"Effectiveness of Mulligan's Movement with Mobilization in the Rehabilitation of Sacro Iliac Joint Dysfunction"

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Abstract

Background: Sacroiliac joint dysfunction (SIJD), allude to the pain in the sacroiliac joint caused by partial subluxation or dislocation in a non-anatomically correct position due to hypermobility or hypomobility within the joint. Mobilization with movement is the manual therapy technique introduced by Brian Mulligan for the management of various musculoskeletal dysfunctions. They address the problems of movement pain and restriction and bring about a change at the time of delivery. Sacroiliac joint dysfunction is due to a positional fault and Brian Mulligan's mobilization with the movement has been found effective in correcting positional faults. Although there is evidence of Mulligan's mobilization on improvement in ROM, there is lacuna of strong evidence to supports the hypothesis, that a reversal of positional fault is the predominant mechanism for the action of mulligan's mobilization. As there is no evidence of the effect of Mulligan's mobilization in sacroiliac joint dysfunction this study has been undertaken.

Methods: 52 subjects were screened having age group of 18-60 years, both males and females having pain over the SIJ with referral to buttock, groin, posterior aspect of the thigh with or without history of fall, having tenderness over sacroiliac joint on palpation and having 5 positive pain provocation tests out of seven were included. Subjects with Acute trauma to low back, Presence of neurological signs such as numbness & amp; profound muscle weakness, Recent surgery on low back, Limb length discrepancies as it can affect the sacroiliac joint orientation, Inflammatory diseases like Ankylosing spondylitis, RA, Pregnancy, Fractures and other pathologies of unknown etiology and obese patients having indistinct osteal landmarks were excluded. 30 patients who fulfilled the screening criteria were included. Evaluation was done where chief complaints, HOPI, drug history was noted. The innominate bone inclination was measured with the help of pelvic inclinometer. Also baseline evaluation was done by Visual analogue scale (VAS) in SIJ pain and Oswestry low back ache disability index. These patients in Experimental Group were treated with mulligan's mobilization with offending movement for correcting positional fault of SIJ along with hot packs (15 minutes) and core stability exercises.

Results: Experimental Group and Control Group were compared statistically by using unpaired t test and the P value for pain was found to be p=0.072 (innominate tilt), p=0.016 (VAS), p=0.047 (Oswestry). The P value for

Received: 20- June -2023 Revised: 02- July -2023 Accepted: 15- August -2023 carryover effect was found to be p=0.064 (innominate tilt), p=0.005 (VAS), p=0.005 (oswestry) which is significant.

Conclusion: Mobilization with movement is effective in mitigating the positional fault at the SIJ, reducing the pain status of the patient thereby alleviating disability and return to activity.

Keywords: mobilization with movement, SIJD, innominate tilt, VAS, oswestry.

1. Introduction

A dysfunctional SI joint refers to the pain in sacroiliac joint caused due to partial dislocation or subluxation in a non-anatomically correct position due to hyper-mobility or hypo-mobility within the joint. The recent 'gold standard' in diagnosing sacroiliac joint pathologies is diagnostic nerve block procedure where anesthetic is inserted into the SIJ, under the guidance of fluoroscope. ^{[11][12]} Multi-test regimen is an well accepted clinical tool to predict SIJ pain when compared with gold standard. It is substantially reliable to be able to be used in a clinical setting ^{[11][17]}



2. Physiotherapeutic Treatment Options for SI Joint Dysfunction

Moist heat, Muscle energy techniques, core strengthening, postural restoration therapy exercises, postural cueing, proprioceptive neuromuscular facilitation, corset, belts or strapping for lumbar, cervical support pillows, stretching and aquatics, Brisk walking, Icing to reduce inflammation and relaxes muscles^{[5],} Core stability exercises – the contraction of the transverses abdominis influences the laxity of sacroiliac joint to a larger extent compared to bracing action using all of the lateral abdominal muscles, significantly reduce the laxity of the sacroiliac joints^[7], mobilizations and manipulations.

