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Letter to the Editor

The Effects of Microwave Diathermy on Pain and Function in Chronic Low Back Pain Patients

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Dear Editor-in-Chief

Although superficial heat therapy is most often used as a physical therapy for treating low back pain (LBP), it has a disadvantage that it has a great effect of heating the skin and subcutaneous tissue and cannot penetrate deep tissue. Deep heat treatments such as microwave diathermy (MWD) are more effective in order to penetrate deep into the muscles and have a relaxing effect on the tissues (1). MWD uses electromagnetic energy to increase the kinetic energy of molecules and convert it into thermal energy to generate deep heat (2). MWD does not stimulate sensory and motor nerves due to its short pulsation period, and there is no risk of electrolyte burns (3). Despite the many benefits of MWD, few studies have specifically investigated the effects of MWD combined with exercise therapy.

Therefore, this study was conducted to investigate the effect of MWD combined with trunk balance exercise on pain and function in chronic LBP patients.

Subjects were 20 outpatients with chronic LBP, and were randomly assigned to the experimental group (MWD + trunk balance exercise) (n = 10) or control group (sham MWD + trunk balance exercise) (n = 10).

The therapeutic dose of MWD in this study was an intermediate dose (80W) and was performed for 20 min at a time, 3 times a week, and for 6 weeks. It was applied without turning on the microwave for the sham treatment, but the patients received it in a prone position, and the MWD have little sense of treatment, so they did not notice the sham treatment.

The trunk balance exercise performed by the subjects included hip extension by lifting the pelvis in a supine position, quadruped position with one arm and the opposite leg extension, and balancing by lifting both feet off the floor with only one hip on the table. The trunk balance exercise was performed for 15 min immediately after MWD.

Differences in general characteristics between the experimental group and the control group before intervention were compared using the Mann-Whitney tests and chi-square tests. The Wilcoxon signed-rank tests were performed to assess the before and after effects in each group. The Mann-Whitney tests were used to assess differences between real MWD and sham MWD. For all analyses, P values <0.05 were considered significant and statistical analysis was performed using SPSS version 20.0 (IBM Corp., Armonk, NY, USA).

The general characteristics (age, sex, duration, weight, height) of the subjects was no statistically significant differences between groups. Changes in pain and disability levels after intervention are shown in Table 1.

Table 1: Comparison of changes in NPRS, ODI and RMDQ in the experimental and control groups

Variable	*EG(n=10)*	*CG(n=10)*	*z*	*P*
NPRS (score)				
Pre-test	6.40±0.97	6.80±1.32	-0.702	0.481
Post-test	4.10±0.99	5.20±1.32	-2.223	0.031[a]
z	-2.833	-2.21		
P	0.001[b]	0.032[b]		
ODI (percentage)[c]				
Pre-test	40.20±3.36	42.00±4.32	-0.994	0.322
Post-test	34.10±2.42	38.40±4.40	-2.112	0.041[a]
z	-2.823	-1.841		
P	0.001[b]	0.072		
RMDQ (score)[c]				
Pre-test	8.60±0.97	7.90±1.60	-0.973	0.331
Post-test	7.40±1.43	7.00±1.33	-0.554	0.582
z	-2.323	-2.065		
P	0.023[b]	0.042[b]		

Values are presented as mean ± standard deviation.
EG, MWD + Trunk balance exercise; CG, shame MWD + Trunk balance exercise; NPRS, Numeric Pain Rating Scale; ODI, Oswestry Disability Index; RMDQ, Roland-Morris Questionnaire.
[a]Significant difference in gains between the two groups, P <0.05.
[b]Significant difference in gains between pre and post-test, P <0.05.
[c]Effect size greater than 0

NPRS (Numeric Pain Rating Scale) results to assess the intensity of pain, about 2.3 points decreased in the experimental group, and there was a significant improvement between pre and post-test (P < 0.05). In the control group, there was a significant improvement between pre and post-test (P < 0.05), but the experimental group was found to be more significant in the comparison between groups (P < 0.05).
ODI (Oswestry Disability Index) results for measuring functional disability, about 6.1 percentage decreased in the experimental group, and there was a significant improvement between pre and post-test (P < 0.05). It also showed a significant improvement in comparison between groups (P < 0.05).
RMDQ (Roland-Morris Questionnaire) results for measuring level of disability, about 1.2 points decreased in the experimental group, and there was a significant improvement between pre and post-test (P < 0.05). There was a significant improvement between pre and post-test in the control group (P < 0.05), and there was no significant differenc between groups (P > 0.05).
In addition, the effect size of ODI and RMDQ for gains in the experimental and control groups was strong (effect size=1.1, 1.0, respectively).
The results of this study showed that the combination of MWD and trunk balance exercise reduces pain, improves disability, and improves functional level in chronic LBP patients. Although this study was not a study on the effect of MWD only, our findings suggested that MWD is effective as an adjuvant therapy combined with exercise therapy.

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Conflict of interest

The authors declare that there is no conflict of interest.

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