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# Update on Parasomnias: A Review for Psychiatric Practice

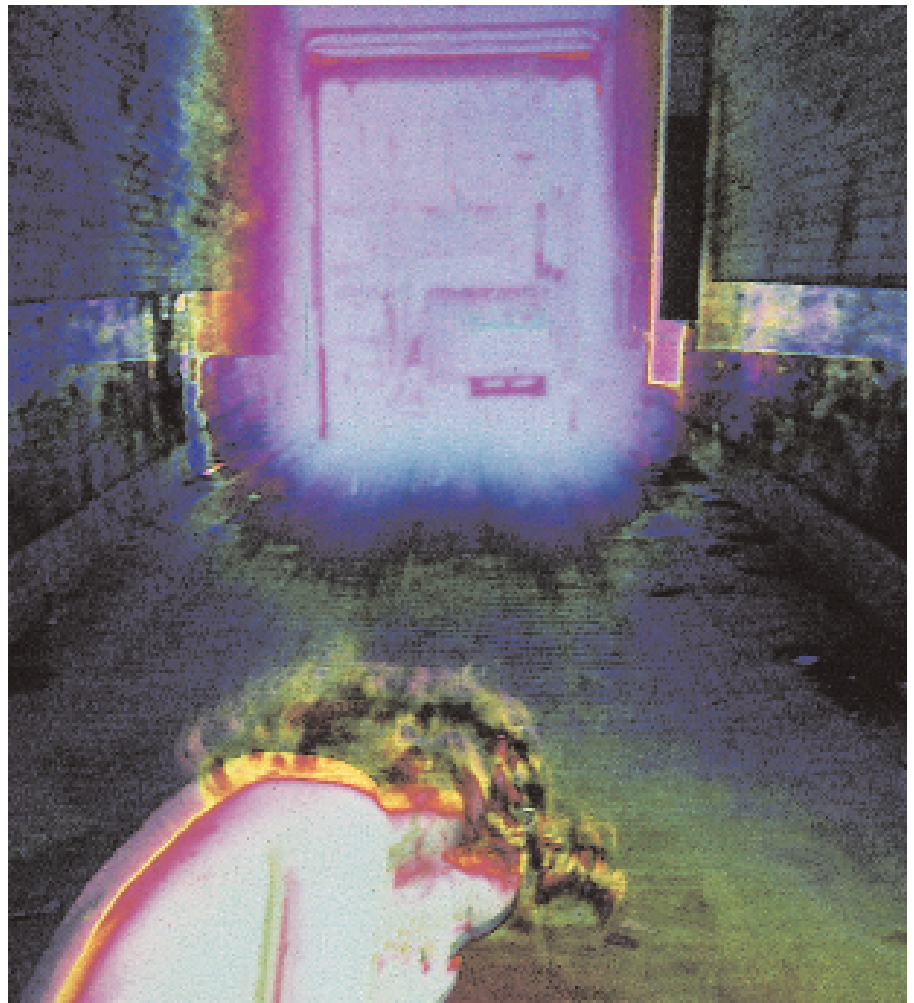
## ABSTRACT

Parasomnias, defined as undesirable behavioral, physiological, or experiential events that accompany sleep, are common in the general population. As a rule, they occur more frequently in children than in adults with the exception of REM sleep behavior disorder (RBD), which is more common in men over 50. No longer considered to be invariably a sign of psychopathology, parasomnias are currently understood as clinical phenomena that arise as brain transitions between REM sleep, non-REM sleep, and wakefulness. This paper presents a clinical approach to diagnosing and treating parasomnias in the general population and in psychiatric patients.

