Efficacy of mobilization techniques and range of motion in patients with adhesive capsulitis of the shoulder pain

Zainab Ali Hussein*

Department of Physiotherapy, College of Health and Medical Technology in Baghdad, Middle Technical University, Baghdad, Iraq

ABSTRACT

Adhesive capsulitis is a condition of uncertain aetiology characterised by significant restriction of both active and passive shoulder motion that occurs in the absence of another known intrinsic shoulder disorder. Maitland's concepts involve the application of passive and accessory oscillatory movements to spinal and peripheral joints Principle of Mulligan's mobilization with movement is, the limited, painful physiological movement is performed actively while the therapist applies a sustained accessory glide at right angle or parallel to a joint. Both the treatment can be valuable additions to existing treatment. This study aimed to compare the efficacy of mobilization techniques and range of motion in patients with adhesive capsulitis of the shoulder pain. reduce the pain and restore the kinetic range of shoulder movements as soon as possible so that we can avoid the shoulder inanimate that happens when most patients are not using muscle for the full movement of the hinge, and this is done by promoting manual therapy with free exercises for the patient. The majority of the patient in the sample was female. Results show a significant improvement in all the outcome measures in both groups as compared to baseline. In addition, end range mobilization and mobilization with the movement was found to be significantly equally effective than compared to a control group for pain, ROM and SPADI. So, effect size was calculated which shows that the effect size of group A was significantly more than that of group A and B.

* Corresponding Author

Name: Zainab Ali Hussein
Email: zainabali132@gmail.com

INTRODUCTION

The natural history of adhesive capsulitis is characterized by three distinct stages of variable duration. Typically, the first stage lasts for 3 to 6 months, the second stage from 3 to 18 months, and the final stage from 3 to 6 months. Adhesive capsulitis is clinically characterized by painful, gradual loss of active and passive shoulder motion. Its most commonly affects middle-aged women and often presents bilaterally. The underlying pathogenesis is poorly understood, though available data suggest that mechanical stress, neoinnervation, neovascularisation and a number of chemical mediators may play a role (Ujwal L Yeole *et al.,* 2017).

The onset of idiopathic adhesive capsulitis has been associated with extended immobilization, relatively mild trauma (e.g. strain or contusion), and surgical trauma, especially breast or chest wall procedures. This condition is associated with medical conditions such as diabetes, hyperthyroidism, ischemic heart disease, inflammatory arthritis and cervical spondylosis. The most significant association is with insulin-dependent diabetes. Bilateral disease occurs in approximately 10% of patients but can be as high as 40 % in patients with a history

of insulin-dependent diabetes (Rizwan Haider *et al.,* 2014).

It is difficult to identify, treat and explain the disease of frozen shoulder (adhesive capsulitis) (Oliveira *et al.,* 2016) with pathology (D'Orsi *et al.,* 2012). It causes the patient an insult and has an impact on nearly 5% of the population (Labbe, 2010) and (Blanchard *et al.,* 2010; Lee *et al.,* 2015). The freezing of the shoulder from diseases prevalent among the elderly affects about 2.5% of them. It also affects 20% of diabetics, and this number is expected to increase in England annually by about 15 or 16 (Buchbinder & Green, 2004; Shah & Lewis, 2007). It causes the patient pain as it limits the movement of the patient and causes permanent disability from about one month to 24 months for the patient (Tveitå *et al.,* 2008; Malhtra *et al.,* 2013; Koh, 2016).

This disease is not widespread among people who practice sports but is prevalent among the general population and causes the disease to become a pain in the movement, forcing the patient to need treatment. The methods of treating the disease vary between aerobics and include the manipulation of the spinal cord correction and surgical treatments (Kazemi, 2000). The treatments of this disease need at minimum 6 months to heal (Fernandes, 2015). The percentage of diseases women is greater than the percentage of the men (Yeole *et al.,* 2017). It reported that only sports exercises, whether alone without treatment or with manual therapy, are as efficient and effective as the shoulder-freezing disease (Ali & Khan, 2015). Many doctors believe that a shoulder-freezing disease may be due to the patient's psychological distress, muscle apathy and low pain, but research has not confirmed these results (Jason, 1981).

