

Sleep disorders and sleep-related illnesses/PGS

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Last update: Wednesday, 28 Dec 2022 at 4.59 pm.

Sleep Disorders

According to the latest **international classification** sleep disorders are divided into 8 groups:

1. **Insomnia**
2. **Sleep breathing disorders**
3. **Hypersomnia of central origin**
4. **Circadian rhythm disorders**
5. **Parasomnia**
6. **Abnormal movements during sleep**
7. **Isolated symptoms**
8. **Other sleep disorders**

The most common sleep problems that are the reason for examination:

- **sleep breathing disorders** (snoring, respiratory arrest, nocturnal dyspnea)
- **insomnia** (falling asleep disorder, sleep continuity disorder and early awakening)
- **excessive daytime sleepiness**
- **atypical nocturnal behavior or motor manifestations**

Sleep disorder anamnesis

- time of lying down, time of falling asleep, feeling of restless legs when falling asleep with urge to move limbs, continuity of night sleep, number of night awakenings and their reason, Nocturia, snoring, respiratory arrest, nocturnal dyspnea, nocturnal palpitations, nocturnal motor activity (in and out of bed), vocalizations during sleep, dreams (colorful, vivid, accompanied by physical activity), time of getting up in the morning, feeling refreshed in the morning, morning headaches and feeling of dry mouth, daytime sleepiness – number and length of daytime naps, subsequent feeling of refreshment, states of sudden loss of muscle tone linked to emotions, sleep paralysis
- total trouble time, coincidence of the time of onset with other events (stress, obesity, head injury, infection, job change, medication, other neurological diseases, etc.), daily routine (shifting, irregular, etc.)

Subjective assessment of daytime sleepiness

1. **Subjective assessment of daytime sleepiness** – scale *Epworth Sleepiness Scale (ESS)*
2. **Sleep diary** – recording of sleep and wakefulness over a longer period of time (e.g. 4 weeks)

Auxiliary examinations, indications of examination methods in the sleep laboratory

Polysomnography

All-night examination in the sleep laboratory. **Simultaneous EEG recording** – electroencephalography (minimum 2 leads), **EOG** – electrooculography – registration of horizontal and vertical eyeball movements and **EMG of chin muscles**, are necessary to distinguish between sleep and wakefulness and individual sleep stages. At the same time, other parameters are monitored, which will make it possible to diagnose the event. Sleep Disorders – **a stream of air in front of the nose and mouth, microphone, breathing movements** of chest and abdomen, **EKG, saturation** of hemoglobin with oxygen, **EMG of lower leg muscles**. Simultaneous **video recording** is advantageous.

- **Indication:** excessive daytime sleepiness, ventilation disorder during sleep or periodic limb movements, abnormal behavior or movement during sleep, nocturnal paroxysmal manifestations of unclear etiology (nocturnal epilepsy, parasomnia), rarely insomnia.

Limited polygraphy

Also an all-night breathing examination, EKG and oximetry, can also be performed outside the sleep laboratory.

- **Indication:** ventilation disorder during sleep.

Actigraphy

Several-day monitoring of physical activity taken from the upper limb in case of suspected circadian rhythm disorders, examination of insomnia and hypersomnia, or 3 times in a row nocturnal monitoring of movements of the lower limbs as a screening method for capturing periodic movements of the limbs during sleep.

Multiple Sleep Latency Test (MSLT)

Repeated polysomnographic 20-minute measurements after falling asleep (only EEG, EOG and EMG) during the day - sleep latency and event. sleep stages.

- **Indication:** verification and quantification of excessive daytime sleepiness, suspicion of narcolepsy (here, MSLT as a condition for diagnosis).

Titration of CPAP and BiPAP

In patients with sleep-disordered ventilation indicated for treatment with overpressure in the airways (CPAP) or for treatment with non-invasive pressure-controlled ventilation support (BiPAP).

Sleep breathing disorders

Symptoms

Ronchopathy (snoring), repeated respiratory arrests or shortness of breath, unrefreshing night sleep, excessive daytime sleepiness and fatigue, morning headaches, dry mouth, concentration disorders, cognitive disorders, insomnia, waking up at night with a feeling of shortness of breath, nocturia.

The **association with other diseases** is significant – obesity, neuromuscular diseases, gastroesophageal reflux, chest deformities, abnormalities of the facial skeleton and dentition, hypothyroidism, obstructive pulmonary disease (COPD), acromegaly etc. Sleep breathing disorders lead to hypertension, to increased atherogenesis, to ischemic cerebrovascular events a metabolic syndrome.

