

Comparative Effects of Stabilization Exercises and Muscle Energy Techniques on Pain and Disability in Patients with Sacroiliac Joint Pain

Exercises and Muscle Energy Techniques on Pain and Disability

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ABSTRACT

Objective: To compare the effects of stabilization exercises and muscle energy techniques on pain and disability in patients with sacroiliac joint pain.

Study Design: A randomized clinical trial study

Place and Duration of Study: This study was conducted at the Ibn e Siena Hospital and Bakhtawar Amin Hospital, Multan from March 2022 to August 2022.

Materials and Methods: Sample size of 34 patients with the age ranging from 30 to 50 years having sacroiliac joint pain, recruited through consecutive sampling. All were randomly allocated through simple random sealed opaque enveloped method into two groups; Group A was treated with Stabilization exercises and Group B was treated with Muscle energy techniques (METs). The intervention was applied for 4 weeks received (12 sessions of treatment with 3 sessions per week). Numeric Pain Rating Scale (NPRS) and the Modified Oswestry Disability Index (MODI) were used for assessing the impact of the treatment at the beginning and after 4 weeks of treatment. Analysis was done using SPSS version 25 and t-tests were applied.

Results: Participants n=34 were split into Group A (Stabilization Ex.) and Group B (METs) randomly with Group A's mean age was 40.23 and standard deviation was 6.33 and for Group B was 38.76 and standard deviation was 5.80. The mean values of the NPRS and MODI scores before and after treatment differed significantly with p value < 0.05 in both study groups.

Conclusion: This study concluded that both treatment groups i.e., stabilization exercises and muscle energy technique were effective in reducing pain and disability among sacroiliac pain patients. However, muscle energy technique was more effective in comparison to stabilization exercises.

Key Words: Pain, Disability, Exercise therapy, Sacroiliac joint

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INTRODUCTION

Sacroiliac joint (SIJ) is an axial joint transfer load from lumbar to lower extremities¹. This joint is made main for stability not for mobility². There is evidence of SIJ innervation, so it may also cause low back pain³. The stabilizing muscle of SIJ includes; gluteus maximus, piriformis, paraspinal muscle and hamstring⁴.

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The biomechanical mechanism is for SIJ stability is force closure and form closure⁵. SIJ becomes unstable due to laxity of posterior and interosseous ligaments. The etiology of SIJ is combination of axial loading and sudden rotation⁶. SIJ pain can be due to hypomobility or hypermobility⁷.

Stabilization exercises are used for gaining neuromuscular control, enhancing endurance and strength of muscles, which raises muscular function and reduces pain⁸. Stability exercises also prevent musculoskeletal injury⁹. Stabilization exercises prescribed as low back pain is treated with stability training¹⁰. MODI is sensitive to sacroiliac caused pain⁴. NPRS administered in pain quality evaluation¹¹.

The physical therapy treatment for SIJ dysfunction is mainly focus on correcting muscular imbalance that cause its asymmetry. Mulligan mobilization with movement is considered effective manual techniques. METs in which a precisely controlled forced is generated by patient, which is directed against the force applied by therapist.¹² This is used to stretch,

strengthen, and relax targeted muscles¹³. METs are used for addressing pain, muscular strain, for treating joint dysfunction and restoring range of motion¹⁴. The study aims to target SIJ pain patients and treat them with stabilization exercises and METs. Comparing both exercise therapies and to see if any of these is superior over the other for the management of SIJ pain that would provide better outcomes for pain and disability that helps the clinicians to provide evidence-based approach towards the application of intervention.

MATERIALS AND METHODS

This randomized clinical trial was carried out at Ibn e Siena Hospital and Bakhtawar Amin Hospital, Multan after getting ethical approval from research ethical committee of Riphah Lahore campus (Ref. No. REC/RCR &AHS/22/0107) from March 2022 to August 2022. This study registered at Clinical Trials with identifier no: NCT05356390. Participants were selected through consecutive sampling. Sample size calculated was 34 by EPITOOL software using MODI tool values¹⁵ with confidence interval 0.95. Sample was 34 after 10% attrition rate was 38 to manage drop outs. Inclusion criteria includes both male and female, age range 30 to 50 years with positive Laslett's criteria, NPRS value < 7, Modified ODI score 21-40 %. Patients with history of pregnancy, lumbosacral disc herniation, and sacroiliac joint inflammation were excluded. All were randomly allocated through simple random sealed opaque enveloped method into two groups. Informed consent was taken from all the participants. Outcome measures used were the NPRS and the MODI. This was a single blinded study in which participants were blind. Group A was treated with Stabilization exercises that includes floor bridging, heel prop and alternate arm and leg raise was administered to iliopsoas, gluteal and hamstrings. These exercises were performed 3 sets of 10 reps each, performed three times weekly for four weeks. Hip abduction strengthening with hold for 5 second and repeat 10 times¹⁶.

