

9. Diagnosis

An accurate diagnosis of PMNE is essential for the correct treatment of this common disorder in childhood.

It is recommended actively searching for cases from 5 years of age in any visit for illness or routine check-up [D].

Only the correct exclusion of non-monosymptomatic cases and secondary enuresis will enable us to identify true monosymptomatic cases and implement the recommendations contained in these guidelines. This will avoid starting unnecessary or unsuitable treatments that tend to be long and ineffective and discourage patients when the desired outcome is not achieved. Indeed, in many cases this only prolongs the problems of both children and parents.

To establish a diagnosis of PMNE we need to look at both subjective data (symptoms) and objective data (questionnaires, bladder diaries, examinations), obtained in the clinical visit.

9.1 Clinical interview

Clinical history that targets both daytime and nighttime micturition:

Basic data

Basic data are: age at onset of enuresis, duration, frequency of wet nights, previous efforts by the parents to control the condition, and prior treatments. A dry period lasting for more than 6 months distinguishes primary from secondary enuresis.

Psychosocial assessment

If there has been a dry period of more than 6 months, the diagnosis is secondary enuresis that often is derived from psychological problems (the child's personality, family conflicts, the birth of a sibling, school environment, or the presence of alternative caregivers are important in these cases).

In primary enuresis, psychological problems (if they exist) are typically secondary to the enuresis itself. However, some family attitudes regarding bed-wetting can cause treatment to fail, particularly through the use of negative

reinforcement or punishment, which should be avoided. One must also be attentive to how the child reacts to certain recommendations, such as forcing him/her to make the bed at night or siblings' teasing that he/she might interpret as punishment or something akin to it. It is important to reward (positive reinforcement) any progress towards dryness, however small it may be, to make the child feel proud and improve his/her self-esteem.

The parents' and the child's attitude toward enuresis is important when setting targets and deciding on the type of treatment. The child's attitude can be assessed by asking him/her about his/her concerns about the subject and the desire to receive and cooperate with therapy.

Occasionally a diagnosis of a psychological/psychiatric condition will impede the child from collaborating at all with treatment. Likewise, because it is so common, it is important to detect children with a diagnosis or suspicion of ADHD, particularly the inattentive subtype, as well as investigating the existence of stressful family situations and the parents' willingness or cooperative attitude, as these have a bearing on the choice of treatment.

Annex 2 presents the DSM-IV diagnostic criteria for ADHD³¹.

Sleep habits

It is worthwhile asking if the child breathes through the mouth, snores, is agitated or suffers apnoea while sleeping, especially in order to rule out obstruction of the upper airway. If the child is more tired in the morning than normal for the number of hours slept, then nocturnal apnoea should be considered⁸⁵ [V]. Although obstruction of the upper airway is clearly related to secondary enuresis, it should also be factored in when considering primary enuresis.

Information from the parents on the difficulty of waking the child has no treatment implications and it is therefore not necessary to study sleep patterns as part of the clinical history of a child with enuresis.

Frequency of bowel movements and fecal consistency

Constipation and encopresis can cause enuresis, so it is important to see if there are fewer than 3 bowel movements per week, or dry feces or if encopresis is present. Encopresis could be the result of constipation or (more frequently) due to behavioral problems. Although both (constipation and encopresis) are more closely related to secondary enuresis, they should also be considered in primary enuresis.

Fluid intake habits and the number and times of bedwetting incidents

Parents usually tell us about the approximate frequency of wet nights per month and they know if there are one or more incidents per night. Most enuretic children urinate once a night, after midnight, although there are some children who wet the bed more than once per night. In these cases, particularly if they urinate before midnight, you need to see if they are drinking too many liquids just before going to bed and if they drink diuretic beverages such as sodas and colas at the end of the day. Enuresis consisting of more than one incident per night with normal fluid intake suggests a bladder with a low functional capacity or detrusor overactivity during the night.

Daytime symptoms

The accurate diagnosis of monosymptomatic enuresis requires any urological or neurological illness that interferes with urination to be ruled out. The anamnesis should be meticulous and aimed at detecting these conditions, particularly when they are unknown to the parents, as tends to occur in the case of overactive bladder or dysfunctional voiding (table X).

