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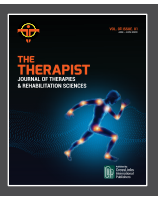

Original Article

Comparative effects of Scapular Mobilization Combined with Glenohumeral Mobilization Versus Glenohumeral Mobilization Alone on Pain, Disability and Quality of Life in Frozen Shoulder

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ABSTRACT

Frozen shoulder is an idiopathic ailment of a shoulder characterized by the onset of pain in the shoulders with no apparent cause. It is a condition which is associated with pain, weakness of muscles and restricted range of motion for months and years. **Objectives:** To compare the effects of Glenohumeral mobilization alone and Scapular mobilization combined with Glenohumeral mobilization on pain, disability, and quality of life in frozen shoulder subjects. **Methods:** Purposive sampling of frozen shoulder patients from OPDs of the Physiotherapy Department of Government hospitals in Faisalabad was used in this quasi-experimental study. Two groups of thirty people with frozen shoulders were established: First and second groups Group 1 received Glenohumeral mobilization alone for four weeks, while group 2 received Scapular mobilization with Glenohumeral mobilization. The Numeric Pain Rating Scale, Shoulder Pain Disability Scale, and Health Questionnaire were used to assess pain, disability, and quality of life respectively. SPSS version 21 was used to analyze the data**. Results:** The data analysis showed that significance value i.e., P-value is 0.05 indicating that there was greater effect of scapular mobilization combined with glenohumeral mobilization as compared to glenohumeral mobilization alone on pain, disability and quality of life in frozen shoulder patients. **Conclusions:** Scapular mobilization in conjunction with glenohumeral mobilization was more effective at reducing pain, disability, and quality of life in frozen shoulder patients than either technique alone.

INTRODUCTION

The onset of pain in the shoulders without any apparent cause is characteristic of the idiopathic condition known as frozen shoulder [1, 2]. Codman was the first to coin the term "frozen shoulder" in 1934. Codman noticed a significant decrease in forwarding. The two most important factors are elevation and outward rotation [1]. The natural history of adhesive capsulitis is divided into three stages, each of which lasts for a different amount of time. The first stage usually lasts three to six months, the second stage three to eighteen months, and the final stage three to six months. Clinically, a painful loss of active and passive shoulder mobility over time is what defines adhesive capsulitis. The prevalence of adhesive capsulitis ranges from 3 to 5 percent in the general population, but it can reach 20 percent in diabetic individuals [3]. The majority of adhesive capsulitis patients are middle-aged women, and the non-dominant arm is thought to have a prevalence of between 2% and 5%. Diabetes, thyroid

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illness, and a hereditary propensity, such as Dupuytren-like disease, are other risk factors for adhesive capsulitis [4]. Diabetes, thyroid dysfunctions, and hypoadrenalism are examples of systemic factors; Examples of intrinsic factors include rotator cuff pathologies, biceps tendinitis, calcific tendinitis, and acromioclavicular arthritis; Extrinsic factors include humeral fractures, cervical disc disease, stroke, Parkinson's disease, and cardiopulmonary dysfunction [5]. The majority of frozen shoulder instances may be treated through basic care. Nonsteroidal anti-inflammatory medications (NSAIDs), glucocorticoids administered orally or as intra-articular injections, and/or physical therapy are common conservative therapies for frozen shoulder [6]. Recent controlled clinical trials have failed to provide positive effects with steroid injections into the shoulder joint [7]. A local anesthetic can be used on patients who are in a lot of pain [8]. The MUA technique can be used and is made up of three main parts: manipulation, anesthesia, as well as arthroscopic release [9]. Apprehension and a sense of urgency for functional restoration may be reduced if they are aware and understand that it may take many years before symptoms are totally cured [10]. Physical examination plays a significant role in diagnosis which can be challenging depending on the stage of the disease and the presence of concurrent shoulder pathology [11]. It is still unclear how frozen shoulder affects those who are affected [12]. Stretching, strengthening exercises, proprioceptive neuromuscular facilitation (PNF), and mobilization therapies are all available to reduce discomfort and increase glenohumeral ROM while treating frozen shoulder. Electrotherapy methods such as ultrasound (US), interferential therapy, transcutaneous electrical nerve stimulation, short wave diathermy, and LASER are also utilized [13]. The role of scapular motion adaptation in FS rehabilitation may be important [14]. Prior to being sent to a surgeon, the majority of patients are recommended a course of physiotherapy [15]. Other treatments for adhesive capsulitis, such as ultrasound, massage, iontophoresis, and phonophoresis, have not been demonstrated to be beneficial [16]. The purpose of this study was to determine if scapular mobilization combined with glenohumeral mobilization is more effective than glenohumeral mobilization alone for improving patient recovery and rehabilitation and to provide clinicians with more information and literature regarding these combined therapies because there is a lack of it.

