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The Effectiveness of Cyrix Deep Friction Massage and End Range Mobilisation Technique in Adhesive Capsulitis

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Abstract

Background: Adhesive capsulitis, commonly known as frozen shoulder, is a debilitating condition characterized by pain and progressive restriction of shoulder movements.

Aim and objective: This study investigates the effectiveness of Cyrix Deep Friction Massage (DFM) and End Range Mobilization Technique (ERMT) in the management of adhesive capsulitis.

Method: A comparative interventional study was conducted involving 60 individuals diagnosed with adhesive capsulitis. Participants were randomly assigned into two group (group A and group B). Outcome measures included pain levels, shoulder range of motion and functional disability assessed at baseline, after a specified intervention period and follow-up visits.

Results: Results demonstrated that both Cyrix DFM and ERMT interventions led to significant improvements in pain reduction, increased shoulder range of motion and enhanced functional outcomes. Cyrix DFM exhibited a particular efficacy in addressing soft tissue restrictions, while ERMT targeted end range joint mobility. Moreover, the combined application of Cyrix DFM and ERMT yielded synergistic benefits, resulting in a more comprehensive improvement in adhesive capsulitis symptoms. Findings suggest that incorporating these manual therapy techniques into the treatment protocol for adhesive capsulitis may offer a valuable therapeutic approach for enhancing patient outcomes.

Conclusion: This study contributes valuable insights into the holistic management of adhesive capsulitis, highlighting the effectiveness of Cyrix deep friction massage and end range mobilization technique in addressing both soft tissue and joint restrictions. However, end range mobilization provides better results.

Keywords: Adhesive capsulitis • Deep friction massage • End range mobilization • Frozen shoulder

Introduction

Adhesive capsulitis, commonly known as frozen shoulder, is a prevalent cause of shoulder pain and disability in the general population. It is characterized by insidious and painful development, leading to a gradual restriction of all planes of movement in the shoulder. It is the main cause of shoulder pain and dysfunction in middle aged and elderly population. Adhesive capsulitis can also be defined as an idiopathic painful restriction of shoulder movements, resulting in a global limitation of the glenohumeral joint. It is a common disorder with an estimated incidence of 3% to 5% of the general population. Reeves described three stages of the disease: Stage 1 is freezing phase which is mainly characterized by pain usually lasting 2-9 months. Stage 2 is frozen phase, in which pain gradually subsides, but the stiffness is marked lasting 4-12 months. Stage 3 is thawing phase, in which pain resolves and improvement in Range of Motion (ROM) appears [1].

Many treatments have been employed in the management of shoulder disorders; few have been proven to be effective in randomized controlled trials. Nonsteroidal anti-inflammatory drugs, local anaesthetics and corticosteroid injections into the glenohumeral joint, calcitonin and antidepressants, distension arthrography, closed manipulation, physical therapy modalities and stretching exercises can be listed among the most common non-surgical approaches to treatment in adhesive capsulitis. Physical therapy is often the first line

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of management for shoulder pain. Although education regarding frozen shoulder and simple home stretching exercises have been shown to improve self-assessed shoulder function and health status in patients with adhesive capsulitis. The self-limiting nature of adhesive capsulitis complicates the discussion of the efficacy of any treatment method in the long term [2].

To regain the normal extensibility of the shoulder capsule, passive stretching of the shoulder capsule in all planes of motion by means of end-range mobilization techniques has been recommended. These techniques are frequently used by physical therapists and manual therapists. Few studies have described the use of these techniques in joints with capsular adhesions [3]. End range mobilization techniques are physical therapy interventions that aim to improve joint mobility by specifically targeting the end range of motion. In the context of treating adhesive capsulitis (frozen shoulder), end range mobilization techniques may be employed to address the restricted movement of the shoulder joint. These techniques are typically performed by a qualified healthcare professional, such as a physical therapist [4].