## INTRODUCTION

Sleep consists of two strikingly different states: Rapid eye movement sleep (REM) and non-rapid eye movement sleep (NREM), which alternate in a cyclical fashion. Sleep begins with a “shallow” Stage 1 of NREM and “deepens” to NREM Stages 2, 3, and 4, which are followed by the first brief episode of REM in approximately 90 minutes. After the first sleep cycle, NREM and REM sleep continue alternating in a cyclical fashion. The duration of each cycle is approximately 90 minutes. Stages 3 and 4 of NREM sleep (also known as deep sleep,

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**Key Words: parasomnia, sleep disorder, REM, NREM**

**Upon awakening from a REM parasomnia, an individual is typically alert and has vivid recollection of dream content and mental activity. Individuals with NREM parasomnias who are awakened during the course of sleep are typically disoriented, confused, do not recall dreaming, and will have no recollection of behavior or mentation in the morning.**

delta sleep, or slow wave sleep) predominate during the first third of the night. REM sleep episodes become longer as the night progresses, and the longest REM periods are found in the last third of the night.<sup>1</sup>

Parasomnias can arise from any state of sleep (REM and NREM) as well as sleep-wake transitions and are classified into distinct syndromes on this basis. Disorders of arousal, for example, are the most prevalent of the NREM parasomnias. Typically, disorders of arousal occur during the first third of the night, during the time when deep sleep is most abundant. REM sleep parasomnias are more likely to emerge during the later portion of the sleep period, when REM sleep is most abundant. Upon awakening from a REM parasomnia, an individual is typically alert and has vivid recollection of dream content and mental activity. Individuals with NREM parasomnias who are awakened during the course of sleep are typically disoriented, confused, do not recall dreaming, and will have no recollection of behavior or mentation in the morning. They are regarded as being partially asleep and partially awake. In contrast, individuals with REM parasomnias are regarded as being asleep with liberated motor activity.

### **NREM PARASOMNIAS: DISORDERS OF AROUSAL AND SLEEP-WAKE TRANSITION DISORDERS**

The NREM parasomnias can be categorized as disorders of arousal

and disorders of sleep-wake transition. One example of a sleep-wake transition is a result of sleep inertia, the tendency for sleep process to continue despite awakening, which in vulnerable individuals can lead to a condition known as sleep drunkenness. Following awakening from sleep, individuals with this condition experience a protracted period of impaired vigilance and performance, normally occurring transiently during the transition from sleep to wakefulness. Sleep deprivation may impose more severe sleep inertia on an individual, and sleep drunkenness can last up to several hours.<sup>2,3</sup>

Disorders of arousal include confusional arousals, sleep terrors, and sleepwalking. These parasomnias are best conceptualized as partial or incomplete arousals from deep sleep. During these events, states of sleep and wakefulness coexist and are mixed with one another. The patient is in a state that lies between deep sleep and full wakefulness: He or she is partially asleep and partially awake.<sup>2-4</sup>

Disorders of arousal are common phenomena in childhood and become less frequent after the age of five. In general, a family history of disorders of arousal predisposes the patient to these parasomnias. Specifically, the DQB1 gene is associated with sleepwalking.<sup>5</sup> The episodes of confusional arousal, sleep terror, or sleepwalking may be facilitated by factors that deepen sleep, such as young age, the use of

CNS depressants (including alcohol), recovery from sleep deprivation, or fever. Factors that disrupt sleep and introduce arousals into the normal sleep process, such as pain, stress, shift work, environmental noises, periodic limb movements, sleep apneas, and full bladder can also trigger disorders of arousal.<sup>2</sup> Recent reports of association between the use of zolpidem and sleepwalking or sleep eating may be related to zolpidem's ability to deepen sleep.

#### **Confusional arousals.**

Confusional arousals are common in children. They result from partial or incomplete arousal from deep sleep, typically during the first third of the night. Their prevalence in the 15 to 24-year-old population is six percent, and in those over the age of 65 it is one percent.<sup>3</sup> Confusional arousals are manifested by episodes of confused and slowed thinking, disorientation to time and place, perceptual impairment, and inappropriate responsiveness to external stimuli. Complex motor activity is absent, but individuals may exhibit automatic behaviors, such as picking at clothes and linens, kicking, thrashing in bed, and using objects inappropriately. These episodes are not accompanied by expression of terror or sleepwalking. They typically last from 1 to 10 minutes, and are followed by retrograde amnesia for the event.<sup>2,4-6</sup> These phenomena may occur in adults, as well, and result in cognitive abnormalities. For example, sleep-deprived physicians

who are awakened from deep sleep may experience confusional arousals and are at risk for errors in judgment and decision. Although distinct from sleep terrors and sleepwalking, confusional arousals may evolve into sleep terrors and sleepwalking.

