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Comparative Study

Effect of IFT with Anterior Glide versus Posterior Glide Joint Mobilisation Technique on Shoulder External Rotation Rom in Patients with Adhesive Capsulitis: Comparative Study

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Abstract

Background: Adhesive capsulitis is a clinical diagnosis made from a history of the gradual onset of severe shoulder pain with the progressive limitation of active and passive glenohumeral movements. The most significant loss of movement is in the external rotation of the joint. Traditionally physical therapists have used an anterior glide of the humeral head on the glenoid technique to improve external rotation range of motion a choice based on 'convex on concave' concept of joint surface motion.

Aim & objective of the study: To compare the effect of IFT with anterior glide versus posterior glide joint mobilization technique on shoulder external rotation ROM in patients with adhesive capsulitis.

Data Analysis and Results: This study results shows that there is statistically significant improvement in the variables of shoulder pain and disability index (SPADI) and Shoulder External Rotation ROM between pre and post mean values in both control and experimental group with $p<0.05$. The Post mean values of SPADI and Shoulder External Rotation ROM in degrees with p values $p<0.05$ in Control group when compared to Experimental Group.

Conclusion: This study concluded that both anterior glide and posterior glide with Interferential therapy reduce the pain and improve the external rotation range of motion in adhesive capsulitis. Meanwhile, interferential therapy with anterior glide is more effective than the interferential therapy with posterior glide in reducing the pain and improving the external rotation range of motion in adhesive capsulitis.

Key Words: Adhesive Capsulitis, Shoulder Joint, Shoulder Joint Mobilization, Anterior Glide, Posterior Glide, SPADI, Shoulder External Rotation ROM.

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Introduction

Total functionality of the upper limb is closely tied to the shoulder complex's architecture. The limb's joint mechanics enable the positioning, use, and hand control immediately anterior to the body, where the actions can be observed easily[1]. Four joints that make up the shoulder complex move precisely, in unison, and simultaneously. The clavicle, scapula, and humerus all move as the position of the arm is altered. The Sternoclavicular, Acromioclavicular, Glenohumeral, and Scapulothoracic Gliding Mechanisms work together to produce these motions.[2,3,4]

Adhesive capsulitis of the shoulder is a frequent condition that affects 2 to 5 percent of adults overall and up to 20 percent of those with diabetes.[5] In England[6], a general practise list of 6250 people on average would see 15 to 16 new cases annually.[7] Neviaser invented the term "adhesive capsulitis" in 1945 to designate a pain and stiffness in shoulder.[8] When describing a painful shoulder disease that develops slowly and causes stiffness and difficulties sleeping on the afflicted side, Codman[9] coined the phrase "frozen shoulder." However, it was Duplay who first defined the illness as 'periarthritis scapulohumerale' in 1872.[10] These phrases are now used interchangeably.[11,12,13]

The clinical identification of adhesive capsulitis is grounded on a history of progressively limiting passive and active glenohumeral motions together with the gradual development of significant shoulder discomfort.[12,13] External rotation of the joint has the most loss of motion.[9,12]

A number of accounts state that the sickness has three phases and affects children between the ages of 11 and 13. The "adhesive phase," which is a time of increasing stiffness, is usually followed by a painful phase that lasts three to eight months.[12,13] The resolving phase of an ongoing recovery of mobility generally persists between 5 and 24 months.[5,12,14]

Conditions that are linked to or result from a recognised predisposing factor should be treated with adhesive capsulitis, whereas the first idiopathic condition is known as adhesive capsulitis, and the following condition is known as. For example, a broken humerus, a dislocated shoulder, an avascular necrosis of the humerus, or a stroke. The majority of sources confirms that adhesive capsulitis is the product of inflammation of the synovium and capsules in the joint, which results in the formation of capsular contractures[15]. Clinically speaking, the glenohumeral joint has a general reduction of passive and active range of motion, in which external rotation is the movement that is more physiologically limited and results in functional limitation.[15]

Transcutaneous electrical stimulation is a common treatment method used by therapists. They can choose between continuous or as a series of pulses direct current administered, or alternating current at various rates. With regard to therapeutic application, each type of current has both benefits and drawbacks.

