A COMPARATIVE STUDY BETWEEN THE EFFECTS OF McCONNELL TAPING AND KINESIOTAPING ON SHOULDER PAIN, RANGE OF MOTION AND FUNCTIONAL ABILITY IN PATIENTS WITH SHOULDER IMPINGEMENT SYNDROME

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EXAMINERS

1)

2)

This dissertation is submitted to

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Master of Physiotherapy, Speciality: Sports Physiotherapy

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CERTIFICATE

This is to certify that the dissertation titled **"A COMPARATIVE STUDY BETWEEN THE EFFECTS OF McCONNELL TAPING AND KINESIOTAPING ON SHOULDER PAIN , RANGE OF MOTION AND FUNCTIONAL ABILITY IN PATIENTS WITH SHOULDER IMPINGEMENT SYNDROME"** is a bonafide record of work done under my guidance and supervision in the partial fulfilment for the degree of **MASTER OF PHYSIOTHERAPY-SPECIALITY: SPORTS PHYSIOTHERAPY (APRIL 2016)** by **Mr.PAUL JOSE (Reg.No:-271450161)** postgraduate student of Madha College of Physiotherapy, Kundrathur, Chennai.

GUIDE **PRINCIPAL**

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LIST OF ABBREVATIONS

SIS	:	Shoulder Impingement Syndrome
KT	:	Kinesiotaping
VAS	:	Visual Analogue Scale
SPADI	:	Shoulder Pain and Disability Index
AROM	:	Active Range of Motion
EMG	:	Electromyography
et al	:	and others
SD	:	Standard Deviation
SEM	:	Standard Error of Mean
n	:	Number of subjects
EXT ROT	:	External Rotation
INT ROT	:	Internal Rotation

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INTRODUCTION

INTRODUCTION

Shoulder impingement syndrome (SIS) is the most frequently recorded disorder of shoulder complaints, which accounts for 44 -65% of all complaints of shoulder pain during aphysician's office visits(van der Windt etal., 1995,1996; Vecchio etal.,1995).Subacromial space is defined by the humeral head inferiorly, the anterior edge and under surface of the anterior third of acromion, coracoacromial ligament and acromioclavicular joint superiorly(Neer 1972).

Shoulder impingement has been defined as compression and mechanical abrasion of the rotator cuff structures asthey pass beneath the corocoacromial arch during elevation of the arm (Matsen F A etal 1990; Neer C S Jr 1983).Several theories are proposed as the causes of the narrowing of the subacromialspace. There are two main mechanistic theories as to the cause of the narrowing subacromial space.

The first is intrinsic impingement which theorizes that partial or full thickness tendon tears occurs as the result of the degenerative process that occurs over time with overuse ,tension overload or trauma of the tendons(Burdoff etal.,1998;Uhthoff etal 1998). In intrinsic disorders, the tendon is thickened and inflamed at areas of calcification, swollen at the site of partial cuff tears, or covered by a chronically inflamed and indurated subacromial bursa. Osteophytes, acromial changes, muscle imbalances and weakness and altered kinematics leading to impingement will subsequently follow.

The second is extrinsic impingement, where inflammation and degeneration of the tendon occur as a result of mechanical compression by some structure external to the tendon(Neer 1972;Bigilani and Levine 1997), In extrinsic cases, the shape of the acromion,(Neer CS,1972;, BigilaniLH,1986) the attachment of the coracoacromial ligament(Soslowsky LJ etal,1994; Edelson JG etal, 1995) and changes in the acromioclavicular joint (Peterson CJ, 1983)have been implicated.

Itis often stated that in most instances overuse of the affectedarm is the basic cause of impingement. Potential extrinsic mechanics that may lead to shoulder impingement syndrome are faulty posture ,altered scapular or

glenohumeralkinematics posterior capsule tightness and acromial and coracoacromial arch pathology(Michener LA etal 2003).Postural, kinematic and the scapular muscle changes(weakness/fatigue) have all been demonstrated to directly or indirectly alter the subacromial space dimension and relationship to the structures within the subacromial space(Michener LA etal, 2003). It is difficult to ascertain whether tendon degeneration or the changes external to the tendon came first (Michener LA etal 2003).

Shoulder impingement syndrome may lead to a full thickness tear of the rotator cuff tendons and degenerative joint disease of the joints of the shoulder girdle (Neer,1972;Fu etal., 1991;Bigilani and Levine, 1997;Budoff etal., 1998). Clinically, a rotator cuff rupture is characterized by painful or impaired active abduction, with reduced strength in abduction, external rotation and elevation (Heerspink F L etal, 2011).

Altered function of lower trapezius and serratus anterior has been found to influence the scapular movement and associate with subsequently poor shoulder functions and chronic impingement problems (Kibler WB et al 2003; Cools et al, 2002 and Ludewig and Cook, 2000) observed inhibition of the serratus anterior and lower trapezius and over activation of the upper trapezius muscle in subjects with shoulder impingement syndrome. The current rehabilitation protocols mainly emphasize theidea of restoration of scapular control Kibler WB., et al, 1991; Mottram SL., etal 1997)and the role of various muscles among the subacromial space(Lunden JB,. etal,2010; Escamilla RF,. etal 2009).

The glenohumeral joint is a relatively unstable joint, whose stability depends on the surrounding ligaments, capsule, and muscles, such as rotator cuff and scapulothoracic muscles. r pain in overhead athletes. The coordination between the parts of the trapezius muscle is especially crucial. The assumption is that the increased activity of the upper and lower trapezius, the decreased activity of the serratus anterior, and the inadequate coordination between these muscles increase the posterior tilt, and decrease the external rotation of scapula during shoulder elevation. Ultimately, with this alternative muscle control, the subacromial space significantly

narrows which leads to shoulder impingement syndrome. Increased imbalance between anterior deltoid and rotator cuff muscle provoking superior humeral migration is another factor causing impingement symptoms.

Physiotherapy is often the first choice of treatment for SIS. However, the effectiveness of physiotherapy in patients with SIS is still under debate. Conclusions from systematic reviews suggest that physiotherapy-led interventions, combining different methods or techniques, are not more effective than exercises alone except adding manual mobilization to exercises, which seems to be of additional benefit. Most technical treatments such as ultrasound or laser therapy cannot be recommended. Thus nearly all current systematic reviews emphasize the need for more high quality trials of physiotherapy interventions, especially of combination of treatment techniques (Thilo O Kromer etal, 2010).

Both McConnell taping and Kinesiotaping techniques are used in conjunction with other physiotherapeutic interventionsin the management of shoulder impingement syndrome(Host H H, 1995; Kaya E etal ,2011; Cools A etal ,2002; Smith MJ &Sparkes V, 2006; Shakeri H etal, 2013).

Several literature revealed minimal evidence to support the use of KT in the treatment of shoulder disorders. Controversy exists regarding the effects of KT on patients with shoulder pain and related disorders. Some investigators have demonstrated that taping effectively improved the postural alignment, increased the shoulder ROM, and reduced pain and discomfort of the glenohumeral joint. (Jaraczewska E etal 2006, Wang S.1999;Lewis J 2005; Kase K etal 2003;Kaya E et al, 2011). However, the results of the other studies did not support the utilization of KT for decreasing pain intensity or disability in patients with suspected shoulder tendonitis/impingement(Ackermann B etal , 2002; Alexander CM etal, 2003),.

Few studies have been conducted on McConnell scapular taping on shoulder impingement syndrome. It has been thought that McConnell taping would decrease the activity of the upper trapezius and increase the activity of lower trapezius and serratus anterior muscle. It has been proved that there is a decrease in the acivity of the upper trapezius muscle(Smith MJ and Sparkes V ,2006; Selkowitz DM etal,2007)

and a increase in the activity of lower trapezius (Selkowitz DM etal, 2007) .There is also evidence for a short-term role for scapula taping as an adjunct to routine physiotherapy in the management of shoulder impingement symptoms(Peter M etal 2009).

Kinesiotape is believed to increase space which will thereby reduce the pressure by lifting the skin, and it is also thought to causes lymphatic correction which will help to decrease the pressure under the kinesiotape strip that act as channels to direct the exudates to the nearest lymph ducts. Kinesiotape technique also helps to maintain the scapula thoracic stability and normalize the scapula humeral rhythm by altering the scapular muscle activity and correcting abnormal scapular position There is evidence for the increased activity of lower trapezius in 60 to 30 degree arm lowering phase by kinesiotape as compared with sham application in baseball players with shoulder impingement syndrome (Hsu YH etal 2009).

AIM OF THE STUDY

The aim of the study is to compare the effect of McConnell taping technique and Kinesiotapingtechnique on shoulder pain ,range of motion and functional ability in patients with shoulder impingement syndrome.

OBJECTIVE

The objective of this studyis to investigate the effect of McConnell taping versus Kinesiotaping in shoulder impingement syndrome in a randomized and prospective way. Specifically to determine

1. The immediate and 24 hours post taping effect of McConnell taping on pain intensity, AROM and functional ability in shoulder impingement syndrome

2. The immediate and 24 hours post taping effect of Kinesiotaping on pain intensity, AROM and functional ability in shoulder impingement syndrome

3. Compare the effect of McConnell taping technique and Kinesiotaping technique on pain intensity, AROM and functional ability in patients with shoulder impingement syndrome

HYPOTHESIS

1. Null Hypothesis (Ho)

There is no significant difference between the effects of McConnell taping technique and the effect of Kinesiotaping technique on patients with shoulder impingement syndrome.

2. Alternative Hypothesis (H1)

There is significant difference between the effects of McConnell taping technique and the effect of Kinesiotaping technique on patients with shoulder impingement syndrome.

OPERATIONAL DEFINITIONS

Shoulder impingement syndrome

Neer defined shoulder impingement syndrome as mechanical compression of the rotator cuff, subacromial bursa and biceps tendon against the anterior undersurface of the acromion and coracoacromial ligament especially during elevation of the arm. Neer stated that as many as 95% of all rotator cuff tears could be attributed to mechanical impingement.

Scapular taping

Shoulder taping is used frequently in the clinical setting as a helpful adjunct to other physiotherapy modalities when treating shoulder pathology and dysfunction.

Pain

Pain is "an unpleasantsensory and emotionalexperience associated with actual or potential tissuedamage.

SPADI

The shoulder pain and disability index (SPADI) is a self-report questionnaire developed to measure the pain and disability associated with shoulder pathology. The SPADI consists of 13 items in two subscales: pain (5 items) and disability (8 items); originally presented in a visual analogue format.

Range of motion

Range of motion is the distance and direction of movement of a joint, which is measured using goniometer. Goniometric AROM measurements for the shoulder appear to be highly reliable when taken by the same physical therapist, regardless of the size of the goniometer used.

REVIEW OFLITERATURE

REVIEW OF LITERATURE

1. Marc Campolo etal (2013), conducted a study on the comparative effect of two taping technique (Kinesio and McConnell) on anterior knee pain during functional activities and concluded that both Kinesiotape and McConnell tape may be equally effective in reducing pain during stair climbing.

2. AliahF Shafeen , Anthony M J Bull , Caroline M Alexander (2015) conducted a comparative study between the effects of Rigid(Lewis technique) and Elastic tape(Kinesiotape) on scapular kinematics and pain in subjects with shoulder impingement syndrome; and concluded that both rigid and elastic tapes reduces the scapular internal rotation in patients with shoulder impingement syndrome as well a reduction in pain in sagittal plane movements.

3. Kaya DO, Baltaci G, Toprak U, Atay AO (2015), conducted a comparative study on Kinesiotaping with exercise versus manual therapy with exercise in patients with subacromial impingement syndrome and concluded that the use of kinesiotaping with exercise and manual therapy with exercise are both effective in decreasing pain and disability in patients with subacromial impingement syndrome. The kinesiotaping with exercise intervention was more effective in decreasing pain at night than the manual therapy with exercise treatment group.

4. Hassan Shakeri, RoshanakKeshavarz, Amir Massoud Arab,IsmaeilEbrahimi, (2013) conducted a study on the effect of Kinesiotaping on pain intensity during movement, pain experienced during the night (nocturnal pain), and pain-free shoulder range of motion (ROM) immediately after taping, after three days and after one week, in patients with SIS and concluded that Kinesiotaping produces an immediate improvement in the pain intensity at movement and nocturnal pain in patients with Shoulder impingement syndrome.

5. Morey J Kobler and William J Hanney(2012) conducted a study on the reliability and concurrent validity of shoulder mobility measurements using a digital inclinometer and a goniometer and concluded that goniometry and digital inclinometer can be used interchangeably for measuring shoulder mobility measurements.Clinicians should consider the 95% limits of agreement when using these instruments interchangeably as clinically significant differences are likely to be present.

