

## การเปรียบเทียบผลการรักษาด้วยวิธีการยืดและกดจุดตามด้วยการยืด ในผู้ที่มีกลุ่มอาการกล้ามเนื้ออักเสบ

Comparison of Treatment Effects of Strain Counter-Strain and Ischemic Compression  
Followed by Passive Stretching in Subjects with Myofascial Pain Syndrome

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### บทคัดย่อ

กลุ่มอาการกล้ามเนื้ออักเสบเป็นอาการปวดกล้ามเนื้อที่พบได้ทั่วไปในทางคลินิก มีอุบัติการณ์และความชุกค่อนข้างสูง อาการที่พบในผู้ที่มีกลุ่มอาการกล้ามเนื้ออักเสบ มีสาเหตุมาจาก จุดกดเจ็บที่อยู่ภายในใยกล้ามเนื้อนั้นๆ มีการรักษาด้วยหัตถบำบัดอยู่หลายวิธีที่ใช้ในการรักษาจุดกดเจ็บที่อยู่ภายในใยกล้ามเนื้อดังกล่าว การศึกษานี้มีวัตถุประสงค์เพื่อเปรียบเทียบ 2 เทคนิคการรักษา กลุ่มที่ 1 คือ การยืดกล้ามเนื้อ (strain counter-strain) 90 วินาที และกลุ่มที่ 2 คือ การกดจุด (ischemic compression) ไม่เกิน 1 นาที ตามด้วยการยืด (passive stretching) 30 วินาที ในผู้ที่มีกลุ่มอาการกล้ามเนื้ออักเสบ (myofascial pain syndrome, MPS) โดยไม่พบปัญหา เช่น การบาดเจ็บของเส้นประสาท (nerve injury) ภาวะความไม่มั่นคงของกระดูกสันหลังระดับคอ (cervical spine instability) โรคทางฮอร์โมน (hormonal disease) โรคทั้งระบบของร่างกาย (systemic disease) และอยู่ในภาวะเครียดทางอารมณ์ (emotional stress) ซึ่งมีอายุอยู่ระหว่าง 18 - 40 ปี จะได้รับการสุ่มเข้ากลุ่มการรักษา 2 กลุ่ม แต่ละกลุ่มจะได้รับการรักษา 2 ครั้ง ครั้งละ 10 นาที โดยการรักษาทั้ง 2 ครั้ง ห่างกัน 2 วัน ผู้เข้าร่วมการวิจัยจะได้รับการตรวจจวงศาการเคลื่อนไหวของคอ (neck range of motion, neck ROM) แรงกดน้อยที่สุดที่ทำให้เริ่มเจ็บ (pressure pain threshold, PPT) และการตรวจประเมินระดับความเจ็บ (pain intensity) ก่อนและหลังทำการรักษา เมื่อสิ้นสุดการรักษาในแต่ละวัน ผู้เข้าร่วมการวิจัยจะได้รับการประเมินความรู้สึกของอาการโดยรวมหลังทำการรักษา (patient's perception of change, PPC) จากผลการศึกษาพบว่ากลุ่มที่ได้รับการรักษาด้วยการยืดกล้ามเนื้อ มีการเพิ่มขึ้นของจวงศาการเคลื่อนไหวของคอในทิศทางเอียงศีรษะไปด้านซ้ายและหมุนศีรษะไปทางด้านซ้าย กลุ่มที่ได้รับการรักษาด้วยการกดจุดตามด้วยการยืดกล้ามเนื้อมีการเพิ่มขึ้นของจวงศาการเคลื่อนไหวของคอในทิศทางเอียงศีรษะไปด้านซ้ายและขวา หมุนศีรษะไปทางด้านซ้ายและขวา แต่ไม่พบว่ามีผลแตกต่างกันในระหว่างกลุ่ม ส่วนค่าตัวแปรแรงกดน้อยที่สุดที่ทำให้เริ่มเจ็บ ระดับความเจ็บ และความรู้สึกของอาการโดยรวมหลังทำการรักษา ไม่มีความแตกต่างกันทั้งภายในกลุ่มและระหว่างกลุ่ม ดังนั้นเทคนิคการรักษาทั้ง 2 กลุ่มมีประสิทธิภาพในการเพิ่มช่วงการเคลื่อนไหวของคอได้ใกล้เคียงกัน และผู้เข้าร่วมการวิจัยมีเจตคติที่ดีต่อเทคนิคการรักษาทั้ง 2 กลุ่มเหมือนกัน

