Adolescent Sleep: The Perfect Storm

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Adolescents are sleep deprived
What’s ‘typical’ in adolescent sleep

• Adolescents need 9-9.5 hours of sleep, but most achieve only 7.5 hours (National Sleep Foundation 2006, 2012).

• Short term effects of poor sleep:
  – Sleepiness & fatigue, Impaired attention (Fallone et al 2001), memory (Yoo et al 2007a), Impaired immune system (Rogers et al 2001), Greater emotionality (Yoo et al 2007b), and MVAs.

• Long term effects of poor sleep:
  – increased risk of developing anxiety, depression, substance abuse, overweight, diabetes and cardio-vascular complications.
Adolescents are at special risk of sleep problems due to a ‘Perfect storm’

- Biological and emotional vulnerability, amplified by lifestyle factors
Biological vulnerability
Homeostatic Sleep Pressure (S)

Circadian Rhythm ‘body clock’ (C)
Body Clock (SCN) - Melatonin

• Our body clock is entrained to the external clock via light and dark.

• Dark triggers sleep
  – Melatonin is released in dim light
  – lowers core body temperature and makes you feel sleepy

• Light wakes you up
  – Light suppresses melatonin
  – Body temperature increases and we feel alert and awake
2 Processes are altered by adolescence

Sleep pressure develops slowly

Clocks run later than at any other point in the lifespan
2 Processes are altered by adolescence
Social Jetlag

• Biologically primed to sleep and wake later, but this is incompatible with school start times.

• Leads to a pattern of sleep restriction on school nights and sleeping in on weekends to “catch up”.

• Discrepancy between school day versus weekend wake time:
  – creates social jetlag (daytime sleepiness, fatigue, morning nausea etc).
  – Also makes reliable sleep onset difficult to achieve.
  – And maintains difficulty falling asleep.
Lifestyle Factors
Homework (NSF, 2006)

Part-time work (NSF, 2006)

Extra-curricular activities (NSF, 2006)

Socialising

Decreased parental control
National Survey of Australian Teens

- Over 80% of the sample have a mobile and iPod in their bedroom at night.
- Over half (55%) have a computer in their bedroom.
- Approx one third have TV’s, radios and gaming consoles.
- At least 70% had 3 or more appliances in their bedroom at night.
- Dose-response Rx between use of devices and sleep problems

Gamble, D’Rozario, Bartlett, Williams, Bin, Grunstein & Marshall (under review)
Studies have documented negative effects of technology on teen sleep:

- **Later bedtimes** (Shochat et al, 2010)
- **Delayed sleep onset** (Dworak et al, 2001; Shochat et al, 2010; Van den Bulk, 2004)
- **Frequent night waking throughout the night** (Van den Bulk, 2004)
- **Short sleep duration** (Shochat et al, 2010; Van den Bulk, 2004)
- **Irregular sleep patterns** (Van den Bulk, 2004)
- **Daytime fatigue** (Van den Bulk, 2004)
Mechanism of action is unclear

- Devices emit light that suppresses melatonin & delays sleep onset (Higuchi et al 2005).

- Electromagnetic radiation disturbs sleep stages (Hamblin et al 2002).

- Physical & mental arousal prevents winding down (Wang et al 2006).

- Use in bed conditions the bed as a place of arousal.

- Devices simply ‘replace’ sleep.
Common Sleep Problems

1. **Insomnia** – primary (5-10%) or secondary (40-60%)

2. **Delayed Sleep Phase Syndrome** (7-15%)

3. **Poor sleep hygiene** – self imposed sleep restriction

4. **A combination** (90% of clinical practice)
Primary Insomnia

• A persistent distressing difficulty in:
  • Falling asleep (takes more than 30 minutes)
  • Staying asleep (awake for >30 minutes during the night)
  • Waking too early
  • Unrefreshing sleep

• Occurs 3 nights per week for 1 month +

• At least one of the following forms of daytime dysfunction
  • Sleepiness
  • fatigue/malaise
  • Attention, concentration or memory impairment
  • Mood disturbance, irritability
  • Decreased motivation, energy or initiative
  • Proneness to accidents, errors or clumsiness
Awake

