

**EFFECTIVENESS OF SCAPULAR STRETCHING AND
STRENGTHENING EXERCISES FOR ADHESIVE CAPSULITIS
PATIENTS ATTENDENT AT CRP**

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Bachelor of Science in Physiotherapy (B. Sc. PT)

Session: 2006-2007

BHPI, CRP, Savar, Dhaka-1343



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Bangladesh

February, 2013

We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for the acceptance of this dissertation entitled

**EFFECTIVENESS OF SCAPULAR STRETCHING AND
STRENGTHENING EXERCISES FOR ADHESIVE CAPSULITIS
PATIENTS ATTENDENT AT CRP**

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DECLARATION

I declare that the work presented here is my own. All sources used have been cited appropriately. Any mistakes or inaccuracies are my own. I also declare that for any publication, presentation or dissemination of information of the study. I would bound to take written consent of my supervisor.

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Acknowledgement

In the name of ALLAH, most merciful and most gracious. It would not have been possible to complete this research without the help and support of kind people around me, only some of whom it is possible to give particular mention here.

I would like to express the deepest appreciation to my supervisor Assistant Professor Md. Nasirul Islam, who has the attitude and the substance of a genius: he continually and convincingly conveyed a spirit of adventure in regard to research, and an excitement in regard to teaching. Without his guidance and persistent help this research would not have been possible.

Also, it's my honor to mention Assistant Professor Md. Shofiqul Islam for the good advice, support and guide to conduct this research.

In addition, I would like to thank my honorable Course coordinator and our dragoman Associate Professor Mr. Obaidul Haque, Head of the Department of Physiotherapy Associate Professor Md. Anwar Hossain whose contribution have been invaluable on both in Academic and Clinical level, for which I am extremely grateful.

All the intern physiotherapists of Muscuskeletal Unit, CRP extended their helping hand in data collection procedure, I am obliged to them. Thanks to my both roommates Waliul and Abdullah for their continuous help in data analysis, my model of all photography Sabbir and also to my beloved friend Thouhid, Sharif and Al-amin for being so kind to me.

Acronyms

BHPI	Bangladesh Health Professions Institute
CRP	Centre for the Rehabilitation of the Paralyzed
MS	Musculo-skeletal
MWM	Movement with Mobilization
NSAID's	Non-Steroidal Anti-inflammatory Drugs
PT	Physiotherapy
RCT	Randomized Control trail
ROM	Range of Movement
TENS	Transcutaneous Electrical Nerve Stimulation
UST	Ultrasound Therapy
VAS	Visual Analogue Scale
WHO	World Health Organization

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Abstract

Purpose: The purpose of the study was to explore the effectiveness of Scapular stretching and strengthening exercises with conventional physiotherapy compare to only conventional physiotherapy for Adhesive capsulitis of Shoulder. *Objectives:* To compare pain intensity at rest, Abduction, Lateral rotation, Medial rotation, lying in affected side and ROM in Abduction, Lateral rotation, Medial rotation before and after Scapular stretching and strengthening exercises with conventional physiotherapy and conventional Physiotherapy alone in Patients with adhesive capsulitis. *Methodology:* Fourteen patients with adhesive Capsulitis were randomly selected from outdoor musculo-skeletal unit, CRP and then 7 patients with Adhesive Capsulitis were randomly assigned to Scapular stretching and strengthening exercises with conventional physiotherapy group and 7 patients to the only conventional physiotherapy group for this randomize control trial study. AsThe study was a single blinded study which has been conducted at musculoskeletal department of CRP, savar. Visual Analogue Scale was used to measure pain intensity in different functional position and Goniometer to measure ROM. Unrelated “t” test was used to compare the result in ROM analysis and Pain was analyzed by Calculating mean difference between two groups. *Results:*In Experimental group, Mean difference of reduction of resting pain was 4.57 which were 2.29 times more than Mean difference in control group. Also there was significant improvement of pain in Abduction, Lateral rotation; medial rotation and pain during lying in affected side, as the mean difference were consecutively 2.28, 2.14, 2.00, and 2.57 times more than control group. The study also found significant Improvement of ROM In case of Abduction ($p<.05$). A small but not statistically significant improvement has been found in Medial rotation and lateral rotation of Shoulder. *Conclusion:* This experimental study shows that Scapular stretching and strengthening exercises with conventional physiotherapy is more effective than conventional physiotherapy alone for patients with Adhesive Capsulitis.

Key words: Adhesive Capsulitis, Scapular stretching and strengthening exercises, Conventional physiotherapy.

1.1 Background

Adhesive capsulitis is a common but poorly understood syndrome of painful shoulder stiffness. Frozen shoulder syndrome was first described by Duplay in 1872. He used the term peri-arthritis scapulo-humerale and believed that manipulation under anesthesia had a role in its treatment. In 1934, Codman used the term frozen shoulder to describe this condition. He stated that most cases resolved in about two years without treatment. In 1945, Neviaser coined the term adhesive capsulitis to reflect his findings at surgery and autopsy in patients treated for a painful, stiff shoulder. More recently, Zuckerman and Cuomo defined frozen shoulder or idiopathic adhesive capsulitis, as a condition of uncertain etiology characterized by substantial restriction of both active and passive shoulder motion that occurs in the absence of a known intrinsic shoulder disorder (Griggs et al., 2000).

Adhesive capsulitis is a common cause of shoulder pain and disability. It is characterized by spontaneous onset of shoulder pain accompanied by progressive limitation of both active and passive glenohumeral movement (Carette et al., 2003).

Adhesive capsulitis (frozen shoulder) is an insidious painful condition with gradual restriction of all planes of movement in the shoulder. It is the main cause of shoulder pain and dysfunction in middle aged and elderly populations. Adhesive capsulitis can be due to idiopathic or post-traumatic causes but the term adhesive capsulitis should be reserved for the idiopathic type of shoulder stiffness. Factors associated with adhesive capsulitis include female gender, age older than 40 years, trauma, immobilization, diabetes, thyroid disease, stroke, myocardial infarction, and the presence of autoimmune diseases, cervical spine disorders and reflex sympathetic dystrophy syndrome. Idiopathic (primary) adhesive capsulitis is characterized by fibrosis of the capsule resulting with progressive, painful loss of active and passive shoulder motion. There are three stages of the disease: Stage I is mainly characterized by pain usually lasting 2–9 months. In Stage II (frozen stage); pain gradually subsides but stiffness is marked lasting 4–12 months. In Stage III (thawing phase); pain resolves and improvement in range of motion (ROM) appears (Guler & Kozanoglu, 2004).

Adhesive capsulitis of the shoulder is a common affliction, affecting 2–5% of the general adult population and up to 20% of patients with diabetes. An average general practice list of 6250 patients in England would expect to see 15 to 16 new cases each year (Shah & Lewis, 2007).

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 movement. The most significant loss of movement is in the external rotation of the joint (Kisner & Colby, 1990).

The condition is widely reported as a disease of middle and is characterized by three phases. A painful phase, lasting between 3 and 8 months is followed by a phase of progressive stiffness or ‘adhesive phase’, typically lasting 4–6 months. Final resolution phase of gradual return of motion usually lasts 5–24 months (Shah & Lewis, 2007).

It is assumed that 3% of people in Europe develop the condition in their lifetime. There is no known racial preference; however, adhesive capsulitis is associated with certain conditions, particularly insulin-dependent diabetes. Some people with frozen shoulder may get better over a period of 18–24 months. In other cases, symptoms can persist for several years. Studies suggest that about 50% of people with frozen shoulder continue to experience symptoms up to seven years after the condition starts. However, with appropriate treatment it is possible to shorten the period of disability (Captuli, 1999).

Many treatments have been employed in the management of shoulder disorders; few have been proven to be effective in randomized controlled trials. Non-steroidal anti-inflammatory drugs, local anesthetic and corticosteroid injections into the glenohumeral joint, calcitonin and antidepressants, distension arthrography, closed manipulation, physical therapy modalities and stretching exercises can be listed among the most common non-surgical approaches to treatment in adhesive capsulitis. Physical therapy is often the first line of management for Frozen Shoulder (Griggs et al., 2000).

As physiotherapy Intervention the traditional principles of treatment of adhesive capsulitis are to relieve pain, maintain range of motion, and ultimately to restore function. The treatment of adhesive capsulitis by means of physiotherapy all along consists of different modalities (e.g., exercises, electrotherapy or massage) which may be applied side by side. Relief of pain may be achieved by massage, deep heat, ice, ultrasound, TENS (transcutaneous electrical nerve stimulation), and LASER (light amplification by stimulated emission of radiations) as described in our standard text books and other literature concerning the treatment of adhesive capsulitis. However, they probably offer little benefit. Mostly these applications are adjunct to other treatment modalities like mobilization techniques or home exercise program. Although adhesive capsulitis is generally considered to be a self-limiting condition that can be treated with physical therapy, to regain the normal extensibility of the shoulder capsule, passive stretching of the shoulder capsule in all planes of motion by means of mobilization techniques has been recommended. Grades I and II of Maitland mobilization techniques are primarily used for treating joints limited by pain. The oscillations may have an inhibitory effect on the perception of painful stimuli by repetitively stimulating mechanoreceptors that block nociceptive pathways at the spinal cord or brain stem levels. These non-stretch motions help move synovial fluid to improve nutrition to the cartilage whereas Grades III and IV are primarily used as stretching maneuvers. Appropriate selection of mobilization technique for treatment can only take place after a thorough assessment and examination (Arslan&Celiker, 2001).

Based on the theories of muscle imbalance, clinicians postulate that, strengthening of the posterior scapular stabilizers combined with stretching of the pectoral muscles can correct the scapula-humeral rhythm. Exercise protocol of rotator cuff and scapular retractors believe to restore the normal kinematics of gleno-humeral and scapulo-thoracic motion that plays an important role on Adhesive capsulitis or such conditions limiting normal shoulder kinesiology(Michener et al., 2004).

1.2 Rationale

The aim of the study was to find out the effectiveness of stretching and strengthening exercise of scapular muscles in Adhesive capsulitis. Literature shows that, Patients with frozen shoulder exhibit significant deficits in shoulder kinematics, including increased elevation and upward scapular rotation. Jewell and colleaguesPt (2000), suggested in their meta-analysis of physical therapy interventions for frozen shoulder syndrome that joint mobilization and exercise were the most effective interventions.

In the field of research in physiotherapy, hasn't encoded any research on effectiveness of stretching and strengthening exercise of scapular muscles in Adhesive capsulitis. There are some achievements in overall Physiotherapy intervention in Adhesive capsulitis but experts suggests that stretching and strengthening exercise of scapular muscles is one of the important interventions for this condition.

The purpose of this study is to compare the effectiveness of stretching and strengthening exercise of scapular muscles with conventional physiotherapy and conventional physiotherapy alone for the patient with Adhesive capsulitis. There were some research articles published about physiotherapy intervention for patient with Adhesive capsulitis, but stretching and strengthening exercise of scapular muscles for Adhesive capsulitis is not so focused among them. So, in this study "Effectiveness of Scapular Muscle Stretching and Strengthening in Combination with Conventional Physiotherapy for Adhesive Capsulitis" will give the evidence for effectiveness of effectiveness of stretching and strengthening exercise of scapular muscles in patient with Adhesive capsulitis. However, research helps to improve the knowledge of health professionals, as well as develops the profession. The results of the study may help to guide physiotherapists to give evidence based treatment in patient with Adhesive capsulitis, which will be beneficial for both the patient with Adhesive Capsulitis and for developing the field of physiotherapy profession.

1.3 Aim

The aim of this study is to compare the Effectiveness of Scapular Muscle Stretching and Strengthening in Combination with Conventional Physiotherapy for Adhesive Capsulitis.

1.4 Objectives

- ✓ To compare pain intensity at rest before and after conventional physiotherapy with Stretching and strengthening exercise of scapular muscles and conventional physiotherapy alone in patients with Adhesive capsulitis.
- ✓ To evaluate pain intensity at Shoulder abduction before and after conventional physiotherapy with Stretching and strengthening exercise of scapular muscles and conventional physiotherapy alone in patients with Adhesive capsulitis.
- ✓ To relate pain intensity at Shoulder lateral rotation before and after conventional physiotherapy with Stretching and strengthening exercise of scapular muscles and conventional physiotherapy alone in patients with Adhesive capsulitis.
- ✓ To associate pain intensity at Shoulder medial rotation before and after conventional physiotherapy with Stretching and strengthening exercise of scapular muscles and conventional physiotherapy alone in patients with Adhesive capsulitis.
- ✓ To evaluate pain intensity during sleeping in affected side before and after conventional physiotherapy with Stretching and strengthening exercise of scapular muscles and conventional physiotherapy alone in patients with Adhesive capsulitis.
- ✓ To calculate Improvement of Range of Movement (ROM) of Shoulder Abduction before and after conventional physiotherapy with Stretching and strengthening exercise of scapular muscles and conventional physiotherapy alone in patients with Adhesive capsulitis.
- ✓ To estimate Improvement of Range of Movement (ROM) of Shoulder Lateral rotation before and after conventional physiotherapy with Stretching and strengthening exercise of scapular muscles and conventional physiotherapy alone in patients with Adhesive capsulitis.
- ✓ To compare Improvement of Range of Movement (ROM) of Shoulder Medial rotation before and after conventional physiotherapy with Stretching and strengthening exercise of scapular muscles and conventional physiotherapy alone in patients with Adhesive capsulitis.

1.5 Hypothesis

Stretching and Strengthening exercise with conventional physiotherapy is more effective than conventional physiotherapy alone for the treatment of patient with Adhesive capsulitis.

1.6 Null hypothesis

Stretching and Strengthening exercise with conventional physiotherapy is no more effective than conventional physiotherapy alone for the treatment of patient with Adhesive capsulitis.

1.7 List of variables

1.7.1 Dependent variable

Adhesive capsulitis

1.7.2 Independent variable

Conventional physiotherapy, Stretching and strengthening exercise of scapular muscles.

1.8 Operational definition

1.8.1 Adhesive Capsulitis

14 patients with adhesive Capsulitis were randomly selected from outdoor musculo-skeletal unit, CRP and then 7 patients with Adhesive Capsulitis were randomly assigned to Scapular stretching and strengthening exercises with conventional physiotherapy group and 7 patients to the only conventional physiotherapy group for this randomize control trial study. The study was a single blinded study.

1.8.2 Conventional physiotherapy

Physiotherapeutic interventions that are widely accepted and commonly practiced by medical community.. The researcher formulated a list of evidence based physiotherapy interventions of Adhesive Capsulitis and provided those to the physiotherapist to mark the interventions commonly used as conventional physiotherapy for Adhesive capsulitis. After finishing the pilot study, researcher became able to find out the conventional physiotherapy interventions used for Adhesive capsulitis and their frequency of use, with the consent of eight clinical physiotherapists. Capsular stretching, Accessory movements, pendulum exercise, pulley exercise, Infra-red radiation and Ultrasound were the most commonly used

interventions, the frequency of use was 100%, Movement with mobilization and oral NSAID were the second most commonly used interventions and the frequency was 75-99% and corticosteroid injection were the partially used interventions and the frequency of use was 25-49%.

1.8.3 Stretching and strengthening exercise of scapular muscles

Researcher developed a parameter of stretching and strengthening exercise of scapular muscles based on expert's opinion and Some study programme for enhancing glenohumeral rhythm and joint mobility along with strengthen the muscles performing particular joint play.

