

Comparative Effectiveness of Mulligan Technique and Lumbosacral Exercises in Sacroiliac Joint Dysfunction (Randomized Clinical Trial)

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Abstract

Background: Sacroiliac joint dysfunction is a frequent cause of lower back pain and the primary contributor of reduced mobility and impaired daily activities. Effective therapeutic interventions are essential for alleviating symptoms. This study investigates and compares the outcomes of mulligan's mobilization techniques and Lumbosacral exercises program in individuals diagnosed with sacroiliac joint dysfunctions.

Objective: To determine the comparative effects of Mulligan's mobilization techniques and Lumbosacral exercises on functional disability and pain, measured using Modified Oswestry Disability Index (MODI) and Numeric Pain Rating Scale (NPRS).

Methods: Twenty four patients (15 females and 9 males) with sacroiliac joint dysfunction (SIJD) were randomly assigned into two groups 12 in group A (Mulligan's Mobilization Techniques) and 12 in group B (Lumbosacral Exercises) after fulfilling inclusion criteria. Both groups underwent treatment over six weeks. Assessment using outcome measures MODI and NPRS were carried out at baseline, 3rd week and 6th week. Data analysis was conducted in SPSS, employing descriptive statistics, repeated measures ANOVA and independent t-test to identify significant differences within and between groups.

Results: Significant improvements in both Functional disability and Pain scores were observed in both groups over the course of treatment ($p < 0.05$). Although both interventions were effective, Group A had slightly greater reduction in Functional disability scores by the third and sixth week but NPRS scoring results were same in both groups showing significant reduction in pain, although not all differences were statistically significant.

Conclusion: Both Mulligan mobilization and Lumbosacral exercises proved beneficial for managing Sacroiliac Joint Dysfunction. Mulligan's technique may offer slightly enhanced short term benefits, but further research with a larger sample size is recommended to confirm these findings.

Keyword: *Sacroiliac Joint Dysfunction, SIJD, Mulligan mobilization, Lumbosacral exercises, Lower back pain, MODI, NPRS, Physiotherapy, Physical therapy.*

Introduction

Sacroiliac joint dysfunction (SIJD) is a leading cause of lower back pain, particularly affecting individuals under 45 years of age (Basu et al.; Fiani et al., 2021). The SIJ is responsible for stabilizing the pelvis and supporting the upper body (Hermans et al., 2022; Raj et al., 2023). Dysfunction in this joint can result from both traumatic and non-traumatic factors, including arthritis, pregnancy, and post-surgical changes (Newman & Soto, 2022; Tan et al., 2024). Effective management of SIJD requires a combination of physical therapy and therapeutic techniques (Aranke et al., 2022).

Mulligan's mobilization technique is based on joint alignment, where gentle mobilization is combined with active or passive limb movement to restore joint function (Nithya et al., 2021; Waseem et al., 2023). This method aims to reduce pain and improve range of motion. Lumbosacral exercises, on the other hand, focus on strengthening the pelvic muscles, including the gluteus maximus and the abdominal muscles, to provide stability and reduce pain in the sacroiliac joint.

Materials and Methods

3.1 Study Design:

This study was a randomized clinical trial comparing Mulligan's mobilization techniques and lumbosacral exercises.

3.2 Study Setting:

The study was conducted at the Core Physiotherapy Clinic in Layyah.

3.3 Duration of Study:

The study was completed within three months after approval.

3.4 Sample Size:

24 participants (12 in each group) were included in the study based on the calculation using Open Epi software.

3.5 Study Groups:

- **Group A:** Received Mulligan's mobilization techniques.
- **Group B:** Received lumbosacral exercises.

3.6 Data Collection Tools:

- **NPRS:** Measures pain on a scale from 0 (no pain) to 10 (worst pain).
- **MODI:** Assesses functional disability related to lower back pain, with scores ranging from 0% (minimal disability) to 100% (bed bound).

3.7 Data Analysis Procedure:

Data were analyzed using SPSS version 27. ANOVA repeated measures and independent t-tests were used to compare the results within and between the groups.

Results

The study found that both interventions resulted in significant improvements in pain and disability scores ($p < 0.05$). Group A showed greater improvements in the MODI score at the 3rd and 6th weeks compared to Group B. NPRS scores were reduced significantly in both groups, with no significant difference between the groups.

Table no. 1 Demographic statistics

	Mulligan technique (Mean \pm SD)	Lumbosacral exercises (Mean \pm SD)
Age	37.58 \pm9.98	33.25\pm 7.44
Gender	1.58\pm0.515	1.67\pm0.492

Table 2: Intra Group Comparison using ANOVA Repeated Measure for both group

Variables	Assessment	Mean\pmSD	Mean Diff.	p-value
Mulligan technique (MODI)	Baseline	28.25 \pm 6.51	-2.08	0.001
	3rd Week	22.42 \pm 5.38	-7.5	
	6th Week	16.92 \pm 4.06	-12.66	
Mulligan technique (NPRS)	Baseline	6.50 \pm 1.57	-0.17	0.001
	3rd Week	4.42 \pm 1.44	-1.25	
	6th Week	2.50 \pm 1.17	-2.08	
Lumbosacral exercises(MODI)	Baseline	30.33 \pm 7.08	2.08	0.050
	3rd Week	29.92 \pm 7.19	7.5	
	6th Week	29.58 \pm 7.22	12.66	
Lumbosacral exercises(NPRS)	Baseline	6.67 \pm 1.49	0.17	0.001
	3rd Week	5.67 \pm 1.61	1.25	
	6th Week	4.58 \pm 1.50	2.08	

