

EFFECTIVENESS OF MAITLAND MOBILIZATION AND MUSCLE ENERGY TECHNIQUE WITH CORE MUSCLE STRENGTHENING EXERCISES IN THE TREATMENT OF SACROILIAC JOINT DYSFUNCTION

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Introduction

Goldthwaite and Osgood indicated the sacro-iliac joint (SIJ) as a probable cause of low backache in 1905, but it was generally disregarded since Mixter and Barr identified the disc between the vertebrae as the primary culprit in back discomfort in 1934. There is proof that this joint's malfunction could cause discomfort to travel down the identical path as the sciatic nerve, much like a bulging lumbar spinal disc (1). The Sacroiliac (SI) joint (SIJ) dysfunction pain usually occurs at the region of base of spine at the affected side (low back) and Gluteal/Buttock area that may radiate to proximal thigh till knee. It is usually caused by either excessive movement (hypermobility) and decreased movement (hypo mobility) at a joint (2). Walking and gait can also be disturbed in subjects with low back pain and hip pathology such as sacroiliac joint dysfunction. SIJD affects the alignment of pelvis i.e. anterior pelvic tilt and posterior pelvic tilt according to the condition that increases during standing and stance phase of gait cycle. Bilateral SIJ pain make the subject tread by slow speediness and take short footsteps whereas subjects with one side SIJ pain can root minor frontward flexion of the physique towards unaffected side (3). Lower backache presently is among the most commonly found muscular and skeletal disorders. to which a reported lifetime prevails up to 90% in working age group (4). The cause of LBP is usually found in lesion of the discs or the facet joints at the L4-L5 and L5-S1 levels but almost 50% of the LBP patients are without disco genic pain into the lower limbs (5). Prevalence of SIJD varies considerably anywhere between 10%-53% of the patients with LBP and about 20% of

asymptomatic adults (6). With the enhancement of industry and technology the comfort level has been increased. The drawback of these consequences resulting in increased body weight which in turn leads to less physical strength (7). They provide the safety of the L5-S1 segment movement by the help of their limited movement and powerful ligaments of L5-S1 area. SI joints have more flexible support to the upper body with the help of its unique architecture of tough ligament, which helps it to permit more stability (8).

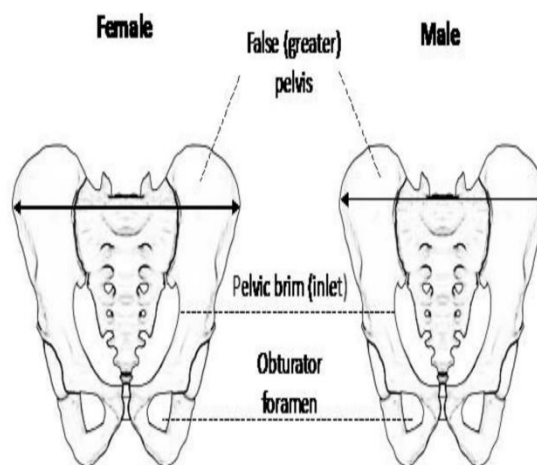


Figure 1: Sacro-iliac joint of woman and man (9)

To reduce muscle guarding and pain phenomenon neurophysiological and mechanical effect is gained by joint Mobilization (10). SIJ mobilization is another method of physical therapy. To date, a few studies had evaluated the effects of SIJ mobilization on surrounding muscle length and strength (11). It has been observed that MET play significant role in decreasing pain of SIJ Dysfunction. (12). By the activation of joint sensory receptors, Maitland mobilisation method is intended to help those suffering from lumbar biomechanical discomfort (13). The current study was approved to evaluate the effectiveness of Maitland lumbar mobilisation and

muscular energy technique on discomfort threshold, standard of living, and gait characteristics among individuals who suffered from persistent lower back discomfort. Both of these treatments have been shown to be effective in treating musculoskeletal discomfort.

As a result of this, this study was carried out.

