

## Review Article

# PHYSIOTHERAPY INTERVENTIONS FOR ADHESIVE CAPSULITIS OF SHOULDER: A SYSTEMATIC REVIEW

Jacob Isaac Jason \*, Ganesh Sundaram S, Vengata Subramani M.

Department of Physiotherapy, Faculty of pharmacy and health sciences, Universiti Kuala Lumpur - Royal College of Medicine Perak, Malaysia.

## ABSTRACT

**Objective:** The purpose of this study was to conduct a systematic review on various physiotherapy management for adhesive capsulitis of shoulder.

**Methods:** A search of the literature was conducted using Clinical Key, ProQuest and PEDro databases up to September 2015. Search limits included the English language and human studies. Search terms included adhesive capsulitis, frozen shoulder, Physical therapy, Physiotherapy etc.

**Inclusion criteria:** Systematic reviews and randomised controlled trials (RCTs) in English language were included if they fulfilled the following criteria: (a) patients with adhesive capsulitis were included, (b) results on pain and function were reported, and (c) a study period of at least two weeks was reported. Articles were assessed using the Jadad (1) scale and Physiotherapy Evidence Database (PEDro) scale. 'High-quality' was defined as a "yes" score of 50% in Jadad scale and a PEDro rating of 5 out of 10. Totally 17 studies were selected for this systematic review.

**Conclusion:** This study has found sufficient level of evidence for physiotherapy in the treatment of adhesive capsulitis the shoulder. In particular, manual treatment must be combined with commonly indicated exercise or conventional physiotherapy, as it remains the standard care.

**KEY WORDS:** Adhesive capsulitis, frozen shoulder, Physiotherapy.

**Address for correspondence:** Mr.Jacob Isaac Jason, MPT, Lecturer, Department of Physiotherapy, Faculty of pharmacy and health sciences, Universiti Kuala Lumpur - Royal College of Medicine Perak, Malaysia. **E-Mail:** [jisaacjason@gmail.com](mailto:jisaacjason@gmail.com)

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## INTRODUCTION

Adhesive capsulitis is one of the most common problems of the arm. This condition is a challenge for Physiotherapists, as it is difficult to treat and may last for several weeks. It is a painful and disabling condition and the aetiology is unclear. Adhesive capsulitis is caused by tightening of the joint capsule and results in stiffness and pain. Adhesive capsulitis occurs in three distinct stages. The first stage is called the freezing stage. As the symptoms progress, pain becomes worse and ROM becomes more restricted. This phase lasts between 3 to

9 months and is characterized by an acute synovitis of the gleno-humeral joint [1,2].

The second stage is called the frozen or transitional stage. During this stage use of the arm may be limited. The frozen stage lasts anywhere 4 to 12 months. The capsular pattern is reduced external shoulder rotation followed by shoulder flexion, and internal rotation [2].

The third stage begins when ROM begins to improve and is called the thawing stage. This stage lasts from 12 to 42 months and is defined by a gradual return of shoulder mobility [2].

Prolonged immobilization of a joint has been shown to cause several detrimental pathophysiological findings including decreased collagen length, ligament atrophy resulting in decreased stress absorption, collagen band bridging across recesses, random collagen production, and altered sarcomere number in muscle tissue [3].

Possible causes of secondary adhesive capsulitis are of systemic, extrinsic, or intrinsic nature. Systemic causes include diabetes mellitus, thyroid dysfunction, and hypoadrenalism. Extrinsic causes include cardiopulmonary conditions, cervical spine diseases, and stroke, Parkinson's disease, and humerus fractures. Possible intrinsic factors are rotator cuff pathologies, biceps tendinitis, calcific tendinitis, and acromio-clavicular joint arthritis. Likewise, the presence of recent surgery, immobilization, trauma, and even Dupuytren's disease has also been associated with the development of secondary adhesive capsulitis [4].