**คำสำคัญ :** การยืดกล้ามเนื้อ การกดจุด การยืดกล้ามเนื้อ กลุ่มอาการกล้ามเนื้ออักเสบ

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## ABSTRACT

Myofascial pain syndrome (MPS) is a common regional muscle pain in clinical practice. There are high incidence and prevalence of MPS. Symptoms of MPS originate from myofascial trigger point. There are several useful manual techniques for treatment of myofascial trigger point. This study aimed to compare 2 treatment techniques; group 1 was strain counter-strain for 90 seconds and group 2 was ischemic compression for no longer than 1 minute followed by passive stretching for 30 seconds in subjects with myofascial pain syndrome. Subjects aged between 18-40 years with myofascial pain syndrome at upper trapezius muscle, without nerve injury, cervical spine instability, hormonal disease, systemic disease, and emotional stress, were randomly divided into 2 groups to receive 10 minutes of treatment twice with 2 day interval. Neck range of motion (neck ROM), pressure pain threshold (PPT), and pain intensity were assessed at before and after each treatment session. Patient's perception of change (PPC) was also determined at the end of each session. The results showed increasing of neck ROM in direction of left lateral flexion and rotation to left in group 1. Group 2 was found increasing of neck ROM in direction of left lateral flexion, right lateral flexion, rotation to left and rotation to right. No difference of neck ROM between both groups. Pressure pain threshold, pain intensity, and patient's perception of change was not found different both before-after treatment and between groups. So, effect of both treatment techniques on increasing of ROM were similar and subjects both groups seemed to appreciate with both treatment techniques.

**Keywords** : strain counter-strain, ischemic compression, passive stretching, myofascial pain syndrome

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## INTRODUCTION

Myofascial pain syndrome (MPS) is a common regional muscle pain in clinical practice. There is a high prevalence of myofascial pain syndrome in patients with regional musculoskeletal pain syndrome (Yap, 2007). The incidence of myofascial pain syndromes is higher in women than men (Rachlin & Rachlin, 2002). Myofascial pain syndrome can occur in all skeletal muscles but upper trapezius muscle is probably muscle that usually found with myofascial pain syndrome. There are several perpetuating factors that related with myofascial pain syndrome such as mechanical, systemic, and psychological factor (Gerwin, 2005; Starlanyl, 2007; Pradit, 2542). The characteristics of myofascial pain syndrome (MPS) are pain, limited range of motion, muscle weakness without muscle atrophy and autonomic dysfunction that originate from a myofascial trigger point (MTrP) (Gerwin, Channon, Hong, Hubbard, & Gevirtz, 1997; Pradit, 2542). The pain consists of local pain and referred pain. Each muscle has its own characteristic pain pattern. Myofascial trigger point can be categorized as either active or

latent trigger point (Pradit, 2542). Active trigger point is a cause of symptoms such as pain and autonomic phenomena at rest, or pain in response to movement. Latent trigger point does not cause pain at rest but may cause restricted movement and weakness without muscle atrophy.

Ischemic compression and passive stretching technique are manual techniques that are usually used for trigger point treatment (Fernandez-de-las-Penas, Alonso-Blanco, Fernandez-Carnero, & Miangolarra-Page, 2006; Jaeger & Reeves, 1986; Meseguer, Fernandez-de-las-Penas, Navarro-Poza, Rodriguez-Blanco, & Gandia, 2006; Simons, 2002; Travell & Simons, 1983; Wong & Schauer-Alvarez, 2004). Ischemic compression is a technique that applies sustained pressure at the trigger point with sufficient force to create tolerably painful and holds for an enough time to inactivate the trigger point (Travell & Simons, 1983). Passive stretching technique is used to increase extensibility of muscle, joint range of motion, and relaxing muscle. Concept of passive stretching technique is setting muscle in lengthening length and hold with time that promoted muscle to relaxation.

Strain counter-strain technique was introduced by Lawrence H. Jones (Jones, Kusunose, & Goering, 1995). The concept of this technique is setting of muscle in shorten position for 90 seconds that lead to muscle relaxation (Chaitow, 2002; Jones et al., 1995). From previous studies, strain counter-strain was effective treatment for patients with myofascial pain syndrome.

Passive stretching and ischemic compression techniques are parts of manual therapy that usually used as a treatment for patients with myofascial pain syndrome. When clinicians use both techniques, patients will feel discomfort during treatment. On the other hand, patients will feel most comfortable during treatment with strain counter-strain technique. Some patients are not responsive with standard treatment including manual therapy techniques, but previous study showed that strain counter-strain technique could improve symptoms of these patients (Dardzinski, Ostrov, & Hamann, 2000). Currently, there are some studies reporting the outcomes after the use of individual technique such as ischemic compression (Dearing & Hamilton, 2008; Fernandez-de-las-Penas et al., 2006), passive stretching (Hanten, Olson, Butts, & Nowicki, 2000; Whatman, Knappstein, & Hume, 2006) and strain counter-strain technique (Dardzinski et al., 2000; Lewis & Flynn, 2001; Meseguer et al., 2006) in patients with muscle pain condition. Interestingly, little is known whether the combination treatment is more beneficial. Therefore, in this study, it aims to investigate the effects of the combination of ischemic compression and passive stretching when compared with more comfortable technique, strain counter-strain technique.

