BEDWETTING

WHAT LIES BENEATH?

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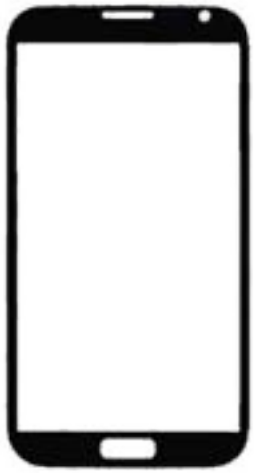

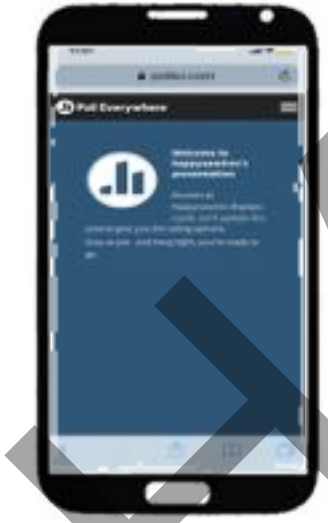

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What is the normal range of urination frequency for a child 6-y old?

a) 4-8

b) 3-8

c) 2-5

d) 4-7

Before we start

Voiding Frequency

(Normal: 4-7 /day)

- Frequent micturition ≥ 8/day
- Infrequent micturition ≤ 3/day

Incontinence

- Continuous
- Intermittent
  - Daytime
  - Nocturnal incontinence = ENURESIS

MNE

Involuntary bedwetting in a child > 5 years old without any LUT symptoms and without history of bladder dysfunction

Lower U.T. symptoms

- Dysuria
- Frequency
- Urgency
- Urge incontinence
- Hesitancy
- Weak or interrupted stream
- Post-void dribbling
- Holding maneuvers
- Feeling of incomplete emptying
- Straining

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Agenda

Is it really Enuresis?

Why does it happen?

How could we assess a child with enuresis?

How could we optimize therapy?

Case (1)

A 6-year-old boy presented by bedwetting since birth.

History of Desmopressin therapy and inadequate response.

Evaluation of the patient:

- Stunted growth with inadequate weight gain (since birth)
- Mild pallor

When poll is active, respond at **PollEv.com/happysawires**

Is it really ENURESIS?

a) YES

b) NO

It is NOT enuresis !

Clues of Diagnosis

- History: frequency of micturition > 10 /day
- Bladder diary: POLYURIA (> 2000ml/m^2/day)
- Abnormal growth & anemia

Water Deprivation test

Nephrogenic D.I. → **Nephronophthisis**

Case (2)

A 6-year-old boy presented by bedwetting since birth.

History of Desmopressin therapy and inadequate response.

Parents described their child as a deep sleeper with a lot of snoring during sleep.

Normal urine frequency & volume

Irrelevant examination

When poll is active, respond at **PollEv.com/happysawires**

Is it really ENURESIS?

a) YES

b) NO

It is enuresis + Comorbid condition (OSA) !

Clues of Diagnosis

- Snoring during sleep all the days with interrupted breathing pattern (OSA)

Adenoidectomy 1st

↓

Improvement

Case (3)

A 6-year-old boy presented by bedwetting since birth.

History of Desmopressin therapy and inadequate response.

No snoring

Normal frequency & volume

Irrelevant examination

Is it really ENURESIS?

a) YES

b) NO

It is enuresis BUT !

