

**EFFECTIVENESS OF BOWEN'S TECHNIQUE IN PATIENTS WITH ADHESIVE CAPSULITIS; A
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Lahore*******Consultant Physical therapist, Ali Hospital G-9/1, Islamabad**Corresponding author: Ferwa Tahrim Senior Physical Therapist, Ali Hospital G-9/1, Islamabad***ABSTRACT:**

Background: Adhesive capsulitis or Frozen Shoulder is a condition that is indicated with pain and progressive limitation of active and passive shoulder range of motion. It is described as a four-step cycle of disease progression and recovery over time of six months to 2 years. The Bowen technique comprises of a set of moves that are gentle and purposeful which utilizes subtle inputs to the body as a result stimulating the body to heal itself. It is not like the firm pressure of massage or many physical therapies.

Objective: To determine the effectiveness of Bowen's technique on pain and restricted movements in patients with adhesive capsulitis. Also, to compare Bowen's technique with conventional physical therapy treatment

Methodology: A sample size of 74 participants was recruited for the study which was divided in two equal groups of 37. Experimental group was treated with Bowen's technique and control group was treated by conventional physical therapy protocol carried for adhesive capsulitis.

Results: The between group analysis showed that experimental group had significant results in improving external rotation, abduction, NPRS and flexion ($p < 0.05$) as compared to control group. Whereas, the SPADI and internal Rotation did not show significant results in between groups ($p > 0.05$). Within group analysis of both groups showed significant results on all outcomes as ($p < 0.05$).

Conclusion: The results showed that Bowen's technique is effective in treating adhesive capsulitis alone and can also be used in conjunct with ongoing physical and manual therapy practices.

Keywords: Shoulder, capsule, capsulitis, ligaments, frozen shoulder, shoulder pain, muscle, treatment, physical therapy, manual therapy, Bowen's technique.

INTRODUCTION:

Adhesive capsulitis or Frozen Shoulder is a condition that is indicated as painful and restricted movements of shoulder joint. The decrease in the range of motion is progressive in nature. ¹ The rate of incidence of the disease is averagely around 2-5% in the common population. It is characterized by discomfort and pain in the joint accompanied by a majorly decrease in the range of motion. The characterization of pain is presented as dull, not

properly located.¹⁻²

Females population is tended be more involved in the occurrence of this structural disease than males, but there is no evidence of involvement of gene structure or ethnicity of patients in the rate and cause of incidence.³

Adhesive Capsulitis has been categorized on the basis of progression history in three characteristic patterns of stages that is starting with pain in the joint followed by constriction and tightness on movement and repossession of movements.⁴ The most prominent pattern and symptoms of Adhesive capsulitis are constricted movements in reference to directions such as forward flexion, abduction & external and internal rotation.⁵

Due to the fibrosis, synovial space is decreased and thus the amount of fluid in the joint decreases. This reduced space and synovial fluid causes restriction and the overall joint volume is markedly diminished.

The shrunken capsule on the humeral neck is very restricted when move by the patient or the therapist and causes severe discomfort in the form of pain. The shoulder joint is a quite complex joint leading to a further complex biomechanics of the joint. The Glenohumeral joint provides movements in six degrees of freedom (flexion, extension, abduction, adduction, internal rotation, external rotation) and is one of the most dynamic joint in the body. The movement is caused by the sliding of mobile head of Humerus on the static glenoid fossa that elicits the convex on concave rule.⁶

A meta-analysis conducted in 2016 concluded that population of patients that were diabetes mellitus positive had 5 times more chance of developing the disease as compared to population having no diabetes mellitus. (14) Diabetes is considered to be a crucial precursor in causing FS, almost 10-22% of population of frozen shoulder had diabetes mellitus, reported in a study conducted in 2019.⁷

The treatment regime for adhesive capsulitis spreads over wide a range. First and the foremost it is most addressed with conservative management like exercise or hydrocortisone steroidal injections in the capsule. These interventions are helpful in initial diagnosis and treatments and gives 90% good prognosis for the disease. Most commonly to address the pain physicians prescribe NSAIDs to decrease the inflammation. Oral corticosteroids have also been used in adverse pain for rapid effects.⁸

