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## Research Article

### EFFECT OF SCAPULAR TAPING IN SHOULDER IMPINGEMENT SYNDROME

Pranali Pandit., Ashwini Kamble and Savita Rairikar

<sup>1</sup>Dept of Botany, Arulmigu Palaniandavar College of Arts and Culture, Palani - 624001

<sup>2,3</sup>Dept of Botany, Vellalar College for Women, Thindal, Erode-12

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Shoulder impingement, scapular taping, strengthening exercises

#### ABSTRACT

**Introduction:**-shoulder impingement syndrome is a clinical syndrome which occurs when there is inflammation of rotator cuff muscles which causes pain and weakness at the shoulder. scapula has important role in impingement syndrome. scapular taping in an attempt to alter scapular muscle activity is commonly used in rehabilitation programme. So purpose of this study is to find out the effect of scapular taping in shoulder impingement syndrome and to compare the effectiveness of taping and exercises versus only exercises in shoulder impingement syndrome.

**Methodology:**-30 candidates who met the inclusion criteria were selected who were diagnosed to have shoulder impingement syndrome. 15 subjects (group A) were treated with only exercises and (group B) were treated with taping and exercises assessed with SPADI and VAS.

**Results:**- p value was more significant in group B as compared to group A. group A and B both showed decrease in pain, increase in range of motion and improvement in shoulder function. however group B showed more significant improvement than group A.

**Conclusion:**-scapular taping appear to provide a reduction in pain when assessed by SPADI and VAS. And also there is significant increase in the range of motion of the shoulder joint.

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#### INTRODUCTION

Shoulder impingement syndrome also called as painful arc syndrome, is a clinical syndrome which occurs when the tendons of the rotator cuff muscles become irritated and inflamed as they pass through the subacromial space, the passage beneath the acromion this can result in pain, weakness and loss of movement at the shoulder.<sup>[1][2]</sup>

The scapula has been found to play an important role in impingement syndrome.<sup>[3]</sup> the intrinsic muscles of scapula include the muscles of the rotator cuff i.e, subscapularis, teres minor, supraspinatus and infraspinatus.<sup>[4]</sup> These muscles are responsible for internal and external rotation of the GH joint along with humeral abduction. The extrinsic ms includes the biceps, triceps and deltoid ms. The third group which is mainly responsible for stabilization and rotation of scapula consist of trapezius, serratus anterior, levator scapulae and rhomboids.

If the scapula fails to properly elevate the acromion impingement may occur during acceleration phase of an overhead activity. The two ms most commonly inhibited during an overhead activity are serratus anterior and the lower trapezius.<sup>[5]</sup> These two ms acts as a force couple within the

glenohumeral joint to properly elevate the acromion process and if the ms imbalance exists shoulder impingement may develop.

#### Signs and Symptoms

The most common symptom in impingement syndrome are pain, weakness and loss of movement at the affected shoulder.<sup>[1]</sup> pain is often worsened by shoulder overhead movements may occur at night, especially if the pt is lying on the affected shoulder. The ROM at the shoulder may be limited by pain. A painful arc of movement may be present during elevation of the arm from 60<sup>0</sup>-120<sup>0</sup>.<sup>[6]</sup>

#### Diagnosis

- History
- Physical examination
- Investigation:-MRI, x-ray

#### Management

The management of shoulder impingement pathology should address the primary underlying causative factors. This typically includes posture and neuromuscular control via specific exercise<sup>[4,6,7,8-9]</sup> and facilitatory taping.<sup>[9-10]</sup>

\*Corresponding author: Pranali Pandit

Dept of Botany, Arulmigu Palaniandavar College of Arts and Culture, Palani - 624001

### Need For Study

- In the reviews we found that mostly kinesio tape and McConnell tape was used for scapular taping in shoulder impingement.
- Also in most of the reviews immediate effects of taping was seen
- So there was need to study the effect of rigid taping for scapula in shoulder impingement and to see the long time effect of taping

### Aims and Objectives

**Aim:-**To study the effect of scapular taping in patients with shoulder impingement syndrome.

### Objectives

- To find the effect of scapular taping in patients with shoulder impingement syndrome.
- To find the effect of shoulder exercises in shoulder impingement patients.
- To compare the effectiveness of taping and exercises versus only exercises in shoulder impingement patients.

