Sleep-Related Violence

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Here's a brief history of sleepwalking, associated factors, and pathology; sleep-related violence and forensic considerations; and management strategies.

What do the following criminal cases have in common? In 1686 a Colonel Culpepper of King James’s Court not only shot a member of the guard, but shot his horse as well. In 1847 in Massachusetts, Albert Tirrell slit the throat of a female acquaintance with a razor and set the house on fire. In 1985 in Ontario, Canada, Kenneth Parks stabbed his mother-in-law to death and critically wounded his father-in-law. In 1997 in Phoenix, Arizona, Scott Falater stabbed his wife 44 times near their backyard pool and left her lying there. After he returned some 30 minutes later to find she was still alive, he retrieved work gloves from the garage and dumped her body into the pool. He then held her head under water. In 2008 in Wales, Brian Thomas choked his wife of 40 years to death while they were on vacation.

In all cases the defense claimed these criminal actions occurred while the defendant was in a sleepwalking state and amnestic of all behaviors. Four of the 5 cases resulted in acquittal or a special verdict. Only Falater was convicted; he is now serving a life sentence. These are only a few of the cases among more than 100 instances of apparent sleep-related violence that have been reported, most often in the legal literature, but more recently in the psychological literature as well. They include instances of homicide, assault, and sexual assault.

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Historical reports of sleepwalking can be found from more than 1000 years ago. However, until recently these reports of nocturnal wandering included a number of now separately diagnosed sleep and neurological disorders. Alcohol intoxication, dissociative states, fugue states, epilepsy, REM behavior disorder (RBD), and many other disorders that occur at night were lumped together and labeled as somnambulism. Sleepwalking is now considered a non-REM parasomnia and is characterized along with sleep terrors and confusional arousals as a disorder of arousal.¹ Other disorders such as nightmares and RBD occur during REM sleep and are etiologically and behaviorally distinct.

The scientific understanding of sleepwalking and related parasomnias has historically reflected the predominant beliefs of the time. Superstitions and religious beliefs defined sleepwalkers as possessed or demonic. In the 19th and first half of the 20th centuries sleepwalkers were said to be acting out dreams. And, as psychodynamic theories held that dreams often manifested psychological traumas, it was not difficult to divine the source of behaviors, violent or otherwise, that occurred during sleep.²
A major Kuhnian-type paradigm shift in the theory of sleepwalking occurred in the 1950s and 1960s with the advent of electroencephalography (EEG) and sleep laboratories. The first major change was the identification of REM sleep and the further finding that if someone is awakened during REM sleep, chances are 80% or better that he or she will report a vivid, hallucinatory experience—what is generally called a dream. In addition, REM sleep is associated with a lack of voluntary muscle tone. Thus, the active dreamer is unable to somnambulate.

The brain state as characterized before 1957 was actually most consistent with a newly discovered sleep disorder—RBD—described in 1985. Patients with RBD have an intermittent loss of muscle atonia during REM sleep, most often because of encroaching slowly developing neuropathology, such as Parkinson disease or multiple system atrophy, that may take years or decades to fully manifest. To the surprise of researchers, the first sleep laboratory studies performed starting in 1965 found that sleepwalking and related disorders—sleep terrors and confusional arousals—did not occur during REM sleep. Rather, they typically occurred in the first third of the sleep period during a time characterized by high-amplitude delta EEG waves: variously called deep sleep, slow wave sleep, stage 3 or 4 sleep and, now, N3 sleep. The complex behaviors followed a sudden arousal. For unknown reasons, the sleepwalker did not awaken completely but remained in a brain state that was neither awake nor asleep.

Factors associated with sleepwalking

A “perfect storm” of sorts needs to occur for sleepwalking to take place. Research has shown that sleepwalking is most often associated with predisposing, priming, and provoking factors (3 Ps). However, we do not know why sleepwalking happens on a particular night and not on another when all 3 Ps are present.

Predisposing factors are genetic, and sleepwalking clearly runs in families. However, at least 3 different modes of genetic inheritance have been reported, and positive findings rarely exceed 50% in group studies. Thus, genetic research is not yet useful for clinical or forensic purposes.

