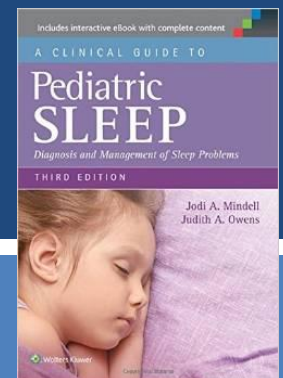
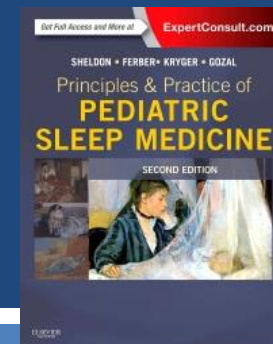


לילה... טוב?

הפרעות שינה בילדים ומתבגרים

גושן
GOSHEN

בריאות ורווחת הילד בקהילה
Community Child Health & Well Being
صحة ورعاية الطفل في المجتمع المحلي

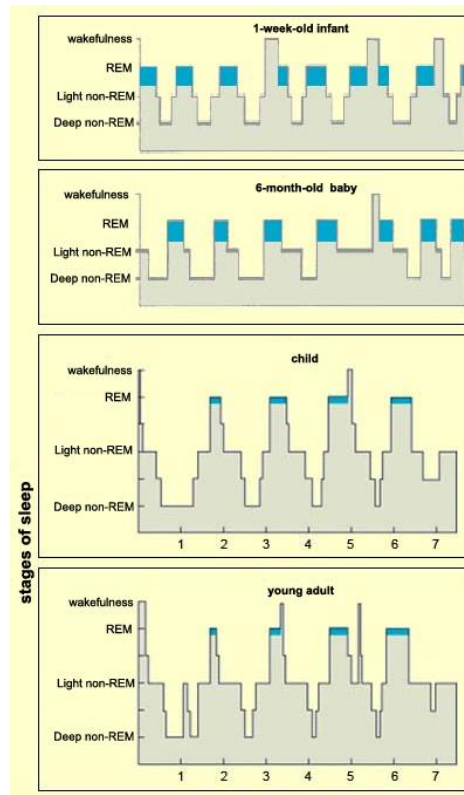


8/6/20

יואל רייטה, הדסה

Sleep - Definition

A reversible behavioral state of perceptual disengagement from and unresponsiveness to the environment



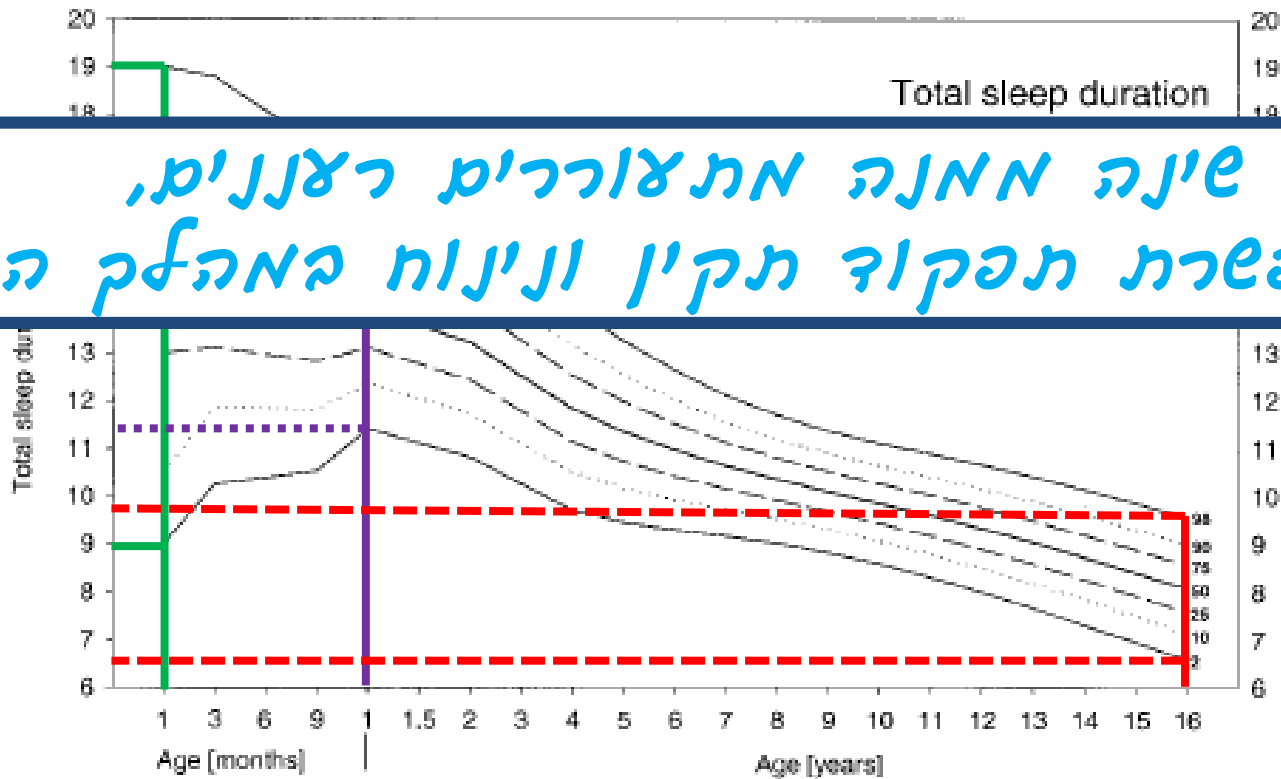
Sleep - Why?

Function Of Sleep Theories:

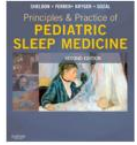
- Restoration theory
 - Sleep required for enhanced tissue growth & repair
 - NREM - body tissue repair
 - REM - brain tissue repair
- Evolutionary and adaptive theories
 - Sleep for enhanced survival
- Learning Theory
- Energy conservation theory
- Other theories:
 - Hypnotoxin theory
 - Motor & muscle rest



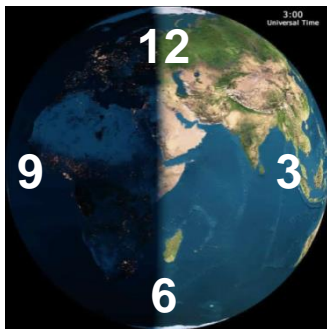
Sleep - How Much?



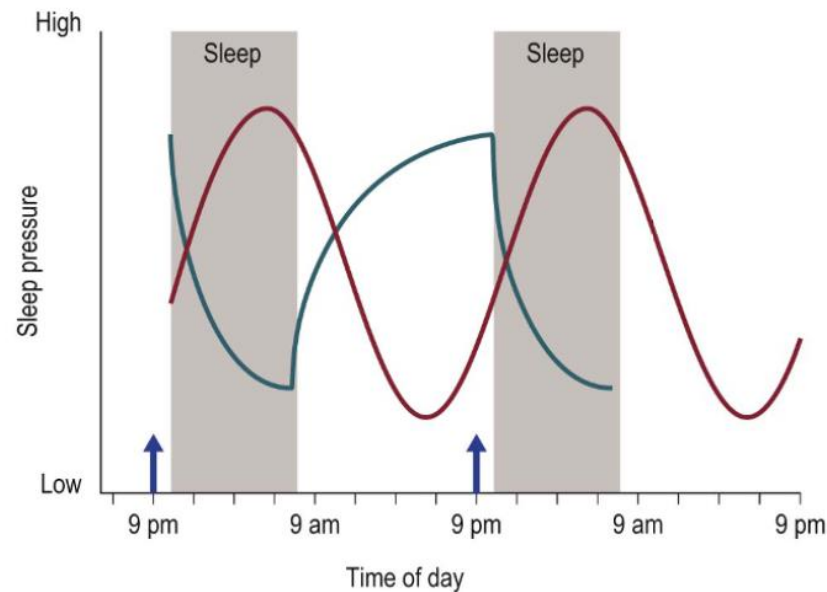
Sleep - When?



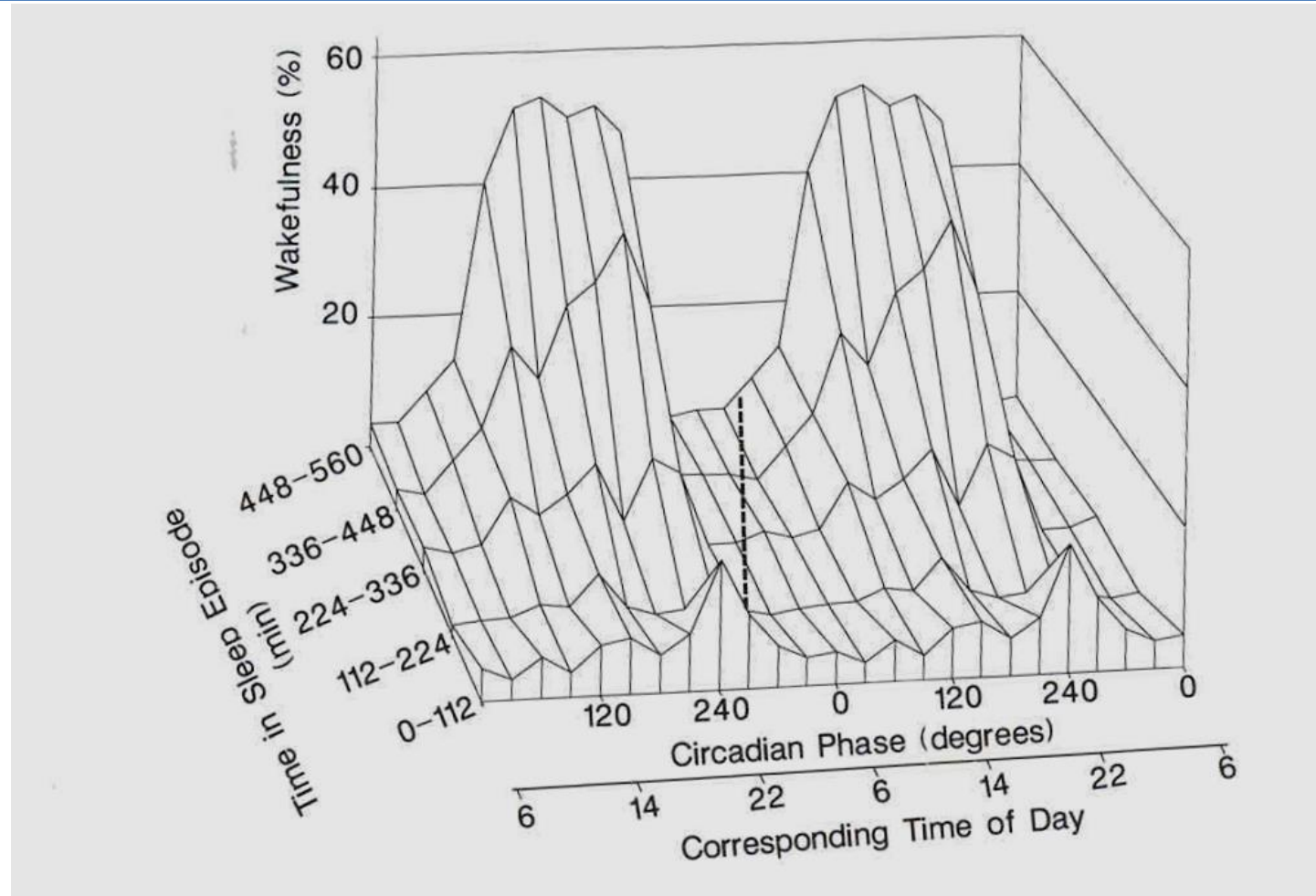
- The two process model of sleep regulation
 - ▣ Process S - Homeostatic process - sleep pressure - SWS
 - ▣ Process C - Circadian timing system - REM



melatonin



Sleep - When?



