

Sleeping disorders in Family Practice

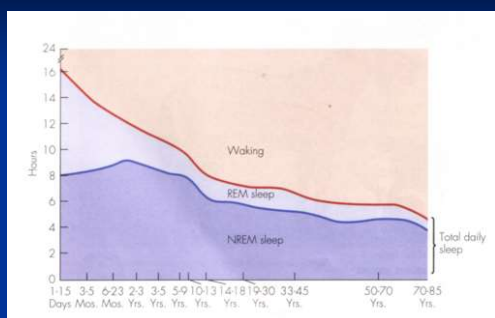
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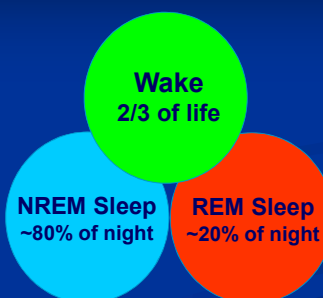
Why do we sleep?

Repair and Restoration Theory

- sleep enables the body and brain to repair after activity during the day – homeostatic balance
- memory
- sleep deprivation leads to irritability, impaired concentration and hallucinations
- BUT, how much we sleep does not depend on how much we worked that day



Sleep Stages



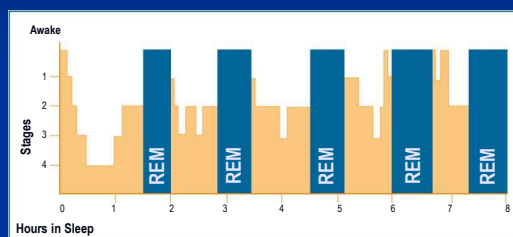
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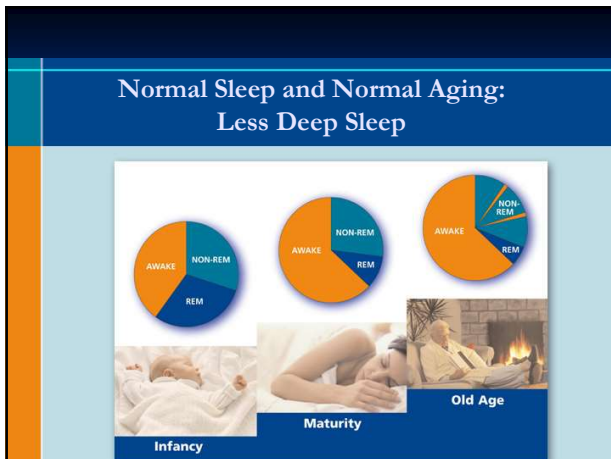
Stages of sleep

1. NREM Sleep
 - A. Stage 1
 - B. Stage 2
 - C. Stage 3
 - D. Stage 4
2. REM Sleep

5

The Sleep Cycle in Adults





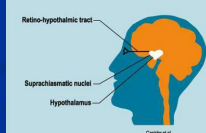
Sleep disorders (ICSD 3)

1. Insomnia.
2. Sleep Related Breathing Disorders.
3. Hypersomnia.
4. Circadian Rhythm Sleep Disorder.
5. Parasomnia.
6. Sleep related Movement Disorder.

8

Normal Sleep and Normal Aging: Our Internal Clock

- The biological clock resides in the brain
- It helps regulate when we feel sleepy and when we are alert
- It works in tandem with light and dark, and our body temperature and hormones



- Jeffrey C. Hall, Michael Rosbash és Michael W. Young
- The Nobel Prize in Physiology or Medicine 2017
- „for their discoveries of molecular mechanisms controlling the circadian rhythm”.

- The National Institute of Health estimates that more than 70 million Americans suffer from sleep problems.
- The problem escalates with age with the largest users of sleeping pills in the over 65 age bracket.
- The biggest consumers of hypnotics and tranquilizers are the elderly and we know that prescriptions for sleeping drugs are generally long term.

