

# Comparing the Effectiveness of Scapula Stabilization Exercise Versus Scapula Stability Taping on Shoulder Impingement Pain

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## Abstract

**Background:** Shoulder impingement pain is caused by the compression of the rotator cuff and the subacromial bursa. Reduced scapular stability was found to cause shoulder impingement. So, the purpose of the study was to identify whether scapula stability taping vs. scapular stabilization exercise is more effective in the treatment of shoulder impingement pain.

**Purpose:** To compare the effectiveness of scapula stabilization exercise versus scapula stability taping on shoulder impingement pain.

**Methods:** This experimental study has been conducted from November 2022 to April 2023. 58 subjects were divided into Group A (29 Subjects) and Group B (29 Subjects). Group A was treated with shoulder stabilization exercises, and Group B was treated with shoulder stability taping. The treatments were given for 4 days per week and continued for 4 weeks.

**Result:** The results showed that the subject's pain, shoulder ROM, and disability improved statistically stabilization exercise Group than stability taping Group.

**Conclusion:** Findings conclude that 4 weeks of scapular stabilization exercises were found to be more effective in increasing scapular muscle strength in preventing shoulder impingement.

**Key Words:** Shoulder Impingement Pain, Scapular Stabilization Exercise, Scapula Stability Taping, VAS, Neer's test, Goniometer, SPADI.

## Introduction

The shoulder joint, also known as glenohumeral joint, has a wide range of motion in the ball and socket joints of the human body. The scapula, which is where all the muscles come together at the shoulder, is the main bone structure.<sup>1</sup> The primary muscle group in charge of sustaining the

shoulder joint is the rotator cuff muscles. Rotator cuff problems, adhesive capsulitis, shoulder instability, and shoulder arthritis are common ailments that can cause chronic shoulder discomfort.<sup>2-3</sup> One of the most prevalent causes of shoulder discomfort is impingement of the shoulder syndrome, which is characterized by irritation of the rotator cuff muscles and the subacromial bursa. In as many as 65% of cases,

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shoulder impingement syndrome may be blamed for the pain in the shoulder.<sup>4</sup> While impingement and rotator cuff illness are more prevalent in players whose sports entail repetitive overhead movements, rotator cuff tears are more prevalent in the early population. According to Neer, athletes experience impingement syndrome and rotator cuff disease at an earlier age than people in the general population.<sup>5</sup> In patients with impingement of the shoulder syndrome, the benefits of scapular stability exercises right after surgery on pain and function.<sup>6</sup> Weakness of the scapula stabilizer and ensuring changes in biomechanics might lead to aberrant stresses being placed on the anterior shoulder structure, an increased risk of the rotator cuff compression, and impaired performance. To evaluate the impact of scapula training on reducing signs of impingement and stability as our capacity to measure the strength of these muscles advances exercise for strengthening the scapula are often not taxing on the rotator cuff and are simple to incorporate into a shoulder treatment regimen.<sup>7</sup> Taping is frequently utilized in therapies as an extrinsic feedback mechanism to enhance muscle pattern, postures, and muscular activation.<sup>8</sup> One frequent complementary therapy for shoulder impingement disease is scapula taping.<sup>9</sup> The elastic tape may extend up to 130 to 140 percent of its static resting length, guaranteeing that the attached muscle and joint can move freely it include reducing pain stimulating the nervous system, restoring proper muscular function by strengthening weak muscles, removing lymphatic fluid buildup or hemorrhages beneath the skin, and adjusting joint misalignment by stimulating the nervous system, lowering spasms of the muscles. Kinesiotaping may be an alternate therapeutic choice for shoulder impingement syndrome.<sup>10</sup>

### Aim

To compare the effectiveness of scapula stabilization exercise versus scapula stability taping on shoulder impingement pain.

