COMPARISON OF SUSTAINED PRESSURE VS ISCHEMIC COMPRESSION ON TRIGGER POINTS IN CHRONIC MYOFACIAL PAIN MANAGEMENT

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ABSTRACT

OBJECTIVE: To determine the effect of different trigger points approaches in improving chronic myofascial pain.

METHODS: This randomized controlled trial was conducted in Railway General Hospital, Rawalpindi, Pakistan from July-December 2016. Patients were randomly divided into two treatment groups through lottery method, in which 37 male participants who full filled the inclusion criteria (persistent pain >6 months, gradual onset of pain and impaired level of activity) were randomly allocated to sustained pressure (Group A) and ischemic compression (Group B) treated groups. Both groups received eight treatments sessions. They were evaluated at baseline and after 8th visit through Numeric Pain Rating Scale (NPRS) and Chronic Pain Acceptance Questionnaire (CPAQ).

RESULTS: Within the group-A the pre and post-treatment mean for NPRS were 5.05±1.17 and 2.63±0.955 ($p < 0.001$). Pre and post-treatment CPAQ activity engagement values were 32.00±2.42 and 41.74±2.53 ($p < 0.001$). Pre and post-treatment CPAQ pain willingness values were 29.42±3.04 and 32.63±2.91 ($p < 0.001$). Pre and post-treatment CPAQ sum was 61.42±3.67 and 73.84±3.64 ($p < 0.001$). In the group-B pre and post-treatment value for NPRS was 5.28±1.07 and 2.39±0.77 ($p < 0.001$). For CPAQ activity engagement, the pre and post-treatment values were 32.33±1.64 and 43.50±1.20 ($p < 0.001$). Pre and post-treatment values for CPAQ pain willingness were 32.28±1.74 and 32.22±1.43 ($p > 0.05$). Pre and post treatment values for CPAQ sum were 64.61±2.42 and 75.72±1.12 ($p < 0.001$).

CONCLUSION: Improvement in pain relief was observed in both groups but there was no significant improvement in pain relief between ischemic compression and sustained pressure groups.

KEY WORDS: Chronic Pain (MeSH); Facial Neuralgia (MeSH); Myofacial Pain Syndrome (MeSH); Trigger Points (MeSH); Pain Measurement (MeSH).

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INTRODUCTION

Pain is an unpleasant sensory or emotional response to actual or potential tissue damage. Pain is a symptom of disease or injury in any part of body. Pain is classified as acute and chronic pain. Sudden onset of pain is defined as acute pain whereas chronic pain is the pain that persists for 6 months or more and cause damage to the body.[1] Principally chronic pain is a complex, polygonal phenomenon deprived of a broadly accepted definition that is why it is defined as the pain, which persist beyond its healing time.[2]

A study conducted in Canada revealed that prevalence of chronic pain was more in females than males and the most frequent cause of chronic pain was arthritis and commonly effected lower back region.[3] Osteoarthritis, rheumatoid arthritis, back pain and headaches were the most common causes of chronic pain in Libya.[4] Myofascial pain is common in patients seen in pain clinics. It is usually associated with injury or occupational repetitive activity. Muscle balance and function is restored by physiotherapy treatment rather than medication. Identifying and managing perpetuating factors (posture, repetitive actions, occupational factors) is a priority. Commonly applied diagnostic criteria for myofascial trigger point are the local twitch response, tender spot in a taut band of muscle, patient pain recognition and pain referral pattern.[5] During examination, palpation of the muscles is used to assess tenderness, patterns of pain referral, skin temperature, muscle tone, swelling, skin moisture and the location of trigger points. Myofascial trigger points (MTrPs) are typically located in those areas that are prone to impaired circulation and increased mechanical strain (e.g., upper trapezius, levator scapulae, infraspinatus, quadratus lumborum, and gluteus minimus).[2]

Myofascial trigger point treatment is given to relieve pain and tightness of involved muscles, inactivate the trigger points, improve circulation and range of motion and eliminate the causing factors. Treatment approaches used to inactivate the MTrPs are medications, needling, stretching, psychiatric therapies, massage, hand manipulation and chiropractic techniques. These

