

Effect of Hot Moist Pack and Muscle Energy Technique in Subjects with Sacro-Iliac Joint Dysfunction

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Abstract: Introduction: Sacroiliac joint dysfunction is reversible decreased mobility of the joint, the result of articular causes. One of the Most common source of low back pain is Sacroiliac joint dysfunction. Objectives: To determine the effect of HMP and MET in subjects with sacroiliac joint dysfunction and To compare the effect of (HMP and MET) and conventional therapy in patients with Sacroiliac joint dysfunction. Conclusion: 34 subjects of age group between 20- 45 years, having sacroiliac joint dysfunction were recruited. They were allocated into 2 groups and treated with HMP, MET, core muscle strengthening and general mobility exercises for 10 days. Assessment was done on 1st day pre-treatment and 10th day post treatment; pre and post intervention outcomes were measured using VAS, MODI And spinal ROM using inch tape. Result: Both the groups showed improvement but there was significant improvement in VAS, MODI and extension ROM of lumbar spine in group treated with HMP and MET. Conclusion: HMP and MET in combination are effective in management of sacroiliac joint dysfunction.

Keywords: SIJ Dysfunction, HMP, MET, VAS and MODI, ROM

1. Introduction

Most common source of low back pain is Sacroiliac joint dysfunction. A condition presumed to be caused by acquired mechanical instability, with no history of major trauma, which leads to either fixed subluxation or hyper mobility of the joint ^(1,2). Prevalence of Sacroiliac joint dysfunction is 13% to 30% with low back pain ^(3,4). Sacroiliac joint dysfunction is reversible decreased mobility of the joint, the result of articular causes⁽⁵⁾. Low Back Pain affects 70-85% of adults atleast once in their lifetime ⁽⁶⁾.

2. Review of Literature

- 1) Shiby Varghese et al.: A study on the effectiveness of muscle energy technique as compared to manipulation therapy in chronic low back pain. *International Journal of Latest Research in Science and Technology*:2012, vol.1; issue2, pageNo.:D214-D217. Conducted the study on the effectiveness of muscle energy technique as compared to manipulation therapy in chronic low back pain and concluded that MET is as effective as manipulation in chronic low back pain. The results showed that MET is as effective as manipulation in chronic low back pain.
- 2) James M. Mielewski et al: Muscle energy technique following low back pain and SIJ dysfunction: case report; pty 768, May 2009. conducted the study on Muscle energy technique following low back pain and SIJ dysfunction and concluded that combined use of MET, therapeutic exercise, TENS, hot pack, cold packs and soft tissue mobilization appeared to reduce pain, increase strength, increase ROM and improve overall function following SIJD.

3. Material and Methodology

Subjects who diagnosed as SIJD were selected. Further they were screened clinically using various tests and diagnosis and were put in either of the groups Group A (HMP and core muscle strengthening) and Group B (HMP and MET) by Convenient sampling. Before proceeding to intervention a written consent was taken from subject. Ethical clearance was obtained from university's institutional review board. Inclusion criteria were both male and female, who are willing to participate in study, Age between 20-45 years with presentation of anterior rotational dysfunction and in-flare. Exclusion criteria were subject with Fracture, Dislocations & inflammatory pathology.

4. Outcome Measure

Subjects in both the Groups were evaluated pre and post treatment program using VAS, MODI and Range of Motion.

4.1 VAS

VAS is used to measure the quantity of pain.

4.2 MODI

MODI is used to find out the amount of disability.

4.3 ROM

ROM of lumbar spine is taken by modified schobers test for flexion and extension by inch tape and inch tape to measure side flexion.

5. Statistical Analyses

Statistical analysis for the present study was done by using the INSTAT. Various statistical measures such as Mann Whitney test, Wilcoxon matched pair test, Paired 't' test and Unpaired 't' test were used for this purpose. Intra Group comparison (within Group) was analyzed statistically using Wilcoxon matched pairs test for VAS Scale, MODI Score inter Group comparison (between Group) was analyzed statistically using Mann Whitney test and ROM Score assessment was statistically analyzed by using paired 't' test and unpaired 't' test. Probability values less than 0.05 were considered statistically significant and probability values less than 0.0001 were considered statistically extremely significant.

