Journal of Advanced Zoology
ISSN: 0253-7214
Volume ***45*** *Issue -****3 Year 2024*** *Page* ***01-10***

Comparative Study Of Hot Pack Along With Therapeutic Ultrasound And Exercise Verses Therapeutic Tecar Along With Myofacial Release And Exercise On Supraspinatus Tendinitis In Female

Kranti kumar[1], Dr Monika Sharma[2*]

[1]Post Graduate student MPT Sports 2 Associate ProfessorDepartment of Physiotherapy, Institute of applied medicine and research (IAMR)Atal Bihari vajpayee Medical university (ABVMU),Lucknow, India
[2]Department of Physiotherapy, Institute of applied medicine and research (IAMR)Atal Bihari Vajpayee Medical University (ABVMU),Lucknow, India.*

***Corresponding Author:**-Dr Monika Sharma*
**Associate Professor,HOD, Department of Physiotherapy Institute of Applied Medicines and research Ghaziabad, doctormonikasharma05@gmail.com*

Abstract

Background and objective: This study aimed to compare the efficacy of two treatment protocols for supraspinatus tendinitis in female patients: (1) hot pack combined with therapeutic ultrasound and exercise, and (2) therapeutic TECAR combined with myofascial release and exercise. The primary outcomes measured were pain reduction, improvement in range of motion (ROM), and functional recovery.
Methods: A randomized controlled trial was conducted with 60 female participants diagnosed with supraspinatus tendinitis, equally divided into two treatment groups. Group A received hot pack, therapeutic ultrasound, and exercise, while Group B received therapeutic TECAR, myofascial release, and exercise. Pain intensity was assessed using the Visual Analog Scale (VAS), ROM was measured for shoulder flexion, abduction, and external rotation, and functional recovery was evaluated using the Shoulder Pain and Disability Index (SPADI). Assessments were made at baseline, mid-point (three weeks), and post-treatment (six weeks).
Results: Both groups showed significant improvements in all measured outcomes. However, Group B demonstrated superior results across all parameters. At the mid-point and post-treatment assessments, Group B had significantly lower VAS scores compared to Group A, indicating greater pain reduction ($p < 0.05$). ROM improvements were also more pronounced in Group B, with significant differences in shoulder flexion, abduction, and external rotation ($p < 0.05$). Functional recovery, as measured by SPADI scores, was significantly better in Group B at both the mid-point and post-treatment evaluations ($p < 0.05$).
Conclusion: The combination of therapeutic TECAR and myofascial release with exercise proved to be more effective than hot pack and therapeutic ultrasound with exercise for managing supraspinatus tendinitis in female patients.

Keywords: Supraspinatus tendinitis, TECAR therapy, myofascial release, therapeutic ultrasound, functional recovery

INTRODUCTION

Supraspinatus tendinitis is a prevalent condition characterized by inflammation and degeneration of the supraspinatus tendon, part of the rotator cuff complex in the shoulder. This condition commonly arises from repetitive overhead activities, trauma, or degenerative changes and leads to shoulder pain and impaired function, significantly affecting the quality of life of those affected, particularly females [1]. The increasing incidence of shoulder pathologies necessitates the exploration of effective treatment modalities to manage and alleviate symptoms associated with supraspinatus tendinitis. Supraspinatus tendinitis is typically caused by repetitive microtrauma to the supraspinatus tendon, leading to inflammation, fibrosis, and eventual degeneration [2]. The supraspinatus muscle, one of the four rotator cuff muscles, plays a crucial role in shoulder abduction and stabilization. Chronic overuse or acute injury can result in tendon impingement against the acromion or coracoacromial ligament, exacerbating the inflammatory process and leading to tendinitis [3,4]

Patients with supraspinatus tendinitis typically present with shoulder pain, particularly during overhead activities, and may experience weakness and limited range of motion. The pain is often localized to the anterolateral aspect of the shoulder and can radiate down the arm. Clinical examination reveals tenderness over the greater tuberosity and pain with resisted shoulder abduction and external rotation [5]. Diagnostic imaging, including ultrasound and magnetic resonance imaging (MRI), is often employed to confirm the diagnosis and assess the extent of tendon involvement [6]. Conservative management of supraspinatus tendinitis traditionally involves a combination of rest, nonsteroidal anti-inflammatory drugs (NSAIDs), and physical therapy. Physical therapy modalities, including thermal therapy, therapeutic ultrasound, and exercise, are commonly used to alleviate pain, reduce inflammation, and restore function [7].

