



ISSN 2278 – 0211 (Online)

A Randomized Controlled Trial to Study the Efficacy of Low Level Laser Therapy Combined with Ischemic Compression in the Treatment of Latent Myofascial Trigger Points

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Abstract:

A myofascial trigger point (MtrP) is a hyperirritable area in a skeletal muscle that contain hyperirritable taut palpable bands located within a skeletal muscle that is painful on compression or stretch and that can give a typical referred pain pattern as well as autonomic phenomena. At present various interventions are available to treat myofascial trigger points. However, there are not many studies that have analyzed the effects of low level laser therapy and ischemic compression in the treatment of latent myofascial trigger points. The aim of the study was to find out the efficacy of low level laser therapy combined with ischemic compression in the treatment of latent myofascial trigger points.

Thirty subjects were randomly assigned into 2 groups. Both groups received treatment 5 days per week for 4 weeks. In group A(combination therapy) laser treatment was given for 10 minutes and ischemic compression was given for 5 minutes, whereas group B received ischemic compression for 5 minutes. Outcomes were evaluated by visual analog scale and range of motion. Study showed significant ($p < 0.05$) reduction in pain and increased range of motion in both groups. But the pain reduction and increased range of motion was more significant in group A than group B. Combination of low level laser therapy and ischemic compression proved more effective treatment in latent myofascial trigger points than ischemic compression alone.

Keywords: Myofascial, Trigger points, Low level laser, Ischemic compression, Combination therapy

1. Introduction

A myofascial trigger point (MtrP) is a hyperirritable area in a skeletal muscle that contain hyperirritable taut palpable bands located within a skeletal muscle that is painful on compression or stretch and that can give a typical referred pain pattern as well as autonomic phenomena. There are two main types of trigger points active and latent. Both trigger points become activated by variety of stimuli, including poor posture, overuse, or muscle imbalance[1]. Active trigger points cause patient related pain symptoms that are local and referred, whereas latent trigger points are those that evoke referred pain only when palpated[2]. People of any age can develop myofascial trigger points, which leads to myofascial pain syndrome[1]. But greatest numbers were between the ages of 21-50 years. Myofascial trigger points occur in both sexes although it appears to be more common in females than males[3]. MtrP are among the most common, yet poorly recognized and inadequately managed causes of myofascial pain seen in medical practice with a point of prevalence from 10% to 18% and lifetime prevalence from 30% to 50% [4].

The causes of myofascial pain syndrome are associated with acute or chronic repetitive trauma (such as strain, sprain, contusion, poor posture, muscle overloading), lesions involving various structures (such as tendonitis, bursitis synovitis, arthritis, intervertebral disc lesions), or emotional stress such as anxiety, depression and somatization [5]. The presence of active and latent myofascial trigger points are more common in upper trapezius in subjects with neck pain[1,6]. The two main regions for the presence of MFTP's, as found in the upper trapezius muscle fibers, namely MFTP 1 and MFTP 2 [1].

Various studies has been done for the treatment of trigger point in upper trapezius [7,8,9]. Many treatment approaches such as ischemic compression, stretching exercises and physical therapy modalities including ultrasound therapies have been reported in the management of neck pain. Various studies demonstrated that ischemic compression can be used as prophylactic or preventive measures in the trigger points. Ischemic compression is relatively new technique, which has been proven to have beneficial effect on reducing trigger point sensitivity in patients with myofascial trigger points[10]. Previous studies have confirmed the utility of low level laser in the treatment of myofascial trigger points. Laser therapy on myofascial trigger points has proven beneficial for reducing and alleviating pain [11]. Laser irradiation stimulates collagen production, alters DNA synthesis, and improves the function of damaged neurological tissues [12]. Low level laser therapy improves local microcirculation, it can also improve oxygen supply to hypoxic cells in the trigger point areas, at the same time it remove the collected waste products, the normalization of the microcirculation obtained due to laser application[11].

The present study was undertaken with the intention to compare the effectiveness of ischemic compression and laser therapy in myofascial trigger point treatment in upper trapezius.

2. Material and Methods

This study was approved by Research and Ethical committee of University College of Physiotherapy (UCOP), Faridkot. Patients were taken from OPD of UCOP, Faridkot referred from Department of Orthopedics of GGS Medical College and Hospital Faridkot. Informed consent was signed by each participant. A randomized controlled trial with equal randomization (1:1 for two groups) was done with 15 patients in each group. Inclusion Criteria included non radiating pain in neck from minimum 3 months having age group between 20-40 years; both male and female were included in the study having bilateral trigger points in upper trapezius. Patients were excluded when they have diagnosed case of fibromyalgia, cervical spondylosis, cervical disc prolapsed, history of dislocation of cervical vertebrae, history of neck surgery with past 2 to 3 years, cognitive deficits, unilateral trigger points, diagnosed cases of cervical radiculopathy or myelopathy.

