Gait robot-assisted rehabilitation in persons with spinal cord injury: A scoping review

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Abstract: BACKGROUND:Many robots are available for gait rehabilitation (BWSTRT and ORET) and their application in persons with SCI allowed an improvement of walking function. OBJECTIVE:The aim of the study is to compare the effects of different robotic exoskeletons gait training in persons with different SCI level and severity. METHODS:Sixty-two studies were included in this systematic review; the study quality was assessed according to GRADE and PEDro's scale. RESULTS:Quality assessment of included studies (n=62) demonstrated a prevalence of evidence level 2; the quality of the studies was higher for BWSTRT (excellent and good) than for ORET (fair and good). Almost all persons recruited for BWSTRT had an incomplete SCI; both complete and incomplete SCI were recruited for ORET. The SCI lesion level in the persons recruited for BWSTRT are from cervical to sacral; mainly from thoracic to sacral for ORET; a high representation of AIS D lesion resulted both for BWSTRT (30%) and for ORET (45%). The walking performance, tested with 10MWT, 6MWT, TUG and WISCI, improved after exoskeleton training in persons with incomplete SCI lesions, when at least 20 sessions were applied. Persons with complete SCI lesions improved the dexterity in walking with exoskeleton, but did not recover independent walking function; symptoms such as spasticity, pain and cardiovascular endurance improved. CONCLUSION:Different exoskeletons are available for walking rehabilitation in persons with SCI. The choice about the kind of robotic gait training should be addressed on the basis of the lesion severity and the possible comorbidities.

Keywords: Gait rehabilitation, exoskeleton robot, spinal cord injury

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