Early diagnosis of this condition can be difficult and patients visit the clinic belatedly, often with a prior diagnosis of rotator cuff pathology. Some patients have even undergone prior surgical procedures to treat sub acromial pathology [3]. The most efficient treatment for this common disease is still under debate, and no standard treatment has been established yet. Several treatment options have been proposed, such as rest, physical therapy, medication with nonsteroidal anti-inflammatory drugs, calcium deposit needling, localized injection of anaesthetics or corticosteroids, and extracorporeal shock wave therapy. ESWT has been recommended as a second-line therapy before surgery is performed [5].

The treatment protocols for adhesive capsulitis and number of sessions required for a therapeutic effect have not been adequately addressed by the literature. The aim of this study was to analyse the scale of research into the management of adhesive capsulitis by systematically determining what research has been done before this review.

## METHOD

**Search strategy:** A literature search regarding adhesive capsulitis treatment was performed on Clinical Key, ProQuest and PEDro databases.

Search terms included adhesive capsulitis, frozen shoulder, Physical therapy and Physiotherapy. Case studies, duplications, conference proceedings, and discussion papers were removed. The articles were then assessed for quality using the Jadad scale and Physiotherapy Evidence Database (PEDro) scale.

**Inclusion criteria:** Systematic reviews and randomised controlled trials (RCTs) were included if they fulfilled the following criteria: (a) patients with adhesive capsulitis were included, (b) results on pain and function were reported, and (c) a study period of at least two weeks was reported. Studies in English language only were included due to lack of resources to translate.

**Study selection:** Two reviewers independently selected potentially relevant studies from the full-text articles. A consensus method was used to solve disagreements regarding inclusion of studies.

**Categorization of the literature:** The selected articles are categorized as Systematic reviews and randomised controlled trials (RCTs). Randomised controlled trial category contains all RCTs published up to the search date of the systematic review (September 2015).

**Methodological quality assessment:** Two reviewers assessed the methodological quality of each RCT using the 5 quality criteria of Jadad [1] (Table 1) and Physiotherapy Evidence Database (PEDro) scale. 'High-quality' was defined as a "yes" score of 50% in Jadad scale and a PEDro rating of 5 out of 10.

**Table 1:** JADAD Scale for methodological quality [1].

| How points are awarded:  |                    |
|--|--------------------|
| 1) Is the study randomised?  | If yes, + 1 point. |
| Is the randomisation procedure appropriate and reported in the study?                        |                    |
| If yes, +1 point. If no, delete all points awarded for randomisation.                        |                    |
| 2) Is the study double blind?  | If yes, + 1 point. |
| Is the double blinding method appropriate and reported in the study?                         |                    |
| If yes, +1 point. If no, delete all points awarded for double blinding.                      |                    |
| 3) Are the reasons for patient withdrawals and dropouts described, for each treatment group? | If yes, +1 point   |

The minimum score possible for inclusion of a study in the review was 2 (one point each for randomisation and double blinding). The maximum score possible was 5 (2 points for descriptions of randomisation, 2 points for descriptions of double blinding, and 1 point for

descriptions of withdrawals).

## RESULTS

Characteristics of the included studies: The literature search resulted in 5 RCTs from the PEDro database. Via ProQuest (11) RCTs, via Clinical Key 1 systematic review and 4 RCTs were found. Totally **17 studies** were included for this systematic review.

Methodological quality: Out of the 5 RCTs from PEDro one study focussed on economic evaluation and one study included arthroscopy. So only 3 studies from PEDro were included in this review. Of the 11 RCTs from ProQuest 1 was a case report and 1 study did not have a control group. So 2 RCTs from ProQuest were excluded from this review.

**Systematic review:** Manipulative therapy for shoulder pain and disorders: a systematic review: Brantingham et al. 2011 [6] conducted a search of the literature using the Cumulative Index of Nursing Allied Health Literature. PubMed; Manual, Alternative, and Natural Therapy Index System; Physiotherapy Evidence Database; and Index to Chiropractic Literature dating from January 1983 to July 7, 2010. There is fair evidence for the treatment of adhesive capsulitis, and soft tissue disorders using MMT to the shoulder.