Dysfunctional voiding or **functional obstructive micturition** consists of a functional obstructive micturition without an organic cause that is accompanied by urgency and incomplete voiding and which predisposes to urinary infections.

The **overactive bladder, urge syndrome** or **urgency-frequency syndrome** is defined as urgency, with or without incontinence, usually associated with fre-

Table X. Factors to investigate in the clinical history of children with enuresis

To investigate	Differential diagnosis
<ul style="list-style-type: none"> - Daytime incontinence - Increased daytime voiding frequency - Voiding urgency <ul style="list-style-type: none"> - Sensation of urinating with very little urine in the bladder - Holding maneuvers (squatting) - Urine forthcoming immediately after micturition 	<ul style="list-style-type: none"> - Dysfunctional voiding or overactive bladder
<ul style="list-style-type: none"> - Recurrent urinary infections - Improper postures for urination 	<ul style="list-style-type: none"> - Dysfunctional voiding

quency and nocturia, in the absence of proven infection or other pathology. This concept, defined as such in adults, is more difficult to assess in children.

Daytime incontinence is not always easy to detect. If you ask the question, "Is the child incontinent during the day?" the parents may incorrectly answer, "No". The question should be phrased: "Does the child usually wet his/her underwear?" or "Does he/she have urine losses, even if it's only drops?"

The normal situation is for there to be complete dryness, without any leakage. Many parents believe that incontinence refers only to incidents of large urine leaks that require the child to change clothes, but they do not consider it incontinence if he/she only wets his/her underpants or if the amount of urine lost is so small that there is no need to change clothes.

It must be highlighted that the incidence of incontinence only when the child is absorbed in games is "postponed voiding" and lacks pathological implications.

Normal 24 hours- **frequency** of micturition is 4-7 times a day. If the child urinates 8 times or more, or more than once every 75 minutes, this is a case of increased frequency. This increased daytime micturition frequency is often

an intermittent and normal symptom in childhood that is aggravated or appears when the child is excited or experiencing stress, after having had a lot of fluid and diuretic beverages (with caffeine or carbonated drinks).

Urgency is the sudden urge to void that cannot be postponed, with the fear of losing urine. An overactive bladder may be accompanied by voiding drops or a small stream after micturition, and holding maneuvers. Holding postures are learnt when faced with a sudden urge to void and as a means of trying to reduce the loss of urine. The common maneuver of squatting occurs in a young girl when she suddenly stops doing what she was doing, presses her thighs together, crouches while crossing her legs, and presses one heel into her perineum. Another common posture in older children is to sit down in a chair with the thighs pressed together on top of one foot. Once the feeling of urgency has disappeared (i.e., of imminent loss of urine), they usually go to the toilet immediately (although sometimes they carry on playing). Crossing the legs, wriggling while seated, dancing around a particular spot, or pressing the genitals with one hand are other behaviors that indicate the feeling of urgency.

Urgency must be distinguished from postponed voiding, which is when the child ignores the signal of the urge to void until the very last minute, usually when he/she is absorbed or engrossed in a game, or watching a film... In this case he/she may also adopt holding maneuvers in order to 'hang on'. The difference between the urgency syndrome and postponed voiding is that, in the first case, the child goes to the toilet as soon as he/she can, whereas in postponed voiding, he/she continues playing until the next incident of urgency, if he/she manages to postpone voiding or has losses. Quite often the child continues with what he/she is doing despite the loss; this only happens when he/she is engrossed in a game.

The sensation of urinating with very little urine in the bladder as the usual way of voiding, points to low maximum voided volume, which will have to be verified through measurements.

Many children with urgency urinate again –a few drops or a small stream– just a few minutes after voiding, or just after getting off the toilet. In young girls, some parents observe that they wipe themselves with toilet paper many times so as to avoid getting their underpants wet (this can also be observed in labial fusion, although in this case they

wet due to the retention of urine in the introitus, not due to the post-micturition stream seen in urgency).

Recurrent urinary infections suggest a high probability of dysfunctional voiding or other urological alterations.

Sometimes an **improper position for urinating** due to the use of very high toilets (that do not allow the child to support his/her feet) predisposes to dysfunctional voiding.

Annex 3 presents a clinical questionnaire⁸⁶, validated in English with a group of 3-10-year olds, for the diagnosis of dysfunctional voiding. It is easy to use as it consists of only 10 questions, 9 of which are for the child and the last one is for the parents.

