

Helping children sleep

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ABSTRACT

Sleep problems in children are very common and affect both the child and parents. The common problems are bedtime resistance, delayed sleep onset and frequent night waking. This review summarises current non-pharmacological practices and intervention options to aid healthy children sleep. Children may benefit from good sleep hygiene practices, which include a consistent routine for bed and consistent bedtime, a quiet darkened and warm bedroom, a consistent wake time and daytime exercise. In more problematic cases children benefit from a sleep programme. Programmes are many and effective, and include extinction or extinction-based procedures, and scheduled awakenings. An extinction programme alone, although highly effective, is difficult for parents to comply with. Modifications of the extinction programme show promise but need further evaluation. Identifying and managing sleep problems in childhood may improve health, including emotional well-being, in adolescence and adulthood.

INTRODUCTION

Sleep problems in children are common with approximately 25–40% of children aged between 1 and 5 years developing some form of sleep problem.^{1–3} The common problems are bedtime resistance, delayed sleep onset and frequent night waking. They fall into the class of sleep disorders known as dyssomnias, that is, disorders of initiating and maintaining sleep and are simply characterised by a disturbance in the amount, quality, or timing of sleep. They can arise from inadequate sleep hygiene and develop into a sleep problem that requires intervention to reverse some of the unwanted learnt habits.

Many children respond well to brief treatment. This can be practitioner- and/or parent-initiated but essentially parent-applied. Educating parents in the best evidence-based practices is the key to success in helping children sleep and is recommended as a standard treatment/prevention strategy for sleep problems.⁴

In this review we present an update of research on current sleep hygiene practices and sleep programme interventions to educate parents. The primary aim is to help healthy children sleep — independently of pharmacological interventions. The information is mostly obtained from research on the solitary sleeper, that is, the child sleeping in his/her own bed or cot. Thus the information is not always applicable to families that practise co-sleeping (the child sleeping in the parental bed). In addition, a range of practices are covered that are not always applicable to families where large variations exist in relation to weekday/weekend schedules, to cultural differences, and/or to societal expectations.

PRELIMINARY CONSIDERATIONS

Normal sleep and what constitutes a sleep problem

Age-specific normative reference values for bed-times, wake times and sleep duration (night and day) from age 1 to 10 years are given in table 1.

Wakings per night decrease and sleep quality improves across the first 5 years of life.⁵ An optimal or adequate amount of sleep for age or development level is not defined in absolute terms. There is wide individual variation, especially in the very young, although this variation declines as the child matures. Published guidelines for practising healthy sleep recommend that over a 24 h period, toddlers (aged 1–3 years) require 12–14 h, preschoolers (3–5 years), 11–12 h, and school-aged children (6–12 years), 10–11 h of sleep.⁶ When sleep is perceived as a problem, parental complaints centre on difficulty encouraging their child to sleep or stay asleep, frequent nocturnal waking, and/or early morning waking, with the frequency of nocturnal awakenings being the main factor by which parents judge the quality of their child's sleep.⁵

There is no standardised definition for sleep latency (the time between going to bed and sleep onset), the frequency and duration of awakenings, or the duration of sleep that constitute a sleep problem. Most definitions are parent reported. Subscale scores from the Sleep Disturbance Scale for Children⁷ have been used to describe individual sleep problems,⁸ and in respect of a sleep problem overall, categorical parental ratings have been used effectively.⁹

Transient episodes of sleep problems, although common, are usually of little significance unless there is an underlying medical reason, such as otitis media. Daytime napping (if not the normal practice), bedtime that is too early, caffeine-containing food or beverages, and physical discomfort or illness are common factors associated with transient episodes.

