

ORIGINAL ARTICLE

IJPHY

A COMPARATIVE STUDY TO DETERMINE THE EFFICACY OF ROUTINE PHYSICAL THERAPY TREATMENT WITH AND WITHOUT KALTENBORN MOBILIZATION ON PAIN AND SHOULDER MOBILITY IN FROZEN SHOULDER PATIENTS

¹Muhammad Junaid²Syed Ijaz Ahmed Burq³Shazia Rafique⁴Salman Malik⁵Akhtar Rasool⁶Iqra Mubeen⁷Saifullah Khalid

ABSTRACT

Background: Froze shoulder in other words adhesive capsulitis is a condition characterized by progressive loss of shoulder mobility with general symptoms of pain, limited range of motion and altered scapula thoracic rhythm. The condition is mostly treated by using traditional physical therapy measures the study was conducted with the aim to determine the efficacy of routine physical therapy treatment with and without Kaltenborn mobilization in reducing pain and increasing shoulder mobility in frozen shoulder patients.

Method: The study was conducted in the department of Physiotherapy Mayo Hospital Lahore. A sample of 60 patients was collected by using non-probability, convenience sampling without any discrimination regarding, social economic status, education, out of which there were 8 drop outs. Sample was distributed in two groups (26 participants each) i.e. experimental group receiving routine physical therapy and Kaltenborn Mobilization technique and control group receiving the routine physical therapy only. Participants were recruited based on the inclusion and exclusion criteria. Demographic data and data regarding pain relief was collected using self-made questionnaire and penn shoulder scale questionnaire respectively.

Results: Results were evaluated by using SPSS version 19.1 it was seen that range of motion of cervical region was greater for the experimental group than control group. The maximum PENN score achieved in control group were 51 however for experimental group the value was 64.

Conclusion: It was concluded that kaltenborn mobilization is an effective means of treating frozen shoulder and when combined with routine physical therapy gives better results.

Keywords: Kaltenborn mobilization (KM), routine physical therapy, Adhesive capsulitis, Mobilization, PENN scale, visual analogue scale

Received 23rd February 2016, revised 13th March 2016, accepted 28th May 2016



www.ijphy.org

10.15621/ijphy/2016/v3i3/100836

²Physical therapist, Lahore General hospital, Lahore, Pakistan.

³Physiotherapist, School of physiotherapy, King Edward medical University, Mayo Hospital Road, Nelagumbad, Anarkali, Lahore 54000, Pakistan.

⁴Principal, Institutional Address: Multan Institute of Health Sciences, Multan, Pakistan.

⁵Incharge department of Physiotherapy, Sargodha Medical College, Sargodha, Pakistan.

⁶Research officer, Multan Institute of health sciences, Multan, Pakistan.

⁷Senior lecturer, Institutional Address: IPMR, Dow University of health sciences, Karachi, Pakistan.

CORRESPONDING AUTHOR

¹Muhammad Junaid

School of physiotherapy,
King Edward medical University,
Mayo Hospital Road, Nelagumbad,
Anarkali, Lahore 54000, Pakistan.

