Why Behavioral Treatments?

- Much chronic insomnia is a direct result of behaviors that perpetuate it
- Most insomniacs seem to need regular meds...and are surprised — and relieved — when they realize that they don’t
- Avoids multiple adverse medication effects and long-term costs
- Psychological benefits — people become more attuned to themselves and develop a more realistic experience of personal control

“I Can’t Sleep”

- c/o difficulty initiating or maintaining sleep
- early morning awakening
- resistance to a reasonable bedtime
- difficulty sleeping w/o parent or caregiver intervention
- negative health, behavioral, social or occupational effects
- at least 3 X per week for at least 3 months
Drugs vs. Behavioral Treatment

Comparable treatment effects
More rapid improvement w/ sleep medication
More sustained improvement w/
Cognitive Behavioral Therapy for Insomnia
(CBT-I)

Morin et al. JAMA 1999

CBT-I vs. Pharmacotherapy

An 8-week study

% Change in Sleep Efficiency

N = 15/group

Data are from sleep diaries

Morin et al. JAMA 1999
CBT-I vs. Pharmacotherapy

- 80 subjects got CBT-I alone X 6 wks, then either
  - Extended CBT-I X 6 months or no treatment
- 80 subjects got CBT-I + zolpidem 10 mg X 6 weeks, then either
  - Extended CBT-I alone with no additional zolpidem or CBT-I + pm zolpidem

- At 6 weeks
  - Insomnia severity decreased comparably w/ no further change in either group
  - Proportions of treatment responders & treatment remitters were equivalent

- At 6 months
  - Remission rates for both groups increased

- 6 month follow-up
  - Remission rate for CBT-I group continued to increase; but decreased for group getting CBT-I + zolpidem prn

Morin, C et al. JAMA 2009

A Cautionary Note

- Zolpidem is well-known to trigger dangerous sleepwalking incidents, including sleep driving, as well as episodes of sleep-related eating

  - possibly less likely w/ eszopiclone

Predictable Factors In Insomnia

- Predisposing
- Precipitating
- Perpetuating
Factors In Insomnia

- **Predisposing**
  - hyperarousal
  - weak homeostatic drive
  - short sleeper

- **Precipitating**
  - stressful life event
  - schedule change
  - may be hard to identify

**Perpetuating Factors**

- **Behavioral**
  - irregular schedule
  - excessive time in bed
  - napping
  - excessive caffeine or alcohol
  - stimulating activities close to bedtime
  - clock watching

- **Cognitive**
  - worry throughout the day
  - fear of not sleeping
  - irrational beliefs about consequences
Getting Enough Sleep

Recommended Amount of Sleep for a Health Adult: A Joint Consensus Statement of the
American Academy of Sleep Medicine and Sleep Research Society

7 or more hours

Respect Individual Differences

...best indicator of an individual’s need for sleep is the amount that is
required to feel rested and well the next day

Normal Variants

• Short sleeper
• Long sleeper
• Older sleepers

Salvador Dali 1930
Sleep Physiology 101

- Circadian rhythms
- Homeostatic forces
Circadian Rhythms

- self-sustaining, nearly 24-hour rhythms in all living organisms that anticipate the light-dark cycle
- manifest in biochemical, molecular, physiological & behavioral cycles
  - sleep / wake
  - appetite
  - propensity for exercise
  - immune function
  - hormones
  - drug metabolism
  - level of alertness independent of prior sleep
- "phase shifting" occurs via zeitgebers
- our preferred sleep patterns are genetically-determined

Zeitgebers

- sunlight
- sleep-wake cycle
- noise
- social cues
- food
- temperature
Homeostatic Forces

- More pressure to sleep after a long wake time
- More pressure to wake up after a long sleep time
- Interact with—but are independent of—the circadian system

Circadian & Homeostatic Influences

A Shorter Rhythm

*Ultradian rhythm*

- about 90 minutes by adolescence
Developmental Changes

- Major changes over the lifespan in:
  - Total sleep time/consolidation of sleep
  - Distribution of sleep stages
  - Circadian rhythmicity and timing

- Childhood: more deep sleep
- Adolescence: sleep needs increase
- Elderly: fragmented, reduced efficiency
Sleep History

