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EFFECT OF MCKENZIE METHOD OF MECHANICAL DIAGNOSIS AND THERAPY (MDT) ON PAIN, RANGE OF MOTION AND SHOULDER FUNCTIONS IN INDIVIDUAL WITH STAGE 2 ADHESIVE CAPSULITIS – AN EXPERIEMENTAL STUDY

Physiotherapy

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ABSTRACT

INTRODUCTION Adhesive capsulitis is painful and debilitating condition leading to stiffness and disability in shoulder joint. McKenzie method of mechanical diagnosis and therapy (MDT) is comprehensive, evidence-based system of assessment, diagnosis, treatment and prevention strategies. There is paucity of literature about effect of MDT on shoulder. Hence purpose of study is to assess effectiveness of MDT on pain, range of motion (ROM) and shoulder functions in individuals with stage II adhesive capsulitis.

MATERIAL AND METHOD Subjects aged 35-60 years, clinically diagnosed with stage 2 adhesive capsulitis, symptoms for 3 months, restricted active ROM of shoulder <120 degrees were included and divided into 2 groups-Group A(n=8) (conventional therapy-hot pack, capsular stretching, active assisted shoulder ROM) and group B (n=8) (McKenzie therapy- repeated flexion, extension, extension with hand behind back then over pressure). On first after day, Numerical pain rating scale and Penn shoulder score was taken and active shoulder range of motion of shoulder were measured by universal goniometer. After 5 consecutive day's protocol, all outcome measures taken, statistical analysis was done using Wilcoxon and Mann Whitney U test.

RESULT MDT was significantly more effective for shoulder flexion (p=0.01) and extension (p=0.01) ROM than conventional therapy.

CONCLUSION McKenzie therapy is effective in improving shoulder ROM in individuals with stage 2 adhesive capsulitis.

KEYWORDS

McKenzie Method of Mechanical Diagnosis and Therapy, Adhesive capsulitis, Conventional physiotherapy.

INTRODUCTION

Adhesive capsulitis is one of the commonest musculoskeletal disorder that has a disabling capacity and is characterized by pain and restriction of range of motion in shoulder joint. Typically occurs in the fifth and sixth decades of life, thus affecting individuals of working age. Adhesive capsulitis is an extremely painful and debilitating condition leading to stiffness and disability. The disability resulting from this condition has considerable economic impact on affected individuals and society.[1]It can be either primary (idiopathic) or secondary. Secondary adhesive capsulitis is defined as that associated with trauma; rotator cuff disease and impingement; cardiovascular disease; hemiparesis; or diabetes.[1]

There are 3 overlapping phases of adhesive capsulitis. Freezing phase lasts up to 3 months with progressive and increasing pain on movement. Pain tends to be constant and diagnosis in the early stages before movement is lost can be difficult. Frozen phase lasts 3 months to 12 months. There is gradual reduction of pain but stiffness persists with considerable restriction in range of motion (ROM). Pain pattern changes from constant to end range pain of reduced intensity. Thawing phase lasts 12 months to 42 months. There is improvement in ROM with resolution of stiffness. End range pain may persist until full resolution.[1]

McKenzie method of mechanical diagnosis and therapy (MDT) is a comprehensive, evidence-based system of assessment, diagnosis, treatment and prevention strategies aimed at subjects education and independence.[2] The system utilized a mechanical evaluation that involves single and repeated active, passive and or resisted movements that are performed at the end range while evaluating symptomatic and mechanical responses.[3]

NEED OF THE STUDY

McKenzie Method of Mechanical Diagnosis and Therapy (MDT) is a well-known and commonly applied technique in management of spinal disorders. There is paucity of literature that assesses the effectiveness of MDT in stage II adhesive capsulitis. Hence aim of present study is to evaluate the effectiveness of McKenzie method of MDT in individuals with stage II adhesive capsulitis on pain, range of motion and shoulder function.