Why sleep problems are important to manage

Early childhood is a critical time for children to develop their neurocognitive and intellectual capabilities for their lifetime ahead. To maximise a child's potential, optimal sleep becomes a key component to the biological and environmental mix that shapes this development. Potential consequences of sleep problems can therefore be significant. For example, inadequate quality or quantity of sleep can have negative impacts on daytime functioning of children in relation to behaviour¹⁰ and cognitive development¹¹ including academic performance,¹² and can predispose them to more accidental injury.¹³ Furthermore, sleep problems in early life have been linked with

Table 1 Reference values for bedtimes and wake times across 1–10 years of age, including daytime, night-time and total sleep duration*

| | 1 year | 2 years | 3 years | 5 years | 7 years | 10 years |
|-------------------------------|-------------|---------|-------------|-------------|-------------|------------|
| Bedtime (h:min) | 20:16 | ¶ | 19:46 | 20:11 | 20:15† | 20:59 |
| Wake time (h:min) | 7:19 | ¶ | 7:35 | 7:20 | 7:07† | 6:56 |
| Total sleep duration (h) | 13.2‡, 13.9 | 13.2 | 12.0‡, 12.5 | 11.2§, 11.4 | 10.6 | 9.9, 10.4§ |
| Night-time sleep duration (h) | 11.7 | 11.5 | 11.4 | 11.1, 11.2§ | 10.1†, 10.7 | 9.9, 10.2§ |
| Daytime sleep duration (h) | 2.4 | 1.8 | 1.7 | ¶ | ¶ | ¶ |

Based on data from: Zurich Longitudinal Study (ZLS)⁴¹ (no symbol).

*All sleep duration data are parent reported except data from the ABC study¹⁸ that is recorded from actigraphy. Sleep duration from the ZLS⁴¹ is the time from the child going to bed to morning waking; for the others, sleep duration is the time from falling asleep to morning waking.

†Auckland Birthweight Collaborative (ABC) study (New Zealand).¹⁸

‡A Swedish longitudinal study.⁴²

§England and Growth (England and Scotland).⁴³

¶Comparable data not available or applicable.

later behavioural and emotional problems¹⁴ and some aspects of poor neuropsychological functioning in adolescence.^{9 15} Sleep problems in children lead to a secondary negative impact on maternal well-being and family functioning. Maternal depression¹⁶ and marital discord are common¹⁰ and child abuse has been described.¹⁷ Nocturnal awakenings and prolonged sleep latency impair sleep consolidation and shorten the duration of sleep. Cross-sectional and longitudinal studies have linked short sleep duration and sleeping problems with overweight/obesity in children.^{18–20} An awareness and understanding of the potential consequences cited above, brings into perspective the importance of managing sleep problems.

MANAGING SLEEP PROBLEMS

Establishing good sleep hygiene

There are a number of general principles that can be applied to establish good sleep practices, referred to as 'sleep hygiene'. The aim is for the parent and child to adopt these as habit if practised routinely. Sleep hygiene practices focus on consistent daytime and night-time practices that promote sleep and encourage non-problematic sleep behaviour. Survey results report an association between good sleep hygiene and better sleep across several ages.²¹ Sleep routine only has been evaluated for children independent of sleep management programmes with promising results short term,²² but long-term outcomes are unknown. A few studies have shown non-problematic sleep is relatively stable across age, for example, a large population Swedish study⁵ found that high-quality sleep and no night waking was relatively stable across ages 1, 3 and 5 years (Peder P, personal communication). Sleep hygiene may work through the individual or combined actions of entraining circadian rhythms, conditioning behaviour, reducing anxiety, reducing environmental stimulation and enhancing relaxation. For children, sleep hygiene practices include:

Preparation for bed routine and consistent bedtime

Preparation for sleep should begin at the same time each evening, for the same duration, and the routines adopted kept as consistent as possible to associate them with sleep. Recommendations are that for young children, preparation begins 30 min ahead of the time the child usually goes to sleep, and for older children 30–60 min²³ but not any earlier so as to keep to a minimum the time for problem behaviours to arise if the child is not ready for sleep. A recent study establishing a consistent routine in infants/toddlers with a sleep problem has reported significant improvements in sleep

latency, and in the frequency and duration of night wakings at 3-week follow-up.²² Parental ratings of their child's sleep, and maternal mood significantly improved after adoption of these practices.

