Effectiveness of Mobilization with Movement with and without Therapeutic Ultrasound in Rehabilitation of Idiopathic Adhesive Capsulitis

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ABSTRACT:

Background: Frozen shoulder syndrome is clinically known as adhesive capsulitis, is a painful and debilitating condition causing fibrosis of the glenohumeral joint capsule with a chronic inflammatory response. Patients experience pain, limited range of motion and disability generally lasting anywhere from 1 to 24 months. There is a lack of evidence about the effectiveness of therapeutic ultrasound (US) with mobilization with movement compared with mobilization with movement and without movement (US) in the treatment of adhesive capsulitis.

Objective: To determine the effectiveness of mobilization with movement with and without therapeutic ultrasound in rehabilitation of idiopathic adhesive capsulitis.

Methodology: The single blinded randomized control trial was conducted on 50 patients in the out-patient physical therapy and rehabilitation department of Maroof International Hospital Islamabad and patients with idiopathic adhesive capsulitis having pain for at least 1 month, not able to lie on the affected side at night and both active and passive motion restricted in flexion, abduction and external rotation, were randomly selected and placed into two groups. The MWM with therapeutic ultrasound were applied in group A, while MWM alone in group B. The study variable were pain score on visual analogue scale (VAS), active range of motion (AROM) of shoulder flexion, abduction and external rotation and were compared at baseline and at completion on plan of care after six months. Data was analyzed on SPSS and statistical tests were applied to determine the probability at 95% level of significance.

Results: fifty patients with adhesive capsulitis were enrolled and placed randomly into two groups, the base line characteristics were similar in both groups, six week after intervention, patients with group A had more improvement in pain score (0.000), active range of abduction (0.001), external rotation (0.000), internal rotation (0.000) and functional activity (0.037) as compared to group B. In group B improvement was less in pain score (0.010), active range of abduction (0.591), external rotation (0.001), internal rotation (0.01) and functional activity (0.081) as compared to group A.

Conclusion: Ultrasound with movement with mobilization produced a better result therefore can be recommended in the treatment of idiopathic adhesive capsulitis of shoulder.

Keywords: Adhesive Capsulitis, Frozen Shoulder, MWM, Therapeutic Ultrasound (JRCRS 2013; 1(1): 2-6)

INTRODUCTION:

The term “capsulitis” or “frozen shoulder” refers to a common shoulder condition characterized by the global restriction in the shoulder range of motion in a capsular pattern. The capsular pattern in the shoulder is characterized by most limitation of passive lateral rotation and

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abduction[1]. the presence of capsular pattern is necessary to give a diagnosis of shoulder capsulitis2. Although the ROM varies depending upon which stage the patient presents, yet he or she still has limitations of passive ROM in a capsular pattern. This condition was first described by Duplay. Neviaser, who called it adhesive capsulitis, as he, under arthroscopy, observed that the capsule looked thickened and adhered to underlying bone and could be peeled off from the bone. In an idiopathic capsulitis there is no apparent cause. The shoulder gradually becomes painful and stiff. Some authors have divided frozen shoulder in primary frozen shoulder, which corresponds to idiopathic. The secondary corresponds to traumatic capsulitis or if some other medical condition is present alongside. The natural course of the condition is longer than generally stated and not always complete, that is, not all get full recovery. The traditional principles of treatment of adhesive capsulitis are to relieve pain, maintain range of motion, and ultimately to restore function. The treatment of adhesive capsulitis by means of physiotherapy all along consists of different modalities (e.g. exercises, electrotherapy or massage) which may be applied side by side. Relief of pain may be achieved by massage, deep heat, ice, ultrasound, TENS (transcutaneous electrical nerve stimulation), and LASER (light amplification by stimulated emission of radiations) as described in our standard text books and other literature concerning the treatment of adhesive capsulitis. Mostly these applications are adjunct to other treatment modalities like mobilization techniques or home exercise program. Although adhesive capsulitis is generally considered to be a self-limiting condition that can be treated with physical therapy, to regain the normal extensibility of the shoulder capsule, passive stretching of the shoulder capsule in all planes of motion by means of mobilization techniques has been recommended. Appropriate selection of mobilization technique for treatment can only take place after a thorough assessment and examination. As mentioned above, the capsulitis is challenging for therapeutic as well as rehabilitation purposes. In this present work, the purpose is toevaluate the efficacy of the movement with mobilization in the rehabilitation with or without of the adhesive capsulitis. It is hypothesized that the importance of MWM techniques with ultrasound is more effective than only movement with mobilization exercise program in case of adhesive capsulitis.

MATERIALS AND METHODS

Fifty subjects (both male and female) between age group of 40 and 60 were selected from patients in rehabilitation OPD of Maroof International Hospital Islamabad after they were diagnosed of suffering from the idiopathic shoulder adhesive capsulitis. All subjects were diagnosed by orthopedic doctor and they were checked for the global restriction at shoulder joint, by expert physiotherapist. After the initial assessment, written informed consent forms were obtained from the participants who met the inclusion criteria.

The inclusion criteria of the study were of age between 40 to 60 years; shoulder ROM restriction; pain for more than 2 months. All the patients were having global restriction of shoulder joint range of motion, that is, movements of shoulder were restricted in shoulder in all direction. Subjects were excluded if they had history of fracture around shoulder; any inflammatory disorder around shoulder; diabetic or any neurological involvement; patient taking any steroids and/or analgesics; having any cardiac conditions. Variables of this study included VAS (Visual analogue scale) for pain, and two ROM selected for the study, that is, Shoulder external rotation and shoulder abduction. Abduction range and external rotation range were measured by goniometer. Each subject was asked to mark on the 10 cm long visual analogue scale (VAS) for pain intensity and is also requested to complete the shoulder pain.

