DEFINITIONS:

ENURESIS	• Urinary incontinence
NOCTURNAL ENURESIS	• Bedwetting • Discrete episodes of urinary incontinence during sleep in children ≥ 5 years old
MONO-SYMPTOMATIC ENURESIS	• No other lower urinary tract symptoms • No history of bladder dysfunction

PRESENTATION:

- Common problem in children
  - Affects 16% of 5-year olds
- Most commonly isolated nocturnal enuresis
- Associated with decreased self-esteem
- High rates of spontaneous resolution
  - 5 years: 16%   10 years: 5%   ≥ 15 years: 1-2%

GOALS OF THERAPY:

- To stay dry on specific occasions (ex// sleepovers)
- Reduce number of wet nights (ex// 80% reduction over 2 wks)
- Reduce time between wet night
- Reduce impact on child and family
- To prevent recurrence

APPROACH:

- Rule out causes that require separate treatment
  - "Reverse what you can reverse"
  - Diabetes, obstructive sleep apnea, constipation, bowel and bladder dysfunction
- Define expectations
  - Any short-term dryness priorities? (ex// camp, sleepover)
  - Not child's fault → child should not be punished
- Treatment will:
  - Be prolonged
  - Take some time to see effect
  - Likely will be relapses
- Goal oriented
- Consistent follow-up
- Child needs to be mature enough to assume some responsibility

EDUCATION AND REASSURANCE:

- Incidence (common)
- Usually resolves on its own
- Nobody's fault
- Impact can be reduced by:
  - Using mattress protectors
  - Using washable or disposable products
  - Using room deodorizers
  - Thorough cleaning prior to dressing
  - Emollients to prevent chafing

LIFESTYLE MODIFICATIONS:

- Keep calendar of wet and dry nights
- Void during the day and just before going to bed (4-7x/day)
- If wakes at night → go to the toilet
- Avoid high-sugar and caffeine-based drinks, especially in evening
- Fluid intake – majority in morning and early afternoon
  - 40% 7 am to 12 pm
  - 40% 12 pm to 5 pm
  - 20% after 5 pm
- Routine use of diapers and pull-ups should be avoided

MOTIVATIONAL THERAPY:

- Record of progress
  - Rewards for positive behavior changes (NOT for enuresis free nights)
  - Do NOT use penalties
- Most effective in:
  - Children 5-7 years old
  - Who do not have nightly enuresis
- 3-6 month trial
- Relapse rate: approx. 5%

ENURESIS ALARMS:

- First-line for children if education & motivation strategies have not been effective
- Enuresis > 2 times per week
  - Child able to wake to sound or touch of the alarm
  - Child should be in charge of the alarm
- Initial trial 3-4 months
- Continue until 14 consecutive dry nights
- Efficacy (meta-analyses):
  - Dry for 14 consecutive nights: EA 66% vs. no treatment 4%
  - Relapse: EA 55% vs. no treatment 99%

DESMOPRESSIN:

FIRST LINE FOR:	• Children > 5 years old who have not responded to education and motivational therapy • Children & families wanting rapid or short-term improvement ○ Special occasion • Children who have failed or not suitable for enuresis alarm
MOA	• Synthetic vasopressin analog • Reduces urine production (ADH stimulation)

DOSE	• 0.2 mg PO QHS → titrate to desired effect (max 0.4 mg/dose)
	• Decreased dose gradually when discontinuing
	  ○ Taper by 50% for 2 weeks prior to D/C
	  ○ Decreased likelihood of relapse

ADRs	• Hyponatremia
	  ○ Limit fluid intake 1 hr pre- to 8 hours post- dose to 240 mL (approx. 1 cup)
	  ○ Do not give if fever, recurrent vomiting/diarrhea, etc)
	• Intranasal formulation: no longer used for this indication
	  ○ Safety concerns (hyponatremia)

