

Sleep disorders and learning disabilities



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What types of sleep disturbance?

- Physiological sleep abnormalities
eg. REM sleep, sleep spindles
- Sleep disorders associated with the underlying condition
eg. Down syndrome and sleep disordered breathing
- Co-existing primary sleep disorders
- 'Sleep problems'
eg. getting to sleep, waking in night, early waking, irregular sleep, short duration sleep, (excessive daytime sleepiness)
- Sleep disorder causing/exacerbating the underlying condition?

Conditions associated with sleep disordered breathing

Down syndrome

Craniofacial syndromes

Mucopolysaccharidoses

Fragile X syndrome

Prader-Willi syndrome

Cerebral palsy

Spina bifida/myelomeningocele

Hydrocephalus

Arnold-Chiari malformation

(Stores & Wiggs 2001)

Sleep problems associated with sleep disordered breathing

- Sleep onset difficulties
- Night wakings
- Sleep terrors
- Sleep walking
- Sleep talking
- Bruxism
- Anxiety
- Enuresis

Guilleminault & Khramtsov (2001)

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Sleep disturbance as a cause of ADHD symptoms?

- Periodic limb movement disorder
(Picchiatti et al 1999; Chervin 2002)
- Sleep related breathing disorders (SRBD)
(Crabtree et al 2003; Guilleminault et al 1981)

ADHD symptoms reversed by treatment of sleep disorder
(Hansen and Vandenberg 1997; Dahl et al 1991; Guilleminault et al 1982)

How common is sleep disturbance?

ADHD	25% - 50%
Autistic spectrum disorders	49% - 89%
Intellectual disabilities	34% - 86%
Down syndrome	
Smith-Magenis syndrome	
Prader-Willi syndrome	
Angelman syndrome	
Visual impairment	42% - 77%

(see Stores & Wiggs 2001)

How common is sleeplessness in children with learning disabilities?

- Mild and severe problems
 - < 6 years 86%
 - 6-11 years 81%
 - 12-16 years 77%
- Night waking
67% - 56%
- Settling problems
51% - 56%

(Bartlett, Rooney & Spedding 1985)

(Quine 1991)

(Bartlett et al 1985)

(Wiggs & Stores 1996)

How common is sleeplessness in adults with learning disabilities?

- 120 adults, mean age 36 years, mild - profound ID
15% reported as having a sleep problem
(Espie and Tweedie 1991)
- 103 individuals, 11-58 years, profound ID in residential care
39% sleeping < 5 hrs per night
(Poindexter and Bihm 1994)
- 210 adults, 21-83 years, mild - profound ID in community Health Authority/Social Services houses
27% settling
56% night waking
(Brylewski and Wiggs 1998)

Probably increased prevalence of sleeplessness in the elderly due to...

- Physiologic factors (ie. age related changes)
- Medical (eg. CNS degenerative disorders)
- Psychiatric (eg. depression)
- Pharmacological
- Social (ie. change in rest/activity patterns)
- Age-related sleep disorders (eg. REM sleep behaviour disorder, Restless legs syndrome)



Risk factors for sleep disorders

- Physical factors
- Psychiatric/behavioural problems
- Impaired learning/communication
- Parent/family/carer mental state/behaviours

Effects of sleep disruption

(Pilcher & Huffcutt 1996; Guilleminault & Pelayo 2000)

Family/carer stress

Physical

- Growth
- Immune system
- Death!

Motor skills

- Hand eye coordination
- Reaction time

Cognition

- Memory
- Attention
- Divergent thinking

Performance

- Work/school
- Accidents

Mood and behaviour

- Fatigue/overactivity
- Irritability/Aggression
- Anxiety/Depression
- Hallucinations

Effects of sleep extension?

In typically developing children, increasing sleep by as little as 40 minutes led to significant effects on next day cognitive functioning
(CPT, digit span, simple RT)

Sadeh et al (2003)

What help is being received?

- Treatment received by a limited number of families
 - 47% with severe learning disability (n=124)
 - 54% with autistic spectrum disorders (n=61)

(Wiggs & Stores 1996; 2000)

- Had coped for years already
- Did not want child on medication
- Thought treatment unlikely to be helpful
- Previous unfavourable treatment experiences
- Did not want to trouble professionals
- Financial reasons?