6. McConnell J, Donnelly C, Hamner S, Dunne J, Besier T (2012) conducted a study on the passive and dynamic shoulder rotation range in uninjured and previously injured overhead throwing athletes and the effect of shoulder taping. They concluded that Passive internal rotation-external rotation ROM is a poor indication of dynamic shoulder function. Athletes who have had a previous shoulder injury demonstrate a greater dynamic IR-ER ROM than athletes who have never had a shoulder injury. Shoulder taping decreased the dynamic range of the previously injured athlete, so that it was nearer the dynamic range of the uninjured athlete. Shoulder taping might provide increased protection for the injured athlete by decreasing the dynamic internal rotation–external rotation ROM and by facilitating better shoulder and scapular muscle control.

7. Jiu-jenq Lin etal (2010) investigated the effects of scapular tape on the electromyographic activity of the upper trapezius, lower trapezius,serratus anterior, anterior deltoid, and shoulder proprioception in 12 healthy shoulders and concluded that significant changes in EMG activity in the scapular muscles with the application of tape in the asymptomatic group. Proprioceptive feedback was also enhanced with taping. They found a significant decrease in muscle activity in the upper trapezius muscle and an increase in muscular activity in the middle trapezius muscle with taping also there was no muscle activity in the middle trapezius muscle. They also foundan increase in muscular activity in theserratus anterior muscle, but no change in muscular activity in the lower trapezius, with taping.They suggested

that taping can inhibit muscleactivity in the upper trapezius and enhance activity in the serratus anterior, butnot in the lower trapezius.

8. Kaya E,Zinnuroglu M, Tugcu I(2010) conducted a comparative study between kinesiotaping and physical therapy modalities for the treatment of shoulder impingement syndrome and concluded that Kinesiotape is more effective than the local modalities at the first week and was similarly effective at the second week of the treatment. Kinesio taping may be an alternative treatment option in the treatment of shoulder impingement syndrome especially when an immediate effect is needed.

9. Peter Miller and Peter Osmotherly(2009) conducted a pilot randomised controlled trial on whether scapula taping facilitate recovery for shoulder impingement symptoms and concluded that there is a short term role for scapula taping as an adjunct to routine physiotherapy in the management of shoulder impingement symptoms and also highlights the need for consideration on a case basis relating to or skin reaction.

10. Yin-Hsin Hsu, Wen-Yin Chen, Hsiu-Chen Lin,Wendy T.J. Wang, Yi-Fen Shih (2009) conducted a study on the effects of taping on scapular kinematics and muscle performance in baseball players with shoulder impingement syndrome and concluded that kinesiotapping could be a useful therapeutic and prophylactic assistance both in the clinic as well as field.

11. Boonstra AM, SchiphorstPreuper HR, Reneman MF, Posthumus JB, Stewart RE (2008) conducted a study on the reliability and validity of the visual analogue scale for disability in patients with chronic musculoskeletal pain and concluded that the reliability of VAS for disability is moderate to good.

12. Thelen M D, Dauber J A,Stoneman P D (2008) conducted a randomized,double-blinded clinical trial on the the clinical efficacy of kinesiotape for shoulder pain and conclude that kinesiotape may be of some assistance to clinicians in improving pain-free active ROM immediately after tape application for patients with shoulder pain.

13. Jean Sebastian Roy etal (2007) found that all subject showed significant improvements in the SPADI at the end of the study . A disappearance of the painful arc motion in flexion and abduction and an increase in isometric peak torque in lateral rotation and abduction, and changes in the scapular kinematics,mainly in the sagittal plane ,were observed.

14. Joy C MacDermid etal (2006) concluded that SPADI is a valid measure to assess pain and disability in community based patients reporting shoulder pain due to musculoskeletal pathology.

15. Smith M J and Sparkes V(2006) conducted a study on the immediate effect of scapular taping (McConnell 1999) on surface electromyographic activity of the scapular rotators in swimmers with subacromial impingement symptoms and concluded that there is a reduction in the EMG activity of the upper fibres of trapezius as a consequence of the taping. However there was no statistically significant change in the EMG activity of the lower fibres of trapezius or serratus anterior.

16. Lori A Michener etal (2003) concluded that evidence exists to support the presence of the anatomical factors of inflammation of the tendons and bursa, degeneration of the tendons, weak or dysfunctional rotator cuff musculature, weak or dysfunctional scapular musculature, posterior glenohumeral capsule tightness, postural dysfunctions of the spinal column and scapula and bony or soft tissue abnormalities of the borders of the subacromial outlet. These various mechanisms, singularly or in combination may cause subacromial impingement syndrome.

17. Lewis J S etal(2002) suggested that changing posture by thoracic and scapular taping had an effect on all components of posture measured and these changes were associated with a significance increase in the range of motion in shoulder flexion and abduction in the plane of the scapula.

18. Cools A,Witvrouw E E, Danneels L, Cambier D (2002) conducted a study on the influence of McConnell taping(1999) on the electromyographic muscle

activity in the scapular rotators in healthy shoulders and concluded that there is no significant influence of tape on EMG activity in the scapular muscles in healthy subjects.

19. Timothy FT etal (2000) conducted a studyon the quantification of posterior capsule tightness and motion loss in patients with shoulder impingement and concluded that posterior capsule tightness showed a significant correlation to the loss of internal rotation range of motion. Patients with shoulder impingement in their nondominant arm demonstrated a more global loss of range of motion compared with patients having impingement in their dominant arm.

20. Graichenetal (1999) concluded that muscle activity and arm position were found to cause systematic changes in the width of subacromial space.

21. Douglas E Conroy and Karen W Hayes(1998) conducted a study on the effectof joint mobilisation as a component of comprehensive treatment for primary shoulder impingement syndrome and concluded that mobilisation decreased 24 hour pain and pain with subacromial compression test in patients with primary shoulder impingement syndrome.

22. Host H H etal (1995) concluded that the patients with anterior shoulder impingement was able to return to all of his regular overhead sports activities without pain following scapular taping used in combination with home exercise programme.

23. Hawkins R J and Kennedy J C (1980) concluded that the impingement sign which reproduces pain and resulting facial expression when the arm is forcibly forward flexed is the most reliable physical sign in establishing the diagnosis.

DESIGN

AND

METHODOLOGY

DESIGN AND METHODOLOGY

Data will be collected from patients, who are referred to the outpatient physiotherapy department of Madha Medical College, Chennai-122 with diagnosis of shoulder impingement syndrome, after obtaining informed consent.

STUDY DESIGN

Experimental study design. Single blinded randomised controlled clinical trial.

STUDY SETTING

Department of Physiotherapy,
Madha Medical College and Hospital,
Kovur , Chennai-122

SUBJECTS

The study included he sample of 24 subjects of both genders (20 males and 4 females) who were diagnosed to have Shoulder Impingement Syndrome by the referring orthopaedist. All the patients selected for the study are of the age group of 18 to 70 years.

OUTCOME MEASURES

Visual Analogue Scale (VAS) for pain intensity
Active Range of Motion using standard goniometer
SPADI (Shoulder Pain and Disability Index)

STUDY DURATION

4 months

TOOLS AND MATERIALS

Hypoallergenic cover roll stretch tape, Leukotape P,Kinesiotape, Goniometer, chairs.

Cover Roll Stretch Tape

Leukotape P

Kinesiotape

SELECTION OF SUBJECTS

24 Subjects with shoulder impingement syndrome were recruited based on the inclusion/ exclusion criteria .Informed consent of the subjects was obtained prior to the study after explaining to them about the procedure .Name, age and gender of the subject were recorded.

INCLUSION CRITERIA

1) Male and female of age 18 to 70 years who are diagnosed with unilateral subacromial impingement syndrome.

2) Unilateral shoulder pain of more than 1 week during the last six months prior to study localised (anterior and / or anterolateral) to the acromion and pain produced or increased during flexion and /or abduction of the symptomatic shoulder.

3) Atleast any four of the following:

   a) Positive Neer impingement sign
   b) Positive Hawkin's sign
   c) Pain reproduced during supraspinatus empty can test
   d) Painful arc of movement between 60 degrees to 120 degrees
   e) Pain with palpation on the greater tuberosity of humerus

EXCLUSION CRITERIA

1) Shoulder subluxation / dislocation of shoulder
2) Steroid injection into oraround the shoulder in past 2 months
3) Acute trauma /fracture of articulating bones of shoulder girdle
4) Cervicobrachial pain syndrome
5) Adhesive capsulitis of shoulder
6) History of previous shoulder surgery
7) Past skin reaction associated with the use of adhesive tapes
8) Metastatic lesion
9) Shoulder arthritis
10) Primary scapulothoracic dysfunction due to paresis
11) Poor or fragile skin condition
12) Non steroidal anti inflammatory drugs use
13) Patients undergoing shoulder treatment including physical therapy one year prior to the first assessment were excluded
14) Patients with positive full can test and speed's test were also excluded

SAMPLING METHOD

Twenty four patients were recruited based on the inclusion and exclusion criteria. Informed consent of the subjects was obtained prior to the test after explaining to them about the procedure .Name, age and gender of the subject were recorded. Subjects were randomly allocated to two groups of 12 subjects each by **simple random sampling**. Group 1 received McConnell taping and Group 2 received Kinesiotaping . A pre taping assessment on shoulder pain,pain free active range of motion and functional ability were done for all subjects using visual analogue scale(VAS), standard goniometer, and shoulder pain and disability index (SPADI) questionnaire respectively.

INTERVENTION

Group 1 subjects received McConnel taping and Group 2 received Kinesiotaping, following which a post taping assessment was done with the tape on. The pain at rest and on movement (flexion,abduction,external rotation and internal rotation) ,pain free active range of motion(AROM) and functional ability were measured immediately after taping and 24 hours after the application of the tape (tape insitu) using visual analogue scale(VAS), standard goniometer, and shoulder pain and disability index (SPADI) questionnaire respectively.

PROCEDURE

McConnell Taping (GROUP 1)

Scapular taping was done according to the guidelines of McConnell (1999). Strips of 2-in (5.08-cm) Cover Roll stretch tape and Leukotape were used for the scapular taping procedure, which is based on the McConnell method. A strip of cover roll stretch tape was applied over the muscle belly of the upper trapezius, starting anterior just proximal to the clavicle. The tape was firmly pulled over the belly of the upper trapezius, meanwhile giving a skin traction on the soft tissue towards the cervical spine .On the posterior side of the trunk, the tape was attached towards the thoracic spine, following the muscle fibres of lower trapezius. The same

procedurewas repeated with a leukotape strip(McConnell 1999).All the taping applications were performed by the same researcher.

McConnell taping with Cover Roll Stretch tape and Leukotape P

Kinesiotaping(GROUP 2)

The general application guidelines were consistent with the procedure described by Kase etal(2003) .We used red 2 inch Epos kinesiotape for our study.Initially we taped the supraspinatus muscle using a Y strip from insertion to origin with paper off tension (15%-25%).The base of the strip was placed 3 cm below the greater tuberosity of the humerus with no tension. Then, the patient adducted the shoulder with lateral neck flexion to the opposite side. The rest of the strip was appliedalong the spinous process of the scapula with a relatively lightertension which is described as 15–25% of the full stretch application (100%) where the superior tail should follow superior to the spine of scapula,approximately the junction between the upper trapezius muscle and supraspinatus ending at the superior medial border .The inferior tail should follow along the spine of scapulaand lay the distal 1 to 2 inches with no tension.

The second Y strip was used for the deltoid muscle. The base of the Y-shaped strip wasplaced 3 cm below the deltoid tuberosity of the humerus without tension. Both anterior and posterior tails were applied with light (15–25%) tension (paper off tension). The anterior and posterior tails were placed along the outer borders of the anterior and posterior deltoid muscle, respectively, without tension.

The third tape which is a I strip was applied over the teres minor muscle. The I-type strip was placed on the lower facet of the greater tuberosity of the humerus with no tension. Then, the patient abducted the shoulder in horizontal flexion with internal rotation. We placed the rest of the strip along the axillary border of the scapula with light (15–25%) tension.

Kinesiotaping with Epos Kinesiotape

OUTCOME MEASURES

Three outcome measures were used in this study. Visual Analogue Scale (VAS) for pain intensity, Range of motion of shoulder joint using a standard goniometer, and Functional ability using shoulder pain and disability scale (SPADI) were recorded at baseline and immediately after taping and 24 hours post taping with the tape on.

VAS Scale

We used a 100 mm VAS scale to record the pain intensity at pre tape and post tape (immediate and 24 hours) sessions.Pain was recorded at rest and pain on movement (flexion, abduction, external rotation and internal rotation).Pain on movement is recorded as the pain intensity experienced at the end point of the pain free active ROM test.

