EFFICACY OF NON-INVASIVE HIGH POWER LASER ACUPUNCTURE STIMULATION IN CHRONIC NON-SPECIFIC LOW BACK PAIN

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ABSTRACT

Background: *Chronic nonspecific low back pain (CNSLBP) is defined as persistent back pain lasting longer than 12 weeks, localized between the inferior gluteal fold and the costal margin. CNSLBP affects people of all ages and is a leading contributor to the disease burden worldwide. Because CNSLBP does not have a known anatomical cause, treatment focuses on reducing pain and its consequences. High-intensity laser therapy has been proven to significantly reduce pain by describing the anti-inflammatory, anti-edematous, and analgesic effects of HILT.* ***Purpose:*** *The aim of this study was to investigate the effect of high-power laser acupuncture on pain, back range of motion on patients with CNSLBP. Patients and Methods: This study was conducted at the outpatient clinic, Faculty of physical therapy, Cairo University between April and December 2023. Sixty patients of both gender (42 female and 18 male) with CNSLBP aged (29.4±5.9) years and Body Mass Index (BMI) ranged from (23±1.9) kg/m2 were randomly assigned into 2 equal groups. Group A received high power laser acupuncture (HPLA) and conventional physical therapy program (hot packs and stretching exercises, strengthening exercises and lumbar stabilization exercises). The treatment was applied 3 times per week for consecutive 4 weeks. Group B received sham laser and conventional physical therapy, Pain intensity was evaluated by Visual Analog Scale (VAS) and back range of motion by back range of motion instrument (BROM) in patients with CNSLBP. Statistical analysis, Mixed design MANOVA was performed to compare within and between groups' effects for measured variables (pain, back range of motion). Results: There was a significant difference in VAS and BROM scores within both groups (P = 0.001). In addition to a significant difference in VAS and in BROM scores between groups in favor to group A (P = 0.001).* ***Conclusion:*** *Application of HPLA may relief pain and improve back range of motion in patients with CNSLBP.*

Keywords: *chronic nonspecific low back pain, high power laser acupuncture, back range of motion.*

INTRODUCTION

Chronic nonspecific low back pain (CNSLBP) affects people of all ages and is a leading contributor to disease burden worldwide. Because the CNSLBP does not have a known path anatomical cause, treatment focuses on reducing pain and its consequences (1). CNSLBP is a common condition that can be effectively treated by acupuncture. However, several treatment point prescriptions (i.e., local acupoints, distal acupoints, and sensitized acupoints) may be used.(2).

High-intensity laser therapy (HILT) has been used more recently in the therapeutic protocols of pain managements. Adding therapeutic interventions to laser therapy is usual in clinical practice. Laser photo biomodulation (PBM) therapy is a non-invasive and painless method of treatment in physiotherapy which may have both local and systemic effects on the patients. The effect of PBM on tissues depends on such factors as wavelength, irradiation mode (continuous or pulse), pulse duration, pulse time interval, energy fluency and power output. The PBM stimulates cells including pain receptors in peripheral tissues, the immune system and can cause vasodilation and analgesic effects. So, it is widely used to reduce patients' pain. Moreover, laser therapy can stimulate repairs to damaged tissues and peripheral nerves leading to neurological regeneration. The main difference between HILT and Low level laser therapy, is that the more powerful beams (power >500 mW) are irradiated to penetrate deeper, bringing a desired high amount of multi-directional energy to deep tissues in a short time (3) .

Laser acupuncture (LA) is the use of laser light as an alternative to needles to stimulate acupuncture points has been promoted for almost three decades. Evidence was found to support the use of LA in the treatment of myofascial pain, postoperative nausea and vomiting and for the relief of chronic tension headache. LA would appear to represent an effective form of acupuncture for the management of these conditions and could be considered as a viable alternative to more traditional forms of acupuncture point stimulation (4). This study was conducted to investigate the effect of High-power laser acupuncture on pain and back range of motion for CNSLBP.

MATERIALS AND METHODS

This work was performed at the outpatient clinic at Faculty of Physical Therapy, Cairo University in the period from April to December 2023, the study was approved by Research Ethics Committee of Faculty of Physical therapy (NO: P.T.REC/012/004540) It was registered at Pan African Clinical Trial Registry (Registry ID PACTR 202004688).

Study design

Single blinded randomized control trial.

