

Effectiveness of Ultrasound Therapy versus Kinesio Taping on Pain, Range of Motion, and Shoulder Functional Activities in Acute Supraspinatus Tendinitis Individuals

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Abstract: ***Background:** Acute supraspinatus tendinitis is one of the most common causes of shoulder pain and functional disability, particularly among individuals performing repetitive overhead activities. The condition is characterized by pain, reduced shoulder range of motion, impaired muscle performance, and limitations in activities of daily living. Therapeutic ultrasound and Kinesio taping are commonly used physiotherapy interventions; however, evidence comparing their effectiveness remains limited. **Aim:** To compare the effectiveness of ultrasound therapy and Kinesio taping on pain, shoulder range of motion, and shoulder functional activities among individuals with acute supraspinatus tendinitis. **Methodology:** A randomized comparative interventional study was conducted among 30 participants diagnosed with acute supraspinatus tendinitis. Participants were randomly allocated into two groups of 15 each. Group A received therapeutic ultrasound along with a conventional exercise programme, while Group B received Kinesio taping along with the same conventional exercise programme. Treatment was administered three sessions per week for four weeks. Outcome measures included the Numerical Pain Rating Scale (NPRS), Universal Goniometer, and the Shoulder Pain and Disability Index (SPADI). Assessments were performed before and after the intervention. **Results:** Both Group A and Group B demonstrated statistically significant improvements in pain, shoulder range of motion, and shoulder functional activities after four weeks of treatment ($p < 0.05$). However, Group A (Ultrasound Therapy) showed significantly greater improvement in pain reduction, shoulder range of motion, and functional activities, as measured by the NPRS, Universal Goniometer, and SPADI, compared with Group B (Kinesio Taping). **Conclusion:** Both Ultrasound Therapy and Kinesio Taping, when combined with a conventional exercise programme, were effective in reducing pain, improving shoulder range of motion, and enhancing shoulder functional activities in individuals with acute supraspinatus tendinitis. However, Ultrasound Therapy (Group A) demonstrated superior clinical outcomes compared with Kinesio Taping (Group B) and may therefore be considered the more effective intervention for the conservative management of acute supraspinatus tendinitis.*

Keywords: Acute supraspinatus tendinitis, Therapeutic Ultrasound, Kinesio Taping, Shoulder Pain, Range of Motion, Shoulder Pain and Disability Index (SPADI), Numerical Pain Rating Scale (NPRS)

1. Introduction

The shoulder joint is the most mobile joint in the human body and plays an essential role in activities of daily living, occupational tasks, and sporting activities. Its high mobility is achieved at the expense of stability, making it susceptible to musculoskeletal disorders. Rotator cuff pathology accounts for a major proportion of painful shoulder conditions, and the supraspinatus tendon is frequently affected because of its anatomical position beneath the

acromion, limited vascularity, and repeated mechanical loading.

The rotator cuff consists of the supraspinatus, infraspinatus, teres minor, and subscapularis muscles, which provide dynamic stabilization of the glenohumeral joint. The supraspinatus initiates the first 15° of shoulder abduction and contributes to humeral head stabilization throughout movement. Repetitive compression and tensile loading can result in tendon degeneration and clinical symptoms.

Patients commonly report lateral shoulder pain aggravated by overhead activities, lifting, reaching, or lying on the affected side. Clinical findings may include a painful arc, weakness during resisted abduction, and positive impingement-related tests. Risk factors include age-related degeneration, repetitive overhead activity, poor posture, scapular dyskinesia, occupational overuse, and sports-related repetitive loading.

Therapeutic ultrasound is a commonly used electrophysical modality in musculoskeletal physiotherapy. It produces thermal and non-thermal effects that may influence tissue extensibility, blood flow, cellular activity, collagen elasticity, and tissue repair. Kinesio taping is an elastic therapeutic technique intended to support injured tissues without restricting movement.

Although both interventions are widely used, comparative evidence for acute supraspinatus tendinitis is limited. Therefore, the present study was designed to compare their effects when each was combined with the same conventional exercise programme.

Aim

- To compare the effectiveness of ultrasound therapy versus Kinesio taping on pain, range of motion, and shoulder functional activities in individuals with acute supraspinatus tendinitis.

Objectives

- To assess the effect of therapeutic ultrasound on pain, shoulder range of motion, and functional activities.
- To assess the effect of Kinesio taping on pain, shoulder range of motion, and functional activities.
- To compare the effectiveness of therapeutic ultrasound and Kinesio taping on the selected outcome measures.

2. Methodology

Study Design: Randomized comparative interventional study.

Sample: 30 participants diagnosed with acute supraspinatus tendinitis, randomly allocated into two groups of 15.

Study Duration: 4 weeks; 3 sessions per week; total 12 sessions.