(Wiggs & Stores 1996; Quine 1992; Bartlett et al 1985)

Treatment approaches

- Reassurance/explanation
- Sleep hygiene
- Safety measures



- Psychological
 - * Behavioural
 - * Cognitive
- Chronotherapy (altering sleep timing)
- Medication
 - * Hypnotics
 - * Stimulants
 - * Melatonin
 - * Others
- Physical measures
- Surgery

Sleep problems vs sleep disorders

- 3 presenting problems
 - Sleeplessness
 - Excessive sleepiness
 - Events/behaviours associated with sleep
- Over 80 sleep disorders listed in International Classification of Sleep Disorders – Second Edition (*American Academy of Sleep Medicine 2005*)

Approaches to sleeplessness



- Sleep hygiene
- Hypnotics
- Melatonin
- Behavioural management

Sleep hygiene

Sleeping environment should be conducive to sleep

- Familiar setting
- Comfortable bed, darkened, quiet room, correct temperature
- Non-stimulating
- No negative associations

Encourage

- Bedtime routines
- Consistent bedtime and waking up times (weekdays, weekends, holidays); consistent daytime timing of all meals
- Thinking about problems and plans before going to bed
- Falling asleep without parents/carers
- Regular daily exercise, exposure to sunlight
- Positively reinforce good sleep behaviour with praise/rewards

Sleep hygiene contd.

Avoid

- Overexcitement near bedtime
- Late evening exercise
- Caffeine containing drinks late in the day (that includes cola and most chocolate drinks)
- Large meals late at night (a light snack is good if it prevents hunger)
- Excessive or late napping during the day
- Too much time awake in bed (especially if distressed)

Sedative-hypnotic medication

- Degree of improvement?
- Paradoxical excitation
- Effects not sustained
- Daytime 'hangover' effects
- Dependence
- Withdrawal effects
- Carer resistance
- Gives no opportunity for 'learning' to sleep
- ✓ Short-term crisis intervention

Ramchandani, Wiggs, Webb & Stores (2000)

Owens, Rosen & Mindell (2003)

Melatonin

Stores (2003) Arch Dis Child; Turk (2003) J Med Genet

- Study design
- Population of study
- Nature of sleep disorder
- Melatonin profiling
- Administration of intervention
- Outcome measure

Issues...

Short term side effects?

Effects on seizure frequency?

Effects on reproduction/puberty?

Role in growth hormone secretion/immune function?

Drug interactions?

Contaminants in commercial preparations?

Long-term safety?

Behavioural sleep medicine

Preferred by families

No hang-over effects

Lack of negative side-effects

Empowering parents/carers

Used in conjunction with other techniques

But....can be demanding

Reported behavioural techniques to treat sleeplessness in people with intellectual disabilities

Behavioural Technique	No. of studies	Total n	Study design*
Extinction	5	23	MB = 1 (3)
Graduated extinction	1	1	
Sleep-wake scheduling (± bedtime fading, response cost)	7	31	MB = 3 (8) RCT = 1 (14)
Graduated extinction and sleep/wake scheduling	3	15	MB = 1 (4)
Mixture of techniques	2	55	RCT = 2 (55)
Booklet ± parent groups	2	66+	RCT = 1 (66)
Desensitisation	1	1	
Chronotherapy	2	5	

* MB = multiple baseline; RCT = randomised controlled trial;
AC = alternating condition

Status of behavioural techniques

Chambless & Hollon (1998) J Consult Clin Psychol

- 'Well established'
 - » Extinction
 - » Checking
 - » Preventive approaches
- 'Probably efficacious'
 - » Scheduled waking
- 'Promising'
 - » Extinction with parental presence
 - » Positive routines/faded bedtime

Clinical implications

- Assessment of sleep/wake patterns
- Diagnosis of underlying disorder
- Where the sleep disorder has a behavioural element behavioural techniques may be useful
- Parental carer preferences/practical considerations should guide management decisions in absence of empirical evidence

Review papers:

Lancioni GE, O'Reilly MF, Basili G (1999) *American Journal on Mental Retardation*, **104**, 170-186.

Didden R, Sigafoos J (2001) *Research in Developmental Disabilities*, **22**, 255-272.

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Richdale A, Wiggs L (2005)

International Journal of Behavioral and Consultation Therapy, **1**, 165-189.

Books:

Stores G (2001) *A Clinical Guide to Sleep Disorders in Children and Adolescents*. Cambridge: Cambridge University Press.

Stores G, Wiggs L (Eds) (2001) *Sleep Disturbance in Disorders of Development: Its Significance and Management*. MacKeith Press: London