# Parasomnias

**Giselle de Martin Truzzi, Cristina Frange, and Fernando Morgadinho Santos Coelho**

Parasomnias are a verbal, motor, or experiential phenomenon that occurs during entry into sleep, within sleep, or during arousal from sleep. Parasomnias may occur during non-rapid eye movement sleep (NREM), rapid eye movement sleep (REM), or during transitions to and from sleep, and are classified accordingly: NREM-related, REM-related, and "other parasomnias" (e.g., sleep enuresis) [1]. The word parasomnia derives from the Greek "para" meaning "alongside" and the Latin word "Somnus," meaning "sleep."

Some parasomnias are considered a primary sleep phenomenon, while others may be secondary due to medication or psychiatric disorders, for example. The evaluation of parasomnias depends on an accurate history, age of onset, and time of the night of the episodes, comprising a detailed anamnesis and a clear description of the events. Refer the patient to a physician in case of suspected parasomnias. Video polysomnography is used to evaluate the parasomnias; as the events may not occur every night, multiple nights of video PSG may be needed.

NREM sleep parasomnias often occur in the transition from the deepest to the most superficial stages, about 2 to 3 hours after the onset of sleep, predominantly in the first half of the night. Most of these manifestations resolve spontaneously [2].

G. de Martin Truzzi (✉)
Psychobiology Department, Universidade Federal de São Paulo, São Paulo, SP, Brazil

C. Frange
Neurology and Neurosurgery Department, Universidade Federal de São Paulo, São Paulo, SP, Brazil

Certified in Sleep Physiotherapy by the Brazilian Sleep Society (ABS), and The Brazilian Association of Cardiorespiratory Physiotherapy and Physiotherapy in Intensive Care (ASSOBRAFIR), São Paulo, SP, Brazil

World Physiotherapy Network for Health Promotion in Life and Work, São Paulo, SP, Brazil

F. M. Santos Coelho
Neurology and Neurosurgery Department; Department of Psychobiology, Escola Paulista de Medicina, Universidade Federal de São Paulo, São Paulo, SP, Brazil



C. Frange, F. M. S. Coelho (eds.), *Sleep Medicine and Physical Therapy*,
https://doi.org/10.1007/978-3-030-85074-6_23

REM sleep parasomnias are more prevalent in the second half of the night, and the chance of spontaneous remission is lower than in NREM sleep parasomnias [3, 4].

## 1 NREM-Related Parasomnias

### *1.1 Disorders of Arousal*

Confusional arousals are brief episodes of incomplete arousal from sleep, characterized by awakening with mental confusion and often go unnoticed unless reported by the bed partner or parents. It occurs very often in younger children, with almost 2–7% of adults present confusional arousals [5]. Patients don't usually walk out of bed and there is no autonomic arousal (tachycardia, tachypnea, and diaphoresis), and behavior may be inappropriate or actions and responses may be slower than usual. A confusional arousal episode usually lasts up to 5–15 minutes. It is a very common condition in children and usually resolves by the age of 5 years old.

Sleepwalking (somnambulism) consists of a series of complex behaviors that occur during NREM sleep, with evidence of a familial role in the development of sleepwalking. Patients may walk out of bed, with the individual in altered absent consciousness, the eyes are usually open, and may have somniloquy (talking during sleep). In addition to ambulation, the episodes have evidence of persistent sleep, altered consciousness, and impaired judging during ambulation – which can lead to inappropriate behaviors or dangerous ones. Patients are difficult to arouse when sleepwalking. When awakening from such an episode, there are tachycardia, mental confusion, amnesia, and abnormal behaviors. The prevalence varies in children, ranging from 3.5% and 14.5%, and in adults between 0.6% and 34% [6]. Sleepwalking can be calm or agitated, with varying degrees of complexity and duration, and may also be accompanied by sleep terrors.

Sleep terrors (night terrors, *pavor nocturnus*) are sudden arousals from sleep accompanied by loud screams, crying, and the autonomic nervous system and behavioral manifestations of intense fear. There is often intense autonomic discharge (e.g., tachycardia, tachypnea, flushing of the skin, diaphoresis, mydriasis, and increased muscle tone). The patient frequently sits up in bed and does not remember what happened. The sleep terror episode may be accompanied by incoherent vocalizations. Sometimes there is prolonged inconsolability associated with a sleep terror in children or adults. It typically occurs in prepubertal children, diminishes in adolescence, and is uncommon in adulthood [1, 7].