Mobilization along with the movement is the manual therapy concept designed by Brian Mulligan for the treatment of various musculoskeletal **dysfunctions** ^[19] Definition - MWM's are defined as "Sustained repositioning of one particular surface on its neighbor while a movement or function is undertaken" ^[10] They address the problems of movement pain and restriction and bring about a change at the time of delivery. They are painless when indicated ^{[10][19]}, delivered in weight bearing posture as weight-bearing treatment techniques are widely believed to be lofty than non-weight bearing techniques, as they duplicate aspects of functional activities. ^[6]

A keystone to MWM is that the pain should always mitigate and/or eliminated during the application (Exelby 1995, Exelby 1996, Mulligan 2004, Wilson 2001). Additional gains in pain reduction can be attained via passive overpressure at the end of the available range of motion during the MWM (Mulligan 2004, Wilson 2001)^[15] It works like cream on milk and gives 'long lasting' effects. The direction of applied force (translation or rotation) is perpendicular to the plane of the movement or impaired action and in some cases, it is parallel to the treatment plane ^[19] Brian states that slight positioning errors contribute in mobility limitations and/or pain after an injury or

strain. When a corrective mobilization (a repositioning) is sustained, pain-free function is restored, and repeated treatments start to provide long-lasting changes, even though these are not easily felt or visible on x-rays.

Reasons that seem to confirm the positional fault hypothesis is that mobilizing the joint in the same direction many times without the movement, and then checking the active range will not result in immediate change. Also, the mobilization with movement is nearly always at right angles to the plane of the movement taking place and will only work in one direction. When successful in restoring say flexion the same correction will also restore extension if lost. Repeating the proper MWM numerous times appears to restore the joint's ability to stay on course.^[1]

There are two positional faults encountered in the sacroiliac joints that can cause pain. One is called the 'posterior innominate' where the ilium is slightly backwards on its sacral facet and 'anterior innominate' where ilium is slightly forwards on the sacral facet. These dysfunctions are due to maltracking of the joint thus leading to a positional fault by altering the position of the innominates. In our study we have measured the positional fault at the sacroiliac joint using a pelvic inclinometer. Also, we have seen the effect of MWM on pain and disability status of an individual.

Sacroiliac joint dysfunction, according to Borowsky and Fagen, is much more prevalent and frequently neglected than is widely believed. A positioning error is the cause of sacroiliac joint dysfunction, and Mulligan's mobilization with movement has been shown to be successful in resolving positional errors.

Mulligan's mobilization has been shown to increase Range Of Motion (ROM), but there isn't enough evidence to conclusively confirm that it is the primary mechanism of action for positional fault reversal. This study was conducted since there is no proof that Mulligan's mobilizations improves sacroiliac joint problems.

3. Methods

In this study, 30 subjects between age group of 18-60 years, both males and females were included. These patients were then allocated to control group or in experimental group of 15 each, through simple random sampling. Evaluation was done where chief complaints, history of present illness, drug history was noted. The innominate bone inclination was measured with the help of pelvic inclinometer.



Also baseline evaluation of Visual analogue scale (VAS) for SI joint pain and Oswestry low back ache disability index was documented.

Inclusion Criteria:

• Pain over sacroiliac joint with referral to gluteal region, groin, posterior thigh region with or without H/O fall

- Age group: 18-60 years
- Both genders
- Tenderness over SI joint on palpation
- 5 positive pain provocation tests out of 7

Exclusion Criteria:

- Acute trauma to low back
- Presence of neurological signs such as numbness and profound muscle weakness
- Recent surgery on low back
- Limb length discrepancies as it can affect the sacroiliac joint orientation.
- Inflammatory diseases like Ankylosing spondylitis, RA
- Pregnancy
- Fractures and other pathologies of unknown etiology
- Obese patients having indistinct osteal landmarks.

Interventions:

Experimental group was given Mulligan's mobilization with offending movement for correcting positional fault was given to SI joint along with hot packs for 15 minutes and core stability exercises. For anterior innominate dysfunction, posteromedial glide was given while performing an offending movement say bending forward, extension in prone or lions position, sit to stand, walking, stair climbing.



For posterior innominate dysfunction, anterolateral glide was given while performing an offending movement. 6-10 repetitions in sets of 3 were given with a rest period of 30 seconds between each set.



Control group was given hot packs for 15 minutes and core stability exercises.



Pre and post results of all the outcome measures were obtained and compared statistically. Values were taken immediately and again 5 days post-intervention to check the carryover effect.

4. Study Setting and Study Design

Experimental study conducted on patients having SIJ dysfunction. The study was conducted at O.P.D of Dr. D. Y. Patil College of Physiotherapy, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune.

Tables and Graphs

Innominate tilt of the SI joint, VAS for SI joint pain, total score of Oswestry Disability questionnaire was taken pre and post therapy. Paired t-test was done to check the pre and post difference within the group and unpaired t-test as done to compare the experimental and control group.

Table 1: Comparison of mean at pre and post treatment in experimental and control group – Immediate effects.

IMMEDIATE EFFECTS	EXPERIMENTAL	CONTROL
INNOMINATE TILT	8.4	12.64
VAS	5.5	6.84
OSWESTRY	45%	55%

 Table 2: Comparison of mean at pre and post treatment in experimental and control group –carryover effects.

