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Effects of Friction Massage Versus Capsular Stretching in Adhesive Capsulitis - A Randomized Active Controlled Study Among Coastal Patients

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Keywords:

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Abstract

Frozen shoulder, or otherwise called adhesive capsulitis, is a painful disorder that progressively restricts movement of the shoulder. This study's main goal was about comparing the effectiveness of friction massage and capsular stretching in treating adhesive capsulitis. Twenty patients with the disease were enrolled in the trial, and they were randomized either Group A or B. Group A underwent IFT and friction massage for six weeks, while Group B experienced six weeks of capsular stretching, which consisted of five sets each session. Data from the pre- and post-test were gathered, and independent sample T-tests were used to assess them. The results revealed a highly significant difference at the P< 0.0001 level of significance. These findings led to the conclusion that Group A, which received a friction massage, was more efficacious alleviating pain and increasing the shoulder joint's range of motion.

1. Introduction

Adhesive capsulitis, also identified as frozen shoulder, can develop in coastal life as a result of repetitive overhead motions like surfing or paddleboarding, resulting in pain and limited movement. Adhesive capsulitis, sometimes known as frozen shoulder, is an elusive painful illness that gradually limits shoulder motion in all planes. [(1)]. They exhibit a restriction of the capsular pattern, the most restricted being outward rotation. This is followed by abduction in the scapular plane, and flexion mobility is then also impaired. The orthopaedic condition known as "frozen shoulder," which was initially identified by Codman in 1934, affects patients in general practise often. This term was created by Codman to describe a slow-onset condition that affects the region where the deltoid muscle inserts and results in months of shoulder pain and discomfort. Patients' difficulty to sleep on the affected side is their main complaint. Moreover, there is only modest external rotation and glenohumeral elevation, as well as underwhelming radiographic outcomes. In general, there are two types of the condition: primary, for which there are no known causes, and secondary, in which a cause has been found (from history, clinical examination and radiographic appearances). There are two types of adhesive capsulitis: primary and secondary. The basic condition is usually idiopathic, has an ominous beginning, and is frequently accompanied by other conditions including diabetes mellitus, thyroid illness, medications, or cervical spondylosis. Usually, a shoulder injury or trauma is followed by the secondary disease. Rotator cuff tears, fracturing, surgery, and immobilization are typical injuries. The freezing (painful), frozen (sticky), and thawing stages

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are frequently the order in which frozen shoulder develops. There is a slow onset of diffuse, excruciating shoulder discomfort throughout the freezing stage, which lasts between 2 and 9 months and usually gets worse at night. With a distinctive progressive loss of flexion, then the abduction, and external rotation of the shoulder joint and the discomfort will start to lessen during the frozen stage. Even 4 to 12 months are possible for this stage. Throughout the thawing period, which lasts between 5 and 26 months, the patient gradually regains range of motion.. Although adhesive capsulitis frequently resolves on its own, it can also continue and manifest with symptoms that are typically modest; discomfort is the most frequent complaint[1,2] The elderly and middle-aged folks suffer from it the most. Idiopathic or post-traumatic causes of frozen shoulder should be treated with an adhesive cap study, however. Frozen shoulder affects between 2% and 5% of the general population [3-5]and between 10% and 15% of athletes.

People in their fourth to the 6th decades of life are most commonly affected, and women, particularly those with diabetes, are more likely to develop adhesive capsulitis. One or both shoulders may suffer injury simultaneously in 6% to 17% of people, or one shoulder may be damaged at first and the other a few years later. According to studies, persons who experience shoulder ROM loss find it difficult to carry out their everyday tasks in general, which has an impact on their ability to work and overall quality of life. [6][7] Oral medications, physical therapy, exercise, steroid injections, and hydro dilatation are examples of common conservative therapies.. [10,12,13] During the uncomfortable initial freezing stages, pain control is the main therapy objective. NSAIDs are frequently given to patients, however they have minimal effect on the natural course of adhesive capsulitis. NSAIDS are not recommended for usage in the specific case of adhesive capsulitis, according to randomized controlled trials. [14,15]. After administering a corticosteroid injection, soft tissue or joint mobilisation, and stretching exercises, a variety of therapy options are available for an instant considerable recovery of motion and reduction of discomfort. One of the most significant manipulative techniques is Cyriax deep friction massage, which was developed by James Cyriax and Russell. Yet, it is a method that is mostly used by physical therapists to treat soft tissue injuries that affect the muscle, ligament, and tendon. Cyriax's explanation and principle for preserving flexibility within ligament, tendon, and muscle connective tissue structures by limiting the creation of adhering scar tissue. Tennis elbow and supraspinatus tendinitis were reported to benefit from cyclix. [8] By stretching the capsular joints, the synovial gland is stimulated to create a liquid lubricant, which makes it easier for the articulating joints to slide past one another. This procedure is known as capsular stretching. As we age, our capsular joints become more prone to calcification, which can be painful and make movement challenging. Stretching the capsule can ease intra-articular pressure and promote articular surface separation.