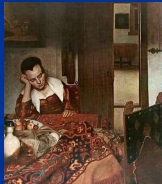
Insomnia Definitions

Global Sleep Dissatisfaction (GSD, Ohayon 1993)

‘insomnia is first defined by the subject himself, by his persistent complaint (at least 6 months) about the quality or the quantity of his sleep’

- Four major criteria are commonly used:
 - Difficulty Initiating Sleep,
 - Difficulty Maintaining Sleep,
 - Early Morning Awakening,
 - Non Restorative Sleep

They must have also daytime consequences



Insomnia – associated features

At least one (or more) of the following

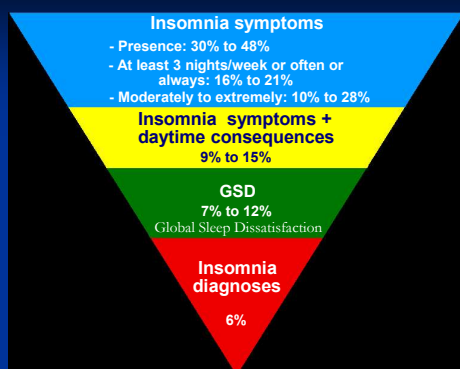
- Fatigue or malaise
- Attention, concentration impairment
- Social/ vocational dysfunction/ poor work
- Mood disturbance or irritability
- Daytime sleepiness

14

Insomnia - definition

- Insomnia is not defined by the number of hours of sleep, but rather, by an individual's ability to sleep long enough to feel healthy and alert during the day.
- The normal requirement for sleep ranges between 4 and 10 hours
- Insomnia is a symptom, not a disorder by itself

Authors	Place	N	Age	Criteria	Prevalence	Comments
Lavigne & Montplaisir (1994)	Canada	2,019	≥ 18	None	10.0%	Household interviews, prevalence based on a single question
Phillips et al. (2000)	Kentucky, USA	1,803	≥ 18	None	9.4%	Telephone interviews, prevalence based on a single question
Rothdach et al. (2000)	Augsburg, Germany	385	65-83	IRLSSG	9.8%	Face-to-face interview, 3 questions based on criteria described by the International RLS Study group (need positive answers to all questions)
Ulfberg et al. (2000)	Sweden	2,608 men	18-64	IRLSSG	5.8%	Postal questionnaire, 4 questions based on criteria described by the International RLS Study group (need positive answers to all questions)
Ohayon and Roth (2002)	5 European countries	18,980	15-100	ICSD	5.5%	Telephone interviews, prevalence based on ICSD criteria evaluated by an expert system
Sevim et al. (2003)	Mersin, Turkey	3,234	≥ 18	IRLSSG	3.2%	Face-to-face interview, 4 questions based on criteria described by the International RLS Study group (need positive answers to all questions) + the IRLSSG severity scale
Berger et al. (2004)	Pomerania, Germany	4,310	20-79	IRLSSG	10.6%	Face-to-face interview, 3 questions based on criteria described by the International RLS Study group (need positive answers to all questions)



Types of insomnia

- Transient insomnia
 - < 4 weeks triggered by excitement or stress, occurs when away from home
- Short-term
 - 4 weeks to 6 months, ongoing stress at home or work, medical problems, psychiatric illness
- Chronic
 - Poor sleep every night or most nights for > 6 months, psychological factors (prevalence 9%)

Insomnia - assessment

- Determine the pattern of sleep problem (frequency, associated events, how long it takes to go to sleep, and how long the patient can stay asleep)
- Include a full history of alcohol and caffeine intake and other factors that might affect sleep
- Review current medications that patient is taking to eliminate these as possible causes
- Take a history to rule out physical cause and/or psychosocial cause

Possible causes of insomnia

- | | |
|-----------------------------------|--------------------|
| Headache | Abdominal pains |
| Bad or vivid dreams | Fever/night sweats |
| Problems of breathing | Leg cramps |
| Chest pain/heartburn | Fear/anxiety |
| Need to pass urine or move bowels | Depression |

Insomnia – resultant problems

- Reduction in motivation, energy or initiative
- Proneness for errors or accidents at work or while driving
- Tension, headaches or gastrointestinal symptoms in response to sleep loss
- Concerns or worries about sleep
- Secondary psychiatric problems

21

Medical problems

- Depression
- Hyperthyroidism
- Arthritis, chronic pain
- Benign prostatic hypertrophy
- Headaches; Sleep apnoea
- Periodic leg movement,
- Restless leg syndrome (RLS)

22

Medications and insomnia

Type of medication	Example
CNS stimulants	D-amphetamine, Methyphenindrate
Blood pressure drugs	α - blockers, β - blockers
Respiratory medicines	Salbuterol, Theophylline
Decongestants	Phenylephrine, Pseudoephedrine
Hormones	Thyroxin, Corticosteroids
Other substances	Alcohol, Nicotine, Caffeine