In general, confusional arousals are benign and require no treatment. Parents need to be reassured, and episodes should not be interrupted. Interruption may lead to increased agitation and possible injury.

**Sleep terrors (parvornocturnus, incubus attacks).** Sleep terror attacks arise abruptly, usually during the first third of the night. Although typically these attacks represent partial arousals from deep sleep, occasionally sleep terrors may arise from other stages of NREM sleep and during daytime naps. The individual sits up with an expression of terror, emits a piercing scream, and appears frightened and inconsolable. He usually displays autonomic arousal with rapid breathing, tachycardia, sweating, dilated pupils, and increased muscle tone. He also looks awake, but typically is unresponsive to environmental stimuli, and if awakened, is disoriented and confused. The typical duration is between 30 seconds and 3 minutes, and at the end of an attack, he usually returns to sleep. There is usually amnesia for the episode, although occasionally amnesia is not complete and individuals may report a single image, described as "having difficulty breathing."<sup>2,4-6</sup> Attacks represent partial arousals from deep sleep and may be triggered by sleep-disruptive phenomena, such as untreated apneas, periodic limb

movements, pain, full bladder, and environmental noise. As is the case with other disorders of arousal, there is a strong genetic component, and individuals commonly report family history of sleep terrors and other disorders of arousal. The prevalence of sleep terrors has been reported between 1 and 7 percent in children and in two percent of adults.<sup>3</sup>

**Sleepwalking (somnambulism).** Sleepwalking consists of a series of complex behaviors that are initiated during slow-wave sleep and results in walking during sleep.<sup>6</sup> Typically, the individual sits up in bed during the first third of the night, looks around with a blank stare, and exhibits some repetitive motor automatisms, such as picking at clothes or linens. He or she gets up and walks around the bedroom, enters other rooms, and may even leave the house. During the sleepwalking episodes, the individual exhibits decreased awareness and impaired responsiveness to his or her surroundings and can be difficult to arouse. The patient appears clumsy, uncoordinated, and prone to self-inflicted injuries. He or she may trip over furniture, sustain cuts after walking into mirrors, fall down a flight of stairs, and even walk through a window. Complex behaviors, such as cooking, eating, or driving, may occur. Sleepwalking episodes typically last less than 15 minutes; episodes lasting more than one hour have been reported. Attempts to awaken a sleepwalker usually fail to produce arousal and may lead to aggressive and violent responses.<sup>2,4-6</sup> Cases of sleepwalking violence, including homicidal somnambulism, have been described

in the literature.<sup>7</sup> Sleepwalking episodes usually terminate by the patient returning to bed and resuming sleep. Sleepwalkers may also awaken to find themselves in inappropriate places (e.g. in the neighbor's yard or outside in freezing weather without proper clothing). Up to 40 percent of children experience at least one sleepwalking episode during childhood and 2 to 3 percent of children sleepwalk more than once per month. Between 2 and 3 percent of adults in general population sleepwalk.<sup>3,8</sup>

**Treatment of NREM parasomnias.** For most children, treatment of parasomnias is not necessary; the child is usually unaware of the event at the time of occurrence and does not recall the event in the morning. Disorders of arousal usually pose little risk of danger to the child. The parents may be frightened by sleep terrors and sleepwalking, and parental sleep may be disrupted if child is experiencing these events. In most cases, parents simply need to be reassured that events are not harmful to the child and will decrease in frequency. No effort should be made at termination of sleep terrors and sleepwalking; episodes should be allowed to run their course and end spontaneously. Adhering to good sleep routines and avoidance of sleep deprivation will usually help in reducing the frequency of events. If sleepwalking caused an injury in the past, parents will need to be educated about creating a safe environment in which injury to the child is less likely. Measures may need to include removing sharp objects from the room, blocking child's access to

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stairs and windows, placing mattress on the floor, and keeping doors locked if necessary. In some cases, scheduled awakenings may be effective.

