



ADDED EFFECT OF CYRIAX ON INFRASPINATUS AND TERES MINOR TENDON ON PAIN, EXTERNAL ROTATION RANGE AND FUNCTIONAL ABILITY IN PATIENTS WITH ADHESIVE CAPSULITIS.

Physiotherapy

Nidhi Sharma (BPTH) Mumbai.

Dr Pooja Gulunjkar (MPT) Ortho, Pune.

Dr Snehal Ghodey (MPT) Ortho, MAEER's Physiotherapy college.

ABSTRACT

Background and Objective: Adhesive capsulitis is one of the most common condition affecting shoulder causing pain, functional limitation and capsular pattern of restriction affecting external rotation range the most. Cyriax technique of soft tissue mobilization found to be effective in treating patients with such symptoms. Therefore, the purpose of the study is to find out the immediate effect of Cyriax on infraspinatus and teres minor tendon along with the conventional physiotherapy exercises on pain, external rotation range and functional ability in patients with P.A shoulder.

Method: Pre and pos test experimental study design with two groups: group A receiving conventional physiotherapy and group-B receiving Cyriax along with the conventional treatment. Total 26 subjects (13 were in conventional group and 13 in Cyriax with conventional therapy group) in adhesive capsulitis patients having pain and reduced range based on simple random sampling. Intensity of the pre and post treatment pain was measured using NRS and SPADI. Range of motion using universal goniometer. For three sessions a week.

RESULTS: By the result of paired t-test within the group for group-A for range of motion of external rotation and the result of Wilcoxon's signed rank test within the group for NPRS and SPADI was significant. the result of unpaired -t test between the group A and B for range of motion (external rotation) and the result of Mann Whitney-U test between groups for NPRS and SPADI was not significant.

CONCLUSION: It has been concluded that The Cyriax method of deep friction massage has an added beneficial effect over conventional therapy in the treatment of Adhesive capsulitis.

KEYWORDS

Cyriax, soft tissue mobilization, frozen shoulder, Adhesive capsulitis, SPADI scale, periarthritis shoulder.

INTRODUCTION:

Adhesive Capsulitis is an insidious painful condition with gradual restriction of all planes of movement in the shoulder¹. It is a condition of uncertain etiology characterized by global limitation of both active and passive shoulder range of motion where radiographic findings other than osteopenia are absent². This condition most frequently affects persons aged 40-60 years and generally occurs in women than in men and is somewhat more common in the nondominant arm³. Patients with frozen shoulder showed a particular pattern of restriction known as the capsular pattern of restriction. The common capsular pattern of limitation described has reduced motions with external rotation being most limited followed by abduction flexion and internal rotation⁷. The occurrence of adhesive capsulitis in unilateral shoulder increases the risk of contralateral shoulder involvement by 5% to 34%⁶.

Contractile tissues play an important role in frozen shoulder yet the most neglected part. Teres minor and Infraspinatus muscle play an important role in external rotation of shoulder. EMG studies conducted states that these muscles are the prime external rotators showing EMG activities of 77.4 ± 23.10 and 81.62 ± 13.02 respective⁴. Many protocol has been formulated for the treatment of frozen shoulder such as heat therapy, electrical modalities such as I.F.T, TENS, Codman's pendular exercises, active assisted ROM exercises with finger ladder, shoulder wheel, wand exercises capsular Stretching, mobilization such as Maitland, mulligan have proven to be of great benefit.

STM also called as tissue mobilization is another technique which is used nowadays in conjunct with other mobilization techniques in improving shoulder range. Cyriax also known as deep friction massage, is a specific type of connective tissue massage applied to the soft tissue structure such as tendon, muscle bellies musculotendinous junction, ligaments and joint capsules Transversely to provide therapeutic movement over a small area. Researchers have demonstrated that this technique effectively improve mechanical muscle properties in individual with chronic shoulder pain⁵. As patients shows a capsular pattern of restriction in which external rotation is more restricted, which makes these patients are more functionally dependent thus it has been a great need to improve external rotation range to gain independence.

METHOD:

Almost 48 Periarthritis shoulder patients were assessed for the study, of which some patients did not meet the inclusion criteria. Few could not complete the follow up session, few patients found it difficult to

attain the shoulder position required for cyriax. Hence total 28 diagnosed Adhesive Capsulitis patients were taken for the study and analyzed. Written informed consent was taken from patient in their preferred language. General shoulder examination including demographic data and other details, were taken as per the Evaluation sheet annexure 1. ROM, pain evaluation (NRS), SPADI score was assessed. Tests were done to rule out other condition associated. Investigations if carried with the patients. Subjects were asked to pick up a chit amongst the chits having names of two different groups i.e. control and experimental group This randomization was done using replaceable chit method. Patients got divided into two groups of which 13 were allotted in experimental group receiving cyriax physiotherapy and 15 in the control group. The control group received conventional treatment with hot packs, shoulder active exercises, isometrics. capsular stretching for 1 week. The experimental group received cyriax massage for infraspinatus tendon along with conventional therapy 3 times a week for 1 week, cyriax massage was given thrice a week for a week. The ROM, pain evaluation (NRS), SPADI Questionnaire scoring was reassessed by the end of a week time.

