

# Comparison between Myofascial Release and Progressive Pressure Release on Low Back Dysfunction

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## ABSTRACT

**Background and Purpose:** In an effort to investigate the effect of manual therapy in patients with low back dysfunction, as they constitute the largest client group seen by out patient physical therapists. The purpose of this study was to compare between the effect of progressive pressure release and myofascial release on pressure pain threshold in patients with low back dysfunction.

**Subjects:** A sample of 20 subjects with low back dysfunction, with a mean age of 30.86 years ( $SD=5.35$ ), participated in this study. Two myofascial trigger points were selected from two lumbogluteal muscles (quadratus lumborum and piriformis). **Methods:** Subjects were randomly assigned into 2 experimental groups, group (A) received myofascial release, while group (B) received progressive pressure release, 3 days per week for 4 weeks. The measurement outcome was pressure pain threshold value measured by an electronic algometer. **Results:** The measurements of the pressure pain threshold value of group (B) improved significantly at the end of the program than group (A)  $P$  value was  $<0.05$ . **Discussion and Conclusion:** Both groups improved by the end of the program in pressure pain threshold values, However progressive pressure release was more effective than myofascial release in treatment of patients with low back dysfunction indicating the possibility of its utilization in out patient clinic.

**Key Words:** Low back dysfunction, Myofascial trigger points, Progressive pressure release, Myofascial Release.

## INTRODUCTION

Chronic low back dysfunction (CLBD) was labeled for a group of disorders. The possible origins of pain in (CLBD) were suggested to be zygapophysical joints, sacroiliac ligaments and joints, dura, muscles, interspinous ligaments and bone<sup>24,26</sup>. The vast majority of CLBD is caused by mechanical disorder not pathological disorder. The key concept is of a painful musculoskeletal dysfunction, which may occur in tissues that are structurally

normal. The precise cause of CLBD is difficult to determine. Sometimes it is a case of a frank injury, but more often is related to an underlying chronic muscle imbalance, poor posture, or emotional stress<sup>16</sup>.

Dysfunction can occur at a multi-segmental level in functional movements across several motion segments related to abnormal myofascial length. In cases where pain becomes chronic, pain-avoidance behavior has become the normal, leading to increasing pain and dysfunction in muscles and ligaments that are not used to their

ultimate limits. If the functional range of motion (ROM) is limited because of pain for a long period of time, the actual ROM will decrease as the soft tissues shorten and strength decreases. The impairment then may be a result of these consequences of disuse, rather than a result of the initial injury<sup>3,18</sup>.

Myofascial pain has a high prevalence among individuals with regional pain complaints and is often a co-morbid with other conditions. The prevalence varies from 21% of patients seen in a general orthopedic clinic, to 30% of general medical clinic patients with regional pain, to as high as 85% to 93% of patients presenting to specialty pain management centers<sup>6</sup>. It is often associated with biomechanical and medical perpetuating factors that influence outcome<sup>8</sup>.

The term myofascial trigger point (MTrP) was first mentioned by Travell in (1942). The classical and most commonly used description of trigger points is that by Simons and Travell, it is the presence of exquisite tenderness at a nodule in a palpable taut band of muscle fiber, and is able to produce referred pain, either spontaneously or on digital compression. They exhibited a local twitch response or jump sign in response to digital pressure or dry needling<sup>8</sup>. Patients with myofascial trigger points responded well to a wide range of manual therapy modalities. The hands-on management offers a unique and often effective access to this body and mind connections<sup>17</sup>.

Manual therapy techniques as trigger point pressure release, acupressure, muscle energy technique, rhythmic stabilization, reciprocal inhibition and myofascial release have been used to relieve chronic myofascial pain. Its purpose was to move superficial tissues over the underlying structures to improve their mobility and to relieve the subcutaneous tightness<sup>19</sup>. Unfortunately, the

scientific basis for these techniques was still inadequate, limiting the guide to treatment choice<sup>12</sup>.

