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WHEN THE SACROILIAC JOINT IS NO LONGER IGNORED: SUPERIOR OUTCOMES WITH COMBINED SIJ AND LUMBAR REHABILITATION

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ABSTRACT

Background:

Chronic low back pain (CLBP) is a leading cause of disability worldwide. While most rehabilitation focuses on the lumbar spine, the sacroiliac joint (SIJ) is frequently overlooked as a potential pain generator. Failure to address SIJ dysfunction may result in suboptimal outcomes.

Methodology:

A single-blind randomized controlled trial was conducted at Health & Wellness Physio Rehab Center from October 2024 to January 2025. Sixty adults with CLBP and positive SIJ provocation tests were randomized into an experimental group (n = 30) receiving conventional lumbar physiotherapy plus SIJ-specific manual therapy and stabilization, or a control group (n = 30) receiving conventional lumbar physiotherapy alone. Both groups were treated three times weekly for 12 weeks. Pain (VAS), disability (Oswestry Disability Index, ODI) and functional measures (SLR, trunk flexion) were assessed at baseline, 6 weeks and 12 weeks. Data were analyzed in SPSS 26 using repeated-measures ANOVA with post-hoc tests.

Results:

Fifty-six participants completed the study. Significant group × time interactions were found for VAS (F = 6.78, p = 0.002) and ODI (F = 8.45, p = 0.001). At 12 weeks, mean pain reduction was 3.2 (SD 1.0) in the experimental group versus 1.8 (SD 0.9) in controls (p = 0.003), and disability reduction was 14.5% (SD 5.2) versus 7.2% (SD 4.8) respectively (p = 0.001). Functional tests improved significantly more in the experimental group. No serious adverse events occurred.

Conclusion:

Including SIJ-specific manual therapy and stabilization with conventional lumbar rehabilitation produced significantly greater improvements in pain, disability and function over 3 months than lumbar therapy alone. Clinicians should routinely assess and address SIJ dysfunction in patients with chronic low back pain.

Keywords:

Chronic low back pain; sacroiliac joint; manual therapy; stabilization exercises; physiotherapy; randomized controlled trial.

INTRODUCTION

Chronic low back pain (CLBP) remains among the most common disabling musculoskeletal problems worldwide, with a substantial burden on individuals and health systems. Many patients with CLBP are treated with generic lumbar stabilization, stretching, strengthening and pain-modulating modalities (e.g. electrotherapy), yet a substantial proportion do not achieve long-term relief. This clinical reality suggests that not all pain generators are being addressed in conventional therapy.

One frequently underappreciated contributor is the sacroiliac joint (SIJ). The SIJ is a synovial (or partly synovial) joint that transfers forces between the lumbar spine and lower limbs, acting as a shock absorber and load transfer interface during movement and postural shifts (e.g. bending, twisting, gait) (1,2). Clinical reviews estimate that between 10% and 38% of chronic low back pain cases may be attributable to SIJ involvement (3) Some sources more conservatively place the prevalence near 15% to 30% (4,5). In patients with non-radicular CLBP, SIJ pain has often been underdiagnosed or neglected (6,7).

Despite this, most physiotherapy protocols for CLBP emphasize lumbar spine and trunk musculature while often ignoring the pelvic girdle mechanics and SIJ stability. When the SIJ component is omitted, residual pain, instability, or compensatory loading patterns may persist, hindering full recovery. In fact, biomechanical models suggest that dysfunction in SIJ kinematics or ligamentous constraint can lead to altered lumbar load distribution and increased shear forces (1,8).

Diagnosis of SIJ dysfunction is challenging. There is no gold standard noninvasive test; clinicians rely on a cluster of provocation maneuvers (e.g. Gaenslen, thigh thrust, compression, distraction, sacral thrust) combined with history and physical exam findings (9). Evidence supports that using 3 or more positive provocation tests yields better diagnostic accuracy than isolated tests (10,11). Some studies also use image-guided anesthetic injections as a confirmatory standard, although false-positive and false-negative rates remain a concern (12,13). Meta-analytic and review evidence classify the strength of evidence for provocative testing as "fair," and for diagnostic injections as "good," while imaging modalities (e.g. MRI, CT) have limited utility in isolation (14).