In addition, there are priming factors. Many episodes of sleepwalking and sleepwalking-related violence follow periods of acute sleep deprivation. After acute sleep deprivation, rebound sleep often occurs. Deep sleep typically rebounds first, resulting in a higher than usual quantity or percentage of deep sleep. Rebound deep sleep may be associated with an increased threshold for arousal, perhaps providing an explanation for why sleepwalkers have difficulty awakening. Situational stress is another common priming factor that is often present along with sleep deprivation. Loss of a job, the night before an important test, relationship difficulties, etc, are usually easy to identify. However, the presence of predisposing and priming factors is not sufficient to cause sleepwalking: something must provoke or trigger the episode. Most often this is a sound or touch. Recent research has shown sleep-disordered breathing (eg, snoring, apnea) is often a trigger. Successful treatment of sleep-disordered breathing—continuous positive airway pressure or surgery—can dramatically reduce or eliminate episodes of complex sleep-related behaviors.

Underlying pathology

In addition to non-REM disorders of arousal, there are non-REM parasomnia subtypes: sleep-related eating, sexual behavior in sleep, sleep driving, and sleep-related violence. Many patients with one of these variants also have a current or past history of sleepwalking, confusional arousals, or sleep terrors.

In addition to possible genetic elements, neuroimaging studies have started to advance our understanding of the underlying pathology of sleepwalking. An important element to consider is the normal state of the brain during sleep. For all intents and purposes, the cortex is deactivated during sleep. However, its functions should not be necessary during sleep because incoming sensory stimuli are blocked or filtered at the level of the thalamus.

It should be noted that the amplitude of the slow, high-amplitude delta waves that characterize deep sleep is negatively correlated with the degree of deactivation. This information becomes important when we consider the findings of Bassetti and colleagues. These researchers triggered a sleep terror in a 17-year-old male while he was undergoing single-photon emission computed tomography neuroimaging. The results showed that the frontal cortex was deactivated, but incoming sensory stimuli were not blocked; as a result, some stimuli were reaching the deactivated cortex. This study has not been replicated, but the results appear consistent with recent findings concerning brain function during sleep. States of consciousness have been found to be not unitary but overlapping. Many brain disorders, including sleepwalking, were hypothesized to be the result of dissociated brain functions. Research has demonstrated that both wake and sleep may occur in the brain simultaneously—“local sleep.” This suggests the neuropathology of the sleepwalker is functional or at least current neuroimaging technology is insufficient to detect any lesions or
malformations. The functional problem appears to involve incomplete gating of incoming stimuli that might result in an arousal uninhibited by the cortex.

What behaviors might be expected in such situations? Behaviors related to basic impulses such as hunger, sex, and aggression might still be available. Other behaviors sometimes termed automatic behaviors might also be available. Can driving a car be an automatic behavior? Highway hypnosis—aside—is a fully functioning cortex required for driving, walking, eating, or defending one's self from a perceived aggressor?

**Sleep-related violence**

Sleep-related violence is an interesting example of this odd brain state and to some degree lends support to the theories described above. There does not appear to be anything inherently violent about sleepwalkers. Cartoonish images of sleepwalkers moving about the house with arms outstretched, often grasping a knife while chanting “kill, kill, kill,” are not consistent with extensive scientific and clinical knowledge of sleepwalking. Rather, in nearly all cases reliably described, the victim of the violence most often seeks out or encounters the sleepwalker.\(^13\)

Family members or friends may simply encounter the sleepwalker in the hallway or elsewhere and not realize he is sleepwalking. More often, a family member attempts to prevent injury by blocking or grabbing the sleepwalker. This may set off a primitive, defensive form of aggression. With the cognitive parts of the brain deactivated, the sleepwalker cannot recognize the family member or friend. The eyes of the sleepwalker are open, although we do not know how well the eyes are functioning. The sleepwalker can navigate in familiar settings, but accidents are common.