Adhesive capsulitis is characterized by pain, stiffness, and limited function of the glenohumeral joint, which adversely affects the entire upper extremity. Patients typically describe onset of shoulder pain followed by a loss of motion. The most common limitations in range of motion are flexion, abduction, and external rotation. Approximately 70% of frozen shoulder patients are women; however, males with frozen shoulder are at greater risk for longer recovery and greater disability. Although the exact pathophysiologic cause of this pathology remains elusive, there are two types identified in the literature: idiopathic and secondary adhesive capsulitis. Idiopathic (“primary”) adhesive capsulitis occurs spontaneously without a specific precipitating event. Primary adhesive capsulitis results from a chronic inflammatory response with fibroblastic proliferation, which may actually be an abnormal response from the immune system. Secondary adhesive capsulitis occurs after a shoulder injury or surgery, or may be associated with another condition such as diabetes, rotator cuff injury, cerebrovascular accident (CVA) or cardiovascular disease, which may prolong recovery and limit outcomes (Kirkley et al., 1999).

In a profile study of 32 patients with adhesive capsulitis, heart disease and diabetes were more prevalent in those suffering from adhesive capsulitis than a control group (McNeely et al., 2004).

In a study, 19% of older diabetic patients had adhesive capsulitis; however, recent estimates place the incidence as high as 71% when patients with pre-diabetes (metabolic syndrome) are included. Both Type I and Type II diabetics are susceptible to frozen shoulder; unfortunately, diabetics have worse functional outcomes as measured by disability and quality of life questionnaires compared to non-diabetics with frozen Shoulder (Laska & Hanning, 2001). Frozen shoulder is also a common complication following stroke, occurring in 25% of patients within 6 months in USA (Riley et al., 1989).

Three stages of frozen shoulder have been described in the literature: painful stage, stiffness or “frozen” stage, and recovery or “thawing” stage, with the average length

of symptoms lasting 30 months. The average range of motion in frozen-stage shoulder patients is 98° of abduction, 117° of flexion, 33° external rotation and 18° of internal rotation with the shoulder abducted to 90°. While the “stiffness stage” is the longest of the stages, adhesive capsulitis is thought to be reversible in the acute pain stage. In addition to limited range of motion, shoulder complex muscle imbalances lead to altered shoulder motion. The upper trapezius tends to be more activated than the lower trapezius, creating an imbalance of the scapular stabilizers leading to increased elevation and upward rotation of the scapula during elevation of the glenohumeral joint in both the frontal and sagittal planes. Patients with adhesive capsulitis have higher EMG ratios of upper trapezius to lower trapezius during arm elevation when compared to asymptomatic subjects, indicating a muscular imbalance (Thomas et al., 2007).

The literature reports that adhesive capsulitis progresses through three overlapping clinical phases:

- **Acute/freezing/painful phase:** gradual onset of shoulder pain at rest with sharp pain at extremes of motion, and pain at night with sleep interruption which may last anywhere from 3-9 months.
- **Adhesive/frozen/stiffening phase:** Pain starts to subside, progressive loss of glenohumeral motion in capsular pattern. Pain is apparent only at extremes of movement. This phase may occur at around 4 months and last till about 12 months.
- **Resolution/thawing phase:** Spontaneous, progressive improvement in functional range of motion which can last anywhere from 1 to 3.5 years (Wirth et al., 1997).

Patients with frozen shoulder exhibit significant deficits in shoulder kinematics, including increased elevation and upward scapular rotation. Eventually, patients with adhesive capsulitis develop the characteristic “shrug sign” during glenohumeral joint elevation, where the scapula migrates upward prior to 60 degrees of abduction. This indicates compensation due to lack of capsular extensibility as well as a change in the central nervous system motor patterning due to maladaptive movement (Morrison et al., 1997).

Patients with adhesive capsulitis may also develop adaptive postural deviations such as anterior shoulders or increased thoracic kyphosis as the function of the shoulder complex remains limited and painful. Adhesive capsulitis is generally related to a shortening and fibrosis of the joint capsule (ligaments) surrounding the shoulder joint. Nevasierwas among the first to report thickening and contraction of the shoulder capsule as well as inflammatory changes through histologic analysis. (Ludewig & Reynolds, 2009).

The contracture of the shoulder ligaments actually decreases the volume of the capsule, thus limiting range of motion. It is likely that limitations in range of motion and the pain associated with frozen shoulder are not only related to capsular and ligamentous tightness, but also fascia restrictions, muscular tightness, and trigger points within the muscles. Physical therapists can address impairments and limitations associated each of these contributors to the pathology of adhesive capsulitis with a variety of treatment methods (Thomas et al., 2007).

Physical Therapy in Adhesive capsulitis

Physical therapy interventions for frozen shoulder syndrome are joint mobilization and exercise. Physical therapy is the most effective interventions. Non-aggressive physical therapy interventions are generally more effective than aggressive or intensive interventions (Roubal et al., 1996).

Physical therapy interventions used with patients with frozen shoulder frequently include modalities, manual techniques, and therapeutic exercise. While some of these interventions have been studied in patients with adhesive capsulitis, it is important to remember that not all clinical interventions have evidence to support their use in specific patient populations. Recall that evidence-based practice is best defined as the use of the best evidence available along with clinical experience while taking into consideration the unique needs of an individual patient (Bunker & Anthony, 1995).

Modalities

The rationale for using modalities in patients with adhesive capsulitis includes pain relief and affecting scar tissue (collagen). However, the use of modalities such as

ultrasound, massage, iontophoresis, and phonophoresis has not been proven to be beneficial in treatment of patients with adhesive capsulitis (Bal et al., 2008).

Interestingly, transcutaneous electrical stimulation (TENS) has been shown to significantly increase range of motion more than heat combined with exercise and manipulation. Research also suggests that low-power laser therapy is more effective than a placebo for treatment of patients with adhesive capsulitis. Recently, deep heating through diathermy combined with stretching was shown to be more effective than superficial heating for treating frozen shoulder patients (Vermeulen et al., 2002).

Passive Motion

Because adhesive capsulitis involves fibrotic changes to the capsuloligamentous structures, continuous passive motion or dynamic splinting are thought to help elongate collagen fibers. Continuous passive motion (CPM) was recently compared with conventional PT in 57 patients with adhesive capsulitis. Both groups improved after 4 weeks of treatment; while there was no significant difference between the groups, the CPM patients had greater reduction in pain levels (McHardy et al., 2008). Dynamic splinting was also recently evaluated in patients with Stage 2 (“frozen stage”) adhesive capsulitis. The experts noted better outcomes when physical therapy was combined with the protocol, although there was no statistically significant difference between standard physical therapy or the Dynasplint alone. The concept of total end-range time (TERT) has also been described in the treatment of patients with adhesive capsulitis, suggesting maintenance of a stretch in the maximally lengthened range of motion for a total of 60 minutes per day (Bunker, 1997).

Manual Techniques

As stated previously, joint mobilization is an effective intervention for adhesive capsulitis. Several studies have demonstrated the effectiveness of joint mobilization in adhesive capsulitis patients. In particular, posterior glide mobilization was determined to be more effective than anterior glide for improving external rotation range of motion in patients with adhesive capsulitis (Mantone et al., 2000).

Chang (2004), randomly assigned 20 consecutive adhesive capsulitis patients to physical therapy interventions including grade III stretch mobilization with distraction

at end range of abduction and external rotation using either an anterior or posterior directed linear translation. After 3 sessions, the posterior mobilization group had significantly improved their external rotation range of motion by 31 degrees versus only 3 degrees in the anterior mobilization group.

In addition, high-grade joint mobilization techniques were more effective than low-grade mobilization in improving glenohumeral mobility and reducing disability in a recent randomized controlled trial of treatment of patients with adhesive capsulitis. (Sattar & Luqman, 1985).

Myofascial trigger points, focal areas of increased tension within a muscle, may be present in the musculature around the shoulder complex in patients with adhesive capsulitis. In Travel and Simons' classic textbook, the authors describe how the subscapularis muscle in particular is referred to as the “Frozen Shoulder” muscle because trigger points in the subscapularis cause limitations in shoulder elevation and external rotation. The Spray and Stretch technique for the subscapularis and latissimusdorsi muscle may be effective at reducing trigger point irritation, pain, and helping to gradually lengthen tight muscles (Critchley et al., 1976).

Soft Tissue Mobilization

Soft tissue mobilization and deep friction massage may benefit adhesive capsulitis patients. Deep friction massage using the Cyriax method was shown to be superior to superficial heat and diathermy in treatment of patients with adhesive capsulitis (McNeely et al., 2008).

Recently, instrument-assisted soft tissue mobilization (IASTM) as used in such interventions as Graston Technique, ASTYM, or guasha has become increasingly popular in physical therapy practice. IASTM reportedly provides strong afferent stimulation and reorganization of collagen, as well as an increase in microcirculation. The inferior glenohumeral capsule and pectoral fascia are often restricted, as well as the insertion of the latissimusdorsi and subscapularis. IASTM may help improve fibroblast proliferation and promote normal collagen alignment, although no studies have evaluated outcomes of the use of IASTM on patients with adhesive capsulitis (Bulgen et al., 1984).

Therapeutic Exercise

Probably the most commonly prescribed therapeutic exercises for adhesive capsulitis are active-assisted range of motion (AAROM) exercises. These typically involve the patient using the uninvolved arm, or using equipment such as rope-and-pulley, wand/T-bar, or exercise balls. Generally, these exercises are performed for flexion, abduction and external rotation ranges of motion which are frequently the most limited (Kazemi, 2000).

Griggs and colleagues found that physical therapy including 4 self-stretches (passive flexion, horizontal adduction, internal rotation behind the back with the unaffected arm, and external rotation at 0° using a cane) performed at least twice a day produced a satisfactory outcome in 90 percent of stage 2 adhesive capsulitis patients. These patients significantly improved in pain, range of motion, and shoulder function; however, the study did not compare the intervention to other types of treatment. Despite this limitation, the authors suggested that more aggressive treatments such as manipulation are rarely necessary (Ludewig & Braman, 2011).

Resistive exercises typically include strengthening of the scapular stabilizers and rotator cuff, when range of motion has progressed enough for strengthening to be an appropriate intervention. Muscles prone to weakness in a variety of shoulder dysfunctions include the lower trapezius, serratus anterior, and infraspinatus. Patients with adhesive capsulitis have significantly weaker lower trapezius muscles compared to asymptomatic controls. It is important that treating therapists facilitate normal movement patterns rather than allowing pathological adaptive patterns to prevail during movement for the sake of completing an exercise (Jobe, 1983).

If a patient demonstrates a ‘shrug sign’ while performing resisted abduction, the exercise should be stopped and modified with less resistance or be attempted in an altered position, while cuing of the patient for proper movement patterns. The “Shoulder Sling” exercise can be used to help re-train the initial setting phase of the rotator cuff when initiating abduction. The Shoulder Sling exercise for a “rotator cuff set” is considered analogous to a “quad set” exercise in the lower extremity. The elastic band creates an “upward and inward” vector of resistance that the patient must push against in a “down and out” vector. This movement simulates the initiation of

abduction as well as the depression and stabilization functions of the rotator cuff, which occur prior to and during abduction. Anecdotally, this exercise helps reduce early activation of the upper trapezius during abduction in patients demonstrating a shrug sign(Andersen et al., 1998).

Rigid and Kinesiological Taping

Although no studies have been published on the efficacy of taping (such as rigid strapping tape or kinesiological taping [KT]) with patients who have adhesive capsulitis, taping may be helpful in reducing pain and providing tactile cues through proprioceptive and afferent mechanisms. The mechanisms and efficacy of taping applications remain unclear. Because adhesive capsulitis patients often exhibit poor posture and scapular mechanics, KT may provide postural cues and assist with promoting proper scapular motion(Hazleman, 1972).

Additional Interventions

Non-operative treatment may also include injections directly into the glenohumeral joint joint. These injections often contain both a corticosteroid and an anesthetic, and can also include saline to distend the capsule, stretching the fibers. When saline is used to distend the capsule, it is known as “distension arthrography” or “hydroplasty”. Corticosteroid injections have been shown to be as effective as exercise for treating frozen shoulder, particularly when provided in the early stages of the pathology (Manske&Prohaska, 2010).

In their systematic review, Blanchard et al. suggested that corticosteroid injections have a greater effect when compared to physical therapy when utilized within the first 6 weeks of treatment, although these differences diminished over time.They noted a moderate effect of corticosteroid injections on pain, external rotation ROM, and disability at 6 weeks, and only small effects after 12 weeks (Trampas&Kitsios, 2006).

Distension arthrography is often successfully combined with physical therapy.In fact, therapeutic exercise, including physical therapy, is more effective when combined with a corticosteroid injection(Lin et al., 2009).

Adhesive capsulitis patients not responding to physical therapy are often treated with manipulation under anesthesia (MUA), where the shoulder is forcefully moved by the

physician into the full ranges of motion, breaking the adhesions located within of the shoulder capsule. In addition to increased risk of complications from anesthesia, MUA can cause severe damage including labral tears, tendon tears, fractures, and ruptures of the shoulder ligaments. Most recently, steroid injections with distention arthrography have been shown to be as effective as MUA and are therefore the recommended course of treatment because of the risks associated with MUA (Dodenhoff et al., 2000).

Rehabilitation Protocol for Adhesive capsulitis

Phase I:

1. Patient education:

- emphasize full ROM may never be recovered
- spontaneous resolution & reduction of stiffness
- avoid painful activity/activity modification

2. Upper body cycle ergometer: 50 r.p.m, 8 minute warm - up

3. Modalities: 10 - 15 minutes, before, during, or after exercise

- moist heat
- cold pack

4. ROM exercise/stretch: low intensity, short duration, 1-5 seconds, 2-3 times per day, pain-free, passive, AAROM

- pendulums (1 min clockwise, 1 min counter-clockwise)
- internal rotation in standing
- horizontal adduction in standing
- pulley for elevation in sitting or standing
- forward flexion in supine using own hand
- external rotation using pipe/stick in supine
- extension in standing using pipe/stick in supine

5. Manual Techniques:

- Low - grade mobilization (Grade I or II)
- Positional stretching of CHL: 5 minutes-> progress to 15 minutes

6. Strengthening:

- Isometric in all planes, 5 second holds, 1 set of 10 each direction, against wall (Pt, 2000).

Phase II:

1. Patient education:

- moderate irritability
- activity modifications/basic functional activities

2. Upper body cycle ergometer: 50 r.p.m, 8 minute - warm up

3. Modalities: 10 - 15 minutes, before, during, or after exercise

- moist heat
- cold pack

4. ROM exercise/stretch: 5 - 15 seconds, passive AAROM to AROM, low load, prolonged

- Same as in Phase I, but increase duration and length of stretch

5. Manual Techniques:

- Same as Phase I for abd and flexion, instead End-Range in varying degrees of elevation and rotation, 10 - 15 repetitions
- Mobilization with Movement 3 sets of 10 repetitions with 1 minute rest in between
- Last 3 minutes, passive PNF if needed to increase ROM
- Low - to - High Grade Mobilizations

6. Strengthening:

- Theraband: 5 directions, 3 sets of 12 reps, progress with colors of band (Pt, 2000).