23

Other problems

- Exercise
- Noise
- Light
- Hunger

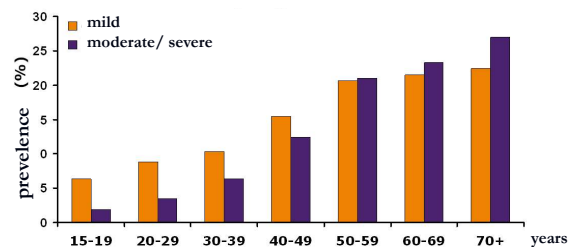
24

Health and Environment Affect Our Sleep

With age, we become more sensitive to:

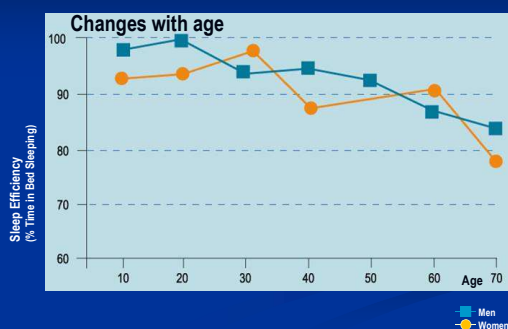
- Hormonal Changes
- Physiological Conditions
- Environmental Conditions
 - Light
 - Noise
 - Temperature

The prevalence and severity of insomnia



1. Weyerer & Dilling, Sleep 1991; 14 (5): 392-398;
2. Lemoine et al. J Sleep Res; 16 (4): In press

Normal Sleep and Normal Aging: Sleep Efficiency



Sleep Problems/Disorders Prevalent Among Older Persons

SYMPTOMS OF SLEEP PROBLEMS BY AGE

Symptoms: a few nights a week or more	55-64	65-74	75-84
Insomnia	49%	46%	50%
Snoring	41%	28%	22%
Sleep Apnea	9%	6%	7%
Restless Legs Syndrome (RLS)	15%	17%	21%

Management of insomnia

- Good Sleep History
- Rule out primary psychiatric disorders
- Rule out adverse effects of medications
- Treat underlying causes whenever possible
- Treat underlying depression
- Sleep Diary
- Interventions – CB therapy, medications

29

Keep a Sleep Diary to Identify Your Sleep Habits and Patterns

SLEEP DIARY



NATIONAL SLEEP FOUNDATION

Treatment

The following tips can help improve sleep.

- Use the bed only for sleep and sex
- Go to bed at the same time every night
- No daytime napping
- No caffeine, alcohol, or nicotine
- Maintain comfortable sleeping conditions
- Eat at regular times daily (avoiding large meals near bedtime)
- Exercise early in the day
- Get out of bed if you are not asleep after 5-10 minutes and do something else (going to another room may help reduce anxiety about falling asleep)
- Practice evening relaxation routines such as muscle relaxation or meditation
- Medications: non-benzodiazepines drugs



Cognitive Behaviour Therapy (CBT)

Technique	Patient Symptoms
Stimulus control	Delayed sleep onset
Sleep restriction	Excessive time spent in bed; fragmented or poor quality sleep
Relaxation	High physiologic, cognitive, or emotional arousal

32

Relaxation training

- Progressive muscle relaxation
- Diaphragmatic breathing
- Autogenic training
- Biofeedback
- Meditation, Yoga
- Hypnosis to ↓ anxiety & tension at bedtime

33

Cognitive Behaviour Therapy (CBT)

Technique	Patient Symptoms
Stimulus control	Delayed sleep onset
Sleep restriction	Excessive time spent in bed; fragmented or poor quality sleep
Relaxation	High physiologic, cognitive, or emotional arousal
Cognitive	Racing or obsessive thoughts around bedtime
Sleep hygiene education	Any of the above or general poor sleep hygiene

34

Benzodiazepine receptor agonists

- **Benzodiazepines**
 - Lorazepam
 - Clonazepam
 - Temazepam
 - Flurazepam
 - Quazepam
 - Alprazolam
 - Triazolam
 - Estazolam
- **Non Benzodiazepines**
 - Zolpidem
 - Zolpidem CR
 - Zaleplon
 - Eszopiclone
- Both these classes act on the GABA_A receptors (BzRA) in PCN

35

Non benzodiazepines

- Act at the benzodiazepine receptor
- Less risk of dependence
 - Zaleplon short ½ life
 - Zolpidem, Zopiclone slightly longer ½ life
 - No difference in effectiveness & safety
 - More expensive

36

Zolpidem

- Short half life
- Does not produce rebound insomnia
- Low abuse potential
- Less likely to produce withdrawal symptoms
- Rebound insomnia after first night of withdrawal, but soon resolves

