

## ORIGINAL ARTICLE

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# Comparison of Hold-Relax Technique and Active Release Technique in Shoulder Impingement Syndrome

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## ABSTRACT

**Background:** One of the common shoulder joint dysfunction is shoulder impingement syndrome, which produces pain in the joint and reduces overhead elevation movement. It represents the third most frequent disease of the musculoskeletal system. The study's objective was to compare the hold-relax technique and active release technique (ART) among people with shoulder impingement syndrome.

**Methodology:** The study design is an experimental study. Patients diagnosed with Shoulder impingement syndrome were selected for this study. The study was conducted at the Outpatient physiotherapy department, ACS Medical College and Hospital, Chennai. A total of 30 subjects with age groups between 40 and 60 years were selected for the study. Simple Random Sampling method used to divide the samples into two equal groups (15) by lottery method. The total duration of the study was four weeks, with four sessions a week. Outcome measures of the study were pain, range of motion, and shoulder function. And measurement tools used were Goniometer, VAS, and SPADI to collect data for this study.

**Result:** The comparative study between group A and group B shows a significant difference in pain effectiveness, external rotation ROM and function with a p-value  $>0.0001$ , and no significant difference in the effectiveness of abduction ROM with a p-value  $>0.1217$  among patient with shoulder impingement syndrome.

**Conclusion:** The study concluded that the active release technique is more effective than the hold-relax technique on pain, abduction ROM, external rotation ROM and shoulder function among patients with shoulder impingement syndrome.

**Keywords:** Shoulder impingement syndrome, Active release technique, Hold-relax technique.

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## INTRODUCTION

The shoulder has a high range of mobility in the body with a maximum range of motion. Its structure is shallow as it provides comprehensive mobility with less stability. Ligaments and musculature around the shoulder provide stability of the joint. Any muscle weakness around the shoulder and laxity of the joint ligament leads to instability, leading to shoulder pain and subluxation of the joint [1-5]. When compare shoulder pain with low back pain, it is less common among people who work in sitting and standing jobs, and it is around sixteen to twenty-one percent of the population. The disability rate for shoulder dysfunction is just about one-fifth of all other musculoskeletal problems among the patients [6-8].

Subacromial impingement syndrome is one of the common reasons for shoulder dysfunction. Prevention of shoulder injury is vital to maintain normal mobility of the joint. Prevent of shoulder ailments has been rated as seven to twenty-six percent of the population, so need more advanced training methods to improve prevention rate [9-11].

Rotator cuff muscles are supporting the joint with many strong movements around the shoulder. Any injury of this muscle can alter the function of the shoulder joint. This can lead to Shoulder impingement syndrome associated with tendinitis of the rotator cuff muscles, which pass through the subacromial space [12-14].

Ligament structure includes coracoacromial ligament, which gives glenohumeral stability. Shoulder structure stability is associated with the coracoacromial arch, which connects with the coracoid process and acromion. Supraspinatus tendon can be compressed and injured between the head of humerus and coracoacromial arch during the shoulder joint elevations [15].

This study aimed to compare the hold-relax technique and active release technique in shoulder impingement syndrome.

## METHODOLOGY

The study design is an experimental study. Patients diagnosed with Shoulder impingement syndrome were selected for this study. The study was conducted at the outpatient physiotherapy department, ACS Medical College and Hospital, Chennai. Thirty (30) Patients with age between 40 and 60 years were selected for the study. Simple Random Sampling method used to divide the samples into two equal groups (15) by lottery method. The total duration of the study was four weeks, with four sessions a week. Outcome measures of the study were pain, range of motion, and shoulder function. And measurement tools used were Goniometer, VAS, and SPADI to collect data for this study.

### Procedure:

In this study, 30 subjects will be included based on inclusion and exclusion criteria. The patients will undergo the Hawkins Kennedy test. In those patients in the sitting

position, the shoulder flexed to 90 and elbow flexed to 90, and the arm was internally rotating. If the pain occurs, the test is positive. The patients are assessed for pain by VAS, ROM by goniometer, and function by SPADI. They will divide into two groups. Group A for the hold-relax technique and Group B for the active release technique.

