

Sleep Disorders in Older People

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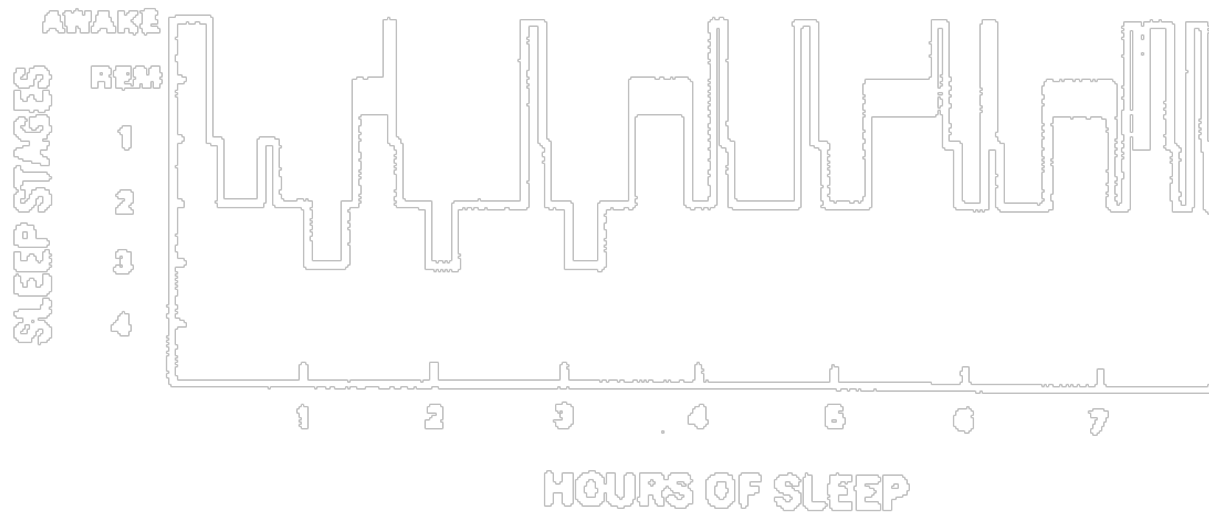
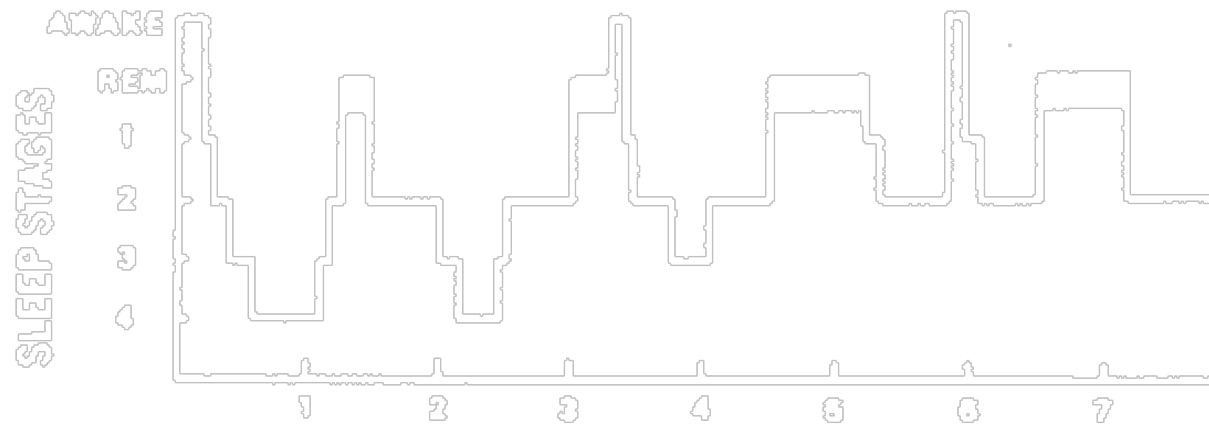
Sleep

- Sleep is associated with well being, health and mortality
- Sleep is a vital physiological process with important restorative functions that are essential for optimal daytime functioning