Hot pack therapy is widely used to manage musculoskeletal conditions, including tendinitis. The application of heat increases blood flow to the affected area, promoting tissue relaxation and pain relief [8]. Heat therapy is believed to enhance the extensibility of collagen tissues, reduce muscle spasm, and facilitate the removal of metabolic waste products [9]. However, the effects of heat therapy are often transient, and its efficacy in the long-term management of tendinitis remains debated [10]. Therapeutic ultrasound is a deep heating modality that utilizes high-frequency sound waves to promote tissue healing and reduce inflammation. The mechanical vibrations generated by ultrasound waves produce thermal and non-thermal effects, including increased cellular metabolism, enhanced blood flow, and reduced pain perception [11,12,13] Among these, therapeutic TECAR (Transfer of Energy Capacitive and Resistive) therapy and myofascial release have gained attention for their potential benefits.

Therapeutic TECAR therapy involves the application of high-frequency electromagnetic energy to the affected tissues. This modality operates on two modes: capacitive, which targets superficial tissues, and resistive, which penetrates deeper structures [14]. TECAR therapy is believed to promote tissue healing by increasing local blood flow, enhancing cellular metabolism, and reducing inflammation [15,16,17]

Myofascial release is a manual therapy technique that targets fascial restrictions to improve tissue mobility and reduce pain [18]. Myofascial release involves applying sustained pressure to the fascial tissues, promoting the release of adhesions and improving tissue elasticity [19]. This technique has been shown to enhance range of motion, reduce pain, and improve functional outcomes in various musculoskeletal conditions [20,21,22]. Despite the availability of various treatment options, the optimal approach for managing supraspinatus tendinitis remains unclear. While traditional modalities like hot pack therapy and therapeutic ultrasound are widely used, emerging therapies such as TECAR therapy and myofascial release offer potential advantages. However, there is limited research directly comparing these treatment modalities, particularly in the context of supraspinatus tendinitis in females.

Females may experience unique biomechanical and hormonal factors that influence the prevalence and progression of tendinitis [23]. Therefore, it is crucial to evaluate the efficacy of these treatment modalities in this specific population to guide clinical decision-making and improve patient outcomes. The primary aim of this study is to conduct a comparative analysis of two physiotherapeutic interventions for the management of supraspinatus tendinitis in females. The study aims to evaluate the effectiveness of a traditional approach involving hot pack, therapeutic ultrasound, and exercise in comparison to a modern intervention incorporating therapeutic Tecar, myofascial release, and exercise.

METHODOLOGY

3.1 Study Design

This study used a randomized controlled trial to evaluate the effectiveness of two treatment protocols for supraspinatus tendinitis in female patients. Participants were randomly assigned to either Group A, receiving hot pack, therapeutic ultrasound, and exercise, or Group B, receiving therapeutic TECAR, myofascial release, and exercise.

3.2 Study Setting

The study was conducted in the Department of Physiotherapy at a Yashoda super speciality hospital kaushambi Ghaziabad or OPD Physiotherapy Department IAMR collage Ghaziabad equipped with the necessary facilities and equipment for the interventions.

3.3 Study Duration

The study spanned one year, from January to December, encompassing participant recruitment, intervention administration, and follow-up assessments. Each participant underwent a six-week treatment period with evaluations at baseline, mid-point (three weeks), and post-treatment (six weeks). The six-month period was chosen to allow sufficient time for intervention effects to manifest and to provide a thorough evaluation of short-term outcomes, including data analysis and interpretation.

3.4 Study Participants

Inclusion criteria for participants were female patients aged 20 to 50 with a clinical diagnosis of supraspinatus tendinitis, persistent shoulder pain for at least three months, the ability to follow the study protocol, and willingness to provide written informed consent. Exclusion criteria included a history of shoulder instability, recent shoulder surgery, systemic inflammatory conditions, contraindications to therapeutic ultrasound or TECAR, pregnancy, other medical conditions affecting shoulder function, and participation in another clinical trial or physical therapy program during the study period.

3.5 Study Sampling

Participants were recruited using a convenience sampling method from female patients visiting the Department of Physiotherapy with a diagnosis of supraspinatus tendinitis.

3.6 Study Sample Size

A power analysis determined that 60 participants were necessary to detect significant differences between the two treatment groups with 80% power and a 0.05 significance level. Therefore, 30 participants were randomly assigned to each intervention group. This sample size was selected to ensure robust statistical analysis and reliable results, accounting for potential dropouts.

