

## MANAGEMENT OF BEDWETTING IN CHILDREN

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**Abstract :** Nocturnal enuresis or bed wetting is a benign condition, yet needs treatment to relieve the child and parents of the accompanying anxiety and the stigma attached. More than 85% children attain complete bladder control by 5 years. The underlying cause of enuresis is not clear; various proposed pathophysiological mechanisms have been described. In most children with enuresis, extensive investigations are not required. A simple and structured evaluation that includes a detailed history, clinical examination and measurement of the voided volume is sufficient. The various treatment modalities available are bladder training, behavioral modification using the alarm, medications such as oxybutinin and desmopressin along with good supportive care. No treatment plan is ideal and in a given child the modality may be selected based on information obtained from the structured evaluation and the parent and child's preference. Often a combination works best. This communication discusses a therapeutic approach.

**Key words:** Nocturnal enuresis, Evaluation, Treatment

### ETIOLOGY & CLASSIFICATION

Enuresis is a common problem encountered in clinical practice. It is not enough to tell parents seeking attention, that the child will grow out of the problem. A child having nearly complete evacuation of the bladder at least twice a month after the fifth year of life definitely warrants attention. As a rule the bed will be soaking wet as against incontinence, which is loss of urine without normal emptying of the bladder. Bladder control is usually attained between the ages of one and five years. More than 85% children will have complete diurnal and nocturnal control by five years of age<sup>1</sup>.

At the outset it is important to classify enuresis as *primary* when the child has never been dry and *secondary* when bedwetting starts after a minimum period of six months of dryness at night. It is considered monosymptomatic if the child has no daytime symptoms like urge, frequency or daytime incontinence<sup>2</sup>. Primary monosymptomatic enuresis does not require extensive evaluation. Secondary enuresis on the other hand warrants investigations.

There is no single definite underlying cause for enuresis, it is often multifactorial. Evidence points towards maturational delay, inadequate arousal during sleep, genetic predisposition, reduced functional bladder capacity and an altered secretion or response to antidiuretic hormone, as some of the factors responsible for enuresis<sup>3</sup>. A recent study found that breast feeding the infant for more than three months may protect against bedwetting in childhood<sup>4</sup>. Attempts to identify the possible cause in a given child can help translate the information into therapeutic options.

### INVESTIGATIONS

Most children with primary monosymptomatic nocturnal enuresis considered as uncomplicated enuresis require no further evaluation. A detailed history and clinical examination helps differentiate these children from ones with a more complex problem (Table 1). At times the history of daytime

symptoms such as holding maneuvers, urgency and day time wetting may not be forthcoming on history alone and a voiding diary maintained for at least two days yields a lot of information<sup>5</sup>. It is therefore advisable to request parents to maintain a record of the time of each void and the volume of urine passed each time, along with a record of any "accidents" as noted from a dampness of the underpants. This record helps identify a child with a relatively small functional capacity of the bladder where a frequent small quantity-voiding pattern is noted. In a child with reduced functional bladder capacity the average maximum volume of urine voided at urge is much less than the expected bladder capacity for the age as determined using standard formulae as under<sup>6</sup>.

Age < 2 yrs Bladder capacity in milliliter = Weight in kg x 7

Age > 2 yrs Bladder capacity in milliliter = (Age in yrs+2) x 30

**Table 1** Initial evaluation for Enuresis

	<i>Uncomplicated</i>	<i>Complicated</i>
Onset	Primary	Secondary
Diurnal symptoms	Absent	Present
Urinary stream	Normal	Abnormal
Examination*	Normal	Abnormal
Urinalysis	Normal	Abnormal

\* Examination includes developmental and neurological assessment, examination of the abdomen, genitalia and spine.

A special mention needs to be made of any history of holding maneuvers used by the child such as crossing of the legs, bending forward or squatting. Such children possibly have a functional voiding disorder and may require further evaluation. Though a normal urodynamic study provides reassurance of

normal bladder function, it is a costly, invasive and unpleasant procedure in young children and offers little in the management of uncomplicated enuresis.

## TREATMENT

Timely treatment of nocturnal enuresis prevents psychological damage to the child and provides relief to the family. It should be started without wasting time on investigations in any child who wants to sleep dry and has uncomplicated enuresis. No single therapeutic plan seems ideal for all patients. Assessing the level of motivation of the patient and his parents prior to offering the choice of treatment is important. Emotional support may be required when the family history reveals psychosocial stress especially in adolescents and those with complicated enuresis.

Withholding fluids in the evening, random awakening of the child to void or punitive measures result in significant stress to the child and family. However caffeinated drinks like tea, coffee and sodas should be avoided in the evening. Adequate fluid intake during the day ensures lesser intake during the evening, as the child would then have received his daily fluid requirement during the first half of the day. This also helps in reducing the often associated problem of constipation which can aggravate bladder dysfunction.

The success of any form of therapy depends to a large extent on the child being motivated to work towards sleeping dry. The child is reassured and provided emotional support. Every attempt is made to remove any feeling of guilt. The benign nature of the disorder is explained to the child and parents. The child should be encouraged for total involvement in the therapy with maintenance of a dry night diary. Dry nights merit praise and encouraging words from the parents. Various modalities of treatment are available for the treatment of enuresis. The final choice of modality for treatment depends on the likely cause of enuresis and the patient's preference.

