Faculty of Medicine

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EFFECTIVENESS OF A MILL'S MANIPULATION FOR TENNIS ELBOW PATIENT

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

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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 A MILL'S MANIPULATION FOR TENNIS ELBOW PATIENT

Submitted by **Md. Ashfaquzzaman**, for the partial fulfilment of the requirement for the degree of Bachelor of Science in Physiotherapy (B.Sc. PT).

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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 decline that same any publication, presentation or dissemination of information of the study. I would bind to take consent from the department of Physiotherapy of Bangladesh Health Profession Institute (BHPI).

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CONTENTS

Acronyms

BHPI	Bangladesh Health Professions Institute
CRP	Centre for Rehabilitation of the paralysed
LE	Lateral Epicondylitis
DTFM	Deep Transverse Friction massage
MWM	Movement with Mobilization
RCT	Randomized Control Trial

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Abstract

Purpose: To find out the effectiveness of a mill's manipulation for tennis elbow patient. Objectives: To assess the effect on pain and disability of tennis elbow patients after applying conventional and a specific physiotherapy treatment. Methodology: The study was a quantitative clinical trial. 29 patients were allocated based on inclusion and exclusion criteria into two groups. In control group (n=14) patient received conventional physiotherapy and in experimental group (n=15) patient received a mill's manipulation additionally. The age range was 20-65 years old. They received 6 sessions of treatment. Patient Rated Tennis Elbow Evaluation were used in the study to see the effectiveness in the pretest and posttest values of pain and disability. Results: After completing treatment sessions the study found that Effectiveness of a mill's manipulation is not significant enough between the control and experimental group analysis, but can be used for treating LE. More study is required regarding this issue. Conclusion: The quantitative clinical trial showed that within group result is significant but between group analysis shows that the experimental treatment is not significant enough.

Key words: Tennis Elbow, DTFM, Mill's manipulation.

CHAPTER – I INTRODUCTION

1.1 Background

Lateral epicondylitis is one of the most commonly encountered condition of the upper limb. (Thurston, 1998). The upper limb plays an important role in everyone's daily life and the hand is the effectors organ of the upper limb (Puranik, 2009). Lateral epicondylitis is a common soft tissue condition which is treated by the physiotherapists in various ways. A painful elbow syndrome consists of lateral, medial and posterior elbow symptoms; among them the lateral elbow pain is one of the significantly noticed symptoms which results from repetitive stress (Ebnezar, 2003).

Lateral epicondylitis or tennis elbow is a condition where pain at the lateral side of the elbow, increase during gripping, squeezing, repeated twisting movement, resisted wrist extension and the dominant arm is usually affected (Bisset et al., 2005).
Pain and tenderness over the lateral humeral epicondyle is the main feature of lateral epicondylitis and pain on resisted dorsiflexion and radial deviation of the wrist is seen (Hudak et al., 1996). Lateral epicondylitis was first described in 1873 by Mr. Runge (Trivedi et al., 2014).

The exact cause of tennis elbow is still not clear (Jones, 2009). It most commonly occurs due to damage to the common extensor tendon of the forearm (Trivedi, et al., 2014). In another study says that, probably this tendinopathy is degenerative rather than inflammatory (Olaussen et al., 2015).

In Bangladesh the incidence of tennis elbow is 2.77% (Hasan et al., 2009). Tennis elbow affects 1% to 3% of the adult population and only 5% of people suffering from tennis elbow actually play tennis (Smidt et al., 2003). The prevalence of tennis elbow in Sweden is 1% to 3%, which increases to 19% in men between 40 and 50 years of age (Labelle et al., 1992). The incidence rate increases to 10% in women with the age range between 42 to 46

years (Buchbinder et al., 2007). It is reported that 7.4% of industrial workers and 40% to 50% of tennis players in the USA are affected with tennis elbow (Labelle et al., 1992). The incidence of tennis elbow is between 4 and 7 per 1000 patients per year (Struijs et al., 2004). In western societies lateral epicondylitis is a significant economic burden resulting in a high rate of sick level (Shmushkevich & Kalichman, 2013).

Lateral epicondylitis most commonly occurs in persons between 30 and 60 years old. Both male and female are equally affected but this condition becomes more severe in women (Stasinopoulos & Johnson, 2004).

Typically, patients develop these symptoms between the ages of 35 and 55 (Buller et al., 2014). Malik et al., (2013) showed that men and women are affected equally; however, there is a higher frequency of lateral epicondylitis among manual laborers who use heavy tools (e.g., construction workers). The dominant arm is most commonly affected. Tennis elbow is seen in both tennis and non-tennis players. Up to 50% of tennis players experience some types of elbow pain and 75% to 80% of these elbow pains are diagnosed as tennis elbow (Bisset et al., 2005). The duration of a typical episode of lateral epicondylitis is between 6 months to and 2 years (Smidt et al., 2003). Lateral epicondylitis become chronic when symptoms persist more than three months (Khuman et al., 2013).

Tennis elbow is a common disorder amongst tennis players because all individuals are exposed to repetitive stress on the wrist extensors and they are at risk for developing the condition. The diagnosis of tennis elbow is based on clinical examination. However, in chronic cases, ultrasound, radiographic examination, and MRI may be useful to exclude other causes of lateral elbow pain (Olaussen et al., 2009). The duration of a typical episode of lateral epicondylitis is between 6 months to and 2 years (Smidt et al., 2003). Lateral epicondylitis become chronic when symptoms persist more than three months (Khuman et al., 2013).

The conventional treatment protocol for lateral epicondylitis consists of many physical therapies in a variety of clinical settings, such as stretching strengthening, Deep Transverse Friction Massage (DTFM) and mobilization. These treatments of

tennis elbow generally aim to relieve pain, control inflammation, promote healing, improve local and general fitness, and control force loads (Noteboom et al., 2005).

