COMORBILITA' FUTURE NELLE BAMBINE CON DISTURBI MINZIONALI ED EVACUATIVI

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... are commonly encountered in school-aged

2% to 7%

daytime wetting can be
socially and psychologically distressing
for the affected child.


Baseline annual resolution rate 15%.

Bloom DA. BJU Inter. 2000; 85:43-46
Micturition occurs in the 
assembled or awake state

There is electroencephalographic evidence of cortical arousal during sleep in response to bladder distension.

To serve as an adequate reservoir the bladder capacity normally increases by about 30 ml per year until puberty.

“EXPECTED BLADDER CAPACITY”

\[30 + (\text{yrs} \times 30)\] ml

until 12 yrs (max 390 ml)

At between 1 and 3 years of age the cortical inhibitory pathways to and from the pontine micturition center develop, allowing the child to have voluntary control over the reflexes that control the detrusor and sphincter muscles.


- aware of bladder fullness
- voluntarily initiate or inhibit a detrusor contraction
- suppress voiding at socially inappropriate time
- fully co-ordinated
- residual urine disappeared
By 4 years of age, most children have normal urinary bladder control. The sphincter reflexively constricts during bladder filling and relaxes during a voluntary detrusor contraction allowing voiding to occur.

learned to postpone micturition

is able to initiate micturition EVEN if the bladder is NOT FULL
Enuresis. Bedwetting--the last taboo.

**DOOSON P.**

PMID: 21196688 [PubMed - indexed for MEDLINE]

Only 40% of Italian parents consulted a pediatrician and 8% admitted the use of treatment for the condition.


Toll-Free Telephone Medical Information on Nocturnal Enuresis: The First Italian Experience over a Two-Year Period.

Urol Int 2009;82:143-146 (DOI: 10.1159/000200788)

**N. 467** Elementary school teachers Iowa

- **37%** ask children to wait to go to the bathroom
- **18%** received information about abnormal elimination
- **8%** were aware of specialist trained to treat children with these problems

Suboptimal conditions exist in the bathrooms
- only 35% boys’ restrooms
- only 48% girls’ restrooms

"always clean"

Because children spend nearly half of their waking house at school, there is the potential for school to have a significant impact in their elimination patterns.
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Apprendimento della minzione

**Quadro urodinamico**

- P. Vescicale
- P. Addominale
- EMG sfintere
- Flusso urinario
- Volume

**P**

RIFLESSO

VOLONTA'

0 50 100 150
DEVELOPMENT OF URINARY CONTROL

**Dysfunction**

**Elimination**

**Syndrome**

Image showing the development of urinary control with various anatomical parts labeled, such as the brain, brainstem, cervical region, thoracic region, lumbar region, sacral region, T10-L2, pelvic nerves, pudendal nerves, sympathetic nervous system, parasympathetic nervous system, somatic nervous system, urethral sphincter, and muscles of the pelvic floor.
Frequency of UTI was significantly higher in the chronic functional constipation.


Constipation in children INCREASES the LIKELIHOOD of urinary incontinence, bladder overactivity, dyscoordinated voiding, a large capacity, poorly emptying bladder, recurrent UTI and deterioration of VUR.

There are a number of resolution of bladder symptoms after successful treatment of constipation

Turner-Warwich reported that patients with PBND had confirmed of symptoms for years before diagnosis life-long problem.

Donhoe JM. Primary bladder neck dysfunction (PBND) in children and adolescents I-II. J Urol 2005; 173: 212-16

- Pelvic floor EMG LAG-TIME interval between pelvic floor relaxation on EMG and the start of flow directly correlates with opening time (UD)
- On α-blocker therapy a decrease in mean pelvic floor EMG lag-time from 24.47 to 6.67 sec. (p<0.001) corresponded with improved flow parameters, while no improvements was noted in untreated patients.
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vagina

Sphincter urethrae

Urinary trigone
Trigonal ring
Detrusor loop

Pubic symphysis

Urethrovaginal sphincter
Compressor urethrae

© 1993, University of Michigan
The acquisition of volitional bladder control, particularly at night, is an important and well-established developmental neurological milestone.