Participants

The patient's age ranged from 19 to 70 years old with BMI between 18.5 and 25 kg/m2. The selective criteria of CNSLBP were Painful sensation below T 12 and above inferior gluteal cleft. The patients had 3 months of continuous or interrupted LBP symptoms. And they excluded from this research at the following conditions; any vestibular, visual or neurological dysfunction affecting balance, Low back pain with radicular leg pain symptoms (and/or neurological deficit), pregnant or obese women, history of spinal fracture and malignancy, specific LBP, defined as herniated disc, spondylolisthesis and ankylosing spondylitis and sever disabling LBP (5). Assessment performed at baseline (before starting of treatment) and after the last session. Outcome measures were pain intensity which assessed by VAS, back range of motion was assessed

by Back range of motion instrument. Sample size calculation was done using F-test MANOVA within and between interaction effect, with 80% power at $\alpha = 0.05$ level, number of response variable 3, for 2 groups and effect size = 0.4. The minimum proper sample size is 52 subjects, adding 8 subjects (15% as drop out). Total sample size is 60 subjects, 30 in each group. The sample size was calculated using the G*Power software (version 3.0.10).

Measurement procedures

Patients in the two groups of the study were evaluated pre and after 12 sessions. Pain measurement: patients were asked to mark the point that exactly matched his/her pain (6). Back range of motion measurement: in flexion and extension, the inclinometer was attached to the sacrum S1, unit was secured to the body by straps. Extended arm is inserted into the distal portion of the unit and fixed at T12 to guide the protractor, then the patients were asked to bend forward and to extend back and the angle was recorded. During rotation,
BROM device with a compass and goniometer used. The device was fixed at the level of T12 and a magnet was suspended at the level of S1. Patients were asked to rotate right and left and the angle was recorded. For side bending, the BROM device is fixed at T12, and degrees of motion were recorded from posterior by the gravity goniometer (7).

Treatment procedures

High Power Laser Acupuncture

High power laser therapy A Zimmer Opton pro, integrated High-power class IV laser device (serial N: 15200013306 & REF: 4682, made in Germany, manufactured by Zimmer Medizin Systeme). It emits radiation in the infrared range to deliver topical heating and raise tissue temperature. The laser probe - with the small spacer (3.1cm2) – was applied perpendicularly on the skin, with parameters of 3watts, 5Hz, 50% duty cycle, 20 joule/ point for 13 seconds with 6.4 j/cm2 was used. The patient was lying prone, exposing the treatment area and pillows were kept under the head and ankles for relaxation; the lumbar area was scrubbed with alcohol pad. Thirteen points commonly used acupuncture points: unilateral GV3, GV4, and GV5 and bilateral BL23, BL24, BL25, BL40, and GB30 (7,8).

Location of GV3, in lumbar region on the posterior median line in the depression inferior to the spinous process of the fourth lumber vertebra and was located with the patient prone, the spinous process of L4 is at the midpoint of the highest point of the iliac crests. GV4 location, in lumbar region on the posterior median line in the depression inferior to the spinous process of the second lumber vertebra and was located with the patient prone, the spinous process of L2. GV5 location, in lumbar region on the posterior median line in the depression inferior to the spinous process of the first lumber vertebra and was located with the patient prone, the spinous process of L. BL25 location, in lumbar region on the posterior median line in the depression inferior to the spinous process of the fourth lumber vertebra and 1.5 cm lateral to the posterior median line was located with the patient prone, find GV3 at midpoint of line linking the highest points of the two iliac crests. The point is 1.5 cm lateral to GV3. BL24 location, in the lumbar region 1.5 cm lateral to the posterior median line at level of the inferior border of the spinous process of third lumbar vertebra. BL23 location, in the lumbar region 1.5 cm lateral to the posterior median line at level of the inferior border of the spinous process of second lumbar vertebra. BL40 location, on the posterior aspect of the knee at the midpoint of the popliteal crease. GB30 location, on the buttocks at the junction of the lateral 1/3 and medial 2/3 of a line connecting the prominence of the greater

trochanter with the sacral hiatus. It was located with the patient lying side with the bottom leg extended and the upper thigh flexed, place the transverse crease of the little finger joint on the greater trochanter and point the thumb towards the spine. The point at the tip of the thumb. Alternatively, with the patient prone, find the point in the depression posterior to the prominence of the greater trochanter at the junction of lateral 1/3 and the medial 2/3 of the line connecting the prominence of the greater trochanter and the sacral hiatus.