We saw that the treatment protocol consists of variety of clinical setting, so the treatment policy should be modified. For the treatment of tendinopathies, Cyriax treatment should consists of deep transverse friction massage (DTFM) on its own. DTFM is a specific type of connective tissue massage applied precisely to the soft tissue structures in these cases applied to the tendons. (Cyriax, 1982). It is clear that DTFM can be used for both symptomatic pain relief and also for promotion of tissue healing. (Stasinopoulos and Johnson, 2004). Cyriax (1982) had suggested that, ‘‘if clinicians intend to use Cyriax treatment in treating patients with LE, it can only be considered Cyriax treatment if DTFM and Mill’s manipulation are used together (not separately) and the Mill’s manipulation is performed immediately after the DTFM’’. It can be claimed that Mill’s manipulation is mostly used in clinical practice for the promotion of tissue healing. (Stasinopoulos and Johnson, 2004).

1.2 Rationale

There is not enough research investigation to find out the efficacy a mill's manipulation with conventional physiotherapy comparing with only conventional physiotherapy on tennis elbow patient. Physiotherapists use variety of protocol to treat the patient. There is no fixed guideline to treat the patient. This study will investigate the effectiveness of a mill's manipulation on pain management commonly used by physiotherapists practicing for the management of tennis elbow patient. This will help the physiotherapists to follow a proper guideline regarding patient management. In Bangladesh, tennis elbow represents a challenge to the clinician, because considering the context of our country, patients often struggle to follow the evidenced-based treatment recommended.

The purpose of this study is to find out the effectiveness of a mill's manipulation for the patient with tennis elbow. There have been some research articles published about physiotherapy interventions for patients with tennis elbow. But very few research articles published regarding this specific treatment. However, research helps to improve the knowledge of health professionals, as well as to develop the profession. The results of this study may help to guide physiotherapists to give evidence-based treatments to patients with tennis elbow, which will be beneficial for both the patient with tennis elbow, and for developing the field of physiotherapy.

1.3 Aims

The aim of this study is to evaluate the effectiveness of a mill's manipulation in patients with lateral epicondylitis.

1.4 Objectives

- To find out the pain intensity at rest, doing a task with repeated arm movement, carrying a plastic bag of groceries, at its least, at its worst before and after introducing physiotherapy intervention.
- To evaluate functional outcome of specific activities like Turn a doorknob, Carry a grocery bag, Lift a full coffee cup to mouth, open a jar, Pull up pants, Wring out a washcloth or wet towel.
- To evaluate functional outcome of usual activities before and after introducing physiotherapy intervention.

1.5 Hypothesis

Null Hypothesis

Ho: $\mu 1 - \mu 2 = 0$ or $\mu 1 \geq \mu 2$, Where the experimental group and control group mean difference is same or control group is higher than experimental group.

Alternative Hypothesis

Ha : $\mu 1 - \mu 2 \neq 0$ or $\mu 1 \neq \mu 2$ where experimental group and control group mean difference is not same.

Where,

Ho= Null hypothesis Ha= Alternative hypothesis $\mu 1$= Mean difference in initial assessment $\mu 2$= Mean difference in final assessment

1.6 Operational definition

Tennis elbow: Tennis elbow or lateral epicondylitis is a clinical condition characterized by pain and tenderness over the lateral side of the elbow, difficulties in functional activities and with positive Mill's test, Cozen test or resisted middle-finger extension test when examined clinically.

Conventional physiotherapy: Physiotherapeutic interventions that are widely accepted and commonly practiced by the medical community.

Deep transverse friction massage: Deep friction massage is a specific connective tissue massage. The purpose of deep friction massage is to maintain the mobility within the soft tissue structures of ligament, tendon, and muscle and prevent adherent scars from forming. The massage is deep and must be applied transversely to the specific tissue involved unlike the superficial massage given in the longitudinal direction parallel to the vessels which enhances circulation and return of fluids.

Mill's manipulation: Mill's manipulation is a small-amplitude high-velocity thrust performed at the end of elbow extension while the wrist and hand are held flexed.

CHAPTER – II LITERATURE REVIEW

The most commonly featured upper limb problem is tennis elbow (Thurston et al., 1998). Lateral epicondylitis or Tennis elbow refers to a syndrome of pain centered over the common origin of the extensor muscles of the fingers and wrist at the lateral epicondyle. Tennis elbow is defined as pain in the common extensor group of wrist muscles at their origin of lateral epicondyle, or pain directly over the lateral epicondyle (Trivedi et al., 2014). The incidence rate of lateral epicondylitis in general practice is 47/1000 per year (Assendelft et al., 1996). The mostly effected age group is in between 35-54 years (Greenfield and Webster, 2002). Both men are women are equally affected (Ahmed et al., 2013). Viswas told that, it commonly affects the dominant arm, with a prevalence rate of 1–3% in the general population, but the incidence rapidly increases up to 19% between 30–60 years of age group and causes more severe and long-standing effects in women. (Viswas et al., 2012)

There are no differences between men and women (Shiri et al., 2006). In occupational populations the prevalence is between 2-23% (Leclerc et al., 2001). Differences in the prevalence in different studies may be related to different definitions; self-reported symptoms or clinical examination (Kryger et al., 2007). Tennis players appear to be affected even at younger age, 16-36 years and there are reports of a prevalence of up to 35-42 % among tennis players (Silva, 2008). Huisstede mentioned that the CANS model distinguishes the following specific tendinopathies and neuropathies at the elbow: lateral epicondylitis, medial epicondylitis, cubital tunnel syndrome and radial tunnel syndrome Of these, epicondylitis (i.e.lateral epicondylitis and medial epicondylitis) is one of the most prevalent disorders, with an estimated prevalence of 5% in the general population, 8.9% among meat cutters and 14.5% among workers in the fish processing industry (Huisstede et al., 2007). Silverstein reported a claim that the incidence rate for epicondylitis of is 11.7/10 000 full-time workers per year.In tennis elbow both macroscopic and microscopic lesions is found in the structures of Extensor Carpi Radialis Brevis (ECRB). (Silverstein et

al., (2007).The pathology of lateral epicondylitis involves a tear of tendon at origin of the extensor muscles from lateral epicondyle (Trividi et al.,2014). In a study of (Fedorczyk, 2006) stated that, microscopic study demonstrated the presence of fibroblastic tissue and vascular invasion of the common extensor tendon, described as angiofibroblastic tendonosis, implying a degenerative tendinopathy. However, recent studies have demonstrated the presence of the neuropeptides, substance P and calcitonin related gene peptide (CRGP) in sensory nerve fibres supplying the extensor carpi radialis brevis (ECRB). (Ljung et al., 1999). Which could imply the possibility of neurogenic sensitization as an additional source of pain.(Zeisiget et al., 2006).