Cyriax deep transverse friction massage is a type of connective tissue massage developed in an empirical way by Cyriax. It is applied by the finger(s) directly to the lesion and transverse to the direction of the fibers. Friction is slower in effect but leads to a physically more fundamental resolution, resulting in more permanent cure and less recurrence. According to Cyriax, friction also leads to increased destruction of pain provoking metabolites, such as Lewis's substances. This metabolite, if present in too high a concentration, provokes ischemia and pain. Cyriax showed good improvement in adhesive capsulitis and stated that it should be applied in every day practice by physiotherapists. Whereas the deep friction applies therapeutic movement over only a very small area. The movement is more effective for being so concentrated. Indeed, greater movement may easily be imparted locally by the physiotherapist's finger than could ever have been obtained by any amount of the most strenuous exercises and it moves those very tissues on which manipulation has no effect. By this means and by this means alone, massage can reach structures far below the surface of the body. Since the source of pain in patients for whom manual methods are required, so often lies in muscle, tendon or ligament, whether as the result of injury or repeated strain, a penetrating technique is essential if such tissues are to be affected [5-7].

There are various studies that shows effectiveness of Cyriax deep friction massage and effectiveness of end range mobilization in adhesive capsulitis, but there is no literature available comparing Cyriax deep friction massage versus end range mobilization in adhesive capsulitis. So, the present study is intended to compare the effectiveness of the Cyriax deep friction massage versus end range mobilization technique in adhesive capsulitis.

Materials and Methods

Study design

A comparative interventional approach is chosen for conducting the present study. As most of the researchers in the field of physical therapy demand utmost labor of accuracy, a comparative interventional design is thought to be a suitable one. The ethical clearance was taken from the Internal Research Committee (IRC), Uttaranchal college of technology and biomedical sciences (Approval no: UCT10RE278).

Materials and study site

In this research sterilized and standard instruments were used. The frequently used materials include, Universal Goniometer, hot packs, couch, stool, pillow and towel. The study was conducted at Sheth P.T. Surat General Hospital, Surat, Gujrat, India, Sarvajanik College of Physiotherapy, Surat, Gujrat, India and Ayurvedic college and hospital, Surat, Gujrat, India.

Sample size

A randomized sampling technique was adopted in the present study. A total of 60 patients of 40-60 years of age were taken as universal population for this study. Among this population, subjects who were approachable to the researcher form the accessible population. Total of 60 subjects with adhesive capsulitis were taken as an accessible population, consisting 30 in each of the 2 groups.

Group A: 30 subjects treated by Cyriax deep friction massage with hot packs.

Group B: 30 subjects treated by end range mobilization technique with hot packs.

Both the group received the treatment thrice a week for three weeks and Pre-test and Post-test was done to assess pain, range of motion and functional ability.

Inclusion criteria

- Age 40-60 years.
- Gender both.
- Idiopathic adhesive capsulitis cases.
- Unilateral adhesive capsulitis.
- Normal radiographic findings.
- Having painful stiff shoulder for at least 3 months of duration.
- Having restriction of more than 50% in passive shoulder flexion, abduction and external rotation compared with the opposite side.
- Subject not received any treatments or exercises for previous 1 month.
- Referred cases of adhesive capsulitis.

Exclusion criteria

- Diabetic patients.
- Painful stiff shoulder after a major trauma.
- Any neurological deficits affecting shoulder function in activities of daily living.
- Adhesive capsulitis secondary to shoulder dislocation, fracture, previous surgery on affected shoulder, reflex sympathetic dystrophy, rotator cuff tears and any tumours.
- Patients refused to stop using Non-Steroid Anti-Inflammatory Drugs (NSAID) and corticosteroids throughout treatment.
- Uncooperative patients.
- Subject not able to understand the questionnaire.

Variables

Independent variables: Cyriax deep friction massage and end range mobilization.

Dependent variables: Visual Analog Scale (VAS) and Shoulder Pain and Disability Index (SPADI) questionnaire [8,9].

Group A

Before starting the treatment full examination of the patient was done, pain was measured by using a VAS score, active range of motion was measured by universal goniometer and functional ability by using SPADI score and result are recorded in the assessment form and data was recorded in the data collection form [10].

