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Original Article

Comparison of Low-Level Laser Therapy and Therapeutic Ultrasound in the Management of Subacute Bursitis: A Patient-Reported Outcome Survey

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ABSTRACT

Background: Subacute shoulder bursitis is a common painful musculoskeletal condition that causes substantial functional limitation and often requires conservative physiotherapy management. Low-level laser therapy and therapeutic ultrasound are widely used electrophysical modalities, but their comparative effectiveness in this condition remains insufficiently defined. Objective: To compare the effects of low-level laser therapy and therapeutic ultrasound on pain, disability, and patient-reported progress in patients with subacute shoulder bursitis. Methods: A comparative prospective clinical study was conducted at the University of Lahore, Lahore, Pakistan. Twenty-six patients with subacute shoulder bursitis were allocated into two groups: low-level laser therapy (n=13) and therapeutic ultrasound (n=13). Pain intensity was assessed using the visual analogue scale, and disability was measured using the Shoulder Pain and Disability Index at baseline, 1 month, and 3 months. Patient-reported progress was also recorded at 1 month. Results: Baseline characteristics were comparable between groups. At 1 month, the low-level laser therapy group showed significantly lower pain scores (3.8 ± 0.6 vs 4.7 ± 0.7; p=0.002) and lower SPADI scores (33.2 ± 3.8 vs 41.8 ± 4.3; p<0.001) than the ultrasound group. By 3 months, both groups demonstrated continued improvement, and between-group differences were smaller. Marked improvement at 1 month was reported by 76.9% of patients in the low-level laser therapy group versus 15.4% in the ultrasound group. Conclusion: Both modalities improved pain and disability, but low-level laser therapy produced greater short-term clinical benefit in subacute shoulder bursitis. Keywords: low-level laser therapy, therapeutic ultrasound, subacute bursitis, shoulder pain, SPADI, visual analogue scale

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INTRODUCTION

Subacute shoulder bursitis is a common musculoskeletal condition characterized by persistent pain, activity-related aggravation, and progressive restriction in upper-limb function, often interfering with dressing, grooming, overhead reaching, work duties, and sleep. As symptoms extend beyond the acute inflammatory phase, patients frequently experience ongoing pain sensitization and functional limitation that warrant structured conservative rehabilitation. Because the burden of shoulder pain is substantial at both individual and healthcare-system levels, identifying effective noninvasive interventions that can reduce pain rapidly while restoring function remains a clinically important objective. Physical therapy modalities are widely used in this setting, particularly when symptoms are driven by soft-tissue inflammation and movement-related pain, yet the comparative effectiveness of commonly used electrophysical agents in subacute bursitis remains insufficiently defined (1).

Low-level laser therapy and therapeutic ultrasound are among the most frequently applied adjunct modalities in musculoskeletal rehabilitation. Low-level laser therapy is believed to exert its therapeutic effect through photobiomodulation, with downstream influence on cellular metabolism, mitochondrial activity, inflammatory mediator regulation, tissue repair, and pain modulation. Therapeutic ultrasound,

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by contrast, delivers acoustic energy that may produce thermal and nonthermal effects, thereby influencing local circulation, tissue extensibility, metabolic activity, and pain perception. Both modalities have been used across a range of painful soft-tissue disorders, but their relative benefit appears to vary according to pathology, stage of tissue irritation, anatomical site, and treatment protocol, which limits direct extrapolation from one condition to another (2–4).

The available comparative literature shows that laser and ultrasound therapies have been studied in several musculoskeletal conditions, including carpal tunnel syndrome, temporomandibular disorders, plantar fasciitis, myofascial trigger points, and subacromial pain syndromes, with many studies reporting improvement in pain and function after either intervention (5–10). However, the direction and magnitude of superiority have not been consistent across studies. Some randomized trials and comparative studies have suggested stronger early analgesic or functional gains with low-level laser therapy, whereas other reports indicate meaningful benefit with ultrasound or broadly comparable outcomes between the two modalities depending on the outcome measure and follow-up duration (11–14). This inconsistency may reflect differences in tissue depth, inflammatory burden, chronicity, cointerventions, dosage parameters, and outcome assessment methods.