### Randomised Controlled Trials

Effects of whole-body Cryotherapy: Ma et al. [7] compared two different treatment approaches - physical therapy modalities, and joint mobilization Vs whole-body cryotherapy for symptoms of adhesive capsulitis of the shoulder (N=30). Significant difference between groups was found for all the outcome measures with greater improvements in the whole-body cryotherapy group ( $P < .01$ ).

Effects of extracorporeal shockwave therapy: Chen C Y et al. conducted a clinical trial [8], (n=40) on primary adhesive capsulitis to find whether extracorporeal shockwave therapy can improve primary adhesive capsulitis better than oral steroid therapy. Patients were allocated to the oral steroid group or ESWT group. Outcome measures are the Constant Shoulder Score and Oxford Shoulder Score. Results showed that ESWT group showed significant improvement and can be an alternative treatment for primary

adhesive capsulitis of the shoulder.

Low-power laser treatment: In a study by Stergioulas A [9] sixty-three patients with frozen shoulder were randomly assigned into two groups. Compared to the placebo group, the active laser group had significant decrease in pain scores at the end of 4 and 8 week of treatment, and at the end of 8 week follow-up, a significant decrease in shoulder pain and disability index (SPADI) scores and Croft shoulder disability questionnaire scores, a significant decrease in disability of arm, shoulder, and hand questionnaire (DASH) scores at the end of 8 week of treatment, and at 16 week post treatment; and a significant decrease in health-assessment questionnaire (HAQ) scores at the end of 4 week and 8 week of treatment. The results suggested that laser treatment was more effective in reducing pain and disability scores than placebo.

Ultrasound with end Range Mobilization Vs Cryotherapy with end Range Mobilization: Ansari SN et al. [10] conducted a study to check the effectiveness of Ultrasound with end range mobilization in alleviating pain of patients with frozen shoulder. Forty subjects with frozen shoulder were randomly assigned to two groups. Subjects in Group 1 received Ultrasound and End range mobilization of shoulder while subjects in Group 2 got Cryotherapy and End range mobilization of shoulder. Both the groups were treated once a day, 6 days a week for 4 weeks. Response to pain was the outcome measure. Ultrasound with end range mobilization produced better pain relief compared to cryotherapy with end range mobilization.

Effect of axillary ultrasound and laser combined with post-isometric facilitation: Elhafez HM et al. [11] conducted a randomized clinical trial study on Fifty-nine participants. They were assigned into three equal groups of fifteen. The subjects were blinded to their group allocation. Standard care group (A) received traditional physical therapy treatment in the form of pulsed ultrasound, scanning laser, supervised exercise program and home exercise program; Group B received the same physical therapy program as Group A except that the ultrasound and scanning laser were applied to the axillary region of the painful shoulder (the new technique); Group C received the same modified physical therapy

program as Group B plus post-isometric facilitation technique to the painful shoulder. The results concluded that combining axillary ultrasound and laser with post-isometric facilitation had a greater (short term) effect in reducing pain and improving shoulder ROM in patients with shoulder adhesive capsulitis.

Continuous passive motion: Dundar U et al. [12] conducted a study to compare the response with different treatment methods [CPM vs. conventional physiotherapy treatment] for adhesive capsulitis. Patients were assigned randomly for CPM treatment or CPT protocol and parameters were measured. All patients were evaluated for pain at rest, movement, night, measurement of range of motion constant functional shoulder score and the shoulder pain and disability index at baseline, and at weeks 4 and 12. CPM treatment provides better response in pain reduction than the conventional physiotherapy treatment in the early phase of treatment in adhesive capsulitis.