Insufficient information is available about the shoulder-freeze disease. Most physicians use many treatments such as painkillers, anti-inflammatory medication, massage therapy and heat treatment, ultrasonic waves, chiropractic methods, use of exercises and surgical methods. However, the previous studies did not specify which of the treatments mentioned the best were. However, most studies report that acupuncture is a good way to treat a shoulder freeze as it is safer than medical treatment and has fewer side effects. It used to treat most diseases in modern times (Asheghan *et al.,* 2016).

RESULTS

This search consists of the sample which size is 100, 60 females and 40 males. It has a mean of age 63.05± 10.615 years. This sample decomposed randomly into two groups, where the group (A)

contain 15 patients and group (B) contain 5 patients. The next table indicates the results.

The next figure indicates the percentage between the males and the females that found in the sample, where 60% of the sample were females, and 40% were males.

This sample of patients have a pain in their shoulder with mean 2.67 ± 0.617 in-group (A), and 2.8 ± 0.837 in-group (B). These values were significant for each pain and range of motion (Flexion and Abduction) because the p-value of the group (A) was 9.47E-12, and it was 0.00045 for the group (B). The flexion measure has increased from 30.87 ± 3.758 to 145 ± 6.268 in-group (A), and it increased in-group (B) from 32 ± 4.472 to 139 ± 4.183. These differences were highly significant because the p-value of the group (A) was 2.8E-19, and it was 1.93E-06 for the group (B). The Abduction measure has increased from 31.33 ± 6.114 to 160 ± 9.82 in-group (A), and it increased in-group (B) from 34 ± 6.519 to 159 ± 8.944. These differences were highly significant because the p-value of the group (A) was 4.1E-17, and it was 2.56E-05 for the group (B). The next table indicates the results.

The disability measure has increased from 62.2 ± 7.253 to 305 ± 13.758 in-group (A), and it increased in-group (B) from 66 ± 10.84 to 298 ± 11.511. These differences were highly significant because the p-value of the group (A) was 1.32E-18, and it was 7.16E-06 for the group (B). The next table indicates the results. The SPADI measure has increased from 70.73 ± 7.186 to 307.67 ± 13.978 in-group (A), and it increased in-group (B) from 74.2 ± 10.545 to 300.8 ± 10.941. These differences were highly significant because the p-value of the group (A) was 2.20E-18, and it was 6.75E-06 for the group (B). The next table indicates the results.

The error bar chart has been drawn to indicate the differences between the two groups for each pre-treatment and, and it was as follows:
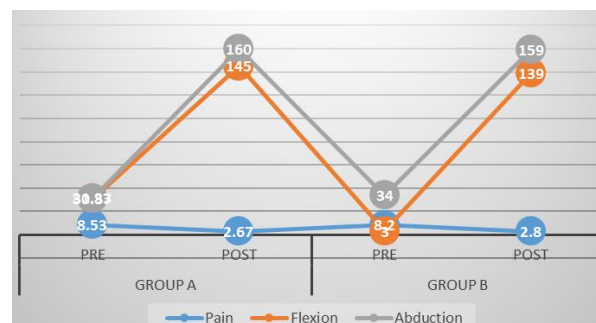
Figure 1: Error bar chart for groups

The previous figure indicates that the pain reduced from pretreatment to post-treatment in both groups. It also indicates that the flexion and the abduction (disability) increased from pretreatment to post-treatment in both groups.

Table 1: Descriptive statistics for variables

Variables	Level	sample size = 20	100	percentage	
Group	A	15	75	75%	74%
	B	5	25	25%	26%
Age (years)	≥ 45 ≤ 75	100	100	100%	100%
	46-55				
	56-65				
	66-75				
Total		100		100%	100%
Gender	Male	8	40	40%	40%
	Female	12	60	60%	60%

