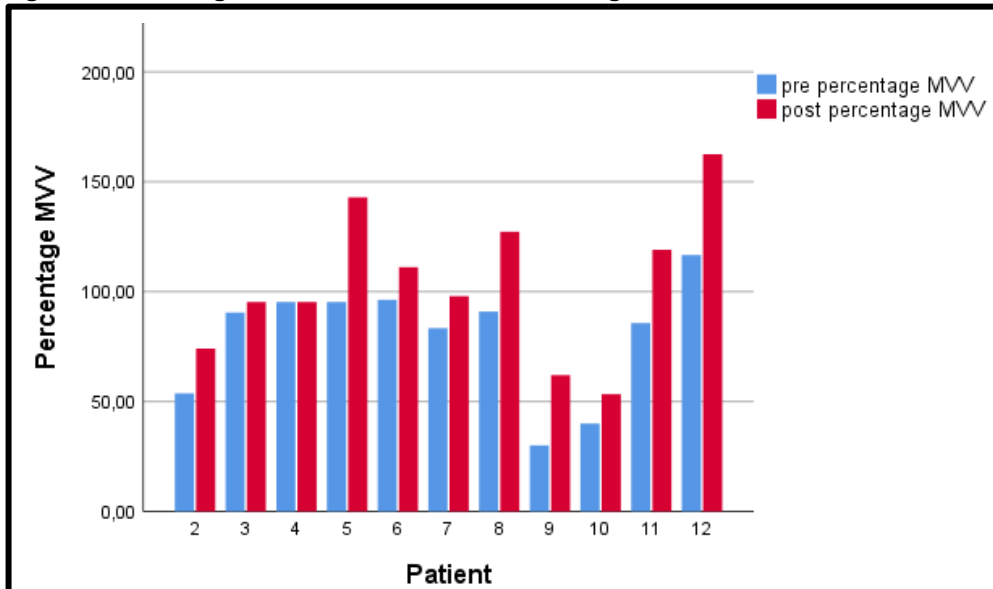
Figure 2: Percentages of mean nocturnal urine production before and after voiding school



Legend: This table shows the mean percentages NUP pre-and post-VS for patient eight and patient twelve.

The difference in MVV was compared before and after VS as well because it provides information on the maximal bladder capacity of the patients. The statistical test was performed on the available data for eleven of the twelve children in the database. A significant difference ($p < 0,001$) was noted in MVV before and after VS. Figure 3 gives an overview of the MVV before and after VS for each child. Ten of the eleven children showed an increase in MVV while one child showed no difference. After the VS program only 18,2% still had a decreased bladder capacity, lower than 65% of the expected MVV. In general, the children reached an average of 103,7% (SD = 33,42) of their expected MVV after VS. Moreover, data on voiding frequency before and after VS was compared for two children. A non-significant result ($p = 0,705$) was found.

Figure 3: Percentages of MVV before and after voiding school



Legend: This table shows the percentage of the MVV pre and post VS for eleven patients. The percentages are from patient two to twelve.

Furthermore, post-VS data on fluid intake was available for five patients. The results indicated that after the VS program they all reached the target value. Data on fluid intake pre- and post-VS was available for two children. After comparison, there appeared to be no significant difference ($p = 0,656$) in the fluid intake of the children before and after VS.

Finally, after completing the VS program there was data for eight patients regarding type of incontinence. 12,5% went from combined day- and nighttime to having EN without daytime symptoms, 75% did not differ in type of incontinence and 12,5% became completely dry four months after participating in the VS program without other treatments. **Table 2** shows the shift in type of incontinence before and after VS.

Table 2: Type of incontinence pre- and post-voiding school

		Type incontinence pre voiding school			
		DI + EN	DI	EN	Dry
Type incontinence post voiding school	DI + EN	1			
	DI				
	EN	1		5	
	Dry			1	

Legend: In this table represents the data on type of incontinence of eight children of whom pre- and post-VS data was available. For each child the type of incontinence before and after the VS program can be deduced. DI = daytime incontinence; EN = enuresis.

4. DISCUSSION

LUTS are common in children (5-8). Early treatment of these symptoms is important and should be done in early childhood more specifically from five years onward (37). This way, future complications can be prevented.

4.1 Clinical characteristics of children referred for voiding school

Results of the current study showed that 33,3% of the children with EN also suffer from DI. An article of Shah et al., described clinical features of EN in children (38). This article showed that 17,6% of the children with EN suffered from DI as well. The difference in these numbers could be explained by the difference in group size, 425 children in Shah et al., versus twelve children in the current study. Another explanation could be that Pakistani children were compared to Belgian children.

Moreover, 18,2% of the children that participated in the current study suffered from nocturnal polyuria before attending VS. Nervéus et al., found that from a group of 220 enuretic children 23% had nocturnal polyuria. This number is close to the findings in this study (39). Guidelines of the International Children's Continence Society (ICCS) state that nocturnal polyuria occurs when the NUP is more than 130% of the EBC. The NUP is calculated by determining the weight of the wet diaper and subtracting the weight of the dry diaper. Afterwards the morning voided volume is added. If the NUP is lower than the EBC the cause of EN is presumably an overactive bladder (39, 40). In this case, a non-monosymptomatic form of EN will be suspected since there is a combination of EN with other LUTS. When nocturnal polyuria is present it is often linked with a monosymptomatic form of EN in which no other LUTS are experienced. Although it is uncommon, one should know that nocturnal polyuria can also occur in people with non-monosymptomatic enuresis (38). It is important to uncover the cause of the bedwetting because this will impact the treatment options (41). In both monosymptomatic as well as non-monosymptomatic EN urotherapy will be the first choice of treatment. After urotherapy, the children will be re-evaluated. If symptoms persist pharmacological treatment with desmopressin for nocturnal polyuria or medication for an overactive bladder such as anticholinergics may be necessary to resolve incontinence (37, 42).