Sleep Medicine



Insomnia



Central Disorders of
Hypersomnolence



Circadian Rhythm
Sleep-Wake Disorders



Parasomnias



Sleep Related Breathing
Disorders



Sleep Related
Movement Disorders

Sleep In Infancy

- Behavioral Insomnia of Childhood
- Parasomnia



Sleep In Infancy

- Developmental milestones achieved during the first 6 months of life:
 - Sleep consolidation - the infants ability to sleep for a continuous periods during the night augmented by short daytime naps
 - Sleep regulation - the infants ability to control internal states of arousal to fall asleep without parental intervention (self soothe)

Sleep In Infancy

- Normal sleeping patterns:

- 10-19 → 12-13 hours per day

- Sleep episodes

- Breast fed 1-3 hours
 - Bottle fed 2-5 hours

- Day - night distribution

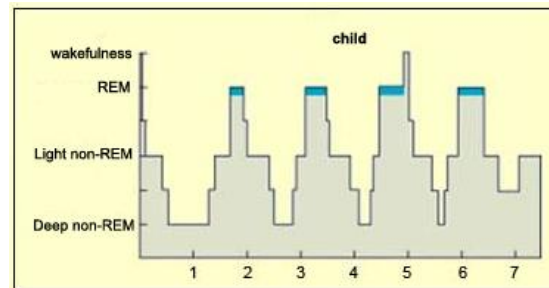
- 6 daytime hours
 - 8 nighttime hours

- Nighttime 9-10h
 - Daytime sleep 3-4h
 - Naps 1-4; $\frac{1}{2}$ -2h long



BIC Sleep Onset/Associations

Sleep associations are acquired behaviors. The child associates certain behaviors or environmental conditions with falling asleep



BIC - Limit Setting Type

- Inadequate enforcement of bedtime limits resulting in bedtime stalling or refusal
 - Typically ≥ 2 yo, capable of leaving bed
 - Examples:
 - Bedtime resistance - refusal to stay in bed/room
 - Curtain calls
 - Demanding to fall asleep in parents bed



BIC - Treatment

□ Prognosis - good - most methods & cases

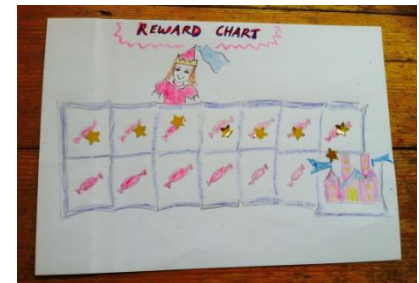
□ Strategies

- Consistency
- Positive reinforcement
- Avoid punishments
- Consequences



□ Improve sleep hygiene

- Light / dark cues
- Calm activity before bedtime
- Consistent, short, bedtime routine
- Break sleep associations - awake in bed
- Avoid caffeine (breast feeding)
- Avoid electronics



BIC - Treatment

□ Graduated extinction

- Child placed in bed TIRED BUT AWAKE, with parental return at preset intervals
- On returns - routine, neutral, minimal comforting

□ Timetables:

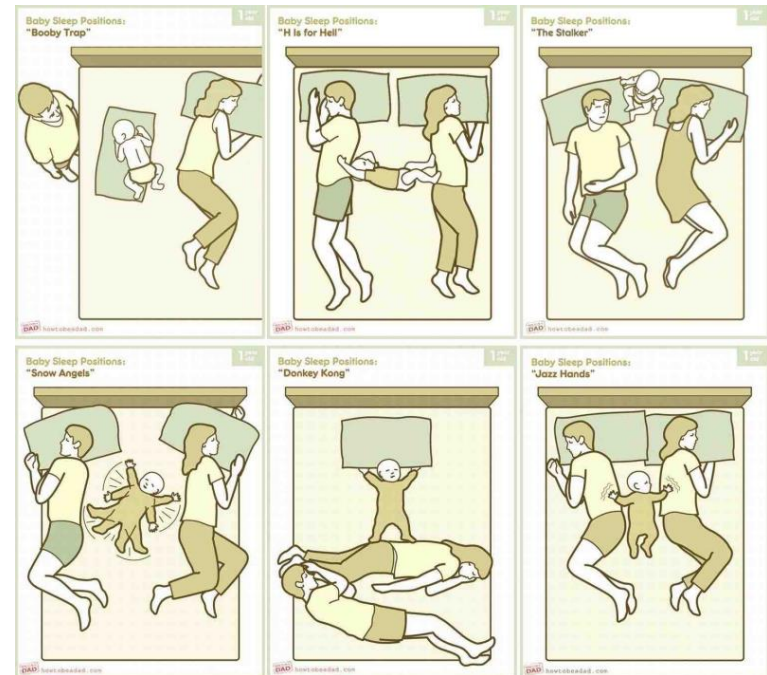
- 5→5→10 minutes
- Detailed:



חזרות נוספות	חזרה שלישית	חזרה שניה	חזרה ראשונה	לילה מספר
5	5	3	1	1
7	7	5	3	2
10	10	7	5	3
12	12	10	7	4
15	15	12	10	5
17	17	15	12	6
20	20	17	15	7

Co-sleeping

- Differentiate :
 - ▣ Lifestyle / cultural - conscious decision
 - ▣ Reactive
- Conventional medicine does not encourage co-sleeping:
 - ▣ Psychosocial/developmental effects
 - ▣ Increased SIDS risk
 - ▣ Increased breastfeeding



Co-sleeping



How the Rock 'n Play became a cult baby product — and why Fisher-Price is recalling it

The popular sleeper product has been connected to at least 32 infant deaths, according to Consumer Reports.



שימוש בטוח במנשאים לתינוקות

נייר עמדה



Sleep In Adolescents

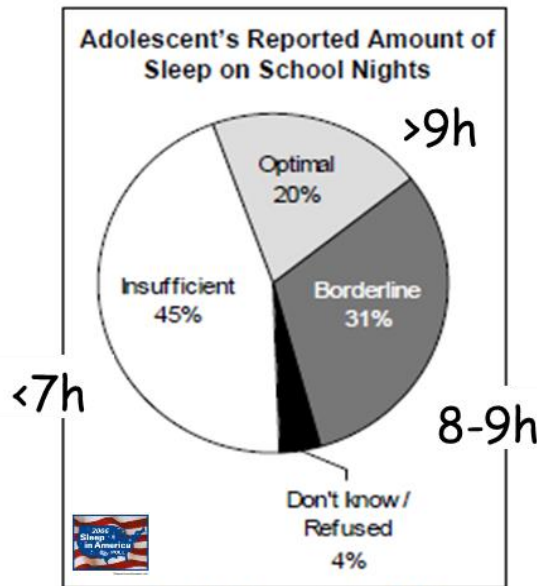
- Insufficient Sleep
- Delayed Sleep Phase Disorder
- Poor Sleep Hygiene



Insufficient Sleep

Sleep parameter	Tanner stage				
	1 (n = 12)	2 (n = 10)	3 (n = 10)	4 (n = 8)	5 (n = 7)
Total sleep time (min)					
Mean	542	545	550	544	536

No change!
 ~9 hours (9:20)

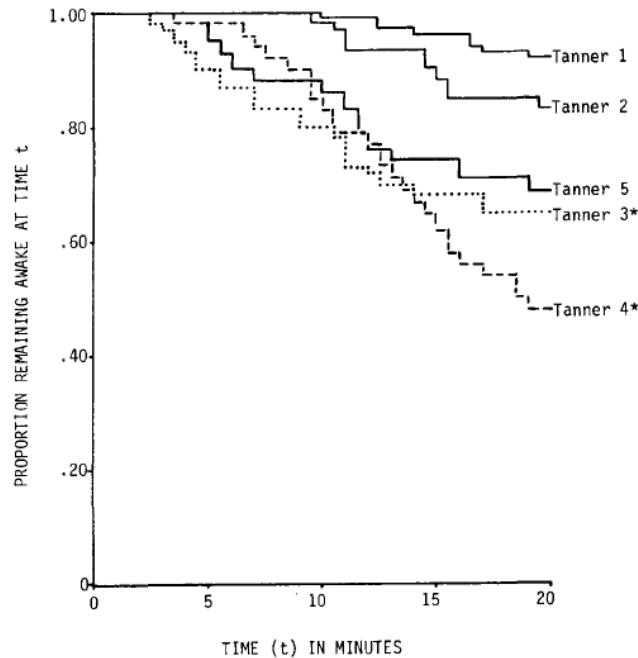


Bedtime (hr:min)	22:58 ± 01:25
Sleep latency (min)	26 ± 26
Wake-up time (hr:min)	06:45 ± 00:32
Sleep duration (hr:min)	7:23 ± 1:07