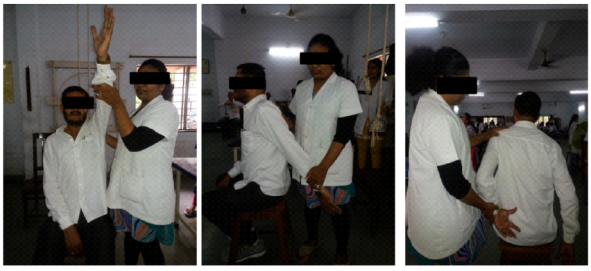
METHODOLOGY

An experimental study was conducted at outpatient physiotherapy department of general hospital. Age 35-60 year both male and female, clinically diagnosed with stage 2 adhesive capsulitis, subjects having a painful stiff shoulder for at least 3 months and more, limited shoulder ROM beyond 120 degree or less, referred by orthopaedic surgeon for physiotherapy were included for the study. Subjects with history of surgery in the affected shoulder since last 6 months, inflammatory diseases like rheumatoid arthritis and polyarthritis, painful stiff shoulder after a severe trauma e.g., rotator cuff rupture, fracture, dislocation, ligament injury, uncontrolled diabetes, corticosteroids injections in preceding 3 months, subjects with neurological condition, patients with cardiac conditions, infections and coagulation disorders were excluded. 16 participants were included by screening the inclusion and exclusion criteria.

Numerical pain rating scale (NPRS) for pain, shoulder ROM with universal goniometer and penn shoulder score were taken on day 1 and day 5 of exercise. The penn shoulder score is a 100 point scale with 3 subscales including pain (at rest, normal and strenuous activities), level of satisfaction and shoulder functions. Maximum score indicates high function, low pain, and high satisfaction with the shoulder function. The lower the score, the lesser will be the function, more the pain and reduced satisfaction. Reliability of this scale is 0.94 (95% CI, 0.89-0.97).[4]

Patients willing to participate in 5 days exercise protocol were conveniently divided into 2 groups: group A and group B. Group A received conventional therapy for 5 consecutive day that included hot pack over the shoulder for 10 minutes in supine position. Capsular stretching of shoulder joint capsule in supine position, 3 repetition of each capsular stretching was given. Pendulum exercise, finger ladder, shoulder pulley, shoulder wheel and wand exercises were given with 10 repetitions a day.[5]

Group B received McKenzie method of MDT and conventional therapy once a day for 5 consecutive days. McKenzie method of MDT included repeated active shoulder flexion with end range over pressure given by therapist and it was maintained for 5 second and 10 repetitions were performed (figure 1a). Repeated active shoulder extension with end range over pressure was given by therapist and it was maintained for 5 second and 10 repetitions performed (figure 1b). Repeated movement of hand behind the back with overpressure in direction away from the back and it was maintained for 5 second and 10 repetitions performed figure 1c).[6]



(a) (b) (c)

FIGURE 1 Techniques of McKenzie method of MDT

STATISTICAL ANALYSIS

Each group consisted of 8 participants. Statistical analysis was done by using SPSS version 18. Within group analysis of group A and group B was done by Wilcoxon signed rank test. Between group analysis of group A and B was done by Mann Whitney U test. Level of significance kept at 5%.

RESULT

Both group A and B consisted of 8 participants per group. Group A had 6 females and 2 male whereas group B had 3 females and 5 males. Mean age in group A was 52.5 year and of group B was 53 years.

Pre and post treatment mean of group A for NPRS was 5.7 and 4.5 (p= 0.01), for shoulder flexion was 125 and 127 (p=0.04), for extension was 36.8 and 37.5 (p=0.31), for abduction was 79.3 and 86.8(p=0.04), for internal rotation was 35.6 and 39.8(p=0.03), for external rotation was 30 and 33.5(p=0.03), and for penn shoulder score was 55.4 and 63.7(p=0.01).

