

Influence of Tonifying Selected Body Meridians by Low Level Laser and Phonophoresis on Mechanical Neck Pain

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ABSTRACT

Background: Body meridians, also known as energy pathways, are a foundational concept in traditional Chinese medicine (TCM)

Purpose of the study: The purpose of this study was to evaluate the relationship between some selected body meridians and mechanical neck pain patients.

Materials and Methods: There were 60 volunteers with mechanical neck pain of both genders. Their ages ranged from 20 to 40. They were divided into four equal four groups received treatment on meridians. The pressure algometer measures the level of discomfort.

Results: pain intensity decreased significantly after treatment compared to before treatment within groups, according to a 3×2 Mixed design MANOVA ($P=0.0001$; $P<0.05$). Following treatment, the combined phonophoresis and laser group with traditional physical therapy program experienced a significant decrease in pain intensity compared to the phonophoresis and laser groups alone. This was also the case for pain intensity in classical acupoint groups.

Conclusion: According to the study's findings, there was a reduction in pain intensity; however, the phonophoresis and LLLT group showed more improvement than the other groups. For reducing pain intensity, LLLT, phonophoresis and traditional physical therapy program work better together than any treatment alone.

Keywords: Low level laser therapy; phonophoresis; classical acupoints;; pressure algometer and inclinometer.

1. INTRODUCTION

The 360 traditional acupoints, also known as meridians, stand in for several human organs, including the liver, kidney, heart, and small liver, bladder, pericardium, stomach, spleen, lung, large intestine, and intestine. Four acupoints on the afflicted side will be chosen: Houxi (Small Intestine Meridians, SI 3), Waiguan (Sanjiao Meridians, TE 5), Hegu (Large Intestine Meridians, LI 4), and Shousanli (Large Intestine Meridians, LI 10). These acupoints are frequently used to treat cervical myofascial pain syndrome (MPS).

Common Classical acupoints used for neck pain treatment:

Shousanli (LI 10): Location: On the radial side of the forearm, 2 cun below the elbow crease.

Function: Shousanli is often used to clear heat and alleviate pain. In the context of cervical myofascial pain, it may help reduce inflammation and pain in the neck and shoulder region as shown in *Figure 1*.

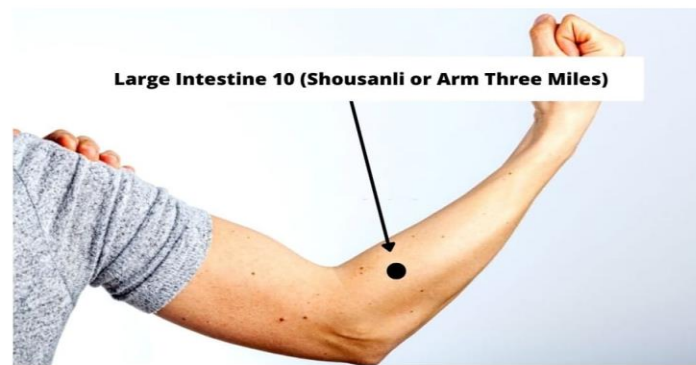


Figure (1): Shousanli point.

Phonophoresis for traditional acupoints and trigger points: Phonophoresis (PH) is the application of ultrasound to improve topical medication absorption and deep tissue penetration. Numerous factors, such as the rate, depth of skin penetration, degree of drug penetration, and potential adverse tissue effects, influence the therapeutic benefits of drugs given topically. Low Level Laser for Trigger Points and Classical Acupoints: Among the different techniques of application in Low Level Laser Therapy (LLLT), there are some very promising "trigger points" (TPs), or myofascial zones of particular sensibility and of highest projection of focal pain points, due to ischaemic conditions (He Ne 632.8 nm visible red or infrared 820-830 nm continuous wave and 904 nm pulsed emission). After treating over 200 patients clinically (including those with skeletal muscle disorders, myogenic neck pain, shoulder and arm pain, epicondylitis humeri, tenosynovitis, cervical and radicular pain, and headaches and facial pain, for whom the "trigger points" were better than we ever imagined), the effects of LLLT and the results surpassed our expectations.

Hegu (LI 4): Location: On the dorsum of the hand, between the 1st and 2nd metacarpal bones, in the middle of the 2nd metacarpal bone on the radial side.

Function: Hegu is a commonly used point for pain relief. It has a broad range of applications and may help relieve pain and tension in the neck, head, and face as shown in **Figure 2**.

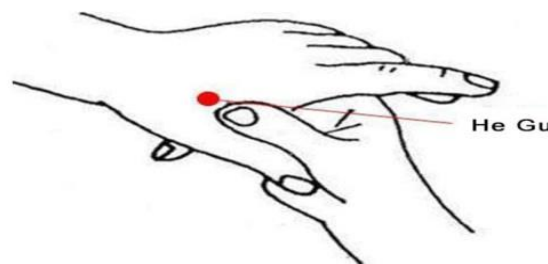


Figure (2): Hegu point.