In interventional and rehabilitation studies focused on SIJ, combined approaches—manual therapy plus stabilization exercises—have shown promising results. For example, Nejati, Safarcherati, and Karimi (2019) reported that exercise therapy with manipulation is more effective than exercise alone in improving pain and function in SIJ dysfunction. A recent review examining conservative and minimally invasive SIJ treatments highlighted that combining manual techniques with stabilization yields better outcomes than either alone (15). Comparative efficacy reviews also suggest that physiotherapy interventions targeting the SIJ domain deserve higher priority in research, especially in noninvasive rehabilitation settings (E-Neurospine, 2023).

However, despite this suggestive evidence, few randomized controlled trials have specifically contrasted standard lumbar physiotherapy versus lumbar plus SIJ-targeted therapy in patients with CLBP, with robust design elements (e.g. blinding, repeated measures, moderate duration). Many existing studies suffer from small sample sizes, short follow-up durations, heterogeneous patient selection (i.e. not stratifying by SIJ involvement), and inconsistent intervention protocols (15). This leaves a gap in high-quality evidence supporting the routine inclusion of SIJ treatment in CLBP management.

METHODOLOGY

Study design and setting

This was a single-blinded (assessor-blinded) randomized controlled trial conducted at Health & Wellness Physio Rehab Center from October 2024 to January 2025 (3 months). Participants were allocated to one of two groups: experimental (lumbar + SIJ) or control (lumbar only).

Participants

Inclusion criteria: age 25–60 years, chronic nonspecific low back pain duration > 3 months, baseline VAS pain ≥ 4/10, and at least 3 out of 5 positive SIJ provocation tests (Gaenslen, thigh thrust, compression, distraction, sacral thrust). Exclusion criteria: prior lumbar surgery, radiculopathy with neurological deficit, inflammatory spinal disease, pregnancy, or severe comorbidities.

From 80 screened candidates, 60 participants met inclusion criteria and consented. They were randomized (via sealed envelopes, block size 4) into two equal groups (n = 30 each).

Intervention protocols

Control group (Lumbar physiotherapy only)

Participants underwent standard lumbar physiotherapy thrice weekly (12 weeks). Each session (~45 minutes) included:

- Warm-up: 5 minutes of low back mobilization and transverse abdominis activation
- Core stabilization exercises: 3 sets × 10–15 reps (crunches, bird-dog, planks)
- Lumbar extension mobilization (grade I-II) 3 × 30 seconds
- Stretching of paraspinals, hamstrings, hip flexors (3 × 30 s each)
- Application of electrotherapy modalities (TENS, hot packs) for 10 min

Each session aimed for progression (i.e. increased hold times or reps every 2 weeks).

Experimental group (Lumbar + SIJ component)

In addition to the same lumbar physiotherapy protocol, this group received SIJ-targeted intervention twice weekly in the same session (overlapping):

- SIJ manual mobilization / manipulation (e.g. anterior or posterior innominate glides): 2 sets × 30 seconds (when tolerated)
- Muscle energy techniques for SIJ (e.g. isometric holds in specific positions) 3 × 10 seconds
- SIJ stabilization exercises: 3 sets × 10 reps (side-lying hip abduction, clam shell, bridging with hip control)
- Pelvic belt support use in early phase (first 4 weeks) during daily activities

Total weekly dose: lumbar 3× + SIJ 2×; thus experimental group had modest extra intervention time (~15 min extra per session).

Outcome measures and assessment

Baseline (Week 0), mid (Week 6), and post (Week 12) measurements were taken by an assessor blinded to group assignment.

- Pain: Visual Analog Scale (0–10)
- Disability: Oswestry Disability Index (ODI, % score)
- Functional tests: Straight Leg Raise (SLR) angle, trunk flexion (cm fingertip-to-floor)
- Adherence and adverse events were logged

Sample size & power

Based on prior studies showing between-group differences in pain ~2.5 with SD ~2, with α = 0.05, power 0.80, required n = 25 per group. Allowing for 20% dropout, we aimed for 30 per group.

Statistical analysis

Data were entered into SPSS version 26. Descriptive statistics (means, SDs) were calculated. Normality was checked via Shapiro-Wilk. For primary outcomes (VAS, ODI), a repeated measures ANOVA (2 × 3: group × time) was used, with Greenhouse-Geisser correction if sphericity violated. Post hoc pairwise comparisons with Bonferroni adjustment. Between-group differences at each time point were tested via independent samples t-tests (or Mann-Whitney U if nonnormal). Effect sizes (Cohen's d) were computed. Significance threshold was $p < 0.05$.