Sleep Architecture

- Normal sleep progresses through **several stages in a predictable pattern.**

Sleep Architecture



Characteristics of sleep

Slow-wave sleep

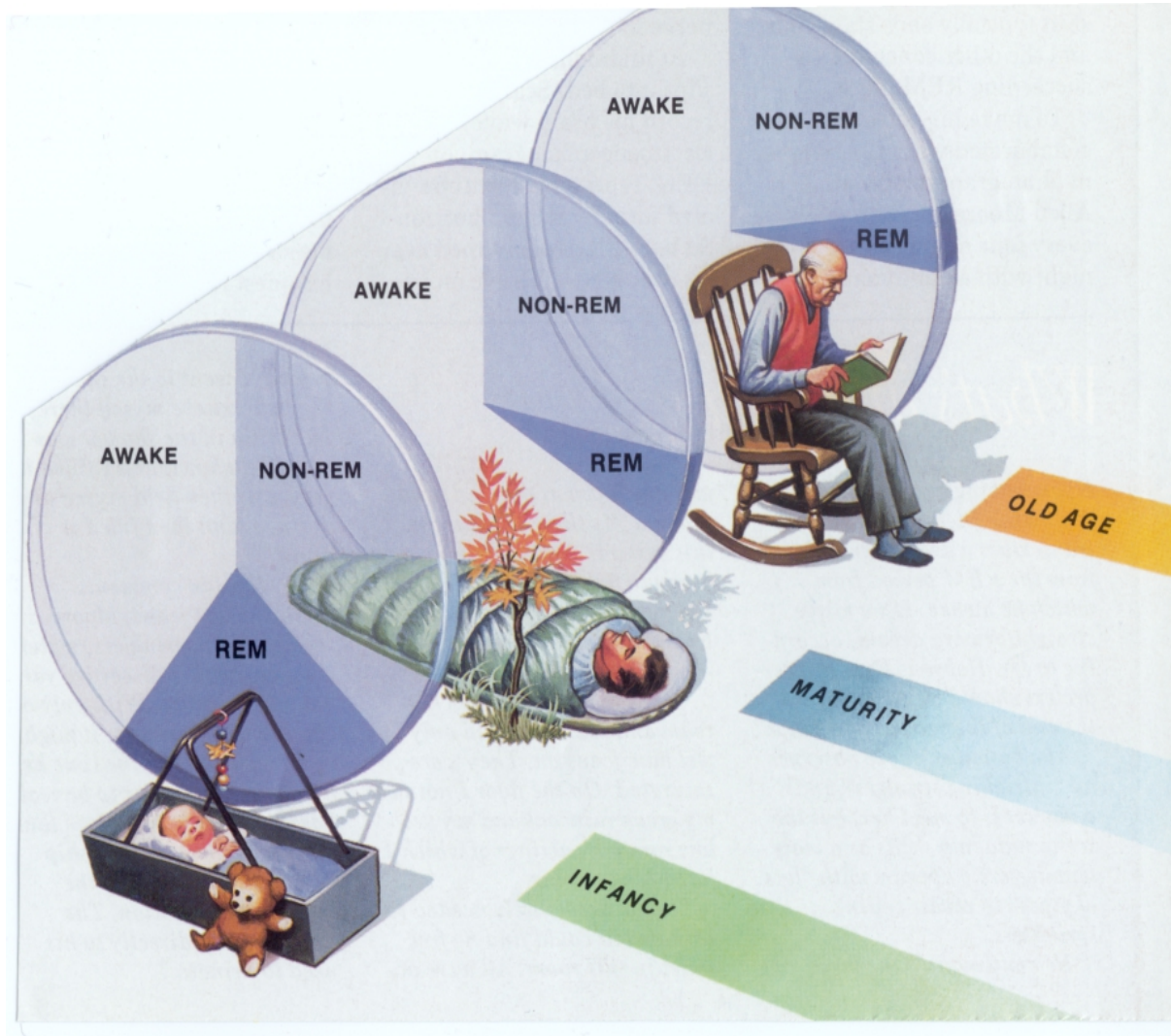
- progressive decrease in spinal reflexes
- progressive reduction in heart rate and breathing rate
- reduced brain temperature and cerebral blood flow
- increased hormone secretion (e.g. growth hormone)
- synchronised cortical activity

REM sleep

- spinal reflexes absent
- rapid eye movements behind closed eyelids
- increased body temperature and cerebral blood flow
- desynchronised cortical activity
- dreams

Structural Changes in Sleep

Duration of Sleep



Predictable Age Related Changes in Sleep Architecture

- Sleep fragmentation
- Reduced sleep efficiency
- Decreased quality of sleep
- Decrement in amplitude of low frequency delta on EEG

Sleep Disorders: Insomnia

- Difficulty initiating sleep, maintaining sleep and/or unrestorative sleep leading to daytime impairments
- Affects 20-50% of adult population in Western countries
- Reported more in older women than men
- Up to 57% of non-institutionalized older people have problems with chronic insomnia

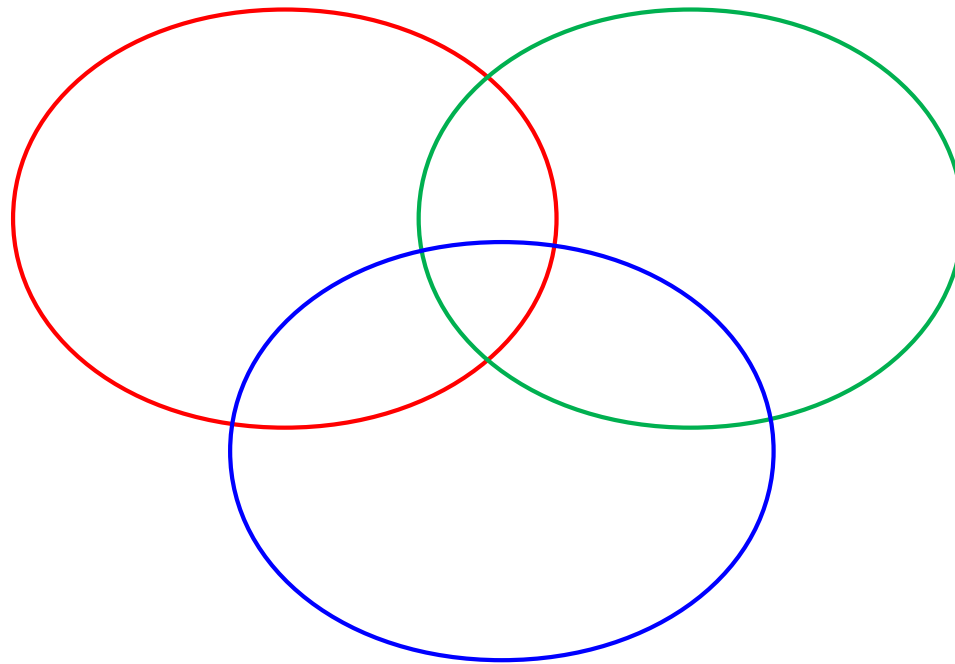
Insomnia

- Chronic insomnia is **associated with a wide range of health problems**: mental disorders, discomfort, anxiety, substance abuse.
- Chronic insomnia can **increase risk for new onset depression** with persons with persistent insomnia 3 x more likely to develop depression within a 1 year period
- **Possible causality between short sleep duration and development of diabetes mellitus** in community dwelling middle and older age adults

Insomnia

AGEING

DISEASE



PERCEPTION

Variables Associated with Poor Sleep Quality

- Gender
- Marital status
- Chronic illness
- Presence of psychological stress, level of daily hassles, stress
- Level of social support
- Dietary habits
- Excessive daytime napping
- Medical conditions
- Loss of spouse
- Depression
- Retirement
- Social isolation
- Comorbid disease

- **During hospitalization** the prevalence of sleep deprivation seems to increase for multiple reasons: **environmental factors, circadian dysregulation, acute clinical problems.**
- These complaints of insomnia can persist for several months post discharge.