Methodology

Study Design

Randomized Clinical Trial

Sampling Method

Purposive Sampling Method

Setting

Patients were selected from Outdoor Patient

Department of following hospitals

- Allied Hospital, Faisalabad
- Aziz Fatima Hospital, Faisalabad
- Madinah Teaching Hospital, Faisalabad

Duration

The study was completed within the period of 4 months after the approval of synopsis

Interventional Period

4 weeks consisting of 3 sessions per week of total 12 sessions on alternative days per week

Sample Size

Sample size was 38 subjects by using the Formula by Charan and Biswas in 2013. The formula was used to calculate sample size (14).

Sample size = $2 S.D^2 (Z_{\alpha/2} + Z_{\beta})^2 / d^2$

By taking visual analogue scale as outcome measure of interest, data was taken from

Mean Group of A = 4.644

Mean group B = 3.117 S.D=16943

$Z_{\alpha/2}$ type I error of 5%= 1.96

Z_{β} keeping power of study at 80 % = 0.84

Keeping allocation ratio 1:1

Sample size= 19 per group

According to the formula, the estimated number of participants to sample for both groups was thirty eight.

Selection Criteria

Inclusion criteria

- Age 25-40 years
- Both genders (males and females)
- Low back pain and gluteal\buttock pain from last 3 months and more that may radiate towards proximal posterior thigh till knee
- Pain and tenderness at sacroiliac joint
- Having pain both unilaterally or bilaterally
- Oswestry disability index score above 20% but below 80% (15).
- Minimum 3 pain level on VAS (16).
- Cadence less than 115 steps per minute (17-18)
- Walking speed less than 82 meters per minute or less than 1.4m/sec
- 3 or more positive pain provocative test of sacro-iliac dysfunction
 - Positive Compression exam
 - Positive Ganslene exam
 - Positive Thigh trust exam
 - Positive Standing flexion exam
- Positive Gillet or stork exam

Exclusion Criteria

- Radiating pain below the knee
- Surgery or trauma to hip, knee and ankle within 3 months prior to study¹⁹

- Vertebral Fracture
- Diagnosed Disc herniation
- Nerve root irritation
- Diagnosed Inflammatory diseases of vertebral column (ankylosing spondylitis and rheumatoid arthritis)
- Diagnosed Tumors or Malignancy²⁰
- Pregnant females²¹
- Hypermobility of hip
- Diagnosed neurological problems like loss of reflexes and lower extremity muscle weakness
- Accident or orthopedic surgery history related to spine, SIJ, or hip joints within three months before the study²²
- Patients who have undergone treatment for the same condition in the preceding three months, regardless of the modality
- Patients who are unable to cooperate in the study²³

Data Collection Tools

Visual Analogue Scale (VAS)

VAS had been in use for measuring pain since 1920s. The scale has 0-10 score. The most left side is with “no pain” and most right side is with “worst pain”. The pain is measured from the most left point to most right point. Patient chooses a number form 0-10 according to what he/she thinks about his/her pain .

Oswestry Disability Index (ODI)

The ODI is a self-assessment survey which measure “back specific functions” and it has ten items scale. Each item has six categories of responses. Each item has score from 0-5, greater marks is called poorer and which is shown into a 0-100 scale. The ten items are pain intensity, lifting, sleeping, standing, personal car,

sitting, social life, walking, work and travelling²⁴. There is a maximum score of 5 possible points, with each of the 10 questions receiving a score between 0 and 5. After that, the entire score is multiplied by 2 to get the percentage equivalent of the score²⁵. Patients who have marks between 0 and 2 they have Negligible Debility, patients who lies in range of 2 and 4 have Moderate Disability, patients who lies in range of 4 and 6 have Severe Disability, patients in range of 6 and 8 are crippled and patients who lies in range 8-10 are bed bound .

