Monosymptomatic and Non-monosymptomatic Enuresis

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Área da Mulher, Criança e Adolecente – CHLC, EPE
WORLD BEDWETTING DAY
Time To Take Action - 29th May 2018
DEFINITIONS

- **Urinary Incontinence:** involuntary loss of urine.
  - Continuous or intermittent
  - Occurs after continence should have been achieved (physiological until 5-Y-O)

- **Daytime Incontinence:** Leakage that occurs during the day
  - ≥ 1 accident/2 weeks.

- **Enuresis:** Any wetting that occurs in discrete amounts at night, regardless of whether it is associated with daytime symptoms.
  - DSM-IV-TR: ≥2t/week for ≥ 3 consecutive months in a child who is ≥ 5-Y-O
  - ICD-10: ≥2t/mo in the past 3 mo for children ages 5 and 6-Y-O; ≥1t/mo in the past 3 mo for children ages ≥7-Y-O.
DEFINITIONS

- **Bladder Dysfunction**: anomalies in bladder filling or voiding.

- **Urinary Frequency**: > 7 micturitions/day.

- **Infrequent voiding**: < 4 micturitions/day.

- **Primary**: A child who has never been dry on consecutive nights for >6 months.

- **Secondary**: Appears after a “dry period” of ≥6 months.
DEFINITIONS

**Monosymptomatic Enuresis (MNE) [nocturnal]**
- Loss of urine exclusively at night.
- Without other symptoms. Without diurnal complaints.
- 50-80% of all cases of enuresis.

**Non-Monosymptomatic Enuresis (NMNE)**
- Loss of urine during the night, with day-time symptoms.

**Isolated Diurnal Incontinence**
- Usually associated with other symptoms of bladder dysfunction.
CLASSIFICATION

Physiological urinary incontinence

Functional urinary incontinence
- Monosymptomatic enuresis MNE [nocturnal]
- Non-monosymptomatic enuresis NMNE
- Bladder dysfunction with diurnal symptoms
  - Hyperactive bladder
  - Micturition delay and hypoactive bladder
  - Non-coordinated micturition
  - Other

Organic urinary incontinence
- Anatomic
- Neurological
- Diminish urinary concentrating ability
- Psychiatric

Bladder dysfunction

Until 5-Y-O
CLASSIFICATION

INCONTINENCE

Continuous

Organic cause

Intermittent

Day-time

Enuresis

MNE

Primary

Secondary

NMNE

Primary

Secondary

Bladder dysfunction
ORGANIC INCONTINENCE

CAUSES AND CHARACTERISTICS OF ORGANIC URINARY INCONTINENCE

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<th>Anatomic</th>
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<td>Causes</td>
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<td></td>
<td>Obstruction:</td>
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<tr>
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<td>Inexistence of urinary continence</td>
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<td>Tubulopathy</td>
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<td>Diabetes insipidus</td>
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| Characteristics       | Inexistence of urinary continence | Recurrent UTI, inability to fell the need to urinate, neurogenic bowel, thick and trabeculated bladder |
# ORGANIC INCONTINENCE

## Causes and Characteristics of Organic Urinary Incontinence

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| Characteristics | Inexistence of urinary continence | Recurrent UTI, inability to fell the need to urinate, neurogenic bowel, thick and trabeculated bladder | Polyuria Severe nocturnal thirst |
ORGANIC INCONTINENCE

ECTOPIC URETER – POSSIBLE LOCATIONS

- Ureter
- Normal ureteral orifice
- Seminal vesicle
- Bladder neck
- Prostate
- Prostatic urethra
- Urethral sphincter
Monosymptomatic Enuresis
MNE – Prevalence

- **Spontaneous remission:** 15% per year.
- More common among boys (2:1) in whom is often more difficult to treat.
- Primary enuresis is twice as common as secondary enuresis.
- More common at all ages in lower socioeconomic groups.
- More common in institutionalized children.