Clues of Diagnosis

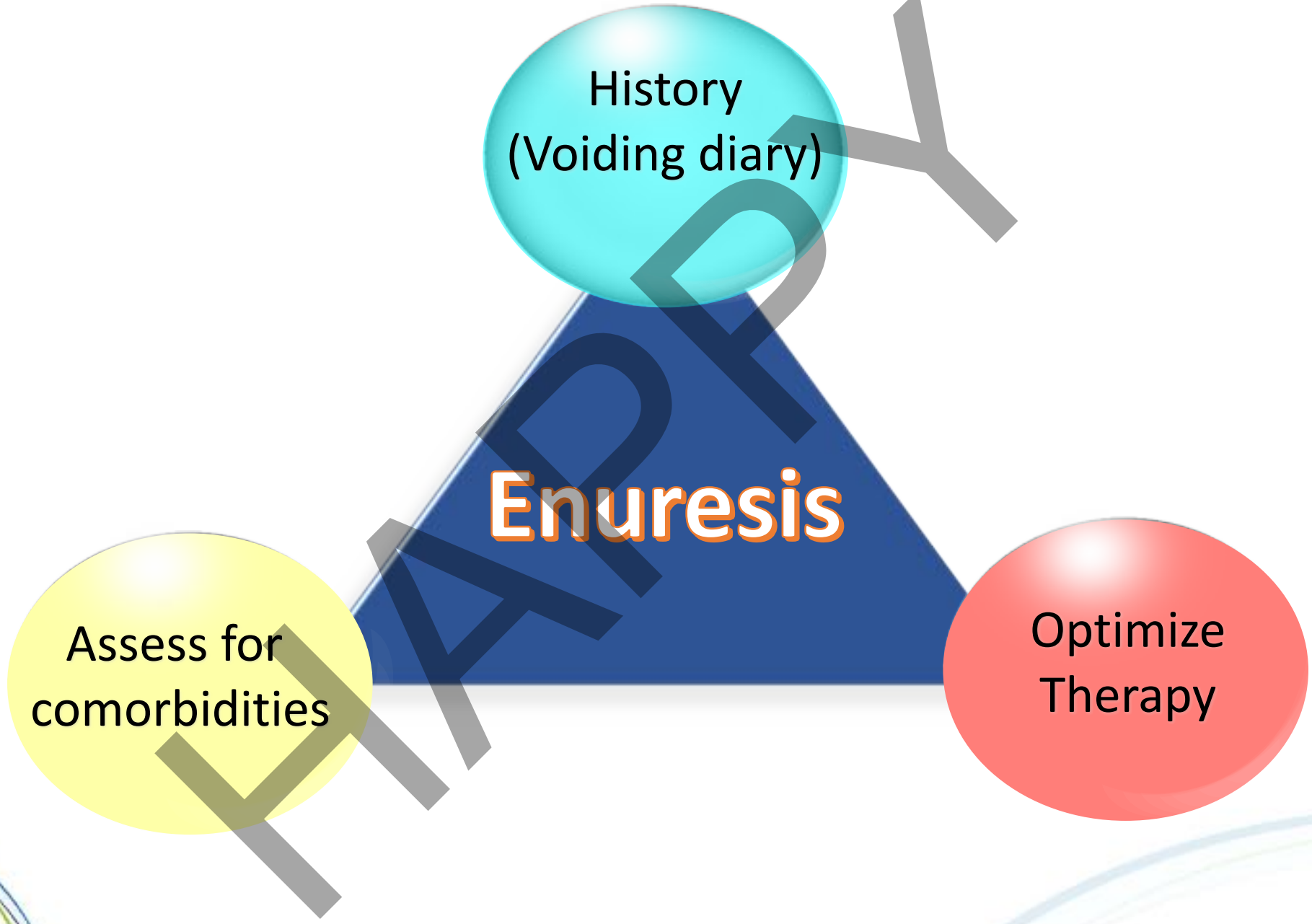
- No nocturnal polyuria (pants & underwear)

