

Effects of sequential approach of positional release for subscapularis and OLA Grimsby technique on shoulder external rotation in adhesive capsulitis

Ramish Saleem, Muhammad Salman Bashir, Rabiya Noor

Abstract

A sample of 34 patients was randomly assigned to two Groups A and B (17 in each group). Positional release of subscapularis technique to Group A participants and Proprioceptive Neuromuscular Facilitation (PNF) (hold-relax) and anterior mobilisation technique were simultaneously applied to Group B participants. Data was collected from Nusrat Abdul Rauf Centre for Enablement and Faisal Hospital, Faisalabad, from August 30, 2018 to November 27, 2018. The duration of the treatment was four weeks with three sessions per week. The main outcome measures were Numeric Pain Rating Scale (NPRS), Shoulder Pain and Disability Index (SPADI), and shoulder external rotation range of motion. The differences between Ola Grimsby group (Group B) and subscapularis release group (Group A) were statistically significant for pain, disability and shoulder range of motion (p -value <0.05) with higher mean values for Ola Grimsby group. This study concluded that the sequential effects of Ola Grimsby technique are better as compared to positional release of subscapularis in terms of reducing pain and improving shoulder external rotation range of motion.

Keywords: Pain, Frozen Shoulder

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Introduction

Adhesive capsulitis (also known as frozen shoulder) is a major health problem because of its high prevalence. It is a painful and debilitating disorder of unknown cause.¹ It is recognised as a painful condition with a sudden onset, characterised by pain, tightness, and trouble in sleeping.² It can be categorised as primary and secondary. Primary refers to the condition with an unknown cause, whereas secondary frozen shoulder is related to previous history of trauma, surgery or any other underlying systemic disease.³ Provoking conditions may be diabetes mellitus, heart disease, cervical degenerative diseases, respiratory infections, thyrotoxicosis, joint inflammation, rotator cuff pathologies, and fractures related to the shoulder joint.⁴ The limitation in motion ranges usually occurs following a

Riphah College of Rehabilitation and Allied Health Sciences, Riphah International University, Lahore, Pakistan.

Correspondence: Ramish Saleem. e-mail: ramishsaleem00@gmail.com

typical capsular pattern; external rotation being the most apprehensive, followed by abduction and then internal rotation depicting major involvement of internal rotators of the shoulder and obliteration of joint capsule.⁵ A variety of interventional techniques have been applied in physical therapy for the management of pain, restoration of range of motion, and early return to functional independence. These applications comprise anti-inflammatory injections, manipulative therapy, exercise therapy, massage techniques, electrotherapeutic modalities as well as education of the patient.^{6,7} A study described the use of mobilisation techniques for end of range of motion in patients with shoulder pathology. The study was conducted on a small population by using convenient sampling technique. Both male and female patients with pain and more than half of limited shoulder movements were included. The study results represented gains regarding pain relief and improved mobility. Movements of external rotation and abduction improved most importantly.⁸ The usefulness of proprioceptive neuromuscular facilitation techniques were studied involving male and female subjects and the outcomes demonstrated significant improvement in shoulder pain score over time and abduction range of movement. Another study, carried out to ascertain the effects of different types of mobilisation techniques on adhesive capsulitis, showed that Maitland mobilisations have greater effects in terms of increasing ROM and reducing pain and is highly recommended for frozen shoulder patients.^{9,10} The effects of mobilisation and Proprioceptive Neuromuscular Facilitation (PNF) in frozen shoulder patients were studied in conjunction with ultrasound. PNF utilises stretching inhibitory techniques where the duration of isometric contraction is 3-6 seconds, followed by 10 seconds of voluntary relaxation of muscle for further elongation of the muscle to new range. PNF produced results of improved range of motion by tissue elongation whereas mobilisation reduced ischaemia, oedema formation, and inflammation, and, hence, lessens joint effusion and pain. The study results concluded that the effects produced by PNF are greater as compared to mobilisation. An interventional study by Nehal K. Kalasva, considered the effects of Myofascial release to subscapularis and PNF in improving the external rotation range of shoulder. Myofascial release is a procedure of applying specific manual forces with a

goal to make myofascial modifications, in order to improve the length of contracted structures. Axilla is the region where palpation of subscapularis and then locating shortened bands, thereby any restricted areas, or hyper-irritable points is possible. The study outcomes revealed high improvements in lateral rotation by applying PNF.¹¹ The effects of proprioceptive neuromuscular facilitation stretching on shoulder range of motion in overhand athletes were reported. Contract-relax-contract and hold-relax-contract techniques applied on both male and female participants proved effective in improving outer rotation range of motion when performed consistently two times a week for six weeks.¹² In this study, effects of a combination of Hold-relax and Shoulder Mobilisation are addressed in terms of pain, disability, and ROM in patients with adhesive capsulitis as in previous literature both techniques were used separately for immediate effects. Unfortunately effects of sequential application of these techniques have not been addressed yet. So, there is a dire need to explore the magnitude of these effects in symptomatic population.¹³