Diagnostics

Polysomnography or **limited polygraphy**. In the case of confirmation of the diagnosis, ENT examination, dental surgeon consultation including X-ray cephalometry, spirometry event. complex lung examination, event. examination arterial blood gases and parameters of acid-base balance.

Obstructive sleep apnea (OSA)

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Comment: Obstructive Sleep Apnea (OSA) vs. Central Sleep Apnea (CSA) The point is, that in OSA during apnoic pause (no air flow from and out of the nose), you should see chest movement (there is obstruction in retroglottal space). In case of CSA, the problem is with the CNS respiratory centers and there is no obstruction, thus in case of apnoic pause (again no air flow), you will not see chest movement.

ICSD-3

1. Insomnias – psychophysiological, idiopathic, sleep hygiene...
2. Obstructive Sleep Apnea (OSA) and Central Sleep Apnea (CSA)
3. Narcolepsy
4. Circadian rhythm
5. Parasomnias
6. Movement disorders during sleep – Bruxism and Restless Leg Syndrome.

Central sleep apnea (CSA)

Central sleep apnea

Hypoventilation/hypoxemic syndromes

Saturation drop O_2 during sleep it has **flowing character**, captured breath irregularity and lower amplitude rather than clear breath pauses awakening responses may not be present. Most often in **diseases of the lung parenchyma**, esp. interstitial pulmonary fibrosis, COPD, **laryngeal stenoses**, **neuromuscular diseases** (myasthenia, muscular dystrophy, severe chest malformations) and considerable obesity.

Therapy

Treatment of the underlying disease, symptomatically BiPAP, in indicated cases also oxygen therapy (not suitable for neuromuscular diseases).

Insomnia

Symptoms

Difficulty falling asleep, interrupted sleep, early awakening, unrefreshing sleep, daytime problems - fatigue to sleepiness, concentration and memory disorders, increased tension, irritability, risk of injury, changes to mood disorders, reduced motivation, somatic problems (headaches, digestive problems).

Diagnosis

Based on the medical history, polysomnography is exceptionally necessary to rule out an organic sleep disorder.

Basic etiological units of insomnia and basic symptoms:

1. **Transient** (acute) - lasting up to 4 weeks, stress-induced, e.g. acute somatic illness, workload, family problems, etc.
2. **Chronic** (psychophysiological, learned, fixed) - anxiety about the impossibility of sleeping before lying down, fear of not sleeping, fear of this disease and its consequences.
3. **Paradoxical** - sleep perception disorder; the patient thinks that he does not sleep at all or that he sleeps very little, while this does not correspond to reality.
4. **Circadian rhythm disorder** - jet lag syndrome, shift work, delayed and advanced phase syndrome, and others.
5. **Organic insomnia** (caused by another disease) – restless legs syndrome, periodic limb movements during sleep, sleep apnea, neurometabolic diseases, structural malformations of the CNS.
6. **Secondary insomnia in psychiatric diseases** (anxiety-depressive syndrome, psychoses, personality disorders, etc.).
7. Other causes – inappropriate sleep hygiene, and side effects of medicines, drugs, or alcohol.

Therapy

1. **Psychotherapeutic intervention** - explanation of the origin of the disorder and calming of the patient, instruction on sleep hygiene, cognitive behavioral therapy, possibly individual or group psychotherapy, and relaxation techniques.
2. **Medicinal**
 - transient insomnia – hypnotics of the III. generation (zolpidem, zopiclone) and removal of the provoking cause.
 - chronic insomnia – antidepressants with a positive effect on sleep, e.g. trazodone, mirtazapine, hypnotics of the III. generation as the ultimum refugium.

Circadian rhythm disorders can also be the cause of insomnia (but also daytime sleepiness).

Circadian rhythm disorders

In these disorders, the preferred time of going to bed and waking up deviates from the usual social norm by more than 2 hours.

Main symptoms

Insomnia at the time of usual falling asleep or early awakening, difficult awakening with signs of sleep intoxication. Drowsiness, fatigue, irritability, concentration or memory disorders, accident proneness during the day.

