

A comparative study of ultrasound therapy and kinesiology taping in the management of pain relief in frozen shoulder at stage-II

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ABSTRACT

- ◎ **DESIGN**-Randomized clinical trial
- ◎ **AIMS AND OBJECTIVES**-This study compares the effectiveness of kinesiology taping and ultrasound therapy in frozen shoulder. The objective of this study was to find out the effect of kinesiology taping and ultrasound therapy in improving pain.
- ◎ **METHODS AND MEASURES**- 30 participants with frozen shoulder who were referred by orthopedician and willing to take treatment for 12 weeks, were recruited for the study. The subjects were screened and were put in either of 2 groups- Group A-**Kinesotaping** , GroupB-**Ultrasound therapy**. By Convenience Method. A written informed consent was taken from each participant.

The pre and post intervention assessment was done by using Visual Analogue Scale{VAS} , SPADI score , ROM assessment by universal Goniometry {abduction , flexion , lateral rotation and medial rotation}.

- ◎ **RESULTS**-VAS& SPADI were statistically significant for pain and disability (P <0.01) indicating greater improvements in both the groups for both the outcome measures. On comparing the pre and post test score the mean score showed greater improvement in pain and disability in group A receiving kinesiology taping technique then group B receiving ultrasound therapy. (P <0.01)

- ◎ **CONCLUSION-** In this study the aim was to compare the effectiveness of kinesiology taping and ultrasound therapy in the management of pain relief in frozen shoulder at stage-II along with conventional physiotherapy measures and home based exercise program used for the treatment of frozen shoulder. Based on the result of statistical analysis this study found that kinesiology taping as compare to ultrasound therapy is more beneficial in improving shoulder pain associated with frozen shoulder.

KEY WORDS- adhesive capsulitis (frozen shoulder) , kinesiology taping , ultrasound therapy, VAS , SPADI.

INTRODUCTION

The shoulder is one of the most sophisticated and complicated joints of the body:

- To allow so much movement the joints need to be ‘free’ to move, therefore the shoulder should be unstable; However a series of complex ligaments and muscle keep it in joint. Because the shoulder is such a unique joint it is also prone to unique and complex problems. In fact it would be more correct to call it the SHOULDER COMPLEX.
- The deepest layer includes the bones and the joints of the shoulder.
- The next layer is made up of the ligaments of the joints.
- The tendons and the muscles come next.
- The nerves supply all the structures above and make them work.
- The bones of the shoulder consist of the humerus (the upper arm bone), the scapula (the shoulder blade), and the clavicle (the collar bone).

FROZEN SHOULDER:-

Also known as adhesive capsulitis is a “ chronic inflammation in the musculotendinous or synovial tissue such as the rotator cuff, biceps tendon , or joint capsule”

It is characterized by a stiff shoulder that has a considerable lack of function.

There are three stages of a frozen shoulder (adhesive capsulitis) Freezing , Frozen and Thawing.

First stage: The Freezing Stage

In these stage there is severe pain in the shoulder even at rest. There is also a decrease in shoulder external rotation and abduction ROM

These symptoms appear 2-3 weeks after onset of pain and can last from 10 to 36 weeks.

These symptoms of loss ROM are secondary to the pain and are not true capsular contractures.

Second stage: The Frozen Stage

In these stage , pain is no longer present at rest but only with movement.

There is decrease of capsular volume in the shoulder, which is reflective of loss of motion.

There is loss of motion in all plane ,and pain in all parts of the range. There may be evidence of atrophy of the rotator cuff, biceps, deltoids, and triceps brachii.

Typically this stage last 4 to 12 months

Third stage : The Thawing Stage

In these stage there is a slow but progressive recovery of ROM.
The recovery of ROM is due to capsular remodeling.

INDIVIDUAL RISK

- It is most common in women
- It effects 1 in 50 adults during their lifetime
- Most common age range is 40-60
- It usually occurs in non dominate arm
- 1 in 5 will experience in other shoulder too.

Kinesio Taping:It is a therapeutic taping technique which not only offers patients and athletes the support they are looking for , but helps to rehabilitate the affected condition as well. Using a highly specific tape design that works with the body, allowing full range of movements. In many cases range of movement will be improved.

- It can be worn 3-5 days, allows breathing of the skin and whisks away sweat.

ULTRA SOUND THERAPY:

- It is a sound wave that has a freq greater than 20KHz
- It is generated by applying an alternate current to a Piezoelectric crystal. This crystal contracts and expands at the same freq at which current changes polarity. The second field generated by this crystal in turn makes the molecule in the sound field vibrate and oscillate.
- The crystal commonly used in US units is synthetic plumbic Zirconium Titanate (PZT)
- Therapeutic US has a freq range of 0.7 and 5.0 MHz
- Most clinics will have 1 MHz and 3 MHz sound head.