Active Range of Motion (AROM)

Pre taping and post taping(immediate and 24 hours) pain free Active ROM for shoulder flexion, abduction , external rotation and internal rotation was measured using a standard goniometer according to the work of Morey J Kobler and William J Hanney(2012) . Measurement was taken at the point where the patient felt pain during shoulder movement.

Flexion-AROM was assessed with the participant seated upright in a high back chair and a cloth gait belt secured around their waist (at the level of the umbilicus) and back of the chair to limit trunk compensation. The arm was actively elevated in a strict sagittal plane with the palm down to the participants' end-range ability at which time the measurement was recorded. The goniometric measurement was taken with the fulcrum placed inferior and lateral to the acromion process, the stable arm parallel to the trunk and the moving arm parallel to the longitudinal axis of the humerus.

Abduction-AROM was measured in the seated chair position, as in flexion, with the trunk upright. The arm was actively elevated in the strict coronal plane with the thumb pointed up toward the ceiling to allow the required external rotation necessary to avoid impingement of the greater tuberosity on the acromion process.Once active end-range was achieved the measurements were documented. The goniometric measurement was taken with the fulcrum placed at the midpoint of the posterior aspect of the glenohumeral joint, the stable arm parallel to the trunk and the moving arm parallel to the longitudinal axis of the humerus.

External rotation-AROM was tested in the supine position with the hips and knees flexed to approximately 45 degrees. The tested arm was supported on the table in 90 degrees of abduction, elbow flexed to 90 degrees, and the wrist in neutral. A towel roll was placed under the humerus to ensure neutral horizontal positioning; which required the humerus to be level to the acromion process based on visual inspection. Once positioned, the participant was asked to rotate their arm back into external rotation to their end available range without discomfort. The participant was instructed not to lift their lower back during this measurement. Once active end-range was achieved the measurement was recorded. The goniometric measurement was taken with the stable arm parallel to the floor and the moving arm parallel with the forearm.

Internal rotation-AROM was measured in the prone position with the tested arm supported on the table in 90 degrees of abduction, the forearm flexed to 90 degrees, and the wrist in neutral. A towel roll was placed directly under the arm to ensure neutral horizontal positioning and to provide stabilization. The participant was instructed to internally rotate their arm while maintaining the 90 degree abducted position. The tester carefully monitored participants to avoid compensatory scapular movement through verbal cues. Manual cues were provided as necessary if the participant did not maintain the required testing position on the first attempt. Manual cues were required for 4 participants to keep their arm in the 90-degree abducted position; however, the prone position was chosen as it did prevent anterior tilting of the scapula at end-range. Once active end-range was achieved the measurement was

recorded. The goniometric measurements were taken with the stable arm parallel to the floor and the moving arm parallel with the forearm.

Functional Ability

The Shoulder Pain and Disability Index (SPADI) is a self-report questionnaire developed to evaluate patients with shoulder pathology which is a valid measure to assess pain and disability in community-based patients reporting shoulder pain due to musculoskeletal pathology (Joy MacDermaid).

The questionnaire consist of 13 items which are divided into 2 subscales (Pain and Disability).There are 5 items in the pain subscale and 8 items in the disability subscale.A minimum of 2/3 of items in each subscale must be answered in order to compute a subscale score. Total score is calculated by averaging the pain and disability subscale scores. he minimal clinically important difference has been reported to be 8 points; this represents the smallest detectable change that is important to the patient (Paul et al 2004).Shoulder functional ability was assessed using shoulder pain and disability index pre taping and post taping (immediate and 24 hours).

DATA ANALYSIS

DATA ANALYSIS

The following statistical tools were employed to analyse the data.Data analysis was done using SPSS software version (16.0)

The score were obtained by using VAS for pain intensity (rest, flexion, abduction, external rotation, internal rotation), goniometer for pain free active range of motion(flexion, abduction, external rotation, internal rotation) and SPADI for functional ability. All the dependent variables within Group 1 and 2were analysed using paired t test. All the dependent variables between Group 1 and 2 were analysed using independent t test. Statistical significance was set at ($p<0.05$) level.

1. Mean X= $\frac{\sum x}{n}$

2. Standard Deviation SD = $\sqrt{\frac{\sum(x - x1)2}{n - 1}}$

3. Paired "t"test = $\frac{\bar{d}\sqrt{n}}{SD}$

$$s_d = \sqrt{\frac{\sum\overline{(d-\bar{d})^2}}{n-1}}$$

$$\bar{d} = \frac{\sum d}{n}$$

Where,

n = number of samples SD =Standard deviation D = Mean difference

4. Independent t –test t cal = $\left|\frac{(x1 - x2)}{SE}\right|$

$$SE = S\sqrt{\frac{1}{n1} + \frac{1}{n2}}$$

Where $S = SE\sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2}}$

n 1,n 2 = Size of the samples of two groups

TABLE 4.1

COMPARISON OF VAS BETWEEN PRETEST AND POST TEST ANALYSIS OF Mc CONNELL TAPING IN GROUP 1

VAS (mm)	PRE TREATMENT			POST TREATMENT (IMMEDIATE)			POST TREATMENT (DAY 1)		
	MEAN	SD	SEM	MEAN	SD	SEM	MEAN	SD	SEM
REST	29.00	9.30	2.68	14.92	5.85	1.69	11.75	8.63	2.49
FLEXION	66.83	10.09	2.91	47.08	6.70	1.93	44.83	5.85	1.69
ABDUCTION	75.17	8.60	2.48	54.00	8.41	2.42	51.75	6.96	2.01
EXT ROT	47.25	9.90	2.85	29.75	9.81	2.83	28.17	9.13	2.63
INT ROT	67.17	7.74	2.23	48.17	7.48	2.16	44.92	8.33	2.40

SD= STANDARD DEVIATION

SEM=STANDARD ERROR OF MEAN

Interpretation

Table 4.1 denotes that there is a difference between the means of pretest and post test (immediate and day 1) pain score (VAS) in GROUP 1. There is a marked improvement in the post test means of pain scores immediately after taping and 24 hours after the application of the tape with tape on.

TABLE 4.2

COMPARISON OF VAS BETWEEN PRETEST AND POST TEST ANALYSIS OF KINESIO TAPING IN GROUP 2

VAS (mm)	PRE TREATMENT			POST TREATMENT(IMMEDIATE)			POST TREATMENT(DAY 1)		
	MEAN	SD	SEM	MEAN	SD	SEM	MEAN	SD	SEM
REST	30.00	10.85	3.13	19.17	7.98	2.30	14.25	9.21	2.66
FLEXION	63.67	7.07	2.04	46.42	7.64	2.20	44.92	7.32	2.11
ABDUCTION	71.92	6.47	1.86	54.25	8.54	2.46	48.75	10.46	3.02
EXT ROT	52.83	9.14	2.64	34.83	8.08	2.33	34.08	8.78	2.53
INT ROT	67.50	6.51	1.88	50.08	5.38	1.55	46.33	7.27	2.10

SD= STANDARD DEVIATION

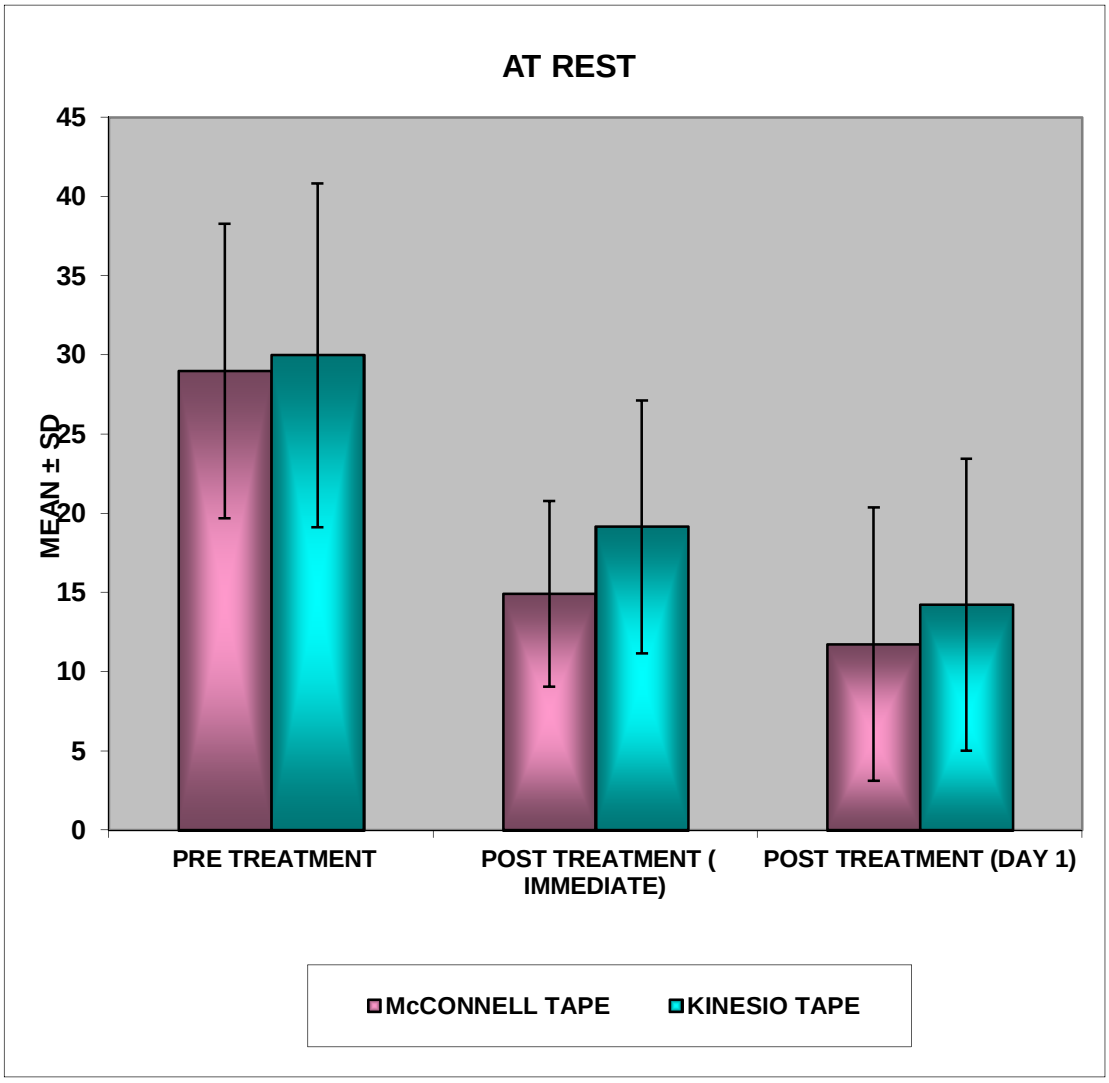
SEM=STANDARD ERROR OF MEAN

Interpretation

Table 4.2 denotes that there is a difference between the means of pretest and post test (immediate and day 1) pain score (VAS) in GROUP 2. There is a marked improvement in the post test means of pain scores immediately after taping and 24 hours after the application of the tape(day 1) with tape on; except in external rotation mean post test pain score immediate and day 1, which is similar.

