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Bedtime Wetting: A review of the NICE guidelines.

Being dry at night is a developmental skill, which like other milestones, people attain at different ages. So, whilst 100% of babies could be said to wet the bed this reduces to about 1% of adults. This leads to some confusion as to what is 'normal' and when does bed-wetting or nocturnal enuresis (NE) become a 'medical' problem.

NICE Guidelines 2010 What's new (ish)

- There is no minimum age for treating NE
- Think of daytime symptoms
- Routine urinalysis is not necessary- nor are other investigations
- Alarms are the first line of treatment
- Desmopressin if alarms fail or are unsuitable.
- Impiramine/ bladder training and psychotherapy should not be used as single treatments

NICE have recently produced some guidelines on *Nocturnal Enuresis; the management of bedwetting in children and young people* (NICE 2010) which help to answer these questions and offer an evidence based approach to the problem. As a paediatrician with a major interest in this area I hope to share some of the most useful evidence, but also to highlight some of the challenges and areas of disagreement.

The most important messages for children

- It is not your fault
- You are not alone
- It will get better

The most important messages for children

It is not you fault:

Because being dry at night is a developmental achievement (Light 1998), it is usually not something over which the child has active

control. There is some evidence that children who are late at being dry may have other subtle neurodevelopmental problems (Von Gontard et al 2006a). In some children there may be a behavioural component, but these are usually easy to identify and address. Very few children will wet the bed on purpose.

Clearly, it is important to make it as easy as possible for a child to be dry overnight, by altering those behaviours which make wetting more likely and ensuring that there are no underlying issues such as constipation or medical problems such as diabetes. However, if despite none of these obstacles being present the child still wets, it should be seen as something unavoidable.

Unfortunately, this message is frequently not understood, and leads to inappropriate management and parental responses ranging from disappointment, through telling off and punishing to physical abuse (Sapi et al 2009, Can et al 2004).

The confusion around personal responsibility is highlighted by the use of star charts. Using star charts with rewards for being dry is common practice. Effectively this is suggesting to the child that dryness is good behaviour and being wet is therefore bad behaviour – or that being wet is naughty.

Having said this, there may be some children who benefit from star charts with dryness as the goal- perhaps addressing a certain behavioural element such as waking but not going to the toilet. A short-term trial of a few days may help, but if not immediately successful, they should be abandoned within a week- as they are really just taunting the child.

The NICE guidelines (NICE 2010) suggest that star charts should be used for co-operation in the treatment programme rather than success. It's not whether you win or lose its how you play the game, so being rewarded for responsible drinking; urinating and taking medication or setting an alarm is acceptable.

The issue of removing nappies is unclear. Whilst this is recommended as a trial in the NICE guideline, this does suggest that wetting is behavioural. In practice removing nappies might work for those children who wet after waking in the morning rather than going to the toilet. For most families it simply causes extra hardship and washing.

Unfortunately children who wet the bed are likely to be told off or punished for wetting. International studies suggest that up to 50% of bedwetting children are punished physically for bedwetting (Can et al 2004). In countries like the UK where the incidence of physical punishment is lower and absorbable nappies or pants are widely available, the incidence of enuresis related abuse is likely to be

lower, but is still significant (Van Gontard 2006b) and even one case is unacceptable.

The NICE guidelines do discuss the connection between child maltreatment and bedwetting, and this is probably a little unsatisfactory. Whilst bedwetting may result from child maltreatment, it is almost certainly not going to be the main or presenting symptom. Most cases of abuse will present with a history of maltreatment with bedwetting as a consequence. It is therefore probably intrusive and unhelpful to interrogate every child with bedwetting in the expectation of uncovering some sinister secret. There is some unease that this even receives a mention in the NICE guideline at all, as parents may feel that they are being stigmatised.

You are not alone and it will get better

Studies across populations vary, but an indication of the prevalence of NE is shown in the table below (based on Van Gontard et al 2006). Boys are more affected than girls.

Age	Number of children bedwetting	% Bedwetting Children
5	1 in 6	16.7
7	1 in 10	10
10	1 in 15	6.7
18	1 in 100	1

The figures can be hard to interpret because different studies define bedwetting in different ways (Ramirez-Backhouse et al 2010). So, wetting the bed once in three months could be classified as bedwetting. (In fact the occasional wetter is very difficult to treat, if they don't know when the wetting is going to happen, it seems unnecessary to have treatment all the time- yet, even that occasional wet night may be very embarrassing).