Normal scores are different for boys and girls:

- Girls: normal 0-6 points (sensitivity 93% and specificity 87%).
- Boys: normal 0-9 points (sensitivity 81% and specificity 91%)

9.2 Clinical examination

The examination should be simple, quick, and focus on the problem so that it can be carried out in Primary Care. It basically consists of examining the back, gait, and genitals and palpating the abdomen and lumbosacral bony processes.











- The examination will particularly look for:
 - Signs of neuropathy: spinal deformity, asymmetric atrophy of the feet, hammer toes, or high arches in the feet.
 - Signs of dysraphism: the absence of one or more bony processes when palpating the back. Discolored skin, dimples, hairy tufts, subcutaneous lipoma, asymmetric thighs, oblique gluteal fold. Although a coccygeal dimple in the intergluteal fold is considered normal, if it is located above the gluteal fold, it may be due to a scar that pulls on spinal cord tethering.
 - Genitals: in children, the meatus should be examined to rule out narrowness, although it is best to observe the stream during micturition. In girls, the introitus should be examined in the 'frog' position (heels together, knees bent and muscles in abduction) to rule out vulvitis, vaginitis, and labial fusion, which are related to losses of urine/urgency/urinary infection. The meatus should be observed: if it is hypospadiac (inside the vagina) or if it is covered with a mucous membrane that directs the stream forward, this predisposes to dysfunctional voiding. A very wide vaginal orifice or scars suggest the possibility of sexual abuse.
- Basic neurological examination: observation of gait on the toes and heels, forward and backward. If normal, rule out further examination. If anamnesis or the previous examinations are suggestive of neurological involvement, a sensitivity and perineal reflexes study should be made.
- Palpation of the abdomen: You can find a large bladder, a mass on the flank, or a mass in the left inguinal or left lumbar region (nine regions system) due to fecal impaction.
- Rectal examination: this is not necessary (unless you wish to check for fecaloma on the basis of suspicion based on the clinical or abdominal examination).

9.3 Bladder diary

This is an "objective" recording tool that can provide valuable clinical information impossible to obtain in an interview. It consists of recording (either the parents or the child, depending on age

Figure 4. Three-day voiding chart.

Name Number of hours.....
 Surname Date of the first day

	First day			Second day			Third day		
	Amount	Notes		Amount	Notes		Amount	Notes	
									
5-6									
6-7									
7-8									
8-9									
9-10									
10-11									
11-12									
12-13									
13-14									
14-15									
15-16									
16-17									
17-18									
18-19									
19-20									
20-21									
21-22									
22-23									
23-24									
24-01									
01-02									
Maximum		Got up to void?			Got up to void?			Got up to void?	

• Notes

L = Loss, has soiled (feces) or wet (urine) clothes

H = Holds on till the last minute because is concentrating on a game or film... and forgets to go to the toilet (urine or feces)

U = Urgency, sudden urge, not enough time to reach the bathroom from when he/she detects the urge to void or defecate, must run and can lose (or has lost) control

B = Goes to the toilet and defecates **N** = Normal. **G** = Hard feces (like a goat's) **S** = Soft.

3-day MDVV (maximum daytime voided volume) (excluding the 1st morning urine) ml

Theoretical MDVV [(Age + 2) x 30] ml

% of the theoretical MDVV [MDVV x 100 /theoretical MDVV] %

Has there been urine loss during the daytime? (Yes/No)/Has the child soiled him-/herself? (Yes/No)/Is there constipation? (Yes/No)

• Notes: the day starts when the child gets up and ends when he/she gets up the next day. Several volumes or notes can be written down in one box. If he/she gets up to urinate during the night, do not write down the volume, just "yes" or "no".

and ability) the voids that take place during normal daily activity throughout the day. The voiding times and volumes are recorded (measured by urinating into a measuring jar), as well as other data such as urine leakage, voiding urgency, holding on as long as possible because the child is watching TV, on the computer or playing a game... observed by the parents at the time these events occur.