Treatment may be needed if episodes are frequent, severe, and impose danger to the patient, parent, or bed partner—for example, when episodes cause distress and disrupt the patient's or bed partner's sleep, when there are undesirable consequences, e.g., weight gain or excessive daytime sleepiness, and when behaviors are violent or sexual in nature. In adults, the treatment approach may need to be stepwise and include avoiding sleep deprivation, treating primary sleep disorders that may precipitate disorders of arousals, avoiding or minimizing the use of medications that may fragment sleep and precipitate events, and ensuring safety of sleep environment. If the above measures are not effective, the use of benzodiazepines, such as diazepam, oxazepam, and especially clonazepam usually help.<sup>2,9,10</sup>

Individuals typically eat foods they would not choose under usual circumstances. Individuals typically consume high-calorie foods, often in unusual combinations and in a sloppy manner; fruits and vegetables are typically avoided. Sometimes inedible substances, such as uncooked meats, dog food, or dishwashing detergents, are consumed. SRED has features of a parasomnia (sleepwalking, partial arousals) combined with characteristics of binge eating disorder.<sup>11,12</sup> During these episodes, individuals are confused, not fully awake, and display variability in degree of awareness of their behavior. Accurate recollection of the event is absent, and individuals report that they were “half-asleep.” Individuals with SRED frequently have prior histories of sleepwalking with later onset of eating at night. Sleep-related eating disorder is differentiated from the condition night eating syndrome in that individuals with night eating syndrome consume meals during night hours while being fully awake,

condition; the prevalence of SRED is estimated to be 1 to 5 percent of the adult population, and women are affected 2 to 4 times more frequently than men.<sup>4</sup>

**Treatment of sleep-related eating disorder.** First steps in treatment of SRED are aimed at mitigating precipitating sleep disorders, such as obstructive sleep apnea syndrome, periodic limb movement disorder, or restless legs syndrome. Combinations of dopaminergic agents, opiates, and trazodone, as well as topiramate have been used with some success.<sup>13-15</sup>

## SEXSOMNIA

Several case series of patients exhibiting complex sexual behaviors during sleep have been recently described. At this time it is unclear whether sexsomnia is a distinct parasomnia or a variant of sleepwalking. Some features of this parasomnia are distinct from sleepwalking: Behaviors involve sexual partners, individuals exhibit sexual arousal, and more prominent

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## SLEEP-RELATED EATING DISORDER AND NIGHT EATING SYNDROME

Sleep-related eating disorder (SRED) is characterized by partial arousals or awakenings from NREM sleep associated with ingestion of food in a compulsive, “out of control” fashion.<sup>4,11,12</sup> This behavior usually occurs nightly, frequently more than once per night, and

with full awareness and ability to recall their behavior, and is not classified as a parasomnia. Clinical consequences of sleep-related eating disorder include lacerations from utensils, burns from hot food, obesity, hypercholesterolemia, hyperglycemia, and dental carries. Patients on MAOIs may eat tyramine-containing foods, which may precipitate a hypertensive crisis. SRED appears to be a chronic

autonomic activation, and some form of dream mentation is present.<sup>16</sup>

## REM-SLEEP PARASOMNIAS: REM-SLEEP BEHAVIOR DISORDER, NIGHTMARES AND HYPNOGOGIC/ HYPNOPOMPIC HALLUCINATIONS

REM-associated parasomnias include nightmares, REM-sleep behavior disorder, and hypnagogic

and hypnopompic hallucinations. REM sleep occurs in a cyclical fashion throughout the night. The first REM cycle is brief and occurs approximately 90 minutes after sleep onset; subsequent cycles occur approximately 90 minutes apart, and the duration of REM cycles

cats result in RBD-like behaviors with a loss of skeletal muscle atonia during REM sleep. RBD occurs while the patient is fully asleep. These behaviors are not due to partial arousals from REM.