Sampling: Simple random sampling.

Outcome Measures

Outcome Measure	Purpose
Numerical Pain Rating Scale (NPRS)	Assessment of pain intensity
Universal Goniometer	Assessment of shoulder range of motion
SPADI	Assessment of shoulder pain and functional disability

Intervention

Group A – Therapeutic Ultrasound

Participants were positioned comfortably in sitting with the affected shoulder exposed. The shoulder was positioned in

slight extension and internal rotation using the Modified Crass position. Coupling gel was applied and the transducer was moved continuously over the supraspinatus tendon and greater tuberosity.

Weeks 1–2: Pulsed mode, 20%, 3 MHz, 1.5 W/cm², 8 minutes/session. Weeks 3–4: Pulsed mode, 3 MHz, 0.8 W/cm², 5 minutes/session. Treatment was administered three sessions per week.

Group B – Kinesio Taping

The skin was cleaned and dried before application. A Y-strip was applied around the deltoid region using approximately 15–25% tension. Two I-strips were applied across the supraspinatus region and glenohumeral joint using approximately 50–75% tension. Tape was applied three sessions per week with wear time up to 48 hours.

Conventional Exercise Programme

Both groups received pendulum exercises, active-assisted shoulder movements, wand exercises, finger ladder, scapular setting, postural correction, active ROM exercises, rotator cuff and deltoid isometric strengthening, scapular exercises, and stretching.

Study Algorithm

Participants → screening → informed consent → baseline assessment → pre-test NPRS, ROM and SPADI → randomization → Group A: Ultrasound + exercise / Group B: Kinesio taping + exercise → 3 sessions/week × 4 weeks → post-test → statistical analysis.

Statistical Analysis

Quantitative variables were expressed as means and standard deviations, while qualitative variables were expressed as frequencies and percentages. Student unpaired t-test was used for comparison of means. Statistical significance was considered at $p < 0.05$.

Baseline Characteristics

Variable	Group A	Group B	Total
Sample size	15	15	30
Male	7 (23.3%)	8 (26.7%)	15 (50%)
Female	8 (26.7%)	7 (23.3%)	15 (50%)
Right shoulder	8 (26.7%)	9 (30.0%)	17 (56.7%)
Left shoulder	7 (23.3%)	6 (20.0%)	13 (43.3%)

3. Results

Both treatment groups demonstrated statistically significant improvements in the selected outcome measures after four weeks.

NPRS: Group A reduced from 7.13 ± 1.06 to 2.33 ± 1.35 ($t = 27.495$, $p = 0.000$).

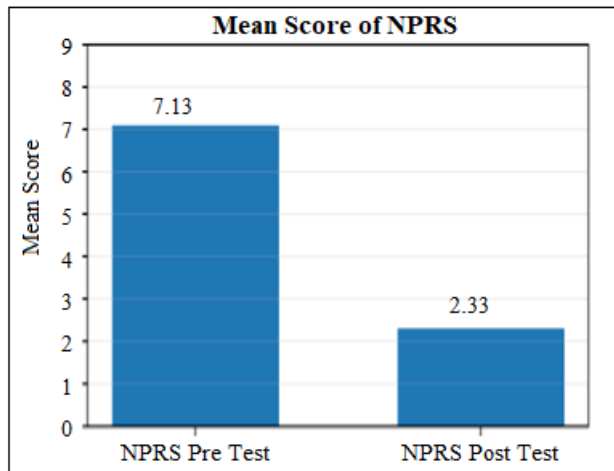


Figure 1: NPRS scores (Pre vs Post)

Table 1: NPRS scores (Pre vs Post)

Parameter	N	Mean	SD	t-value	p-value
NPRS Pre-test	15	7.13	1.06	27.495	0.000
NPRS Post-test	15	2.33	1.35		

Shoulder Abduction: Group A improved from $102.87^{\circ} \pm 14.85$ to $156.80^{\circ} \pm 18.48$ ($t = 33.238$, $p = 0.000$).

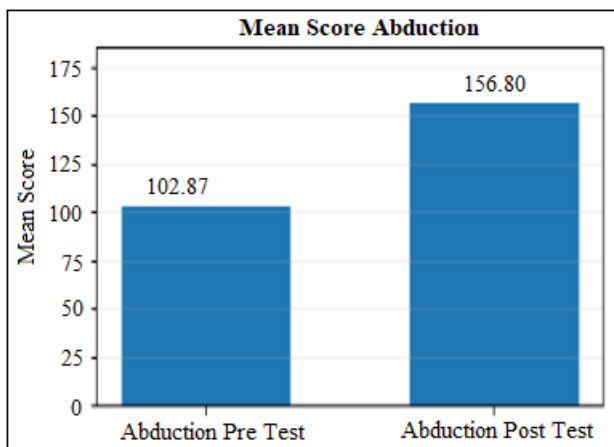


Figure 2: Shoulder Abduction (Pre vs Post).