Division of circadian rhythm disorders:

1. Delayed sleep phase - delayed time of going to sleep and falling asleep, morning sleepiness, and difficulty getting up, occurrence is frequent, especially in adolescence.
2. Advanced stage of sleep - early going to bed, early awakening, especially in older age.
3. The irregular rhythm of sleep and wakefulness - neurodegenerative diseases, organic diseases of the CNS in

early infancy.

4. Free-running rhythm – failure of synchronization with the external environment. The cause may be a malfunction of the suprachiasmatic nucleus (organic damage to this part of the CNS, a defect in the genes determining the duration of the circadian period) or a malfunction of the retinothalamic pathway (blindness).
5. Jet lag syndrome - a temporary failure of synchronization with the light rhythm when crossing more than 2 time zones, the duration and tolerance of the condition is significantly individual.
6. Shiftwork
7. Secondary etiology - other neurological diseases, drugs, medicines, alcohol.

Diagnostics

Anamnesis, sleep diary, objectification using 10-day actigraphy.

Therapy

A regular schedule of sleep and wakefulness, phase shift at a specialized workplace (chronotherapy) in an isolated environment, phototherapy (intense illumination with artificial light in the morning for the delayed phase, in the evening for the advanced phase). If melatonin is available, its administration at the time of desired falling asleep, in the case of a delayed phase of sleep in adolescence, vitamin B12 intramuscularly.

Related articles

Sleep Disorders

Excessive daytime sleepiness

Excessive daytime sleepiness

Narcolepsy

Narcolepsy

1. **Recurrent hypersomnia**
 1. **Kleine-Levin syndrome** – episodes of alternating normal sleep with periods of markedly prolonged sleep phase, typically accompanied by hypersexuality and disordered eating
 2. **Menstrual hypersomnia**
2. **Behavioral hypersomnia** – sleep hygiene disorder with subsequent sleep deprivation, or on the basis of drug, medication or alcohol abuse
3. **Idiopathic hypersomnia** – excessive daytime sleepiness lasting more than 6 months, subjective need for more than 6 hours of sleep, no imperative falling asleep
4. **Secondary hypersomnia** in case of organic CNS involvement

Diagnostics

- **Polysomnography** – does not show any other sleep disorder, sleep duration is extended to more than 10 hours. Average sleep latency in MSLT 5 is shorter than 8 min., but REM sleep is present in max. 1 test.

Therapy

- **Central psychostimulants** – methylphenidate (Ritalin), a modafinil (Vigil).

Atypical nocturnal behavior or manifestations

Parasomnias

Abnormal behavioral manifestations occurring in connection with sleep.

Main symptoms

States of **nocturnal confusion** and **abnormal behavior**, screaming or crying, automatic action. States are of **longer duration** (minutes to tens of minutes), during which is the patient in limited contact, but **reacts appropriately after waking up**, for the events there is usually amnesia. It is typical to **occur in certain parts of the night** depending on the type of parasomnia. They can be potentially dangerous to the patient or his surroundings (aggressive behavior, falls).

- **Differential diagnosis of parasomnias:** especially nocturnal partial complex epileptic seizures, frontal epilepsy, panic disorder.

Disorders of awakening mechanisms from deep NREM sleep

States of **confusion** (*confusional arousals*), **sleepwalking** (*somnambulismus*) and **nightmares** (*pavor nocturnus*). Manifestations occur mostly in the first half of the night, occurrence especially in children, may be associated with chronic stress.

Diagnostics

Polysomnography or video EEG monitoring shows that the manifestations are linked to stages of NREM 3 or 4 sleep (at the same time, sometimes respiratory abnormalities), sometimes diffuse delta activity persists in the EEG even during activity, there are no epileptic EEG changes.

Treatment

Ensuring a sleep environment against injury, in case of higher frequency (more than 5 times per month) or particularly dangerous behavior is the drug of choice clonazepam (Rivotril) or clobazam (Frisium), if a psychological cause is proven, then event. psychotherapy. When OSA is detected, its treatment.

Parasomnias associated with REM sleep

REM sleep behavior disorder

REM behavior disorder (RBD) – muscle atonia disorder in REM sleep. It is more common in **older men**, the association with Parkinson's disease, MSA and with narcolepsy is significant. Patients perform dream experiences (motorically and vocally, they realize their participation in the dream), they often indicate unpleasant persecution by people or animals. Maximum manifestations in the second half of the night.

- **Diagnostics:** polysomnography shows increased muscle tone or lack of atonia in REM sleep and motor activity event. vocalization during REM sleep.
- **Treatment:** clonazepam (Rivotril) for night.

