Effectiveness of Mobilization with Movement in weight bearing position on pain, shoulder range of motion and function in patients with shoulder dysfunction

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Abstract

The purpose of the study was to investigate the effectiveness of mulligan mobilization with movement in weight bearing position on pain, shoulder range of motion and function in patients with shoulder dysfunction. The study was conducted on 32 patients of age between 18-50 years, who are diagnosed with shoulder dysfunction and follow the inclusion and exclusion criteria. Subjects were randomly allocated to two groups. The control group (n=16) received stretching, strengthening and shoulder active range of motion exercises with hot pack. The experimental group (n=16) received the same with an additional mulligan's mobilization with movement in weight bearing. Clinical outcome measures were pain intensity on numeric pain rating scale, pain free shoulder range of motion in flexion, abduction, internal rotation and external rotation as measured with a goniometer and disability of the shoulder with the help of shoulder pain and disability index. Data was collected at baseline and after 2 weeks of intervention in both groups. The results revealed that there was a statistically significant improvement in pain scores and flexion range of motion of shoulder in the experimental group when compared with control group, however no significant change was observed in disability and other ranges measured.

Key words: *Mobilization with movement, Shoulder dysfunction, Mulligan's mobilization, Shoulder pain*

Introduction

Shoulder dysfunction is the second most common health problem affecting approximately 16%-20% of the population [1]. It is characterized by restrictions in activities of daily living due to pain and limitation of range of motion (ROM) of the shoulder [2]. It includes various causes such as tendinopathy, bursitis, rotator cuff tears, adhesive capsulitis, shoulder impingement, glenohumeral osteoarthritis and trauma from injury.

Alterations in scapular position and motion occur in 68% to 100% of patients with shoulder injuries[3]. The scapular position have a mechanical effect on acromio and sternoclavicular joints[4]. The reductions in scapular upward rotation and posterior tilt during arm elevation could reduce the available sub acromial space, thus contributing to the development or progression of impingement[5]

Conservative treatment recommends physical therapy which includes electrotherapy, exercises and mobilization techniques. Amongst a well-known technique is mobilization with movement [MWM] developed by Brian Mulligan that is based on analysis and correction of minor positional faults at a joint. These faults are recorded in painful shoulder in various kinetic studies.[6–9].

There is a dearth in trials supporting or disapproving the use of mulligan's MWM in shoulder dysfunction. The MWM in weight bearing position of the shoulder girdle involving correction of scapulothoracic positional faults is a novel technique and its effectiveness is relatively unexplored in shoulder dysfunction patients. Weight bearing can have additional proprioceptive benefits

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on clinical measures. Hence, the aim of the study is to evaluate the effectiveness of MWM in weight bearing position on shoulder pain, ROM, and function.

Material and Method

After approval from the research review committee and the institutional ethical committee of Indian Spinal Injury Centre, New Delhi, and a sample of 33 patients were screened for inclusion and exclusion criteria. Inclusion criteria for the study were Age: 18-50 years, Gender: Male & Female, Sub-acute shoulder pain (2-12 weeks), Patient diagnosed with shoulder dysfunction (shoulder impingement, AC joint lesion, Rotator cuff tendinopathy, sub acromial bursitis). Exclusion criteria involved subjects diagnosed with complete rotator cuff tears, adhesive capsulitis, shoulder pain of cervical origin[1], traumatic onset of shoulder pain, previous shoulder or cervical spine surgery, systemic illness[11], subjects contraindicated for Mulligan mobilization, patients unable to do weight bearing in all fours position.

GROUP A (Experimental group)

Patient is on all fours (lion position). The therapist stands on the painful side and places one hand beneath and over the clavicle, the thenar and hypothenar eminences lie along the lateral border of the scapula. A sponge may be used under the hand on the clavicle for patient comfort. Pull the scapula caudally, externally rotate it, move it medially towards thoracic spine and proximate the hands. Patient now rocks back slowly towards heels causing shoulder to flex. (Fig 1)[5]

The aim is to flex the arm with no pain. When movement without pain is achieved repetitions are done. Three sets of ten is the usual prescription. Patients were also given 10 minutes of hot pack and conventional physiotherapy treatment as described below.

GROUP B (Control group)

It included active assisted range of motion using a cane, pendulum exercises, corner push up and cross body adduction, Strengthening exercises consisting of internal and external rotation with 1 kg weight in side lying, active pain free range of motion in scaption, chair press, push-ups plus and upright rows[13].