Another symptom that was examined is urgency. This can be described as a sudden need to void and it is usually seen in children with an overactive bladder (32, 43). In the current study, this symptom was reported present by 66,7% of the children. In an article by Lebl et al 56% of incontinent children stated that they had experienced symptoms of urgency (44). These

numbers are both quite similar. However, it is important to note that the population in this article consisted mainly of children with DI while the current study has no children with exclusively DI but only children with EN and combined day-and nighttime wetting.

Concerning voiding frequency the current study found that 30% of the children had an increased average voiding frequency, 0% had a decreased voiding frequency and 70% had a normal average voiding frequency. Shah et al., reported that 25,4% of 429 children with EN had an increased voiding frequency. This number correlates with the results in this study (38). ICCS guidelines mention that healthy children have a voiding frequency ranging from four to seven times a day. However, children with daytime urinary incontinence often have an increased voiding frequency (≥ 8 times/day) or decreased voiding frequency (≤ 3 times/day) because of bladder dysfunctions (32, 45). An increased voiding frequency is suggestive of an overactive bladder especially when symptoms of urgency and wetting episodes appear as well (32). However, an increased voiding frequency can also originate from incomplete bladder emptying during urination which will lead to the rapid refilling of the bladder (46).

Bladder and bowel dysfunction, a combination of LUTS with bowel complaints such as constipation, also occurs quite frequently in the pediatric population (47). In the current study 44,4% of the children show bowel symptoms beside the LUTS. In literature concerning this subject a prevalence of 18.4% was found (47, 48). Multiple studies show that the bowel and bladder interact with each other. When a child is constipated the rectum will be filled with stool and this will press on the bladder leading to a decreased bladder capacity, symptoms of urgency and an increase of voiding frequency. The high amount of faeces in the rectum can also provoke spasms of the pelvic floor muscles which will cause incomplete voiding and post residual volumes (11, 49). To summarize, children with bowel problems have an increased risk for LUTS (14, 50). Literature also shows that normalizing bowel function can decrease the LUTS (51). For this reason it is important that doctors always ask about bowel complaints. Furthermore early diagnosis and treatment of these children is also important for their psychosocial wellbeing and to prevent secondary comorbidities (11).

Additionally, in the current study the researchers found that 50% of the children had a fluid intake that was lower than the norm. An article of Van den Broeck et al., found that 74% of children had an inadequate intake of fluid before VS as well. This article had a sample size of 38 participants compared to 12 participants in the current study. Of these 12 participating children data on fluid intake was only available for 10 children. Thus the difference in the percentages that were found can be explained by the size of the study population (52). It seems that quite often children don't drink enough at breakfast and at school. When they come home

after school they are thirsty and try to compensate by drinking a lot in the evening. However, this can result in nocturnal polyuria (53).

Regarding MVV, 27,3% of the children in this study had a decreased MVV of lower than 65% of the EBC for their age before VS. In general, they reached 79,8% (SD = 26,27) of their expected MVV. Tkaczyk et al., examined the effect of a 3 month bladder advice program in children with monosymptomatic EN. The results indicated that 24% of the children had a decreased MVV before the program. In the same article the children reached 82 % (SD = 31) of their expected MVV before the program (54). These numbers correspond quite well with the findings in the current study. However it should be noted that the study population in the two studies differed slightly. In the current study included both children with EN as well as children with combined day- and nighttime incontinence whereas the study by Tkaczyk et al., only included children with EN.

One child, included in this study, did not only have LUTS but also ADHD and DCD. It is known that LUTS are often associated with ADHD (12, 14). Children with DCD are known to experience more symptoms of incontinence too (55). ADHD, DCD and incontinence can all be connected to problems in the central nervous system (56). A deficit in the maturation of the central nervous system, more specifically in the brainstem, is associated with EN. Evidence indicates that even higher cortical structures, such as the motor cortex circuitry, can show signs of maturation deficits in children with EN as well (57). These children will perform poorly on fine- and gross motor tasks and have poor quality of movement (58, 59). Furthermore, ADHD has also been related to a delay in the cortical maturation. The delay was most prominent in the prefrontal cortex. Cognitive functions situated in this area are for example the ability to subdue inappropriate responses and thoughts, higher-order motor control and executive control of attention (56, 60). Several studies have reported that it is challenging to treat children with ADHD. They seem to be less adherent to and show lower success rates compared to healthy children (56, 61). For this reason it is important for doctors to gather information on comorbid developmental disorders and behavioural problems.

A urinary tract infection was detected in one child in this study. An acute lower urinary tract infection or cystitis is often associated with LUTS such as dysuria, urgency and frequency (62). In this case adequate treatment of the urinary tract infection will resolve the symptoms (63). However, multiple studies have shown that urinary tract infections and LUTS caused by bladder dysfunctions often coexist (62, 64, 65). Due to voiding dysfunctions incomplete bladder emptying can occur. This will lead to post-void residual urine volumes with a high risk for development of lower urinary tract infections. Insufficient bladder emptying can also result in

an increased bladder pressure. If this persists secondary vesicoureteral reflux will arise (62, 66). Recurrent upper urinary tract infections due to vesicoureteral reflux can cause irreversible kidney damage (62, 67) Thus it is important for clinicians to record the presence of upper urinary tract infections and treat them accordingly to prevent a negative impact on the kidneys (68).