In a systematic review by Fernandez et al. (2005) it was suggested that further studies were required to investigate the efficacy of manual therapy, with emphasis on the use of adequate treatment techniques for MTrPs using manual therapy<sup>4</sup>. The effectiveness of manual therapy as a treatment for CLBD was a subject of great discussion. It was probably the treatment that has been subjected to a greatest number of reviews that have arrived at differing conclusions, and the one with the most precarious position in the 'recommended treatment lists' of national and international guidelines<sup>20</sup>.

Progressive pressure release recognizes the relationship between damaged myofascia and a remote referral point, by interrupting the aberrant pattern by manual application of gradually increasing pressure that theoretically breaks apart the restricted soft tissue. Progressive pressure technique uses the same concept of barrier-release technique to release the contraction knot in the muscle. This approach guides the practitioner towards the clinical target and it ensures the tolerability of digital pressure during the treatment itself<sup>21</sup>.

Myofascial Release Therapy considered the continuous anatomical nature of the myofascial system and the structural implications of chronic change within that system. It's a soft tissue manipulation technique, where slow, sustained gentle stretching exerted in the line with the fiber direction of the tissue being treated, which engaged the elastic component of the elastic-collagenous complex, stretching it until it commenced, and then eventually ceased, to release. The purpose of myofascial release was to move superficial tissues over the underlying

structures to improve their mobility and to relieve the subcutaneous tightness<sup>1</sup>.

Thus the objective of this study was to compare between the effects of progressive pressure release and myofascial release on pressure pain threshold in patients with low back dysfunction. So it was hypothesized that there was no significant difference between the effects of progressive pressure release and myofascial release on pressure pain threshold in patients with low back dysfunction.

## MATERIALS AND METHODS

### Subjects

Twenty subjects with CLBD participated in this study; referred from orthopedic physician for physical therapy treatment. Additional inclusion criteria were the presence of one or more MTrPs in two selected lumbogluteal muscles (quadratus lumborum and piriformis). Subjects were excluded if they

could not attend the required number of visits, had pathology or structural deformities of trunk, hip, knee and ankle joints, had radicular symptoms, disc prolapse, severe scoliosis, spondylolysis, previous back surgery, and females that were pregnant.

All subjects signed the consent form. They were randomly assigned into two groups: group A (n=10; 5 male, 5 female) received myofascial release, three times per week for four weeks, and group B (n=10; 5 male, 5 female) received progressive pressure release technique, three times per week for four weeks. All measurements were taken and treatment sessions were conducted by the same physical therapist. The subject's age, weight and height were recorded. There was no significant difference in demographic data between both groups (Tab. 1). Subjects were instructed to discontinue taking any medication that had been initiated 30 days or more prior to the enrollment in the study.

**Table (1): Characteristics of subjects with CLBD.**

	Group A		Group B	
	Mean	±SD	Mean	±SD
Age (yrs)	29.87	±4.77	29.94	±5.35
Weight (Kg)	76	±6.39	71	±6.24
Height (cm)	163.34	±4.05	167.66	±2.05

### Instrumentation and Measurements

An electronic algometer "Force one gauge-model FDI" (Wagner instruments, Greenwich, CT, USA) was used to measure MTrP tenderness by determining the pressure pain threshold value (PPT) that was measured in pound force (lbf), using a pressure transducer probe, that was placed perpendicular over the MTrP. It was used for quantitative documentation of MTrPs tenderness, and for quantifying the effects of the physical therapy treatment. Previous studies have demonstrated the reliability and validity of the pressure algometer in measuring

MTrP sensitivity and pressure pain threshold scores where the outcome measures were used in the analyzed trials<sup>5,6</sup>. Measurements were collected at the first treatment session as a pre-test measure and at the last treatment session as a post-treatment measure.

### Evaluative Procedures

#### *Myofascial Trigger Point Tenderness*

MTrPs were identified according to their essential criteria that was adopted for accurate identification by Travell and Simons<sup>23</sup>, that were; presence of a tender nodule in a palpable taut band of skeletal muscle fiber, where

digital compression on the nodule may elicit a referred pain pattern; patient pain recognition that produced a jump sign when digitally compressed, and pain appeared at the end of ROM<sup>9,14</sup>. MTrPs in the quadratus lumborum and piriformis were obtained. The patient was placed in a position to open up a wider space where MTrPs were easier to identify.