### METHOD AND METHODOLOGY

- Study design:-Experimental study
- Study sample:- 30(15 in each group)
- Sampling:-Randomized

### Inclusion Criteria

- Unilateral shoulder pain
- Neer's and Hawkinskenedy test-positive

### Exclusion Criteria

- Patient with cervical disorder
- H/o previous shoulder surgery
- Steroid injection around joint in the past 2 months
- Neurological deficit
- Poor fragile skin condition
- Patients with adhesive capsulitis.

### Procedure

Oral consent was taken from all the candidates who participated in this study.30 candidates who met the inclusion criteria were selected who were diagnosed to have shoulder impingement syndrome.15 subjects (group A) were treated with only exercises and (group B)were assigned to the group who were treated with taping and exercises.

The intervention that is (group B) received scapular taping applied three times per week for the two weeks of their treatment. Each taping was removed after two days. Shoulder exercises given to patients were (strengthening of scapula stabilizers, rotator cuff muscles, capsular stretching and hot pack if needed).

The method of scapula taping was based on the common dysfunctions of winging, pseudo-wingings, and excess downward rotation. The taping consisted of two straps: the first strap anchored over the anterior deltoid muscle and extended posteriorly along the line of the spine of the scapula, terminating in the midline; the second strap anchored anteriorly

over the coracoid process and extended posteriorly and inferomedially over the scapula in imitation of the line of pull of the lower trapezius. The outcome measures were taken at baseline and 2weeks following the commencement of treatment.

### Scapular taping



### Scapular Retraction Exercises





**Exercise for Serratus Anterior**



**Strengthening of Supraspinatus**



### **Strengthening of Infraspinatus**



#### **Outcome Measures**

1. SPADI questionnaire.
2. Shoulder range of movement (flexion ,abduction, internal rotation and external rotation )
3. A visual analogue scale (VAS) pain score.

#### **Materials used for study**

1. Rigid tape
2. Goniometer
3. Theraband

#### **Spadi Scale**

Pain scale

How severe is your pain?

0=no pain, and 10=the worst pain imaginable

- At its worst
- when lying on the involved side
- Reaching for something on a high shelf
- Touching the back of your neck
- Pushing with the involved hand

Disability scale

How much difficulty do you have?

- Washing your hair
- Washing your back
- Putting on an undershirt or jumper
- Putting on a shirt that buttons down the front
- Putting on your pants
- Placing an object on a high shelf
- Carrying a heavy object of 10 pounds
- Removing something from your back pocket

#### **REVIEW OF LITERATURE**

Taping patients with clinical signs of subacromial impingement syndrome: the design of a randomized controlled trial Joeri Kalter, Adri T Apeldoorn *et al* BMC musculoskeletal disorders 2011 Abstract-shoulder problems are a common complaint of the musculoskeletal system. physical therapist treat these patients with different modalities such as exercise, massage and

shoulder taping. although different techniques have been described the effectiveness of taping has not yet been established. The aim of this study is to assess the effectiveness and cost-effectiveness of usual physical therapy care in combination with a particular tape technique for subacromial impingement syndrome of the shoulder compared to usual physical therapy without this tape technique in a primary health care setting.

**Methods and design:-** sample of 140 patients between 18 to 65 years of age with a diagnosis of subacromial impingement syndrome as assessed by physical therapist will be recruited. in both the groups, usual care consist of individualized physical therapy care. The primary outcome will be shoulder specific function (simple shoulder test) and pain severity (11 point numerical rating scale). Utilities (quality adjusted life years) will be measured using EuroQol. the data will be collected at baseline and 4,12 and 26 weeks follow ups.

**Discussion:-** this pragmatic study will provide information about the effectiveness and cost effectiveness of taping in patients presenting with clinical signs of SAIS.