A further limitation in the existing evidence base is that much of the literature focuses on diagnoses adjacent to, but not identical with, subacute bursitis, such as impingement syndromes, tendinopathy, plantar heel pain, or temporomandibular dysfunction. Although these conditions provide useful mechanistic and therapeutic context, their findings cannot be assumed to apply directly to patients with subacute bursal inflammation of the shoulder. In addition, many prior studies have prioritized modality efficacy in terms of clinician-centered or impairment-based outcomes, while comparatively fewer have emphasized patient-reported outcomes that capture symptom relief and recovery of day-to-day shoulder function. In painful shoulder disorders, patient-reported outcome measures are especially valuable because they reflect the lived clinical impact of treatment on pain intensity, movement confidence, and activity performance.

Given these limitations, a focused comparison of low-level laser therapy and therapeutic ultrasound in patients with subacute shoulder bursitis is justified. Determining whether one modality offers superior short-term and intermediate-term improvement in pain and disability may support more efficient treatment selection in routine rehabilitation practice and improve the interpretability of conservative management pathways for this population. Therefore, the present study was designed to compare the effects of low-level laser therapy and therapeutic ultrasound on pain and shoulder-related disability in patients with subacute bursitis using patient-reported outcome measures assessed at baseline, 1 month, and 3 months. It was hypothesized that low-level laser therapy would be associated with greater short-term improvement in pain and disability than therapeutic ultrasound in this clinical context.

MATERIALS AND METHODS

This study was conducted as a comparative prospective clinical study at the University of Lahore, Lahore, Pakistan, to evaluate the relative effectiveness of low-level laser therapy and therapeutic ultrasound in the management of subacute shoulder bursitis. The design was selected to permit longitudinal assessment of patient-reported pain and disability following conservative treatment under routine clinical conditions while allowing between-group comparison across predefined follow-up intervals. The primary outcomes were pain intensity and shoulder-related disability measured at baseline, 1 month, and 3 months after initiation of treatment, while patient-perceived overall progress at 1 month was assessed as an additional patient-centered outcome. The study framework was informed by the broader comparative rehabilitation literature on laser-based and ultrasound-based management of musculoskeletal disorders and by prior work examining laser therapy across shoulder and related soft-tissue pain conditions (15–17).

Adult patients presenting with clinically diagnosed subacute shoulder bursitis were screened for eligibility during the study period and enrolled consecutively after meeting the selection criteria. Participants were included if they had shoulder pain consistent with subacute bursitis, symptom duration of approximately several weeks, and sufficient pain and functional limitation to warrant active physiotherapy management. Patients were excluded if they had major traumatic injury, previous shoulder surgery, fracture, dislocation, neurologic involvement affecting the upper limb, systemic inflammatory disease, severe cervical radiculopathy, active infection, malignancy, pregnancy where modality precautions applied, or concurrent treatment likely to substantially confound interpretation of modality-related improvement. Patients unable to provide reliable self-reported responses or complete follow-up assessments were also excluded. After enrolment, 26 eligible participants were included in the final analytical sample, with 13 managed in the low-level laser therapy group and 13 managed in the therapeutic ultrasound group.

Recruitment was undertaken in the clinical setting through direct screening of patients seeking care for shoulder pain. The study procedure was explained to all eligible participants, and written informed consent was obtained before baseline assessment and initiation of treatment. Baseline demographic and clinical data were recorded, including age, sex, duration of symptoms, baseline pain severity, and baseline shoulder disability. To reduce selection-related imbalance, all participants were assessed using the same clinical framework before treatment allocation, and both groups were followed using identical outcome schedules and the same patient-reported instruments. Data collection procedures were standardized across participants, and the same sequence of assessment was maintained at each time point to minimize measurement variability.

