

PERIODIC LIMB MOVEMENT (PLM): A MEDICAL SLEEP DISORDER

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ABSTRACT

The study of sleep disorder describes the disorders or diseases that a person suffers from, when he/she is suffering from any of them. In the following paper we have discussed the same. The specific disorder discussed below is the Periodic Limb Movement (PLM). As the name suggests, PLM is the periodic movement of the lower part of leg during the sleep hours of an individual. It takes place at some specific interval of time. The same can be diagnosed by polysomnography. The studies have revealed the fact that PLM cannot be cured completely, but the medication can be continued for relief.

Keywords: *Sleep Disorder, Types of Sleep Disorder, Periodic Limb Movement (PLM)*

I. INTRODUCTION

A sleep disorder is a physical and psychological condition or disturbance of sleep and wakefulness caused by abnormalities that occur during sleep or by abnormalities of specific sleep mechanisms. Although the sleep disorder exists during sleep, recognizable symptoms manifest themselves during the day. Accurate diagnosis requires a polysomnogram, widely known as a "sleep test." It is estimated that some 40 million Americans suffer from chronic, long-term sleep disorders. Another 20 to 30 million Americans suffer from some kind of sleep disorder on an irregular basis.

It is estimated that some 40 million Americans suffer from chronic, long-term sleep disorders. Another 20 to 30 million Americans suffer from some kind of sleep disorder on an irregular basis. The movements typically involve the legs, but upper extremity movements may also occur. Movements occur periodically throughout the night and can fluctuate in severity from one night to the next. They tend to cluster in episodes that last anywhere from a few minutes to several hours. These movements are very different from the normal spasms, called hypnic myoclonia, that we often experience initially while trying to fall asleep.

II. SLEEP DISORDER

A sleep disorder, or somnipathy, is a medical disorder of the sleep patterns of a person or animal. Some sleep disorders are serious enough to interfere with normal physical, mental, social and emotional functioning. Polysomnography and actigraphy are tests commonly ordered for some sleep disorders. Disruptions in sleep can be caused by a variety of issues, from teeth grinding (bruxism) to night terrors. When a person suffers from difficulty falling asleep and/or staying asleep with no obvious cause, it is referred to as insomnia.

Sleep disorders are broadly classified into dyssomnias, parasomnias, circadian rhythm sleep disorders involving the timing of sleep, and other disorders including ones caused by medical or psychological conditions and sleeping sickness. Some common sleep disorders include sleep apnea (stops in breathing during sleep),

narcolepsy and hypersomnia (excessive sleepiness at inappropriate times), cataplexy (sudden and transient loss of muscle tone while awake), and sleeping sickness (disruption of sleep cycle due to infection). Other disorders include sleepwalking, night terrors and bed wetting. Management of sleep disturbances that are secondary to mental, medical, or substance abuse disorders should focus on the underlying conditions.

The most common sleep disorders include:

- **Bruxism:** Involuntarily grinding or clenching of the teeth while sleeping.
- **Delayed sleep phase disorder (DSPD):** inability to awaken and fall asleep at socially acceptable times but no problem with sleep maintenance, a disorder of circadian rhythms. (Other such disorders are advanced sleep phase disorder (ASPD), non-24-hour sleep-wake disorder (non-24) in the sighted or the blind, and irregular sleep wake rhythm, all much less common than DSPD, as well as the transient jet lag and shift work sleep disorders.)
- **Hypopnea syndrome:** Abnormally shallow breathing or slow respiratory rate while sleeping.
- **Idiopathic hypersomnia:** a primary, neurologic hypersomnia, which shares many similarities with narcolepsy.
- **Insomnia disorder:** Chronic difficulties in falling asleep and/or maintaining sleep when no other cause is found for these symptoms.
- **Kleine–Levin syndrome:** characterized by persistent episodic hypersomnia and cognitive or mood changes (rare)
- **Narcolepsy:** Excessive daytime sleepiness (EDS) often culminating in falling asleep spontaneously but unwillingly at inappropriate times. Also often associated with cataplexy, a sudden weakness in the motor muscles that can result in collapse to the floor.
- **Night terror:** sleep terror disorder, an abrupt awakening from sleep with behaviour consistent with terror.
- **Nocturia:** A frequent need to get up and urinate at night. It differs from Enuresis, or bed-wetting, in which the person does not arouse from sleep, but the bladder nevertheless empties.
- **Parasomnias:** Disruptive sleep-related events involving inappropriate actions during sleep; sleep walking and night-terrors are examples.
- **Periodic limb movement disorder (PLMD):** Sudden involuntary movement of arms and/or legs during sleep, for example kicking the legs. Also known as nocturnal myoclonus. See also Hypnic jerk, which is not a disorder.
- **Rapid eye movement sleep behaviour disorder (RBD):** Acting out violent or dramatic dreams while in REM sleep, sometimes injuring bed partner or self (REM sleep disorder or RSD)
- **Restless legs syndrome (RLS):** An irresistible urge to move legs. RLS sufferers often also have PLMD.
- **Sleep apnea, obstructive sleep apnea:** Obstruction of the airway during sleep, causing lack of sufficient deep sleep, often accompanied by snoring. Other forms of sleep apnea are less common. When air is blocked from entering into the lungs, the individual unconsciously gasps for air and sleep is disturbed. Stops of breathing of at least ten seconds, 30 times within seven hours of sleep, classifies as apnea. Other forms of sleep apnea include central sleep apnea and sleep-related hypoventilation.
- **Sleep paralysis:** is characterized by temporary paralysis of the body shortly before or after sleep. Sleep paralysis may be accompanied by visual, auditory or tactile hallucinations. Not a disorder unless severe. Often seen as part of narcolepsy.

- Sleepwalking: Engaging in activities that are normally associated with wakefulness (such as eating or dressing), which may include walking, without the conscious knowledge of the subject.
- Somniphobia: A cause of sleep deprivation. Somniphobia is a dread/ fear of falling asleep or going to bed. Signs of illness include anxiety and panic attacks before and during attempts to sleep.
- Situational circadian rhythms sleep disorder: shift work sleep disorder (SWSD). Jet lag was previously included here, but it doesn't appear in DSM-5 (Diagnostic and Statistical Manual of Mental Disorders).

Treatments for sleep disorders generally can be grouped into four categories:

- Behavioural and psychotherapeutic treatment.
- Rehabilitation and management.
- Medication.
- Other somatic treatment.

None of these general approaches is sufficient for all patients with sleep disorders. Rather, the choice of a specific treatment depends on the patient's diagnosis, medical and psychiatric history, and preferences, as well as the expertise of the treating clinician. Often, behavioural/psychotherapeutic and pharmacological approaches are not incompatible and can effectively be combined to maximize therapeutic benefits. Management of sleep disturbances that are secondary to mental, medical, or substance abuse disorders should focus on the underlying conditions.

III. TYPES OF SLEEP DISORDER

- Dyssomnias - A broad category of sleep disorders characterized by either hypersomnia or insomnia. The three major subcategories include intrinsic (i.e., arising from within the body), extrinsic (secondary to environmental conditions or various pathologic conditions), and disturbances of circadian rhythm.
- Insomnia: Insomnia is often a symptom of a mood disorder (i.e., emotional stress, anxiety, depression) or underlying health condition (i.e., asthma, diabetes, heart disease, pregnancy or neurological conditions).
- Primary hypersomnia. Hypersomnia of central or brain origin.
- Narcolepsy: A chronic neurological disorder (or dyssomnia), which is caused by the brain's inability to control sleep and wakefulness.
- Idiopathic hypersomnia: a chronic neurological disease similar to narcolepsy in which there is an increased amount of fatigue and sleep during the day. Patients who suffer from idiopathic hypersomnia cannot obtain a healthy amount of sleep for a regular day of activities. This hinders the patients' ability to perform well, and the patient has to deal with this for the rest of their lives.
- Recurrent hypersomnia - including Kleine–Levin syndrome
- Posttraumatic hypersomnia
- Menstrual-related hypersomnia
- Sleep disordered breathing (SDB), including (non exhaustive):

