

# Periodic Limb Movements during Sleep

by Susan Blonshine BS, RRT, RPFT

**R**estless legs syndrome (RLS) affects 3 percent to 8 percent of the population in the United States. Common symptoms include sensations in the legs that occur during periods of inactivity that become more severe at night. Often the patient will have involuntary jerking of the limbs during sleep and occasionally during wakefulness that leads to difficulty falling asleep or staying asleep. The disrupted sleep causes the individual to complain of daytime tiredness or fatigue.

It is estimated that 80 percent of the individuals with RLS have periodic limb movements during sleep (PLMS), although the converse is not true. Individuals and especially senior citizens with PLMS may not have other RLS features; and, in fact, no more than 30 percent of those with

PLMS also have RLS. The cause of RLS is not well defined. It may be idiopathic or have overlapping causes of a genetic or a secondary disorder origin. Recent literature has also examined a link between RLS and symptoms of attention-deficit hyperactivity disorder.

## Diagnosis

Although RLS is typically diagnosed between ages 50 and 60, a medical history may reveal symptoms dating back to childhood. The prevalence of PLMS increases after age 65. The increasing incidence of PLMS with age makes it more likely that a positive polysomnogram is indicative of RLS in the younger individual. A relationship between circadian rhythm with the maximum effects at night has been found for RLS, subjective discomfort, and PLMS. The

maximum level of subjective discomfort and motor restlessness occurred following midnight with a peak intensity on the falling phase of the core temperature cycle. The authors concluded that the diagnostic criteria that RLS occurs with rest and during the night have independent bases.<sup>1</sup>

The repetitive movements occurring at 15- to 40-second intervals during non-REM (rapid eye movement) sleep define PLMS. Usually the legs are involved with an extension of the great toe associated with flexion at the ankle, knee, and hip. The arms are also sometimes involved. Although PLMS is associated with recurrent microarousals during sleep, the frequency of PLMS with microarousals does not correlate well with objective daytime sleepi-

references

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2. Winkelman, J.W. (1999). The evoked heart rate response to periodic leg movements of sleep. *Sleep*, 22(5), 575-580.
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4. Hening, W., Allen, R., Earley, C., et al. (1999). The treatment of restless legs syndrome and periodic limb movement disorder. An American Academy of Sleep Medicine Review. *Sleep*, 22(7), 970-999.

additional reading

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ness. Generally, after polysomnography is performed, periodic leg movements are subdivided based on their association with an electroencephalogram (EEG) arousal. The association of increased heart rate and blood pressure responses with daytime sleepiness, but without EEG arousals, is also described in the literature.<sup>2</sup> The clinical significance of heart rate and blood pressure response without EEG arousal probably warrants further study.

**Treatment**

The first clinical guidelines providing

evidence-based practice parameters for the treatment of RLS and periodic limb movement disorder (PLMD) were published in November 1999.<sup>3</sup> The recommendations are based on a comprehensive review of the medical literature regarding treatment of RLS and PLMD.

Treatment varies based on the identification of underlying conditions. If the RLS is associated with iron or vitamin deficiency, the treatment includes iron, B12, or folate supplements. A review of habits or activities that improve or worsen RLS is important to determine lifestyle changes that may be of benefit. Good sleep hygiene should always be a part of the recommended treatment. All medications prescribed for the individual with RLS should be reviewed. (continued on page 96)

Additional Resources for Patient Education

1. American Academy of Sleep Medicine wellness booklet: "Restless Legs Syndrome and Periodic Limb Movement Disorder"
2. Restless Legs Syndrome Foundation, [www.rls.org](http://www.rls.org)

## Periodic Limb Movement

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Medications known to worsen symptoms include calcium-channel blockers, metoclopramide, most anti-nausea drugs, major tranquilizers, phenytoin, and even some cold and allergy products. Antidepressive medications may also play a role in worsening symptoms.

If symptoms worsen or the aforementioned treatments are unsuccessful, pharmacological therapy may be indicated. Pharmacological treatment should be limited to individuals meeting diagnostic criteria and experiencing insomnia and/or excessive daytime sleepiness secondary to RLS or PLMD.<sup>3</sup> Four primary classes of drugs have undergone clinical studies including dopaminergic agents, benzodiazepines, opioids, and anticonvulsants. The U.S. Food and Drug Administration has not approved any of these drugs for the treatment of RLS. A recent review of the literature reveals that half of the articles on pharmacological interventions were concentrated on dopaminergic agents, particularly levodopa in various formulations.<sup>4</sup> These agents have been found to be the most successful in the treatment of RLS and PLMD.<sup>3</sup>

### Summary

The causes for daytime sleepiness are varied and often overlooked. RLS and PLMS are but two more causes where respiratory therapists in multiple clinical settings need to raise their awareness level. Testing in the sleep center and performance of

polysomnography is an important diagnostic tool for these individuals. Determining the etiology of RLS and PLMS, as well as defining the best treatment options, requires further research.

Understanding and implementing practice guidelines as recommended by the American Academy of Sleep Medicine is a major step toward improved care for this population. 🌱

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## Imaging in Cardiology

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- To detect post-angioplasty or post-bypass graft reocclusion
- To improve post-myocardial infarction prognostic risk stratification
- To assess acute chest pain syndromes
- To improve the sensitivity of traditional stress ECG evaluation.

Nuclear cardiology has emerged as a centerpiece to cardiac diagnostics. Sensitivity and specificity range from 80–85 percent and are comparable with stress echocardiography. Making a determination between which technique (nuclear or echo) to use often rests with the experience and expertise of each physician and diagnostic laboratory. Radiation exposure, due to very short half-lives of six hours or less, is negligible to both patient and technician. The reliance on a protocol requiring a rest injection and image as well as a post-stress injection and image involves a relatively time-intensive procedure and is perhaps the primary limitation to this technique. 🌱

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### ADDITIONAL READING

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