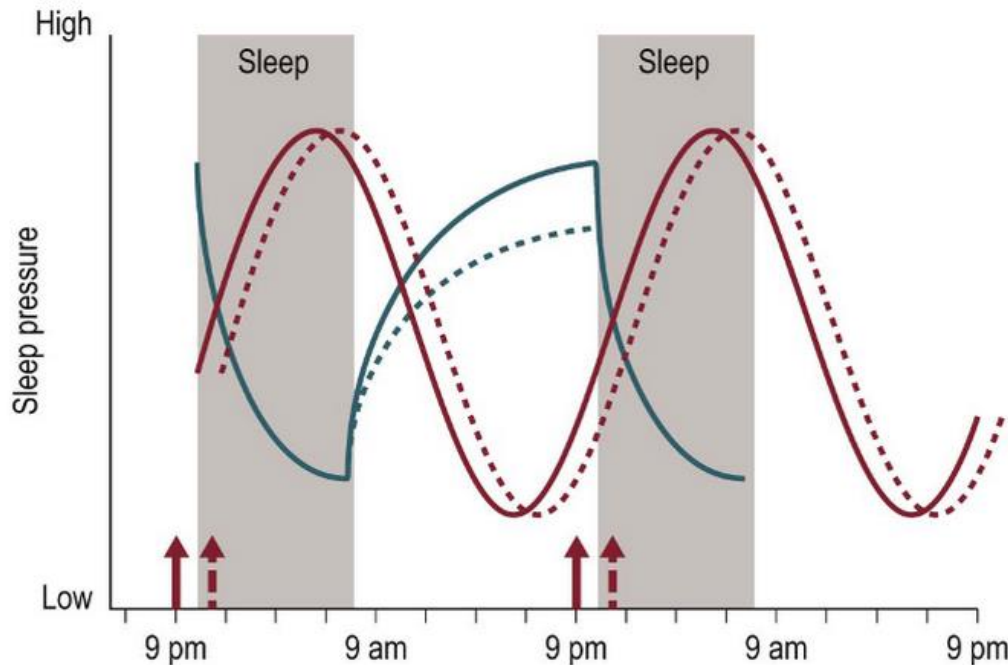
Insufficient Sleep

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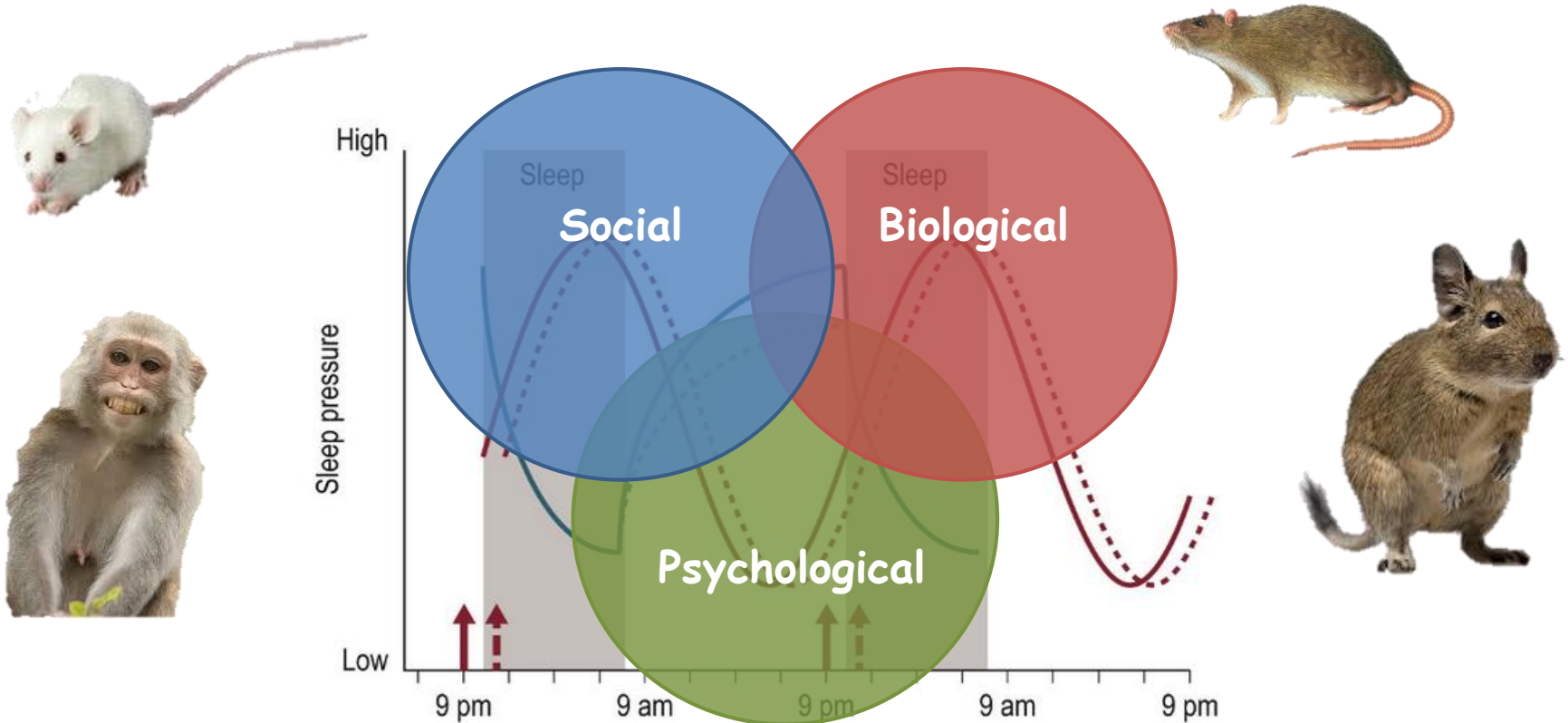
Delayed Sleep Phase Disorder



	Species					
	human (<i>Homo sapiens</i>)	rhesus monkey (<i>Macaca mulatta</i>)	degu (<i>Octodon degus</i>)	laboratory rat (<i>Rattus norvegicus</i>)	laboratory mouse (<i>Mus musculus</i>)	fat sand rat (<i>Psammomys obesus</i>)
Magnitude of delay	1-3 h	2 h	3-5 h	1-4 h	1 h?	0-3 h under a long photoperiod*, 10-14 h under a short photoperiod



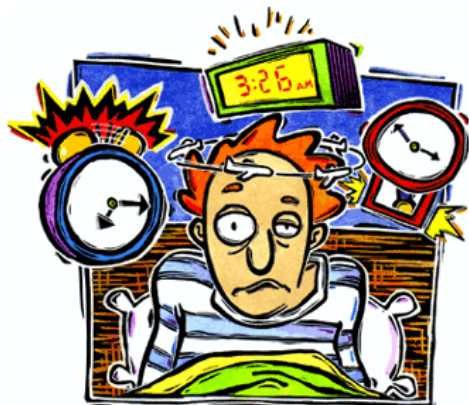
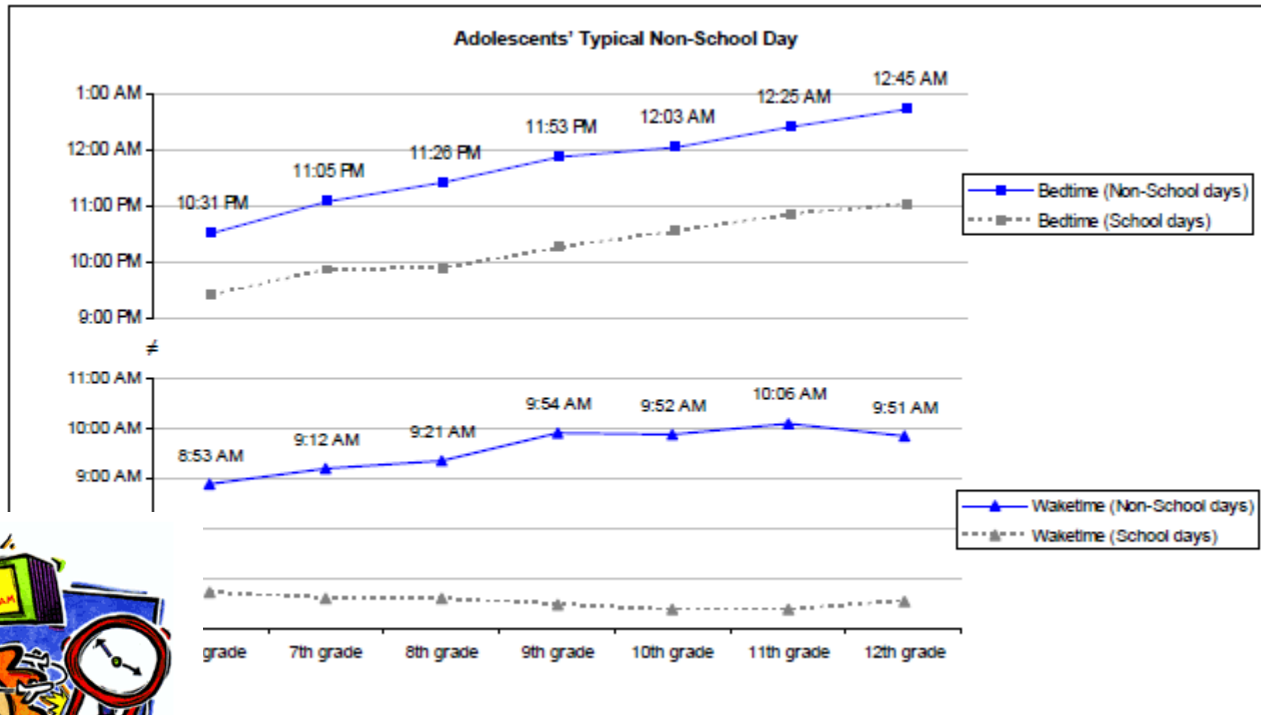
Delayed Sleep Phase Disorder



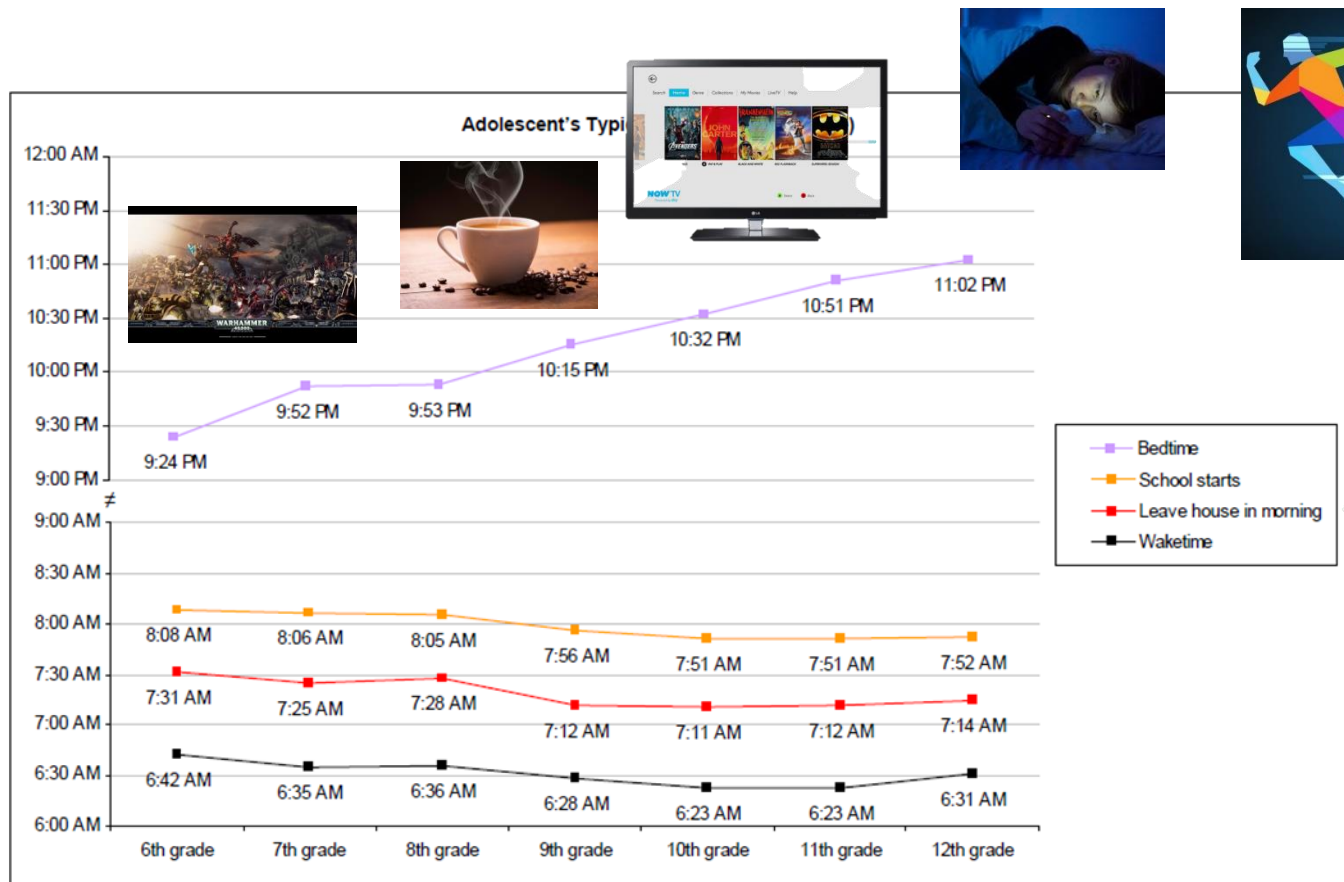
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Magnitude of delay	1-3 h	2 h	3-5 h	1-4 h	1 h?	0-3 h under a long photoperiod*, 10-14 h under a short photoperiod