### Material and Method

This research is an experimental study. The study was conducted with a sample size of 58 participants between the age group of 17-32 years. Randomized technique is used in this study. The participants

were selected from SCPT (SMCH Hospital) and Illam's Physio Centre, according to selection criteria. Participants received an overview of the method, and a formal informed consent form was acquired. Materials required are Kinesiotaping, Goniometer, ball.

**Study procedure:** From November 2022 to April 2023

### Inclusion Criteria

1. 17-32 Years of age
2. Male overhead recreational players for at least 6 hours a week
3. Less than one month has passed from beginning of shoulder impingement symptoms
4. A VAS pain level of less than or equal to 7/10.

### Exclusion Criteria

1. Previous dislocation of the shoulder in the same or opposite shoulder
2. Players who have bilateral shoulder soreness
3. Acromioclavicular joint pathology
4. Cervical spine radiculopathy.

### Outcome measures

- Visual analog scale (VAS)
- Shoulder Pain and Disability (SPADI)
- Goniometer
- Neer's test

### Procedure

Subjects were selected based on selection criteria. 58 subjects were divided into two groups. Group A was taken as experimental group (n=29) and treated with shoulder stabilization exercise and Group B was taken as control group (n=29) treated with shoulder stability taping. The detailed procedure for performing the Neer's test was explained to the subjects prior. Outcome measures used for identifying the shoulder impingement are Goniometer which was used to assess the range of joint (Flexion, Abduction, Internal rotation) and VAS score for determining the intensity of pain and SPADI was used to evaluate the level of disability.

### Group A: Scapular stabilization exercises for shoulder impingement pain.

The experimental group receives six types of scapula stabilization exercises for the shoulder impingement pain. The protocol used for all six exercises was 3 sets of 8 repetitions, 2 sessions were given daily. Each participant was treated for 4 weeks, 4 days a week. Procedures to do for the respected exercises

1. **Scapular retraction:** Patient asked to maintain a straight spine in a seated position in a meantime asked to Squeeze shoulder blades together and sustain for a little while.
2. **Prone shoulder blade squeezes:** Patients were asked to place the arms down on a mat or flat surface and with arms straight they had to squeeze the shoulder blade together and then release it and continue it several times.
3. **Scapular wall slides:**In this exercise patients were asked to place the arms facing forward in standing position with feet apart and against the wall. And they were asked to slide the arms above the wall until the elbows are at top touching the wall, and then slowly they were asked to step back to the normal position
4. **Prone Y, T and W Exercises:**Patients were asked to lie down on the flat surfaces with the arms extended on the flat surface with the arms. For the "Y" exercise, raise your arms up and slightly outward, forming a "Y" shape. For the "W" exercise, bend your elbows and raise your arms up and out to the sides, forming a "W" shape. Hold each position for a few seconds before lowering your arms and repeating several repetitions.
5. **Wall press up:** Patients were asked to keep the shoulder blades back and down to set the scapula and then Lift your arms forward, elbows straight, so your hands barely reach the wall and slowly bend your elbows to push your chest towards the wall, as if performing a press-up. Next, squeeze your scapula while pushing back through your hands to stand back up and the procedure was repeated for 20 to 40 times. Always start with little resistance or your own weight and go up as you grow stronger. Maintaining appropriate

form is essential, and any workouts that make you uncomfortable or in pain should be avoided.

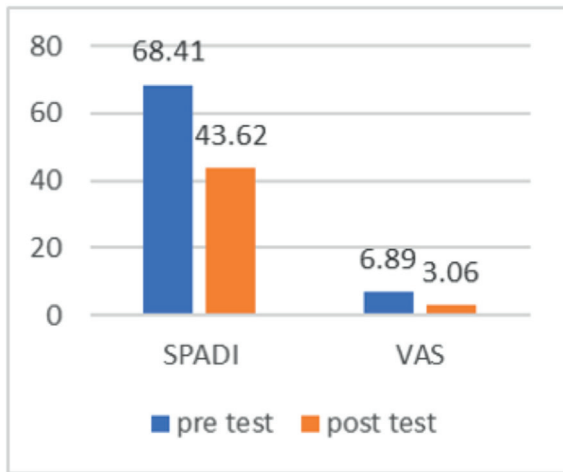
### Group B: Kinesio taping for shoulder impingement pain

The primary purpose of Kinesio taping for shoulder impingement is to support and encourage the shoulder joint's normal alignment and mobility. Here is a common gain line for Kinesio tape application for shoulder impingement.