According to Cyriax(1936), there is four types of tennis elbow.

Acute means acute pain following indirect trauma. The second type is sub-acute, pain following indirect trauma which occurs gradually and follows vigorous exercise with the arm. The third one is chronic occupational pain. This types usually develops over one or more months and is usually found in older patients. The fourth one is pain following direct trauma, which is due to direct injury over the lateral epicondyle.

(Kesson et al., 1998) said that, According to the site of involvement tennis elbow is of 4 types.

Type 1: inflammation at the supracondylar ridge

Type 2: tenoperiosteal junction

Type 3: body of the tendon

Type 4: muscle belly

Tennis elbow has no established etiology, however it is assumed to be caused by recurrent micro damage caused by overuse of the wrist and hand (Bui, 2014). Micro trauma is a type of injury that occurs as a result of sports, industrial jobs, and household chores (Croisier et

al., 2007). Pain can also be caused by myofascial trigger points in the muscles that adhere to the lateral epicondyle (Bui, 2014).

It's frequently produced by wrist contractions and gripping activities that are highly rapid, monotonous, repetitive, and eccentric (Stasinopoulus et al., 2005). Tennis elbow is hypothesized to be caused by degeneration of the wrist's common extensors tendon (silvestrini et al., 2005). Tennis elbow is caused by a ripping of the tendon at the musculotendinous junction, and the healing process is slowed by the lack of periosteal tissue overlaying the tendon (Khuman et al., 2013). Inflammation of the radial humeral bursa, synovium, periosteum, and annular ligament are all probable causes (Puranik, 2009).

Pain, a loss of muscle strength, and arm dysfunction are the most typical signs of tennis elbow. Pain and dysfunction limit one's ability to work and improve one's quality of life (Lee et al., 2014). According to Khuman, Tennis elbow symptoms include pain in the lateral epicondyle of the humerus during resisted wrist extension, as well as functional problems affecting activities of daily living connected to wrist and forearm movements, ccording to (Khuman et al., 2013). According to Noteboom, there is substantial discomfort in the anterior aspect of the lateral epicondyle and the lateral forearm (Noteboom et al. 1994). Because the underlying bursa is irritated, many people suffer pain at the head of the radius when they pronate (Trivedi et al., 2014). Grip strength is harmed as a result of muscle loss and a voluntary reduction in effort to avoid pain (Khuman et al., 2013).

Myofascial pain is a common type of muscle and fascia pain that is often connected with myofascial trigger points and occasionally pain directed to the forearm muscle (Shumshkevich & Kalichman, 2013).

The therapy of lateral epicondylitis aims to alleviate discomfort, reduce inflammation, promote healing, reduce overload forces, enhance function, preserve motion, increase flexibility, strength, and endurance development (Lee et al., 2014). Physiotherapy treatment begins with an examination, activity modification, and ice application, followed by the selection of modalities (Faisal et al., 2013).

Rest, ice, brace, nonsteroidal anti-inflammatory drugs, ultrasound, laser, TENS, deep transverse friction massage, stretching, strengthening, eccentric exercise, extracorporeal

shockwave therapy, elbow mobilization with movement technique, tapping, manipulation, and other treatments are commonly used for tennis elbow (Amro et al., 2010). Tennis elbow can be treated effectively with rest, activity adjustment, local splints, and steroid injection, according to (Dunkow et al., 2004).

Rest, according to Zeisig, is beneficial for pain alleviation as symptoms worsen with activity. Tennis elbow can be treated with two different sorts of treatments. They're divided into two categories: electrotherapeutic and physical intervention (Zeisig, 2008)

Therapeutic ultrasonography (US) has become the most widely utilized technology in recent decades, with physiotherapists using it to treat common musculoskeletal diseases including LET (Dimitrios et al., 2013).

For tennis elbow treatment, about half of physiotherapists utilize pulse and continuous ultrasound. Greenfield and Webster (Greenfield & Webster, 2002). Jones, found no significant differences in results across groups when pulsed ultrasound was compared to alternative treatments such as injections and TENS in a systematic review, with minimal evidence for its effectiveness (Jones, 2009). As a result, the efficacy of ultrasonography in the treatment of tennis elbow is questionable. So far as we know, there hasn't been any research done to determine the usefulness of ultrasonography for LET (Dimitrios et al., 2013).

The use of laser therapy by physiotherapists for the treatment of tennis elbow is uncommon (Greenfield & Webster, 2002). According to Jones (2009), the short-term usefulness of laser is debatable, and there is little evidence that laser can be used for long-term effectiveness. Jones (2009) reported that there was no definitive data on the usefulness of pulsed short wave diathermy in the care of tennis elbow, despite the fact that it is utilized by just under 10% of physiotherapists in (Greenfield & Webster's, 2002) study. Only one short trial compared its effectiveness to a placebo, and the results showed no changes between groups at the end of the 8-week treatment period.

Only one study has been conducted on the usefulness of ice therapy in the treatment of tennis elbow (Jones, 2009). Manias and Stasinopoulos compared an exercise and ice group against an exercise group only, with the ice applied for 10 minutes after each exercise

session. There were no significant differences between the two groups after 4 months of follow-up, indicating that ice may be useless as a treatment for tennis elbow (Manias & Stasinopoulos, 2006).

Stretching exercise is one of the traditional physiotherapy treatments for tennis elbow (Zeisig, 2008). Static stretching reduces pain, improves grip strength, and aids in the return to normal range of motion (Lee et al., 2014). A summary of systematic reviews Jones (2009) discovered that progressive stretching exercise and ultrasound were both helpful after 6-8 weeks of treatment in a short trial; however, progressive stretching exercise was more effective than ultrasound (Jones, 2009).

