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THERAPEUTIC EFFICACY OF CODMANS VERSUS MAITLAND REGIME FOR THE TREATMENT OF FROZEN SHOULDER SYNDROME

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Abstract:-

Frozen shoulder syndrome is a commonly encountered clinical complaint. It is encountered by clinicians (General Practitioners (GP's), Rheumatologists, Orthopedic surgeons) and physical therapists (Physiotherapy, Osteopathy, Chiropractic).Shoulder joint is one of the most rewarding and functional joints involved in daily routines including performances, occupational and recreational activities.

***Aim** to Compare the Therapeutic efficacy of codmans and Maitland regime for the treatment of frozen shoulder syndrome*

***Methods** Each group consists of fifteen patients and they were equally divided into two groups such as Group A and B. The group include both male and female with the age group of 30-55 years. One group of patients treated with conventional Shoulder exercise regime and other group treated with Maitland manipulation.*

***Study Design** Comparative study with pretest and post –test design*

***Results** Group A patients which shows significantly 1.46(P□0.05) pain reduction. Group B patients which shows significantly 1.40(P□0.05).Finally both the groups shows the pain reduction*

***Clinical Implications** The notion of the current study which provides evidence that Conventional Shoulder exercises and Maitland mobilization were equally effective for the management of pain in frozen shoulder.*

Both manual mobilization therapy along with general exercises and exercises alone brought improvements in outcome measure scales for pain, glenohumeral ranges and shoulder pain.

Key words:*Frozen shoulder syndrome, Codman shoulder exercise, Visual analog scale*

INTRODUCTION

Frozen shoulder syndrome is a commonly encountered clinical complaint. It is encountered by clinicians (General Practitioners -GP's, Rheumatologists, and Orthopedic surgeons) and Movement and pain expert (Physiotherapy, Osteopathy, Chiropractic). 'Frozen shoulder' is not straightforward. It has been used incorrectly as a general diagnosis for shoulder pain and stiffness. In 1896 duplay[2] was termed the clinical entity of frozen shoulder periarthritis scapulohumeral, theorizing the pathological condition was in the periarticular structures (Robert et.al 2004). The disorder known as a condition difficult to define, difficult to treat difficult to explain from the point of view of pathology (Codman et.al 1934). In described four stages frozen shoulder through the assistance of the Arthroscopy. Stage-I : Pre adhesive Stage , Found in patients with little to no restriction of Gleno-Humaral Motion, Stage-II : Acute Adhesive Synovitis with proliferative synovitis and early adhesive, Stage-III : Maturation Stage in Which less Synovitis is demonstrated with Axillary fold, Stage-IV : Chronic stage (Nevasier et.al 1962). Presently with fully matured adhesions with notable restriction of range of motion. Shoulder joint is one of the most rewarding and functional joints involved in daily routines including performances, occupational and recreational activities (Robert et.al 2004). Operation of this joint facilitates stability and mobility which often mutually co-exist between the upper and lower limb movements during skilled and powerful activities of the hands.

Incidence/ Epidemiology:

The exact prevalence and incidence of frozen shoulder are not known, but cumulative risk of at least one episode of frozen shoulder has been estimated to be a minimum of two percentage (Rizk et al 1982).Frozen shoulder affects females slightly more than males typically between forty and sixty years of age. The non-dominant arm is more likely to be involved, although about 6-50% of people are affected bilaterally. (Frances Cuomo 1999 Binder et.al 1984 and Balgen et.al 1978).Frozen shoulder syndrome is common affecting 2-5 percentage of the general population, whilst in diabetics the incidence is between 10-20 percentages. When a history of bilateral involvement identified the possibility of a constitutional predisposition should be explored Thomas et.al 2003 and Parker et.al 2014).The same shoulder rarely involved with adhesive capsulitis (Lundberg et.al 2005 and Basland et.al 2010).Other factors such as depression, immunologic factors, posture and occupation have been implicated in the etiology.

Materials and Methodology

- Six Face Physiotherapy Clinic, Green Park New Delhi.
- Physiotherapy Department, JPN Apex Trauma Centre, AIIMS

Method of collection of data

Sample design:

The samples were selected by using simple random sampling technique. Patients who are diagnosed to have frozen shoulder randomly assigned to one of two groups. Each group consists of fifteen patients and equally divided into two groups such as Group A and B. The group include both male and female with the age group of 30-55 years. One group of patients treated with conventional Shoulder exercise regime and other group treated with Maitland manipulation.