6. Results

1. VAS:

Table 6.1: Comparison of pre - values of VAS

Group	Mean \pm SD	Median
A	6.8 \pm 1.021	7.0
B	6.3 \pm 1.743	6.5

In the present study pre-interventional mean and SD of VAS was 6.8 \pm 1.021 in group A and 6.3 \pm 1.743 in group B. Inter group analysis of VAS pre score was done by using unpaired t test. Pre interventional analysis showed no significant difference between Group A and Group B.

Table 6.2: Comparison of post - values of VAS

Group	Mean \pm SD	Median
A	6.54 \pm 1.633	4.6
B	3.11 \pm 1.694	2.7

In the present study pre-interventional mean and SD of VAS was 6.54 \pm 1.633 in group A and 3.11 \pm 1.694 in group B. Inter group analysis of VAS pre score was done by using unpaired t test. Post interventional analysis showed very significant difference between Group A and Group B with p value 0.0023

2. MODI:

Table 6.3: Comparison of pre - values of MODI

Group	Mean \pm SD	Median
A	30.6 \pm 6.451	33.000
B	33 \pm 6.255	35.000

In the present study pre-interventional mean and SD of MODI was 30.6 \pm 6.451 in group A and 33 \pm 6.255 in group B. Inter group analysis of MODI pre score was done by using unpaired t test. Pre interventional analysis showed no significant difference between Group A and Group B with p value 0.2884.

Table 6.4: Comparison of post - values of MODI.

Group	Mean \pm SD	Median
A	21.29 \pm 6.039	24.000
B	14.29 \pm 5.753	16.000

In the present study post-interventional mean and SD of MODI was 21.29 \pm 6.039 in group A and 14.29 \pm 5.753 in group B. Inter group analysis of MODI pre score was done by using unpaired t test. Post interventional analysis showed very significant difference between Group A and Group B with p value 0.0015.

Table 6.5: Comparisons of pre & post values of VAS within GROUP A & B

Group	Pre-treatment		Post-treatment		p' value
	Mean \pm SD	Median	Mean \pm SD	Median	
A	6.8764 \pm 1.021	7.000	4.644 \pm 0.8559	4.500	<0.0001
B	6.335 \pm 1.743	6.500	3.117 \pm 1.6943	2.700	<0.0001

The table also shows the comparison of mean and standard deviation of pre and post values of Group A and B.

In the Group A, the mean VAS score on pre intervention was 6.8764 \pm 1.021 which was reduced to a mean of 4.644 \pm 0.8559 postsessions. The P value by Paired t test was found to be <0.0001 which is extremely significant.

In Group B, the mean VAS score on pre intervention was 6.335 \pm 1.743 which was reduced to a mean of 3.117 \pm 1.6943 postintervention. The P value by Paired t test found to be <0.0001 which is extremely significant.

Table 6.6: Comparisons of pre & post values of MODI within GROUP A & B

Group	Pre-treatment		Post-treatment		p' value
	Mean \pm SD	Median	Mean \pm SD	Median	
A	30.647 \pm 6.451	33.000	21.294 \pm 6.039	24.000	<0.0001
B	33 \pm 6.255	35.000	14.29 \pm 5.753	16.000	<0.0001

The table also shows the comparison of mean and standard deviation of pre and post values of Group A and B.

In the Group A, the mean MODI score on pre intervention was 30.647 \pm 6.451 which was reduced to a mean of 21.294 \pm 6.039 postsessions. The P value by Paired t test was found to be <0.0001 which is extremely significant.

In Group B, the mean MODI score on pre intervention was 33 \pm 6.255 which was reduced to a mean of 14.29 \pm 5.753 postintervention. The P value by Paired t test found to be <0.0001 which is extremely significant.

3. ROM:

Table 6.7: Comparison of pre - values of flexion

Group	Mean \pm SD	Median
A	3.411 \pm 0.8915	3.4
B	3.623 \pm 0.6638	3.4

In the present study pre-interventional mean and SD of flexion ROM was 3.411 \pm 0.8915 in group A and 3.623 \pm 0.6638 in group B. Inter group analysis of Flexion ROM pre score was done by using unpaired t test. Pre interventional analysis showed no significant difference between Group A and Group B. P value was 0.4379 which showed not significant.

