EFFECTIVENESS OF MYOFASCIAL RELEASE TECHNIQUE IN TREATMENT OF SACROILIAC JOINT HYPO-MOBILITY IN POSTNATAL WOMEN

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ABSTRACT

Background: Sacroiliac joint (SIJ) dysfunction is considered a main cause of a pregnancy related back pain, which may continue to persist postnatal. Myofascial release technique (MFR) is application of low intensity, prolonged stretch to myofascial structures to improve function by increasing the sliding properties of restricted myofascial tissues.

Purpose: This study was designed to investigate the effect of MFR on postnatal SIJ hypo-mobility.

Materials and Methods: Fifty postnatal women complaining from SIJ hypo-mobility participated in this study. Their ages ranged from 26 to 35 yrs., and their body mass index (BMI) didn’t exceed 30 kg/m 2. They were randomly assigned to two equal groups, group A (Gr. A), and group B (Gr. B). Both groups received three sessions per week for 8 successive weeks. Gr. A received traditional physical therapy program, while Gr. B received traditional physical therapy program in addition to MFR. Doppler imaging of vibration was utilized to measure SIJ mobility pre- and post- intervention and an electronic digital goniometer was used to measure back flexion, and extension ROM.

Results: Findings revealed a statistical improvement in post-intervention values of SIJ mobility in addition to trunk flexion and extension ROM in Gr. B compared to Gr. A (P<0.001).

Conclusion: Adding MFR to traditional physical therapy program is highly recommended in treatment of SIJ hypo-mobility in postnatal women.

Keywords: sacroiliac hypo-mobility, sacroiliac dysfunction, myofascial release technique - traditional physical therapy - postnatal.

I. INTRODUCTION

Many females suffer from low back pain (LBP) as a musculoskeletal problem during and after pregnancy. Most of back pain in and around the sacroiliac joint (SIJ) is linked to labor, but can continue for 2 or 3 years after birth due to a variety of mechanical, biochemical, circular and psycho-social causes. Various studies reported presence of SIJ pain in pregnant women in nearly 89% and in postpartum woman 26% [6]. The SIJ dysfunction is described as "a relative mobility condition with corresponding structural (positional) changes between the sacrum and ilium" [4]. Manual techniques as joint mobilization of the locked joint, pelvic stabilizing exercise used to
treat tightness of structures surrounding the SIJ surrounding muscles such as deep tissue massage, stretching and myofascial release are also proposed [7].

Myofascial release is an important technique to reduce discomfort and physical weakness. It can be described as a type of manual treatment involving low power application, extending to the myofascial complex [1]. In addition, MFR helps in the normalization of tight myofascial tissue length and sliding properties, releases pressure on pain-sensitive structures and re-establishes joint movements by improving vein and lymphatic system drainage, and supports fluid static decongestants, changes in the concentrations of some circulatory pain mediators, such as end cannabinoids and endorphins[9]. Two main MFR techniques are used in the treatment of SIJ pain: direct and indirect release and self-myofascial release (e.g., applied by the patients themselves using tools as roller massagers) [9].

II. MATERIALS AND METHODS

2.1 Patient's Characteristics and Experimental Design

The research included 50 postpartum women with sacroiliac joint hypo-mobility with threshold difference<3, and sacroiliac pain, depending on orthopedist referral. A consent form was obtained from all the volunteers. Their age were 26 to 35 years, selected from Deraya University's outpatient center of Faculty of Physical Therapy. Two equal groups of patients were randomly selected. Gr. (A) control group consisted of 25 females were treated by traditional physical therapy program while Gr. (B), study group consisted of 25 females were treated by both traditional physical therapy and myofascial release technique. For eight weeks, all participants had three sessions a week (total of 24 sessions). The exclusion criteria were: Acute lower limb injury, previous hip operations or pathology, spinal deformity or disease, nor surgeries, and sacroiliac joint hyper-mobility. Assessment of subjects in both groups was carried out pre- and post-treatment using Doppler imaging of vibration and an electronic digital goniometer.

2.2 Evaluation procedures

1. Back flexion, extension range of motion: measured by electronic digital goniometer. It has a range of 0° to 360°. The validity and reliability of electronic digital goniometer was tested and is well documented [15].