- Rule in or out
  - Restless Legs Syndrome
  - Sleep Disordered Breathing
  - Parasomnia, especially Nightmares or Sleep-Related Eating Disorder
- Evaluate sleep/wake schedule

Timing Is Everything

- Encourage a separate appointment whenever possible
- Emphasize how important resolving this problem is for short and long term health
- Help the patient feel how seriously you take their problem

Sleep Schedule

<table>
<thead>
<tr>
<th></th>
<th>Usual</th>
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<th>Latest</th>
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<tbody>
<tr>
<td>Bedtime</td>
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<tr>
<td>Lights out</td>
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<td></td>
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<tr>
<td>Time it takes to get to sleep?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wake time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Get up time</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

How many times do you wake up on an average night?
How long does it take you to get back to sleep after waking up?
How many naps do you take each day, and how long do they last?
Analyzing the Sleep Schedule

- Understand that subjective estimates are often inaccurate—but they are actually quite valid as indicators of change over time
- Look for large irregularities or variability
- Note big discrepancies between time in or out of bed & actual sleep time
- Note napping and consider causes

<table>
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<tbody>
<tr>
<td><strong>Bedtime</strong></td>
<td>10:30 PM</td>
<td>8 PM</td>
<td>1:30 AM</td>
</tr>
<tr>
<td><strong>Lights out</strong></td>
<td>11 PM</td>
<td>8 PM</td>
<td>2 AM</td>
</tr>
<tr>
<td><strong>Time it takes to get to sleep?</strong></td>
<td>1 hr</td>
<td>30 min</td>
<td>2.5 hrs</td>
</tr>
<tr>
<td><strong>Wake time</strong></td>
<td>5:30 AM</td>
<td>5:30 AM</td>
<td>Noon</td>
</tr>
<tr>
<td><strong>Get up time</strong></td>
<td>6 AM</td>
<td>5:45 AM</td>
<td>Noon</td>
</tr>
</tbody>
</table>

How many times do you wake up on an average night? 3
How long does it take you to get back to sleep after waking up? 30 min – 1 hr
How many naps do you take each day, and how long do they last? 0-1, 30 min

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Bedtime</strong></td>
<td>9 PM</td>
<td>8 PM</td>
<td>10 PM</td>
</tr>
<tr>
<td><strong>Lights out</strong></td>
<td>10 PM</td>
<td>8:15 PM</td>
<td>10 PM</td>
</tr>
<tr>
<td><strong>Time it takes to get to sleep?</strong></td>
<td>1 hr</td>
<td>30 min</td>
<td>10 min</td>
</tr>
<tr>
<td><strong>Wake time</strong></td>
<td>7 AM</td>
<td>6:30 AM</td>
<td>9:30 AM</td>
</tr>
<tr>
<td><strong>Get up time</strong></td>
<td>7:30-8 AM</td>
<td>6:35 AM</td>
<td>10:30 AM</td>
</tr>
</tbody>
</table>

How many times do you wake up on an average night? 3
How long does it take you to get back to sleep after waking up? 20 min to 1 hr
How many naps do you take each day, and how long do they last? 0-1, 20 min
COGNITIVE BEHAVIORAL THERAPY

- Relaxation Training
- Stimulus Control
- Sleep Restriction Therapy
- Timed Bright Light Exposure
- Education in Realistic Expectations

Relaxation Techniques

- Physical and mental relaxation
  - Relaxed breathing and body awareness
  - Pleasant mental imagery
- Self-hypnosis, meditation
- Biofeedback
- Music

Sleep Restriction Therapy

- Used for fragmented, interrupted sleep
  (problems with sleep maintenance)
  - Especially when coupled with excessive time in bed
- Accepts mild daytime sleepiness as a temporary side effect
- Might take 6-8 weeks, often less
- Probably retrain circadian/ultradian rhythms
Procedure for SRT

- Chose a realistic, restricted time in bed
- Establish wake-up time, then calculate bedtime
- Plan activities thoughtfully
- Expect temporary difficulties
- Log sleep
- If TIB is aggressively restricted, extend time in bed gradually in 15 min increments when sleep efficiency > 90%
- Get the clock out of sight!