For acupoint locations, a vertical and horizontal coordinate method was adopted as often as possible and employed modern anatomical terms consistently, which helps the reader to select, find and use the exact points. In addition, the anatomical landmark method was used to provide absolute and accurate standards for locating acupoints (9).

Each patient was treated 3times /week for 4 consecutive weeks (10).

Conventional physical therapy program

Superficial heat (hot packs) for 15 minutes (11).

Exercises: selected physical therapy exercises program (stretching of hip flexors, hamstring, and lower back extensors muscles, strengthening exercises for abdominal and back muscles and lumbar stabilization exercises) (12).

Passive manual stretching:

Passive manual stretching of the iliopsoas, hamstrings, and lower back extensors were performed from three positions: prone, supine, and supine with knee-to-chest positions, respectively. The positions were held for 30 s. The exercises were repeated three times per session Handling and maneuvers were performed in accordance with those described in the literature (13,14).

1- Passive manual stretching for iliopsoas

On the plinth, the patient lies prone and the therapist stands next to the stretched side of the patient. Manipulate the patient by supporting and grasping the anterior side of the patient’s distal femur, stabilizing the buttocks to prevent the pelvis from moving, and extending the hip by raising the femur from the table.

2-Passive manual stretching for hamstring

The patient is on a plinth, supine, with the therapist's stride next to the affected side. Manipulate and maneuver the patient's lower leg with an arm or shoulder, supporting the patient's leg. stabilize the opposite leg along the anterior side of the thigh using your other hand, belt, or with the help of someone else. Manipulate the patient's hip, flexing the hip as much as possible with the knee extended at 0° and the hip at neutral rotation.

3-Passive manual stretching for lower back extensors

The patient supine lying on plinth with the therapist stride standing beside the affected side, With the patient hip and knee flexed, move them toward the lower abdomen and tell the patient catch them by their hand.

B-Strengthening exercises:

Strengthening exercises for abdominal and back extensor is very important in cases of CNSLBP (12). The exercises were repeated ten times and two sets. Handling and maneuvers were performed in accordance with those described in the literature (15).

Abdominal strengthening exercises:

The patient is lying supine on the plinth with the therapist stride standing beside them.

Handling and maneuvers: The therapist fixed the patient's lower limbs and pelvis. The patient was instructed to lift their head, neck, and shoulder blades off the plinth, hold the position for 5 seconds, and then relax (15).

Back strengthening exercises:

The patient is lying prone on the plinth. The therapist is standing beside the patient. Handling and maneuvers: the patient's lower limbs and pelvis were fixed. Instruct the subject to elevate their head, shoulders, and upper torso off the plinth, hold the position for 5 seconds, and then relax. (15).

Lumbar stabilization exercises:

Lumbar stabilization exercises comprised abdominal bracing, side support, and quadruped exercises; the subject started with ten repetitions (hold 8 s) and then progressed to 30 repetitions (16).

1-Abdominal bracing exercises,

The patient was in a crock lying position and was instructed to tighten their stomach. The subject was instructed to hold the position for 8 s, relax, and repeat (16).

2-Side support exercises:

The patient was placed in a side-lying position resting on one elbow and one foot and directed to tighten their stomach and lift their hips for 8 S, relax, and repeat on both sides (16).

3-Quadruped exercises:

The patients used their arms and legs as levers to train the lower back muscles; initially, the patient elevated one leg and extended the hip to 30° while supporting the trunk on the remaining three limbs and tightening the stomach. Then, the patient alternates with the other leg (16).

Data analysis and statistical design

Data were expressed as mean± SD. Unpaired t-test and chi square test were used to compare between subjects Characteristics of the two groups. Shapiro-Wilk test was used for testing normality of data distribution.2*2*2 mixed design MANOVA was performed to compare within and between groups' effects for measured variables (pain and back range of motion) Statistical package for the social sciences computer program (version 20 for Windows; SPSS Inc., Chicago, Illinois, USA) was used for data analysis. P less than or equal to 0.05 was considered significant.

Results

Subject characteristics:

Sixty patients with CNSLBP with demographics as shown in table (1) The subject characteristics of group A and B. There was no significant difference between the mean value of subjects age, weight, height and BMI of both groups (p=0.08, 0.09, 0.08 and 0.85) respectively. The number (%) of females of groups A and B were 20 (66.7%) and 22 (73%) respectively and the number (%) of males were 10 (33.3%) and 8 (27%) respectively, there was no significant difference between both groups of number of sex distribution (p= 0.529).