INTRODUCTION

Adhesive capsulitis also known as frozen shoulder is condition in which active or passive mobility is lost gradually, the condition mainly arises due to the contracture of shoulder i.e. glenohumeral joint capsule [1,2]. Symptoms of this condition are limited range of motion (ROM) pain, altered scapulohumeral rhythm and muscle weakness due to disease [2,3,4]. Prevalence of this condition is slightly greater than 2% in general population. It affects person older than forty years, mostly women are affected by frozen shoulder. 70% of women are presenting with frozen shoulder 20-30% of those affected develop frozen shoulder in opposite side [5] Pain increases with cold and is worst at night. Patient feels constant pain in his shoulder sudden jerky movements can enhance the pain and cramping. The path of physiological process may involve fibrosis of shoulder joint capsule and inflammation of synovium. Frozen shoulder consist of three stages, first freezing, frozen and thawing [5,6] Symptoms are pain and persistent stiffness therefore full range of motion cannot be achieved by the patient. Everyday tasks like bathing driving sleeping and dressing become painful to perform. Kaltenborn mobilization evaluates the motion on the articular surface and applies them to treatment, this treatment is according to MacConaill's classification, which polishes most articular surfaces have concave exteriors and convex interiors [15,6]. Passive sustained stretch technique is applied in the treatment of kaltenborn mobilization. It enhances joint mobility without articular surface suppression. Grade 1-3 are graded and are applied to increase joint mobility. Grade 1 applies distraction of small intensity that causes stress within the joint capsule it also decrease pain. Grade 2 refers to the force that stretches prearticular tissue. Grade 3 causes enough distraction or gliding so that stretch sophisticatedly occur. It also enhance ROM for the treatment of external and internal rotation [7,8,16]. Sustained stretch technique in kaltenborn mobilization along the therapeutic modalities are effective. Therapists used inferior translation for the humeral head in clinical practice. They follow concave convex rule. Whereas posterior translation is more effective than the anterior one [10,11,9] Joint mobilization controls the pain through neurophysiological affects this is because of stimulating type 2 mechanoreceptor and inhibiting type 4 nociceptors. At the end of mobilization golg tendon organ is provoked by passive joint mobilization [11,12,13,14]. Routine physical therapy includes, electric stimulation, ultrasound, isometric strengthening exercise, wall pushing, wall climbing, pendular exercises, stationary wheeling by hand, home exercise program and heat as well as basic and advanced modalities [8]. The present study aim is to compare the effectiveness of kaltenborn mobilization and conventional physical therapy in treating shoulder pain and hypomobility resulted due to frozen shoulder.

MATERIALS AND METHOD

Study was conducted in the department of Physiotherapy Mayo Hospital Lahore. A sample of 60 patients was collected by using non-probability, convenience sampling

without any discrimination regarding, social economic status, education, out of which there were 8 drop outs. Sample was distributed in two groups (26 participants each) i.e. experimental group receiving routine physical therapy (hot pack, stretching strengthening) and Kaltenborn Mobilization technique and control group receiving the routine physical therapy only. All patients having NPRS above 5 were treated with grade 1 and grade 2 and all the patients having NPRS below 5 were treated with grade 3 mobilization techniques with each set of 40 seconds with rest interval of 30 second after each set. Patients from both groups were treated into the department of Physiotherapy, Mayo Hospital, Lahore. They were asked to lie supine on a five foot high wooden couch and hot pack of standard size was applied over the region of the shoulder. Hot pack specification were as follow; damp towel heated in microwave, reusable and were applied for 10-15 minutes. Participants were recruited based on the inclusion criteria, patients both male and female of age between 30 and 70 years suffering with frozen shoulder, with no recent injury, fracture, cancer or those having no metabolic disease were included in study however diabetic patients (Lean BMI < 18.5) or people having other major musculoskeletal problems or with red flag signs e.g. R.A, osteoporosis, paget's disease; patient with any recent history of shoulder trauma or with history of prolonged immobilization due to neurologic disorder; patients suffering with Neuralgia /Hemiplegia or Bilateral Frozen shoulder were excluded from this research. Questionnaires were circulated among participants to gather demographic data and baseline values regarding pain and range of motion. The predesigned Numeric pain scale rating (NPSR), PENN shoulder scale and questionnaire was used to collect the data from the participants and goniometry was used to measure the pre and post-treatment improvement in ROM. Shoulder pain and disability index (SPADI) was used to compare the pre and post treatment shoulder pain. Each patient received 4 sessions per week for two weeks. (Total 8 sessions), each session was of 25 minutes for control group 40 minutes for the experimental group. Assessment was made during, following and after the intervention and its effectiveness was measured accordingly. Once the treatment was complete the patients were followed up by phone for checking recurrence of symptoms and the data was analyzed using SPSS version 19 and T-test was implemented to find out the average variance of quantitative variables. P-value < 0.05 was considered significant.