Study Design:

Comparative study with pretest and post –test design.

Selection Criteria:

a. Inclusion criteria

1. Patients with 1st and 2nd stages of frozen shoulder.
2. Aged between 40 -55 years.
3. Both male and female are included.
4. Symptoms present for at least three months.
5. Marked loss of active and passive shoulder motion
6. (Greater than a 50 percent loss of external rotation) especially with the shoulder abducted 90^0 ,
7. Unilateral involvement.

b. Exclusion criteria

1. Cervical Radiculopathy
2. Severe osteoporosis
3. Fractures around shoulder
4. Neurological disorders
5. Joint effusion from trauma(or)Disease
6. Supraspinatus tendonitis
7. OA/RA of Shoulder
8. Local corticosteroid injection to the affected shoulder within the last 3 months or current corticosteroid therapy.
9. Patients with Neuromuscular diseases.
10. Diabetes patients.
11. Prior shoulder surgery.
12. History of substantial shoulder trauma.
13. Any Oncological, Metabolic, Infectious, Neuromuscular causes of shoulder pain.
14. Muscle/tendon tears.

Group Allocation:-

Total of thirty patients with frozen shoulder, fulfilling the inclusion criteria were selected .The subjects were randomly divided into two groups of fifteen each by random sample method.

Group A – Fifteen under gone Codman Shoulder exercise regime

Group B – Fifteen under gone Maitland manipulation

Outcome measures taken for study

Duration of Study -Ten days duration for each subject

Measurement Tools Visual Analog Scale

Materials Used for Study

1. Pulley and rope
2. Towel
3. Stick
4. Shoulder Wheel
5. Wall ladder

Procedure

Group A- codman shoulder exercise

Sample method : Random Sample Method

Technique:

Codman shoulder Exercise passive and active exercises, Towel Exercise, Wall ladder Exercise, Shoulder Wheel (Marine's Wheel) Exercise, Self-Mobilization & Stretching, Free exercises, strengthening exercise.

Duration : Ten days

Session : Once in a day

Pre-test and posttest results which taken by using Visual Analog Scale.

Position of the Patient

The patient can be performed the following exercises standing and sitting, but are mostly and appropriate performed in supine position.

Method

It is important to perform these exercises apply gently, but it needs to be stressed out that at each session the arm level should be pushed slightly past upto the point of pain.

Codman's Exercise

Start with the simple stretching, such as Codman's pendulum exercises to gently loose and relax the shoulder. The patient bends at the waist, balances with the good arm and allows the stiff side to swing with gravity near circular motion with the hand turned inward and out ward. Forward elevation may be assisted by a pulley the arm up over head it will accomplish this motion, which is best performed seated with the back of the patient to the pulley

Free and Stretching exercises:

Forward elevation of the shoulder is performed with the extremity in the plane of the scapula as it is grasped either at the wrist or behind the elbow and push upward gradually. This is bestperformed supine to keep compensatory factors, Such as trunk tilt to a minimum. External rotation is aided with a can while than patient lying supine and holding the arm at the side, and external rotation is performed by pulling the arm up behind the back with assistance of the opposite arm or a towel. Using the opposite extremity the affected limb is stretched to its limit and slightly past it held in place for a count of five to ten seconds and followed by the resting position. Periods of rest in between each session are necessary to relive muscle tension and pain. And also external rotation performed supine with the elbow close to the body. A stick is held in the hand with the elbow flexed to ninety degrees and is used to rotate the affected extremity away from the body. Internal rotation is performed by pulling the wrist of the affected extremity in to extension first behind the back than bringing the hands up between the shoulder blades. It may also be assisted with the towel (Toweling Exercise) or by grasping a door handle behind the back and performing a deep knee bend. Gross body adduction performed as the affected extremity is pulled across the chest towards the contra lateral side. This maneuver assists in stretching the posterior portion of the capsule, which is of utmost important in obtaining internal rotation.

Procedure

Group B- Maitland Manipulation technique.

Sample method : Random Sample Method

Technique

Grade I (Small amplitude rhythmic oscillating movement at the beginning of range of movement manage pain and spasm)

Grade II (Large amplitude rhythmic oscillating movement within midrange of movement

Manage pain and spasm).Total duration of study considered for ten days. Before staring the investigator explained about the treatment procedure. Prior permission and consent approval which was obtained through IRB. The investigator recorded baseline, 5^{th} day followed and end of the session measured on 10^{th} day. Pretest and post test results measurement have taken by using Visual Analog Scale.