Data Collection Procedure

For inclusion in study subjects with low back pain were evaluated by SIJ Dysfunction tests. Subjects whose 3 or more provoking examinations were positive were considered in study. After signing consent form participants were allocated to the group A and Group B by using computerized generated randomization. Discomfort and debility in participants were measured by VAS, ODI before and after the 4 weeks of treatment period. Pain was measured pre and post treatment of each session and disability and gait were measured at baseline before treatment session and after the treatment session. Gait parameters were evaluated by a bout of walking in 1 minute (68). During the interventional phase of four weeks, both groups received same baseline treatment of moist hot pack for 15 minutes and strengthening exercises. Group A received Maitland Mobilization while Group B received Maitland Mobilization with mMETs for 3 alternative days in 4 weeks (total 12 sessions).

Diagnosis

The following tests were used for the diagnosis of SIJ Dysfunction: Compression test, Ganslene test, the

thigh trust test, the standing forward flexion test and the Gillet test.

Treatment plan

Hot pack for 15 minutes prior to application of respective technique to reduce pain and muscle spasm + strengthening exercises after Muscle Energy Technique and Maitland Mobilization

Ethical Consideration

A data collection letter was obtained from the university. Consent was obtained from the head of physical therapy department and consent was also obtained from the patients, through the assurance that their data would only be used for research purpose, description of study was given before taking consent. Provision of all information to the patients provided regarding this study in effective way like what would be the benefit of treatment and no harm to them regarding this treatment.

Results

This was a randomized control trial performed on a convenient sample of 38 participants having complain of lower backache with SIJD reporting in Allied hospital, Faisalabad, Aziz Fatima Hospital, Faisalabad and Madinah teaching hospital Faisalabad. Subject were involved in the research after they passed the inclusion criteria and also who resulted positive in 3 or more sacroiliac joint provocative test. Subjects were randomly allocated into 2 treatment groups which were Maitland Mobilization group as group A and METs & Maitland Mobilization group as group B. All groups were given treatment in twelve sessions on alternative days, overall consisting on 12

days (3 days a week). Data which was collected from the subjects consisted of sacroiliac joint dysfunction pain on VAS, ODI, Cadence and Walking speed. Primary and secondary outcomes were taken pre and post treatment sessions. Only visual analogue scale values were taken pre-treatment session and after every treatment session consisting of total 13 measurements. Cadence and walking speed were recorded utilising a pedometer. VAS score, ODI lower backache survey score, cadence and walking speed score were analyzed using parametric tests because of normality p value >0.05 . The tests used were independent t test and paired t test for Oswestry low back pain questionnaire score, cadence and walking speed. For visual analogue scale, repeated measures ANOVA and independent t -test was used. SPSS version 25 was used for arithmetical examination of data by doing within group and between group analysis using descriptive and inferential statistical analysis techniques. Descriptive statistics was used for result presentation. After analyzing and getting results conclusion were made.

Table 1 above shows that 38 participants were included in the research then they were allotted group by randomisation to two study groups. Descriptive statistics was applied by comparing groups for analysis of mean age in both groups as shown in above table. Table is showing the mean age of participants which is 34.47 ± 4.51 in group A and 32.58 ± 4.36 in group B. Minimum age is 27 and maximum age is 40 in group A. Minimum age is 25 and maximum age is 40 in group B. **Table 2** above shows frequency of gender. Table is showing the gender of participants which is 18 males (47.4%) and 20 females (52.6%).

Table 3 above shows Shapiro-wilk statistical test that

indicates that the data is normally distributed in the Independent sample t test shows significant difference in table of inferential statistics. As p-value of Pre values of post Oswestry disability Index Score in both visual analogue scale for group A is 0.417 and for groups as p value<0.05 and alternative hypothesis is group B is 0.417. As p-value is greater than 0.05 it acknowledged.

meets the criterion for parametric test i.e. repeated measures ANOVA for intra-group examination and independent T-test for inter-group analysis, since the data is normally distributed.

Table 4 above shows that the mean pain level decreased with each subsequent session. The baseline mean VAS score of group A was 5.63 ± 1.31 and the final 12th session mean VAS score was 1.25 ± 0.856 . The baseline mean VAS score of group B was 5.88 ± 1.22 and the final 12th session mean VAS score was 0.71 ± 0.59 . Independent sample t test shows significant difference in values of VAS scores at last session in both groups as p value<0.05 and from mean value it is apparent that group B showed more improvement than group A. As the p-value is less than 0.05 in last session, alternative hypothesis is acknowledged.