3.7 Study Procedure

Participants were randomly assigned to either Group A or Group B upon enrollment. Group A received hot pack treatment, therapeutic ultrasound, and a structured exercise program, while Group B received therapeutic TECAR, myofascial release, and a similar exercise program. Both groups attended three weekly sessions for six weeks, conducted by licensed physiotherapists. Group A's interventions focused on heat therapy and ultrasound, whereas Group B's interventions included TECAR and myofascial release, with both groups following structured exercise regimens.

3.8 Study Data Collection

Data were collected at baseline, mid-point (three weeks), and post-treatment (six weeks) using the Visual Analog Scale (VAS) for pain intensity, goniometer for range of motion (ROM), and the Shoulder Pain and Disability Index (SPADI) for functional status. VAS ratings ranged from 0 (no pain) to 10 (worst pain imaginable), ROM was measured in degrees for shoulder flexion, abduction, and external rotation, and SPADI scores assessed the functional impact of shoulder pain.

3.9 Study Data Analysis

Data analysis was performed using SPSS version 25.0. Descriptive statistics summarized participant demographics and baseline characteristics. Independent t-tests compared mean differences between groups at each time point, while paired t-tests assessed changes within groups. Repeated measures ANOVA evaluated changes over time within and between groups for each outcome measure, considering the interaction effects of time and treatment group. A significance level of $p < 0.05$ was considered statistically significant.

3.10 Ethical Considerations

The study adhered to ethical principles outlined in the Declaration of Helsinki and received ethical approval from the Institutional Review Board (IRB). Informed consent was obtained from all participants, who were assured of their right to withdraw at any time without consequences. Confidentiality and anonymity were maintained, with data securely stored and accessible only to the research team. The study ensured no undue risk or harm to participants.

RESULT AND ANALYSIS

4.1 Participant Demographics

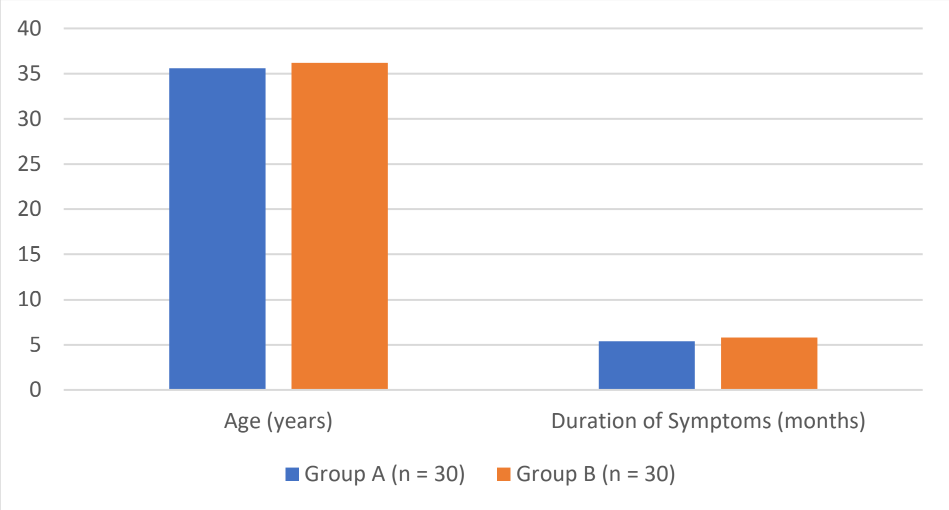
Demographic Characteristics of Participants

Table 1 presents the detailed demographic characteristics of the participants in both Group A and Group B, including p-values for statistical comparison.

Table 1: Demographic Characteristics of Participants

Characteristic	**Group A (n = 30)**	**Group B (n = 30)**	**p-value**
Age (years)	35.6	36.2	0.762
Duration of Symptoms (months)	5.4	5.8	0.541
Body Mass Index (BMI)	24.3	24.7	0.683
Gender (%)			
- Female	100%	100%	N/A
Employment Status (%)			
- Employed	60%	55%	0.795
- Unemployed	40%	45%	
Dominant Hand (%)			
- Right	90%	85%	0.719
- Left	10%	15%	
Physical Activity Level (hours/week)	2.5	2.3	0.654
Comorbidities (%)			
- Hypertension	15%	18%	0.756
- Diabetes	10%	12%	0.782
Education Level (%)			
- High School	40%	35%	0.796
- College Degree	45%	50%	0.814
- Postgraduate	15%	15%	1.000
Previous Shoulder Injury (%)	20%	18%	0.835