Table (1): Demographic data of subjects of both groups

Demographic data	Group A	Group B	t-value	p-value
Age (years)	26.7±5	29.4±5.9	-1.77	0.08
Weight (kg)	67.5±10.9	62.6±8.7	1.74	0.09
Height (cm)	169±6.9	165±9.1	1.76	0.08
BMI (kg/m^2)	23±1.9	22.9±1.3	0.193	0.85
Sex Females Males	N (%) 20 (66.7) 10 (33.3%)	N (%) 22 (73%) 8 (27%)	χ^2= 0.397	0.529

Data was expressed as mean ± standard deviation or number (%), χ^2 : chi square, p- value: significance

Effect of treatment on VAS:

Within group comparison revealed a significant decrease in VAS in both groups at post treatment compared with that pretreatment (p = 0.001) (Table 2). While between groups comparison revealed a statistically significant difference post treatment (p= 0.001) in favor to group A (Table 2)

Effect of treatment on back ROM:

Within group comparison revealed a significant increase in back ROM in both groups post treatment compared with that pretreatment (p = 0.001) (Table 2). While between groups comparison revealed a statistically significant difference post treatment (p= 0.001) in favor to group A (Table 2)

Table (2): Mean ±SD of pain and BROM pre and post treatment of both groups

Pain (cm)	**Group A Mean ±SD**	**Group B Mean ±SD**	**Mean difference**	**f-value**	**P-value[1]**
Pre-treatment	7 ± 1.3	6.8 ± 1	0.2	0.375	0.543
Post-treatment	2.8 ± 1.3	4.8 ± 1.2	-2	30.1	0.001*
% of change	⬇ 60 %	⬇ 29.4 %			
P-value	0.001*	0.001*			
Back range of motion	**Group A Mean ±SD**	**Group B Mean ±SD**	**Mean difference**	**f-value**	**P-value[1]**
Flexion (cm)					
Pre-treatment	4.12 ± 0.78	4.38 ± 0.75	-0.26	1.43	0.237
Post-treatment	9.6 ± 1.9	6.42 ± 1.16	3.18	50.63	0.001*
% of change	⬆ 133 %	⬆ 46.6 %			
P-value	0.001*	0.001*			
Extension (degrees)					
Pre-treatment	7.64 ± 2.36	6.52 ± 1.87	1.12	3.45	0.069
Post-treatment	13.24 ± 3.92	9.8 ± 2.1	3.44	14.96	0.001*
% of change	⬆ 73.3 %	⬆ 50.3 %			
P-value	0.001*	0.001*			
Right rotation (degrees)					
Pre-treatment	5.92 ± 2	5 ± 1.68	0.92	2.96	0.092
Post-treatment	9.6 ± 2.12	7.52 ± 2.1	2.08	12.35	0.001*
% of change	⬆ 62.2 %	⬆ 50.4 %			
P-value	0.001*	0.001*			
Left rotation (degrees)					
Pre-treatment	6± 2.1	5.24 ± 2.16	0.76	1.6	0.212
Post-treatment	9.84 ± 1.95	7.48 ± 1.87	2.36	19.03	0.001*
% of change	⬆ 64 %	⬆ 42.7 %			
P-value	0.001*	0.001*			
Right bending (degrees)					
Pre-treatment	11.4 ± 1.94	11 ± 2.36	0.4	0.43	0.516
Post-treatment	19.12 ± 3.95	14.88 ± 2.83	4.24	19.02	0.001*
% of change	⬆ 67.7 %	⬆ 35.3 %			
P-value	0.001*	0.001*			
Left bending (degrees)					
Pre-treatment	10.6 ± 1.85	10.6 ± 2.6	0	0	1
Post-treatment	19.2 ± 4.14	14.6 ± 2.9	4.6	20.68	0.001*
% of change	⬆ 81 %	⬆ 37.7 %			
P-value	0.001*	0.001*			

SD: standard deviation, p-value: level of significance within group, p-value[1]: level of significance between groups, *: significant