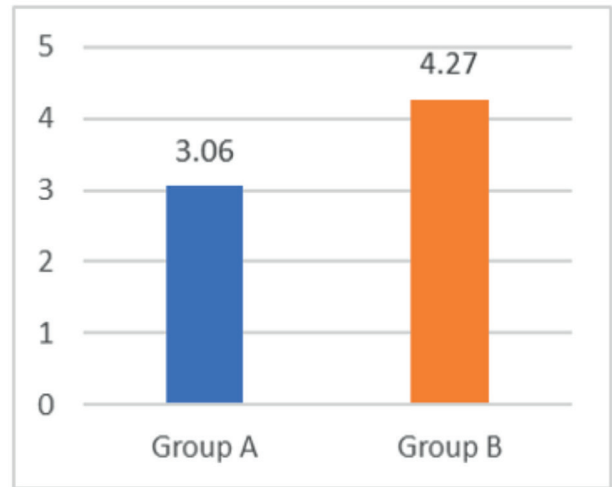
1. **Positioning:** The patient was asked to widen the space between the acromion process and the rotator cuff tendons, first place the shoulder in a slightly retracted and depressed posture.
2. **Prepare:** The skin around the shoulder was cleansed and dried to maintain the tape adhesion.
3. **Anchor:** It started by placing an anchor strip of tape on a sturdy location, such as the upper back or upper arm, where the tape is not stretched.
4. **Main tape strip:** The two tape strips were cut to the proper length for the four main tape strips. Then the first straps were applied vertically down the side of the shoulder blade, working your way up from the lower edge. Stretch the tape just a little bit when you apply it. Then the second strip was applied horizontally over the upper back, right below the acromion process. Applied the tape without allowing it to stretch.
5. **Additional strips:** Depending on each person's requirements, more strips were added. These could comprise shoulder support strips or muscle activation strips to target certain muscles causing the impingement.

### Data analysis

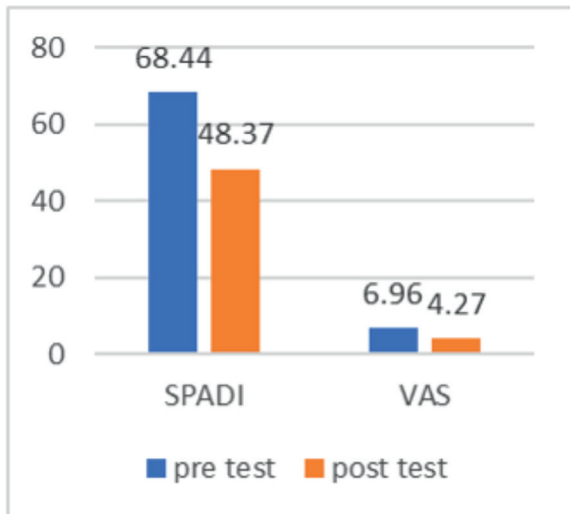
Using tabular and inferential statistics, the gathered data was evaluated. The mean and standard deviation (SD) were utilized for all parameters. The statistically significant differences between pre-test and post-test measures were examined using a paired t-test. When utilizing the unpaired t-test to look at significant changes in the experimental group, the significance level of  $p < 0.0001$  was determined to be statistically significant.