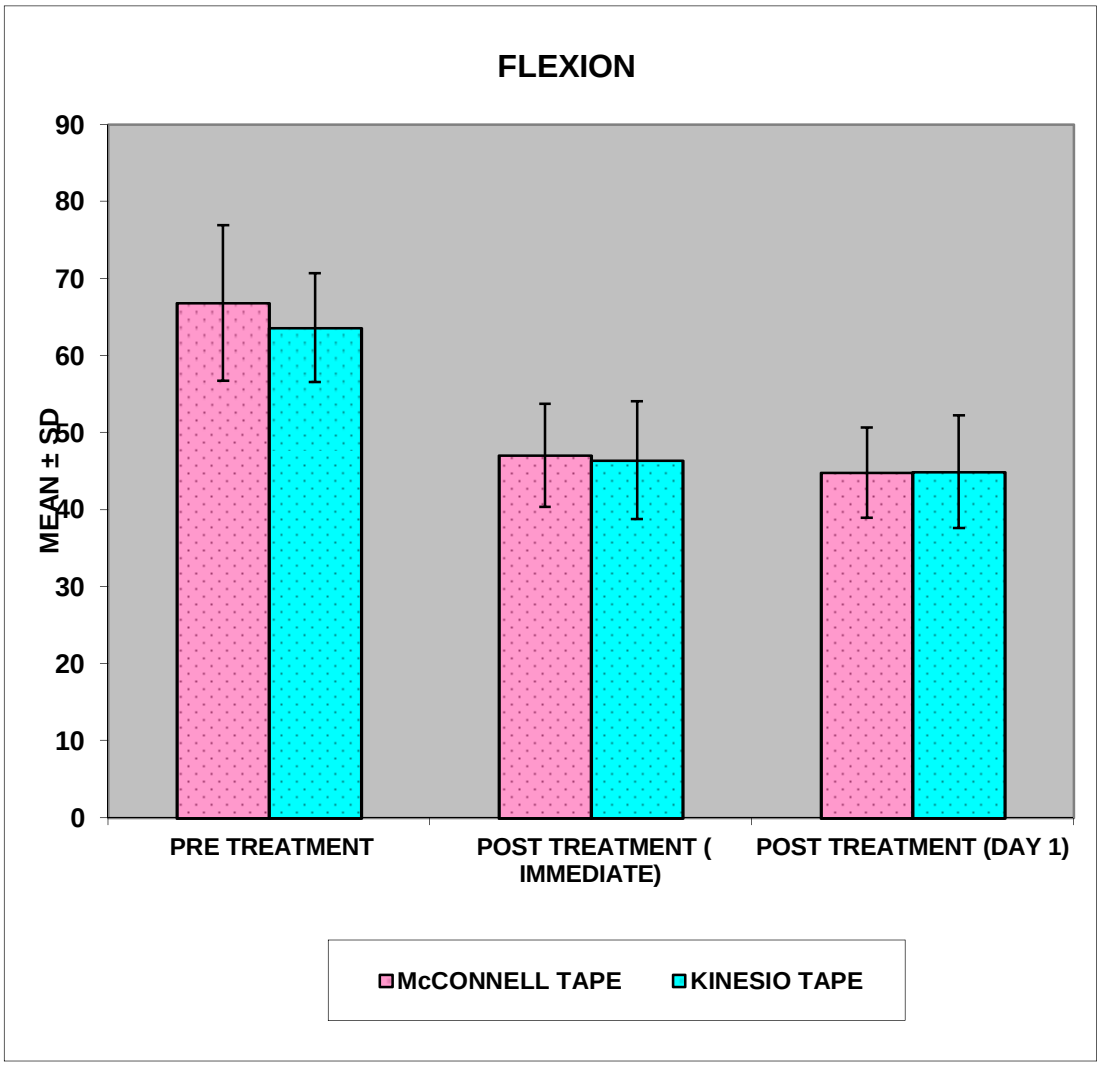
GRAPH 4.1

GRAPHICAL REPRESENTATION OF PRE TREATMENT AND POST TREATMENT (IMMEDIATE AND DAY 1) VALUES OF VAS AT REST IN GROUP 1 AND GROUP 2



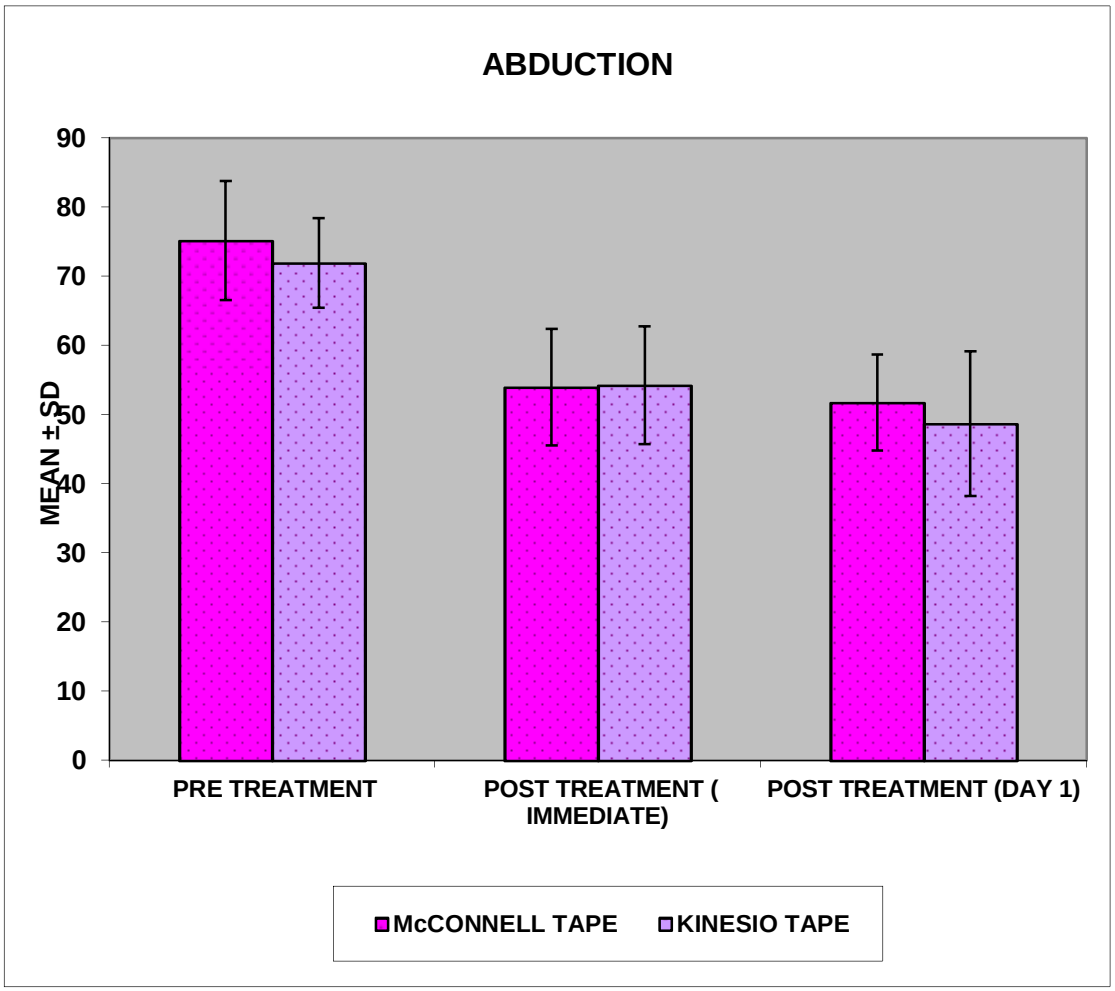
GRAPH 4.2

GRAPHICAL REPRESENTATION OF PRE TREATMENT AND POST TREATMENT (IMMEDIATE AND DAY 1) VALUES OF VAS ON FLEXION IN GROUP 1 AND GROUP 2



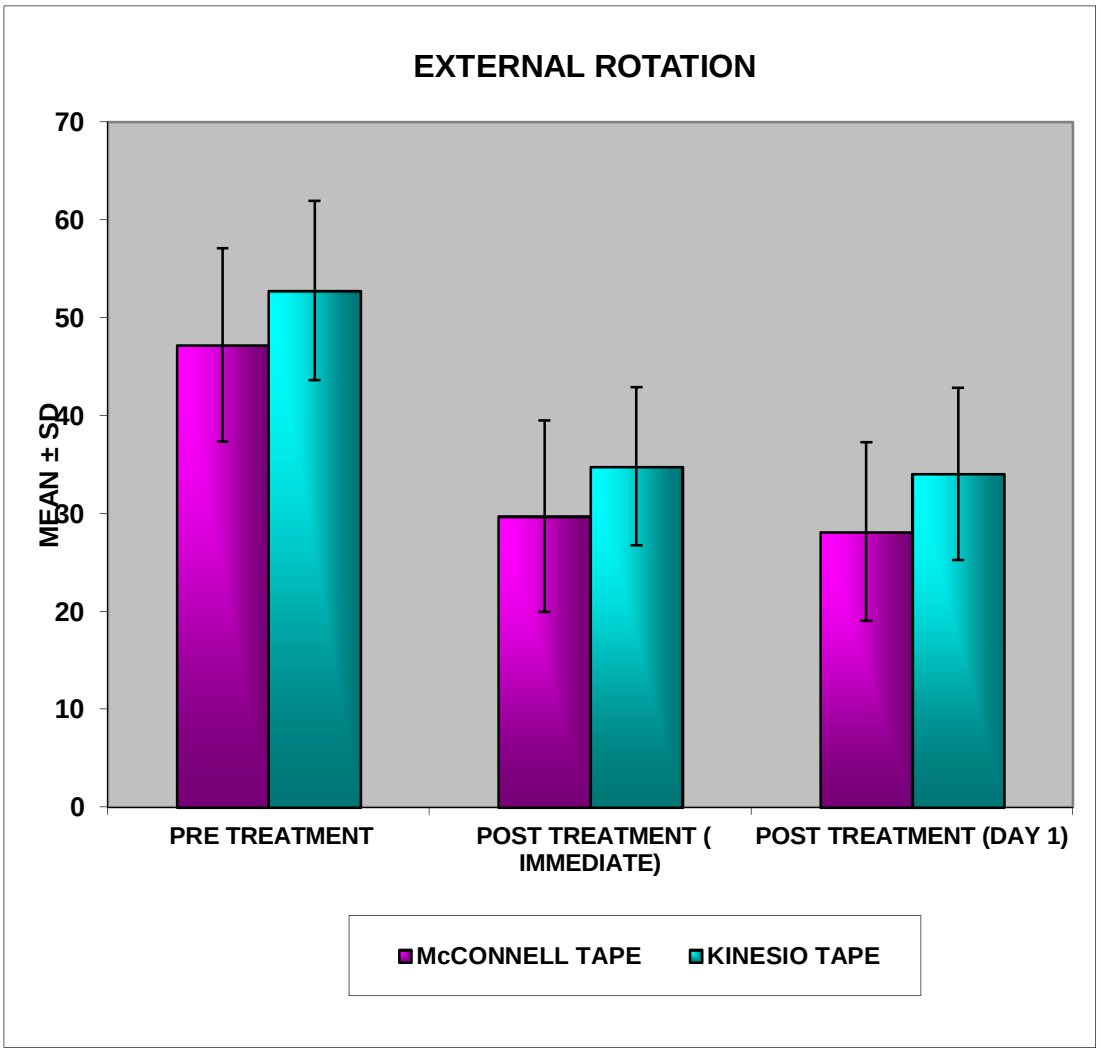
GRAPH 4.3

GRAPHICAL REPRESENTATION OF PRE TREATMENT AND POST TREATMENT (IMMEDIATE AND DAY 1) VALUES OF VAS ON ABDUCTION IN GROUP 1 AND GROUP 2



GRAPH 4.4

GRAPHICAL REPRESENTATION OF PRE TREATMENT AND POST TREATMENT (IMMEDIATE AND DAY 1) VALUES OF VAS ON EXT. ROT. IN GROUP 1 AND GROUP 2



GRAPH 4.5

GRAPHICAL REPRESENTATION OF PRE TREATMENT AND POST TREATMENT (IMMEDIATE AND DAY 1) VALUES OF VAS ON INT. ROT. IN GROUP 1 AND GROUP 2