For the treatment of tennis elbow, orthotic devices are mentioned in roughly 21% of cases (Jones, 2009). Different forms of braces and orthotic devices are available (Struijs et al., 2004). Tennis elbow straps or bands are the most often utilized brace among all of them. Several studies have shown that forearm bracing reduces stress on the origin of the Extensor Carpi Radialis Brevis (ECRB) muscle (Jones, 2009). According to Bui (2014), a forearm brace is an excellent treatment for lowering pain in tennis elbow patients.

The most appropriate therapy approach for evaluating the treatment outcome in patients with tennis elbow is strengthening exercise programs (Pienimaki et al., 1996). The three types of strengthening exercises for soft tissue structure are isometric, concentric, and eccentric (Stasinopoulos et al., 2005). Isometric strengthening training, according to Park, is a beneficial treatment during the early term (Park et al., 2009)

In the therapy of tennis elbow, eccentric exercise is the most effective. Only eccentric activity for the damaged tendon is recommended by physiotherapists (Stasinopoulos et al., 2005). Jones (2009) noted in his systemic review that eccentric training causes tendon strengthening, which activates tenocyte mechanoreceptors to create collagen, which is the fundamental cellular mechanism that determines tendon injury healing. In a randomized controlled experiment of 3 months of eccentric exercise vs. daily stretches, Svenlov and Adolfsons discovered that the eccentric training program resulted in considerable increases in grip strength, with complete remission of symptoms in 86 percent of the eccentric group (Svenlov & Adolfsons, 2001)

Mobilization with movement is a type of manual therapy that is frequently utilized in the treatment of patients with tennis elbow (Slater et al., 2006). Brian Mulligan devised a method of manual therapy procedures that combine a continuous manual gliding force to a joint with contemporaneous physiologic joint mobility, either actively or passively (Abbott et al., 2001). This treatment is used to treat pain and stiffness caused by movement (Slater et al., 2006). Patients who have pain when lifting their arm, such as when swinging a tennis racket, reaching for shelves, or working overhead, may benefit from MWM treatment (Vicenzino, 2003).

Kochar & Dogra compared a 3-week trial of ultrasonography and MWM against ultrasound alone in a small research. Both groups then undertook a 10-week upper-limb rehabilitation program that included the use of weights. & This study found that the MWM group improved significantly in terms of discomfort and the weight test, but there was no difference in grip strength. In comparison to the ultrasound group, the MWM group recovered faster (Kochar & Dogra, 2002)

Many therapists employ tapping to treat tennis elbow in order to reduce pain and restore movement patterns that are functional (Jones, 2009). A tiny study found that tapping can be used as a supplement to exercise (Vicenzino et al., 2003). The neurophysiologic effects of taping are described by Shamsoddini, who claim that the tape affects grip strength by modifying pain perception, enabling big afferent fibers, and promoting endogenous pain inhibition processes (Shamsoddini et al., 2010)

According to Sharath, taping is effective for a variety of reasons, including injury prevention, limiting extremes of ROM, applying compression to reduce pain, swelling, and spasm, and immobilizing or resisting the implicated part to encourage healing (Sharath, 2005) According to Alam (2008), tape is put in numerous layers over the joint and is positioned to give outside support and reduce forces that might impose stress to a damaged area. (Shamsoddini et al., 2010) conducted a study comparing tapping to other treatments, and found that using the taping technique (diamond tape) reduced pain and increased grip strength in subjects with lateral epicondylalgia shortly after application.

Soft tissue mobilization is known as myofascial release. Myofascial release is a treatment that involves applying a low-load, long-duration stretch to the myofascial complex to

restore ideal length, reduce pain, and improve function. MFR is characterized by the application of slow, continuous pressure to confined face layers, either directly or indirectly (Ajimsha et al., 2012). Patients with Lateral Epicondylitis are treated with the Myofascial Release Technique (MFR), but there are few formal reports of its effectiveness rate (Trivedi et al., 2014).

Deep transverse friction massage (DTFM), according to Thomas (2010), is a soft tissue mobilization treatment that works by relaxing and stretching the dysfunctional tissue. The usefulness of DTFM has been studied in only a few cases (Jones, 2009).

In a study on deep transverse friction massage for tendonitis, Thomas (2010) discovered that DTFM is useful in improving rehabilitation (Viswas et al., 2012) compared a 4-week supervised therapeutic exercise program to Cyriax physiotherapy with DTFM in a small randomized controlled study and concluded that the supervised exercise program is more effective than DTFM at reducing pain and improving function.

Cyriax stated that substantial success in treating tennis elbow using deep transverse friction (DTF) in combination with Mill's manipulation, which is performed immediately after DTF. For considering it be a Cyriax intervention, the two components should have to use together in the order mentioned. Patients must follow the protocol three times a week for four weeks. (Stasinopoulos and Johnson, 2004).

When active activation of the extensor muscles produced, manipulation is successful. Mill's manipulation elongates scar tissue by rupturing adhesions (Alam, 2008). Stasinopoulos and Johnson conducted a literature study with the goal of describing the Cyriax method, its efficacy, and application in the treatment of tennis elbow (Stasinopoulos and Johnson, 2004).

The goal of this study was to see if DTFM combined with mill’s manipulation and traditional physiotherapy was successful in reducing pain and improving function. I believe that DTFM, together with a mill's manipulation and traditional physiotherapy, would help tennis elbow patients to reduce pain and increase functional activities.

