

Strategies for treatment of pain, psychological deficits and quality of life deficits in people with Spinal Cord Injury

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ABSTRACT

Chronic pain is a usual phenomenon in persons living with spinal cord injury (SCI). Populations with spinal cord injury (SCI) have an increased risk of depression, anxiety, pain, and poorer quality of life (QoL). This systematic review aimed to identify interventional research regarding the care provided for people with SCI during rehabilitation and synthesize the evidence of the effects and characteristics of these studies regarding their effects on depression, anxiety, pain, and poorer quality of life (QoL). Databases (Cochrane, MEDLINE, Embase, PsycINFO) were reviewed from the 1st October 2020 to January 2021. Twelve papers met the inclusion criteria, and demonstrated a range of results of interventions delivered individually, in a group format, in person, and online. Only seven studies reported significant reductions in pain-related outcomes (with moderate effect sizes), with the remaining studies (n = 5) demonstrating no change. Four studies described reductions in depressive symptoms and five reported reductions in anxiety. Quality of life was assessed in six studies although in only four studies significant gains were found. Study quality ranged from high to low/weak. This review found promising evidence that some approaches for people with SCI can improve their pain relief and psychosocial adaptation (pain management program, cognitive Behavioral therapy, mindfulness, exercise, psychological education, transcranial direct current stimulation). Although significant methodological limitations weakened study findings. Additionally, studies were conducted in only a few developed countries with subgroups of patients having specific illness characteristics or severity, therefore their generalizability to the wider SCI population is uncertain. Consequently, future research should adopt more robust study designs to test interventions targeting pain relief and the psychological well-being of patients with SCI with different socio-cultural backgrounds and psychological adjustment conditions in the early stages of rehabilitation.

Key Words: Spinal cord injury; Rehabilitation; Pain; Quality of life; Psychological adjustment; Mental health

Spinal cord injury (SCI) leads to sensory motor deficits that are partial or complete (1). Populations with SCI usually face secondary complications such as psy-

chological complications at an increased rate than the general population (a 22,2% of this population is affected by depression and anxiety) (2) in addition to a

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downsized Quality of life (3). Research also supports that there is a mutually reinforcing relationship between chronic pain and depression in this population (4). In this population besides the secondary complications the primary issue that affects this group of patients is chronic pain, that also appears to be resilient to pharmacological treatment (5).

Research has begun to investigate the role of interventions (physical and psychological) in improving pain and psychosocial outcomes after spinal cord injury. However, the benefits and side effects of non-pharmacological treatments remain unclear (6). Studies have investigated the effects of non-pharmacological interventions in the treatment of chronic pain; however, they show deficiencies in their design. A particular problem is the use of inappropriate control interventions, such as waiting lists. It has been shown that in direct comparisons, placebo interventions tend to be superior to untreated or waiting list control interventions, especially for related to pain variables (7).

At present, it is therefore difficult to make decisions regarding the use of non-pharmacological treatments for chronic pain in people with SCI. Therefore, the objectives of this systematic review were:

- To synthesize and critically evaluate the available quantitative and qualitative data on the effects of interventions on pain and the results related to pain, depression, stress and quality of life in people with SCI.
- Make specific recommendations for future research based on existing knowledge of the present literature.

Methods

Studies included participants living with Spinal Cord Injury, regardless of age, gender, and severity of disability. Both traumatic and non-traumatic injuries were included. Studies involving participants with other conditions were included if the results from the Spinal Cord Injury subgroup were presented separately from the other groups. Also included were studies in which interventions were performed within a hospital setting or health facilities.

Non-pharmacological study interventions were defined as experimental treatments that did not involve medication or any other active substance. Eligible treatments included surgery, exercise, acupuncture, massage, joint mobilization, relaxation training, heat

therapy (hot or cold application), static magnetic field therapy, brain stimulation, and psychological or behavioral therapies, as well as psychosocial (e.g. therapy, skills training, psychological education, supportive intervention, counseling, counseling, visual imaging, hypnotic therapy). However, studies on other interventions, such as the use of durable equipment, were only considered if the focus was on treating people with chronic pain.