## MATERIALS AND METHODS

The subjects were voluntarily recruited from patients who come for treatment at the physical therapy clinic and students of the Faculty of Physical Therapy, Mahidol University. All subjects aged

between 18-40 years with myofascial trigger point in the upper trapezius muscle without nerve injury, cervical spine instability, hormonal disease, systemic disease, and emotional stress. Subjects were allocated by match-paired technique into 2 groups considering of the severity of pain, gender, age, working styles, and type of MPS. After that, Group 1 received treatment by strain counter-strain technique and group 2 received treatment by ischemic compression followed by passive stretching technique. Each treatment session was performed not longer than 10 minutes. Group 1 received strain counter-strain for 90 seconds and rest for 10 seconds before started next treatment. Group 2 received ischemic compression not longer than 1 minute and then rest for 10 seconds, after that followed by passive stretching for 30 seconds and then rest for 10 seconds before started next treatment. Subjects received 2 sessions of treatment. Second treatment was performed in 3 days after first treatment. Each subject immediately received post-treatment assessment. Pre-treatment assessment consisted of neck range of motion (neck ROM): flexion (F), extension (E), left lateral flexion (LLF), right lateral flexion (RLF), rotation to left (RL), and rotation to right (RR) by using Cervical range of motion (CROM), pressure pain threshold (PPT), and pain intensity. PPT, which represented sensitivity of myofascial trigger point, was measured by using algometer. Visual analogue scale (VAS) was used for measuring of pain intensity during application of pressure 2.5 kg. at trigger point. Neck ROM, pain intensity, PPT, and patient's perception of change (PPC) were then immediately measured after the treatment session finished within 2 minutes.



Picture 1 Strain counter-strain



Picture 2 Ischemic compression



Picture 3 Passive stretching

## RESULT AND DISCUSSION

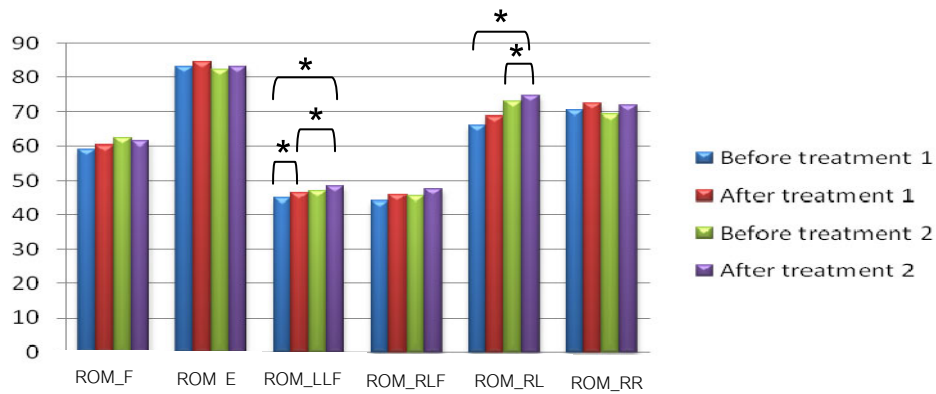
### Characteristics of subjects

In this study, thirteen women and one man with averaged age of  $21.36 \pm 2.13$  years were recruited. All of them were right-handed and had both sides of MPS. This study found two sides of active and twelve sides of latent MPS in group 1. For group 2, there were four sides of active and ten sides of latent MPS. Most active MPS found in the subjects were changed to latent MPS at end of first treatment, excepted one subject in group 2. At end of treatment, all of active MPS were changed to latent MPS.