Structural Changes in Sleep: Normal or Abnormal?

- **Normal aging must be viewed in counterpoint to pathological aging.**
- Some of changes may be related to
 - Mental and physical health status
 - Situational categories (institutionalisation)
 - Personal categories (lifestyle and individual differences)

Structural Changes in Sleep

Mental and Physical Health Status

- Recent hospitalisation, limitation of physical function;
- Self-perception of health;
- Joint pain and stiffness;
- Emphysema, a history of stroke or heart disease;
- Depression and anxiety

Structural Changes in Sleep

Mental and Physical Health Status

- Sleep-related respiratory disturbance (SRRD)
 - Refers to episodes of apnoea and hypopnea that suppress the deeper stages of sleep
- Periodic leg movements (PLM)
 - Involuntary limb movements that can occur in all stages of sleep but tend to predominate in the lighter stages (stages 1 and 2)
- Dementia

Structural Changes in Sleep

Lifestyle and Individual Differences

- Diet, exercise, sleeping habits – daytime napping and excessive time spent in bed
- Personality profiles – elevated levels of anxiety and neuroticism
- Hereditary predispositions

Older people spend more time in lighter stages of sleep

- Decreased slow wave sleep
- Increased fragmentations of entire sleep cycle
- REM sleep may decrease overall
- Take longer to initiate sleep
- Decreased total sleep time
- Have early morning awakening
- Increased need to nap during the day
- Tend to fall asleep during the daytime faster
- Older women maintain sleep better with aging but with menopause have increased subjective complaints of insomnia

- **Optical changes in the eye** (senile miosis, increased crystalline lens opacity) decreases light reaching the retina and **affect circadian rhythm**.

Evaluation of Sleep Disorders

- History
 1. Multidisciplinary approach
 2. Past sleep history
 3. Detailed inventory of specific sleep complaints in the presence of bed partner
 4. Inquiry regarding alcohol, tobacco, caffeine and other meds (dose, time)

Hypnogram

- Displays distribution of sleep stages across the night
- Healthy adults – NREM, N1, N2, N3 followed by a period of REM
- REM occurs about 90 minutes into sleep
- Reduction in N3 and increased in REM as night progresses
- Punctuated by brief arousals and awakenings

Examples of Sleep-Related Questions That Can Help to Screen for Sleep Problems in the Geriatric Patient

- Do you have difficulties falling asleep or maintaining sleep?
- Do you feel excessively sleepy, tired or fatigued during the day?
- What is your sleep schedule during the weekdays and on weekends?
- How many hours do you sleep during the night?
- How long does it take you to fall asleep after deciding to go to sleep?
- How many times do you wake up during a typical night?
- Do you feel refreshed when you wake up in the morning?
- Do you have loud snoring and do you stop breathing at night?
- Do you have restless ness or crawling or aching sensations in your legs when trying to fall asleep?
- Do you repeatedly kick your legs during sleep?
- Do you act out your dreams?

Labs

- **Polysomnography** specifically with complaints of sleep stage abnormalities (**restless leg syndrome, unusual behaviors and sleep disordered breathing**)

Tests

- MSLT- multiple sleep latency tests
- Objective assessment of daytime sleepiness
- EES- Epworth Sleepiness Scale

Your
**Multiple Sleep
Latency Test (MSLT)**
What to expect



- 1 - Lights on
- 2 - Patient awake
- 3 - Electrodes reapplied
- 4 - 20 minute nap
- 5 - Patient awake
- 6 - 20 minute nap
- 7 - Patient eats lunch
- 8 - 20 minute nap
- 9 - Patient leaves

MSLT: MSL > 8 minutes

	Mean Sleep Latency MSL
Normal	10.4 ± 4.3 (four naps) 11.6 ± 5.2 (five naps) 30% MSL < 8 min 16% MSL < 5 min
Narcolepsy	3.1 ± 2.9 16% MSL > 5 min
Idiopathic hypersomnia	6.2 ± 3.0
Sleep apnea	7.2 ± 6.0 min
Traditional MSL ranges	< 5 min = severe sleepiness 5 to < 10 = moderate sleepiness > 10 to 15 = mild (borderline) sleepiness
<i>min</i> , Minutes; <i>MSL</i> , mean sleep latency; <i>MSLT</i> , multiple sleep latency test; <i>SD</i> , standard deviation.	

Pictorial Epworth Sleepiness Scale

Name: _____ Date: ____/____/____ Hospital No: _____ Date of Birth: ____/____/____

In contrast to just feeling tired, how likely are you to doze off or fall asleep in the following situations? Even if you have not done some of these things recently, try to work out how they would affect you. Use the following scale to choose the most appropriate number for each situation.