Hot packs: The subject was placed in supine lying position and then moist heat therapy by hot pack was given to the affected shoulder by placing hot packs wrapped in a towel for 20 minutes. After 20 minutes the hot packs were removed from the affected shoulder.

Cyriax deep friction massage: The friction massage was achieved by fractioning over the surface with the practioner's index finger. Cyriax deep friction massage was given to supraspinatus tendon, infraspinatus tendon, subscapularis tendon, pectoralis major muscle for 20 minutes. The subjects were treated three times a week on alternate days for 3 weeks [11].

Deep friction massage for supraspinatus tendon: Patient's posture: The patient bends her elbow to a right angle and puts her forearm behind her back, her elbow well into her side. She then leans back in the half lying position, thus fixing her arm in adduction and medial rotation. In this position of the arm the supraspinatus tendon is bent through a right-angle and lies in the sagittal plane, passing from the base of the coracoid process directly forwards over the head of the humerus to the greater tuberosity, emerging under the anterior edge of the acromion.

Technique: If the patient's right shoulder is to be treated, the physiotherapist must use his right hand; if her left shoulder, his left hand. He sits facing her shoulder and makes sure that the patient's arm has not moved from the adducted position. He places the tip of his index finger on the patient's tendon, flexing it at the distal joint but keeping it extended at the proximal interphalangeal joint. He reinforces with the middle finger. His thumb is used for counter pressure; in order that it shall be well placed for this purpose, it must be applied as far down the patient's arm as the physiotherapist's span will allow, *i.e.*, as nearly opposite his index finger as possible. While this posture is held, the anterior edge of the tendon is easily palpable. The physiotherapist finds the right spot, not on the bone of the greater tuberosity, but directly posterior to this point. His finger is made to traverse the tendon from side to side by his alternately flexing and extending wrist, using the thumb both as a fulcrum and to maintain pressure. The sweep is 2 cm from one edge of the tendon to the other. A physiotherapist's greatest strength just suffices to break up the scar in the tendon [12,13].

Deep friction massage for infraspinatus tendon

Patient's posture: The lies face downwards, propping herself up on her elbows. The weight of her thorax acting downwards ensures that her scapula lies at right-angles to the humerus; in this position the acromion is drawn away from the greater tuberosity, uncovering it. Slight lateral rotation is maintained by the patient's holding on to the edge of the couch. This combination of flexion and slight lateral rotation brings the tuberosity downwards. The arm is now pushed into slight adduction, which brings the humeral tuberosity out from under the acromion. Running along, just below the most lateral extent of the spine of the scapula, the infraspinatus tendon is easy to feel on its course towards the head of the humerus.

Technique: The physiotherapist sits facing the patient's head and places his fingers on the front of her shoulder. He feels for the tendon with his thumb which he flexes until good pressure is obtained. Alternate abduction and adduction of the thumb now draw it to and fro across the tendon. At the extreme of the adduction movement, he feels the tip of his thumb engage against the posterior acromial edge [14].

Deep friction massage for subscapularis tendon

Patient's posture: The patient adopts the half lying position on the couch. She holds her arm close to her side and bends her elbow, putting her hand on her thigh.

Technique: The physiotherapist sits at the patient's side facing her. He puts his thumb on the head of her humerus and identifies the bicipital groove, rotating her arm to and fro using the forearm as a lever, to identify the two edges. Immediately medial to the inner edge of the groove lies the subscapular tendon, but it cannot be palpated; it feels as hard as bone. He notes the spot. He then bends his thumb to a right angle and hooks it round the medial edge of the upper part of the deltoid muscle and draws the belly laterally, letting the short head of the biceps slip under his finger. He can now apply his thumb to the subscapular tendon without the intervening mass of deltoid belly. He now moves his thumb vertically up and down, applying counter pressure with his fingers at the back of the shoulder. In this way the transverse friction can be given to the upper or lower part of the tendon [15].

Deep friction massage for pectoralis major muscle

Patient's posture: The patient adopts the half-lying position on the couch. She abducts her arm somewhat so as to bring the muscle into prominence, her hand may suitably rest on her hip.