### Enuresis at 7.5 years of age

<table>
<thead>
<tr>
<th>Age</th>
<th>Prevalence</th>
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<tbody>
<tr>
<td>5-Y-O</td>
<td>12% to 25%</td>
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<tr>
<td>8-Y-O</td>
<td>7% to 10%</td>
</tr>
<tr>
<td>12-Y-O</td>
<td>2% to 3%</td>
</tr>
<tr>
<td>Teenager</td>
<td>1% to 3%</td>
</tr>
<tr>
<td>Adulthood</td>
<td>2%-3%</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Enuresis at 7.5 years of age</th>
<th>1 t/week</th>
<th>2 t/week</th>
<th>Every night</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Girls</strong></td>
<td>8.9%</td>
<td>1.5%</td>
<td>0.2%</td>
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<tr>
<td><strong>Boys</strong></td>
<td>16.8%</td>
<td>3.3%</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

Butler RJ et al. Nocturnal enuresis at 7.5 years old: prevalence and analysis of clinical ALSPAC Study Team:2427-31.

MNE – Causes

Genetic factors

Maturational delay

Alterations in vasopressin secretion

Psychological influences

Sleep factors

Abnormal bladder dynamics
MNE – Causes

- Detrusor overactivity
  - Increased arousal threshold
  - Nocturnal polyuria
  - Lack of normal nocturnal increase in vasopressin secretion
  - Delay of bladder coordination by CNS
MNE – Causes

Genetic Factors

- If one parent affected: 44% of probability.
- If both parents: 77%.
- Age of remission in parents → predictive of age of remission in the child.
- Monozygotic twins: 58% of concordance.
- Dizygotic twins: 36% of concordance.

- Scandinavian linkage studies depicted a locus for enuresis on chromosome 13 (ENUR 1) and another (ENUR 2) on chromosome 12.
  
MNE – Causes

Nocturnal Polyuria

- In the 1950s: studies showing that children with enuresis have significantly increased nocturnal urine production compared with unaffected children.

- Increased fluid intake before bedtime.
- Reduced response to ADH.
- $\emptyset$ normal nocturnal increase in ADH secretion.

- Some studies: blunted response to ADH in enuretic children.
  ... but subsequent studies failed to reproduce this observation.
- Other studies: decreased nocturnal secretion of ADH.
  $\rightarrow$ Primary or secondary to the small bladder capacity?

- The relationship between ADH secretion and night time urinary output remains controversial...
MNE – Causes

- **Sleep factors**
  - No data support the concept that children with enuresis wet during “deep” sleep.
  - Wetting has been shown to occur throughout different sleep patterns.
  - Children with severe enuresis are “light sleeper” but they don’t wake up before voiding → the arousal centre may be suppressed in these children.
  - Persistently overactive bladder may lead to the abnormal arousal response.
  - Association between **OSA syndrome** and enuresis.
  - ↑ atrial natriuretic factor → inhibits the RAA pathway.
  - Tonsillectomy/adenoidectomy: cure enuresis to a significant extent.

**Obstructed airways** → **Paradoxical rising of the arousal threshold** → **Child don’t wake up before voiding**

**Persistent negative intrathoracic pressure** → **Increased atrial natriuretic peptide** → **Poliuria**
MNE – Causes

Abnormal bladder dynamics

- Enuretic children: smaller-than-normal functional bladder capacities at night.
- Detrusor overactivity.
- Urodynamic studies: higher bladder instability at night.
- If both daytime incontinence and enuresis: higher degree of functional bladder abnormalities and a higher failure rate with conventional treatment. (compared with patients with enuresis alone).
MNE – Causes

Maturational delay

- Most cases of MNE resolves spontaneously → delayed maturation of a normal developmental process.

- Urodynamic/EEG: progressive maturation in bladder stability + ↑ CNS recognition of bladder fullness and ability to suppress onset of bladder contraction.

- Children with enuresis: smaller bladder capacity (functional).

- Fine and gross motor clumsiness, perceptual dysfunction, and speech defects.

- Greater incidence of enuresis in children who were delayed in the attainment of motor and language milestones.

- Lower height, lower bone age and late sexual maturation in enuretic children.
MNE – Causes

Psychological Influences

- Higher prevalence of enuresis in children who have ADHD (30% greater chance of enuretic events).

- The reason may be a neurochemical effect.

- **Psychiatric disorders** (social behavior disorders, anxieties, depressive disorders) in children with enuresis are higher (up to 40%) than in non-enuretic groups. **Cause?**
  **Consequence?**
  **Coincidental?**
SECONDARY ENURESIS

- New-onset nighttime wetting on consecutive nights after a ≥6-mo period of dryness.
- Usually not related to an organic cause.
- Stressful event: birth of a sibling, move, death of a parent or grandparent, divorce, abuse,...
- May rarely be a side effect of a medication: lithium, valproic acid, clozapine and theophylline.
- Should be evaluated and treated like PNE; there is no need for additional laboratory work or imaging studies.
Non-monosymptomatic Enuresis
• Enuresis associated with **day time LUT** symptoms.