Table 6.8: Comparison of post - values of flexion

Group	Mean \pm SD	Median
A	6.076 \pm 1.2	5.7
B	5.647 \pm 0.84	5.5

In the present study post-interventional mean and SD of flexion ROM was 6.076 \pm 1.2 in group A and 5.647 \pm 0.84 in group B. Inter group analysis of Flexion ROM post score was done by using unpaired t test. Post interventional analysis showed no significant difference between Group A and Group B. P value was 0.02362 which showed not significant.

Table 6.9: Comparison of pre - values of extension

Group	Mean \pm SD	Median
A	2.44 \pm 0.569	2.3
B	2.37 \pm 0.523	2.0

In the present study pre-interventional mean and SD of extension ROM was 2.44 \pm 0.569 in group A and 2.37 \pm 0.523 in group B. Inter group analysis of extension ROM pre score was done by using unpaired t test. Pre interventional analysis showed no significant difference between Group A and Group B. P value was 0.7324 which showed not significant.

Table 6.10 Comparison of post-values of extension

Group	Mean \pm SD	Median
A	3.09 \pm 0.888	2.8
B	3.4 \pm 1.271	2.8

In the present study post-interventional mean and SD of extension ROM was 3.09 \pm 0.888 in group A and 3.4 \pm 1.271 in group B. Inter group analysis of extension ROM post score was done by using unpaired t test. Post interventional analysis showed no significant difference between Group A and Group B. P value was 0.4220 which showed not significant.

Table 6.11: Comparison of pre- values of side flexion to right

Group	Mean \pm SD	Median
A	11.52 \pm 1.58	11
B	11.05 \pm 1.37	11

In the present study pre-interventional mean and SD of side flexion ROM was 11.52 \pm 1.58 in group A and 11.05 \pm 1.37 in group B. Inter group analysis of side Flexion ROM pre score was done by using unpaired t test. Pre interventional analysis showed no significant difference between Group A and Group B. P value was 0.3628 which showed not significant.

Table 6.12: Comparison of post- values of side flexion to right

Group	Mean \pm SD	Median
A	15.4 \pm 1.12	16
B	14.87 \pm 1.08	15

In the present study post-interventional mean and SD of side flexion ROM to right was 15.4 \pm 1.12 in group A and 14.87 \pm 1.08 in group B. Inter group analysis of side Flexion ROM post score was done by using unpaired t test. Post interventional analysis showed no significant difference between Group A and Group B. P value was 0.1630 which showed not significant.

Table 6.13: Comparison of pre- values of side flexion to left

Group	Mean \pm SD	Median
A	12.11 \pm 1.40	12
B	11.76 \pm 1.20	12

In the present study pre-interventional mean and SD of side flexion ROM to left was 12.11 \pm 1.40 in group A and 11.76 \pm 1.20 in group B. Inter group analysis of side Flexion ROM pre score was done by using unpaired t test. Pre interventional analysis showed no significant difference between Group A and Group B. P value was 0.4376 which showed not significant.

Table 6.14: Comparison of post- values of side flexion to left

Group	Mean \pm SD	Median
A	15.41 \pm 1.873	15
B	15.47 \pm 1.231	15

In the present study pre-interventional mean and SD of side flexion ROM to left was 15.41 \pm 1.873 in group A and 15.47 \pm 1.231 in group B. Inter group analysis of side Flexion ROM pre score was done by using unpaired t test. Pre interventional analysis showed no significant difference between Group A and Group B. P value was 0.9145 which showed not significant.

Table 6.15: Comparisons of pre & post values of flexion ROM within GROUP A & B

Group	Pre-treatment		Post-treatment		'p' value
	Mean \pm SD	Median	Mean \pm SD	Median	
A	3.41 \pm 0.89	3.4	6.07 \pm 1.2	5.7	<0.0001
B	3.62 \pm 0.66	3.4	5.64 \pm 0.84	5.5	<0.0001

The table also shows the comparison of mean and standard deviation of pre and post values of Group A and B.

In the Group A, the mean flexion range of motion score on pre intervention was 3.41 \pm 0.89 which was increased to a mean of 6.07 \pm 1.2 post sessions. The P value by Paired t test was found to be <0.0001 which is extremely significant. In Group B, the mean flexion range of motion score on pre intervention was 3.62 \pm 0.66 which was increased to a mean of 5.64 \pm 0.84 postintervention. The P value by Paired t test found to be <0.0001 which is extremely significant.