This clinical tool has been used without difficulty in children^{26,87,88} and is considered of mandatory in clinical practice by expert forums on urinary incontinence in children³³ and adults. In the case of enuresis, it is particularly necessary because the evaluation method that makes use of several parameters will help us to make an accurate diagnosis of "monosymptomatic" enuresis and consider prognostic values such as MDVV (Maximum Daytime Voided Volume) [la] (see prognostic factors) that will guide us in our decisions as to the type of treatment to follow or whether to refer the patient to other specialists.

It is essential that the bladder diary be filled in for at least 3 days [A]. It can be done conveniently over two weekends.

We have prepared a chart for enuresis that also includes data on fecal control, where one can record urine leakage or fecal losses (L), the feeling of having to hurry to urinate or defecate (U), holding on until the very last moment (H), bowel movements (B) and their normal consistency (hard or soft) (N, G or S) (figure 4).

When a child is considered capable of filling it in, the form is presented to the child and he/she is told that for 3 days he/she will be the "detective of his/her bladder". It is stressed that it is only valid if it represents the normal and usual behavior of the child's bladder and that there are no 'right' or 'wrong' figures. The parents should supervise and fill in the notes. The chart is discussed with the child and the family at the second visit in order to clarify or jot down any confusing or omitted data. If necessary, repeat the exercise and do not start treatment on any child without a chart that can be interpreted.

Reading/interpretation of the bladder diary

The most important data in the voiding chart are, on the one hand, those of diagnostic value, such as high micturition frequency or the presence of daytime losses, and on the other hand, those of prognostic value (such as MDVV).

Table XI. Data that can be taken from bladder diaries.

<p>*Nocturia: number of micturitions recorded during the hours of sleep at night (each micturition is preceded and followed by a period of sleep).</p>	<p><i>Comment:</i> this may not be measurable in enuretics, but we are interested in knowing if it occurs once or more.</p>
<p>*Daytime frequency: number of micturitions recorded during wakeful hours, from the first void after waking up and getting up in the morning until the last micturition before going to sleep.</p>	<p>Normal ≤ 7</p>
<p>24-hour frequency: total number of voids (daytime + nocturia) in 24 hours.</p>	<p>Normal ≤ 8.</p>
<p>Maximum voided volume: largest volume of urine voided in a single micturition. Previously called Functional bladder capacity.</p>	
<p>*Maximum daytime voided volume (previously called Daytime functional bladder capacity): maximum volume of urine voided in a single daytime void excluding the first urine in the morning.</p>	<p><i>Comment:</i> there are different formulae that approximate the theoretical values for each age. Koff's formula⁸⁹: Vol. (ml)=(Age (yr.)+2) x 30</p>
<p>Maximum nighttime voided volume (previously called Nocturnal functional bladder capacity): largest volume of urine voided in a single micturition at night, including (often the only one) the first urine in the morning</p>	<p><i>Comment:</i> usually 1.6-2.1 times higher than "maximum daytime voided volume.</p>
<p>Nocturnal diuresis or nocturnal volume of urine: defined as the volume of urine produced between the time the individual goes to bed with the intention of sleeping and the moment he/she wakes up with the intention of getting up. The last micturition before going to bed is excluded, but the first void after getting up in the morning is included.</p>	<p><i>Comment:</i> can be collected by keeping the wet diaper from the night in a closed bag (so it does not dry out), later weighing it on a scale that can detect 5 grams (including many kitchen scales) and subtracting the weight of the dry diaper.</p>
<p>24-hour diuresis: measured by collecting all the urine over 24 hours. Usually started after the first void after getting up in the morning (excluded) and completed when the first void after getting up the following morning is recorded</p>	<p>*Polyuria: >40 ml/kg/day or 2.8 liters in adults. Not well defined in children.</p>
<p>Nocturnal polyuria: Nocturnal diuresis represents over 20% in young adults. No figure has been established for children, although some studies speak of more than 50%.</p>	
<p>*Urgency: (marked as "hurry" in the chart) the clear, sudden urge to void that is difficult to postpone</p>	<p><i>Comment:</i> common in small children, not always pathological.</p>
<p>*Daytime losses: the manifestation of urinary incontinence. Can be small, if drops that hardly wet the underpants, and large if clothing is completely soaked.</p>	
<p>*Child's postures: for instance, he/she holds urine until the very last minute because he/she is concentrating and engrossed in a TV or game and forgets to go to the toilet.</p>	
<p>* Data of particular interest in enuresis</p>	

The normal number of voids or normal 24-hour micturition frequency is 4-6 times (percentiles 25-75) and 3-8 times (percentiles 2.5-97.5)²⁶. By consensus, a normal threshold is 8 micturitions in 24 hours and 7 if nighttime is not taken into account. Threshold values are always difficult to interpret *per se*. They are of great diagnostic value for overactive bladder when accompanied by urgency or incontinence, data that can also be obtained from the bladder diary.