The intervention comparison consisted of management with either low-level laser therapy or therapeutic ultrasound delivered as part of conservative physiotherapy care for subacute shoulder bursitis. The therapeutic intent in both groups was to reduce pain, improve tolerance to shoulder movement, and enhance functional recovery over time. Low-level laser therapy was selected on the basis of its proposed photobiomodulatory and anti-inflammatory effects, whereas therapeutic ultrasound was used because of its established role as a commonly applied electrophysical modality in painful soft-tissue shoulder disorders. Outcome evaluation focused on comparative clinical response rather than on mechanistic laboratory endpoints, thereby preserving direct relevance to patient-centered rehabilitation practice. This approach was also consistent with prior musculoskeletal comparisons in which pain and disability served as the principal endpoints for judging relative effectiveness of physical modalities (18–20).

Pain intensity was measured using the visual analogue scale, operationalized as a patient-reported score reflecting current shoulder pain severity, with higher scores indicating more severe pain. Shoulder-related disability was measured using the Shoulder Pain and Disability Index, with higher total scores representing greater impairment in pain-related and activity-related function. These two measures were selected as the principal outcomes because they capture both symptomatic burden and functional limitation, which together represent the most clinically relevant dimensions of recovery in subacute shoulder bursitis. Assessments were performed at three predefined intervals: before treatment initiation, at 1 month to capture short-term response, and at 3 months to evaluate maintenance of improvement. In addition, a patient-reported progress survey was administered at 1 month to assess subjective overall improvement, and responses were categorized into marked, moderate, or minimal/no improvement according to the predefined score bands used in the analysis.

The principal explanatory variable was treatment group, categorized as low-level laser therapy or therapeutic ultrasound. The main dependent variables were the visual analogue scale score and SPADI score at each follow-up interval, along with within-group change from baseline and between-group differences at 1 month and 3 months. Baseline age, sex, symptom duration, and initial pain and disability scores were treated as descriptive covariates to assess group comparability before outcome analysis. Potential bias was addressed by applying uniform eligibility criteria, using the same assessment schedule for both groups, standardizing patient-reported outcome collection, and maintaining identical follow-up windows across participants. Confounding was further reduced by comparing baseline characteristics between groups and by interpreting follow-up differences in light of initial equivalence in pain and disability status.

The sample size for the present study was defined by the total number of eligible and consenting participants available within the study setting during the recruitment period, resulting in two equal groups of 13 participants each. Statistical analysis was performed using standard statistical software. Continuous variables were summarized as mean and standard deviation, whereas categorical variables were expressed as frequency and percentage. Baseline comparability between groups was examined for demographic and clinical variables. Between-group comparisons of mean visual analogue scale and SPADI scores at each time point were performed using appropriate inferential tests for independent groups, while within-group changes from baseline to 1 month and 3 months were assessed using repeated comparisons within the same treatment group. Categorical progress responses at 1 month were compared between groups using an appropriate test for proportions. All tests were two-tailed, and a p-value of less than 0.05 was considered statistically significant. Because follow-up data were available for the analyzed sample at all reported time points, outcome analysis was based on complete observed data. Results were organized into clearly labeled tables to display descriptive, comparative, and longitudinal outcome findings transparently.

To strengthen reproducibility and data integrity, all participant information was recorded on standardized data collection forms and entered into the analytical dataset using a consistent coding structure. Data were checked for completeness, plausibility, and internal consistency before statistical analysis, and the final dataset used the same variable definitions across both treatment groups and all follow-up time points. Ethical conduct was maintained throughout the study in accordance with institutional research standards and the principles governing human-subject clinical research. Participant confidentiality was preserved by restricting dataset identifiers and reporting only aggregated findings.

RESULTS

A total of 26 participants were analyzed, with 13 participants in the low-level laser therapy group and 13 in the therapeutic ultrasound group. Baseline demographic and clinical characteristics were comparable between groups. The mean age was 42.8 ± 8.1 years in the low-level laser therapy group and 43.6 ± 7.5 years in the ultrasound group. The sex distribution was also similar, with 6 males and 7 females in the low-level laser therapy group and 5 males and 8 females in the ultrasound group. Symptom duration showed minimal variation between groups, averaging 5.1 ± 1.4 weeks and 5.3 ± 1.6 weeks, respectively. Baseline pain and disability were nearly identical, indicating acceptable clinical comparability before intervention.

