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A study to find out the effectiveness of instrument assisted soft tissue mobilisation, myofascial release on quadratus lumborum in mechanical low back pain subjects: A randomized controlled study

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Abstract

Background and objectives: Low back pain is an extremely human phenomenon, it can occur at any age. The one muscle that is highly active during lumbar flexion, extension and lateral bending is the Quadratus lumborum, it is the over looked muscle and potential source of low back pain. Physical therapist attempts to manage patients with back pain by utilizing a wide variety of interventions including modalities, exercises, manipulation and instrument assisted soft tissue mobilization, The purpose of the study is to find the effectiveness of instrument assisted soft tissue mobilization, myofascial release on quadratus lumborum the management of pain, disability and lumbar range of motion in mechanical low back pain patients.

Methods: Forty five clinically diagnosed mechanical low back pain subjects were selected for the study and randomly divided in to three groups A, B and C. Group A received instrument assisted soft tissue mobilization, group B received myofascial release and group C received conventional physiotherapy for a period of eight consecutive days, each day one session and one session last for fifteen minutes. The treatment techniques are targeted on quadrates lumborum muscle. Low back pain, disability and spinal flexion range of motion were measured by visual analog scale, Roland Morris questionnaire and modified scobers test respectively. The measurements were recorded at zero level and at the end of eight day.

Results: The data's were analyzed by paired't' test and ANOVA. The results of the present study shows that instrument assisted soft tissue mobilization, myofascial release and conventional physiotherapy all these three treatment methods are effective in reducing pain and disability, and improving spinal flexion range of motion among mechanical low back pain subjects. When comparing these three methods there is no significant difference between them on the selected variables.

Keywords: Instrument assisted soft tissue mobilization, interferential therapy, myofascial release, Roland Morris questionnaire for pain & disability, visual analogue scale

Introduction

Low back pain is an extremely human phenomenon, it can occur at any age and affects mostly people ageing from 20 to 60 yrs, the most productive period of a person's life ^[1]. Low back pain is the leading cause of disability in people younger than age 45 yrs and third leading cause of disability in people older than 45 years ^[2]. Life time prevalence of low back pain (LBP) is widely reported to be 80% and at any given point of time it affects between 4-33% of the population. The one muscle that is highly active during lumbar flexion, extension and lateral bending is the Quadratus lumborum ^[3] (QL), it is the over looked muscle and potential source of low back pain ^[4]. A sustained contraction of QL is required during sitting, walking, lying, and other functional activities in order to stabilize the trunk and maintain body mechanics ^[3]. Poor posture and body positioning alters the body mechanics which results in development of muscle trigger points (MTrP) in this muscle. Physical therapist attempts to manage patients with back pain by utilizing a wide variety of interventions including modalities, exercises, and manipulation, There is a strong evidence of QL being a major cause of LBP disorders which often develops active and latent MTrP ^[5], QL muscle group plays a prominent role in normal body mechanics. Instrument assisted soft tissue mobilization (IASTM) enables clinicians to effectively locate and treat individuals diagnosed with soft tissue dysfunction; the clinical use of soft tissue mobilization is the purported to

enhance treatment effectiveness and the inducement of tissue micro trauma and is believed to elicit a local inflammatory response. IASTM is performed with ergonomically designed instruments that detect and treat fascial restrictions, encourage rapid localization and effectively treat areas exhibiting soft tissue fibrosis, chronic inflammation, or degeneration [5, 6]. The presence of trigger point is essential for myofascial pain syndrome, pain may be felt along the crest of the spine, groin and tenderness in the greater trochanter, and person may have to drop on all fours due to pain from quadratus lumborum [7, 8]. Myofascial release (MFR) is a safe and very effective hands-on technique that involves applying gentle sustained pressure into the Myofascial connective tissue restrictions to eliminate pain and restore motion. The goal of myofascial release is to release fascia restriction and restore its tissue. [9]. Myofascial Release is a very effective, gentle and safe hands-on method of soft tissue mobilization, developed by John Barnes that involves applying gentle sustained pressure to the Subcutaneous and myofascial connective tissue. The goal of myofascial release is to release fascia restriction and restore its tissue. The purpose of the study is to find the effectiveness of instrument assisted soft tissue mobilization, myofascial release in the management of pain, disability and lumbar range of motion in mechanical low back pain patients.