IV. PERIODIC LIMB MOVEMENT (PLM)

Periodic limb movement (PLM), also known as nocturnal myoclonus, is a condition where a sleeper moves limbs involuntarily during sleep, thus disrupting normal sleep patterns. Limb movements usually occur at periodic intervals from 20-40 seconds apart, mainly during the first half of the night, and only during non-REM

sleep (during REM sleep, any movement is overridden by the muscle Antonia or paralysis that accompanies that stage of sleep). These movements are associated with partial arousals or micro-awakenings, although the sufferer is usually unaware of the limb movements or even of the frequent sleep disruptions. The involuntary kicking during sleep that most often characterizes PLM causes sleep disruption for both the sleeper and, perhaps to an even greater extent, their sleeping partner.

Unlike Restless Leg Syndrome (RLS) where the sufferer voluntarily moves limbs to dispel an uncomfortable feeling, and which tends to occur mainly during resting waking hours, PLM movement actually occurs during sleep itself and is completely **involuntary**, with the sufferer usually not even being aware of the movement. However, the two conditions are linked to some extent, and 80% of RLS sufferers also report PLM (although the reverse association is much weaker). Both PLM and RLS are much more common in older people, affecting up to a third of all over-60s by some estimates, and the two disorders are often talked about together and conflated, although they are quite separate complaints. There are also some possible associations with REM sleep behaviour disorder and narcolepsy.

PLM movements occur as a result of a sudden contraction of one or more muscle groups, but the root causes remain unknown. Many **Parkinson's disease** patients also suffer from PLM, so it is hypothesized that a lack of dopamine may be involved. Other contributing factors include shift work, coffee, stress and exercise just before bedtime. **Treatment** of PLM typically includes the elimination of these contributing factors as far as possible and pharmacological treatment with the same drugs as are used with Parkinson's disease.

The exact cause of PLMS is still unknown. Scientists believe that the underlying mechanisms probably involve factors in the nervous system, although studies have not revealed any consistent abnormalities. PLMS are not considered medically serious. They can, however, be implicated as a contributing factor in chronic insomnia and/or daytime fatigue because they may cause awakenings during the night. Occasionally, PLMS may be an indicator of a serious medical condition such as kidney disease, diabetes or anaemia.

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4.1 The Symptoms of PLM

Symptoms of PLM are usually leg movements with the extension of the big toe in combination with a partial flexing of the ankle, knee, or hip. Movement of the legs is more typical than movement of the arms. It can often cause a partial or full brief awakening, resulting in fragmented sleep. Patients are frequently unaware of these movements

4.2 Treatment of PLM

Generally, there are several classes of drugs that are used to treat PLM. These include drugs closely related to those that treat Parkinson's disease, anticonvulsant medications, benzodiazepines, and narcotics. Current treatment recommendations consider the anti-Parkinson's type medications as a first line of defence. Medical treatment of PLM often significantly reduces or eliminates the symptoms of these disorders. There is no cure for PLM and medical treatment must be continued to provide relief.

V. CONCLUSION

A sleep partner may observe PLM, which often affects the partner before the person knows of his or her behaviour. In other cases, the diagnosis is made with the use of an overnight polysomnogram (a test that records bodily functions during sleep). This test is often used to assess the cause of daytime sleepiness or recurrent awakenings from sleep. Blood work may be done in order to test iron status, folic acid, vitamin B12, thyroid function, and magnesium levels.

The causes of PLM are unknown. However recent research has shown that people with a variety of medical problems, including Parkinson's disease and narcolepsy, may have frequent periodic limb movements in sleep. PLM may be caused by medications, most notably, antidepressants.

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