4.2 Effectiveness of voiding school on symptom reduction

One of the objectives of this study was to examine the effectiveness of VS on symptom reduction in children with LUTS. Available literature shows that positive results for various voiding variables are achieved through VS. However it is important to note that in the current study the VS program only consisted of education on normal bladder function, bladder dysfunctions, right voiding posture, lifestyle advice on drinking and voiding habits and information on the consequences of bad voiding habits. These elements are all part of standard urotherapy. Nevertheless, most articles concerning VS also use additional interventions on top of the educational part. Examples are pelvic floor muscle training (PFMT), biofeedback, neuromodulation, intermittent catheterization and psychological counselling (32).

In the current study no significant difference was found in the amount of wetting accidents in children before and after VS. However in literature a significant difference is found. For instance, Hoebeke et al., showed that the amount of days with wetting accidents in children with DI decreased from $4 \pm 2,93$ to $1 \pm 2,08$ days a week. There was also a decrease in wetting episodes for EN. It went from $6 \pm 2,61$ to $2 \pm 2,73$ wetting episodes a week (28). The fact that the current study showed no significant difference could be because data on this subject before and after VS was only present for two children. Another reason could be that personal factors of the child's life, for example stress, can influence the LUTS (7, 69). Additionally, in Hoebeke et al., the voiding school program was applied for a longer period of time compared to the current study.

Regarding voiding frequency no significant difference was found before and after VS. For one child the voiding frequency increased from nine to twelve times a day. In OAB, the bladder capacity of the children is decreased. Which will lead to quick refilling of the bladder and thus symptoms of urgency and frequency (70). When children with OAB increase their fluid intake, the symptoms of urgency and frequency may increase as a result (71, 72). For the other child the frequency went from ten to eight times a day. So, for this child the voiding frequency decreased with two voidings a day. An article by Glad Mattsson et al., found that children with a high voiding frequency were able to decrease their voiding frequency with a mean of one voiding a day after voiding school (23). As mentioned before in the current study a decrease

in voiding frequency was seen for one child. However, due to the low amount of data comparing the results is difficult and not very reliable.

The current study showed that a lower percentage of children had a decreased bladder capacity lower than 65% of the EBC after the VS program. After statistical analysis, a significant difference in MVV before and after VS was noted. Other articles also found significant improvements in bladder capacity after a VS program (73). Additionally, An article by Amira et al found a significant normalization of bladder capacity after bladder training in children with EN as well (74). These positive results can be explained because children were given lifestyle advice on eating and drinking habits. They were asked to avoid coffee, tea and other liquids that will provoke bladder contractility (53). Apart from this, children were also instructed on bladder training. This entailed retention control training of the bladder to increase the bladder capacity (75, 76).

In regards to fluid intake there were no significant results before VS compared to after VS. Though, it should be mentioned that after the VS program all five children of which data was available were drinking sufficiently during the day. Van den Broeck at al., found a significant improvement in fluid intake at six month follow up after VS (52).

When looking at the type of incontinence, the results show that 12,5% became completely dry after VS in the current study. The children that had participated were enrolled in the VS program immediately after their first consultation. Another study by Saarikoski et al, also assessed the effect of VS. However, in this study therapy resistant children were enrolled in the program and 22% of the children had become completely dry afterwards (22). A possible explanation for the difference in numbers could be that in the current study the sample size was smaller. Another explanation could be that the study protocols differed. In the current study the children got a one-hour VS session. This is in opposition to the study by Saarikoski et al, where the participating children were educated for two days (22).

4.3 Strengths and limitations

This study has some limitations. First of all, the collected data was retrospective data. So the study design does not have a high level of evidence (77). In addition, only 12 participants were included, which is a very small sample size. As a result, reliable conclusions on the study population cannot be formed. Moreover, there was missing data for multiple participants. Thus not all voiding variables could be examined for all participants. Furthermore, the current study only examined the effectiveness of VS on symptom reduction. Despite QoL being an important

outcome measure in the evaluation of the effectiveness of interventions as well. Nonetheless, in this study data on QoL was not collected.

Nevertheless, this study has several strengths as well. First of all, a blinded assessment was applied. So, none of the researchers had any information about the participants. Secondly, all the data was gained through the medical records of the children. Thus they were always thoroughly assessed by a urologist before being referred to the physical therapist for urotherapy. This way the doctor could exclude neurological disorders and anatomical defects as a cause for the LUTS in the children. Furthermore, ICCS guidelines and terminology was used throughout this whole study. Finally, SPSS was used for statistical analysis. This software allows for more extensive and detailed investigation of data compared to the Microsoft Excel program.

4.4 Recommendations for future research and clinical practice

Further research should investigate children who were primarily referred to a VS program without other previous treatments. This way, the effectivity of VS programs containing standard urotherapy can be assessed in a reliable manner. In addition, research groups should carry out more randomized controlled trials (RCT) on VS. At the moment, this study design is largely lacking in current literature on the subject. Yet, RCT's are very valuable because of their high level of evidence. They should also investigate the improvements of voiding variables before and after VS. To evaluate these variables the use of voiding diaries is preferred over invasive investigative tools such as urodynamics. Furthermore, new studies should be long enough to allow children to interact with the new information they have received and allow the body to undergo the changes. A long follow-up period should also be included since achieving complete dryness may take a while. Last but not least, these children are known to have a decreased QoL (78). Yet, literature on the impact of VS on QoL is scarce. Thus we urge researchers to implement the evaluation of QoL in their future work.