Static progressive stretch device plus traditional therapy Vs traditional therapy alone: Ibrahim M et al. [13] conducted a study to compare the effect of static progressive stretch device plus traditional therapy with traditional therapy alone for the treatment of adhesive capsulitis. After the intervention, there were significant ( $P < 0.05$ ) difference between the groups for all outcome parameters: 0.3 for mean VAS scores [95% confidence interval (CI) -0.6 to 1.1], -10.1 for DASH scores.

Effectiveness of PNF Stretching and Self Stretching: In a study by Mehta H et al. [14] 30 subjects having adhesive capsulitis of shoulder with restriction of external rotation and abduction were included and subjects were randomly divided into two groups. Group A: (n=15) treated with PNF stretching. Group B: (n=15) Treated with self-stretching. Analysis was based on ROM and Shoulder Pain and Disability Index scores. PNF Stretching was more effective in improving gleno-humeral joint mobility and reducing disability as compared to Self-Stretching.

Effectiveness of Sustained Stretching of the Inferior Capsule: In this study by Paul A et al. [15] a total of 100 participants were randomly assigned to experimental group and a control

group, with each group having 50 subjects. The control group received physiotherapy and the experimental group received counter-traction and physiotherapy for 2 weeks. The outcome measures used were ROM, VAS, and the Oxford Shoulder Score. Results indicate that shoulder counter-traction along with physiotherapy improves shoulder function in frozen shoulder patients.

Stretch Glides for patients with Primary Adhesive Capsulitis: In this study by Joshi P et al. [16] 30 subjects were divided into two groups - Anterior stretch glide (ASG) and Posterior stretch glide (PSG). Each group received ultrasound, exercise protocol and their designated glides for 2 weeks. It is found that anterior stretch glide is very effective in reducing pain and increasing external rotation range of motion in patients with primary adhesive capsulitis.

Effectiveness of Soft Tissue Mobilization Preceding Joint Mobilization Technique: Deshmukh SS et al. [17] compared the efficacy of treatment strategies - Myofascial release Arm-pull technique and Maitland's joint mobilization technique in patients with adhesive capsulitis. 30 subjects fulfilling the inclusion criteria were selected and randomly allocated into 2 Groups, Group I: Control Group - Maitland's mobilization + Exercises, Group II: Experimental Group - MFR Arm pull + Maitland's mobilization + Exercises. Statistical analysis showed significant difference in Myofascial release Arm pull technique preceding Maitland's mobilization with respect to pain, function and ROM.

Joint mobilization versus self-exercises: The purpose of this study conducted by Tanaka K et al. [18] was to find the management for limited gleno-humeral joint mobility (LGHM) due to adhesive capsulitis based on the frequency of sessions for joint mobilization and the self-exercise compliance. Patients (n=120) were divided randomly into high-frequency session group (HF group, more than two times a week), moderate-frequency session group (MF group, once a week), and low-frequency session group (LF group, less than once a week). Results indicated that the effectiveness of self-exercise depends on the frequency of treatment. Significant improvements seen in the dominant-handedness group, in which patients would use