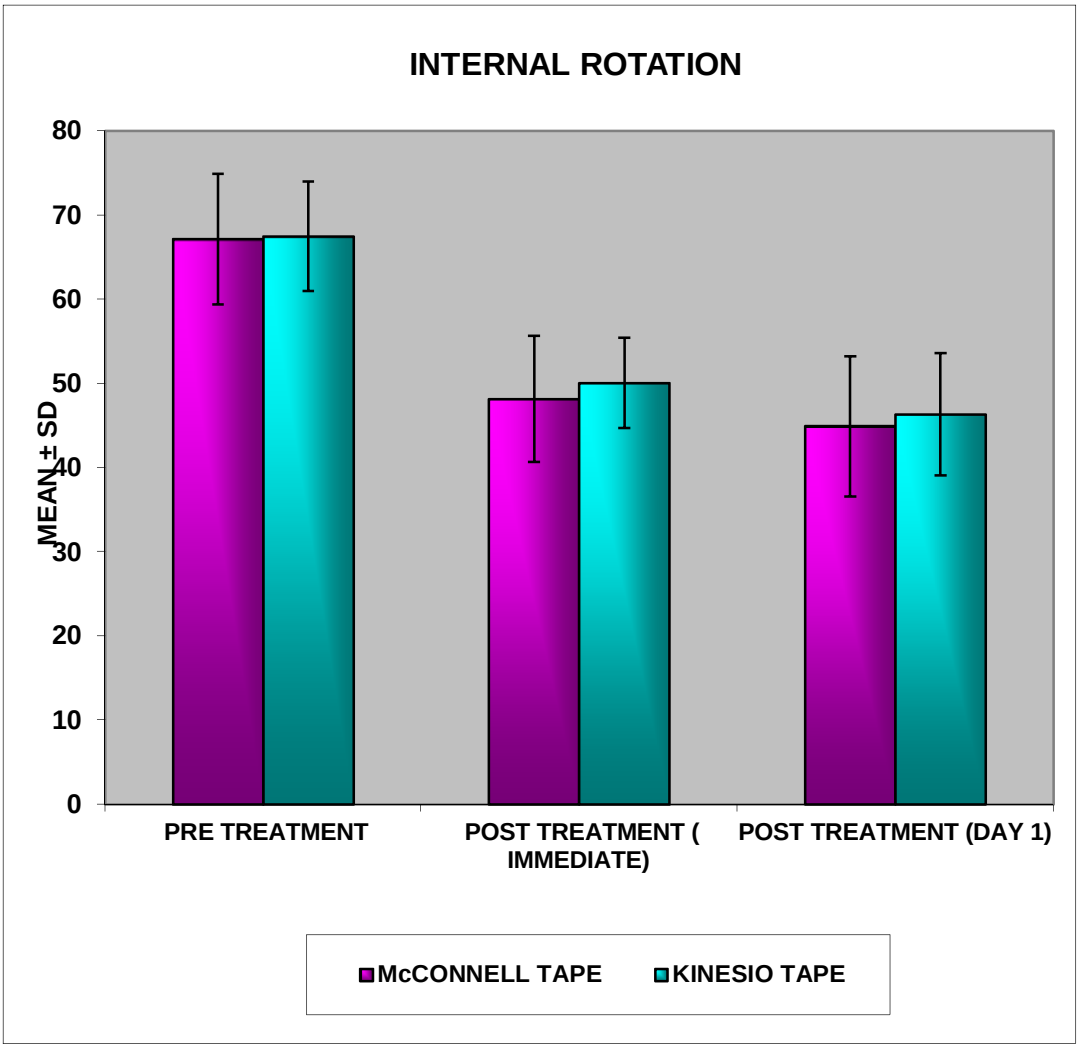


TABLE 4.3

COMPARISON OF AROM BETWEEN PRETEST AND POST TEST ANALYSIS OF Mc CONNELL TAPING IN GROUP 1

AROM (Degrees)	PRE TREATMENT			POST TREATMENT(IMMEDIATE)			POST TREATMENT (DAY 1)		
	MEAN	SD	SEM	MEAN	SD	SEM	MEAN	SD	SEM
FLEXION	95.00	16.65	4.80	115.83	13.95	4.02	120.00	12.43	3.58
ABDUCTION	76.67	16.96	4.89	97.92	18.02	5.20	100.42	16.30	4.70
EXT ROT	50.42	7.52	2.17	64.58	6.89	1.99	65.83	6.33	1.82
INT ROT	35.83	5.57	1.60	47.92	8.64	2.49	50.42	6.20	1.79

SD= STANDARD DEVIATION

SEM=STANDARD ERROR OF MEAN

Interpretation

Table 4.3 denotes that there is a difference between the means of pretest and post test (immediate and day 1) pain free active range of motion (AROM) in GROUP 1. There is a marked improvement in the post test means of AROM scores immediately after taping and 24 hours after the application of the tape with tape on.

TABLE 4.4

COMPARISON OF AROM BETWEEN PRETEST AND POST TEST ANALYSIS OF KINESIO TAPING IN GROUP 2

AROM (Degrees)	PRE TREATMENT			POST TREATMENT (IMMEDIATE)			POST TREATMENT (DAY1)		
	MEAN	SD	SEM	MEAN	SD	SEM	MEAN	SD	SEM
FLEXION	97.92	16.71	4.82	115.00	17.58	5.07	117.08	15.29	4.41
ABDUCTION	77.50	16.16	4.66	92.08	15.58	4.50	96.67	17.10	4.93
EXT ROT	53.75	4.82	1.39	64.17	6.33	1.82	67.08	5.82	1.68
INT ROT	33.33	5.36	1.54	48.33	5.36	1.54	50.42	4.98	1.43

SD= STANDARD DEVIATION

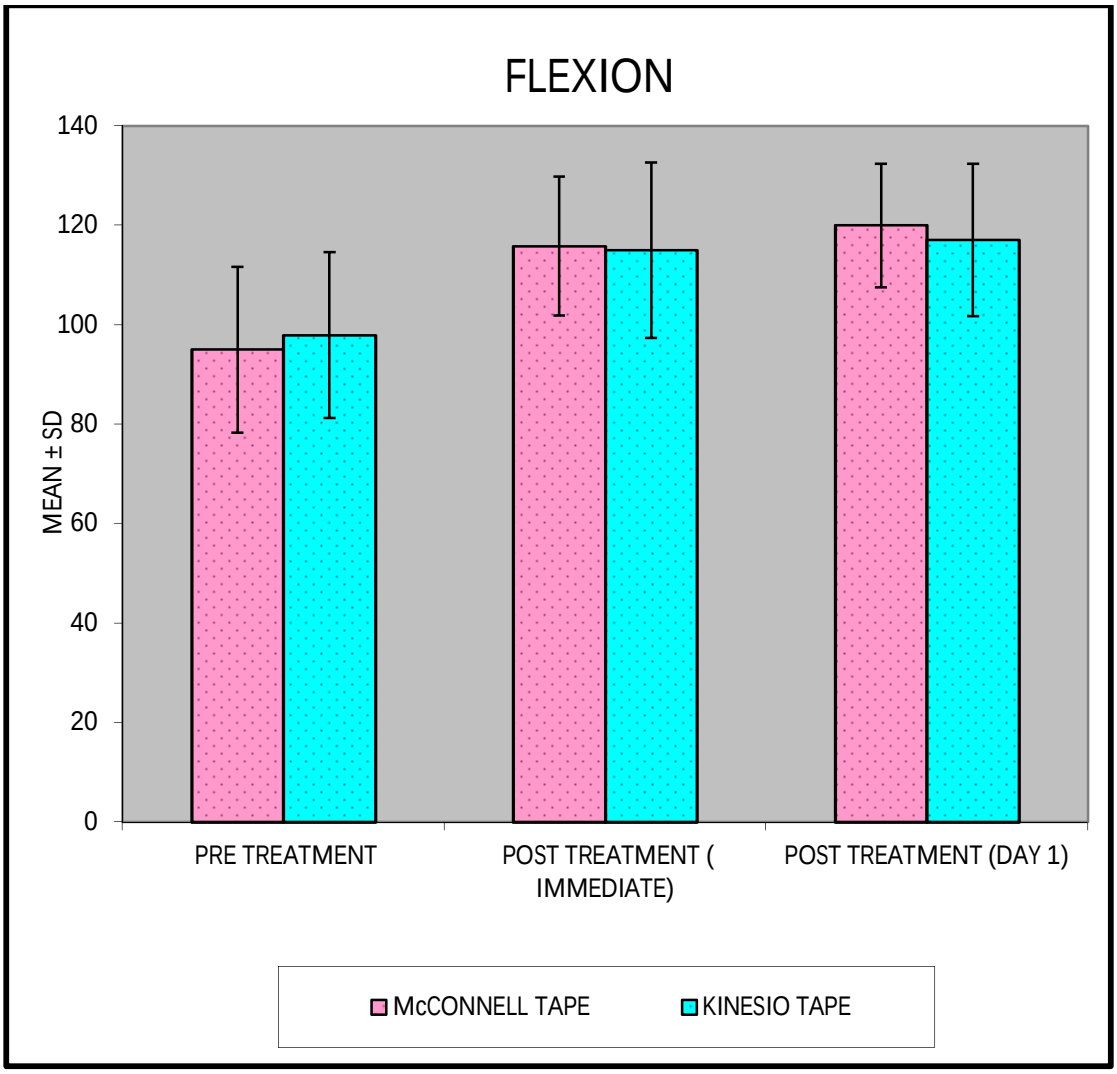
SEM=STANDARD ERROR OF MEAN

Interpretation

Table 4.4 denotes that there is a difference between the means of pretest and post test (immediate and day 1) pain free active range of motion (AROM) in GROUP 2. There is a marked improvement in the post test means of AROM scores immediately after taping and 24 hours after the application of the tape with tape on.

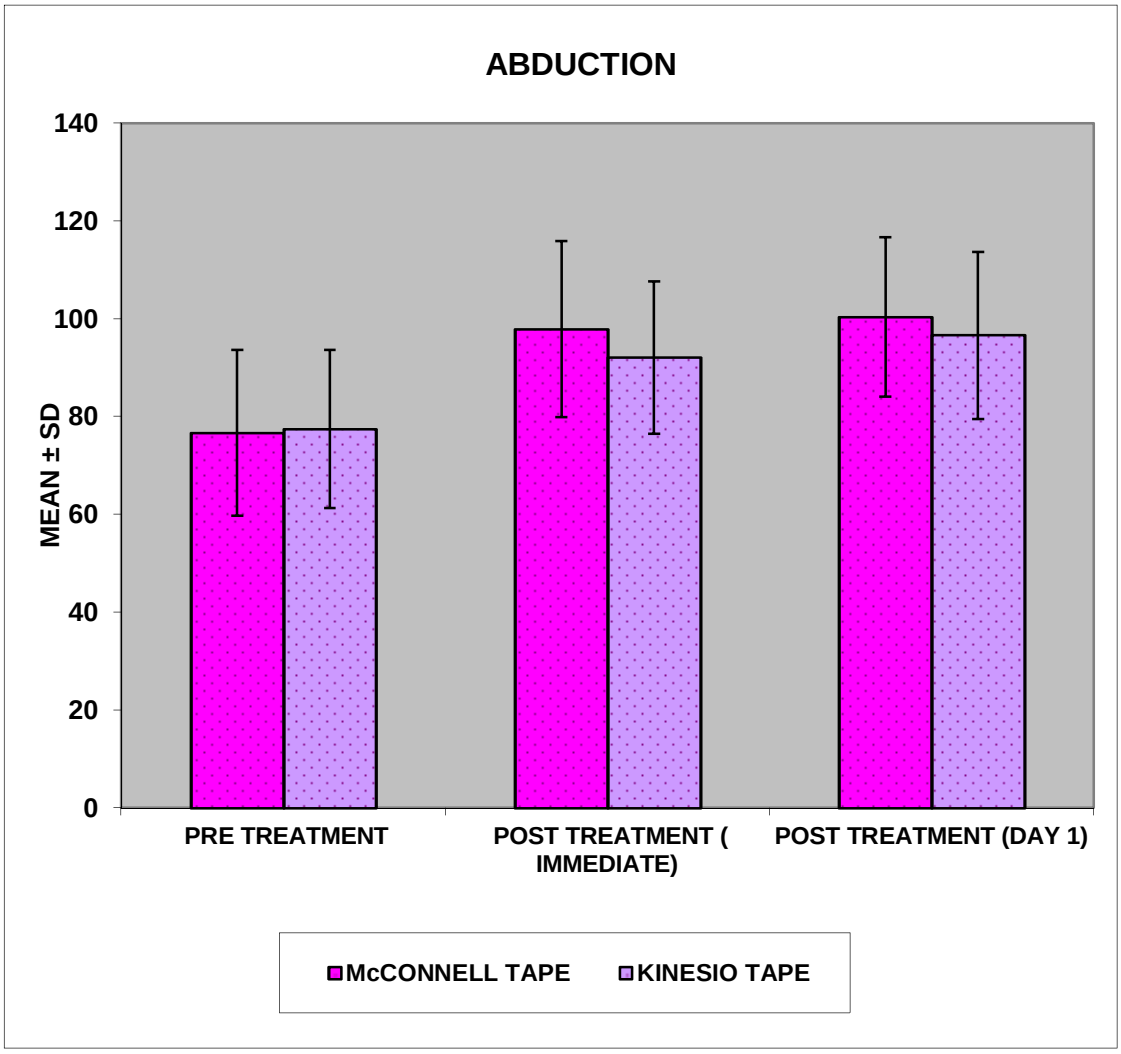
GRAPH 4.6

GRAPHICAL REPRESENTATION OF PRE TREATMENT AND POST TREATMENT (IMMEDIATE AND DAY 1) VALUES OF AROM IN FLEXION IN GROUP 1 AND GROUP 2