• Higher incidence of daytime wetting in children experiencing stressful events.

• Increased risk for constipation and encopresis.

• Most cases result from alterations in function, but it is important to seek specific disorders.
Non-monosymptomatic enuresis (não-MEN) and Vesical dysfunction with isolated diurnal incontinence

<table>
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<tr>
<th>Clinical signs of BLADDER DYSFUNCTION</th>
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<tbody>
<tr>
<td>- Consistently increased (≥ 8 t/d) or decreased (≤ 3 t/d) voiding frequency</td>
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<td>- Straining (↑ abdominal P to initiate and maintain voiding)</td>
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<tr>
<td>- Daytime incontinence</td>
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<tr>
<td>- Pollakiuria</td>
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<tr>
<td>- Urgency</td>
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<td>- Hesitancy</td>
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<tr>
<td>- Holding maneuvers</td>
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<tr>
<td>- Staccato micturition/ intermittency</td>
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<tr>
<td>- Dysuria</td>
</tr>
<tr>
<td>- Post-micturition dribbling</td>
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<tr>
<td>- Genital or lower urinary tract pain</td>
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MANAGEMENT
DIAGNOSIS

Exclusion of organic disease

Classification into one of the functional categories (if applicable)

Identification of comorbidities
DIAGNOSIS

ANAMNESIS

- Urinary losses: only at night or also during the day time?
- Frequency? (Every night? Several times per week? Per month?)
- Volume of wetness (dribbling vs soaking)?
- Where does it occur? (Only at home? Only outside home? Both?)
- How often does the child go to the toilet every day?
- Does the child have to get up at night?
- Leucorrhea?
- Number of times per day the child is wet? Underpants always wet?
- Holding maneuvers?
- How does the child urinate? Posturing?
- Intermittent urine stream? Does the child have to strain or squeeze?
- Dysuria? Pollakiuria? Imperative urge to urinate?
- Leakage associated with urgency/cough/laugh/after voiding?
DIAGNOSIS

ANAMNESIS

- Age of toilet training? Stressful toilet training?
- Toilet fobias?
- UTI? (Febrile/afebrile?)
- Constipation/soiling/encopresis?
- Child’s drinking habits? (How much? What? When?)
- Does the child drink large volumes of fluids, specially in the evening?
- Signs of a general developmental delay?
- Psychological or behavioral abnormalities?
- Comorbidities? Surgeries? OSA syndrome?
- What has already been done to treat the child’s urinary incontinence?
- Stressful situations within the family or at school?
- Family history of enuresis?
- Social history.
DIAGNOSIS

- Body weight and height
- Genital examination + examination of underwear
  - Hypospadias, phimosis, labial adhesions, urethral abnormalities
  - Leucorrhea
  - Urine dripping
  - Signs of fecal incontinence
- Inspection of lumbosacral spine
  - Occult spinal dysraphism: dimple, lipoma, hair tuff, sacral agenesis
- Abdominal palpation
  - Fecalomas; distended bladder.
- Neurological and lower limbs examination
  - Signs of lower cord dysfunction (muscle atrophy, feet deformities, claw toes, reflex abnormalities, ↓ sensibility)
- Urinary stream
**COMORBIDITIES**

- **Defecation problems**
  - Fecal incontinence
  - Constipation
  - Encopresis
    - 15% of children with enuresis also have encopresis

- **Recurrent UTI**
  - Afebrile
  - Febrile → referral for pediatric urologist or nephrologist
COMORBIDITIES

- **Psychiatric and neurodevelopmental comorbidities**
  - Socialization problems
  - ADHD
  - Anxiety
  - Depression
  - Sleep disorders (OSA, parasomnias)
  - Developmental disorders (language SD, motor function disorders)

**Quality of life of children with enuresis comparable to other chronic diseases (asthma, diabetes mellitus).**
Bedwetting has a serious impact on a child

- School and social performance
- Emotional well-being, Self-esteem
- Day time functioning
DIAGNOSIS