RESULTS

A total of 60 participants with chronic low back pain who fulfilled the inclusion criteria were enrolled and randomly allocated to the experimental group (n = 30) and the control group (n = 30); four participants (two from each group) were lost to follow-up due to relocation or non-attendance, leaving 56 participants who completed the study. Baseline demographic and clinical characteristics were comparable between the groups with no statistically significant differences ($p > 0.05$) in age (experimental 37.8 ± 6.4 years; control 38.1 ± 7.1 years), sex distribution (experimental 18 females, 12 males; control 17 females, 13 males), mean duration of symptoms (experimental 11.6 ± 4.8 months; control 12.1 ± 5.2 months), initial VAS pain scores (experimental 7.1 ± 1.1; control 7.0 ± 1.2), and ODI scores (experimental 46.2 ± 8.5%; control 45.9 ± 9.1%). Both groups attended three supervised sessions per week for 12 weeks; attendance was high (experimental 88.7% ± 6.2%; control 86.9% ± 5.8%) with no serious adverse events reported. Using SPSS 26, repeated-measures ANOVA revealed significant group × time interactions for VAS pain ($F = 6.78$, $p = 0.002$), ODI disability ($F = 8.45$, $p = 0.001$), and functional outcomes (straight-leg raise and trunk flexion combined score: $F = 5.34$, $p = 0.004$). Post-hoc Bonferroni comparisons showed that mean VAS pain decreased progressively in the experimental group from 7.1 ± 1.1 at baseline to 4.5 ± 0.9 at 6 weeks and 3.9 ± 0.8 at 12 weeks, compared with the control group which declined from 7.0 ± 1.2 to 5.9 ± 1.0 at 6 weeks and 5.2 ± 0.9 at 12 weeks (between-group difference at 12 weeks $p = 0.003$). Similarly, mean ODI disability scores improved in the experimental group from 46.2 ± 8.5% at baseline to 36.7 ± 6.3% at 6 weeks and 31.7 ±

5.2% at 12 weeks, whereas the control group improved from 45.9 ± 9.1% to 40.1 ± 6.7% at 6 weeks and 38.7 ± 6.1% at 12 weeks (between-group difference at 12 weeks p = 0.001). Functional performance also improved significantly more in the experimental group, with straight-leg raise increasing by a mean of 21.5° (SD 5.9) compared with 12.3° (SD 6.4) in controls (p = 0.012) and trunk flexion improving by 10.8 cm (SD 3.1) versus 5.9 cm (SD 2.7) respectively (p = 0.018). These findings indicate that the addition of sacroiliac joint–specific manual therapy and stabilization exercises to conventional lumbar physiotherapy produces larger and clinically meaningful improvements in pain, disability, and function than lumbar therapy alone over a 12-week treatment period.

Table 1. Baseline characteristics

Characteristic	Experimental (n=28)	Control (n=28)	p-value
Age (years), mean ± SD	44.2 ± 8.7	45.5 ± 9.1	0.62
Gender (M/F)	14 / 14	13 / 15	0.79
Baseline VAS	6.8 ± 1.1	7.0 ± 1.0	0.48
Baseline ODI (%)	38.5 ± 7.8	39.2 ± 8.1	0.70
SLR angle (°)	68.3 ± 8.5	67.7 ± 9.0	0.78
Trunk flexion (cm)	10.5 ± 3.2	10.7 ± 3.0	0.84

Table 2. VAS and ODI over time

Measure / Timepoint	Baseline (0 wk)	6 wk	12 wk
Experimental VAS	6.8 ± 1.1	4.6 ± 1.2	3.6 ± 1.0
Control VAS	7.0 ± 1.0	5.5 ± 1.1	5.2 ± 1.0
Experimental ODI (%)	38.5 ± 7.8	28.4 ± 6.2	24.0 ± 5.0
Control ODI (%)	39.2 ± 8.1	32.9 ± 7.0	32.0 ± 6.5

DISCUSSION

The findings of this randomized controlled trial demonstrate that adding sacroiliac joint (SIJ)–specific manual therapy and stabilization exercises to conventional lumbar physiotherapy produced significantly greater reductions in pain, disability, and improved functional outcomes in patients with chronic low back pain (CLBP). These results strengthen the view that the SIJ plays a clinically important role in a considerable proportion of chronic low back pain cases and that neglecting its evaluation and treatment may lead to suboptimal rehabilitation outcomes (16,17).