Enuresis Alarm

Clues of Diagnosis

- DDAVP after dinner immediately before sleep

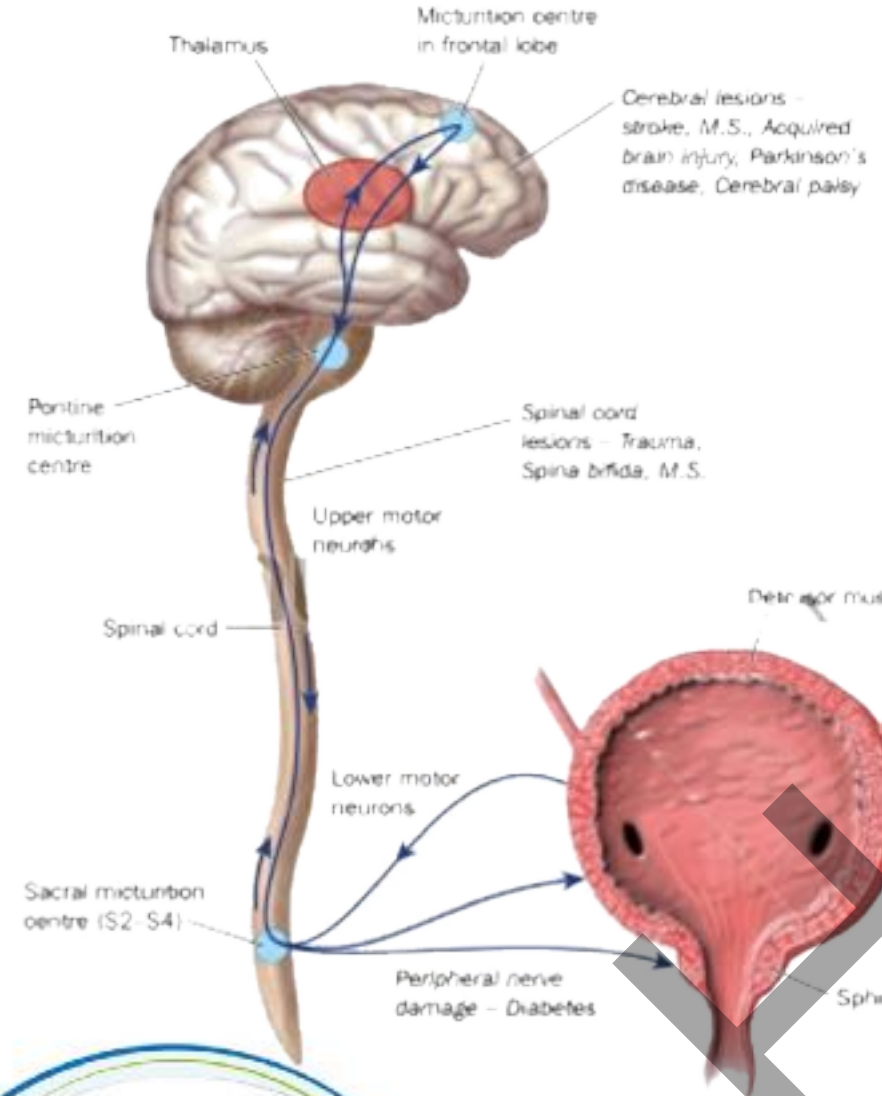
Optimize therapy


History
(Voiding diary)
Enuresis
Assess for
comorbidities
Optimize
Therapy

Why does it happen?

Why does it happen?

Physiology



Bladder filling

(bladder capacity + Compliance)