Materials and Methods

It was a Pre & post test Experimental study 45 Low Back pain subjects with involvement of Quadratus lumborum muscle of both sex with age between 30-40yrs were selected by the simple random sampling method out of them 15 were allotted to Group A for Instrument assisted soft tissue mobilization (IASTM), 15 were allotted to Group B for Myofascial release (MFR) of quadratus Lumborum (QL), and 15 were allotted to Group C for Conventional Physiotherapy. Patient with lumbar disc lesion, psychotic disorders spinal cord injury were excluded. IASTM, MFR and Conventional physiotherapy were given for a period of 3 weeks, 3-4 times per week for 5 min & conventional for 15 min. Study variables were measured at zero weeks and at the end of third week for analyses.

Procedure

45 Low back pain subjects with involvement of Quadratus Lumborum with age between 30 to 40 were included in this study. All the subjects who satisfied the inclusion and exclusion criteria were selected after taking acceptance through the consent form from the parent for the participation in this study out of them fifteen were allotted in group A for IASTM and fifteen were allotted in group B for Myofascial release therapy and fifteen were allotted in group c for Conventional physiotherapy. Pain was measured by Visual Analog scale, Disability by Roland Morris questionnaire and Lumbar Range of Motion by Modified Scobers test.

Group a (Iastm)



Patient is positioned in side lying with the affected side hip and knee is slightly flexed and the contra lateral side extended, the area to be treated is applied with albolene or moisturizer with largest convexity start superficially scan longitudinally along the pattern of dysfunction, often we feel the grit treat faster strokes in one direction until released and progress depth for 2-5min. 5 min may be used for further improvement in pain and ROM. the treatment is given for 3 weeks 4 times per week.

Group B (Myofascial Release)



The upper QL trigger point is found just lateral to where the lumbar Para spinal muscles and the twelfth rib meet, this trigger point lies underneath the Para spinal muscle mass in this region, so the therapist must approach it from the side to contact it directly. The lower QL trigger point lies deep in the region where the Para spinal muscles meet the hip crest (iliac crest).The middle or deep QL trigger points lie closer to the spine than the superior or lower trigger points, next to the third and fourth lumbar vertebrae then release functionally perform for 3-5 min until it releases the treatment duration is given for 3weeks 4 times per week.

Group C (Conventional)

All the patients were positioned in prone lying on a couch and treated with IFT (Interferential therapy) using standardized parameters of carrier frequency 3.85 kHz And pulse duration of 130 us with quadripolar application for 15 minutes for 3weeks 4 times per week.

Measurement Procedure

Modified Scobers Test

A pen was used to mark the midpoint between the posterior superior iliac spines (PSIS). Then using the inch tape measure two points were marked, one that was 10 cm superior to the PSIS, and the other one that is 5 cm inferior to the PSIS, the distance between the superior and inferior mark, was measured and recorded then the patient was asked to flex the spine as far as possible, the distance between the superior and inferior was measured and recorded.

Rolland Morris Pain And Disbaility Questionarie

The patient was instructed to put a mark next to each appropriate statement. The total number of marked statements are added by the clinician Clinical improvement over time can be graded based on the analysis of serial questionnaire scores. If, for example, at the beginning of treatment, a patient's score was 12 and, at the conclusion of treatment, her score was 2 (10 points of improvement), we would calculate an 83% (10/12 x 100) improvement.

Numerical Rating Scale

The patient is asked to make three pain ratings, corresponding to current, best and worst pain experienced over the past 24 hours. The average of the 3 ratings was used to represent the patient’s level of pain over the previous 24 hours Please indicate the intensity of current,

best, and worst pain levels over the past 24 hours on a scale of 0 (no pain) to 10 (worst pain imaginable)

Results

The table shows, mean difference, standard deviation and paired ‘t’ value between pre and post test scores of pain for group A, group B & group C

| PAIN | Measurement | Mean | Mean Difference | Standard Deviation | Paired ‘t’ Value |
|---------|-------------|------|-----------------|--------------------|------------------|
| GROUP A | Pre-test | 7.2 | 3.4 | 0.9 | 14.32* |
| | Post- test | 3.8 | | | |
| GROUP B | Pre-test | 7.06 | 3.46 | 0.99 | 14.07* |
| | Post- test | 3.6 | | | |
| GROUP C | Pre-test | 7.33 | 1.93 | 0.80 | 9.35* |
| | Post- test | 5.4 | | | |