TABLE I: DEMOGRAPHIC DATA OF THE STUDY SUBJECTS

Variables	Overall	Group A	Group B
Age (years)	44.35±12.03	44.57±13.30	44.11±10.90
Occupation	Labor:62.2% Other:21.8% Retire life:10.8%	Labor:68.4% Other:15.8% Retire life:10.5%	Labor:55.6% Other:27.8% Retire life:11.1%
Referral	Orthopedic:59.5% Other: 21.6% GP & Self: 8.1%	Orthopedic:57.9% Other:21.1% GP & Self:10.5%	Orthopedic:61.1% Other: 22.2% GP & Self:5.6%
Onset of Pain	Six month:45.9% Nine month :21.6% Twelve month :16.2 %	Six month :52.6% Nine month :26.3% Twelve month :10.5%	Six month:38.9% Nine month :16.7% Twelve month :22.2%
Resisted movement	Normal:56.8% Painful:43.2%	Normal:47.4% Painful:52.6%	Normal:66.7% Painful:33.3%
NPRS	5.16±1.11	5.05±1.17	5.28±1.07

NPRS = Numeric Pain Rating Scale; GP = General Practitioner

approaches also consolidate the effects of other therapies as supplementary treatments.[6] In the trigger point management, multiple approaches like ischemic compression and sustained pressure are used for pain management.[2] There is limited research on use of these methods for chronic myofascial pain in our setup. In this study, we are going to find out which treatment approach is better for the management of myofascial pain syndrome. It will also be useful to educate and treat people with the most simple and effective treatment approach more easily. The objective of this study was to determine the effect of different trigger points approaches in improving chronic myofascial pain.

METHODS

The study design was randomized control trial (RCT) and data was collected from Physiotherapy OPD of Riphah Rehabilitation and Research Center, Railway General Hospital, Rawalpindi, Pakistan. The study duration was 6 months from July 2016 to December 2016. The Non-probability purposive sample technique was used to collect sample. A total of 37 patients (n=37) having chronic musculoskeletal pain were included in the study and were divided into two groups using lottery method (Group A=19 and Group B=18). Patients were randomly assigned according to the inclusion criteria that is pain persist more than 6 months, gradual onset of pain and impaired level of activity. The exclusion criteria of the study were acute injuries, prolapsed intervertebral disc (PIVD), disability, recent surgery and amputations.

Out-come measuring tools were Numeric Pain Rating Scale **(**NPRS)[7] and Chronic Pain Acceptance Questionnaire (CPAQ).[8] The NPRS is a one-dimensional measure of pain intensity in individuals. It is 11 point numeric scale usually called numeric edition of visual analogue scale in which an individual select a number between 0-10. Both 0 and 10 represent the pain extreme with 0 means no pain and 10 representing the worst as you can imagine. The patient is asked to point a number on the scale to rate their pain intensity, which is noted. Higher score indicates greater pain intensity.[9] NPRS was used and patients were asked to rate their pain before the first session of treatment and at the end of last treatment session.

McCracken, Vowles and Eccleston proposed 20 items based two factors Chronic Pain Acceptance Questionnaire (CPAQ) for the assessment of chronic pain. This two-factor model has been supported but awaits further confirmation.[8] There have been 2 factors identified in the CPAQ: **1-**Activity engagement (pursuit of life activities regardless of pain) Items 1,2,3,5,6,8,9,10,12,15,19. **2-**Pain willingness (recognition that avoidance and control are often unworkable methods of adapting to chronic pain) Items 4,7,11,13,14,16,17,18,20.

In our study CPAQ was used for the assessment of chronic pain on all included participants on the first session of treatment and at the end of last treatment session.

Structured questionnaire was used for first and final assessment. Informed consent was taken from each patient participated in the study. Base line measures were taken at 1st visit. Range of motion (ROM), NPRS score and CPAQ scores were calculated. Two weeks

TABLE II: COMPARISON OF THE STUDY GROUPS AT BASE LINE AND AT END OF THE TREATMENT

Variables	Groups	Base line (mean±SD)	End value (mean±SD)	P value
Pre NPRS	Group A	5.05±1.17	2.63±0.95	<0.01
	Group B	5.28±1.074	2.39±0.77	<0.01
Pre CPAQ Activity	Group A	32.00±2.42	41.74±2.53	<0.01
	Group B	32.33±1.64	43.50±1.20	<0.01
Pre CPAQ Pain willingness	Group A	29.42±3.04	32.63±2.91	<0.01
	Group B	32.28±1.74	32.22±1.43	>0.05
Pre CPAQ Sum	Group A	61.42±3.67	73.84±3.64	<0.01
	Group B	64.61±2.42	75.72±1.17	<0.01

