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# A COMPARATIVE STUDY ON THE USE OF KINESIO TAPING AND THERAPEUTIC ULTRASOUND ALONG WITH CONVENTIONAL PHYSIOTHERAPY FOR TREATMENT OF SUB-ACROMIAL IMPINGEMENT.

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**ABSTRACT** A comparative study was done on patients suffering from subacromial impingement by using kinesio taping along with HPE and another group was treated with conventional physiotherapy including along with ultrasound to find out their effects on reduction of pain and ROM of shoulder. A total number of 22 patients aged between 19-45 were included. They were divided into two groups of 11. The first group was treated with KT every alternate day for 3 weeks along with home exercises.. The second group was treated with the US +MT for 3 weeks daily. Evaluation was done by DASH and VAS scale pre and post-treatment . DASH and VAS scale scores showed a tremendous decrease after a week of treatment in both the groups. And at the end of the third week, both groups showed almost the same results. Both the interventions are equally beneficial in patients with sub-acromial impingement.

**KEYWORDS :** Kinesio tape, sub-acromial impingement, conventional physiotherapy, therapeutic ultrasound.

## INTRODUCTION :

Shoulder impingement is outlined as compression and mechanical abrasion of body structures as they pass below the coracoacromial arch throughout the elevation of the arm[1,2]. Many theories are projected that explains the first etiology of shoulder impingement, as well as anatomical abnormalities of a coracoacromial arch or humeral head, tension overload, anaemia or degeneration of rotator cuff tendons and shoulder kinematic abnormalities.[3]. Inflammation within the suprahumeral house, inhibition of the complex body part muscles, injury to the complex body part tendons, and altered mechanics square measure believed to exacerbate the condition[1,3,4]. kinematic changes have been through to be present in patients with impairment been thought to be present in patients with impingement syndrome and result in the narrowing of the supraspinatus muscle output or suprahumeral space[3,5,6]. Conservative treatment of patients with impingement symptoms mostly includes exercise programs to restore normal kinematics or muscle activity and strength.

Altered performance of the lower cowl muscle and anterior serratus muscle influences the scapular movement and square measure related to poor shoulder functions and chronic impingement problems[11].

Aim of KT taping in this condition is, it corrects the scapulohumeral rhythm by altering the muscle activities of scapular muscles and correcting the abnormal scapular position. KT taping provides control of scapula and shoulder by providing constant proprioceptive feedback and correcting alignment during dynamic movements. KT promotes proximal stability of scapula allowing free movements without pain.

The therapeutic US works by driving compression and refraction of sound waves alternatively at more than 20,000 cycles per second. The US has two types of benefits-thermal and non-thermal. Thermal effects help in pain relief and non-thermal helps in enhancing cell repairing and promotes healing. Pain relief and cell repair help in regaining lost or decreased range of motion in sub-acromial impingement.

In order to increase the range of motion, muscle power and to rrestore the mobility & stability of the shoulder, active, free and assisted exercises are performed.

Mulligan mobilization as an integral part of manual therapy is performed in order to reduce pain, increase range and also to correct shoulder kinematics.

## PATIENTS AND METHODS :

After getting approval from hospital and college authorities and getting patients signed the consent, patients suffering from shoulder pain associated with sub-acromial impingement between September 2017 to March 2019 were included in the study. The patients came to OPD with a complaint in shoulder pain and difficulty in taking hand overhead and performing activities of daily living like taking bath and combing hair which was affecting their quality of life.

A thorough history was taken and the following observations were recorded.

Range of abduction of the shoulder in any plane.

1. pain between 60-80'
2. pain between 80-120'
3. Pain beyond 120'.

Empty can test for supraspinatus involvement.
Hawkins-Kennedy test for positive external impingement.
Manual muscle testing is done and the power of muscles is recorded.

History of any intra-articular steroid injection, shoulder girdle fracture, cervical radiculopathy, acromioclavicular sprain, duration of shoulder pain for more than 6 months is taken.