Phase III:

1. Patient education:

- increase activities/high demand activities
- pain decreased

2. ROM exercises/stretch: 5 - 15 seconds, passive AAROM to AROM, low load, prolonged

- same as phase II, but increase duration, past end - range
- end range/lower pressure, increased duration, cyclic loading

- can use stick or cane in standing over table for prolonged elevation & external rotation

3. Manual Techniques:

- High Grade Mobilization/Sustained (HGMT) - Grades III & IV
- Distraction, posterior glides > anterior glides (perform before HGMT) 3 sets of 30 seconds (End-range posterior mobilizations hold 1 minute x 15 times)
- Abduction & External rotation
- Last 3 minutes passive PNF, if needed to increase ROM

4. Strengthening:

- Low - to - high resistance end range dumbbell in sitting: flexion, abduction, extension 1 - 2 lbs to begin with, 2 - 3 sets of 10
- Sidelyingdumbbells IR, ER 3 sets of 10 - 12 (1 - 2 lbs) (Pt, 2000).

Scapular Muscle Stretching and Strengthening Exercise Parameters

A. Exercise 1:

Starting position: Stand Upright, raise your hands, keep the elbows extended, grip a therabelt over your head.

Steps:

- 1) Slowly try to put down your hands sideways.
- 2) Put it until your both hands are in a parallel position.
- 3) Avoid bending your elbows.
- 4) Perform it 10 times per set, three sets a day.
- 5) Stop performing beyond painful range.



Starting position



ending position

B. Exercise 2:

Starting position: Stand Upright, grip one therabelt down by your unaffected hand, grip another therabelt near your neck.

Steps:

- 1) Slowly try to put up your affected hand upright.
- 2) Put it until your elbow straight up over head.
- 3) Avoid bending your elbows.
- 4) Perform it 10 times per set, three sets a day.
- 5) Stop performing beyond painful range.



Starting position



Ending Position

C. Exercise 3:

Starting position: Stand Upright, grip one end of therabelt by your affected hand keeping elbow bend, another end tied with a pillar.

Steps:

- 1) Slowly try to pull it back.
- 2) Pull it upto the last limit of your shoulder moving back.
- 3) Avoid keeping your elbows straight.
- 4) Perform it 10 times per set, three sets a day.
- 5) Stop performing beyond painful range.



Starting position



ending position

D. Exercise 4:

Starting position: Stand Upright, grip one end of the belt by your affected hand keeping elbow straight, another end tied with a pillar.

Steps:

- 1) Slowly try to pull it back.
- 2) Pull it up to the last limit of your shoulder moving back.
- 3) Avoid keeping your elbows bent.
- 4) Perform it 10 times per set, three sets a day.
- 5) Stop performing beyond painful range.



Starting position



ending position

E. Exercise 5:

Starting position: Stand Upright, grip one end of the belt down by your unaffected hand behind your neck, grip another end of the belt by your affected hand in front of your face.

Steps:

- 1) Slowly try to pull your affected hand forward.
- 2) Pull it until your elbow is straight in front of your face.
- 3) Avoid bending your elbows.
- 4) Perform it 10 times per set, three sets a day.
- 5) Stop performing beyond painful range.



Starting position



ending position

F. Exercise 6(stretching of Levator Scapulae)

Starting position: Stand Upright, grip your occiput by affected hand beyond your neck, neck will be in nutral position.

Steps:

- 1) Slowly try to pull your affected hand forward.
- 2) Pull it untill your neck flexed in front of your face.
- 3) Aboid bending your neck sideways.
- 4) Perform it 10 times per set, three sets a day.
- 5) Stop performing beyond painful range.



Starting Position

Ending Position

G. Exercise 7 (Stretching of Rotator Cuff)

Starting position: Stand Upright, place your affected hand infront on a wall, try an round (Clockwise) movement of your shoulder.

Steps:

- 1) Slowly try to place your affected hand forward on a wall.
- 2) Perform clockwise movement.
- 3) Aboid extending your elbows.
- 4) Perform it 10 times per set, three sets a day.
- 5) Stop performing beyond painful range.



Starting position

Ending position

H. Exercise 8 (Stretching of Subscapularis)

Starting position: Stand Upright, flex your affected shoulder upto right angle by flexing elbow, grip your affected side elbow down by your unaffected hand infront.

Steps:

- 1) Slowly try to pull your affected hand towards adduction.
- 2) Pull it untill your shoulder is fully adducted.
- 3) Aboid extending your elbows.
- 4) Perform it 10 times per set, three sets a day.
- 5) Stop performing beyond painful range.



Starting Position

Ending position

I. Exercise 9 (Stretching of Supraspinatus)

Starting position: Stand Upright, place your unaffected side elbow bellow affected side elbow. Grip your fingers bellow, the affected shoulder will be at adductied position. Steps:

- 1) Slowly try to pull your affected hand outward.
- 2) Pull it untill your lateral rotation is in last of range.
- 3) Aboid excessive stretching .
- 4) Perform it 10 times per set, three sets a day.
- 5) Stop performing beyond painful range.



This research was a quantitative evaluation of the comparison between the exercise programs combined with Scapular Muscle Stretching & Strengthening and exercise along for pain and functional activity management of the patients with Adhesive capsulitis. To identify the effectiveness of this treatment approach Visual Analogue Scale (VAS) and Goniometer was used as measurement tools for measuring the pain intensity in several functional positions.

3.1 Study design

The study was conducted by using Randomized Control Trail (RCT).

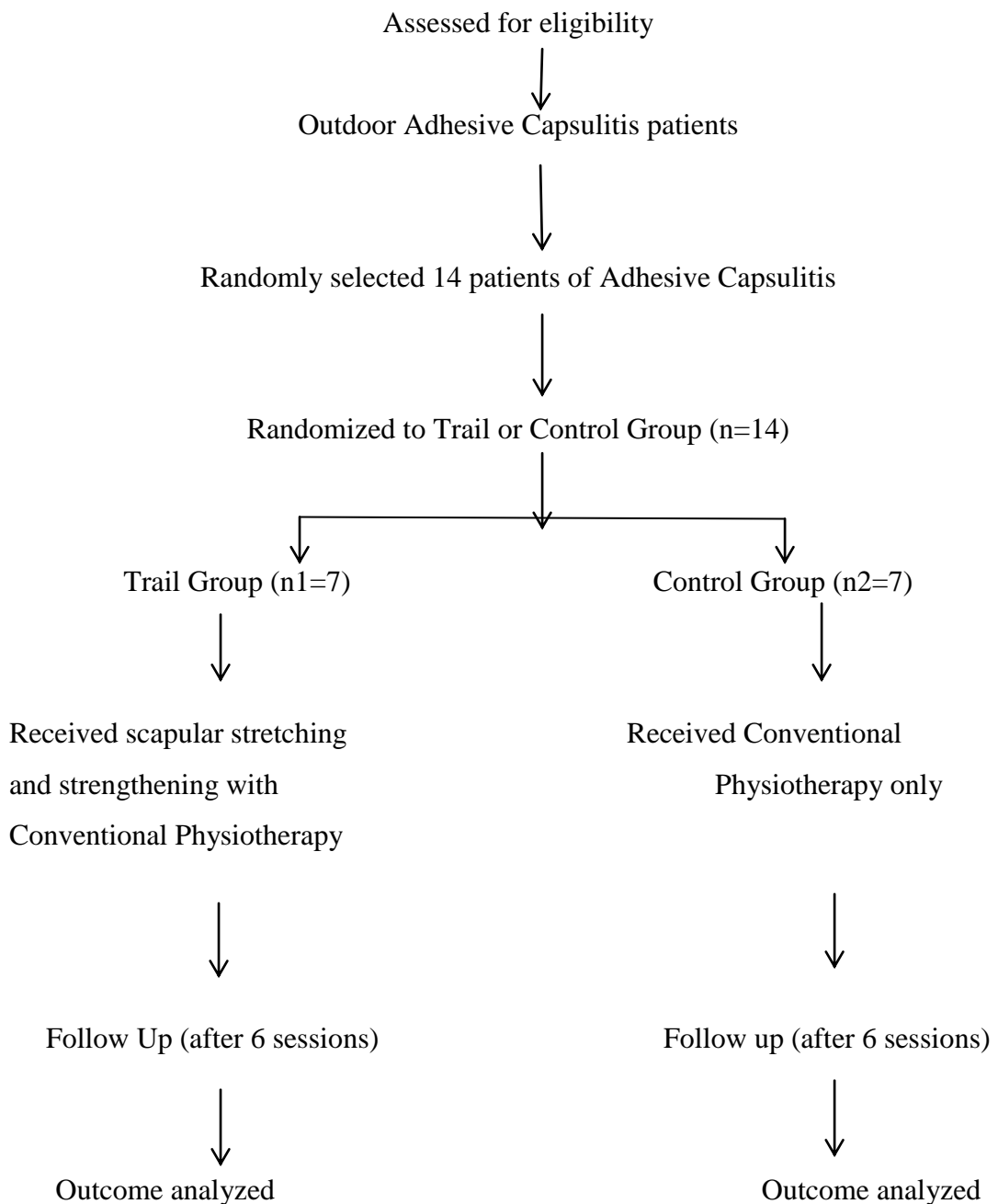
From the outdoor patients with adhesive capsulitis, 14 patients randomly selected and then 7 patients with Adhesive Capsulitis were randomly assigned to Scapular stretching and strengthening exercises with conventional physiotherapy group and 7 patients to the only conventional physiotherapy group for this randomize control trial study. The study was a single blinded study which has been conducted at musculoskeletal department of CRP, savar.

A pre test (before intervention) and post test (after intervention) was administered with each subject of both groups to compare the pain effects before and after the treatment. The design could be shown by-

r o x o (experimental group)

r o o (control group)

Flowchart of the phases of randomized controlled trial



A flowchart for a randomized controlled trial of a treatment program including conventional physiotherapy with stretching and strengthening exercise of scapular muscles for patient with Adhesive Capsulitis.

3.2 Study area

Outdoor Physiotherapy, Musculoskeletal Unit-2, Department of Physiotherapy, CRP, Savar, Dhaka- 1343.

3.3 Study Population

A population refers to the entire group of people or items that meet the criteria set by the researcher. The populations of this study were the Adhesive capsulitis Patients.

3.4 Sample selection

Subjects, who met the inclusion criteria, were taken as sample in this study. Fourteen patients with Adhesive capsulitis were selected from outdoor musculoskeletal physiotherapy department of CRP (Savar) and then 7 patients with Adhesive Capsulitis were randomly assigned to Scapular stretching and strengthening exercises with conventional physiotherapy group and 7 patients to the only conventional physiotherapy group for this randomize control trial study. The study was a single blinded study. When the samples were collected, the researcher randomly assigned the participants into experimental and control group, because it improves internal validity of experimental research. The samples were given numerical number C1, C2, C3 etcfor the control and E1, E2, E3 etc for experimental group. Total 14 samples included in this study, among them 7 patients were selected for the experimental group (received stretching and strengthening exercise of scapular muscles with conventional physiotherapy) and rest 7 patients were selected for control group (conventional physiotherapy only)

3.5 Inclusion criteria

- ✓ The participants were those individuals who has been diagnosed previously as Adhesive Capsulitis or recently diagnosed by Physiotherapist.
- ✓ Voluntary participants.
- ✓ Age group: 20-60 years old of both sexes.

3.6 Exclusion criteria

- Subject who had history of taking physiotherapy intervention, oral NSAID or corticosteroid injection previously.
- The participants who had deformity of the affected shoulder.
- Patients with clinical disorder which may become worsen with strengthening, e.g. hypoglycemic patient, severe uncontrolled hypertensive patient, recent fracture around shoulder.
- Subjects who were mentally unstable.

3.7 Conventional Physiotherapy

The researcher formulated a list of evidence based physiotherapy interventions of Adhesive Capsulitis and provided those to the physiotherapist to mark the interventions commonly used as conventional physiotherapy for Adhesive capsulitis. After finishing the pilot study, researcher became able to find out the conventional physiotherapy interventions used for Adhesive capsulitis and their frequency of use, with the consent of eight clinical physiotherapists. Capsular stretching, Accessory movements, pendulum exercise, pulley exercise, Infra-red radiation and Ultrasound were the most commonly used interventions, the frequency of use was 100%, Movement with mobilization and oral NSAID were the second most commonly used interventions and the frequency was 75-99% and corticosteroid injection were the partially used interventions and the frequency of use was 25-49%.

3.8 Method of data collection

3.8.1 Data collection tools

A written questionnaire, pen, paper and a Goniometer were used as data collection tools in this study.

3.8.2 Questionnaire

The questionnaire was developed under the advice and permission of the supervisor following certain guidelines. There were eight close ended questions with visual analogue scale (VAS) with some objective questions which were measured by examiner and each question was formulated to identify the change of pain with each activity.

3.9 Measurement tool

3.9.1 Visual Analogue Scale (VAS)-In this study researcher used visual analogue scale for measuring the intensity of pain. The VAS is a simple and accurate way of subjectively assessing pain along a continuous visual spectrum. VAS consists of a straight line on which the individual being assessed marks the level of pain. The ends of the straight line are the extreme limits of pain with 0 representing no pain and 10 representing the worst pain ever experienced. According to Myles (1999), the visual analog scale (VAS) is a tool widely used to measure pain and a change in the visual analog scale score represents a relative change in the magnitude of pain sensation.

3.9.2 Goniometer In this study researcher used Goniometer for measuring the Range of Movement (ROM) of shoulder Abduction, Lateral rotation and Medial rotation. The Goniometer is a simple and accurate way of objective assessment of ROM.

3.10 Data collection procedure

The study procedure was conducted through assessing the patient, initial recording, treatment and final recording. After screening the patient at department, the patients were assessed by qualified physiotherapist. Six sessions of treatment was provided for every subject.

Fourteen subjects were chosen for data collection according to the inclusion criteria. The researcher divide all participants into two groups and coded C1 (7) for control group and E1 (7) for experimental group. Experimental group received conventional physiotherapy with stretching and strengthening exercise of scapular muscle and control group received only conventional physiotherapy.

Data was gathered through a pre-test, intervention and post-test and the data was collected by using a written questionnaire form which was formatted by the researcher. Pre test was performed before beginning the treatment and the intensity of pain and ROM of shoulder movements were noted with VAS score and degrees on questionnaire form. The same procedure was performed to take post-test at the end of six session of treatment. Researcher gave the assessment form to each subject before starting treatment and after six session of treatment and instructed to put mark on the line of VAS according to their intensity of pain. The researcher collected the data both

in experimental and control group in front of the qualified physiotherapist in order to reduce the biasness. At the end of the study, specific test was performed for statistical analysis.

3.11 Intervention

A common intervention program was executed for both groups as conventional physiotherapy, it includes- . Capsular stretching, Accessory movements, pendulum exercise, pulley exercise, Infra-red radiation and Ultrasound, which are the most frequently, used interventions. In this study, the experimental group was treated with stretching and strengthening exercise of scapular muscles in addition with conventional physiotherapy. Clinicalphysiotherapist applied the stretching and strengthening exercise and the conventional physiotherapies. Each group got 6 sessions of treatment. There is no evidence of exact repetition for stretching and strengthening exercise, but in practice expert opinion suggests that 6 sessions is minimal enough for patients with adhesive Capsulitis to get more effectiveness.

3.12 Ethical consideration

Research proposal was submitted for approval to the administrative bodies of ethical committee of CRP. Again before beginning the data collection, researcher was obtained the permission from the concerned authorities ensuring the safety of the participants. In order to eliminate ethical claims, the participants were set free to receive treatment for other purposes as usual. Each participant was informed about the study before beginning and given written consent.