*Kuhtz-Buschbeck et al., 2005*

Persistent bedwetting has been associated with delayed achievement of language and motor milestones in otherwise healthy children. Functional neuroimaging studies have implicated a complex neural network involving, among other regions, *frontal*, *insular* and *cingulate cortices* in volitional bladder control.

*Blok et al., 1997, 1998; Nour et al., 2000; Athwal et al., 2001*

Neuropathology, neuroimaging and neuropsychological studies have consistently implicated the *frontal lobes* in the pathogenesis of SCZ

*Weinberger et al., 2001*
Enuresis as a premorbid developmental marker of schizophrenia*

Thomas M. Hyde,1 Amy Deep-Soboslay,1 Bianca Iglesias,1 Joseph H. Callicott,1 James M. Gold,2 Andreas Meyer-Lindenberg,3,† Robyn A. Hoen,1 Llewellyn B. Bigelow,1 Michael F. Egan,1,‡ Esther M. Emsellem1 and Daniel R. Weinberger3

We investigated whether a history of childhood enuresis, a well-established marker of neurodevelopmental delay, is associated with SCZ and with measures of brain abnormalities also associated with SCZ.

The high frequency of childhood enuresis associated with SCZ and abnormalities in prefrontal function and structure in patients with a childhood history of enuresis suggest that childhood enuresis may be a premorbid marker for neurodevelopmental abnormalities related to SCZ. These findings add to the evidence implicating prefrontal dysmaturation in this disorder, potentially related to genetic risk factors.
More light sleep associated with frequent cortical arousals

BUT

INABILITY TO AWAKEN

COMPLETELY

The transition from light sleep to complete awakening, as elicited by the arousal center, MAY BE PARADOXICALLY SUPPRESSED BY LONG-TERM OVERSTIMULATION BY SIGNALS FROM THE BLADDER.
Corticotropic releasing factor: A mediator of emotional influences on bladder function.

Adam P. Klausner and William D. Steers

From the Department of Urology, University of Virginia Health System, Charlottesville, Virginia

- synthesized in neurons of PVN = key mediator anxiety–hypothalamic–pituitary–adrenal (HPA) axis
- expressed in areas of CNS that control voiding (Locus Coeruleus – Barrington’s nucleus) during anxiety – depression – pain – functional disorders of pelvic viscera
- bladder activity
- the expression may be influenced by estradiol

... HPA dysregulation occurs primarily with urge incontinence and does not appear to be involved with stress urinary incontinence ...