3. Intervention

Each patient was examined by therapist, in order to assess the presence of latent myofascial trigger point in upper trapezius[13]. After the assessment patients were divided into two groups based on randomization and inclusion and exclusion criteria. Group A (experimental) received laser and ischemic compression on upper trapezius and Group B (control) received ischemic compression alone. Treatment was given 5 days a week for 4 weeks duration. The follow up was at the 0, 2nd week and 4th week.

In Group A Gallium-Aluminum-Arsenide laser was used to deliver low level laser therapy. The low level laser therapy was given at upper trapezius trigger points with the following parameters: wavelength 650 and 810 nm and power output of <500mW, relative humidity 80% with irradiation time of 10 minutes. This was followed by ischemic compression. For this, the patients were positioned in supine lying and muscle was placed in a mild stretch, with a small pillow or towel to support the neck. Manual digital pressure applied with thumb or strong finger pressed directly on the trigger point to create tolerable painful, sustained pressure. Pressure was gradually increased by adding thumb or finger from the other hand as necessary. This pressure was continued up to 1 ½ minute with as much as 20 to 30 lb of pressure. The maximum treatment time was 5 minutes [7]. The treatment was given for 5 days a week for a total of 4 weeks and Group B received ischemic compression alone for 5 days a week for total of 4 weeks

4. Data Analysis

The data obtained were analyzed using SPSS. T-test was used to determine the efficacy of low level laser therapy combined with ischemic compression in the treatment of myofascial trigger points. ANOVA was used for within group comparison of both groups. Post Hoc Test was used for multiple comparisons within both groups. The level of statistical significance was set at a p value of 0.05.

5. Results

Total 30 subjects participated in this study (14 males and 16 females) with age group of 18-40 year in both groups. There was no significant difference in the age group. Paired t-test were performed within group A and B on 0 week and 2 week, 2 week and 4 week, 0 week and 4 week to analyze the significance of VAS and CROM. There were significant difference within group A and B. Unpaired t-test was performed between group A and group B to analyze the significance of VAS and CROM at 0, 2, 4 week. The calculated value of t was greater than table value, this shows that there is significant improvement between group A and B VAS scoring from 0 to 4th week, the mean difference of 0 week is 0.74 between pre values, the mean difference of 2 week is 0.4 between post 2 values, the mean difference of 4 week is 0.87 between post 2 values of both groups at $p < 0.05$ (Fig.2). ANOVA was used for within group comparison and post hoc test was used for multiple intragroup comparisons for both groups. ANOVA was performed between and within values at 0 week, 2 week, 4 week in group A and group B to analyze the significance of VAS and CROM (Fig.3, 4). Post Hoc test has been done for multiple comparisons within group A and group B to analyze the significant difference between values of CROM and VAS at different time period. There is significant difference within group A and B ($p < 0.05$)