These findings were recorded and people were divided into two groups each containing 11 members each. The treatment was given according to the patient's visit to OPD and complete assessment and thorough the study was done for all 22 patients separately.

DASH and VAS scales were used to take readings and separate records were maintained during the day, night, before and after treatment and at the end, readings are compared.

**The US along with conventional physiotherapy treatment method:**

The basic aim of treatment is to prevent further damage and it of manual therapy techniques such as joint mobilization techniques and transverse friction massage and shoulder pendulum exercises initially. In order to revive the useful level by increasing fixed storage, muscle strength, and adaptability, the treatment consisted of ROM exercises with rope and pulley, L bar exercises, self-capsular stretching exercises, joint mobilization techniques and strengthening exercises with weights, therapeutic bands, springs, and push-ups. The standard exercise protocol and manual medical care got to revive muscular deficits in strength, mobility, and coordination of the complex body part and also the pectoral arch muscles to unload the subacromial space during active movement and reduce pain. Continuous ultrasound for 7 minutes was given which was operated at a frequency of 1.5 MHz, and an intensity of 1 W/cm2 by the treating physical therapist by using the technique of slow circular movements with the help of transducer head over the superior and anterior periarticular regions of the patient's glenohumeral joint and over the shoulder trigger points.

## KT TAPING METHOD:

The KT tape lifts the skin which creates negative pressure which increases space. The KT strip reduces pressure under it which acts as a channel to direct the exudates to nearby lymph duct which increases blood circulation to that particular area promoting healing. It also helps to maintain scapulothoracic stability through mechanical correction.

Taping was applied to three major muscles (supraspinatus, deltoid and teres minor).

The patient was in a sitting position and physical therapist by his side. We started with the normal relaxed position of patient and taped supraspinatus first because it is a muscle which provides stability to scapula which prevents any unwanted movement by fixing scapula. Took a 10 cm long strip and placed the base of strip 3 cm below greater

tuberosity of humerus with zero tension. After it, the patient was asked to adduct his shoulder along with the lateral rotation of the neck to the opposite side. The remaining strip was applied along the spinous process of the scapula with 20-25% tension in mid and zero tension at the end.

The second muscle taped was deltoid. A strip was cut into Y-shape and its base was placed 3 cm below deltoid tuberosity of humerus without tension. The anterior tail was applied to the anterior border of deltoid with 20-25% tension by externally rotating the shoulder and posterior tail at the posterior border by internal rotation and forward flexion of the shoulder.

The last muscle to be taped was teres minor. The I-strip was placed at the lower facet of greater tuberosity of humerus with zero tension. Then, the patient is asked to abduct shoulder in horizontal flexion and internal rotation .the rest of the strip was placed along the axillary border of scapula with 20-25% tension.

**TREATMENT GROUPS AND METHODS:**

GROUP 1 -a group of 11 patients with shoulder pain and stiffness was assessed.

VAS scale for pain; DASH scale for shoulder disability; Goniometry test for ROM of the shoulder; MMT for muscle testing.

Group 1 patients received Kinesio taping for 3 weeks with basic home exercise program including pendular exercises and wand exercises thrice a day. Taping was done every alternate day for three weeks. So, a patient visit to OPD was three times a week.

Group 2 was prescribed a daily program of therapeutic US for 7 minutes daily[1.5 MHz and 1W/cm2],including manual therapy which included MWM of shoulder,strengthening exercises(serratus anterior ,trapezius,and external rotation) and stretching (posterior shoulder and pectoralis minor) ,relaxation of trapezius ,ROM exercises and wand exercises performed in supervision of physical therapist . The session took almost 45 minutes to 1 hour daily and was done only once in a day. The visit to OPD by the patient was daily(6 days a week) for 3 weeks.

