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Original Article

Effects of Thoracic Manipulation in Increasing Rom and Pain in Frozen Shoulder Randomized Control Study

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ABSTRACT

Adhesive capsulitis is a common musculoskeletal condition that can cause discomfort and a limited range of motion (ROM) in the shoulder. Unknown is the precise pathophysiology of frozen shoulder. The tendon fibrosis and capsule contractors that limit mobility at the glenohumeral joint are often to blame. **Objective:** To determine the efficacy of thoracic spine manipulation on shoulder ROM, pain and disability in patients with frozen shoulder. **Methods:** This study was conducted in a randomized control fashion at the HHIRS Rehabilitation Department in Mansehra. Patients experiencing shoulder discomfort between the ages of 40 and 60 were included, both male and female. The analysis was carried out using SPSS version 22.0. For normality, the Shapiro-Walk test was applied. Tests both parametric and non-parametric were used to compare results within and across groups. **Results:** Friedman test presented comparison within group of variables via non parametric test for shoulder pain and ROMs. There is significant improving in variables on VAS scale and range of motions in both groups showed significant improvement $p<0.001$. Both group A and B showed statistically significant improvement in disability $p<0.001$ while in B group there was an irrelevant alteration in 3rd week. **Conclusions:** In comparison to traditional physical therapy alone, thoracic spine manipulation is more successful in improving shoulder discomfort, disability and ROM.

INTRODUCTION

Adhesive capsulitis is a common musculoskeletal disorder that can lead to shoulder disability and restricted range of movements (ROMs) with pain [1]. The exact pathophysiology of frozen shoulder is unknown. Usually it is due to capsule contractors and fibrosis of tendon that restricts the movement at glenohumeral joint [2]. Women are most effected as compare to men after the age of 40 [3]. Frozen shoulder or Adhesive capsulitis has 3 stages. It gradually evolves and stage 1 is called freezing stage which is more painful and lasts 2 to 9 months. Stage 2 lasts for 12 months with reduction in pain and restricted ROMs. Stage 3 which is called recovery stage in which ROMs get back to normal [3, 4]. Goal of supervision of frozen shoulder is to get discomfort help and avoid debility through

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physiotherapy and in intense cases steroid intra-articular injections. Therapy session include heat therapy, electrotherapy, anti-inflammatory and analgesics, steroids, mobilization and therapeutic exercise. It is observed that following these patient can recover early [5-8]. Thoracic vertebral management is beneficial in patients with frozen shoulder [9]. Hypo mobility is common at thoracic segments of spine with restricted glenohumeral joint [10]. Various studies indicated that manipulation of thoracic spine is beneficial for relieving the pain and decrease the disability of shoulder [11]. In literature thoracic manipulation showed significant improvement in blood flow of upper extremity and signify the relation between thoracic manipulation and functional capabilities of shoulder [12].

METHODS

This study was a randomized control carried out at Rehabilitation department of HHIRS, Mansehra. Duration of study among May 2020 to Sep 2020 Patients of both gender with age of 40 to 60 years having shoulder pain were included. Subjects clinically diagnosed with frozen shoulder of stage 2 or 3 with hypermobility of thoracic spine [13, 14]. Subjects with history of trauma or fracture or other thoracic pathologies were not included in the study. Participants were randomly allocated in control group A and Interventional group B. Each group had 16 participants. Subjects underwent 3 sessions per week and measurements for assessment were taken at baseline, 6th visit and last assessment was at 3rd week. Semi -structured questionnaire was used [15]. Control group underwent traditional physical therapy session which include heat therapy 8 min, TENS for 8 to 10 min, stretching and passive ROMs with 5 repetitions [16-18]. Experimental group B received conventional rehabilitation session (TENS, Heat therapy and stretching exercise) along with thoracic manipulation throughout all session. Inclinometer was used to measure shoulder range. Visual analogue scale was used for pain, DASH scale. VAS used for discomfort, In-clinometer for shoulder range ROM and DASH scale was used to assess the disability of upper extremity. Analysis was done through SPSS version 22.0. Shapiro-walk test was used for normality. Parametric and non-parametric tests were applied to evaluate the outcome between and withing groups.