Does Scapula Taping Facilitate Recovery for Shoulder Impingement Symptoms? A Pilot Randomized Controlled Trial  
Peter Miller, B Pty, Grad Cert H Sca and Peter Osmotherly, B Sc, Grad Dip Pty, M Med Scib

J Man Manip Ther. 2009; 17(1): E6-E13

### Abstract

Scapula taping is a commonly used adjunctive treatment for shoulder impingement pathology. However, this intervention has not previously been subject to formal investigation. A pilot single-blind randomized controlled trial was conducted to evaluate facilitatory taping as an adjunct to routine physiotherapy management. Twenty-two subjects with unilateral shoulder impingement symptoms were randomized into a taping with routine physiotherapy or a routine physiotherapy only group. The intervention group had scapula taping applied three times per week for the first two weeks of their treatment. All subjects were assessed at baseline, then at 2 and 6 weeks after the commencement of treatment. Pain and functional ability were assessed using the Shoulder Pain and Disability Index, range of shoulder elevation, and self-reported pain on elevation. At 2 weeks, the taping group demonstrated a strong trend toward reduced pain both on self-reported activity (SPADI pain subscale mean for taping 27.0 versus 41.5 for control) and pain during measured abduction (mean VAS 22.8 for taped, 46.8 for control). This study provides preliminary evidence for a short-term role for scapula taping as an adjunct to routine physiotherapy in the management of shoulder impingement symptoms.

The immediate effect of scapular taping on surface electromyographic activity of the scapular rotators in swimmers with subacromial impingement symptoms

M.J. Smith

V. Sparkes

*Physical Therapy in Sport* 7 (4), p. 171..2006.09.002

### Introduction

The application of scapular taping in an attempt to alter scapular rotator muscle activity is a commonly employed

physiotherapeutic intervention in the injury management and rehabilitation of athletes.

Twenty swimmers who demonstrated SI symptoms on clinical testing were recruited. The objective was to use surface electromyography (EMG) to measure any immediate change in the muscle activity of the scapular rotators (upper fibres of trapezius (UFT), lower fibres of trapezius (LFT) and serratus anterior (SA)) following the application of a commonly used scapular taping technique (McConnell, 1999) during repeated humeral elevation in the scapular plane. Related t-tests were conducted to look for statistically significant changes as a consequence of the taping.

### RESULTS

There was a highly statistically significant () reduction in the EMG activity of the UFT as a consequence of the taping. However there was no statistically significant change in the EMG activity of the LFT () or SA ().

### DISCUSSION

The application of scapular taping in a symptomatic sample caused a statistically significant reduction in UFT activity, but no change in LFT or SA activity. This study provides evidence that the McConnell (1999) scapular taping technique used in this study is an appropriate technique to reduce UFT activity, in the immediate term, in symptomatic SI sporting populations.

Position-Oriented Scapular Taping in the Treatment of Shoulder Pain and Impingement

Author

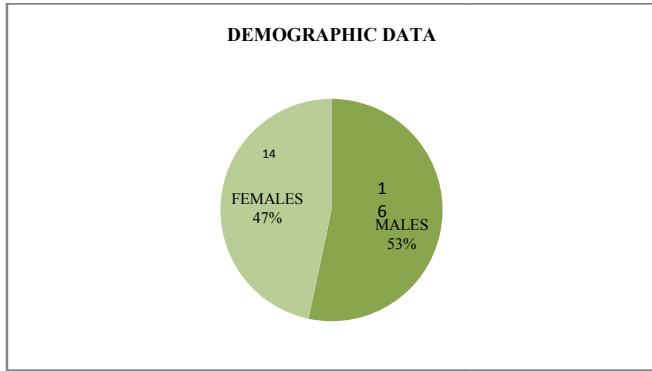
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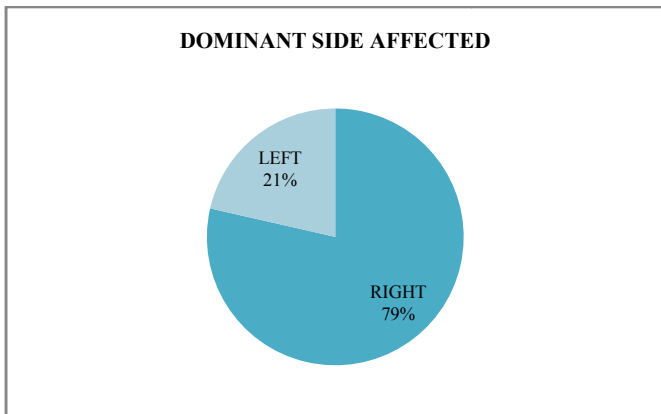
### Abstract