Waiguan (TE 5): Location: 2 cun above the dorsal wrist crease, between the radius and ulna, on the Sanjiao meridian.

Function: Waiguan is associated with regulating the Sanjiao (Triple 4 Energizer) meridian. It is often used for pain and musculoskeletal issues, making it potentially useful for cervical myofascial pain as shown in **Figure 3**.

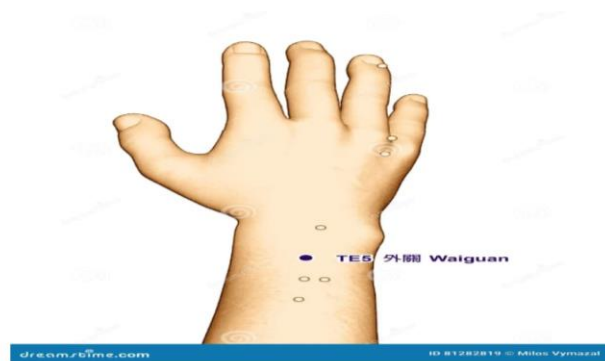


Figure (3): waiguan point.

Houxi (SI 3): Location: On the ulnar side of the hand, in the depression proximal to the head of the 5th metacarpal bone.

Function: Houxi is related to the Small Intestine meridian and is commonly used for promoting the circulation and relieving pain. It may be employed in the treatment of myofascial pain in the shoulder and neck area as shown in **Figure 4**.

Houxi (SI 3)



Figure (4): Houxi point.

1. MATERIALS AND INSTRUMENTS

A-Measurement Equipment:

Pressure Algometer:

The algometer is a piece of apparatus that measures how sensitive a person is to pain. With putting pressure on the determined trigger point up to patient tolerable limit of pain threshold reading was taken.

B-Therapeutic equipment:

Chinesport diode laser machine and chinesport ultrasonic device

2. METHODOLOGY

60 individuals, both male and female, reported having mechanical neck pain. They are between the ages of 20 and 40. 4 equal groups were divided at random. Pain threshold determined by Algometer machine. Low level laser, phonophoresis and traditional physical therapy program were applied on the following selected meridians: For the first group, which included 15 volunteers of both sexes with neck pain, phonophoresis of 1% hydrocortisone and 1% diclofenac on classical acupoints was administered for four weeks, with three treatments each week. The second group, which included 15 volunteers of both sexes with neck pain, received 1% hydrocortisone phonophoresis in addition to 5% diclofenac on traditional acupoints. For four weeks, they attended three sessions a week. In the third group, which included

15 volunteers with neck pain of both sexes, LLL was applied to traditional acupoints. They went to three sessions a week for up to four weeks. In the fourth group, which included 15 volunteers with neck pain of both sexes, LLLT and phonophoresis were applied to classical acupoints. For a maximum of four weeks, they attended three sessions per week.

3. RESULTS AND DISCUSSION

A total of 60 patients took part in the trial, and they were split up into 4 groups at random (15 patients each group). There are four groups for myofascial trigger points and four groups for classical acupoints (A, B, C, and D). There was no discernible age difference between groups A, B, C, and D ($P=0.275$; $P>0.05$). Group A received laser therapy, Group B received hydrocortisone 1%+diclofenac 1% laser and phonophoresis, Group C received hydrocortisone 1%+diclofenac 5% laser and phonophoresis, and Group D received a combination of laser and phonophoresis.

Group A ($P=0.973$), Group B ($P=0.514$), Group C ($P=0.391$), and Group D ($P=0.070$) all showed non-significantly ($P>0.05$) increased right rotation at post-treatment compared to pre-treatment, according to multiple pairwise comparison tests (time effect) for CROM variables.

The left rotation significantly ($P<0.05$) increased within group D ($P=0.026$) at post-treatment compared to pre-treatment, but there were non-significantly ($P>0.05$) increased in left rotation at post-treatment within group A ($P=1.000$), group B ($P=0.574$), and group C ($P=0.117$). At post-treatment compared to pre-treatment, right and left side bending were significantly ($P<0.05$) higher in group D ($P=0.008$ and $P=0.036$, respectively), but non-significantly ($P>0.05$) higher in groups A ($P=0.688$ and $P=0.826$, respectively), B ($P=0.369$ and $P=0.635$, respectively), and C ($P=0.372$ and $P=0.488$, respectively).