The transducer probe tip was applied perpendicular over the MTrP, and the power was switched ON. Required pressure was exerted on the site of MTrP by pressing the transducer firmly downwards. The digital display gave the actual pressure applied at the site in pound force. Exerted pressure was held and was gradually increased until the subject indicated first sign of pain and said "STOP". The digital reading at this point was the pressure pain threshold value and to save this value, the HOLD switch was pressed.

## **Treatment Procedures**

### ***Progressive Pressure Release Technique***

This manual technique was performed on the two selected lumbogluteal muscles. The patient was placed in a position to maximize stretch, then by the thumb or knuckles that were applied in the form of flat palpation over the MTrP, steady, gentle, gradual increasing pressure was applied downwards, moving inward toward the center. Once tissue resistance was felt, pressure was maintained, until resistance dissipated, and a slow release or a "melting away" sensation of the tissue was felt, further increase in pressure moving again inward toward the center was applied. Pressure application was guided by the patient's pain tolerance, where constant feedback was provided by the patient. It was applied for at least 30 seconds and up to two minutes at a time, and was repeated three to four times. The patient breathed deeply and slowly while we progressively increased the

pressure. When gradual increasing pressure is applied, a definite increase in resistance is encountered (the barrier) and at the same time the patient begins to feel a degree of discomfort. With the maintenance of the degree of pressure, the barrier releases, and the finger advances slightly inwards, more toward the center<sup>23</sup>.

### ***Myofascial Release Technique***

The patient was placed in a position to maximize the stretch and vertical stroking technique was performed. Counter pressure was applied by one hand in a cephalic direction, while the knuckles of the other hand applied slow stretch to the muscle in a longitudinal direction, in direction of the barrier. When a barrier was reached, the pressure was maintained until there was a release and the hand felt the motion and softening of the tissue, then pressure progressed to the next barrier. Pressure was maintained for approximately 3-5 minutes and was repeated three to four times<sup>2</sup>.

## **RESULTS**

The results of this study showed that there were significant differences in pressure pain threshold value measurements of the 2 lumbogluteal muscles (quadratus lumborum and piriformis). Significant improvement was found between the beginning and the end values of both groups for pressure pain threshold value P value was <0.05. A comparison of mean values for the pressure pain threshold value of both groups is shown in table 2.

For the comparison of the groups, there was no significant differences in base line values in pressure pain threshold value, but there was a significant improvement in group B at the end of the treatment program, where P values was <0.04 for the right and left

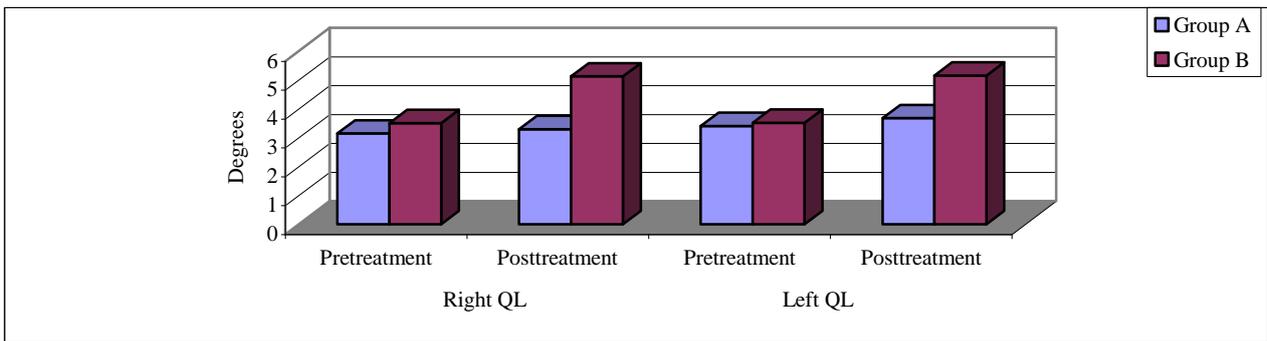
quadratus lumborum, right and left piriformis. Representative images of pressure pain threshold values of both groups were shown in

figure 1 for quadrates lumborum, figure 2 for piriformis.