After the assessment and the data collection, participants were given the therapeutic intervention

according to their groups. The US group received continuous US with 3 MHz frequency and 1.5 W/cm intensity with a transducer head of 5 cm for 10 minutes. After coating the skin with an aquasonic gel, US was delivered by moving the applicator over the anterior, superior and posterior regions of the target joint in slow, overlapping strokes.

RESULTS

Demographic Data Total of 40 patients (female = 14 and male = 26) participated in the study.
Their variables had insignificant difference between the two groups at pre-intervention

In both groups, that is, Group A and Group B, there is a statistically significant difference between VAS between pretest and posttest scores. The mean improvement in Group A was 0.000and in Group B was 0.010. Both groups have shown statistically significant improvement in pain scores.

The External Range of Motion In both groups, that is, Group A and Group B, there was a statistically significant difference between EXRT of group A and EXRT of group B. The mean improvement observed in Group A is 0.000 and in Group B is 0.001. Both groups improved significantly in external range of motion.

The Abduction Range of Motion In both groups, that is, Group A and Group B, there was a statistically significant difference between ABD of group A and ABD of group B. The mean improvement observed in Group A was 0.037 and in Group B is 0.081. Both groups improved significantly in abduction range of motion.

DISCUSSION

The present study was designed to know the effectiveness of movement with mobilization techniques adjunct with ultrasound in the treatment of idiopathic shoulder adhesive capsulitis by comparing with movement with mobilization alone. While analyzing the outcome measures of this study, it was observed that both the groups have shown significant improvement over time. Both the groups showed reduction in pain scores, and this is in agreement with previous study suggesting that mobilization reduces pain due to neurophysiologic effects on the stimulation of peripheral mechanoreceptors and the inhibition of nociceptors.6

The activation of apical spinal neurons as a result of peripheral mechanoreceptor by the joint mobilization produces presynaptic inhibition of nociceptive afferent activity. Mechanical force during mobilization may include breaking up of adhesions, realigning collagen or increasing fiber glide when specific movements stress the specific parts of the capsule.

The ongoing circulatory stasis may lead to ischemia and the potential for intraneural edema, inflammation, and fibrosis. The therapeutic ultrasound has an effect on fluid flow as blood flow in the vessels supplying the nerve fibres and synovial fluid flow surrounding the avascular articular cartilage. This, by a pressure gradient, is generated which helps in facilitating exchange of fluid, that is, increased venous drainage and dispersing the chemical irritants. This causes a reversal of the ischemia, edema, and inflammation cycle and reduces joint effusion and relieves pain by reducing the pressure over the nerve endings. The neurophysiologic effect is based on the stimulation of peripheral mechanoreceptors and inhibition of nociceptors. In Group A, noticeable improvement may be due to beneficial effect of exercise with therapeutic protocol. Many studies have claimed that exercise program is the most effective treatment for shoulder adhesive capsulitis. 8

The exercises within the pain free range of motion stimulates mechanoreceptors and decreases pain. Exercises within pain free range also move the synovial fluid, thus decrease inflammation and decrease pain. Both groups improved significantly in range of motion of external rotation

and abduction Ranges. Both groups improved significantly in abduction range of motion. And Group A shows a statistically significant improvement in ROM than Group B. Considering the pathology of adhesive capsulitis wherein there is a contracture of joint capsule along with other periarticular structures, the effects of mobilizations allow for stretching of the shortened and contracted soft tissues, besides providing the necessary translational movements required to gain the normal physiological movements of the shoulder thus inducing beneficial effects[9].

The predominant adhesive capsule and associated soft tissue tightness of frozen shoulder have been commonly addressed in clinical treatment approaches by mobilization techniques. Mobilization techniques improve the normal extensibility of the shoulder capsule and stretch the tightened soft tissues to induce beneficial effects. It may be attributed to the fact that the intent of end-range mobilizations is not only to restore joint play but also to stretch contracted periarticular structures thought to increase the proprioceptive and kinesthetic sensation in the joint thus individuals can do the activities in newly gained range of motion. So person can maintain the improved range of motion by using the joint appropriately. This result supports the findings of previous studies showing improvement after mobilization in adhesive capsulitis. Group A received ultrasound therapy, so this can be reason for improvement in group A. It has been proved that ultrasound increases the extensibility of the soft tissue on the basis of creep response thus altering the viscoelastic properties and range of motion can be gained. 10

Individuals need to do the activities in newly gained range of motion to maintain motion at the joint. This result supports the findings of previous studies showing improvement after exercises in adhesive capsulitis. Group A received ultrasound additionally so this may be the reason of greater improvement compared to Group B. Rationale behind improvement in functional capacity might be due to ease in pain and increased range of motion, consequently reduced suffering in daily activities, pain with specific tasks, and difficulty in moving arm and lifting actions. Both groups had reduction in their pain and improved their range of motion. Whereas Group A improved better in terms of pain and range of motion, then the group B.11

The Results of this study after analysis were directed towards the conclusion that movement with mobilization technique with therapeutic ultrasound protocol is more effective for treating idiopathic shoulder adhesive capsulitis, as the experimental group (Group A) has shown significant improvement than the control group (Group B) in all outcome parameters. The results were significant at with 95% confidence interval in between the groups for pain intensity and the range of motion of abduction and external rotation of shoulder. Thus, these results allowed rejection of the null hypothesis and thereby supported to accept the experimental hypothesis. 12

CONCLUSION:

It is concluded that the Movement with mobilization (MWM) technique combined with ultrasound is more effective than Movement with mobilization (MWM) technique in the physical therapy management of pain and range of motion (ROM).

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