01

Impulse transmission to higher centers

02

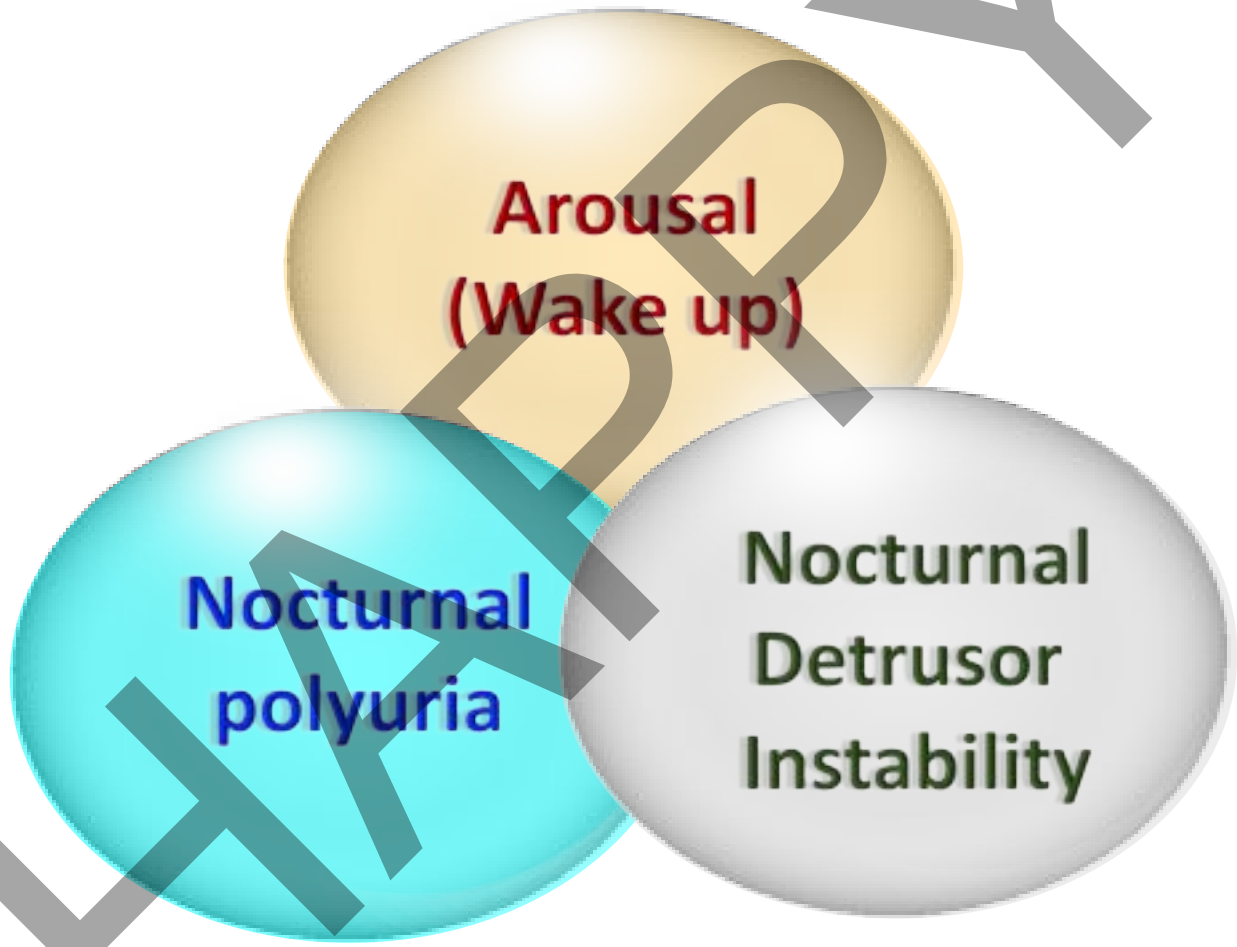
03

Higher centers response & AROUSAL

04

Bladder emptying

Why does it happen?

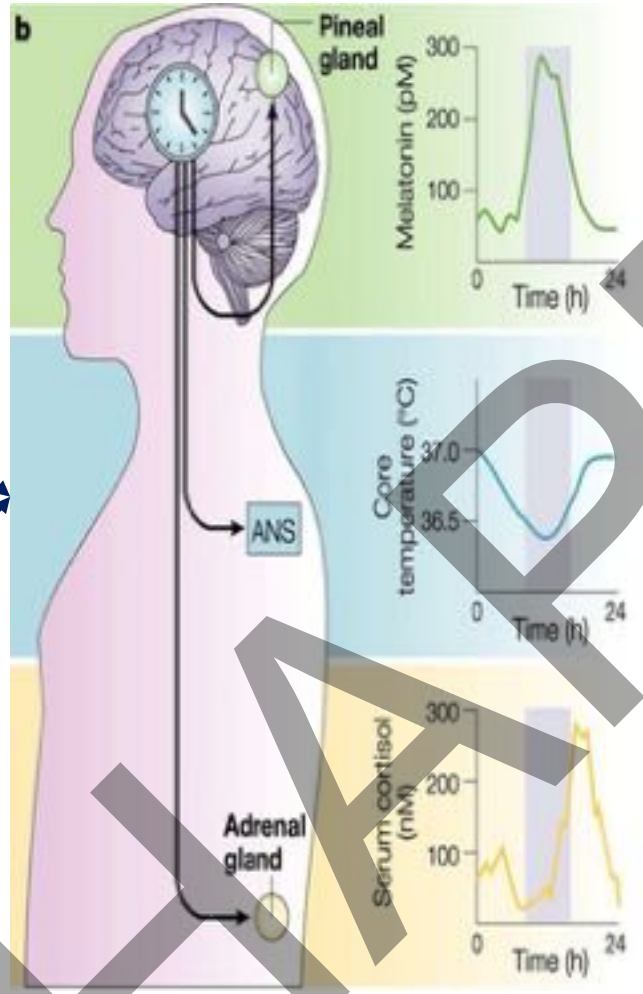


Arousal problem

Enuretics have a polysymnographically normal sleep.

