

# Elongated Needle Therapy-promoting Recovery Mechanism after Spinal Cord Injury

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## Introduction

Acupuncture relieves pain by stimulating specific points on the patient's body known as acupoints. When these acupoints are fully activated, clinicians and patients experience sensations of soreness, numbness, fullness, or heaviness known as De qi or Te qi. Acupuncture is classified into two types: manual acupuncture and electroacupuncture (EA). Acupuncture is an important part of traditional Chinese medicine that has been shown to induce favourable neuroplasticity for central and peripheral nervous system injuries. According to recent research, elongated needle therapy (ENT) with BL54 and ST28 may help to restore acute spinal cord injury (ASCI) [1].

## Description

However, the precise mechanism for this has yet to be discovered. Acupuncture is an important part of traditional Chinese medicine that has been shown to induce favourable neuroplasticity for injuries to the central and peripheral nervous systems. Recent research suggests that elongated needle therapy (ENT) with BL54 and ST28 may aid in the recovery of acute spinal cord injury (ASCI). The precise mechanism for this, however, has yet to be discovered. In a spinal cord contusion model of SCI, all experimental groups except controls underwent a laminectomy. Three of the groups received EA once daily for three days following SCI. Intrathecal injections of LY294002 (Akt inhibitor; 10 g, 20 L) or PD98059 (ERK inhibitor; 3 g, 20 L) were given to the two drug groups one hour before SCI. Animals were killed 48 hours after SCI, and spinal cord tissue samples were collected for transferase dUTP nick end labelling (TUNEL), immunohistochemistry, and western blot assays [2-4].

In the injured spinal cord segment, EA significantly increased p-Akt and p-ERK1/2 expression, decreased cytochrome c and caspase-3 expression, and inhibited neuronal apoptosis. The use of Akt and ERK inhibitors had the opposite effect. Acupuncture may promote SCI repair by activating the PI3K/Akt and ERK1/2 signalling pathways and inhibiting the mitochondrial apoptotic pathway.

The global incidence and disability rate of spinal cord injury (SCI) are high, imposing a significant burden on patients. Significant research efforts have been devoted to identifying new strategies for effectively treating SCI. In traditional Chinese medicine, Governor Vessel electro-acupuncture (GV-EA) combines acupuncture with modern electrical stimulation. It has been shown to improve the microenvironment of injured spinal cord (SC) by increasing endogenous neurotrophic factors and decreasing inflammation, protecting injured neurons and promoting myelination. Furthermore, axons extending

from transplanted stem cell-derived neurons have the potential to bridge the two severed ends of tissues in a transected SC, allowing neuronal circuits to be rebuilt and motor and sensory functions to be restored [5].

## Conclusion

However, every treatment approach for severe SCI has proven ineffective. Combining treatments, such as electro-acupuncture (EA) and adult stem cell transplantation, appears to be a more promising approach. In this review, after summarising our team's recent progress over the last two decades, particularly in the use of GV-EA for SCI repair. EA can stimulate the nerve endings of the meningeal branch using this strategy. This would cause dorsal root ganglion neurons in the SC to secrete excessive amounts of calcitonin gene-related peptide. The neuropeptide then activates local cells to secrete neurotrophin-3 (NT-3) at the injury/graft site of the SC, which mediates the survival and differentiation of donor stem cells overexpressing the NT-3 receptor. Increased local NT-3 production promotes host neural tissue reconstruction, such as nerve fibre regeneration and myelination. All of these events would eventually strengthen cortical motor-evoked potentials and restore motor function to paralysed limbs. The data presented here will serve as a foundation for future research on the clinical application of GV-EA and adult stem cell transplantation for the treatment of SCI.

## Conflicts of Interest

The authors declare no conflict of interest.

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