

Effectiveness of Kaltenborn Mobilization Versus Muscle energy technique on Restricted External Rotation in Frozen Shoulder Patients

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Abstract:

Background: Frozen shoulder, also called adhesive capsulitis, involves stiffness and pain in the shoulder joint. Signs and symptoms typically begin slowly, then get worse. Over time, symptoms get better, usually within 1 to 3 years. Globally, the incidence of frozen shoulder is estimated to be 2 to 5 percent of the general population is estimated at 2–5%. According to past researches frozen shoulder found to affect 8.2% of men and 10.1% of women. Different treatment options are used to treat this problem in which mobilizations and other methods are also used as treatment option.

Method: Diagnosed frozen shoulder patient were included in research with the sample size of 42. participants were divide in 2 groups A(METS) and B(kaltenborn mobilization). Among them ratio of male and female participants was 12(57.1) and 9(42.9) respectively in group A. and the ratio of male and female participants was 13(61.9) and 8(38.1) respectively. The means age in mets and kaltenborn technique was 49.9 ± 6.5 and 50.2 ± 6.0 respectively.

Result. There was Significant improvement at post-treatment levels in pain and ROM and SPADI in both groups. Although ROM improvement and pain reduction was improved in both groups but statistically significant ($p<0.05$) between group shown kaltenborn was superior to METs in improving range. And mets showed significant decrease in SPADI.

Conclusion:

The study showed the statistics which indicates that muscle energy and kaltenborn mobilization in frozen shoulder patients both are helping hand in improving range of motion but mets showed significant decrease in SPADI.

KEYWORDS: Frozen shoulder, muscle energy technique, kaltenborn mobilization, SPADI

1. INTRODUCTION

Frozen shoulder, generally referred as Adhesive capsulitis (AC), is a situation of unsure etiology characterized through ache and a revolutionary loss of each energetic and passive range of motions (ROMs).¹ Frozen shoulder is common in general orthopedic practice. It may occur spontaneously with no apparent etiology, or be associated with a variety of local or systemic disorders. Diagnosis is based on recognition of pain features and selective limitation of passive external rotation.

Adhesive capsulitis progressed from a painful stage to a healing stage over one to two years, and was thought to resolve completely without treatment. The most effective treatment for adhesive is unknown.² Non-op management is the general consensus. First-line treatment for adhesive out of order Treatments such as physiotherapy, NSAID,s and corticosteroid injection allow reduction of pain and/improved range of motion.³

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Traditionally, physical therapists have used an anterior glide of the humeral head on the glenoid technique to improve external rotation ROM, a choice based on the “convex-on-concave” concept of joint surface motion.⁴ Various grades of mobilizations, such as mid-range and end-range mobilizations, are suggested by Kaltenborn to improve joint mobility and to reduce pain.⁵ Muscle Energy Techniques (MET) are a form of soft tissue or joint, manipulations or mobilizations, deriving from osteopathic medicine, employed in the treatment of musculoskeletal dysfunction.⁶

Shoulder pain and disability can be measures by The shoulder pain and disability index which is a self-administered questionnaire which includes pain and disability subscales questions.⁷ Muscle Energy Techniques are manual therapies that use gentle muscle contractions to relax and unwind. Stretches muscles and normalizes joint movements.⁷

There is evidence, however, that joint mobilization procedures can lessen the associated glenohumeral rotational deficits characteristic of this condition, especially external rotation.⁴ Manual therapy has been important part of rehabilitation and assessment of restricted joint movement.⁸

2. METHODOLOGY

A Randomized control Study was conducted in Med-care and City hospital of district Gujrat and district Gujranwala .Data was collected from Orthopedic and physiotherapy wards of (Medcare and City) hospitals with the sample size of 42 patients. Patient were divide into 2 groups .21 patients in each group with random number of males and females in both groups. Values of pain, range and disability of patients were collected by using goniometer and a SPADI questionnaire on first day(pre) and on 12th (post) sessions. Two treatment option were used in which one group was given with muscle energy technique and second received anterior glide of mobilization of kaltenborn technique. Treatment sessions were given to both groups for 12 consecutive days. After which results were calculated by measuring post values of ROM, pain and SPADI questionnaire.

3. RESULTS

A total of 42 subjects 23(54.76%) male & 19 female (45.24%) participated in the study. The age range of participant was 40_60 There were 21 participants in each Of 2 group. Baseline treatments were balanced between the two groups. There was markeable difference in pain range and spadi in patient who was given with anterior glide of shoulder than the patients who received muscle energy technique in their pre and post values of rom, pain and spadi. This study showed that the muscle energy technique was significant in improving the overall SPADI score from 72.2 to 25.4. while mets were just improved from 82.5 to 47.5 on spadi. p value is less than <0.05 so results showing significant improvement in ROM and SPADI.