Recurrent sleep paralysis

Transient **impossibility of movement** ((a feeling of total paralysis, only the movements of the eyeballs are preserved) linked episodically to the transition of the sleep/wake state, usually associated with a significant feeling of anxiety and fear of this state, the inability to call for help, the state **disappears" spontaneously within seconds**, minutes at the most, ending with touch, addressing, turning on the light. In children and young adults, it is a **benign issue**, but for dramatic clinical manifestations it may be a reason for a nighttime arrival at the hospital and for further investigation (risk of iatrogenization).

- **Diagnostics:** based on medical history.

Nightmares

Waking up as a result of **unpleasant dream experiences**, which the patient remembers at least in outline. In childhood, these manifestations are common, in adults there is an association with mental illnesses and/or L-DOPA treatment, there is a known connection with a strong emotional experience or the occurrence of post-traumatic stress disorder. **Polysomnography** demonstrates awakening from REM sleep, **treatment** if necessary, is the administration of anxiolytics at night or antidepressants.

Other parasomnias

1. **Dissociative disorders and panic attacks** – the attack precedes awakening, there is no amnesia, the condition is accompanied by vegetative manifestations of anxiety, shortness of breath.
2. **Enuresis nocturna** – primary in children (the dry interval was no longer than 2 months), secondary – the occurrence of urination after a longer dry interval (in case of embarrassment, it must be ruled out that these are not mitigated epileptic seizures).
3. **Night eating syndrome** – compulsive overeating at night after a long sleep, often also of indigestible substances.
4. **Catathrenia** (*nocturnal grunting* – night purring) – making long expiratory noises in sleep, without impaired ventilation, treatment is rarely necessary, moreover, it is problematic.

Differential diagnosis of parasomnias – epileptic seizures in sleep

Epileptic seizures can start during sleep or from being awake during the night.

- **Generalized seizures** with unconsciousness with tonic-clonic convulsions (GTCS) can be activated in stages **1 and 2 of NREM sleep**, in REM sleep the seizure alertness is lower.
- **Partial seizures** bound to sleep – Jacksonian paroxysms, complex partial seizures arising from the temporal, frontal and supplementary motor areas. Specific EEG findings are found in benign age-related epilepsies with partial seizures, when epileptiform activity is activated.
- A specific finding is **status epilepticus electricus in NREM sleep** (ESES), which is often accompanied by epileptic acquired **aphasia** (Landau-Kleffner syndrome), but can also occur in other encephalopathies (e.g. in patients with chromosomal aberrations). **Sleep apnea can decompensate epileptic disease!**

Diagnosics

- 24 hour **video monitoring, polysomnography** – in the EEG we can capture both ictal and specific interictal manifestations. In the recording, the ictal EEG is often disturbed by movement artifacts, the video recording is also used for the semiological classification of paroxysmal states.

Treatment

It is similar to seizures occurring while awake.

 For more information see *Treatment of epilepsy*.

Abnormal movements during sleep

Restless legs syndrome (RLS)

Periodic limb movements during sleep (PLMS)

Rhythmic movements

Rhythmic stereotyped movements during wakefulness and in superficial stages of NREM sleep. Head movements (*iactatio capitis*), rocking the body sideways (*body rolling*) or just the head (*head rolling*). Movements occur in longer sequences, sometimes patients are not aware of them. They are physiological in infancy, persisting into adulthood can lead to sleep disturbances and tiredness of the muscles involved, in addition to disturbing the partner.

Diagnosics

Polysomnography or videoEEG monitoring – necessary to rule out other causes, especially epileptic etiology of conditions and to specify the semiology of the manifestations.

Treatment

Possible to try clonazepam or imipranin, however, treatment tends to be less successful.

Bruxism

A condition in which a patient clenches his teeth and moves them against each other while not chewing or eating. It is sometimes referred to as "gnashing of teeth", which can be very intense (eg at night).

Division

- Night (nocturnal),
- Daytime (daytime).

Symptoms

- Morning sensitivity to bite
- Tooth feeling on the water
- tooth abrasion
- Facet and crown fractures
- masticatory muscle hypertrophy
- proven link between emotional lability and bruxism

Treatment

- Daily bruxism must be consciously suppressed by the patient
- At night with tricyclic antidepressants
- Properly designed protective bite plates