Warm bath as part of the routine preparation for sleep

Anecdotally, this is a practice many parents carry out as part of their child's bedtime routine, but has not been studied. In young adults, taking a bath before bedtime results in passive body heating that can increase the perception of sleepiness and result in an increase in the subsequent amount of slow wave sleep,²⁴ which is the most quiescent state of sleep.

Bibliotherapy as part of the routine preparation for sleep

This is the practice of using books to help solve problems. Night-time fears are sometimes the cause of delays in sleep onset and bedtime resistance. Children themselves report these as being highly prevalent²⁵ and they respond well to brief treatment. Bedtime stories with discussions or drawings that deal positively with the dark have been used clinically and successfully to treat night-time fears.²⁶ Variations include use of a social story (eg, The Sleep Fairy²⁷) relaying parental expectations for appropriate bedtime behaviour and rewards for meeting those expectations.²⁸ There are no studies examining sleep onset and bedtime resistance using these techniques, however reducing night-time fears through bibliotherapy, may do this by association. Bedtime reading is recommended as part of the routine for children of all ages to promote good sleep.²¹

Physical environment for sleep The room the child sleeps in should be a quiet darkened warm place. Noise and light increases the risk of sleep disorders.^{8 29} A room too hot or too cold will disrupt sleep (<75° F or 24°C is recommended³⁰) and a television in the room discourages good sleep.²¹ Sleep time should be associated with 'lights out' to encourage sleep onset, and likewise, as soon as the child wakes in the morning — 'lights on'. These are cues linking the natural cycle of light and dark with the sleep/wake cycle and reinforces the child's sleep and wake times. Many children will not sleep with the light off, but commercially available night-lights of low illuminance are an alternative.

Consistent wake time As well as keeping a consistent bedtime, keeping a consistent rise time may help those with bedtime resistance. If parents get into the routine of allowing their child to 'catch up' in the morning, the sleep cycle, if left to run freely, will shift later and perpetuate the sleep onset problem and create a phase delay to their circadian rhythm.²

Daytime food Caffeinated beverages and caffeine-rich food is discouraged at least 4 h before bedtime. Eating is better associated with daytime behaviour, but if food is to be eaten in the evening, 'snooze foods' that are high in the amino acid tryptophan (a precursor of sleep-inducing substances, serotonin and melatonin) may aid sleep if given approximately 45–60 min ahead of sleep.³¹ Examples of tryptophan-containing foods include dairy products, soy products, meat, poultry, beans and rice. The evidence that tryptophan promotes sleep is limited to its active sleep-promoting effects in the newborn³² and to increasing adults' perceptions of fatigue and lethargy following oral or intravenous administration.³¹ Foods high in carbohydrates and calcium and medium to low in protein are recommended to aid sleep and can be given as bedtime snacks (if food is necessary at this time), for example a peanut butter sandwich, or an oatmeal biscuit with a glass of milk.

Daytime exercise The results from adult research studies have led to the recommendation of physical exercise as a good sleep hygiene practice, but not within 3 h before bed to avoid delaying sleep onset.³³ Research studies in children are sparse but the evidence is favourable towards daily physical exercise being incorporated into recommendations for sleep hygiene in children.^{34 35}

Sleep programmes

If a sleep problem develops, some parents' may choose to totally accept this, often taking the child into the parent's bed, or totally ignore it, by leaving the child to cry, or will follow a sleep programme. The goal of sleep programmes is to enable the child to fall asleep independently at bedtime or after any night waking, without undesirable behaviours or fears around sleep. Treating unduly early morning awakenings as nocturnal awakenings, also addresses this problem area. Safety of the sleeping environment for the child is a prime consideration. Reinforcing and rewarding good bedtime behaviour, through the use of cuddles/star charts, for example, is strongly recommended. Programmes include extinction or extinction-based procedures, positive routines and scheduled awakenings. The technical term 'extinction' is best described as the removal of any inappropriate parental attention that may reinforce the problem sleep behaviour. 'Ignoring', is the lay term to describe it. Interventions are not recommended for infants less than 6 months of age because they may interrupt feeding practices and no sleep programme should be given to children who are ill. Also parents need to become *fully* acquainted with a programme's correct use for it to be successful.