Bladder capacity is highly variable because the bladder is an elastic, muscular organ that is influenced by situations that produce different degrees of emotional tension. In a single person, it varies from one void to another and also in terms of between different micturitions or days and also on the basis of how it is measured. The most usual measures are the MDVV, i.e. the maximum voided volume during the daytime, excluding the first void in the morning, which is part of the bladder capacity while asleep. This is usually 1.6 to 2.1 times greater than the MDVV²⁵. The MDVV is considered the maximum voided volume obtained over the course of the 3 days covered by the chart, excluding the first volume in the morning. This figure is taken as a reference to calculate the percentage of the theoretical

bladder capacity, the theoretical MDVV, according to Koff's formula⁸⁹: $ml = (age + 2) \times 30$.

Table XI presents other interesting data that can be obtained from bladder diaries.

9.4 Dipstick urinalysis

Urinary infection

Is performing dipstick urinalysis or a urine culture to detect urinary infection in children with PMNE worthwhile?

The objectives of this test are:

- To detect whether there is an asymptomatic urinary infection (screening) with sufficient reliability.
- If a high probability of bacteriuria is detected, to determine if it is clinically relevant.

The clinical importance of bacteriuria depends on:

- Children with PMNE having a greater number of urinary infections or problems associated with it in comparison with the general population of non-enuretic children (urological anomalies, dysfunctional voiding...). As previously described in the section dealing with

factors associated with enuresis, the prevalence of bacteriuria in children with PMNE is the same as that of the general population, that of asymptomatic bacteriuria [IIc].

- The diagnosis and/or treatment of the bacteriuria modifying the prognosis of enuresis.

There are no studies that assess the prognostic impact the existence of bacteriuria at the time of diagnosis of PMNE has. Nevertheless, in studies on enuresis treatment failure or persistence into puberty or adulthood, no higher prevalence of bacteriuria is found [IV].

Urological abnormalities associated with treatment failure of monosymptomatic nocturnal enuresis such as urethral stenosis⁹⁰ [IV] or functionally small bladder do not associate urinary infection.

In a series of 97 children with treatment failure who reached puberty or adulthood with enuresis, none were found to have bacteriuria⁹¹ [IV].

On the basis of these data we can deduce that if we do not routinely perform a urine culture or a dipstick urinalysis in all children seeking care at the facility, nor is there cause to do so in a child whose only symptom is enuresis.

In monosymptomatic nocturnal enuresis it is recommended adopting the same attitude to urinary tract infection as in the general population [B].

Diabetes mellitus and diabetes insipidus

Juvenile diabetes mellitus is not associated with PMNE [IV] and the diagnosis of diabetes is obtained earlier as a result of the clinical manifestations of the disease than by means dipstick urinalysis in a child with enuresis.

Routine testing to rule out diabetes mellitus in children with PMNE is not recommended [C].

Given that **diabetes insipidus** has an incidence of 5 cases per million per year in the general pediatric population⁷⁹ [IIIb], it is not expected that a test (dipstick urinalysis) that is not considered useful in diagnosing patients with a clinical suspicion of diabetes insipidus will aid in diagnosing this illness in children that consult for PMNE in whom no epidemiological evidence of association has been found.

The standard diagnostic method is the water deprivation test, which is difficult to perform, requires hospital admission in strictly controlled conditions, is difficult to interpret, and is always indicated in order to establish a diagnosis when there is clinical suspicion of polyuria plus hyperosmolarity, or polydipsia-polyuria, but on the basis of a dipstick urinalysis.

It is not recommended dipstick urinalysis as a screening device for diabetes insipidus in children with PMNE [B].

9.5 Other diagnostic tests

Abdominal ultrasound, plain abdominal X-ray, X-ray of the spine, and other tests are not deemed necessary in PMNE.