Guilleminault and colleagues\(^14\) described a situation in which this type of defensive aggression was directly observed. During a sleep laboratory experiment, the researchers attempted to trigger episodes of complex sleep behaviors in clinically diagnosed sleepwalkers. Once deep sleep occurred, they presented acoustic stimuli that triggered complex behaviors—some research participants got out of bed and started to move around the sleep laboratory. This posed an unanticipated problem: how to ensure the safety of the sleepwalkers. Technicians entered the room and approached the sleepwalking subjects. They were met with violence, such as punches and kicks; one subject picked up a chair and threw it at the technicians. This suggests that under the right circumstances any sleepwalker can become violent.

The potential violence of patients who have RBD is completely different in both etiology and form.\(^15\) In RBD, the patients are in REM sleep when the violence occurs. It occurs because the usual REM sleep atonia is lost intermittently, which allows the patient to essentially act out the content of the dream. However, it is important to remember that the action remains within the dream world. While dreaming, the patients are not conscious of being in bed with a spouse sleeping nearby. Rather, their actions are those of the dream character. The accountant who is dreaming he is repelling pirates with a cutlass might accidentally punch his wife. It is unlikely that his wife was part of the dream scenario or that the punch was intentionally directed at her.

**Forensic considerations**

Forensically, both sleepwalking and RBD might result in violence without intention, planning, or culpability. Every year a dozen or more criminal defenses are based on the theory that the defendant was in the midst of sleepwalking or a related disorder when the criminal behavior occurred. There certainly are bona fide cases of sleepwalking violence that, depending on the jurisdiction, might fulfill the requirements of an insane or non-insane automatism. Certainly mens rea cannot be present in someone who is not awake. For that matter, someone who is not awake cannot know right from wrong. The diagnostic and forensic evaluation of an episode of sleep violence can be problematic. Because sleepwalking is associated with amnesia of the episode, the patient/defendant cannot provide details. For the same reasons, the patient/defendant is not able to provide a direct memory of previous episodes. Any history provided is most likely to come from family or friends. However, the patient/defendant may be able to provide more circumstantial evidence. Awakening in a location other than the bedroom or unexplained damage or injuries may suggest something has happened during the night.

In forensic situations, malingering must also be considered part of the differential diagnosis. Sleepwalking must be carefully distinguished from other potential causes of nocturnal wandering. In recent years, there has been a concerted effort by some defense attorneys to suggest alcohol and even severe alcohol intoxication can be a trigger for sleepwalking behavior and not the direct cause of criminal behavior. This is considered junk science.\(^16\) The recently published International Classification of Sleep Disorders states that sleepwalking and related disorders should not be diagnosed in the presence of alcohol intoxication.\(^17\)

In the UK, Canada, and occasionally the US, the individual found to have been sleepwalking during
the commission of a crime may be remanded to a hospital or more often to an appropriately trained physician, most often a psychiatrist. However, the state-of-the-art treatment of sleepwalking is straightforward and rarely requires a hospital stay.\(^\text{18}\)

**Management strategies**

First, attention must be paid to the most common priming factors: sleep deprivation and situational stress. A regular sleep-wake schedule with 7 or more hours of total sleep time is a good starting point. Brief awakenings scheduled to disrupt deep sleep are effective in children. Hypnosis has also been reported to be effective, and there may be similarities between the hypnotic state and the sleepwalking state. Elimination of triggering factors such as snoring or sleep apnea can be effective. Assistance in dealing with situational stress is often required. Treatment with benzodiazepines is often effective for both sleepwalking and RBD; clonazepam remains the drug of choice. The occurrence of sleep-related violence may also be suppressed with these interventions, although this type of behavior rarely repeats itself and usually there is no continuing danger.

**Conclusion**

Sleep-related violence is a generally accepted variant of sleepwalking and related disorders. It may result in injury to self and others, and can have legal consequences. Sleepwalking may be treated by modifying potential priming and triggering factors, with or without medication. Sleep-related violence is likely to be reduced if family and friends take steps not to challenge the sleepwalker directly, although this cannot always be avoided because of safety concerns.

**Disclosures:**

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