Unmodified extinction The aim of unmodified extinction is to eliminate parental attention that reinforces the behaviour. In addition to good sleep hygiene, the child is left to cry him/herself to sleep. However, the downside is that extinction procedures can create emotional distress for parents as they may involve long periods of intense crying that can be difficult to ignore. Acceptance and full compliance with the programme may become a problem. Anecdotally, someone close, but not so emotionally involved with the child, can have more success than the parent in complying with the extinction technique.

Graduated extinction This is also known as 'controlled crying' and is viewed as more acceptable than unmodified extinction.³⁶ This involves instructing parents to progressively increase the time period from start of crying to the parental response, that is, once the undesirable behaviour begins, check briefly after 5 min, then if it persists, wait another 10 min to

check etc, or check on a fixed schedule (eg, every 5 min). The brief check involves instructions to comfort for a brief period (15 s to a minute) with minimal interaction.

Extinction with parental presence This is another version that is effective and acceptable for parents and is based on the assumption that sleep disturbance in young children is due to separation anxiety. The programme involves a similar structure to unmodified extinction but has the parent remain in the room during the extinction procedure (even 'camping out' with a bed) and can incorporate 'fading out' where the parent gradually removes him/herself from the bedroom. The presence of the parent acts as reassurance to the child, enabling them to sleep without waking. Undoubtedly parental presence is a more gentle approach than pure extinction but often takes longer (the parent needs to be prepared to camp out for at least seven nights). A modification of the technique for the very young incorporates children learning from their parents as role models that it is 'time to sleep'.³⁷ The child is placed to sleep in the bed/cot awake and the parent bids goodnight. At settling and night waking, the parent feigns sleep and does not respond. If the child cannot see the parent, the parent may have to cough or do something to reassure the child of their presence. Parental presence has been evaluated as improving sleep in infants and children up to 2 years by decreasing night waking^{37 38} and increasing the amount of sleep.³⁷

Bedtime pass programme This is another modification of the extinction programme recommended for children over 3 years of age with bedtime resistance.³⁹ It requires that children get into bed, are provided with a card exchangeable for one 'free' trip out of their room or one visit by the parent to satisfy an acceptable request, to surrender the pass after use, and extinction thereafter. Effectiveness has been evaluated in a small randomised controlled trial of 3–6-year-old children with significant reductions in the time required to quieten each night. Parents were accepting of the programme and reported high levels of satisfaction.

Scheduled waking This involves keeping a diary of the child's waking times over a week so parents can anticipate when the child is likely to spontaneously wake. The parent is then given a schedule to wake the child 15–60 min before the anticipated time. When the frequency of spontaneous waking decreases, the duration between the scheduled wakings is gradually lengthened and then eliminated altogether.⁴⁰ This type of approach appears to increase the duration of consolidated sleep.

CONCLUSIONS

Sleep hygiene practices have merit but there are no standard practices or combinations of practices to follow. Recommendations around sleep hygiene are mostly incorporated into sleep training programmes, but have rarely been evaluated independent of a sleep programme. However, results from a recent trial intervening with good routines for problem sleepers are encouraging.²² The effectiveness of sleep hygiene practices as preventive strategies over the long term is unknown. Sleep programmes for children with more major sleep problems should be available, so that standard recommendations can be given. Unmodified extinction programmes are highly effective, but are difficult for parents to apply. Newer options for extinction-based interventions that are acceptable to parents look promising, but require further study. Identifying and managing sleep problems in childhood may improve health, including emotional well-being, in adolescence and adulthood.

Competing interests None.

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