DISCUSSION

This study investigated the effect of The purpose of this study is to investigate the effect of high-power laser acupuncture on low back pain and lumbar ROM, in patients with CNSLBP. Results showed that HPLA and conventional physical therapy program are effective in treating patients with CNSLBP; however, HPLA can be more effective than conventional physical therapy program in

treating patients of CNSLBP. Low back pain was traditionally treated with low intensity laser with its analgesic effects contributes to the better functional ability of patients and better range of lumbar spine motion. Since recently, the new type of lasers, the high-power one, is being used as an alternative to low intensity laser for treatment of low back pain and many other musculoskeletal disorders as for shoulder pain (17), degenerative knee disease (18), and chronic pain in the ankle (19). The present study results come in line with a study was conducted by Gocevska et al., 2019, they investigated the effect of HPLT on chronic low back pain they found that HPLT is effective in reducing low back pain, disability and improving range of motion of patients with chronic low back pain. They attributed their findings to the analgesic effect which is mediated by the inhibition of painful sensation at different levels, the reduction of histamine and bradykinin release from inflammatory tissue, and the increased pain threshold. They also postulated that laser light reduces the secretion of substance P from peripheral nociceptors, thus reducing the pain relay and preventing the development of hyperalgesia. Laser analgesic effect is due to increased secretion of endogenous opioids such as β-endorphins, by which the pain is centrally inhibited. The photo bio stimulation effect of laser also improved the tissue function and the range of motion, through the absorbed laser light in the tissue increases the mitochondrial oxidative process; hence the production of ATP, RNA and DNA is increased resulting in a photobiological effect (20).

Some researchers used combined exercises treatment with HPLT, Alayat et al., 2014, which agrees with the result of the current study, reported that a combined treatment of exercises and high-intensity laser gave a better range of lumbar spine motion, reduced pain and better functionality in patients with CNSLBP than using a high-intensity laser solely, or without exercises and placebo laser with exercises. They found out that four weeks of treatment with exercises and laser Scanning transversely and longitudinally in the lower-back area of L1–L5 and S1, to cover the fasciae, sacral ligaments, ileum, latissimus dorsi, obliquus externus abdominis, and the upper part of the gluteus maximus resulted in statistically significant improvement of VAS scale and Functional ability measured by the Oswestry Disability Index. They attributed their findings to the absorption at the tissue level is characterized by light diffusion in all directions (the scattering phenomenon), which increases the mitochondrial oxidative reaction and subsequently increases adenosine triphosphate (ATP), RNA, and DNA production. These so-called photochemistry effects result in the phenomenon of tissue stimulation, also known as the photobiology effect (10).

Also, the present study agrees with a study conducted by Fiore et al., 2011, in their randomized trial have also found the analgesic effect of high-intensity laser in patients with low back pain. The results obtained in both groups of patients were analyzed by the VAS scale and Oswestry Disability Index immediately after the completed therapy formed of 15 sessions on the zones of muscular contracture, at the end on the lumbar and dorsal muscles, latissimus dorsi and obliquus externus and magnus gluteus. Scanning election criteria, was performed both transversally and longitudinally and showed a significantly improve in pain and function ability in patients treated with a high-intensity laser. They attributed their findings to using a particular waveform with regular peaks of amplitude elevated value and distant among them come to decrease thermal accumulation phenomenon and able to induce in the deep tissue photochemical and photochemical effects that increase blood flow vascular permeability, cell metabolism, and photo mechanical level of tissue. The action of HILT developed on the nervous terminations with an analgesic

effect as this radiation type is characterized by a particular absorption that is obtained with concentrated light but with diffuse light in all directions (scattering phenomenon) and resulting in the phenomenon of its photobiology effects (21).

Also, the present study is consistent with a study by Choi and his colleagues at 2017 was conducted to examine the effects of High Intensity Laser Therapy on pain and function of patients with chronic back pain, the treatment was applied to the L1–L5 and S1 regions for 10 minutes by using a high intensity laser device. The study showed that High Intensity Laser Therapy can be an effective nonsurgical intervention method for reducing pain and helping the performance of daily routines of patients who have chronic back pain. They attributed the results to the HILT effect on homeostasis as it enhances ATP production by inducing thermal effects through photothermal interaction. It can also be attributed to the fact that HILT relaxed stiffened tissue by increasing expansibility inside collagen tissue through a stimulation of metabolism of cells that was caused by decreased infection and increased temperature of the local area (22)

The result of the current study regarding pain decrease and range of motion increase may be due to the use of HPLT on acupuncture points in addition to the use of exercises program. Exercise therapy has become a standard procedure for the management of spinal pain. Combined exercises for gluteal muscles strengthening and exercises for lumbar segmental stabilization have shown improvement in balance, larger muscle endurance and a decrease in disability pain index in patients, Gur., et al 2003 was assumed that exercises for the strengthening of spinal, abdominal and gluteal muscles, which are applied in patients with chronic low back pain, should be combined with laser therapy for achieving better results. Several researchers have shown no advantages of using laser therapy alone or conducting exercises alone in the treatment of chronic pain, but these studies have analyzed only the short-term effects of laser therapy (23).

