◇ Effects of sonic whole body vibration on ambulatory abilities and c-Fos expression in crushed sciatic nerve injury-induced white mice.

The purpose of this study was to examine the effects of sonic whole body vibration on the ambulatory abilities and c-Fos expression in crushed sciatic nerve injury-induced mice. To evaluate ambulatory abilities, weight-bearing tests were conducted. Immunohistochemistry for c-Fos was conducted on the ventrolateral periaqueductal gray(vIPAG)areas.

1. Measurement of ambulatory abilities

. Figure 5 shows the weight-bearing test results evaluating ambulatory abilities of the mice. On the first day, the weight load factors for the control group, crushed sciatic nerve injury group, 8Hz-, and 16Hz-vibration treated groups were 63.17±1.97%, 40.32±1.63%, 36.02±1.40%, and 35.05±1.55%, respectively. On the second day, the weight load factors were 61.81±2.06%, 35.47±3.19%, 38.34±2.44%, and 43.74±1.59%, respectively. On the third day, the weight load factors were 63.80±1.56%, 43.87±2.65%, 45.43±1.38%, and 50.09±0.97%, respectively. On the fourth day, the weight load factors were 63.34±0.96%, 44.33±3.38%, 52.10±1.62%, and 51.50±1.12%, respectively. On the fifth day, the weight load factors were 65.89±1.36%, 5.86±2.07%, 54.34±1.12%, and 53.59±1.19%, respectively.

Figure 5. Sonic whole body vibration enhanced weight-bearing

(% of body weight) following sciatic crushed nerve injury.

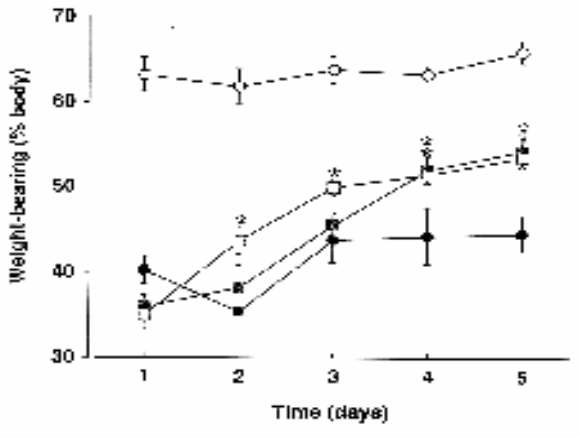
(○) Sham operation group,

(●) Sciatic crushed nerve injury group,

(■) Sciatic crushed nerve injury and sonic whole body vibration 8 Hz group,

(□) Sciatic crushed nerve injury and sonic whole body vibration 16 Hz group.

The values are represented as the mean±S.E.M. *p 〈 0.05 compared to the 1st day.



As can be observed from Figure 5, the weight load factors for both 8 Hz and 16 Hz whole body sound wave vibration therapy treated groups rapidly increased by the second day of testing when compared to the crushed sciatic nerve injury group.

2. Measurement of pain

Figure 6 shows the c-Fos-positive cell numbers in the vlPAG region following induction of crushed sciatic nerve injury. The results for the control group, crushed sciatic nerve injury group, 8Hz-, and 16Hz-vibration treated groups were 19.09±0.55, 51.45±1.62, 39.63±1.11, and 29.73±0.83, respectively.

Figure 6. Effect of sonic whole body vibration on the c-Fos expression in ventrolateral periaqueductal gray (vlPAG).

Upper: Photographs of the c-Fos-positive cells. The scale bar represents 100 μm.

(1) Sham operation group,

(2) Sciatic crushed nerve injury group,

(3) Sciatic crushed nerve injury and whole body vibration 16 Hz group.

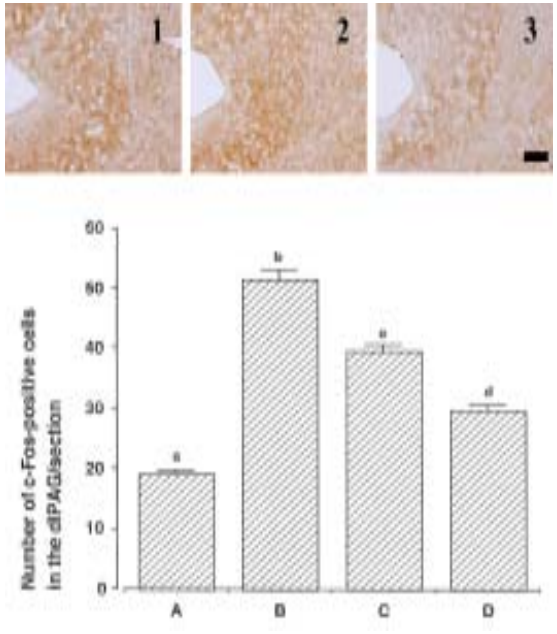
Lower: Mean number of c-Fos-positive cells in each group. The values are represented as the mean ± S.E.M.

(A) Sham operation group,

(B) Sciatic crushed nerve injury group,

(C) Sciatic crushed nerve injury and sonic whole body vibration 8 Hz group,

(D) Sciatic crushed nerve injury and sonic whole body vibration 16 Hz group.



As can be observed from Figure 6, the increased expression of c-Fos in the vlPAG region in crushed sciatic nerve injury-induced group was statistically significant. Treatment of injury-induced mice with whole body sound wave vibration therapy reduced the expression of c-Fos in a statistically significant manner. Treatment with 16Hz was found to reduce c-Fos expression more than treatment with 8Hz. This difference was statistically significant.

3. Conclusion

After analyzing the ambulatory abilities and vIPAG c-Fos expression levels in sonic whole body vibration treated mice that had been induced for crushed sciatic nerves, the following conclusions were obtained:

1. Sonic whole body vibration enhanced the ambulatory abilities that had been reduced as a result of crushed sciatic nerve. This result was statistically significant.

2. Sonic whole body vibration inhibited the expression of c-Fos that had been increased as a result of crushed sciatic nerve. This result was statistically significant.

The results in this study imply that sonic whole body vibration in patients with damaged sciatic nerves can prevent the deterioration of ambulatory abilities and aid in faster recovery. Furthermore, it can play an effective therapeutic role in controlling pain caused by nerve damage.

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