



EFFECT OF MUSCLE ENERGY TECHNIQUE AND MULLIGAN MOBILIZATION IN SACROILIAC JOINT DYSFUNCTION

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ABSTRACT

Background: The purpose of this study was to assess the effectiveness of muscle energy technique and mulligan mobilization in sacroiliac joint dysfunction

Method: 30 subjects with sacroiliac joint dysfunction were included in this study. The age between 20-45 years. Subjects were selected by simple random sampling method and allocated into 2 groups, for group A muscle energy technique, hot moist pack and mulligan taping and for group B muscle energy technique, hot moist pack, mulligan mobilization and mulligan taping for sacroiliac joint. Before and after the treatment subjects were assessed and analysed with visual analogue scale for pain, Range of motion with inch tape for lumbar spine and modified Oswestry low back pain questionnaire for disability.

Mulligan taping and Hot moist pack were used as baseline treatment.

Result: Statistical analysis was performed using paired t-test and unpaired t-test. Intra group comparison (within group) was analysed statistically using paired t-test for VAS, MODI and ROM using inch tape. This shows there is significant effect in Group A similarly there is extremely significant difference in Group B. But in intergroup comparison (between groups) was analysed statistically using unpaired t-test. This shows that pre intervention there was no significant difference in VAS, MODI and ROM. While on comparing post interventional values, the results between two groups using unpaired t-test revealed that there was statistically extremely significant difference seen in VAS, MODI and ROM.

Conclusion: From this study, it can be concluded that there was extremely significant improvement in subjects who underwent muscle energy technique, hot moist pack, mulligan mobilization and mulligan taping (Group B) statistically and clinically. Overall there was extremely significant difference found between the groups. Hence this study accepts the alternate hypothesis (H₁).

KEYWORDS : Sacroiliac joint dysfunction, Muscle energy technique, Mulligan mobilization and Mulligan Taping.

Introduction

The pelvis is made up of three bones i.e two paired ilia and a sacrum and three joints i.e two sacroiliac joints and one pubic symphysis^(1,2). They are held together by strong ligaments which does not allow much movement⁽¹⁾. The SIJ receive 60% of the total body weight (Sniiders et al 1993). Muscles attached to pelvis are Internal Oblique, External Oblique, transverses Abdominis and rectus Abdominis attached superiorly on the pelvis. Quadratus Lumborum, Thoracolumbar fascia, Multifidus and erector spinae attached posteriorly^(3,1,4). Hip and thigh muscles such as gluteus maximus attach laterally, latissimus dorsi inferiorly, psoas, and piriformis muscles cross anteriorly to the SIJ^(3,1,4). Change in length of piriformis muscle is seen in sacroiliac joint dysfunction⁽⁴⁾. Low Back Pain affects 70-85% of adults atleast once in their lifetime⁽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^(6, 7). Prevalence of Sacroiliac joint dysfunction is 13% to 30% with low back pain^(8,9). Misalignment of this joint can cause the pain associated with SIJ dysfunction. Referral of SIJ pain has been noted to be located in the following areas: lower lumbar spine, buttock, groin, medial, lateral, posterior thigh, and sometime the calf⁽¹⁰⁾. According to Hungerford et al. those who have SIJ dysfunction show a reduced ability to initiate the recruitment of the Internal oblique, multifidus, and gluteus maximus muscles during gait⁽¹¹⁾. Three common presentations account for some 90-95% of those found to be out of alignment.

These presentations are:

1. 'Rotational malalignment' (80-85%)
2. Pelvic 'flare' - innominate 'outflare'/'inflare' (40-50%), and
3. 'upslip' (15-20%). downslip is rare.

Anterior dysfunction of sacroiliac joint is major factor in aetiology of idiopathic low back pain⁽¹²⁾. SI Joint pain is referred in following areas: lower lumbar spine, buttock, groin, medial, lateral and posterior thigh and sometimes even calf⁽¹³⁾.

Muscle energy technique:

Muscle energy techniques are soft tissue manipulation methods that incorporate precisely directed and controlled, patient initiated, isometric and/or isotonic contractions, designed to improve musculoskeletal function and reduce pain⁽¹⁵⁾.

For many years, MET has been advocated to treat muscle imbalances of the lumbopelvic region such as pelvis asymmetry. The theory behind MET suggests that technique is used to correct an asymmetry by targeting a contraction of the hamstring or the hip flexors on the painful side of the low back and moving the innominate in a corrected direction⁽¹⁶⁾.

Greenman, defined MET as manual medicine treatment procedure that involves the voluntary contraction of the subjects muscle in a precisely controlled direction, at varying levels of intensity, against a distinctly executed counterforce applied by the therapist⁽⁷⁾.