Situation <input checked="" type="checkbox"/> Please tick box	0 No chance of dozing	1 Slight chance	2 Moderate chance	3 Definitely would doze
Sitting and reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Watching TV	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sitting inactive in a public place (e.g. Theatre or a meeting)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
As a passenger in a car for an hour without a break	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lying down to rest in the afternoon when circumstances permit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sitting and talking to someone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sitting quietly after lunch without alcohol	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In a car, while stopped for a few minutes in traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Primary Sleep Disorders

- Sleep apnea
- Restless leg syndrome

Secondary Sleep Disorders

- Medical conditions
- Psychiatric disorders
- Polypharmacy
- Psychosocial factors

Chronic Medical Conditions Impacting Sleep

- Medical Condition

- Diabetes**

- Increased incidence of obstructive sleep apnea
 - Increased incidence of sleep disordered breathing
 - Autonomic neuropathy leading to
 - Ventilatory disorders

Chronic Medical Conditions Impacting Sleep

- Medical Condition

Dementia

- Delayed sleep induction
- Prolonged wake time after arousal from sleep
- Increased activity during periods of wakefulness
- “Sundowning”
- Increased daytime sleepiness compared with age matched controls

Chronic Medical Conditions Impacting Sleep

- Medical Condition

- Depression**

- Exaggerated behavioral disturbances
 - Insomnia
 - Increased number of awakenings
 - Chronic pain
 - Decreased sleep time
 - Delayed sleep onset
 - Increased nighttime awakenings
 - Increased depressive symptoms

Chronic Medical Conditions Impacting Sleep

- Medical Condition

Parkinson's Disease

Decreased total sleep time

Malignancies

Excessive fatigue

Leg restlessness

Insomnia

Decreased sleep efficiency

Excessive sleepiness

Chronic Kidney Disease and incontinence

Restless leg syndrome

Periodic limb movement

Sleep apnea

Chronic Medical Conditions Impacting Sleep

- Medical Condition

- Chronic Obstructive Pulmonary Disease**

- Reduction in arteriolar oxygenation
 - Decline in baseline oxygen
 - More frequent in blue bloaters
 - Decline in ventilatory response to hypoxia
 - Exaggerated breath to breath variability
 - Exaggerated increase in respiratory frequency sleep disordered breathing
 - Hypopneas (partial respiration)
 - Apneas (complete cessation of respirations)

Medications with Negative Effect on Sleep

- Bronchodilators
- Corticosteroids
- Decongestants
- Diuretics
- Stimulating antidepressants
- Antihistamines (increased delirium, do not use with narrow angle glaucoma as it increases intraocular pressure)

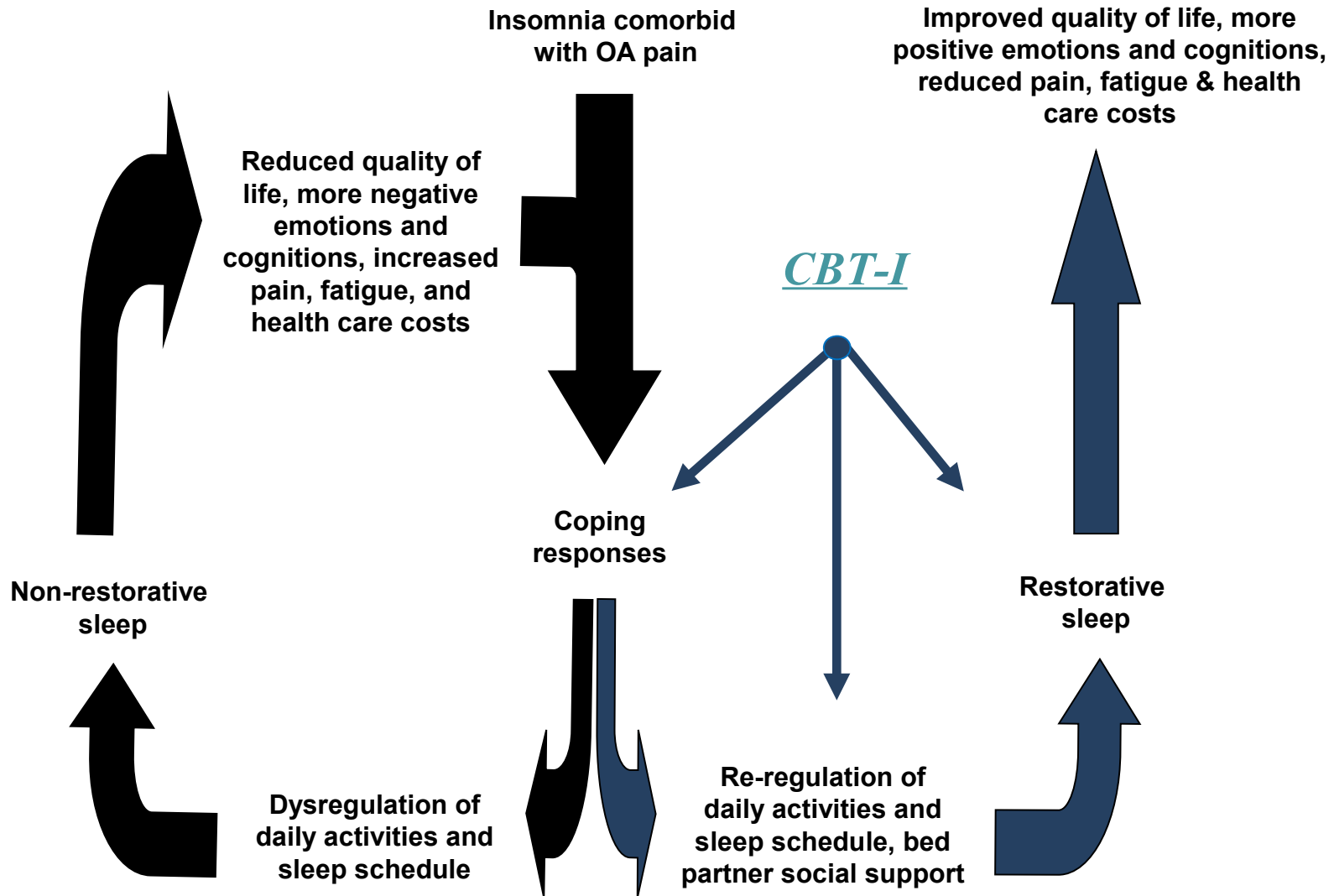
Evidence based Standards of Care to Manage Insomnia

- Benzodiazepines and Z-drugs are **effective** in the management of chronic insomnia. However benzodiazepines, Z-drugs and antidepressants **pose a risk of harm**.
- Relaxation therapy and cognitive/behavioral therapy are effective in the management of chronic insomnia in subsets of the chronic insomnia population.

