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Effects of energy and number of sessions of extracorporeal shock wave therapy on functional recovery

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Introduction

- Extracorporeal shock wave therapy (ESWT) has emerged as promising option to treat neurological disorder.
- However, there is still considerable controversy with respect to specific protocols of ESWT in terms of energy density, dosage and number of sessions.
- The aim of this study is to investigate the effects of energy density and number of sessions of ESWT on functional recovery in rats with induced sciatic nerve injury and to find out which dose and method are effective.

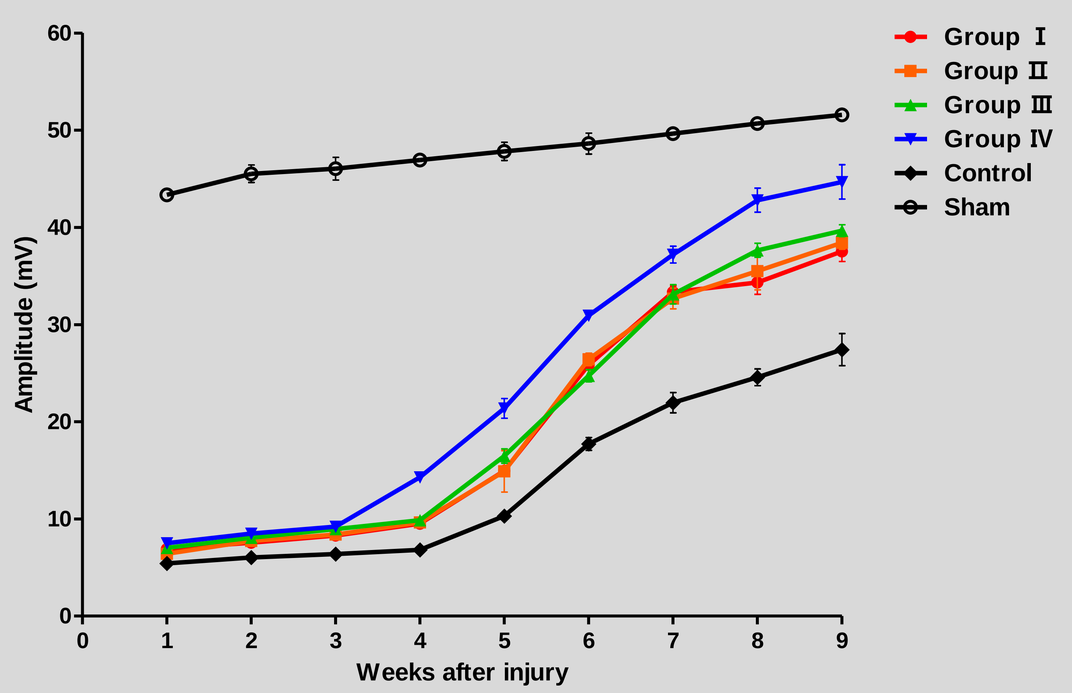
Method

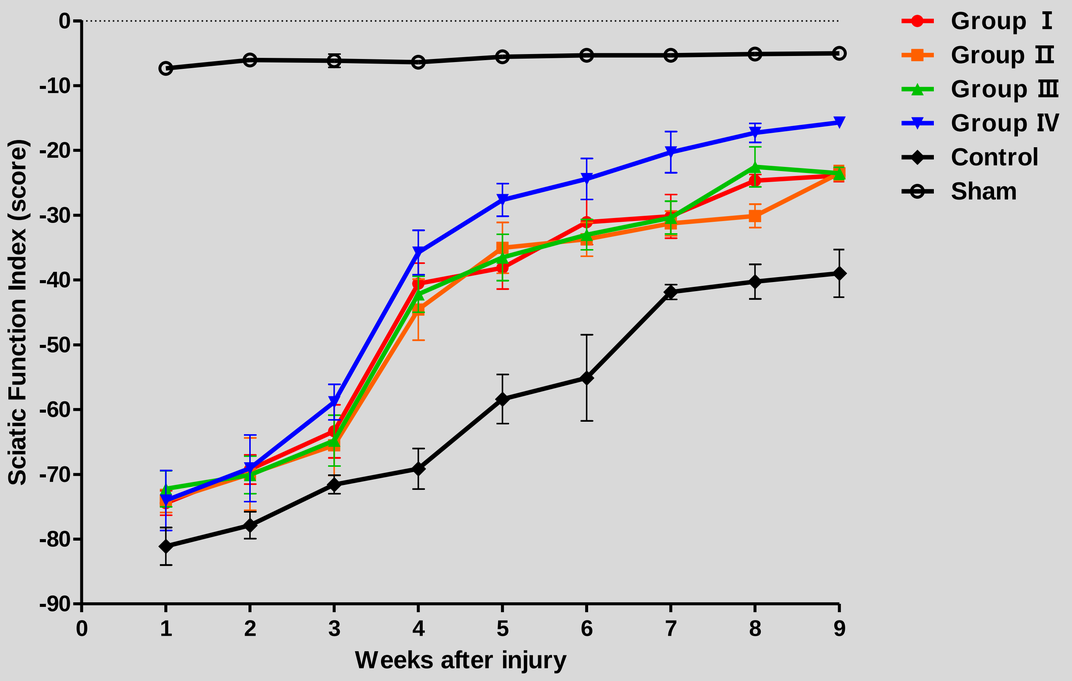
- Thirty rats were used and randomly divided into six groups
  : four experimental groups, control, and sham group (each n=5).
- The experimental groups received different energy densities (low-energy, 0.098 mJ/mm^2 and high-energy, 0.229 mJ/mm^2) of ESWT with single session or repeated session after sciatic nerve injury
  - Group I (0.098 mJ/mm^2, 4 Hz, 400 pulses, single session)
  - Group II (0.098 mJ/mm^2, 4 Hz, 400 pulses, repeated 3 sessions)
  - Group III (0.229 mJ/mm^2, 4 Hz, 400 pulses, single session)
  - Group IV (0.229 mJ/mm^2, 4 Hz, 400 pulses, repeated 3 sessions)
  - Control group (sciatic nerve injury, no treatment)
  - Sham group
- The sciatic functional index (SFI) analysis and electrophysiological studies were used to determine the effect of sciatic nerve damage on functional recovery for every week.

Results

- The findings of the electrophysiological study and sciatic functional index observation revealed that the ESWT treated group improved at a variable extend.
