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Research Article

Effectiveness of Shoulder Mobilization on Abduction in Dominant Versus Non-Dominant Periarthritic Shoulder

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Abstract

Background: Periarthritis Shoulder is common condition of the shoulder joint, affecting 2% of the general population. Periarthritis is characterized by initially painful and later progressively restricted active and passive range of motion of the shoulder joint. Mobilization is a passive manual therapy applied to joints and related soft tissues at varying speeds and amplitudes for therapeutic purposes. If Periarthritis shoulder has considerable effect on dominant versus non dominant shoulder, the dominant shoulder has more effects in decreasing pain and increasing movement than non-dominant shoulder. This is based on cerebral dominance, lateralization of pain and side to side symmetry.

Aim: To determine the recent research evidence for the Effectiveness of Shoulder Mobilization on abduction in Dominant or Non dominant Periarthritic Shoulder.

Method: this review includes simple randomized controlled trail (RCTS). Subjects with Periarthritis shoulder attending physiotherapy outpatient department at KGH and VAPMS College of physiotherapy would be included in this study.

Results: present outcomes show that mobilization in dominant Periarthritic shoulder is effective in reducing pain and increasing range of motion (ROM) than non-dominant Periarthritic shoulder without adverse effects.

Keywords: Shoulder Mobilization; SPADI; Periarthritis; Dominant Side; Non-Dominant Side

Abbreviations

SPADI: Shoulder Pain and Disability Index; ROM: Range of Motion; SD: Standard Deviation; PA: Periarthritis; SE: Standard Error

Introduction

Periarthritis was first identified by Neviaser in 1945, Neviaser identified "Periarthritis" is a chronic inflammatory process leading to thickening and contracture of the shoulder capsule which latter becomes adherent to the humeral head. Zuckerman and Cuomo defined the condition is distinguish by significant restriction of both active and passive shoulder motion that occurs in the absence of a known intrinsic shoulder disorder. This condition is describe as a contracted, thickened joint capsule that appears to be drawn tightly around the humeral head, with relative absence of synovial fluid, and chronic inflammatory changes within the synovial layer of the capsule leading to stiffness pain and dysfunction [1]. "Frozen shoulder" firstly named by Codman in 1934. Codman explained frozen shoulder is a painful shoulder condition with insidious onset and is gradually associated with stiffness and pain in forward elevation, external rotation, abduction movement and difficulty in sleeping over affected side. Adhesive capsulitis, Periarthritis, and

frozen shoulder are all other terms used to explain painful and stiff glenohumeral joint. Adhesive capsulitis is defined as a common condition characterized by sudden and gradual inflammation of the shoulder joint capsule which leads to contracture and thus resulting in stiffness and decreased in shoulder movements [2].

The prevalence rate of periarthritis affecting shoulder is 2-5.3%, with individuals affecting commonly at the age group of between40 to 60 years. Usually periarthritis shoulder is a self-limiting condition which may resolve within 2-3 years but it can extend beyond 3 years in up to 40% of patients. According to Smita Bhimrao 2014, Frozen Shoulder or Adhesive Capsulitis affects 3% to 5% of the general population and up to 20% in people with diabetes [4]. The incidence of Frozen Shoulder in unilateral shoulder increases the risk of contra lateral shoulder involvement with 5% to 34%. It is divided in to 4 stages with symptoms lasting for 30 months. Joint Mobilization is a form of passive movement used to treat painful and stiff synovial joints [15]. Goals

- Increase active and passive range of motions.
- Increase strength.
- Decrease pain.

SPADI is a disease specific, self-administered questionnaire that measures the impact of shoulder pathology in terms of pain and disability [25].

A Goniometer is a device that measures an angle or permits rotation of an object to a definite position [27].

Material and Methodology

- **Study Design**: Pre and posttest experimental design.
- **Sampling Method**: Random sampling method.
- **Sample size**: 30

Thirty persons with Periarthritis has been selected and assigned into two equal groups.

- **Group A:** Patients with shoulder mobilization in dominant shoulder.
- **Group B:** Patients with shoulder mobilization in non-dominant shoulder.

Study Set - up

- **VAPMS College out:** Patient department bakkanpalem, Visakhapatnam**.**
- **11B physiotherapy out:** Patient department, King George Hospital.

Duration of course-one year.

Criteria

Inclusion criteria

- Age 40-60 years
- Diabetic and non-diabetic conditions
- Gender - male and female
- Right and left side
- Periarthritis shoulder in 2nd and 3rd stages

Exclusion criteria

- Bicipital tendinitis
- Supraspinatus tendonitis
- Complete tear of rotator cuff muscle
- Unstable joint
- Fracture of shoulder
- Dislocation of shoulder
- Acromioclavicular joint tenderness
- Subacromial bursitis

Materials

- Hot Pack
- Straps and belts

Methodology

The study was designed as Simple Randomized Trial and the sample is divided into two groups. Group A is given with hot pack and Mobilization in dominant side Periarthritis patients, while

Group B is given with hot pack and Mobilization in non-dominant side Periarthritis shoulder patients.