While studies that included single or combined psychosocial approaches such as Cognitive Behavioral Therapy, skills training, psychological training, supportive interventions or counseling were also included. These psychosocial interventions were carried out within the usual care framework for people with SCI. where also pharmacological and medical treatments may be provided.

This systematic review includes other interventions such as stress reduction techniques through mindfulness, meditation, yoga, conscious mobility, awareness in daily life, and breathing techniques that are not included as documented psychological therapies or, as well as psychosocial approaches. Interventions involving consciousness as part or all of the intervention were included in this review.

Control interventions included active pharmacological or non-pharmacological treatments, placebo interventions or waiting list groups.

Results

Twelve papers met the inclusion criteria (8-20), and demonstrated a range of results of interventions delivered individually, in a group format, in person, and online. Only seven studies reported significant reductions in pain-related outcomes (with moderate effect sizes), with the remaining studies (n = 5) demonstrating no change. Four studies described reductions in depressive symptoms and five reported reductions in anxiety. Quality of life was assessed in six studies although in only four studies significant gains were found. Study quality ranged from high to low/weak.

The heterogeneity and methodological flaws of the studies would not allow the generalizability of the findings and their effectiveness. Nevertheless, ten of those examined the depression symptoms, ten of them measured stress, nine studies examined pain while six

studies examined quality of life.


A study found transcranial direct current stimulation (tDCS) to be superior to a fake intervention but the overall evidence shows a vague positive result on chronic pain in patients with SCI. Exercise as an intervention for chronic pain was beneficial but still had methodological flaws (blinding and randomising). Moreover, studies on chronic pain which utilized control groups without any therapy or waiting list groups were found to be problematic because they would have different outcomes even compared with placebo interventions.

In psychosocial interventions alone or with mindfulness, focusing on pain reduction or quality of life, demonstrated short term outcomes in comparison with other interventions (exercise) and they were less effective. Nevertheless, the outcomes were not clear because of the heterogeneity of the different approaches and assessment tools used in every study and it was difficult to explain the underlying therapeutic mechanism (if any). Unexpectedly, a cognitive behavioral therapy was generally adopted from most researchers utilizing psychosocial interventions and it might be the reason for these studies to have beneficial outcomes. The findings of the present review showed that there is need for further research in order to positively support the use of mindfulness in favor of other interventions.

Despite the firm application of literature review methods and the methodologic assessment as well,

there are certain limitations to be taken into consideration. There is a chance that during literature research, selection bias was introduced due to not selected studies which should be included, mainly because they were not published in peer review issues. Another limitation was the presence of only one reviewer.

Conclusions

Overall, this review found promising evidence that some approaches for people with SCI can improve their pain relief and psychosocial adaptation (pain management program, Cognitive Behavioral Therapy, mindfulness, exercise, psychological education, transcranial direct current stimulation). Nevertheless, significant methodological limitations weakened study findings. Additionally, studies were conducted only in a few developed countries with subgroups of patients having specific illness characteristics or severity, therefore their generalizability to the wider SCI population is uncertain. Consequently, future research should adopt more robust study designs to test interventions targeting pain relief and the psychological well-being of patients with SCI with different socio-cultural, economic, clinical backgrounds and psychological adjustment conditions in the early stages of rehabilitation. Such programs should be evidence-based, cost effective and with a standardized protocol in order for them to be easily applied into the inpatient and outpatient rehabilitation schemes by health professionals. 

REFERENCES

1. American Spinal Injury Association. 2015. Retrieved 09 October 2018, from <http://www.asia-spinalinjury.org>.
2. Williams R, Murray A. Prevalence of Depression After Spinal Cord Injury: A Meta-Analysis. *Archives of Physical Medicine and Rehabilitation*. 2015 Jan 1;96(1):133–40.
3. Lude P, Kennedy P, Elfström M, Ballert C. Quality of Life in and After Spinal Cord Injury Rehabilitation: A Longitudinal Multicenter Study. *Topics in Spinal Cord Injury Rehabilitation*. 2014 Jul 1;20(3):197–207.
4. Ullrich PM, Lincoln RK, Tackett MJ, Miskevics S, Smith BM, Weaver FM. Pain, depression, and health care utilization over time after spinal cord injury. *Rehabil Psychol*. 2013 May;58(2):158–65.
5. Teasell RW, Mehta S, Aubut J, Foulon BL, Wolfe DL, Hsieh JTC. Pain following spinal cord injury. *Spinal Cord Injury Rehabilitation Evidence*. 2010. (SCIRE; vol. Volume 3).
6. Siddall PJ, Finnerup NB. Chapter 46 Pain following spinal cord injury. *Handb Clin Neurol*. 2006;81:689–703.
7. Hróbjartsson A, Gøtzsche PC. Placebo interven-

