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Locomotor recovery after thoracic spinal cord lesions in cats, rats and humans

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Review

Abstract. More than a hundred years of extensive studies have led to the development of clinically valid animal models of spinal cord injury (SCI) used to investigate neurophysiological mechanisms, pathology and potential therapies. The cat and rat models of SCI were found particularly useful due to several behavioral responses that correspond to clinical symptoms seen in patients. This review concentrates on recovery of motor behavior in the rat and cat models of thoracic spinal cord injury. At the beginning an outline of the general concept of neural control of locomotion: the existence of a spinal network producing the locomotor activity and the supraspinal and sensory inputs that influence this network is presented. Next, the severity of functional impairment in relation to the extent and precise location of lesions at the thoracic level in cats and rats is described. Finally, the impact of animal studies on the treatment of SCI patients and the possibility that a spinal network producing the locomotor activity also exists in humans is discussed.

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