Delayed Sleep Phase Disorder



Poor Sleep Hygiene



Poor Sleep Hygiene - Caffeine

- A xanthine derivative
- Mechanism of action - nonspecific adenosine receptor antagonism
- Adenosine is an endogenous sleep-promoting substance with neuronal inhibitory effects
- $T_{1/2}$ - 3.5-5 hours

- Increased mental alertness, a faster and clearer flow of thought
- Increased wakefulness
- Decreased fatigue
- Likely decreases:
 - Stroke, mortality, cardiac mortality, diabetes, cancer (BCC, melanoma, head & neck, prostate, endometrium, breast)
- Decreased progression of disease

- Increased restlessness
- Sleep onset delay
- Decreased deep sleep - brain development
- Palpitations, HTN, GERD, urine output
- Heavy consumption causes - agitation, anxiety, tremor, rapid breathing, insomnia
- Withdrawal symptoms

Poor Sleep Hygiene - Technology

Exploring the complex pathways among specific types of technology, self-reported sleep duration and body mass index in UK adolescents

T Arora^{1,2}, S Hussain¹, K-B Hubert Lam³, G Lily Yao¹, G Neil Thomas^{4,5} and S Taheri^{1,2}

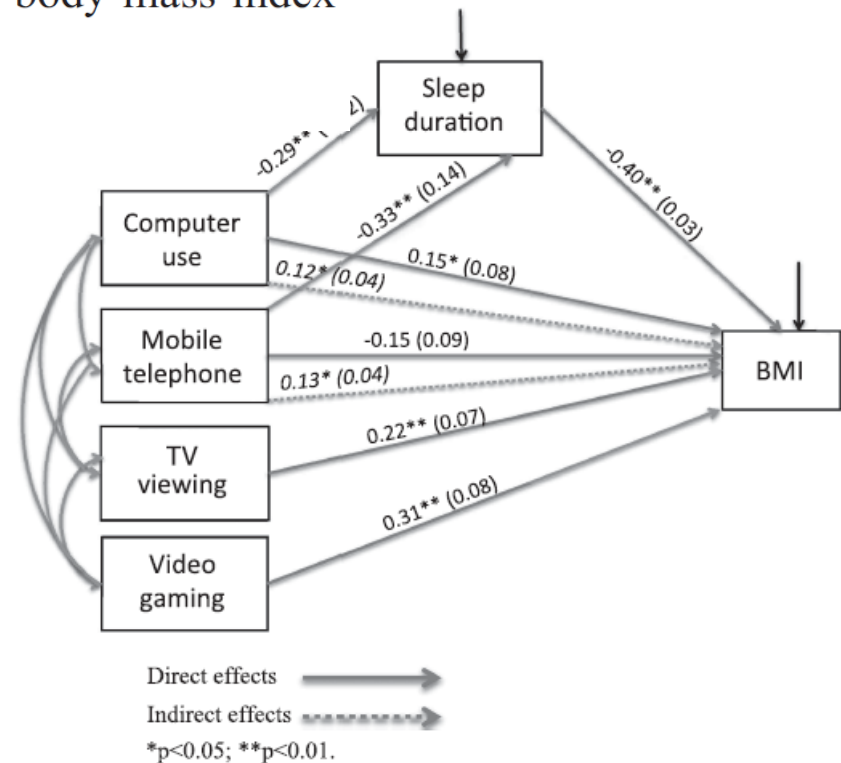
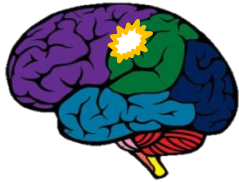


Figure 1. Path analysis theoretical model. *P<0.05; **P<0.01. Data are presented as standardised coefficients (standard errors).

Consequences

Associated w/ depression, anxiety & suicidal ideation



Cognitive impairment
Poor school performance

Risk taking behavior & compromised decision making
Drowsy driving Substance abuse



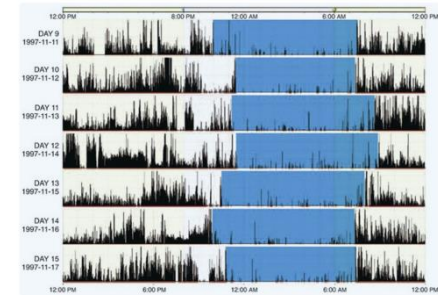
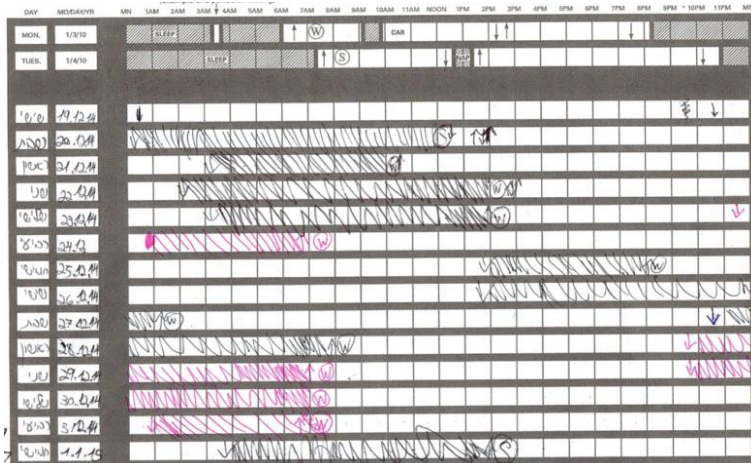
Excessive daytime sleepiness
Tardies & unexcused absences



Physical consequences:
Obesity
Immune dysfunction
Metabolic dysfunction

Diagnosis

History, Sleep diaries, Actigraphy



Treatment

- ▣ Reinforce the need for at least 8h sleep
- ▣ Improve sleep hygiene
- ▣ Adhere to a regular sleep/wake schedule (including weekends)

Time for Bed: Parent-Set Bedtimes Associated with Improved Sleep and Daytime Functioning in Adolescents

Michelle A. Short, BBehavSci(Hons)¹; Michael Gradisar, PhD¹; Helen Wright, PhD¹; Leon C. Lack, PhD¹; Hayley Dohnt, PhD¹; Mary A. Carskadon, PhD²

Earlier Parental Set Bedtimes as a Protective Factor Against Depression and Suicidal Ideation

James E. Gangwisch, PhD¹; Lindsay A. Babiss, BA²; Dolores Malaspina, MD³; J. Blake Turner, PhD⁴; Gary K. Zammit, PhD⁵; Kelly Posner, PhD⁴

Treatment

- ▣ Reinforce the need for at least 8h sleep
- ▣ Improve sleep hygiene
- ▣ Adhere to a regular sleep/wake schedule (including weekends)

- ▣ DSPD treatment:
 - Sleep hygiene measures
 - Improve light/dark cues
 - Low dose melatonin (0.3-0.5mg)
 - Chronotherapy

Parasomnias



Parasomnia - Definition

- Behavioral phenomena that occur out of sleep and include
 - Sleep talking (somniloquy)
 - Sleep walking (somnambulism)
 - Night terrors
 - Nightmares
 - Nocturnal enuresis
 - Etc.

Incidence and Remission of Parasomnias among Adolescent Children in the Tucson Children's Assessment of Sleep Apnea (TuCASA) Study

Oscar Furet, RN M.P.H.,
Arizona Arthritis Center, University of Arizona, Tucson, AZ

James L. Goodwin, Ph.D., and
Arizona Respiratory Center, University of Arizona, Tucson, AZ

Stuart F. Quan, M.D.
Arizona Respiratory Center, University of Arizona, Tucson, AZ. Division of Sleep Medicine,
Brigham and Womens Hospital and Harvard Medical School, Boston, MA

- A prospective cohort
- 503 → 350 children
- Enrolled 6-11 yo
- F/U - +5 y's

Incidence, Prevalence & Remission

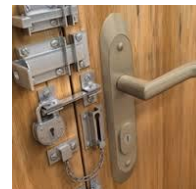
Parasomnia	Prevalence Time 1 (Entire Cohort) ^a	
	N	%
Enuresis	37/503	7.4
Night Terrors	13/503	2.6
Sleep Talking	60/503	11.9
Sleepwalking	6/503	1.2

Time 2					
Prevalence ^c		Remission ^d		Incidence ^e	
N	%	N	%	N	%
8/350	2.3	17/24	70.8	1/326	0.3
2/349	0.6	9/9	100.0	2/340	0.6
32/350	9.1	24/37	64.8	19/313	6.0
5/350	1.4	1/2	50.0	4/348	1.1

Parasomnia

- No work-up required unless one suspects an underlying trigger:
 - OSA
 - Nocturnal seizures
 - Psychiatric disease w/nocturnal dissociative disorder
- Management:
 - Reassurance
 - Ensure safety (locks/bells/alarms/gates)
 - Guide quietly back to bed
 - Stress reduction, regular routine & adequate sleep
 - Rarely - clonazepam (topamax)

**IF FOUND
PLEASE RETURN
TO BEDROOM**



Central Disorders of HYPERMORNOLENCE



Hypersomnolence



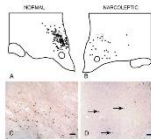
- EDS - excessive daytime sleepiness:
the inability to stay awake and alert during the major waking episodes of the day resulting in periods of irrepressible need for sleep or unintended lapses into drowsiness or sleep

Children may present paradoxically with inattentiveness, emotional lability, hyperactivity or decreased performance in school

Hypersomnia - DD

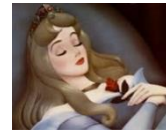
Narcolepsy

Type 1 / 2



Idiopathic hypersomnia

Kleine Levine Syndrome



Hypersomnia d/t
Psychiatric d.o.