What is clear from the table is that of those children that wet at five years of age, around 95% of them will be dry by the time they are 18 (Butler 2008). Experience suggests that many of those who are slower to become completely dry, nevertheless become significantly drier over time- that is they have fewer wet nights and/or are less wet.

Although there is clearly significant improvement over time for most children, it is likely that those children that have never had a dry night may be less sensitive to treatment. About 1% children over the age of seven have never, spontaneously, had any significant dry nights. This is the same incidence as in adults. It is tempting to suggest that there are two groups of children who wet the bed, and that the prognosis for those who have never had a dry night is poor (Yeung et al 2001). I.e. they may never be dry by themselves. This does not mean that they cannot be dry with treatment.

Unfortunately there are no longitudinal studies to support this, but there are some suggestions that men who continue to wet the bed may have other urolgical issues (Gokce et al 2010).

A rose by any other name.

There can be a lot of confusion about defining enuresis. The main distinctions are if the NE is the only urinary symptom, and if there has ever been any significant period of dryness.

If a child has NE but no other urinary problems they are said to be *monosymptomatic.* If they have other symptoms- particularly daytime frequency and urgency then they are said to be *polysymptomatic.*

Children who have not had a period of complete dryness for 6 months are considered to have *Primary NE* whilst those who wet after having been dry for at least six months are said to have S*econdary NE*.

So, a child who had never been dry and had day and night time symptoms would be described as having *Polysymptomatic Primary NE.*

In practice, the most relevant feature is the presence of other symptoms. Not only is this because treatment is more likely to be successful if all underlying causes are considered, but also treating the NE without addressing the other symptoms may be 'selling the child short'

What makes a child dry?

Most of our understanding about night time dryness relies on the three systems approach, first properly described by Butler (Butler et al 2000). Depending on how this is understood, it describes either what is needed for dryness or what is missing in enuresis.

The three systems are

- Bladder Function.
- Urine Production
- Rousability

All these factors interact, so that the urine produced overnight has to be contained the bladder. If the bladder 'overfills' it needs to be able to wake the child up. So, if there is an imbalance, the child is likely to wet.

Clearly there is potential to influence some of these factors. For example drinking before bedtime, especially drinks, which cause a diuresis, will serve to increase overnight urine production. Going to bed with a full bladder will mean that there is little capacity before it overfills- so ensuring that the child urinates before bedtime is essential.

There is also a very important fourth 'system'- which is constipation/ stool withholding. This is very important for a number of reasons (Halachmi et al 2008) – the most simple analogy is that if there is stool in the rectum pushing on the bladder it will have a similar effect to a pregnant uterus, and everyone is familiar with the impact that pregnancy has on urinary function. Beyond this, most children with constipation will be stool withholding, trying not to defaecate, which also impacts on bladder function. Parents will often underestimate constipation in children (McGrath et al 2008)

It is worth considering the three systems in a little detail:

Bladder Function

The simplest measure of bladder function is urinary volume. This varies with age and is usefully considered to be (Koff 1983)

(Age in years +1) X 30 ml
Or (Age+1) X fl Oz

So a seven year would have an expected bladder volume of 240 ml or 8 fl oz. Adult levels are reached at about 12 years of age.

Many children have Overactive Bladder Syndrome, formerly known as Detrusor instability and usefully considered as a twitchy bladder. These children pass urine frequently with a small urinary volume. They usually have some degree of urgency and may have some daytime wetting. Many of them seem to manage their condition by severely limiting their fluid intake.

Keeping a 'wee diary' for a day or two can be helpful. Children are asked to record how often they pass urine, and the volume passed. This is best achieved with the use of a measuring jug. A normal expectation would be that urinary volume should be close to expected bladder volume and they should pass urine less than 8 times per day.

Many of the adults who had persistent NE in the Honk Kong study (Yeung 2008) appeared to have features of Bladder Overactivity. This is very sad, because one would expect most, if not all, of these to respond if given appropriate treatment.

Urine production

Urine production is influenced by a number of factors, most obviously how much fluid has been ingested and also drugs including caffeine and alcohol. Urine production can be controlled by the pituitary hormone Vasopressin- also known as anti-diuretic hormone (ADH). This works on the kidneys to increase the reabsorption of water and so reduce urine output. There is some evidence that some children with NE produce inadequate amounts of Vasopressin at night (Norgaard et al 1985), hence, the success of its analogue desmopressin in treating NE.

Rousability

Children who wet do so because they do not wake up. They seem to have different sleep patterns to other children although the quality of their sleep is good. Rousability certainly seems to be less of a problem with age.