Figure 1: Demographic Characteristics of Participants



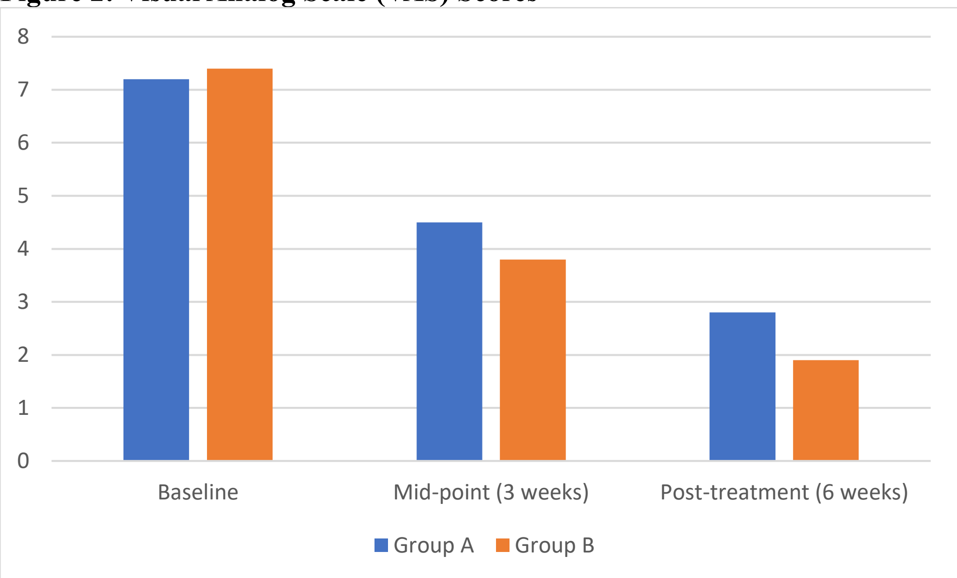
4.2 Pain Reduction

Table 2 shows the changes in pain intensity measured by the Visual Analog Scale (VAS) at different time points.

Table 2: Visual Analog Scale (VAS) Scores

Time Point	Group A (mean ± SD)	Group B (mean ± SD)	p-value (between groups)
Baseline	7.2 ± 1.1	7.4 ± 1.0	0.578
Mid-point (3 weeks)	4.5 ± 1.2	3.8 ± 1.1	0.034*
Post-treatment (6 weeks)	2.8 ± 1.1	1.9 ± 1.0	0.009**
p-value (within group)	<0.001**	<0.001**	

Figure 2: Visual Analog Scale (VAS) Scores



4.3 Range of Motion (ROM)

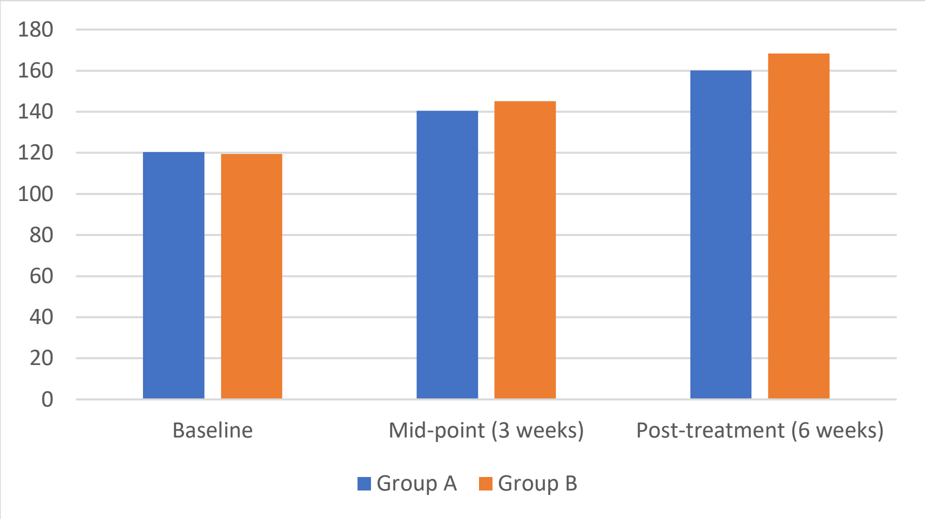
Range of Motion (ROM) - Shoulder Flexion (Degrees)

As shown in Table 3, the shoulder flexion ROM improved significantly in both groups.