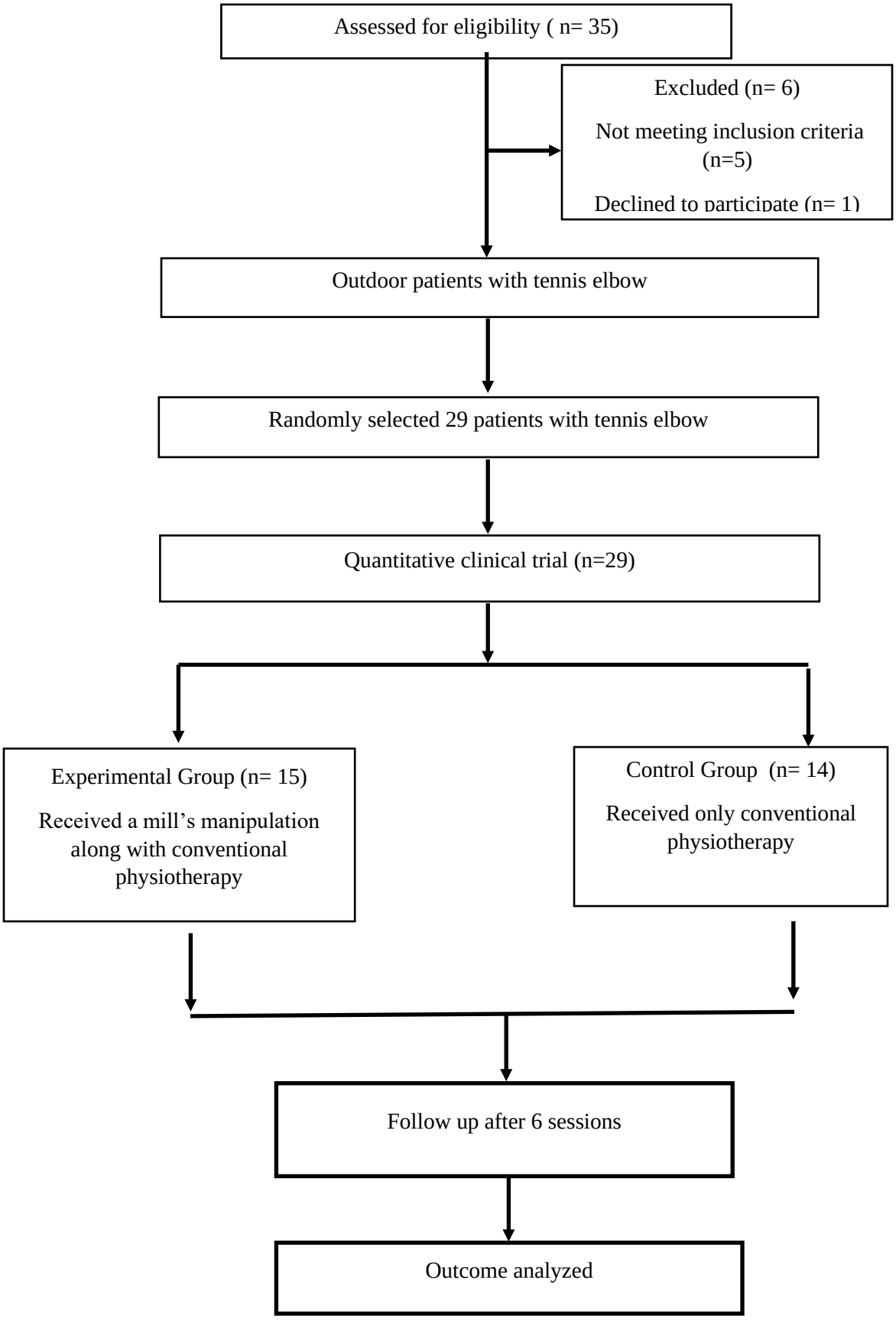
CHAPTER – III METHODOLOGY

This research was a quantitative evaluation of the comparison between the exercises programs of conventional physiotherapy, with conventional physiotherapy combined a mill's manipulation, for the pain management of patients with tennis elbow. To identify the effectiveness of this treatment, the numeric pain rating scale was used as a measurement tool for measuring the pain intensity in several functional positions.

3.1 Study Design:

The research design was RCT (Randomized Control Trial) where samples were divided into two groups experimental and control. 29 tennis elbow patients were randomized and then 15 patients with tennis elbow were randomly assigned with a mill's manipulation therapy along with conventional physiotherapy group, in the experimental group and 14 patients with tennis elbow to the conventional physiotherapy group which was control group, for this randomized controlled trial study. A pre-test (before exercise) and post-test (after exercise) was administered with each subject of both groups to compare the pain effects, and functional ability before and after the treatment.

Flowchart of the phases of Quantitative Clinical Trial



3.2 Study area:

Physiotherapy musculoskeletal outdoor department of Centre for Rehabilitation of the Paralyzed (Savar & Mirpur).

3.3 Study population:

The study population is the patients diagnosed with tennis elbow in the Musculo-skeletal Unit of Physiotherapy Department at CRP, Savar & Mirpur Dhaka. The study population must fulfill the inclusion criteria of the study.

3.4 Sampling Technique:

Simple random sampling technique was used of this study. 29 patients with tennis elbow pain who met the inclusion criteria selected & randomized into experimental and control group from outpatient musculoskeletal unit of physiotherapy department of CRP, (Savar & Mirpur) Dhaka. All the participants had an equal probability of assignment to any of two groups and then 15 patients were randomly assigned to experimental group comprising of treatment approaches of a mill's manipulation combined with conventional physiotherapy techniques and 14 patients to the Control group was treated with only the conventional physiotherapy techniques for this study. The samples were given numerical number C1, C2, C3 etc. for the control group and E1, E2, E3 etc. for experimental group.

3.5 Inclusion criteria:

• Both male & female tennis elbow patients were included. (Stasinopoulos & Johnson, 2004).

• Subject who had taken corticosteroid injection more than 6 months ago.

• Pain with gripping activities.

• Pain with resisted wrist extension.

• Pain with passive wrist flexion with the elbow extension.

• Tenderness on palpation over the lateral epicondyle of humerus.

• The participants who had no any deformity of the affected elbow and wrist.

(Viswas et al., 2012)

• Voluntary participants.

3.6 Exclusion criteria:

- Cardiovascular diseases.
- Neurological impairments.
- Neuromuscular diseases.
- Previous trauma to the elbow region.
- Previous surgery to the elbow region.
- Peripheral nerve entrapment.
- Cervical radiculopathy.
- Corticosteroid injection inside 6 months.
- Previous therapy for elbow joint (minimizing expectation bias).
  (Viswas et al., 2012)

3.7 Sample Size:

In this study, 29 participants were randomized according to inclusion and exclusion criteria. 15 participants were allocated into the experimental group and 14 participants were in control group.

3.8.1 Data collection tools:

A written questionnaire, pen, paper, consent form were used as data collection tools in this study.