DIAGNOSTIC EXAMS

- **Urinalysis** (leucocituria; glicosuria; decreased urine density)
- **Uroculture** (urinary tract infection)
- **Renal and bladder ultrasound**
  - NOT NECESSARY if anamnesis clearly identifies MNE
  - Fundamental if bladder dysfunction/organic disease suspected
  - Bladder capacity, bladder wall thickness, post-void residual volume.
- **Urodynamic study**
  - Refractory cases to treatment
  - Significant day time symptoms/organic disease suspected
- **Specific exams (MRI, cistography, etc.)**
  - Organic disease suspected
  - Risk of kidney lesion
  - Comorbidities
DIAGNOSIS

EVALUATION OF THE BLADDER DIARY AND 14-DAY EXCRETION DIARY

- Frequency of micturition
- Micturition volumes
  - 1st morning urine
  - Maximum micturition volume (excluding the first morning urine)
  - Mean micturition volume (excluding the first morning urine)
  - Nocturnal urine volume (first morning urine + nocturnal urine volume)
- Amount of fluids taken/24 h
- Urinary incontinence events over 14 days (diurnal/nocturnal)
- Fecal incontinence events over 14 days
Diurnal excretion diary during 2 weekends

<table>
<thead>
<tr>
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<th>Volume of drinks (mL)</th>
<th>Volume of urine (mL)</th>
<th>Leakage of urine (✓ or x)</th>
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Identify any underlying bladder dysfunction problem.

Establishing a baseline record of the enuresis pattern.

This baseline monitoring itself may be associated with a dramatic improvement.
TREATMENT

**BASIC STANDARDS**

- It is **crucial** that the child and the parents be **motivated**.
- Educate about high prevalence of enuresis → Reduce guilt and stress.
- Inform about relative high spontaneous cure rate → encourage hope.
- In **NMNE**, **day time** symptoms should be treated **before** night time symptoms.
- If **fecal incontinence** is present, it should be treated **first**.
- **Psychiatric** comorbidities should be treated concomitantly.
  In severe forms, psychotherapy administered by a pedo-psychiatrist may be more effective.
- **Combined** therapies increase **success rate**.
- Any treatment should be **re-evaluated** regularly and usually takes a very long time (**several months**) until results are reached.
TREATMENT

BASIC STANDARDS

SUCCESS!!

Family

Health professional

Patient
TREATMENT

Urotherapy

- All non-surgical and non-pharmacological treatment modalities.

- **Information and demystification:** physiology, maturation, pathophysiology, therapeutic approaches, comorbidities.

- Based on the principle of **empowerment** → aims are improved bladder control and improved quality of life by strengthening patients’ own responsibility.

- Methods that are still being practiced, such as fluid restriction, nocturnal rousing, punishment, are not effective and should not be used.

- Also provides a useful adjuvant approach in organic urinary incontinence.
Bedwetting is nobody’s fault, and families and doctors should be able to discuss the condition without embarrassment or guilt.
TREATMENT

Urotherapy

- **Voiding behavior**: schedules for voiding, hygiene, calendars. Voiding before bedtime and upon waking and before longer journeys.

- **Water intake and nutrition**: “7 glasses rule”. Appropriate quantity of fluids, per age, divided into 7 glasses/day. Last water intake up to 2 hours before going to bed. Last intake of dairy until 4 hours before going to bed.

### Water requirements

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>Total volume/day</th>
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<tbody>
<tr>
<td>4 – 8 Y</td>
<td>F/M</td>
<td>1000 – 1400 mL</td>
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<tr>
<td>9 – 13 Y</td>
<td>Fem</td>
<td>1200–2100 ml</td>
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<tr>
<td></td>
<td>Masc</td>
<td>1400–2300 ml</td>
</tr>
<tr>
<td>14 – 18 Y</td>
<td>Fem</td>
<td>1400–2500 ml</td>
</tr>
<tr>
<td></td>
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<td>2100–3200 ml</td>
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TREATMENT

Urotherapy

Calendario miccional

Semana 1
Semana 2
Semana 3
Semana 4
Semana 5

Número de noches secas

Calendario miccional 2013

Colorea sobre los días...

un SOL objetivo conseguido, noche secas
una NUBE noche húmeda

Total días secos
Total días húmedos

abril

GOOD JOB!
WAY TO GO!
AWESOME!
TREATMENT

Urotherapy

http://www.bladderandboweluk.co.uk/world-bedwetting-day-2018/
TREATMENT

Behavioral modulation

- **ALARM**
  - Treatment of MNE (older children).
  - Evaluate whether family accepts underlying stress.
  - Many children awaken more than once a night.
  - Necessary to wake up the child completely for success.
  - If the child does not wake, the parent must awaken and accompany her to the bathroom → significant parental involvement.
  - Gradually the child awakens earlier and the wet spot diminishes in size until the sensation of bladder fullness causes the child to awaken before wetting.
  - Wear underwear instead of diapers.
  - Need to be used every night.
TREATMENT