CARRYOVER EFFECTS	EXPERIMENTAL	CONTROL
INNOMINATE TILT	7.92	12.25
VAS	3.62	5.94
OSWESTRY	24%	45%



5. Results

Pre and post treatment- immediate and 5 days post compared with paired t-test for group A showed immediate reduction in the innominate tilt which is statistically significant (P=<0.005). The carryover effect although not

significant is maintained with a mean difference of -0.48. VAS value was reduced immediately and had a carryover effect which is statistically significant (P = <0.005). Reduction in oswestry low back ache disability index score immediately as well as having a carryover effect which is statistically significant (P = <0.005).

Pre and post treatment- immediate and 5 days post compared with paired t-test for group B showed reduction in the innominate tilt – Significantly reduced immediately with a P value of 0.002 and 5days post, although it was not significant statistically, it had a mean difference 0.39. VAS value was found to be reduced immediately and having a carryover effect which is statistically significant (P = <0.005). Reduction in oswestry low back ache disability index score immediately as well as having a carryover effect which is statistically (P = <0.005)

The discomfort status of Innominate tilt was determined to be p = 0.072 when Groups A and B were compared using an unpaired t-test. VAS was found to have a p-value of 0.016, and the Oswestry scale to have a p-value of 0.047. The statistical significance of the carryover impact of innominate tilt, VAS, and oswestry was shown to be p = 0.064, p = 0.005, and p = 0.005, respectively.

6. Discussion

The quality of life and health care costs are both significantly impacted by low back pain, which is a serious health issue.^[27] According to reports, it is the third most common cause of disability for people over 45 and the most common cause of disability in people under 45 (Anderson 1988). A little over 40% of persons claim to have experienced low back discomfort in the previous six months. (Erhard RE, DonTigny RL, and Bourdillon JF) Sacroiliac joint discomfort has been discovered to be a frequent source of low back pain and is frequently disregarded while treating the low back. Clinicians have recommended a number of therapies for SIJ syndrome, however there is little data on their effectiveness. According to Rasmussen and Postacchini (1988), manual therapy, a frequent treatment for people with low back pain, is more effective than a placebo. An damaged joint can be restored to function by reversing a positional error with Mulligan's mobilization with movement. In this study we have tried to find the effect of mobilization of movement in sacroiliac joint dysfunction. Here, we documented variations in the innominate tilt after mobilizing the sacroiliac joint, changes in the pain and disability status of our patients.

The pain status of Innominate tilt, VAS and Oswestry scale was found to be significantly reduced in the experimental group as compared to the control group. Changes in the innominate bone inclination was found to be measured by the pelvic inclinometer and application of MWM to the sacroiliac joint caused the joint to track back into its position thus causing the reversal, restoring the innominate into its original position has led to the decrease in pain. Also, we can say that reduction in pain and return to activity has led to minimizing the disability in our patients, thus improving the functional performance. It was noted that there was significant improvement in pain intensity, personal care, standing, walking, and sleeping components of oswestry low back ache disability questionnaire whereas improvements in lifting, sex life and travelling were less significant. As a result, even while MWM has considerable initial effects (by 4-5°), patients can still receive treatment in order to further lessen their pain and experience an improved carryover effect.

As a result, mobilisation combined with movement is a powerful therapeutic method that produces results quickly. MWM will help us recuperate quickly, preventing the need for additional visits. Thus, it serves as a crucial complement to other types of therapy. Additionally, it was discovered that the experimental group had a much higher carryover impact than the control group in terms of Innominate tilt, VAS, and Oswestry scale. Movement has a large carryover effect in addition to its immediate impact. As a result, the effects are long-lasting.

Positional defects develop after an injury and cause the joint to maltrack, resulting in symptoms like pain, stiffness or weakness, and a visible restriction of movement[15].[19] Changes in the articular cartilage's form, the orientation of ligament and capsule fibres, or the pull of muscles and tendons have all been proposed as potential causes of positional faults[15]. Their effectiveness arises from the correction and maintenance of these minor postural flaws that result from injury or muscular imbalances during motions, etc.[10][19] The quick pain-relieving effect is mechanical in nature and is predicated on the hypothesis that bony positioning defects exist and that the MWM can correct these faults[19].

Our study thus established the value of Mulligan's mobilization with movement in treating sacroiliac joint dysfunction and laid the groundwork for further studies in this field.

7. Conclusion

Mobilization with movement is effective in reducing the positional fault at the sacroiliac joint. It helps in reducing the pain status of the patient and thus return to activity. It assists in reducing impairment, which may then encourage a person to resume ADLs and enhance their functional performance.

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