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Impact of integrated sleep and anxiety management on persistent headache: a case report

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Introduction
Chronic insomnia and anxiety are frequently associated with persistent headache in a bidirectional relationship that perpetuates pain and functional impairment. Sleep deprivation promotes central sensitization and alters the serotonergic and melatoninergic systems in nociceptive modulation, while anxiety induces hyperarousal and hinders sleep. Nighttime screen use reduces melatonin and worsens circadian dysregulation. This report describes the impact of integrated treatment for these factors.

Case presentation
A 24-year-old female university student presented with a three-year history of chronic insomnia and a four-year history of untreated anxiety. Over the last eight months, her sleep worsened, characterized by difficulty initiating and maintaining sleep, multiple awakenings, less than five hours of sleep per night, and circadian rhythm inversion. She reported prolonged nighttime screen use and frequent on-demand zolpidem use. Six months ago, she developed a daily persistent headache (ICHD-3), holocranial, pressing, with a Visual Analog Scale (VAS) intensity of 8, associated with fatigue, irritability, concentration deficits, and major academic impairment. The Epworth Sleepiness Scale score was 16 and the Insomnia Severity Index (ISI) was 22 (severe insomnia). Polysomnography showed reduced sleep efficiency (68%), increased latency (52 minutes), and reduced deep sleep, without apnea. Lab tests and brain MRI were normal. A multimodal approach was initiated with cognitive behavioral therapy for insomnia (CBT-I), chronotherapy, screen restriction, morning sunlight exposure, prolonged-release melatonin, and hypnotic tapering. For anxiety, venlafaxine XR 37.5 mg/day and weekly psychotherapy were started. Progressive regularization of the sleep-wake cycle and anxiety improvement were observed. After three months, she slept seven hours per night, the headache decreased to VAS=3 (2 to 3 monthly episodes), with functional gain and permanent zolpidem discontinuation.

Discussion
The relationship between anxiety, insomnia, and headache is reciprocal. Sleep deprivation increases neuronal excitability and compromises serotonergic nociceptive modulation. Nighttime artificial light reduces melatonin and maintains circadian misalignment. Anxiety promotes hyperarousal, muscle tension, and amplifies pain perception. The favorable outcome following sleep-wake cycle reorganization and emotional management reinforces the influence of psychological and chronobiological factors on pain.

Conclusion
Insomnia and anxiety act as perpetuating factors for headache. A multimodal approach focused on sleep hygiene, melatonin regulation, and anxiety treatment promoted significant clinical improvement, highlighting the importance of investigating these factors in refractory headaches.

Keywords:
Chronic insomnia
Persistent headache
Circadian rhythm

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