3.13 Informed Consent

The researcher obtained consent to participate from every subject. A signed informed consent form was received from each participant. The participants were informed that they have the right to meet with outdoor doctor if they think that the treatment is not enough to control the condition or if the condition become worsen. The participants were also informed that they were completely free to decline answering any question during the study and were free to withdraw their consent and terminate participation at any time. Withdrawal of participation from the study would not affect their treatment in the physiotherapy department and they would still get the same facilities.

Every subject had the opportunity to discuss their problem with the senior authority or administration of CRP and have any questioned answer to their satisfaction.

3.14 Data analysis

In order to ensure that the research have some values, the meaning of collected data has to be presented in ways that other research workers can understand. In other words the researcher has to make sense of the results. As the result came from an experiment in this research, data analysis was done with statistical analysis.

All participants were code according to group to maintain participant's confidentiality. All subjects of both experimental and control group score their pain intensity on visual analogue scale before starting treatment and after completing treatment. Reduction of pain intensity for both groups and improvement of ROM of different movements of shoulder are the differences between pre-test and post-test score.

Experimental studies with the different subject design where two groups are used and each tested in two different conditions and the data is interval or ratio should be analyzed with unrelated „t“ test. As it was experimental and had unmatched groups of different subjects, who was randomly assigned to conventional physiotherapy with Stretching and strengthening exercise and only conventional physiotherapy group and the measurement of the outcome came from ROM by Goniometer, with considering interval or ratio data, so the parametric unrelated „t“ test was used in this study to calculate the level of significance. Unrelated „t“ test and mean difference was calculated to test the hypothesis on the basis of following assumptions-

- ✓ Data were ratio
- ✓ Two different set of subjects in two conditions

The “t” formula-

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\left[\frac{\left(\sum x_1^2 - \frac{(\sum x_1)^2}{n_1} \right) + \left(\sum x_2^2 - \frac{(\sum x_2)^2}{n_2} \right)}{(n_1 - 1) + (n_2 - 1)} \right] \times \sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

Where

\bar{x}_1 = mean of scores from treatment group.

\bar{x}_2 = mean of scores from control group.

$(x_1)^2$ = the square of the each individual score from treatment group totaled.

$(x_2)^2$ = the square of the each individual score from control group totaled.

$(\sum x_1)^2$ = the total of the individual score from treatment group squared.

$(\sum x_2)^2$ = the total of the individual score from control group squared.

n_1 = number of subjects from treatment group.

n_2 = number of subjects from control group.

3.15 Significant level

In order to find out the significance of the study, the researcher calculated the “p” value. The p values refer the probability of the results for experimental study. The word probability refers to the accuracy of the findings. A p value is called level of significance for an experiment and a p value of <0.05 was accepted as significant result for health service research. If the p value is equal or smaller than the significant levels, the results are said to be significant.

Calculating the degree of freedom from the formula:

$$\text{Degrees of freedom (df)} = (n_1 - 1) + (n_2 - 1) = (7 - 1) + (7 - 1) = 12$$

df	.1	.05	.025	.01	.005	.0005
12	1.356	1.782	2.179	2.681	3.055	4.318

Table-1: Level of significance for one tailed hypothesis

3.16 Elimination of confounding variables

Confounding variable has an effect on the study variables which can affect the result of the study. There were some confounding variables in this study such as patient’s age, history of taking recent physiotherapy intervention, oral NSAID, steroid injection or other treatment which could influence the result of the study. Researcher found no significant difference between the mean age of two groups and the mean age of control group was 45 years and mean age of trial group was 48 years, so there was no

effect of age which can influence the result. To control the confounding variables, researcher set the inclusion criteria as to include only those subjects who have no history of taking recent physiotherapy intervention, oral NSAID, steroid injection or other treatment.

3.17 Limitations

- ✓ The main limitation of this study was its short duration.
- ✓ The study was conducted with 14 patients of Adhesive Capsulitis, which was a very small number of samples in both groups and was not sufficient enough for the study to generalize the wider population of this condition.
- ✓ It is limited by the fact daily activities of the subject were not monitored which could have influenced. Researcher only explored the effect of stretching and strengthening exercise of scapular muscles after 6 weeks, so the long term effect of stretching and strengthening exercise of scapular muscles was not explored in this study.
- ✓ The research was carried out in CRP Savar such a small environment, so it was difficult to keep confidential the aims of the study for blinding procedure. Therefore, single blind method was used in this study.
- ✓ There was no available research done in this area in Bangladesh. So, relevant information about Adhesive Capsulitis patient with specific intervention for Bangladesh was very limited in this study.

Mean Age of the Participants:

Experimental Group		Control Group	
Subjects	Age (Years)	Subjects	Age (Years)
E1	43	C1	40
E2	55	C2	50
E3	50	C3	50
E4	41	C4	25
E5	60	C5	51
E6	27	C6	40
E7	55	C7	55
Mean Age	48 years	Mean Age	45 years

Table 2: Mean Age of Participants

Sex of the Participants: 14 Patients with adhesive Capsulitis were included as sample of the study, among them almost 29% (n=10) were male and about 71% (n=4) were female.

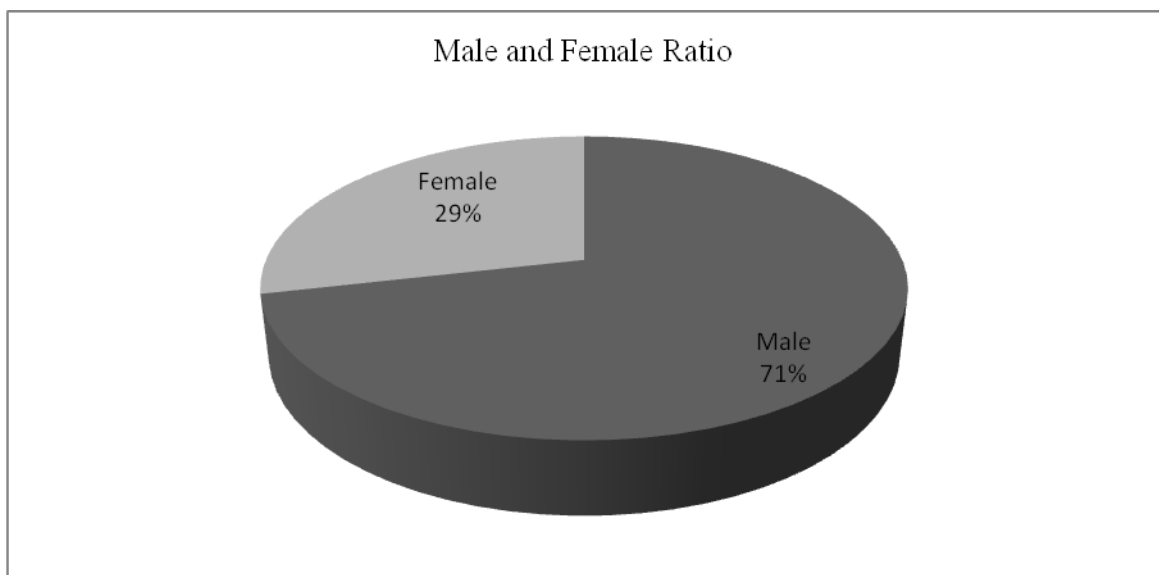


Figure 1: Gender Distribution

Fourteen patients with adhesive capsulitis were enrolled in the study. 7 in the Stretching and strengthening exercise of Scapular muscle with conventional physiotherapy treatment group (experimental group) and 7 in the only conventional physiotherapy treatment group (control group). The all subjects of both experimental and control group scored their pain on visual analogue scale before and after completing treatment.

Resting pain: Reduction of pain scores at Rest in adhesive capsulitis, Stretching and strengthening exercise of scapular muscles with conventional physiotherapy treatment group and only conventional physiotherapy treatment group for pain at rest were differences between pre-test and post-test pain scores.

Only Conventional physiotherapy group (Control Group)									
Pain in VAS Scale	1	2	3	4	5	6	7	8	9
Pre-test						1 Person (14%)	4 Persons (57%)	2 Persons (29%)	
Post-test			1 Person (14%)		5 Persons (72%)	1 Person (14%)			
Conventional physiotherapy with Stretching and Strengthening exercise of scapular muscles (Experimental Group)									
Pain in VAS Scale	1	2	3	4	5	6	7	8	9
Pre-test							2 Persons (28%)	5 Persons (72%)	
Post-test		2 Persons (28%)	3 Persons (44%)	2 Persons (28%)					

Table 3: Reduction of Resting Pain

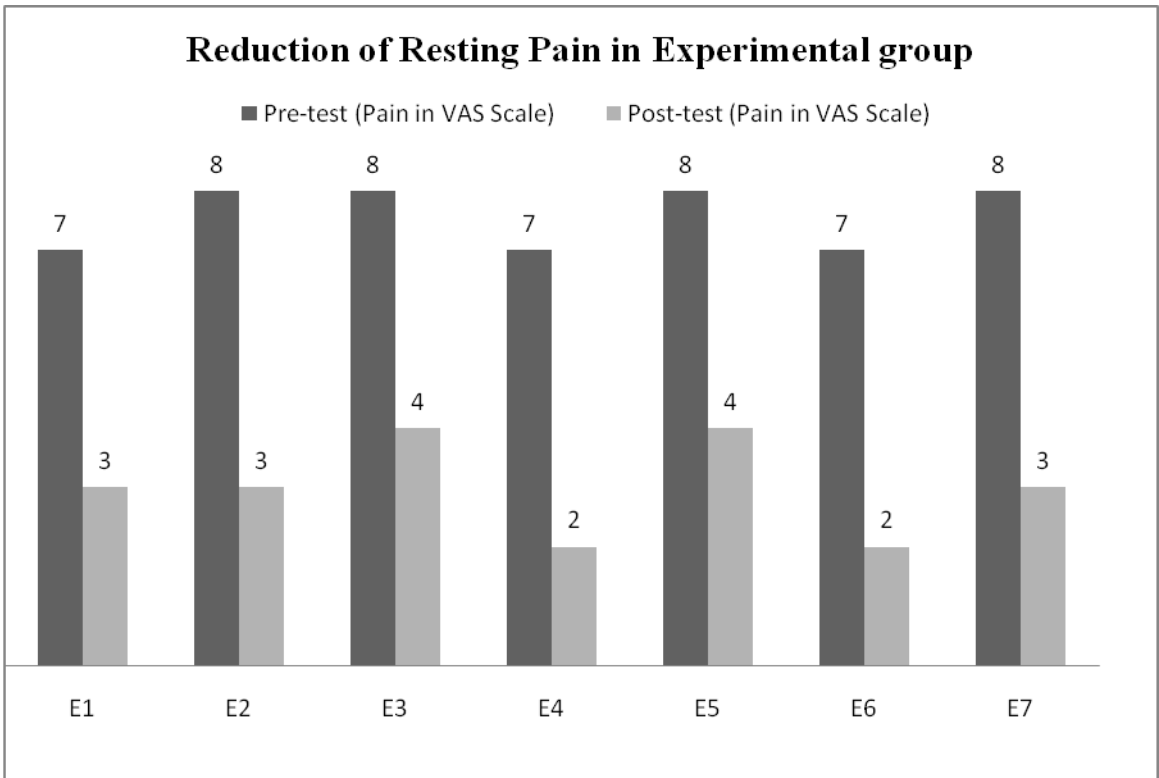
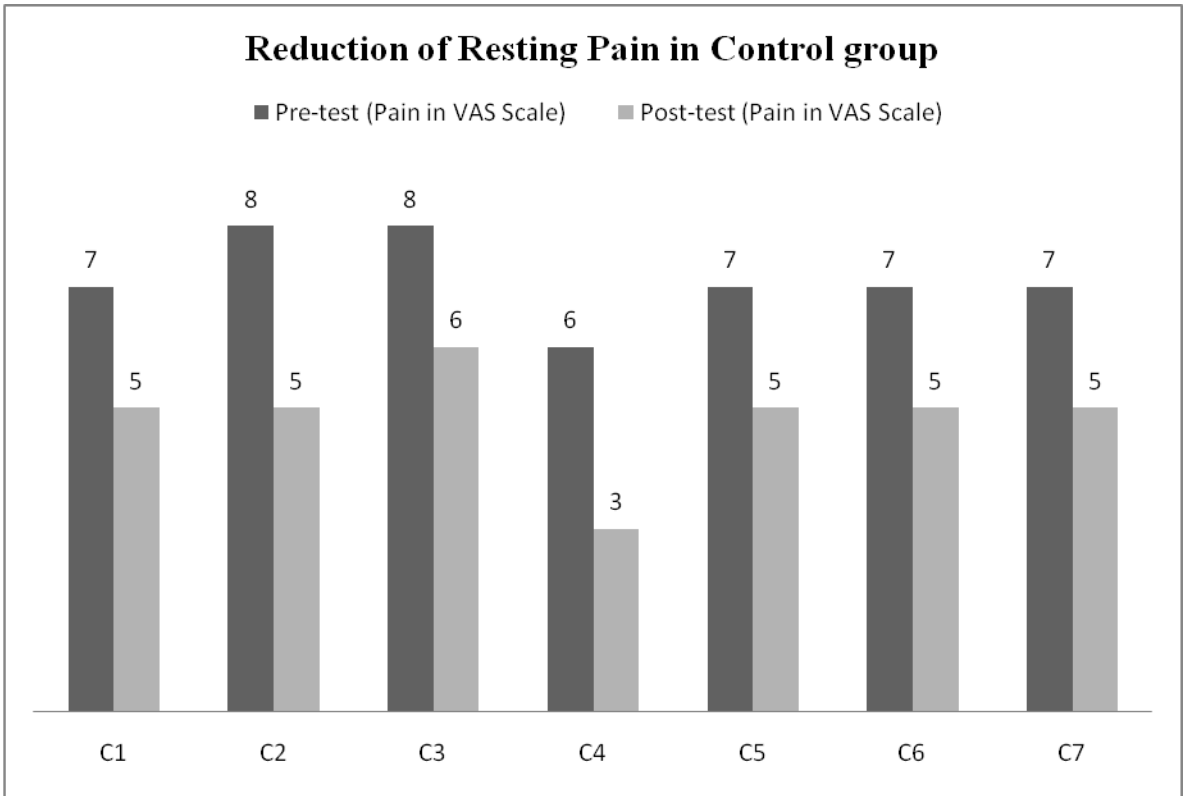


Fig 2: Reduction of Resting Pain in different Subjects

Pain in Abduction (raising hand sideways): Reduction of pain scores in abduction in Adhesive capsulitis, Stretching and Strengthening exercise of scapular muscles with conventional physiotherapy treatment group and only conventional physiotherapy treatment group for pain in abduction were differences between pre-test and post-test pain scores.

