Original Article

EFFECTS OF MUSCLE ENERGY TECHNIQUE ON PAIN AND DISABILITY IN SUBJECTS WITH SI JOINT DYSFUNCTION

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ABSTRACT

Background: Low back pain has become one of the most common, and most difficult medical problems costing $24 billion (1990) for treatment. With the consideration of costs of disability, lost workforce productivity and other related factors, the cost of society rises to $50 billion. In spite of this, disability due to low back pain has continued to rise.

Aims and Objectives: The incidence of lower back pain in humans parallels the incidence of the common cold, with a lifetime rate approaching 95%.Several attempts have been made to treat the chronic low back pain due to SIJ dysfunction with mobilization, manipulation and other treatment methods.

Methodology: 20 men and women were recruited for the study on the basis of Unilateral back pain experiencing around or near sacral sulcus and Positive muscle length tests for piriformis, Erecter Spinae,Quadrtus Lumborum. All the subjects were randomly assigned into two groups where Subjects in group A undegone MET and mobilization and Group B was treated only with mobilization of SI joint. Outcome was measured on first day and then after 1 and 2 week from each subjects pain and disability by Visual analogue scale and modified oswestry disability questionnaire (MODI)

Results: Paired t test was used to analyse the values of VAS and MODI within the group. ANOVA was used for between the analyses of VAS and MODI for both the groups.

Conclusion: MET and mobilisation are both effective in treating chronic low back pain due to sacroiliac joint dysfunction.

KEYWORDS: MET (Muscle Energy Technique); VAS (Visual Analogue Scale); MODI (Modified Oswestry Disability Questionnaire).

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INTRODUCTION

Low back pain has become one of the most common, and most difficult medical problems costing $24 billion (1990) for treatment. With the consideration of costs of disability, lost workforce productivity and other related factors, the cost of society rises to $50 billion. In spite of this, disability due to low back pain has continued to rise.[1]An area of low back pain that has attracted increased research is the SIJ and associated structures. Idea related with a possible pain mechanism associated with SIJD come from a number of areas: muscle imbalance, muscle imbalance or ligament sprain/strain, sacral or ilial misalignment.[2]The clinicians will attempt to identify the key contributing factors to the generation of low back pain. These factors relate to specific areas of dysfunction that may be causing irritation to the tissues that are generating pain, or that may cause pain via hypersensitization of nociceptive pathways in CNS.

One factor is joint dysfunction, defined as "loss of joint play movement that cannot be produced by voluntary muscles".[3] Joint dysfunction can cause pain to arise from joint itself.[4]In addition to joint dysfunction, examination for presence of muscle dysfunction is performed.[3] This can be identified through history, Inspection, Palpation, length tests Muscle imbalance has also been sighted as a possible cause of pain. This theory maintain that the SI joint itself is unaffected, but the musculature surrounding the SI joint is in form of dysfunction (Kermond 1995).This muscular imbalance could limit the flexibility of muscle of low back and ultimately begin a syndrome of chronic disuse culminating in decreased function and heightened pain.[4] The sacroiliac joint is unable to function in isolation; anatomically and biomechanically it shares all of its muscles with the hip joint.[2]There are no absolute historical, physical, or radiological features to provide definitive diagnosis of sacroiliac joint pain.[4] The diagnosis of symptomatic sacroiliac joint pathology may mean that either sacroiliac joint contains the pain generating tissues, or that the sacroiliac joint functions or malfunctions in such a way as to cause pain.[5] Clinical signs of sacroiliac joint dysfunction are pain and local tenderness, with increased pain on position changes such as ascending or descending stairs or slopes or rising from sitting or lying to standing. Pain may also increase with prolonged postures like standing or sitting. Pelvic girdle disorders can be classified into three groups they include hypo mobility with or without pain, hyper mobility with or without pain or normal mobility with pain in the sacroiliac joint.[6] According to Diane Lee(1989) the osteokinematic function depends upon the composite artrhrokinematic and myokinematic function of pelvic girdle. In patient of low back pain due to sacroiliac joint dysfunction, mobilization and stabilization exercises are among the few approaches that have evidence of effectiveness basically concentrating the arthrokinematic of pelvic girdle.[5] But no attempt has been made to evaluate the effect of restoring the myokinematics in subjects of low back pain with sacroiliac joint dysfunction.[8] Thus it is imperative to remember that although the assessment and treatment of the articular components of the pelvic girdle region is emphasized, the motor system function as a whole and the abnormal movement patterns may persist long after the articular function has been restored. So rehabilitation is incomplete until this component is addressed. Evidence suggested the use of mobilization and manipulation in treating SI joint dysfunction. But on attempt has been made to study the effect of other treatment options available on sacroiliac joint dysfunction So this study was performed to assess the effect of MET on pain and disability in subjects with chronic low back pain due to sacroiliac joint dysfunction.[9] thus aims of the present study was to find out the effects of MET on low back pain and disability due to SIJD with the hypothesis that there is a good effect in reduction of low back pain.