A total of 40 patients are included as per inclusion criteria. They are randomly assignment into two groups A and B with 20 patients in each group. Baseline assessment through Visual analog scale (VAS), Shoulder pain and disability index (SPADI) and Goniometry was done respectively for Pain, Function and shoulder range of motion (abduction) for both groups. Treatment was given three times a week for four weeks (12 sessions).

- **Hot pack procedure:** Patient is in supine lying hot pack is placed on shoulder joint for 20 minutes [12].
- **Mobilization procedure:** Patient is positioned in supine lying position with shoulder abducted to 30 degrees and therapist stands in walk stand position with holding the proximal end of the humerus with one hand and maintaining a lateral humeral distraction in its midrange position with other hand. Caudal glide mobilization are given to the shoulder joint at a rate of 2-3 glides for one second for 30 seconds for each glide, given for 5 sets. The technique was applied three times a week for four weeks (12 sessions) [22].

Figure 1: Caudal glide position.

Measuring tools

Shoulder pain and disability index

The SPADI was developed by Roach and colleagues in 1991. The shoulder pain and disability index (SPADI) is a self-report questionnaire developed to measure the pain and disability associated with shoulder pathology.

SPDI is a questionnaire that consists of two sets: one for pain scale and other for disability scale (mobility). Pain scale consists of 5 questions related to the severity of individual's pain. Disability scale consists of 8 questions which are designed to measure the available range of upper extremity. To complete the questionnaire it takes 5 to 10 minutes. The patient is instructed to choose the number that describes the highest level of pain and extent of difficulty in using the involved shoulder.

The pain scale is summed up to a total of 50 and disability scale summed up to 80. Total SPADI score is expressed in percentage. A score of 0 indicates best and 100 indicates worst. A higher score indicates more disability.

How severe is your pain? **pain scale**	0= no pain; 10 = so difficulty
At its worst	0 1 2 3 4 5 6 7 8 9 10
When lying on involved side	0 1 2 3 4 5 6 7 8 9 10
Reacting for something on a high shelf	0 1 2 3 4 5 6 7 8 9 10
Touching the back of your neck	0 1 2 3 4 5 6 7 8 9 10
Pushing with the involved arm	0 1 2 3 4 5 6 7 8 9 10
Disability scale	0= no difficulty; 10 = so difficulty
Washing your hair	0 1 2 3 4 5 6 7 8 9 10
Washing your back	0 1 2 3 4 5 6 7 8 9 10
Putting on an undershirt/jumper	0 1 2 3 4 5 6 7 8 9 10
Putting on a shirt that button down the front	0 1 2 3 4 5 6 7 8 9 10
Putting on a pants	0 1 2 3 4 5 6 7 8 9 10
Placing an object on a high shelf	0 1 2 3 4 5 6 7 8 9 10
Carrying a heavy object of 10 pounds	0 1 2 3 4 5 6 7 8 9 10
Removing something from your back pocket	0 1 2 3 4 5 6 7 8 9 10

Table 1

SPADI (shoulder)

- Name
- Date

Technique

A Goniometer is an instrument which measures both active as well as passive range of motion of the joint. Positioning of the joint is important in goniometry because it helps to place the joint in a zero without any disturbances. Firstly palpate the relevant bony landmark and align the goniometer then the examiner records the starting measurement and removes the goniometer, and the patient moves the joint through the available range of motion. Once the joint run through the available range of motion, the examiner replaces and realigns the goniometer, and then mark the measurement. The examiner repeats the measurement three consequent times and calculates the average active range of motion. Then the examiner compares the readings with the contralateral side.

The joint is then moved through its passive (PROM) and the above-mentioned steps are repeated to measure PROM accurately. Care is necessary to make sure that the patient does not move his body while moving the joint, thereby ensuring accurate measurement. Any disturbed position in the joint tightens the soft tissue structures which lead to a limited range of motion [27].