In 2003 Wilson found using MET and resistance exercises may benefit a patient greater than using neuromuscular re-education and resistance exercises to reduce low back pain and improve function.⁽¹⁷⁾

MET has been defined when the patient uses their force against the therapist's counterforce⁽¹⁵⁾. The therapist brings the area of treatment to a pain free end range barrier by taking up the slack of the available soft tissue⁽¹⁵⁾. Once the patient is brought to the pain free end range barrier the therapist will request the patient to use his/her muscles to resist or push back against the therapist. By knowing the anatomy, MET is used by placing the patient in a controlled and exact position, to allow a counterforce to be applied by the therapist, and the patient is responsible for the amount of force applied⁽⁴⁾. The force generated by the patient can be a muscle twitch, or a maximum muscle contraction⁽⁴⁾. MET has several uses that can help increase muscle strength, increase range of motion (ROM), and decrease edema.⁽²⁰⁾

Mulligan mobilization:

The mulligan concept of mobilization with movement (MWM) is a specific therapeutic intervention designed to couple accessory mobilization with physiological motion.⁽¹⁸⁾

The concept was developed by Brian mulligan in new zealand (1970's) on basis of clinical experiences and the influences of noted physical therapist Freddy Kaltborn, Geoff Maitland, Robin Mckenzie and Robert Elvey and Dr.James cyraix.

Mulligan experimented in clinical practice to develop his theory of MWM. The mulligan concept of manual therapy is based on the application of sustained accessory joint mobilization often in a weight-bearing position, which utilizes patient generated active or functional task through a specified range of joint movement (Vicenzino et al.2011).

As the use of mobilization with movement (MWM) techniques has increased, the number of studies analysing the efficacy of mulligan techniques has proliferated in the field of peripheral manual therapy.(paungmali et al.2003;Collins et al.2004;Desantis and Hasson,2006; vicenzio et al,2006;penso,2008; Teys et al.,2008; Amro et al.,2010;Tey et al.,2013).

MATERIALS AND METHODOLOGY

A experimental study was conducted at physiotherapy department of Krishna College of physiotherapy. A total 30 patients were equally divided into two groups using simple random sampling allocation (Group A and Group B). Group A was given Muscle energy technique, Hot moist pack and Mulligan taping. Group B were given Muscle energy technique, Hot moist pack, Mulligan taping and mulligan mobilization Patients were selected according to inclusion and exclusion criteria. Written informed consent was taken and whole study was explained to them. Inclusion criteria were as follows: 1) both male and female participants willing to participate in study. 2) Patient with age group 20-45 years. 3) Patients with diagnosis of sacroiliac joint dysfunction. Exclusion criteria were as follows: 1) Patients with osteoporosis. 2) Patients with inflammatory pathology 3) Patients with Hip fracture.

Group A -Treatment given:

- Muscle energy technique
- Hot moist pack
- Mulligan taping

Group B -Treatment given:

- Muscle energy technique
- Hot moist pack
- Mulligan taping
- Mulligan mobilization.

Mulligan taping and Hot moist pack were baseline treatment for both groups A and B.

STATISTICAL ANALYSIS

The data was entered into Microsoft Excel 2016.the data was analysed using instant software. Descriptive statistics were used to analyse baseline data for demographic data. Pre and Post treatment protocol was analysed using paired t test and unpaired t test.

Results:

30 subjects of Sacroiliac joint dysfunction meeting the inclusion criteria were included in this study. Following the data collection, the subjects were allotted into 2 groups, . group A muscle energy technique ,hot moist pack and mulligan taping and for group B muscle energy technique, hot moist pack ,mulligan mobilization and mulligan taping for sacroiliac joint. During 3times per week for 2 week protocol, 15 subject (7 males and 8female) were in group A, 15 subjects (5males and 10 female) were in group B, Treatment was given according to mentioned above for Group A and Group B.The descriptive analysis of the study is summarized in table 1. age distribution 2.comparison of VAS, 3.Comparison of MODI 4. Comparison of ROM with inchtape.

Table no. 1-Age distribution

| Groups | Mean Age (Yrs) ± SD |
|-----------|---------------------|
| Group (A) | 30.13 ± 6.20 |
| Group (B) | 26.6 ± 6.17 |

VAS: Visual analogue scale

| Groups | Pre-interventional Mean ± SD | Post-interventional Mean ± SD | P Value by paired t test |
|----------------------------|------------------------------|-------------------------------|--------------------------|
| Group (A) | 8.2 ± 0.86 | 5.1 ± 1.24 | <0.0001 |
| Group (B) | 7.86±1.060 | 2.26 ± 0.5936 | <0.0001 |
| P value by unpaired t test | 0.3528 | <0.0001 | |