Table 3: Range of Motion (ROM) - Shoulder Flexion (Degrees)

Time Point	Group A (mean ± SD)	Group B (mean ± SD)	p-value (between groups)
Baseline	120.3 ± 10.2	119.5 ± 11.0	0.731
Mid-point (3 weeks)	140.4 ± 9.8	145.2 ± 8.7	0.045*
Post-treatment (6 weeks)	160.1 ± 8.5	168.3 ± 7.9	0.003**
p-value (within group)	<0.001**	<0.001**	

Figure 3: Range of Motion (ROM) - Shoulder Flexion (Degrees)



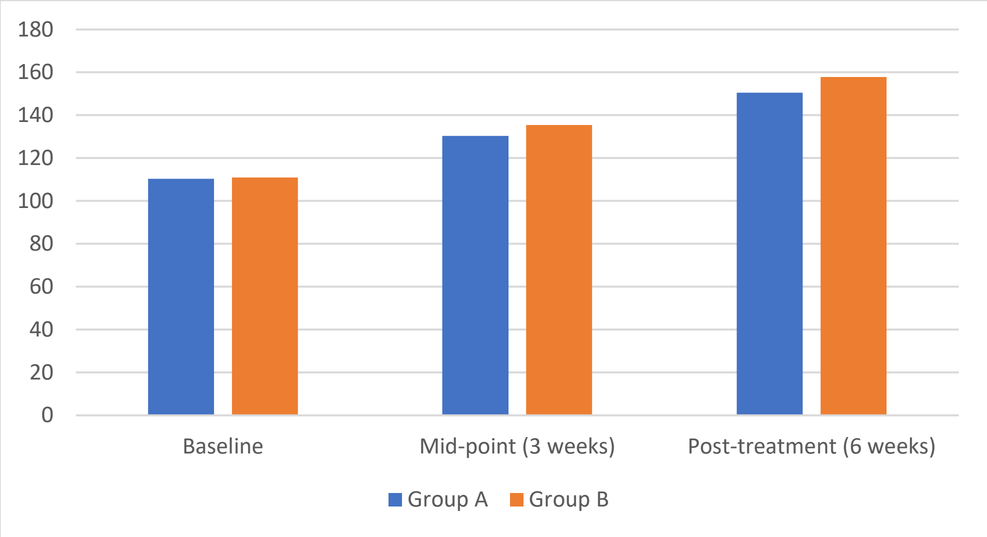
Range of Motion (ROM) - Shoulder Abduction (Degrees)

Table 4 highlights the shoulder abduction ROM improvements.

Table 4: Range of Motion (ROM) - Shoulder Abduction (Degrees)

Time Point	Group A (mean ± SD)	Group B (mean ± SD)	p-value (between groups)
Baseline	110.4 ± 9.7	111.0 ± 10.5	0.818
Mid-point (3 weeks)	130.3 ± 8.6	135.4 ± 8.3	0.022*
Post-treatment (6 weeks)	150.5 ± 7.9	157.9 ± 7.2	0.006**
p-value (within group)	<0.001**	<0.001**	

Figure 4: Range of Motion (ROM) - Shoulder Abduction (Degrees)

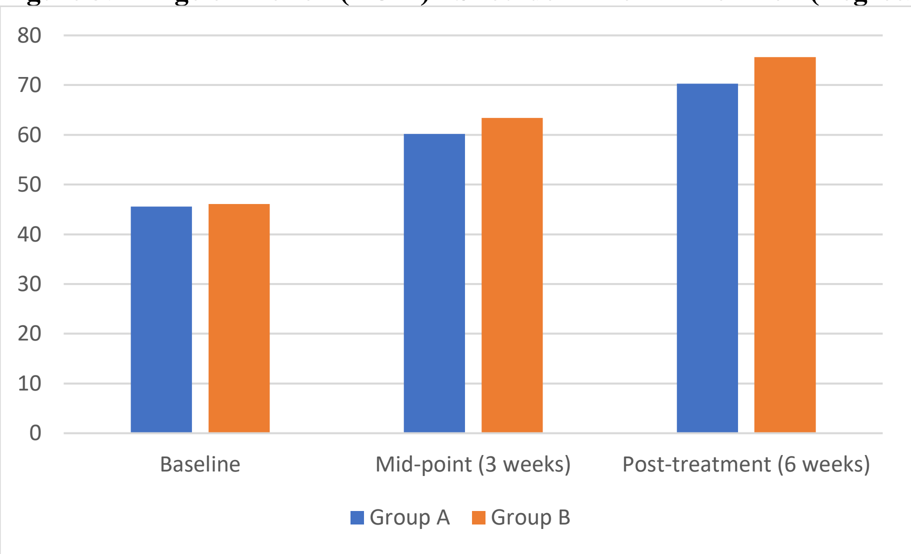


Range of Motion (ROM) - Shoulder External Rotation (Degrees)
Improvements in shoulder external rotation ROM are detailed in Table 5.