PROCEDURE:

CONTROL GROUP:

The control group received conventional therapy as follow:

Hot pack to the affected shoulder for 10 minutes I.F.T 4P for 15 minutes over the affected side. Shoulder active exercises including Codman's pendular exercises, finger ladder exercises for shoulder flexion and abduction, Wand exercises which include active shoulder flexion, abduction, extension, internal rotation, and external rotation. Shoulder isometrics which include static contractions for shoulder flexors, extensors, abductors, medial rotators and lateral rotators by pushing against the wall. capsular stretching exercises which included stretching anterior, posterior, and inferior joint capsule, Maitland mobilization anterior inferior caudal glides were given to the patient.

EXPERIMENTAL GROUP:

The experimental group received cyriax deep friction massage for infraspinatus tendon along with conventional physiotherapy. Cyriax massage was given for thrice a week for a week for a duration of 10-15 minutes.

Cyriax massage for infraspinatus tendon

The patient lies in the sphinx position (prone on elbows) refer figure 3. 90° of elbow flexion, with the shoulder in slight lateral rotation and adduction, just below the most lateral aspect of spine of the scapula, the

infraspinatus tendon is easy to feel on its course towards the head of the humerus. Cyriax friction massage is then applied using thumb and fingers for counter pressure refer figure 1 and 2.

Technique:

The therapist 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 is performed. Now draw it to and fro across the tendon. refer figure 1 and 2. At the extreme of the adduction movement, feel the tip of his thumb engage against the posterior edge of acromion. The frictioning thumb stays flexed, and in contact. Range of external rotation would be measured daily and reported after a week of treatment along with SPADI score of the patient.

Patient Position And Therapist Position Of The Experimental Group:-



Figure 1: Cyriax friction massage (CFM)



Figure 2: CFM with pillow under neck.



Figure 3: Patient position (SPHINX).

OUTCOME MEASURES

The intensity of pain was measured by using Numeric rating scale (NRS). The range of external rotation ROM with universal goniometer before and after the intervention session. functional disability of the patients were measured using shoulder pain and disability index (SPADI).

STATISTICAL METHODS

Descriptive statistical analysis has been carried out and presented as mean SD. Significance was assessed at 5 % level of significance with p value 0.05 less than this is considered as statistically significant difference. Paired 't' test as a parametric and Wilcoxon signed rank test as a non-parametric test have been used to analysis the variables pre intervention to post-intervention. Independent or unpaired 't' test as a parametric and Mann Whitney U test as a non-parametric test have been used to compare the means of variables between groups. The Statistical software GraphPad version- was used for the analysis of the data

RESULT:

Table-1 suggests that the p value of baseline parameters for ROM (external rot), pain and SPADI disability score between the two groups was found to be non-significant (>0.005) suggesting that the baseline values for the outcome measures was matched. Table 2 suggests that pre and post values for pain, ROM & SPADI was significant <0.0005 within the experimental (cyriax) group. Within the group analysis of pain, ROM, SPADI in conventional group Group-B showed significant

difference. Table-4 suggest that the p value for demographic data of age and duration of symptoms between the two groups was found to be significant and non-significant (>0.05) respectively. Table 5 suggest that the p value within the two groups was found to be significant (<0.05) respectively. Chart 1 and 2 gives information regarding the gender distribution seen within the two groups. Table-6 suggest that the p value between the two groups was found to be non-significant (>0.05) respectively.

Table-1 Baseline parameters:

OUTCOME MEASURES	CYRIAX GROUP (mean+/-SD)	CONVENTIONAL GROUP (mean+/-SD)	p Value
ROM (External rotation)	39.69+/-18.038	34.666+/-10.244	0.3648
PAIN O/A	4.30+/-0.854	4.333+/-0.6172	0.2365
O/R	2.53+/-0.967	3.0+/-1.069	0.2397
SPADI	35.38+/-0.035	34.61+/-0.044	0.8839

** Statistically Significant difference $p < 0.05$.

Table-2 Within group analysis of range of motion, pain, and SPADI score of experimental group-B

OUTCOME MEASURES	PRE RX (mean+/-SD)	POST RX (mean+/-SD)	p Value
ROM (external rotation)	29.076+/-16.91	39.692+/-18.03	$<0.0001^*$
Pain: - O/A	6.0+/-0.912	4.307+/-0.854	0.0002
O/R	4.076+/-1.037	2.538+/-0.076	0.0005
SPADI	67.6+/-0.041	59.8+/-0.035	0.0002

** Statistically Significant difference $p < 0.05$. Paired t-test; Wilcoxon's signed rank test.

Table-3 Within the group analysis of pain, ROM, SPADI in conventional group Group-A.