Technique: The physiotherapist sits by the patient's side, facing her. He grasps the edge of the muscle, which would otherwise be apt to move as a whole with the physiotherapist's hand. By maintaining his grip and pulling his hand bodily towards himself, he imparts the required friction.

Group B

The patient lies supine with elbow extended and the forearm pronated. The belt lies just below the medial epicondyle and is wound around the therapist shoulder, the therapist stands with face towards the patient's feet. The therapist stabilizes the distal humerus with one hand while with the other hand the therapist stabilizes forearm. Now glide the ulna laterally with the belt by moving the shoulder gently upwards little force is used. It was provided, there is no pain the patient then actively bends or extends his wrist while maintaining the mobilization. Perform the glides of 3 sets of 10 glides in elbow extension. The treatment was given twice a week for three weeks.

Hot packs: The subject was placed in supine lying position and then moist heat therapy by hot pack was given to the affected shoulder by placing hot packs wrapped in a towel for 20 minutes. After 20 minutes the hot packs were removed from the affected shoulder.

End range mobilization: Shoulder of the affected extremity was abducted to the available end range and then distraction, anterior, posterior and caudal glides were given as described by Maitland. Three sets of Maitland mobilization are given and each set consist of 10-15 repetitions with 1-minute interval between each set with total duration of 20 minutes. Subjects were treated three times in a week on alternate days for 3 weeks [16].

Glenohumeral (GH) joint distraction

Patient position: Supine with arm in resting position, *i.e.*, 55 degrees of abduction, 30 degrees of horizontal adduction and rotated so that the forearm is in the horizontal plane. Physiotherapist support the forearm between his trunk and elbow.

Hand placement: Physiotherapist use his hand nearer the part being treated and place it in the patient's axilla with his thumb just distal to the joint margin anteriorly and fingers posteriorly.

Mobilizing force: Physiotherapist move the humerus laterally with the hand in the patient 's axilla [17].

GH caudal glide

Patient position: Supine with arm in resting position, i.e., 55 degrees of abduction, 30 degrees of horizontal adduction and rotated so that the forearm is in the horizontal plane. Physiotherapist support the forearm between his trunk and elbow.

Hand placement: Physiotherapist place one hand in the patient's axilla to provide the grade I distraction. The web space of the physiotherapists other hand is placed just distal to the acromion process.

Mobilizing force: With the superiorly placed hand, physiotherapist glide the humerus in an inferior direction [18].

GH joint anterior glide

Patient position: prone, with the arm in resting position over the edge of the treatment table, supported on physiotherapist's thigh. Physiotherapist stabilizes the acromion with padding.

Therapist position and hand placement: Physiotherapist stand facing the top of the table with the leg closer to the table in a forward stride position. Physiotherapist supports the patient's arm against his thigh with his outside hand; the arm positioned on physiotherapist's thigh provides a grade I distraction. Physiotherapist places the ulnar border of his other hand just distal to the posterior angle of the acromion process, with his fingers pointing superiorly; this hand gives the mobilizing force.

Mobilizing force: Physiotherapist glide the humeral head in an anterior and slightly medial direction. Physiotherapist bend his both knees so that the entire arm moves anteriorly [19].

GH joint posterior glide

Patient position: Supine with the arm in resting position.

Therapist position and hand placement: Physiotherapist stand his back to the patient, between the patient's trunk and arm. Physiotherapist supports the arm against his trunk, grasping the distal humerus with his lateral hand. This position provides grade I distraction to the joint. Physiotherapist place the lateral border of his top hand just distal to the anterior margin of the joint, with his fingers pointing superiorly. This hand gives the mobilizing force.

Mobilizing force: Physiotherapist glide the humeral head posteriorly by moving the entire arm as he bend his knees [20].

Statistical data analysis

Statistics were performed by using SPSS 13. Results were calculated by using 0.05 level of significance. Mean, standard deviation and statistical test (p test and t test) were also calculated [21].