METHODOLOGY

Sample:

20 men and women were recruited for the study on the basis of Unilateral back pain experiencing around or near sacral sulcus and Positive muscle length tests for piriformis, Erecter Spinae, Quadratus Lumborum with mean age of Group A was 31.10 years and group B was 30.80 years. each subject was volunteered for the study and having no Radiating pain, no lumbar disc herniation, spinal deformities. Each subject signed an informed consent and the rights of each subject were protected. The research protocol was approved by the Institutional Review Board of the Dolphin (PG) institute of biomedical and natural sciences. All the subjects were randomly assigned into two groups where Subjects in group A undergone MET and mobilization and Group B was treated only with mobilization of SI joint. Outcome was measured on first day and then after 1 and 2 week from each subjects pain and disability by Visual analogue scale and modified oswestry disability questionnaire (MODI).

Application of Muscle Energy Technique:

MET was applied in three different muscle viz quadratus lumborum, erector spinae and piriformis. For each muscle after positioning the patient was asked to apply 30% force against therapist force and hold that contraction for 7-10seconds and after that relax for 5seconds and when patient exhale,

therapist take muscle to new restriction barrier, hold this position for 10-60 seconds with 3-5 repetition. Lewit technique was used for Quadratus Lumborum muscles where the therapist stands behind the side lying patient, at waist level. The patient has the uppermost arm extended over the head to firmly grasp the top of the table and on an inhalation adduct the uppermost leg until the practitioner palpate strong quadrates activity elevation of around 30 degree usually. The patient holds the leg in this manner isometrically allowing gravity to provide resistance. After 10 seconds contraction the patient allow the leg to hang slightly behind him over the back of the table. The therapist straddle this and cradling the pelvis with both hands leans back to take out all the slack and to ease the pelvis away from the lower ribs during an exhalation. The stretch should be held for 30 seconds. For Erector Spinae the patient sits on a treatment table legs hanging over the side. The therapist stands behind the patient placing his one knee on the table close to the patient, at the side towards which side bending and rotation will be introduced. The therapist will move the patient into flexion, side bending and rotation over the therapist's knee. After taking the patient into comfortable limit of flexion he is asked to look towards the direction from which rotation has been made while holding the breath for 7-10 seconds. For Piriformis muscle patient was supine, the treated leg is placed into flexion at the hip and knee so that the foot rest on the table lateral to the contralateral knee. The angle of hip flexion should not exceed 60 degree .The therapist place one hand on the contralateral ASIS to prevent pelvis motion, while the other hand is placed against the lateral flexed knee as this is pushed into resisted abduction to contract piriformis for 7-10 seconds.

Mobilization technique for SI joint:

Patient was positioned into supine lying close to the edge of table, the ischial tuberosity is palpated with the caudal hand. The flexed hip and knee ware supported against the therapist's caudal shoulder and arm. The anterior aspect of the ASIS and the innominate bone are palpated with the cranial hand. The physiological limit of flexion/lateral rotation of the innominate bone is reached by passively flexing the femur with the caudal hand and applying a postero-medial force to the innominate bone with the cranial hand. The passive mobilization is repeated by rhythmically flexing the innominate bone with the two hands.

Data analysis:

Data was analysed by using statistical package of social sciences SPSS software version 11.5 Paired t test was used to analyse the values of VAS and MODI within the group. ANOVA was used for between the analyses of VAS and MODI readings of both the groups. The p value was set at <0.05.

RESULTS

Within the group analysis using t test showed that there is significant improvement of MODI in both the groups from 0 day to 9th day of intervention. Within the group analysis using ANOVA showed that there is significant improvement of pain in group A from 0 day to 9th day of intervention but group B showed statistically non significant improvement in pain Between the group analyses using independent sample t test showed that there is insignificant improvement in both pre and post intervention of MODI from 0 to 9th day. Between the group analysis using independent sample t test showed that there is insignificant improvement in Pre, Mid and Post intervention of VAS from 0 to 9th day.