Other classes of medications

- | | |
|---|--|
| <ul style="list-style-type: none"> ■ Antidepressants <ul style="list-style-type: none"> ■ Trazadone ■ Mirtazapine ■ Doxepin ■ Amitriptyline ■ Antipsychotics <ul style="list-style-type: none"> ■ Olanzapine ■ Quetiapine | <ul style="list-style-type: none"> ■ Melatonin Receptor Agonists <ul style="list-style-type: none"> ■ Melatonin ■ Ramelteon ■ Miscellaneous <ul style="list-style-type: none"> ■ Valerian ■ Diphenhydramine ■ Cyclobenzaprine ■ Hydroxyzine ■ Alcohol |
|---|--|

38

Parasomnias

- Parasomnias are a heterogeneous group of sleep disorders that are not strictly speaking abnormalities or dysfunctions of the processes underlying sleep-wake states

The American Classification of mental disorders (DSM-V) recognizes only three parasomnias:

- Nightmares
- Night terrors
- and Sleepwalking



Edvard Munch (1893)
The Scream

NIGHTMARES

Associated with various psychiatric disorders.

Response to antidepressant medications.

In schizophrenic patients and acute schizophrenic episodes.

Individuals with a posttraumatic stress disorder may also experience recurrent nightmares about the traumatic event.



Eugène Delacroix (1825)
Femme Endormie

SLEEP PARALYSIS

- Transient and generalized inability to move and speak that occur during the transitional period between sleep and wakefulness.
- Episodes vary from one to several minutes and are usually extremely distressing especially when they are accompanied with hypnagogic or hypnopompic hallucinations
- 30 to 60% of narcoleptic patients
- Epidemiological studies shown that 6.2% of the general population experienced at least one such episode in their lifetime.
- Moreover, sleep paralysis is often associated with a mental disorder. In some cases, anxiolytic medication may be responsible for this manifestation

Sleep Breathing Disorders

The most common sleep disordered breathing disorders:

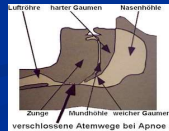
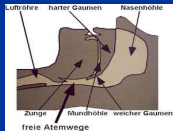
- **Obstructive sleep apnea syndrome (OSAS)**
- **Central sleep apnea syndrome**
- **Upper airway resistance syndrome**



Vincent Van Gogh (1890) La Sieste

Obstructive sleep apnea

- An obstructive apnea occurs when airflow is absent or nearly absent, but ventilatory effort persists. It is caused by complete, or near complete, upper airway obstruction.
- Patients with OSA often have reduced upper airway size due to excess surrounding soft tissue, or a highly compliant airway. The combination of diminished neural output to the upper airway muscles during sleep and reduced upper airway size can result in upper airway collapse, with resulting obstructive apnea.



Apnea

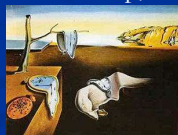
- Apnea is the cessation, or near cessation, of airflow. It exists when airflow is less than 20 percent of baseline for at least ten seconds in adults.
- Apnea can produce arousals from sleep, increased arterial carbon dioxide, and decreased oxygen levels.

Hypopnea

- Hypopnea is a reduction of airflow to a degree that is insufficient to meet the criteria for an apnea.
- Airflow decreases at least 30 percent from baseline.
- There is diminished airflow lasting at least ten seconds.
- At least 90 percent of the duration of diminished airflow is spent with airflow that is at least 30 percent less than baseline.
- Decreased airflow is accompanied by at least four percent oxyhemoglobin desaturation.

Obstructive sleep apnea

- More than 15 apneas, hypopneas per hour of sleep (ie, an AHI > 15 events/hr) in an asymptomatic patient, OR
- More than five apneas, hypopneas per hour of sleep (ie, an AHI > 5 events per hour) in a patient with symptoms (eg, sleepiness, fatigue and inattention) or signs of disturbed sleep (eg, snoring, restless sleep, and respiratory pauses).

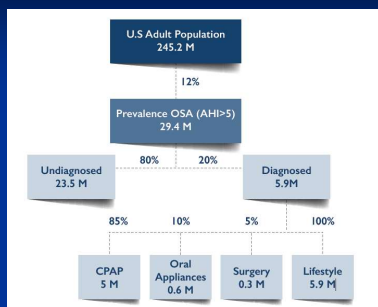


Salvador Dalí (1931)
Persistence of Memory

EPIDEMIOLOGY

- 3-9% have OSAH if defined as an AHI greater than five events per hour accompanied by at least one symptom that is known to respond to treatment (eg, daytime sleepiness).
- The prevalence of OSAH increases with age. Among patients 65 years and older, there is a two- to three-fold higher prevalence compared to patients 30 to 64 years old.