Results

Demographic description

In both the group higher percentage of female (63 and 57% in Group A and Group B respectively) were participated (Figures 1 and 2). The Table 1 describes mean and Standard Deviation (SD) of age for subjects of Group A and Group B. The mean and standard deviation of subjects of group A and group B are 50.26 ± 7.02, 52.90 ± 7.15 respectively.

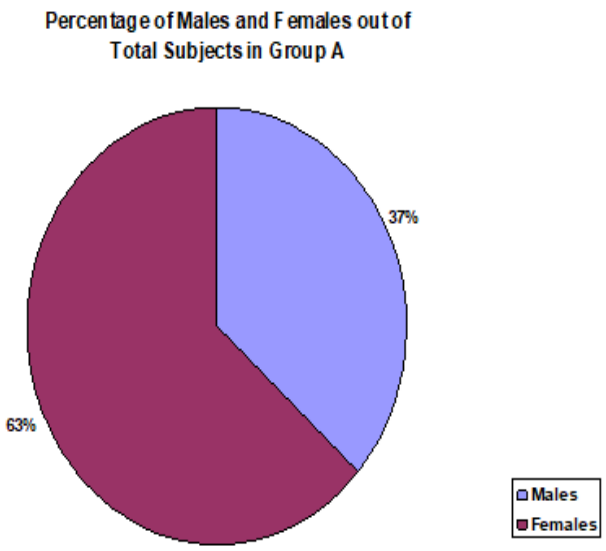

Figure 1. Percentage of males and females out of total subjects (30) in group A.

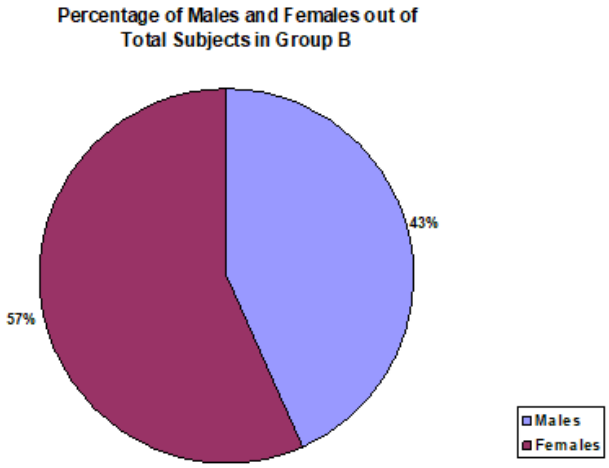

Figure 2. Percentage of males and females out of total subjects (30) in group B.

Table 1. Mean and SD of age for the subjects of group A and group B.

Demographic	Group A		Group B	
	Mean	SD	Mean	SD
Age	50.26	7.02	52.9	7.15

Comparison within groups

The Table 2 describes mean and standard deviation of SPADI total for pre-test and post-test group A is 81.27 ± 6.15, 43.38 ± 5.25 and for group B is 80.34 ± 7.00, 36.25 ± 6.45 respectively. The mean difference and standard deviation for group A is 37.89 ± 2.66 and for group B is 44.09 ± 3.64 respectively.

Table 2. Mean and SD of SPADI (total) at pre, post and mean difference (pre-post) interval for the subjects of group A and group B.

SPADI (Total)	Group A		Group B	
	Mean	SD	Mean	SD
Pre	81.27	6.15	80.34	7
Post	43.38	5.25	36.25	6.45
MD (Pre-Post)	37.89	2.66	44.09	3.64

Table 3 describes the paired t test within (both groups) group A and group B. The t values for group A and group B are 77.93 ($p<0.05$) and 66.21 ($p<0.05$) respectively.

Table 3. Comparison of mean value for SPADI (total) at pre and post interval within group A and group B.

SPADI (Total)	Group A		Group B	
	t value	P value	t value	P value
Pre *vs.* Post	77.93	P<0.05	66.21	P<0.05

Table 4 describes mean and standard deviation of VAS for pre-test and post-test for group A and group B are 7.36 ± 0.71, 4.50 ± 0.82 and 7.40 ± 1.10, 2.63 ± 0.96 respectively. The mean difference and standard deviation for group A is 2.86 ± 0.57 and for group B is 4.76 ± 0.67 respectively.

