

## **Circadian rhythm sleep disorders following mild traumatic brain injury**

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**Objective:** To describe the physiologic and behavioral characteristics of circadian rhythm sleep disorders (CRSDs) following minor traumatic brain injury (mTBI) in patients complaining of insomnia.

**Methods:** Forty two patients with insomnia complaints following mTBI were screened. Those suspected of having CRSD underwent actigraphy, saliva melatonin and oral temperature measurement, and polysomnography. All patients also filled out a self-reported questionnaire to determine their circadian preference.

**Results:** Fifteen of the 42 patients (36%) with complaints of insomnia following mTBI were diagnosed with CRSD. Eight patients displayed a delayed sleep phase syndrome (DSPS), whereas seven displayed an irregular sleep–wake pattern (ISWP). Whereas all patients with DSPS exhibited a 24-hour periodicity of oral temperature rhythm, three of seven patients with ISWP lacked such a daily rhythm. In addition, ISWP patients exhibited smaller amplitude of oral temperature rhythm vs the DSPS group. Subjective Morningness–Eveningness Questionnaire scores were in accordance with the clinical diagnosis of DSPS or ISWP based on actigraphy.

**Conclusions:** Minor traumatic brain injury might contribute to the emergence of circadian rhythm sleep disorders. Two types of these disorders were observed: delayed sleep phase syndrome and irregular sleep–wake pattern. The types differed in the subjective questionnaire scores and had distinct profiles of melatonin and temperature circadian rhythms.