Statistical test

Paired "t" test

Standard deviation

$$S = \sqrt{\frac{\sum(X-\bar{X})^2}{(n-1)}}$$

$\bar{x}$= Mean of sample

n = Number in sample

Standard error

SE = SD/√n

Level of significance

$$\text{'t'} = \frac{\bar{x}}{s/\sqrt{n}}$$

Unpaired "t" test

Standard deviation

$$S = \sqrt{\frac{\sum(X-\bar{X})^2+\sum(Y-\bar{Y})^2)}{(n_1+n_2-2)}}$$

Standard error

$$SED = S\sqrt{\frac{s_1^2+s_2^2}{(n_1 n_2)}}$$

Level of significance

$$T = \frac{(\bar{x}-\bar{y})}{SED}$$

X1	X2	X1-X2= ∑X	x^2
78.26	34.5	43.7	25
86.1	36	50.16	2.131
83.2	35.1	48.14	0.313
86.1	35.1	51	5.29
86.2	35	51.2	6.25
88.2	35	53.2	20.25
86.1	30.5	55.6	47.61
78.24	30.5	47.7	1
86.19	30.5	55.6	47.61
79.16	30.5	48.6	0.01
84.12	35.5	48.6	0.01
78.41	35.5	42.9	33.64
80.10	34	46.1	6.76
78.52	35	43.5	27.04
80.12	35	45.1	12.96
		731.1	235.8

Table 2: PAIRED "t" TEST.

SPADI on dominant shoulder (GROUP - A).

X1	X2	X1-X2= ∑X	x^2
79.12	19.1	60	0.25
79.15	17.5	61.6	4.41
80.1	19.5	60.6	1.21
80.2	20.1	60.1	0.36
79.15	19.1	60	0.25
80.1	25.1	55	20.25
80.2	19.5	60.7	1.44
80.1	18.2	61.9	5.76
79.10	19.5	59.6	0.01
79.10	18	61.1	2.56
80.1	15.5	64.6	26.01
80.1	20.1	60	0.25
79.15	25.1	54	30.25
79.15	25.1	54	30.25
80.1	20.1	60	0.25
		873.9	123.51

Table 3: SPADI on non-dominant shoulder (Group - B).

X1	X2	X1-X2= ∑X	X^2
30	75	-45	5.76
35	80	-45	5.76
30	75	-45	5.76
40	75	-35	57.7
40	75	-35	57.7
40	75	-35	57.7
30	75	-45	5.76
35	80	-45	5.76
35	80	-45	5.76
30	80	-45	5.76
35	80	-45	5.76
30	80	-50	57.7
40	80	-40	5.29
40	80	-40	5.29
40	80	-40	5.29
		-635	292.75

Table 4: Goniometer on dominant shoulder (Group- A).

X1	X2	X1-X2= ∑x	X2
35	65	-30	19.36
30	60	-30	19.36
30	60	-30	19.36
30	60	-30	19.36
30	60	-30	19.36
30	60	-30	19.36
35	65	-30	19.36
35	55	-20	31.36
35	55	-20	31.36
40	55	-15	112.3
40	60	-20	31.36
40	60	-20	31.36
35	65	-30	19.36
35	60	-30	19.36
35	60	-30	19.36
		-395	431.34

Table 5: Goniometer on non-dominant shoulder (Group-B). Unpaired "t" test.
SPADI scale on periarthritis shoulder.

X	X2	Y	Y2
34.5	1190.6	19.1	420.2
36	1296	17.5	462.2
35.1	1232	19.1	519.8
35.1	1232	20.5	420.2
35	1225	21.5	462.2
35	1225	21.5	462.2
30.5	930.2	20.8	432.6
30.5	930.2	20.5	420.2
30.5	930.2	20.5	420.2
30.5	930.2	20.5	420.2
35.5	1260.2	21.8	475.2
35.5	1260.2	22.8	519.8
34	1156	22.8	519.8
35	1225	22.8	519.8
35	1225	20.5	420.2
507.7	17247.4	321.3	6894.6

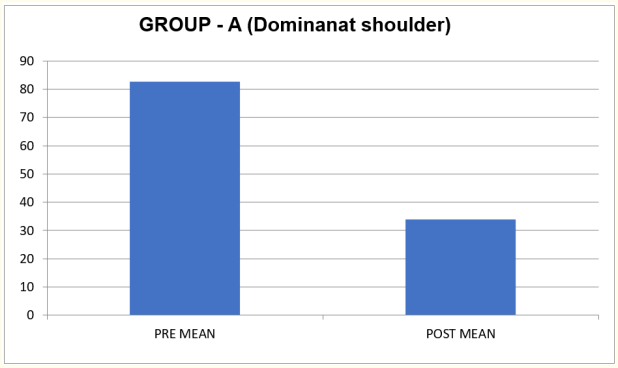
Table 6: Group A (Post intervention) Group B (Post intervention). Unpaired "t" test.
Goniometer on periarthritis shoulder.