Taping of the scapula is used by physical therapists in the treatment of subacromial impingement; however, little research has been performed to help determine the effectiveness of the taping procedure. The purpose of this study was to determine the effect of scapular taping on active range of motion performed in abduction and scaption, muscle performance, and pain on an individual with subacromial impingement using a single subject research design. An ABA design was used with the baseline phase (A) involving strengthening exercises and the intervention phase (B) involving both exercise and the application of scapular tape. Graphical analyses of the results indicated a significant improvement in pain, muscle performance and active range of motion performed in scaption during the intervention phase. Although significance was determined, it cannot be surmised if the change occurred due to the taping procedure, the implementation of strengthening exercises or a combination of both. A clinical significance in active range of motion abduction did not occurred.

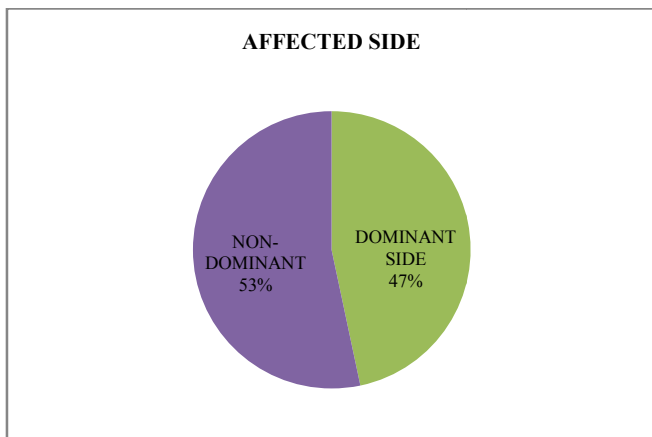
**RESULTS**



53% males and 47% females were participated in this study

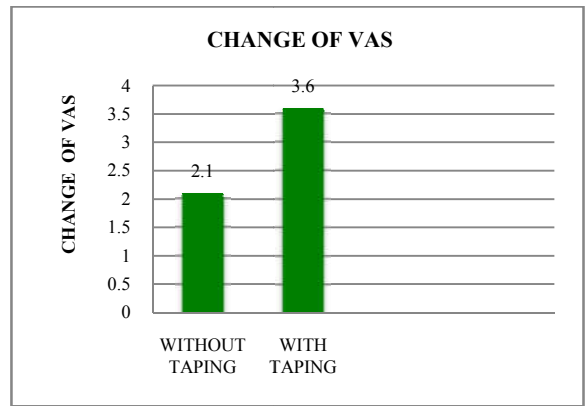
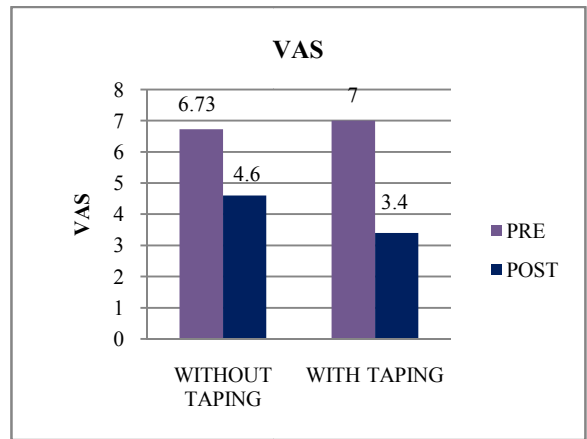


In 79% patients right dominant side was affected and in 21% patients left dominant side was affected