Outcome measure	PRE RX (Mean +/-SD)	POST RX (Mean +/-SD)	P Value	Significance
Pain	5.53+/-0.639	4.33+/-0.61	0.0001	SIGNIFICANT
ROM (EXT ROTATION)	27.73+/-9.96	34.66+/-10.24	0.000024	SIGNIFICANT
SPADI	49+/-0.05	42+/-0.07	0.00074	SIGNIFICANT

** Statistically Significant difference $p < 0.05$. Paired t-test ; Wilcoxon's signed rank test.

Table-4 Demographic Data

Sr no.	Demographic Data	Cyriax group (n=13) mean +/-SD	Conventional group (n=15) mean+/-SD	p value
1)	Age	57 +/-6.62	51+/-8.50	0.03
2)	Duration of Symptoms	1.9+/-0.54	1.8+/-0.64	0.65

Gender Distribution: (charts 1 and 2) respectively.

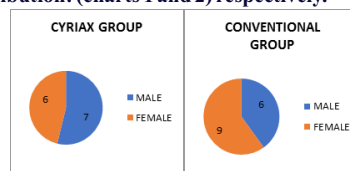


Chart-1

Chart-2

Table-5 Within the group analysis of pain, ROM, SPADI in conventional group Group-A

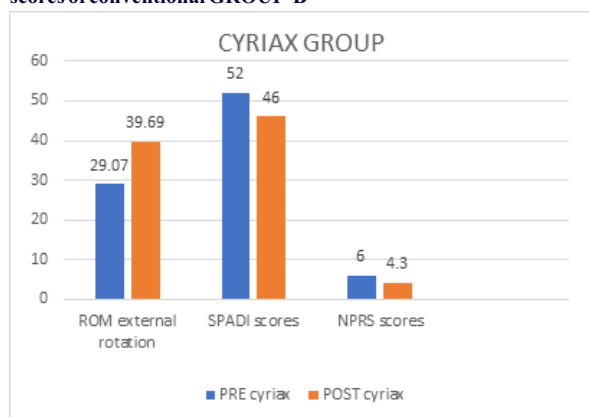
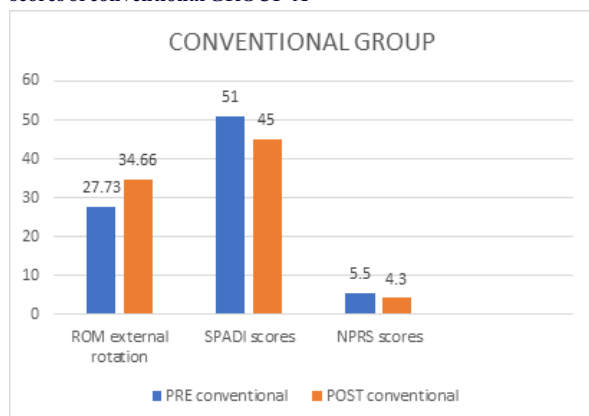
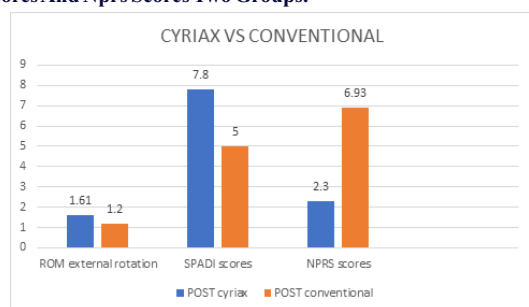
Outcome measure	PRE RX (Mean +/- S.D)	POST RX (Mean +/-S. D)	P VALUE	Significance
Pain	5.53+/-0.639	4.33 +/-0.61	0.0001	SIGNIFICANT
ROM (external rotation)	27.73+/-9.96	34.66+/-10.24	0.00002	SIGNIFICANT
SPADI	49+/-0.05	42+/-0.07	0.00074	SIGNIFICANT

** Statistically Significant difference $p < 0.05$. Paired t-test; Wilcoxon's signed rank test.

Table-6 Between two groups A and B analysis of pain ROM and SPADI. (Group-A & B)