2. Methodology

An east coast tertiary care hospital in India served as the site of this investigation. The patients gave their informed permission. This study had 20 patients in total. The people we chose for the study were male and female patients with stages 1 and 2 adhesive capsulitis, postsurgical or surgical immobilization adhesive capsulitis, between the ages of 4.0 and 55.

The following conditions were excluded from the study: complete shoulder arthroplasty, glenohumeral arthritis, uncontrolled diabetes, rotator cuff tear, shoulder dislocation, . After the selection process the selected participants are allocated into two groups in a random manner. By using a lottery system, 10 volunteers each for capsular stretching (group B) and friction massage (group A) are selected. Group B received capsular stretching in addition to conventional therapy, while group A received friction massage in addition to conventional therapy. The discomfort and range of motion were evaluated in the post test as they had been in the pretest following the 6-week treatment period. The outcome was established based on the data analysis.

Procedure Friction Massage:

Heat pack: 10 minutes, IFT for 10 minutes, 3 times per week Using Cyrix DFM on certain muscles (Supraspinatus, Infraspinatus, subscapularis, Deltoid and Pectoralis) Three times per week, for a total of 15 minutes, three minutes for each muscle.

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Deep friction massage to supraspinatus tendon:

Patient's position: The patient stands with his or her elbow bent at the proper angle and his or her forearm positioned directly behind the patient's back. The person then pulls back into a half-lying position and fixes the arm in medial rotation and adduction. Technique: The therapist sits with his back to the patient's shoulder and places the tip of the tendon on the distal IP joint while maintaining the proximal IP joint stretched and supported with his middle finger. The wrist is successively flexed and extended, with the thumb acting as a fulcrum, to cause the finger to move the tendon from side to side. Deep friction massage to infraspinatus tendon: [14,15] Patient's posture: Patient lays face downwards, propping up on his/her elbow. Slight lateral rotation of the arm is maintained by the patient holding on to the edge of the couch. To be more specific, the Therapist sits with his back to the patient and places his fingers on the patient's front shoulder. The thumb of the therapist should be flexed to apply good pressure as they feel for the tendon. To drag the thumb across the tendon, perform alternate abduction and adduction movements.

Deep friction massage to subscapularis tendon:

Patient's position on the couch is half-lying. The patient holds the arm close to the body, bends the elbow, and places the hand on the thigh.

The therapist sits with his or her back to the patient. The subscapular tendon, which is medial to the inner margin of the groove, is palpable once he locates the bicipital groove. He then moves vertically up and down while exerting counterpressure with other fingers at the back of the shoulder by bending his thumb at a straight angle. [16, 17,18]

Capsular Stretching:

The anterior, inferior, and posterior shoulder capsules of the participants were stretched after a 10-minute treatment with a damp pack.

The subjects were placed either side lying with the affected arm raised or high sitting, and the shoulder and arms were brought back into extension. This stretch was maintained for a minimum of 30 seconds and for as long as possible, up to the point where the patient felt pain. The posterior capsule was stretched with the subject lying on their back and the therapist performing cross body adduction.

The person was lying on his back while being stretched in the antero-inferior capsule. The affected arm is raised to the highest possible elevation in order to stretch the antero inferior capsule, and counterpressure is maintained at the patient's sternum to avoid spinal extension. Each stress is mild yet solid, and it is not released until discomfort gives way to pain. B Group received five repetitions per set, five sets per session, one session per day, and five days per week for six weeks of capsular stretching. To prevent muscle discomfort after exercise, 10 minutes of ice were followed with capsular stretching. [19,24, 25,26,27]

Outcome Measure

Table 1 lists the outcome measures that will be evaluated to ascertain the effectiveness of the treatment. The outcome measure includes shoulder pain and movement range. All measurements will be performed at the baseline week 0 and at the end of the intervention weeks 6.