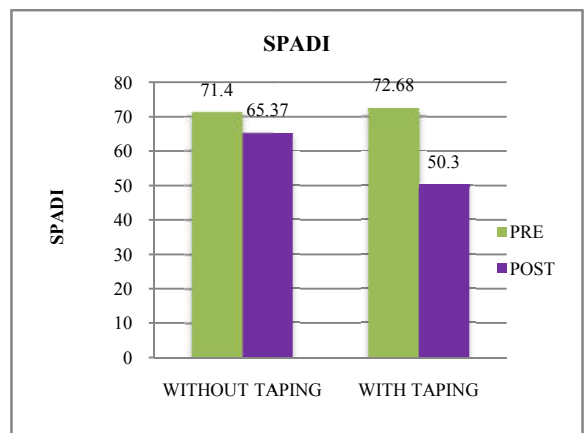
Dominant side was affected in 47 % patients and non dominant side was affected in 53% patients.

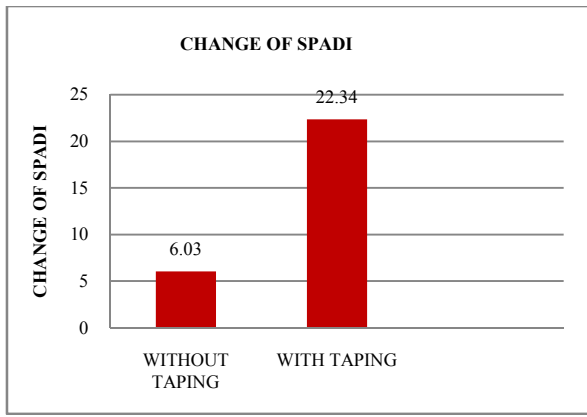
**Graph 1** Comparison of VAS in with taping and without taping group



	Mean VAS Pain(Mean ± SD)	
	Exercise Program Group(A)	Taping And Exercise Program Group(B)
Pre	6.7±1.75	7±1.3
Post	4.6±1.63	3.4±1.1
p value	<0.0018	<0.0001
P value	'P'<0.0001 Significant	

**Graph 2** Comparison of SPADI score in with taping and in without taping group

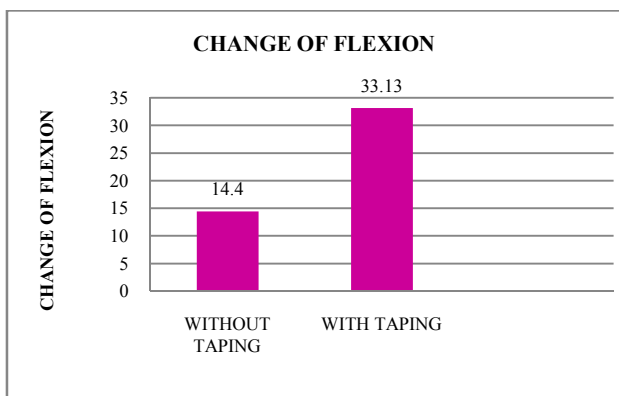
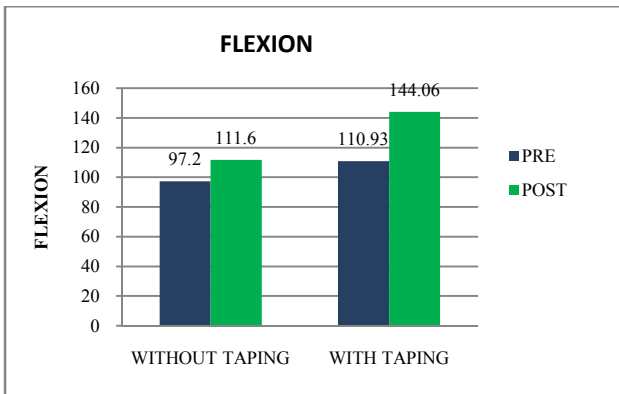




Mean SPADI(Mean ± SD)

	Exercise Program Group( A)	Taping And Exercise Program Group(B)
Pre	71.4±9.55	72.68±10.70
Post	65.37±8.66	50.34±9.02
p value	0.08	<0.0001
P value	'P'<0.0001 SIGNIFICANT	