Worry, frustration, distress/upset

Conditioned Insomnia

Fight or Flight Response
# Insomnia: Sleep onset & waking early

<table>
<thead>
<tr>
<th>Symbols</th>
<th>in bed</th>
<th>lights out</th>
<th>asleep</th>
<th>out of bed</th>
<th>went outdoors after got up out of bed</th>
</tr>
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<table>
<thead>
<tr>
<th>Abbreviations</th>
<th>SOL - Time to fall asleep after lights out (in minutes)</th>
<th>WASO - Time spent awake during night - not including SOL (in minutes)</th>
<th>TIB - Time In Bed (in hours)</th>
<th>TST - Total Sleep Time (in hours)</th>
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**Comments:** Example, vivid dreams, events that may have affected sleep. For example: Monday - slept poorly due to presentation next day.

Tues sleep was difficult as I was anxious due to an assignment.
Secondary Insomnia

- Insomnia due to another psychological disorder that is judged to be primary
- Adolescence is peak time for onset of anxiety and depression
- Insomnia may present as a symptom of anxiety and depression.
- Insomnia may trigger the development and relapse of anxiety and depression.
Longitudinal Study (Jansson-Frojmark & Lindblom, 2008)

• Random Sample of 3000 Swedish residents aged 20-60 years
• Measured depression, anxiety & insomnia at baseline and 1 year follow up

• Results:
  – At baseline and 1 yr follow up anxiety, depression and insomnia significantly inter-correlated
  – High anxiety only at baseline = insomnia at f/up
  – High depression only at baseline = insomnia at f/up
  – Insomnia only at baseline = high anxiety at f/up
  – Insomnia only at baseline = high depression at f/up
Delayed Sleep Phase Syndrome

Sleep Wake Cycles

Time of Day
Delayed Sleep Phase Syndrome

- DSPS is a disorder of the timing of sleep.

- Pattern of falling asleep late (12-2am) and waking late if allowed to sleep and wake when body wants to.

- Melatonin (sleepy hormone) is released later into the bloodstream in response to dim light.

- Affects 7-15% of adolescents and is biologically based (genetic and hormones)

- Dimensional – on a spectrum

- Increasingly occurring in primary-school aged kids due to earlier onset of puberty
### Symbols
- **△** in bed
- **C** = cafffeinated drink (eg. cola)
- • lights out
- **F** = food
- ↑ out of bed

### Abbreviations
- **SOL**: Time to fall asleep (in minutes)
- **TST**: Total Sleep Time (in hours)
- **WASO**: Time spent awake during night not including SOL (in minutes)

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**Notes:**
- WASO values are marked as **SSS**.
The combination

Circadian delay + Lifestyle factors

- Difficulty falling asleep, distress, possible insomnia
- Late bedtime &/or difficulty falling asleep

Social Jetlag, Daytime fatigue & napping

- Restricted sleep during school week

Reinforces circadian delay

- Sleep in on weekends
What can you do?
What to do

• **Look for warning signs** of sleepiness, fatigue, anxiety, and depression in verbal and non-verbal behaviour.

• **Understand the biology** of teen sleep – going to bed late, waking late and sleeping in on weekends is relatively normal.

• Most young people pass through this phase without any need for intervention.

• Help should be sought
  – If a young person wants it or is distressed about their sleep
  – Their sleep is impacting their ability to function (mood, grades, school attendance etc)
What to ask if you only have 5 minutes

- Do you snore?
- Do you have trouble falling asleep, staying asleep, waking too early?
- How is your sleep/wake different on weekends?
- Do you consider yourself a ‘morning person’ or a ‘night owl’?

<table>
<thead>
<tr>
<th></th>
<th>Falling asleep</th>
<th>Staying asleep</th>
<th>Waking early</th>
<th>Sleep better on weekends</th>
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- check **anxiety & depression**
Sleep Diary (1-2 weeks)

- **Google 2 week sleep diary and click on images**
  - [http://studenthealth.emory.edu/hp/documents/two_week_sleep_diary.pdf](http://studenthealth.emory.edu/hp/documents/two_week_sleep_diary.pdf)
Use technology for good not evil

**Sleptalk:** records sound above threshold. Useful to rule out snoring, some parasomnias

The **Sleep Cycle alarm clock:** analyses sleep patterns and wakes you when you are in the lightest sleep phase. Warning: There is no evidence for this!