OUTCOME	MEASUREMENT TOOL
Shoulder pain	Visual analogue scale
Range of motion	Goniometry

Table 1: Outcome measures

Measurement of pain level

The VAS is a 10-point scale encompassing a number from 0 to 10 ; 0 represent no pain and 10 represent the worst pain. [21,22]

Range of Motion

A fulcrum, a moving arm, and a fixed arm make up a goniometer.The device will assess the shoulder's range of motion.[20, 23]

Statistical Analysis

Using the SPSS program, statistical analysis was carried out. The mean and standard deviation for each result is also shown. The starting points for each outcome metric were all shown. To compare within-group change, preintervention changes, and

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postintervention changes on day 1 and at the end of six weeks, a paired T test was performed for each outcome measure.

The pre and post-test analysis of pain in group A was based on the data collected .The mean and standard deviation of pre-test was 8.4±0.9and post-test was 3.9±0.8 respectively.

The p-value is 0.001 and the t-value is -3.425 is illustrated in **table 2**.This demonstrates that the pre and post-test differed significantly .There is statistically significant difference because the level of significance is set at ≤ 0.05.

The pre and post-test analysis of pain in group B based on the data collected. The mean and standard deviation of pre-test was 8.6 ±0.97 and post-test was 5±0.82 respectively. The p-value is 0.0001 and the t-value is 8.43 is illustrated in **table 3**.This demonstrates that the pre and posttest differed significantly. There is statistically significant difference because the level of significance is set at ≤ 0.05.

The pre and post-test analysis of range of motion (abduction) in group A based on the data collected. The mean and standard deviation of pre-test is5.93 ±7.85and post-test is98.6 ± 9.88respectively. The p-value is 0.0001 and the t value is 9.20 are illustrated in **table 4.**This demonstrates that the pre and post-test differed significantly. There is statistically significant difference because the level of significance is set at ≤ 0.05.

The pre-test data analysis of range of motion (abduction) for group B based on the data collected. The mean and standard deviation for group A was 65± 11.5and group B was 97.6±12.0 respectively. The p-value is 0.0001 and the t-value is 13.8 are illustrated in **table 5.**This demonstrates that the pre-test of group A and B differed significantly. There is statistically significant difference because the level of significance is set at ≤0.05.

The pre-test data analysis of range of motion(external rotation)for group A based on the data collected.The mean and standard deviation for pretest was 12±6.32and post-test was 40±12.2respectively. The p-value is 0.0001and the t-value is 7.79 are illustrated in **table 6.**This demonstrates that the pre-test and postest differed significantly. There is statistically significant difference because the level of significance is set at ≤0.05

The post test data analysis of range of motion (external rotation) for group B based on the data collected.The mean and standard deviation for group A was 11.5±5.8and group B was 31±6.58respectively. The p-value is 0.0001 and the t-value is 7.13 are illustrated in **table 7.**This demonstrates that the pre and post-test of group B differed significantly.There is statistically significant difference because the level of significance is set at ≤ 0.05.

3. Result Analysis

TABLE 2: Intragroup Pre And Post Test Analysis Of Pain (Vas) For Friction Massage Group

GROUP	OUTCOME	SAMPLE	MEAN AND STANDARD DEVIATION	T- VALUE	P- VALUE
A	PRE-TEST	10	8.4±0.9	9.42	0.0001
	POST TEST	10	3.9±0.8		

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TABLE 3: Intragroup Pre And Post Test Anaysis Of Pain (Vas) For Capsular Stretching Group

GROUP	OUTCOME	SAMPLE	MEAN ND STANDARD DEVIVATION	T –VALUE	P-VALUE
B	Pre-test	10	8.6±0.97	8.43	0.0001
	Post test	10	5±0.82		

TABLE 4: Intragroup Pre And Post Test Analysis Of Range Of Motion For Friction Massage Group

GROUP	OUTCOME	SAMPLE	MEAN ±STANDAD DEVIATION	T-VALUE	P-VALUE
A	PRETEST	10	59.3 ±7.85	9.20	0.0001
	POST TEST	10	98.6±9.88		

TABLE 5: Intragroup Pre And Post Test Analysis Of Range Of Motion For Capsular Stretching