(STILL THEY MAY HAVE AN AROUSAL DEFECT)

Circadian Rhythm & Enuresis



	Day (activity/awake)	Night (rest/sleep)
Dominance	Voiding	Storage
Urine production	High	Low
Voiding frequency	High	Null (very low)
pAVP (ADH)	Low	High
pANP	Low	High
PRA/PA (activity)	High	Low
PRA/PA (recumbency)	Low	High
GFR	High	Low
Electrolyte excretion	High	Low
FE_{Na}%	High	Low
$U_K/(U_{Na+K})$%	High	Low
Urine osmolality	Low	High
Detrusor contractility	High (?)	Low (?)
Functional bladder capacity	Low (?)	High (?)
Sympathetic tone	High (?)	Low (?)
Parasympathetic tone	Low (?)	High (?)
Pressure-sensing in the bladder	??	??
Activity of PMC	??	??
Cortical control of micturition	??	??

Why does it happen?

GENETICS

75% risk where both parents have been enuretics as children

45% risk where only one parent has been enuretic

15% risk where there is no parental history of enuresis

How could we assess a child w enuresis?

History

- Voiding diary
- Comorbid conditions
- Compliance to TTT

Examination

- Back inspection
- Motor & sensory LL & saddle area

Investigations

Urinalysis

Voiding Diary

(3 days*)

Voiding and fluid intake diary

Name: _____ Date of birth: _____

Date: _____

Voiding diary

Time	Urine volume (mL)	Straining/ interrupted stream	Wetting: Damp/wet?	Urge	Comments/observations

Fluid intake diary

Time	Fluid intake (mL)

* ICCS recommends 2 days

Determine EBC

Diagnostic tool of NP:
Measurement of night-time urine production (diaper wet + 1st morning void volume*)

EBC = [age (y) + 1] x 30

Reduced bladder capacity
= if MVV < 65% of EBC

Nocturnal Polyuria (NP)
= if MVV > 130% of EBC

* ICCS recommends not to involve 1st morning void

Is it really MNE?

Does the child have daytime symptoms? → NMNE – dysfunctional voiding neurogenic bladder - UTI

Does the child have polyuria or polydipsia? → IDDM – DI (central, nephrogenic), others

Does the child have behavioral/psychosocial disorders? → Autism – ADHD - others

Does the child have motor or developmental delay/learning problems?

Does the child have red flags? → Weight loss – anemia – encopresis – neurological defect in LL

Comorbid Conditions

Constipation

- ≤ 2 defecations / w
- ≥ 1 encopresis /w
- Retentive posturing
- Large fecal mass
- Painful or hard bowel movements

Snoring/OSA

- Insufficient arousal response
- Insufficient ADH release during sleep
- Impaired UDs

Behavioral

- ADHD
- Social problems
- PDD

Obesity

- Not explained yet

MNE subtypes	→	Optimize therapy
Normal urine output and EBC	→	DDAVP or Alarm
Reduced nocturnal bladder capacity	→	Alarm (mostly DDAVP resistant)
Nocturnal polyuria	→	DDAVP
Nocturnal polyuria and reduced BC	→	DDAVP + Anticholinergics (NMNE)

Optimize therapy

Desmopressin

(oral lyophilisate)

Which Patients

- NP
- MVV > 70%
- Comorbidities 1st

Pharmacodynamics

- 1 hour before sleep
- 2 hours after food
- B.W. dependent
- Sleep hours 8 hours

Adjuvants

- Limit fluid intake from 1 h before to 8 h after.
- Ensure adherence to ttt

Optimize therapy

Enuresis ALARM

Which Patients

- Patient age > 7 y
- MVV < 65%
- Motivated, adherence

Instructions

- Worn every night
- Initial failure is common
- At least 3 mo for trial

Adjuvants

- Parents cooperation
- Re-attach the alarm if returns to sleep

Alternative Treatment

- Biofeedback
- Reboxetine
- Mirabegron
- Botox

CONCLUSION