Table 2: Test of motion effect for (A and B) groups

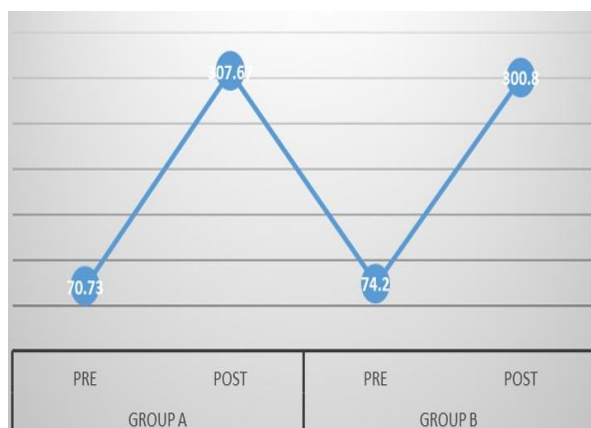|	Group A			Group B		
	pre	post	p-value	pre	Post	p-value
Pain	8.53 ± 1.06	2.67 ± 0.617	9.47E-12	8.2 ± 1.304	2.8 ± 0.837	0.00045
Flexion	30.87 ± 3.758	145 ± 6.268	2.8E-19	32 ± 4.472	139 ± 4.183	1.93E-06
Abduction	31.33 ± 6.114	160 ± 9.82	4.1E-17	34 ± 6.519	159 ± 8.944	2.56E-05
Disability	62.2 ± 7.253	305 ± 13.758	1.32E-18	66 ± 10.840	298 ± 11.511	7.16E-06
SPADI	70.73 ± 7.186	307.67 ± 13.978	2.20E-18	74.2 ± 10.545	300.8 ± 10.941	6.75E-06

Significance Level (α) = 0.05

Table 3: Test of treatment effect on gender groups

	Female			Male		
	pre	post	p-value	pre	post	p-value
Pain	8.33±1.371	2.67±0.492	3.03E-09	8.63±0.518	2.75±0.886	1.57E-06
Flexion	31.67±3.892	143±4.33	4.86E-16	30.38±3.926	143.13±8.839	3.19E-09
Abduction	30.42±5.823	160±9.293	4.18E-14	34.38±6.232	159.38±10.155	1.54E-08
Disability	62.8±8.382	303.75±10.472	2.14E-15	64.75±8.049	30.2.5±17.525	4.54E-09
SPADI	70.42±7.960	306.42±10.655	2.56E-15	73.38±8.228	305.25±17.466	5.22E-09

Table 4: Test of treatment effect

	Total		
	pre	post	p-value
Pain	8.45±1.099	2.70 ± 0.657	2.47E-15
Flexion	31.15±3.856	143.5 ± 6.304	6.94E-25
Abduction	32 ± 6.156	159.75 ± 9386	2.87E-22


Figure 2: Error bar chart for SPDI

Therefore, the SPADI increased from pretreatment to post-treatment in both groups. But the group (A) which contain the patients who underwent to the manual treatment is more effective than group (B) which contain the patients who underwent to the traditional treatment because the group (A) has p-value smaller than the group (B).

The samples show that the pain measure for gender groups was reduced from 8.33 ± 1.371 to 2.67 ± 0.492 for female, and also reduced in the male from 8.63 ± 0.518 to 2.75 ± 0.886.

These differences were significant because the p-value for a female was 3.03E-09, and it was 1.57E-06 for a male. The flexion measure has increased from 31.67 ± 3.892 to 143 ± 4.33 in-group (female), and it increased in-group (male) from 30.38 ± 3.926 to 143.13 ± 8.839. These differences were highly significant because the p-value of the group (female) was 4.86E-16, and it was 3.19E-09 for the group (male). The Abduction measure has increased from 30.42 ± 5.823 to 160 ± 9.293 in-group (female), and it increased in-group (male) from 34.38 ± 6.232 to 159.38 ± 10.155. These differences were highly significant because the p-value of the group (female) was 4.18E-14, and it was 1.54E-08 for the group (male). The disability measure has increased from 62.8 ± 8.382 to 303.75 ± 10.472 in-group (female), and it increased in-

group (male) from 64.75 ± 8.049 to 30.2.5 ± 17.525. These differences were highly significant because the p-value of the group (female) was 2.14E-15, and it was 4.54E-09 for the group (male). The SPADI measure has increased from 70.42 ± 7.96 to 306.42 ± 10.655 in-group (female), and it increased in-group (male) from 73.38 ± 8.228 to 305.25 ± 17.466. These differences were highly significant because the p-value of the group (female) was 2.56E-15, and it was 5.22E-09 for the group (male).