Table#1: Demographic characteristics of the participants:

	Muscle energy technique (N=21)	Kaltenborn mobilization (N=21)
Age(y) (means±S.D)	49.9±6.5	50.2±6.0
Gender		
Male (n%)	12(57.1)	13(61.9)
Female (n%)	9(42.9)	8(38.1)

Table #1 showing the demographic data of the participants in which mean age of the participants in group (METS) IS **49.9±6.5** along with the gender male which is **12** in number with **(57.1%age)** and females were **9** in numbers with **(42.9%age)**. On other side of other group is (kaltenborn mobilization) with average Mean of age **50.2±6.0 in years** along with the gender male which is **13** in number with **(61.9%age)** and females were **8** in numbers with **8(38.1%age)**.

Table#2: Between group differences of RANGE OF MOTION:

Groups	Pre ROM	Post ROM	Mean	Std.deviation	t value	P value
Muscle energy technique	31.5 ^o	50.7 ^o	-19.14	5.54	-15.825	0.00
Kaltenborn mobilization	47.0 ^o	72.8 ^o	-25.71	7.92	-14.868	0.00

Table #2 is showing the difference of both groups with respect to ROM. In muscle energy technique pre rom was 31.5^o and post rom was 50.7^o. however Mean was -19.14 and std.deviation of 5.54 along with the t value of -1.5825 with significant p value (<0.05) on other hand kaltenborn technique also improved ROM from 47^o to 72.8^o which is although a good improvement with Mean of -25.71 and std.deviation of 7.92 along with the t value of -14.868 with significant p value (<0.05)

Table#3: Between group differences of SPADI SCALE:

Between group differences	Pre SPADI	Post SPADI	Mean	std.deviation	T value	P value
Muscle energy technique	81.5	47.5	33.4	9.9045	15.074	0.00
Kaltenborn mobilization	72.2	25.4	46.8	8.41	25.453	0.00

Table #3 is showing the difference of both groups with respect to SPADI. In muscle energy technique pre SPADI was 81.5 and post SPADI was 47.5. however, Mean was 33.4 and std. deviation of 9.9045 along with the t value of 15.074 with significant p value (<0.05) on other hand kaltenborn technique also improved SPADI from 72.2 to 25.4 which is although a good improvement with Mean of 46.8 and std. deviation of 8.41 along with the t value of 25.453 with significant p value (<0.05).

4. DISCUSSION

Adhesive capsulitis is a severe condition of the shoulder joint that has no known etiology, although there is a large body of data that shows a positive response to physiotherapy therapies. Simultaneously, even now, the challenge of entirely combating pain and incapacity with a certain therapeutic technique in a timeframe is noted. Current study was undertaken to evaluate the effectiveness of two different techniques i:e-mets and kaltenborn mobilization on frozen shoulder patients.

In this study kaltenborn mobilization was compared with muscle energy technique both treatments produce significant improvement in different diementions.the results of this study can be compared with the previous study conducted by Mr Farjad Afzal* in 2022 in Department of Allied Health Sciences, University of Sargodha,

Sargodha, Punjab, Pakistan. A sample of 75 patients who fulfilling inclusion and exclusion criteria were selected and divided into three groups by random table method. The study populations were selected by convenient sampling techniques by following inclusion and exclusion criteria Data was collected with the help of outcome measurement tool, shoulder pain and disability index (SPADI). This is an outcome measurement tool, that have two dimensions; (1) For pain and (2) For functional activities. For the assessment of pain, there are five questions, while for the assessment of functional activities there are eight questions [16]. Demographic data like age, gender, and side of adhesive capsulitis are also collected. The selected 75 patients were divided into three groups by the method of randomization: (1) Group I received Kaltenborn method of treatment; (2) Group II received muscle energy technique; and (3) Group III is a control group that obtained conventional treatment in the form of heat and range of motion exercises. The pre intervention measurements were 59.36 ± 16.15 , 58.52 ± 14.03 and 65.00 ± 15.84 in control, Kaltenborn, and METs groups, respectively. Meanwhile, the post intervention measurements were 50.58 ± 15.98 , 39.44 ± 12.23 and 28.80 ± 7.94 in control, Kaltenborn and METs groups respectively. This study concluded that both techniques are effective in the treatment of adhesive capsulitis to decrease the pain and disability in experimental groups in comparison to control groups. METs is superior to Kaltenborn in pain and disability management when compared to each other.⁹