**Behavioral modulation**

- **ALARM**
  - Needed 30-50 nights / 3-4 months of treatment to get results.
  - Cure: alarm was used for 1 month and did not alarm (kept dry).
  - The child uses the alarm every other day before discontinuing it.
  - Response rate: 50-70%.
  - Long-term success rate after stopping treatment: 40-50%.
  - The most effective means of long term control as well as preventing relapses.

- Should not be tried if:
  1. The child wets the bed only once or twice per week;
  2. The child or parents do not seem to be enthusiastic about the enuresis alarm;
  3. Rapid or short-term improvement seems to be the goal for the parents;
  4. Parents seem to express negative feelings/blame their child for wetting the bed.
TREATMENT

Behavioral modulation

- **BIOFEEDBACK**
  - Non-coordinated micturition.
  - Acoustic or visual signals → train children to relax and void their bladder.

- **NEUROMODULATION**
  - Overactive bladder.
  - Transcutaneous/percutaneous neuro-stimulation.
## TREATMENT

### Farmacotherapy

<table>
<thead>
<tr>
<th>Drug</th>
<th>Doses</th>
<th>Effect Indications</th>
<th>Adverse Effects</th>
<th>Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desmopressin (synthetic analog of ADH)</td>
<td>0.2 - 0.6 mg &gt;7-Y-O 30 min before sleep Do not use intranasal formulations! Fluid intake should be reduced 1h before administration</td>
<td>- ↓ volume of urine produced over night - <strong>Enuresis</strong></td>
<td>Water intoxication: Headache Nausea Hyponatremia Cerebral edema Seizure</td>
<td>V. Willebrand disease Hypertension Suspend if: fever, vomiting and diarrhea, vigorous exercise.</td>
</tr>
</tbody>
</table>

- Quickly effective → may be used when needed (camping, etc.).
- Maximum effect: 1h after ingestion. Total effect: 9h.
- The initial duration of treatment should be for 2-6 wk, to ascertain its anti-enuretic effect.
- Use 6 months and then stop 2 weeks.
- Response rate is defined by a 50% reduction in wet nights. 70% of children improve; 25% without wet nights.
- After stopping treatment most children relapse (65-80%).
- May not make the child completely dry, if bladder instability and reduced functional bladder capacity.
- “Works or it doesn’t.”
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<tr>
<td>Anticholinergics</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Oxybutynine</td>
<td>≥5-Y-O: 5 mg, b.i.d. → 5 mg, t.i.d.</td>
<td>↓ uninhibited bladder contractions</td>
<td>Xerostomia</td>
<td>Glaucoma Obstructive uropathy</td>
</tr>
<tr>
<td></td>
<td>0.3-0.6 mg/kg/day</td>
<td>- Daytime incontinence</td>
<td>Flushing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 5-Y-O: short-acting form</td>
<td>- Enuresis</td>
<td>Constipation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥6-Y-O: once-a-day form</td>
<td>- ↓ bladder capacity</td>
<td>Dizziness</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Hyperactive bladder</td>
<td>Concentration deficit disorder (20%)</td>
<td></td>
</tr>
</tbody>
</table>

- They rarely are effective when used alone, but work well in combination with desmopressin.
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</thead>
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<tr>
<td>Tricyclic antidepressants</td>
<td>25-50 mg if &lt;12-Y-O</td>
<td>- ↓ uninhibited bladder contractions</td>
<td>Arrhythmia</td>
<td>Glaucoma</td>
</tr>
<tr>
<td>Imipramine</td>
<td>Maximum 75 mg if &gt;12-Y-O</td>
<td>- ↑ concentrations of ADH release.</td>
<td>Seizure</td>
<td>Avoid concomitant use of MAOI and SSRI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ↑ arousal and suppressing rapid eye movement sleep.</td>
<td>Hypotension</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Enuresis</td>
<td>Coma</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Gastrointestinal disturbance</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sleep disturbances</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Anxiety</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Xerostomia</td>
<td></td>
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</tbody>
</table>