Based on literature and the current study certain recommendations can be made towards clinicians and other health care professionals that treat children suffering from bladder dysfunctions and accompanying LUTS. Due to the low sample size and missing data of the current study it is hard to draw conclusions concerning the best treatment options for LUTS and underlying bladder dysfunctions. Nevertheless, based on other literature on this subject, the following recommendations are supported. For all types of incontinence, conservative management in the form of urotherapy should be the first step in treating the symptoms of incontinence. It seems that a large number of children can be helped through standard urotherapy. For instance, a meta-analysis on the effects of standard urotherapy found that

56% of children was successfully treated and became dry within the year (37). The current study showed significant improvements after a VS program consisting of standard urotherapy as well, though only for MVV. If children do not respond to standard urotherapy specific interventions such as biofeedback and PFMT may be added. These interventions have shown to be effective in reducing LUTS as well (70, 79). For EN, the alarm is a very useful device and has shown to improve nighttime wetting (80, 81). For therapy resistant children who did not respond to urotherapy and VS programs, pharmacological treatment can be recommended. Yet, it is important to note that medications aimed at normalizing bladder function will often have side-effects while urotherapy does not (66).

5. CONCLUSION

Both the current study as well as other literature regarding VS have observed significant effects on symptom reduction in children. Thus VS, consisting of standard urotherapy, can be beneficial for children when applied right after the first consultation. Therefore, this is recommended. These VS programs should primarily consist of standard urotherapy. But if this is insufficient specific additional interventions can be applied. For therapy resistant children who have already undergone VS programs without success, other treatments such as medications or surgery may be administered.

6. REFERENCES

1. W. L. Robson, A. K. Leung, D. A. Bloom, Daytime wetting in childhood. *Clin Pediatr (Phila)* 35, 91-98 (1996).
2. B. Bulum *et al.*, Lower urinary tract dysfunction is frequently seen in urinary tract infections in children and is often associated with reduced quality of life. *Acta Paediatr* 103, e454-458 (2014).
3. M. Fuentes, J. Magalhães, U. Barroso, Jr., Diagnosis and Management of Bladder Dysfunction in Neurologically Normal Children. *Front Pediatr* 7, 298 (2019).
4. P. F. Austin *et al.*, The standardization of terminology of lower urinary tract function in children and adolescents: Update report from the standardization committee of the International Children's Continence Society. *Neurourology and Urodynamics* 35, 471-481 (2016).
5. A. L. Hellstrom, E. Hanson, S. Hansson, K. Hjalmas, U. Jodal, MICTURITION HABITS AND INCONTINENCE IN 7-YEAR-OLD SWEDISH SCHOOL ENTRANTS. *European Journal of Pediatrics* 149, 434-437 (1990).
6. E. Bakker, M. van Sprundel, J. C. van der Auwera, J. D. van Gool, J. J. Wyndaele, Voiding habits and wetting in a population of 4332 Belgian schoolchildren aged between 10 and 14 years. *Scandinavian Journal of Urology and Nephrology* 36, 354-362 (2002).
7. G. T. Vaz *et al.*, Prevalence of lower urinary tract symptoms in school-age children. *Pediatric Nephrology* 27, 597-603 (2012).
8. M. Kajiwara, K. Inoue, A. Usui, M. Kurihara, T. Usui, The micturition habits and prevalence of daytime urinary incontinence in Japanese primary school children. *Journal of Urology* 171, 403-407 (2004).
9. M. Lopes, A. Ferraro, U. Dória Filho, E. Kuckzinski, V. H. Koch, Quality of life of pediatric patients with lower urinary tract dysfunction and their caregivers. *Pediatr Nephrol* 26, 571-577 (2011).
10. E. R. Dourado *et al.*, Emotional and behavioral problems in children and adolescents with lower urinary tract dysfunction: a population-based study. *J Pediatr Urol* 15, 376.e371-376.e377 (2019).
11. J. D. Santos, R. I. Lopes, M. A. Koyle, Bladder and bowel dysfunction in children: An update on the diagnosis and treatment of a common, but underdiagnosed pediatric problem. *Can Urol Assoc J* 11, S64-s72 (2017).

12. T. K. Yang *et al.*, Correlation between symptoms of voiding dysfunction and attention deficit disorder with hyperactivity in children with lower urinary tract symptoms. *J Urol* 187, 656-661 (2012).
13. R. C. Marciano *et al.*, Mental disorders in children and adolescents with lower urinary tract dysfunction. *J Bras Nefrol* 38, 441-449 (2016).
14. A. von Gontard, M. Pirrung, J. Niemczyk, M. Equit, Incontinence in children with autism spectrum disorder. *J Pediatr Urol* 11, 264.e261-267 (2015).
15. A. von Gontard, Urinary incontinence in children with special needs. *Nat Rev Urol* 10, 667-674 (2013).
16. S. B. Bauer, Special considerations of the overactive bladder in children. *Urology* 60, 43-48; discussion 49 (2002).
17. T. Ebiloglu *et al.*, Biofeedback as a first-line treatment for overactive bladder syndrome refractory to standard urotherapy in children. *J Pediatr Urol* 12, 290.e291-290.e297 (2016).
18. A. von Gontard *et al.*, Psychological and Physical Environmental Factors in the Development of Incontinence in Adults and Children: A Comprehensive Review. *J Wound Ostomy Continence Nurs* 44, 181-187 (2017).
19. I. Franco, Functional Bladder Problems in Children Pathophysiology, Diagnosis, and Treatment. *Pediatric Clinics of North America* 59, 783-+ (2012).
20. H. Kakizaki, M. Kita, M. Watanabe, N. Wada, Pathophysiological and Therapeutic Considerations for Non-Neurogenic Lower Urinary Tract Dysfunction in Children. *Low Urin Tract Symptoms* 8, 75-85 (2016).
21. B. Samijn *et al.*, Lower urinary tract symptoms and urodynamic findings in children and adults with cerebral palsy: A systematic review. *Neurourol Urodyn* 36, 541-549 (2017).
22. A. Saarikoski, R. Koppeli, S. Taskinen, A. Axelin, Voiding school as a treatment for daytime incontinence or enuresis: Assessing the effectiveness of intervention by measuring changes in wetting episodes. *Journal of Pediatric Urology* 14, (2018).
23. G. Glad Mattsson, M. Brannstrom, M. Eldh, S. Mattsson, Voiding school for children with idiopathic urinary incontinence and/or bladder dysfunction. *J Pediatr Urol* 6, 490-495 (2010).
24. N. Brownrigg, J. Pemberton, K. Jegatheeswaran, J. DeMaria, L. H. Braga, A Pilot Randomized Controlled Trial Evaluating the Effectiveness of Group vs Individual Urotherapy in Decreasing Symptoms Associated with Bladder-Bowel Dysfunction. *Journal of Urology* 193, 1347-1352 (2015).
25. A. Saarikoski, R. Koppeli, S. Salanterä, S. Taskinen, A. Axelin, Voiding school as a treatment of daytime incontinence or enuresis: Children's experiences of the intervention. *Journal of Pediatric Urology* 14, (2018).