Outcome measures	Group A (mean +/-SD)	Group B (mean +/- SD)	P-value	Significance
Pain	5.0 +/-4.33	4.30 +/- 0.85	0.239	NOT SIGNIFICANT
ROM	34.66 +/-10.24	29.0 +/-16.91	0.364	NOT SIGNIFICANT
SPADI	7.00+/-0.03	5.00+/-0.02	0.130	NOT SIGNIFICANT

** Statistically Significant difference $p < 0.05$. Unpaired t-test; Mann Whitney-U test.

GRAPH-2 PRE and POST values of ROM, SPADI and NPRS scores of conventional GROUP-B**GRAPH-2 PRE and POST values of ROM, SPADI and NPRS scores of conventional GROUP-A****Graph: -3 Post Treatment Difference In External Rotation, Spadi Scores And Nprs Scores Two Groups.**

DISCUSSION:-

The experiment showed that there was overall improvement in both control and experimental groups. There was statistical significance for NPRS, External rotation ROM and SPADI scores ($P < 0.05$).

To support my theory, A study of Arora et al (2011) also states that the the DTF could relieve pain and help and help in effective connective tissue repair by stimulating the phagocytes and also relieves adhesions formation and break unwanted adhesions. The study of Kanse and

Shanmugun in 2012 also supports that the MFR and DTF along with conventional therapy showed significant reduction in pain and improvement in ROM due to neurophysiological effects. This improvement in the ROM and pain reduction is due to effects of cyriax massage (Traumatic hyperemia, tissue perfusion, stimulation of mechanoreceptors). Stimulation of mechanoreceptors in cyriax friction massage, temporary analgesia is produced by a quantity of afferent impulses. This also helps the patient to perform movement exercise. The Improvements in pain scores and ROM observed DTF group could be due to post massage analgesic effect, modulation of non-nociceptive impulses at spinal cord level (Gate control theory) and inhibition of mechanoreceptors by movements being rhythmic over the affected area, by just closing the gate for afferents. Friction also leads to increase destruction of pain provoking metabolites (Levi's substances) whose presence in high concentration provokes ischemia and pain. Another reason for pain relief after prolonged deep friction to a localized area could be local anesthetic effects and lasting peripheral nerve effects. The ROM improvement could be due to reduction in pain¹². The positive effect in our study could be because of the nature of MFR technique, which is primarily to maximize the blood flow to the structures. The study of Choie and Jung in 2015 states that Thoraco Lumbar Fascia release was effective in reducing shoulder pain and the degree of shoulder pain as indicated by SPADI measured after the intervention significantly showed the difference from that before the intervention. Mechanical and neural responses are triggered by friction massage, thereby enabling a hearing physiological adaptation of the fascia through the interface system¹³. The massage consists of gentle passive movements which move the structure but do not detach the healing fibrils from proper formation. The transverse movement is an imitation of the structure's normal mobility by broadening but not stretching or tearing the healing fibers. The movement encourages realignment and lengthening of these fibers^{3,4}. The manual rolling of the tendon sheath to and fro against the tendon in cyriax serves to smooth the gliding surfaces off again. While the causative overuse was longitudinal friction in tendons e.g. external rotator (infraspinatus), the curative is transverse the main effects of cyriax deep friction massage are summarized as follows: Traumatic hyperaemia, helps to evacuate pain triggering metabolites. Movement of the affected structure, prevents or destroys adhesions and helps optimize the quality of the scar tissue⁵. The Cyriax method requires fewer hospital visits, enabling the patients to proceed in their daily and professional activities. No special equipment is needed for the method but only an experienced health professional. The manipulation used during the Cyriax approach is mild and does not require anesthesia. It provides a healthcare advantage during the active treatment period and this is of major importance for both the patient and the overloaded physical therapist⁴.

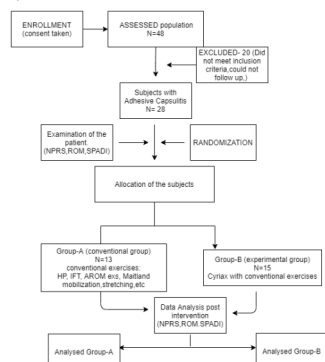
CONCLUSION AND CLINICAL SIGNIFICANCE:

The Cyriax method of deep friction massage has an added effect over conventional therapy causing significant improvement in the external rotation range significant reduction in pain and an improvement in functional abilities of the subjects in the treatment of Adhesive Capsulitis. The method is non-invasive and effective thus cyriax deep friction massage can be included in the standardised treatment program for Adhesive capsulitis.

LIMITATIONS:

The limitation of the study is that there is no long term follow up data for our treatment group. Also randomised controlled studies of large population are needed to define a standard treatment and longer protocols is needed to get accuracy.

FLOWCHART:



CONSORT (Consolidated Standards for Reporting of Trials) Flowchart

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