**Table 2:** Summary of published studies on the physiotherapy management of adhesive capsulitis.

| Author                  | Intervention   | Control   | Duration                  | Result   |
|-------------------------|--|---|---------------------------|--|
| Brantingham et al. 2011 | Manipulative therapy (Systematic review)                                       | -   | Jan. 1983 to July 7, 2010 | Fair level of evidence for MMT   |
| Ma et al. 2013          | Whole-body cryotherapy   | Physical therapy modalities and joint mobilization        | 4 weeks                   | Significant improvement in WBC group (Ps <.01).  |
| Chen et al. 2014        | Extracorporeal shockwave therapy   | Oral steroid therapy                                      | 12 weeks                  | Significant improvement in EST for both the CSS and OSS (P = .041 and P = .045, respectively)  |
| Stergioulas 2008        | Low-power laser  | Placebo laser treatment                                   | 8 weeks                   | Significant improvement in all outcome measures  |
| Ansari & Shah 2013      | Ultrasound with end range mobilization   | End range mobilization of shoulder                        | 4 weeks                   | Significant difference between the two groups to infer the effectiveness of UST and ERM over Cryotherapy   |
| Elhafez & Elhafez 2015  | Axillary ultrasound and laser with post-isometric facilitation                 | Supervised exercise program and home exercise program     | 4 weeks                   | Significant improvement in experimental group after treatment and after 4 weeks follow up (P < 0.05)   |
| Dundar et al. 2009      | Continuous passive motion  | Conventional physiotherapy treatment                      | 12 weeks                  | CPM group showed better shoulder pain index scores than the CPT group  |
| Ibrahim et al. 2014     | Static progressive stretch device  | Traditional therapy                                       | 4 weeks                   | (P < 0.05) Significant improvement for SPSSD   |
| Mehta et al. 2013       | PNF Stretching   | Self-stretching   | 4 weeks                   | PNF Stretching showed significant improvement in ROM and SPADI   |
| Paul et al. 2014        | Counter-traction   | Conventional Physiotherapy                                | 2 weeks                   | Sixty percent of the participants (n = 30) were improved to the fourth stage of satisfactory joint function according to the Oxford Shoulder Score in the experimental group (p < 0.001) |
| Joshi & Jagad 213       | Stretch Glides   | Ultrasound, same exercise protocol                        | 2 weeks                   | Anterior stretch glide is more effective in improving shoulder external rotation and pain.   |
| Deshmukh et al. 2014    | Myofascial release Arm-pull technique  | Maitland's mobilization + Exercises                       | 3 weeks                   | Myofascial release Arm pull technique showed significant results in reducing symptoms as well as improving functional abilities  |
| Tanaka et al. 2010      | High-frequency session   | Conventional Physiotherapy Protocol                       | 5 months                  | High frequency of sessions in the hospital setting may be effective to increase the compliance level.  |
| Vermeulen et al. 2006   | High-grade mobilization techniques (HGMT)                                      | Passive mobilization techniques within the pain-free zone | 12 weeks                  | Statistically significant improvement found in the HGMT group for passive abduction  |
| Shah & Misra 2013       | Maitland Mobilization Technique  | Moist pack, active ROM exercises                          | 2 weeks                   | Significant ROM improvement was seen in Maitland mobilization group and reduction in pain was seen in MET group  |
| Yang et al. 2012        | End-range mobilization, mid-range mobilization, and mobilization with movement | Pendular exercises and scapular setting                   | 12 weeks                  | Statistically significant improvements were found in ERM and MWM. Additionally, MWM corrected scapula-humeral rhythm significantly   |
| Yang et al. 2012        | End-range mobilization/scapular mobilization treatment approach (EMSMTA)       | Standardized physical therapy program                     | 8 weeks                   | Subjects in the EMSMTA group experienced greater improvement in outcomes compared with the criteria-control group at 4 weeks   |

the affected shoulder in everyday life. The finding suggests that high frequency of sessions may be effective to increase the compliance level.

Effectiveness of high-grade mobilization techniques (HGMT) Vs low-grade mobilization techniques (LGMT): Vermeulen HM et al. [19] compared high-grade mobilization techniques (HGMT) with that of low-grade mobilization techniques (LGMT) in subjects with adhesive capsulitis of the shoulder. 100 subjects with unilateral adhesive capsulitis lasting 3 months or more and 50% or more decrease in passive joint mobility were enrolled in this study. Subjects randomly assigned to the HGMT group were treated with intensive passive mobilization techniques in end-range positions, and subjects in the LGMT group were given passive mobilization techniques within the pain-free zone. The duration of treatment was 12 weeks. Subjects were assessed at baseline and at 3, 6, and 12 months. Primary outcome measures included active and passive range of motion and shoulder disability (Shoulder Rating Questionnaire [SRQ] and Shoulder Disability Questionnaire [SDQ]). HGMT are more effective in improving gleno-humeral joint mobility and reducing disability than LGMTs.