Hypersomnia d/t
medical d.o.



Insufficient sleep syndrome



Long Sleeper

Narcolepsy (type I)

- A chronic disorder that presents with a tetrad of symptoms:
 - ▣ Excessive daytime sleepiness (EDS)
 - ▣ Cataplexy
 - ▣ Hypnagogic/hypnopompic hallucinations
 - ▣ Sleep paralysis

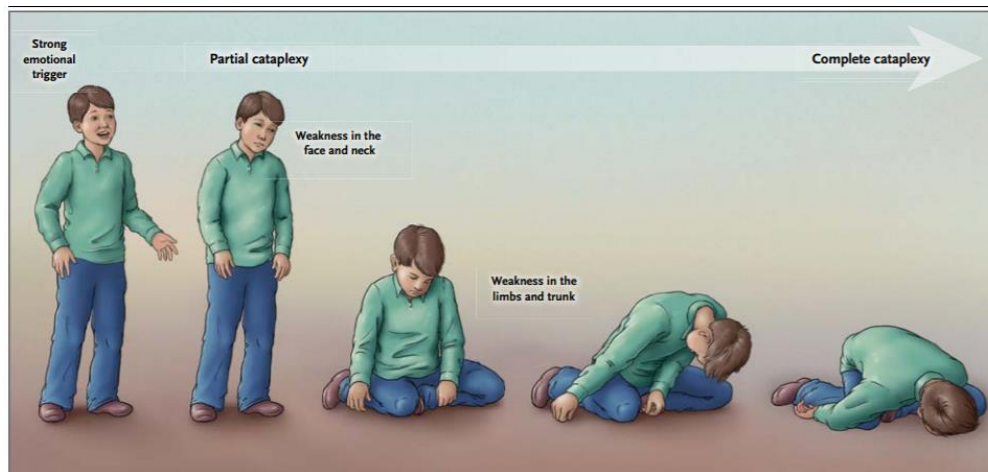


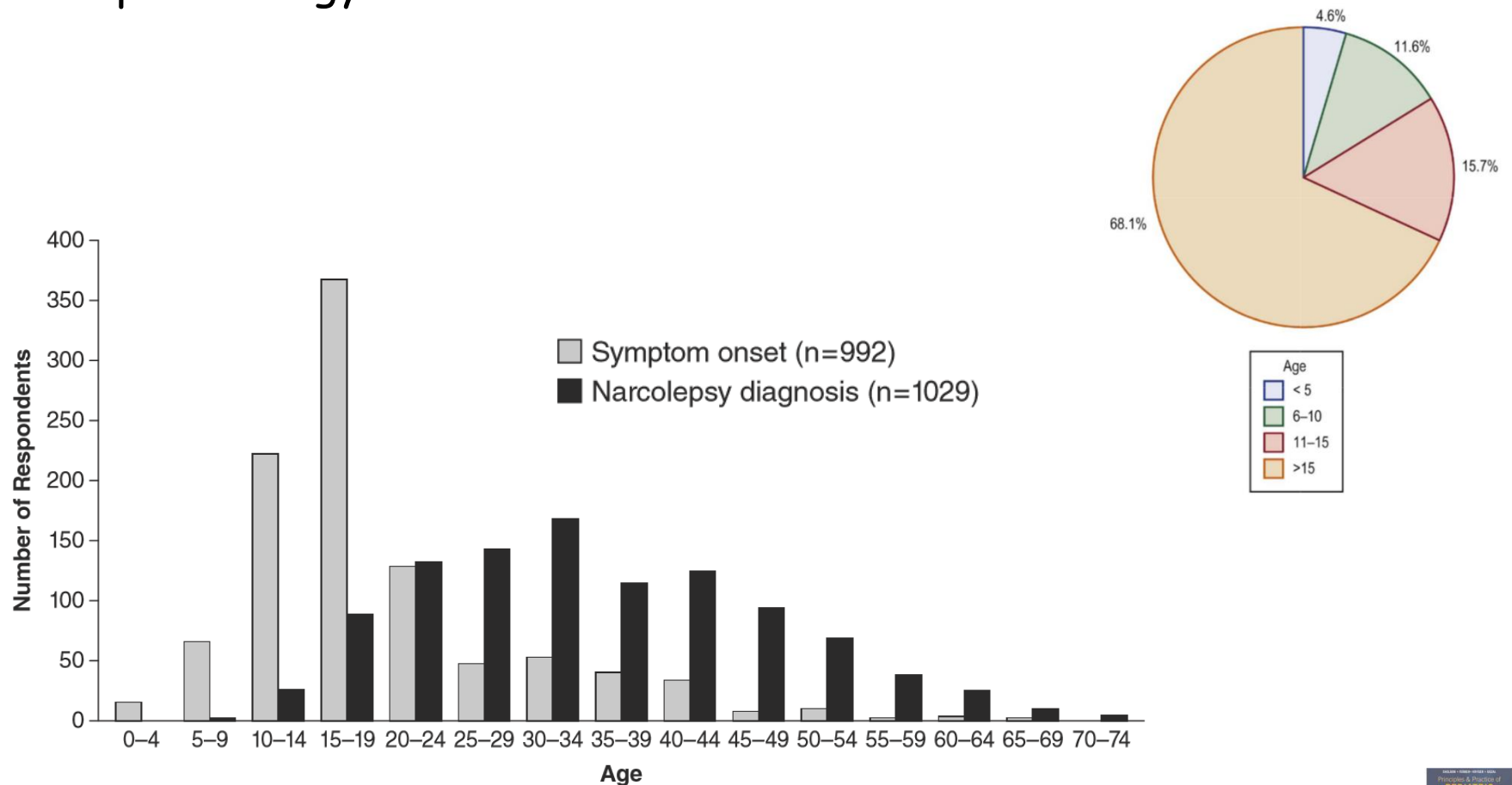
Figure 1. Cataplexy.

Cataplexy is characterized by sudden, emotionally triggered episodes of muscle weakness with preserved consciousness. These episodes typically begin with weakness of the muscles of the face and neck that then spreads to involve the muscles of the limbs and trunk.



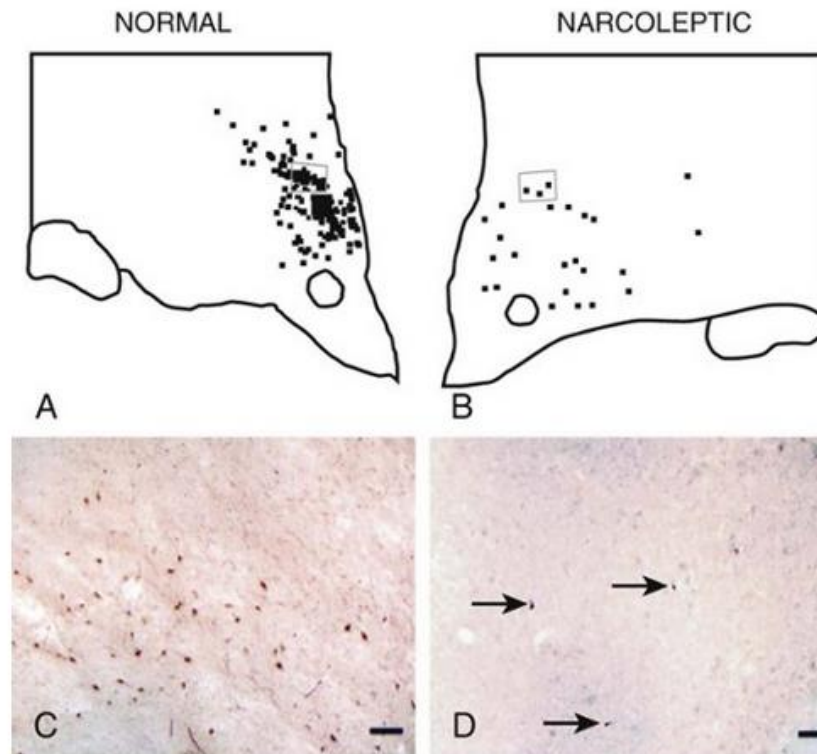
Narcolepsy (type I)

□ Epidemiology:

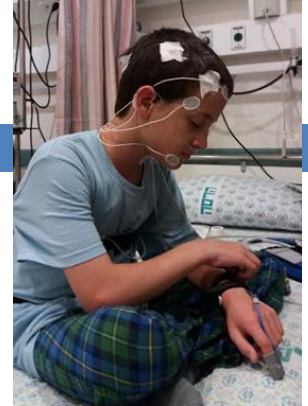


Narcolepsy

- Pathogenesis
 - ▣ Destruction of hypocretin (orexin) secreting cells in the posterior hypothalamus

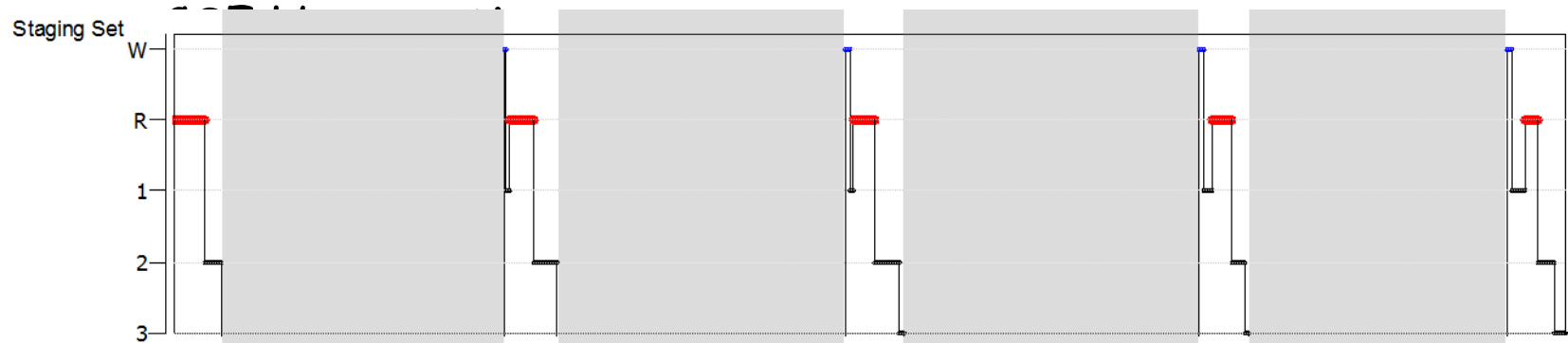


Narcolepsy (type I)