Maitland manipulation:

The postero-anterior movements are one of the most valuable movements in the treatment of extremely painful shoulders. It is not a technique that is hindered by local tenderness as a longitudinal movement. Grade I movement are better produced by direct thumb pressure against the head of the humerus than by using the upper arm as a lever. Because of the difference in accuracy of control with each method.

Patient position:

The patient lies with elbow flexed and his forearm resting against a pillow(s) on his trunk, and a pillow or blanket should be placed under his elbow. This is support his forearm so that medial rotation, adduction and extension are avoided. The position must be adjusted until it is symptom free position.

Physiotherapist position:

The therapist's kneels laterally and superiorly to the patients shoulder and positions his two thumbs back to back, with their tips in contact with posterior surface of the head of humerus adjacent to the acromion process and pointing towards the ceiling. The fingers of the left hand are spread over the clavicular area and those of his right hand spread over deltoid.

Technique:

It is of prime importance that the oscillatory movements should be produced by the physiotherapists arm. If the movement is produced by the thumb flexors the movements become uncomfortable for the patient and physiotherapist loses all feel of movements. When Grades I and II movements are used it is imperative that there should be no pressure against the head of humerus. At the beginning of the movements and that, with each oscillation the head of the humerus is returned to its relaxed position. As the pressure will be very light the point of the thumb should be used. When the pain is minimal and both accessory and physiological movements are used to mobilize the joint it may be more suitable to use the patients are as a lever.

Patient position: Supine with pain free position of the arm.

Physiotherapist position:

Therapist stands by the patient's right forearm facing his head. He holds his forearm against his right side and supports under the posterior surface of the head of the humerus then places his hands together, the posterior surface of his right hand is placed in the palmar surface on the left hand so that the index fingers overlap and the later borders of the index fingers contact the back of the head of the humerus. His thumbs hold around the humerus to form an encompassing grasp. He may need to crouch if he chose to position his upper arm in coronal plane. It is most commonly positioned in a small degree of abduction.

Technique:

The slack of scapular movements is taken up by lifting the head of humerus so that any further oscillatory movement will be associated with the postero-anterior gleno- humeral movement. Great care should be taken to ensure the technique is completely painless performed slowly and smoothly, and used only for a very short time (Thirty seconds).The patient should experience lessening of pain after two treatments, enabling the physiotherapist to increase the amplitude of his technique, and before long to carry the amplitude into a small degree of discomfort. These two techniques are well accepted and practiced by physiotherapist all over the world, this present study which is done to compare the effect of conventional exercises and Maitland manipulation technique in reducing pain and increase range of motion of patients.

Results

Table: Pre and Post Paired't' test of Group – A Conventional Shoulder Exercises

MEAN	Pre test	Post test	Pre test	Post test
	Day 1	Day 5	Day 1	Day 10
	75.46	35.867	75.46	1.46
't' value	16.38		25.38	
'P' value and level of significance	P□0.05 and significant		P□0.05 and significant	

The statistical analysis of VAS obtained at the end of ten days period for Group a showing the comparison of pain value. This results which are Presented 1st day75.46, 5th day 35.86 and 10th day 1.46. Consequently the level of the pain intensity which is observed after the intervention strategy the pain level reduced.

Fig 1: Shows visual analogue scale for pain in Group A- Codman Shoulder Exercises