Table 5 above shows that for group analysis paired sample test was applied to find out difference within the groups. The pre and post Oswestry disability index mean values for group A are 51.63 ± 5.48 and 19.50 ± 5.68 , respectively. According to the mean values, group A showed improvement in Oswestry disability index score after 12 sessions. As p-value<0.05 so alternate hypothesis is acknowledged.

Table 6 above shows that the pre and post Oswestry disability index mean values for group A are 51.68 ± 5.86 and 19.50 ± 5.68 , respectively. The pre and post Oswestry disability index mean values for group B are 51.47 ± 5.57 and 11.18 ± 2.65 , respectively. It shows that group B showed more improvement than group A.

Table 7 above shows that the pre and post Cadence mean values for group A are 60.89 ± 7.25 and 78.38 ± 10.98 , respectively. The pre and post Cadence mean values for group B are 61.32 ± 8.74 and 84.76 ± 11.79 , respectively. It shows that group B showed more improvement than group A. Independent sample t test shows insignificant difference in values of post Cadence Score in both groups as p value>0.05 and null hypothesis is acknowledged.

Discussion

This was an RCT performed on a convenient sample of 38 participants having complain of LBP with SIJD reporting in Allied hospital, Faisalabad, Aziz Fatima Hospital, Faisalabad and Madinah teaching hospital Faisalabad. Subject were encompassed in the research after they passed the inclusion standards and also who resulted positive in 3 or more sacroiliac joint provocative test. Subjects were randomly allocated into 2 treatment groups which were Maitland Mobilization group as group A and METs & Maitland Mobilization group as group B. All groups were given treatment in twelve sessions on alternative days, overall consisting on 12 days (3 days a week). Data which was collected from the subjects consisted of sacroiliac joint dysfunction pain on VAS, Oswestry disability index (ODI), Cadence and Walking speed. Primary and secondary outcomes were taken pre and post treatment sessions. Only visual analogue scale values were taken pre-treatment session and after

every treatment session consisting of total 13 measurements. Cadence and walking speed were recorded utilising a pedometer. VAS score, MODI lower backache form score, cadence and walking speed score were analyzed using parametric tests because of normality p value >0.05 . The tests used were independent t test and paired t test for modified Oswestry low back pain questionnaire score, cadence and walking speed. For visual analogue scale, repeated measures ANOVA and independent t -test was used. SPSS version 25 was used for numerical examination of data by doing within group and between group analysis using descriptive and inferential statistical analysis techniques. After analyzing and getting results conclusion were made. Both groups showed improvement in sacroiliac joint pain. Significant mean difference was seen in both outcome measures with group B having muscle energy techniques and Maitland mobilization, showing more improvement in sacroiliac joint pain and quality of life than group A with Maitland mobilization. Within and between groups, four basic study parameters were examined. These four basic study parameters are sacroiliac joint pain on VAS, Oswestry disability index (ODI), cadence and walking speed. Within and between groups, four basic study parameters were examined. These four basic study parameters are sacroiliac joint pain on VAS, Oswestry disability index (ODI), cadence and walking speed. One variety of lumbar backache is discomfort in the pelvic girdle region. Coupled with the SIJ and the nearby muscular & skeletal and ligamentous tissues, discomfort in the pelvic girdle is a collection of painful muscular and skeletal

conditions. SIJ dysfunctions, which can occur in up to sixty-five percent of people with lower backache, are among the most common causes of pain in these individuals. It is still a significant challenge because it is thought to be the main source of back discomfort²⁶

Conclusion

It is concluded from the current study that Maitland mobilization in combination with muscle energy technique and Maitland mobilization alone are both effective to treat sacroiliac joint dysfunction but combination of Maitland mobilization and muscle energy technique showed better results in the improvement of symptoms and standards of living

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