□ Diagnosis

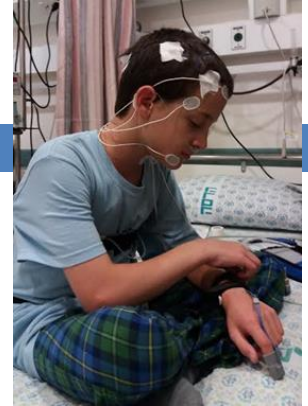
- ▣ Polysomnography (PSG)
- ▣ MSLT - $MSL \leq 8\text{min}$; ≥ 2 SOREMPs



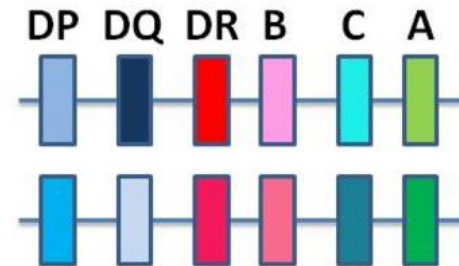
Narcolepsy (type I)

□ Diagnosis

- ▣ Polysomnography (PSG)
- ▣ MSLT - $MSL \leq 8\text{min}$; ≥ 2 SOREMPs
- ▣ CSF Hypocretin
- ▣ Association w/ HLA DQB1*06:02



ADAM

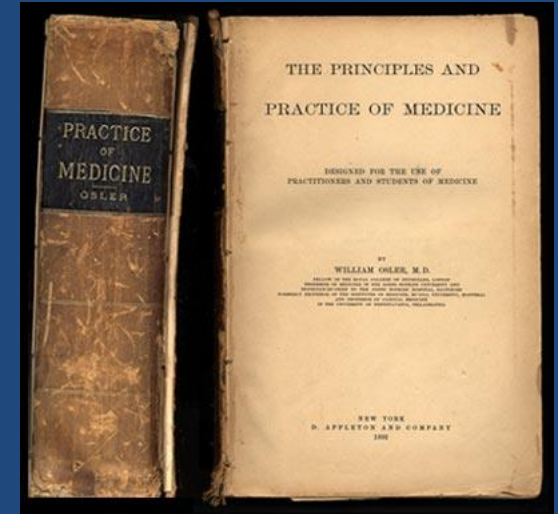


Kleine-Levin Syndrome

- Relapsing-remitting episodes
 - Episode duration - Median 10d
 - Interval - Median 4m
 - Median length of disease 13y
- Hypersomnia (~18h/day)
- Cognitive disturbances
- Behavioral disturbances
 - Hypersexuality
 - Hyperphagia (~4.5kg Wt increase)
- No abnormality between episodes



“...At night the child’s sleep is greatly disturbed, the respirations are loud and snorting, and there is sometimes prolonged pauses, followed by deep, noisy, inspiration... In long standing cases, the child is very stupid looking, responds slowly to questions, and maybe sullen and cross ... It is impossible for them to fix attention for long...”



Pediatric OSA

OSA

Screening - Does the child snore? YES + any of:

History

- Frequent snoring (≥ 3 nights/wk)
- Labored breathing during sleep
- Gasps/snorting noises/observed episodes of apnea
- Sleep enuresis (especially secondary enuresis)^a
- Sleeping in a seated position or with the neck hyperextended
- Cyanosis
- Headaches on awakening
- Daytime sleepiness
- Attention-deficit/hyperactivity disorder
- Learning problems

Physical examination

- Underweight or overweight
- Tonsillar hypertrophy
- Adenoidal facies
- Micrognathia/retrognathia
- High-arched palate
- Failure to thrive
- Hypertension



Pedi. Obs. SDB - Epidemiology

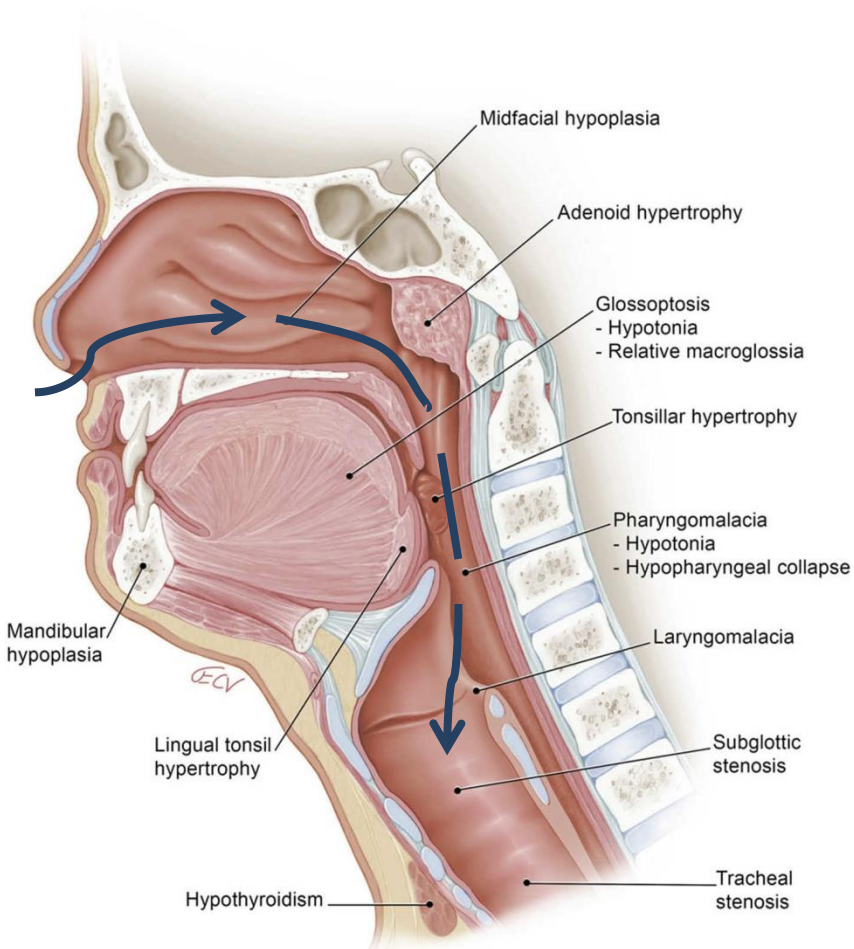
➤ Prevalence

- Snoring - 10%
- OSAS - 2-3%; in obese adolescents 13-59%

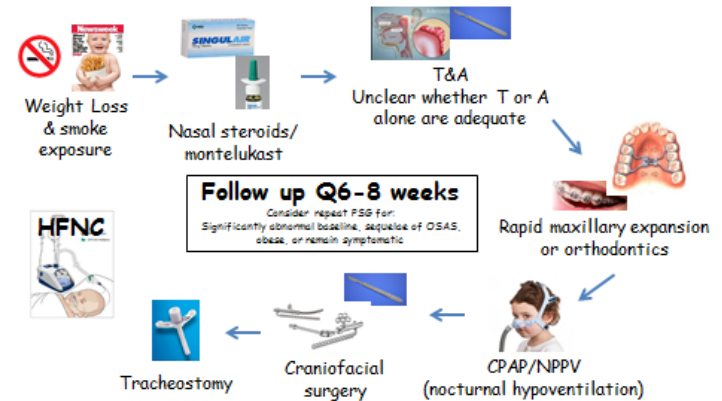


Young, 2002
Van Hoorenbeeck, 2013
Guillemainault, 2012

OSAS



OSAS - Stepwise Treatment



Consequences

➤ Lack of treatment consequences:



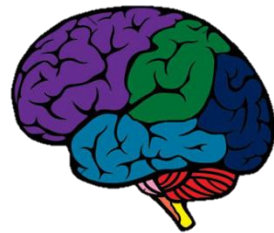
HTN
Pulmonary HTN



Impaired QOL



The Metabolic synd



Excessive daytime sleepiness
ADD/ADHD
Academic difficulties
Behavioral difficulties

Nocturnal enuresis
Failure to thrive

Smoke Exposure



Associations Between Secondhand Smoke Exposure and Sleep Patterns in Children

AUTHORS: Kimberly Yolton, PhD,^a Yingying Xu, MS, MA,^a Jane Khoury, PhD,^b Paul Succop, PhD,^c Bruce Lanphear, MD, MPH,^a Dean W. Beebe, PhD,^a and Judith Owens, MD^f

Snore-Associated Sleep Fragmentation in Infancy: Mental Development Effects and Contribution of Secondhand Cigarette Smoke Exposure

Hawley E. Montgomery-Downs, PhD^a, David Gozal, MD^b

PREDICTORS OF OSA SEVERITY IN ADENOTONSILLECTOMY CANDIDATES

<http://dx.doi.org/10.5665/sleep.3394>
Predictors of Obstructive Sleep Apnea Severity in Adenotonsillectomy Candidates
Tanya G. Weinstock, MD¹; Carol L. Rosen, MD²; Carole L. Marcus, MBBS³; Susan Garetz, MD⁴; Ron B. Mitchell, MD⁵; Raouf Amin, MD⁶; Shalini Paruthi, MD⁷; Eliot Katz, MD⁸; Raanan Arens, MD⁹; Jia Weng, MS¹⁰; Kristie Ross, MD²; Ronald D. Chervin, MD, MS¹⁰; Susan Ellenberg, PhD¹¹; Rui Wang, PhD¹; Susan Redline, MD, MPH¹

Snoring in the first year of life

EA Mitchell and JMD Thompson

Sleep-Disordered Breathing in 3,680 Greek Children

Athanasios G. Kaditis, MD,^{1*} Jonathan Finder, MD,² Emmanouel I. Alexopoulos, MD,¹ Konstantinos Starantzis, MD,¹ Kalliopi Tanou, MD,¹ Stella Gampeta, MD,¹ Eleftherios Agorogiannis, MD,¹ Sofia Christodoulou, MD,¹ Anastasia Pantazidou, MD,¹ Konstantinos Gourgoulialis, MD,¹ and Paschalis Adam Molyvdas, MD¹

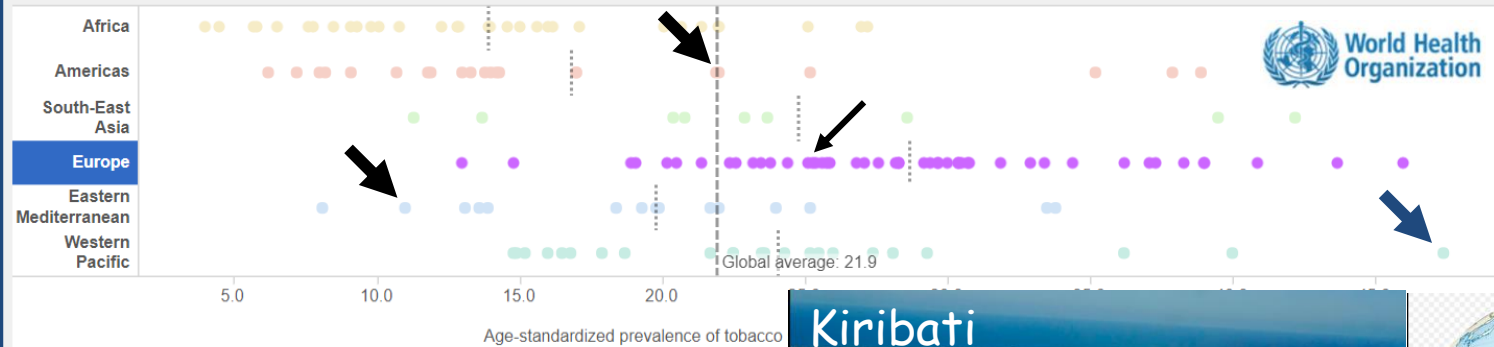
The Association Between Secondhand Smoke and Sleep-Disordered Breathing in Children: A Systematic Review