Maitland Mobilization Technique Vs Muscle Energy Technique: In this study by Shah AS et al. (20) 30 subjects with adhesive capsulitis were selected and were assigned in two groups with 15 subjects each. Group A received moist pack, active ROM exercises and Maitland mobilization. Group B received moist pack, active ROM exercises and Muscle Energy Technique (MET). Both the groups were treated 6 times a week for 2 weeks. All the subjects were measured for pain by VAS, ROM on first day before start of treatment and on 15th day after treatment. There was significant improvement in pain and ROM in both groups. ROM improvement was seen more in Maitland mobilization group and pain reduction was seen more in MET group.

Comparing 3 mobilization technique-end-range mobilization (ERM), mid-range mobilization (MRM), and mobilization with movement (MWM): In this comparative study by Yang J et al. [21] 3 mobilization techniques-end-range mobilization (ERM), mid-range mobilization (MRM), and

mobilization with movement (MWM) was applied on subjects (n= 28) with frozen shoulder syndrome. The duration of each treatment was 3 weeks, for a total of 12 weeks. Outcome measures included the functional score and shoulder kinematics. Statistically significant improvements were found in ERM and MWM. MWM corrected scapula-humeral rhythm significantly better than ERM.

Effectiveness of the end-range mobilization and scapular mobilization approach: In this study by Yang J et al. [22] 34 subjects with FSS (Frozen shoulder syndrome) were included. Eleven subjects were assigned to the control group, and 23 subjects were randomly assigned to the criteria-control group with a standardized physical therapy program or to the EMSMTA (end-range mobilization/scapular mobilization treatment approach) group. The treatment session is twice a week for 8 weeks. Range of motion (ROM), disability score, and shoulder complex kinematics were measured at the beginning, 4 weeks, and 8 weeks. Subjects in the EMSMTA group experienced greater improvement than criteria-control group at 4 weeks.

## DISCUSSION

Various treatments have been suggested for adhesive capsulitis. The purpose of this systematic review was to analyse the literature about various physical therapy treatment available for adhesive capsulitis. We identified seventeen studies that studied the effectiveness of physiotherapy modalities for the treatment of adhesive capsulitis. One possible limitation of our study is the importance given for RCTs.

When selecting a physical treatment method for adhesive capsulitis, it is extremely important to consider the patient's symptoms, stage of the condition, and recognition of different patterns of motion loss.

There is a fair level of evidence for manual mobilisation techniques with exercise for adhesive capsulitis. Generally, the greatest change noted with MMT indicated a change or increase in ROM and function rather than pain. The study on the effect of scapular mobilisation [22] also suggest that insufficient scapula-humeral rhythm and posterior tipping of the

scapula during arm elevation are important to consider in rehabilitation of patients with adhesive capsulitis. Usage of a static progressive stretch device has a beneficial long-term effect on shoulder range of motion, pain and functional outcomes in patients with adhesive capsulitis of the shoulder. Robertson [23] reported the usage of ultrasound therapy in treatment of patients with frozen shoulder. According to him, active therapeutic ultrasound is used for treating people with pain and musculoskeletal injuries to promote soft tissue healing. Both thermal and non-thermal effects of UST are proven beneficial in reducing inflammation and improve tissue extensibility. The increased pliability of the tissue along with the reduction of inflammation as a part of thermal effects of UST paves way for aggressive mobilization of shoulder with low perception of pain. Continuous passive motion (CPM) is also an established method of preventing joint stiffness and of overcoming it.