X	X2	Y	Y2
75	5625	65	4225
80	6400	60	3600
75	5625	60	3600
75	5625	60	3600
75	5625	60	3600
75	5625	60	3600
75	5625	65	4225
80	6400	55	3025
80	6400	55	3025
80	6400	55	3025
80	6400	60	3600
80	6400	60	3600
80	640	65	4225
80	6400	60	3600
80	6400	60	3600
1170	91350	900	54150

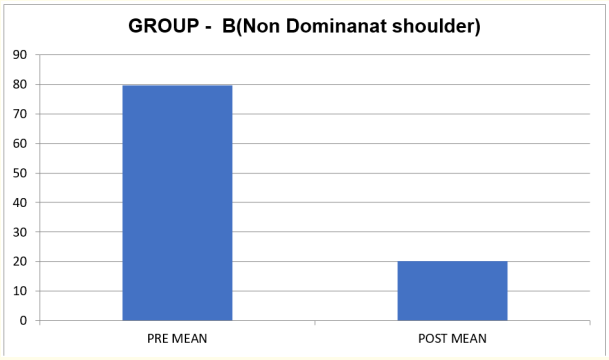
Table 7: Group A (Post intervention) Group B (Post intervention).

Data presentation

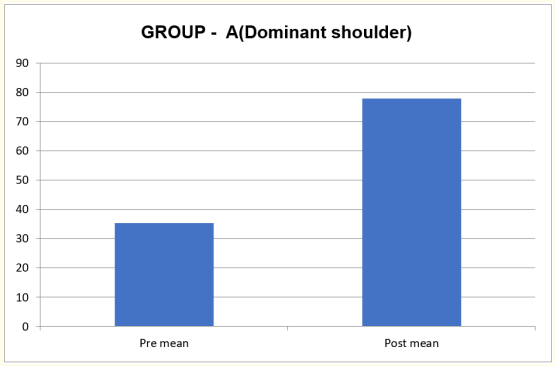
PARIED" t" - Test



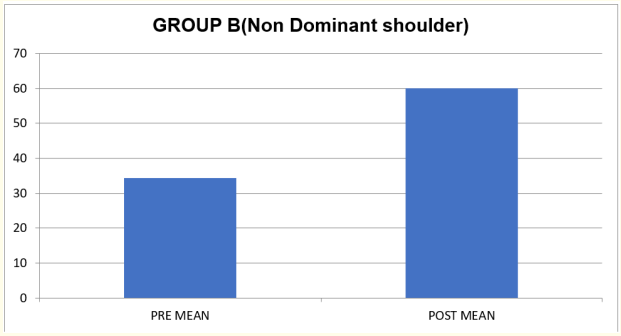
Graph 1: SPADI scale.



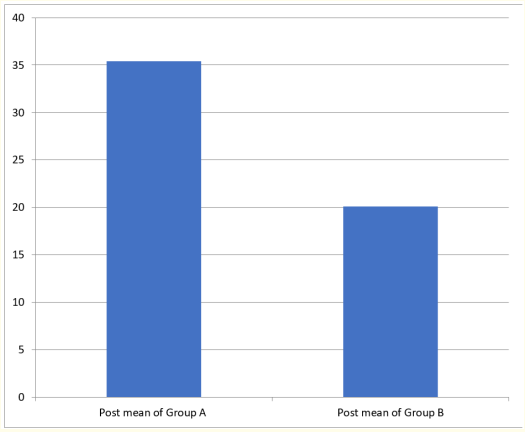
Graph 2



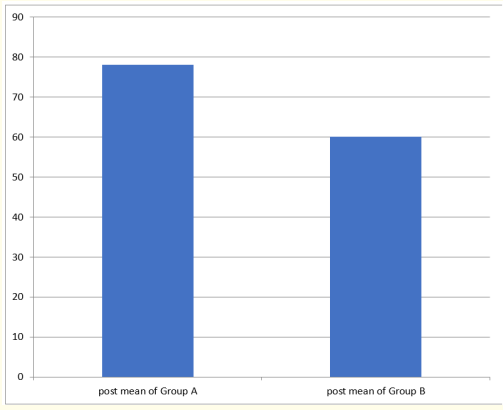
Graph 3: Goniometer scale.



Graph 4



Graph 5: Unpaired t- Test.
SPADI between group A and B.



Graph 6: Goniometer between group A and B.

Data Analysis and Results

Paired t -test

Variable	Mean	SD	SE	T14	L.O.5 at 5%
Pre-Test	82.6	4.1	1.05	45.9	0.0001
Post Test	33.8				

Table 8: SPADI scale for group a (Shoulder mobilization)

Tabulated 't' value with 14df at 0.05 level of significance in a two tailed test is 0.0001 which is lesser than the calculated 't' 45.9.

Variable	Mean	SD	SE	T14	L.O.S at 5%
Pre-test	79.6	2.96	0.76	77.6	0.0001
Post test	20.1				

Table 9: SPADI Scale for Group B (Shoulder Mobilization).

Tabulated 't' value with 14df at 0.05 level of significance in a two tailed test is 0.0001 which is lesser than the calculated 't' 77.6.

Paired t-test

Variable	Mean	SD	SE	T14	L.O.S at 5%
Pre test	35.3	4.95	1.27	- 33.3	0.0001
Post test	78.0				

Table 10: Goniometer Scale for Group-A.