Table 2: Shoulder Abduction (Pre vs Post).

Parameter	N	Mean	SD	t-value	p-value
Abduction Pre-test	15	102.87	14.85	33.238	0.000
Abduction Post-test	15	156.80	18.48		

SPADI: Group A reduced from 74.67 ± 8.52 to 28.20 ± 7.69 ($t = 33.512$, $p = 0.000$).

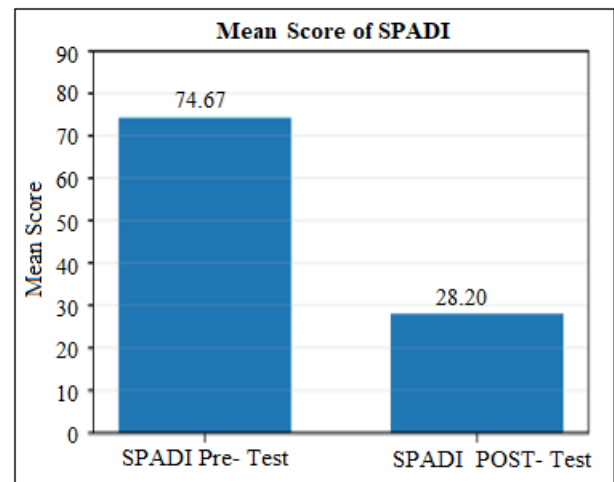


Figure 3: SPADI scores (Pre vs Post)

Table 3: SPADI scores (Pre vs Post)

Parameter	N	Mean	SD	t-value	p-value
SPADI Pre-test	15	74.67	8.52	33.512	0.000
SPADI Post-test	15	28.20	7.69		

Group B: NPRS 7.60 ± 1.30 to 4.33 ± 1.63 ; shoulder abduction $98.47^{\circ} \pm 14.75$ to $130.67^{\circ} \pm 14.77$; SPADI 72.13 ± 8.52 to 46.73 ± 10.29 .

Table 4: Comparison of Outcome Measures Between Group A and Group B.

Variable	Group	N	Mean	SD	t-value	p-value
NPRS Post	A	15	2.33	1.35	3.661	0.001
NPRS Post	B	15	4.33	1.63		
Abduction Post	A	15	156.80	18.48	4.279	0.000
Abduction Post	B	15	130.67	14.77		
SPADI Post	A	15	28.20	7.69	5.589	0.000
SPADI Post	B	15	46.73	10.29		

4. Discussion

The present study compared Therapeutic Ultrasound and Kinesio Taping on pain, shoulder range of motion, and functional activities among individuals with acute supraspinatus tendinitis. Thirty participants were randomly assigned into two groups. Group A received Therapeutic Ultrasound combined with conventional exercises, while Group B received Kinesio Taping combined with identical exercises.

Both groups demonstrated significant reductions in pain after four weeks. The reduction was greater in the Ultrasound Therapy group. Therapeutic ultrasound is described as producing thermal and non-thermal effects that may increase local circulation, improve collagen extensibility, reduce muscle spasm, and support tissue repair.

Kinesio Taping also demonstrated a significant reduction in pain. Its proposed mechanisms include cutaneous mechanoreceptor stimulation, proprioceptive feedback, and neuromuscular support.

Shoulder abduction range of motion improved significantly in both groups, with a greater increase in Group A. Reduced

pain and improved tissue extensibility may have allowed participants to move the shoulder more comfortably.

Functional improvement assessed using SPADI demonstrated significant changes in both groups. The greater reduction in Group A indicates greater improvement in the measured functional outcome during the four-week intervention.

The study also found statistically significant between-group differences in post-treatment NPRS, shoulder abduction, and SPADI values. Baseline comparisons were not statistically significant, indicating that the groups were comparable before intervention.

5. Conclusion

This randomized comparative interventional study evaluated Therapeutic Ultrasound and Kinesio Taping, each combined with a conventional exercise programme, in individuals with acute supraspinatus tendinitis. Both treatment groups demonstrated statistically significant improvements in pain, shoulder range of motion, and functional ability after four weeks.

Participants treated with Therapeutic Ultrasound demonstrated greater improvements in pain reduction, shoulder abduction range of motion, and SPADI scores compared with participants treated with Kinesio Taping in the present study.

6. Limitations

- Small sample size of 30 participants.
- Intervention duration was limited to four weeks.
- Long-term follow-up was not performed.
- Both groups received a conventional exercise programme.

7. Recommendations

Future studies should include larger sample sizes, longer treatment duration and follow-up, and additional outcomes such as muscle strength, quality of life, patient satisfaction, and imaging assessments.

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