RESULTS

The mean age of patients included in the study was 48.90 with a range of 30 years to 65. Out of 52 patients 50% were male and 50% were female. All the patients included in both groups were married. Education of most of the patients was matric. Pain and trauma was seen not to be the reason of pain in majority of patients only 7.7% felt pain due to immobility and 19.2 were those who felt pain after trauma whereas remaining either described no known reason of pain or cause other than trauma and immobi-

lization. 42.3% population mentioned that pain radiates towards arm whereas 57.7% patients had localized pain to shoulder. 36.5% was found to be diabetic whereas 63.5% population was not diabetic. 34.6% of population was hypertensive and the same figure complained of numbness in arm however 65.4% had normal blood pressure and the same figure had no such complaint of numbness in arm. Pre-treatment pain scale value on VAS for control group ranged between 6-8 however values were between 5-8 for experimental group with majority of patients with pain of 7 score (for both groups). After treatment values of visual analogue scale for control group ranged between 3 and 6 with majority of patients with value of 5 and for experimental group between 2 and 6 with majority of patients with value of 4. Pretreatment active range of motion of abduction for control group was between 55 and 100 which after treatment improved to 125. For experimental pretreatment active range of motion of abduction was between 60 and 120 which improved to 160. Pre-treatment mean \pm S.D AROM of flexion of shoulder was 85.77 ± 85.77 which improved to 126.06 ± 19.080 . Pre-treatment mean \pm S.D AROM of extension of shoulder was 25.29 ± 5.278 which improved to 35.87 ± 6.318 . Pre-treatment mean \pm S.D active range of motion of internal rotation of shoulder was 27.02 ± 6.587 which improved to 41.73 ± 8.511 after treatment. Pretreatment mean \pm S.D of active range of motion of external rotation of shoulder was 33.27 ± 6.780 and it improved to 51.25 ± 8.510 . The maximum AROM of flexion gained in the control group was up to 140 degree while the maximum AROM of flexion gained in the experimental group was up to 165 degree measured by goniometer. Furthermore the number of patients who gained maximum AROM of flexion was in the experimental group. So, the result proved that routine physical therapy plus Kaltenborn mobilization is more effective as compared to the individual Routine physical therapy. The maximum AROM of extension gained in the control group was up to 45 degree while the maximum AROM of extension gained in the experimental group was up to 55 degree measured by goniometer. Furthermore the number of patients who gained maximum AROM of extension was greater in the experimental group. So, the result proved that routine physical therapy plus Kaltenborn mobilization is more effective as compared to the individual Routine physical therapy. The maximum AROM of internal rotation gained in the control group was up to 55 degree while the maximum AROM of internal rotation gained in the experimental group was up to 65 degree measured by goniometer. Greater number of participants of experimental group gained maximum AROM of internal rotation. The maximum AROM of external rotation gained in the control group was up to 60 degree while the maximum AROM of external rotation gained in the experimental group was up to 75 degree measured by goniometer and the number of patients who gained maximum AROM of external rotation was more in the experimental group as compared to the control group. P value of > 0.05 indicated that there was

a significant difference in both the treatment regimens. The maximum penn score gained in the control group was up to 51 while the maximum PENN score gained in the experimental group was up to 64 measured by PENN shoulder scale as larger value of PENN score indicates greater relief thereby it may be interpreted that participants of experimental group enjoyed more relief than control group. Generally pronounced increased range of motion in experimental group in comparison to control group depicts the superiority of kaltenborn in addition to routine physical therapy when compared to routine physical therapy alone.

DISCUSSION

Previously a research conducted at Rawalpindi medical college, revealed that kaltenborn mobilization is more effective in increasing abduction of shoulder joint, in that study 47 patients were treated having 24 male and 23 female, kaltenborn technique was applied to group A participants for two weeks, this group showed satisfactory increase in satisfactory increase in ROM of shoulder abduction. With p value less than 0.0001, the other group in contrast to my study was however treated with scapular mobilization the results of this technique were found unsatisfactory with p value less than 0.047 [16]. In the present research the group receiving kaltenborn mobilization showed more improvement in shoulder abduction i.e. before treatment it was between 60-125 and after treatment it improved to 160, however for control group pretreatment value of shoulder abduction was 55-100 and it improved to 125 only. Similarly other range of motion was also found to increase more dramatically for group receiving kaltenborn mobilization than routine physical therapy. Another research was conducted to compare the effects of kaltenborn mobilization with mulligan and it concluded that there was no significant difference in pain and ROM improvement for both of the treatment techniques [17].

CONCLUSION

Based on the result it was concluded that improvement was best seen in the experimental group, in which patients received routine physical therapy plus kaltenborn mobilization and that kaltenborn along with routine physical therapy techniques is more effective in relieving pain related to frozen shoulder and regaining lost range of motion.