Pre and post treatment mean of group B for NPRS was 5.1 and 2.8(p=0.01),for shoulder flexion was 129.5 and 136.6(p=0.48), for extension was 39.4 and 47.5(p=0.02), for abduction was 87.8 and 98.8(p=0.01), for internal rotation was 43 and 49.1(p=0.02),for external rotation was 25 and 34.77(p=0.01) and for penn shoulder score was 52.29 and 66.94(p=0.01), which shows that, all outcome measures ($p < 0.05$) shows significant improvement except shoulder extension (p=0.31) ROM in group A and shoulder flexion ROM (p= 0.48) in group B.

Table 1 shows between group analysis of NPRS, shoulder ROM and Penn shoulder score which shows significant improvement in shoulder flexion (p= 0.01) and extension (p=0.01) ROM

TABLE 1 Between group analysis of outcome measures

OUTCOME MEASURES	MEAN±SD	U VALUE	p VALUE
NPRS (A)	1.25±1.38	20	0.10
NPRS(B)	2.27±1.09		
SHOULDER FLEXION (A)	2.62±2.72	9.5	0.01
SHOULDER FLEXION (B)	14.66±14.47		
SHOULDER EXTENSION(A)	0.62±1.76	14	0.01
SHOULDER EXTENSION (B)	8.11±7.47		
SHOULDER ABDUCTION(A)	7.5±9.69	28	0.43
SHOULDER ABDUCTION (B)	11±9.16		
SHOULDER INTERNAL ROTATION(A)	4.25±4.94	19	0.09
SHOULDER INTERNAL ROTATION(B)	8.55±5.45		
SHOULDER EXTERNAL ROTATION(A)	3.5±3.07	22.5	0.18
SHOULDER EXTERNAL ROTATION (B)	9.77±8.52		
PENN SHOULDER SCORE (A)	8.23±8.41	21	0.14
PENN SHOULDER SCORE (B)	14.62±6.79		

A= group A and B= group B

McKenzie Method of Mechanical Diagnosis and Therapy (MDT) were more significantly effective for shoulder flexion and extension ROM than conventional therapy.

DISCUSSION

In this experimental study effect of MDT in subjects with stage 2 adhesive capsulitis was assessed and results showed MDT is effective in improvement in pain, shoulder ROM and function in subjects with stage 2 adhesive capsulitis with more improvement in shoulder flexion and extension ROM.

Ashley bowser and Brian T. Swanson et alin 2016 in their case report they suggest that MDT shows clinical significant improvement in passive ROM, pain and function in subject with shoulder pain.[7] **Santosh Metgud, Shruti Naik et al in 2017** in an experimental study concluded that McKenzie method of mechanical diagnosis and therapy was effective in improving the range of motion, reducing pain at the shoulder joint and furthermore improving the shoulder functions in individuals with stage II adhesive capsulitis.[6] **Shruti Naik, Santosh Metgud et al in 2017** in an randomised control trial suggested that Maitland and McKenzie method of mechanical diagnosis and therapy both are equally effective in treatment of adhesive capsulitis in terms of pain, ROM and function.[8]

In the derangement syndrome like adhesive capsulitis, repeated end-range loading in the appropriate direction, termed directional preference, progressively improve the range of motion. Likewise movements in the opposite direction may increase symptoms and limitations in the range of movement.[3]

Repeated movements during MDT technique causes stimulation of the mechanoreceptors and hence abolishes pain and improves ROM because of overpressure applied at the available end range.[2] Hence it shows significant improvement in pain, ROM and function of shoulder.

CONCLUSION

McKenzie method of mechanical diagnosis and therapy (MDT) is effective in improvement in pain, shoulder ROM and function in subjects with stage 2 adhesive capsulitis with more improvement in shoulder flexion and extension ROM.

LIMITATION

Blinding was not done due to nature of intervention. The treatment protocol was for very short period of time.

CLINICAL SIGNIFICANCE

MDT can be used in addition with the conventional therapy in treatment in subjects with stage 2 adhesive capsulitis.

FUTURE RECOMMENDATIONS

Further study with longer duration of treatment session and study including subjects with secondary adhesive capsulitis like adhesive capsulitis with hemiparesis is recommended.

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