Table 4. Mean and SD of VAS at pre, post and mean difference (pre-post) interval for the subjects of group A and group B.

VAS	Group A		Group B	
	Mean	SD	Mean	SD
PRE	7.36	0.71	7.4	1.1
POST	4.5	0.82	2.63	0.96
MD (Pre-Post)	2.86	0.57	4.76	0.67

Table 5 describes paired t test of VAS within (both the groups) group A and group B. The t values for group A and group B are 27.48 ($p<0.05$) and 38.45 ($p<0.05$) respectively.

Table 5. Comparison of mean value for VAS at pre and post interval within group A and group B.

VAS	Group A		Group B	
	t value	P value	t value	P value
Pre *vs.* Post	27.48	P<0.05	38.45	P<0.05

Comparison between groups

Table 6 describes the unpaired t test of SPADI total between group A and group B. The t values are 0.546 ($p>0.05$) and 4.689 ($p<0.05$) respectively. The mean difference of SPADI Total between group A and group B is -7.517 ($p<0.05$) respectively.

Table 6. Comparison of mean value for SPADI (Total) at pre, post and mean difference (pre-post) interval between group A and group B.

SPADI (Total)	Group A *vs.* Group B	
	t value	P value
Pre	0.546	P>0.05
Post	4.689	P<0.05
MD (Pre-Post)	-7.517	P<0.05

Table 7 describes the unpaired t test of VAS between group A and group B. The t values are -0.139 ($p>0.05$) and 8.077 ($p<0.05$) respectively. The mean difference of VAS between group A and group B is -11.728 ($p<0.05$) respectively. The result defines that there is significant change within group A and group B. The result show that group B responds better than group A. This proves that treatment protocol given to group B is better than group A.

Table 7. Comparison of mean value for VAS at pre, post and mean difference (pre-post) interval between group A and group B.

VAS	Group A *vs.* Group B	
	t value	P value
Pre	-0.139	P>0.05
Post	8.077	P<0.05
MD (Pre-Post)	-11.728	P<0.05

Discussion

The purpose of the study was to compare the effectiveness of Cyriax deep friction massage and end range mobilization technique in adhesive capsulitis. The design of this study was comparative in nature. A total of 60 subjects of age within 40 to 60 years having adhesive capsulitis were taken in the study. Subjects were divided in to 2 groups, group A and group B. Group A consisted of 30 subjects of adhesive capsulitis being treated with Cyriax deep friction massage and group B consisted of 30 subjects of adhesive capsulitis being treated with End Range Mobilization Technique. Both the groups were given treatment on alternate days, thrice a week for 3 weeks. The objectives of the study were to decrease pain, increase active range of motion and to improve functional ability in adhesive capsulitis. The outcome measures of the study were pain, active range of motion and functional ability. Pain was measured by VAS; active range of motion was measured by universal goniometer and

functional ability was measured by SPADI. Statistical analysis was performed using SPSS 13 software package. Inter group analysis was done using unpaired t test and intra group analysis was done using paired t test.

The mean and standard deviation of age for group A was 50.26 ± 7.02 and for group B was 52.90 ± 7.15 respectively. In group A there were 63% of females and 37% of males and in group B there were 57% of females and 43% of males respectively. The t value of SPADI total at pre-test between group A and group B was 0.546 ($p>0.05$). This shows that there was no significant difference between the subjects of both the groups and the subjects of both groups were homogenous. The mean value of VAS for group A was 2.86 ± 0.57. The mean values of SPADI pain, SPADI disability and SPADI total for group A were 19.13 ± 1.40, 30.13 ± 3.27 and 37.89 ± 2.66 respectively. The t value of VAS at pre-test between group A and group B was -0.139 ($p>0.05$). This shows that there was no significant difference between the subjects of both the groups and the subjects in both groups were homogenous. These findings are supported by the various study conducted at different places which validate our findings. Cynthia Liesdek et al. found that Cyriax deep friction massage was effective reducing pain in adhesive capsulitis and inter observer reliability according to Cyriax method might be good under controlled conditions. Deep friction massage, exercise therapy and passive mobilizations were the most frequently applied treatment. Similarly, Fusun Guler-uysal and Erkan Kozanoglu had done a study on "comparison of early response to two methods of rehabilitation in adhesive capsulitis" and found that Cyriax method of rehabilitation provides a faster and better response than the conventional physiotherapy methods in early phase of treatment of adhesive capsulitis.