Only Conventional physiotherapy group (Control Group)										
Pain in	1	2	3	4	5	6	7	8	9	
VAS Scale										
Pre-test						1	4	2		
						Person	Persons	Persons		
						(14%)	(57%)	(29%)		
Post-test			1	1	4	1				
			Person	person	Persons	Person				
			(14%)	(15%)	(57%)	(14%)				
Conventional physiotherapy with Stretching and Strengthening exercise of scapular muscles (Experimental Group)										
Pain in	1	2	3	4	5	6	7	8	9	
VAS Scale										
Pre-test							3	4		
							Persons	Persons		
							(28%)	(72%)		
Post-test		4		3						
		Persons		Persons						
		(57%)		(43%)						

Table 4: Reduction of Pain in abduction

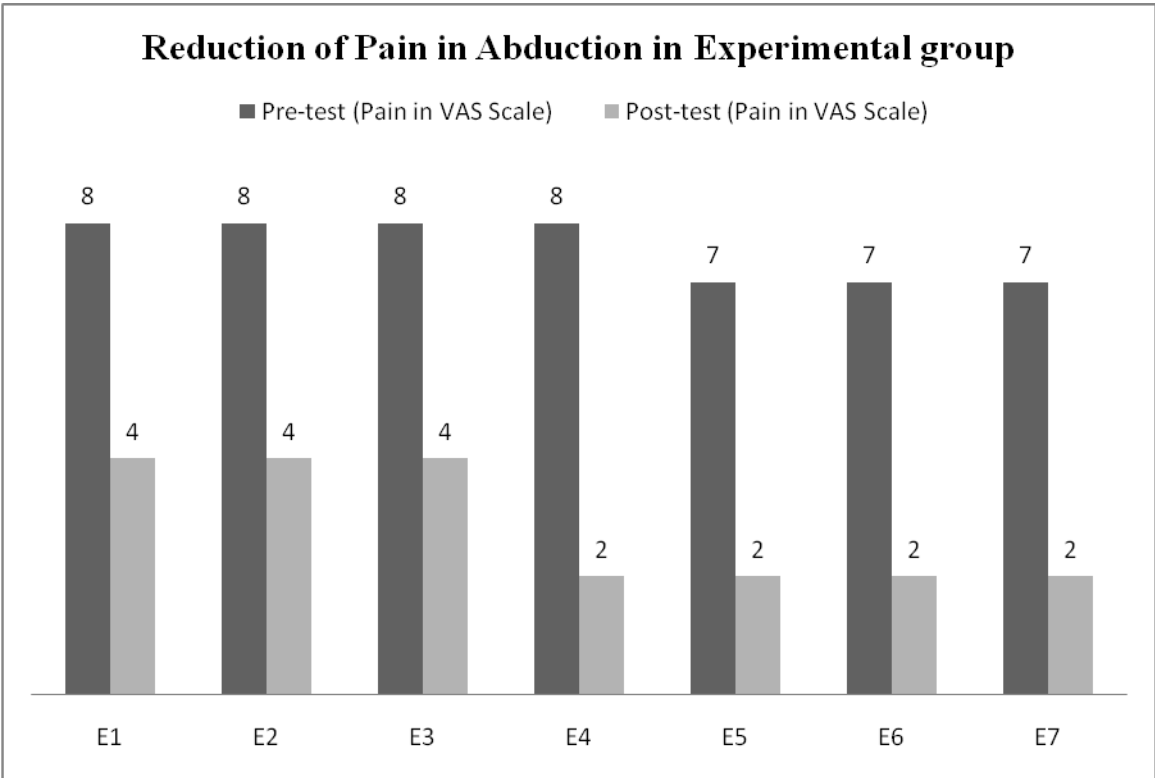
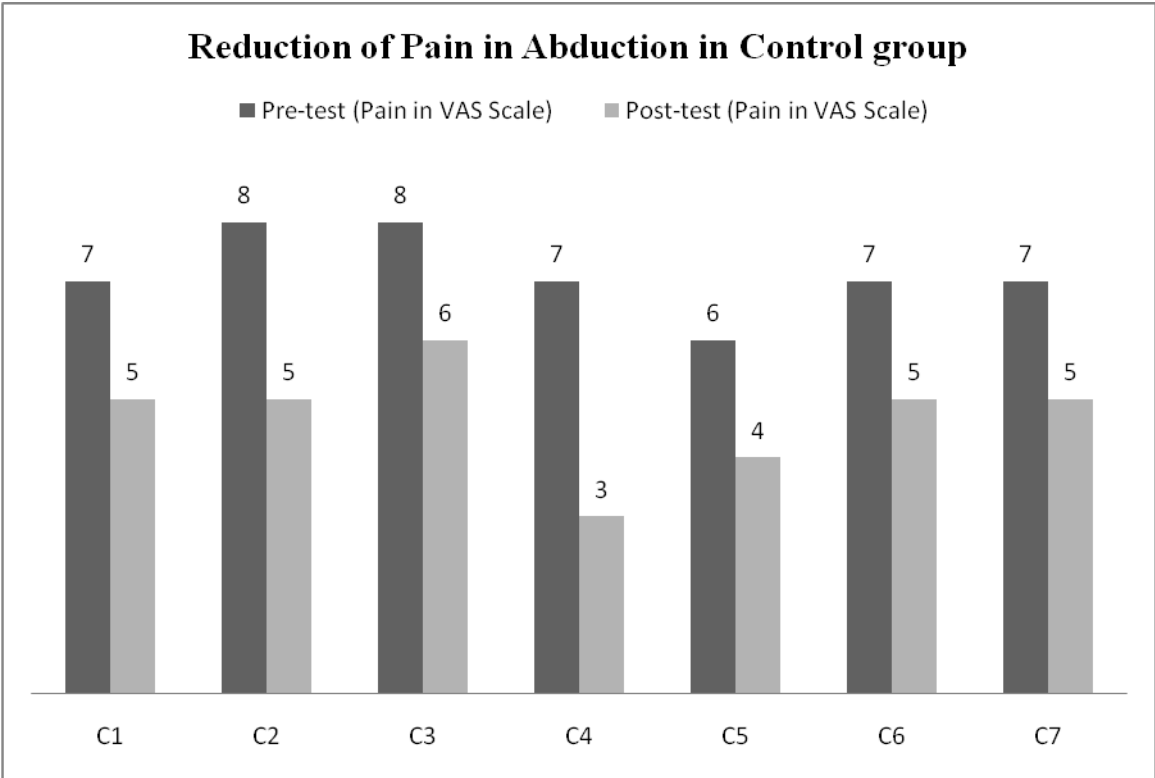


Fig 3: Reduction of Pain in Abduction

Pain at Lateral Rotation (Combing hair): Reduction of pain scores at lateral rotation in Adhesive capsulitis, Stretching and Strengthening exercise of scapular muscles with conventional physiotherapy treatment group and only conventional physiotherapy treatment group for pain at lateral rotation were differences between pre-test and post-test pain scores.

Only Conventional physiotherapy group (Control Group)										
Pain in VAS Scale	1	2	3	4	5	6	7	8	9	
Pre-test						3	2	2		
						Persons (46%)	Persons (28%)	Persons (28%)		
Post-test				4	2	1				
				persons (57%)	Persons (29%)	Person (14%)				
Conventional physiotherapy with Stretching and Strengthening exercise of scapular muscles (Experimental Group)										
Pain in VAS Scale	1	2	3	4	5	6	7	8	9	
Pre-test						1	4	2		
						person (14%)	Persons (58%)	Persons (28%)		
Post-test		3	3	1						
		Persons (43%)	Persons (43%)	Person (14%)						

Table 5: Reduction of Pain in Lateral rotation

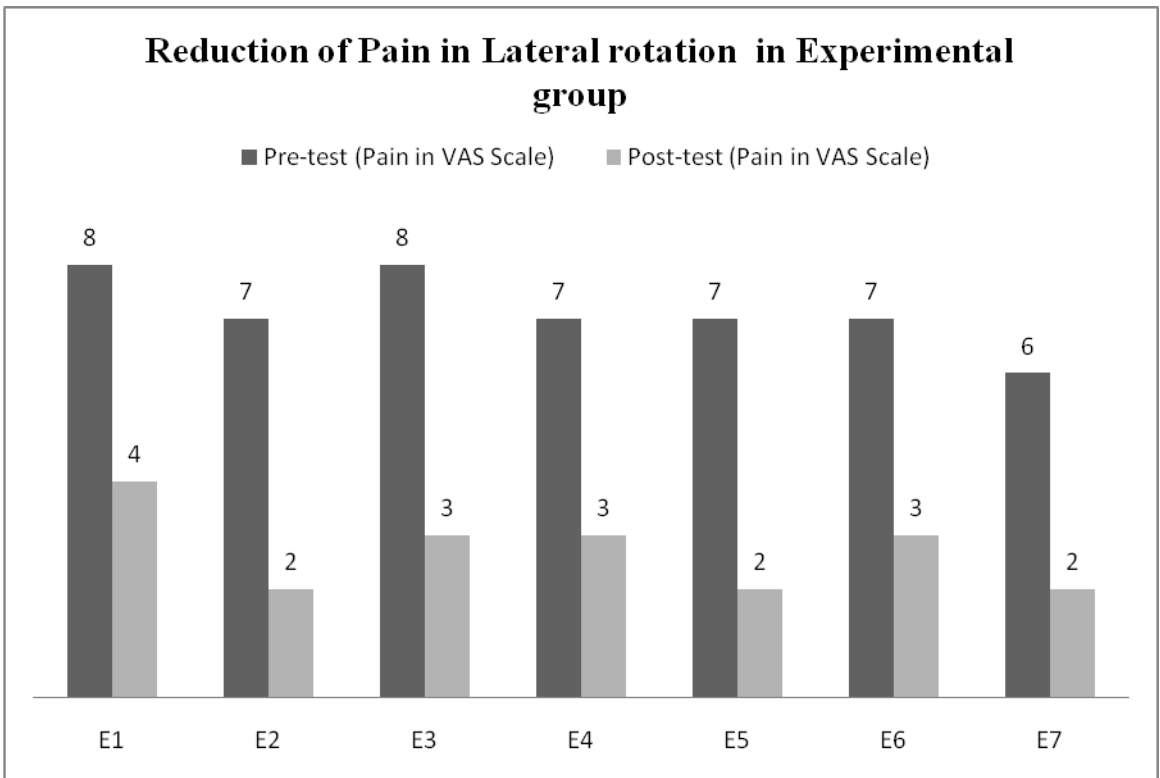
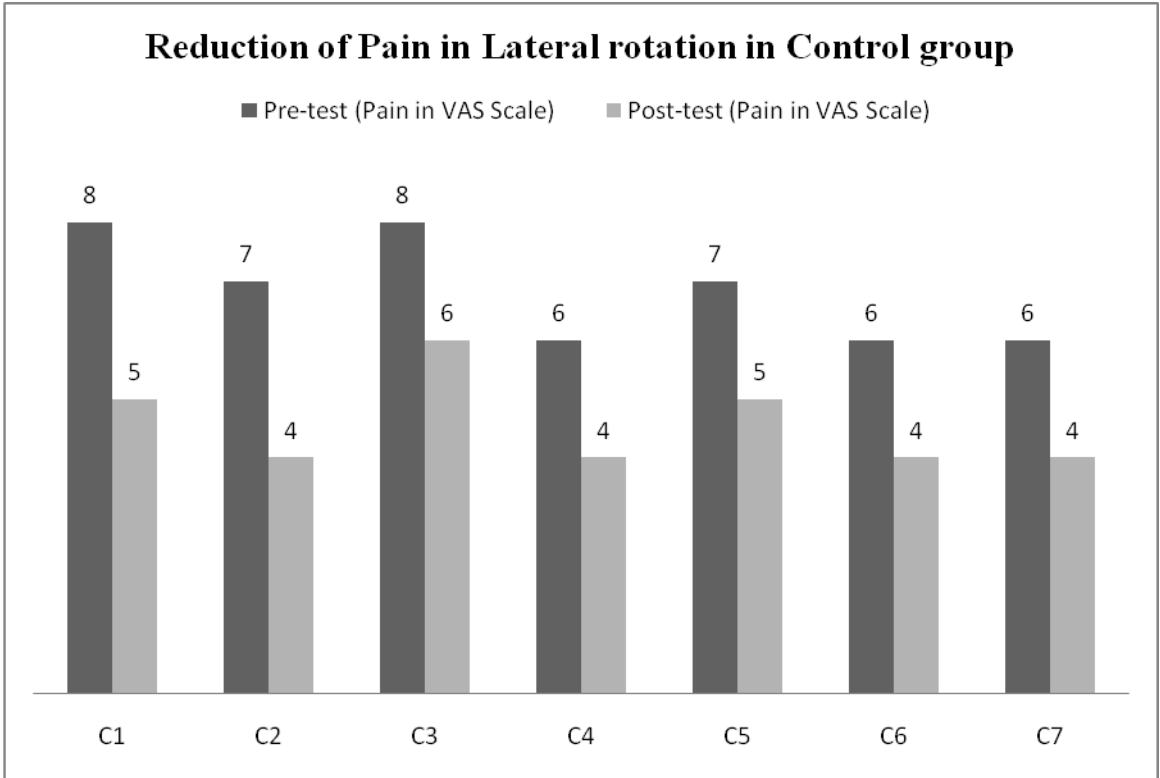


Fig 4: Reduction of Pain in Lateral rotation

Pain at Medial Rotation (Scratching lower back): Reduction of pain scores at medial rotation in Adhesive capsulitis, Stretching and Strengthening exercise of scapular muscles with conventional physiotherapy treatment group and only conventional physiotherapy treatment group for pain in medial rotation were differences between pre-test and post-test pain scores.

Only Conventional physiotherapy group (Control Group)									
Pain in	1	2	3	4	5	6	7	8	9
VAS									
Scale									
Pre-test						2 Persons (28%)	3 Persons (46%)	1 Person (14%)	1 Person (14%)
Post-test			2 Persons (29%)	1 person (14%)	2 Persons (29%)	2 Persons (28%)			
Conventional physiotherapy with Stretching and Strengthening exercise of scapular muscles (Experimental Group)									
Pain in	1	2	3	4	5	6	7	8	9
VAS									
Scale									
Pre-test						1 person (14%)	3 Persons (46%)	2 Persons (28%)	1 person (14%)
Post-test		3 Persons (42%)	2 Persons (28%)	2 Persons (28%)					