There is a suggestion (Butler 2003) that some children will wake at night but will not get up to go to the toilet. This could be due to fear of the dark/ burglars etc or 'laziness.' Some children will wet in the morning after waking because they don't want to go to the toilet.

Clearly if a child is wetting when awake, and usually establishing this requires very direct questions to the child, the management becomes essentially behavioural. These children may well respond to star charts- and may be the group that responds best to alarms.

Bedwetting Formulation

- What do we want to achieve/ what would we settle for?
  - Ideally dry every night but might settle for dry most night or even drier most nights.
- Why do we want to achieve this?
- How are we going to try?

History taking

The essential information that is needed is highlighted in the NICE guideline and includes establishing whether the wetting is of recent

onset, which would increase the likelihood of an underlying medical condition.

Other information required includes establishing if there has ever been any significant dryness or not.

Important questions	Reasons for questions
How long has it been going on for?	Recent onset suggests possible systemic disease.
Has there been a significant period of dryness (>6 months)	If there has- consider physical or emotional triggers.
Bedwetting Pattern ➢ How many nights/week ➢ Volume of urine ➢ Times of wetting/ how many times per night ➢ Associated waking	Identifies possible areas of intervention.
Daytime Symptoms ➢ Frequency ➢ Urgency ➢ Wetting ➢ Straining/pain	The first three would suggest Overactive bladder.

Basic measures

The simple measures involve paying attention to drinking and urinating during the day. In reality, most children do not drink enough at school. This means that they leave all of their drinking for when they get home- in the hours before bedtime. Getting children to drink during the day at school is a great challenge with few answers (TES 2004). Caffeinated and high sugar content drinks should be avoided (NICE 2010)

The NICE guidelines do not mention a time before bedtime when drinking should stop, as this is a contentious issue. There are many professionals who actually encourage drinking before bedtime with the aim of 'stretching the bladder.'

This does seem counterintuitive. The body will handle a fluid load within about two hours so, two hours after a drink, all excess fluid is

in the bladder. It seems sensible to restrict drinking before bedtime. A purported 'lack of research' should not mean abandoning reason.

Lifting also seems to get a bad press, largely because it is seen as offering a short term solution- rather than a cure. But, this is also true of desmopressin, and if lifting works for the family and keeps the child dry then it should be encouraged.

As mentioned above, reward systems are likely to be of limited benefit, if used with dryness as an endpoint, but can be used to encourage co-operation with behavioural change- for example for drinking and going to the toilet and taking medication appropriately.

The Next Steps

NE presents at any age, parents of children as young as three may present their child, but sometimes the first presentation is not till teenage years. This is because most families believe that it is a problem that will improve over time. The age of presentation is therefore a reflection of when the family have had enough.

As regards the impact on the child, there is evidence that this increases with age (Redsell et al 2001). In the younger children, the parents may perceive their children to be more anxious than they actually are (Joinson et al 2007). As the children age, they do seem to have more psychological and behavioural problems (Yeung 2004). These can feedback to make wetting more likely- for example altering bladder function or sleep patterns.

When a family do present, this is usually because they want some help for the child or young person to be dry. Often the practitioner needs to understand who has generated the request for an appointment. If it is the parents, and the child is unconcerned about wetting, then the chances of success may be limited, because the child may not comply with basic measures.

Alternatively, if the young person has requested the appointment, this is because they have a desire to be dry. In this situation, parents may be reluctant to try medication, wanting to give it 'a bit more time.' If it is impacting on the young persons self esteem, the health care provider may have to advocate on their behalf.

Ultimately, these children want to be dry. Ideally they would do it by themselves. But, if the only way they can be dry is by taking long term medication then that is fine. In practice, parents often ask if the medication won't make them learn to be dry then why should they take it. A useful analogy is that spectacles are not a 'cure' for short-sightedness but they make the condition bearable.

Treatment options.

Alarm

Despite the fact that most of the work in enuresis is built upon the three systems approach, The NICE guidelines do not mention it specifically. This is because they conclude that the preferred treatment option is the alarm, regardless of where the problem lies. A recent study by the chair of the NICE group (Evans 2010) shows that whilst the alarm is a little more effective than medication, there is a high drop out rate, so that it is only likely to work in highly motivated families.