Table 1: Paired sample test within group of MODI

Group	t value	p value
Group A	16.2	0.0001
Group B	4.122	0.003

Table 2: ANOVA within the group VAS

Group	F value	p value
Group A	5.591	0.009
Group B	1.094	0.349

Table 3: Independent samples test between the groups

MODI	t value	p value
Pre MODI	0.624	0.541
Post MODI	-0.381	0.707

Table 4: Independent sample test between the groups

VAS	t value	p value
Pre VAS	1.172	0.257
Mid VAS	0.421	0.679
Post VAS	-0.111	0.913

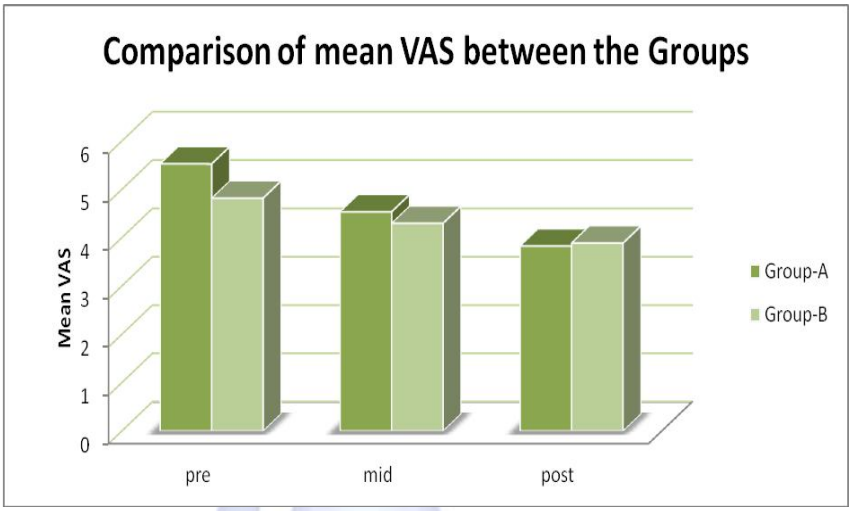

Fig 1: Comparison of mean VAS between the groups.

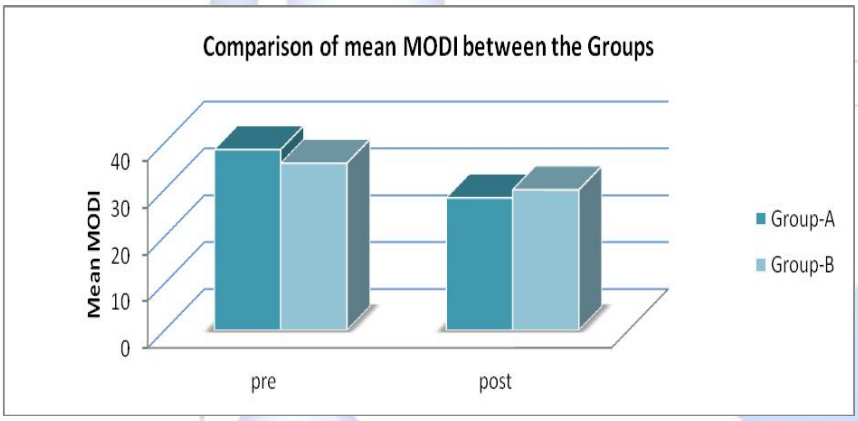

Fig 2: Comparison of mean MODI between the groups.

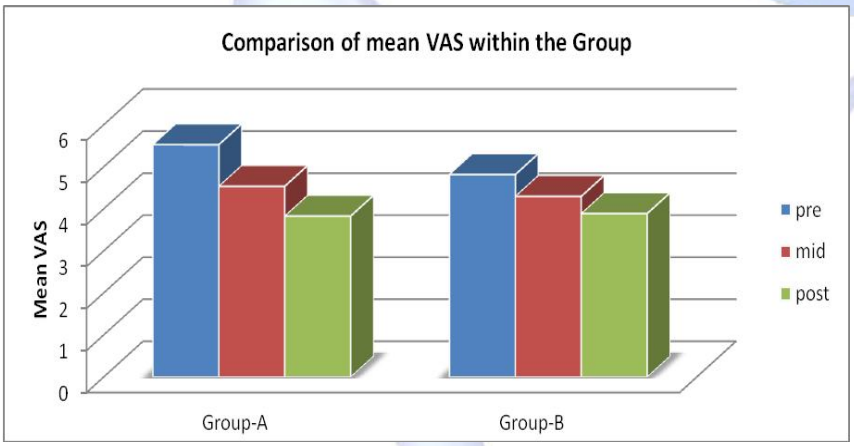

Fig 3: Comparison of mean VAS within group.