Table 3: Inter Groups comparison using Independent Sample t-Test

Variables	Group	Mean \pm SD	t-Statistics	Mean Diff.	df	P value
MODI Baseline	Mulligan	28.25 \pm 6.51	-0.75	-2.08	21.85	0.461
	Lumbosacral exercise	30.33 \pm 7.08				
MODI 3rd week	Mulligan	22.42 \pm 5.38	-1.99	-7.5	20.38	0.009
	Lumbosacral exercise	29.92 \pm 7.19				
MODI 6th week	Mulligan	16.92 \pm 4.05	-3.61	-12.67	17.32	0.00
	Lumbosacral exercise	29.58 \pm 7.22				
NPRS Baseline	Mulligan	6.50 \pm 1.57	0	0.17	21.96	0.792
	Lumbosacral exercise	6.67 \pm 1.49				
NPRS 3rd week	Mulligan	4.42 \pm 1.44	-2.38	-1.25	21.73	0.058
	Lumbosacral exercise	5.67 \pm 1.61				
NPRS 6th week	Mulligan	2.50 \pm 1.17	-3.92	-2.08	20.72	0.001
	Lumbosacral exercise	4.58 \pm 1.51				

Discussion

This research investigated the effects of lumbosacral exercises and mulligan mobilization with mobility on pain and impairment in sacroiliac joint dysfunction (SIJD). We think this is a pioneering research since it compares different SIJD treatments in Pakistan. Statistically, there was a substantial impact of Mulligan on MODI outcomes ($p < 0.001$), however both the Lumbosacral Exercises and Mulligan groups showed improvement in NPRS and MODI. In 2023, researchers Waseem et al. looked explored the effects of PNF and mulligan mobilization on disability and pain in sacroiliac joint dysfunction. Research shows that Mulligan mobilization is more successful than the status quo of treatment. Group that underwent Mulligan mobilization was shown to be more effective in reducing impairment in individuals with SIJD. Mulligan Mobilization and the Contract-Relax approach were compared for their effectiveness in treating SIJD patients in this research (Waseem et al., 2023). When it comes to rehabilitating sacroiliac joint dysfunction, Dr. Soumik Basu's 2023 research on Mulligan's Movement with Mobilization was the gold standard. According to their research, moving about while mobilizing helps alleviate sacroiliac joint positioning faults. It aids in alleviating the patient's pain condition, allowing them to resume their activities. It helps lessen impairment, which can inspire a person to go back to doing ADLs and improve their functional performance (Basu et al.). In 2022, researchers Chitale et al. found that when compared to various manual therapy procedures for reducing persistent low back pain (LBP), Mulligan mobilization was the most effective treatment option. When drawing conclusions, pain, stiffness, and impairment were taken into account. In addition to Mulligan mobilization, core strengthening exercises and back strengthening exercises may alleviate low back pain by loosening tight muscles and improving range of motion (Chitale Jr et al., 2022). In terms of the efficacy of Mulligan mobilization methods to decrease discomfort, impairment, and increase range of motion, the results of previous investigations were consistent with the present research, even if there were differences in sample size, demographic, and methodology.

Patients with SIJDS benefit better with a regimen that includes both manual treatment and exercise therapy, according to research published in 2020 by Aghalar Javadov et al. When combined with manual treatment, SIJ-specific exercise routines are even more effective (Javadov et al., 2021). In a 2022 research, Amna Khalid et al. found that SI Joint Dysfunction pain and impairment might be effectively alleviated with the use of both MET and core muscle strengthening activities. In the instance of a hypomobile joint, MET was also useful in

increasing mobility (Khalid et al., 2022). In 2021, Bhupendra Karki et al. investigated the efficacy of piriformis stretches and muscle activation exercises for sacroiliac joint discomfort. The researchers found that the combination of the two methods was superior (Karki et al., 2021). While these studies used different methodologies, sample sizes, and populations to draw their conclusions, the present study found that manual therapy, core muscle strengthening and METs, piriformis stretching, and muscle activation exercises effectively reduced pain, disability, and hypo-mobility.

Patients suffering from sacroiliac joint dysfunction were the subjects of this research, which sought to evaluate the efficacy of Mulligan mobilization with that of Lumbosacral exercises in terms of pain and disability. According to the results, Mulligan mobilization is more effective in reducing participants' functional impairment and discomfort. A little misalignment of the joint, according to Mulligan's theory, is the source of the discomfort that causes the limitation. Postural error causes a change in biomechanics, which in turn causes discomfort. The Mulligan mobilization method involves facilitating the spine's and the limbs' natural apophyseal glide and mobility. The spinous process and transverse process are provided passive accessory mobility, and the patient is instructed to do flexion and extension, among other activities. One tenet of Mulligan mobilization is that the patient should not feel any discomfort throughout the procedure (Chitale Jr et al., 2022).

Conclusion

It is concluded that, the Mulligan mobilization technique and lumbar spinal exercises were shown to reduce pain and functional disability in the current study's subjects with sacroiliac joint dysfunction, the results showed that the former was more effective. These findings provide credence to the idea that Sacroiliac Joint Dysfunction may be effectively treated by using Mulligan's strategies.

Limitations

1. The study sample size is relatively small with total 24 participants (12 in each group), which may limit the generalizability of the findings, and the statistical power may be limited.
2. The study evaluated short term effects over 6 week period, and the long term sustained ability of the observed improvement is unknown.
3. Lack of standardized diagnostic criteria, can effect accuracy of results.
4. Both NPRS and MODI rely on self-reporting, which can be influenced by individual perception, emotional state or expectations.

5.3 Recommendations

1. Adding a Control group can helps to evaluate true effective intervention.
2. Future studies should consider to add participants with Acute Sacroiliac joint Dysfunction to provide deeper insight into treatment.
3. Use of blindness can help to distinguish the true effective intervention.
4. Future studies should consider a broader range of participants in terms of age, life style and activity level to increase the relevance of results to different groups.

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