Epidemiology



Source: Primary research with experts, U.S. Census (2014), Peppard "Increased Prevalence of Sleep-disordered Breathing in Adults," American Journal of Epidemiology (2013)

OSA can affect anyone, but is more common in some people, including those who:

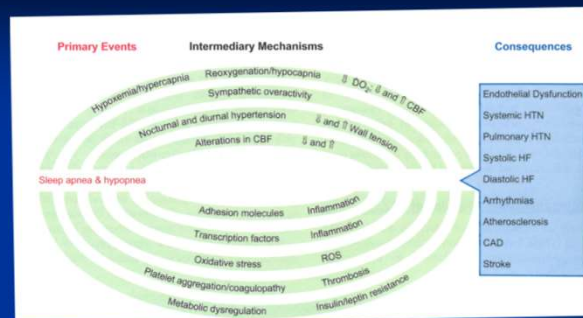
- loud snore
- intermittently stop breathing when sleeping
- are male and middle age
- are a woman past menopause
- are overweight or obese
- have a large neck size (17 inches or more)
- have a small airway
- have a small lower jaw
- have large tonsils, large tongue
- have an abnormal face shape, or nasal blockage

Complications of OSA



1. Mathew B, *et mtsai*. J Am Board Fam Med. 2008; 21: 562-8.
2. Mokdad AH, *et mtsai*. JAMA. 2003; 289: 76-9.
3. Luppino FS, *et mtsai*. Arch Gen Psychiatry. 2010; 67: 220-9.
4. Parkin DM, *et mtsai*. Br J Cancer. 2011; 105(suppl 2): S77-S81.

51



Jordan 2007 Sleep Medicine Clinics

Possible C-V Complications of OSA

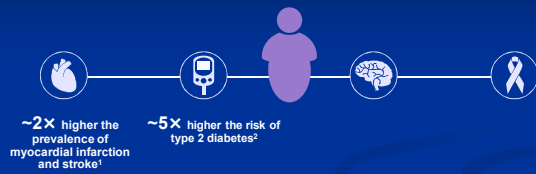
- Endothelial dysfunction
- Hypertension
- Pulmonary hypertension
- Systolic or diastolic heart failure
- Arrhythmias
- Coronary artery disease
- TIA and stroke
- Dementia
- Death

What kind of diseases are treated of the unknown OSAS patients?

- unknown OSAS patients vs. controll

Diagnosis	OR	95% CI
Cardiovascular disease	2,6	2.0-3.3
Hypertension	2,5	2.0-3.3
Ischemic heart disease	1,3	0.8-1.9
Congestive heart failure	3,9	1.7-8.9
Arrhythmia	2,2	1.2-4.0

Complications of OSA



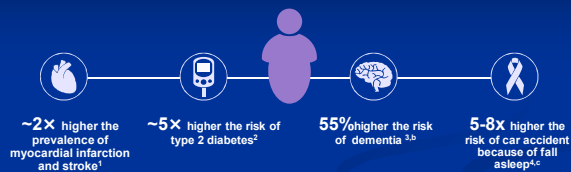
1. Mathew B, és mtsai. *J Am Board Fam Med*. 2008; **21**: 562-8.
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4. Parkin DM, és mtsai. *Br J Cancer*. 2011; **105**(suppl 2): S77-S81.

55

Diabetes

- OSA is an independent risk factor for diabetes, as it is associated with changes in glucose metabolism which places patients at increased risk of development of type 2 diabetes.
- Studies have found that the percentage of people living with diabetes who also have OSA to be anywhere between 17 and 48 percent.
- Evidence also suggests a relationship between OSA, obesity and diabetes: 86 per cent of obese type 2 diabetes patients have OSA.