Tabulated 't' value with 14df at 0.05 level of significance in a two tailed test is 0.0001 which is lesser than the calculated 't' -33.3.

Variable	Mean	SD	SE	T14	L.O.S AT 5%
Pre test	34.3	5.30	1.36	- 18.7	0.0001
Post test	60				

Table 11: Goniometer Scale for Group-B.

Tabulated 't' value with 14df at 0.05 level of significance in a two tailed test is 0.0001 which is lesser than the calculated 't' -18.7.

Unpaired t- test

Treatment	Post mean		SD	SE	T28	LOS at 5%
Shoulder mobilization	35.4	63.5	3.71	0.95	12.2	2.05
Shoulder mobilization	20.1	339.7				

Table 12: SPADI Scale.

Tabulated 't' value with 28df at 0.05 level of significance in a two tailed test is 2.05 which is lesser than the calculated 't' 12.2.

Unpaired t-test

Variable	Post mean		SD	SE	T28	LOS at 5%
Shoulder mobilization	78	90	2.53	0.65	16.2	2.05
Shoulder mobilization	60	150				

Table 13: Goniometer.

Tabulated 't' value with 28df at 0.05 level of significance in a two tailed test is 2.05 is lesser than the calculated 't' 16.2.

Results

		Experimental values	At	Table values	
T14	Paired for A SPADI SCALE	45.9	0.05	2.15	Highly significant showing that shoulder mobilization effective on dominant shoulder.
T14	Paired for B SPADI SCALE	77.6	0.05	2.15	Highly significant showing that shoulder mobilization effective on non-dominant shoulder but Group A results are better than Group B
T14	Paired for A GONIOMETER	-33.3	0.05	2.15	Highly significant showing that shoulder mobilization effective on dominant shoulder
T14	Paired for B GONIOMETER	-18.7	0.05	2.15	Highly significant showing that shoulder mobilization is effective, but Group A results are better than Group B.

T28	Unpaired A and B SPADI SCALE	12.2	0.05	2.05	Significant, null hypothesis is rejected, and Alternate hypothesis is accepted.
T28	Unpaired A and B GONIOMETER	16.2	0.05	2.05	Significant, null hypothesis is rejected, and Alternate hypothesis is accepted.

Table 14

The results are shown that better results are seen in effect of shoulder mobilization on dominant Periarthritis shoulder. Hence null hypothesis is rejected and alternate hypothesis is accepted.

Discussion

The aim of the study is to find the effectiveness of shoulder mobilization in dominant vs non dominant Periarthritis shoulder. The study was detailed to find out which group i.e., dominant or non-dominant shoulder got better outcome results.

In this study overall 30 Subjects who met the inclusion criteria are randomly allocated into 2 groups. The subjects of age between 40-60 years as per the inclusion criteria, who were suffering from Periarthritis shoulder were selected.

15 subjects with group A treated with shoulder mobilization in dominant shoulder, while the other 15 treated with shoulder mobilization on non-dominant shoulder.

Pretreatment values are taken using SPADI and GONIOMETER Scale before 4 weeks of treatment intervention, and after 4 weeks of treatment intervention. These values are analysed by paired "t "test and unpaired "t" test.

It showed that subjects from group - A showed greater improvement in movement, than compared with the subjects from group - B, subjects with group A (dominant shoulder) showed better improvement in movement because of cerebral dominance right handed individuals has increase in pain tolerance that left handed. Hence group A shown better results than group B. Based on this data we accept alternate hypothesis and reject the null hypothesis.

Periarthritis is an enigmatic condition characterized by painful, progressive and disabling loss of active and passive glenohumeral joint range of motion in multiple planes. Periarthritis typically progress through a series of stages that correspond to arthroscopic and histological findings. In the painful stage, patients often have mild shoulder pain and decreased glenohumeral joint ROM.

Master chart

S. No	Age	Sex	Pre	Post	X	X2	X-X	(X-X)2
1.	41	F	78.2	34.5	43.7	1849	-5	25
2.	45	F	86.1	36	50.16	2510.0	1.46	2.131
3.	46	M	83.2	35.1	48.14	2313.6	-0.56	0.313
4.	40	M	86.1	35.1	51	2601	2.3	5.29
5.	45	M	86.2	35	51.2	2621.42	2.5	6.25
6.	45	M	88.2	35	53.2	2830.2	4.5	20.25
7.	50	F	86.1	30.5	55.6	3091.3	6.9	47.61
8.	55	F	78.2	30.5	47.7	2275.2	-1	1
9.	52	F	86.1	30.5	55.6	3091.3	6.9	47.61
10.	53	M	79.1	30.5	48.6	2361.9	-0.1	0.01
11.	45	M	84.1	35.5	48.6	2361.9	-0.1	0.01
12.	47	M	78.4	35.5	42.9	1840.4	-5.8	33.64
13.	42	M	80.1	34	46.1	2125.2	-2.6	6.76
14.	43	M	78.5	35	43.5	1892.2	-5.2	27.04
15.	50	M	80.1	35	45.1	2034.0	-3.6	12.96
16.					731.1	35798.6	0.6	235.87

Table 15: Pre-mean = 82.6

Post mean = 33.8

SD = 4.1

SE = 1.05

T14 = 45.9.

