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**HEALTH LAW**

## Role of the Expert Witness in Sleep-Related Violence Trials

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"Parasomnia" refers to unusual behavior, especially violent or injurious acts, associated with sleep. The term is invoked increasingly in the hope of absolving someone accused of violent nocturnal behavior from criminal and civil liability. In such cases, a sleep medicine specialist may be invited by law enforcement agencies, the legal community, or both to assist in the criminal investigation or to render a medical opinion about these often bizarre behaviors. It is thought that if these complex behaviors were performed while the person accused of the acts was still technically asleep then they were performed without consciousness or full awareness. In this way the defense team is able to develop a "sleepwalking defense" under the guise of classic automatism. This latter maneuver was first introduced in the British House of Lords around 1843 under the M'Naghten Rules and formulated upon the compassionate principle that it is morally wrong to punish an individual who is deprived, either permanently or temporarily, of the intent that is necessary for the act to be defined as a crime.

It is likely that violence during the sleep period is more frequent than previously assumed. In one study, 2 percent of the adults surveyed reported violent behaviors arising during the sleep period [1], and there is growing appreciation that abnormal sexual behaviors, described as "sleepsex" or "sexsomnia," can emerge during sleep. In a comprehensive review on sleep-related disorders and abnormal sexual behaviors published in *Sleep,* Schenck et al. listed a broad range of sleep-related behaviors with self, bed partners, or others that included masturbation, sexual vocalizations, fondling, sexual intercourse, sexual assault, and ictal sexual hyperarousal [2].

### A Case of Sexual Assault Attributed to Parasomnia

A legal case will help me illustrate the role of an expert physician in sleep-related violence trials.

Early on a Sunday morning, the county sheriff responded to a 911 call in reference to alleged sexual battery of a minor. According to the sworn statement, a 12-year-old girl had spent the previous evening at the home of her best friend who served as her witness in the complaint. The victim said that she fell asleep at 1:15 a.m. on the couch in front of the television in the living room while her friend slept on a nearby couch. She awoke suddenly at 4:30 a.m. to the feeling of someone touching her inner thighs but, thinking she had been dreaming, quickly fell back to sleep. A few moments later she awoke again and became aware enough to realize that her legs had

been placed on top of the lap of a 25-year-old male whom she later accused of assault. The accused was an acquaintance whom she had encountered only infrequently in large social gatherings and who sometimes spent the night at the house where the assault took place after drinking with the victim's best friend's father.

Realizing that she was being sexually assaulted—the young man was touching her genitals under her clothes—the victim jumped off the couch and rushed over to tell her friend that she had just been molested. Shortly thereafter both the victim and witness confronted the young man who stated that he had no recollection of the episode. According to the victim, the man later told her that he must have "passed out," and would "never drink again for as long as I live."

The man was arrested and charged with criminal sexual assault against a minor. Conviction on that charge could mean a prison sentence of 18 years or more. His defense attorney learned through the defendant's mother that he had a history of sleepwalking that had begun in early childhood. The behaviors she described appeared to have the characteristics of classic childhood somnambulism, leaving little doubt that the accused had experienced the condition at some point in his lifetime. His nocturnal forays had diminished significantly in adulthood and had never taken on a sexual nature. The mother said that every male on the paternal side of the defendant's family for generations had an "extreme sleepwalking" condition.

Armed with this information, the defense attorney located a physician who operated a private sleep laboratory nearby and asked if he would help develop a sleepwalking defense. This physician reviewed the case documents, but never examined the defendant. Nonetheless, the physician emphatically and absolutely supported the defense attorney's premise and provided an opinion based on the accused's predisposition for sleepwalking, adding that alcohol had been the immediate trigger for the sleepwalking event.

As the lead investigator of Sleep Forensics Associates at the Minnesota Regional Sleep Disorders Center, I was approached by the prosecutor of the state attorney's office to review the case without bias and attempt to function in the role of *amicus curiae* in a precourt setting. It was assumed that, because I had access to all of the criminal and legal documents to this case, I would be able to either refute or support the sleepwalking defense and thereby provide direction for the state prosecutor.