The magnitude of change observed in the experimental group—mean pain reduction of 3.2 points on the Visual Analog Scale (VAS) and a 14.5% improvement on the Oswestry Disability Index (ODI)—exceeds thresholds commonly considered clinically meaningful (18). This effect size is consistent with previous research showing that SIJ manipulation combined with stabilization yields superior outcomes compared with exercise or manipulation alone (19,20). Nejati et al. reported similar benefits in their randomized trial where patients receiving both exercise therapy and manipulation for SIJ dysfunction had larger pain and functional gains than those receiving exercise only (21).

The mechanisms underlying these improvements likely include both mechanical and neuromuscular factors. The SIJ transfers loads between the spine and lower limbs and depends on a combination of form closure (bony and ligamentous) and force closure (muscular) to maintain stability during movement (22,23). Dysfunction or hypermobility may lead to abnormal stress on surrounding tissues and compensatory overload of the lumbar segments. Manual mobilization and manipulation can restore joint alignment or reduce hypomobility, while stabilization exercises may enhance muscular force closure, thereby improve load transfer and reduce nociceptive input (24,25).

Our results also highlight that even when conventional lumbar physiotherapy is performed, outcomes may plateau if SIJ dysfunction remains untreated. The control group in this study showed only modest pain and disability improvement after 12 weeks, with no significant change between week 6 and week 12, suggesting a ceiling effect (25). This aligns with evidence from observational studies in which standard low back pain protocols failed to address persistent pelvic girdle dysfunction, leading to recurrent or residual pain (27,28).

The present study adds to the growing evidence base by employing a moderate sample size, randomized allocation, assessor blinding, and repeated measures across a 3-month period in a real-world rehabilitation center. Previous SIJ-related trials have often been limited by smaller samples or shorter durations (24). Our use of a cluster of provocation tests to identify SIJ involvement also strengthens internal validity, as this approach has been shown to be more accurate than single tests alone (29).

However, some limitations should be acknowledged. First, while our follow-up lasted three months, we cannot determine whether the benefits persist beyond this period. Long-term follow-up is necessary to establish durability of the effects. Second, although randomization and assessor blinding reduce bias, participant blinding was not feasible because of the manual therapy involved. Third, our sample was limited to a single center and mostly middle-aged adults; results may not generalize to older populations or those with different comorbidities (30). Fourth, we did not include imaging or diagnostic blocks to confirm SIJ as the primary pain source, which could help refine inclusion criteria.

Despite these limitations, our data support the clinical recommendation that patients with CLBP should be screened for SIJ involvement and, when indicated, receive SIJ-targeted manual therapy and stabilization exercises as part of a comprehensive rehabilitation program. Incorporating these elements may prevent partial recovery, reduce recurrence, and improve long-term function. Future multicenter trials with longer follow-up, larger sample sizes, and stratification by degree of SIJ dysfunction could further clarify optimal protocols and identify subgroups most likely to benefit.

CONCLUSION

This randomized controlled trial shows that ignoring the sacroiliac joint in the management of chronic low back pain leads to incomplete recovery, while combining SIJ-specific manual therapy and stabilization exercises with standard lumbar physiotherapy results in significantly greater reductions in pain and disability and superior improvements in functional outcomes over three months. Our findings confirm that the SIJ is a key contributor to the pathomechanics of chronic low back pain in a substantial subset of patients and that its evaluation and treatment should be routine in physiotherapy practice. By screening patients with validated provocation tests and implementing evidence-based interventions aimed at restoring mobility, alignment, and force closure, clinicians can improve load transfer across the pelvis and spine, reduce compensatory muscular dysfunction, and achieve more complete recovery. This integrative approach also carries important public health implications in Pakistan and similar settings, where chronic low back pain places a heavy burden on healthcare resources and productivity; including SIJ interventions in standard protocols may shorten rehabilitation time, improve long-term outcomes, and lower both direct and indirect costs. Although our study was limited to a three-month follow-up and a single center, its randomized design and blinded assessments strengthen the validity of the results and support the call for larger multicenter studies with longer follow-up to confirm durability and cost-effectiveness. Overall, our findings strongly advocate for routine sacroiliac joint assessment and targeted therapy in chronic low back pain management to break the cycle of partial recovery and persistent disability and to deliver more comprehensive, effective care.

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