

통증 및 근골격재활

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OP1-1-6

Comparison of High versus Low-Energy Extracorporeal Shock Wave Therapy for Knee Osteoarthritis

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Background

Osteoarthritis (OA) is the most prevalent progressive degenerative joint disease and is a leading cause of pain and disability in most countries. The treatment Methods for knee OA are diverse. Recently, many researchers have demonstrated the effects of focused extracorporeal shock wave therapy (fESWT) for knee OA which has previously been resistant to conservative treatment. However, despite the many reports on the efficacy of fESWT for knee OA, the exact treatment protocol is not established. Particularly, many controversies exist regarding the proper amount of energy to be applied to the affected tissue. Therefore the purpose of this study is to investigate the dose-related effects of fESWT in patients with knee OA.

Method

Patients who suffered from knee OA at least 3 months and radiologically diagnosed as Kellgren-Lawrence (KL) grade II or III were recruited. All patients were randomly divided into high-energy (HE) group and low-energy (LE) group. HE group received high-energy fESWT(1,000 shocks/session, energy flux density (EFD) per shock 0.1 mj/mm²) and LE group received low-energy fESWT(1,000 shocks/session, EFD per shock 0.03 mj/mm²). All patients received fESWT 1 session per week for 3 weeks. At each session, all subjects were positioned in a supine manner, with the affected knee flexed at 90°. The shockwave probe was held stationary on a tender area around the medial tibial plateau. During the course of the experiment, all subjects were prevented from receiving any additional treatment, such as physical therapy, steroid injection, or anti-inflammatory drugs. Before and 1 months after the treatment, Western Ontario and McMaster Universities Osteoarthritis index (WOMAC), Lequesne index, 9-Stair climb test (9-SCT) and Visual Analogue Scale (VAS) of pain perception were evaluated.

Results

Seven patients were recruited in each group. There were no significant differences in baseline characteristics and initial values between two groups (Table1). One month after the treatment, all groups showed significant improvement in WOMAC, Lequesne index, 9-SCT and VAS (Table 2). But the changes in all measurements showed no significant difference between two groups (Table 3).

Conclusion

In this study, there were no significant differences between HE and LE fESWT treatment for knee OA. Further well-designed studies in a larger population might be needed to elucidate the effect of energy differences of fESWT on knee OA.

Table 1. Baseline characteristics of two groups

	HE group (n=7)	LE group (n=7)	p-value
Age (year)	68.0±7.9	66.4±6.0	0.548
BMI (kg/m ²)	26.0±4.7	26.2±4.7	0.916
KL grade			
II	4	3	
III	1	2	
WOMAC (0-96)	37.2±17.7	50.8±7.0	0.151
Lequesne index (0-24)	7.2±2.1	7.4±2.5	0.841
9-SCT (sec)	72.2±12.1	68.0±9.7	0.855
VAS (0-10)	3.6±0.9	4.4±0.9	0.222

Values are presented as mean±standard deviation.

BMI, Body Mass Index; KL, Kellgren-Lawrence; WOMAC, Western Ontario and McMaster Universities Osteoarthritis index; 9-SCT, 9-Stair climb test; VAS, Visual Analogue Scale.

Table 2. Change of measurements after treatment

	HE group(n=7)		p-value	LE group (n=7)		p-value
	Pre	Post		Pre	Post	
WOMAC (0-96)	37.2±17.7	25.8±13.9	0.043*	50.8±7.0	37.4±5.3	0.042*
Lequesne index (0-24)	7.2±2.1	4.6±2.5	0.042*	7.4±2.5	5.0±1.2	0.047*
9-SCT (sec)	72.2±12.1	68.6±11.7	0.043*	68.0±9.7	63.6±10.4	0.042*
VAS (0-10)	3.6±0.9	2.0±0.7	0.038*	4.4±0.9	2.0±0.8	0.039*

Values are presented as mean±standard deviation.

WOMAC, Western Ontario and McMaster Universities Osteoarthritis index; 9-SCT, 9-Stair climb test; VAS, Visual Analogue Scale.

*p<0.05 by Wilcoxon signed rank test.

Table 3. Changes of measurements between two groups

	HE group (n=7)	LE group (n=7)	p-value
Δ WOMAC	-11.4±5.6	-12.8±3.0	0.421
Δ Lequesne index	-2.6±1.5	-2.6±1.6	0.841
Δ 9-SCT	-3.6±2.7	-3.8±2.6	0.918
Δ VAS	-1.6±0.55	-2.2±0.83	0.310

Values are presented as mean±standard deviation.

WOMAC, Western Ontario and McMaster Universities Osteoarthritis index; 9-SCT, 9-Stair climb test; VAS, Visual Analogue Scale.