26. M. A. W. Vijverberg, A. ElzingaPlomp, A. P. Messer, J. D. vanGool, T. deJong, Bladder rehabilitation, the effect of a cognitive training programme on urge incontinence. *European Urology* 31, 68-72 (1997).
27. C. J. Bachmann *et al.*, Long-term effects of a urotherapy training program in children with functional urinary incontinence: a 2-year follow-up. *Scand J Urol Nephrol* 42, 337-343 (2008).
28. P. Hoebeke *et al.*, Prospective evaluation of clinical voiding reeducation or voiding school for lower urinary tract conditions in children. *J Urol* 186, 648-654 (2011).
29. L. S. Harris, A. P. Purohit, Bladder training and enuresis: a controlled trial. *Behav Res Ther* 15, 485-490 (1977).
30. M. Cederblad, A. Sarkadi, G. Engvall, T. Neveus, No effect of basic bladder advice in enuresis: A randomized controlled trial. *Journal of Pediatric Urology* 11, (2015).
31. K. Chun, S. J. Kim, S. T. Cho, Noninvasive Medical Tools for Evaluating Voiding Pattern in Real Life. *Int Neurourol J* 21, S10-16 (2017).
32. P. F. Austin *et al.*, The standardization of terminology of lower urinary tract function in children and adolescents: update report from the Standardization Committee of the International Children's Continence Society. *J Urol* 191, 1863-1865.e1813 (2014).
33. C. R. Chapple, Is a voiding diary really necessary in 2014? *Eur Urol* 66, 301-302 (2014).
34. S.-J. Chang, S.-S. Yang, Non-invasive assessments of pediatric voiding dysfunction. LUTS: lower urinary tract symptoms. 63-69 (2009).
35. S. Yang, I. Chiang, S. Chang, Interpretation of uroflowmetry and post-void residual urine in children: fundamental approach to pediatric nonneurogenic voiding dysfunction. (2012).
36. S. Yang, S. Chang, Uroflowmetry in children can be simply classified as normal or abnormal pattern. *Urol Sci* 21, 142-144 (2010).
37. A. V. Gontard, E. Kuwertz-Bröking, The Diagnosis and Treatment of Enuresis and Functional Daytime Urinary Incontinence. *Dtsch Arztebl Int* 116, 279-285 (2019).
38. S. Shah *et al.*, Frequency and features of nocturnal enuresis in Pakistani children aged 5 to 16 years based on ICCS criteria: a multi-center cross-sectional study from Karachi, Pakistan. *BMC Fam Pract* 19, 198 (2018).
39. T. Nevéus, The amount of urine voided in bed by children with enuresis. *J Pediatr Urol* 15, 31.e31-31.e35 (2019).
40. T. Nevéus *et al.*, Management and treatment of nocturnal enuresis-an updated standardization document from the International Children's Continence Society. *J Pediatr Urol* 16, 10-19 (2020).
41. C. Van Herzeele, J. V. Walle, K. Dhondt, K. V. Juul, Recent advances in managing and understanding enuresis. *F1000Res* 6, 1881 (2017).