The column chart has been drawn to indicate the differences between the two groups for each pre-treatment and post-treatment.
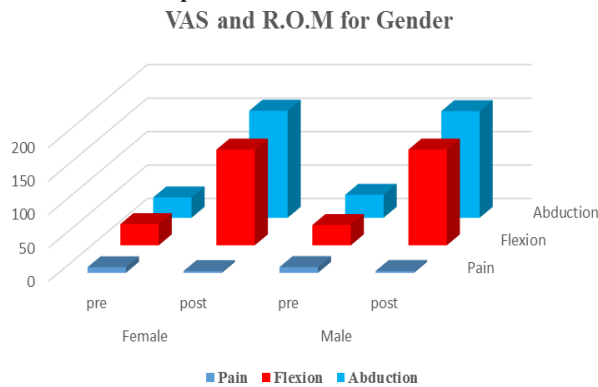
Figure 3: Column chart for groups male and female

The previous figure indicates that the pain reduced from pretreatment to post-treatment in both groups. It also indicates that the flexion and the abduction (disability) increased from pretreatment to post-treatment in both groups. Therefore, the SPADI increased from pretreatment to post-treatment in both groups. In addition, we note that the treatment for females is more effective than the treatment for males.
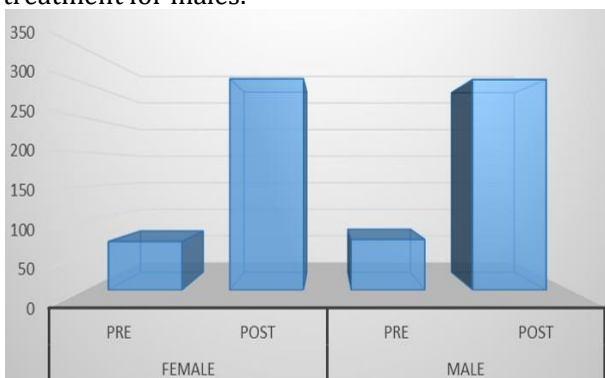
**Figure 4: Column chart for SPADI**

For the total patient of the drawn sample, we note that the pain measure has reduced from 8.45 ± 1.099 to 2.70 ± 0.657. These differences were significant because the p-value was 2.47E-15. The flexion measure has increased from 31.15 ± 3.856 to 143.5 ± 6.304. These differences were highly significant because the p-value was 6.94E-25. The Abduction measure has increased from 32 ± 6.156 to

159.75 ± 9386. These differences were highly significant because the p-value was 2.87E-22.

The column chart has been drawn to indicate the differences between the two groups for each pre-treatment and post-treatment.

The previous figure indicates that the pain reduced from pretreatment to post-treatment. It also indicates that the flexion and the abduction (disability) increased from pretreatment to post-treatment.
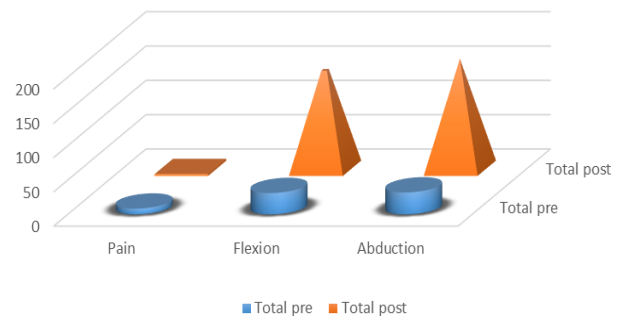
Figure 5: column chart total post-treatment and total pretreatment

Therefore, the SPADI increased from pretreatment to post-treatment in both groups, which indicate that the treatment of the patients is very important and it makes effective changes for them.

DISCUSSION

This search aimed to reduce the pain and restore the kinetic range of shoulder movements as soon as possible so that we can avoid the shoulder inanimate that happens when most patients are not using muscle for the full movement of the hinge, and this is done by promoting manual therapy with free exercises for the patient. Therefore, we can return the patient to his normal life.

All patients with adhesive capsulitis subjected to the treatment of adhesive capsulitis for two weeks. This treatment was consisting of two types (manual treatment and traditional treatment). This search studied the effect of each treatment. The results indicate that the manual treatment makes patients better, where the pain reduced and the range of motion increased in manual treatment more than the traditional treatment.

CONCLUSION

The manipulation technique (Exercises movement) on the shoulder of motion and pain in patients with adhesive capsulitis was a success, and it improved for all variables that we study in this search (Pain reduced, flexion increased, and Abduction increased). The results also indicated that the manual treatments are more effective than the traditional treatment.

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