Group B was treated with METs performed as post isometric relaxation technique targeting hamstrings, iliopsoas, and quadratus lumborum and erector spinae. The position was held for 10-30 seconds and was performed 3 times per session 4 times per week for 4 weeks¹⁷.

Common Treatment for both groups was application of hot pack (10min) and TENS (10min), patients were requested to avoid performing other treatment protocol during study duration.

The data was analyzed by using SPSS version 25. Statistical significance was set at $p=0.05$. Shapiro wilk test was used to know normality of data. Variable NPRS p value 0.17 and MODI Variable have p value 0.07. Both values were > 0.05 which showed that data is normally distributed and parametric t-tests were applied. For within group analysis Paired t-test was

used and for between group analysis independent t-test was used.

RESULTS

Total number of participants were 34 (Group A stabilization Exercises =17 and Group B METs=17). Descriptive data for gender, in group A there were 52.9 % males and 47.1% females and in group B there were 58.8% males and 41.2% females shown in Table No.1. Descriptive data for Age, weight, height, and BMI values for group A and group B shown in Table No.2. The mean and standard deviation for Age in group A was 40.23 ± 6.33 whereas for group B 38.76 ± 5.804 .

Within Group analysis done by paired sample t test for pre and post treatment comparison. Within Group A analysis for NPRS shows p value 0.62 and for MODI shows p value <0.001 shown in Table No.3. Within Group B analysis for NPRS shows p value 0.10 and for MODI shows p value <0.001 shown in Table No.4.

Between Group A and B analysis done by independent t-test. The results showed that there was significant difference in post treatment between groups with p value < 0.05 for NPRS and MODI as shown in Table No.5.

Figure 1 showed the Clustered Bar graph for NPRS for comparing means within group. This shows that both treatments were effective in reducing pain but METs were more effective.

Figure 2 showed the Clustered Bar graph for Modified ODI for comparing means within group. This shows that both treatments were effective in reducing disability.

Table No. 1: Gender of Group A and B Participants

Treatment Groups	Gender	Frequency	%age
Group A: Stabilization Ex.	Males	9	52.9
	Females	8	47.1
Group B: METs	Males	10	58.8
	Females	7	41.2

Table No. 2: Descriptive Statistics of Group A and B Participants

Treatment Groups	Variables	Mean \pm SD
Group A Stabilization Ex.	Age	40.23 ± 6.339
	Body weight	64.47 ± 7.600
	Height	1.658 ± 0.066
	BMI	22.61 ± 3.900
Group B METs	Age	38.76 ± 5.804
	Body weight	67.47 ± 4.431
	Height	1.664 ± 0.053
	BMI	24.43 ± 2.368