REFERENCES

- [1] Vermeulen HM, Obermann WR, Burger BJ, Kok GJ, Rozing PM, van den Ende CH. End-range mobilization techniques in adhesive capsulitis of the shoulder joint: a multiple-subject case report. *Physical Therapy*. 2000;80(12):1204-13.
- [2] Villafaña JH, de-las-Peñas CF, Silva GB, Negrini S. Contralateral Sensory and Motor Effects of Unilateral Kaltenborn Mobilization in Patients with Thumb Carpometacarpal Osteoarthritis: A Secondary Analysis. *Journal of physical therapy science*. 2014;26(6):807-12.
- [3] Vermeulen H, Stokdijk M, Eilers P, Meskers C, Rozing P, Vlieland TV. Measurement of three dimensional shoulder movement patterns with an electromagnetic

- tracking device in patients with a frozen shoulder. *Annals of the rheumatic diseases*. 2002;61(2):115-20.
- [4] Uthoff HK, Boileau P. Primary frozen shoulder: global capsular stiffness versus localized contracture. *Clinical orthopaedics and related research*. 2007;456:79-84.
- [5] Sluka K, Skyba D, Radhakrishnan R, Leeper B, Wright A. Joint mobilization reduces hyperalgesia associated with chronic muscle and joint inflammation in rats. *The Journal of Pain*. 2006;7(8):602-7.
- [6] Diercks RL, Stevens M. Gentle thawing of the frozen shoulder: a prospective study of supervised neglect versus intensive physical therapy in seventy-seven patients with frozen shoulder syndrome followed up for two years. *Journal of Shoulder and Elbow Surgery*. 2004;13(5):499-502.
- [7] Binder A, Bulgen D, Hazleman B, Roberts S. Frozen shoulder: a long-term prospective study. *Annals of the rheumatic diseases*. 1984;43(3):361-4.
- [8] Arshad HS, Shah IH, Nasir RH. Comparison of Mulligan Mobilization with Movement and End-Range Mobilization Following Maitland Techniques in Patients with Frozen Shoulder in Improving Range of Motion. *IJSR*. 2015;4(4):2761-2767.
- [9] Mangus BC, Hoffman LA, Hoffman MA, Altenburger P. Basic principles of extremity joint mobilization using a Kaltenborn approach. *JSR*. 2010;11(4): 235-250
- [10] MacConaill M. THE MOVEMENTS OF BONES AND JOINTS 5. The Significance of Shape. *Journal of Bone & Joint Surgery, British Volume*. 1953;35(2):290-7.
- [11] Kaltenborn FM. *Fisioterapia manual: extremidades*. 2004.
- [12] 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.
- [13] Roubal PJ, Dobritt D, Placzek JD. Glenohumeral gliding manipulation following interscalene brachial plexus block in patients with adhesive capsulitis. *Journal of orthopaedic & sports physical therapy*. 1996;24(2):66-77.
- [14] Reeves B. The natural history of the frozen shoulder syndrome. *Scandinavian journal of rheumatology*. 1975;4(4):193-6.
- [15] Neviasser RJ, Neviasser TJ. The Frozen Shoulder Diagnosis and Management. *Clinical orthopaedics and related research*. 1987;223:59-64.
- [16] Syed shaki lur rehaman, khalid Farooq, Danish, asghar khan, suhail Iqbal sheikh, fozia sibtain. Comparison between Kaltenborn and General Scapular Mobilization in Adhesive Capsulitis Patients *Journal of Rawalpindi medical college (JRMC)*; 2012;16(2):121-122
- [17] Gui Do Moon, Jin Yong Lim, Da Yeon Kim, Tae Ho Kim. Comparison of Maitland and Kaltenborn mobilization techniques for improving shoulder pain and range of motion in frozen shoulders. *J. Phys. Ther. Sci.* 2015; 27: 1391-139.

Citation

Junaid, M., Ahmed Burq, S., Rafique, S., Malik, S., Rasool, A., Mubeen, I., & Khalid, S.. (2016). A COMPARATIVE STUDY TO DETERMINE THE EFFICACY OF ROUTINE PHYSICAL THERAPY TREATMENT WITH AND WITHOUT KALTENBORN MOBILIZATION ON PAIN AND SHOULDER MOBILITY IN FROZEN SHOULDER PATIENTS. *International Journal of Physiotherapy*, 3(3), 316-319.