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The effects of active release technique on the gluteus medius for pain relief in persons with chronic low back pain

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Objective: Low back pain is a primary of source of dysfunction and economic costs. Gluteus medius muscle co-activation and activity pattern change caused the low back pain. Active release technique (ART) is a patented, non-invasive, soft tissue treatment process that both locates and breaks down the scar tissue and adhesions. The purpose of this study was to assess the effects on chronic low back pain using ART on gluteus medius so that suggest usable treatment method for treating chronic low back pain.
Design: One group pretest-posttest design.
Methods: Twelve patients with chronic low back pain were participated in this study. Subjects in ART group were received 2 times a week for 3 weeks treatments with either ART on gluteus medius muscle trigger points. Outcome measures were conducted by pain intensity with a pain visual analogue scale and pressure pain threshold on gluteus medius.
Results: Completion of the intervention, the visual analogue scale was decreased in ART group ($p < 0.05$). Also pressure pain threshold was decreased in ART group ($p < 0.05$).
Conclusions: Our results suggest that the response to ART may be usable to treat low back pain. ART was presented to reduce pain level of low back in people with chronic low back pain. Further study is required to management for low back pain due to gluteus medius and more ART study.

Key Words: Low back pain, Trigger points, Visual analogue scale

Introduction

The incidence of low back pain (LBP) has been estimated between 4%-56% of the general population per year [1]. Between 60% and 80% of the population will experience LBP during their lives and up to 15% become [2,3]. LBP is second only to the common cold in missed work days in the United States affecting as much as 20% of the work force annually [4,5]. Annual prevalence rate estimates for LBP range from 41% to 65% [6]. And healthcare economists estimate that 15% of the cases generate up to 80% of the healthcare costs associated with LBP [7]. LBP is a primary source of disability and economic costs [8].

In despite of prevalence and social costs, most LBP appears to be of unknown etiology [9]. Reasons for this statement include a lack of sensitivity of special testing used to assess LBP, a high rate of anatomical anomalies noted on diagnostic imaging, a failure to demonstrate a high correlation between anatomic abnormality with clinical symptomatology, and the failure of clinical examination to predict symptom and disability rates [10].

Muscles of the lumbar spine have been demonstrated to

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act as primary sources of back and buttock pain. The disorders that affect predominantly the musculature of the lumbar spine include muscle strain injury, spasm or guarding, and myofascial complaints, such as trigger point [11].

It has found that muscle activation patterns of people with LBP are different from those of ordinary persons [12,13]. Back pain can occur due to co-activation of gluteus medius agonist-antagonist muscle in standing postures. For the problems of gluteus medius, pain spreads to gluteal and sacral regions. The myofascial trigger point of gluteus medius can be ignored as the cause of LBP [14]. There are few studies on gluteus medius mediation related to LBP.

Active release technique (ART) is perhaps the most popular of the soft tissue therapy/mobilization techniques utilized by manual therapists [15]. ART is a patented, non-invasive, soft tissue treatment process that both locates and breaks down the scar tissue and adhesions which cause pain, stiffness, weakness, numbness, and physical dysfunctions.

The purpose of this study is to assess the effects of ART on chronic LBP due to gluteus medius so that suggest useable treatment method for treating chronic LBP.

Methods

Interventions

Participants who volunteered and agreed to participate in the study, included 12 adults (Table 1). And the study was approved by the Sahmyook University Ethics Committee (Ref no. SYUIRB2012-013).

Inclusion criteria are as follows: (1) a diagnosis of chronic LBP, without neurologic or vascular deficit, established by the participating medical doctor who initially examined the patient; (2) medius trigger points identified in the gluteus muscle; (3) present for at least half the days in a 12-month period in single or multiple episodes [16]; (4) did not participate in activities or have an occupation that included vigorous activity that may perpetuate or aggravate the existing problem; (5) had an initial pain score of at least 30/100 on the visual analogue scale (VAS).

Potential participants are excluded if (1) there was a possibility of a serious spinal, pathologic, or psychiatric disorder; (2) they had previously had spinal surgery, as the clinical outcome was likely to be very different; (3) there were any contraindications to the treatment(s) proposed in this trial (eg. the patient could not tolerate ART or trigger point therapy); (4) they could not walk 100 m when free of back pain or get up and down from the floor, because keeping active could be difficult; and (5) they had received treatment from another health care provider in the previous 3 months for spinal pain.