Klausner AP, J Urol 2004; 172: 2570-73
COMORBILITA' FUTURE NELLE BAMBINE CON DISTURBI MINZIONALI ED EVACUATIVI

THE DAY AFTER TOMORROW
IN THEATRES WORLDWIDE 28 MAY 2004

July 2006

WHERE WILL YOU BE?
### COMORBILITA' FUTURE NELLE BAMBINNE CON DISTURBI MINZIONALI ED EVACUATIVI

<table>
<thead>
<tr>
<th>Disturbio Minzionale</th>
<th>Descrizione</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUMENTATA FREQUENZA MINZIONALE</td>
<td>&gt; 8 minzioni/die</td>
</tr>
<tr>
<td>VESICA IPERATTIVA (URGENZA)</td>
<td>Condizione che riguarda pazienti che soffrono di urgenza. Sostituisce termine “instabilità vescicale”</td>
</tr>
<tr>
<td>MANOVRE SOSTEGNO PIANO PERINEALE</td>
<td>Manovre attivate per rimandare la minzione o contrastare l’urgenza (saltelli su punta dei piedi, incrocio forzato gambe, accovacciamento spesso con calcagno premuto su perineo)</td>
</tr>
<tr>
<td>INCONTINENZA DA URGENZA</td>
<td>Incontinenza in pazienti che avvertono urgenza. E’ sinonimo di incontinenza nei bambini con vescica iperattiva</td>
</tr>
<tr>
<td>GOCCIOLO POST-MINZIONALE</td>
<td>Perdita involontaria di gocce di urina dopo che la minzione è terminata. L’incontinenza da reflusso vaginale si presenta analogamente (&gt;5aa.)</td>
</tr>
<tr>
<td>MINZIONE DIFFERITA</td>
<td>Incontinenza in presenza di abituali manovre di sostegno piano perineale</td>
</tr>
<tr>
<td>DIMINUITA FREQUENZA MINZIONALE</td>
<td>&lt; 3 minzioni/die</td>
</tr>
<tr>
<td>VESICA IPOATTIVA (PIGRA)</td>
<td>Riguarda pazienti con bassa frequenza minzionale. Necessità di usare il torchio addominale per svuotare la vescica. Sostituisce il termine “vesica pigra”</td>
</tr>
<tr>
<td>MINZIONE FORZATA</td>
<td>Minzione iniziata o mantenuta utilizzando torchio addominale</td>
</tr>
<tr>
<td>MITTO ESITANTE</td>
<td>Difficoltà ad iniziare minzione o lunga attesa prima di iniziare minzione (&gt;5aa.)</td>
</tr>
<tr>
<td>MITTO DEBOLE</td>
<td>Mitto emesso con poca forza</td>
</tr>
<tr>
<td>MITTO INTERMITTENTE</td>
<td>Mitto emesso a scatti subentranti</td>
</tr>
<tr>
<td>SENSAZIONE SVUOTAMENTO INCOMPLETO</td>
<td>Sintomo non rilevante prima dell’adolescenza</td>
</tr>
<tr>
<td>Condizione</td>
<td>Descrizione</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Incontinenza Continua</strong></td>
<td>Perdita continua di urina in maniera consistente. Indica una malformazione o danno iatrogeno</td>
</tr>
<tr>
<td><strong>Incontinenza Intermittente</strong></td>
<td>Perdita di urina in episodi tra di loro distinti durante il giorno, la notte o in entrambe</td>
</tr>
<tr>
<td><strong>Incontinenza Notturna</strong></td>
<td>Sinonimo di enuresi</td>
</tr>
<tr>
<td><strong>Enuresi Monosintomatica</strong></td>
<td>Enuresi presente in un bambino che non presenta nessun altro sintomo di disfunzione vescicale</td>
</tr>
<tr>
<td><strong>Enuresi Non-Monosintomatica</strong></td>
<td>Enuresi in un bambino che presenta anche sintomi di disfunzione vescicale come incontinenza urinaria diurna, urgenza, manovre di sostegno del piano perineale</td>
</tr>
<tr>
<td><strong>Enuresi Primaria</strong></td>
<td>Enuresi in un bambino che non è mai stato asciutto per almeno di 6 mesi</td>
</tr>
<tr>
<td><strong>Enuresi Secondaria</strong></td>
<td>Enuresi in un bambino è stato precedentemente asciutto per almeno 6 mesi</td>
</tr>
<tr>
<td><strong>Nicturia</strong></td>
<td>Risveglio notturno per urinare (&gt;5aa.)</td>
</tr>
</tbody>
</table>
### COMORBILITA' FUTURE NELLE BAMBINE CON DISTURBI MINZIONALI ED EVACUATIVI