**Golf counter under pillow** ($2 on ebay): press it every time you wake up: Useful to corroborate report of frequent waking.
How willing are they?

• Most young people are therapeutic ‘prisoners’
• Parents and doctors are often motivated to fix sleep issues than they are
• Be realistic about what can be achieved if motivation is low.
Treatment: what does it involve?
What steps does my client take to get help?

• First port of call is typically the GP or paediatrician.

• Doctor can provide a referral to a paediatric sleep physician if OSA, restless legs or periodic limb movement are suspected and a sleep study is required.

• Obtain a referral to a psychologist, or clinical psychologist (with or without sleep specialty) if you think psychological factors are causing or maintaining the sleep problem.

• Referral to a psychologist is not compulsory – only if you wish to claim the Medicare rebate ($124) for up to 6+4 sessions.
Sleep Wake Cycles

Clocks run later than at any other point in the lifespan.

Sleep pressure develops slowly.
Set and ‘sell’ a regular wake time

- Your wake time is the anchor
- *Imagine what these waves would look like if you moved your wake time from 7am, to 10am and back to 7am?*

Your morning wake time determines sleep pressure and thus sleep onset at night
Get light & dark at the right times

• Our body clock is entrained to the external clock via light and dark.

• Dark triggers sleep
  – Melatonin is released in dim light
  – Get dim light at night, esp 1 hour before bed

• Light wakes you up
  – Light suppresses melatonin
  – Get light in the morning.
  – Open bedroom curtains, eat breakfast outside or next to window, go for a walk etc
Address Sleep Hygiene Issues

- Assess the Sleep Environment: Too noisy, light, hot/cold, Mattress/pillow uncomfortable

- Caffeine: Effects for 3-5hrs. Avoid after 4pm. Multiple teas & coffees accumulate.

- Exercise: No vigorous activity within 5 hours of bed. Body temperature needs time to drop.

- Naps: no longer than 20 mins and before 4pm.

Change the hour before bed

One hour before bed:

1. Stop work and study
2. Turn down the lights
3. Switch off electronic devices

But what will I do?!
Change the hour before bed

- Design activities that teens can fill the time with (pamper, draw, ??)
- Expect motivation to be VERY LOW
- Negotiate - Take what you can get – any change is better than none.
- Conduct an experiment.
  - Monitor sleep for 3 nights with technology and 3 nights without technology and compare results.
  - Was sleep any better?
  - Did they miss anything truly important? How bad was it?
Behavioural Treatments that Work

Stimulus Control &
Sleep Restriction Therapy
Cohen’s d = .8

Underlying Rationale:
• assumes there is a learned association between wakefulness (stress) and the bed.
• To break this association you mustn't spend excessive time awake in bed
Stimulus Control Therapy

Stimulus Control in a nut shell
• Associate the bed with sleep, not lying awake
• Get out of bed if you’re not asleep within 15-20mins, do something calming in another area, then return to bed and try again. Repeat all night.
• Uprise the next morning regardless of sleep obtained & don’t nap.

Tips for young people
• Stay in the bedroom (use a bean bag, chair or pillow in their room)
• Prepare the space and activity ahead of time
• NO clocks, texting, laptops, TV or homework
• Start on a Friday night or school holidays.
Stimulus Control Therapy

Special issues to consider

Can they do it?
• Requires a fair degree of self motivation and independence to manage emotions and behaviour alone in the middle of the night
• Not used in primary school aged children
• Used in adolescents on a case-by-case basis depending upon maturity, independence and willingness.

What will parents think?
• Likely to make parents very anxious. Helps if the client will allow their parents to be informed and involved.
Sleep Restriction Therapy

Sleep Restriction Therapy in a nut shell

• Keep a sleep diary for 7-14 days
• Focus on Sleep Efficiency, where SE = Total Sleep Time/Time In Bed x 100
• If Sleep Efficiency is < 85%, Limit Time in Bed (TIB) to average Total Sleep Time (TST), but don’t go less than 5 hours
• When sleep efficiency is > 85% for 7 nights increase TIB by 15 minutes by going to bed earlier or waking later

Example:
• Alice went to bed at 9pm and fell asleep at midnight. She woke and got out of bed at 7am. What is her sleep efficiency?