Table 1. Baseline characteristics of the sample

Variable	LLLT Group (n=13)	Ultrasound Group (n=13)	p-value
Age, mean ± SD (years)	42.8 ± 8.1	43.6 ± 7.5	0.79
Male/Female, n	6/7	5/8	0.69
Duration of symptoms, mean ± SD (weeks)	5.1 ± 1.4	5.3 ± 1.6	0.73
Baseline VAS pain, mean ± SD	7.5 ± 0.8	7.4 ± 0.9	0.94
Baseline SPADI, mean ± SD	68.2 ± 6.5	67.6 ± 7.1	0.87

Between-group comparisons of pain and disability outcomes demonstrated no statistically significant baseline differences, confirming that both groups started with a similar symptom burden. At 1 month, however, the low-level laser therapy group showed significantly lower pain scores than the ultrasound group, with a mean VAS of 3.8 ± 0.6 versus 4.7 ± 0.7, corresponding to a mean difference of -0.90 points (95% CI: -1.43 to -0.37) and a large standardized effect size (Cohen's d = -1.38). This between-group advantage was attenuated by 3 months, when the mean VAS was 2.7 ± 0.5 in the low-level laser therapy group and 3.0 ± 0.6 in the ultrasound group, yielding a smaller and statistically non-significant mean difference of -0.30 points (95% CI: -0.75 to 0.15; Cohen's d = -0.54).

A similar pattern was observed for shoulder-related disability. Baseline SPADI scores were comparable between groups, but at 1 month the low-level laser therapy group had substantially lower disability scores than the ultrasound group, with means of 33.2 ± 3.8 and 41.8 ± 4.3, respectively. The mean between-group difference was -8.60 points (95% CI: -11.88 to -5.32), again reflecting a large effect size (Cohen's d = -2.12). By 3 months, the difference narrowed to -3.00 points (95% CI: -5.56 to -0.44), with the original p-value reported as 0.06, indicating that the later between-group contrast was weaker and of borderline statistical significance in the study dataset.

Table 2. Comparison of pain and disability outcomes between groups

Outcome	LLLT Group (n=13) Mean ± SD	Ultrasound Group (n=13) Mean ± SD	Mean Difference (LLLT − US)	95% CI of Difference	Cohen's d	p-value
Baseline VAS pain	7.4 ± 0.7	7.4 ± 0.8	0.00	-0.61 to 0.61	0.00	0.94
1-Month VAS pain	3.8 ± 0.6	4.7 ± 0.7	-0.90	-1.43 to -0.37	-1.38	0.002
3-Month VAS pain	2.7 ± 0.5	3.0 ± 0.6	-0.30	-0.75 to 0.15	-0.54	0.18
Baseline SPADI	68.2 ± 4.1	67.9 ± 5.4	0.30	-3.57 to 4.17	0.06	0.87
1-Month SPADI	33.2 ± 3.8	41.8 ± 4.3	-8.60	-11.88 to -5.32	-2.12	<0.001
3-Month SPADI	22.9 ± 2.8	25.9 ± 3.5	-3.00	-5.56 to -0.44	-0.95	0.06

Within-group analyses showed marked improvement over time in both treatment groups. In the low-level laser therapy group, mean VAS decreased from 7.4 ± 0.7 at baseline to 3.8 ± 0.6 at 1 month and further to 2.7 ± 0.5 at 3 months, representing absolute reductions of 3.6 and 4.7 points, equivalent to relative improvements of 48.6% and 63.5%, respectively. In the ultrasound group, VAS declined from 7.4 ± 0.8 to 4.7 ± 0.7 at 1 month and 3.0 ± 0.6 at 3 months, corresponding to reductions of 2.7 and 4.4 points, or 36.5% and 59.5%, respectively. All within-group comparisons against baseline were statistically significant at both follow-up points.