S. No	Age	Sex	Pre	Post	X	X2	X-X	(X-X)2
1.	45	F	79.1	19.1	60	3600	0.5	0.25
2.	48	M	79.1	17.5	61.6	3794.5	2.1	4.41
3.	49	M	80.1	19.5	60.6	3672.3	1.1	1.21
4.	45	M	80.2	20.1	60.1	3612.0	0.6	0.36
5.	45	F	79.1	19.1	60	3600	0.5	0.25
6.	45	F	80.1	25.1	55	3025	-4.5	20.25
7.	46	F	80.2	19.5	60.7	3684.4	1.2	1.44
8.	50	F	80.1	18.2	61.9	3831.6	2.4	5.76
9.	55	M	79.1	19.5	59.6	3552.1	0.1	0.01
10.	50	M	79.1	18	61.1	3733.2	1.6	2.56
11.	55	M	80.1	15.5	64.6	4173.1	5.1	26.0
12.	46	M	80.1	20.1	60	3600	0.5	0.25
13.	45	M	79.1	25.1	54	2916	-5.5	30.25
14.	45	F	79.1	25.1	54	2916	-5.5	30.25
15.	45	F	80.1	20.1	60	3600	0.5	0.25
16.					893.2	53310.2	0.7	123.51

Table 16: Pre mean = 79.6; Post mean = 20; 1SD = 2.96; SE = 0.76; T14 = 77.6.

S. No	Age	Sex	Pre	Post	X	X2	X-X	(X-X)2
1.	41	F	30	75	-45	2025	2.4	5.76
2.	45	F	35	80	-45	2025	2.4	5.76
3.	46	M	30	75	-45	2025	2.4	5.76
4.	40	M	40	75	-35	1225	-7.6	57.7
5.	45	M	40	75	-35	1225	-7.6	57.7
6.	45	M	40	75	-35	1225	-7.6	57.7
7.	50	F	30	80	-45	2025	2.4	5.76
8.	55	F	35	80	-45	2025	2.4	5.76
9.	52	F	35	80	-45	2025	2.4	5.76
10.	53	M	30	80	-45	2025	2.4	5.76
11.	45	M	35	80	-45	2025	2.4	5.76
12.	47	M	30	80	-50	2500	7.4	57.7
13.	42	M	40	80	-40	1600	-2.3	5.29
14.	43	M	40	80	-40	1600	-2.3	5.29
15.	50	M	40	80	-40	1600	-2.3	5.29
			530	1170	-635	27175	-3.1	292.7

Table 17: Pre mean = 35.3; Post mean = 78; SD = 4.95; SE = 1.27; t14 = - 33.3.

S. No	Age	Sex	Pre	Post	X	X2	X-X	(X-X)2
1.	45	F	35	65	-30	900	4.4	19.36
2.	48	M	30	60	-30	900	4.4	19.36
3.	49	M	30	60	-30	900	4.4	19.36
4.	45	M	30	60	-30	900	4.4	19.36
;.5.	45	F	30	60	-30	900	4.4	19.36
6.	45	F	30	60	-30	900	4.4	19.36
7.	46	F	35	65	-30	900	4.4	19.36
8.	50	F	35	55	-20	400	-5.6	31.36
9.	55	M	35	55	-20	400	-5.6	31.36
10.	50	M	40	55	-15	225	-10.6	112.3
11.	55	M	40	60	-20	400	-5.6	31.36
12.	46	M	40	60	-20	400	-5.6	31.36
13.	45	M	35	65	-30	900	4.4	19.36
14.	45	F	35	60	-30	900	4.4	19.36
15.	45	F	35	60	-30	900	4.4	19.36
			515	900	-395	10825	11	431.34

Table 18: Pre mean = 34.3; Post mean = 60; SD = 5.30; SE = 1.36; t14 = - 18.7.