The results of this study can be compared to a local study conducted by Naveed and colleagues in 2016, in which they compare the effectiveness of muscle energy technique, Kaltenborn G III mobilization with a combination of Kaltenborn and METs [13]. They selected 72 patients with neck pain and divided into three groups, and Goniometry and Oswestry disability neck index were used as the outcome measurement tools. They concluded that there was significant improvement in the combination group (METs and Kaltenborn G III Mobilization techniques) as compared to a single treatment. They measured short term and midterm effectiveness, and duration of treatment was 7 days. Another difference in this study was duration of treatment. In current study, 2 weeks treatment was used, while in the published study they used 7 days of treatments only. Results of previous study support the results of current study. The difference between these two studies are it was conducted on patient with neck pain, while current study was conducted on patients with frozen shoulder. In the study they compare the individual techniques with the combination techniques and found that the combination techniques group is more effectiveness, compared with the single technique group.¹⁰

The results of this study can be compared with study conducted by Suri and colleges. Suri and colleagues conducted study on frozen shoulder in which they compared the muscle energy technique with Maitland techniques, and they concluded that muscle energy technique is more effective for control of pain, whereas Maitland's technique has more effectiveness in increasing the range of motion and mobility of joint.¹⁰

In this study, they compared the Maitland method of mobilization with muscle energy techniques, but in the current study Kaltenborn technique was used. Study support that METs is more effective when compared. The results of this study were in line with the study conducted by Shakil and colleagues. Shakil and colleagues conducted a study on adhesive capsulitis to compare the effects of Kaltenborn techniques and general scapular mobilization, and they concluded that Kaltenborn mobilization is more effective when compared with general scapular mobilization.¹¹

5. CONCLUSION

Kaltenborn Mobilization is more effective in reducing pain and increasing function and Disability among the patients having Adhesive Capsulitis as compared to MET for Pain, ROM and shoulder functions.

Abbreviations

ER=External rotation, METS= Muscle energy technique, SPADI= Shoulder pain and disability index

Conflict of interest

There was no conflict of interest.

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Data availability

Data will be provided on demand by corresponding author. @ sadainbutt98@gmail.com

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REFERENCES

1. Walling S, Kalita A, Dutta A. Effectiveness of Kaltenborn Posterior Glide and Coracohumeral Ligament Positional Stretching on External Rotation Range of Motion in Patients with Adhesive Capsulitis. *Indian Journal of Forensic Medicine & Toxicology*. 2021;15(2):1001.
2. Ramirez J. Adhesive capsulitis: diagnosis and management. *American family physician*. 2019;99(5):297-300.
3. Yip M, Francis A-M, Roberts T, Rokito A, Zuckerman JD, Virk MS. Treatment of adhesive capsulitis of the shoulder: a critical analysis review. *JBJS reviews*. 2018;6(6):e5.
4. Johnson AJ, Godges JJ, Zimmerman GJ, Ounanian LL. The effect of anterior versus posterior glide joint mobilization on external rotation range of motion in patients with shoulder adhesive capsulitis. *Journal of orthopaedic & sports physical therapy*. 2007;37(3):88-99.
5. Hammad SM, Arsh A, Iqbal M, Khan W, Bilal B, Shah A. Comparing the effectiveness of kaltenborn mobilization with thermotherapy versus kaltenborn mobilization alone in patients with frozen shoulder [adhesive capsulitis]: A randomized control trial. *J Pak Med Assoc*. 2019;69(10):1421-4.
6. Gill MA, Gohel BP, Singal SK. Effect of muscle energy technique on pain and function in adhesive capsulitis—an interventional study. *Int J Health Sci Res*. 2018;8(3):133-7.
7. GoPinath Y, SeenivaSan SK, Veeraraghavan SNC, Viswanathan R, Govindaraj MK. Effect of Gong's Mobilisation versus Muscle Energy Technique on Pain and Functional Ability of Shoulder in Phase II Adhesive Capsulitis. *Journal of Clinical & Diagnostic Research*. 2018;12(9).
8. Rathod D, Priyanka G, Palkar A. Comparative study of kaltenborn mobilisation versus mulligan mobilisation in patients with frozen shoulder. *International Journal of Health Sciences and Research*. 2019;9(9):320-4.
9. Afzal F. Effectiveness of Kaltenborn Joint Mobilization Technique Versus Muscle Energy Technique on Pain and Disability in Patients with Shoulder Adhesive Capsulitis. *Journal of Clinical and Nursing Research*. 2022;6(5):134-40.
10. Anwar N, Khalid K, Rana AA, Hayat MK, Idrees MQ, Zafar S. EFFICACY OF KALTENBORN GRADE III MOBILIZATIONS, MUSCLE ENERGY TECHNIQUES AND THEIR COMBINATION TO IMPROVE RANGE AND FUNCTIONAL ABILITY IN ADULTS WITH MECHANICAL NECK PAIN. *INTERNATIONAL JOURNAL OF PHYSIOTHERAPY*. 2016;3(4):482-6.
11. Shakil-ur-Rehman S, Danish KF, Khan A, Sheikh SI, Sibtain F. Comparison between Kaltenborn and general scapular mobilization in Adhesive capsulitis Patients. *Journal of Rawalpindi Medical College*. 2012;16(2).