



## Clinical Identification of the Simple Sleep-Related Movement Disorders\*

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Simple sleep-related movement disorders must be distinguished from daytime movement disorders that persist during sleep, sleep-related epilepsy, and parasomnias, which are generally characterized by activity that appears to be simultaneously complex, goal-directed, and purposeful but is outside the conscious awareness of the patient and, therefore, inappropriate. Once it is determined that the patient has a simple sleep-related movement disorder, the part of the body affected by the movement and the age of the patient give clues as to which sleep-related movement disorder is present. In some cases, all-night polysomnography with accompanying video may be necessary to make the diagnosis. Hypnic jerks (*ie*, sleep starts), bruxism, rhythmic movement disorder (*ie*, head banging/body rocking), and nocturnal leg cramps are discussed in addition to less well-appreciated disorders such as benign sleep myoclonus of infancy, excessive fragmentary myoclonus, and hypnagogic foot tremor/alternating leg muscle activation.

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**Key words:** alternating leg muscle activation; benign sleep myoclonus of infancy; bruxism; excessive fragmentary myoclonus; hypnagogic foot tremor; movement disorders; nocturnal leg cramps; rhythmic movement disorder; sleep; sleep-related movement disorders; sleep starts

**Abbreviations:** ALMA = alternating leg muscle activation; EFM = excessive fragmentary myoclonus; EMG = electromyogram; HFT = hypnagogic foot tremor; PAM = periodic arm movement; PLMS = periodic limb movements in sleep; REM = rapid eye movement; RLS = restless legs syndrome; RMD = rhythmic movement disorder

This review will focus on simple, sleep-related movement disorders. Restless legs syndrome (RLS) and periodic limb movements in sleep (PLMS) are representative of such disorders but will, however, not be covered in detail because they are the subject of another contribution in this series of articles. Parasomnias will also not be covered in detail. As opposed to simple, sleep-related movement disorders, parasomnias are often characterized

by complex behaviors during sleep that appear purposeful and goal-directed, but are outside the conscious awareness of the individual and are therefore inappropriate. Rapid eye movement (REM) sleep behavior disorder and disorders of partial arousal (*ie*, sleep walking, sleep terrors, and confusional arousals) are representative of parasomnias of this type.

The main goal of this review is to teach the reader how to think about all the sleep-related movement disorders in such a way as to come to a proper more narrowly focused differential diagnosis and, ultimately, the proper diagnosis for the simple sleep-related movement disorders. In this context, RLS, PLMS, and parasomnias will be mentioned briefly and will be briefly described when they are in the differential diagnosis of the simple sleep-related movement disorders.

In addition to attempting to make a diagnosis or differential diagnosis based on clinical criteria, it should be emphasized that overnight polysomnography with accompanying video may be necessary to document the nature of the sleep-related movement

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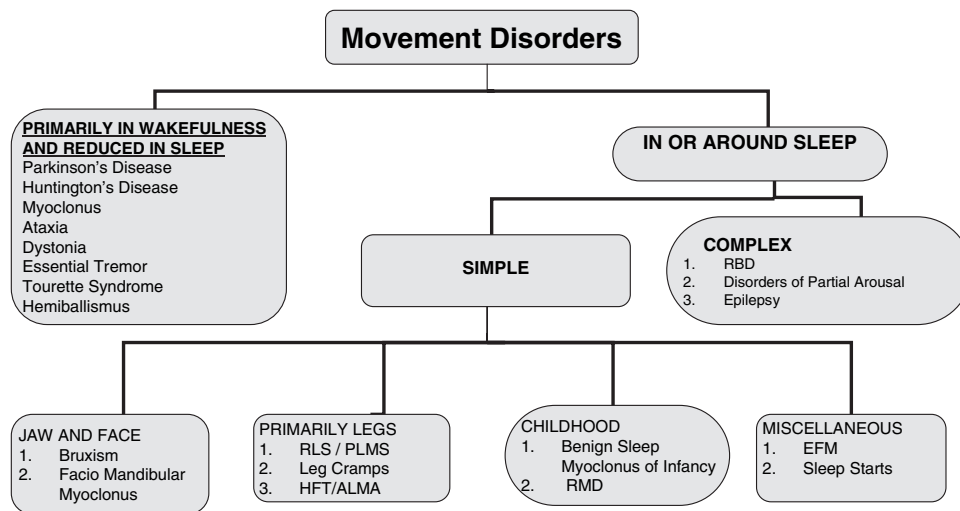
disorders and to properly differentiate them from other simple sleep-related movement disorders, as well as from sleep-related epilepsy and parasomnias. Figure 1 indicates an approach to the diagnosis of all of the sleep-related movement disorders including the simple sleep-related movement disorders and forms the basis for the subsequent discussion of the simple sleep-related movement disorders.

#### APPROACH TO THE SLEEP-RELATED MOVEMENT DISORDERS

The most important thing in diagnosing a sleep-related movement disorder is to have the right approach. The first question to ask is whether the movement disorder occurs only during sleep or whether it also occurs during wakefulness. If the movement disorder also occurs during the day, the diagnosis may include but not be limited to daytime movement disorders that persist to varying degrees during sleep. These include such things as Parkinson disease, Huntington chorea, Tourette syndrome, essential tremor, dystonias, ataxia, myoclonus, neuroleptic-induced akathisia, and hemiballismus.<sup>1</sup> In general, all of the daytime movement disorders persist during sleep but to a much lesser degree than during wakefulness. Although we will not focus on the daytime movement disorders here, Parkinson disease has been the best studied in

regard to its relationship to sleep. Parkinson disease may disrupt sleep in the following several ways<sup>2</sup>: the rigidity and tremor may disrupt sleep; the dopaminergic drugs used to treat Parkinson disease may cause daytime drowsiness with subsequent napping during the day followed by insomnia at night; the dopaminergic drugs used to treat Parkinson disease may cause nighttime hallucinations and paranoia with subsequent insomnia; urinary incontinence associated with Parkinson disease may cause insomnia; depression, which is very high in patients with Parkinson disease, may cause insomnia with early morning awakenings; and there may be a higher prevalence of other specific sleep disorders with Parkinson disease, such as REM sleep behavior disorder, RLS, and PLMS or sleep apnea.

If the movement disorder occurs only at night, the next question to ask is whether the sleep-related movement disorder appears to be simple or complex. If the movement is complex, you may be dealing with a parasomnia rather than a simple movement disorder. Parasomnias are generally characterized by inappropriate activity during sleep that appears to be simultaneously complex, goal-directed, and purposeful but outside the conscious awareness of the patient, and therefore not truly goal-directed or purposeful at all. Sleep walking, sleep terrors, confusional arousals, and REM sleep behavior disorder are examples of this type of activity.<sup>3-5</sup> Sleep walking,



#### DEFINITIONS

RLS:	Restless Legs Syndrome
PLMS:	Periodic Limb Movements in Sleep
HFT:	Hypnagogic Foot Tremor
ALMA:	Alternating Leg Muscle Activation
RMD:	Rhythmic Movement Disorder
EFM:	Excessive Fragmentary Myoclonus
RBD:	REM Sleep Behavior Disorder

FIGURE 1. Flow chart for the approach to the differential diagnosis of sleep-related movement disorders.

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