3.8.2 Method of Data collection:

The study procedure was conducted through assessing the patient, initial recording, treatment and final recording. After screening the patient at the department, the patients were assessed by a graduate physiotherapist. 6 sessions of treatment were provided for every subject. The researcher divided all participants into two groups and was coded C1, C2, C3, C4, C5 etc. for control group and E1, E2, E3, E4, E5 etc for trial group. Data was gathered through a pre-test, intervention and post-test and the data was collected by using a written questionnaire form which has been formatted by the researcher. Pre-test was performed before beginning the treatment and the intensity of pain was noted with Numeric Pain Rating Scale's score from. The same procedure was performed to take posttest at the end of 6 sessions of treatment. Researcher was provided the assessment form to each subject before starting treatment and after 6 sessions of treatment patient was instructed to put mark on the line of Numeric Pain Rating Scale according to their intensity of pain. The researcher was collected the data of both trial and control group in front of the qualified physiotherapist in order to reduce the biasness.

3.9. Measurement tools:

3.9.1 Numeric pain rating scale-

In this study researcher used visual analogue scale for measuring the intensity of pain. Numeric Pain Rating Scale is commonly use for the measurement of pain (Polly et al., 2003). The Numeric Pain Rating Scale is an 11 point Scale for patient self-reporting of pain. NPRS consists of a straight line on which the individual being assessed marks the level of pain.

3.9.2 The Socio-Demographic part and injury related part were analyzed by a self generated questionnaire.

3.9.3 The researcher had also chosen a valid questionnaire named **Patients Rated Tennis Elbow Evaluation Questionnaire** for the evaluation of pain status and functional disability experienced by patients.

74 patients (age=28-69) with lateral epicondylitis

T-R reliability

- Pain ICC = 0.99
- Function ICC = 0.99
- Total ICC = 0.99 (Leung et al., 2004).

3.10 Data analysis:

To ensure that the research had some values, the meaning of collected data had 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 by using the software named Statistical Package of Social Science (SPSS) version 20. All participants were code according to group to maintain participant's confidentiality and both the experiment and control group participants score their pain status and functional disability on the Numeric Pain Rating Scale (NPRS).

Socio-economic and injury related information's were analyzed by doing descriptive analysis. pain status and functional disability were analyzed by using nonparametric test.

Wilcoxon sign rank test was used for the within group analysis and Mann-Whitney U test was used for the between group analysis.

3.11 Intervention:

In this study there was two groups, experimental and control group. In the experimental group along with the conventional physiotherapy treatment a mill's manipulation was added and in the control group only conventional physiotherapy treatment was applied to the patients. After 6 sessions the outcome the treatment was measured between and within the groups. The treatment was given by the clinical physiotherapists of musculoskeletal unit of CRP, Savar & Mirpur. Patients were advised to follow the instructions.

3.12 Hypothesis test:

Wilcoxon sign rank test

Experimental studies with the different subject design within one subject groups and the data is non-parametric and numerical data, which should be analyzed with "Wilcoxon Signed Rank Test:" As it was quantitative clinical trial and had within groups of different subjects, who were selected conventional physiotherapy exercise group and experimental group which was comprised of an added mill's manipulation, and the measurement of the outcome came from collecting Numeric pain rating score, so the "Wilcoxon Signed Rank Test" was used in this study to calculate the level of significance. "Wilcoxon Signed Rank Test:" was calculated to test the hypothesis based on following assumptions-

- Data were numerical
- Data were not well distributed
- Within-group comparison among subjects
- This test was done for within groups

Wilcoxon sign test denoted by Z test, after the conclusion of the observed value and p-value whenever it is less than the table value of significance 0.05 level then null hypothesis was considered as rejected and alternative hypothesis considered as accepted.

$$\mathbf{Z} = \frac{W_s - \frac{n(n+1)}{4}}{\sqrt{\frac{n(n+1)(2n+1)}{24}}}$$

Here, W_s = Smallest of absolute values of the sum

n = Total number of samples

Calculating the Z value,

$$Z = \frac{W_s - \frac{n(n+1)}{4}}{\sqrt{\frac{n(n+1)(2n+1)}{24}}} = \frac{7.758 - \frac{15(15+1)}{4}}{\sqrt{\frac{15(15+1)(2\times15+1)}{24}}} = \frac{52.241}{\sqrt{\frac{7440}{24}}} = -2.9666$$

Table 1 : Wilcoxon sign rank test

	Experimental Group (n=15)		Control Group (n=14)	
Variables	**Z**	**P**	**Z**	**P**
When are you at rest	2.966	.003*	2.831	.005*
When doing a task with repeated arm movement	3.535	.001*	3.209	.001*
When carrying a plastic bag of groceries	3.472	.001*	3.334	.001*
When your pains at its least	2.831	.005*	3.213	.001*
When your pains at its worst	3.360	.001*	3.017	003*
Turn a doorknob or key	1.633	.102	2.214	.027*
Carry a briefcase by the handle.	3.449	.001*	3.322	·001*
Lift a full coffee cup or glass of milk to your mouth.	1.961	.050*	2.220	.026*

	Experimental Group (n=15)		Control Group (n=14)	
Variables	**Z**	**P**	**Z**	**P**
Open a jar.	3.336	.001*	3.108	.002*
Pull up pants.	2.277	.023*	2.060	.039*
Wring out a washcloth or wet towel.	3.389	.001*	3.266	.001*
Personal activities (dressing, washing)	3.342	.001*	3.106	.002*
Household work (cleaning, maintenance)	3.458	.001*	3.224	.001*
Work (your job or everyday work)	3.501	.000*	3.225	.001*
Recreational or sporting activities	3.535	.000*	3.087	.002*

Mann-Whitney U test

Mann-Whitney U test is a non-parametric test that is simply compares the result obtained from each group to see if they differ significantly. This test can only be used with ordinal or interval/ ratio data.

Assumption

- All the observation from both groups were independent with each other
- The responses were ordinal
- Under the null hypothesis, the distribution of both groups was equal
- This test was done for between groups

The formula of Mann-Whitney U test:

$$\mathbf{U = n_1 n_2 + \frac{n_x(n+1)}{2} - T_x}$$

Here,

n_1 = number of subjects from experimental group.

n_2 = number of subjects from control group.