GROUP	OUTCOME	SAMPLE	MEAN STANDARD DEVIATION	T-VALUE	P-VALUE
B	PRE-TEST	10	65±11.5	13.8	0.0001
	POST TEST	10	97.6±12.0		

TABLE 6: Intragroup Pre And Post Test Analysis Of Range Of Motion For Friction Massage

GROUP	OUTCOME	SAMPLE	MEAN STANDARD DEVEIATION	T VALUE	P VALUE
A	PRE-TEST	10	12±6.32	7.79	0.0001
	POST TEST	10	40±12.2		

TABLE 7: Intragroup Pre And Posttest Analysis Of Range Of Motion For Capsular Stretching

GROUP	OUTCOME	SAMPLE	MEAN STANDARD DEVIATION	T -VALUE	P- VALUE
GROUP B	PRE-TEST	10	11.5±5.8	7.13	0.0001
	POST TEST	10	31±6.58		

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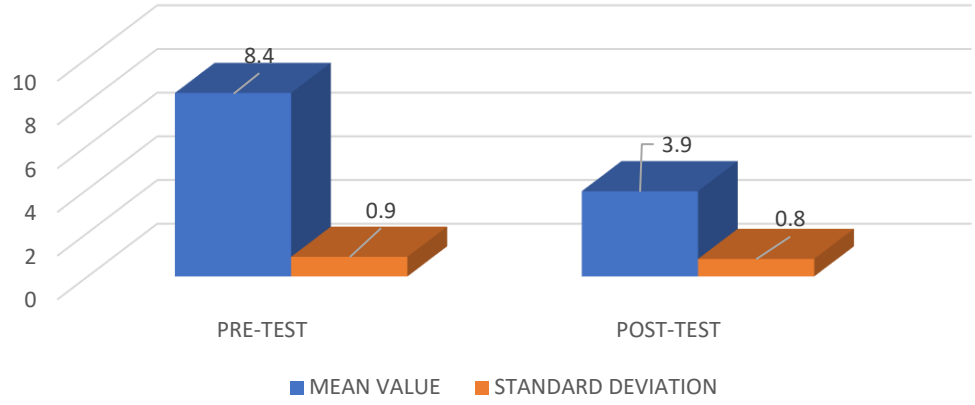
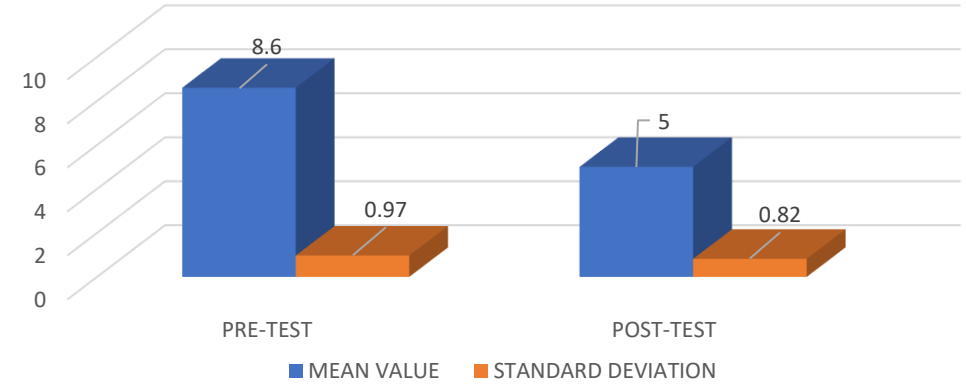
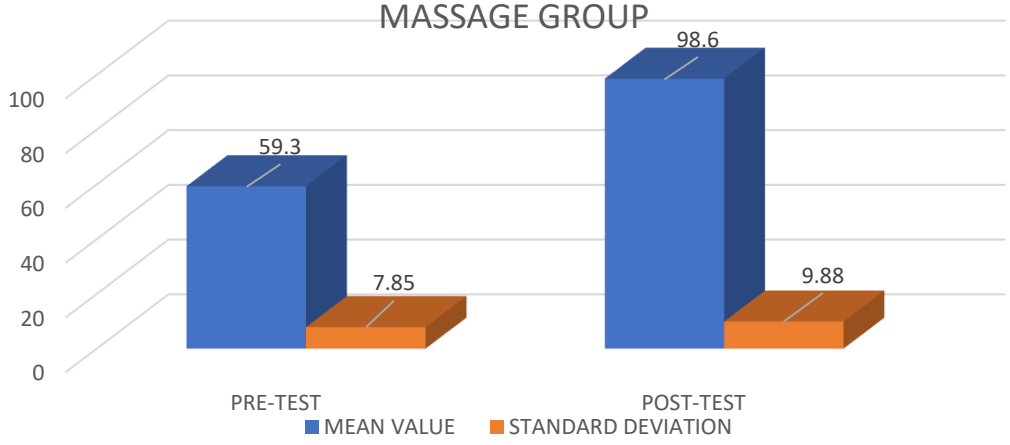
GRAPH 1: ANALYSIS OF VAS FOR FRICTION MASSAGE GROUP