Table 6: Reduction of Pain in Medial rotation

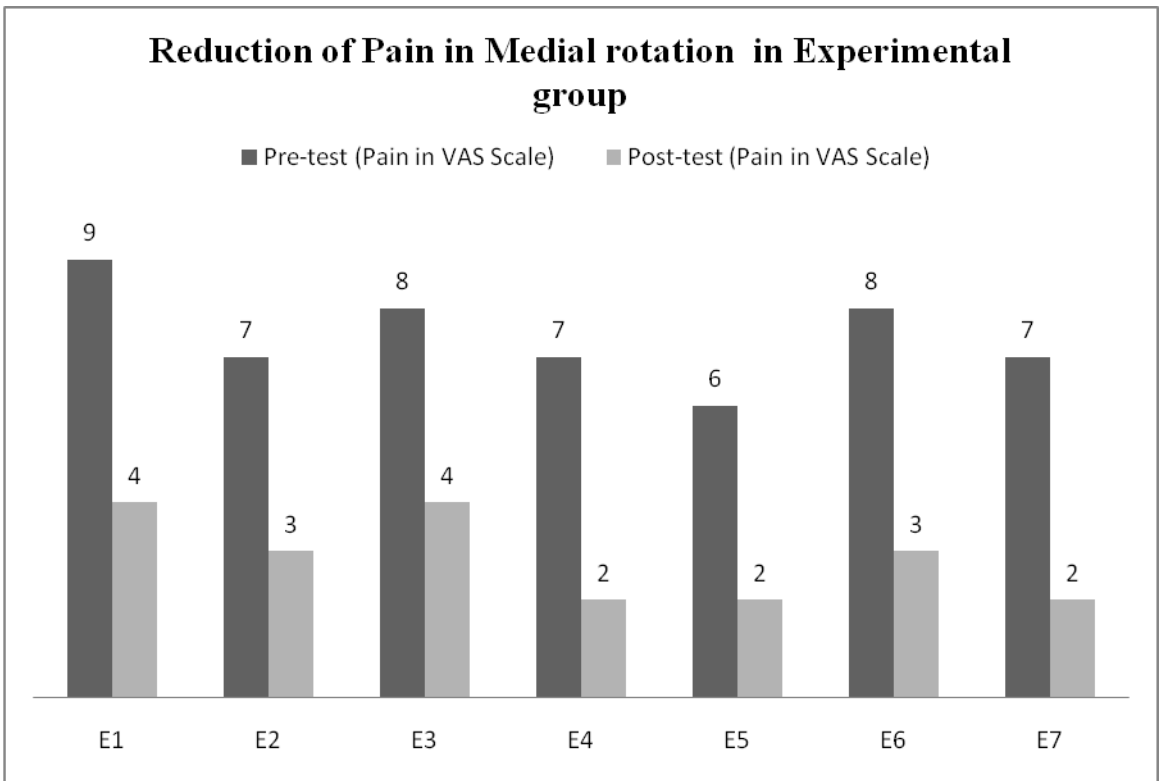
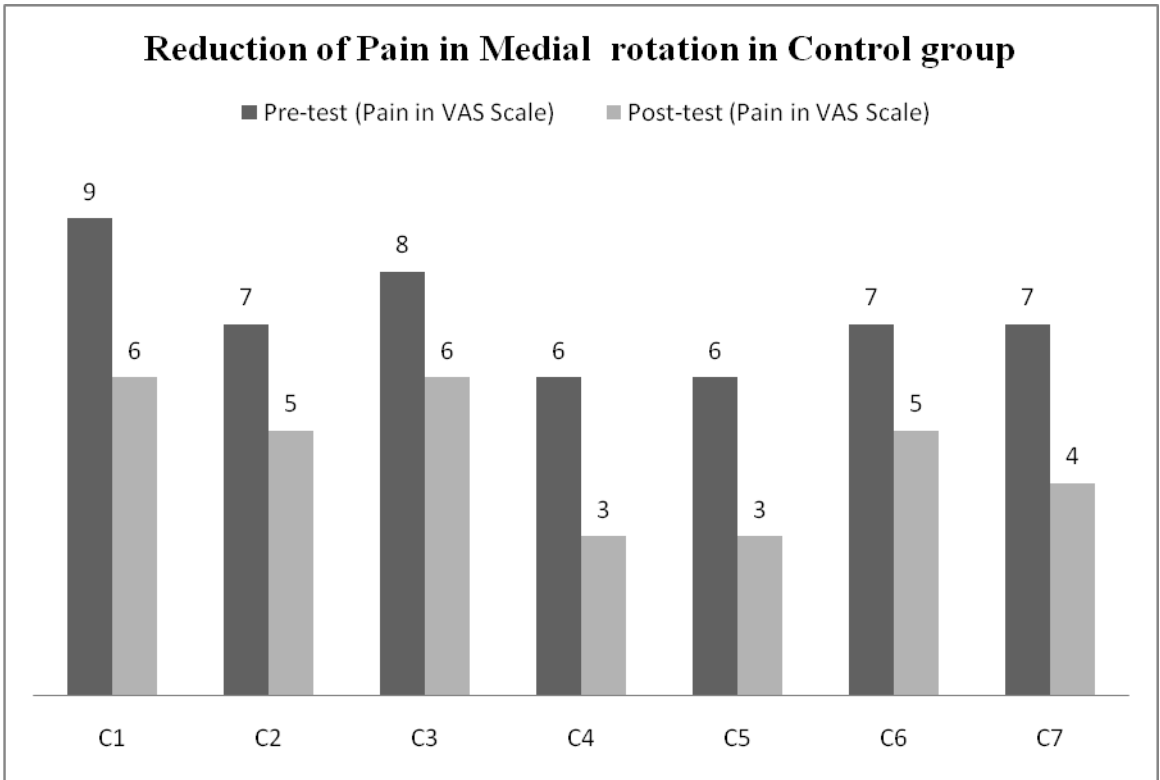


Fig 5: Reduction of Pain in Medial rotation

Pain during sleeping in affected side : Reduction of pain scores in Adhesive capsulitis, Stretching and Strengthening exercise of scapular muscles with conventional physiotherapy treatment group and only conventional physiotherapy treatment group for pain during sleeping in affected side were differences between pre-test and post-test pain scores.

Only Conventional physiotherapy group (Control Group)									
Pain in VAS Scale	1	2	3	4	5	6	7	8	9
Pre-test				1 Person (14%)		4 Persons (58%)		2 Persons (28%)	
Post-test			3 Persons (43%)	3 persons (43%)		1 Person (14%)			
Conventional physiotherapy with Stretching and Strengthening exercise of scapular muscles (Experimental Group)									
Pain in VAS Scale	1	2	3	4	5	6	7	8	9
Pre-test					1 Person (14%)	2 persons (28%)	2 Persons (29%)	2 Persons (29%)	
Post-test	3 Persons (43%)	3 Persons (43%)	1 Person (14%)						

Table 7: Reduction of Pain during sleeping in affected side

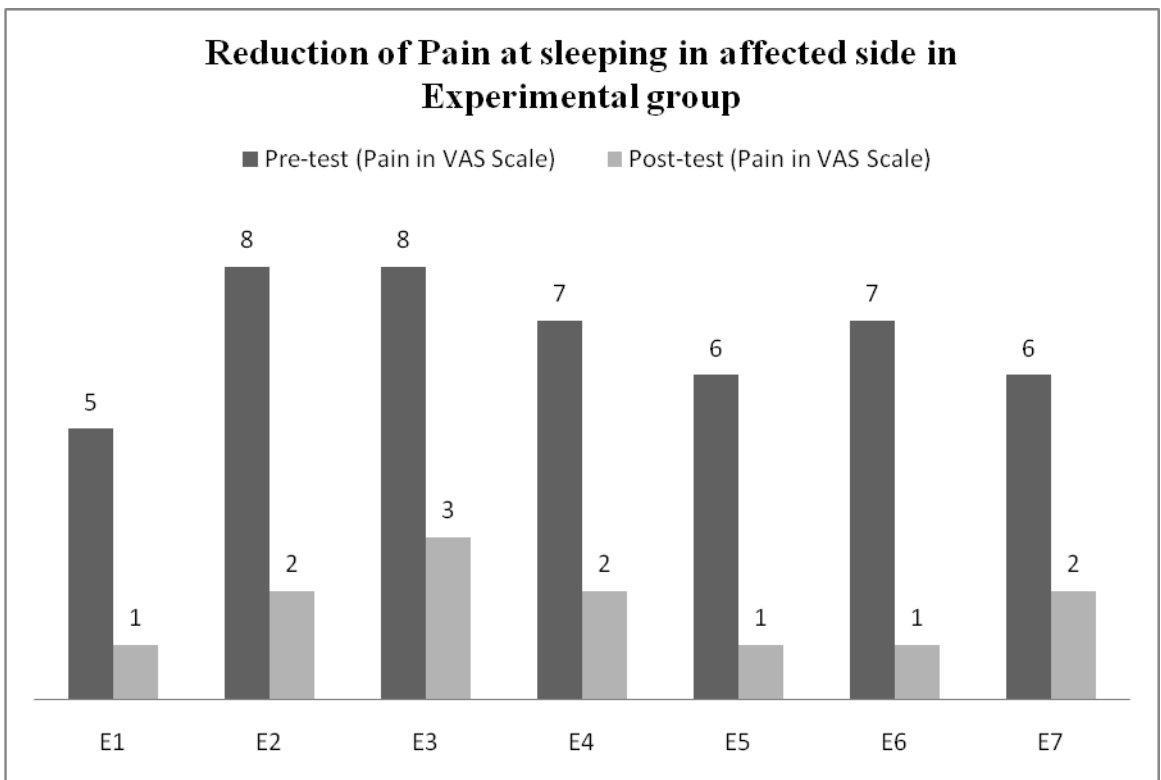
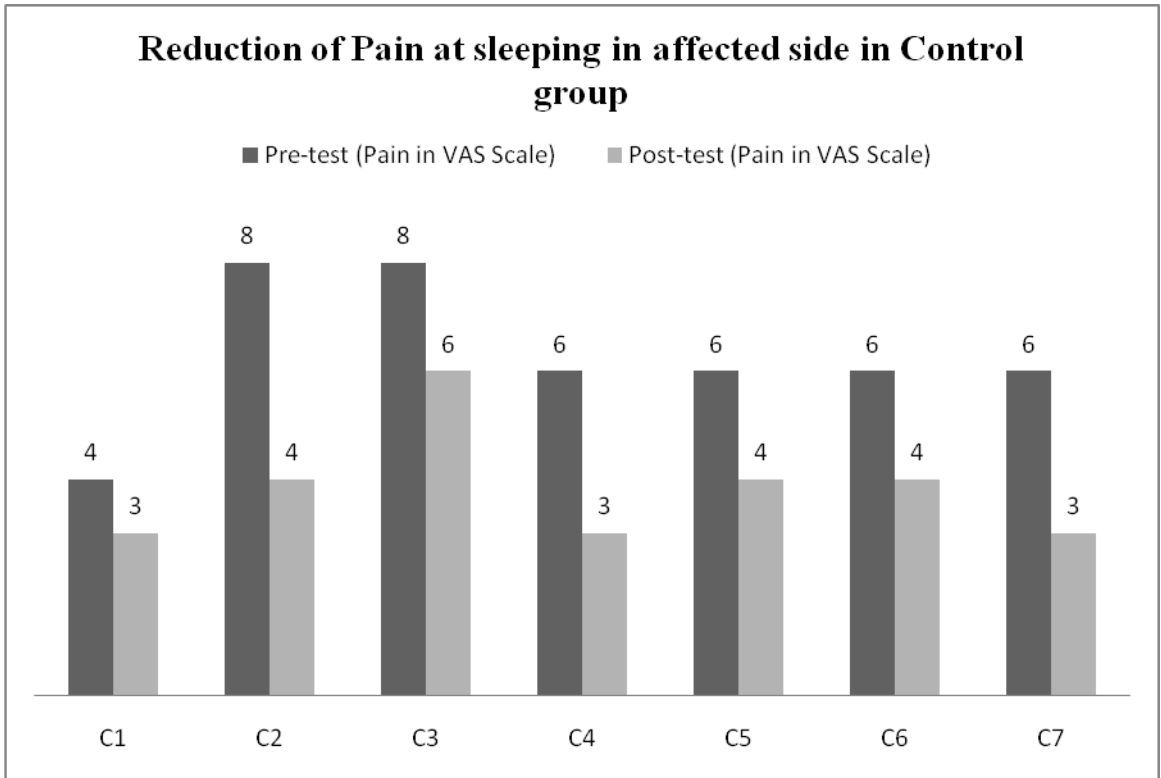


Fig 6: Reduction of pain in lying affected side

Subjects	Mean Difference of Pain Reduction in Control group										
	Rest		Abduction		Lateral rotation		Medial rotation		Sleeping in affected side		
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
C1	7	5	7	5	8	5	9	6	4	3	
C2	8	5	8	5	7	4	7	5	8	4	
C3	8	6	8	6	8	6	8	6	8	6	
C4	6	3	7	3	6	4	6	3	6	3	
C5	7	5	6	4	7	5	6	3	6	4	
C6	7	5	7	5	6	4	7	5	6	4	
C7	7	5	7	5	6	4	7	4	6	3	
Total	7	50	34	50	33	48	32	50	32	44	27
Mean		7.14	4.86	7.14	4.71	6.86	4.57	7.14	4.57	6.29	3.86
Mean difference		2.28		2.43		2.29		2.57		2.43	
Subjects	Mean Difference of Pain Reduction in Experimental group										
	Rest		Abduction		Lateral rotation		Medial rotation		Sleeping in affected side		
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
E1	7	3	8	4	8	4	9	4	5	1	
E2	8	3	8	4	7	2	7	3	8	2	
E3	8	4	8	4	8	3	8	4	8	3	
E4	7	2	8	2	7	3	7	2	7	2	
E5	8	4	7	2	7	2	6	2	6	1	
E6	7	2	7	2	7	3	8	3	7	1	
E7	8	3	7	2	6	2	7	2	6	2	
Total	7	53	21	53	20	50	19	52	20	47	12
Mean		7.57	3.00	7.57	2.86	7.14	2.71	7.43	2.86	6.71	1.71
Mean difference		4.57		4.71		4.43		4.57		5.00	

Name of the variables	Experimental Group (Mean Pain reduction)	Control group (Mean Pain reduction)
Pain at rest	4.57	2.28
Pain at abduction (Raising hand sideways)	4.71	2.43
Pain at lateral rotation (Combing Hair)	4.43	2.29
Pain at medial rotation (Scratch Lower Back)	4.57	2.57
Pain at sleeping in affected side	5.00	2.43

Table 8: Comparison of mean difference of pain reduction in both groups

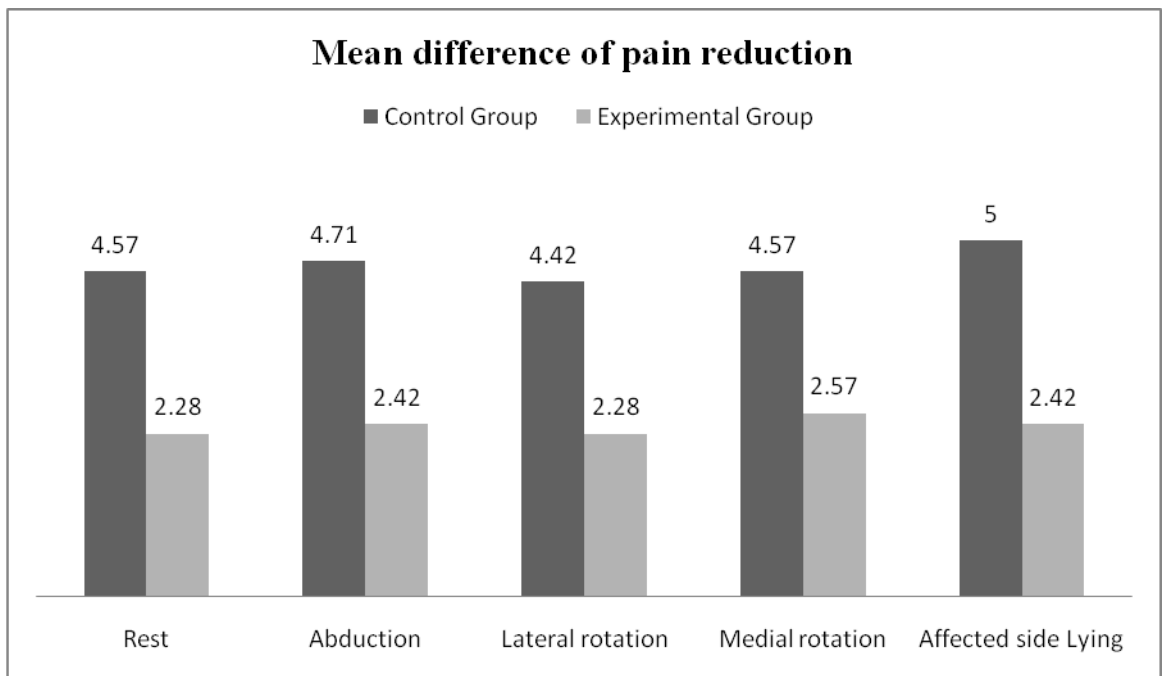


Fig 7: Mean difference of pain reduction

Improvement of ROM

Mean difference of Improvement of Range of motion between pre-test and post-test in conventional physiotherapy with Stretching and strengthening exercise of scapular muscles and only conventional physiotherapy group.