Treatment strategies targeting abnormal shoulder kinematics may prevent stiffness or if stiffness develops, shorten its duration. Shoulder motion occurs in multiple planes of movement. Loss of shoulder mobility can result in significant functional impairment. The traditional treatment approach to restore shoulder mobility emphasizes mobilization of the shoulder. But forced elevation in a stiff and painful shoulder can be painful and potentially destructive to the gleno-humeral joint. McClure et. al [24] suggested that to make improvements in the mobility of a stiff shoulder, treatment should be aimed towards applying tension to the capsule, extra capsular ligaments, and tendons of the rotator cuff, in an effort to elongate the restricting tissues. Low-load stretches had been advocated as an effective technique to increase extensibility of the GH capsule.

In a study on the effect of ESWT [8] patients showed functional outcome improvement regardless of whether they were treated with ESWT or oral steroids, but those who received ESWT had faster and better improvements. Also it is found that the axillary application of ultrasound and laser could replace the traditional application (above the shoulder) for faster

recovery of patients with shoulder adhesive capsulitis. Adding post-isometric facilitation technique along with the above treatments may give better recovery.

However it should also be noted that aggressive physical therapy can exacerbate pain and diminish adherence to the treatment plan. So caution should be exercised in patients who have a high degree of pain and stiffness.

## CONCLUSION

This study has found sufficient level of evidence for physiotherapy in the treatment of adhesive capsulitis the shoulder. In particular, manual treatment must be combined with commonly indicated exercise or conventional physiotherapy, as it remains the standard care. This study is intended to guide Physiotherapists in the appropriate use of MMT, soft tissue technique, exercise, and/or electrotherapy for the treatment of adhesive capsulitis in the context of available evidence. More studies are also needed for more definitive conclusions about long-term outcomes.

## ABBREVIATIONS

RCT: Randomised Controlled Trial  
 ESWT: Extra Corporeal Shockwave Therapy  
 CPT: Conventional Physiotherapy Treatment  
 SPADI: Shoulder Pain And Disability Index

**Conflicts of interest: None**

## REFERENCES

- [1]. Hinett K. Quality and assessment. *Qual Assur Educ.* 1996;1(1):53–10.
- [2]. Manske RC, Prohaska D. Diagnosis and management of adhesive capsulitis. *Curr Rev Musculoskelet Med.* 2008;(May):1–10.
- [3]. Mangine RE, Heckmann T E-MM. Alternative techniques for the motion-restricted shoulder. J A, K W, editors. *The athletes shoulder.* Churchill Livingstone; 1994.
- [4]. Struyf F, Meeus M. Current evidence on physical therapy in patients with adhesive capsulitis: What are we missing? *Clin Rheumatol.* 2014;33(5):593–600.
- [5]. Kim Y-S, Lee H-J, Kim Y, Kong C-G. Which method is more effective in treatment of calcific tendinitis in the shoulder? Prospective randomized comparison between ultrasound-guided needling and extracorporeal shock wave therapy. *J Shoulder Elbow Surg* 2015 Sep 15; 23(11):1640–6.