**Table n0. 1 : demographic details of patients who participated in study.**

| DEMOGRAPHIC DETAILS. | KT GROUP | MT+US GROUP |
|---|---|---|
| NO. OF PATIENTS. | 11 | 11 |
| AGE(YEARS) | 19-45 | 19-45 |
| SEX | MALES[05] | MALES[06] |
| | FEMALES[06] | FEMALES[06] |
| | FULL TIME | FULL TIME |
| OCCUPATION | SWIMMERS[02] | SWIMMERS[01] |
| | RECREATIONAL | RECREATIONAL |
| | SWIMMERS[05] | SWIMMERS[04] |
| | HOMEMAKER[03] | HOMEMAKER[04] |
| | CLERK[01] | ENGINEERS[02] |

**RESULTS :**

22 subjects participated in this study. Demographic details are given in [Table 1]. There was not a much difference in the first assessment done using VAS scores [TABLE 2].

None patient had any side effects of treatment. Three subjects dropped out the study from group two due ti inability to visit OPD daily.Initial assessment of ROM [Table 03] and MMT[Table 04] .

Result of group 1 illustrated a tremendous decrease in VAS scale in first 3 days but no change in DASH ,ROM or muscle strength. At the end 1st week there was decrease in patient symptoms and VAS and DASH were decreased. Also there was increase in range of motion of shoulder abduction and external rotation by 3'.

By second week ROM increased to 7' and power by one grade.

By third week end ROM increased upto 10' and MMT score increased by 1 grade.VAS was 1 on exertional activities.No pain during rest or at night. ROM of post treatment shown in [Table 05].MMT after treatment is shown in [Table 06]

Result of group 2 illustrated no improvement in symptoms at first week. the subject used to get relief while treatment but as sson as the treatment was over same symptoms returned.

By mid of second week the patients had decreased VAS and DASH and also the ROM increased by 2' and power of muscles also increased .

By the end of second week ROM increased by 4' and power by 1 grade.

By the end of third week ROM increased upto 10' and MMT score increased by 1 grade.VAS was 1 on exertional activities.No pain during rest or at night.VAS and DASH score after treatment is illustrated in [Table 07].

**Table 02: Initial Assesment Score Before Treatment.**

| INITIAL ASSESSMENT. | GROUP I[KT TAPE] | GROUP II[US+MT] |
|---|---|---|
| VAS SCORE | 8 | 8.5 |
| DASH SCORE | 68+/- 10 | 66+/-10 |
| NIGHT PAIN | 9 | 8.5 |
| MOVEMENT PAIN | 9 | 9 |

**Table 03:initial Assessment Of Range Of Motion.**

| MOTION | RANGE |
|---|---|
| 1.SHOULDER ABDUCTION | 80'+/- 20' |
| 2.SHOULDER EXTERNAL ROTATION | 30'+/-10' |
| 3.SHOULDER INTERNAL ROTATION | 40'+/-10' |

**Table 04: Initial Assessment Of Manual Muscle Testing Grades.**

| MUSCLES GROUP | GRADE |
|---|---|
| 1.SHOULDER ABDUCTORS | -3 |
| 2.SHOULDER EXTERNAL ROTATORS | -3 |
| 3.SHOLDER INTERNAL ROTATORS | 3 |

**Table 05: Rom Of Both Groups At Commencement Of Treatment .**

| RANGE OF MOTION | GROUP 1 | GROUP 2 |
|---|---|---|
| 1.SHOULDER ABDUCTION | 110'+/-30' | 120'+/-20' |
| 2.EXTERNAL ROTATION | 50'+/-20' | 60'+/-20' |
| 3.INTERNAL ROTATION | 60'+/-10' | 60'+/-10' |

**Table 06 : Mmt Of Both Groups At Commencement Of Treatment.**

| MUSCLES GROUP | GROUP 1 | GROUP 2 |
|---|---|---|
| 1.SHOULDER ABDUCTORS | +4+/-0.5 | +4+/-1 |
| 2.SHOULDER EXTERNAL ROTATORS | 4+/-1 | 4+/-0.5 |
| 3.INTERNAL ROTATORS | 4+/-0.5 | 4+/-1 |

**Table 07: Dash And Vas Scores After End Of Treatment.**

| FINAL ASSESMENT | GROUP 1 | GROUP 2 |
|---|---|---|
| VAS SCORE | 2 | 1 |
| DASH SCORE | 30+/-10 | 25+/-10 |
| NIGHT PAIN | 3 | 2 |
| MOVEMENT PAIN | 2 | 1.5 |

**DISCUSSION:**

Various taping methods have been adapted to be used clinically for patients with shoulder problems. Taping is a treatment option which enhances functional recovery. For the treatment of anterior shoulder impingement, tape recording was applied to produce proximal scapular stability. The application of scapular taping used with home exercise program was shown to improve shoulder pain and ROM[10].