Graph 3 Comparison of flexion range in with taping and in without taping group

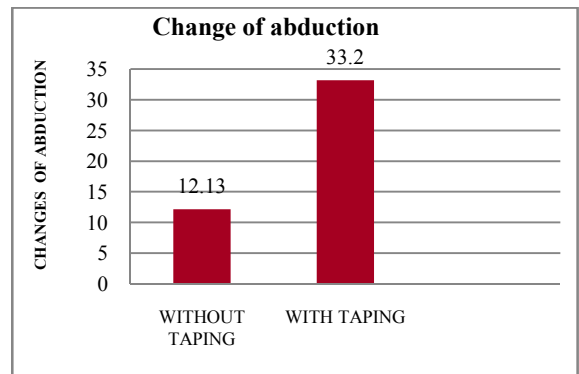
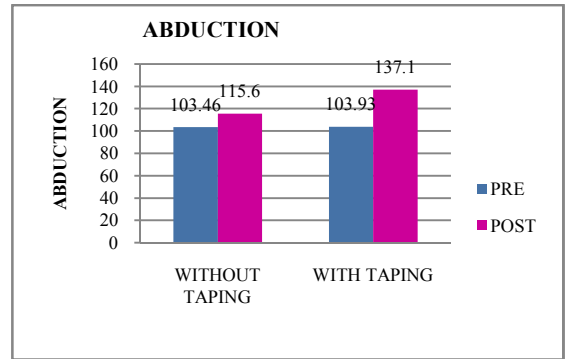


Mean Flexion(Mean ± SD)

	Exercise Program Group(A)	Taping And Exercise Program Group(B)
Pre	97.2±15.06	110.9±21.93
Post	111.6±13.35	144.06±20

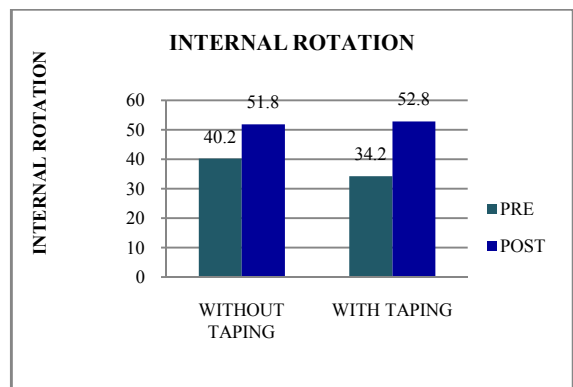
p value	0.09	<0.0002
P value	'P'<0.0001 SIGNIFICANT	

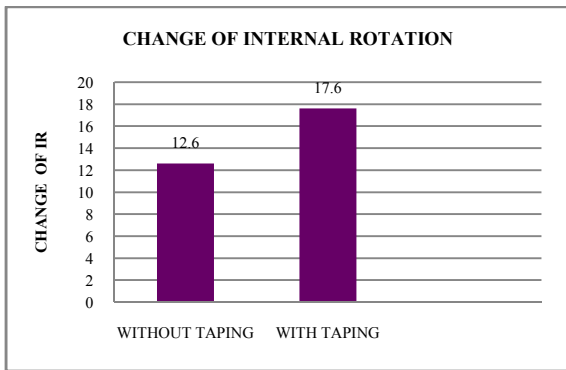
Graph 4 Comparison of abduction range in taping and in without taping group



Mean Abduction (Mean ± SD)

	Exercise Program Group(A)	Taping And Exercise Program Group(B)
Pre	103.47±18.50	103.9±25.5
Post	115.60±17.50	137.1±17.6
p value	0.07	<0.0003
P value	'P'<0.0001 Significant	