RBD individuals do not seem to enact their customary dreams;

*suggestive of RBD.* There is a strong association between RBD and Lewy body-involving neurodegenerative disorders of Parkinson's disease, multiple systems atrophy, and dementia of the Lewy body type. In one study, half of the Parkinson's disease patients had REM sleep

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increases as the night progresses. Longest REM cycles typically occur at the end of the night.

Humans enter REM sleep as a result of actively orchestrated, complex interactions between multiple neuronal networks. One of the cardinal features of REM sleep is the active inhibition of skeletal muscle activity during REM. Skeletal muscle atonia during REM sleep occurs in the context of a highly active brain and prevents sleepers from acting out their dreams.

**REM-sleep behavior disorder.** REM-sleep behavior disorder (RBD) is the best studied REM sleep parasomnia. The prevalence of violent behavior associated with RBD is 0.5 percent in the general population.<sup>17</sup> Unlike NREM parasomnias, REM sleep behavior disorder is more common in the elderly. The age of onset is typically between 50 and 60 years old, men are affected more frequently than women, and in many individuals there may be a subclinical prodromal state, which can last for decades. In individuals with RBD, the mechanism responsible for normal skeletal muscle atonia is not functioning properly and individuals act out their dreams. Lesions and malfunctions in the brain stem are believed to be responsible for the lack of skeletal muscle atonia during REM sleep. Experimentally induced bilateral dorsal pontine lesions in

dreams that end up being enacted are altered and more threatening. Individuals with RBD also report increased violent content of dreams. Behaviors in individuals with RBD include limb and body jerking, punching, kicking, talking, shouting, swearing, leaping from bed, running into walls or furniture, and striking and choking the bed partner. Since episodes occur during REM sleep, behaviors may recur in a cyclical fashion, every 90 minutes or so through out the course of sleep. The frequency of dream enactment ranges from few times a week to nightly. After being awakened, individuals are able to recall and describe vivid dreams, usually of a threatening nature. Individuals typically describe threatening dreams in which they are pursued or in danger with attempts to escape or fight back, and upon awakening, they relate emotions of fear. REM-sleep related behaviors may result in very serious injuries to patients or their bed partners. Reported injuries include lacerations, bone fractures, falls, and even subdural hematomas.<sup>18</sup> While patients typically come to medical attention complaining of injurious behaviors towards themselves or their bed partner, violence is usually not concordant with the patient's character.<sup>7,17</sup>

*Clinical considerations in patients with complaints*

behavior disorder.<sup>19</sup> In a series of patients with multiple systems atrophy, 69 percent had RBD.<sup>20</sup> Close follow-up of patients with "idiopathic" RBD revealed that more than half eventually developed Parkinson's disease. The majority of patients with "idiopathic" RBD ultimately go on to develop manifestation of parkinsonism. RBD can precede the development of Parkinson's disease by more than 10 years.<sup>14</sup> One hypothesis is that the neurodegenerative disorders associated with RBD may represent the same spectrum of diffuse Lewy body disease. This hypothesis is supported by both clinical and pathology studies.<sup>21</sup>

*Acute reversible RBD.* Acute RBD is most commonly associated with withdrawal from alcohol, benzodiazepines, and barbiturates, as well as with the administration of some psychiatric medications. The administration of tricyclic antidepressants, selective serotonin reuptake inhibitors, cholinergic agents, and monoamine oxidase inhibitors has been associated with increased risk of developing acute forms of RBD.<sup>22,23</sup> Mirtazapine was reported to cause RBD in individuals with parkinsonism.<sup>24</sup> Behaviors in individuals with acute RBD include limb and body jerking, kicking the bed, shouting, and striking bed partners. After awakening, individuals were fully alert and able