- Wide variation in cure rates have been reported (64% to 80%)
- Relapse rates of 755 (especially when imipramine therapy is discontinued abruptly)
## TREATMENT

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<tbody>
<tr>
<td><strong>Alpha-Blockers</strong>&lt;br&gt;Tamsulosin</td>
<td>0.2 – 0.4 mg&lt;br&gt;0.2 mg if &lt;5-Y-O&lt;br&gt;0.4 mg if ≥5-Y-O (use off-label)</td>
<td>- ↓ bladder output resistance&lt;br&gt;- <strong>Daytime incontinence</strong></td>
<td>Headache&lt;br&gt;Dizziness&lt;br&gt;Hypotension</td>
<td>C.I. in CKD</td>
</tr>
</tbody>
</table>
**MNE – TREATMENT**

**Terminology / Calculations required for evaluation**

**Expected BC (ml) = (age in years + 1) x 30**

**Reduced BC (ml) = <65% of EBC**

**Nocturnal polyuria = nocturnal U Vol >130% EBC**

Note: Evaluate only wet nights
Diaper weight + 1st morning urine

<table>
<thead>
<tr>
<th>Age</th>
<th>EBC</th>
<th>Reduced BC</th>
<th>Nocturnal polyuria</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Y</td>
<td>180 ml</td>
<td>&lt; 117 ml</td>
<td>&gt; 234 ml</td>
</tr>
<tr>
<td>6 Y</td>
<td>210 ml</td>
<td>&lt; 136 ml</td>
<td>&gt; 273 ml</td>
</tr>
<tr>
<td>7 Y</td>
<td>240 ml</td>
<td>&lt; 156 ml</td>
<td>&gt; 312 ml</td>
</tr>
<tr>
<td>8 Y</td>
<td>270 ml</td>
<td>&lt; 175 ml</td>
<td>&gt; 351 ml</td>
</tr>
<tr>
<td>9 Y</td>
<td>300 ml</td>
<td>&lt; 195 ml</td>
<td>&gt; 390 ml</td>
</tr>
<tr>
<td>10 Y</td>
<td>330 ml</td>
<td>&lt; 214 ml</td>
<td>&gt; 429 ml</td>
</tr>
</tbody>
</table>

BC = bladder capacity
MNE – TREATMENT

Treatment directed to the underlying problem

**Nocturnal polyuria**
- Normal BC
  - 1st choice: DDAVP

**Nocturnal polyuria**
- Decreased BC
  - Combination: DDAVP + alarm

**Normal nocturnal urine volume**
- Decreased BC
  - 1st choice: alarm
MNE – TREATMENT

Child ≥5 years who wets bed

Advice (eg causes, fluid and food intake)
CMT questioning
Physical examination and dipstick

Symptoms suggestive of bladder dysfunction/comorbidity?

YES: Treat these first/refer if necessary

NO: MNE

Advice on treatment options: shared decision based on preferences, motivation and diary if completed

Alarm
Desmopressin
MNE – TREATMENT

Alarm

Medical follow-up contact 1–2 times/month

No improvement

Clinical re-evaluation (including diary)
Confirmation of MNE
Change treatment

Improvement

Continue alarm with regular re-evaluation

Dry for 14 consecutive nights
Discontinuation
Advise family to resume contact/treatment if relapse

No improvement at 6–8 weeks
Combination alarm + desmopressin or refer to specialist
MNE – TREATMENT

Desmopressin

Medical follow-up contact
1–2 times/month
Titrater dose if necessary

No improvement

Clinical re-evaluation (including diary)
Confirmation of MNE
Change treatment

Improvement

Continue desmopressin with regular re-evaluation

Dry for 3 months

Cease treatment (May try gradual withdrawal)

Advise family to resume contact/treatment if relapse

Unsatisfactory improvement at 6–8 weeks

Combination alarm + desmopressin or refer to specialist
MNE – Failure to therapy

- Inability to achieve > 50% improvement in symptoms.

**Most common causes:**
- Non-motivated child/family;
- Incorrect use of medication/alarm.

**Other causes:**
- Overactive bladder;
- Underlying disease (e.g., diabetes mellitus/diabetes insipidus);
- Occult constipation;
- Sleep apnea.

- If on additional evaluation no underlying etiology is found, then combination therapy or switch to imipramime may be considered.

- If detrusor overactivity/small functional bladder capacity suspected, a combination of oxybutynin and desmopressin may be indicated.
Behavioral therapy → best treatment for daytime wetting, regardless of cause.