In terms of low-frequency alternating currents and direct current, the outer layers of skin have a high electrical impedance (>1 kHz). Deep tissues are painful to treat because a large transcutaneous current flow is necessary for enough current to go deeply. Even though they usually oscillate too fast to directly trigger the tissues, alternating currents of medium (>lkHz to l0kHz) meet less resistance and easily penetrate the tissues (attributable to a marked decline with how skin capacitance affects current flow).[16-18]

Interferential current therapy, which was developed in the early 1950s, assisted in overcoming these difficulties. The device produces two slightly distinct medium-frequency alternating currents, which are commonly used to induce analgesia, provoke muscle contraction, modify the activity of the autonomic system, enhance healing, and reduce oedema.[18-20]

According to the "convex on concave" theory of joint surface motion[21], physical therapists have long used the anterior glide of the humeral head on the glenoid technique to extend the range of motion for external rotation. Roubal et al., on the other hand, used a posteriorly directed glide correction based on the "capsular constraint mechanism" to restore both the exterior and interior rotation range of motion.

In order to increase shoulder external rotation range of motion and functional activity in persons

with primary adherence, this study intended to determine the direction of force application (anterior vs. posterior) for glenohumeral joint mobilisation.[21]

The main aim and objectives of the study to compare the effect of IFT with anterior glide versus posterior glide joint mobilization technique on shoulder external rotation ROM in patients with adhesive capsulitis.

The results of the study if it explains Interferential Therapy with anterior joint mobilization or posterior joint mobilization for adhesive capsulitis which is better, it will provide greater importance and significance in the selection of treatment approaches for adhesive capsulitis.

Materials and Methodology

Study Design:

Comparative study

Study Setting:

Joy physiotherapy Clinic OP department, Madurai.

Study Duration:

2 months

Study Sample:

Simple random sampling

Study Population:

In and around Madurai district

Study Sample

A total number of 20 patients who were diagnosed as adhesive capsulitis by clinical Orthopaedician were selected by random sampling method and divided into 2 groups after due consideration to the inclusion and exclusion criteria.

Criteria of Selection:

Inclusion Criteria

- Patients with 4-5 months duration of adhesive capsulitis.
- Idiopathic adhesive capsulitis (insidious onset).
- Sex-both sexes.
- Age group-30 to 50 years.
- Pain with restricted range of motion not more than 50%.
- Unilateral condition.
- Restricted range of motion due to capsular lesion.

Exclusion Criteria

- Polyarthritis.
- Hemiplegic shoulder.
- Cardiovascular disease.
- Osteoporosis.
- Cervical spondylosis.
- Hypertension.
- Brachial neuralgia.
- Neurological disorder (like Stroke, Parkinsonism).
- Subscapularis flexibility deficits.
- Fractured/ Dislocated shoulder.
- Severe shoulder deformity.

Variables:

- Shoulder Pain and Disability Index (SPDAI).
- Shoulder External Rotation ROM.

Materials and Tools:

- Goniometer.
- Shoulder pain and disability index chart.
- Couch
- Pillows
- Inch tape

Interventions:

- Mobilisation technique
- IFT

Procedure:

A total number of 20 subjects who met the inclusion criteria were recruited by simple random sampling method by obtaining consent form from the participants. After the informed consent obtained they were divided into 2 groups - group A and group B with 10 subjects in each group.

After a brief demonstration about the procedures, Group A subjects were subjected to IFT with Anterior Glide for a period of 4 weeks. After a brief demonstration about the procedures, Group B subjects were subjected to IFT with Posterior Glide of 5 sessions for a period of 4 weeks.

Pre test and Post test results were recorded and computed for suitable statistical analysis with spss 16 software version of windows.

Treatment Interventions:

IFT – Interferential Therapy for both groups A and B

4000 Hz to 4500 Hz - Medium Frequency Current

Beat frequency – 50 Hz used

Intensity – Comfortable Limit

Duration – 15 Minutes

Sessions – 20 sessions in the span of 4 weeks

Anterior Glide of Gleno Humeral (GH) Joint:

Purpose: to increase shoulder external rotation and extension Position: patient is prone with shoulder at edge of table and abducted to 90 degrees, elbow flexed to 90 degrees; mobilizing hand on posterior humeral head while stabilizing hand holds mid-humerus Mobilization: anterior force applied by mobilizing hand to humeral head while stabilizing hand applies gentle traction.

Posterior Glide of Gleno Humeral (GH) Joint:

Purpose: to increase shoulder flexion and internal rotation Position: patient is supine with the shoulder at the edge of the table, scapula stabilized by the table or towel roll; abducted to 45 degrees and elbow slightly flexed; mobilizing hand on anterior humeral head and stabilizing hand supporting elbow Mobilization: posterior force applied by mobilizing hand to humeral head while stabilizing hand applies gentle traction.