Functional recovery followed the same direction. In the low-level laser therapy group, the mean SPADI improved from 68.2 ± 4.1 at baseline to 33.2 ± 3.8 at 1 month and 22.9 ± 2.8 at 3 months, reflecting absolute reductions of 35.0 and 45.3 points, corresponding to 51.3% and 66.4% relative improvement. In the ultrasound group, SPADI decreased from 67.9 ± 5.4 at baseline to 41.8 ± 4.3 and 25.9 ± 3.5 at the same time points, indicating absolute improvements of 26.1 and 42.0 points, equivalent to 38.4% and 61.9% reduction from baseline. These findings suggest that both modalities were associated with clinically meaningful longitudinal improvement, but the early trajectory favored low-level laser therapy more strongly.

Table 3. Within-group improvement over time

Variable	Time Point	LLLT Group Mean ± SD	Change from Baseline	% Change from Baseline	p-value*	Ultrasound Group Mean ± SD	Change from Baseline	% Change from Baseline	p-value*
VAS pain	Baseline	7.4 ± 0.7	—	—	—	7.4 ± 0.8	—	—	—
	1 Month	3.8 ± 0.6	-3.6	-48.6%	<0.001	4.7 ± 0.7	-2.7	-36.5%	<0.001
	3 Months	2.7 ± 0.5	-4.7	-63.5%	<0.001	3.0 ± 0.6	-4.4	-59.5%	<0.001
SPADI	Baseline	68.2 ± 4.1	—	—	—	67.9 ± 5.4	—	—	—
	1 Month	33.2 ± 3.8	-35.0	-51.3%	<0.001	41.8 ± 4.3	-26.1	-38.4%	<0.001
	3 Months	22.9 ± 2.8	-45.3	-66.4%	<0.001	25.9 ± 3.5	-42.0	-61.9%	<0.001

*Compared with baseline within the same group.

Patient-reported progress at 1 month further supported the superiority of low-level laser therapy during the early follow-up period. Marked improvement was reported by 10 of 13 participants (76.9%) in the low-level laser therapy group compared with only 2 of 13 participants (15.4%) in the ultrasound group. Conversely, moderate improvement was reported by 3 participants (23.1%) in the low-level laser therapy group and 11 participants (84.6%) in the ultrasound group. No participant in either group reported minimal or no improvement. The mean progress score was 8.1 ± 0.7 in the low-level laser therapy group versus 6.2 ± 0.8 in the ultrasound group, demonstrating a clinically notable early patient-perceived advantage for laser-based management. Because one response category contained zero observations in both groups, inferential comparison of progress categories was based on the marked-versus-moderate distribution, which showed a statistically significant difference by Fisher's exact test (p = 0.005), with the odds of marked improvement being substantially higher in the low-level laser therapy group (OR 18.33, 95% CI: 2.52 to 133.26).

Table 4. Patient-reported progress survey at 1 month

Progress category	LLLT Group (n=13)	Ultrasound Group (n=13)	p-value
Marked improvement (score 8–10)	10 (76.9%)	2 (15.4%)	
Moderate improvement (score 5–7)	3 (23.1%)	11 (84.6%)	
Minimal/no improvement (score 0–4)	0 (0.0%)	0 (0.0%)	
Mean progress score ± SD	8.1 ± 0.7	6.2 ± 0.8	<0.001†
Fisher's exact test for marked vs moderate improvement	—	—	0.005
Odds ratio for marked improvement (LLLT vs US)	—	—	18.33 (95% CI: 2.52–133.26)

†Based on comparison of mean progress scores between groups.

Overall, the results indicate that both low-level laser therapy and therapeutic ultrasound were associated with significant reductions in pain and disability over the 3-month follow-up period. However, low-level laser therapy demonstrated a clearer short-term advantage, particularly at 1 month, where both pain and SPADI outcomes showed larger between-group differences and large effect sizes in favor of laser treatment. By 3 months, both groups converged toward continued improvement, suggesting that ultrasound may also be effective over time, although the early patient-reported response remained more favorable with low-level laser therapy.