42. E. Kuwertz-Broking, A. von Gontard, Clinical management of nocturnal enuresis. *Pediatric Nephrology* 33, 1145-1154 (2018).
43. J. P. Van Batavia, A. J. Combs, A. M. Fast, K. I. Glassberg, Overactive bladder (OAB): A symptom in search of a disease - Its relationship to specific lower urinary tract symptoms and conditions. *Journal of Pediatric Urology* 13, (2017).
44. A. Lebl, S. N. Fagundes, V. H. K. Koch, Clinical course of a cohort of children with non-neurogenic daytime urinary incontinence symptoms followed at a tertiary center. *Jornal De Pediatria* 92, 129-135 (2016).
45. W. Jian Guo, Q. Wang, X. Zhang, Normal voiding pattern and bladder dysfunction in infants and children. *Life Science Journal* 4, 1-9 (2007).
46. S. J. Chang *et al.*, Treatment of Daytime Urinary Incontinence: A Standardization Document From the International Children's Continence Society. *Neurourology and Urodynamics* 36, 43-50 (2017).
47. J. M. Chung *et al.*, An epidemiologic study of voiding and bowel habits in Korean children: a nationwide multicenter study. *Urology* 76, 215-219 (2010).
48. M. L. van Engelenburg-van Lonkhuyzen, E. M. Bols, M. A. Benninga, W. A. Verwijs, R. A. de Bie, Bladder and bowel dysfunctions in 1748 children referred to pelvic physiotherapy: clinical characteristics and locomotor problems in primary, secondary, and tertiary healthcare settings. *Eur J Pediatr* 176, 207-216 (2017).
49. M. A. Averbeck, H. Madersbacher, Constipation and LUTS - how do they affect each other? *Int Braz J Urol* 37, 16-28 (2011).
50. C. Sampaio *et al.*, Constipation and Lower Urinary Tract Dysfunction in Children and Adolescents: A Population-Based Study. *Front Pediatr* 4, 101 (2016).
51. L. Borch, S. Hagstroem, W. F. Bower, C. Siggaard Rittig, S. Rittig, Bladder and bowel dysfunction and the resolution of urinary incontinence with successful management of bowel symptoms in children. *Acta Paediatr* 102, e215-220 (2013).
52. C. Van den Broeck *et al.*, Prospective evaluation of the long-term effects of clinical voiding reeducation or voiding school for lower urinary tract conditions in children. *Journal of Pediatric Urology* 12, (2016).
53. H. B. Lottmann, I. Alova, Primary monosymptomatic nocturnal enuresis in children and adolescents. *Int J Clin Pract Suppl*, 8-16 (2007).
54. M. Tkaczyk *et al.*, Evaluation of the effect of 3-month bladder basic advice in children with monosymptomatic nocturnal enuresis. *J Pediatr Urol* 13, 615.e611-615.e616 (2017).
55. K. Price, U. Butler, bowel and bladder management in children with disabilities. 11, 143-148 (2001).

56. J. Niemczyk, M. Equit, L. Hoffmann, A. von Gontard, Incontinence in children with treated attention-deficit/hyperactivity disorder. *J Pediatr Urol* 11, 141.e141-146 (2015).
57. A. von Gontard, M. Equit, Comorbidity of ADHD and incontinence in children. *Eur Child Adolesc Psychiatry* 24, 127-140 (2015).
58. A. von Gontard, C. M. Freitag, S. Seifen, R. Pukrop, D. Röhling, Neuromotor development in nocturnal enuresis. *Dev Med Child Neurol* 48, 744-750 (2006).
59. R. H. Largo *et al.*, Neuromotor development from 5 to 18 years. Part 1: timed performance. *Dev Med Child Neurol* 43, 436-443 (2001).
60. P. Shaw *et al.*, Attention-deficit/hyperactivity disorder is characterized by a delay in cortical maturation. *Proc Natl Acad Sci U S A* 104, 19649-19654 (2007).
61. C. R. Crimmins, S. R. Rathbun, D. A. Husmann, Management of urinary incontinence and nocturnal enuresis in attention-deficit hyperactivity disorder. *J Urol* 170, 1347-1350 (2003).
62. B. Becknell, M. Schober, L. Korbel, J. D. Spencer, The diagnosis, evaluation and treatment of acute and recurrent pediatric urinary tract infections. *Expert Rev Anti Infect Ther* 13, 81-90 (2015).
63. R. Stein *et al.*, Urinary tract infections in children: EAU/ESPU guidelines. *Eur Urol* 67, 546-558 (2015).
64. J. P. Van Batavia, J. J. Ahn, A. M. Fast, A. J. Combs, K. I. Glassberg, Prevalence of urinary tract infection and vesicoureteral reflux in children with lower urinary tract dysfunction. *J Urol* 190, 1495-1499 (2013).
65. S. A. Koff, T. T. Wagner, V. R. Jayanthi, The relationship among dysfunctional elimination syndromes, primary vesicoureteral reflux and urinary tract infections in children. *J Urol* 160, 1019-1022 (1998).
66. J. Chase, P. Austin, P. Hoebeke, P. McKenna, The Management of Dysfunctional Voiding in Children: A Report From the Standardisation Committee of the International Children's Continence Society. *Journal of Urology* 183, 1296-1302 (2010).
67. S. Swerkersson, U. Jodal, R. Sixt, E. Stokland, S. Hansson, Relationship among vesicoureteral reflux, urinary tract infection and renal damage in children. *J Urol* 178, 647-651; discussion 650-641 (2007).
68. A. K. C. Leung, A. H. C. Wong, A. A. M. Leung, K. L. Hon, Urinary Tract Infection in Children. *Recent Pat Inflamm Allergy Drug Discov* 13, 2-18 (2019).
69. M. T. Grzeda, J. Heron, A. von Gontard, C. Joinson, Effects of urinary incontinence on psychosocial outcomes in adolescence. *European Child & Adolescent Psychiatry* 26, 649-658 (2017).