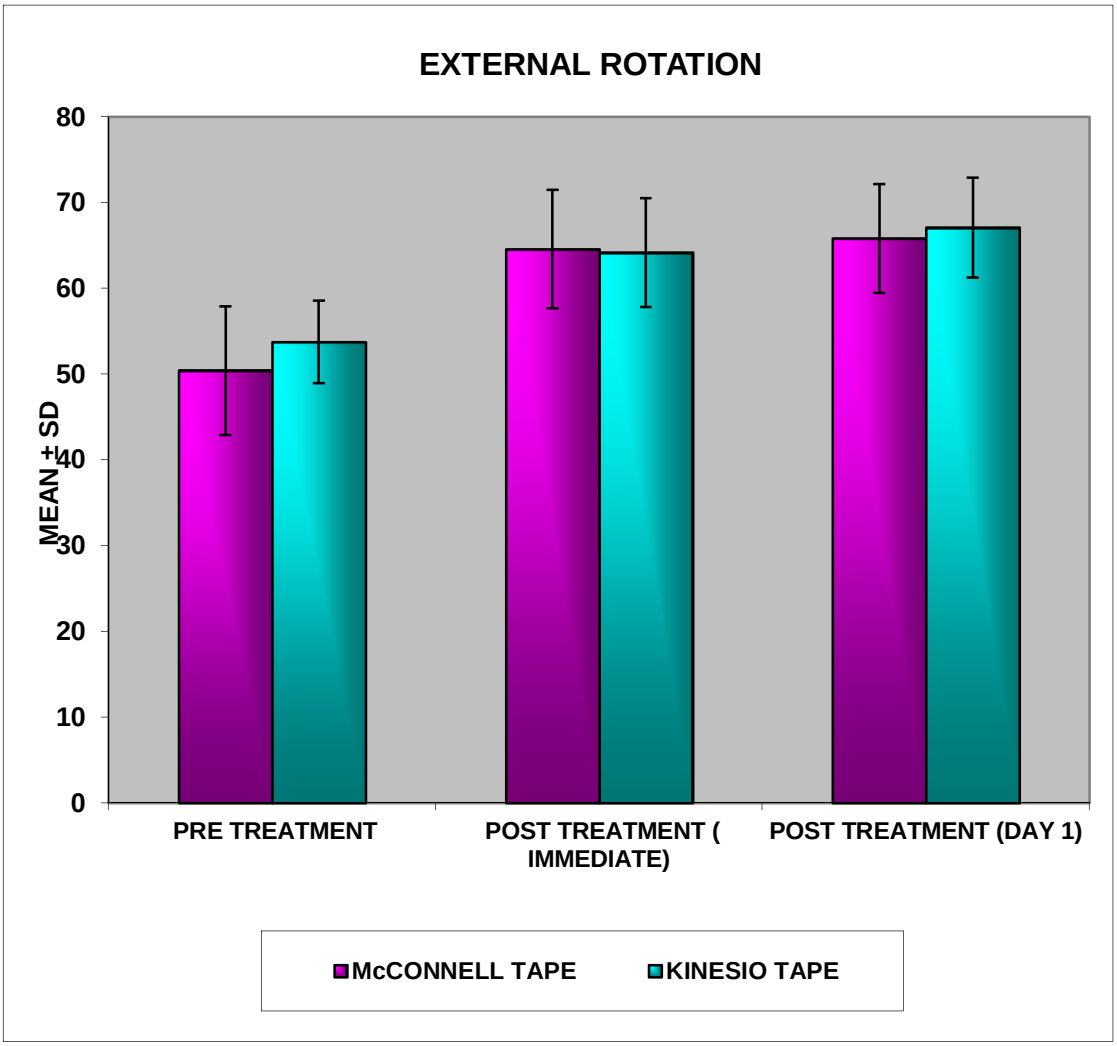
GRAPH 4.7

GRAPHICAL REPRESENTATION OF PRE TREATMENT AND POST TREATMENT (IMMEDIATE AND DAY 1) VALUES OF AROM IN ABDUCTION IN GROUP 1 AND GROUP 2



GRAPH 4.8

GRAPHICAL REPRESENTATION OF PRE TREATMENT AND POST TREATMENT (IMMEDIATE AND DAY 1) VALUES OF AROM IN EXT.ROT. IN GROUP 1 AND GROUP 2



GRAPH 4.9

GRAPHICAL REPRESENTATION OF PRE TREATMENT AND POST TREATMENT (IMMEDIATE AND DAY 1) VALUES OF AROM IN INT.ROT. IN GROUP 1 AND GROUP 2

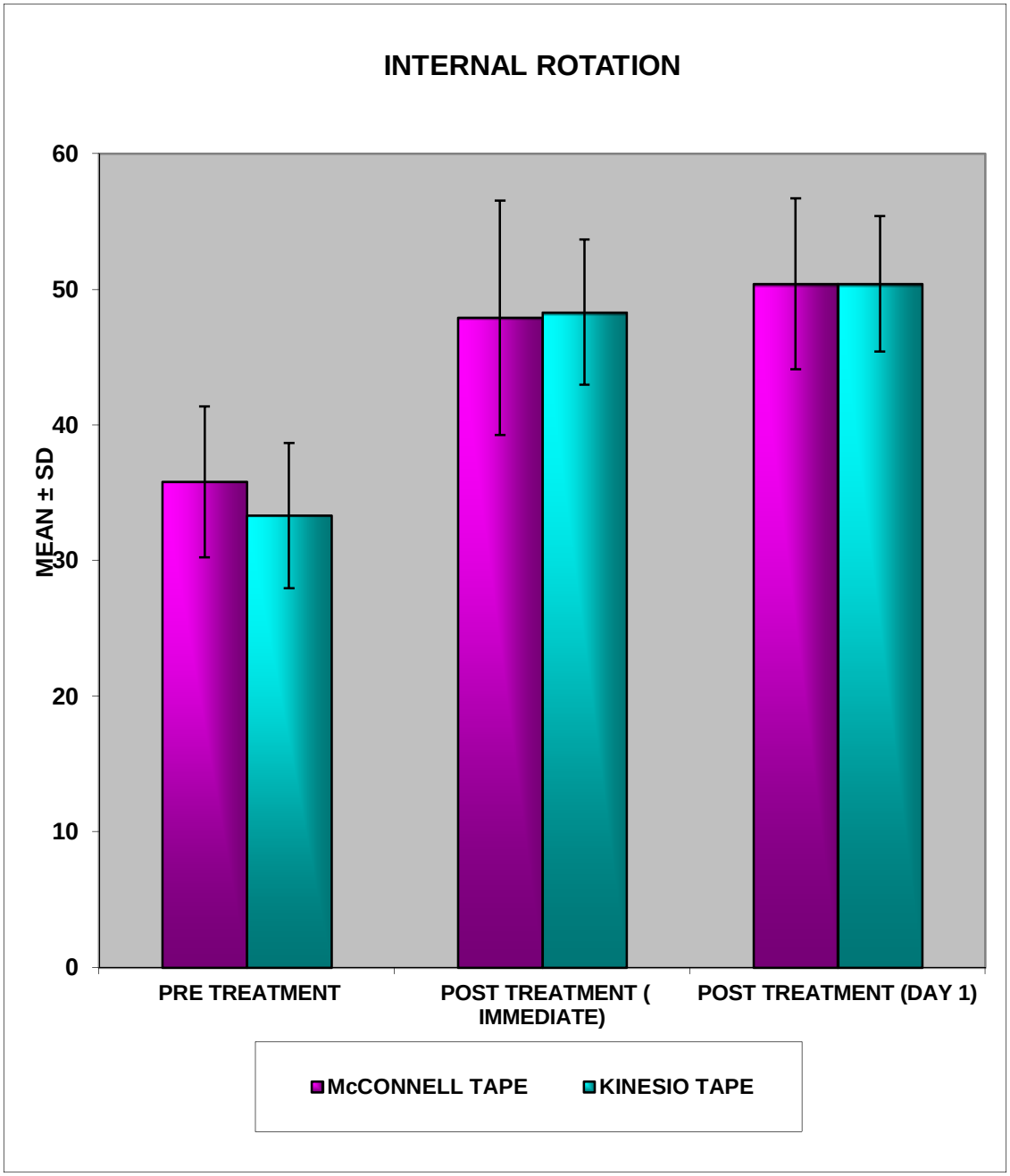


TABLE 4.5

COMPARISON OF SPADI SCORE BETWEEN PRE TREATMENT AND POST TREATMENT ANALYSIS OF GROUP 1 AND GROUP 2

TAPING	SPADI (%)	MEAN	SD	SEM
Mc CONNELL (GROUP 1)	**PRE TREATMENT**	61.75	6.797	1.962
	POST TREATMENT (DAY 1)	46.00	6.551	1.891
KINESIO (GROUP 2)	**PRE TREATMENT**	60.83	6.279	1.813
	POST TREATMENT (DAY 1)	45.75	4.789	1.382

SD: STANDARD SEVIATION

SEM: STANDARD ERROR OF MEAN

Interpretation

Table 4.5 denotes that there is a difference between the means of pretest and post test (immediate and day 1) SPADI score (%) in Group 1 and Group 2. There is a marked improvement in the post test means of SPADI scores immediately after taping and 24 hours after the application of the tape with tape on.

GRAPH 4.10

GRAPHICAL REPRESENTATION OF PRE TREATMENT AND POST TREATMENT (IMMEDIATE AND DAY 1) VALUES OF SPADI IN GROUP 1 AND GROUP 2

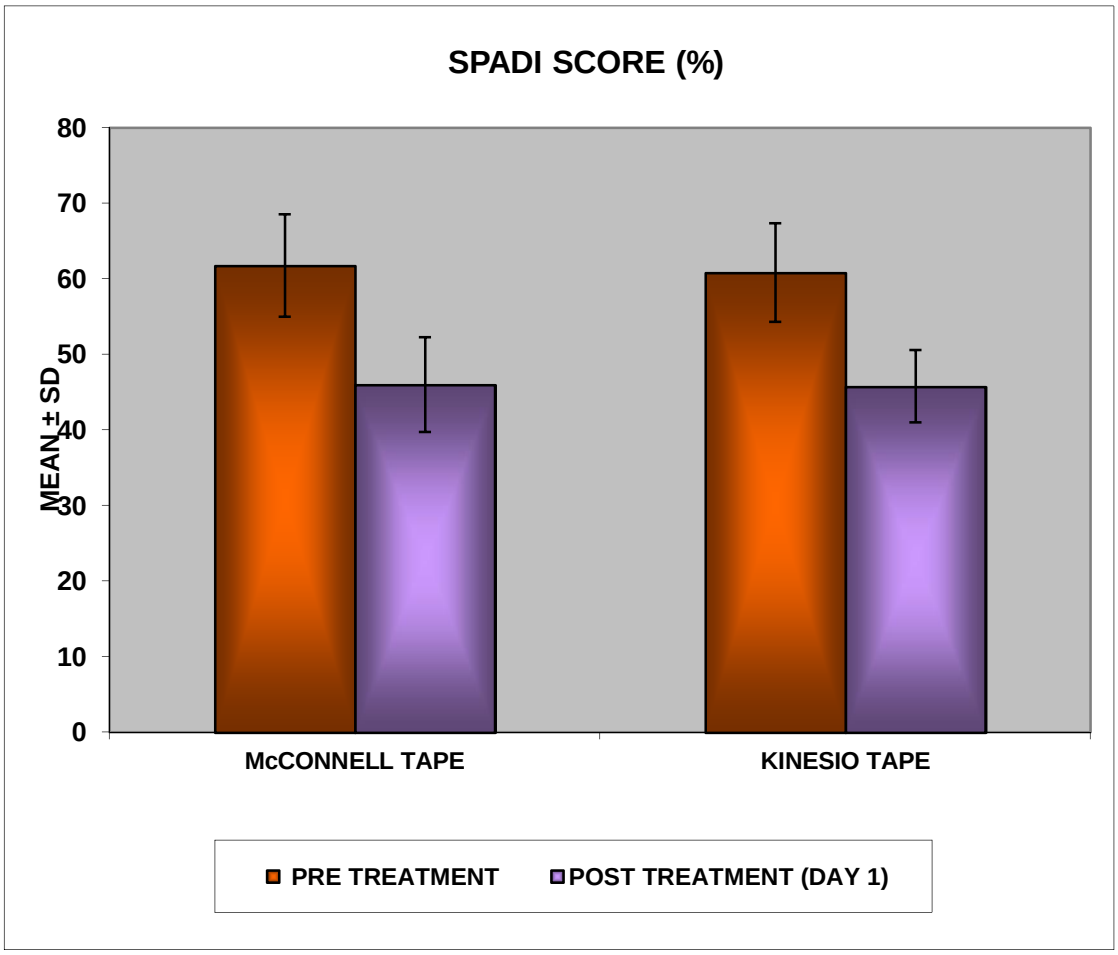


TABLE 4.6

COMPARISON OF POST TAPING VAS SCORE IN GROUP 1 (McConnell)

VAS (mm)	POST TREATMENTMENT IMMEDIATE					POST TREATMENT DAY1				
	MEAN	SD	SEM	t	P value	MEAN	SD	SEM	t	P VALUE
REST	14.92	5.854	1.690	10.648	.000	11.75	8.635	2.493	12.528	.000
FLEXION	47.08	6.708	1.936	12.841	.000	44.83	5.859	1.691	12.483	.000
ABDUCT-ION	54	8.410	2.428	17.040	.000	51.75	6.969	2.012	13.573	.000
EXT ROT	29.75	9.818	2.834	15.846	.000	28.17	9.134	2.637	15.546	.000
INT ROT	48.17	7.481	2.160	15.436	.000	44.92	8.339	2.407	14.024	.000

SD= STANDARD DEVIATION;

SEM=STANDARD ERROR OF MEAN

P value should be less than 0.05 to be significant

Interpretation

Table 4.6 denotes that there is a significant difference between the means of post test (immediate and day 1) VAS score in GROUP 1. There is a significant improvement in the post test means of VAS scores immediately after taping and 24 hours after the application of the tape when compared to pretest condition.