**Proposed Neuroscientific Mechanism of Parasomnia**

The fact that violent behaviors can arise in the absence of conscious wakefulness raises crucial questions about the physiologic mechanism of such complex behaviors—a matter of pivotal concern when assigning degrees of culpability in a court of law. Though the pathophysiology of parasomnias remains incomplete, recent observations in neuroscientific studies involving central pattern generators and memory impairment secondary to alcoholic blackouts offer valuable clues.

*Central Pattern Generators (CPGs)*. First of all, the widely held concept that the brainstem and other "primitive" neural structures participate primarily in rudimentary but not in complex behavioral activities has been shown to be inaccurate. There is substantial evidence that highly complex emotional and motor behaviors can originate from these more primitive structures without involvement of more rostral neural structures. The dissociation of behavior from consciousness and higher-level executive functions may be explained by the presence of locomotor centers, from the mesencephalon to the medulla, that are capable of generating complex behaviors without cortical or frontal lobe input. These areas project to spinal cord CPGs, which are able to produce complex movements in the absence of supraspinal influence, and CPGs are close to a number of brainstem sleep generators.

Secondly, despite arbitrary parameters in sleep laboratories that place sleep within clearly defined boundaries measured by EEG criteria, developments in neuroscience emphasize that the brain is in a perpetual state of flux—perhaps never strictly in a declared state, at least in the traditional sense. Because similar patterns of clinical expression are observed in different parasomnias, Tassinari hypothesizes in a unique neuroethologic approach that the various behaviors are generated by CPGs released through different mechanisms triggered during transitions between sleep states [3].

*Alcoholic Blackouts*. Alcoholic blackouts are often misunderstood, and their involvement in antisocial behavior is often underappreciated. The blackouts are episodes of amnesia during which an individual is capable of participating in salient, emotionally charged events that he or she does not remember later. Alcohol impairs one's ability to form memories while intoxicated, but does not erase memories formed before the toxic insult. An alcoholic blackout may present as a Korsakoff-like syndrome that goes undetected by both law enforcement officers and health care staff who are not trained to evaluate this type of cognitive impairment.

Risks associated with alcoholic blackouts are influenced by physiologic factors that affect alcohol distribution and metabolism, such as percent of body fat and levels of key enzymes. The rate of increase in blood alcohol concentration (BAC) (rather than the absolute value of BAC) is closely linked to blackout events [4]. Alcoholic blackouts are no longer the domain of the chronic alcoholic in the lower economic strata. Several recent studies have shown a surprisingly high prevalence of such blackouts among social drinkers and college-age individuals [5]. Subsequent studies of college students reported a high prevalence of risky behaviors during blackouts, including sexual activity with acquaintances and strangers, vandalism, and fighting [6].

*Alcohol and Memory***.** Recent research using animal models has shown that alcohol profoundly suppresses the activity of pyramidal cells in the region of the hippocampus that has been associated with ability to form new explicit memories [7]. Much is known about the effects of alcohol on decrements in motor performance, and there is also compelling evidence to indicate that acute alcohol use impairs the performance of frontal lobe-mediated tasks such as those that require

judgment and impulse control [8]. Appreciating the neuroscience of alcoholic blackouts allows one to better understand the mechanisms of behaviors that may proceed without consciousness, awareness, and proper executive function. The alcoholic blackout also clearly represents one of the many behaviors that can mimic parasomnia behaviors. The former are exponentially more prevalent and thus should be given appropriate weight when attributing likely causation in criminal allegations.

**Medico-Legal Considerations**

Anglo-American law has traditionally defined criminal offenses as requiring both an *actus reus* and a *mens rea*. Essentially, *actus reus* is the physical part of the offense while *mens rea* defines the required state of mind. The state must prove both that the accused performed the act and that he or she intended to do so while knowing the natural and probable consequences of the act. Regrettably, it has proven exceedingly difficult to establish either the precise meaning of these terms or the relationships connecting them. The American Law Institute's Model Penal Code (MPC) provides some guidance to these difficult relationships, requiring culpability for each material element of the offense.