Data Analysis and Results

This study results shows that there is statistically significant improvement in the variables of SPADI and Shoulder External Rotation ROM between pre and post mean values in both control and experimental group with $p<0.05$. There is homogenous of variables in pre values of variables of SPADI and Shoulder External Rotation ROM in degrees between control and experimental groups. The Post mean values of SPADI and Shoulder External Rotation ROM in degrees with p values $p<0.05$ in Control group when compared to Experimental Group.

Students t test was used for statistical analysis.

Table 1: Comparison of Pre and Post Mean, Standard Deviation, 't' Value and 'p' value of SPADI and Shoulder External Rotation Range of Motion in Control Group.

No of Subjects	Variables	Mean Value		SD		T Value	P Value
		Pre	Post	Pre	Post		
10	SPADI	65.5	53.8	36.28	34.18	4.40787	0.00017
	Shoulder External Rotation ROM	28.0	60.1	10.89	68.1	-11.42447	0.00001

$p<0.05$

Table 2: Comparison of Pre and Post Mean, Standard Deviation, 't' Value and 'p' value of SPADI and Shoulder External Rotation Range of Motion in Experimental Group.

No of Subjects	Variables	Mean Value		SD		T Value	P Value
		Pre	Post	Pre	Post		
10	SPADI	64.8	50.7	36.18	43.34	5.00006	0.000046
	Shoulder External Rotation ROM	28.5	43.7	16.94	31.79	-6.88542	0.00001

$p<0.05$

Table 3: Comparison of Pre Mean, Standard Deviation, 't' Value and 'p' value of SPADI and Shoulder External Rotation Range of Motion between Control and Experimental Group to check homogeneity.

No of Subjects	Variables	Pre Mean Value		SD		T Value	P Value
		Control	Experimental	Control	Experimental		
10	SPADI	65.5	64.8	36.28	36.18	0.26005	0.39887
	Shoulder External Rotation ROM	28.0	28.5	10.89	16.94	-0.2997	0.383919

$p<0.05^{NS}$

Table 4: Comparison of Post Mean, Standard Deviation, 't' Value and 'p' value of SPADI and Shoulder External Rotation Range of Motion between Control and Experimental Group to check significance.

No of Subjects	Variables	Pre Mean Value		SD		T Value	P Value
		Control	Experimental	Control	Experimental		
10	SPADI	53.8	50.7	34.18	43.34	1.11339	0.140094
	Shoulder External Rotation ROM	60.1	43.7	68.1	31.79	5.18902	0.000031

$p<0.05$

Discussion

Due to shoulder joint mobilizations both anterior and posterior glides with interferential therapy, which occur as a result of the breakdown of adhesions of joint space, flexibility of ligaments, and other joint structures, there is statistically significant improvement in the variable of SPADI and Shoulder External Rotation ROM in degrees in both groups. This physiological adjustment contributes to an increase in the shoulder joint's range of motion (ROM), notably the degree of shoulder external rotation. Interferential Therapy Application has a therapeutic impact that is demonstrated in this study as a reduction in pain using the Shoulder Pain and Disability Index as a gauge.

IFT's potential to reduce pain is consistent with study by G.C. Goats et. al. (1990) that interferential treatment may efficiently activate voluntary muscle, improve peripheral blood flow, and expedite bone mending. The use of this strategy to reduce pain is supported by empirical research[22], and according to ZAMBITO ET AL (2006), this randomised double-blinded controlled study offered the first proof that IFT is considerably beneficial in reducing pain. At the beginning of the treatment, the placebo effect is impressive, but it usually wears off after a few weeks.[23]

The results of the study done on were supported by the significant increase in Shoulder External Rotation Range of Motion (ROM) brought on by Anterior and Posterior glides conducted a research with 49 individuals who had adhesive capsulitis. For around 4 to 8 weeks, each patient received treatment. By combining vigorous physical therapy with intra-articular infusion and light manipulation, the research aimed to change the course of the disease and shorten the length of time needed for recovery. The findings of this study show that following the initial physiotherapy treatment, almost 90% of patients saw a significant improvement.[24]

Conclusion

According to the study's findings, both groups SPADI and shoulder external rotation range of motion significantly improved between pre and post measurements. Based on the findings, this study came to the conclusion that anterior glide and posterior glide with interferential treatment both lessen discomfort and increases the range of motion for external rotation in adhesive capsulitis. While analysing the data (table 3,4) we can conclude that, interferential therapy with anterior glide is superior to interferential therapy with posterior glide for relieving pain and increasing external rotation range of motion in adhesive capsulitis.

Ethical Clearance: Taken from Institutional Ethical Review Board, Santosh College of Physiotherapy, Madurai.

Conflict of Interest: Nil

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