Spielman et al. 1987

Sleep Restriction Therapy: Pre and Post

Calculate average Time in Bed, average Total Sleep Time → use these to choose new restricted Time in Bed
### Contraindications to SRT

- ANY other primary disorder of sleep until treated (e.g., sleep apnea)
- Major depression or other acute or severe psychiatric disorder, until treated
- Circadian Rhythm Disorder
- Shift Work Sleep Disorder

---

### Timed Bright Light Exposure

- resets circadian clock
- establishes new circadian phase
- time of exposure critical
- must be daily initially
Timed Bright Light Exposure

- Be outdoors as early as possible after waking up in the morning for 30 min.
- The activity does not matter and you can be in the shade. Just getting your eyes exposed to ambient outdoor light is all that's needed.
- Start with 7 days a week. You may be able to cut back when things are stable to maybe 4-5 times / wk.
Thoughts About Insomnia

- It's a chemical imbalance
- I can't control it
- I can't function the next day
- I must get 8 hours every night
- A bad night predicts more bad nights
- I'll get really sick
- When I don't sleep, I need to stay in bed more

Rapid Resolution of Chronic Insomnia

Mr. I.B. DIMS

- 68 y.o. C had an MI 6 yrs ago.
- Developed difficulty sleeping in the hospital that continues despite full recovery.
- Wakes feeling tired, less so on nights when he sleeps through. Denies depressed mood; may be somewhat more irritable on days when he feels most sleep deprived.
- Fire Inspector; works 8-9 for 3 wks; 4th wk on call (awakened every Xs / nights).

Perpetuating Factors

Bedtime 9 pm w/5 C. SOL = 60-65 minutes
Sleeps thru 'til 6 am "30% of time" (wakes 1 h before alarm). Usually wakes 3-4 hrs to get back to sleep; Alarm at 7 am. No naps.
Mr. Dim’s Sleep Schedule

<table>
<thead>
<tr>
<th></th>
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<tbody>
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<td>Bedtime</td>
<td>9 PM</td>
<td>8:45 PM</td>
<td>11:30 PM</td>
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<tr>
<td>Lights out</td>
<td>9 PM</td>
<td>8:45 PM</td>
<td>11:30 PM</td>
</tr>
<tr>
<td>How long to get</td>
<td>45 min</td>
<td>30 min</td>
<td>1 hr</td>
</tr>
<tr>
<td>to sleep?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wake time</td>
<td>6 AM</td>
<td>6:30 AM</td>
<td>8 AM</td>
</tr>
<tr>
<td>Get up time</td>
<td>7 AM</td>
<td>6:30 AM</td>
<td>8:30 AM</td>
</tr>
</tbody>
</table>

How many times do you wake up on an average night? 1
How long does it take you to get back to sleep after waking up? 2-3 hrs
How many naps do you take each day, and how long do they last? 0-1, 15-20 min

The Problem?

Mr. DIMS is usually spending 10 hours in bed a night!

Mr. Dim’s Treatment Plan:

Bedtime 9 pm w/LO. SOL = 60-90 minutes. Sleeps thru 10:06 am “36% of time” (wakes 1 hr before alarm).
Usually wakes at 9:30-9:50 w/2-3 hrs to get back to sleep. Alarm at 7 am. No naps.
Mr. DIMS Rx

- Reduce time in bed from 9 pm–7 am ➔ 11 pm–6:30 am
- Avoid sleeping in & napping on weekends
- Start logging sleep and come back in 3 weeks for relaxation training & more aggressive SRT

Mr. DIMS Follow-up

- Forgot his sleep logs
- In bed only from 11 pm to 6:30 am; first few nights were difficult but rapidly noted much shorter SOL and fewer awakenings. Wakes once as before, but has a rapid return to sleep
- “Better sleep than for several years”
- Did relaxation training, liked it
- Called to cancel 1-month follow-up appt.