In physical therapy intervention most commonly, patients are assigned a home plan of self-stretching exercises like wall climbing, cross body adduction, towel stretch, Pendular stretch etc. to ensure mobility and preserving the movements in the patient. Active and passive ROM exercises are also done in setting and prescribed as home plan.⁹ With advanced stages manual therapy and the modalities are also included in the plan according to the patients' needs. Many studies indicate that exercise improves the pain and restricted range of motions significantly. Along with physical therapy treatment and elector-therapy treatment is also used in conjunct to this.⁸⁻⁹

A more newly developed and frequently procedure is also adopted i.e. arthroscopic capsular release. It is a more advanced technique to break adhesions as there is visual evidence for the diagnosis and treatment efficacy. But surgical procedures are then followed by post-surgical precautions. LASER therapy is a recent and newly adopted non-invasive radiation treatment protocol that uses a light of beam to breakdown the adhesions formed in the joint.¹⁰ Wong et al reported in a study conducted in 2011 that Physical therapy in conjunction with medical therapy such as corticosteroid injections has been carried out as a widely accepted treatment regimen and is considered more effective than both the therapies alone. Initial therapy protocol includes gentle range-of- motion exercises and Stretching exercise, hot pack, TENS, therapeutic ultrasound and massage.¹¹ Ewald et al conducted a study in 2011 that suggested that heating and the stretching is useful in treating pain restricted ROM in frozen shoulder, this

includes the use of pendulum stretching followed by other stretching exercises like towel stretching and wall climbing, which is used to induce length by stretching the capsule around the shoulder joint. There is reporting of enhanced quality of movement in performing tasks, and relief of painful motion with use of deep heating along with the exercises than using electrotherapy itself.¹²

In 2017, Chan et al. conducted a study that established that using pendulum exercise, cross body stretch, that effect the posterior capsule, and isometric exercises for internal and external rotation had positive outcomes in treating pain an improving ROMs of patients with adhesive capsulitis.¹³

Ali and Khan, in another study in 2015 reported that exercise alone has significant outcomes in improvement in pain and ROMs of shoulder joint. This study was conducted to establish the effects of various exercises in patients with adhesive capsulitis. It was spanned for 5 weeks consecutively and participants were divided in two groups of manual therapy and exercise alone. The exercise alone group exhibited significant recovery and the study stated that both manual therapy and exercise are equally effective in the treatment of adhesive capsulitis.¹⁴

The pilot study conducted by B. carter¹⁸ is only sole study conducted on effectiveness of Bowen's technique on Adhesive capsulitis which is not sufficient to establish its importance in including it in the treatment regimen. After evaluating literature, the effects of Bowen's technique therapy have been most often described in the form of a case or pilot studies. There is no evidence of Bowen's technique evaluated in comparison with conventional protocols already being carried out. The application of Bowen technique, producing significant results, will be opted in treatment for the better, improved and innovative noninvasive management of Adhesive Capsulitis. It will also help researchers in acquiring sufficient knowledge for further research on Bowen technique and its various applications as this technique is not widely applied in the field of physical therapy treatment.

METHODOLOGY:

The study design is Randomized Control Trial, registered with the clinical trial# NCT04852939. Randomized Non probability purposive sampling technique was used. The study was conducted in National Institute of Rehabilitation Medicine, Islamabad, Pakistan.

The study spanned over the time period of 6 months following the consent from research panel from February 2021 to July 2021

This study would include 74 total participants.¹⁵ which would be divided into two groups, 37 each group. The outcome measure used to calculate sample size was shoulder pain and disability index (SPADI) from reference study. Group A is experimental group which was provided with Bowen's technique and group B is control group which was treated with conventional physical therapy treatment protocol.

The criteria for participants to include in the study were both genders with Age 25 to 60 years and who full fill the following criteria.

- History of worsening shoulder pain
- Painful movement from at least 3 months
- Grade 2 & 3 adhesive capsulitis
- Both Diabetic and non-diabetic
- Limited Ranges in capsular pattern

Participants having trauma, fracture, dislocation, under ongoing physiotherapy treatment and cortisone injection prior 3 months were not included in the trial. These criteria in the history of disease were not included in the study.

DATA COLLECTION TOOLS:

Following tools would be used for the 'Pre' & 'Post' assessment during the study.