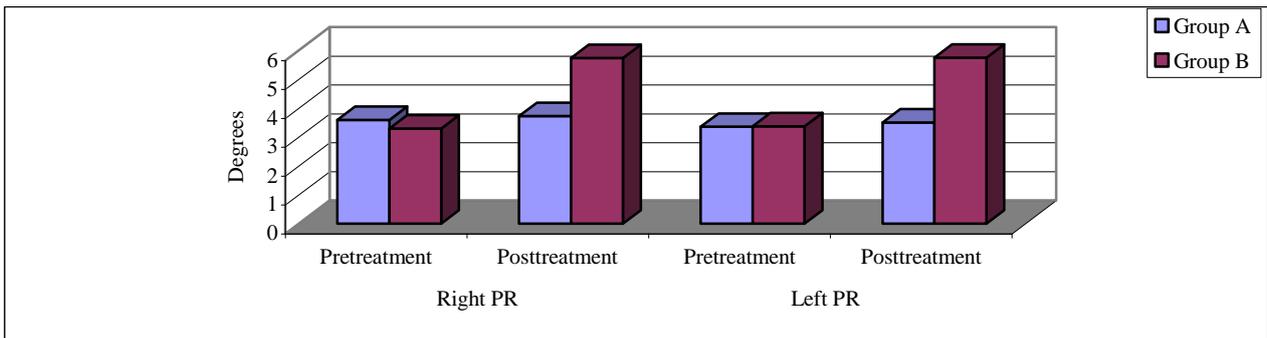
**Table (2): Comparison of control and treatment groups of subjects with CLBD for pressure pain threshold.**

Pressure Pain Threshold	Group A		Group B		Both Groups Between Group P
	Pre Test	Post Test	Pre Test	Post Test	
Q.L. Right	3.15±2.07	3.30±2.11	3.51±2.25	5.13±2.57	.04
Q.L. Left	3.41±1.88	3.68±1.97	3.52±2.11	5.16±1.85	.04
Piri . Right	3.60±2.58	3.73±2.67	3.30±2.42	5.74±2.67	.04
Piri. Left	3.36±2.11	3.51±2.17	3.38±2.76	5.75±3.46	.04

Values are mean ± SD. There were no significant differences in the pre-test values between groups. Significant difference at P<.05. Q.L.=quadratus lumborum, Piri=piriformis.



**Fig. (1): Mean and ±SD for QL PPT.**



**Fig. (2): Mean and ±SD for PR PPT.**

**DISCUSSION AND CONCLUSION**

The present study compared the effect of progressive pressure release and myofascial release in patients with chronic low back dysfunction. The results of this study showed

that both groups obtained successful outcomes, as measured by a significant increase in pressure pain threshold values. But in comparison of both groups, group B that received progressive pressure release showed greater improvement in PPT values when

compared to group A. In a single case study by Hong<sup>11</sup>, in treatment of shoulder pain. The subject was treated with very gentle pressure on the MTrP, pressure was then gradually increased. The subject received MTrP therapy 2-3 times/ week. After two months the subject complained of almost no pain in his shoulder.

Also, Hanten et al<sup>10</sup>. examined the effect of a home program of progressive pressure release (with a handheld tool) for patients with active MTrPs in their neck and upper back. Subjects in the treatment group were found to have a significant increase in pressure pain threshold in comparison to those in the control group. The study by Hong<sup>21</sup> emphasized that progressive pressure release could help for pain control. In this study, the increase in PPT values indicate that progressive pressure release played an important role in reducing MTrP tenderness, and this finding was in line with Hanten et al. and Hong.

In a study by Fryer et al.,<sup>7</sup> they investigated the effect of manual pressure release on MTrPs in the upper trapezius muscle, they found that with 60 seconds of pressure release produced significant immediate decreases in sensitivity of MTrPs. Furthermore, the effect size in the treatment group was large, suggesting a strong clinical effect. The results suggested that pressure release is an effective therapy for MTrPs in the upper trapezius.

In a study by Hong et al.,<sup>13</sup> they investigated the immediate effects of various physical therapy modalities on pain threshold of active MTrPs, these therapeutic modalities included spray and stretch, superficial and deep heat therapy, myofascial release and deep gradual pressure release. They found that deep pressure release was more effective than the other modalities in increasing the pain threshold and reducing the tenderness of the active MTrP immediately after therapy. Our

results were in agreement with those obtained by Hong et al in terms of reduction in PPT values.