Common Orthopaedic conditions and their first line Physiotherapy Management			
CONDITION	**ACUTE (RICE)**	**SUB ACUTE**	**CHRONIC**
Bursitis a)traumatic b)non-traumatic	a)cryotherapy b)biomechanical analysis	a)avoid activity b)stretch or strengthening	electrotherapy
Frozen shoulder (depends on primary lesion)	Deep Heating, (nocturnal pain thermotherapy contraindicated) U.S.,	Exercise Programme	Passive mobilisation
Rotator cuff tear	Cryotherapy, US, TENS	Friction massage (contraindicated in old pts)	SWD (if no ↑pain on exposure)
Swimmer's shoulder (impingement)	US, LASER (Low), Cryotherapy	Pulsed Galvanic stimulation, US, Transverse friction massage, Passive mobilisation, Kinesio Taping	Strengthening
Supraspinatus tendinitis	Cryotherapy, wet heat/US	Isometrics	Strengthening Ex's
Tennis elbow/ Golfer's elbow	Cryotherapy, Sinusoidal stimulation, US with Hydrocortisone cream, TENS,	Manipulation(contraindicated if pain at rest), Effleurage, Knead	Post surgical – Diapulse, TENS,US, Mobilization,
Myositis Ossificans	Iontophoresis (2% acetic acid,) Phonophoresis, extra corporeal shock wave therapy	Avoid stretching and massage	Strengthening Ex's
Carpal tunnel syndrome	Deep pulsed US, TENS,	Tendon - Nerve glides,	Ergonomics, Ex's
Ganglion cyst	Ultrasound	Massage gently	Immobilized (brace)
Wrist strain	PRICE	Passive motion, Aquatic therapy, TENS	Isotonic Ex's,
De Quervain's syndrome	cryotherapy	US, Deep heat modality,	Transverse friction massage
Dupuytren's contracture (only post operatively)	Splinting, FUT, FUP, ROM uninvolved	Range of motion exercises,	Strengthening
Trigger Finger	Paraffin wax bath, US	Friction massage	Exercises
Mallet finger	Splinting, cryotherapy,	ROM and Conditioning Ex's	Stretching
Sacroiliac Dysfunction	Thermotherapy, SI joint belt, electrotherapy, Taping,	Transversus abdominis, deep Gluteal muscle contractions/ex's	Restore power, proprioception, balance, gait patterns
Iliotibial tract syndrome	Discontinue cycling, US, Hydrocollator packs	Graduated sustained stretching,	@Max stretch position Holds
Piriformis syndrome	US (broad strokes longitudinally) / Hot/cold sprays 10min,	Soft tissue mobilization, Stretch in FAIR position,	MFR, Exercises (roll, cycling, knee bends)
Acetabular Labral Tear	Pain control(Maitland's grade 1), trunk stabilisation, Laser, ES	Muscle strengthening, sensory motor training, ROM	Advanced sensory motor, sport specific
Patellofemoral Syndrome	Taping, Foot orthosis, manual therapy, ES for VMO	Quadriceps strengthening ex's, *Ober's (IT,TFL)and Thomas test ex's	Proprioceptive training, Functional and strengthening ex's
Patellar Tendinitis (Jumper's knee)	Cryotherapy, Diapulse, US, Quadriceps Isometrics,	Gradual mobilisation	eccentric exercise, Passive stretches
ACL Tear (mild otherwise post operative cases only)	NMES, Taping, Brace,	Quadriceps & Hamstring strengthening, cpm	Exercises Proprioception, Coordination, Isokinetics
Meniscal Tear(old pts Ex therapy & Arthroscopy same effect but general Arthroscopy is effective)	TENS, Thermotherapy, Galvanic stimulation, Phonophoresis, Ex's	Wall squats, VMO emphasised, CPM	Weight bearing, stationary cycling, track running
Total Knee Replacement	(Circumferential) massage, Full extension, Isometrics	ROM, SLR, Balance, Non-weight/partial weight bearing, Proprioception	Weight bearing-crutch, Patellar glides, progressed, Aerobic ex's,
Achilles Tendonitis	Ice massage, pulsed US, Diapulse, Heel cushion, avoid strain of wt.	Heel Raise advise, passive stretch, US,	Bilateral toe standing, Jog, spot Run
Ankle sprain (no diastasis)	RICE, toe movements, immobilised/ strapping, Daily open tapping, Cast bracing,	Mobilisation, Ice immersion	Active, weight bearing ex's, thermotherapy if no edema, US, Reeducation, Transfers, sports
Plantar fasciitis	Contrast bath, FFB, US	Mild stretches, Fascial release,	Sole muscle exercises,
Calcaneal spur	Wedging of shoe, Heel raise, Sarbo rubber heel pad, FFB, US	Intrinsic muscle ex's, sustained toe curling,	Strengthening ex's, lateral foot border walk
Metatarsalgia	Cold packs, warm water bath, TENS, US, Diapulse, FUP, avoid high heels	FFB along with intrinsic muscle ex's,	Reeducation of walking, strengthening ex's
Tarsal Tunnel Syndrome	Thermotherapy, US, TENS,	Ionotophoresis, Nerve glides,	Orthotics, Ex's
Morton's Neuralgia	Rest, massage, cryo, plantar pads to elevate heads of MT,	FFB, deep tissue massage, US (phonophoresis), extracorporeal shockwave therapy,	Stretching ex's