- **Goniometer:** A goniometer is an instrument that is used to measure the angles of movements occurring at joints. It can be measured by allowing the under the test structure to rotate with instrument and a precise angle can be measured against the markings. Intra-class Correlation Coefficients ($ICC \geq 0.94$)¹⁵
- **Numeric Pain Rating Scale:** Numerical Pain Rating Scale (NPRS) the Numerical Rating Scale (NPRS-11) is a scale of 11-points in which patient report the scoring itself. NPRS is the most commonly used scale for one directional pain reporting. Interclass correlation coefficient ($ICC: 0.74$)¹⁶
- **Shoulder Pain and Disability Index (SPADI):** It is self-administered questionnaire which evaluates pain and functional capacities of the patients with shoulder dysfunction. It takes 5 to 10 minutes for a patient to complete and is the only reliable and valid region-specific scale for the shoulder region. Intra-class correlation coefficient ($ICC \geq 0.89$)¹⁷

DATA COLLECTION PROCEDURE:

The participants were divided into 2 groups i.e. Experimental and control group. Both groups were provided with treatment sessions of 40 minutes 3 sessions per week for 6 weeks. The data was collected at National Institute of Rehabilitation Medicine, Islamabad. Consent was taken from the participants' prior recruitment. And inclusion criteria were evaluated on the basis of a well structured and targeted questionnaire. Participants having a prior physical therapy treatment, and direct trauma or fracture and having treated by corticosteroid injections were excluded from the study.

To meet the inclusion criteria the participants were asked to perform internal rotation, abduction and external rotation in the same sequence to confirm the indication of adhesive capsulitis in the capsular pattern. Ranges of motion were measured by goniometer for reduced error readings. For the measurement of functional ability of the participants, shoulder pain and disability index (SPADI) were used. The pain level of participants was evaluated using numeric pain rating scale (NPRS).

INTERVENTION:

Experimental Group (A): Group A or experimental group was given Bowen's therapy. First of all Bowen move applied is the cup move where posterior border of deltoid is targeted just above the crease of arm fold in axilla. This move helps in rolling the muscle fibers in a vertical direction. Then the arm is passively moved into flexion at 90°. This position is held at the level of patient's chest. After this the targeted arm is gradually moved towards the other shoulder in opposite direction. This move is also carried out passively. After attaining the adduction of the arm by moving towards opposite shoulder, the involved shoulder is tapped by the therapist with heel of the hand.

Now the arm is again passively moved to the original starting position. After that the therapist targets the anterior fiber of the deltoid muscle. The therapist assesses the amount of the pressure to be applied and when to release the pressure according to the reaction of muscle under the fingers. The priority is to use least number of moves possible to activate the healing process of the body.¹⁸

Control Group (B): Group B was given conventional physical therapy treatment that started by giving hot pack and TENS for 15 mins. 19 Followed by Pendulum stretches in 10 revolutions.²⁰ after that Cross body stretch was performed in 4 repetitions.²¹ Followed by towel stretch/hand behind the back 4 repetitions ²¹ and lastly Isometric internal and external rotation exercises.²² the participants of control group were also evaluated at baseline and on the 6th week of treatment.

DATA ANALYSIS:

The Data collected was analyzed by using SPSS version 22. Kolmogorov- Smirnov test was applied to find out the normality of the data. According to the normality of the data, Paired T test was applied for the immediate effects of Bowen's technique within group analysis for variables with $p > 0.05$. Non-parametric test was applied on data for which the p value < 0.05 . After checking the normality Wilcoxon- signed rank test was used to analyze immediate effects of Bowen's technique on pain and abduction variable. Assessments were done on 2 levels: baseline and 6th week.

RESULTS:

The total number of participants included in the study was 74, divided in two groups of 37 each i.e. Group A; experimental and group B; control group. Among the 74 participants of the study 30 (41%) were male and 44 (59%) participants were female. In the experimental group number of male participants was 13 and female participants were 24 in total. The number of male and female participants in control group was 17 and 20 respectively. The participants that were included had a mean age of $49.14(\pm 7.25)$. The history of pain in months had a mean of $8.37(\pm 3.31)$. The frequency of shoulder involved in all participants was; 46(68%) had right shoulder involved and 28 (32%) had a left problematic shoulder. The number of patients with stage 2 adhesive capsulitis was 58(78%) and the number of participants with stage 3 adhesive capsulitis was 16 (22%). The number of participants with diabetes mellitus was 51(69%) and the number of non-diabetic patients was 23(31%)