T_x = the larger rank total.

n_x = the number of the subjects of the group with larger

Mann-Whitney U test, after the conclusion of the observed value and p-value whenever it is less than the table value of significance 0.05 level then null hypothesis was considered as rejected and alternative hypothesis considered as accepted.

Calculating the formula of Mann-Whitney U test:

$$U = n_1 n_2 + \frac{n_x(n+1)}{2} - T_x = 15 \times 14 + \frac{14(14+1)}{2} - 225.50 = 315 - 225.50 = 89.5$$

Table 2 : Mann-Whitney U test

Variables	Pre-test			Post-test		
	Mann-Whitney U	Z	P	Mann-Whitney U	Z	P
When are you at rest	89.500	.687	.492	82.000	1.053	.292
When doing a task with repeated arm movement	97.000	.357	.721	76.500	1.289	.197
When carrying a plastic bag of groceries	94.000	.493	.622	78.000	1.216	.224
When your pains at its least	74.500	1.380	.168	77.500	1.250	.211
When your pain its worst	101.500	.162	.872	78.500	1.217	.224
Turn a doorknob or key.	81.500	1.211	.226	90.000	.926	.355
Carry a briefcase by the handle.	84.500	.933	.351	76.000	1.368	.171
Lift a full coffee cup glass of milk to your mouth.	90.500	.710	.478	90.500	.773	.439

	Pre-test			Post-test		
Variables	**Mann-Whitney U**	**Z**	**P**	**Mann-Whitney U**	**Z**	**P**
Open a jar.	81.500	1.038	.299	69.000	1.599	.110
Pull up pants.	100.500	.212	.832	103.000	.100	.920
Wring out a washcloth or wet towel.	79.500	1.157	.247	64.000	1.8312	.067
Personal activities (dressing, washing)	103.500	.067	.947	93.000	.532	.595
Household work (cleaning, maintenance)	85.000	.885	.376	99.500	.244	.807
Work (your job or everyday work)	79.000	1.192	.233	102.000	. 134	.893
Recreational or sporting activities	102.500	.114	.909	100.500	.207	.836

3.13 Informed Consent:

For this study, researcher was given consent form to every participant for the purpose of the research and consent forms was explained to the subject verbally. Researcher mentioned those participants were fully voluntary and they had the right to withdraw at any time. Researcher insured them confidentiality would be maintained. Information might be published in the way of presentation or writing format but they did not be identified. The study results may not have any direct effects on them but the members of Physiotherapy population may be benefited from the study in future. They will not be embarrassed by the study. At any time, the researcher would be available to answer any additional questions in regard to the study.

3.14 Ethical consideration:

The research proposal was submitted for approval to the administrative bodies of the ethical committee of CRP and also had followed the Bangladesh Medical Research guideline (BMRC) and the World Health Organization (WHO) guideline. Again Before data collection, permission from the Ethical Committee of Bangladesh Health Professions Institute (BHPI) took and a requested letter hand over to the appropriate authority of the study area for taking permission and seeking assistance for smooth access to data collection with insurance of patient's safety. 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. The researcher received verbal and signed an informed consent form to participate in this study from every subject. The participants were informed that they have the right to meet with an outdoor doctor if they think that the treatment is not enough to control the condition or if the condition becomes worse. The participants were also informed that they were completely free to decline to answer any question during the study and were free to withdraw their consent and terminate participation at any time. If the patient wants to withdraw herself from the study, it 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.

CHAPTER – IV RESULTS

Table 3 -Socio-Demographic Information:

	Control Group		Experimental Group	
	Mean with SD	Min-Max	Mean with SD	Min-Max
Age	38±8.575	25-52	41.80±10.115	26-62
Sex	1.64±0.497	1-2	1.13±0.352	1-2
Marital Status	1.21±0.426	1-2	1.07±0.258	1-2
Educational Qualification	3.93±1.592	2-6	3.80±1.821	1-7
Occupation	3.57±2.623	1-8	6.80±4.195	1-13
Living place	1.57±0.756	1-3	1.73±0.594	1-3
Family Type	1.29 ±0.469	1-2	1.13±0.352	1-2
Family Members	5.21±2.547	1-11	4.53±1.302	3-7
Hand dominant	1.07±0.267	1-2	1.07 ± 2.58	1-2
Income (Per month)	40642.86±28064.780	8000-100000	29400±16855.690	10000-80000

Table 4-Injury Related information:

	Control Group		Experimental Group	
	Mean with SD	Min-Max	Mean with SD	Min-Max
What is the main issue that brought you in today?	1.21±0.802	1-4	1.27±0.799	1-4
How long has the current problem been going on?	1.29±0.611	1-3	1.40±0.737	1-3
Which side is involved?	1.29±0.469	1-2	1.40±0.632	1-3
Which part of elbow is your site of pain?	2.36±0.842	1-3	2.53±0.915	1-4
Do you perform any repetitive or forceful tasks or movements?	1.00±0.000	1-1	1.00±0.000	1-1

Socio-Demographic Information:

Age:

The Socio-demographic Information table shows that among 29 participants with tennis elbow the mean age of participants between control group and concentric experimental group were 38 ± 8.575and 41.80 ± 10.115 years with a range from 25 to 52 where the minimum age of control group was 25 and maximum was 52 years. Again, the minimum age of experimental group was 26 and maximum was 62 years old.

Sex:

The mean gender of 29 participants with standard deviation between control group and concentric experimental group were 1.64±0.497 and 1.13±0.352 . In this study 18 males and 11 females were included and the percentage of male and female were 62.1% and 37.9%.

Marital status:

Among the participants, 86.2% (n= 25) were married and 13.8% (n=4) were unmarried.

Educational Qualification:

Among the participants of the study the mean with standard deviation of educational background is 3.93±0.426. Among the participants 6.9% (n=02) was illitarate,24.1% (n=7) was primary level pass, 6.9% (n=2) was SSC pass, 20.7% (n= 6) was HSC pass, 24.1% (n= 7) was graduate, 13.8% (n= 4) was post graduated and 3.4% (n=1) were others.