Type A, Anxiety & Night Owl Tendencies
Mr. Nat A. Bideal

- 48 yo, J has taken Xanax® for sleep for 3 years.
- Moderate anxiety about work and family issues.
- Embarrassed about his “drug dependence” and wants off; tried various
  tapering, abrupt discontinuation while on vacation, etc. to no avail.
- A night of poor sleep greatly increases anxiety at work which tends to fuel
  additional bad nights.
- Pravastatin for high cholesterol; no other medical history.
- Xanax® 2 mg at 10 PM, in bed 10:30, 1 hr to get to sleep, wakes 1-3 times/night w/ 30 minutes to get back to sleep. Alarm at 5:30, snoozes it, X, gets
  up tired, 20 min nap after work. Weekends bedtime is midnight, wakes
  once w/ quicker return, sleeps in until 9 AM
- Mild snoring, worse w/ alcohol, occasional pauses in breathing. No unusual
  movements, nightmares, etc.

Mr. Bideal’s Past History

- Was a “night owl” in high school & college, often not asleep till 3 AM and
  late to school, or took afternoon classes in early college. As his career
  goals formed, he was able to maintain a more normal schedule.
- Always a bit “high strung,” Type A, over-achiever, etc.
- His original employer was bought out by a “more ruthless” company.
- Precipitant was birth of first child w/ his commitment to be an “equal
  parent.” Up at night with infant and associated worries about
  performance the next day. Two kids now sleep through OK.

Mr. Bideal’s Sleep Schedule

<table>
<thead>
<tr>
<th></th>
<th>Usual</th>
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</tr>
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<tr>
<td>Bedtime</td>
<td>10:30 PM</td>
<td>9:30 PM</td>
<td>1 AM</td>
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<tr>
<td>Lights out</td>
<td>10:45 PM</td>
<td>9:30 PM</td>
<td>1:30 AM</td>
</tr>
<tr>
<td>How long to get</td>
<td>1 hr</td>
<td>30 min</td>
<td>2 hrs</td>
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<tr>
<td>to sleep?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wake time</td>
<td>5:30 AM</td>
<td>5:30 AM</td>
<td>10 AM</td>
</tr>
<tr>
<td>Get up time</td>
<td>5:55 AM</td>
<td>5:35 AM</td>
<td>11 AM</td>
</tr>
</tbody>
</table>

- How many times do you wake up on an average night? 1-2
- How long does it take you to get back to sleep after waking up? 30 min - 1 hr
- How many naps do you take each day, and how long do they last? 1–2, 20–45 min
Circadian Rhythm Disorders

- Delayed Sleep Phase Syndrome
  - usually begins in adolescence
  - preferred sleep phase is quite late, risking catastrophic effects on work or school
- Advanced Sleep Phase Syndrome
  - abnormally early sleep period
Mr. Bideal’s Treatment Plan

- Xanax® 2 mg at 10 PM, in bed 10:30, 1 hr to get to sleep, wakes 1-2 times/night w/ 30 min. to get back to sleep. Alarm at 5:30, snoozes it 3X, gets up tired, 20 min. nap after work. Weekends tardiness is most nights, wakes once napper returns, sleeps in until 9 AMish.

Mr. Bideal’s Treatment Plan

- Keep Xanax® the same for now
- Get up 5:30 AM 7 days a week; no snoozing alarm, out of bed promptly
- Get 30 minutes outdoors ASAP after awakening, SAME TIME DAILY
- No napping
- Watch for time to get to sleep w/ fewer & shorter awakenings
- When 10 weeks of good progress, reduce Xanax® by ¼ dose
- Monitor & adjust schedule as needed; continue morning light!
- With continued progress, Xanax® by ¼ of starting dose every 2 weeks

Habituation…tolerance…dependence?
How do people get off these drugs?

Chronic Use of Sleep Meds
Ms. Nita Pillé

- 42 yo 9 has been taking 10-15 mg Ambient for 2 years. She gets 7 hrs sleep. Her insurance company is beginning to restrict her supply & her husband pressure her to get off this drug. She has tried going without w/ no success, reporting only 2 hrs fitful sleep w/ it. She's in a panic!
- Is otherwise healthy, exercises regularly, occasional anxiety about issues at work (not severe). No smoker, a cup coffee in AM, occasional wine.
- No snoring, unusual movements in sleep, nightmares, etc.
- Takes Ambient 9:00 PM, in bed 9:30 min, later. (Husband worries she gets "confused" before bed & asks her w/ mins. Occasionally go to bathroom & usually forgets to turn lights off, recall in AM. Occasionally can't get back to sleep and takes another ½ pill. Alarm at 6:30 AM. Same routine on weekends, but no alarm, sleep 'til 7 AM. Groggy for ½ hour. Has missed familiar turns on way to work.