The table shows, mean difference, standard deviation and paired ‘t’ value between pre and post test scores of Disability for group A, group B & group C

| Disability | Measurement | Mean | Mean Difference | Standard Deviation | Paired ‘t’ Value |
|------------|-------------|-------|-----------------|--------------------|------------------|
| GROUP A | Pre-test | 14.27 | 5.74 | 2.5 | 8.87* |
| | Post- test | 8.53 | | | |
| GROUP B | Pre-test | 15.9 | 5.84 | 1.6 | 14.2* |
| | Post- test | 10.06 | | | |
| GROUP C | Pre-test | 16 | 3.14 | 1.25 | 9.70* |
| | Post- test | 12.86 | | | |

The table shows, mean difference, standard deviation and paired ‘t’ value between pre and post test scores of Lumbar ROM (Flexion) for group A, group B & group c.

| Lumbar ROM (Flexion) | Measurement | Mean | Mean Difference | Standard Deviation | Paired ‘t’ Value |
|----------------------|-------------|------|-----------------|--------------------|------------------|
| GROUP A | Pre-test | 3.53 | 3.27 | 2.5 | 8.87* |
| | Post- test | 6.8 | | | |
| GROUP B | Pre-test | 3.93 | 3.34 | 0.90 | 14.33* |
| | Post- test | 7.27 | | | |
| GROUP C | Pre-test | 4 | 2.33 | 0.9 | 10.03* |
| | Post- test | 6.33 | | | |

The table shows ANOVA of Pain, Disability & Lumbar ROM (Flexion) values of group A, B and C

| | F Ratio = SSB/SSW |
|-----------------------|-------------------|
| PAIN | 0.047 |
| DISABILITY | 0.009 |
| LUMBAR ROM (Flexion) | 0.06 |

Collected data’s were statistically analyzed by paired “t” test to find the significance between pre and post test values. In Group A, B & C for pain the calculated paired “t” value is 14.32, 14.07 and 9.35 respectively and ‘t’ table value is 2.977 at 0.005 level. Since the calculated ‘t’ value is more than ‘t’ table value the above study shows that there is significant difference in pain following Instrument assisted soft tissue mobilization, myofascial release & conventional among mechanical low back pain subjects

In Group A, B & C for disability the calculated paired “t” value is 8.87, 14.02 and 9.70 respectively and ‘t’ table value is 2.977 at 0.005 level. Since the calculated’ value is more than ‘t’ table value above study shows that there is significant difference in disability following Instrument assisted soft tissue mobilization, myofascial release & conventional among mechanical low back pain subjects

In Group A, B & C for lumbar ROM (Flexion) the calculated paired’ value is 8.87, 14.33 and 10.03 respectively and ‘t’ table value is 2.977 at 0.005 level. Since the calculated’ value is more than ‘t’ table value above study shows that there is significant difference in lumbar ROM

(Flexion) following Instrument assisted soft tissue mobilization, myofascial release & conventional among mechanical low back pain subjects.

Collected data’s were statistically analyzed by ANOVA, the calculated F value for pain is 0.047 and the table F value is and 2.76 at 5% level. Since the calculated ‘F’ value is less than ‘F’ table value, the study results shows that there is no significant difference between IASTM, myofascial release and conventional physiotherapy in reducing pain among mechanical low back pain.

The calculated paired ‘F’ value for Disability is 0.009 and ‘F’ table value is 2.76 at 5% level. Since the calculated ‘F’ value is less than ‘F’ table value, the study results shows that there is no significant difference between IASTM, myofascial release and conventional physiotherapy in reducing disability among mechanical low back pain subjects.

The calculated paired ‘F’ ratio for lumbar range of motion- flexion is 0.06 and ‘F’ table value is 2.76 at 5% level. Since the calculated ‘F’ value is less than ‘F’ table value, the study results shows that there is no significant difference between IASTM, myofascial release and conventional physiotherapy in improving lumbar range of motion- flexion among mechanical low back pain subjects.

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