70. Y. Pekbay *et al.*, The effects of pelvic floor muscle therapy on symptoms, voiding, and pelvic floor muscle activity parameters in children with overactive bladder. *Neurourol Urodyn* 38, 1430-1442 (2019).
71. B. Mahler *et al.*, The impact of daytime diuresis on voiding frequency and incontinence classification in children. *J Urol* 179, 2384-2388 (2008).
72. C. K. Yeung, H. N. Chiu, F. K. Sit, Bladder dysfunction in children with refractory monosymptomatic primary nocturnal enuresis. *J Urol* 162, 1049-1054; discussion 1054-1045 (1999).
73. K. Heilenkotter *et al.*, Prospective evaluation of inpatient and outpatient bladder training in children with functional urinary incontinence. *Urology* 67, 176-180 (2006).
74. P. A. Amira, P. Dusan, M. L. Gordana, T. Sandra, I. Ivanisevic, Bladder control training in girls with lower urinary tract dysfunction. *International Braz J Urol* 39, 118-126 (2013).
75. S. De Wachter, A. Vermandel, K. De Moerloose, J. J. Wyndaele, Value of increase in bladder capacity in treatment of refractory monosymptomatic nocturnal enuresis in children. *Urology* 60, 1090-1094 (2002).
76. J. D. van Gool *et al.*, Multi-center randomized controlled trial of cognitive treatment, placebo, oxybutynin, bladder training, and pelvic floor training in children with functional urinary incontinence. *Neurourol Urodyn* 33, 482-487 (2014).
77. Van *et al.*, *Evidence-based richtlijnontwikkeling: een Leidraad voor de Praktijk*. (2003).
78. L. A. Veloso, M. J. Mello, J. P. Ribeiro Neto, L. N. Barbosa, E. J. Silva, Quality of life, cognitive level and school performance in children with functional lower urinary tract dysfunction. *J Bras Nefrol* 38, 234-244 (2016).
79. A. Altunkol *et al.*, Is urotherapy alone as effective as a combination of urotherapy and biofeedback in children with dysfunctional voiding? *International Braz J Urol* 44, 985-993 (2018).
80. T. Hyuga, S. Nakamura, S. Kawai, H. Nakai, Evaluation of the Effectiveness of a Short-term Treatment and Repeat Treatment of Nocturnal Enuresis Using an Enuresis Alarm. *Urology* 105, 153-156 (2017).
81. C. C. Peng, S. S. Yang, P. F. Austin, S. J. Chang, Systematic Review and Meta-analysis of Alarm versus Desmopressin Therapy for Pediatric Monosymptomatic Enuresis. *Sci Rep* 8, 16755 (2018).

ABSTRACT IN LAYMAN'S TERMS

Achtergrond: Lagere urineweg symptomen (LUTS) komen vaak voor bij kinderen. Voorbeelden hiervan zijn ongewild urineverlies, urgentie en moeilijk starten bij het plassen. Buiten symptomen kunnen zij ook last hebben van een laag zelfbeeld, angstgevoelens en schaamte. Als de LUTS lang aanhouden kunnen er negatieve gevolgen zijn zoals urine die terug naar de nier stroomt en deze zal aantasten. Het is dus belangrijk dat deze kinderen op jonge leeftijd gediagnosticeerd en behandeld worden.

Doelstellingen: Het doel van deze studie is in de eerste plaats om de klachten van kinderen doorverwezen voor de plasklas te onderzoeken. Vervolgens wordt gekeken of het volgen van de plasklas ervoor kan zorgen dat zij minder symptomen hebben.

Methode: Aan deze studie hebben twaalf kinderen deelgenomen met een leeftijd van zes tot tien jaar oud. Zij werden doorverwezen naar de plasklas. Tijdens de plasklas kregen kinderen informatie over de blaasfunctie en advies rond plas- en drankgewoonten. Er werd hen ook gevraagd om zowel ervoor als erna een plaskalender in te vullen. Deze geeft informatie over bijvoorbeeld de plasfrequentie, het plasvolume, het aantal accidentjes en de stoelgang. Alle data in de studie werden verkregen na afloop van de plasklas vanuit het medische dossier van de patiënten mits hun toestemming.

Resultaten: Eén kindje is volledig droog geworden na het volgen van de plasklas. De anderen behielden een vorm van incontinentie. Bij het vergelijken van het maximaal geplaste volume zagen we een significante verhoging. Voor de plasklas hadden drie kinderen een te kleine blaas, na de plasklas nog maar twee.

Conclusie: Wanneer de plasklas gevolgd wordt, direct na de eerste consultatie bij de dokter, kan dit gunstige effecten hebben voor kinderen die lijden aan LUTS. Als de symptomen niet verminderen kunnen er aanvullende interventies toegepast worden.

PROOF OF SUBMISSION TO THE ETHICS COMMITTEE

Afz.: Commissie voor Medische Ethiek

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Betreft :

Advies voor monocentrische studie met als titel:

"De effectiviteit van de plaskias voor symptoomreductie en levenskwaliteit bij kinderen met lage urinewegsymptomen (Scriptie Sinda Baatout)"

B.U.N.: Nog aan te vragen

- * Informatie- en waarschuwingsnota over de verwerking van informatie voor medisch-wetenschappelijk onderzoek dd. 30/10/2019 : Sinda Baatout
- * CV : Sinda Baatout
- * Antwoord onderzoekers ontvangen via mail van Sinda Baatout op 19/02/2020 in antwoord op opmerkingen EC dd. 27/11/2019
- * (Patiënten) informatie- en toestemmingsformulier:
 - voor de kinderen (Aangepaste versie ontvangen 19/02/2020)
 - voor de deelnemers (Aangepaste versie ontvangen 19/02/2020)
- * Adviesaanvraagformulier dd. 14/01/2020, (volledig ontvangen dd. 19/02/2020)
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Advies werd gevraagd door: Prof. dr. Anne-Françoise Spinolt

BOVENVERMELDE DOCUMENTEN WERDEN DOOR HET ETHISCH COMITÉ BEOORDEELD. ER WERD EEN POSITIEF ADVIES GEGEVEN OVER DIT PROTOCOL OP 20/02/2020 INDIEN DE STUDIE NIET WORDT OPGESTART VOOR 19/02/2021, VERVALT HET ADVIES EN MOET HET PROJECT TERUG INGEDIEND WORDEN.