GRAPH 2: ANALYSIS OF VAS FOR CAPSULAR STRETCHING GROUP



GRAPH 3: ANALYSIS OF ROM - ABDUCTION FOR FRICTION MASSAGE GROUP



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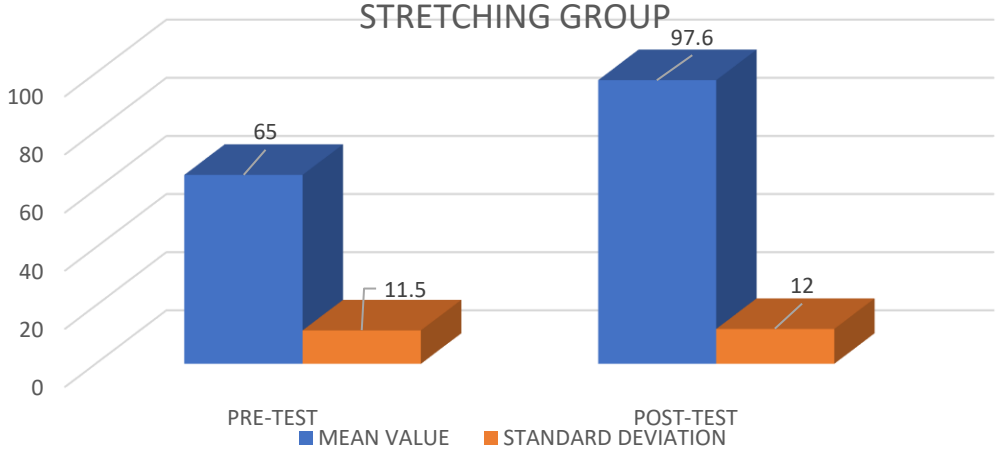
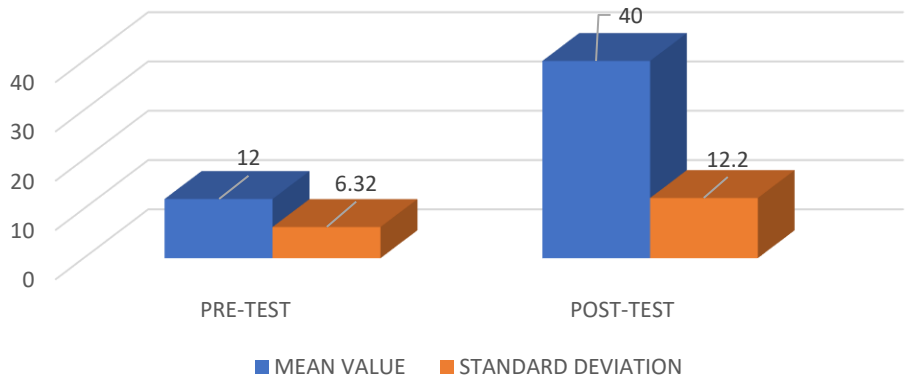
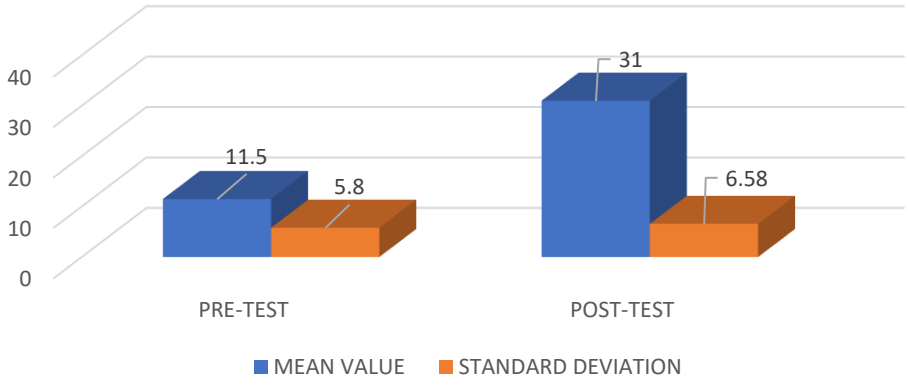
GRAPH 4: ANALYSIS OF ROM - ABDUCTION FOR CAPSULAR STRETCHING GROUP