Ms. Pillé's Failures

- Two years ago, tried "cold turkey" off Ambient. Lasted only 3 nights. Was "terrible." Afraid she'd have an MVA or "get fired."
- Last year her MD suggested tapering. Tried only ½ pill at bedtime for 1 week. Got 5 hrs first night and less w/ each successive night.
- Two months ago, tried full pill and ½ pill on alternate nights. OK sleep w/ full pill and "really bad" w/ ½ pill.
- She's motivated to get off drug, but frightened of consequences.

More Ms. Pillé History

- Her mother & grandmother "couldn't sleep well."
- She had trouble in high school & college w/ deadlines and for periods of time w/ an infant child, each resolved.
- Precipitant was stress around her eldest child being in an MVA with long hospitalization and need for nocturnal care at home. This was happily resolved 20 years ago.
- Poor sleep developed during the child's hospitalization and has persisted, despite the child's return to good health.
Getting Off Sleep Meds

- Understand/empathize w/predisposing & precipitating factors, but these are not part of the treatment plan
- Identify current “perpetuating” factors
- Choose one or more behavioral techniques
- Agree on a treatment plan
- Monitor
- When sufficient progress is apparent, begin VERY GRADUAL taper off meds
- Continue to monitor progress and adjust plan as needed until patient’s confidence has returned and progress is satisfactory

Ms. Pillé’s Sleep Schedule

<table>
<thead>
<tr>
<th>Time</th>
<th>Usual</th>
<th>Earliest</th>
<th>Latest</th>
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<tbody>
<tr>
<td>Bedtime</td>
<td>?</td>
<td>8:30 PM</td>
<td>11 PM</td>
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<tr>
<td>Lights out</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
</tr>
<tr>
<td>How long to get to sleep?</td>
<td>5 min</td>
<td>1 min</td>
<td>1 hr</td>
</tr>
<tr>
<td>Wake time</td>
<td>6:30 AM</td>
<td>6:30 AM</td>
<td>7 AM</td>
</tr>
<tr>
<td>Get up time</td>
<td>6:35 AM</td>
<td>6:30 AM</td>
<td>8 AM</td>
</tr>
</tbody>
</table>

How many times do you wake up on an average night? 0-1
How long does it take you to get back to sleep after waking up? 0-30
How many naps do you take each day, and how long do they last? 0

Takes Ambien g to PM, in bed 30-60 min. later. Husband worries she gets “confused” before bed. Asleep w/in 5 min. Occasionally up to bathroom & usually forgets to flush toilet, no recall in AM. Occasionally can’t get back to sleep and can’t another 1/2 pill. Alarm at 6:30 AM. Same routine on weekends, but no alarm, sleeps ’til 7 AM. Groggy for ~30 minutes on waking.
Ms. Pillé’s Treatment Plan

- Maintain 6:30 AM wake time 7 days a week
- Keep Ambien® to the prescribed 10 mg dose; NO extra Ambien®
- Take Ambien immediately before bedtime, NOT earlier!
- Incorporate mild sleep restriction by going to bed at 10:30 PM
- When 1-3 weeks of no significant wakeings, ✶ Ambien® to ¼ of a pill
- Consider later bedtime as needed
- Gradual reduction of Ambien® by ¼ pill every 2 weeks, no faster
- Adjust schedule as needed

Ms. Pillé’s Progress – Week 2

- Some nights takes “forever” to get to sleep
  ...so move bedtime back to 11 PM
- Occasionally “cheats” with extra ¼ Ambien®
- Fears she “can’t do it”
  ...might help to learn a relaxation technique now
- Husband says she’s “doing great”

A Shorter Rhythm

Ultradian rhythm
- about 90 minutes in adults
Ms. Pillé’s Progress – Week 6

- Is down to just 1/2 tab Ambien®
- Falling asleep w/in 5-10 minutes
- Waking 4-5 times per night, only for maybe 5 minutes
- Feels much better, less worried (she's on her way!)