Although the patients in this study had CLBD due to different causes; the outcomes of the current study provided significant increase in pressure pain threshold of group B than those of group A after 4 weeks of treatment. Since, the body reacts to various stimuli, trauma and stress, both physiological and psychological, in a non-specific way, it adapts to the situation it possess. As long as this situation can be compensated, the body remains apparently healthy. If the noxious stimulus of the interference field exceeds the tolerance of the autonomic system, functional disturbances and objective pathological changes will occur. As a consequence, the body will be forced to further compensate, overwork and breakdown. This is seen as physiologic, neuromuscular and mechanical loss of efficiency and function. This produces reduced ROM, shortening and contracture of the muscles, fascia and surrounding soft tissue, increasing muscular fatigue ability, loss of strength, endurance and neuromuscular coordination, thus disturbing posture and gait<sup>25</sup>.

It is possible that the CNS may attempt to compensate by exaggeration of the activity of lower back muscles causing spasm as a guarding reaction. Spasm causes impairment of muscle circulation and accumulation of metabolites, which produces more pain and further disturbance of the microcirculation in a vicious cycle. Progressive pressure release have many benefits in treating LBD patients, where lengthening sarcomeres was effective in reducing muscle tension, thus reducing the energy consumption and in turn will cease the release of noxious substances, breaking the vicious cycle. Gradual pressure when applied downward on an MTrP, tends to lengthen

sarcomeres, thus increasing the ROM and reducing muscle tension<sup>22</sup>.

Lengthening the sarcomeres reduces the energy consumption and in turn will cease the release of noxious substances. The release of taut bands is essential to break the cycle that induces the ischemic contractions. Also, pain reduction following progressive pressure release may result from reactive hyperaemia in the local area, due to counterirritant effect and from a spinal reflex mechanism that may produce reflex relaxation of the involved muscle<sup>13</sup>.

In conclusion, progressive pressure release is effective modality and should be included in the management program for CLBD. Further research is needed to investigate the long term effect of various manual modalities and the cumulative effects of subsequent repeated therapies need to be demonstrated. As well as well-controlled, double-blinded randomized trials of manual therapy are needed to establish effective therapy and functional outcome studies are needed to assess the efficacy of these treatments.

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### المخلص العربي

#### مقارنة بين العلاج بالضغط التصاعدي اليدوي و العلاج اليدوي في حالات خلل أسفل الظهر

تعد حالات خلل أسفل الظهر من الحالات التي تتردد بأعداد كثيرة علي العيادات الخارجية للعلاج الطبيعي وعلي الرغم من ذلك فإن عدد الدراسات البحثية التي تناولت هذا الموضوع مازال قليلا . ولذلك فإن الغرض من هذه الدراسة هو معرفة مدي كفاءة العلاج بالضغط التصاعدي اليدوي في علاج مرضي خلل أسفل الظهر و ذلك بمقارنته بالعلاج اليدوي . فقد تم اختيار عينة مكونة من عشرون مريضا متوسط أعمارهم (5,35± 30,86) يعانون من خلل أسفل الظهر مع وجود نقطة أو أكثر للألم في العضلات وتم توزيع المرضي بطريقة عشوائية إلي مجموعتين تجريبيتين . المجموعة (أ) تلقت العلاج اليدوي بينما تلقت المجموعة (ب) علاج بالضغط التصاعدي اليدوي 3 مرات أسبوعيا لمدة 4 أسابيع . وقد تم قياس القدرة علي احتمال الألم باستخدام جهاز الالجوميتر الالكتروني في بداية ونهاية مدة العلاج و بمقارنة المجموعتين تبين إن المجموعة الثانية (ب) كانت نتائجها ذات دلالة إحصائية عند مقارنتها بالمجموعة الأولى (ا) في نهاية البرنامج العلاجي مما يؤكد إمكانية استخدام العلاج بالضغط التصاعدي اليدوي في علاج حالات خلل أسفل الظهر في العيادات الخارجية للعلاج الطبيعي .