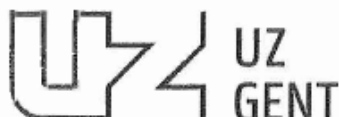
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- * Het Ethisch Comité werkt volgens 'ICH Good Clinical Practice' - regels
- * Het Ethisch Comité bevestigd dat een gunstig advies niet betekent dat het Comité de verantwoordelijkheid voor het onderzoek op zich neemt. Bovendien dient U er over te waken dat Uw mening als betrokken onderzoeker wordt weergegeven in publicaties, rapporten voor de overheid enz., die het resultaat zijn van dit onderzoek.
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* *Het Ethisch Comité benadrukt dat het de promotor is die garant dient te staan voor de conformiteit van de anderstalige informatie- en toestemmingsformulieren met de nederlandsstalige documenten.*

* *Geen enkele onderzoeker betrokken bij deze studie is lid van het Ethisch Comité.*

* *Alle leden van het Ethisch Comité hebben dit project beoordeeld. (De ledenlijst is bijgevoegd)*

* *The Ethics Committee is organized and operates according to the 'ICH Good Clinical Practice' rules.*

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* *None of the investigators involved in this study is a member of the Ethics Committee.*

* *All members of the Ethics Committee have reviewed this project. (The list of the members is enclosed)*

Namens het Ethisch Comité / On behalf of the Ethics Committee



Prof. dr. P. Deron
Voorzitter / Chairman

CC: UZ Gent – HIRUZ CTU
FAGG - Research & Development; Victor Hortaplein 40, postbus 40 1060 Brussel
Prof. dr. Erik Van Laecke

Ledenlijst 2019-2023:

- Voorzitter:** Prof.dr. P. DERON (UZG – chirurg, ♂)
- Secretaris:** Prof.dr. R. PELEMAN (UZG –internist, ♂)
- Leden:** Prof.dr. mr. T. BALTHAZAR (UG – jurist, ♂)
- Dhr. K. BENHADDOU (menschwetenschapper, ♂)
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- Prof.dr. K. VAN LIERDE (UG – logopediste, ♀)**
- Prof.dr. H. VERSTRAELEN (UZG – gynaecoloog, ♂)

Afz.: Commissie voor Medische Ethiek

Prof. dr. Anne-Françoise Spinoit
Urologie - URO
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Ons kenmerk	Uw kenmerk	datum	pagina
BC-07400	NVT	09/03/2020	1/3

Betreft : Advies voor monocentrische studie met als titel:

"De effectiviteit van de plasklas voor symptoomreductie en levenskwaliteit bij kinderen met lage urinewegsymptomen (Scriptie Hanne Bolckmans)"
B.U.N.: Nog aan te vragen

- * Adviesaanvraagformulier 27/12/2019 (Volledig ontvangen dd. 27/02/2020)
- * CV : Hanne Bolckmans
- * Patiënteninformatie- en toestemmingsformulier : voor de kinderen (ontvangen dd. 20/02/2020)
- * Vragenlijsten :
 - Pin-Q kinderversie NL
 - DVSS NL
- * Patiënteninformatie- en toestemmingsformulier : (ontv. 20/02/2020)
- * Begeleidende brief : (ontvangen 20/02/2020)
- * Informatie- en waarschuwingsnota over de verwerking van informatie voor medisch-wetenschappelijk onderzoek dd 18/1/2020 Hanne Bolckmans

Advies werd gevraagd door: Prof. dr. Anne-Françoise Spinoit

BOVENVERMELDE DOCUMENTEN WERDEN DOOR HET ETHISCH COMITÉ BEOORDEELD. ER WERD EEN POSITIEF ADVIES GEGEVEN OVER DIT PROTOCOL OP 27/02/2020 INDIEN DE STUDIE NIET WORDT OPGESTART VOOR 26/02/2021, VERVALT HET ADVIES EN MOET HET PROJECT TERUG INGEDIEND WORDEN.

Vooraleer het onderzoek te starten dient contact te worden genomen met HIRUZ CTU (09/332 05 00).

THE ABOVE MENTIONED DOCUMENTS HAVE BEEN REVIEWED BY THE ETHICS COMMITTEE. A POSITIVE ADVICE WAS GIVEN FOR THIS PROTOCOL ON 27/02/2020 IN CASE THIS STUDY IS NOT STARTED BY 26/02/2021, THIS ADVICE WILL BE NO LONGER VALID AND THE PROJECT MUST BE RESUBMITTED.

Before initiating the study, please contact HIRUZ CTU (09/332 05 00).

DIT ADVIES WORDT OPGENOMEN IN HET VERSLAG VAN DE VERGADERING VAN HET ETHISCH COMITÉ VAN 24/03/2020.

THIS ADVICE WILL APPEAR IN THE PROCEEDINGS OF THE MEETING OF THE ETHICS COMMITTEE OF 24/03/2020.

- * *Het Ethisch Comité werkt volgens 'ICH Good Clinical Practice' - regels*
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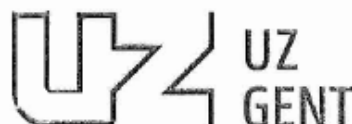
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Namens het Ethisch Comité / On behalf of the Ethics Committee



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Voorzitter / Chairman

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Prof. dr. Erik Van Laecke

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Betreft :

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B.U.N.: Nog aan te vragen

- * Adviesaanvraagformulier 24/1/2020 (Volledig ontvangen dd. 20/02/2020)
- * CV : Lisa Demets
- * Patiënteninformatie- en toestemmingsformulier : voor de kinderen (ontvangen dd. 20/02/2020)
- * Vragenlijsten :
 - Pin-Q kinderversie NL
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Advies werd gevraagd door: Prof. dr. Anne-Françoise Spinolt

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- Dr. N. PETERS (UZG – vruchtbaarheidsarts, ♀)
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- Prof.dr. P. SCHELSTRAETE (UZG – kinderpneumoloog/infectioloog, ♀)
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