Psychological and Behavioral Treatments for Insomnia

- **Stimulus Control Therapy:** A set of instructions designed to reassociate the bed/bedroom with sleep and to reestablish a consistent sleep/wake schedule: go to bed only when sleepy; get out of bed when unable to sleep; use the bed/bedroom for sleep only (e.g. no reading, watching TV); rise at the same time every morning and no napping
- **Sleep Restriction Therapy:** A method to control time in bed to the actual sleep time, thereby creating mild sleep deprivation, which results in more consolidated and more efficient sleep.
- **Relaxation Training:** Clinical procedures aimed at reducing somatic tension (e.g. progressive muscle relaxation, autogenic training) or intrinsic thoughts (e.g. imagery training, medication) interfering with sleep
- **Cognitive Therapy:** Psychotherapeutic method aimed at changing faulty beliefs and attitudes about sleep, insomnia and the next day consequences. Other cognitive strategies are used to control intrusive thoughts at bedtime and prevent excessive monitoring of the daytime consequences of insomnia
- **Sleep Hygiene Education:** General guidelines about health practices (e.g. diet, exercise and substance use) and environmental factors (e. g. light, noise and temperature) that may interfere with or promote sleep

Conceptual model: Impact of CBT for Insomnia



Sleep Quality Evaluation

- Difficulty initiating sleep
- Disruptive sleep
- Early morning awakening
- Nonrestorative sleep
- Often associated with medical illness rather than aging
- When controlled for comorbidity changes in sleep quality and high rates of insomnia become less

Treatments

- **Nonpharmacologic**
- **Light treatment-** exposure to very bright light during the day and darkness at night can consolidate rest and activity patterns in persons with AD
- **Evening light exposure-** effective in consolidating rest/activity rhythms of AD patients and help them sleep better at night. Also helps to fall asleep later and wake up later

Benzodiazapines in Older People

- Prolonged sedation
- Increased risk of falls/fractures
- Postural instability

Z-drugs

- If used dose should be low and for a short, limited period of time
- Concern about abuse/dependency
- Concern about confusion, hallucinations

Sleep Apnea

- Most important and frequently occurring in older people
- Repetitive upper airway obstruction, arousals, O₂ desaturation, daytime sleepiness, snoring, impairment of cognition
- Hard to establish a diagnosis due to lack of normative data in the apnea/hypopnea index

Increased Risks for Obstructive Sleep Apnea

- Hypothyroidism
- Acromegaly
- Disease states affecting the upper airway
- Obesity
- Thick Neck
- Crowded oropharyngeal inlet
- Presence of retrognathia
- Macrognathia

Treatments of OSA

- CPAP- symptomatic treatment, not curative
- Avoid substances that may worsen sleep apnea (alcohol, sedating compounds, nicotine)
- Weight loss, even moderate can decrease symptoms
- Sleep position (avoid lying in supine position)

Depression and Insomnia

- **Early morning awakening**-symptom most consistently related to depression over time
- Strongest predictor of future depression among those not depressed at baseline was sleep disturbance at baseline

Depression and Insomnia

- Alteration in sleep architecture in depression
- Depression increases the risk of poor sleep quality and poor sleep quality is a predictor for future depressive episodes
- Those getting 7 hours of sleep or less are more likely to develop a depressive disorder than those getting more than 7 hours of sleep a day

Anxiety and Insomnia

- Poor sleep can be a consequence of anxiety disorder
- Important symptom of general anxiety disorder (most common among older adults)
- Persons with depression spent more time in bed than non-depressed
- Persons with depressive disorder and comorbid anxiety disorder reported a substantially shorter total sleep time than other elderly persons.
- Poor sleep quality reported in 40-90% of patients with depression