Sebastian M. Jara, BS; James R. Benke, BS; Sandra Y. Lin, MD; Stacey L. Ishman, MD, MPH

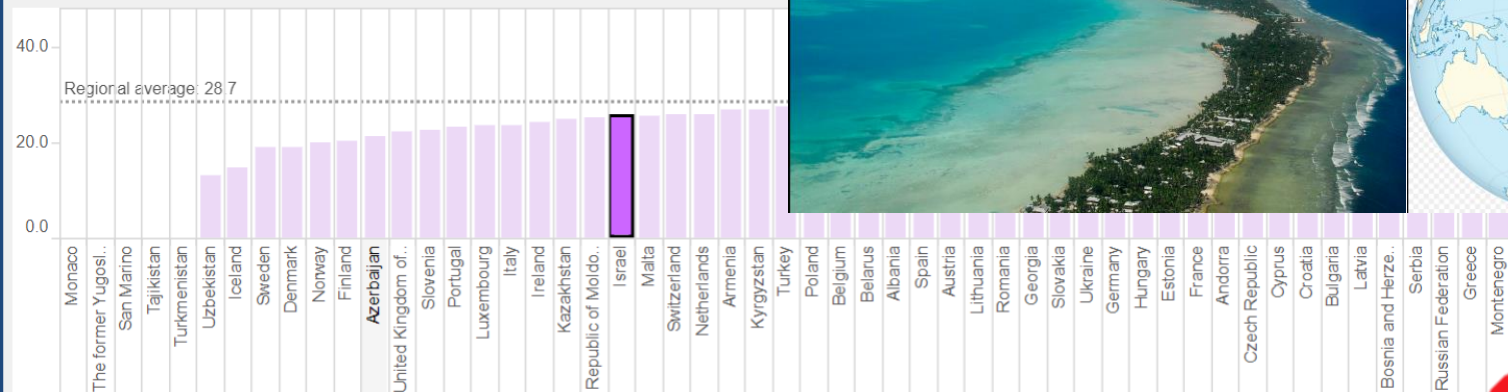


Smoke Exposure

Age-standardized prevalence of tobacco smoking among persons 15 years and older (%), by WHO region, 2016



Distribution by country (in selected WHO region) mouse-over the y-axis

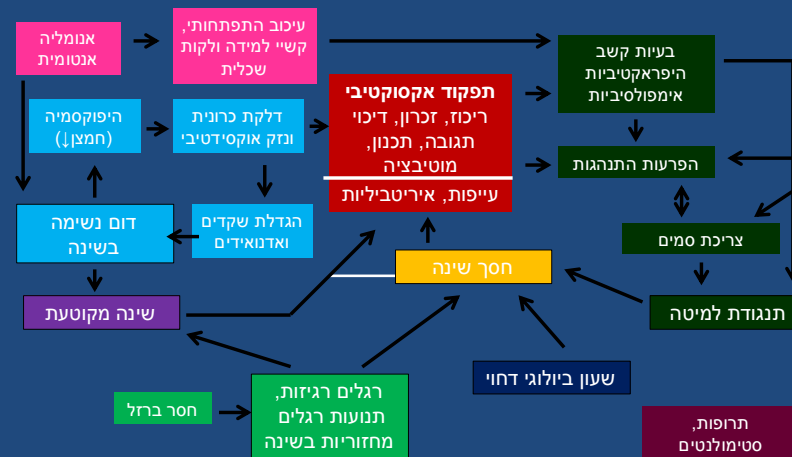


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הפרעות שינה והפרעת קשב וריכוז



הפרעות שינה והפרעת קשב וריכוז

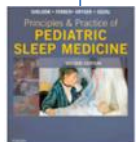
- סוביקטיבית - 25-50% מההורים לילדים עם ADD/ADHD מדווחים על בעיות שינה
- במחקרים שונים:

- שינוי משק השינה משק שבוע בקני 7-11 ש':

- הארכת השינה ב-27 דק' עליה בערנות, השליטה ברגשות ובהתנהגות חסרת מנוחה אימפולסיבית
- הארכת השינה ב-54 דק', החמרה ב...

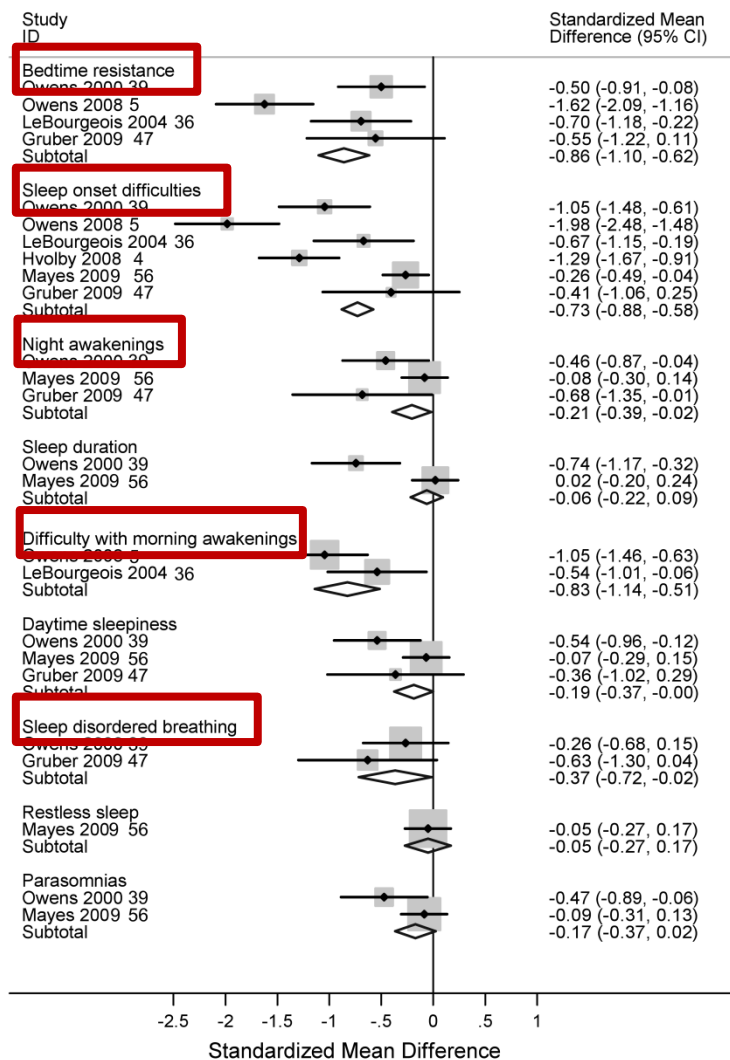
- בקני 5-7 ש', עם דומ נשימה, היפראקטיביות נמצאה ב:

- 26% מהילדים עם דומ נשימה קל
- 5% מהילדים עם דומ נשימה בינוני - קשה
- מסקנת החוקרים - דומ נשימה קשה מביא לילדים לתאריטי, קל...



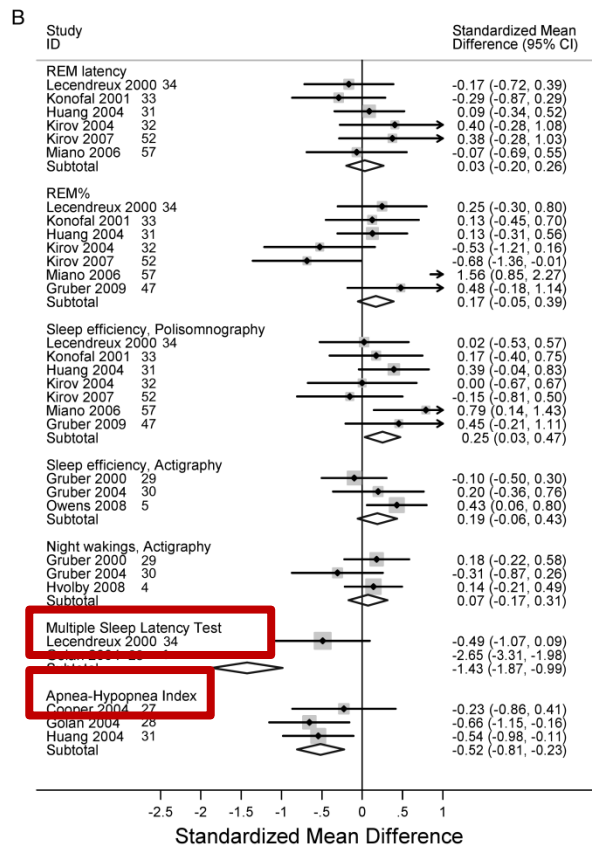
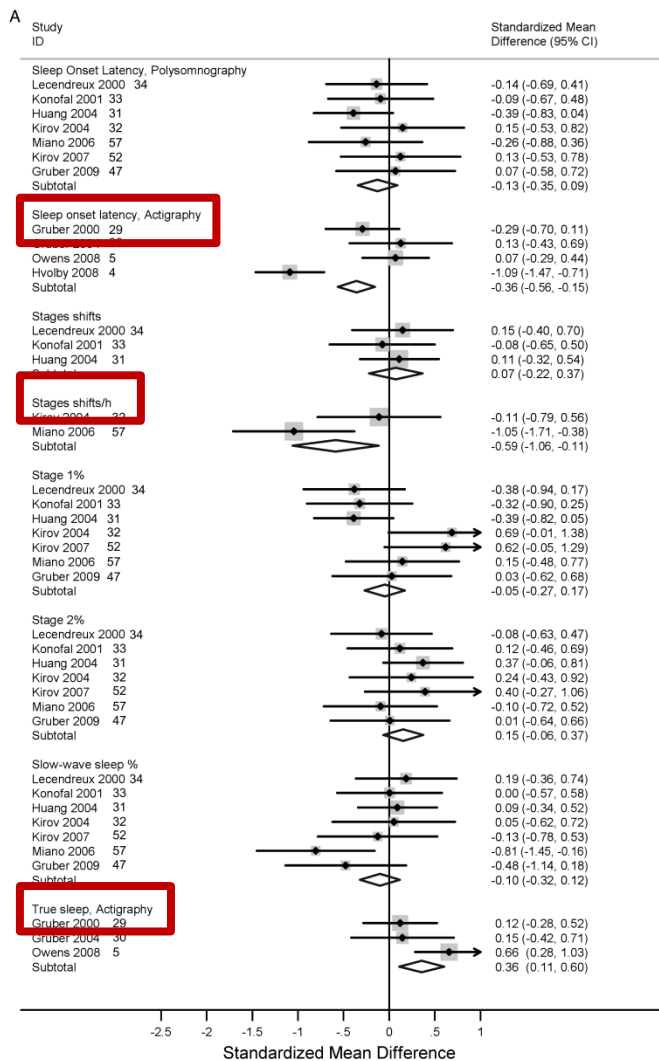
הפרעות שינה והפרעת קשב וריכוז