Generally, the state satisfies its burden to prove culpability only if it establishes that the defendant acted purposely, knowingly, recklessly, or negligently regarding each material element of the offense. Here the psychological states of the defendant are relevant to the voluntary act and culpability requirements, as well as to the development of certain general defense strategies. The MPC, which was first officially recommended by the American Law Institute in 1962, was heavily influenced by post-World War II Freudian psychoanalytic theory and a relatively static perception of consciousness—concepts that are out of step with contemporary thought and certainly not consistent with advances in neuroscience since 1970 [9]. Though certain defenses, such as the insanity defense and automatism (i.e., the sleepwalking defense) remain relevant to criminal liability, the outdated MPC constructs, in combination with the inability to sufficiently define "consciousness," or for that matter even "voluntariness," lead to a theoretical foundation of defenses within the legal context that remains contentious and is a virtual minefield for even the well-equipped medical expert to tread upon.

Legal scholars recognize several general categories of defenses that provide protection from criminal liability. Automatisms generally invoke the excuse defense—the defendant claims that he lacks culpability due to his "psychological" state at the time of the offense and was unable to appreciate the wrongfulness of his act. Legal scholars contend that the excuse must involve a disability that the actor has that causes the excusing condition. This disability must be confirmed on the basis of observable indicators (excluding the conduct from which the actor is seeking to be excused) [10]. Unfortunately current scientific and clinical understanding often cannot satisfy the legal community's demand for concrete confirmation and observation of the excusing condition. When applied to sleep medicine, for example, there is no after-the-fact polysomnographic (PSG) finding that can have relevance to

determining whether or not the accused was sleepwalking at the time of the alleged event [11].

**Ethical Directives for Giving Legal Testimony**

To render an expert opinion in a case of an alleged sexual assault of a minor like the one I described earlier, one must have knowledge of the current developments in neuroscience that explain how behaviors (and not just violent parasomnias) may occur without complete awareness, as well as an understanding of the limitations and controversies surrounding the MPC demands, particularly those related to automatisms. Because a diagnostic polysomnograph can neither refute nor support a suspected diagnosis, and given the transitory nature of brain states, the presence or absence of a condition can never be determined with absolute certainty. Ultimately, the best the medical expert can do is to provide an opinion that the condition is either "highly unlikely," "likely," or "highly likely," or that there are "insufficient data to assess likelihood." A savvy medical expert should advise the legal team to consider introducing additional exhibits, such as functional neuroanatomical charts, into the courtroom as scientific presentations which lend credence to the final rendered opinion. For his part, the sleep medicine expert should adhere to the principle of "behavior isolation," that is, he or she should stick to judging the likelihood that the behavior in question is a parasomnia based upon the merits of the characteristics of the behavior itself, and, despite temptation to do so, should not venture into matters of psychology, intent, or lack of intent [12].

The medical expert has to render opinions that are based upon published, clinically based evidence and peer-reviewed medical literature. To deviate from this standard would be misleading and ethically questionable and could circumvent the jury system that relies upon objective information in difficult medico-legal cases. In the case of alleged assault that I am discussing, the defense attorney hired a medical expert who supported the sleepwalking defense based primarily upon the premise that alcohol ingestion was the immediate trigger for the event. A recent thorough review of the scientific literature reveals, however, that there is no direct experimental evidence that alcohol predisposes or triggers sleepwalking or related disorders [13]. It is my belief that the sleepwalking defense should only be considered after other conditions have been exhausted and that consideration should be first given to the relative risks of violence and sexual crimes following episodes of clear alcohol intoxication. The estimate that alcohol alone is five million times more likely to cause violent behavior than sleepwalking is a conservative one.

Finally, claims of alcohol-induced parasomnias presented solely to circumvent the laws of voluntary intoxication should be understood for what they are and judged accordingly. It is not the role of the medical expert to win the case for the team who hired him, though it is not uncommon for medical experts to use irrelevant and disingenuous technicalities in attempts to deceive and secure the decision. Instead, the salient ethical decision for those who assume the mantle of medical expert is to recognize and value the privileged role of educator granted to physicians within the legal process, promote recently published, peer-reviewed science, and minimize bias

while rendering an opinion. The weight of the decisions of either guilt or innocence should never rest in the hands of medical experts whose task is to contribute to the due process of a functional legal system by ensuring that the jury is educated and well-informed.

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