OPERATIONAL DEFINITION

- **VAS:** It attempts to represent measurement quantities in terms of a straight line placed horizontally on paper. The endpoints of line are labeled with descriptive or numeric terms to anchor the extremities of the scale and provide a frame of reference for any point in the continuum between them. 100mm VAS is used and patient is asked to bisect line at a point representing self assessed position on scale.
- **SPADI:** The Shoulder Pain And Disability Index {SPADI} was developed to measure current shoulder pain and disability in an outdoor setting. The SPADI contain 13 items that assess two domains; a 5-items sub scale that measure pain and an 8 item subscale that measure disability. There are two version of the SPADI; The original version has each item scored on a Visual Analogue Scale {VAS} and a second version has items scored on a Numerical Rating Scale{NRS}.

- **ROM** : Joints and their related structures are examined by performing active and passive joint motions. Joint motion is a necessary component of functional tasks. Careful examination of joint motion for range, end-feel, effect on symptoms, and pattern of restriction help identify and quantify impairments causing functional limitations, and determine which structures need treatment.

AIMS AND OBJECTIVES:

AIM: Aim is to find out that which technique is more effective in the management of pain relief in frozen shoulder

OBEJECTIVE: To find out the effect of ultrasound therapy in frozen shoulder

To find the effect of kinesiology taping in frozen shoulder

HYPOTHESIS

There is a significant difference in the effectiveness of US therapy and kinesiology taping in patients of Frozen Shoulder

NEED OF STUDY

- Adhesive capsulitis is a common painful condition. Characterized by severe loss of mobility and shoulder pain. Patients with this disease have a painful restriction of both active and passive mobility and an overall loss of shoulder movement in all planes.
- Many studies have been done on the treatment of pain relief in frozen shoulder but no such evidences base practice have been found on comparative study of ultrasound therapy and kinesiology taping in the management of frozen shoulder.
- So my intent off the study treats my subjects with ultrasound and kinesiology taping to find out significant improvement in management of pain relief in frozen shoulder.

STATEMENT OF THE PROBLEM

This study is done to find out the significant difference between kinesiology taping and ultrasound therapy in improving the shoulder pain associated with frozen shoulder.

REVIEW OF LITERATURE

ADHESIVE CAPSULITIS

Labbe A 12(2010) in his article on clinical suggestion adhesive capsulitis: “use the evidence to integrate your interventions” has suggested that Frozen Shoulder can be treated by using

physical interventions like modalities, passive motion, and manual techniques, soft tissue mobilization, therapeutic exercise, rigid & kinesiotaping. Because adhesive capsulitis patients often exhibit poor posture and scapular mechanics, KT may provide postural cues and assist with promoting proper scapular motion.

By Tekavec 2012 walker 2004 : Adhesive capsulitis has been reported to affect slightly more women than men and occurs most commonly in middle age, with an increased frequency in people with diabetes.

According to [Giovanni Maria D’Orsi](#) , [AlessioGiai Via](#), [Antonio Frizziero](#),and [Francesco Oliva](#) Sep- 2012 : Adhesive capsulitis is a condition “difficult to define, difficult to treat and difficult to explain from the point of view of pathology”. This Codman’s assertion is still actual because of a variable nomenclature, an inconsistent reporting of disease staging and many types of treatment. There is no consensus on how the best way best to manage patients with this condition, so we want to provide an evidence-based overview regarding the effectiveness of conservative and surgical interventions to treat adhesive capsulitis.

ULTRASOUND

Allen 2006 and watson 2008: Therapeutic ultrasound delivers energy to deep tissue sites through ultrasonic waves { at 1 or 3 MHz freq and intensities between 0.1 watt/square cm } using a crystal sound head. Treatment can be delivered in forms , continuous { non stop ultrasonic waves} and pulsed { intermittent ultrasonic waves}.

Hamer and Kirk (25)1976 demonstrated that ultrasound combined with passive and active exercises gave patients improved pain relief and shoulder motion, others (8,6 1.64) report no significant therapeutic benefit associated with ultrasonic treatment.

Empiricism1976 suggests that if ultrasound is utilized, the shoulder joint should be stretched into abduction and external rotation during this procedure, effecting a prestretch of the anterior and inferior capsule (55).

KINESIOLOGY TAPING

Hacer Dogru, Sibel Basaran*, Tunay Sarpel 2008 said that as illustrated in various studies that taping be it adhesive or kinesiotaping are widely being used far biomechanical correction, for relief of pain or for immobilisation. Although there are various modalities which can help in reducing pain but present review shows that taping can be used as very useful tool for reducing pain. Further it is cheap, less time consuming and easy to manage with excellent results.