CPAQ = Chronic Pain Acceptance Questionnaire; NPRS = Numeric Pain Rating Scale

TABLE III: COMPARISON IN BETWEEN THE STUDY GROUPS A & B AT BASE LINE AND AT END OF THE TREATMENT

Variables	Comparison on base line			Comparison on End value		
	Groups	Mean±SD	P value	Variables	Mean±SD	P value
Pre NPRS	Group A	5.05±1.17	>0.05	Post NPRS	2.63±0.95	>0.05
	Group B	5.28±1.074			2.39±0.77	
Pre CPAQ Activity	Group A	32.00±2.42	>0.05	Post CPAQ Activity	41.74±2.53	<0.01
	Group B	32.33±1.64			43.50±1.20	
Pre CPAQ Pain willingness	Group A	29.42±3.04	<0.01	Post CPAQ Pain willingness	32.63±2.91	>0.05
	Group B	32.28±1.74			32.22±1.43	
Pre CPAQ Sum	Group A	61.42±3.67	<0.01	Post CPAQ Sum	73.84±3.64	<0.05
	Group B	64.61±2.42			75.72±1.17	

CPAQ = Chronic Pain Acceptance Questionnaire; NPRS = Numeric Pain Rating Scale

treatment was given (no of sessions = 8). End values of variables were calculated after completion of treatment sessions.

Group-A received sustained (progressive) pressure: Hot pack (10-15 min), Stretching: 3 sets of 10 repetitions with 10 seconds hold (of targeted muscles) and active range of motion exercises (3 sets of 10 repetitions). Group-B received ischemic compression: Hot pack: (10-15 min) stretching (3 sets of 10 repetitions with 10 seconds hold of targeted muscles) and active range of motion exercises (3 sets of 10 repetitions).

All the patients were assessed at the base line before intervention and at the completion of the 2 weeks intervention plan. Data were analyzed by using IBM SPSS version 21. Independent sample t-test in between groups was applied on the base line comparison and end value comparison.

RESULTS

Total number of 47 patients came to the settings with complaint of chronic pain. Numbers of patients excluded from the study were 10. People who met the inclusion criteria and included in the study were 37. Among them 19 patients were randomly assigned to each group. One patient in group-B was dropout as he did not come for follow up. In group A 19 patients and in group-B 18 patients were analyzed for further study.

When test of normality were applied to data, it was seen that data was normally distributed so parametric tests were applied. There were 37 males with mean age of 44.35±12.03. Most of the patients were labors (62.2%). Majority of the patients were referred from orthopedic departments (59.5%). Other demographic and clinical data was summarized in Table I.

Within the group A (sustained progressive pressure) the pre and post mean value for NPRS was 5.05±1.17 and 2.63±.955 with p-value of <0.001. For CPAQ activity engagement the pre and post mean values was 32.00±2.42 and 41.74±2.53 and the difference was statistically significant with a p-value of <0.001. Upon comparing CPAQ pain willingness the pre and post mean values of 29.42±3.04 and 32.63±2.91 and the difference was statistically significant with p-value of 0.001. The mean values for the CPAQ sum was 61.42±3.67 and 73.84±3.64 with p-value of <0.001 showed significant difference (Table II).

In the group-B (Ischemic compression), the pre and post mean value for NPRS was 5.28±1.07 and 2.39±.77 with p-value of <0.001. For CPAQ activity engagement, the mean value was 32.33±1.64 and 43.50±1.20 showed difference was significant with p-value of 0.000. CPAQ pain willingness the mean values was 32.28±1.74 and 32.22±1.43, difference was statistically not significant with p-value of 0.923. The mean and standard deviation for the CPAQ sum was 64.61±2.42 and 75.72±1.12 with p-value of <0.001 showed significant difference (Table II).

