

## “The stuff that dreams are made of”\*

**D**entistry and specifically orofacial pain have been involved in the science of sleep and its interactions with pain and various other relevant disorders for decades. Yet we have not yet explored dreams; an amazing phenomenon occurring during sleep where brain activity can induce a virtual reality that includes visual, auditory, olfactory, taste, and emotional experiences as true as their waketime counterparts. Humans spend about 2 hours dreaming per night, and we have established that most, but not all, of our dreaming occurs during REM (rapid eye movement) sleep. While neuroscientists routinely examine neural activity during sleep, capturing dreams so that they can be evaluated presents obvious challenges.

There is general agreement about what dreams are, but ongoing debate remains over why we dream. We may dream to augment rest and repair for our mind and body. We may dream for psychologic reasons. In fact, there are several dream theories, from Sigmund Freud’s interpretations to hypotheses that claim dreams are just random. Many of the theories on the function of dreams are contradicted by the sparse, hallucinatory, and narrative nature of dreams, a nature that seems to lack any specific function; the answer to why we dream remains nebulous. The recent advent of deep neural networks (DNNs) has provided a novel conceptual framework within which to understand the evolved function of dreams<sup>1</sup>—fascinating, but beyond the scope of this editorial.

Dreams, it seems, are not just “sleep-time” entertainment. Dreams can provide much information about our state of mind, problems, and wishes for our future. Answers to our problems may be found in our dreams, which may also try to offer solutions.<sup>2</sup> The “dream machine” works efficiently, with insights and “advice” occurring the night of and about a week after a triggering event. This would suggest that dreams serve social and emotional adaptive functions. Would this include pain-related disorders?

A relevant question is: Does pain occur in dreams? It has been shown that realistic, localized painful sensations can be experienced in dreams, either through direct incorporation or from past memories. Nevertheless, the frequency of pain dreams in healthy subjects is low. In one study, dreams often reflected attempts to obtain pain relief.<sup>3</sup> So although pain is rare in dreams, it is compatible with the representational code of dreaming.<sup>3</sup> Patients suffering from burn pain dream more frequently of pain than controls.<sup>4</sup> Findings have indicated that dreaming

about pain may be an added stress for pain patients and may contribute to both poor sleep and higher pain intensity, which could evolve into a cycle of pain–anxiety–sleeplessness.<sup>4</sup>

Researchers have found that during dreams in REM sleep, our stress responses shut down, and the neurochemicals responsible for stressful feelings stop being released.<sup>5</sup> In addition to this, REM helps reduce the negative effects of difficult memories. Although not studied, this suggests to me that pain may be similarly modulated.

Possibly, dreams could be harnessed and manipulated to manage some of the disorders we encounter. There is a definite relationship between bad dreams and chronic pain.<sup>6</sup> Evidence demonstrates that nightmares sometimes accompany migraine, and this link has been proposed as the result of a number of factors that affect both migraine and nightmares; for example, various stressors.<sup>7</sup> Clearly the directionality of the relationship and the involvement of comorbidities are not always clear and need further study.

A lucid dream is a type of dream where the dreamer becomes aware that they are dreaming. A recent study instructed volunteers to enter a lucid dream and imagine themselves experiencing pain in their arms, following which they were required to wake up immediately. Of the participants, around three-quarters experienced pain during lucid dreaming, and one-fifth felt pain even after waking.<sup>8</sup>

These are thought-provoking findings: A dreamer consciously induced pain, without a nociceptive or other stimulus, and was able to subsequently project this into a conscious physical sensation! This is consistent with studies that establish the brain as the source of pain. It strengthens approaches that pain may be controlled through our consciousness. The psycho-physiologic connection found between dreams and wakefulness could lead to new treatments for pain relief.<sup>9</sup> From the use of lucid dreams and “dream incubation” (“planting a seed” for a specific dream topic to occur) . . . this is “the stuff of dreams.”

Rafael Benoliel  
Editor-in-Chief

\*A common quote based on a line from *The Tempest* by William Shakespeare and spoken by the magician Prospero. The exact words are: “We are such stuff as dreams are made on.”

## References

1. Hoel E. The overfitted brain: Dreams evolved to assist generalization. *Patterns (N Y)* 2021;2:100244.
2. Nielsen TA, Kuiken D, Alain G, Stenstrom P, Powell RA. Immediate and delayed incorporations of events into dreams: Further replication and implications for dream function. *J Sleep Res* 2004;13:327–336.
3. Nielsen TA, McGregor DL, Zadra A, Ilnicki D, Ouellet L. Pain in dreams. *Sleep* 1993;16:490–498.
4. Raymond I, Nielsen TA, Lavigne G, Choinière M. Incorporation of pain in dreams of hospitalized burn victims. *Sleep* 2002;25:765–770.
5. van der Helm E, Yao J, Dutt S, Rao V, Saletin JM, Walker MP. REM sleep depotentiates amygdala activity to previous emotional experiences. *Curr Biol* 2011;21:2029–2032.
6. Abdul-Razzak KK, Alkhatatbeh MJ. Nightmares and bad dreams among individuals with musculoskeletal pain: A link to vitamin D and calcium. *Res Psychother* 2021;24:533.
7. Gazerani P. Nightmares in migraine: A focused review. *Behav Sci (Basel)* 2021;11:122.
8. Raduga M, Zhunusova Z, Shashkov A, Sevcenko N. Achieving pain during lucid dreaming and transferring it into wakefulness. *Dreaming* 2020;30:246–256.
9. Zappaterra M, Jim L, Pangarkar S. Chronic pain resolution after a lucid dream: A case for neural plasticity? *Med Hypotheses* 2014;82:286–290.

## Introducing New Associate Editors

**T**he uncharacteristic topic I chose for the editorial is no coincidence.

My dream remains to deepen the understanding that this Journal is an essential component of the continued success of our profession, Orofacial Pain. The past change in the journal's name aptly reflected the necessity to bridge the science of headache with orofacial pain.

It is now time to expand further. As of 2022, we will start a small section called "Currents in Dental Medicine," very much like the pain abstracts we publish.

The plan is to expand this section slowly, eventually creating a virtual space in the Journal dedicated to dental sleep medicine, in particular that which relates to chronic pain.

For this specific task, Associate Editor Gilles Lavigne and I have chosen two new Associate Editors:

### **Dr Dennis Bailey, DDS, DABDSM, DABOP**

Dr Bailey is a highly respected clinician and educator in the field and is nationally recognized as an authority in clinical aspects of dental sleep medicine.

### **Dr Takafumi Kato, DDS, PhD**

Dr Kato is a recognized scientist who brings the prestige of successful academic investigations into sleep. He is located in Japan, and I am happy that we are expanding our geographical distribution of appointed Associate Editors. Dr Takafumi is a Full Professor & Chair of Department of Oral Physiology at the Osaka University Graduate School of Dentistry.

I am convinced this "tweak" in the Journal's content will become an attractive feature for our readers.

I wish you all a happy holiday season. The years 2020–2021 have been very difficult worldwide. I hope the new year brings relative quiet, health, and happiness to you and your families.

Warm regards,

Rafael Benoliel  
Editor-in-Chief