Adolescent Night Owl Extraordinare

Joe L. Darkmann

- 15 y.o., bright, formerly agreeable high-schooler failing 2nd severe attendance problems, missing exams & other deadlines
- Both parents work, Joe must get up in AM on his own
- Often sleeps through the 4 alarms his parents have set—and their oft repeated cell phone calls
- Falls asleep in AM classes (when he gets there at all)...why?
- ...can’t get to sleep until middle-of-the-night
- Is becoming alienated from parents, teachers & some friends
- Thinks he’ll go to a trade school with night classes instead of college

see Wilhelmsen-Langeland et al, Behav Sleep Med 2014.
Joe’s History

- Top of his class throughout grade school, a social & spunky kid
- Sleep and school performance began to deteriorate = age 13
- Resentful about pressure to “fit in,” worsening family conflicts
- Prefers sleeping in a very dark room, “hates” bright morning light
- Parents have tried threats, tipping his mattress so he falls off, etc.
- Not eligible for “accommodation” in school scheduling
- Sleeps 12-14 hours/day on weekends

Joe’s Sleep Schedule

<table>
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<tbody>
<tr>
<td>Bedtime</td>
<td>1 AM</td>
<td>Midnight</td>
<td>7 AM</td>
</tr>
<tr>
<td>Lights out</td>
<td>2 AM</td>
<td>1 AM</td>
<td>?</td>
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<tr>
<td>Time it takes to get to sleep?</td>
<td>1 hr</td>
<td>2 hrs</td>
<td>few min</td>
</tr>
<tr>
<td>Wake time</td>
<td>6:30 AM</td>
<td>6:30 AM</td>
<td>2 PM</td>
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<tr>
<td>Get up time</td>
<td>10 AM</td>
<td>7:30 AM</td>
<td>2 PM</td>
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</table>

How many times do you wake up on an average night? 0
How long does it take you to get back to sleep after waking up? n/a
How many naps do you take each day, and how long do they last? 0-1
Circadian Rhythm Disorders

- Delayed Sleep Phase Syndrome
  - Usually begins in adolescence
  - Preferred sleep phase is quite late, risking catastrophic effects on work or school

- Advanced Sleep Phase Syndrome
  - Abnormally early sleep period

From Principles and Practice of Sleep Medicine, 2nd Ed. pg 478
Timed Bright Light Exposure

- Be outdoors as early as possible after waking up in the morning for 30 min.
- The activity does not matter and you can be in the shade. Just getting your eyes exposed to ambient outdoor light is all that’s needed.
- Start with 7 days a week. You may be able to cut back when things are stable to maybe 4-5 times / wk.

Joe’s Rx*

*An enormous challenge treating him during the school year

- Set alarm, up at noon, immediately outdoors for 30-45 minutes
- Maintain this for 1-2 weeks, adjust length of time pm
- When stable & waking easier, advance wake time by 1 hr ➔ 5 AM
- Keep each advance in place long enough to achieve stability
- Do not advance more than 1 hr at a time
- Obviously, progress is slow
- Deviating even one day ➔ loss of most or all gains!

Joe’s Rx*: An enormous challenge treating him during the school year

- Set alarm, up at noon, immediately outdoors for 30-45 minutes
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- Keep each advance in place long enough to achieve stability
- Do not advance more than 1 hr at a time
- Obviously, progress is slow
- Deviating even one day ➔ loss of most or all gains!
Joe’s Rx – Additional Benefit?

- Timed administration of melatonin may effect on circadian rhythm
- Strength of melatonin dose may not matter
- Try administration of 1 mg 5 hrs â€œH5
- Each time morning rise time is advanced by 1 hr, timing of melatonin administration is advanced by 1 hr
- As gradual progress develops, it may be helpful to shorten the window of time between melatonin administration and HS to 4 hrs, then 3 hrs...
- Treatment is highly individualized...lots of trial and error

Mundey, K. SLEEP 2005;48(16)

Questions?

We sleep, but the loom of life never stops, and the pattern which was weaving when the sun went down is weaving when it comes up in the morning.

Henry Ward Beecher
RECOMMENDED READING?

*Fischer, R. Solve Your Child's Sleep Problems. 1991.*


REFERENCES


Joint Committee Statement. SLEEP 2005. SRS1-24A.