**TABLE 1. Parasomnias and sleep stages**

	<b>Sleep terrors</b>	<b>Sleepwalking</b>	<b>Nightmares</b>	<b>REM-Sleep Behavior Disorder</b>
<b>Sleep Stage</b>	<b>Usually III, IV</b>	<b>III, IV</b>	<b>REM</b>	<b>REM</b>
<b>Most likely time of night</b>	<b>First third of sleep period</b>	<b>First third of sleep period</b>	<b>Final third of sleep period</b>	<b>Final third of sleep period</b>
<b>Age group</b>	<b>Children</b>	<b>Children</b>	<b>20-40% of children</b>	<b>Older men</b>
<b>Family history</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>	<b>No</b>
<b>Violence</b>	<b>If attempt to arouse sleeper</b>	<b>Possible, e.g. homicidal somnambulism</b>		<b>Possible</b>
<b>Amnesia for event</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>	<b>No</b>
<b>Confusion</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>	<b>No</b>
<b>May progress to sleepwalking</b>	<b>Yes</b>		<b>No</b>	
<b>Terminated by</b>	<b>Returning to sleep</b>	<b>Returning to bed/ sleep</b>	<b>Usually awoken the sleeper</b>	

to recall dream content. Antidepressants increase REM sleep latency and decrease time spent in REM sleep. The pathophysiologic mechanism by which antidepressants induce acute RBD remains unclear.<sup>18</sup>

*Treatment of patients with RBD.* As is the case with other parasomnias, ensuring environmental safety is essential when treating patients with RBD. Patients and their bed partners

require education about ways of minimizing injuries. Objects that may be used to cause injury must be removed from the room. Clonazepam at doses of 0.5 to 1mg at bedtime is effective in mitigating both problematic behaviors and threatening dreams in up to 90 percent of patients treated for RBD. Some patients require higher doses; tolerance to clonazepam rarely develops. Melatonin at doses of 3 to 12mg can be effective when used

alone or in combination with clonazepam.<sup>14,18,21</sup> Other agents, such as some tricyclic antidepressants, levodopa, and dopamine agonists, may also be effective.<sup>25,26</sup>

If a patient with RBD has a comorbid anxiety or depressive disorder, psychiatrists need to exercise caution when choosing anxiolytics and antidepressants. Since selective serotonin reuptake inhibitors, tricyclic antidepressants, venlafaxine, mirtazepine, and monoamine oxidase inhibitors have all been associated with an increased risk of developing acute forms of RBD, it is advisable to try to avoid those agents in patients with REM sleep behavior disorder. Bupropion is the only antidepressant that has not been associated with acute forms of RBD, and bupropion's dopaminergic activity may be protective against RBD. Bupropion should be the antidepressant of choice in patients with RBD, and clonazepam should be considered first for treatment of anxiety in patients with RBD.

**Nightmares.** Nightmares are frightening dreams or disturbing mental experiences that usually awaken the sleeper from REM sleep.<sup>27</sup> As they unfold, nightmare dream sequences become increasingly more threatening and disturbing. Dream content most frequently involves imminent danger; attacks or pursuit are common themes. Fear and/or anxiety are the most frequent emotions associated with nightmares; sadness, anger, and dysphoria are also frequently reported. In contrast to sleep terrors, nightmares are not associated with confusion or disorientation, and the individual is able to relate dream content as well as associated fear and anxiety upon awakening. Also, sleep terrors may evolve into sleepwalking; nightmares never do. In contrast to REM-sleep behavior disorder, motor activity (such as sitting up, striking, thrashing, speaking, walking) is usually absent in nightmares. Stress and traumatic events may increase

the frequency of nightmares. Multiple classes of drugs may trigger nightmares. Withdrawal from REM-suppressing medications, such as selective serotonin reuptake inhibitors, tricyclic antidepressants, hypnotics, and alcohol, as well as administration of beta blockers and dopaminergic agonists may precipitate nightmares or increase the severity of nightmares.<sup>28,29</sup> Up to 40 percent of nightmare sufferers have been diagnosed with schizotypal, borderline, or schizoid personality disorders. However,