• TIB = 10hrs, TST = 7hrs, SE = 70%
• What bedtime might you recommend? What wake time might you recommend?
Sleep Restriction Therapy

http://www.youtube.com/watch?v=jV509Mhwkp4
Sleep Restriction Therapy

Tips for young people

• Generally find it easier to delay bedtime rather than wake earlier.
• This suits their body clock and also keeps their wake time more consistent with weekends.
• Use the delayed bedtime to ‘wind down’, rather than do more work.
• First week is the hardest, so start on a Friday night or school holidays.

Special issues to consider

At what age would you reduce an adolescent to 5 hours?

What will parents think?
• Parent often anxious about the idea of delaying bedtime, even temporarily.
Waking is painful

Sleep inertia
• is a period of grogginess upon waking.
• It lasts 5-60mins and is completely normal.
• It doesn’t mean you haven’t had enough sleep.
• Suspend judgement about the night before, and today, until you’ve been awake for 20mins.

Morning battles
• Encourage parents to stay out of morning conflict.
• Let them live out the natural consequences of their decisions (e.g., running late, detention etc)
Waking is painful

*Where did your love of electronic devices go?*
- Wherever possible, young people should take charge and use an alarm or another electronic device.
- Alarm clock away from the bed so you have to get up to turn it off

Clocky the alarm clock ($30)

http://www.youtube.com/watch?v=ZZ_n6WT-1Gs
Normalise heightened emotion at night

At night the limbic (emotional) system fires up and the rational centres (frontal lobes) shut down, so the brain is “All petrol no breaks”

Clients often need 2 separate classes of strategies

1. ‘Rational’ Techniques for the day (e.g., CBT cognitive restructuring)
2. Techniques for the night that are emotion focused
Empty your mind trash (emotional dumping)

- Bedtime might be the first opportunity to be alone, think and process.
- Worries, sadness and anger and regret often flood in.
- In the hour before bed, or earlier you can try the following......

Set a worry period for adolescents
- Note worries throughout the day, then sit down and dedicate time to worrying about them.

Journaling for adolescents.
- Write about whatever is on your mind.
- Based on Pennebaker writing research.

Busy Brain Box for younger children
- Option to take it out in morning and re-examine it
- Choose colours to reflect feeling (red = mad, blue = sad etc)
• Identify **negative headspace** and **switch the channel** to a better one
• Associate Positive rumination and bed.
• Young children – replay positive events of the day with parents as they say goodnight and settle on one to keep thinking about
• Adolescents: plan happy, ”safe” topics to visualise and think about.
### Stubborn beliefs need testing - Behavioural Experiments

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<th>belief</th>
<th>Experiment</th>
<th>What to do</th>
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<tr>
<td><em>The only way I can get more energy is by getting more sleep</em></td>
<td>Energy generating experiment</td>
<td>Monitor mood and energy on a normal day versus an exercise day</td>
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<tr>
<td><em>I cant function without 8 hours of sleep</em></td>
<td>Deliberately sleep for less than 8 hours * at end of Tx</td>
<td>Monitor mood and energy on a normal night versus a shorter night.</td>
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<tr>
<td><em>I have to know the time.</em></td>
<td>Clock watching vs. clock removal</td>
<td>Monitor amount of sleep and mood on normal night vs. without clock watching</td>
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- Make clear predictions about what will happen
- Decide what you will monitor (sleep, mood, energy etc) and when.
- Monitor under ‘normal’ conditions first, then under ‘challenge’ conditions
- What did you learn?
Clinical Services

Sydney Sleep Psychology @ Chatswood.
• admin@sydneysleeppsychoogy.com.au
• 0414 108 100
• www.sydneysleeppsychoogy.com.au

Woolcock Clinic @ Glebe
• reception@woolcock.org.au
• 9114 0000
• www.woolcock.org.au

• See children, adolescents and adults with sleep and emotional disorders
• Obtain a MHCP from your GP to receive full medicare rebate ($124)
Good FREE resources

- [http://www.parentingscience.com/sleep-requirements.html](http://www.parentingscience.com/sleep-requirements.html)

- Free excellent PDF download by Dorothy bruck. Contains the PSQI, sleep diary and relaxation scripts (google teenage sleep dorothy bruck) if the following link doesn’t work (180pg)

Thank you &
happy sleeping 😊

Questions? - Amanda Gamble
admin@sydneysleeppsychoology.com.au
0414 108 100