2. Sacroiliac joint mobility: measured by using vibrations Doppler imaging. Thrive 707A Full Body Massager was used. Each patient was instructed to lie prone on the treatment table, with the ASIS positioned just outside the table. The patient's head was turned away from the ASIS that was vibrating on, and the patient's upper extremities were crossed behind his head. The researcher kept the Vibrator tip and gently but steadily pressed it against the patient's ASIS. The ASIS was unilaterally introduced to 60 Hz vibration. The vibrations are transferred upward to the sacroiliac articulation field. The sonographer assessed the obtained vibrations using the Doppler image device (Toshiba 500 Platinum).

The patient's lower back and upper buttock were exposed. Ultrasonic gel for the successful transmission of the ultrasound from the transducer to the sacroiliac joint was used. The transducer was used over the medial and lateral sides of sacroiliac joint in transverse maneuver. The sonographer modified the scan plane to differentiate between sacral and iliac boney landmarks. Image output was obtained clearly with depth, focus, and Doppler modes adjustment. On the color Doppler screen, Doppler signals from the vibration of ilium and sacrum appeared as blue and red coloration. The sonographer first determined the threshold level (TL) for the iliac segment by recording color gains that occur during the color Doppler picture of iliac segment. Second, a different threshold level was established when a Doppler picture of the sacral segment receiving the vibration on the sacroiliac joint line.

The sacral TL was subtracted from the ilial TL and thus showed the sum of vibration loss on the targeted sacroiliac joint. With each unilateral sacroiliac joint, two sorts of recordings have been taken, for the iliac and sacral landmark, beginning on the left. The same assessment for the right sacroiliac joint was replicated.

2.3 Treatment Procedures

I. Traditional Physical Therapy program:

a- Reinforcement exercises in form of bridging, back extension and sit-up exercises. These exercises were designed to improve the muscles of the abdomen and back. It was done from crook lying and prone positions. b-
Fingers to toes, knees to chests, and back muscles stretching were among the stretching exercises. For each stretching maneuver, the hold time for the stretching force was set to 30 seconds, followed by 30 seconds of rest, 3 times per session (repetitions) [17]. c- Chattanooga Inlect was used for US application. The patient in prone posture, and ultrasound gel was applied to the sacroiliac region. By rotating the ultrasound head in a circular motion at a 90-degree angle, the practitioner applied ultrasound to the right and left sacroiliac joints. Probe with 4 cm width was used to apply continuous US at 1 MHz and 1.5 watt/cm² for 8 minutes.d- Infrared therapy with aBeurer IL 30 originated in Germany. Each patient was placed in a prone lying position, and the infrared light was calibrated such that the energy was stroked at a right angle to the patient for 10 minutes.

III. Myofascial release technique (MFR):
The duration of MFR for each muscle was 90 to 120 seconds, applied twice per session.1. MFR of the erector spinae muscles: patient assumed prone lying position; and the therapist was standing at the level of the patient's pelvis on the treatment side applying cross hand technique.2. MFR of the quadratus lumborum muscle and thoracolumbar fascia: patient assumed side lying position on the non-treated side with a pillow under the waist to increase stretch force over the muscle. The therapist was standing behind the patient at the level of the patient's pelvis applying cross hand technique.3. MFR of the piriformis muscle: patient assumed side lying position, with the side treated being the uppermost. The uppermost lower extremity was placed in hip flexion and adduction, in front of the lowermost of the patient to increase muscle stretch. The therapist was standing behind the patient at the level of patient's pelvis, and applying transverse stroke technique using knuckles.4. MFR of the gluteus medius muscle: patient assumed side lying position on the non-treated side. The therapist was standing behind the patient at the level of the patient's pelvis, and applying vertical stroke technique using knuckles.

Statistical Analysis
Version 22 of the Statistical Package for Social Science (SPSS) software for Windows was used. P value less than or equal to 0.05 between variables was considered significant. Mean and standard deviation were calculated for all studied variables. Comparison between the mean values of different parameters between both groups was performed using the unpaired t-test. Comparison between pre- and post-intervention data within the group was performed using paired t-test.

III. RESULTS
Fifty post-partum women with sacroiliac joint hypo-mobility participated in the study and were screened for eligibility.

