ABSTRACT

Background

A traumatic spinal cord injury (SCI) is a lesion of neural elements of the spinal cord that can result in any degree of sensory and motor deficit, autonomic or bowel dysfunction. Improvement of locomotor function is one of the primary goals for people with SCI. Locomotor training for walking is therefore used in rehabilitation after SCI and might help to improve a person's ability to walk. However, a systematic review of the evidence is required to assess the effects and acceptability of locomotor training after SCI.

Objectives

To assess the effects of locomotor training on improvement in walking for people with traumatic SCI.

Search methods

We searched the Cochrane Injuries Group's Specialised Register (searched November 2011); the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2011, Issue 4); MEDLINE (Ovid) (1966 to November 2011); EMBASE (Ovid) (1980 to November 2011); CINAHL (1982 to November 2011); AMED (Allied and Complementary Medicine Database) (1985 to November 2011); SPORTDiscus (1949 to November 2011); PEDro (the Physiotherapy Evidence database) (searched November 2011); COMPENDEX (engineering databases) (1972 to November 2011); and INSPEC (1969 to November 2011). We also searched the online trials databases Current Controlled Trials (www.controlled-trials.com/isrctn) and Clinical Trials (www.clinicaltrials.gov). We handsearched relevant conference proceedings, checked reference lists of relevant published papers and contacted study authors in an effort to identify published, unpublished and ongoing trials.

Selection criteria

We included randomised controlled trials (RCTs) involving people with SCI that compared locomotor training to a control of any other exercise or no treatment.

Data collection and analysis

Two review authors independently selected trials for inclusion, assessed trial quality and extracted data. The primary outcomes were the speed of walking and walking capacity at final follow-up.
Main results

Five RCTs involving 309 people are included in this review. Overall, the results were inconclusive. There was no statistically significant superior effect of any locomotor training approach on walking function after SCI compared with any other kind of physical rehabilitation. The use of bodyweight supported treadmill training as locomotor training for people after SCI did not significantly increase walking velocity (0.03 m/sec with a 95% confidence interval (CI) -0.05 to 0.11; P = 0.52; I² = 22%) nor did it increase walking capacity (-1.3 metres (95% CI -41 to 40); P = 0.95; I² = 62%). However, in one study involving 74 people the group receiving robotic-assisted locomotor training had reduced walking capacity compared with people receiving any other intervention, a finding which needs further investigation. In all five studies there were no differences in adverse events or drop-outs between study groups.

Authors’ conclusions

There is insufficient evidence from RCTs to conclude that any one locomotor training strategy improves walking function more than another for people with SCI. The effects especially of robotic-assisted locomotor training are not clear, therefore research in the form of large RCTs, particularly for robotic training, is needed. Specific questions about which type of locomotor training might be most effective in improving walking function for people with SCI need to be explored.

PLAIN LANGUAGE SUMMARY

Providing locomotor training to people with spinal cord injury to improve walking ability

A traumatic spinal cord injury (SCI) is a lesion of neural elements of the spinal cord that can result in any degree of sensory and motor deficit, autonomic or bowel dysfunction. Locomotor training for walking is used in rehabilitation after spinal cord injury (SCI) and might help to improve a person’s ability to walk. However, many strategies exist to improve this function, such as treadmill training with and without bodyweight support, robotic-assisted gait training and electrical stimulation.

Five randomised controlled trials were identified involving 309 people with spinal cord injury. None of the locomotor interventions had a beneficial or harmful effect on the people taking part. In all five studies there were no differences in adverse events or drop-outs between study groups. There is not enough evidence to conclude which locomotor training strategy is most effective in improving walking ability in people with spinal cord injury, or that locomotor training benefits a person’s ability to walk over other kinds of rehabilitation.