Fig1

Mulligans MWM in weight bearing position

Statistical Analysis

The statistical package of social science (SPSS) of window version 20 was used for data analysis. Between group analysis was done by using independent t-test for outcome measures of pain (NPRS), range of motion and disability (SPADI). Within analysis was done by using paired t-test. The probability level of 0.05 was selected as the criteria for the level of significance in all test. Value of confidence interval was set at 95%.

Results

The mean Age±SD was 30.87± 9.373 years for group A and 32.37±9.743 for group B. On comparing the mean age of two groups, independent t-test revealed no significant difference (p=0.830) between the groups. Comparing the mean BMI of two groups, independent t-test revealed no significant difference (p=0.202) between the groups.More

The results revealed significant difference between the groups using independent t test for range of motion for flexion (p=0.045) and NPRS for pain (p=0.012) at 0.05 level (Table 1). Within group analysis revealed significant difference with all outcome variables except

external rotation (p=0.060) in group A and group B (p=0.158

Table 1 Baseline measurement between Group A and Group B

Outcome	Group A (Mean+ SD)	Group B (Mean+ SD)	t-value	Sig(P value)
NPRS	5.33± 0.724	5.69± 0.479	-1.617	0.117NS
Flexion	134.80±17.387	135.25± 14.540	-0.78	0.938 NS
Abduction	130.40±16.783	137.44±15.874	-1.200	0.240 NS
IR	74±11.570	73.63±10.905	0.093	0.927 NS
ER	82.40± 14.252	87.13±4.731	-1.256	0.219 NS
SPADI	41.27± 10.110	40.31±4.143	0.348	0.730 NS

Table 2 Between group analysis of outcome measures.

Outcome measure	Group A (Mean+ SD)	Group B (Mean+ SD)	t-value	Sig (P value)
NPRS	2.67±1.047	3.69±1.078	-2.677	0.012*
Flexion	156.40±11.153	147.75±11.857	2.093	0.045*
Abduction	152.27±13.562	146.81±13.318	1.129	0.268
Internal rotation	81.47±10.315	78.75±8.363	0.802	0.429
External rotation	84.07±12.719	88.25±3.624	-1.228	0.237
SPADI	26.27±10.074	27.50±6.272	-0.406	0.688

*Indicates significant difference at the 0.05 level

Discussion

The aim of the present study was to find out the effectiveness of mobilization with movement in weight bearing in conjunction with conventional physiotherapy treatment .It has been seen that for pain in between group analysis there was a significant difference between group A and group B.

Our result is supported by Kachingwe et al[14] whose result suggested that MWM group showed the highest percentage of change in decreasing pain and improving function from pre- to post-treatment. This may be attributed to the fact that the MWM technique is designed specifically for decreasing shoulder pain during active shoulder motion, and the amount of manual force applied is dependent on the ability of the technique to decrease pain with active movement. MWM has the additional benefit of being performed throughout AROM, which may engage additional proprioceptive tissues, such as the Golgi tendon organs activated by tendon stretch.

Satpute et al[11] suggested that MWM evokes a non-opioid descending pain inhibitory system(non–endorphin based) inducing mechanical hypoalgesia. The mechanical stimulus provided by MWM may

trigger central nervous system descending pain inhibitory system's causing hypoalgesia. Mobilization with movement also potentially modulates mechanical local hyperalgesia, which results from the sensitized peripheral nociceptors within the area of dysfunction. The improvement in pain in Group B can be attributed to hypoalgesic effect of exercise

For range of motion- statistically significant improvement in flexion shoulder range of motion when Group A and Group B were compared. The shoulder range of motion of flexion, abduction, increased by 22^0 and 22^0 respectively after MWM application in group A and 12^0 and 9^0 in group B.

The potential reason for more improvement in Group A as compared to Group 2 can be attributed to Mulligan Mobilization which was not given to Group 2. The improvement in mulligan group might be attributed to positional fault concept of mulligan. According to this concept, a minor positional fault of the joint may occur following any pathology, an injury or strain which ultimately leads to altered joint kinematics. Altered joint kinematics in shoulder dysfunction have been previously recorded by various studies.[3,5]

These positional faults affects the joint kinematics which contributes to reduced ROM. Mulligan mobilization aims to correct this minor positional fault and hence improves the range of motion.

Our result are in sync with Teys et al who found significant improvement in range of motion score after 3 sessions. However in our study we gave 6 sessions spread over 2 weeks time. Their study didn't take shoulder disability as an outcome measure which we assessed. The result of this study is similar to previous studies on effectiveness of Mulligan's MWM on various shoulder conditions in non weight bearing position.