GRAPH 5: ANALYSIS OF ROM - EXTERNAL ROTATION FOR FRICTION MASSAGE GROUP



GRAPH 6: ANALYSIS FOR ROM - EXTERNAL ROTATION FOR CAPSULAR STRETCHING GROUP



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4. Discussion

The aim of this study was to compare the effectiveness of friction massage versus capsular stretching in patients with adhesive capsulitis. The results of the study showed that after six weeks of intervention, friction massage was more effective than capsular stretching in reducing pain and improving range of motion in patients with adhesive capsulitis. Both groups showed a statistically significant decrease in pain and improvement in range of motion, but the friction massage group showed greater improvement. Friction massage is known to increase the movement of tissues over one another, break down adhesions, and mobilize fibrous tissue, which can improve the extensibility of scar tissue and free scars from underlying tissue.

These findings are consistent with a study conducted in 2021, which evaluated the effectiveness of Cyriax deep friction massage and cryotherapy in managing pain, range of motion, and functional activity in patients with stage 1 and 2 adhesive capsulitis. The study found that both groups were equally effective in managing symptoms.

Another study conducted by Fusan Guler-Ulser et al. in 2004 evaluated two separate treatment approaches for adhesive capsulitis, namely mobilization exercise and physical therapy and Cyriax deep friction massage. The study found that Cyriax rehabilitation offered a quicker and better response in the initial stages of adhesive capsulitis by decreasing pain, increasing range of motion, and improving functional ability. The present study found that the friction massage group showed a significant impact in VAS scores compared to the capsular stretching group. This finding is consistent with a comparative study conducted by Krishna et al. in 2016, which evaluated the efficacy of deep friction massage and ultrasound therapy in reducing pain and disability in subjects with acute supraspinatus tendinitis. The study found that therapeutic ultrasound with cryokinesis and therapeutic ultrasound with deep friction massage were effective in treating supraspinatus tendinitis.

Moreover, the VAS and range of motion results of the friction massage group in the present study were significant compared to the capsular stretching group. This finding is consistent with a comparative study conducted by Sah et al. in 2017, which compared the efficacy of Gong's mobilization and Cyriax manipulation in subjects with frozen shoulder[25-30]. The study found that both methods were equally successful in enhancing abduction of the shoulder and reducing functional deficit.

In conclusion, the present study suggests that friction massage is more effective than capsular stretching in reducing pain and improving range of motion in patients with adhesive capsulitis. These findings are consistent with previous studies evaluating the effectiveness of friction massage in managing pain and disability in patients with adhesive capsulitis and other musculoskeletal conditions.

Limitations

As the study was limited to only 20 patients , it would have been better if the study was done in a large group. There was no control group. because there were not enough patients due to small sample size. The current study does not involve a long-term follow- up of patient.

5. Conclusion

Both group A and group B in this study were successful in reducing discomfort and enhancing range of motion after six weeks of treatment, however when compared, group A (friction massage) was more successful than group B (capsular stretching). As an addition to the therapeutic therapies for coastal individuals with adhesive capsulitis, we recommend that these education exercises need be given to such patients.

Conflict Of Interest

The author declare that they have no conflict of interest.

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Author Contribution

Apsara. V conceived and designed the experiments, performed the experiments, contributed materials, analyzed, and interpreted the data, and wrote the paper.

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Shangumananth E conceived and designed the experiments, performed the experiments analyzed and interpreted the data, and wrote the paper.

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