MODI: Modified Oswestry disability index

| Groups | Pre-interventional Mean ± SD | Post-interventional Mean ± SD | P Value by paired t test |
|----------------------------|------------------------------|-------------------------------|--------------------------|
| Group (A) | 43.06 ± 6.36 | 34.2 ± 4.17 | <0.0001 |
| Group (B) | 44.4 ± 6.022 | 34.53 ± 3.719 | <0.0001 |
| P value by unpaired t test | 0.4893 | 0.8615 | |

ROM: Range of motion

| Groups | Pre-interventional Mean ± SD | Post-interventional Mean ± SD | P Value by paired t test |
|----------------------------|------------------------------|-------------------------------|--------------------------|
| Group (A) | 2.42 ± 0.5650 | 2.53 ± 0.5273 | 0.1425 |
| Group (B) | 2.75 ± 0.5817 | 3.06 ± 0.6057 | 0.0009 |
| P value by unpaired t test | 0.1300 | 0.0169 | |

Inter Group comparison (between Groups) was analyzed statistically using unpaired t test. This shows that pre intervention there was no statistically significant difference seen with P values for VAS was (<0.0001), MODI (0.4893), ROM Flexion(0.1300), Extension(0.0578). While on comparing the post interventional values, the results between the two Groups using unpaired test revealed that there was very significant difference seen with P value for VAS (<0.0001), MODI (0.8615) which is not significant, ROM flexion (0.01690 and extension (0.1717) both are not significant.

DISCUSSION

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^(6,7)

Reviewing various studies it was analyzed that the use of Interferential therapy, short wave diathermy, Mechanical traction, and surgical options were the lines of treatment routinely used for sacroiliac joint dysfunction.

This study was undertaken considering all the mentioned points and the aim of this study was to evaluate the effect of muscle energy technique and mulligan mobilization in sacroiliac joint dysfunction. Based on principal of muscle energy technique the patient voluntarily uses his muscles from a precisely controlled position in a specific direction, against a distinctly executed counterforce¹⁵

Advantages of muscle energy technique:

Use of muscle energy technique can improve both strength and endurance by increasing the flexibility of the muscles surrounding the joint. It is also beneficial in reducing localized swelling and increasing the restricted range of motion⁽¹⁴⁾

The study was carried out and the result was drawn by using VAS ,MODI and ROM score as the outcome measures.30 patients (12 Males and 18 Females),out of which 19 were Right and 11 were Left side affected, diagnosed as sacroiliac joint dysfunction. The age

Group was between 20–45 years. Study place was Krishna Hospital, Karad. Patients were evaluated and were divided into two Groups by simple random sampling. Group A Included 15 subjects treated with muscle energy technique, hot moist pack and mulligan taping. Group B included 15 subjects treated with muscle energy technique, mulligan mobilization, hot moist pack and mulligan taping.

A pre treatment outcome measure using VAS, MODI scale and ROM was done. The specific treatment protocol was followed 3 times per week for 2 weeks and outcome using VAS, MODI and ROM scale were documented accordingly. An exercise program was designed and a proper ergonomic advice was given.

Intra Group comparison (within Group) was analyzed statistically using paired t test for VAS, MODI and ROM Scale Scores, inter Group comparison (between Group) was analyzed statistically using unpaired t test.

Intra Group comparison (within Group) was analyzed statistically using paired t test for VAS and MODI and ROM Scale Scores. This shows that there is extremely significant difference of Group A VAS ($P < 0.0001$) and MODI ($P < 0.0001$) very significant difference and ROM flexion and extension ($P = 0.1425$, $P = 0.6631$) respectively which is not significant, of Group B VAS ($P < 0.0001$) and MODI ($P < 0.0001$) very significant difference and ROM flexion and extension ($P < 0.0001$, $P < 0.0001$) respectively which is extremely significant,

Inter Group comparison (between Groups) was analyzed statistically using unpaired t test. This shows that pre intervention there was no statistically significant difference seen with P values for VAS was (< 0.0001), MODI (0.4893), ROM Flexion (0.1300), Extension (0.0578). While on comparing the post interventional values, the results between the two Groups using unpaired test revealed that there was very significant difference seen with P value for VAS (< 0.0001), MODI (0.8615) which is not significant, ROM flexion (0.01690) and extension (0.1717) both are not significant.

In this study an attempt was made to analyze the effect of muscle energy technique and mulligan mobilization reducing pain and disability, improving functional status and increasing range of motion in sacroiliac joint dysfunction patients. This study was done to investigate the reduction of symptoms after application muscle energy technique along with mulligan mobilization in sacroiliac joint dysfunction and its post treatment evaluation in a standardized manner using VAS, MODI and ROM scale. The result shows extremely significant improvement with combination of muscle energy technique and mulligan mobilization as compared to individual techniques alone.

The result of current study shows that combination of Muscle energy technique and Mulligan mobilization has extremely significant effect over application of muscle energy technique alone in management of sacroiliac joint dysfunction both statistically and clinically.

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