6. Consort Flow Diagram

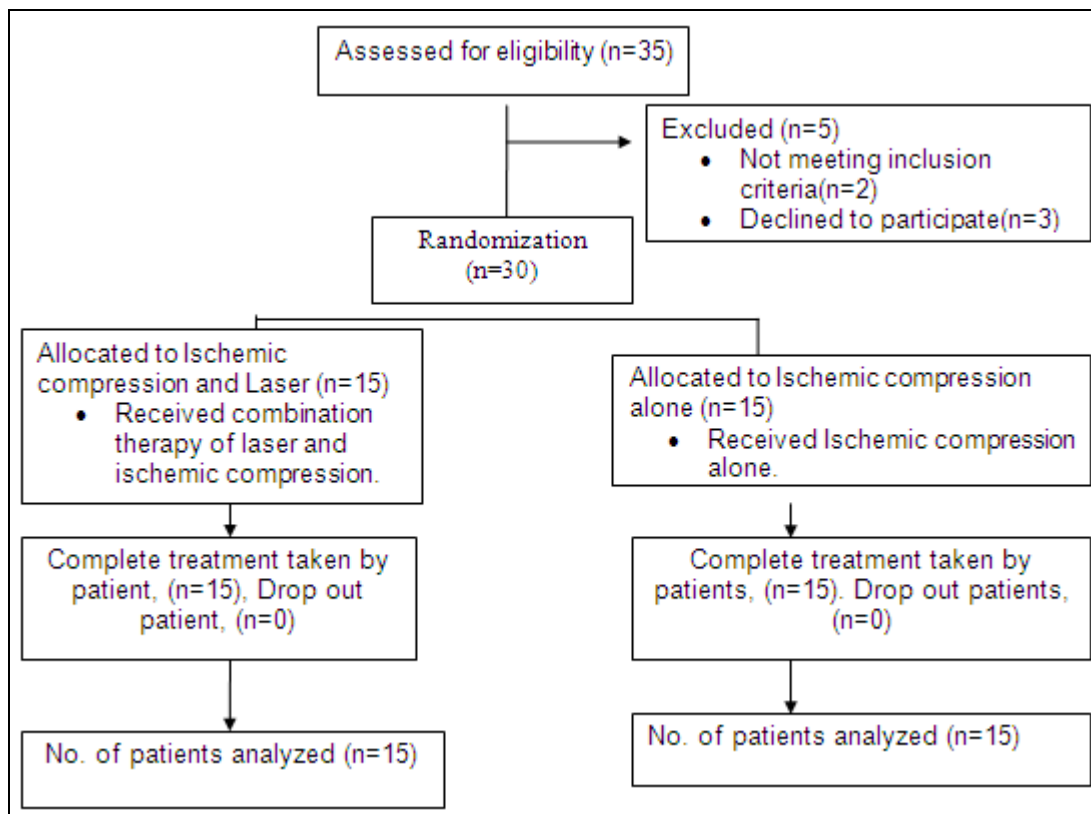


Figure 1: Flow chart of treatment procedure

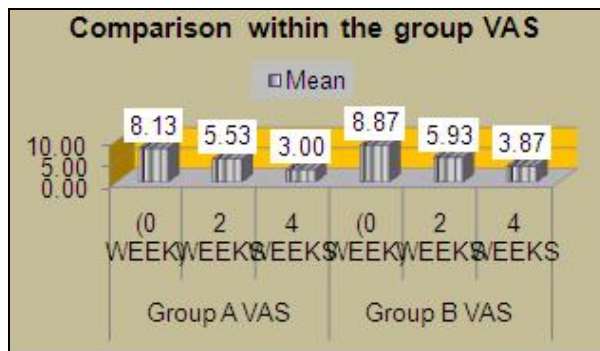


Figure 2: shows intragroup comparison within group A and B (VAS)

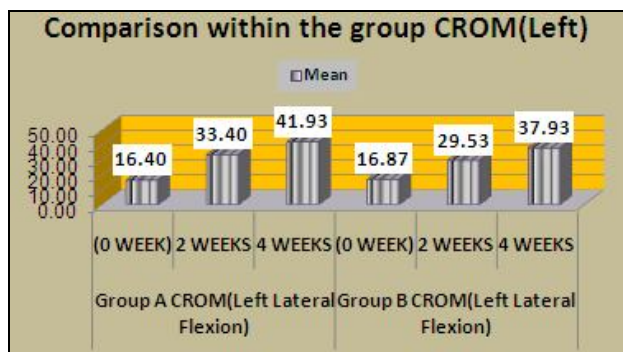


Figure 3: shows intragroup comparison within group A and B (CROM) Right Lateral Flexion

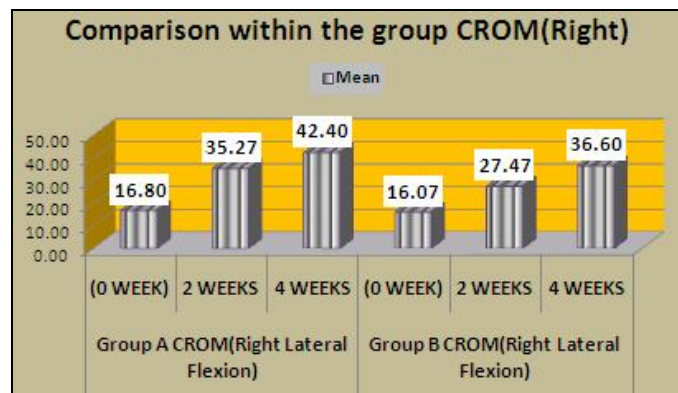


Figure 4: shows intragroup comparison within group A and B (CROM) Right lateral flexion

7. Discussion

We found significant improvement in patients with group A than group B i.e. combination therapy(laser and ischemic compression) shows more effect than ischemic compression alone in the treatment of latent myofascial trigger points on upper trapezius. Our study shows, the greater improvement in the group treated with the laser therapy may be due to the fact that low level laser therapy improves local microcirculation and it can also improve oxygen supply to hypoxic cells in the trigger point areas and at the same time it can remove the collected waste products.. The efficacy of low level laser therapy in trigger points has also been advocated by [11]. In his study he showed that laser is highly effective treatment protocol on trigger points of upper trapezius.

A study by [14] supports the present study. He studied the efficacy of post-isometric relaxation versus integrated neuromuscular ischemic technique in the treatment of upper trapezius trigger points. The study showed both treatment techniques in the treatment of trigger point pain were highly effective in the upper trapezius muscle. The results of the study by [7] are also consistent with the present study. He studied the effect of therapeutic ultrasound, laser and ischemic compression in reducing pain and improving cervical range of motion in patients with myofascial trigger points. The study showed that ischemic compression was highly effective than ultrasound and laser in the treatment of myofascial trigger points.

The limitations of the study were as follows: the sample size for the study was small, the time period of follow up was short, the palpation of measuring pain pressure sensitivity over upper trapezius muscle was not specific. Future research was required for long term effect of technique which can be studied by long follow up. Exercise therapy modules can also be added. Further study can be done with different outcome measures. Effect of Ischemic compression and Laser should be compared with the other advance techniques.

8. Conclusion

This study revealed that both combination therapy(Laser and Ischemic Compression) and Ischemic Compression alone are effective in reducing pain and increasing cervical ROM Lateral Flexion. However it was concluded that adding Laser in the treatment protocol was more effective in reducing pain and increasing cervical ROM of myofascial trigger points on upper trapezius.

9. References

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