The alarms certainly seem unique in the treatment options of monosymptomatic NE in that they probably do actually accelerate the time to dryness (Glazener et al 2005, Gim et al 2009). How they achieve this remains something of a mystery. For a treatment that has been available for over seventy years there is still little real knowledge about how it works. Studies suggest that it acts by increasing bladder volume (Tanelli et al 2004) urine concentration (Butler et al 2007) or rousability (Neveus 2000). Why any of these should occur is unclear.

For some children the alarm trains them to wake at night, whilst others seem to be trained to be able to go trough the whole night without wetting. Children with nocturnal frequency may be dry at night, at the expense of being shattered and exhausted during the day. These children would clearly benefit from some treatment of their nocturia.

The alarms has success rates of up to 80% with most of this achieved within 10 weeks. (Glazener 2005) There is a relapse rate of up to 40% many of whom respond to a further course of alarm treatment.

When giving the alarm, families will usually need quite a lot of support and education. They are likely to need fairly frequent ongoing support, at least initially, in order to persist with treatment. In many the family structure or environment makes alarm use impractical.

A further major difficulty is obtaining alarms. Unfortunately they are not currently available on prescription. They are usually available via local enuresis clinics, although invariably they are in short supply. A challenge identified by NICE is, how to make alarms more readily available. ERIC www.eric.org.uk sells alarms via their

website from £70. There are cheaper ones available, but it is important to make sure that these comply with all safety standards.

Medication.

NICE recommend desmopressin for children where rapid onset, short-term improvement is the priority of treatment (Glazener 2002) or in children where alarm therapy is inappropriate. It is encouraging to see the recommendation that children from 5 years of age can receive desmopressin (NICE 2010).

Desmopressin should be taken 1-2 hours before bedtime and families should receive appropriate advice- especially about fluid restriction. The dose recommended is 200-400mcg of desmopressin in tablet form or 120-240 mcg as a melt. This is the licensed dose in the UK. In other countries there is a higher licensed dose and in practice some children find that an extra 200mcg of tablet or 120 mcg of melt makes a lot of difference. Studies using 600mcg of desmopressin have shown it to have a good safety record even at this dose with an improved response to the higher dose (Skoog et al 1997, Schulman et al 2001).

Surprisingly, NICE recommend desmopressin in the presence of daytime symptoms. This may be appropriate, but in practice the child may be short changed if the daytime symptoms have not also been addressed. Unfortunately, the overactive bladder remains an under recognised entity. This is unfortunate because appropriate treatment can treat with both day and night time symptoms.

If the alarm treatment fails the recommendation is to add in desmopressin. If the desmopressin has failed, the advice is to offer an alarm by itself.

If the desmopressin has only partial effect, the advice is to continue it for six months as the response may improve over this time. This again is counterintuitive; surely the improved response is merely the child's personal improvement rather than the medication.

Anticholinergics in combination with desmopressin are advised as a next step. There is evidence to support this, as even in the absence of daytime symptoms, some children may have idiosyncratic bladder contractions at night. Given what has been said it seems strange that NICE advises that anticholinergics are not used unless somebody with specialist expertise has assessed the child.

In practice a trial of desmopressin alone, followed by a trial of oxybutinin alone and then a combination of the two can usually

identify the lowest quantity of medication needed to achieve dryness.

For those children who do not respond to any intervention, assuming that they have followed all the advice, the major question is whether the interventions have made any difference. For example, a child may still wet, but if the wetness is contained within a pull up, rather than extending to the whole bed, that may be a worthwhile gain. If this is the case, it is worth continuing with treatment.

If there are no significant gains, it is probably worth stopping and restarting again in 3-6 months. It is important to tell families never to totally discard treatments. Interventions that do not work today, may work in the future, because 'your body id getting stronger everyday- and so in the future will need less help to be dry.'

If a child is completely dry on medication, it should be stopped every 3-6 months to see if natural dryness has occurred. If the child is not spontaneously dry, then the treatment can be restarted. Some children will need to be on medication for years.

Support

No child with bedwetting should leaver a consultation without knowing about ERIC – Education and resources for improving childhood continence. www.eric.org.uk They offer support for children and families with continence problems. Their website has a fantastic area for children, which not only informs them, but at least as importantly, helps them realise that they are not alone.

Conclusion

Bedwetting is common. For those working in the field, the NICE guidelines spring few surprises, but work as a timely reminder and refresher for good practice. The fact that NICE have chosen to issue guidelines provides comfort for many, as it shows that this is a problem that needs to be taken seriously.

