Effect of Muscle Energy Technique on Pain And Function in Patients With Sacroiliac Dysfunction—Experimental Study

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ABSTRACT

Purpose of the study: To investigate the effect of Muscle energy technique (MET) on pain and function in patients with sacroiliac dysfunction.

Relevance: Sacroiliac joint is very commonly affected in low back patients. Many other techniques like Mulligan’s, Maitland have been used, but there is less literature available on Muscle Energy Technique. This study intends to study the effect of MET on SIJ dysfunction.

Participants: Forty patients (male 20, female 20) of sacroiliac dysfunction in the age group of 20 to 60 years.

Methods: The participants who fulfil inclusion criteria were participated in the study. All the participants received MET treatment for 3 times per week for 2 week. Numerical pain rating scale (NRS) and Oswestry disability index (ODI) were used as outcome measure to assess pain intensity and functional disability at baseline and at the end of two weeks.

Analysis: Unpaired and Paired t-test was used to compare the effect of MET in two groups. A level of significance was p<0.05.

Results: On comparing the value of NPRS and ODI score from baseline to end of 2 weeks, there was significant reduction of pain intensity and improvement of function noted in both the groups (p<0.05). Between group analysis revealed that younger patients showed significantly greater reduction of pain intensity and improvement of function as compare to older patients (p<0.05).

Conclusion: MET can be use effectively in the management of sacroiliac dysfunction. However, younger patient respondent better than older patients.

Implication: Prevalence of sacroiliac dysfunction is very high in low back pain patients. MET is found to be very effective in those patients even in a short duration of treatment protocol.

Key words: MET, Low back pain, Sacroiliac dysfunction, ODI

INTRODUCTION

Low back pain is 2nd most important cause of low back pain. The cause of low back pain is multifactorial physical, environmental and psychological as well. The most important reason of low back pain patient either present complainants slow progressively or it is insidious in origin post injury or trauma. Repeated
Micro trauma to the site of injury aggravates the symptoms thus needs to bear heavy medical cost and absenteeism over job.

Low back pain is sometimes age related like older subjects has been found more complains due to degenerative changes whereas weight is also a big concern to low back pain, equally subjects doing daily exercises are under low risk of low back pain. Most of the time frequent bending, twisting and bending activities causes severe back pain which may lead to joint dysfunction also, intermittent pain become the most common cause of job dissatisfaction and thus leads to stress and depression. The sacroiliac (SI) joint is the largest axial joint in the body. The SI joint is most often characterized as a large, auricular-shaped, diarthrodial synovial joint. Only the anterior third of the interface between the sacrum and ilium is a true synovial joint; the rest of the junction is comprised of an intricate set of ligamentous connections. Because of an absent or rudimentary posterior capsule, the SI ligamentous structure is more extensive dorsally, functioning as a connecting band between the sacrum and ilia. The main function of this ligamentous system is to limit motion in all planes of movement. The sacroiliac joint is also supported by a network of muscles that help to deliver regional muscular forces to the pelvic bones. The SI joints are designed primarily for stability. Their functions include the transmission and dissipation of trunkal loads to the lower extremities, limiting x-axis rotation, and facilitating parturition. It is generally accepted that 13% of low back pain is due to SI joint dysfunction. Movement and positional abnormalities of the SI joint. Pain in SI joint also referred to buttock, pelvis, and lower extremity which either can be treated with medicines and conservatively with treatment is like manual therapy, osteopathic and chiropractic from nearly 19th century. Usually it is claimed that patient with low back pain complains of pain with positional abnormality which can be successfully treated with manual therapy. Muscle energy technique is a procedure that involves voluntary contraction of muscle in a precisely controlled direction, at varying levels of intensity. It is generally used muscle energy to lengthen a shortened, contracted or spastic muscle, to strengthen a physiologically weakened muscle or group of muscles, to reduce localized oedema and relieve passive congestion, to mobilize an articulation with restricted mobility, trigger points, and myo-fascial state. MET is mostly indicated in case of malpositioning of a bony element for the restoration of joint motion associated with articular dysfunction. To study SI joint dysfunction faber patric and standing flexion test is performed and as per muscle energy technique type of SI joint pathology for example outflare and inflare diagnosed to decide MET techniques for pain relief.

**METHODOLOGY:**

Ethical approval was taken from institutional ethical committee. 40 patients (20 male and 20 female) between age group 20-60 yrs. were having unilateral low back pain were assessed with standing flexion test and iliosacral flare test whoever were showing positive for test were selected for study. Then pre and post treatment NPRS and Oswestry disability index score was obtained from patient

**Treatment Protocol:** Treatment was given for 3 days/2 week

**MET for iliac inflare:**- The patient is supine and the practitioner stands on the affected side, with the cephalad hand stabilizing the non-affected side ASIS and the caudal hand holding the ankle of the affected side. The affected side hip is flexed and abducted while full external rotation is introduced to the hip. The practitioner’s forearm aligns with the lower leg, elbow stabilizing the medial aspect of the knee. The patient is asked to lightly adduct the hip against the resistance offered by the restraining arm for 10 seconds while holding the breath. This process is repeated once or twice, at which time the leg is slowly straightened while abduction and external rotation of the hip are maintained. The leg is then returned to the table.