מטא-אנליזה של
מחקרים
סובייקטיביים

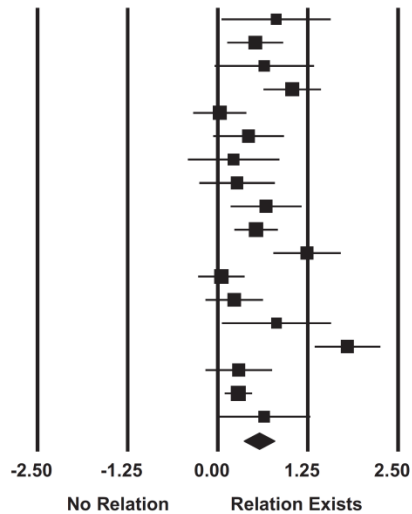


הפרעות שינה והפרעת קשב וריכוז

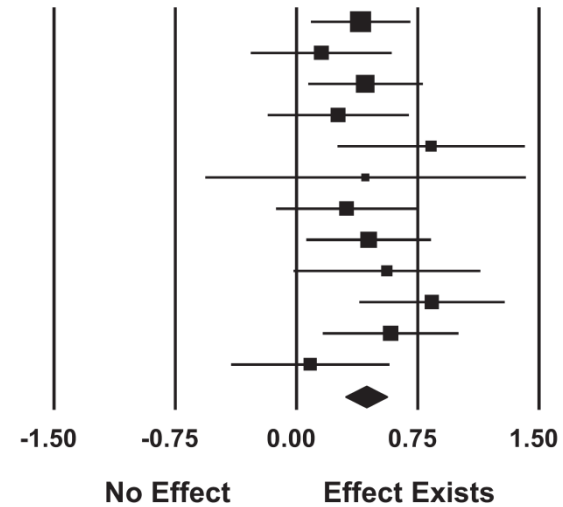
מטא-אנליזה של מחקרים אוביקטיביים



הפרעות שינה והפרעת קשב וריכוז

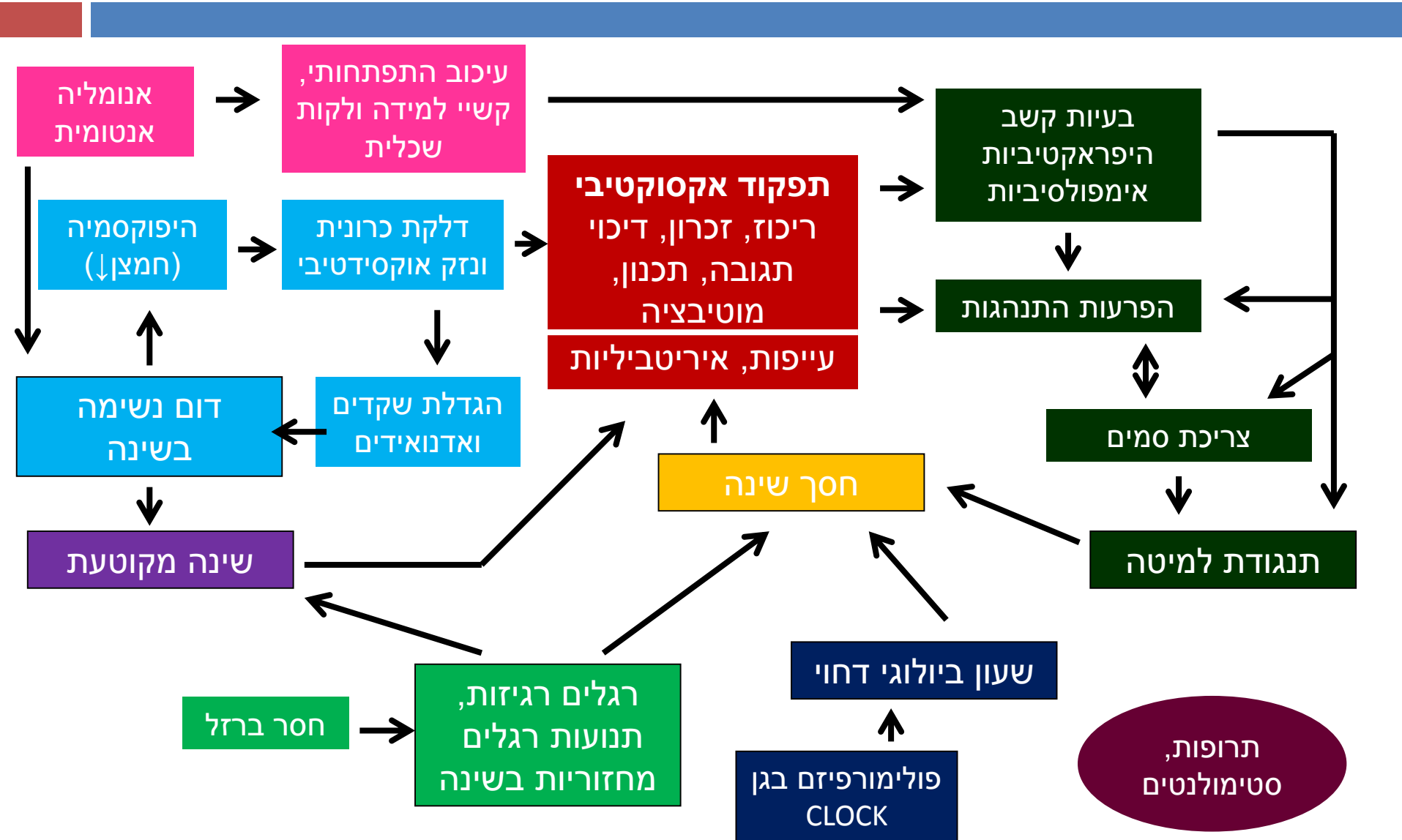


קשר בין תלונות ADHD ותלונות הפרעות נשימה בשינה



השפעת ניתוח T&A על תלונות ADHD

הפרעות שינה והפרעת קשב וריכוז



שנה היא קורונה



Boston-based study tracks sleep patterns during coronavirus pandemic

65 Shares WCVB 5 Updated: 5:29 PM EDT Apr 29, 2020



PANDEMIC

- Southern California organizations seek weekly assistance for workers in state illegally: report
- Ex-WHO official says coronavirus not increasing in reopened spots: 'It's as though something has changed'
- Wearing a face mask can reduce coronavirus transmission by up to 75 percent, study says

Coronavirus negatively impacting sleep habits, new study reveals

CORONAVIRUS · Published April 16 · Last Update April 17

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Coronavirus: How to get to sleep during lockdown

By Manish Pandey
Newsbeat reporter

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IQ score	Percentage
55	0.1%
70	1.9%
85	14%
100	34%
115	14%
130	1.9%
145	0.1%

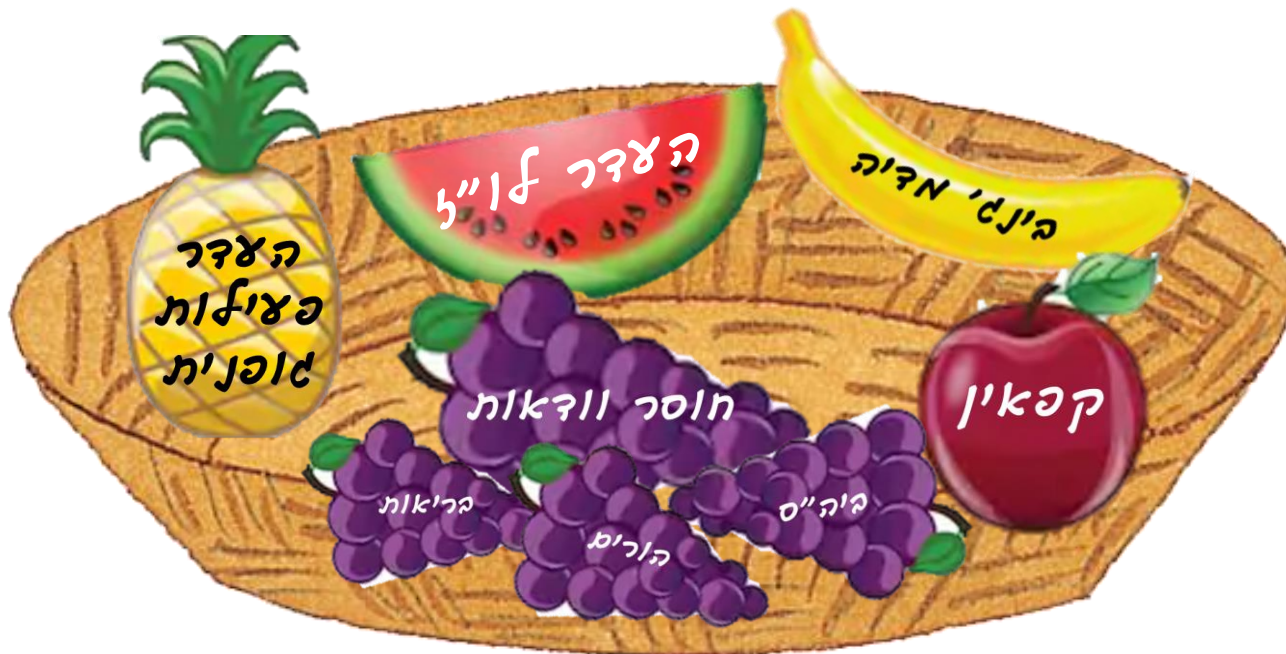
The Science Behind Your Weird Coronavirus Dreams (And Nightmares)

COVID Related Sleep Disorder

Loss of circadian entrainment

Behavioral insomnia

Parasomnias (nightmares, enuresis)



סיכום:



- ❖ הפרעות שינה נפוצות באיז' הילדות ובאיז' ההתבגרות
- ❖ חלק מהביטויים מופיע דוקא במהלך היום:
 - ❖ ישנוניות יתר
 - ❖ הפרעות קשה וריכול
 - ❖ שינויים במצב הרוח
 - ❖ תפקוד קואניטיבי ירוד
 - ❖ וצוד....

- ❖ המרכז לרפואת שינה – מרפאה ומעבדת השינה – הדסה צ'ין כרמ
 - ❖ לימון תורית הדסה – 02-5842111
 - ❖ מלכירות המעבדה – חלית – 02-6779539
 - ❖ יואל רייטר – 050-5935635
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