RESULTS

Friedman test presented comparison within group of variables via non parametric test for shoulder pain and ROMs. There is significant improving in variables on VAS scale. And range of motions in both groups showed significant improvement p<0.001 as presented in Table 1.

Variables	Group	Baseline	2nd week	3rd week	p-value
		Median (IQR)			
VAS	A	6 (1)	4.5 (3)	3 (0)	≤0.001***
	B	8 (4)	3 (3)	3 (2.25)	
External rotation ROM	A	39.5 (5)	67.5 (9)	67.5 (9)	≤0.001***
	B	39.5 (7)	83.0 (5)	83.0 (5)	
Internal rotation ROM	A	37.5 (15)	54 (4)	54 (4)	≤0.001***
	B	28 (4)	61.5 (3)	61.5 (3)	
Flexion ROM	A	111.5 (19.5)	160 (5.75)	160 (5.75)	≤0.001***
	B	110 (10.5)	169.50 (4)	169.50 (4)	
Abduction ROM	A	92.0 (10)	154 (19.5)	154 (19.5)	≤0.001***
	B	97 (6.5)	169 (5)	169 (5)	

Tables 1: ROMs of shoulder shows significant improvement on DASH scale

Both group A and B showed statistically significant improvement in disability p<0.001 while in B group there was an irrelevant alteration in 3rd week (Table 2).

Variables		Mean ± SD	Mean diff	p-value	F-value	p-value of post hoc test
		Measurements				
DASH Group A	1st week	54.88 ± 9.06	26.12	≤0.001***	110.9	<0.001[a]
	2nd week	28.75 ± 3.66				<0.001[b]
	3rd week	26.25 ± 4.40	28.63			0.015[c]
		Measurements				
DASH Group B	1st week	51.63 ± 9.45	28.63	≤0.001***	110.9	<0.001[d]
	2nd week	23.0 ± 3.14				<0.001[e]
	3rd week	23.06 ± 2.89	28.56			1.00[f]

Table 2: Repeated Measures ANOVA test for DASH scale present SD and mean values

Variables	Groups	Mean ± SD	Mean difference	p-value
Dash score	(Control) Group A	28.63 ± 10.48	0.0625	0.985
	Group B (Experimental)	28.56 ± 8.34		
		Mean Rank	Median (IQR)	p-value
VAS score	Group A	15.50	3 (0)	0.373
	Group B	17.50		
ROM (external rotation)	Group A	9.31	75(18.5)	≤0.001***
	Group B	23.69		
ROM(flexion)	Group A	9.50	166.0(10.50)	≤0.001***
	Group B	23.50		
ROM (abduction)	Group A	9.56	164.5(17.25)	≤0.001***
	Group B	23.44		
ROM(internal rotation)	Group A	8.97	58.5(8.25)	≤0.001***
	Group B	24.03		

Table 3: Comparison between groups of pre and post end value 3rd week for VAS, DASH scale and ROMs of shoulder

DISCUSSION

A study on thoracic manipulation showed improve in shoulder ROMs and pain [19]. Result of this study overlap the outcomes of current study. Another study indicated the same effect on frozen shoulder regarding variables disability on the scale of DASH score. The result of the study showed improvement in the functional impairment of the study [20]. This project similarly to the result of our current project in relations of shoulder disability. Moreover, a study carried out on frozen shoulder to see the impact of the

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different physical therapy techniques along with manipulation techniques. The study showed that effect of conventional therapy along with additional techniques is more effective as compared to conventional therapy alone [21]. While in current study same result have found that there is significant improvement in interventional group as compared to the control group which received only conventional physical therapy. A study in 2012 reveled that there is considerable enhancement in ROMs of patients with adhesive capsulitis with reduction in pain. Similarly, current study showed significant improvement in ROMS of shoulder [22]. In a systematic review by Minkalis et al., thrust manipulation of shoulder was introduced as intervention of shoulder disability and study reported reduction in pain and disability [23]. Same findings were reported in current study in terms of shoulder disability and pain. These findings can be beneficial that manipulation of thoracic spine can be effective with other traditional physical therapies in reducing shoulder ache and disability.

CONCLUSION

Thoracic spine manipulation combined with conventional physical therapy is effective for improvement in shoulder disability, shoulder pain and ROMs as compared to conventional physical therapy alone.

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