<table>
<thead>
<tr>
<th><strong>CARTA FREQUENZA-VOLUME</strong></th>
<th>strumento raccolta dati su funzione vescica compilato dai genitori o dal bambino. Non include tutti i dati richiesti dal diario minzionale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIARIO MINZIONALE</strong></td>
<td>strumento di raccolta dati compilato dalla famiglia o dal bambino. Usato per valutare la funzione vescicale. Dati minimi richiesti:</td>
</tr>
<tr>
<td></td>
<td>- volumi vuotati</td>
</tr>
<tr>
<td></td>
<td>- frequenza minzioni</td>
</tr>
<tr>
<td></td>
<td>- introito di liquidi</td>
</tr>
<tr>
<td></td>
<td>- nicturia</td>
</tr>
<tr>
<td></td>
<td>- episodi di incontinenza ed enuresi</td>
</tr>
<tr>
<td><strong>VOLUME VUOTATO</strong></td>
<td>volume diurno emesso durante la minzione documentato nel diario minzionale. Sostituisce termine “capacità vescicale”</td>
</tr>
<tr>
<td><strong>MASSIMO VOLUME VUOTATO</strong></td>
<td>maggiore volume emesso con la minzione desumibile dal diario minzionale. Sostituisce il termine “capacità funzionale vescicale”</td>
</tr>
<tr>
<td><strong>CAPACITÀ VESICALE ATTESA</strong></td>
<td>massimo volume vuotato correlato all’età calcolato [30+(età x 30)] ml.</td>
</tr>
<tr>
<td></td>
<td>Max 12 aa = 390 ml; &lt;65% inadeguato; &gt;150% eccessivo</td>
</tr>
<tr>
<td><strong>POLIURIA</strong></td>
<td>emissione &gt; 2 L di urina per m² superficie corporea/ 24h</td>
</tr>
<tr>
<td><strong>POLIURIA NOTTURNA</strong></td>
<td>volume urine notturne &gt; 130% capacità vescicale attesa per l’età.</td>
</tr>
<tr>
<td><strong>RESIDUO URINARIO</strong></td>
<td>&gt; a 5-20 ml indica svuotamento vescicale incompleto</td>
</tr>
</tbody>
</table>
## COMORBILITA' FUTURE NELLE BAMBINI CON DISTURBI MINZIONALI ED EVACUATIVI

### STIPSI

- **ritardo o difficoltà nella defecazione presente per 2 o più settimane e sufficiente a causare disagio al paziente**
  

Oltre alla bassa frequenza devono coesistere segni e sintomi aggiuntivi come:

- defecazione dolorosa
- masse addominali palpabili
- presenza di fecalomi durante l’esplorazione rettale
- dolore addominale
- reperti patognomici ecografici come diametro rettale aumentato e una impronta retrovesicale.

### ENCOPRESI

Passaggio di feci in un luogo inappropriato sia volontariamente che involontariamente in un bambino ≥ 4 anni, dopo che ogni tipo di causa organica sia stata esclusa. La frequenza deve essere di almeno 1 volta al mese per una durata di 6 mesi (ICD-10) o di 3 mesi (DMS-IV).
COMORBILITÀ' FUTURE NELLE BAMBINÉ CON DISTURBI MINZIONALI ED EVACUATIVI

EPIDEMIOLOGY OF URINARY INCONTINENCE

<table>
<thead>
<tr>
<th>Reference</th>
<th>Year</th>
</tr>
</thead>
</table>
Objective: to investigate the prevalence and lifetime risk factors for UI in middle aged women

Design: prospective cohort study

Participants: 1333 women aged 48 yrs

Results: 50% reported SUI and 22% UUI in the previous year

- Women who at age 6 yrs had wet in the day or several nights a week were more likely to suffer severe incontinence and report urge symptoms
- Occasional bedwetting was not associated with an increased risk in adult life

Urinary incontinence in middle aged women: childhood enuresis and other lifetime risk factors in a British prospective cohort

Diana Kuh, Linda Cardozo, Rebecca Hardy

J Epidemiol Community Health 1999;53:453–458
Effect of Childhood Dysfunctional Voiding on Urinary Incontinence in Adult Women

Vatche A. Minassian, MD, Danny Lovatsis, MD, Dante Pascali, MD, Mary Alarab, MD, and Harold P. Drutz, MD

VOL. 107, NO. 6, JUNE 2006

Objective: to evaluate the correlation between childhood dysfunctional voiding and UI in adulthood