TABLE4.7

COMPARISON OF POST TAPING VAS SCORE IN GROUP 2 (KINESIO)

VAS (mm)	POS TREATMENT (IMMEDIATE)				POST TREATMENT (DAY 1)			
	MEAN	SD	t	P value	SD	SEM	t	P value
REST	19.17	7.987	6.983	.000	9.216	2.660	9.280	.000
FLEXION	46.42	7.645	11.924	.000	5.859	1.691	18.062	.000
ABDUCT-ION	54.25	8.540	10.191	.000	10.463	3.020	10.240	.000
EXT ROT	34.83	8.089	17.115	.000	8.785	2.536	15.377	.000
INT ROT	50.08	5.384	11.939	.000	7.278	2.101	10.101	.000

SD= STANDARD DEVIATION;

SEM=STANDARD ERROR OF MEAN

P value should be less than 0.05 to be significant

Interpretation

Table 4.7 denotes that there is a significant difference between the mean post test (immediate and day 1) VAS score in GROUP 2. There is a significant improvement in the post test means of VAS scores immediately after taping and 24 hours after the application of the tape when compared to pretest condition.

TABLE 4.8

COMPARISON OF POST TAPING AROM SCORE IN GROUP 1 (McConnell)

AROM (Degrees)	POST TREATMENT (IMMEDIATE)					POST TREATMENT (DAY 1)				
	MEAN	SD	SEM	t	P value	MEAN	SD	SEM	t	P value
FLEXION	115.83	13.953	4.028	10.795	.000	120	12.432	3.589	12.845	.000
ABDUCT-ION	97.92	18.023	5.203	7.895	.000	100.42	16.301	4.706	9.922	.000
EXT ROT	64.58	6.895	1.990	13.675	.000	65.83	6.337	1.829	9.857	.000
INT ROT	47.92	8.649	2.497	7.189	.000	50.42	6.201	1.790	12.742	.000

SD= STANDARD DEVIATION

SEM=STANDARD ERROR OF MEAN

P value should be less than 0.05 to be significant

Interpretation

Table 4. 8 denotes that there is a significant difference between the means of post test (immediate and day 1) AROM score in GROUP 1. There is a marked improvement in the post test means of AROM scores immediately after taping and 24 hours after the application of the tape when compared to pretest condition

TABLE 4.9

COMPARISON OF POST TAPING AROM SCORE IN GROUP2 (KINESIO)

AROM (Degrees)	POST TREATMENT (IMMEDIATE)					POST TREATMENT (DAY 1)				
	MEAN	SD	SEM	t	P value	MEAN	SD	SEM	t	P value
FLEXION	115	17.581	5.075	22.985	.000	117.08	15.294	4.415	23.000	.000
ABDUCT-ION	92.08	15.588	4.500	15.113	.000	96.67	17.100	4.936	11.913	.000
EXT ROT	64.17	6.337	1.829	9.101	.000	67.08	5.823	1.681	18.762	.000
INT ROT	48.33	5.365	1.549	14.071	.000	50.42	4.981	1.438	11.881	.000

SD= STANDARD DEVIATION

SEM=STANDARD ERROR OF MEAN

P value should be less than 0.05 to be significant

Interpretation

Table 4.9 denotes that there is a significant difference between the means of post test (immediate and day 1) AROM score in GROUP 2. There is a marked improvement in the post test means of AROM scores immediately after taping and 24 hours after the application of the tape when compared to pretest condition

TABLE 4.10

COMPARISON OF POST TAPING SPADI SCORE BETWEEN GROUP 1 AND GROUP 2

SPADI (%)	POST TREATMENT DAY 1				
	MEAN	**SD**	**SEM**	**t**	**P value**
McCONNELL	46	6.551	1.891	16.783	.000
KINESIOTAPING	45.75	4.789	1.382	13.661	.000

SD= STANDARD DEVIATION

SEM=STANDARD ERROR OF MEAN

P value should be less than 0.05 to be significant

Interpretation

Table 10 denotes that there is a significant difference between the means of post test (day 1) SPADI score in Group 1and Group 2. There is a marked improvement in the post test means of SPADI scores 24 hours after the application of the tape when compared to pretest condition

RESULTS

RESULTS

VAS

There is remarkable difference between the pre test and post test mean values of pain (VAS) , AROM and functional ability of the shoulder in both Group 1 and 2.

In Group 1 there was a significant decrease in pain intensity from (29, 14.92,11.75) at rest, (66.83,47.08,44.83) in flexion, (75.17,54.00,51.75) in abduction, (47.25,29.75,28.17)in external rotation,(6.17,48.17,44.92) in internal rotation.

In Group 2 there was a significant decrease in pain intensity from (30.00,19.17,14.25) a rest, (63.67,46.42,44.92)in flexion, (71.92,54.25,48.75) in abduction, (52.83,34.83,34.08) in external rotation, (,67.50,50.08,46.33) in internal rotation.

When mean values of both Group 1 and 2 are compared, there is a marked improvement in Group 1 compared to Group 2 , except in pain intensity during abduction in day 1 where Kinesiotape had same effect as in McConnell tape on pain in abduction. Kinesiotape was better than McConnel in immediate post treatment session for pain during external rotation.

AROM

In Group 1 there is an significant increase in post test mean values of pain free AROM(Degrees) from baseline (95,115.83 ,120) in flexion, (76.67,97.92,100.42) in abduction, (50.42,64.58,65.83) in external rotation, (35.83,47.92,50.42) in internal rotation.

In Group 2 there was a significant increase in post test mean values of AROM from baseline (97.92,115,117.08)in flexion, (77.50,92.08,96.67) in abduction,(53.75,64.17,67.08) in ext rot, (33.33,48.33 ,50.42) in internal rotation.

When mean values of both Group 1 and 2 there was marked improvement in Group 1 compared to Group 2 , except in AROM of internal rotation(immediate and day1) , where group 2(Kinesiotape) was better than group 1.

SPADI

In Group 1there was a significant decrease in mean SPADI score (%) from baseline to day 1 from 61.75 to 46.

In Group 2 there was a decrease in mean SPADI score from baseline to day 1 from 60.83 to 45.75.

When mean values of SPADI score of both Group 1 and 2 there was marked improvement in Group 1 compared to Group 2.

DISCUSSIONS

DISCUSSION

The results showed that there is a significant difference exist between pre and post treatment values of McConnel taping and Kinesiotaping on pain, active range of motion and functional ability of shoulder in patients with shoulder impingement syndrome.

Our results suggest that there may be a potential positive role for both mcconnel taping and kinesio taping in the immediate and 24 hours session following taping .

The results also suggest that McConnell tape has a marked improvement than Kinesiotape, except in immediate post treatment session for pain during external rotation and pain free active range of motion of internal rotation(immediate and day 1), where Kinesiotape was better than McConnell.

This finding is supported by the published case studies of Host HH and clinical observations of Mottram, where the application of tape resulted in a reduction of painful symptoms reported by their respective patients. Published articles of Shakeri H etal and Kaya E etal infers that kinesiotape has an immediate effect on pain and active range of motion of shoulder. Miller P and OsmothrlyP, infers that rigid scapular taping has an immediate effect on pain and range of motion. These studies support the results of our study on pain and range of motion.

Our study also showed a significant decrease in the SPADI score from baseline in both McConnel and Kinesiotaping group, with marked improvement in McConnel taping group compared to Kinesiotaping group.

This is supported by the published work of Senthil Kumar NS, etal ,where they inferred that rigid scapular taping(lewis)has shownimprovement in SPADI score by demonstrating a decrease in pain and disability and improvement in isometric muscle strength compared with control group in patients with shoulder impingement syndrome.

But the works of Thelen MD etal suggests that there was no significant improvement in SPADI score when compared to the baseline values in patients with shoulder impingement syndrome, but found an immediate effect on the limitation of active ROM.

McConnell taping would decrease the activity of the upper trapezius and increase the activity of lower trapezius and serratus anterior muscle. It has been proved that there is a decrease in the acivity of the upper trapezius muscle(Smith MJ and Sparkes V ,2006; Selkowitz DM etal,2007) and a increase in the activity of lower trapezius (Selkowitz DM etal, 2007) .There is also evidence for a short-term role for scapula taping as an adjunct to routine physiotherapy in the management of shoulder impingement symptoms(Peter M etal 2009).

Kinesio taping can control joint instability, assist postural alignment and relax the overused muscle. It is claimed that the effects of taping maybe due to the sensorimotor and proprioceptive feedbacks mechanisms.

Pain modulation via the gate control theory is one probable explanation for such a change. It has been speculated that tape stimulates neuromuscular pathways by increased afferent feedback (Kneeshaw D) .

Kinesiotape is believed to increase space which will thereby reduce the pressure by lifting the skin(KaseK etal) , and it is also thought to causes lymphatic correction which will help to decrease the pressure under the kinesiotape strip that act as channels to direct the exudates to the nearest lymph ducts(Kaya E etal).

Kinesiotape technique also helps to maintain the scapula thoracic stability and normalize the scapula humeral rhythm by altering the scapular muscle activity and correcting abnormal scapular position

There is evidence for the increased activity of lower trapezius in 60 to 30 degree arm lowering phase by kinesiotape as compared with sham application in baseball players with shoulder impingement syndrome (Hsu YH etal 2009).

Increase in afferent stimulus to large-diameter nerve fibers can lessen the input received from the small-diameter nerve fibers conducting nociception. Another possibility is that the improved motion might have been due to an increase in the number of supraspinatus motor units recruited to perform the activity due to an increase in the proprioceptive stimulus. But, the works of Alexander CM etal hadinferred there was no significant increase in muscular activity after taping as measured by electromyography.

LIMITATION

LIMITATION

- The study was done with a small sample size due to lack of subjects and time constraints.
- The study was conducted for short period of time
- Further the study lacked follow up and this could be included in future endeavors.

SUGGESTIONS

SUGGESTIONS

- Sample size can be larger
- Study can be done on a specific gender
- Effect on night pain can be analyzed
- Psychosocial effects can be analyzed

CONCLUSION

CONCLUSION

From the result of the study, it is concluded that both McConnell taping and Kinesiotaping technique has shown improvement in treating shoulder impingement syndrome.However, when comparing both techniques , the effect of McConnel taping technique is more than Kinessiotaping technique in treating shoulder impingement syndrome.

APPENDIX

APPENDIX 1

INFORMED CONSENT

I..... agree to participate in the research study conducted by the Mr.PaulJose,II year , MPT (Sports), Madha College of Physiotherapy entitled A comparative study between the effects of McConnell taping and kinesiotaping on shoulder pain, range of motion and functional ability in patients with shoulder impingement syndrome.

I acknowledge that the research study has been explained to me and I understand that agreeing to participate in the research means I am willing to ,

1. Provide information about my health status to my researcher(s)

2. Allow the researchers to have access to my professional records pertaining to the purpose of the study

3. Participate in the treatment programme for 2 days.

4. Make myself available for follow up

5. Understand and follow home advice that will be provided.

I have been informed about the purpose, procedures, measurements; treatment involved in the research and my queries towards the research is clarified.

I provide consent to the researcher to use the information, video recording for research and educational purpose only.