Gocevska and his collegues at 2019 indicate that exercise therapy is clinically able to decrease pain, increase ROM, and improve function. It is providing to be economical, practical, and safe to emphasize the importance of an exercise program in rehabilitation aimed at functional recovery. The combined significance, improving chronic low back pain and having this positive effect last for a period of up to 3 months. Moreover, HILT can be useful to reduce pain and disability related, but this is important to add rehabilitation programs with the exercise of leg and spine and stretching to reduce the frequency of low back pain (20).

Moreover, when Conte et al., 2014 compared LASER to pharmacological therapy, results showed that LASER had little biological activity and had few, side effects. These findings supported the current study finding as HPLT is a unique, powerful, and painless modality that has considerable pain-relieving effects. It exhibits photomechanical, photo thermal, and photochemical capabilities, as well as a variety of therapeutic benefits such as anti-edematous, analgesic, and biological stimulation (25).

A study by Shin et al., 2015 was performed to investigate the effect of laser acupuncture on low back pain. the results suggested that laser acupuncture can provide effective pain alleviation and can be considered an option for relief from lower back pain with further studies using long-term intervention, a larger sample size, and rigorous methodology are required to clarify the effect of laser acupuncture on lower back pain. Although there was no significant difference in

outcomes between the two groups, the results suggested that laser acupuncture can provide effective pain alleviation and can be considered an option for relief from lower back pain which agreed with our present study (26).

To treat LBP, acupuncture expert predefined a group of acupuncture points on 3 types of meridians (gallbladder meridian, GB; bladder meridian, BL; Governor Vessel, GV) according to the pain location. The Oriental Medicine is based on the theory that "There is stoppage, there is pain," which means that pain is caused by the obstruction of qi and blood in the meridian. The traditional acupuncture moxibustion theory states the following: "Rescue the waist and back from pain by the WeizHong (BL40)." On the basis of these theories, unilateral GV3, GV4, and GV5 and bilateral BL23, BL24, BL25, BL40, and GB30 are often used for pain relief of LBP (26).

Shin et al., 2015. investigated laser acupuncture on low back pain There were no significant differences between the treatment group (laser acupuncture and sham laser), although significant differences in the VAS score within each treatment group were detected. Treatment was performed with a cup-shaped laser acupuncture device in sequence at 13 commonly used acupuncture points: unilateral GV3, GV4, and GV5 and bilateral BL23, BL24, BL25, BL40, and GB30. They attributed their findings to cupping therapy by partial vacuum has been found to improve the local blood and lymphatic circulation, increase the temperature of the local skin, and relieve painful muscle tension. To hold the device to the skin without causing physiologic or therapeutic effects, they designed the suction pressure within the cupping glass (15 kPa = 112.509 mmHg) to be weaker than that of normal cupping therapy (600 mmHg). However, this cannot exclude the possibility that cupping suction could trigger an analgesic effect. Another study conducted by lin et al., 2012 to investigate the laser acupuncture and soft cupping on low back pain by giving one treatment session (five continuous days). First, they recorded the VAS before the trial. Second, they used 4-channel laser therapy instrument LA400 to treat Weizhong acupoints (BL40) on two feet and Ashi points on dorsal for 10 minutes, showed that The VAS scales of all patients are decreased in these two groups after 5 times of treatment, but it had no significant difference between these two groups in each treatment. Regardless of the variation in laser dosage between the two studies, the length of infiltration was approximately 2-5 mm into the skin, which indicated that the intensity of stimulation was not sufficient to achieve the de-qi sensation (26,27).

Both results of Lin and Shin contradicts with the current study findings. This contradiction could be explained by Firstly, the number of acupoints was different from our study. Secondly, the number of given sessions for treatment was less than those in our study.

CONCLUSION

High power laser acupuncture can be effective in treating patients with CNSLBP regarding pain and back range of motion.

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