Design: case-control study including 84 women referred to a urogynaec outpatient clinic and 86 controls

Results: Higher prevalence of a history of childhood dysfunctional voiding in women with current

- frequency (OR 2.48, P = 0.004)
- urgency (OR 2.02, P = 0.03)
- SUI (OR 2.21, P = 0.01)
- and UUI (OR 2.48, P = 0.009)
**Objective:** to evaluate the relationship between childhood and adult urinary symptoms in middle aged women

**Design:** a population based cohort randomly selected from age and race strata
### Childhood urinary symptoms as risk factors for adult lower urinary tract symptoms

<table>
<thead>
<tr>
<th>Childhood Urinary Symptoms*</th>
<th>Daytime Void Frequency†</th>
<th>Nocturia‡</th>
<th>Urgency§</th>
<th>Stress UI Weekly or More</th>
<th>Urge UI Weekly or More</th>
<th>More Than 1 UTI in last 12 Mos</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Daytime frequency:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted OR†</td>
<td>1.30</td>
<td>1.36</td>
<td>1.88§</td>
<td>0.97</td>
<td>0.76</td>
<td>1.08</td>
</tr>
<tr>
<td>95% CI</td>
<td>0.91-1.86</td>
<td>0.96-1.92</td>
<td>1.32-2.69</td>
<td>0.59-1.58</td>
<td>0.41-1.41</td>
<td>0.68-1.71</td>
</tr>
<tr>
<td><strong>Nocturia:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted OR†</td>
<td>1.63*</td>
<td>2.27‡</td>
<td>1.14</td>
<td>1.26</td>
<td>0.69</td>
<td>1.48</td>
</tr>
<tr>
<td>95% CI</td>
<td>1.05-2.54</td>
<td>1.47-3.5</td>
<td>0.71-1.83</td>
<td>0.66-2.41</td>
<td>0.19-1.44</td>
<td>0.85-2.57</td>
</tr>
<tr>
<td><strong>Daytime UI:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted OR†</td>
<td>0.82</td>
<td>0.50**</td>
<td>0.96</td>
<td>1.60</td>
<td>2.56**</td>
<td>0.87</td>
</tr>
<tr>
<td>95% CI</td>
<td>0.46-1.47</td>
<td>0.27-0.93</td>
<td>0.55-1.68</td>
<td>0.72-5.59</td>
<td>1.11-5.9</td>
<td>0.41-1.85</td>
</tr>
<tr>
<td><strong>Nocturnal enuresis:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted OR†</td>
<td>1.09</td>
<td>0.67</td>
<td>0.94</td>
<td>0.57</td>
<td>2.68††</td>
<td>0.65</td>
</tr>
<tr>
<td>95% CI</td>
<td>0.66-1.79</td>
<td>0.41-1.10</td>
<td>0.58-1.53</td>
<td>0.25-1.34</td>
<td>1.32-5.46</td>
<td>0.33-1.29</td>
</tr>
<tr>
<td>UTIs (1 more than yr):</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted OR†</td>
<td>1.19</td>
<td>1.59</td>
<td>1.47</td>
<td>2.00**</td>
<td>2.03</td>
<td>2.80†</td>
</tr>
<tr>
<td>95% CI</td>
<td>0.70-2.05</td>
<td>0.95-2.66</td>
<td>0.86-2.52</td>
<td>1.00-3.90</td>
<td>0.93-4.46</td>
<td>1.60-4.90</td>
</tr>
</tbody>
</table>

† p < 0.001.

‡‡ p < 0.05.

†† p < 0.01.

**Fitzgerald MP, et al. J Urol. 2006;175(3 Pt 1):989-93**
VOIDING DYSFUNCTION

Childhood symptoms of daytime urinary frequency, nocturia, urinary incontinence, nocturnal enuresis as well as urinary tract infections are strongly associated with OAB symptoms so prevalent in American middle-aged and older women.