For Function - No significant difference in disability can be due to shorter intervention time however within group analysis showed that there was significant improvement in disability of shoulder when pre and post intervention scores were compared. Reduction in pain, improved ROM, and changes in muscle function may be responsible for the improvement we found in shoulder pain and function which was measured with the SPADI questionnaire. This was supported by Satpute et al. who found improvement in shoulder pain and function measured with SPADI.

Improvements in pain, ROM, and disability over the intervention period in both groups may be explained to some degree due to natural resolution and/or,exercise/hot packs. One potential mechanism for this improvement may be that exercise improves joint function by improving muscle strength and control of the scapular and glenohumeral joint stabilizers as well as improving extensibility of shortened ligamentous and capsular tissues.

Our study had the following limitations of non-differentiation of primary and secondary impingement and shorter intervention on small sample size. Future studies can be done keeping in mind the above limitations.

These results provide evidence to support the clinical notion that when the positional faults are corrected shoulder pain, range of motion and function are improved.

Conclusion

MWM in weight bearing position is a useful manual therapy technique to be considered for subjects with shoulder dysfunction.

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Conflict of Interest - Nil

References

1. Brudvig TJ, Kulkarni H, Shah S. The Effect of Therapeutic Exercise and Mobilization on Patients With Shoulder Dysfunction: A Systematic Review With Meta-analysis. Journal of Orthopaedic & Sports Physical Therapy. 2011;41(10):734–48.
2. Lin JJ, Hanten WP, Olson SL, Roddey TS, Soto-quijano DA, Lim HK, Sherwood AM. Functional activity characteristics of individuals with shoulder dysfunctions. Journal of Electromyography and Kinesiology. 2005 Dec 1;15(6):576-86.
3. Surenkok O, Aytar A, Baltaci G. Acute Effects of Scapular Mobilization in Shoulder Dysfunction: A Double-Blind Randomized Placebo-Controlled Trial. Journal of Sport Rehabilitation. 2009;18(4):493–501.

4. Kibler W Ben, McMullen J. Scapular dyskinesis and its relation to shoulder pain. Vol. 11, The Journal of the American Academy of Orthopaedic Surgeons. 2003. p. 142–51.
5. Mulligan BR. Manual therapy ''NAGS'',''SNAGS'',''MWM'S'' etc,6th ed. Wellington: Plane View Services Ltd; 1999.
6. Ludewig PM, Reynolds JF. The Association of Scapular Kinematics and Glenohumeral Joint Pathologies. Journal of Orthopaedic & Sports Physical Therapy. 2009;39(2):90–104.
7. Romero CL, Lacomba MT, Montoro YC, Merino DP, Costa SPD, Marchante MJV, et al. Mobilization With Movement for Shoulder Dysfunction in Older Adults: A Pilot Trial. Journal of Chiropractic Medicine. 2015;14(4):249–58.
8. Pribicevic M, Pollard H, Bonello R, Luca KD. A Systematic Review of Manipulative Therapy for the Treatment of Shoulder Pain. Journal of Manipulative and Physiological Therapeutics. 2010;33(9):679–89.
9. Noten S, Meeus M, Stassijns G, Van Glabbeek F, Verborgt O, Struyf F. Efficacy of different types of mobilization techniques in patients with primary adhesive capsulitis of the shoulder: a systematic review. Archives of physical medicine and rehabilitation. 2016 May 1;97(5):815-25.
10. Djordjevic OC, Vukicevic D, Katunac L, Jovic S. Mobilization with movement and kinesiotaping compared with a supervised exercise program for painful shoulder: results of a clinical trial. Journal of manipulative and physiological therapeutics. 2012 Jul 1;35(6):454-63.
11. Satpute KH, Bhandari P, Hall T. Efficacy of hand behind back mobilization with movement for acute shoulder pain and movement impairment: a randomized controlled trial. Journal of manipulative and physiological therapeutics. 2015 Jun 1;38(5):324-34.
13. Kuhn JE. Exercise in the treatment of rotator cuff impingement: a systematic review and a synthesized evidence-based rehabilitation protocol. Journal of shoulder and elbow surgery. 2009 Jan 1;18(1):138-60.
14. Kachingwe AF, Phillips B, Sletten E, Plunkett SW. Comparison of manual therapy techniqueswith therapeutic exercise in the treatment of shoulder impingement: a randomized controlled pilot clinical trial. Journal of manual & manipulative therapy. 2008 Oct 1;16(4):238-47.