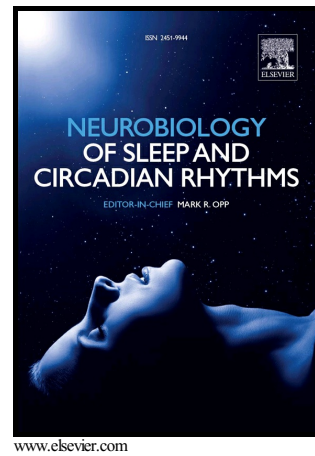


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## The role of sleep in recovery following ischemic stroke: a review of human and animal data

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### Abstract

Despite advancements in understanding the pathophysiology of stroke and the state of the art in acute management of afflicted patients as well as in subsequent neurorehabilitation training, stroke remains the most common neurological cause of long-term disability in adulthood. To enhance stroke patients' independence and well-being it is necessary, therefore, to consider and develop new therapeutic strategies and approaches. We postulate that sleep might play a pivotal role in neurorehabilitation following stroke. Over the last two decades compelling evidence for a major function of sleep in neuroplasticity and neural network reorganization underlying learning and memory has evolved. Training and learning of new motor skills and knowledge can modulate the characteristics of subsequent sleep, which additionally can improve memory performance. While healthy sleep appears to support neuroplasticity resulting in improved learning and memory, disturbed sleep following stroke in animals and humans can impair stroke outcome. In addition, sleep disorders such as sleep disordered breathing, insomnia, and restless legs syndrome are frequent in stroke patients and associated with worse recovery outcomes. Studies investigating the evolution of post-stroke sleep changes suggest that these changes might also reflect neural network reorganization underlying functional recovery. Experimental and clinical studies provide evidence that pharmacological sleep promotion in rodents and treatment of sleep disorders in humans improves functional outcome following stroke. Taken together, there is accumulating evidence that sleep represents a "plasticity state" in the process of recovery following ischemic stroke. However, to test the key role of sleep and sleep disorders for stroke recovery and to better understand the underlying

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