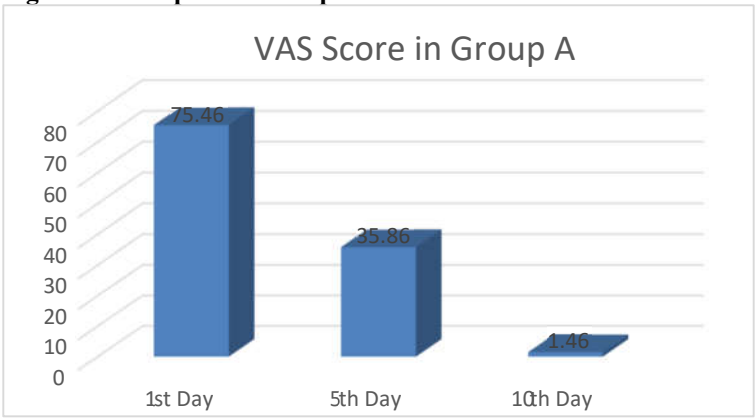
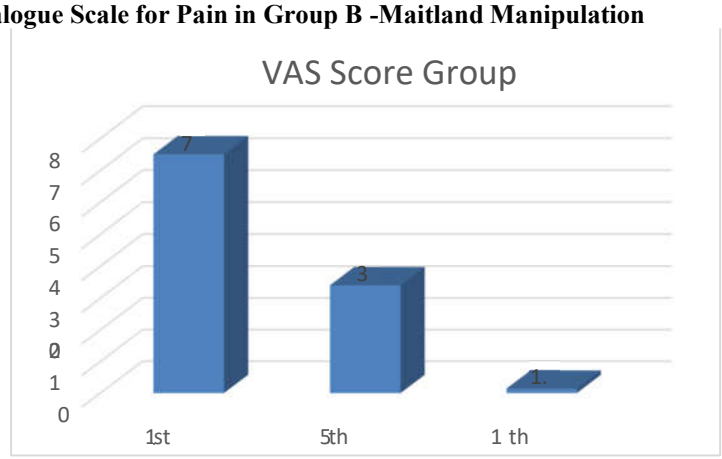


Table 1: Pre and Post Paired‘t’ test Group B Maitland Manipulation

Mean	Pre test	Post test	Pre test	Post test
	Day 1	Day 5	Day 1	Day 10
	75	34.4	75	1.4
‘t’ value	14.31		22.25	
‘P’ value and level of significance	P□0.05 and significant		P□0.05 and significant	

The statistical analysis of VAS score obtained at 1st day 75,5th day 34.4 at the end of ten days 1.4.The results which shows that from baseline to 10th day statistically reduced .Consequently the level of the pain intensity which is observed after the intervention strategy the pain level reduced.

Fig 2: Shows Visual Analogue Scale for Pain in Group B -Maitland Manipulation



Paired‘t’ Test

Group a – Codman Shoulder Exercises

Day 1 to Day 5

For 14 degrees of freedom at 5%level of significance the table‘t’ value is 1.761. This is lesser than the calculated‘t’ value of 16.38 and hence the alternate hypothesis is accepted.

Day 1 to Day 10

For 14 degrees of freedom at 5% level of significance, the table‘t’ value is 1.761.This is lesser than the calculated ‘t’ value 25.383 and hence the alternate hypothesis is accepted.

Group B – Maitland Manipulation

Pretest Value Day 1 to Day 5

For 14 degrees of freedom at 5% level of significance, the table‘t’ value is 1.761. This is lesser than the calculated‘t’ value 14.304 and hence the alternate hypothesis is accepted.

Post Test Value Day 1 to Day 10

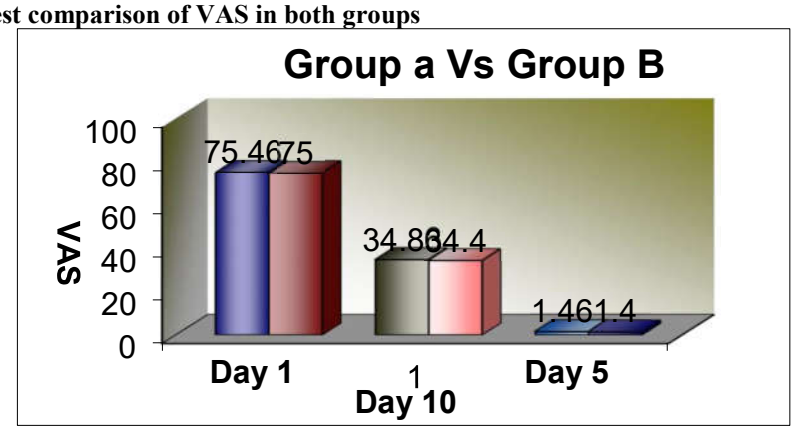
For 14 degrees of freedom at 5% level of significance, the table‘t’ value is 1.761. This is lesser than the calculated‘t’ value 22.25 and hence the alternate hypothesis is accepted.

Unpaired‘t’ Test

Table – Pre and Post group A Vs Group B

	Day 1		Day 5		Day 10	
Mean	Pre-test Group A	Pre test Group B	Post-test Group A	Post-test Group B	Post-test Group A	Post-test Group B
	75.46	75	35.867	34.4	1.467	1.4
‘t’ value	0.0994		0.4901		0.0944	
‘p’ value and level of significance	P□0.05 and not significant		P□0.05 and not significant		P□0.05 and not significant	

Fig3: Pre and post-test comparison of VAS in both groups



Unpaired ‘T’ Test

Pre Test Values Day 1

When the pretest value of the group A and Group B is analyzed by the independent‘t’ test, the value is 0.0994. The table value at 5% level of significance for 28 degree of freedom is 1.701, which is greater than the calculated value. It is proved that there is no significant difference between the two groups.

