

UCSF Pediatric Urology
Child and Family Information Material

Nocturnal Enuresis (Nighttime Bedwetting)

Delay in achieving urinary control during sleep is a common problem in childhood that frequently prompts parents to seek evaluation and attention from health care providers. Persistent nocturnal enuresis (nighttime bedwetting) is the most common issue of bladder control in childhood. Nighttime enuresis is usually defined as the involuntary loss of urine during sleep after the age of 5 years. It is known to cluster in family groups. If one or both parents have had trouble with bedwetting, their children have an increased chance of having similar problems. It is more common in boys.

Fifteen percent of 5 year olds and 10 percent of 6 year olds experience enuresis. As children get older, there is a gradual reduction in the number of children who are wet at a rate of about 15% per year.

Cause

The cause for enuresis is unknown. Twenty to thirty years ago psychological problems were thought to be the cause of enuresis, but this is no longer believed to be the case in the overwhelming majority of children.

There are **several theories**:

1) Most physicians feel that the difficulty lies with a developmental delay in the bladder's maturation. These children simply need more time for their bladders to fully develop. Just as some children walk and talk before others their age, bladder control may have wide variations. The delayed development theory

is reinforced by the fact that spontaneous resolution of bedwetting occurs as children get older.

2) In some children, inadequate production of a hormone that decreases urine output during sleep may be the cause. This hormone, called antidiuretic hormone (ADH), occurs naturally in all of us and is responsible for concentrating urine if we become dehydrated. This hormone is not related to sex hormones. Secretion of this hormone is normally high at night.

3) Contrary to popular belief, research has shown that children with enuresis do not have abnormal sleep patterns.

A physical cause for enuresis is unusual in those children who:

- Wet only during sleep
- Have never had a urinary tract infection
- Urinate normally during the day

A physical cause for enuresis might be present in children who:

- Wet day and night
- Have urinary tract infections
- Have trouble with bowel control

However, if the child is wet during the day and night, it is important to rule out other causes of wetness, such as voiding dysfunction, infection, dysfunctional elimination syndrome and congenital anomalies. For these children, a voiding diary, x-rays and/or lab tests may be recommended to determine if there is any underlying acquired or anatomic problem. The management of this group of children varies in some ways from those who are wet only at night. Therefore, these problems are discussed in other handouts.

Evaluation

The evaluation of children with enuresis is done on an outpatient basis. During the initial consultation, a careful history will be taken which will include questions regarding: parental or sibling

bedwetting, previous urinary tract problems, establishment of toilet training and daytime control. The physical examination will include careful examination of the abdomen and genitalia, and a neurologic exam of legs and perineum to determine sensation and adequate motor development. Inspection of the lower back is done to detect abnormalities that might suggest maldevelopment of the spinal cord.

If the child with nighttime wetting presents with a completely normal history and physical examination in all respects and a normal urine test, further testing is not indicated.

Management

The management of enuresis is not an exact science. Further, since nighttime enuresis is very common until 6 years of age, it is difficult to justify treatment in this age group. Therefore, treatment is generally not recommended for children **less than 6 years old**. At any age, decisions regarding treatment should consider to what extent the problem affects the child and the social aspects of the child's development. Many young children and their parents are better served by reassurance that there is no physical abnormality than by long-term and expensive therapy of uncertain effectiveness.

Treatment may consist of certain drugs, conditioning, behavior modification, or a combination of approaches.

Drug therapy

There is no medication that cures enuresis. The use of certain medications in the treatment of enuresis is purely symptomatic. When the drug is stopped, the enuresis will usually return unless the child has naturally outgrown the enuresis at that time. Two commonly used drugs are **Tofranil** (imipramine) and **DDAVP** (desmopressin acetate).

Tofranil (imipramine). This was the first drug introduced for treatment of enuresis. The specific effect is not known. Imipramine is known to relax the bladder muscle and may also lighten sleep. A successful result with this drug does not appear to lessen the duration of the wetting problem. The drug benefits the child only on the night taken, but cessation of enuresis still requires the neurophysical maturation and ultimate spontaneous resolution that would have occurred without the use of imipramine. Some of the **characteristics** are as follows:

- Generally used in children over 6 years old
- Not available as liquid, only capsule or tablet form
 - a. Dosage for 7-8 years old : 25 mg given one hour before bedtime
 - b. Dosage for 9 years old and older: 50 mg - 75 mg one hour before bedtime
- Success rate only 10%-50%
- Maximal effects achieved in a few days
- Relapse rate is high when drug is discontinued
- Side effects include: anxiety, irritability, insomnia, loss of appetite, moodiness
- Overdosage: cardiac irregularities, convulsions (therapeutic doses for enuresis do not cause cardiac irregularities. An adult should administer the imipramine to the child personally and keep the drug out of children's reach)
- Relatively inexpensive

Due to this medication's increased side effects, risks with overdose and limited success rate, it is used quite infrequently in our practice. We typically will use Tofranil only with children of advancing age (adolescents) who are refractory to all other treatments.