Patients/Methods and Results

This study was a Quasi Experimental Trial. The number of study subjects was calculated to be 34 by using the G power software 3.91 version.¹⁴ By using range of motion (Mean±Std. deviation) from previous studies,² 36 patients were recruited (in order to avoid any drop-outs and follow-up) by assuming 10% attrition rate with power of 80%, 5% margin of error and 95% confidence interval. Data was collected from Nusrat Abdul Rauf Centre for Enablement and Faisal Hospital, Faisalabad, from August 30, 2018 to November 27, 2018. Purposive sampling technique was used. Patients were included in the study after they signed a consent form. Group A was treated with Positional release subscapularis (identified restrictions were treated with Myofascial Release Technique utilising a combination of sustained manual pressure and slow deep strokes for seven minutes). Group B was provided with Proprioceptive Neuromuscular Facilitation (hold relax) technique and mobilisation simultaneously. Patients were provided hold-relax with five repetitions and simultaneously anterior mobilisation with 15-20 repetitions per session. These techniques were applied thrice a week, for four weeks. Moist heat was applied as a baseline treatment for 10-15 minutes. Inclusion criteria were age between 40 and 60 years, only females, shoulder pain for more than three months and limitation of external rotation ≤ 60 degrees. Patients were excluded if they

exhibited any red flags (malignancy,¹⁵ metabolic diseases,¹⁶ rheumatoid arthritis,¹⁷ osteoporosis, prolonged history of steroid use, etc.), neurological involvement,¹⁸ history of recent shoulder trauma; fracture of humerus, scapula or clavicle, rotator cuff injuries, previous surgery, recurrent dislocation or subluxation of shoulder, and severe pain unrelieved by resting the joint.¹⁹ The socio-demographic variables of the two groups were compared showing that both the groups were equal (Table 1). Base line measurement for Numeric Pain Rating Scale score, Shoulder Pain & Disability Index score and shoulder functional mobility (Table 2) shows that both the groups were equal and comparable. The results were calculated using Independent t-test for between group comparison of NPRS, SPADI and shoulder functional mobility (Table 3).

Table-1: Comparison of Socio-Demographic Variables of the two Groups.

Study Group	n	Descriptive Statistics			
		Minimum	Maximum	Mean±SD	
Ola Grimsby	Age of participants	17	40.00	60.00	48.29±6.79
	Height of participants	17	154.94	175.26	163.61±5.46
	Weight of participants	17	62.00	82.00	70.65±5.43
	Body Mass Index	17	23.10	32.00	26.43±2.33
	Valid N (list wise)	17			
Subscapularis Release	Age of participants	17	40.00	60.00	49.47±7.27
	Height of participants	17	139.70	167.64	159.87±7.15
	Weight of participants	17	57.00	83.00	69.82±6.41
	Body Mass Index	17	24.90	33.50	27.362±2.41
	Valid N (list wise)	17			

SD: Standard deviation.

Table-2: Base line measurement for Numeric Pain Rating Scale score, Shoulder Pain & Disability Index score and shoulder functional mobility.

	Ola Grimsby (n=17) Mean ± SD	Subscapularis release (n=17) Mean ± SD	p-value
Numeric Pain Rating Scale score	5.82±1.23	5.70±1.21	0.781
Shoulder Pain & Disability Index	75.35±15.60	75.88±14.78	0.920
Shoulder Flexion	116.05±18.93	116.29±18.49	0.971
functional mobility Extension	32.52±6.206	31.76±6.19	0.721
Abduction	109.70±16.81	105.29±22.63	0.523
Internal rotation	49.58±8.88	47.64±10.517	0.565
External rotation	41.76±12.18	39.17±12.99	0.553

Table-3: Between the Group Comparison of NPRS, SPADI and External rotation.

Groups	Between the Group Comparison of NPRS, SPADI and External rotation					
	NPRS		SPADI		External rotation	
	Pre-treatment	Post-treatment	Pre-treatment	Post-treatment	Pre-treatment	Post-treatment
A	5.70±1.21	4.00±1.32	75.88±14.7	48.17±13.18	39.17±12.9	54.05±14.0
B	5.82±1.23	1.52±1.007	75.35±15.60	21.00±36.119	41.76±12.18	74.58±7.82
p-value	0.78	0.00	0.920	0.006	0.55	0.00
Inference	Non-significant	Significant	Non-significant	Significant	Non-significant	Significant

NPRS=Numeric Pain Rating Scale; SPADI=Shoulder Pain and Disability Index.

Conclusion

This study concluded that effects of sequential application of mobilisation and PNF were more significant in reducing pain and improving shoulder external rotation as compared to subscapularis release technique in adhesive capsulitis.

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Conflict of Interest: None.

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