Post Test Value Day 5

When the posttest value of the group A and Group B is analyzed by the independent‘t’ test, the calculated‘t’ value is 0.4901. The table value at 5% level of significance for 28 degree of freedom is 1.071, so the null hypothesis is accepted.

Post Test Value during day 10

When the post-test value of the experimental group A and Group B were analyzed by the independent‘t’ test, the calculated ‘t’ value is 0.0944, for 28 degrees of freedom at 5% level of significance the table ‘t’ value is 1.701.

Discussion

Frozen shoulder is the distinct clinical entity and lot of confusions that exists regarding the understanding of problem. Clearly in the clinical settings the condition of frozen shoulder can be painful and debilitating to many patients. By understanding a typical presentation of primary frozen shoulder and the literature supporting various treatment approaches, one can apply this knowledge to make treatment decisions based on evidence. The evidence at present supports varied treatment approaches, which are largely dependent on the stage of presentation for treatment and the failure of previous treatments. More clinical trials, With a clarified working definition for inclusion and exclusion criteria will assists in promoting evidence based practice and treatment for Frozen shoulder. This study is randomized trial to compare the effect between conventional exercises and Maitland mobilization technique for reducing pain in frozen shoulder. The statistical analysis of the mean average of pain revealed no significant deference between Group– A who were included in Conventional shoulder Exercise, When compared with Group-B Maitland Mobilization. The percentage of recovery has not shown much difference in reducing pain in both groups. Thus there was no significant difference between both the groups. In this study both conventional exercises and Maitland Manipulation showed significant reduction in pain in Frozen shoulder. The Group-A which underwent Conventional Shoulder Exercises showed statistically significant reduction in pain on day five and day ten ($p<0.05$). These results are consistent with the studies carried out (Andrew ET al.2002). The Group- B, which received Maitland Manipulation, also showed reduction in pain which is statistically Significant ($p<0.05$). These findings are similar to studies with (Shaffer et.al1992) and Maitland. The Comparison of pain reduction between the groups shows Group –B slightly better than the group-A, which is not statistically significant ($p>0.05$). The reason for this could be these technique effects are same in pain management. In these both techniques encourage the accessory movements and improve shoulder Range of motion. However there is no literature available to support these results. The above results shows that both conventional and Maitland are equally effective in reducing pain in Frozen shoulder. Though the results showed that there was no significant difference between conventional and Maitland mobilization techniques. The paired‘t’ test calculated that there was significant decrease in

pain in both Conventional exercise and Maitland mobilization techniques (Henricus et.al.2000).The investigator who concluded that the manipulation and exercise reduces pain for the management of frozen shoulder. Thus the study concluded that both Conventional exercises and Mainland mobilization techniques are equally effective for reducing pain for treating in frozen shoulder.

Conclusion

This is a randomized trail study, which was conducted to study the effect of Conventional Shoulder Exercises and Maitland Manipulation for reducing pain in Frozen Shoulder. The intensity of the pain was measured using VAS in thirty subjects taken from typical clinical population. They are randomly divided into two groups of each fifteen subjects and named as Conventional Shoulder Exercise Group (Group A) and Maitland Mobilization Group (Group B). Group A was treated with Conventional Shoulder Exercises such as Codman's, Self-stretching, Pulley exercise and Toweling exercises etc. and Group B was treated with Grade- I and Grade –II oscillations of Maitland Manipulation for a period of ten days. The values of outcome measures were recorded before the beginning of the treatment regime Day 1 and at day 5 and at the end of day 10. The results were analyzed statistically using's' test. The result showed that there was no significant difference between both the Group A and Group B. Thus as conclusion the current study provides ten days treatment regime which support evidence of the treatment of frozen shoulder. Through this specific treatment strategy being a investigator the efficacy of both treatment protocols which is equally effective. Considering the different exercise protocols like codman Shoulder exercises and Maitland mobilization were equally effective for the management of pain in frozen shoulder conditions. Both manual mobilization therapy along with general exercises brought improvements in clinical outcome measuring the intensity and level of pain.

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