### Bladder training exercises

With an aim of increasing the functional bladder capacity, children are encouraged to drink more water during the daytime and hold urine for an increasing duration after feeling a desire to void. They are also told to try voluntary cessation of micturition during the process of voiding. This increases the ability to withstand uninhibited bladder contractions. The



Figure 1 Child using the alarm while sleeping

efficacy of these measures along with bed time resolution by the child and encouragement from the treating physician is comparable to that of desmopressin or alarm therapy<sup>7</sup>.

### Enuresis alarms

This form of therapy involves the use of an alarm device to elicit a conditioned response of awakening initially to wetting and later to the sensation of a full bladder. Gradually bladder distention evokes micturition. The alarm device consists of a small sensor attached to the child's underwear, or a mat under the bed-sheet and an alarm placed at the bedside. When the child starts wetting the bed, the sensors are activated causing the alarm to sound. This conditions the child to sense a full bladder; subsequently the child awakens at a critical time when

Table 2 Medications in enuresis

Drug	Dose	Side effects	Age for use
DDAVP nasal spray	10-40µg per day	Nasal stuffiness, hyponatremia, seizures	Any if supervised
DDAVP tablets	0.2-0.6 mg/day	Headache, epistaxis, nausea	Any
Oxybutinin	5-20mg per day	Dryness of mouth, flushing, palpitations blurring of vision	>6y
Imipramine	0.9-1.5mg per kg/day	Anxiety, personality change palpitations	>7y
Tolterodine	1 mg twice a day	Mild effects similar to oxybutinin	>5

the bladder is full and the child still dry. These devices are now available in the country and a prototype is depicted in Figure 1

### Pharmacotherapy

A number of medications are used in the treatment of nocturnal enuresis (Table 2). *Tricyclic antidepressants* like imipramine alter the arousal-sleep mechanisms and exert some anticholinergic effects. The effect of these medications is rapid and should be given a couple of hours before bedtime. Side effects have put this group of medication on the back burner. *Anticholinergic drugs* like oxybutinin reduce uninhibited bladder contractions and are useful in children who manifest with urgency and urge incontinence during the daytime or those with a reduced voided volume as calculated from the voiding diary. Oxybutinin maybe also be used as an adjunct to the alarm or treatment with desmopressin, when either of them fails as single therapy<sup>8</sup>. Tolterodine a newer anticholinergic is better tolerated and may be used in children above 5 years. *Desmopressin (DDAVP)* is an analogue of the hormone vasopressin that acts by reducing the nocturnal urine output to a volume less than the functional bladder capacity. Administration of DDAVP as an intranasal spray an hour before bed time is particularly useful in patients showing high nocturnal urine production or a less concentrated urine prior to therapy. In non-responders the dose may be increased upto 40 mcg/day in a stepwise manner. Oral desmopressin in a dose

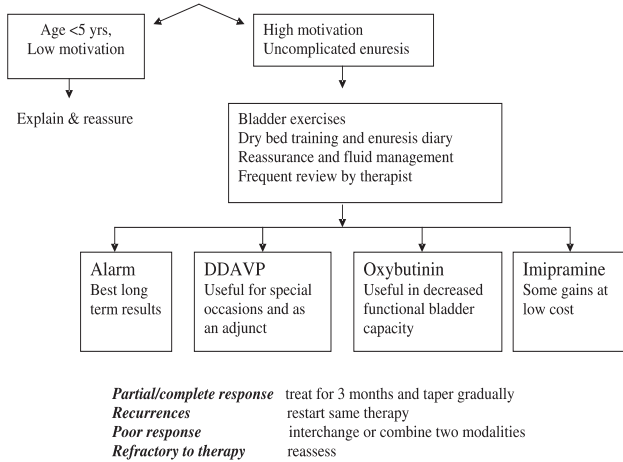


Figure 2 Treatment for primary monosymptomatic nocturnal enuresis

of 0.2 mg increasing to 0.6 mg daily may be given an hour before bedtime. This is now available in the country. Prolonged desmopressin bioactivity may increase the risk of water intoxication, a possible side effect of free water intake by the child when on desmopressin<sup>9</sup>.

While therapy is initiated, certain *guidelines* are recommended. The child is started on a low dose of the medication. Thereafter the dose is adjusted every two weeks to the maximum dose required to achieve dry nights. Therapy is continued for 3-6 months of dry nights and thereafter weaned over three to four weeks. In case of a relapse the same therapy is restarted or behavioral modification using an alarm device, is considered in conjunction. A structured withdrawal of therapy rather than tapering the dose of medications seems to improve the outcome<sup>10</sup>. This is achieved by administering therapy alternate day, followed by twice a week etc.

The various treatment modalities available are not used exclusive of each other and often a combination works best. Failure of one form of therapy should result in substitution or

addition of another. The three system model, suggesting desmopressin for low vasopressin release, oxybutinin along with bladder training for instability when suspected and the alarm to enhance arousability from sleep works well. A combination of one of these with motivational therapy is ideal. Comparative studies have shown that DDAVP has better short-term results, but the alarm has better long-term outcome. Hence, DDAVP is best used under special situations, e.g., if the child needs to remain dry when camping out or staying over at a friend's place. If long term efficacy, cost and safety are taken into consideration, the enuresis alarm comes out superior<sup>11</sup>. In patients with enuresis and a voiding dysfunction DDAVP can enhance the effect of oxybutinin by reducing urinary output and bladder filling, thus reducing uninhibited bladder contractions. Reassurance and motivation of the child for involvement in the therapy and direct frequent contact with the therapist improves the outcome. An algorithmic representation for the treatment of primary monosymptomatic enuresis is depicted in Figure 2.

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