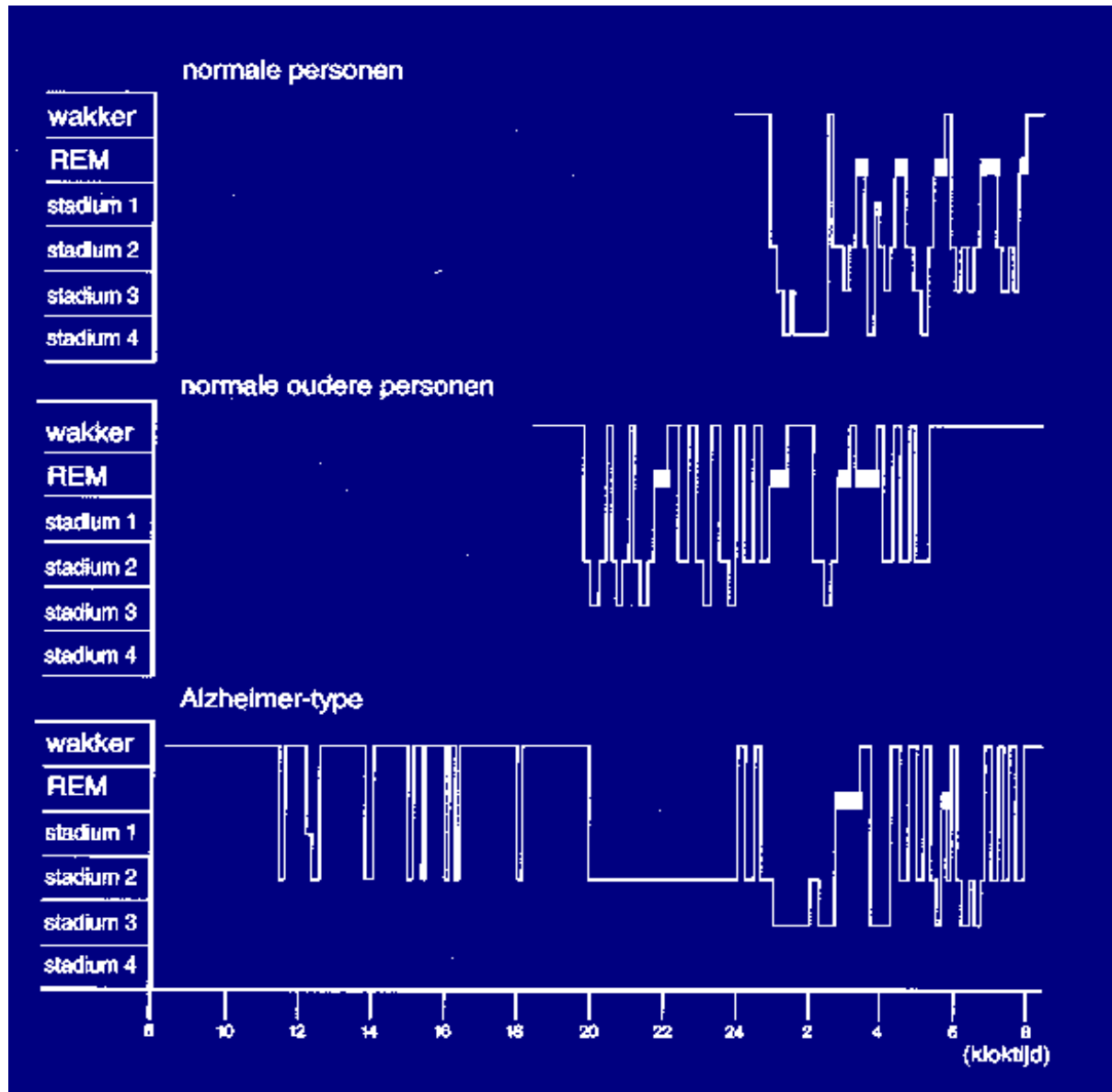
Dementia and Insomnia

- Most frequent cause of insomnia in patients with dementia is a **medical condition or side-effect of a medication**
- Sundowning- marked increase in agitation, confusion and wandering in late afternoon or evening.
- Treatment for sundowning- stimulate the circadian system improving sleep hygiene