Table 5: Range of Motion (ROM) - Shoulder External Rotation (Degrees)

Time Point	**Group A (mean ± SD)**	**Group B (mean ± SD)**	**p-value (between groups)**
Baseline	45.6 ± 6.3	46.1 ± 6.7	0.754
Mid-point (3 weeks)	60.2 ± 5.8	63.4 ± 6.1	0.041*
Post-treatment (6 weeks)	70.3 ± 5.4	75.6 ± 5.7	0.004**
p-value (within group)	<0.001**	<0.001**	

Figure 5: Range of Motion (ROM) - Shoulder External Rotation (Degrees)



4.4 Functional Recovery

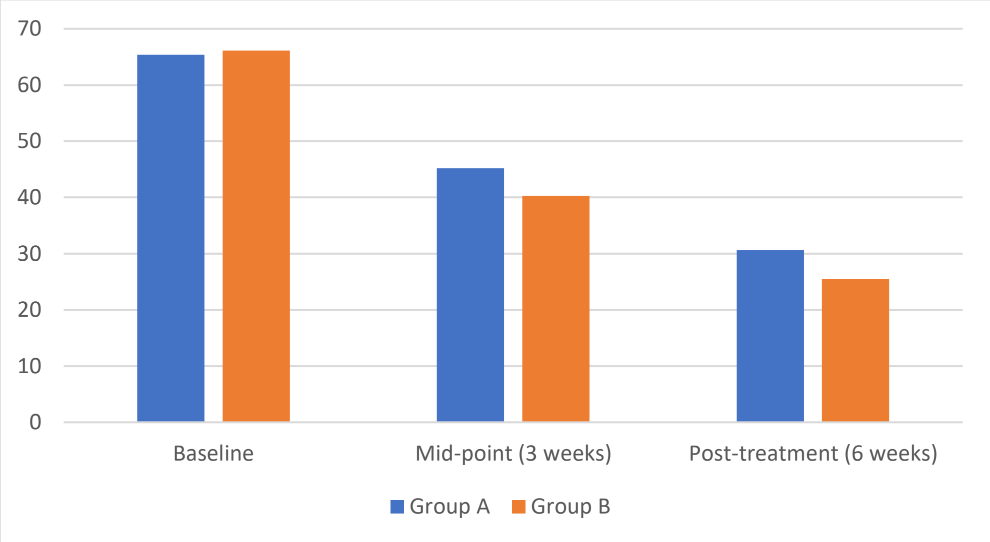
Shoulder Pain and Disability Index (SPADI) Scores

Table 6 presents the SPADI scores, reflecting the functional status of the participants.

Table 6: Shoulder Pain and Disability Index (SPADI) Scores

Time Point	Group A (mean ± SD)	Group B (mean ± SD)	p-value (between groups)
Baseline	65.4 ± 8.9	66.1 ± 9.2	0.755
Mid-point (3 weeks)	45.2 ± 7.8	40.3 ± 7.4	0.029*
Post-treatment (6 weeks)	30.6 ± 7.1	25.5 ± 6.8	0.011*
p-value (within group)	<0.001**	<0.001**	

Figure 6: Shoulder Pain and Disability Index (SPADI) Scores



DISCUSSION

The study's findings provide significant insights into the treatment of supraspinatus tendinitis, highlighting the comparative efficacy of two distinct therapeutic protocols. Both groups demonstrated marked improvements in pain reduction, range of motion (ROM), and functional recovery, yet the combination of therapeutic TECAR, myofascial release, and exercise (Group B) yielded superior outcomes across all primary measures compared to the combination of hot pack, therapeutic ultrasound, and exercise (Group A).

Participant Demographics and Baseline Characteristics

The demographic characteristics of the participants were well-balanced between the two groups, ensuring an unbiased comparison of treatment outcomes. The average age of participants in both groups was similar, as were the duration of symptoms and Body Mass Index (BMI). Employment status, dominant hand usage, physical activity levels, comorbidities, education levels, and previous shoulder injuries were also comparable, reinforcing the homogeneity of the study sample. This uniformity in baseline characteristics is crucial for the validity of the study as it minimizes the potential confounding factors that could influence the treatment outcomes.