METHODS

It is a single blinded, Quasi-Experimental study. The methods of non-probability-purposive sampling were used. A sample size of 30 patients were calculated through the formula: $n=2\sigma^2 (Z1-\alpha+Z1-\beta)^2/(\mu o-\mu\alpha)^2$. The patients were screened and evaluated for frozen shoulder in OPDs of Physiotherapy Department of Govt. Hospitals of Faisalabad. The duration of the study was 9 months after the approval from research and ethical committee. The criteria used to select participants were; patient, both sexes, 40-60 years old, with shoulder pain and limited range of motion during flexion, abduction, and external rotation movements, as well as difficulties with ADLs. Participants were excluded on the basis of: Surgical stabilization of shoulder, Other pathological conditions including rotator cuff tear, tendonitis, Shoulder and neck region malignancies, History of trauma or accidental injuries of upper limb, History of stroke, History of mastectomy and coronary artery bypass grafting (CABG), Those with Rheumatoid arthritis, osteoporosis, or disorders of the cervical spine, elbow, wrist, or hand. Data collection tools used in this study were: Numeric pain rating scale (NPRS), Shoulder Pain and Disability index, EuroQol-5 Dimension (EQ-5D). Thirty participants were recruited according to the inclusion and exclusion criteria from different OPDs of Physiotherapy Department of Government hospitals of Faisalabad and divided into Group 1 and Group 2, containing 15 individuals each. Purpose of the study was explained to all the subjects and the written consent and demographics was obtained from them before participating in the study. Group 1 (n=15) received scapular mobilization combined with glenohumeral mobilization which includes upward rotation, downward rotation, protraction, retraction and glenohumeral mobilization which includes anterior glide, posterior glide and lateral glide holding for 5-10 seconds of 10 repetitions for four weeks. Group 2 (n=15) received glenohumeral mobilization alone which includes anterior glide, posterior glide and lateral glide holding for 5-10 seconds of 10 repetitions for four weeks. Duration of session for each group was about 30 minutes. Exercise Protocols for Scapular Mobilization and glenohumeral mobilization is given in Table 1. These interventions were given to each group thrice a week. Pain, disability and quality of life were measured at 0 week and at the end of 4 weeks of intervention. The scores of patients from these scales were analyzed to find out the effectiveness of given interventions. the variables were analyzed and their frequencies and percentages were evaluated. For within group analysis the Wilcoxon test was used and the analysis of between the two groups, the Mann-Whitney test was conducted in order to see which group shows the better results. Data were entered and analyzed by SPSS 25.0. P-value <0.05 was considered significant.

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FITT	Scapular Mobilization	Glenohumeral Mobilization
Frequency	3 times/ week	3 times/ week
Intensity	Hold 5-10 seconds 5-10 Reps	Hold 5-10 seconds 5-10 Reps
Time	30 minutes/ session	30 minutes/ session Anterior
Type	Upward rotation Downward rotation Protraction Retraction	glide Posterior glide Lateral glide

Table 1: Exercise Protocols for Scapular and Glenohumeral Mobilization

RESULTS

The frequency of all the age groups were evaluated and it showed that the most frequent age group was between 40-50 year which means the older population is more at risk of developing frozen shoulder. 53.3% females were found to have frozen shoulder which is more than males i.e., 46.7%. out of 30 participants, 12 participants didn't have any past medical history, 5 participants had Diabetes, 9 participants had Hypertension, 3 participants had both Diabetes & Hypertension and only 1 participant had past medical history of both Diabetes & Surgery. The percentages of participants with nil, Diabetes, Hypertension, Diabetes & Hypertension and Diabetes & Surgery were 40.0, 16.7, 30, 10, and 3.3 respectively. 60 % of the patients were having left side more affected than right limb (Table 2).