Importantly, a given episode may be a mixture of the mentioned types of disorders of arousal, all of them with confusion during the episode and partial or complete amnesia.

### *1.2 Sleep-Related Eating Disorder*

Recurrent episodes of involuntary eating and drinking during arousals from sleep are called sleep-related eating disorders. They are associated with diminished levels of consciousness and subsequent recall, with problematic consequences. Eating

episodes occur involuntarily during partial arousals from sleep with subsequent partial recall. Patients usually don't remember having eaten during the night. This condition can be idiopathic but can be associated with a primary sleep disorder, another clinical condition, or the use of a sedative-hypnotic medication [1].

## 2 REM-Related Parasomnias

### *2.1 REM Sleep Behavior Disorder*

REM Sleep Behavior Disorder (RBD) is characterized by complex motor activity or vocalization during sleep (i.e., loss of muscle atony during REM sleep) associated with dreaming [1]. *Dream enactment behavior* or *acting out one's dream* is observed when the patient presents motor activity, as "staging, acting" the dream, without suppression or muscle atony [8].

Data on the prevalence of the disease in the population are still scarce and limited since it has a low prevalence and part of the diagnostic criteria requires video polysomnography, which makes the diagnosis expensive and limited. In addition, in many cases, the change is not observed and reported by the patient and/or roommate [9]. For diagnosis, in addition to clinical history, it is necessary to observe, with the video polysomnography the absence of muscle atony during the period of recording REM sleep. In polysomnography (PSG) findings, there are sustained muscle activity in REM sleep on chin electromyography (EMG) and transient muscle activity during REM on chin or limb EMG (Fig. 1).

RBD predominates in males and increases with age. It usually begins in the fifth or sixth decade of life. In younger patients, it may also be related to narcolepsy type 1 and the use of antidepressants. It is also related to the use of alcohol, lower educational levels, depression, anxiety, and posttraumatic stress, among others [10]. An important characteristic of RBD is that it is the greatest prodromal marker of α-synucleinopathies, and it may be present before the development of these diseases. A-synucleinopathies are neurodegenerative diseases in which there is an accumulation of α-synucleins in nerve cells, as Parkinson's disease, Lewi body dementia, and multiple system atrophy [11].

The patient with RBD has a clinical history of complex movements and/or vocalization during the dream, which may include laughing, crying, cursing, singing, clapping, punching, slapping, kicking, gesticulations, and chewing, among others. The movements are often aggressive and can cause physical trauma to the patient and roommate. After waking up, the patient may be alert and able to report the dream, consistent with the motor activity he presented while sleep [1].

RBD can be classified as idiopathic, due to medication or identifiable changes [12], or even secondary, when caused by neurodegenerative diseases, autoimmune diseases, lesions or tumors in the central nervous system, tautopathy associated with anti-IgLON5 antibodies, after stroke, medications (in particular the use of antidepressants) [13], and narcolepsy [14]. RBD has a strong association