**MET for iliac outflare:**- The patient is supine and the practitioner is on the affected side, supinated cephalic hand under the patient’s buttocks with finger tips hooked into the sacral sulcus on the same side. The caudal hand holds the patient’s foot on the treated side, with the forearm resting along the medial calf/shin area as
the hand grasps the foot. The hip on the treatment side should be fully flexed and adducted and internally rotated, at which time the patient is asked to abduct the hip against resistance, using up to 50% of strength, for 10 seconds while holding the breath. Following this and complete relaxation, slack is taken out and the exercise repeated once or twice more. As the leg is taken into greater adduction and internal rotation, to take advantage of the release of tone following the isometric contraction the fingers in the sacral sulcus exert a traction towards the practitioner, effectively guiding the ilium into a more inflected position. After the final contraction, adduction and internal rotation are maintained as the leg is slowly returned to the table.

**DATA ANALYSIS:**

**Table 1: Comparison of Pre and Post NPRS Score**

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>T value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40</td>
<td>5.475</td>
<td>0.8767</td>
<td>14.694</td>
<td>0.000</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
<td>3.55</td>
<td>0.9044</td>
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<td></td>
</tr>
</tbody>
</table>

**Table 2: Comparison of Pre and Post Oswestry Score**

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>T value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40</td>
<td>16.4</td>
<td>3.96</td>
<td>18.941</td>
<td>0.000</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
<td>9.175</td>
<td>2.697</td>
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</tbody>
</table>

**Table 3: On comparison to age group pre and post NPRS (on activity) score**

<table>
<thead>
<tr>
<th>Group</th>
<th>Age</th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>T value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20-40</td>
<td>5.273</td>
<td>0.827</td>
<td>7.831</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.364</td>
<td>0.7895</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>41-60</td>
<td>5.722</td>
<td>0.8448</td>
<td>6.137</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.778</td>
<td>1.003</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table : 4 On comparison to age group pre and post NPRS (on rest) score**

<table>
<thead>
<tr>
<th>Group</th>
<th>Age</th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>T value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20-40</td>
<td>2.364</td>
<td>0.827</td>
<td>4.648</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.273</td>
<td>0.7895</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>41-60</td>
<td>2.722</td>
<td>0.5745</td>
<td>5.005</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.667</td>
<td>0.686</td>
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<td></td>
</tr>
</tbody>
</table>

**Table :5 On comparison to age group pre and post Oswestry score**

<table>
<thead>
<tr>
<th>Group</th>
<th>Age</th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>T value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20-40</td>
<td>15.09</td>
<td>3.308</td>
<td>8.190</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>7.955</td>
<td>2.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>41-60</td>
<td>18</td>
<td>4.187</td>
<td>6.512</td>
<td>0.000</td>
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<tr>
<td></td>
<td></td>
<td>10.67</td>
<td>2.301</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**RESULT:**

On comparison of NPRS t value is 14.694 and p was 0.000 similarly ODI score shows t value 18.941 and p is 0.000 which is statistically significant.

On comparison of NPRS between two age group 20-40 t value was 4.648 and p is 0.000 and 41-60 t values score was 5.005 and p was 0.000 which is statistically significant similarly ODI score for age group 20-
40 age group shows t value 8.190 and p was 0.000 likewise age group 41-60 shows t value 6.512 and p was 0.000 which is statistically significant similarly

**DISCUSSION:**

Muscle energy technique is used to lengthen a shorted, contracted or spastic muscle, to strengthen a physiologically weakened muscle or group of muscles, to reduce localized edema and relieve passive congestion, to mobilize an articulation with restricted mobility, trigger points, and myofascial states.

When a muscle is isometrically contracted, its antagonist will be inhibited, and will demonstrate reduced tone immediately following this. Thus the antagonist of a shortened muscle, or group of muscles, may be isometrically contracted in order to achieve a degree of ease and additional movement potential in the shortened tissues.

The neurological effects of the loading of the Golgi tendon organs of a skeletal muscle by means of an isometric contraction, which produces a post isometric relaxation effect in that muscle. Shortening of muscle seems to be a self-perpetuating phenomenon which results from an over-reaction of the gamma-neuron system. It seems that the muscle is incapable of returning to a normal resting length as long as this continues. While the effective length of the muscle is thus shortened, it is nevertheless capable of shortening further.

The pain factor seems related to the muscle’s inability thereafter to be restored to its anatomically desirable length. The conclusion is that much joint restriction is a result of muscular tightness and shortening. The opposite may also apply where damage to the soft or hard tissues of a joint is a factor. In such cases the periarticular and osteoarthritic changes, all occur in degenerative conditions, these are the major limiting factor in joint restrictions.

The restriction which takes place as a result of tight, shortened muscles is usually accompanied by some degree of lengthening and weakening of the antagonists.

In the study we have seen that the post treatment results of NPRS is more reduced in the age group 20-40yrs where the difference between Average Pre Rx and Average Post Rx is 2.05 compared to 40-60yrs where average post-Rx difference is 1.89 and p value was 0.000. Similarly “Oswestry disability index” shows post treatment results were more effective in the age group 20-40yrs where the difference between average Pre Rx and average Post Rx is 8.23 as compared to 40-60yrs where the average post Rx difference is 7.84 where p was 0.000 which is statistically significant. This shows we should include Muscle energy technique in the treatment of SI joint dysfunction for immediate relief which shows a drastic results in patients.

**CONCLUSION:**

MET is effective in SIJ dysfunction in respect with the type of dysfunction technique like MET for inflare and outflare dysfunction should be decided.

**Conflict of Interest:** NONE

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