Group D, which underwent combined laser and phonophoresis treatment, benefited from these substantial and non-significant variations in CROM at post-treatment as a result of the time effect. Additionally, patients in Group D who received both phonophoresis and laser treatment showed higher improvements in right rotation, left rotation, right side bending, and left side bending (5.53, 6.52, 11.65, and 11.21%, respectively). These patients were followed by patients in Group C (2.65, 4.48, 4.15, and 3.86%, respectively) who received laser treatment alone, patients in Group B (1.90, 1.52, 3.45, and 2.53%, respectively) who received phonophoresis hydrocortisone + 5% diclofenac, and finally, patients in Group A (0.10, 0.00, 1.73, and 1.12%, respectively) who received phonophoresis hydrocortisone + 1% diclofenac.

Group A, B, C, and D for classical acupoints did not differ significantly ($P>0.05$) in right rotation ($P=0.054$), left rotation ($P=0.057$), right side bending ($P=0.054$), or left side bending ($P=0.395$) at pre-treatment, according to multiple pairwise comparison tests (group effect) for CROM variables (Table 1). Additionally, at post-treatment, there were no significant changes ($P>0.05$) in left rotation ($P=0.138$), right rotation ($P=0.092$), or left side bending ($P=0.100$) across the four groups. However, following treatment, groups A, B, C, and D showed a significant difference ($P<0.05$) in right side bending ($P=0.004$).

There were non-significantly ($P>0.05$) higher levels of Trp1, Trp2, and Trp3 at post-treatment compared to pre-treatment in groups A ($P=0.874$, $P=0.524$, and $P=0.734$, respectively), B ($P=0.484$, $P=0.340$, and $P=0.440$, respectively), C ($P=0.154$, $P=0.373$, and $P=0.371$, respectively), and D ($P=0.058$, $P=0.425$, and $P=0.859$, respectively) according to multiple pairwise comparison tests (time effect) for pressure algometer variables within each group for classical acupoints. Group D had a considerably ($P<0.05$) higher Trp4 at post-treatment compared to pre-treatment ($P=0.005$), while groups A ($P=0.951$), B ($P=0.479$), and C ($P=0.150$) had non-significantly ($P>0.05$) higher Trp4 at post-treatment.

Group D, which underwent combined laser and phonophoresis treatment, benefited from these large and non-significant variations in the pressure algometer at post-treatment as a result of the time impact. Additionally, patients in Group D who received both phonophoresis and laser treatment showed improvements in Trp1, Trp2, Trp3, and Trp4 (23.81, 18.13, 21.26, and 55.42%, respectively). These patients were followed by patients in Group C (15.46, 10.44, 10.33, and 13.96%, respectively) who received laser treatment alone, patients in Group B (6.38, 9.43, 8.46, and 7.89%, respectively) who received phonophoresis hydrocortisone + 5% diclofenac, and finally, patients in Group A (1.44, 7.22, 3.61, and 1.09%, respectively) who received phonophoresis hydrocortisone + 1% diclofenac.

Group A, B, C, and D for classical acupoints did not differ significantly ($P>0.05$) in Trp1 ($P=0.071$), Trp2 ($P=0.250$), Trp3 ($P=0.609$), and Trp4 ($P=0.089$) at pre-treatment, according to multiple pairwise comparison tests (group effect). Additionally, there were no significant differences ($P>0.05$) in Trp1 ($P=0.129$), Trp2 ($P=0.425$), or Trp3 ($P=0.859$) across the four groups at the end of treatment. However, there was a significant difference ($P<0.05$) in Trp3 ($P=0.017$) between groups A, B, C, and D after therapy.

Bonferroni test and the mean difference between the groups pairwise for right side bending and Trp4 after treatment. At post-treatment, there were no differences between Group A and Group B (MD=2.46; $P=0.601$; $P>0.05$), Group A and Group C (MD=1.87; $P=1.000$; $P>0.05$), Group A and Group D (MD=3.06; $P=0.250$; $P>0.05$), and Group B and Group D (MD=0.60; $P=1.000$; $P>0.05$). However, there were significant differences in right side bending between Group B and Group C (MD=4.33; $P=0.026$; $P<0.05$) and Group C versus Group D (MD=4.93; $P=0.007$; $P<0.05$) pairwise.

Group A versus Group C (MD=0.67; P=0.015; P<0.05) and Group A versus Group D (MD=0.72; P=0.009; P<0.05) showed significant differences in Trp4 at post-treatment, but there were no differences between Group A and Group B (MD=0.19; P=1.000; P>0.05), Group B and Group C (MD=0.48; P=0.170; P>0.05), Group B and Group D (MD=0.53; P=1.000; P>0.05), or Group C versus Group D (MD=0.05; P=1.000; P>0.05). The combination of the laser program and phonophoresis (Group D) produced the best Trp4 value, according to the post-hoc test and mean differences across groups. The combination of phonophoresis and laser program (Group D) produced the best right side bending and Trp4 values, according to the post-hoc test and mean differences between groups.

5. CONCLUSION

Combined low level laser therapy, phonophoresis and traditional physical therapy application on some selected body meridians achieved the best results in reducing pain intensity in neck pain patients when applied on mechanical neck pain patients.

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