The biomechanical effect of end range mobilization technique induces various effects when force is directed towards the tissue resistance. The mechanical changes may include breaking up of adhesions, realigning of collagen or increasing fibre glide, when specific movements stress the specific of the capsular tissue. A similar study was conducted by Henricus M. in 2000 "End range mobilization technique is Adhesive Capsulitis of the shoulder joint" found that end range mobilization technique was effective in increasing the ROM of shoulder joint in patients of adhesive capsulitis. Similarly, Jin Ian Yang, et al., in 2007 "mobilization techniques in subjects with frozen shoulder syndrome: Randomized multiple treatment trials" found that end range mobilization technique was more effective in increasing mobility and functional ability.

The result of the study suggests that t value is highly significant in each pair of both group A and group B. Both the groups, group A and group B improved in VAS of the shoulder joint and SPADI, which reveals that the treatments given to the subjects of both groups are effective. There is significant improvement in both groups, group A (Cyriax deep friction massage) and group B (end range mobilization). On comparing the result of both the groups, it was found that

Conclusion

This study shows that end range mobilization with hot packs provide better results as compared to Cyriax deep friction massage with hot packs for treating adhesive capsulitis in terms of pain reduction and improvement in active range of motion and functional ability. Further research is warranted to explore the long-term effects, optimal treatment durations and potential variations in response to these interventions based on different stages of adhesive capsulitis.

Limitations

- Study was conducted over a short period of time.
- Sample size was small.
- There was no follow up of the patients.
- Availability of patients.

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Conflict of Interest

There is no conflict of interest.