### Group A:

In the hold-relax technique for shoulder abduction, the patient in a sitting position and asks them to do maximal shoulder abduction and then do adduction against manual resistance by the therapist for seven seconds followed by 5 seconds of relaxation. Later the patient was actively moved shoulder for a full range of movement available in the abduction, and it was repeated five times, about 10 minutes for four times a week, and continued to four weeks.

The same procedure will do for the external shoulder rotation; the patient is supine lying, the shoulder is abducted 90°, and the elbow asks the patient to do the maximal external rotation. They do internal rotation against an opposing isometric for 7 seconds and relax for 5 seconds. Later, the patient actively performed a full range of movement for the same duration of time and frequency, like abduction movement.

### Group B:

In the active release technique, ask the patient to sit and then position the patient's shoulder in 90° abduction. The therapist supports the patient arm then palpates the supraspinous fossa using a finger. Ask the patient to slowly adduct the arm while the therapist moves the muscle plane; the same should repeat for 10 minutes, four times a week for four weeks.

Collected data were tabulated and analyzed by descriptive and inferential statistics. All the parameters were assessed using Graph Prism Pad, version 8.

### Group A- Hold-Relax Technique

VAS	Mean	Number of Pairs	Mean Diff.	SD, SEM	DF	T	p-value	Sig. Diff.
Pre Test	5.133	15	1.267	0.118 0.458	14	10.72	<0.0001	(p < 0.05) ****
Post Test	3.867							

**Table 1:** Paired t-test on VAS within Group A on the effectiveness of Hold-relax technique among patients with shoulder impingement syndrome.

The above table 1 shows a significant difference in VAS on patients with among patients with shoulder impingement syndrome with a p-value >0.0001

ABD ROM	Mean In Degree	Number of Pairs	Mean Diff.	SD, SEM	DF	t	p-value	Sig. Diff.
Pre Test	89.53	15	6.33	1.759 0.4543	14	13.94	P>0.0001	(p < 0.05) ****
Post Test	95.87							

**Table 2:** Paired t-test on abduction ROM within Group A on the effectiveness of Hold-relax technique among patients with shoulder impingement syndrome.

Above table 2 shows a significant difference in abduction ROM on the effectiveness Hold-relax technique among patients with shoulder impingement syndrome with a P-value >0.0001.

Ext. Rotation ROM	Mean	Number of Pairs	Mean Diff.	SD, SEM	DF	t	p-value	Sig. Diff.
Pre Test	21.27	15	6.53	1.807 0.467	14	14	<0.0001	(P < 0.05) ****
Post Test	27.80							

**Table 3:** Paired t-test on External Rotation within Group A on the effectiveness of Hold-relax technique among patients with shoulder impingement syndrome.

Above table 3 shows a significant difference in External Rotation within Group A on patients with shoulder impingement syndrome with a P-value >0.0001.

SPADI	Mean	Number of Pairs	Mean Diff.	SD, SEM	DF	T	p-value	Sig. Diff.
Pre Test	54.73	15	8.067	1.944 0.5021	14	16.07	P>0.0001	(P < 0.05) ****
Post Test	46.67							

**Table 4:** Paired t-test on SPADI within Group A on the Hold-relax technique's effectiveness among shoulder impingement syndrome.

The above table 4 shows a significant difference in SPADI on the effectiveness Hold-relax technique among patients with shoulder impingement syndrome with a P-value >0.0001.

#### Group B - Active Release Technique (ART)

VAS	Mean	Number of Pairs	Mean Diff.	SD, SEM	DF	T	p-value	Sig. Diff.
Pre Test	5.067	15	2.267	0.4577 0.1182	14	19.18	<0.0001	(P < 0.05) ****
Post Test	2.800							

**Table 5:** Paired t-test on VAS within Group B on Active Release Technique's effectiveness among patients with shoulder impingement syndrome.