The base line mean values for NPRS of group-A was 5.05±1.17 and group-B was 5.28±1.074 with p-value of 0.547. The CPAQ activity engagement of group-A the mean values was 32.00±2.42 and group-B the mean value was 32.33±1.64 with p-value of 0.630. For the CPAQ pain willingness, for the group-A the mean value was 29.42±3.04 and for group B the mean value was 32.28±1.74 showed significant difference with p-value of 0.001 (Table III).

When compare the both groups at the end of treatment the mean values for NPRS of group A was 2.63±0.95 and group B was 2.39±0.77 with p-value of 0.404. The CPAQ activity engagement of group A, the mean values was 41.74±2.53 and for group-B the mean value was 43.50±1.20 with p-value of <0.05. For the CPAQ pain willingness the mean value of group-A was 32.63±2.91 and for group-B the mean value was 32.22±1.43 with p-value of >0.05. The mean value for CPAQ sum of group-A was 73.84±3.64 and mean value for group B was 75.72±1.17 with p-value of <0.05(Table III).

DISCUSSION

The results of this study showed that both techniques are equally effective in the management of chronic pain, as measured by NPRS and CPAQ. However, in comparison of both groups, group A that received progressive sustained pressure showed greater improvement in CPAQ activity engagement and pain willingness as well as in CPAQ sum values when compared to group B that showed lesser improvement in CPAQ pain willingness.

In a study by Abdel-Raoof NA et al, they examine the comparison between myofascial release and progressive pressure release on low back dysfunction. They found that progressive pressure release is more effective treatment than myofascial release in treatment of patients with low back dysfunction.[10] This study supports our results for the progressive pressure release that is better technique.

Aguilera FJM et al did a study on immediate effect of ultrasound and ischemic compression techniques for the treatment of Trapezius latent myofascial trigger points in healthy

subjects and they concluded that both treatments showed immediate effect but ischemic compression showed short term positive effect in the treatment of trapezius MTrP sensitivity.[11] This study also support our results for the technique of ischemic compression.

Fernandez-de-las-Penas C examined the effect of ischemic compression technique and transverse friction massage on tenderness of active and latent myofascial trigger points and they concluded that there are no differences between the improvements in both groups. Ischemic compression technique and transverse friction massage were equally effective in reducing tenderness in MTrPs.[12] For ischemic compression technique this study is in favor of our results.

In a study by Gemmell H and his colleagues, they compared the effects of ischemic compression and trigger point pressure release on neck pain and upper trapezius trigger points and found that ischemic compression is five time more effective treatment in the non-specific neck pain and upper trapezius trigger point than SUS (sham ultrasound).[13] This study shows better results in ischemic compression technique.

Bron et al conducted a study on treatment of myofascial trigger points in patients with chronic shoulder pain and they concluded that the treatment of MTrPs in shoulder muscles reduces the number of muscles with active MTrPs and is effective in reducing symptoms and improving shoulder function in patients with chronic shoulder pain.[14] For the management of chronic pain through trigger point releasing techniques this study support our results in improving chronic pain.

Fryer and Hodgson did a study on the effect of manual pressure release on myofascial trigger points in the upper trapezius muscle and they suggest through their results that manual pressure release may be an effective treatment for motor trigger points in upper trapezius.[15] This study also support our results in manual pressure release technique in chronic pain.

Llamas-Ramos R et al conducted a study on the comparison of the short-term outcomes between trigger point dry needling and trigger point manual therapy for the management of chronic mechanical neck pain and they concluded that there was short term greater improvement in MTrP dry needling group than MTrP manual therapy.[16] As this study was compared with different technique of dry needling and that showed a more improvement so it does not support our results.

CONCLUSION

The present study concluded that ischemic compression and progressive sustained pressure both have significant effect on improving the pain of patients with chronic musculoskeletal pain pathologies. Progressive pressure show better results in patient's activity engagement, pain willingness and sum of CPAQ and NPRS.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

MS: Acquisition of data, drafting the manuscript, final approval of the version to be published

AGS: Concept & study design, drafting the manuscript, critical review, final approval of the version to be published

AM & IT: Acquisition of data, drafting the manuscript, final approval of the version to be published

AK & HD: Analysis & interpretation of data, drafting the manuscript, critical review, final approval of the version to be published

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

Authors declared no conflict of interest

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