Variables		Frequency (Percentage)
Age	40-50	16 (53.3%)
	51-60	14 (46.7%)
Gender	Male	14(46.7%)
	Female	16 (53.3%)
Past Medical History	Nil	12 (40.0%)
	Diabetes	5 (16.7%)
	Hypertension	9 (30.0%)
	Diabetes & HTN	3 (10.0%)
	Diabetes & surgery	1 (3.3%)
Affected side	Left shoulder	18 (60.0%)
	Right shoulder	12 (40.0%)
Duration of pain	4-6 months	13 (43.3%)
	7-9 months	13 (43.3%)
	10-12 months	4 (13.3%)

Table 2: Frequencies and Percentages of variables

A Wilcoxon Signed Rank Test for group 1 indicated that NPRS score after the treatment was statistically significantly greater than the NPRS score before the treatment, Z= -3.508, p=<0.01. Total SPADI score revealed that Total SPADI score after the treatment was statistically significantly greater than the Total SPADI score before the treatment with Z-value of -3.690 and p<0.01. And Total Health score after the treatment was statistically significantly greater than Total Health Score before the treatment Z=-3.690, p<0.01. A Wilcoxon Signed Rank Test for group 2 indicated that NPRS score after the treatment was statistically significantly greater than the NPRS score before the treatment, Z= -3.448, p=<0.01. SPADI score after the treatment was statistically significantly greater than the Total SPADI score before the treatment Z= -3.520, p<0.01. and A Total Health score after the treatment was statistically significantly greater than Total Health Score before the treatment Z=-3.358, p=<0.01(Table 3).

	Variables		N	Mean Rank.	Sum of Ranks	P value
Group 1	NPRS score after intervention	Negative Ranks	15	8.00	120.00	<0.01
	NPRS score before intervention	Positive Ranks	0	.00	.00	
	Total SPADI score after intervention	Negative Ranks	15	8.00	120.00	<0.01
	Total SPADI score before intervention	Positive Ranks	0	.00	.00	
	Total Health score after intervention	Negative Ranks	15	8.00	120.00	<0.01
	Total Health score before intervention?	Positive Ranks	0	.00	.00	
Group 2	NPRS score after intervention?	Negative Ranks	14	7.50	105.00	<0.01
	NPRS score before intervention	Positive Ranks	0	.00	.00	
	Total SPADI score after intervention	Negative Ranks	15	8.00	120.00	<0.01
	Total SPADI score before intervention	Positive Ranks	0	.00	.00	
	Total Health score after intervention	Negative Ranks	13	7.00	91.00	<0.01
	Total Health score before intervention	Positive Ranks	0	.00	.00	

Table 3: Data Analysis of NPRS, SPADI And Total Health Score: (Wilcoxon Test for Within Group Analysis)

A Mann-Whitney Test indicated that NPRS score for Group 1 after the treatment was statistically significantly greater than Group 2, p=0.05. Total SPADI score after the treatment in Group 1 was statistically significantly greater than Group 2, p=0.05. And Total Health score of Group 1 after the treatment was statistically significantly greater than Group 2, p=0.05(Table 4).