References

Butler RJ et al (2000) The three systems: a conceptual way of understanding nocturnal enuresis *Scand J Nephrol* **34** (4); 270-7

Butler RJ (2003) plenary session Eric conference York

Butler RJ, et al (2007) Exploring potential mechanisms in alarm treatment for primary nocturnal *enuresis. Scand J Urol Nephrol. 41(5):407-13*

Butler RJ, et al (2008) The prevalence of infrequent bedwetting and nocturnal enuresis in childhood. A large British cohort. *Scand J Urol Nephrol.* **42(3**):257-64.

Can C et al (2004) Child abuse as a result of enuresis. *Pediatr Int*. Feb; **46(1)**:64-6.

Cohn A (2007) The links between continence and child protection *continence UK 1 (4) 57-60*

Gökçe A, et al (2010) The Relationship between Lifelong Premature Ejaculation and Monosymptomatic Enuresis. *J Sex Med.* Mar 11. [Epub ahead of print]

Evans J et al (2010), Randomized comparison of long-term desmopressin and alarm treatment for bedwetting. *J Pediatr Urol.* Jun 23. [Epub ahead of print]

Gim CS, et al (2009) Efficacy of the bell and pad alarm therapy for nocturnal enuresis. *J Paediatr Child Health.* Jul-Aug; **45**(7-8):405-8.

Glazener CM, et al (2002) Desmopressin for nocturnal enuresis in children. *Cochrane Database Syst Rev.* **(3):**CD002112.

Glazener CM, et al (2005) Alarm interventions for nocturnal enuresis in children. *Cochrane Database Syst Rev.* Apr 18 ;(2):CD002911

Halachmi S et al (2008). The impact of constipation on the urinary tract system. *Int J Adolesc Med Health.* Jan-Mar; **20(1)**:17-22.

Joinson C et al (2007) Psychological problems in children with bedwetting and combined (day and night) wetting: A UK population-based study. *J Pediatr Psychol.* Jun; **32(5)**:605-16.

Koff S A (1983) Estimating bladder capacity in children *Urology* 21:248

Light L (1998) Children with enuresis. Most cases of primary nocturnal enuresis are caused by isolated developmental immaturity. BMJ. Mar **7**; 316(7133):777-8.

McGrath KH et al (2008) The frequency of constipation in children with nocturnal enuresis: a comparison with parental reporting. J Paediatr Child Health. Jan; 44(1-2):19-27.

Neveus T (2000) Enuresis- Background and treatment Scan J Urol Nephrol 202 Suppl 206 1-44

National Institute for Health and Clinical Excellence (2010) Nocturnal Enuresis The management of bedwetting in Children and Young People NICE (London) 2010.

Norgaard JP et al (1985) Diurnal anti-diuretic-hormone levels in enuretics *J Urol* **134** 1029

Redsell SA et al (2001) Bedwetting, behaviour and self-esteem: a review of the literature. Child Care Health Dev. Mar; 27(2):149-62.

Ramírez-Backhaus M et al (2010) Nocturnal enuresis. A frequent problem with a difficult estimation of its prevalence *Actas Urol Esp.* May; **34(5)**:460-6

S Sapi MC et al (2009) Assessment of domestic violence against children and adolescents with enuresis. *J Pediatr (Rio J).* Sep-Oct; **85(5):**433-7.

Schulman SL (2001) The Efficacy and Safety of Oral Desmopressin in Children with Primary Nocturnal Enuresis *J Urol* **166:** 2427-2431

Skoog SJ et al (1997) Oral Desmopressin: A Randomised Double-Blind Placebo Controlled Trial of Effectiveness in Children with Primary Nocturnal Enuresis *J urol* **158** 1035-40

Taneli C et al (2004) Effect of alarm treatment on bladder storage capacities in monosymptomatic nocturnal enuresis. *Scand J Urol Nephrol.* **38(3)**:207-10.

Williams E (20004) Water in schools *Times Educational Supplement* 21st May

Van Gontard (2006a) Neuromotor development in nocturnal enuresis. *Dev Med Child Neurol.* Sep; **48(9):**744-50

Van Gontard et al (2006b) Management of Disorders of Bladder and Bowel Control in Children Cambridge University Press ISBN: 189868345X

Yeung CK et al (2004) Characteristics of Primary Nocturnal Enuresis in Adults; an Epidemiological Study *BJU Int* **93:** 341-5

Yeung CK et al (2008) Epidemiological study of primary nocturnal enuresis (bed-wetting) in young adults in Hong Kong. *Hong Kong Med J* **14** (suppl3) s28-30