Double voiding - patients who have emptying problems.

Avoid bladder irritants (caffeinated, carbonated and high citrus-content beverages).

Sit on the toilet 30 min after a large meal, for 10 min, with feet supported, to encourage pelvic floor relaxation.

Treating constipation (most of children who have daytime wetting are constipated).

Biofeedback: for emptying problems.

Alpha blocking drugs: for emptying-based daytime wetting
  Cause smooth muscle relaxation at the base of the bladder and reducing outlet resistance at the proximal sphincter complex, thereby lowering PVR.

Oxybutinin: for reduced bladder capacity
NMNE – TREATMENT

Children > 5 years with daytime urinary incontinence (DUI) ≥1 times per month for > 3 months

Continuous incontinence

Surgery - correct structural GU anomaly, i.e. ectopic ureter, extrophy variant, vesicovaginal fistula, etc

Intermittent incontinence

Nocturnal enuresis (+)

Refer to ICCS’ recommendation for non-monosymptomatic enuresis (NMNE)

1. History
2. Physical exam
3. Urine analysis & culture
4. Questionnaire: lower urinary tract symptoms, bowel function, psychiatric problems
5. Bladder diary
6. Uroflowmetry
7. PVR
8. Bladder ultrasound

Urinary tract infections (+)

Treat urinary tract infection

Bowel dysfunction (+)

Treat coexisting constipation & fecal incont. Refer to ICCS recommendations for FC and FNRFI

Suspect psychiatric issues

Refer to pediatric psychiatrist for possible ADHD, depression and/or anxiety, & intellectual disability

Suspect endocrinologic disease

Refer to pediatric endocrinologist to rule out diabetes insipidus or diabetes mellitus

Suspect chromosome or genetic abnormalities

Refer to specialists

Standard urotherapy
NMNE – TREATMENT

Standard urotherapy

Refractory to urotherapy

Cured

Invasive examination: Anatomical genitourinary tract anomaly or neurogenic bladder

Non-neurogenic

Dysfunctional voiding

1. Specific urotherapy with biofeedback
2. Antimuscarinics for coexisting OAB

Overactive bladder

1. Neuromodulation
2. Antimuscarinics
3. Botulinum toxin A for refractory cases

Urethral vaginal reflux

Specific urotherapy

Giggle incontinence

1. Methylphenidate
2. Cognitive-behavioral therapy

Voiding postponement

Timed voiding with behavioral reinforcement

Underactive bladder

Specific urotherapy with intermittent catheterization

Neurogenic bladder

Refer to ICCS’ recommendations for neurogenic bladder dysfunction

Structural bladder outlet obstruction

1. Surgery
2. Manage coexisting lower urinary tract symptoms
Red flags.

Daytime symptoms not improving with bladder training and oxybutynin over 6-mo.

Enuresis not improving despite 6-mo of alarm and 6-mo of desmopressin.

Psychiatric disorders: child and adolescent psychiatry.

Midline defects, development disorders: neuropediatrics.

Sleep apnea syndrome: ORL.

Continuous urinary incontinence, neurogenic bladder, other form of organic urinary incontinence: pediatric urology, pediatric surgery.
Key Points

- Urinary incontinence in children is a heterogeneous entity.
- Functional causes are much more common than organic causes.
- The main prerequisite for successful treatment is the distinction between MNE and NMNE.
- Diagnosis and initiation of therapy are based on anamnesis and a non-invasive baseline assessment.
- Invasive urodynamic investigation indicated only in complicated patients:
  - Refractory cases to treatment
  - Significant diurnal symptoms / suspicion of organic pathology
KEY POINTS

- Motivation!!!

- Urotherapy is the cornerstone of treatment.

- First treat daytime symptoms and fecal incontinence.

- Psychiatric comorbidities treated in parallel.

- Combination therapies increase success rate.

- Treatment should be directed to the underlying pathology:
  - DDAVP in nocturnal polyuria
  - Alarm in decreased bladder capacity decreased
Bedwetting is nobody's fault.

It can and should be treated.
REFERENCES

- Bedwetting in under 19s. NICE guidelines. Published: 27 October 2010. nice.org.uk/guidance/cg111.
- Nocturnal enuresis (bedwetting) in children and young people. NICE guidelines. Published: September 2040. guidance.nice.org.uk/qs70
Thank you!