CONSORT Diagram

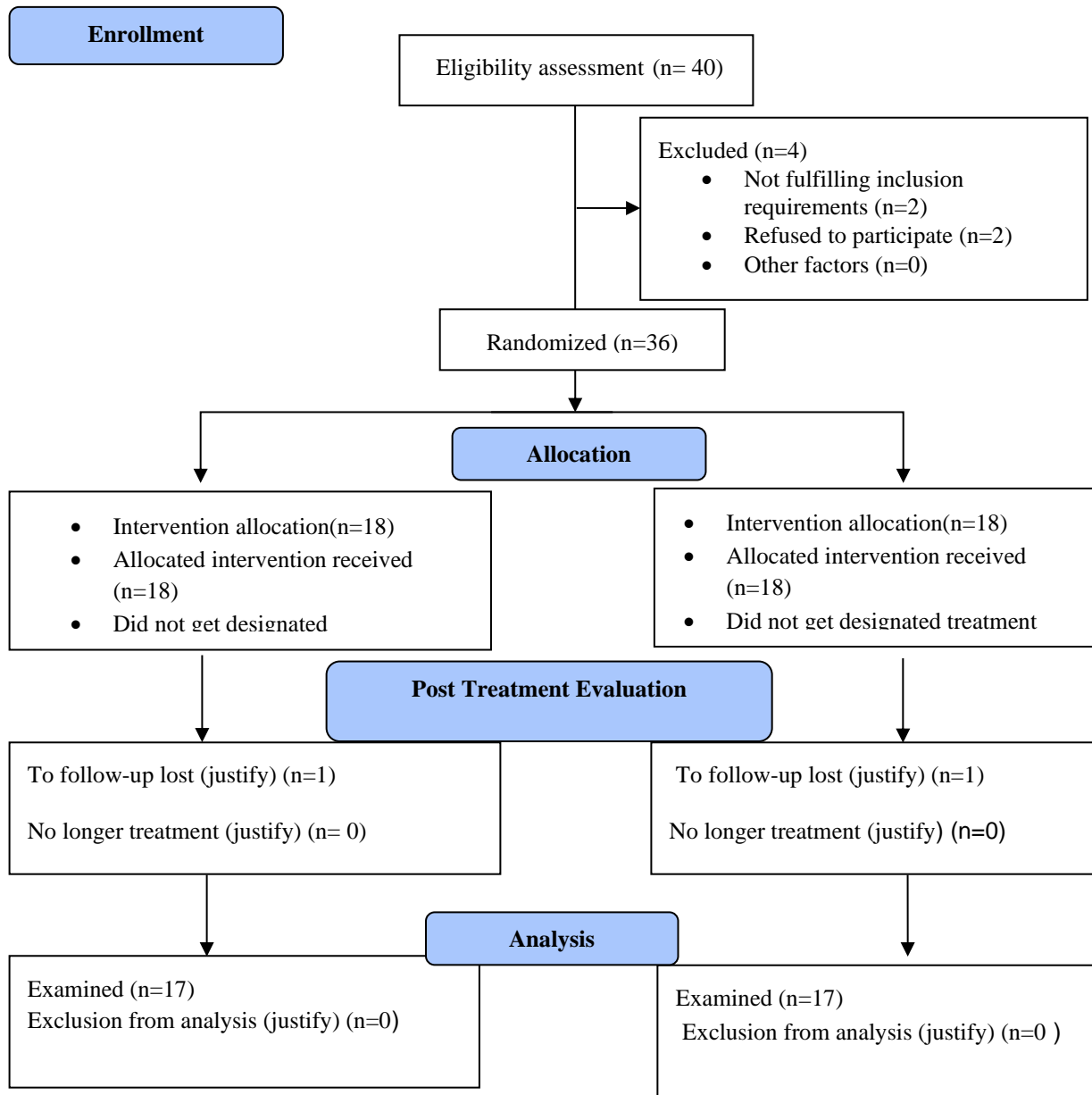


Table No. 3: Within Group-A (Stabilization Exercises) Analysis

Variables	Treatment	n	Mean ± SD	Mean Difference	p-value
NPRS	Pre-Treatment	17	3.582 +1.87	0.235	0.62
	Post-Treatment		3.235 +1.71		
MODI	Pre-Treatment	17	27.5 ±9.36	11.5	<0.001
	Post-Treatment		16.0 ±6.56		

Table No. 4: Within Group-B (METS) Analysis

Variables	Treatment	n	Mean ± SD	Mean Difference	p-value
NPRS	Pre-Treatment	17	3.647 +1.656	2.118	0.10
	Post-Treatment		2.705 +1.490		
MODI	Pre-Treatment	17	27.4+8.97	15.6	<0.001
	Post-Treatment		11.7+6.35		

Table No. 5: Between Group Analysis

Variables	n	Treatment	Groups	Mean \pm SD	p-value
NPRS	17	Pre	Group A	3.529 \pm 1.961	0.18
			Group B	4.235 \pm 1.437	
		Post	Group A	3.294 \pm 1.624	<0.05
			Group B	2.117 \pm 0.927	
MODI	17	Pre	Group A	27.58 \pm 9.361	0.95
			Group B	27.41 \pm 8.97	
		Post	Group A	16.00 \pm 6.56	<0.05
			Group B	11.76 \pm 6.35	