Graph-1 Comparison of pre-test and post-test values of Group A SPADI and VAS



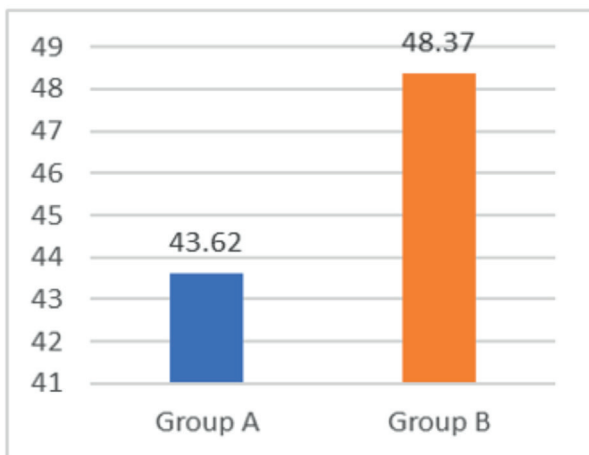
Graph-4 Comparison of post test values of Group A and Group B for VAS



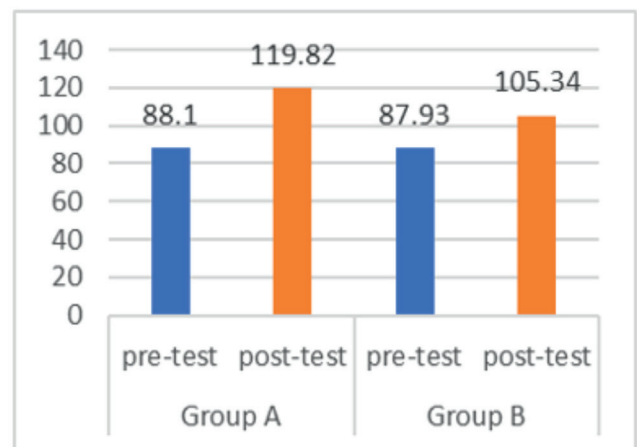
Graph-2 Comparison of pre-test and post-test values of Group B SPADI and VAS



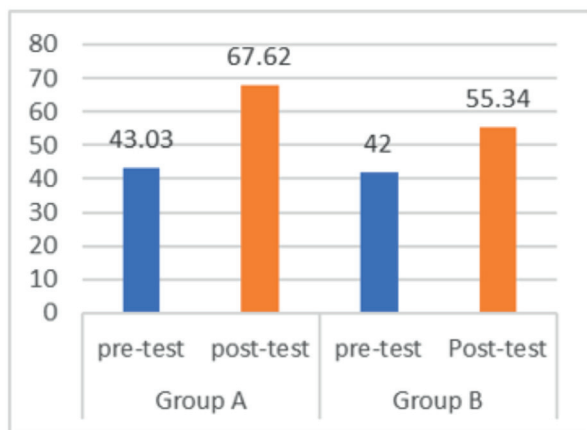
Graph-5 Comparison of pre and post test values of group A and group B for shoulder flexion.



Graph-3 Comparison of post test values of Group A and Group B for SPADI



Graph-6 Comparison of pre and post test values of group A and group B for shoulder abduction.