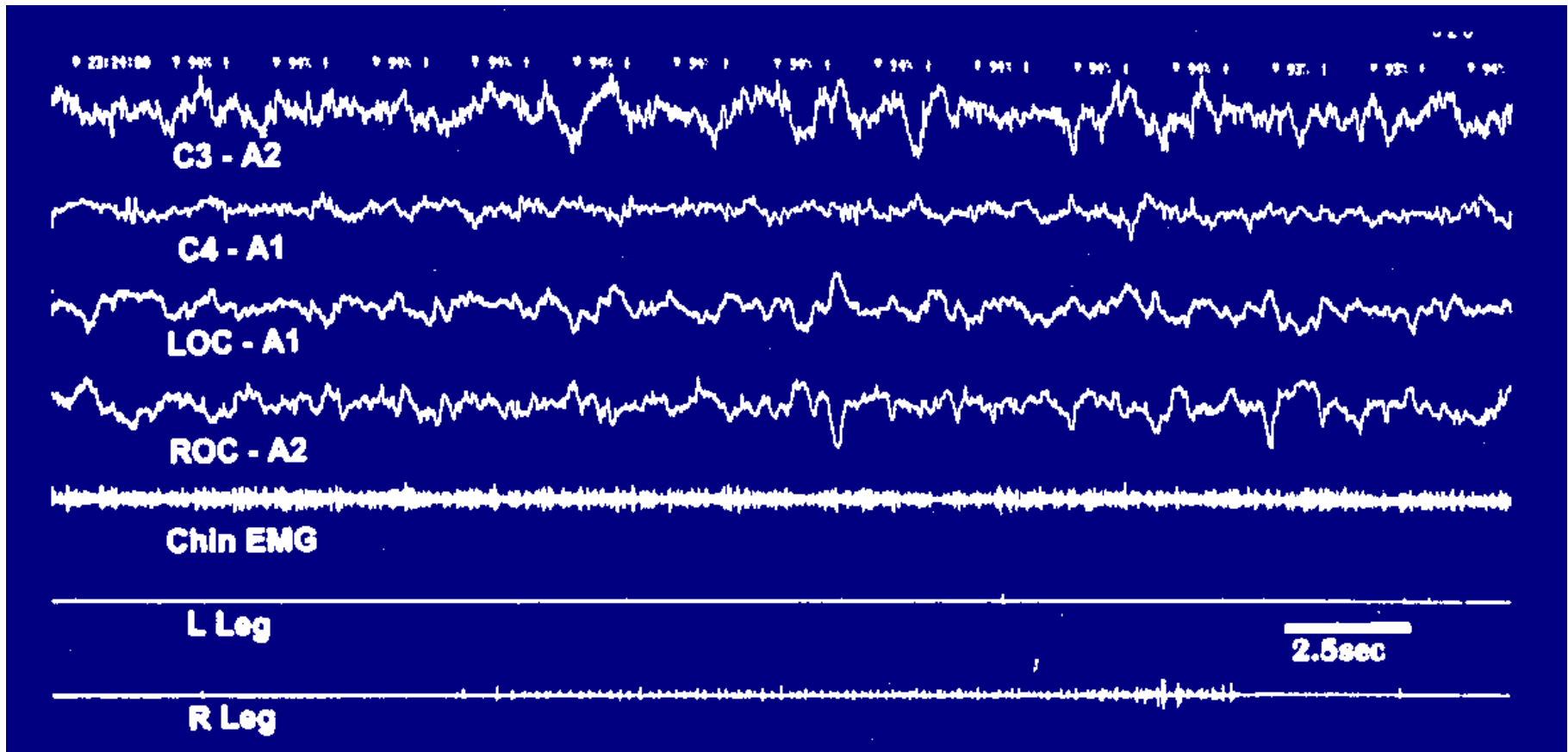
Dementia and Insomnia

- Patients with AD suffer from sleep disturbances- sleep fragmentation, longer periods on intra sleep wakefulness.
- Problem for caregivers
- Community based longitudinal studies showed that excessive daytime sleepiness was associated with a 2 times risk of incident dementia
- As dementia progresses the symptoms of poor sleep become more severe
- Patients become sleepier during the daytime
- Increases in neurocognitive impairment, end organ dysfunction, chronic health condition and increased mortality

Dementia and sleep



Dementia and sleep



REM Sleep

- REM sleep- dreaming/inhibition of voluntary muscle activity
- Disorder – vigorous dream, enacting behavior, nightmares, exacerbated by beta blockers, antidepressants, neurological diseases.
- In Lewy body dementia- 50-80%

- Irregular sleep/activity pattern is a major source of difficulty for family members/caregivers
- Institutionalized patients with sleep disruptions at night are more likely to exhibit aggressive behavior during the day
- Any physical illness that causes the patient discomfort can affect sleep
- Poor sleep quality secondary to sleep disorders can have an effect on various chronic disorders

REM-Sleep Disorder Behaviour

- Loss of normal muscle atonia which normally occurs during REM sleep
- Persons with this disorder may display a variety of movements during REM sleep including walking, thrashing limbs or engaging in complex activity

REM-Sleep Disorder Behaviour



Dateline NBC

Narcolepsy

- Excessive daytime somnolence and fatigue
- Sleep attacks (irresistible urge to sleep)
- Hypnagogic hallucinations
- Sleep paralysis
- Cataplexy

Sleep and Pain Relationships

- Chronic pain is associated with:
 - Increased nighttime sleep-related complaints
 - Increased daytime sleep-related complaints
 - Increased likelihood of napping
 - Increased nighttime awakenings from sleep
 - Increased difficulty returning to sleep after waking

Restless Leg Syndrome

- Strong evidence emerging that it is modulated by presence of genes with **autosomal dominant transmission** and high penetrance
- Reports a significantly **worse executive function** in untreated restless leg syndrome patients than age matched controls
- Little evidence to support drug treatment for suppression of Periodic Leg Movements in older people