**Hypnagogic and hypnopompic hallucinations.** Hypnagogic and hypnopompic hallucinations are vivid perceptual experiences occurring at the onset (hypnagogic) of sleep or upon awakening (hypnopompic). They are thought to result from the intrusion of REM sleep process into the waking state. Hallucinations are most frequently visual, but can be auditory, tactile, or cenesthopathic (abnormal sensations). Visual hallucinations range from poorly formed shadows, shapes, or colors to well formed complex images. Individuals report

## **APPROACH TO PATIENTS WITH PARASOMNIAS**

It is essential to interview both the patient and patient's bed partner because often patients with NREM parasomnia may be unaware of their activities at night. Ask about childhood and family history of parasomnias. Ask about time of night when symptoms occur and whether the patient recalls associated dreams. A neurologic exam is advisable.

**When to consider referral to a sleep specialist.** All patients with adult onset parasomnias (NREM and

**When parasomnias lead to injury or psychological distress to the patient or the bed partner, result in law breaking, impair functioning due to excessive daytime sleepiness, cause weight gain, or complicate the treatment of a primary Axis I disorder, a referral should be made to a sleep specialist for evaluation and treatment.**

most nightmare sufferers are without any psychiatric history.<sup>29</sup> Treatment of nightmares includes psychotherapy, minimizing or avoiding stress, and minimizing the use of drugs that may precipitate nightmares. In individuals with poor sleep hygiene, instituting a regular sleep-wake pattern may reduce the frequency and severity of nightmares.<sup>28,29</sup> Pharmacotherapy with cyproheptadine at doses of 4 to 16mg or prazosin at doses of 5 to 10mg has been helpful in treatment of nightmares.<sup>30,31</sup>

Nightmares are more prevalent in childhood; prevalence of nightmares in children is 20 to 40 percent; 5 to 30 percent of children report having nightmares "often or always." In adults, the prevalence of one or more nightmares per month ranges from 8 to 30 percent. Two to 5 percent of young adults and 1 to 2 percent of older adults report having nightmares "often or always."<sup>32,33</sup>

seeing circles, shadows, faces, persons, and animals in the room. Images may be constant or changing in size, black and white, or in color. Auditory hallucinations may include indistinct sounds, threatening sentences, or complex melodies.<sup>34</sup> Cenesthopathic hallucinations include changes in body part location and extracorporeal experiences: "I am up in the air and I can see my body." Individuals report feelings of loss of balance, flying, falling, or weightlessness. The experience sometimes terminates with one or several body jerks (known as hypnic jerks).<sup>34</sup> Hallucinations can be pleasing or frightening; eventually individuals learn that images are not real and that they disappear after a few minutes. Occasionally, individuals with hypnagogic or hypnopompic hallucinations are misdiagnosed as having psychotic disorders and inappropriately prescribed antipsychotics.<sup>35</sup>

REM) need to be referred to a sleep specialist for an evaluation. The evaluation should include a nocturnal polysomnographic study, and the sleep specialist will determine whether the patient needs an MRI of the brain or a neurologic work up. When parasomnias lead to injury or psychological distress to the patient or the bed partner, result in law breaking, impair functioning due to excessive daytime sleepiness, cause weight gain, or complicate the treatment of a primary Axis I disorder, a referral should be made to a sleep specialist for evaluation and treatment.

Parasomnias are common in the general population. These clinical phenomena arise as brain transitions between REM sleep, NREM sleep, and wakefulness. Parasomnias can be accurately diagnosed and effectively treated. Certain parasomnias may signal the onset of serious medical disorders. In most cases, adhering to good sleep hygiene measures,

avoiding sleep deprivation, treating primary sleep disorders, reducing stress, and ensuring patient safety are very effective measures that provide adequate relief of symptoms. When episodes are frequent, cause distress, and/or impose danger to the patient or their bed partner, effective pharmacotherapeutic measures are available.

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**In most cases, adhering to good sleep hygiene measures, avoiding sleep deprivation, treating primary sleep disorders, reducing stress, and ensuring patient safety are very effective measures that provide adequate relief of symptoms [of parasomnias].**