- The amplitude of the compound muscle action potential was significantly increased in group IV (0.229 mJ/mm^2, 400 pulses, repeated 3 sessions) in compare to the other groups from week 4 onward ($p < 0.05$). However, there were no significant differences in the amplitude between the other groups without the group IV.
- The SFI scores showed significant improvement in the group IV compared to the other group from week 4 onward ($p < 0.05$). However, there were no significant changes in the SFI among the other groups.

Results





Conclusions

- The authors found that ESWT promotes functional improvement in the injured nerve and we believed that high-energy with repeated sessions was the most effective parameter for ESWT to treat the injured nerve.
- Further studies are needed to develop medical guideline in using ESWT to treat neurologic disorders.

Reference

- Seo, Minsu, et al. "Effect of botulinum toxin injection and extracorporeal shock wave therapy on nerve regeneration in rats with experimentally induced sciatic nerve injury." *Toxins* 13.12 (2021): 879.
- Guo, Juan, Hong Hai, and Yuewen Ma. "Application of extracorporeal shock wave therapy in nervous system diseases: A review." *Frontiers in Neurology* 13 (2022).
- Sagir, Dilek, et al. "Efficacy of extracorporeal shockwaves therapy on peripheral nerve regeneration." *Journal of Craniofacial Surgery* 30.8 (2019): 2635-2639.
- Wu, Yi-Hui, et al. "The electrophysiological and functional effect of shock wave on peripheral nerves." *2007 29th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*. IEEE, 2007.
- Chung, Bryan, and J. Preston Wiley. "Extracorporeal shockwave therapy: a review." *Sports medicine* 32 (2002): 851-865.