Treatment Group		N	Mean Rank.	Sum of Ranks	P value
NPRS score after intervention	Scapular + Glenohumeral mobilization (Group 1)	15	18.00	270.00	0.05
	Glenohumeral mobilization alone (Group 2)	15	13.00	195.00	0.05
SPADI score after intervention	Scapular + Glenohumeral mobilization (Group 1)	15	19.00	285.00	0.05
	Glenohumeral mobilization alone (Group 2)	15	12.00	180.00	
Health score after intervention	Scapular + Glenohumeral mobilization (Group 1)	15	18.00	270.00	
	Glenohumeral mobilization alone (Group 2)	15	13.00	195.00	

Table 4: Data Analysis of NPRS, SPADI and Total Health Score: (Mann-Whitney Test for Among Group Analysis)

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The outcomes showed that there was a more tremendous impact of scapular preparation joined with glenohumeral activation when contrasted with glenohumeral activation alone on torment, handicap, and personal satisfaction in frozen shoulder patients, as the importance esteem was viewed as 0.05 for each of the three factors which demonstrated that the examination speculation was acknowledged which was expressed as the scapular assembly joined with glenohumeral assembly is more compelling for treating patients with frozen shoulder. The current study's two groups, scapular mobilization combined with glenohumeral mobilization and glenohumeral mobilization alone, both showed significant improvement in between-group analysis. However, compared to the glenohumeral mobilization group, the mean value of scapular mobilization combined with the glenohumeral mobilization group showed greater improvements in pain, disability, and quality of life.

DISCUSSION

This study's findings were in line with those of a previous one, which was conducted in 2021. That study sought to contrast passive stretching exercises with end-range mobilization and scapular mobilization in terms of pain, disability, and range of motion in a frozen shoulder. End-range mobilization and scapular mobilization were found to be significantly more effective than passive stretching exercises in reducing shoulder pain severity, functional disability, and range of motion, despite the fact that both groups showed significant improvement [17]. An experimental study was conducted in 2019 to know the effectiveness of adding scapulothoracic joint mobilization to glenohumeral joint mobilization in increasing range of motion and functional mobility in frozen shoulder. The result of this study showed that both interventions significantly increase the range of motion and functional ability in frozen shoulder. However, when compared to each other, the addition of scapulothoracic joint mobilization increases the range of motion and functional ability more than glenohumeral joint mobilization alone [18]. In the treatment of adhesive capsulitis, a 2017 study compared the outcomes of glenohumeral mobilization alone and scapular mobilization in combination. Aftereffects of this study demonstrated that glenohumeral activation when joined with scapular preparation is more viable in diminishing agony and further developing the scope of movement in patients with cement capsulitis when contrasted with the glenohumeral assembly alone [2]. In 2016, a second study was conducted to determine whether end-range mobilization combined with scapular mobilization is effective for frozen shoulders. The purpose of this study was to compare end-range mobilization with scapular mobilization to end-range mobilization alone in terms of improving shoulder function and range of motion. Additionally, the effectiveness of end-range mobilization with scapular mobilization was evaluated. The study found that end-range mobilization combined with scapular mobilization was more effective than end-range mobilization on its own [1]. However, glenohumeral mobilization has also been shown to be effective in reducing pain, disability, and range of motion in frozen shoulders in previous research. In 2021, 40 patients with frozen shoulders participated in a quasi-experimental study. The purpose of this study was to determine how end-range glenohumeral mobilization affected frozen shoulder patients. End-range glenohumeral mobilization was found to be effective in reducing pain and disability in frozen shoulder patients, according to the findings of this study [19]. In order to compare the short-term effects of glenohumeral posterior mobilization versus conventional physiotherapy on improving the range of external rotation in subjects with frozen shoulders, a randomized clinical trial was conducted in 2015. The range of motion in external rotation, pain, and functional improvement were the goals of this study. When compared to conventional physiotherapy, the findings of this study suggested that glenohumeral posterior mobilization is an effective short-term treatment for adhesive capsulitis, reducing pain and improving joint function [20].

CONCLUSIONS

In order to compare the short-term effects of glenohumeral posterior mobilization versus conventional physiotherapy on improving the range of external rotation in subjects with frozen shoulders, a randomized clinical trial was conducted in 2015. The range of motion in external rotation, pain, and functional improvement were the goals of this study. When compared to conventional physiotherapy, the findings of this study suggested that glenohumeral posterior mobilization is an effective short-term treatment for adhesive capsulitis, reducing pain and improving joint function.

Conflicts of Interest

The authors declare no conflict of interest.

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