- [6]. Brantingham JW, Cassa TK, Bonnefin D, Jensen M, Globe G, Hicks M, et al. Manipulative therapy for shoulder pain and disorders: Expansion of a systematic review. *J Manipulative Physiol Ther* 2011;34(5):314–46.
- [7]. Ma SY, Je HD, Jeong JH, Kim HY, Kim HD. Effects of whole-body cryotherapy in the management of adhesive capsulitis of the shoulder. *Arch Phys Med Rehabil*. 2013;94(1):9–16.
- [8]. Chen C-Y, Hu C-C, Weng P-W, Huang Y-M, Chiang C-J, Chen C-H, et al. Extracorporeal shockwave therapy improves short-term functional outcomes of shoulder adhesive capsulitis. *J Shoulder Elb Surg*. Elsevier Ltd; 2014;23(12):1843–51.
- [9]. Stergioulas A. Low-power laser treatment in patients with frozen shoulder: preliminary results. *Photomed Laser Surg* 2008 Apr; 26(2):99–105.
- [10]. Ansari SN, Shah S. A Comparative Study to Find out the effect of Ultrasound with end Range Mobilization Over Cryotherapy with end Range Mobilization on Pain in Frozen Shoulder. 2013;7(4):213–8.
- [11]. Elhafez HM, Elhafez SM. Axillary ultrasound and laser combined with post-isometric facilitation in treatment of shoulder adhesive capsulitis: a randomized clinical trial. *Physiotherapy*. The Chartered Society of Physiotherapy; 2015; 101(May):e353.
- [12]. Dundar U, Toktas H, Cakir T, Evcik D, Kavuncu V. Continuous passive motion provides good pain control in patients with adhesive capsulitis. *Int J Rehabil Res*. 2009 Sep;32(3):193–8.
- [13]. Ibrahim M, Donatelli R, Hellman M, Echternach J. Efficacy of a static progressive stretch device as an adjunct to physical therapy in treating adhesive capsulitis of the shoulder: a prospective, randomised study. *Physiotherapy*. 2014 Sep;100(3):228–34.
- [14]. Mehta H, Joshi P, Trambadia H. Effectiveness of PNF Stretching and Self Stretching in Patients with Adhesive Capsulitis-A Comparative Study. *Indian Journal of physiotherapy and occupational therapy*. 2013;7(1):47–52.
- [15]. Paul A, Rajkumar JS, Peter S, Lambert L. Effectiveness of sustained stretching of the inferior capsule in the management of a frozen shoulder. *Clin Orthop Relat Res*. 2014 Jul;472(7):2262–8.
- [16]. Joshi P, Jagad B. Comparison of Stretch Glides on External Rotation Range of Motion in patients with Primary Adhesive Capsulitis. *Indian Journal of physiotherapy and occupational therapy*. 2013;7(1):202–8.
- [17]. Deshmukh SS, Salian SC, Yardi S. A Comparative Study to assess the effectiveness of Soft Tissue Mobilization Preceding Joint Mobilization Technique in the Management of Adhesive Capsulitis. *Indian Journal of physiotherapy and occupational therapy*. 2014;8(1):93–9.
- [18]. Tanaka K, Saura R, Takahashi N, Hiura Y, Hashimoto R. Joint mobilization versus self-exercises for limited glenohumeral joint mobility: Randomized controlled study of management of rehabilitation. *Clin Rheumatol*. 2010;29(12):1439–44.
- [19]. Vermeulen HM, Rozing PM, Obermann WR, le Cessie S, Vliet Vlieland TPM. Comparison of high-grade and low-grade mobilization techniques in the management of adhesive capsulitis of the shoulder: randomized controlled trial. *Phys Ther*. 2006;86(3):355–68.
- [20]. Shah AS, Misra A. Comparative Study on the effectiveness of Maitland Mobilization Technique Versus Muscle Energy Technique in Treatment of Shoulder Adhesive Capsulitis. *Indian J Physiother Occup Ther - An Int J*. 2013;7(4):1.
- [21]. Yang J, Chang C, Chen S, Wang S-F, Lin J. Mobilization techniques in subjects with frozen shoulder syndrome: randomized multiple-treatment trial. *Phys Ther*. 2007 Oct;87(10):1307–15.
- [22]. Yang J, Jan M-H, Chang C, Lin J. Effectiveness of the end-range mobilization and scapular mobilization approach in a subgroup of subjects with frozen shoulder syndrome: a randomized control trial. *Man Ther*. 2012 Feb;17(1):47–52.
- [23]. Robertson VJ, Baker KG. A review of therapeutic ultrasound: effectiveness studies. *Phys Ther*. 2001;81(7):1339–50.
- [24]. McClure PW, Blackburn LG, Dusold C. The use of splints in the treatment of joint stiffness: biologic rationale and an algorithm for making clinical decisions. *Phys Ther*. 1994 Dec;74(12):1101–7.

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