Pain Reduction

Pain intensity, measured by the Visual Analog Scale (VAS), showed significant reductions in both groups over time. At baseline, the mean VAS scores were high and similar between groups, indicating severe pain levels. However, by the mid-point (three weeks), Group B demonstrated a significantly greater reduction in pain intensity compared to Group A. This trend continued post-treatment (six weeks), with Group B reporting substantially lower pain levels. The within-group analysis confirmed that both groups experienced significant pain relief, but the extent of pain reduction was more pronounced in Group B. The superior performance of Group B could be attributed to the synergistic effects of TECAR therapy and myofascial release in reducing inflammation and promoting tissue healing, which are essential for alleviating pain in tendinitis.

Range of Motion (ROM)
Improvements in shoulder ROM were assessed in terms of shoulder flexion, abduction, and external rotation. Both groups showed significant enhancements from baseline to post-treatment, yet Group B consistently outperformed Group A at all measurement points. For shoulder flexion, Group B exhibited greater improvements at both the mid-point and post-treatment stages. Similarly, shoulder abduction and external rotation also showed significant superiority in Group B. These findings suggest that TECAR therapy and myofascial release might offer more effective mechanical benefits, enhancing the elasticity and mobility of the shoulder tissues. The structured exercise program, common to both groups, undoubtedly contributed to these gains, but the additional modalities in Group B seemed to amplify the effects.

Functional Recovery
Functional recovery, evaluated using the Shoulder Pain and Disability Index (SPADI), highlighted the overall impact of the treatments on participants' daily lives. At baseline, both groups had high SPADI scores, reflecting substantial functional impairment. By the mid-point, Group B exhibited a significantly lower SPADI score compared to Group A, indicating better functional improvement. This trend was even more evident post-treatment, with Group B showing a markedly lower SPADI score. The significant within-group improvements underscore the efficacy of both treatment protocols in enhancing shoulder function, but the added benefit of TECAR therapy and myofascial release in Group B suggests a more comprehensive recovery. This could be due to the enhanced pain relief and ROM improvements translating into better functional outcomes.

Mechanisms Underlying the Treatment Efficacy
The distinct mechanisms of the interventions provide insights into their varying efficacies. TECAR therapy involves capacitive and resistive energy transfer, which enhances microcirculation, reduces inflammation, and promotes tissue regeneration. This could explain the superior pain reduction and ROM improvements observed in Group B. Myofascial release, a manual therapy technique, targets the fascia and muscle tissues, relieving tension and improving mobility, further contributing to the enhanced outcomes. In contrast, therapeutic ultrasound in Group A primarily provides deep heat, which aids in pain relief and muscle relaxation but may not offer the same regenerative benefits as TECAR therapy. The hot pack, while effective for superficial heat therapy, lacks the deeper tissue penetration and specific therapeutic effects of TECAR.

Clinical Implications
The study's results have significant clinical implications for the treatment of supraspinatus tendinitis. The superior outcomes associated with TECAR therapy and myofascial release suggest that these modalities should be considered for inclusion in treatment protocols for this condition. Physiotherapists and clinicians can leverage these findings to optimize treatment plans, potentially leading to faster and more comprehensive recoveries for patients. Additionally, the structured exercise program's role in both groups highlights the importance of active rehabilitation in managing tendinitis, emphasizing the need for personalized exercise regimens tailored to individual patient needs.

Limitations and Future Research
Despite the promising findings, the study has several limitations. The sample size, although sufficient for detecting significant differences, was relatively small, potentially limiting the generalizability of the results. The study's duration was six months, providing a comprehensive short-term evaluation but not addressing long-term outcomes. Future research should include larger sample sizes and extended follow-up periods to confirm these findings and explore the long-term efficacy of the treatments. Additionally, while the study focused on female patients, further research is needed to determine if these results are applicable to male patients and other demographic groups.

CONCLUSION

The study concluded that therapeutic TECAR combined with myofascial release and exercise is more effective in reducing pain, improving range of motion, and enhancing functional recovery in female patients with supraspinatus tendinitis compared to the combination of hot pack, therapeutic ultrasound, and exercise. These results highlight the potential benefits of incorporating TECAR and myofascial release into treatment protocols for this condition.