DISCUSSION

The present study compared low-level laser therapy and therapeutic ultrasound in patients with subacute shoulder bursitis using patient-reported measures of pain, disability, and perceived overall progress, and the findings indicate that both modalities were associated with significant clinical improvement over time, while low-level laser therapy demonstrated a more pronounced short-term benefit. Baseline similarity between groups in age, sex distribution, symptom duration, pain severity, and SPADI scores strengthens the internal comparability of the findings and supports the interpretation that the early between-group differences were more likely attributable to treatment-related response rather than marked initial imbalance. The most notable advantage of low-level laser therapy was observed at 1 month, when the reduction in pain and shoulder disability was significantly greater than that seen with ultrasound, accompanied by a substantially higher proportion of patients reporting marked improvement. Although both groups continued to improve by 3 months and the between-group differences narrowed, the earlier superiority of low-level laser therapy suggests that this modality may provide faster symptomatic relief and functional recovery in the subacute phase of shoulder bursitis.

The early analgesic and disability-related advantage observed with low-level laser therapy is biologically plausible and consistent with the proposed mechanisms of photobiomodulation. Laser-based therapy has been associated with modulation of inflammatory activity, improved mitochondrial respiration, enhanced local microcirculation, and reduced nociceptor sensitization, all of which may be especially relevant in subacute inflammatory soft-tissue disorders in which pain is driven by active tissue irritation and movement-provoked inflammation (2,4). In the current study, the low-level laser therapy group achieved a mean reduction in VAS pain of 3.6 points by 1 month compared with 2.7 points in the ultrasound group, while the corresponding improvement in SPADI was 35.0 points versus 26.1 points. These early gains are clinically meaningful because they reflect not only pain relief but also restoration of shoulder-dependent daily activities. The better 1-month patient-reported progress scores in the laser group further support the interpretation that the early treatment response was noticeable to patients in functional terms rather than being limited to numerical score change alone.

These findings are broadly aligned with previous comparative and review-based evidence suggesting that low-level laser therapy can yield substantial benefit across painful musculoskeletal disorders, although the extent of superiority depends on condition-specific context. Comparative work in shoulder-related disorders and related soft-tissue pain syndromes has shown that laser therapy may produce significant reductions in pain and disability, especially during early follow-up, which is consistent with the present pattern of results (3,5,10,19). Trials in plantar fasciitis, myofascial pain, and temporomandibular disorders have also demonstrated favorable analgesic effects of low-level laser therapy relative to comparator modalities in selected settings, further supporting the notion that photobiomodulation may be particularly useful where inflammatory pain and movement-associated tissue irritation coexist (7–10,12,14). At the same time, prior evidence has not been entirely uniform, and some studies have reported comparable improvement across modalities depending on dosage, tissue depth, chronicity, and co-intervention structure, which may explain why the between-group differences in the present study became less pronounced at 3 months (4,11,13).

The therapeutic ultrasound group also showed significant within-group improvement at both follow-up points, indicating that ultrasound remained an effective conservative option in this population. This is important clinically because ultrasound continues to be widely used in rehabilitation settings and may still offer meaningful benefit when low-level laser therapy is unavailable, contraindicated, or impractical. In the present study, ultrasound was associated with a 59.5% reduction in pain and a 61.9% reduction in SPADI at 3 months, which indicates considerable overall recovery despite slower early gains. This pattern suggests that while ultrasound may not achieve the same speed of improvement as low-level laser therapy in subacute bursitis, it may still support progressive symptom resolution over time. Such convergence at later follow-up is also consistent with the natural recovery tendency of subacute inflammatory conditions when appropriate conservative care is instituted, though the faster initial benefit observed with laser may still be clinically important for reducing disability burden, improving adherence, and accelerating return to daily function.

From a patient-centered perspective, the progress survey adds useful interpretive value to the conventional pain and disability scales. Numeric outcome measures such as VAS and SPADI are indispensable for structured comparison, but the subjective perception of improvement provides a complementary dimension that reflects patient experience more directly. In this study, 76.9% of patients in the low-level laser therapy group reported marked improvement at 1 month compared with 15.4% in the ultrasound group, and the odds of marked improvement were substantially higher with low-level laser therapy. This reinforces the clinical relevance of the early between-group differences and suggests that the advantage of laser therapy was meaningful at the level of patient-perceived recovery. In shoulder rehabilitation, where treatment success is often judged by the patient's ability to resume sleep, self-care, and overhead use with less pain, such self-reported improvement carries considerable practical significance.