DDAVP (desmopressin acetate): This drug mimics the natural hormone that acts on the kidneys to conserve body water and concentrate the urine. Some characteristics of DDAVP are:

- Promotes water reabsorption, resulting in increased urine concentration and decreased urine output during sleep
- Generally recommended in children over 6 years old
- Dosage: One 0.2 mg tablet at bedtime for one week. If child becomes dry, continue at this dose. If child remains wet, increase dose to two 0.2 mg tablets for one week. If child becomes dry, continue at this dosage. If child remains wet, increase dose to three 0.2 mg tablets for one week. If child becomes dry, continue at this dose. If child remains wet, then discontinue medication and give us a call.
- DDAVP can also be used on an intermittent basis for overnights and camp outings after the correct dosage has been established.
- Optimal duration of treatment - unknown
- Significant improvement - 25% to 65% of children on DDAVP
- Complete dryness - 12% to 40% of children on DDAVP
- Side effects are minimal, if any
- Expensive
- Relapse rates after discontinuing use - high (approximately 80%)
- If successful, use for 3-6 months and taper dose gradually over several weeks

DDAVP is safe and often effective. It is important that the drug be used only at bedtime to reduce the risk of fluid overload and electrolyte abnormalities. It is a drug that is nice to have available for sleepovers, camp, vacations, etc. However, it is expensive and is not a cure. My approach to treating the child with enuresis is to first initiate a trial of DDAVP. The advantage of a trial of DDAVP is that it provides the child with a treatment option that should assure dryness during times when bedwetting would be particularly inconvenient or traumatic. After a trial of DDAVP, I generally recommend that the parents consider a subsequent trial with one of the conditioning units. The intermittent use of DDAVP along with a conditioning retraining program is often effective in giving your

child an increased sense of self-confidence while working towards a cure that is not drug dependent.

Conditioning / Behavior Modification

Although many approaches to treating enuresis have included behavioral modification, by far the most effective have been the use of "conditioning" alarm units. The alarm unit is designed to awaken the child when he/she begins to wet. The small units are self-contained and are worn on the shoulder or the wrist and activated by a small electrode sewn or attached directly onto the child's underclothing. At present, there are two varieties on the market: one type emits sound and the other generates a vibrating sensation, and there is one that can do both. The traditional alarm emits a sound when it senses that your child has urinated.

This method in both varieties is inexpensive but, however, quite labor intensive, requiring patience. The major cause of failure is poor compliance on the part of the child and the parents. It must be emphasized that this is truly family therapy and the parents must be willing to accept the responsibility of supervising the conditional therapy. When rigidly adhered to, as many as 80% of the children will ultimately demonstrate improved nighttime urinary control, although it may take 6-8 months to be effective. The major problems associated with conditioning are the length of time it takes to demonstrate an adequate response, the disruption of the entire family's sleep pattern, and the fact that many children react sluggishly to the alarm unit.

The principle of conditioning therapy is that repetitively arousing the child at the time of the wetting episode can ultimately condition the child to recognize that urination is about to occur, and subsequently teach the child to inhibit the voiding reflex. Therefore, it is essential during the first few weeks that the parents

completely arouse the child (to a complete "awake" state) when the alarm signals.

Relapse rate may be high as 35% several months after discontinuing use of the alarm, but children can be easily retreated in a short period of time. Other learning techniques may help to reduce relapse. These might include increasing fluids during the day and continued use of the moisture alarm once the child becomes dry.

Methods often tried by parents before they seek medical attention, such as limiting fluids before bedtime, awakening the child at night at random, and reward-punishment strategies, are generally ineffective. Treatment of enuresis can be lengthy and frustrating. Success is in no way assured. But ultimately, all children with simple enuresis will outgrow this pattern eventually.