The above table 5 shows a significant difference in VAS on patients with among patients with shoulder impingement syndrome with a P-value >0.0001

ABD ROM	Mean	Number of Pairs	Mean Diff.	SD, SEM	DF	T	P value	Sig. Diff.
Pre Test	91.73	15	13.27	3.453 0.8916	14	14.88	>0.0001	(P < 0.05) ****
Post Test	105.0							

**Table 6:** Paired t-test on abduction ROM within Group B on Active Release Technique's effectiveness among patients with shoulder impingement syndrome.

Above table 6 shows a significant difference in abduction ROM on the effectiveness of Active Release Technique among patients with shoulder impingement syndrome with a P-value >0.0001.

Ext. Rotation ROM	Mean	Number of Pairs	Mean Diff.	SD, SEM	DF	T	p- value	Sig. Diff.
Pre Test	21.87	15	10.80	1.656 0.4276	14	25.26	<0.0001	(P < 0.05) ****
Post Test	32.67							

**Table 7:** Paired t-test on External Rotation within Group B on Active Release Technique's effectiveness among patients with shoulder impingement syndrome.

Above table 7 shows a significant difference in External Rotation within Group B on patients with shoulder impingement syndrome with a P-value >0.0001.

SPADI	Mean	Number of Pairs	Mean Diff.	SD, SEM	DF	T	p- value	Sig. Diff.
Pre Test	55.60	15	10.60	1.298 0.335	14	31.62	>0.0001	(P < 0.05) ****
Post Test	45.00							

**Table 8:** Paired t-test on SPADI within Group B on Active Release Technique's effectiveness among shoulder impingement syndrome.

Above table 8 shows a significant difference in SPADI on the effectiveness of Active Release Technique among patients with shoulder impingement syndrome with a P-value >0.0001.

#### Comparative Study between Group A and B by ANOVA

Out come Measures	Exercise Group A and B	Test	Mean	Mean Diff.	R Square	F	P-value	Sig. diff.
VAS	Hold-Relax Technique	Pre test	5.133	1.267	0.6141	29.71	<0.0001	(P < 0.05) ****
		Post Test	3.867					
	Active Release Technique	Pre test	5.067	2.267				
		Post Test	2.800					

**Table 9:** ANOVA to compare VAS between Group A and B among patients with shoulder impingement syndrome

The above table 9 shows significant difference on VAS between Group A and B among patients with shoulder impingement syndrome with P value <0.0001.

Out come Measures	Exercise Group A and B	Test	Mean	Mean Diff.	R Square	F	P value	Sig. diff.
ROM Abduction	Hold-Relax Technique	Pre test	89.53	6.33	0.0976	2.019	<0.121	(P < 0.05) Ns
		Post Test	95.87					
	Active Release Technique	Pre test	91.73	13.27				
		Post Test	105.0					

**Table 10:** ANOVA to compare ROM Abduction between Group A and B among patients with shoulder impingement syndrome

The above table 10 shows no significant difference on abduction ROM between Group A and B among patients with shoulder impingement syndrome with P value

<0.1217.

Outcome Measures	Exercise Group A and B	Test	Mean	Mean Diff.	R Square	F	P value	Sig. diff.
Ext. Rotation ROM	Hold-Relax Technique	Pre test	21.27	6.53	0.445	14.95	<0.0001	(P < 0.05) ****
		Post Test	27.80					
	Active Release Technique	Pre test	21.87	10.80				
		Post Test	32.67					

**Table 11:** ANOVA to compare Ext. Rotation ROM between Group A and B among patients with shoulder impingement syndrome

The above table 11 shows significant difference on Ext. Rotation ROM between Group A and B among patients with shoulder impingement syndrome with P value <0.0001.