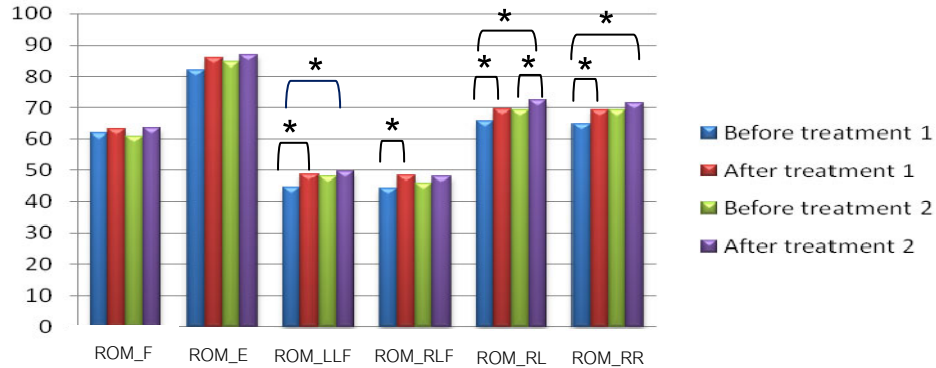
Comparison of all parameters

- Within group

For group 1, it was found significant improvement in neck ROM in direction of LLF (F=11.842, P<0.001) and RL (F=7.303, P<0.007). For group 2, it was found significant improvement in neck ROM in direction of LLF (F=7.881, P<0.001), RLF (F=4.482, P=0.033), RL (F=7.538, P<0.001), and RR (F=6.269, P=0.001). Flexion and extension of neck ROM was found no significance improvement in both groups. Treatment session that significant in neck ROM was showed in picture 4 and 5. Pain intensity, PPT, and PPC was found no significance improvement.



Picture 4 Data of neck ROM in group 1



Picture 5 Data of neck ROM in group 2

\* Showing pairs of significant of data at P-value < 0.05

- Between groups

It was found that no significant difference between two groups in all parameters.

Table 1 Mean and standard deviation of pain intensity, PPT, and PPC

	Group	Before Treatment 1	After Treatment 1	Before Treatment 2	After Treatment 2	P Value Within group	P Value Between group
Pain intensity ( cm )	1	5.16 ± 2.20	6.16 ± 1.71	6.46 ± 1.76	5.42 ± 2.65	0.611	0.747
	2	6.61 ± 1.44	6.13 ± 2.12	5.34 ± 2.40	6.01 ± 2.80		
PPT ( N )	1	18.74 ± 4.85	17.42 ± 3.83	16.94 ± 4.61	17.29 ± 6.34	0.658	0.308
	2	15.23 ± 1.99	16.07 ± 3.26	15.70 ± 4.16	17.17 ± 8.16		
PPC ( cm )	1		1.32 ± 1.26		1.64 ± 1.49	0.234	0.116
	2		2.24 ± 1.52		2.44 ± 1.72		

From the results, Subjects had increasing of neck ROM in direction of left lateral flexion and rotation to left after treatment both groups. In addition, subjects had increasing of ROM in direction of right lateral flexion and rotation to right after treatment in group 2. Increasing of neck ROM may be due to location of the muscle which more lengthening in direction of neck rotation to the same side or neck lateral flexion to the opposite side. From results, effect of strain counter-strain technique on increasing of ROM was similar to ischemic compression followed by passive stretching technique. The increasing of ROM in group 1 may be caused by effect of strain counter-strain that decreased efferent impulse to upper trapezius muscle resulted in muscle relaxation. In group 2, application of ischemic compression resulted in increasing of blood flowed at trigger point that promoted muscle to relaxation. Passive stretching promoted muscle relaxation by inhibiting nerve impulse efferent to muscle that resulted in decreasing of muscle contraction (Kisner & Colby, 1985). If muscle relaxed, it might be more sensitive with compression. This study found no significant change both within group and between groups. It seemed to be decreasing both groups. In addition, decreasing of pressure pain threshold may be due to latent effect on the soft tissue above trigger point from ischemic compression technique. Pain was measured by visual analogue scale during application with pressure 2.5 kg/cm<sup>2</sup> at trigger point. So, if pressure pain threshold decreased, pain intensity would increase. The results showed no significance difference in terms of within group or between groups. This study was opposite to the study by Fernandez-de-las-Penas et al (2006). They studied the immediate effect of ischemic compression and transverse friction massage in subjects with MPS. Their results showed significant improvement in pain intensity. However, both pain intensity and pressure pain threshold seemed to be worst, but patient's perception of change seemed to be good. Both treatment techniques resulted in muscle relaxation that helped decreasing in subject's feeling discomfort. Most subjects with active MPS changed to latent

MPS after treatment in both groups. Perhaps, decreasing in subject's feeling discomfort and changing in type of MPS contributed to subjects' perception of recovery. Most patients from both groups perceived recovery after treatment, but results showed no significant difference both within and between groups. From results of patient's perception of change, subjects from both groups seemed to appreciate with strain counter-strain technique as well as ischemic compression followed by passive stretching technique.

## CONCLUSION

Both treatment techniques increased neck ROM in direction of left lateral flexion and rotation to left. In addition, ischemic compression followed by passive stretching technique increased neck ROM in direction of right lateral flexion and rotation to right. Pain intensity, pressure pain threshold, and patient's perception of change did not differ in both groups. But, subjects both groups seemed to appreciate with strain counter-strain technique as well as ischemic compression followed by passive stretching technique. The results suggested that clinicians could apply strain counter-strain technique or ischemic compression followed by passive stretching technique for treatment patients with myofascial pain syndrome because effect of both treatment groups was in the same way. Further study should be considered of addition of control group, and more subjects should be recruited.

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