EFFICACY	• 30% achieved total dryness • 40% achieved reduction in nighttime wetting • Mean reduction in bedwetting: 1.34 nights per week • No episodes for 14 nights: ARR 18% • Effects NOT sustained when discontinued ○ Relapse rate: 60-70% (vs. 46% with alarms)

TRICYCLIC ANTIDEPRESSANTS:

USE	• Imipramine most common • Considered 3rd line therapy
MOA	• ↓ amount of time spent in REM sleep, stimulate vasopressin secretion and relax the detrusor muscle
EFFICACY	• Similar effectiveness to desmopressin • Relapse rates > 95% after discontinuation • Reassess after 1 month
ADRs	• Nervousness, personality changes, disordered sleep • Black box warning (re: suicidality) ○ Particularly children with pre-existing depressive sx • Dry mouth, cardiac

SUMMARY:

- Nocturnal enuresis = common; not child's fault
- Educational & motivational therapy = 1st line
- Enuresis alarms = lower relapse rates
- Desmopressin = special occasions, failed other therapies
  - Higher relapse rates

DIAPER DERMATITIS:

- Diaper rash
- Affects up to 50% of infants & toddlers
  - Highest incidence: 9-24 months old
- Types: irritant, candida (yeast), allergic

PRESENTATION:

- Episodic and self-limiting
- Mean duration of episodes 2-3 days
- Painful
- Resolves completely once infant stops wearing diapers

CLINICAL EVALUATION:

- Onset/duration
- Stool frequency, volume, consistency
- Dietary changes
- Diaper changing frequency
- Type of diaper
- Potential topical allergens
- Rash appearance (size, color, edema, desquamation, ulceration, pustules/vesicles)

PHYSICIAN REFERRAL:

- Sudden, acute onset
- Moderate-severe presentation
- Systemic signs and symptoms
- Chronic/recurrent
- Secondary infection (cellulitis, UTI)
- > 7 days
- Signs of abuse or neglect

PATHOPHYSIOLOGY:

1. Urine/loose stool in contact with skin → ↑ hydration of stratum corneum → ↑ friction and maceration → ↑ permeability to irritants
2. Stool has fecal urease → reacts with urine to ↑ pH → ↑ pH and bile acids in stool activates fecal enzymes, proteases, ureases, lipases → skin irritation → ↑ permeability to irritants → inflammation

TREATMENT AND PREVENTION PRINCIPLES: ABCDE

Air	• Allow diaper area (bare skin) to be exposed/open to air o Provide diaper-holidays to ensure diaper free time and skin healing time

Barrier	• Apply barrier cream to area
	  o Petrolatum ointment or zinc oxide preparations
	  o Apply with each diaper change
	• ↓ frictional forces & maintains appropriate skin hydration
	• Limited benefits with other preparations

Cleansing	• Gently cleanse with damp cloth, water, and possibly mild soap
	  o Avoid potential allergens & irritants (preservatives, perfumes))
	  o Avoid scrubbing
	  o Barrier product doesn't need to be completely removed
	• Evidence for cleaning products: low quality trials, limited benefit

Diaper	• Use super absorbent diapers (selection of diaper controversial)
	  o Reusable cloth diaper vs. new disposable diapers
	  o New diapers: multiple layers, breathability, environmentally friendly
	• Change diaper as soon as wet/soiled (as often as q1-3 h)
	• Avoid baby powder
	  o Inhalation risk
	  o Fungal infection risk

Education	• Educate parents about ABCD

OTHER THERAPIES:

Topical antifungal	• If fungal dermatitis, use nystatin or azole antifungals
Topical corticosteroids	• Only if prescribed by physician • Systemic absorption possible o Case reports of Cushing's syndrome
Topical antibiotics	• Avoid • If bacterial infection → dr for systemic antibiotics
Avoid	• Topical diphenhydramine • Combination creams with corticosteroids • Baby powder • Other ingredients (phenol, camphor, benzocaine)

SUMMARY:

- ABDE
- Petrolatum ointment or zinc oxide cream
- Refer patients when more complicated rash