References

1. Sarasua, Sara M, Sarah Floyd, William C. Bridges and Stephan G. Pill. "The Epidemiology and Etiology of Adhesive Capsulitis in the US Medicare Population." *BMC Musculoskelet Disord* 22 (2021): 1-12.
2. Hannafin, Jo A and Theresa A. Chiaia. "Adhesive Capsulitis: A Treatment Approach." *Clin Orthop Relat Res* 372 (2000): 95-109.
3. Patel, Riki, Ivan Urits, John Wolf and Anu Murthy, et al. "A Comprehensive Update of Adhesive Capsulitis and Minimally Invasive Treatment Options." *Psychopharmacol Bull* 50 (2020): 91.
4. Lin, Hui-Ting, Ar-Tyan Hsu, Kai-Nan an and Jia-rea Chang Chien, et al. "Reliability of Stiffness Measured in Glenohumeral Joint and its Application to Assess the Effect of End-Range Mobilization in Subjects with Adhesive Capsulitis." *Man Ther* 13 (2008): 307-316.
5. Pitsillides, Alexios and Dimitrios Stasinopoulos. "Cyriax Friction Massage Suggestions for Improvements." *Medicina* 55 (2019): 185.
6. Chaves, Paula, Daniela Simoes, Maria Paço and Francisco Pinho, et al. "Cyriax's Deep Friction Massage Application Parameters: Evidence from a Cross-Sectional Study with Physiotherapists." *Musculoskelet Sci Pract* 32 (2017): 92-97.
7. Breckenridge, John D and James H McAuley. "Shoulder Pain and Disability Index (SPADI)." *J Physiother* 57 (2011): 197-197.
8. Tveitå, Einar Kristian, Ole Marius Ekeberg, Niels Gunnar Juel and Erik Bautz-Holter. "Responsiveness of the Shoulder Pain and Disability Index in Patients with Adhesive Capsulitis." *BMC Musculoskelet Disord* 9 (2008): 1-8.
9. Martin, Carmel F. "Postoperative Pain Relief." Operative Elbow Surgery E-Book: Expert Consult: Online and Print (2011): 107.
10. Pitsillides, Alexios and Dimitrios Stasinopoulos. "The Beliefs and Attitudes of Cypriot Physical Therapists Regarding the Use of Deep Friction Massage." *Medicina* 55 (2019): 472.
11. Klimek, Ludger, Karl-Christian Bergmann, Tilo Biedermann and Jean Bousquet, et al. "Visual Analogue Scales (VAS): Measuring Instruments for the Documentation of Symptoms and Therapy Monitoring in Cases of Allergic Rhinitis in Everyday Health Care: Position Paper of the German Society of Allergology (AeDA) and the German Society of Allergy and Clinical Immunology (DGAKI), ENT Section, in Collaboration with the Working Group on Clinical Immunology, Allergology and Environmental Medicine of the German Society of Otorhinolaryngology, Head and Neck Surgery (DGHNOKHC)." *Allergo J Int* 26 (2017): 16-24.
12. Joseph, Michael F, Kathryn Taft, Maria Moskwa and Craig R. Denegar. "Deep Friction Massage to Treat Tendinopathy: A Systematic Review of a Classic Treatment in the Face of a New Paradigm of Understanding." *J Sport Rehabil* 21 (2012): 343-353.
13. Loew, Laurianne M, Lucie Brosseau, Peter Tugwell and George A. Wells, et al. "Deep Transverse Friction Massage for Treating Lateral Elbow or Lateral Knee Tendinitis." *Cochrane Database Syst Rev* 11 (2014).
14. Yang, Jing-lan, Mei-Hwa Jan, Chein-wei Chang and Jiu-jenq Lin. "Effectiveness of the End-Range Mobilization and Scapular Mobilization Approach in a Subgroup of Subjects with Frozen Shoulder Syndrome: A Randomized Control Trial." *Man Ther* 17 (2012): 47-52.
15. Park, Sam-Sik, Bo-Kyung Kim, Ok-Kon Moon and Wan-Suk Choi. "Effects of Joint Position on the Distraction Distance During Grade III Glenohumeral Joint Distraction in Healthy Individuals." *J Phys Ther Sci* 27 (2015): 3279-3281.
16. Venturin, Davide, Gabriele Giannotta, Leonardo Pellicciari and Alex Rossi, et al. "Reliability and Validity of the Shoulder Pain and Disability Index in a Sample of Patients with Frozen Shoulder." *BMC Musculoskelet Disord* 24 (2023): 212.
17. Agarwal, Surabhi, Shahid Raza, Jamal Ali Moiz and Shahnawaz Anwer, et al. "Effects of two different mobilization techniques on pain, range of motion and functional disability in patients with adhesive capsulitis: a comparative study." *J Phys Ther Sci* 28 (2016): 3342-3349.
18. Yu, Il-Young, In-Gui Jung, Min-Hyeok Kang and Dong-Kyu Lee, et al. "Immediate effects of an End-range Mobilization Technique on Shoulder Range of Motion and Skin Temperature in Individuals with Posterior Shoulder Tightness." *J Phys Ther Sci* 27 (2015): 1723-1725.
19. Liesdek, Cynthia, Daniëlle AWM van der Windt, Bart W. Koes and Lex M. Bouter. "Soft-Tissue Disorders of the Shoulder: A Study of Inter-Observer Agreement between General Practitioners and Physiotherapists and an Overview of Physiotherapeutic Treatment." *Phys* 83 (1997): 12-17.
20. Guler-Uysal, Fusun and Erkan Kozanoglu. "Comparison of the Early Response to Two Methods of Rehabilitation in Adhesive Capsulitis." *Swiss Med Wkly* 134 (2004): 353-358.
21. Vermeulen, Henricus M, Wim R. Obermann, Bart J. Burger and Gea J. Kok, et al. "End-Range Mobilization Techniques in Adhesive Capsulitis of the Shoulder Joint: A Multiple-Subject Case Report." *Phys Ther* 80 (2000): 1204-1213.

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