According to MAHMOUD MOHAMED NASSER 2012 Kinesio Taping and traditional exercises program have more significant effect than traditional exercise program only in the treatment of diabetic frozen shoulder.

According to [Jaraczewska E, Long C. 2006](#) The Kinesio taping method in conjunction with other therapeutic interventions may facilitate or inhibit muscle function, support joint structure, reduce pain, and provide proprioceptive feedback to achieve and maintain preferred body alignment.

VISUAL ANALOGUE SCALE According to

[Hasan Kerem Alptekin, Tugba Aydin, Enes Serkan Iflazoglu, and Mirsad Alkan](#), PTAs a prompt evaluation of the perception of disease severity by the patient, VAS is a significant index that aids direct rehabilitation in the clinic. Concerning CMS, besides being a widely used, popular evaluation method, it can also be useful for evaluating the entire process of shoulder therapy and completing the clinical examination.

SHOULDER PAIN AND DISABILITY INDEX (SPADI)

[Marloes Thoomes-de Graaf, PT, MMT, MSc^{1,2}, Wendy Scholten-Peeters, PhD, Edwin Duijn, MSc, Yasmayne Karel, MSc, Henrica C.W. de Vet, PhD, Bart Koes, PhD, Arianne Verhagen, PhD](#) **2017** Evidence supports the use of the SPADI following shoulder arthroplasty and in adhesive capsulitis. It takes about 2-3 minutes to complete and correlates well with other region-specific shoulder questionnaires. Additionally, it's also shown to be responsive to change over time, in a variety of patient populations and is able to discriminate adequately between patients with improving and deteriorating conditions.

METHODOLOGY :30 participants with frozen shoulder who were referred by orthopedician and willing to take treatment for 12 weeks , were recruited for the study. The subjects were screened and were put in either of 2 groups- Group A-Kinesotaping , Group B-Ultrasound therapy. By convenience method. A written informed consent was taken from each participant.

Group A-

Requires; 4 pieces of y tape

1 piece of I tape , Partner for taping

Group B

Participants of group B were given ultrasound in sitting in continuous mode and an intensity of 1.5 W/cm² for 10 minutes.

PROTOCOL

30 subjects were assigned in two groups 15 in each group (group A and group B).

Group was treated with kinesiology taping along with conventional physiotherapy measures (moist heat, TENS, IFT, codman's pendular exercises, finger ladder, shoulder pulley and home exercise regime program) and ultrasound therapy along with the same conventional physiotherapy measures.

Precautions were also taken with at work.

Outcome Measures

The pre and post intervention assessment was done by using Visual Analogue Scale{VAS} , SPADI score , ROM assessment.

Inclusion criteria:

- Affected by shoulder periartthritis for at Stage-II less than 3 months duration with
- no major trauma.
- Stopped taking analgesics anti inflammatory drugs 15 days prior to electromagnetic therapy or physical therapy.
- Had never had infiltrative steroid therapy.
- Age 40-60years.
- Limited active and passive shoulder movement in all planes.
- pain with motion with a minimum visual analogue scale (VAS) score of 40 mm
- normal findings on radiographs of the glenohumeral joint and
- absence of arthritis,malignancy, and medical conditions such as cardiac diseases,infections and coagulation disorders.

Exclusion criteria:

- Patients having the history of shoulder girdle fracture , glenohumeral , dislocation , concomitant cervical spine symptoms, past shoulder surgery, rotator calf pathology.
- Shoulder gridle motor control , defects associated with neurological disorders.{ eg stroke parkinson's disease.}
- Local corticosteroids injection to the affected shoulder with in the last 3 months.

TIME AND DURATION OF THE STUDY

Duration of the study was 12 weeks; 4 weeks of treatment and 8weeks of follow up;data collection is done at the end of every week.

STATISTICAL TEST:

An appropriate statistical test was applied for data analysis.

'Independent t-test' was used for comparing the two group

Paired t – test was used for comparison of pre and post test score

RESULT OF THE STUDY

There is significant improvement in shoulder pain after application of kinesiology taping as compare to ultrasound therapy. Both the groups (A & B) showed improvement in pain and disability but more improvements occur in group A as compare to group B which suggest that

kinesiology taping is more beneficial than ultrasound therapy in shoulder pain associated with frozen shoulder along with conventional physiotherapy measures.

CONCLUSION

In this study the aim was to compare the effectiveness of kinesiology taping and ultrasound therapy in the management of pain relief in frozen shoulder at stage-II along with conventional physiotherapy measures and home based exercise program used for the treatment of frozen shoulder. Based on the result of statistical analysis this study found that kinesiology taping as compare to ultrasound therapy is more beneficial in improving shoulder pain associated with frozen shoulder.

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