Subjects in ART group were received 2 times a week for 3 weeks treatments with either ART on gluteus medius muscle trigger points. During ART therapy, the therapist applies deep digital tension (utilizing either the thumb or fingers) to the affected site as the tissue is moved both actively and passively from a shortened position to a lengthened position or from a lengthened position to a shortened position. Treatment takes about 5-8 minutes for each area (Figure 1).

Patient position is side-lying on his/her unaffected side. Therapist find out trigger points of gluteus medius muscle and apply firm pressure directly to the superior to inferior. After that, ask patient to flex his/her lower leg from neutral position to full flexed range of hip and return to the initial position while therapist keep pressing the trigger point.

Outcome measures

Visual analogue scale

The subjective pain scale was reported by participants. Subjects mark their pain level on the 100 mm line which starting point, '0', means no pain, ending point, '10', means

Table 1. General characteristics of the subjects (N=12)

Sex	Male	Female
N	5 (42)	7 (52)
Age	39.40 (5.32)	38.71 (8.87)
Height	175.60 (7.33)	159.43 (1.15)
Weight	68.80 (10.57)	53.14 (5.84)

Values are presented as n (%) or mean (SD).

Figure 1. Active release technique on gluteus medius muscle.

worst pain.

Pressure pain threshold

The pain level was measured three times by digital algometer (Algometer Commander, JTECH Medical, Salt Lake City, UT, USA). Algometer has long been used to measure soft tissue pain associated with trigger points [17].

The algometer was calibrated at the onset of each time of testing automatically, before being applied to the subject.

The 0.8-cm applicator head (circular disc with rubberized tip) was put applicator head to measure pressure pain thresholds (PPTs). The testing locations were identified through the placement of pen marks on the skin; the trigger points of target muscles (gluteus medius). The marks served to identify the appropriate location in which to place the nozzle of the algometer. Measuring was repeated three times for each trigger point and output is recorded automatically. The algometer (Algometer Commander, JTECH Medical) calculates average PPT automatically and show on the liquid crystal display. PPTs were measured right before and after intervention.

Data analysis

IBM SPSS Statistics 19.0 (IBM Co., Armonk, NY, USA) was used for statistical analysis, by way of paired T-test with the significance level at 0.05.

Results

Pain, as evaluated by VAS and PPT, decreased with ART. The VAS score changed from 4.15 cm to 2.17 cm and the PPT changed 75.51 N to 95.78 N, indicating a significant change ($p < 0.05$) (Table 2).

Discussion

This study examined the effect of ART mediation on pain reduction and functional change of chronic LBP patients.

If tissues are damaged, there are healing responses in them. They are completed by immune responses. The immune system protects them from infection and cleans the wound. The damaged regions get to be restored. Inflammation and acute pain occur.

Wound tissues or fibrillar connective tissues are related to restoration. These tissues occur in the process to prevent additional damage but they can be problems. These tissues block blood flow and limit movement. Therefore, enough movement should be made by using methods such as ART in the stage that tissues are recovered.

ART recovers movement of all the soft tissues, relaxes entrapped nerves, blood vessels, and lymph and restore the proper texture, elasticity, and functions of soft tissues [18].

One of the causes which cause LBP is co-activation of gluteus medius. Increase of co-activation increases spine loading [8]. Change of the muscle activation pattern like this eventually causes LBP. And lateral pelvic seems to be tilt due to reduction of gluteus medius and tightness gets to appear in the bottom [13].

Like this, the result which applied ART to the patients that back pain occurred due to gluteus medius has found that the pain was significantly reduced in group ($p < 0.05$). But there are few biomechanical studies on gluteus medius yet and it is not enough to generalize it due to lack of subjects.

The result which applied ART to gluteus medius through this study has found that pack pain is reduced. But follow up according to this could not be done. And as it is more likely to reoccur because of the general patents' lifestyle, appropriate exercise should be prescribed together. More studies on mediation methods and ART to manage the back pain which occur because of gluteus medius should be arranged.

Table 2. Comparison of VAS and PPT after ART intervention

	Pre-test	Post-test	*p*
VAS (mm)	41.50 (0.79)	21.70 (0.94)	0.000
PPT (N)	75.51 (11.70)	95.78 (5.20)	0.000

Values are presented as mean (SD).
VAS: visual analogue scale, PPT: pressure pain threshold, ART: active release technique.

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