3.1 Demographic and Baseline Characteristics
No significant differences were discovered among groups in the mean age, height, weight, BMI (p > 0.05) Table (1)

3.2 Clinical Scales
Regarding ROM of back flexion pre- and post- treatment in both groups (Gr. A, and Gr. B), there was statistically significant difference in both groups post-treatment compared with the corresponding values pre-treatment (Table. 2). Comparison between both groups showed no significant difference in ROM of flexion pre-treatment (t=-1.089, P=0.276) and a statistically significant difference post-treatment in favor of Gr. B (t=-5.449, P=0.001). On the other hand, ROM of back extension pre-and post-treatment in both groups (Gr. A, and Gr. B) showed statistically significant difference in both groups post-treatment compared with the corresponding values pre-treatment (Table.3). Comparison between both groups showed no significant difference in ROM of extension pre-treatment (t =-1.079, P=0.276) and a statistically significant difference post-treatment in favor of group B (t=-5.450, P=0.001). Concerning right sacroiliac mobility, the mean difference in pre-treatment values compared to post-treatment values was -3.54 threshold units (TU), -0.23 for Gr. (B), and Gr. (A) respectively. The mean difference in post-treatment values across the studied groups was 3.17 TU. Regarding left sacroiliac mobility, mean difference in pre-treatment values compared to post-treatment values was -4.6 TU and -0.46 TU for Gr. (B), and Gr. (A) respectively. The mean difference of post-treatment values in both groups was 4.47 TU (Table.4)
Table (1). Physical characteristics of the two studied groups.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group A</th>
<th>Group B</th>
<th>t value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>31.80 ± 2.73</td>
<td>28.65 ± 2.60</td>
<td>1.596</td>
<td>0.116 (NS)</td>
</tr>
<tr>
<td>Weight (kg.)</td>
<td>70.16 ± 7.62</td>
<td>71.40 ± 6.80</td>
<td>0.376</td>
<td>0.707 (NS)</td>
</tr>
<tr>
<td>Height (m)</td>
<td>1.50 ± 0.05</td>
<td>1.51 ± 0.09</td>
<td>-1.012</td>
<td>0.315 (NS)</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>27.55 ± 1.52</td>
<td>26.71 ± 2.37</td>
<td>1.338</td>
<td>0.186 (NS)</td>
</tr>
</tbody>
</table>

p > 0.05 = not significant (NS).

Table (2). ROM of trunk flexion pre- and post-intervention for both groups.

<table>
<thead>
<tr>
<th>ROM of trunk flexion (degrees)</th>
<th>Group A</th>
<th>Group B</th>
<th>t value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>28.2 ± 9.65</td>
<td>33.22 ± 7.2</td>
<td>-1.089</td>
<td>0.276 (NS)</td>
</tr>
<tr>
<td>Post</td>
<td>74.44 ± 3.38</td>
<td>83.28 ± 3.36</td>
<td>-5.449</td>
<td>0.001 (S)</td>
</tr>
<tr>
<td>% of change</td>
<td>163.98%</td>
<td>150.66%</td>
<td>-5.703</td>
<td>0.001 (S)</td>
</tr>
<tr>
<td>t value</td>
<td>-4.351</td>
<td>-4.340</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p value</td>
<td>0.001 (S)</td>
<td>0.001 (S)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (3). ROM of trunk extension pre- and post-intervention for both groups.

<table>
<thead>
<tr>
<th>ROM of trunk extension (degrees)</th>
<th>Group A</th>
<th>Group B</th>
<th>t value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>12.05 ± 3.61</td>
<td>10.11 ± 3.75</td>
<td>-1.079</td>
<td>0.276 (NS)</td>
</tr>
<tr>
<td>Post</td>
<td>23.4 ± 1.83</td>
<td>26.35 ± 1.95</td>
<td>-5.450</td>
<td>0.001 (S)</td>
</tr>
<tr>
<td>% of change</td>
<td>94.29%</td>
<td>160.63%</td>
<td>-5.701</td>
<td>0.001 (S)</td>
</tr>
<tr>
<td>t value</td>
<td>-4.330</td>
<td>-4.326</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p value</td>
<td>0.001 (S)</td>
<td>0.001 (S)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (4). Sacroiliac joint mobility pre- and post-intervention for both groups.