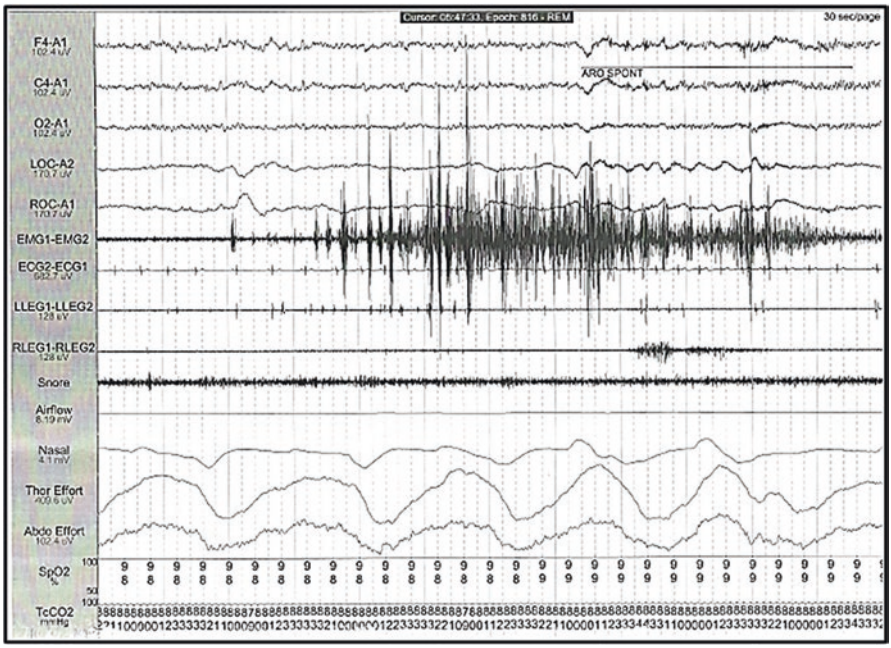


**Fig. 1** Thirty-second (epoch) window page of polysomnography showing the loss of muscle atony during REM sleep stage in the arm electromyography (EMG1-EMG2). Note also brief movements in left and right legs (LLEG1-LLEG2 and RLEG1-RLEG2). (Image courtesy from Dr. Fernando Morgadinho Santos Coelho)

with neurodegenerative diseases, and that idiopathic RBD is an important prodromal of α-synucleinopathies. Older patients have a 33% risk of developing a neurodegenerative disease within 5 years, and 91% in 14 years after the onset of RBD [15].

There is no treatment that can prevent the progression to this disease. However, early monitoring and recognition of neurodegenerative disorders can lead to early treatment and monitoring of the patient, and neuroprotective measures, which can be beneficial in the evolution of the disease [16].

## *2.2 Recurrent Isolated Sleep Paralysis*

Recurrent sleep paralysis is characterized by an inability to move at sleep onset (hypnogogic) or on awakening (hypnopompic), lasting from a few seconds to minutes. Patients are awake and have full memory of the event. Episodes can cause anxiety and fear of sleep and although the diaphragm is not affected, there may exist a sensation of dyspnea. In sleep paralysis, there is partial memory preservation of the event, and there are no stereotyped movements.

The age of onset of sleep paralysis is variable but is more common in adulthood and middle age. Prevalence can range from 4.7% to 41% of the population

[5], which may have had at least 1 episode during life. Predisposing factors are sleep deprivation, irregular sleep periods, sleep disruption, and stress. Sleep paralysis is common in narcolepsy and idiopathic hypersomnia (and the term *isolated* refers to the absence of these diseases). Treatment is not normally necessary in isolated cases, and sleep hygiene measures are an effective way to control sleep paralysis.

### *2.3 Nightmare Disorder*

Nightmare disorder is characterized by repeated occurrences of extended, dysphoric, and well-remembered dreams. They are disturbing mental experiences that generally occur during REM sleep and that often result in awakening. When awakening the patients quickly are oriented and alerted. Details of the content of nightmares are usually recalled by patients. Patients may also present increased prevalence of mood disorders (persistence of nightmare effect, anxiety, dysphoria), sleep resistance (fear of sleep or subsequent nightmares, bedtime anxiety), cognitive impairment (intrusive nightmare imagery, concentration, impaired memory), behavioral problems (bedtime avoidance, fear of the dark), fatigue, and daytime sleepiness [17].

Nightmares occur in around 60–75% of children. Both sexes are equally affected until adolescence when girls are more affected. In adults, about 2–8% have nightmare disorders (18) being more frequent in psychiatric disorders, including posttraumatic stress disorder, borderline personality, and substance abuse, stress, and anxiety. The posttraumatic stress disorder dreams may occur out of NREM stages N2 and N3, during REM sleep, and at the onset of sleep. Cognitive-behavioral treatments have been used to treat nightmares with success.

## 3 Final Words

Treatment of parasomnias includes avoiding precipitating factors (e.g., sleep deprivation and medications) environmental precautions and eventually the use of medications to control the presented condition. There is no evidence of physical therapy interventions for these disorders. The treatment of the parasomnias by a physician is important for the reduction of clinical manifestations and protection of the patient and bed partner, yet physiotherapists may refer the patients to a physician in case of suspicious parasomnia.

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