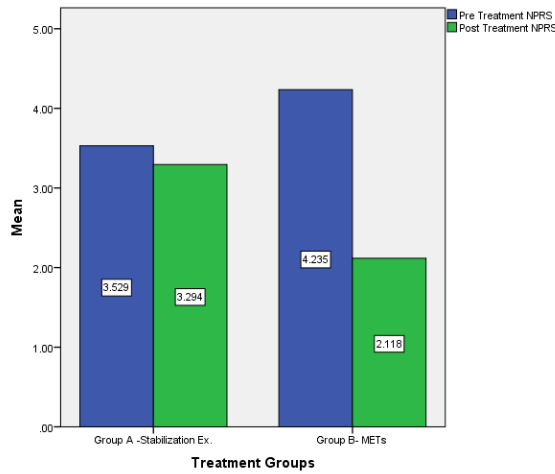


Figure No.1: Cluster bar graph for NPRS within group comparison

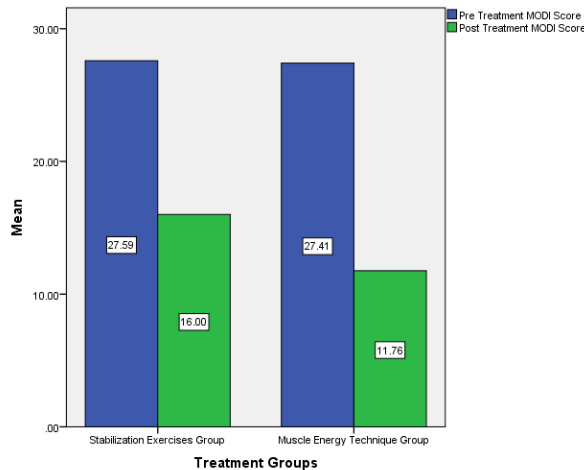


Figure No.2: Clustered Bar graph for Modified ODI within group comparison

DISCUSSION

In the current study, Stabilizing exercises and METs were compared for pain and disability in individuals with SIJ pain with sample size 34. There were significant differences in before treatment and after treatment status in both groups, Group A (Stabilization Group) and Group B groups (METs). In current study, NPRS and MODI score for pre and post treatment comparison within group shows that both treatments were effective in reducing pain and disability. When Independent sample t test was used for comparison of between groups. The results showed that there was significant difference in post treatment between groups. But more significant results were seen in Group B treated with METs.

In 2021, study was conducted to examine the effects of thrust manipulation and METs approaches on pain and impairment in individuals with SIJ dysfunction. There was no statistically significant difference between the NPRS and MODI scores before and after treatment. So, result concluded that both treatment were effective in management of back pain caused by SIJ¹⁸. In 2022, a study conducted to check effectiveness of METs over neuromuscular control exercises. Oswestry Disability Index and the Visual Analogue Scale were used to collect pre- and post-treatment data. This study demonstrated that the METs was more successful than neuromuscular control exercises for treating mechanical acute low back pain¹⁹. In 2021, a study conducted to examine the effects of dynamic stabilization exercise treatment supplemented with METs on a subset of patients with persistent non-specific low back pain. Group A which were given combined therapy of Dynamic stabilization exercises and METs showed significant improvement as compared to other two groups²⁰. In 2017, study conducted to assess the effectiveness of Hot Moist Pack and METs and conventional therapy in SIJ dysfunction patients. There were 2 groups and given treatment using HMP, METs, and other methods, such as exercises to strengthen the core muscles and improve mobility, for 10 days. Therefore, it was determined that using HMP and METs together is more beneficial for treating SIJ discomfort²¹.

In 2020, a study was conducted to assess the effectiveness of Kinesiotaping (KT) and the METs in combination with traditional physiotherapy among patients with mechanically caused SIJD. This study provided information on METs and KT effects in patients with mechanical SIJD that Group A received METs showed more benefits as compared to Group B received KT treatment²². In 2017, a research work conducted to know the Impact of lumbar stability exercise on sacral angle, disc herniation index, as well as functional improvement in lumbar disc herniation patients. It was determined that the lumbar stabilization

workouts, which regulate balance using pelvic movements, improve sacroiliac joint mobility and stability; consequently, it improves pelvic and back motions. These exercises exhibited positive impacts on recovering lumbar disc function as well as on proprioception sensation²³. In 2017, a randomized clinical trial in to examine the effects of core stability exercises on spine kinematics during locomotion with and without load in people with non-specific persistent low back pain. Main conclusion of this presented study revealed how a 16-session core training program affected kinematics measurements, including as during-treatment variability and peak displacement of the trunk and lumbar spine in relation to the pelvis during locomotion in people with NCLBP and healthy people.²⁴

The above-mentioned studies support current study for reducing pain and disability by stabilization exercise and Mets. This research provides useful insight for management of sacroiliac joint pain patients. To improve internal validity, accessor blinding should be included.

CONCLUSION

This study concluded that both treatment groups i.e., stabilization exercises and muscle energy technique were effective in reducing pain and disability among sacroiliac pain patients. However, muscle energy technique was more effective in comparison to stabilization exercises.

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Conflict of Interest: The study has no conflict of interest to declare by any author.

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