Name of the variables	Conventional physiotherapy with Stretching and Strengthening exercise of Scapular muscles group	Only conventional physiotherapy group
Abduction	15.72	10.0
Lateral Rotation	4.29	2.86
Medial Rotation	4.29	2.86

Table 9: Mean difference of Improvement of ROM between pre-test and post-test in experimental and control group

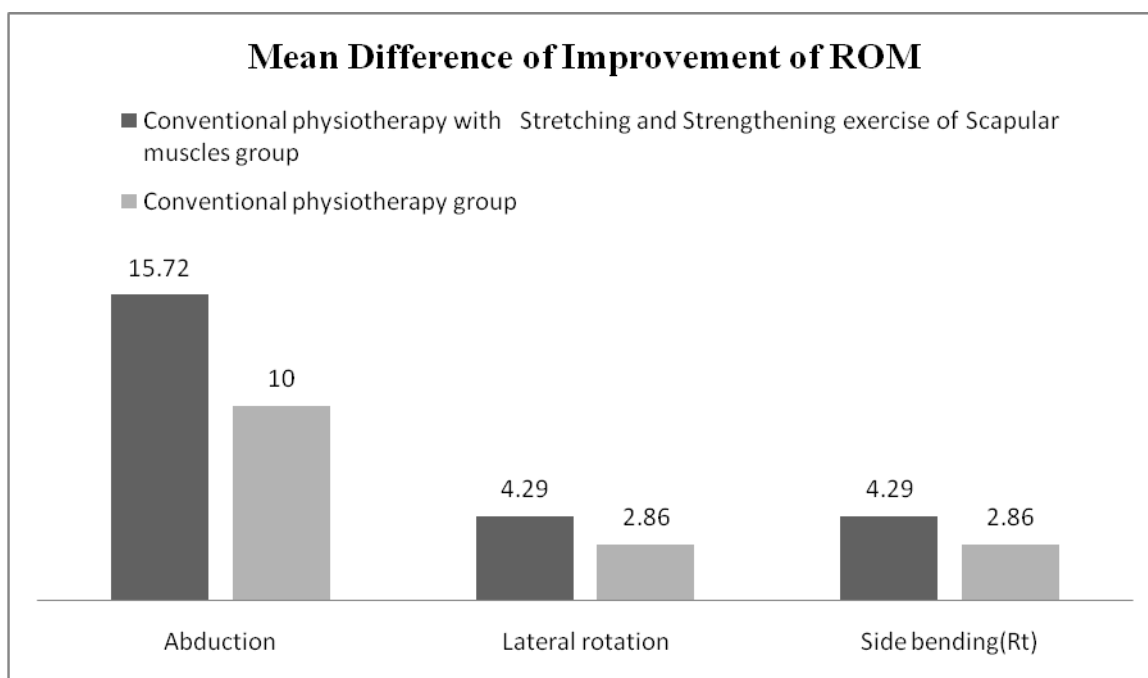


Figure 8: Mean difference of Improvement of ROM between pre-test and post- test in experimental and control group.

Range of Movement in Abduction: Improvement of ROM in Abduction in Adhesive capsulitis, Stretching and Strengthening exercise of scapular muscles with conventional physiotherapy treatment group and only conventional physiotherapy treatment group for Improvement of ROM in Abduction were differences between pre-test and post-test pain scores.

Conventional physiotherapy with Only Conventional physiotherapy Stretching and Strengthening exercise group of scapular muscles

Subjects	ROM in Abduction (X ₁)	X ₁ ²	Subjects	ROM in Abduction (X ₂)	X ₂ ²
E ₁	20	400	C ₁	10	100
E ₂	10	100	C ₂	10	100
E ₃	10	100	C ₃	10	100
E ₄	20	400	C ₄	10	100
E ₅	20	400	C ₅	0	0
E ₆	15	225	C ₆	10	100
E ₇	15	225	C ₇	20	400
	ΣX ₁ =110	ΣX ₁ ² =1850		ΣX ₂ = 70	Σ X ₂ ² = 900

$$\bar{X}_1 = 15.72$$

$$\sum X_1^2 = 1850$$

$$(\sum X_1)^2 = 12100$$

$$n_1 = 7$$

$$\bar{X}_2 = 10.0$$

$$\sum X_2^2 = 900$$

$$(\sum X_2)^2 = 4900$$

$$n_2 = 7$$

Calculating the degree of freedom from the formula

$$df = (n_1 - 1) + (n_2 - 1)$$

$$= (7 - 1) + (7 - 1) = 12$$

Now 't' formula-

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\left(\sum x_1^2 - \frac{(\sum x_1)^2}{n_1}\right) + \left(\sum x_2^2 - \frac{(\sum x_2)^2}{n_2}\right)}{(n_1 - 1) + (n_2 - 1)} \times \sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

$$t = \frac{15.72 - 10.0}{\sqrt{\frac{1850 - \frac{12100}{7} + 900 - \frac{4900}{7}}{(7-1) + (7-1)} \times \sqrt{\left(\frac{1}{7} + \frac{1}{7}\right)}}$$

t= 2.06

Range of Movement in Lateral rotation: Improvement of ROM in Lateral Rotation in Adhesive capsulitis, Stretching and Strengthening exercise of scapular muscles with conventional physiotherapy treatment group and only conventional physiotherapy treatment group for Improvement of ROM in Lateral rotation were differences between pre-test and post-test pain scores.

Conventional physiotherapy with Only Conventional physiotherapy Stretching and Strengthening exercise group of scapular muscles

Subjects	ROM in X ₁ ²	Subjects	ROM in X ₂ ²
	Abduction (X ₁)		Abduction (X ₂)
E ₁	5 25	C ₁	5 25
E ₂	5 25	C ₂	5 25
E ₃	0 0	C ₃	0 0
E ₄	5 25	C ₄	5 25
E ₅	5 25	C ₅	0 0
E ₆	5 25	C ₆	0 0
E ₇	5 25	C ₇	5 25
	∑X ₁ = 30 ∑X ₁ ² = 150		∑X ₂ = 20 ∑ X ₂ ² = 100

$$\bar{X}_1 = 4.29$$

$$\sum X_1^2 = 150$$

$$(\sum X_1)^2 = 900 n_1 = 7$$

$$\bar{X}_2 = 2.86$$

$$\sum X_2^2 = 100$$

$$(\sum X_2)^2 = 400 \quad n_2 = 7$$

Calculating the degree of freedom from the formula

$$\begin{aligned} df &= (n_1 - 1) + (n_2 - 1) \\ &= (7 - 1) + (7 - 1) = 12 \end{aligned}$$

Now 't' formula-

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\left[\frac{\left(\sum x_1^2 - \frac{(\sum x_1)^2}{n_1} \right) + \left(\sum x_2^2 - \frac{(\sum x_2)^2}{n_2} \right)}{(n_1 - 1) + (n_2 - 1)} \right]} \times \sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

$$t = \frac{4.29 - 2.86}{\sqrt{\left[\frac{150 - \frac{900}{7} + 100 - \frac{400}{7}}{(7-1) + (7-1)} \right]} \times \sqrt{\left(\frac{1}{7} + \frac{1}{7} \right)}}$$

$$t = 1.14$$

Range of Movement in Medial Rotation: Improvement of ROM in Medial Rotation in Adhesive capsulitis, Stretching and Strengthening exercise of scapular muscles with conventional physiotherapy treatment group and only conventional physiotherapy treatment group for Improvement of ROM in Medial rotation were differences between pre-test and post-test pain scores.

Conventional physiotherapy with Only Conventional physiotherapy Stretching and Strengthening exercise group of scapular muscles

Subjects	ROM in X_1^2		Subjects	ROM in X_2^2	
	Abduction (X_1)			Abduction (X_2)	
E ₁	5	25	C ₁	0	0
E ₂	0	0	C ₂	0	0
E ₃	5	25	C ₃	5	25
E ₄	5	25	C ₄	5	25
E ₅	5	25	C ₅	5	25
E ₆	5	25	C ₆	0	0
E ₇	5	25	C ₇	5	25
	$\sum X_1 = 30$	$\sum X_1^2 = 150$		$\sum X_2 = 20$	$\sum X_2^2 = 100$

$$\bar{X}_1 = 4.29$$

$$\sum X_1^2 = 150$$

$$(\sum X_1)^2 = 900$$

$$n_1 = 7$$

$$X_2 = 2.86$$

$$\sum X_2^2 = 100$$

$$(\sum X_2)^2 = 400$$

$$n_2 = 7$$

Calculating the degree of freedom from the formula

$$\begin{aligned} df &= (n_1 - 1) + (n_2 - 1) \\ &= (7 - 1) + (7 - 1) = 12 \end{aligned}$$

Now 't' formula-

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\left[\frac{\left(\sum x_1^2 - \frac{(\sum x_1)^2}{n_1} \right) + \left(\sum x_2^2 - \frac{(\sum x_2)^2}{n_2} \right)}{(n_1 - 1) + (n_2 - 1)} \right] \times \sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

$$t = \frac{4.29 - 2.86}{\sqrt{\left[\frac{150 - \frac{900}{7} + 100 - \frac{400}{7}}{(7-1) + (7-1)} \right] \times \sqrt{\left(\frac{1}{7} + \frac{1}{7} \right)}}$$

$$t = 1.14$$

Variables in the study statistically significance at the following level of significance:

No	Variables	Observed 't' value	Observed P value	
1.	ROM in abduction	2.06	<.05	Significant
2.	ROM in lateral rotation	1.14	<.20	Not Significant
3.	ROM in medial rotation	1.14	<.20	Not Significant

Table 10: Level of significance in different variables

The purpose of this study was to evaluate the effectiveness of Stretching and strengthening exercise of scapular muscles with conventional physiotherapy compare to only conventional physiotherapy for Adhesive capsulitis. In this experimental study 14 patients with Adhesive capsulitis were randomly assigned to the experimental group and to the control group. Among these 14 patients, 7 patients were included in the experimental group who received Stretching and strengthening exercise of scapular muscles with conventional physiotherapy and the rest of the 7 patients were included in the control group, who received conventional physiotherapy only. Each group attended for 6 sessions of treatment within two weeks in the physiotherapy outdoor department of CRP Savar in order to demonstrate the improvement. The outcome was measured by using visual analogue scale for pain intensity in different functional position, and goniometer for measuring ROM.

The researcher found significant improvement of pain. In Experimental group, Mean difference of reduction of resting pain was 4.57 which were 2.29 times more than Mean difference in control group. Also there was significant improvement of pain in Abduction, Lateral rotation; medial rotation and pain during lying in affected side, as the mean difference were consecutively 2.28, 2.14, 2.00, and 2.57 times more than control group.

In 2003, an evaluation of a therapeutic exercise programme was held intended to reduce pain and improve shoulder function. Sixty seven male symptomatic workers (mean age 49) were randomised into a treatment intervention group (n = 34) and a control group (n = 33); asymptomatic subjects (n = 25) participated as an additional control group. Subjects in the intervention group were instructed in a standardised eight week home exercise programme of five shoulder stretching and strengthening exercises. Subjects in the control groups received no intervention. Subjects returned after 8–12 weeks for follow up testing. Results suggest a home exercise programme can be effective in reducing symptoms and improving function in construction

workers with shoulder pain. Intervention subjects also reported significantly greater reductions in pain and disability than controls (Ludewig&Borstad, 2003).

Researcher also found significant Improvement of ROM In case of Abduction ($p<.05$). A small but not statistically significant improvement has been found in Medial rotation and lateral rotation of Shoulder.

By a single blinded randomized controlled trial was to investigate the effects of stretching exercises and range of motion, reported pain and reported function in patients with shoulder pain. Twenty-nine patients referred to physiotherapy for shoulder pain were randomly assigned to a treatment group that received six treatments of stretching exercise of the shoulder ($n = 15$) or to a control group that received no treatment while on the waiting list for two weeks ($n = 14$). Measurements were taken both before and after the experimental period by a blinded assessor. Active range of motion was measured for flexion, abduction and hand-behind-back movements. Pain was assessed with the Short Form McGill PainQuestionnaire (SFMPQ) and functional ability was assessed with the Patient Specific Functional Disability Measure (PSFDM). The treatment group showed significant improvements in range of motion compared with the control group for abduction (mean 42.2 degrees, 95% CI 24.1 to 60.4 degrees), flexion (mean 22.6 degrees, 95% CI 12.4 to 32.8 degrees) and hand-behind-back (mean 11.0 cm improvement, 95% CI 6.3 to 15.6 cm). Massage reduced pain as reported on the descriptive section of the SFMPQ by a mean of 4.9 points (95% CI 2.5 to 7.2 points) and on the visual analogue scale by an average of 26.5 mm (95% CI 5.3 to 47.6 mm), and it improved reported function on the PSFDM by a mean of 8.6 points (95% CI 4.9 to 12.3 points). We conclude that stretching exercise of the shoulder is effective in improving range of motion, pain and function in patients with shoulder pain (Dolar& Roberts, 2003).

In this Research, Researcher found improvement of ROM in both conventional physiotherapy and scapular stretching and strengthening group. But the comparison of both improvements shows that, shoulder abduction had significant improvement in scapular stretching and strengthening group than conventional physiotherapy group. Lateral rotation and medial rotation has shown almost same improvement rate.

CHAPTER-VI: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The result of this experimental study have identified the effectiveness of conventional physiotherapy with Stretching and strengthening exercise of scapular muscles are better treatment than the conventional physiotherapy alone for reducing pain and disability in Adhesive Capsulitis patient. Participants in the conventional physiotherapy with Stretching and strengthening exercise of scapular muscles group showed a greater benefit than those in the only conventional physiotherapy group, which indicate that the conventional physiotherapy with Stretching and strengthening exercise of scapular muscles can be an effective therapeutic approach for patient with Adhesive capsulitis.

From this research the researcher wishes to explore the effectiveness of Stretching and strengthening exercise of scapular muscles along with conventional physiotherapy to reduce the features of patient with Adhesive capsulitis, which will be helpful to facilitate their rehabilitation and to enhance functional activities.

Adhesive Capsulitis is a global gleno-humeral disease that just not affects a specific joint but the entire complex. The manifestations are not only pain but also limitation in movements and restriction to activities of daily living. From this research, researcher also concluded the specific variables and comparison of their improvement rates. This will aid the professionals to decide the specific evidence based protocol for applying interventions in Adhesive capsulitis.

6.2 Recommendations

As a consequence of this researcher it is recommended to do further study including comparison of the conventional physiotherapy and Stretching and strengthening exercise of scapular muscles with conventional physiotherapy alone to assess the effectiveness of these interventions with-

- Double blinding procedure.
- A specific protocol should be included that in which stage patient will start this exercises and the protocol of home exercises.
- It is recommended to do further study with more number of subjects and with a longer time frame.
- It is also recommended to include the functional outcome assessment of patient and to identify the average number of sessions that are needed to be discharged from treatment to validate the treatment technique.