Variables		Mean+SD	P –value
SPADI	Pre	84.16 \pm 7.21	0.00
	Post	49.06 \pm 9.90	0.00
External rotation	Pre	47.33 \pm 11.83	0.00
	Post	75.85 \pm 6.59	0.00
Internal rotation	Pre	47.66 \pm 11.74	0.00
	Post	75.50 \pm 6.04	0.00
Flexion	Pre	79.78 \pm 13.19	0.00
	Post	125.59 \pm 17.14	0.00

Table 1: Parametric test for within Group B (PAIRED T TEST)

For control group analysis was also done at baseline and 6th of intervention. SPADI at baseline and 6th weeks showed a significant p-value i.e. $p < 0.05$. External rotation at baseline and 6th week had p-value of $p < 0.05$ which is statistically significant. Internal rotation also at baseline and 6th week had a significant p-value i.e. < 0.05 (Table 1).

Variables		Mean± SD	P –value
SPADI	Pre	84.00 ±7.21	0.00
	Post	47.83 ±9.90	0.00
Ext. rot.	Pre	46.48 ±10.99	0.00
	Post	78.36 ±6.07	0.00
Int. rot	Pre	47.91 ±12.14	0.00
	Post	76.32 ±6.02	0.00
Flexion	Pre	81.72 ±14.16	0.00
	Post	130.70 ±17.96	0.00

Table 2: Parametric test for within Group A (PAIRED T TEST)

After applying paired t test a significant p-value was obtained for SPADI done at baseline and 6th week i.e. $p < 0.05$. Similarly, p-value was also significant for external rotation at baseline and 6th week i.e. $p < 0.05$, internal rotation done at baseline and 6th week; $p < 0.05$ and flexion at baseline and 6th week; $p < 0.05$.

	Groups	Mean+SD. deviation±	Mean Difference	p-value
SPADI pre	EXP	84.00±7.21	-0.32	0.83
	CONT	84.32±5.98		
SPADI post	EXP	47.83±9.90	-2.45	0.29
	CONT	50.29±10.07		
Ext. rot. Pre	EXP	46.48±10.99	-1.70	0.53
	CONT	48.18±12.72		
Ext. Rot. post	EXP	78.36±6.07	5.01	0.00*
	CONT	73.35±6.20		
Int.rot pre	EXP	47.91±12.14	0.51	0.85
	CONT	47.40±11.49		
Int. rot. Post	EXP	76.32±6.02	1.64	0.24
	CONT	74.67±6.02		
Flexion. Pre	EXP	81.72±14.16	3.89	0.20
	CONT	77.83±12.02		
Flexion post	EXP	130.70±17.96	10.21	0.00*
	CONT	120.70±14.82		

Table 3: Parametric test Between Group (INDEPENDENT T TEST)

The participants of the both experimental and control group were analyzed at baseline and at 6th week of intervention. In group A and B the mean for SPADI at baseline was 84.00(±7.21) and 84.32 (±5.98) respectively. At the 6th week the mean for GROUP A and B was 47.83(±9.90) and 50.29 (±10.07) respectively. The results showed that experimental group had a decreased score of shoulder pain and disability index at the 6th week after Bowen's intervention than control group who had received conventional physical therapy protocol (Table 3)

Variable	Assessment	Group A	Group B	Median(IQR)	p-value
		Mean rank	Mean rank		
NPRS	Pre	34.09	40.91	7.00(2.00)	0.16
	Post	32.92	42.08	3.00(2.00)	0.05*
Abduction	Pre	40.18	34.82	84.00 (16.5)	0.28
	Post	45.11	29.89	126.00(32.3)	0.00*

Table 4:Non-parametric test for NPRS and Abduction Between Group (MANN-WHITENY-U TEST)

The improvement in pain scores was assessed by NPRS and was analyzed at baseline and at 6th week in both group A and B the mean rank at baseline for experimental and control groups are 34.09 and 40.91 respectively with median IQR 7.00(2.00). The mean rank at 6th for group A and B are 32.92 and 42.08 respectively with median IQR 3.00(2.00). The results showed that there is improvement in scores of pain in experimental group as compared to the control group (Table 4)

DISCUSSION:

The purpose of conducting the study was to find out the efficacy of Bowen's technique in patients of Adhesive capsulitis as compared to the conventional physical therapy treatment protocol. Both procedures were provided to the patients for 6 weeks with 3 sessions per week to evaluate the results of both techniques. The outcome tools used for evaluation at baseline and after 6 weeks were goniometer for range of motion, numeric pain rating scale (NPRS) and shoulder pain and disability index (SPADI). The total number of participants included in the study was 74, divided in two groups of 37 each i.e. Group A; experimental and group B; control group. Among the 74 participants of the study 30 were male and 44 participants were female.