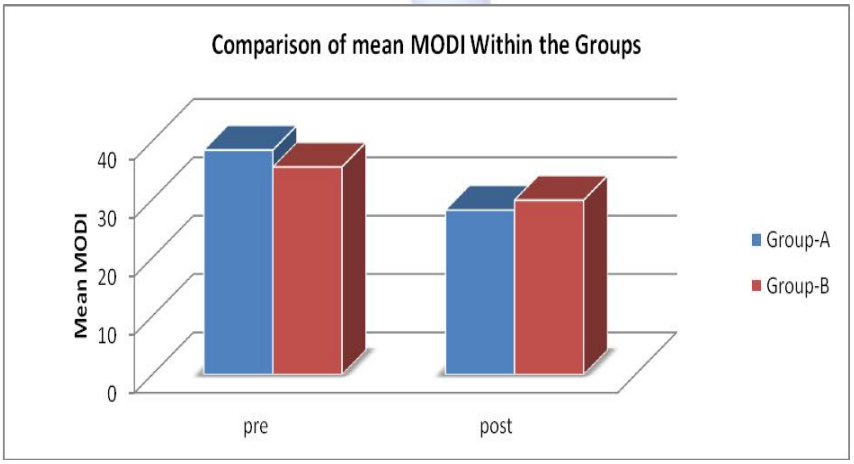

Fig 4: Fig 4: Comparison of mean MODI within the groups.

DISCUSSION

In the present study we investigated the effect of MET on pain and disability in subjects with chronic low back pain due to SIJ dysfunction. The pain of the subjects was assessed three times, pre intervention, mid intervention and post intervention through visual analogue scale and disability was assessed two times pre intervention and post intervention through MODI. The changes observed in this study are noteworthy, within group comparison showed significant changes in the improvement of pain and disability in both Group A and Group B but found no statistically significant difference when compared the readings of VAS and MODI between Group A (METand mobilisation) and group B(mobilisation) from 0 day to 9th day of intervention. Hence on the basis of our within group analysis of data we can say that group A showed better improvement on pain and disability but between group analysis revealed insignificant difference that shows none of the group is better than the other on improvement in pain and disability. The reduction in pain due to MET can be extrapolate on the basis of its neurophysiology ,as described by Chaitow that PIR refers to the subsequent reduction in tone of the agonist muscle after isometric contraction. This occurs due to stretch receptors called Golgi tendon organ that are located in the tendon of the agonist muscle. These receptors react to overstretching of the muscle by inhibiting further muscle contraction. In more technical terms, a strong muscle contraction against equal counterforce triggers the Golgi tendon organ. The afferent nerve impulse from the Golgi tendon organ enters the dorsal root of the spinal cord and meets with an inhibitory motor neurone.[34] Lewit confirm this observation that the increased tension of the affected muscles and the resulting pain and dysfunction are both relieved by restoring the full stretch length of the muscle.[41] One study done by Noelle M.Selkow et al supports the findings of our study by concluding that MET is effective in decreasing pain in patients with acute low back pain Another study done by Roberts BL where he described two techniques of soft tissue manipulation viz neuromuscular technique and MET and found that MET can reduce Pain , muscle rigidity and lengthen muscle fibres.[44] The effect of MET on disability is supported by the study of Capt. Eric Wilson where he reported that MET decreased disability and improved function in patients with acute low back pain.[43] Since MODI is based on low back pain with functional activities, so it makes sense that intervention resulting in pain reduction would also result in an improved MODI score. A study of Patil Praasci et al also concluded the also supported the efficacy of MET in reducing disability. The result of our study also indicating an improvement in pain and disability hence supporting the result of all above quoted studies.[45] But when between the group analyses were done the result revealed an insignificant improvement this could be due to the significant difference in mean values of pre VAS and MODI at the time of recruitment of subjects. As the mean value of VAS and MODI for group A was 5.53±1.2 and 38.5±10.26 and for group B was 4.8±1.49 and 35.6±10.53 respectively. Another explanation for this could be the reason stated by Roberts in his study that decreased pain and decreased muscle tension due to MET seemed to last only a few seconds to minutes indicating that for continued benefit, MET would have to be applied multiple times throughout the day[44] and in our study we gave single session of treatment in a day. Limitations of the study was the amount of resistance applied by patient cannot be quantified and patient were not allowed to deviate from their normal routines so this may had caused or aggravated their low back pain during treatment interval. Future research can be done with large sample size and for a longer duration of time and to see the effect of minimum session of MET required to treat the chronic low back pain due to SIJ dysfunction.

CONCLUSION

From the present study it can be concluded that MET and mobilisation are both effective in treating chronic low back pain due to sacroiliac joint dysfunction.

Conflicts of interest: None

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