I understand that my participation is voluntary and can withdraw at any stage of the research project

Name of the Participant: Date:

Signature

APPENDIX 2

DATA SHEET

Name:

Date:

Age:

Gender:

Pain-McConnell Tape (Group 1)

PAIN (VAS in mm)	At Rest	Pain on Movement (VAS)			
		Flexion	Abduction	Ext.Rot	Int Rot
Pre Treatment					
Post treatment (immediate)					
Post treatment (day 1)					

AROM –McConnell Tape (Group1)

AROM (Degrees)	Flexion	Abduction	Ext.Rot	Int. Rot
Pre treatment				
Post treatment (Immediate)				
Post treatment (day 1)				

SPADI

SPADI Score (%)	**McConnell Tape-Group 1**
Pre treatment	
Post treatment (DAY 1)	

DATA SHEET

Name:

Date:

Age:

Gender:

Pain-Kinesio Tape (Group 2)

PAIN (VAS in mm)	At Rest	Pain on Movement (VAS)			
		Flexion	Abduction	Ext Rot	Int Rot
Pre Treatment					
Post treatment (immediate)					
Post treatment (day 1)					

AROM- KinesioTape (Group 2)

AROM (Degrees)	Flexion	Abduction	Ext Rot	Int Rot
Pre treatment				
Post treatment (Immediate)				
Post treatment (day 1)				

SPADI

SPADI Score (%)	Kinesio Tape - Group 2
Pre treatment	
Post treatment (DAY 1)	

APPENDIX 3

VISUAL ANALOGUE SCALE

B. Visual Analog Scale

APPENDIX 4

GONIOMETER

APPENDIX 5

SPADI QUESTIONNAIRE

Shoulder Pain and Disability Index

Please place a mark on the line that best represents your experience during the last week attributable to your shoulder problem.

Pain scale

How severe is your pain?

Circle the number that best describes your pain where: **0** = no pain and **10** = the worst pain imaginable.

At its worst?	0	1	2	3	4	5	6	7	8	9	10
When lying on the involved side?	0	1	2	3	4	5	6	7	8	9	10
Reaching for something on a high shelf?	0	1	2	3	4	5	6	7	8	9	10
Touching the back of your neck?	0	1	2	3	4	5	6	7	8	9	10
Pushing with the involved arm?	0	1	2	3	4	5	6	7	8	9	10

Total pain score _____ /50 x 100 = _____ %

(Note: If a person does not answer all questions divide by the total possible score, eg. if 1 question missed divide by 40)

Disability scale

How much difficulty do you have?

Circle the number that best describes your experience where: **0** = no difficulty and **10** = so difficult it requires help

Washing your hair?	0	1	2	3	4	5	6	7	8	9	10
Washing your back?	0	1	2	3	4	5	6	7	8	9	10
Putting on an undershirt or jumper?	0	1	2	3	4	5	6	7	8	9	10
Putting on a shirt that buttons down the front?	0	1	2	3	4	5	6	7	8	9	10
Putting on your pants?	0	1	2	3	4	5	6	7	8	9	10
Placing an object on a high shelf?	0	1	2	3	4	5	6	7	8	9	10
Carrying a heavy object of 10 pounds (4.5 kilograms)	0	1	2	3	4	5	6	7	8	9	10
Removing something from your back pocket?	0	1	2	3	4	5	6	7	8	9	10

Total disability score: _____/ 80 x 100 =_____ %

(Note: If a person does not answer all questions divide by the total possible score, eg. if 1 question missed divide by 70)

Total Spadi score: _____ 130 x 100 = _____ %

(Note: If a person does not answer all questions divide by the total possible score, eg if 1 question missed divide by 120)

Minimum Detectable Change (90% confidence) = 13 points
(Change less than this may be attributable to measurement error)

Source: Roach et al. (1991). Development of a shoulder pain and disability index.

APPENDIX 6

MASTER CHART

Mc CONNELL (Group1)						
PAIN(VAS in millimeter)	NAME	AT REST	PAIN ON MOVEMENT			
			FLEXION	ABDUCTION	EXTERNAL ROTATION	INTERNAL ROTATION
PRE TREATMENT	1	43	83	90	73	75
	2	40	78	72	51	64
	3	40	73	81	43	67
	4	27	73	76	51	69
	5	32	63	78	51	77
	6	27	61	70	38	60
	7	10	55	64	37	61
	8	22	57	64	43	59
	9	30	58	70	38	60
	10	20	75	90	50	83
	11	27	73	76	51	69
	12	30	53	71	41	62
POST TREATMENT(IMMEDIATE)	1	25	48	57	50	58
	2	24	59	47	40	55
	3	23	52	59	25	50
	4	13	52	57	38	47
	5	16	45	60	28	53
	6	13	44	49	22	43
	7	8	39	43	20	40
	8	10	40	43	24	36
	9	13	41	52	20	45
	10	10	54	73	32	61
	11	13	52	57	38	47
	12	11	39	51	20	43
POST TREATMENT	1	21	45	50	46	55
(DAY 1)	2	26	53	49	38	53
	3	20	47	52	27	48
	4	15	50	55	35	41
	5	11	43	57	30	45
	6	15	44	47	21	40
	7	0	36	45	20	38
	8	0	38	40	25	34
	9	10	40	53	18	41
	10	0	53	68	28	63
	11	15	50	55	35	41
	12	8	39	50	15	40

AROM -McConnell Tape(Group 1)					
AROM (IN DEGREES)	NAME	FLEXION	ABDUCTION	EXTERNAL ROTATION	INTERNAL ROTATION
PRE TREATMENT	1	0 - 80	0 -65	0 - 50	0 - 40
	2	0 -85	0 -70	0 -40	0 -35
	3	0 - 70	0 -60	0 - 55	0 - 40
	4	0 - 95	0 -70	0 - 40	0 - 35
	5	0 - 100	0 -55	0 - 50	0 - 25
	6	0 - 125	0 -95	0 - 50	0 - 30
	7	0 - 115	0 -105	0 - 55	0 - 40
	8	0 - 100	0 -85	0 - 65	0 - 45
	9	0 - 90	0 -75	0 - 50	0 - 30
	10	0 - 80	0 -65	0 - 55	0 - 35
	11	0 - 85	0 -70	0 - 40	0 - 35
	12	0 - 115	0 -105	0 - 55	0 - 40
POST TREATMENT(IMMEDIATE)	1	0 - 110	0 - 80	0 - 70	0 - 55
	2	0 -110	0 -80	0 -55	0 -45
	3	0 - 95	0 - 80	0 - 60	0 - 50
	4	0 - 120	0 - 110	0 - 55	0 - 60
	5	0 - 110	0 - 80	0 - 65	0 - 40
	6	0 - 140	0 - 115	0 - 65	0 - 30
	7	0 - 130	0 - 120	0 - 70	0 - 50
	8	0 - 130	0 - 120	0 - 75	0 - 60
	9	0 - 105	0 - 100	0 - 65	0 - 40
	10	0 - 100	0 - 90	0 - 70	0 - 50
	11	0 -110	0 -80	0 -55	0 -45
	12	0 - 130	0 - 120	0 - 70	0 - 50
POST TREATMENT(DAY 1)	1	0 - 110	0 - 85	0 - 75	0 - 55
	2	0 -110	0 -85	0 -60	0 -45
	3	0 - 110	0 - 85	0 - 60	0 - 50
	4	0 - 125	0 - 100	0 - 55	0 - 55
	5	0 - 120	0 - 90	0 - 65	0 - 45
	6	0 - 140	0 - 120	0 - 70	0 - 40
	7	0 - 135	0 - 120	0 - 70	0 - 55
	8	0 - 130	0 - 125	0 - 75	0 - 60
	9	0 - 110	0 - 100	0 - 65	0 - 45
	10	0 - 105	0 - 90	0 - 65	0 - 55
	11	0 -110	0 -85	0 -60	0 -45
	12	0 - 135	0 - 120	0 - 70	0 - 55

SPADI- Mc Connell Tape (Group 1)	NAME	SPADI SCORE (%)
PRE TREATMENT	1	66.15
	2	54.6
	3	74.61
	4	62.3
	5	65.38
	6	60
	7	55.3
	8	67.69
	9	63.84
	10	53.84
	11	52.3
	12	64.61
POST TREATMENT (DAY 1)	1	50
	2	33.84
	3	54.6
	4	50
	5	48
	6	48
	7	36.92
	8	53.07
	9	50
	10	40.76
	11	40
	12	46.15

KINESIO TAPE (Group2)						
PAIN(VAS in millimeter)	NAME	AT REST	PAIN ON MOVEMENT(VAS)			
			FLEXION	ABDUCTION	EXTERNAL ROTATION	INTERNAL ROTATION
PRE TREATMENT	1	26	71	80	53	74
	2	33	62	68	60	63
	3	52	71	74	54	73
	4	25	64	68	65	71
	5	44	74	80	69	74
	6	35	56	73	42	59
	7	20	60	67	50	64
	8	36	59	67	45	58
	9	16	52	66	40	69
	10	20	73	85	46	78
	11	33	62	68	60	63
	12	20	60	67	50	64
POST TRAETMENT(IMMEDIATE)	1	14	58	63	34	57
	2	22	49	55	41	55
	3	40	60	57	36	51
	4	13	40	45	39	53
	5	21	53	57	50	53
	6	21	40	50	21	42
	7	17	44	58	35	44
	8	22	40	43	32	44
	9	8	35	40	21	48
	10	13	45	70	33	55
	11	22	49	55	41	55
	12	17	44	58	35	44
POST TRAETMENT(DAY 1)	1	10	55	61	35	60
	2	15	45	53	43	52
	3	39	56	50	33	48
	4	10	38	31	40	49
	5	13	48	47	47	38
	6	17	40	43	15	40
	7	11	42	50	33	41
	8	20	40	39	33	40
	9	0	33	38	24	40
	10	10	55	70	30	55
	11	15	45	53	43	52
	12	11	42	50	33	41

AROM - KINESIO TAPE (Group2)					
AROM (IN DEGREES)	NAME	FLEXION	ABDUCTION	EXTERNAL ROTATION	INTERNAL ROTATION
PRE TREATMENT	1	0 - 85	0 -70	0 - 60	0 - 45
	2	0 -80	0 -60	0 -50	0 -35
	3	0 - 105	0 -70	0 - 60	0 - 30
	4	0 - 120	0 -95	0 - 60	0 - 40
	5	0 - 85	0 -65	0 - 50	0 - 25
	6	0 - 75	0 -55	0 - 50	0 - 35
	7	0 - 100	0 -90	0 - 55	0 - 30
	8	0 - 110	0 -85	0 - 45	0 - 30
	9	0 - 125	0 -105	0 - 55	0 - 35
	10	0 - 110	0 -85	0 - 55	0 - 30
	11	0 -80	0 -60	0 -50	0 -35
	12	0 - 100	0 -90	0 - 55	0 - 30
POST TREATMENT (IMMEDIATE)	1	0 - 105	0 -80	0 - 65	0 - 55
	2	0 -95	0 -75	0 -55	0 -50
	3	0 - 120	0 -85	0 - 70	0 - 40
	4	0 - 140	0 -110	0 - 75	0 - 55
	5	0 - 100	0 -80	0 - 60	0 - 40
	6	0 - 90	0 -75	0 - 60	0 - 50
	7	0 - 120	0 -100	0 - 65	0 - 45
	8	0 - 125	0 -105	0 - 60	0 - 45
	9	0 - 140	0 -120	0 - 70	0 - 50
	10	0 - 130	0 -100	0 - 70	0 - 55
	11	0 -95	0 -75	0 -55	0 -50
	12	0 - 120	0 -100	0 - 65	0 - 45
POST TREATMENT (DAY 1)	1	0 - 110	0 -85	0 - 70	0 - 55
	2	0 -100	0 -75	0 -60	0 -50
	3	0 - 120	0 -100	0 - 75	0 - 50
	4	0 - 140	0 -115	0 - 75	0 - 55
	5	0 - 105	0 -80	0 - 65	0 - 45
	6	0 - 95	0 -75	0 - 60	0 - 50
	7	0 - 120	0 -110	0 - 70	0 - 45
	8	0 - 125	0 -110	0 - 60	0 - 45
	9	0 - 140	0 -115	0 - 70	0 - 55
	10	0 - 130	0 -110	0 - 70	0 - 60
	11	0 -100	0 -75	0 -60	0 -50
	12	0 - 120	0 -110	0 - 70	0 - 45

SPADI KINESIO TAPE GROUP2		
PRE TREATMENT	NAME	SPADI SCORE (%)
	1	52.3
	2	64.61
	3	63
	4	68.46
	5	66.92
	6	63.84
	7	53.84
	8	55.38
	9	53.07
	10	65.38
	11	56.47
	12	68.28
POST TREATMENT DAY1	1	40
	2	46.15
	3	46
	4	50.76
	5	50.76
	6	51.5
	7	42.46
	8	40.76
	9	44.61
	10	50.76
	11	37.8
	12	45.89

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