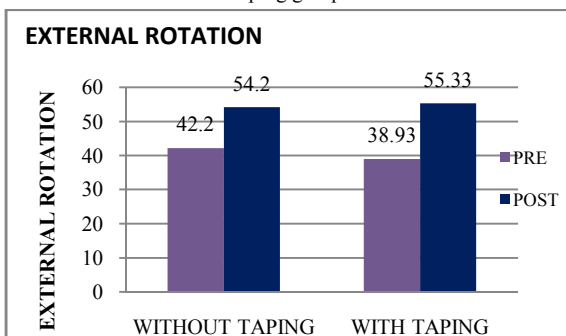




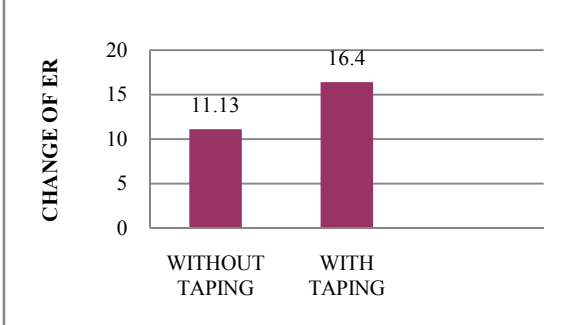
Mean Internal Rotation (Mean ± SD)

	Exercise Program Group(A)	Taping And Exercise Program Group(B)
Pre	40.2±10.12	34.2±7.21
Post	51.8±10.31	52.8±7.29
p value	0.002	<0.0001
P value	'P'<0.007 SIGNIFICANT	

Graph 5 Comparison of internal rotation range in with tapping and in without tapping group



CHANGE OF EXTERNAL ROTATION



Mean External Rotation(Mean ± SD)

	Exercise Program Group(A)	Taping And Exercise Program Group(B)
Pre	42.2±9.55	38.93±8.63
Post	54.2±9.71	55.33±8.42
p value	0.002	<0.0001
P value	'P'<0.0007SIGNIFICANT	

Graph 6 Comparison of external rotation range in with tapping and in without tapping group

## DISCUSSION

- Group A(exercise) and Group B(taping and exercises) both groups showed decrease in pain and increase in range of motion and improvement in shoulder function
- However group B showed significant decrease in pain, increase in range and shoulder function
- Our result suggest that there may be a potential role for scapular taping as an adjunct to usual physiotherapy treatment in the management of shoulder impingement syndrome.
- Scapula plays an important role in shoulder function, it requires both significant mobility and stability.
- In shoulder impingement the activation of upper trapezius fiber is increased and that of serratus anterior decreases (Ludwig P, Cook T 2000)
- With shoulder taping the overactivity of upper trapezius and anterior deltoid is decreased. The effects are related to proprioception feedback. the mechanism by which scapular taping induces effects can be explained by neuromuscular control and proprioceptive feedback (EMG activity on taping 2011)
- There is alteration in shoulder kinematics and associated muscle activity in people with shoulder impingement.ie
- Reduced scapular upward rotation
- Increased anterior tipping and increased scapular medial rotation. [Paula H.Ludewig and Thomas cook,2012]

With scapular taping there is increase in external and upward rotation and posterior tilt during elevation in saggital plane. [ShaheenAF, Villa C. *Et al* 2012]

### Effects of taping

1. Pain relief-joint support and joint Re-alignment
  2. Neuromuscular effect-taping along muscle facilitate muscle activity.
  3. Proprioception enhancement-cutaneous mediated proprioceptive feedback
  4. Tissue deloading
- Pain is reduced by gate control theory because tape stimulates neuromuscular pathway via increased afferent feedback.
  - Taping guides the shoulder through an arc of motion as it decreases mechanical irritation of involved soft tissue.
  - Some components of overall observed effect of placebo effect must be observed. (Thelen MD)
  - Tape offers a constant input on proprioceptive system of upper body muscles which supports the active movement. (Alexander CM Manual Ther apy2003)
  - Due to reduction of pain and improvement of range, functional activities of shoulder were improved.

## Limitations

- Small sample size
- Long term effect of taping after its removal was not seen

## Further Scope of Study

- Study can be done with any shoulder pathology patients.
- Larger sample size can be selected for this study.
- Study can be done for longer duration to see the long term effect of taping.

## CONCLUSION

- On conclusion this study revealed significant difference in intervention group (with taping) as compared to control group (without taping).
- Taping appear to provide a reduction in pain experienced when assessed by both SPADI and VAS.
- Also there is significant increase in the range of motion of the shoulder joint.

## Clinical Implication

- Scapular taping speed up the rehabilitation by lessening pain and improving tolerance to exercise and movement, so can be used in the routine physiotherapy exercises
- Also rigid tape is cheaper than kinesiotape so it is feasible to patient

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