Outcome Measures	Exercise Group A and B	Test	Mean	Mean Diff.	R Square	F	P value	Sig. diff.
SPADI	Hold-Relax Technique	Pre test	54.73	8.067	0.528	20.84	<0.0001	(P < 0.05) ****
		Post Test	46.67					
	Active Release Technique	Pre test	55.60	10.60				
		Post Test	45.00					

**Table 12:** ANOVA to compare SPADI between Group A and B among patients with shoulder impingement syndrome

The above table 12 shows a significant difference in SPADI between Group A and B among patients with shoulder impingement syndrome with a p-value <0.0001.

## RESULT

A total of 15 participants of both genders suffering from shoulder impingement syndrome were included in the study based on specific selection criteria with age group between 42 to 56 years.

In this study, the pain has reduced with a mean difference of 1.267, by Hold-Relax Technique with P value >0.0001, among patients with shoulder impingement syndrome. The study pain has reduced with a mean difference of 2.267, by Active Release Technique with P-value 0.0001, among patients with shoulder impingement syndrome. Abduction ROM has improved with a mean difference of 6.33, by Hold-Relax Technique with P-value > 0.0001, among patients with shoulder impingement syndrome. Abduction ROM has improved with a mean difference of 13.27, Active Release Technique with P-value >0.0001, among patients with shoulder impingement syndrome.

External Rotation ROM has improved with a mean difference of 6.53, by Hold-Relax Technique with P-value > 0.0001, among patients with shoulder impingement syndrome. External Rotation ROM has improved with a mean difference of 10.80, Active Release Technique with P-value >0.0001, among patients with shoulder

impingement syndrome. Shoulder function has improved with a mean difference of 8.067, by Hold-Relax Technique with P-value > 0.0001, among patients with shoulder impingement syndrome. Shoulder function has improved with a mean difference of 10.60, Active Release Technique with P-value >0.0001, among patients with shoulder impingement syndrome.

A comparative study between Group A and Group B showed a significant difference in the effectiveness of pain, external rotation, and shoulder function with P-value >0.0001, respectively, among patients with shoulder impingement syndrome. A comparative study between Group A and Group B showed no significant difference in abduction effectiveness with a P-value >0.1217 among patients with shoulder impingement syndrome. The study concludes that Active Release Technique is a more effective Hold-Relax Technique on pain, Abduction ROM, External Rotation ROM, and Shoulder function among patients with shoulder impingement syndrome.

## DISCUSSION

The study reported that the active release technique was a successful treatment approach in lateral epicondylalgia and can improve the functional activities and the pain-free grip strength.

Study with the intervention of Active release technique and MET has reported reduced pain, improved ROM, and shoulder function in adhesive capsulitis subjects. More improvement was observed in the subjects treated with ART along with conventional therapy. Conventional therapy alone has shown less improvement in the reduction of pain and functional activities [15].

A study with ART has reported good improvement in range of motion in the shoulder. It reveals that this technique has more effect on shoulder joint function. ART has been advised to improve the range of movement in the shoulder joint among patients with capsulitis [16].

In the study, the preliminary data from that clinical pilot trial suggest that the active release technique may be an effective conservative management strategy for carpal tunnel syndrome patients.

In response to ART may be usable to treat low back pain. ART was presented to reduce the low back pain in people with chronic low back pain [17].

The study suggested that the active release technique effectively decreases the level of pain and dysfunction in chronic low back pain patients. The active release technique is also considered to be more effective in improving the pelvic tilt and pelvic rotation than the myofascial release technique. This can be an effective method for the non-pharmacological and non-surgical treatment of chronic low back pain [18].

## CONCLUSION

The study concluded that the active release technique is more effective than the hold-relax technique on pain, abduction ROM, external rotation ROM and shoulder



function among the patients with shoulder impingement syndrome.

**Ethical Clearance:** Ethical clearance has been obtained from the Faculty of Physiotherapy, DR.MGR. Educational and Research Institute, Chennai, to conduct this study with reference number: D-23/ PHSIO/IRB/2019-20 dated 07/01/2020.

**Conflict of interest:** There was no conflict of interest to conduct this study.

**Fund for the study:** It was a self-financed study.

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