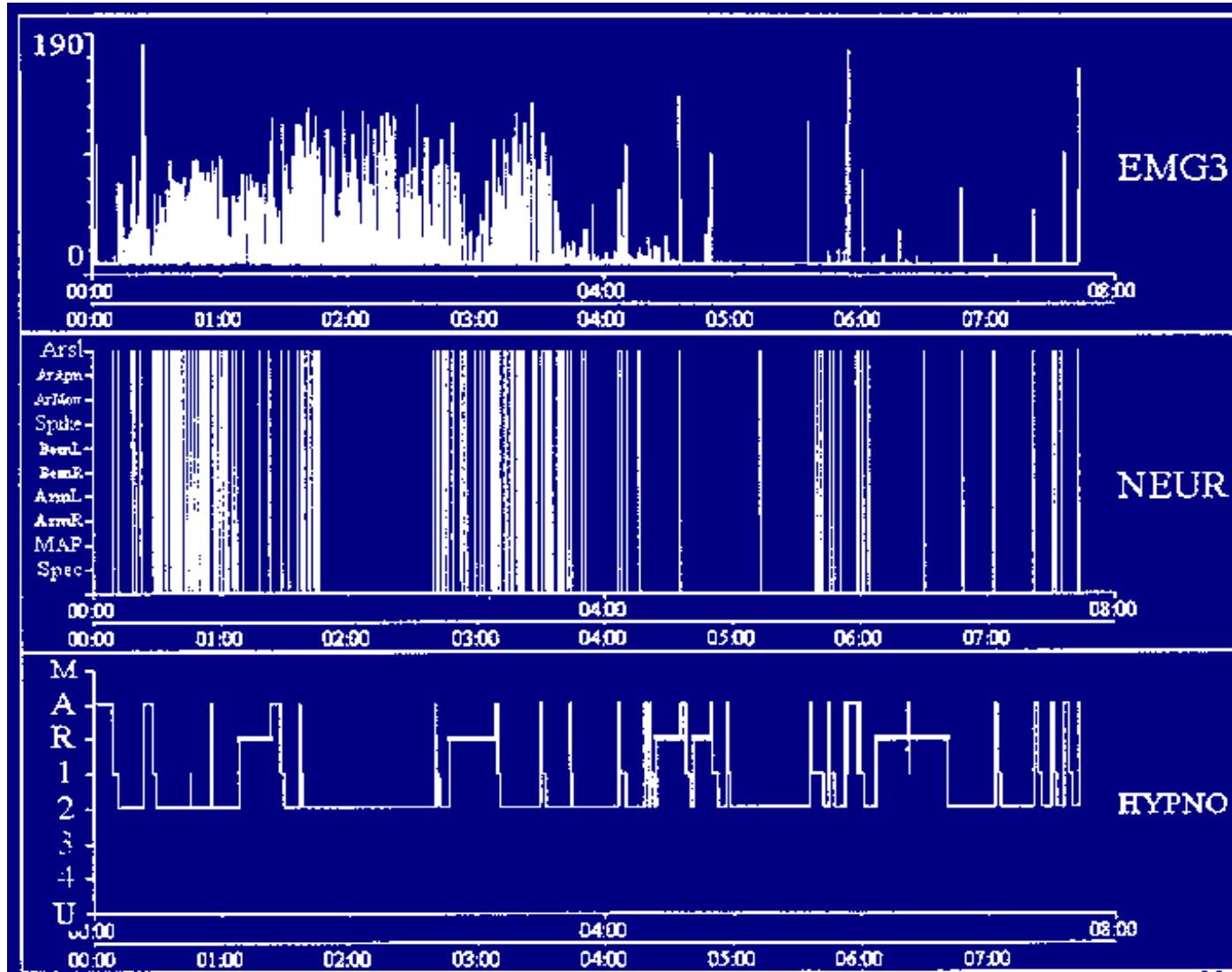
Restless Leg Syndrome

- Creeping sensation in lower extremities
- Tingling, cramping or even very painful sensations usually in the lower extremities
- Intense urge to move legs usually occurs when patients go to bed and cause sleep onset insomnia

Restless Leg Syndrome

- Iron deficiency
- RA
- Renal failure
- Peripheral neuropathy
- Excessive caffeine intake

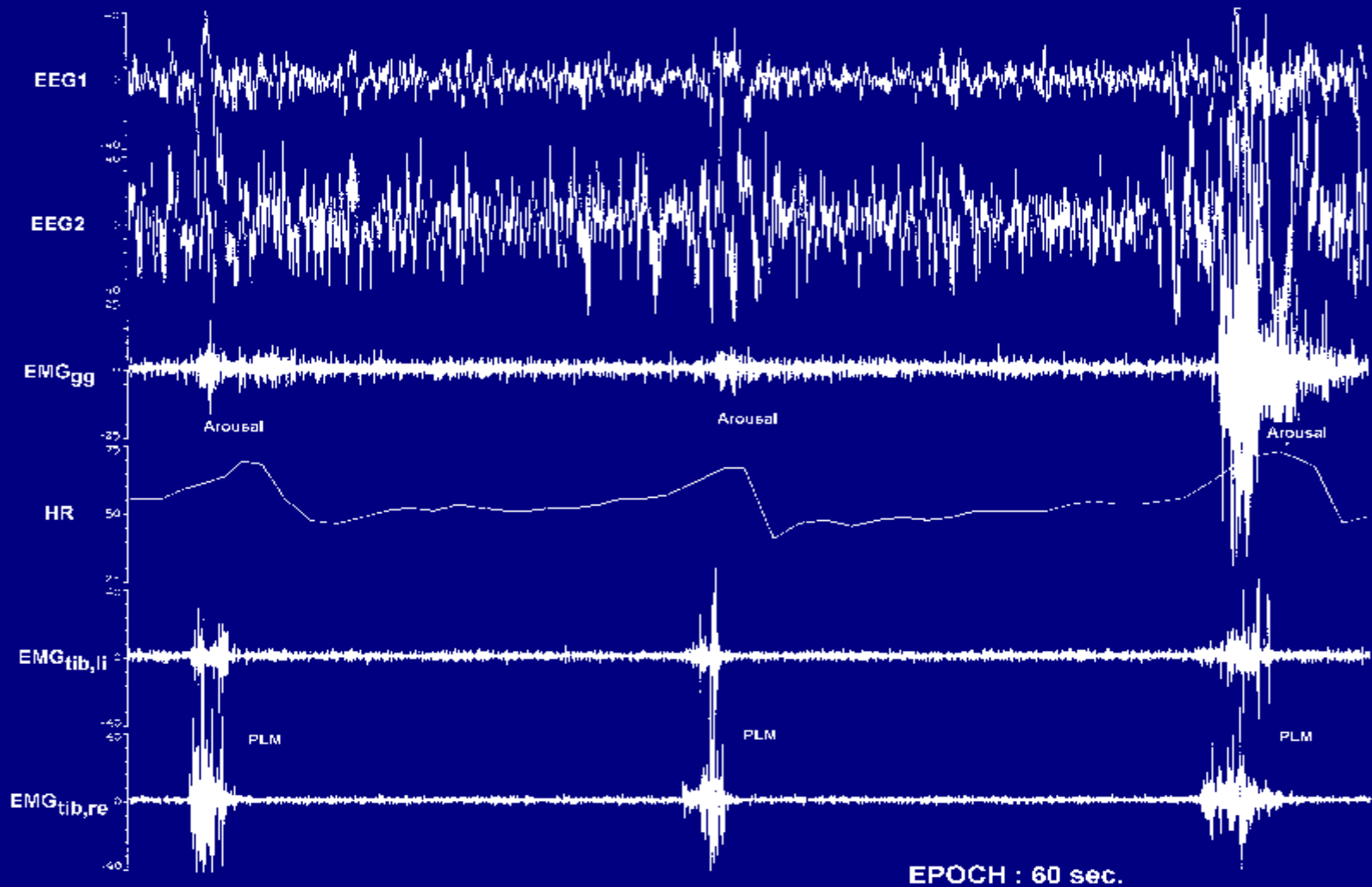
Circadian Pattern of RLS



Periodic Leg Movements

- Subtle contractions of the muscles of the ankles and toes
- Impressive thrashing of the arms and legs (wake people from sleep)
- Repetitive/continuous leg jerks every 20-40 seconds during sleep
- 5-6% of population affected
- Treatment- benzodiazepines, levodopa, dopamine agonists, opiates, iron replacement

Periodic Leg Movements



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