Early identification of population at risk for adult OAB symptoms. Prevention or early intervention may be possible, reducing the significant burden of adult OAB.

Fitzgerald MP, et al. J Urol. 2006;175(3 Pt 1):989-93
Prior studies have identified an association between childhood urinary tract disorders and subsequent adult lower urinary tract symptoms in women. Childhood nocturnal enuresis has been commonly reported by women with detrusor instability


... associated with later adult urinary symptoms of urinary frequency, nocturia and urge incontinence

A history of recurrent UTIs is well established as a risk factor for future health problems.

- **hypertension**
  

- **impaired renal function**
  

- **renal related pregnancy complications**
  
0 Objective: to evaluate the natural history of DES to identify aspects that may be carried out into adulthood

- Participants: 191 women referred to a urogynaec outpatient clinic and 251 controls

- Results: UG pts (41.7%) significantly higher childhood DES scores than controls
  - Higher DES scores correlated significantly with current adult urgency, UUI, SUI, Incomplete emptying, nocturia, nocturnal enuresis, hesitancy,
  - Constipation and faecal incontinence in adulthood was significantly associated with high DES scores
  - Logistic regression revealed childhood urgency associated with adult DES.
**Objective:** to evaluate the prevalence of childhood bladder and bowel dysfunction in adolescents and adults with nocturnal enuresis

**Participants:** 56 adolescents/adults referred to nocturnal enuresis clinic and 293 controls

**Results:** Significant childhood bladder and bowel symptoms along with more adult urge and bowel dysfunction were found in adults and adolescents with nocturnal enuresis.
Enuresis in childhood, and urinary and fecal incontinence in adult life: do they share a common cause?

AYSE GURBUZ, ATES KARATEKE and CANAN KABACA
Zeynep Evren Women and Children Diseases Education and Research Hospital, Istanbul, Turkey
Accepted for publication 18 December 2004

- **Objective:** to investigate any association between urinary or fecal incontinence and childhood bedwetting
- **Participants:** 1021 women referred to a gynaecology outpatient clinic
- **Results:**
  - history of childhood bedwetting in 29.6% and 21.1% of women with and without UI respectively (P < 0.05)
  - Women with SUI had significantly higher rates of enuresis in childhood (35.4%) than those without it (21.1%; P = 0.003)
  - Fecal incontinence was significantly more common in women with a history of bedwetting in childhood (P < 0.05)

Unfortunately, a persisting communication failure still separates the pediatric world from the gynecologica/urological one, puberty being a sort of invisible wall that separates the two clinical domains.


Primary Vulvar Vestibulitis Syndrome

26,6% women had a history of childhood enuresis
AGING DEFINITION

- The process of becoming older, genetically determined and enviromentally modulated
- Any change in an organism over time which refers to a multidimensional process of physical, psychological, and social change
- Complex evolutionary spectrum of innate and progressive processes affecting molecules, cells and the whole organism that is caused by free radicals, non-enzymatic glycosylation, and apoptosis\(^1,2\), plausibly under the control of the endocrine system particularly GH, estrogens and androgens\(^2,3\)

2. Lelbach A et al Orv Hetil 2006
3. Markou A Hormones 2005
1. I sintomi legati alle disfunzioni delle basse vie urinarie in età pediatrica sono:
   - epidemiologicamente rilevanti
   - significativamente associati alla presenza di sintomi di iperattività vescicale nella vita adulta e a disturbi evacuativi come la stipsi.

2. Il documentato maggior rischio di sviluppare incontinenza da stress nelle donne con enuresi notturna in età pediatrica può fornire l’opportunità di evitare alle stesse l’esposizione a fattori di rischio come: travaglio prolungato, applicazione di forcipe o vacuum, parto vaginale e parto di neonato di peso<4Kg.

3. Un approccio “life-span” alle disfunzioni minzionali pediatriche non è più dilazionabile considerato l’impatto negativo di questi sintomi sull’attività vescicale, intestinale e sessuale futura di questi/e bambini/e.