The evaluation of both the interventions at baseline and after 6 weeks by tests showed that both groups had significant results on the outcomes of the participants. There was prominent improvement in pain scores, external rotation, abduction, internal rotation and flexion of all participants in each group. However, Bowen's technique showed more effective results in improvement of External rotation, abduction, flexion and pain score as compared to the conventional protocol. But in terms of SPADI and Internal rotation there was improvement in results in each group but there was no difference in both techniques in terms of statistical evaluation when analyzed in between groups so the effects of Bowen's technique did not supersede the conventional physical therapy protocol for later two outcomes.

Kage et al. conducted a study in 2014 that concluded that Bowen's technique has markedly effective results in treating hamstring tightness has increased the flexibility of the muscle as it was released from the fascial and muscular tightness. This resulted in the increase in active knee extension, and sits and reach test respectively.²³ similarly; in the present study there were positive outcomes in improving flexibility of the shoulder joint capsule which in turn helped in increasing ROMs of the shoulder joint i.e. external rotation, abduction, internal rotation and flexion of GHJ. The targeted muscle in the shoulder region is anterior and posterior fibers of deltoid and posterior joint capsule. When Bowen moves are applied to the shoulder joint it released the capsule and muscle from fascia

and decreased the restriction in the soft tissue structures around the joint. When these structures are released from the fascia range of motion is increased as the flexibility increases. So, all these changes helped in improving flexion, external rotation, abduction and internal rotation of the shoulder joint. A pilot study conducted by Carter in 2001 showed that there was improvement in patient's ROMs and pain score in patients of FS.²⁴ Similarly this study also supports the results of B. Carter's pilot study as Bowen's technique is quite helpful and effective in treating adhesive capsulitis otherwise known as frozen shoulder.²⁵ The efficacy of this treatment protocol can be established in higher terms as it was evaluated in comparison to the conventional physical therapy treatment protocol in the same setting and time with patients having similarity in symptoms falling in the inclusion criteria for the study. The present study was a randomized trial that elaborately evaluated the outcome variables in comparison to the conventional physical therapy treatment protocols. Greater sample size of the study ensures a more generalization of the technique hence proving to be an effective treatment approach. The targeted muscle in the shoulder region is anterior and posterior fibers of deltoid and posterior joint capsule. When Bowen moves are applied to the shoulder joint it released the capsule and muscle from fascia and decreased the restriction in the soft tissue structures around the joint. When these structures are released from the fascia range of motion is increased as the flexibility increases. So, all these changes helped in improving flexion, external rotation, abduction and internal rotation of the shoulder joint.

Based on the studies mentioned above the results of this study show that both Bowen's technique and conventional physical therapy treatment protocol has proved to be effective in treating FS. The studies mentioned above support the effectiveness of the Bowen's technique as it works on the physiological level and works through acting on proprioception and mechano-reception. There was prominent improvement in pain scores, external rotation, abduction, internal rotation and flexion of all participants in each group. However, Bowen's technique showed more effective results in improvement of External rotation, abduction, flexion and pain score as compared to the conventional protocol. But in terms of SPADI and Internal rotation there was improvement in results in each group but it was not significant in terms of statistical evaluation when analyzed in between groups so the effects of Bowen's technique did not supersede the conventional physical therapy protocol.

CONCLUSION:

The outcomes of the study showed that Bowen's technique is quite effective in the treatment of pain, restricted range of motion and shoulder disability in patients with adhesive capsulitis. The results also showed that Bowen's technique has somewhat more efficacy than conventional physical therapy treatment protocol in treating adhesive capsulitis. Bowen's technique is safe and effective enough to be used in general hospital setting alone.

LIMITATIONS:

Initially the study was designed to be carried out in two settings but due to limitation in patient intake in OPD's due to COVID-19 pandemic the study was only conducted in one setting.

RECOMMENDATIONS:

- The assessment of shoulder pain and disability index should be followed up for more than 6 weeks until the adhesion of the joint are resolved for more accurate analysis of functional restoration of the patient.
- The treatment should be continued for a longer time period to see results in less improved symptoms and signs of the disease and in turn fully restored ROMs functional abilities.

- The study should be carried out on a larger scale in different settings for more generalization of Bowen's technique treatment protocol.

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