**Graph-7 Comparison of pre and post test values of Group A and Group B for shoulder internal rotation.**

### Result

As a result, Mean and Standard deviation were calculated by descriptive statistics. Paired T test was used and the P values were considered statistically significant. Subjects of 59 individuals with shoulder impingement pain were assessed for pre and post-test using VAS, Goniometer, SPADI and Neer Test. A statistical analysis for group A pre values of mean and standard deviation for VAS  $6.89 \pm 0.81$  post values  $3.06 \pm 0.84$ , pre values of mean and standard deviation of SPADI  $68.41 \pm 1.15$  post values  $43.62 \pm 1.11$ , pre values of mean and standard deviation for shoulder flexion  $114.65 \pm 1.68$  post values  $137.06 \pm 15.26$ , pre values of mean and standard deviation for shoulder abduction  $88.1 \pm 19.56$  post values  $119.82 \pm 14.42$ , pre values of mean and standard deviation for shoulder internal rotation  $43.03 \pm 9.73$  post values  $67.62 \pm 10.17$ . A statistical analysis for group B pre values of mean and standard deviation for VAS  $6.96 \pm 0.82$  post values  $4.27 \pm 0.79$ , pre values of mean and standard deviation for SPADI  $68.44 \pm 1.08$  post values  $48.37 \pm 1.11$ , pre values of mean and standard deviation for shoulder flexion  $102.93 \pm 11.99$  post values  $110.03 \pm 11.32$ , pre values of mean and standard deviation for shoulder abduction  $87.93 \pm 13.72$  post values  $105 \pm 12.53$ , pre values of mean and standard deviation for shoulder internal rotation  $42 \pm 8.53$  post values  $55.34 \pm 8.33$ . Statistical analysis shows that both Group A (stabilization exercise) and Group B (stability taping) were significant with p value less than 0.001. However, the stability exercise values were

found to be slightly higher and revealed a beneficial effect of pain and function outcome in subjects with shoulder impingement pain

### Discussion

The goal of the present study is to compare the effectiveness of scapula stabilization exercises versus scapular stabilization taping on shoulder impingement pain. A statistical analysis for group A pre values of mean and standard deviation for VAS  $6.89 \pm 0.81$  post values  $3.06 \pm 0.84$ , pre values of mean and standard deviation of SPADI  $68.41 \pm 1.15$  post values  $43.62 \pm 1.11$ , pre values of mean and standard deviation for shoulder flexion  $114.65 \pm 1.68$  post values  $137.06 \pm 15.26$ , pre values of mean and standard deviation for shoulder abduction  $88.1 \pm 19.56$  post values  $119.82 \pm 14.42$ , pre values of mean and standard deviation for shoulder internal rotation  $43.03 \pm 9.73$  post values  $67.62 \pm 10.17$ . A statistical analysis for group B pre values of mean and standard deviation for VAS  $6.96 \pm 0.82$  post values  $4.27 \pm 0.79$ , pre values of mean and standard deviation for SPADI  $68.44 \pm 1.08$  post values  $48.37 \pm 1.11$ , pre values of mean and standard deviation for shoulder flexion  $102.93 \pm 11.99$  post values  $110.03 \pm 11.32$ , pre values of mean and standard deviation for shoulder abduction  $87.93 \pm 13.72$  post values  $105 \pm 12.53$ , pre values of mean and standard deviation for shoulder internal rotation  $42 \pm 8.53$  post values  $55.34 \pm 8.33$ . Both the groups showed betterment in VAS, Goniometer, SPADI. However, subjects in group A who were treated with scapular stabilization exercise showed better improvement in VAS, SPADI, shoulder range of motion, than the subjects in group B who received scapular taping. Rajalaxmi. V et al. in 2015 found an effective improvement in shoulder functions following scapular stabilization exercise<sup>11</sup>. Goksu H et al. in 2016 had significant effective in KT had better recovery from shoulder impingement.<sup>12</sup> Hence, the results obtained from this study has identified that the effectiveness of scapula stabilization exercise versus scapula stabilization taping had proved to be effectively incorporated in the recovery for the patients of shoulder impingement. The effective intervention that addresses the specific cause of shoulder impingement might prevent the occurrence of upper limb discomfort or postural abnormalities of the younger population.<sup>13</sup>

## Conclusion

This study shows that Scapula stabilization exercise has a longer effect compared to taping which provides short-term relief. The data that was collected showed that scapula stabilization exercise is effective in improving functional activities and reducing pain in people with shoulder impingement pain.

**Ethical clearance:** The ISRB committee of a private hospital and institution in Chennai has provided its clearance for the conduct of human research that complies with all applicable national laws, institutional regulations. (Application Number 03/080/2022/ISRB/SR/SCPT).

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**Conflict of interest:** The authors state that there is no conflict of interest.

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