Complications of OSA



1. Mathew B, és mtsai. *J Am Board Fam Med*. 2008; **21**: 562-8.
2. Mokdad AH, és mtsai. *JAMA*. 2003; **289**: 76-9.
3. Luppino FS, és mtsai. *Arch Gen Psychiatry*. 2010; **67**: 220-9.
4. Parkin DM, és mtsai. *Br J Cancer*. 2011; **105**(suppl 2): S77-S81

57

Car Crashes and OSA

- Untreated patients with OSA have higher vehicle collision rate than controls¹
- Patients with AHI > 15 (n = 102) have 8.1-fold increased risk of motor vehicle crash compared to matched controls (n = 152)²
- Patients with AHI > 34 (n = 78) have 15-fold increased risk of motor vehicle crash than matched controls (n = 160)³
- Over 3 years, collision rate in OSA patients treated with CPAP declined to levels similar to those of control subjects¹

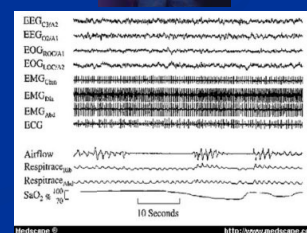
1. George CF. *Thorax* 2001;56:508-512.
2. Teran-Santos J, et al. *N Engl J Med* 1999;340:847-851.
3. Horstmann S, et al. *Sleep* 2000;23:383-389.

DIAGNOSIS

- Polysomnography is the first-line diagnostic study when OSAH is suspected.
- OSAH exists in asymptomatic adults if the AHI is greater than 15 events per hour and in symptomatic adults if the AHI is greater than five events per hour.

Polysomnography

- neurophysiologic variables (electrooculography, EEG, submental myogram) – sleep stages
- Measurement of resp. effort
- Art. O₂ sat., pCO₂ – transdermal pulseoxymetry
- ECG
- Limb movements



TREATMENT

- weight control
- avoidance of alcohol
- stop smoking
- oral appliances
- surgery
- positive airway pressure (CPAP)



OSA Treatment Has a Major Impact on Comorbidities

After one year, patients surveyed state OSA treatment delivers...



Hypertension	<ul style="list-style-type: none"> •41% report blood pressure improvement •17% report decrease in medication usage
Diabetes	<ul style="list-style-type: none"> •31% report improved HbA1c •14x increase in "good quality" sleep
Asthma & Breathing Conditions	<ul style="list-style-type: none"> •54% report improved respiratory function •70% increase in patients reporting symptoms as mild •8x increase in "good quality" sleep

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OSA Treatment Has a Major Impact on Comorbidities

After one year, patients surveyed state OSA treatment delivers...



Insomnia	<ul style="list-style-type: none"> •7x increase in good quality sleep • Decline from 54% to 1% reporting "very bad" quality sleep
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Depression, Anxiety and Mental Health	<ul style="list-style-type: none"> •12x increase in "good quality" sleep •4x reduction in reported life threatening mental health condition •49% report improved mental health
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Heart Disease	<ul style="list-style-type: none"> •56% report reduced heart disease risk •5x decrease in self-reported life-threatening heart disease • Decline from 50% to 3% reporting "very bad" quality sleep • Increase from 0% to 26% reporting "very good" quality sleep
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Barriers to Diagnosis & Treatment

General Public Awareness	Many individuals do not recognize symptoms and severity of the condition.
Primary Care Physician Education	Front-line caregivers do not routinely ask about duration and quality of sleep or screen patients for OSA.
Diagnosis and Treatment Costs	While usually covered by payors for qualified patients, costs average \$2,105 per year for testing, appointments, treatment devices and surgery if necessary.

16/2015. (III.30.) Regulation
OSAS screening must be part of the general medical checkup for drivers in Hungary



Verona, January 2017



Restless Legs Syndrome (RLS)

- Characterized by disagreeable leg sensations occurring most often at sleep onset that provoke an urge to move the legs

1. An urge to move the legs usually accompanied or caused by uncomfortable and unpleasant sensations in the legs;
2. The urge or unpleasant sensations begin or worsen during periods of rest or inactivity
3. Symptoms are partially or totally relieved by movement
4. Symptoms are worse in the evening or at night than during the day



Maurice Cornille Enghel (1938)
Day and Night

RLS



Prevalence of RLS

- RLS increased with age.
- The prevalence of RLS symptoms is close to 20% in elderly people and around 5% for subjects younger than age 30.

ETIOLOGY OF RLS

- RLS has been also linked with lower serum ferritin levels.
- Uremia is another possible cause for RLS
- Other factors have also be identified to cause RLS: folate deficiency, vascular insufficiency (Harvey, 1976), chronic obstructive pulmonary disease (Spillane, 1970), gastrectomy (Banerji et al., 1970), diabetes mellitus (Skomro et al., 2000; Phillips et al., 2000) and caffeine abuse (Lutz, 1978).



Maurice Cornille Enghel (1938)
Hand with Reflective Sphere



Thank you for your attention!