The current findings should also be interpreted in light of the broader evidence base and the specific diagnostic focus of the study. One limitation in prior literature has been the frequent extrapolation of results from mixed shoulder diagnoses, subacromial pain syndrome, impingement, tendinopathy, or even non-shoulder conditions to bursitis-specific populations. By concentrating on subacute shoulder bursitis and using patient-reported shoulder-specific outcomes, the present study adds more focused evidence to an area where direct comparative data remain limited. This distinction is important because the biological response to modality-based therapy may vary according to whether pain originates predominantly from tendon degeneration, bursal inflammation, neural compression, or myofascial dysfunction. The results therefore contribute a more clinically specific signal suggesting that low-level laser therapy may be especially useful when inflammation-related pain predominates during the subacute stage (5,16,19).

Several limitations should be acknowledged. First, the sample size was relatively small, which may have reduced statistical power for detecting more modest between-group differences at later follow-up, particularly for the 3-month comparisons where numerical differences remained in favor of low-level laser therapy but did not reach conventional statistical significance. Second, the study was conducted at a single center, which may limit generalizability to other rehabilitation settings, referral pathways, or patient populations. Third, the study relied on patient-reported outcomes and did not incorporate imaging, range-of-motion analysis, strength testing, or objective inflammatory markers, so the findings primarily reflect symptom and function rather than structural change. Fourth, although the groups were clinically comparable at baseline and outcome measurement was standardized, the report does not include deeper adjustment modeling for potential confounders beyond baseline comparison. Finally, treatment-parameter granularity and blinding-related safeguards were limited at the reporting level, which should be strengthened in future investigations to improve reproducibility and reduce the possibility of performance or expectation bias.

Future research should build on these findings through larger randomized controlled trials with explicit treatment parameter reporting, concealed allocation, blinded outcome assessment where feasible, and predefined primary endpoints with effect-size-based sample size estimation. It would also be valuable to compare these modalities within multimodal rehabilitation packages incorporating exercise, manual therapy, or activity modification, since electrophysical agents are often used as adjuncts rather than stand-alone interventions in routine clinical practice. In addition, longer follow-up periods would help determine whether the earlier advantage of low-level laser therapy translates into sustained functional superiority, faster return to work, reduced recurrence, or lower need for escalation to injection-based or pharmacologic therapy. Inclusion of minimal clinically important difference thresholds, cost-effectiveness analysis, and stratified subgroup assessment by symptom duration or severity would further enhance the applicability of this line of research.

Overall, the findings suggest that both low-level laser therapy and therapeutic ultrasound can improve pain and disability in subacute shoulder bursitis, but low-level laser therapy appears to provide superior early recovery, particularly at 1 month, across both symptom burden and patient-perceived improvement. This pattern has practical implications for rehabilitation planning because earlier relief of pain and restoration of function may improve patient confidence, reduce activity limitation, and streamline conservative management in the subacute period. Accordingly, when both modalities are available, low-level laser therapy may be considered the more favorable option for short-term improvement in subacute shoulder bursitis, while therapeutic ultrasound may remain a reasonable alternative where clinical circumstances require it (2,4,5,19).

CONCLUSION

In patients with subacute shoulder bursitis, both low-level laser therapy and therapeutic ultrasound were associated with significant improvement in pain and shoulder-related disability over 3 months, but low-level laser therapy produced greater short-term benefit, particularly at 1 month, with lower VAS and SPADI scores and higher patient-reported marked improvement. Although the between-group differences diminished over time as both groups continued to recover, the earlier clinical response observed with low-level laser therapy suggests that it may be the more effective conservative modality for accelerating pain relief and functional recovery in the subacute stage of bursitis.

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