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APPENDIX 1: CONSENT FORM (English)

Consent Form (English)

Assalamu-alaikum/ Namasker. My name is Kazi Md. AmranHossain, student of BSc in physiotherapy at Bangladesh Health Professions Institute (BHPI), CRP. I am conducting a study for partial fulfillment of Bachelor of Science in Physiotherapy degree, titled, "Effectiveness of Scapular Muscle Stretching & Strengthening in Combination with Conventional Physiotherapy for Adhesive Capsulitis".

Through this research, I will see the efficacy of Stretching and strengthening scapular muscle along with existing physiotherapy for the case of Adhesive capsulitis. For this regard, I would need to collect data from the patient having Adhesive Capsulitis.

Considering the area of research, you have met the inclusion criteria and i would like to invite you as a subject of my study. If you participate in this study, I will evaluate for a particular intervention (Effectiveness of Scapular Muscle Stretching & Strengthening in Combination with Conventional Physiotherapy) for Frozen Shoulder. The interventions that would be given are safe and will not cause any harm.

I want to meet you a few couple of sessions during your as usual therapy. Your participation will be voluntary. You have the right to withdraw consent and discontinue participation at any time.

If you have any query about the study or your right as a participant, you may contact with, researcher Kazi Md. AmranHossain orNasirul Islam, Assistant professor & Course coordinator, Master in Physiotherapy programme, Department of physiotherapy, BHPI, CRP, Savar, Dhaka-1343.

Do you have any questions before I start?

So may I have your consent to proceed with the interview?

Yes:

No:

Signature of the Interviewer _____

Ihave read and understand the contents of the form. I agree to participant in the research without any force.

Signature of the participant _____

সম্মতিপত্র

আসসালামুআলাইকুম/ নমস্কার। আমার নাম কাজী মো : এমরান হোসেন , বাংলাদেশ হেল থ প্রফেশনস ইনস্টিটিউট এর ফিজিওথেরাপী চতুর্থ বর্ষের ছাত্র । আমি এই গবেষণাটি ব্যাচেলর অ ব সায়েন্স ইন ফিজিওথেরাপী ডিগ্রির পরিপূর্ণতার জন্য করছি । আমার গবেষণার নাম এডহেসিব ক্যাপসুলাইটিসে স্ক্যাপুলার মাংসপেশির স্ট্রেচিং ও স্ট্রেংথেনিং এর কার্যকারীতা।

এই গবেষণার মাধ্যমে আমি জানতে পারব এডহেসিব ক্যাপসুলাইটিসে স্ক্যাপুলার মাংসপেশির স্ট্রেচিং ও স্ট্রেংথেনিং এর কার্যকারীতা । এই জন্য আমার এডহেসিব ক্যাপসুলাইটিস রোগী থেকে প্রয়োজনীয় তথ্য জানতে হবে।

গবেষণার ক্ষেত্রে অনুযায়ী, আপনি এই গবেষণায় অন্তর্ভুক্তির যোগ্যতা অর্জন করেছেন। আমি আপনাকে এই গবেষণায় অংশ গ্রহনের আমন্ত্রণ জানাচ্ছি , আমার একটি নির্দিষ্ট ফলাফলের চেষ্টা করছি - এডহেসিব ক্যাপসুলাইটিসে স্ক্যাপুলার মাংসপেশির স্ট্রেচিং ও স্ট্রেংথেনিং এর কার্যকারীতা ” যে সব চিকিৎসা পদ্ধতি আপনার উপর প্রয়োগ করা হবে তা সম্পূর্ণ নিরাপদ এবং নিশ্চিত যে কোন ক্ষতি সাধন করবে না।

আমি আপনার সাথে বেশ কয়েকবার দেখা করব । আমার অংশ গ্রহন হবে ঐচ্ছিক । এই গবেষণায় যে কোন মুহূর্তে আপনি আপনার সম্মতি নিতে পারেন কিংবা অংশ গ্রহন থেকে বিরত থাকতে পারেন।

আপনার যদি এ গবেষণা সম্পর্কে কোন জিজ্ঞাসা থাকে তবে অনুগ্রহপূর্বক যোগাযোগ করতে গবেষক এমরান হোসেন অথবা নাসিরুল ইসলাম , সহকারী অধ্যাপক ও কোর্সকো-অরডিনেটর, মাস্টার ইন ফিজিওথেরাপী প্রোগ্রাম, ফিজিওথেরাপী বিভাগ, বিএইচপিআই, সিআরপি, সাভার, ঢাকা-১৩৪৩।

শুরু করার পূর্বে আপনার কি কোন প্রশ্ন আছে?

আমি কি শুরু করতে পারি?

হ্যাঁ

না

প্রশ্নকর্তার স্বাক্ষর

আমি এই সম্মতি পত্রটি পড়েছি ও বুঝেছি। আমি স্বেচ্ছায় এই গবেষণায় অন্তর্ভুক্ত হচ্ছি ।

অংশগ্রহনকারীর স্বাক্ষর

১ নং সাক্ষীর স্বাক্ষর

২ নং সাক্ষীর স্বাক্ষর

APPENDIX II: Questioner (English)

Questionnaire (English)

Code No.

This questionnaire is developed for the patient with Adhesive Capsulitis.

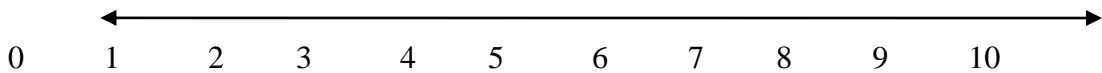
Patient's name: Occupation: Age: Sex:

Address: Date:

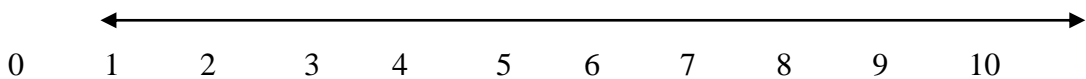
This questionnaire is designed for Adhesive Capsulitis patients. There are some questions (QN 1- QN 5) and with each question there is a long line. The line represents pain situation. The left hand end represents no pain and right hand end represents severe pain. Please a mark on the line where you feel it shows how much pain you have. The Answer of other questions (QN 6- QN 8) will be enlisted by examiner by using some measurement tools.

1. How severe your pain is at resting position?

Pre test



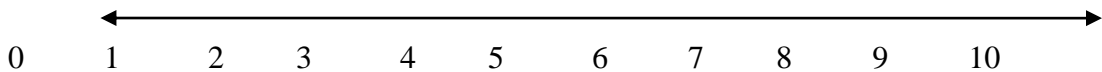
Post test



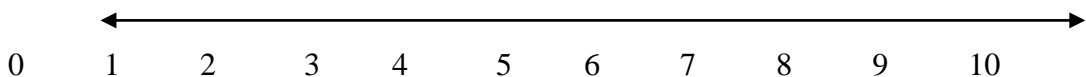
(A Zero (0) means no pain and Ten (10) means extreme pain)

2. How severe is your pain during rising arm sideways (Abduction)?

Pre test



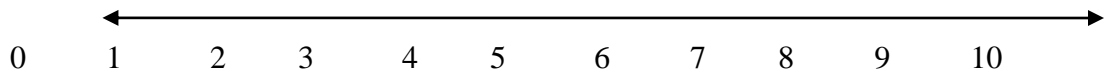
Post test



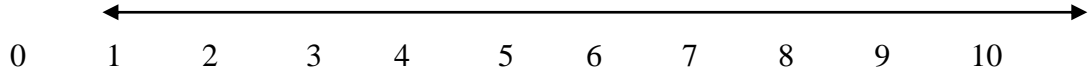
(A Zero (0) means no pain and Ten (10) means extreme pain)

3. How severe is your pain during combing hair (Lateral Rotation)?

Pre test



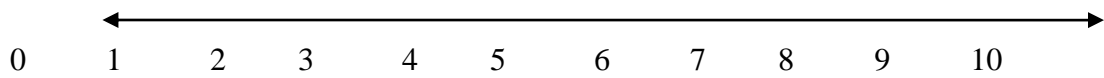
Post test



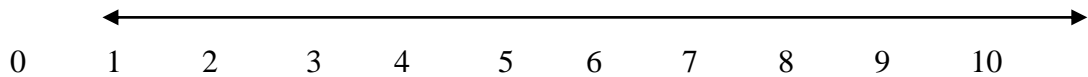
(A Zero (0) means no pain and Ten (10) means extreme pain)

4. How severe is your pain during Scratching Lower back (Medial rotation)?

Pre test



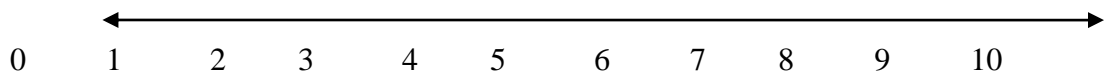
Post test



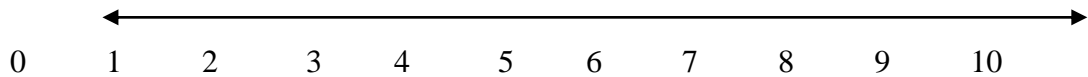
(A Zero (0) means no pain and Ten (10) means extreme pain)

5. How severe is your pain during lying in affected side?

Pre test



Post test



(A Zero (0) means no pain and Ten (10) means extreme pain)

6. Passive ROM of Abduction of Affected Shoulder (Measured by examiner)

Pre- treatment Degrees

Post- treatment Degrees

7. Passive ROM of Lateral Rotation of Affected Shoulder (Measured by examiner)

Pre- treatment Degrees

Post- treatment Degrees

8. Passive ROM of medial rotation of Affected Shoulder (Measured by examiner)

Pre- treatment Degrees

Post- treatment Degrees

Kazimd.AmranHossain

BSc in Physiotherapy

Researcher

প্রশ্নপত্র (বাংলা)

কোডনং-

এই প্রশ্নপত্র এডহেসিভ ক্যাপসুলাইটিস রোগীর জন্য প্রণীত।

রোগীর নামঃ

পেশাঃ

বয়সঃ

লিঙ্গঃ

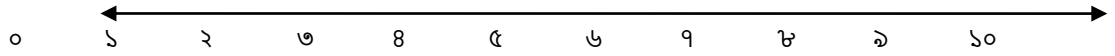
তারিখঃ

ঠিকানাঃ

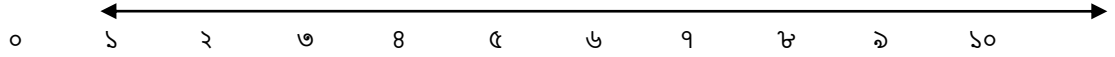
এই প্রশ্নপত্র এডহেসিভ ক্যাপসুলাইটিস রোগীর জন্য প্রণীত। ১নং থেকে ৫নং প্রশ্ন রোগীর ব্যথা নির্দেশ করে, প্রতিটি প্রশ্নের শেষে এ একটি লম্বা লাইন আছে, আপনার হাতের বাম পাশ নির্দেশ করে কোন ব্যথা নেই আর ডান পাশ নির্দেশ করে তীব্র ব্যথা। আপনি যতটুকু ব্যথা অনুভব করেন তা চিহ্নিত করুন। ৬নং থেকে ৮নং প্রশ্নের উত্তর পরীক্ষক লিপিবদ্ধ করবেন।

১. বিশ্রামরত অবস্থায় আপনার ব্যথার পরিমাণ কত?

চিকিৎসার পূর্বে



চিকিৎসার পরে



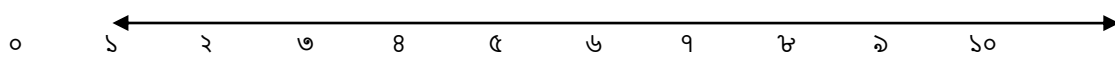
এখানে ০ মানে কোন ব্যথা নেই, ১০ মানে তীব্র ব্যথা।

২) পাশাপাশি হাত তুলতে আপনার ব্যথার পরিমাণ কত?

চিকিৎসারপূর্বে



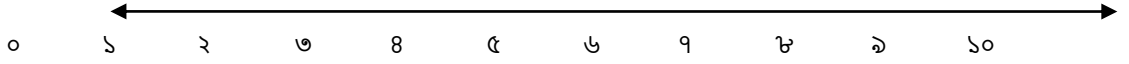
চিকিৎসারপরে



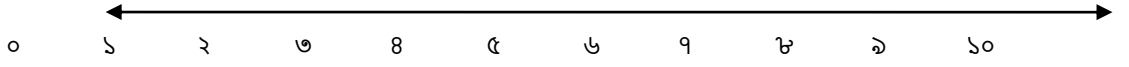
এখানে ০ মানে কোন ব্যথা নেই, ১০ মানে তীব্র ব্যথা।

৩)চুল আঁচড়াতে আপনি কেমন ব্যথা পান?

চিকিৎসারপূর্বে



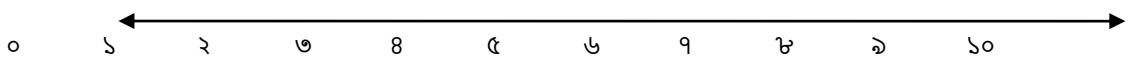
চিকিৎসারপরে



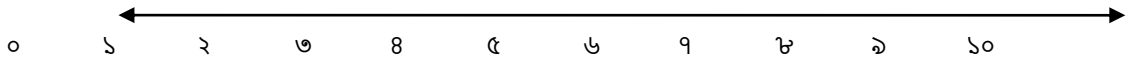
এখানে ০ মানে কোন ব্যথা নেই, ১০ মানে তীব্র ব্যথা।

৪) হাত পিছনে নিয়ে পিঠ চুলকাতে আপনার কেমন ব্যথা লাগে?

চিকিৎসারপূর্বে



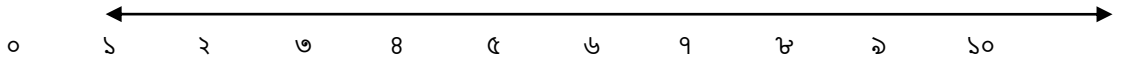
চিকিৎসারপরে



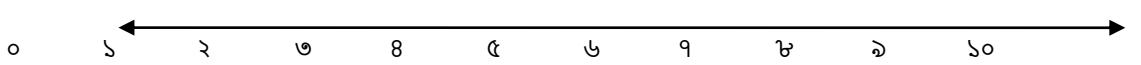
এখানে ০ মানে কোন ব্যথা নেই, ১০ মানে তীব্র ব্যথা।

৫)আক্রান্ত পাশে ঘুমাতে আপনার কত ব্যথা হয়?

চিকিৎসারপূর্বে



চিকিৎসারপরে



এখানে ০ মানে কোন ব্যথা নেই, ১০ মানে তীব্র ব্যথা।

৬) আক্রান্ত কাঁধের পেসিভ এবডাকসন (পরীক্ষক পরিমাপ করবেন)

চিকিৎসারপূর্বে ডিগ্রি

চিকিৎসারপরে ডিগ্রি

৭) আক্রান্ত কাঁধের পেসিভ লেটারাল রোটেশন (পরীক্ষক পরিমাপ করবেন)

চিকিৎসারপূর্বে ডিগ্রি

চিকিৎসারপরে ডিগ্রি

৮) আক্রান্ত কাঁধের পেসিভ মিডিয়াল রোটেশন (পরীক্ষক পরিমাপ করবেন)

চিকিৎসারপূর্বে ডিগ্রি

চিকিৎসারপরে ডিগ্রি

কাজী মোঃ এমরান হোসেন

৪র্থ বর্ষ বিএসসি ইন ফিজিওথেরাপি

গবেষক