Table 6.16: Comparisons of pre & post values of extension ROM within GROUP A & B

Group	Pre-treatment		Post-treatment		'p' value
	Mean \pm SD	Median	Mean \pm SD	Median	
A	2.44 \pm 0.5691	2.3	3.09 \pm 0.88	2.8	<0.0014
B	2.37 \pm 0.523	2.0	3.4 \pm 1.27	2.8	<0.0001

The table also shows the comparison of mean and standard deviation of pre and post values of Group A and B. In the Group A, the mean extension range of motion score on pre intervention was 2.44 \pm 0.5691 which was increased to a mean of 3.09 \pm 0.88 postsessions. The P value by Paired t test was found to be <0.0014 which is very significant.

In Group B, the mean extension range of motion score on pre intervention was 2.37 \pm 0.523 which was increased to a mean of 3.4 \pm 1.27 postintervention. The P value by Paired t test found to be <0.0001 which is extremely significant.

7. Discussions

Sacroiliac joint dysfunction is reversible decreased mobility of the joint; the result of articular causes⁽⁵⁾. Most common source of low back pain is Sacroiliac joint dysfunction. A condition presumed to be caused by acquired mechanical instability, with no history of major trauma, which leads to either fixed subluxation or hyper mobility of the joint^(1,2). In spite of various therapeutic approaches, there exists a paucity of literature, thus there is a need of appropriate form of regimen which will aid in treatment in sacroiliac joint dysfunction. This study is conducted in order to determine the additional effects of HMP and muscle energy technique on recovery duration and long term effectiveness.

The total numbers of participants included in this study were 34 out of which 15 were males and 19 were females. Group A consisted of 8 males and 9 females and group B consisted of 7 males and 10 females.

Out of 34 subjects 23 had left side affected out of which and 11 had right side affected out of which group A had 9 left and 8 right side affected. Group B had 14 left and 3 right side affected.

Wilcoxon matched pairs test was used to analyse the effect of conservative treatment on pain, disability and range of motion. Which showed significant reduction in pain ($p < 0.0001$), disability (MODI) ($p < 0.0001$) and range of motion of flexion ($p < 0.0001$), extension ($p < 0.0014$), side flexion to right ($p < 0.0001$), side flexion to left ($p < 0.0001$).

Wilcoxon matched pairs test was used to analyse the effect of HMP and MET treatment on pain, disability and range of motion. Which showed significant reduction in pain ($p < 0.0001$), disability (MODI) ($p < 0.0001$) and range of motion of flexion ($p < 0.0001$), extension ($p < 0.0001$), side flexion to right ($p < 0.0001$), side flexion to left ($p < 0.0001$).

Comparison of pain, disability and range of motion between two groups was done using Mann-Whitney test to find out effectiveness between two groups.

The statistical analysis revealed that there was a significant difference in pain and disability in both the groups. The group B was more effective in reducing pain, disability and increasing extension range of motion. Flexion range of motion, side flexion to left and side flexion to right where statistically similar there was no difference between group A and group B.

Hence above results showed that subjects treated with HMP and MET showed better results than the conservative treatment. MET not only increases ROM of joints but also increases extensibility of muscle by means of a mechanism expressed as "increased tolerance to stretch". Hot moist pack and MET can be useful in alleviating sacroiliac joint dysfunction in terms of pain, increase in lumbar ROM, and reduce disability. MET is a technique by which correction of joint alignment occurs which helps in reducing pain.

Thermo therapy should always be used prior mobilization and MET is a form of mobilization. Hot moist packs relieve pain, relaxes muscles by vasodilation.

Studies have shown that MET and Mobilization both are equally effective in relieving pain, disability and improving range of motion. The force of mobilization can cause further injury to avoid it, the only technique which has no side effect is core muscle strengthening and MET. This is why I have compared core muscle strengthening and MET. Results has shown improvement by both treatment but statistically MET has shown more effect.

8. Conclusions

In conclusion, the present study provided evidence to support the use of hot moist packs and muscle energy technique for sacroiliac joint dysfunction. MET not only increases ROM of joints but also increases extensibility of muscle. Hot moist pack and MET can be useful in alleviating sacroiliac joint dysfunction in terms of pain, increase in lumbar ROM, and reduce disability.

9. Future Scope

Studies with long term follow up are recommended for generalized result. In future studies other type of dysfunctions such as out-flare, posterior rotational dysfunction, upslip & down slip can be done.

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