- tions for all clinical conditions. *Cochrane Database Syst Rev*. 2010 Jan 20;2010(1):CD003974.
8. Dorstyn D, Mathias J, Denson L. Efficacy of cognitive behavior therapy for the management of psychological outcomes following spinal cord injury A meta-analysis. *J Health Psychol*. 2010 Oct 26;16(2):374-91.
 9. Perry KN, Nicholas MK, Middleton JW. Comparison of a pain management program with usual care in a pain management center for people with spinal cord injury-related chronic pain. *Clin J Pain*. 2010 Apr;26(3):206-16.
 10. Soler MD, Kumru H, Pelayo R, Vidal J, Tormos JM, Fregni F, et al. Effectiveness of transcranial direct current stimulation and visual illusion on neuropathic pain in spinal cord injury. *Brain*. 2010 Sep;133(9):2565-77.
 11. Mulroy SJ, Thompson L, Kemp B, Hatchett PP, Newsam CJ, Lupold DG, et al. Strengthening and optimal movements for painful shoulders (STOMPS) in chronic spinal cord injury: a randomized controlled trial. *Phys Ther*. 2011 Mar;91(3):305-24.
 12. Tan G, Rintala DH, Jensen MP, Richards JS, Holmes SA, Parachuri R, et al. Efficacy of cranial electrotherapy stimulation for neuropathic pain following spinal cord injury: a multi-site randomized controlled trial with a secondary 6-month open-label phase. *J Spinal Cord Med*. 2011;34(3):285-96.
 13. Heutink M, Post MWM, Bongers-Janssen HMM, Dijkstra CA, Snoek GJ, Spijkerman DCM, et al. The CONECSI trial: results of a randomized controlled trial of a multidisciplinary cognitive behavioral program for coping with chronic neuropathic pain after spinal cord injury. *Pain*. 2012 Jan;153(1):120-8.
 14. Heutink M, Post MW, Luthart P, Schuitemaker M, Slangen S, Sweers J, et al. Long-term outcomes of a multidisciplinary cognitive behavioural programme for coping with chronic neuropathic spinal cord injury pain. *J Rehabil Med*. 2014 Jun;46(6):540-5.
 15. Chen H-Y, Wu T-J, Lin C-C. Improving self-perception and self-efficacy in patients with spinal cord injury: the efficacy of DVD-based instructions. *J Clin Nurs*. 2015 Jun;24(11-12):1666-75.
 16. Curtis K, Hitzig S, Leong N, Weeks C, Ditor D, Katz J. Evaluation of a Modified Yoga Program for Persons with Spinal Cord Injury. *Therapeutic recreation journal*. 2015 May 11;49:97.
 17. Guest R, Craig A, Nicholson Perry K, Tran Y, Ephraums C, Hales A, et al. Resilience following spinal cord injury: A prospective controlled study investigating the influence of the provision of group cognitive behavior therapy during inpatient rehabilitation. *Rehabil Psychol*. 2015 Nov;60(4):311-21.
 18. Curtis K, Hitzig SL, Bechsgaard G, Stoliker C, Alton C, Saunders N, et al. Evaluation of a specialized yoga program for persons with a spinal cord injury: a pilot randomized controlled trial. *J Pain Res*. 2017;10:999-1017.
 19. Flores A, Linehan MM, Todd SR, Hoffman HG. The Use of Virtual Reality to Facilitate Mindfulness Skills Training in Dialectical Behavioral Therapy for Spinal Cord Injury: A Case Study. *Front Psychol*. 2018 Apr 23;9:531-531.
 20. Hearn JH, Finlay KA. Internet-delivered mindfulness for people with depression and chronic pain following spinal cord injury: a randomized, controlled feasibility trial. *Spinal Cord*. 2018 Aug;56(8):750-61.

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