Trapezius fibrositis	Soft tissue manipulation, IFT, Thermotherapy,	Relaxation techniques	Stretching, conditioning Ex's
Fibromyalgia	TENS, Manipulations,	Lymph drainage massage,	Aquatic therapy, Ex's
PIVD - Disc bulge	Acute – Rest, corset, prone	Cryo, TENS,US, IFT, Pulsed SWD,	Traction (15 min)
-Disc protrusion (medial to the nerve root :Traction is contraindicated)	Rest, cryo, TENS, US, pulsed SWD, IFT, Traction, corset	Traction - intermittent (<15min)-sustained (>10min)	Extension bias,
-Disc extrusion (hernia)	Rest, TENS, Hydrotherapy, Ice, Extension bias,corset	Traction (2 weeks), gentle pelvic tilt, cat and camel ex's, aerobic,	Flexibility, strength ,posture,
-Disc sequestration	Rest, hydrotherapy, TENS, Deep tissue massage,corset	Traction gently to prevent affect of gravity on spine	Core stability, flexibility, strengthening,
Annular tear	Ice/heat, rest, massage, IFT, corset	Low impact ex's	Core strengthening, stationary bicycle, hydrotherapy
Sciatica	Rest, IFT, TENS, US, thermotherapy, back brace,	Hydrotherapy, core stabilisation program,	Back mobility, core control,
Coccydynia	Donut pillow, gel cushion,	Mobilizations, US, SWD	(Deep) transverse friction,
Cervicogenic headache	Mobilization, manipulations,	SNAG, Trigger point therapy	Strengthening deep neck flexors, upperquarter
Cervical spondylosis	Isometrics, thermotherapy, IRR, IFT, Massage	Traction, Mobilisation, proprioceptive re-education, postural education	Strengthening ex's, mobility,
Cervical rib	Pulsed Diathermy (if no sensory impairment)	Deep tissue massage (T.O.S.)	Self resisted exercises for shoulder girdle muscles
Lumbar spondylosis	Spine manipulation, TENS, IFT, Corset, McKenzie Ex's,	Traction, McKenzie Ex's,	Aerobics, stretching, Core and Gluteal strengthening, ex's,
Lumbar spondylolisthesis	Rest, braces, William's flexion ex's, IFT, TENS	Isometrics and isotonic ex's to trunk muscles, stretches to hamstrings, flexors, paraspinal	Strengthening deep abdominals, core stability
Lumbar stenosis	Flexion bias, Heat/Ice, bedrest, corset, US, TENS,	Single/double leg exercise to chest, treadmill walk, lumbar isometrics,	Core stability, cycling, aerobics, jogging,
Osteoarthritis	Ex's, mobility, manual therapy, thermotherapy, cryo, TENS, IFT, US, Braces,	Hydrotherapy(ROM/Strength/Aerobics), Manual traction, CPM, PNF, pedocycle, QPE	SWD, Muscle strengthening, aerobic conditioning,
Gout/Pseudogout	Lithium Ionisation	Cryotherapy	Mobility
Haemophilic arthritis	Hyaluronidase Iontophoresis (Day 1)	Isometrics, TENS, PNF, Hydrotherapy	Diapulse, U.S, Ex's
Rheumatoid arthritis	TENS, IFT, Postural guidance	Isometrics, Breathing Ex's, ROM	Energy Conservation techniques, Ergonomics
Ankylosis spondylitis	Hydrocollator Packs, Soft tissue manipulations	Diathermy, Postural guidance, stretches, core stabilisation program	Mobility, Breathing Ex's,

(*NOTE: These are only for a quick glance to approximate the PT management in Orthopaedic conditions. As every patient is a new entity, treatment to be planned based on individual patient presentation, which is assessed throughout treatment process.)

Conclusion

After 4 weeks (28 days) of treatment procedure, mobilization for dominant shoulder (Group A) and mobilization for non-dominant (Group B), both groups showed a significant result by using SPADI AND GONIOMETER scale, as an outcome measure.

Though both groups showed significant improvement under respective treatment procedure, but group A showed better improvement than Group B.

This study concludes that individually shoulder mobilization is effective in improving movement and function in Periarthritis shoulder in dominant and non-dominant shoulder.

There is a significant effect of shoulder mobilization on dominant shoulder than non-dominant shoulder.

Limitations and Suggestions

There are several limitations of the present study

- Different pain and mobility scales can be used to access the pain and mobility status of individuals.
- Outcomes were based on subject's data which may vary with their individual and other psychological and physiological status.
- Along with shoulder mobilization Codman Pendular exercises are also effective in increasing movement which is not included in this study.
- Shoulder mobilization with ultrasound has an effect in decreasing pain and increasing movement.
- Sample studies were small, therefore study with a larger population is recommended.
- The study was a short-term study, therefore necessary, to do longer term study to make result more valid.

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