REFERENCES

1. Sung JH, Jung W, Wang J, Kim JH. The Effects of Body Positions and Abduction Angles on Shoulder Muscle Activity Patterns during External Rotation Exercises. Healthcare (Basel). 2023 Jul 8;11(14):1977. doi: 10.3390/healthcare11141977. PMID: 37510418; PMCID: PMC10378914.
2. Lewis JS. Rotator cuff tendinopathy: a model for the continuum of pathology and related management. Br J Sports Med. 2010;44(13):918-23.
3. Neer CS. Impingement lesions. Clin Orthop Relat Res. 1983;173:70-7.
4. Longo UG, Franceschi F, Ruzzini L, Rabitti C, Morini S, Maffulli N, et al. Histopathology of the supraspinatus tendon in rotator cuff tears. Am J Sports Med. 2008;36(3):533-8.
5. Itoi E, Tabata S. Conservative treatment of rotator cuff tears. Clin Orthop Relat Res. 1992;275:165-73.
6. Van Holsbeeck M, Kolowich P, Eyler W, Craig J, Shirazi K, Habra G, et al. US depiction of partial-thickness tear of the rotator cuff. Radiology. 1995;197(2):443-6.
7. Michener LA, McClure PW, Karduna AR. Anatomical and biomechanical mechanisms of subacromial impingement syndrome. Clin Biomech. 2003;18(5):369-79.
8. Diederich CJ. Thermal ablation and high-temperature thermal therapy: overview of technology and clinical implementation. Int J Hyperthermia. 2005;21(8):745-53.
9. Lehmann JF, Warren CG, Scham SM. Therapeutic heat and cold. Clin Orthop Relat Res. 1974;99:207-45.
10. Goats GC. Microwave diathermy. Br J Sports Med. 1990 Dec;24(4):212-8. doi: 10.1136/bjsm.2
11. Baker KG, Robertson VJ, Duck FA. A review of therapeutic ultrasound: biophysical effects. Phys Ther. 2001;81(7):1351-8.
12. Speed CA. Therapeutic ultrasound in soft tissue lesions. Rheumatology. 2001;40(12):1331-6.
13. Ebenbichler GR, Erdogmus CB, Resch KL, Funovics MA, Kainberger F, Barisani G, et al. Ultrasound therapy for calcific tendinitis of the shoulder. N Engl J Med. 1999;340(20):1533-8.4.4.212. PMID: 2097017; PMCID: PMC1478902.
14. Clijsen R, Leoni D, Schneebeli A, Cescon C, Soldini E, Li L, Barbero M. Does the Application of Tecar Therapy Affect Temperature and Perfusion of Skin and Muscle Microcirculation? A Pilot Feasibility Study on Healthy Subjects. J Altern Complement Med. 2020 Feb;26(2):147-153. doi: 10.1089/acm.2019.0165. Epub 2019 Oct 3. PMID: 31580698; PMCID: PMC7044785.
15. Li Z, Wang C, Wei Z, Xu Y, Peng Q, Luo C. Effects of capacitive-resistive electric transfer therapy on pain, function, and quality of life in patients with chronic low back pain: a randomized controlled trial. J Phys Ther Sci. 2017;29(8):1492-6.
16. Mete E, Sari Z. The efficacy of exergaming in patients with knee osteoarthritis: A randomized controlled clinical trial. Physiother Res Int. 2022 Jul;27(3):e1952. doi: 10.1002/pri.1952. Epub 2022 Apr 25. PMID: 35470534.
17. Melzack R, Wall PD. Pain mechanisms: a new theory. Science. 1965;150(3699):971-9.
18. Findley TW, Schleip R. Fascia research: basic science and implications for conventional and complementary health care. J Bodyw Mov Ther. 2007;11(2):91-2.
19. Barnes MF. The basic science of myofascial release: morphologic change in connective tissue. J Bodyw Mov Ther. 1997;1(4):231-8
20. Ajimsha MS, Al-Mudahka NR, Al-Madzhar JA. Effectiveness of myofascial release: systematic review of randomized controlled trials. J Bodyw Mov Ther. 2015;19(1):102-12.
21. Jonsson P, Wahlström P, Öhberg L, Alfredson H. Eccentric training in chronic painful impingement syndrome of the shoulder: results of a pilot study. Knee Surg Sports Traumatol Arthrosc. 2006;14(1):76-81
22. Camargo PR, Alburquerque-Sendín F, Avila MA, Haik MN, Vieira A, Salvini TF. Eccentric training for shoulder abductors improves pain, function, and quality of life in chronic subacromial pain syndrome: a randomized clinical trial. Braz J Phys Ther. 2015;19(4):318-26.

23. Camargo PR, Alburquerque-Sendín F, Salvini TF. Eccentric training as a new approach for rotator cuff tendinopathy: Review and perspectives. World J Orthop. 2014 Nov 18;5(5):634-44. doi: 10.5312/wjo.v5.i5.634. PMID: 25405092; PMCID: PMC4133471.