Pain modulation via the gate control is one of the theories as tape stimulates neuromuscular pathways via increased afferent feedback [14].

The improved motion due to KT is due to increased recruitment in motor units of supraspinatus muscle to increase activity due to increased proprioceptive stimulus. Frazier et.al found vital enhancements in DASH scores and pain on 5 patients having varied shoulder issues by KT and noble metal at an equivalent time[07].

Another study showed bated higher skeletal muscle| skeletal muscle| striated muscle} and exaggerated lower trapezius electromyographic activity in individuals with suspected shoulder impingement with scapular tape recording throughout purposeful overhead tasks, and bated higher musculus trapezius activity during shoulder abduction in the scapular plane[13].

Calis HT et al, (2011) conducted a study to outline and compare the effectuality of ultrasound, optical device, and exercise within the treatment of SIS.

This was a randomized controlled trial with-pre and post-treatment evaluations.

This study was performed on fifty-two patients with SIS United Nations agency were outpatients said the physical drugs and rehabilitation unit.

The patients were put randomly into three groups. According to this study result, they concluded that ultrasound and the laser treatments were not superior to each other in the treatment of SIS[05].

Bennell K, et al (2010) investigated the efficaciousness of a program of manual medical aid and exercise treatment compared with placebo treatment delivered by physiotherapists for the individuals with chronic body structure malady.

Participants were randomized and single-blinded, placebo-controlled trial.

A standardized program of a manual medical aid and residential exercise failed to confer extra immediate advantages for pain and performance compared with a practical placebo treatment that controlled for therapists' contact in middle-aged to older adults with chronic rotator cuff disease[05].

Pribisevic M, (2010) conducted a systematic review to discuss the evidence for manipulative methods of management of shoulder pain and chiropractic management techniques used within the literature.

A literature search of phone system, CINAHL, MANTIS, the Cochrane Musculoskeletal Group trials register and the Cochrane Controlled Trials Register was conducted.

Search terms included chiropractic or manipulative therapy and shoulder pain, impingement, rotator cuff, shoulder instability, shoulder joint, treatment or rehabilitation exercises.

Publications were enclosed if they contained shoulder pain or contained a particular clinical identification of a shoulder pain syndrome within the title; an in-depth description of the treatment intervention which was typical of the profession; treatment performed by a registered professional person and outcome measures were enclosed within the studies.

Exclusion criteria enclosed the identification of adhesive capsulitis or referred/pathological pain.

The articles were reviewed and clinical trials hierarchic on the therapy proof information scale.

From a total of 913 retrieved publications, 22 case reports, 4 case series and 4 randomized, controlled trials met the inclusion and exclusion criteria for this review.

The literature contains two articles of fairly sound methodology.

The proof for treatment management of shoulder pain is restricted to low-level proof within the type of case reports and case series and one tiny controlled trial.

There is a need for more well-designed, trials investigating multi-modal chiropractic management for shoulder pain. (Pribisevic M, 2010)[05].

There was no significant difference between two groups at the beginning of treatment but at 1st week the KT group showed more improvement then MT+US group. But at the end of commencement of treatement, there was no difference in both groups condition.

## CONCLUSION :

The study concluded that both the groups showed improvement in their symptoms at the end of the 3rd week but KT showed improvement in the third day whereas it took MT+US 9 days to show effects. But in the end, the results were the same for both modes of treatment. So, KT can be used as an alternative option for immediate effects and when the patient fails to visit the physical therapist daily.

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