<table>
<thead>
<tr>
<th>Right sacroiliac mobility</th>
<th>Group (A)</th>
<th>Group (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>4 ± 1.76 TU</td>
<td>3.86 ± 1.34 TU</td>
</tr>
<tr>
<td>Post-treatment</td>
<td>4.23 ± 1.92 TU</td>
<td>7.4 ± 3.8 TU</td>
</tr>
<tr>
<td>P value</td>
<td>p = 0.29</td>
<td>p = 0.0001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Left sacroiliac mobility</th>
<th>Group (A)</th>
<th>Group (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>3.13 ± 1.38 TU</td>
<td>3.46 ± 1.66 TU</td>
</tr>
<tr>
<td>Post-treatment</td>
<td>3.59 ± 1.97 TU</td>
<td>8.06 ± 2.54 TU</td>
</tr>
<tr>
<td>P value</td>
<td>p = 0.16</td>
<td>p = 0.0001</td>
</tr>
</tbody>
</table>
IV. DISCUSSION

The main aim of this research was to see how MFR affected SIJ mobility postnatal. Hypo-mobility of sacroiliac joint was present in the patients who took part in this study. The findings demonstrated a significant difference of mean values in all variables between the two groups, Gr. B being better compared to Gr. A (e.g., ROM of back flexion and extension, and sacroiliac mobility) after receiving myofascial release technique along with traditional physical therapy.

Desai (2018) observed that MRT is useful in treating acute trapezitis in young adults, reducing pain caused by ischemic compression and improving cervical lateral flexion and neck dysfunction. By applying a continuous load over the muscle, it works on the taut bands and sarcromere shortening, which stimulates the latent myofascial trigger points and essentially decreases the restraint. MRT extends contractured muscles and activates muscle stretch reflexes, improving ventilation and lymphatic drainage under the fascia. This helps in increasing soft tissue extensibility, and improves ROM [3].

Mohanty et al., (2015) also supported up the findings, stating that MFR is one of the effective protocols in treating lumbar spondylolisthesis in patients as compared to a traditional home exercise regimen. Hypo-mobility of the cervico-thoracic segments and tightness of the thoraco-lumbar fascia are present in Spondylolisthesis, which may result in compensatory hypermobility around the slipped vertebra. Therefore, mobilization of the hypo-mobile cervico-thoracic segments along with myofascial release of the thoraco-lumbar fascia can be considered effective in managing lumbar spondylolisthesis through breaking down adhesions and improving circulation and lymphatic drainage [10].

The results of our study are also supported by the findings of Vadivelan et al. (2017), who found that myofascial trigger point release therapy is more effective in treating trigger points in upper Trapezius than ultrasound therapy because the presence of muscle spasm in the upper trapezius will impair blood supply to the muscles, leading to reduction of oxygen, calcium and other nutrients required for muscle. MFR reduces the sensitivity to pain at trigger points, improves pain perception, and releases fascial restrictions. This restores the length of the tissue and increases pressure on pain-sensitive structures as nervous, blood vessels and restores balance and functionality of the joints and activates endorphins, as the tissue becomes softer and flexible after MFR [12].

The findings also correspond to Hosseinifar (2016), who found that MFR is beneficial to reduce the index of neck disability, increase the threshold of pressure pain and enhance the maximal isometric contraction of neck muscles by pain control [8]. Development of fascial limitations in body areas contributes to hypertension from fascial continuity in other areas of the body. MFR preserves the duration and condition of the limited connective tissue, and relieving nerve, blood vessels pressure. Furthermore, not only are the analgesic effects of MFR is modulated by the activation of the descending pain inhibiting systems, but stimulation and segmental pain modulation of the afferent pathways can be induced by excitation of the afferent A delta fibers [2]. The results supported also by that of Ramezani and Arab (2017), who stated that applying MFR causes capillary dilation and increases the blood flow to the muscle, which in turn increases the removal of waste products that causes stimulation of nociceptors pain fibers there by reducing pain, muscle tension and improving ROM with removing fascial restrictions [11].

Balasubrmaniam et al. (2014) have identified myofascial release as an important means of enhancing lumbar motion in mechanical back pain [16]. In the other hand, Williams (2017), who considered myofascial release tools and hands is effective to lessen discomfort in CLBP patients, hands on myofascial release provide a greater effect on the sympathetic reflex of the nervous system and an increased blood supply across the entire body contributing to less discomfort and a better general function, while instrumentalmyofascial release has the same effect besides requiring less time and less effort from the therapist. This enhances the impairment results at a higher degree than myofascial release hands. Instrumental myofascial release should also be seen as a strongly intervention in cases where extreme adhesions are present and treatment time is limited[14].

V. CONCLUSION

It can be concluded that using a combination of myofascial release technique and conventional physical therapy to improve sacroiliac joint hypo-mobility and back flexion and extension in postnatal women was more successful than using only traditional physical therapy program.
REFERENCES