Occupation:

Among the participants of the study the mean with standard deviation of occupation was 3.57± 2.623 (control group) and 2.20±2.905 (experimental group). Among the 29 participants the number of housewives were 8 (27.6%), 2 factory worker (6.9%), 1 teacher (3.4%), 3 physiotherapist (10.3%),1 Occupational therapist (3.4%), 5 service holder (17.2%), 1 garments worker (3.4%), 1 farmer (3.4%), 2 engineer (6.9%), 1 IT farm (3.4%), 2 cook (6.9%), 1 tailor (3.4%), and 1medical representative (3.4%).

Living Place:

Among the participants of the study the mean with standard deviation of living place of control group is 1.57 ± 0.756 and experimental group is 1.73 ± 0.594. Among the 29 participants the number of Urban living people is 13 (44.8%), Semi urban is 13 (44.8%), Rural is 3(10.3%).

Family Type:

Among the participants of the study the mean with standard deviation of family type of control group is 1.29 ± 0.469 and experimental group is 1.13 ± 0.352. Among the 29 participants the number of single family is 79.3% (n=23) and joint family is 2O.7% (n=6). Family members: Among the participants of the study the mean with standard deviation of family members of control group is 5.21 ± 2.547 and experimental group is 4.53± 1.302. In this study, among the participants 3.4% (n=1) has a small family of 1 members, 3.4% (n=1) has a family of 2 members, 10.3% (n=3) has a family of 3 members, 31.0% (n=9) has a family of 4members, 27.6% (n=8) has a family of 5, 6.9% (n=2) has a family of 6 members, 10.3% (n=3) has a family of 7 members, 3.4% (n=1) has a family of 9 members and 3.4% (n=1) has a relatively large family 11 members.

Hand Dominant:

Among the participants 93.1% (n=27) of the total participants were right hand dominant and 6.9% (n=2) of the total participants were right hand dominant.

Monthly income:

Among the participants of the study the mean with standard deviation of income of control group is 40642.86 ± 28064.780 and experimental group is 29400 ± 16855.690.Among the participants, 3.4%(n=1) of the participants have a monthly income around 0-8000 taka per month, 3.4% (n=1) of the participants have the monthly income around 8000-10000 ,10.3% (n=3) of the participants have 1000015000 taka monthly income,3.4% (n=1) of the participants have 15000-18000 taka monthly income, 13.8% (n=3) of the participants have 180000-20000 taka monthly income, 3.4% (n=1) of the participants have 20000-25000 taka monthly income, 3.4% (n=1) of the participants have 25000- 26000 taka monthly

income, 27.6% (n=8) of the participants have 26000- 30000 taka monthly income, 3.4% (n=1) of the participants have 30000-38000 taka monthly income, 10.3% (n=3) of the participants have 38000- 40000 taka monthly income, 3.4% (n=1) of the participants have 40000- 60000 taka monthly income, 10.3% (n=3) of the participants have 60000-80000 taka monthly income and the rest 3.4% (n=1) earnt almost 80000-100000 taka per month.

Injury Related information:

What is the main issue that brought you in today:

Among the 29 participants the number of participants of having pain in elbow is 89.7% (n=26), weakness of the forearm muscle is 3.4% (n=1), and patients having decrease grip strength is 6.9% (n=2).

How long has the current problem been going on: (weeks)

Among the 29 participants 75.9% (n=22) were having problem upto six months, 13.8% (n=4) having problem for six months to one year and 10.3% (n=3) having problem for more than one year.

Which side is involved:

Among the 29 participants, right side is involved in 69.0% (n=20) patients and left side is involved in 27.6% (n=8) patients.

Which part of elbow is your site of pain:

Among the 29 participants, front part of elbow is the site of pain in 20.7% (n=6) patients, medial part of elbow is the site of pain in 17.2% (n=5) patients. Lateral part of elbow is the site of pain in 58.6% (n=17) patients, back part of elbow is the site of pain in 3.4% (n=1) patients.

Do you perform any repetitive of forceful tasks or movements:

Among the 29 participants, 100% patient did perform any repetitive or forceful tasks or movements.

What kind of repetitive of forceful tasks or movements do you perform:

Among the 29 participants, the types and percentage of repetitive or forceful movements done by the participants are ; bag carrying 3.4%(n=1), biker 3.4% (n=1), board writing 3.4% (n=1), computer use 3.4% (n=1), cooking 6.9% (n=2), cutting clothes 3.4% (n=1), garments worker 6.9% (n=2), household activity 24.1% (n=7), physiotherapy related 6.9% (n=2), plaster bandaging 3.4% (n=1), sewing 3.4% (n=1), therapy related 3.4% (n=1), twisting activity 3.4% (n=1), typing 6.9% (n=2), washing & physiotherapy related 3.4% (n=1), and weight lift 13.8 (n=4).

Numeric Pain Rating Scale (NPRS)

Wilcoxon sign rank test was used to analyze the significance by measuring the within pre and post values of the each group Pain status and functional disability experienced by patients is measured through Patients Rated Tennis Elbow Evaluation Questionnaire .Then this test is done within pre and post values of control and experimental group. Then Mann-Whitney U test was done for the between group analysis of pain and functional disability.

When are you at rest:

In, the within group analysis the researcher found, Z value of experimental group was 2.966 and P value was .003. Also the Z value of control group was 2.831 P value was .005. So, in within group analysis the result showed significant improvement ($p<0.05$) in both control and experimental group which meant the alternative hypothesis was accepted and null hypothesis was rejected.

In, the between group analysis the researcher found changes of U value in pre and post status. The pre value of U was 89.500 and post value of U was 82.500. But The P value was .292 which was not significant. This result din not show significant improvement ($P>0.05$). So null hypothesis was accepted for the between group analysis.

When doing a task with repeated arm movement:

In, the within group analysis the researcher found, Z value of experimental group was 3.535 and P value was .001. Also the Z value of control group was 3.209. P value was .001. So, in within group analysis the result showed significant improvement ($p<0.05$) in both control and experimental group which meant the alternative hypothesis was accepted and null hypothesis was rejected.

In, the between group analysis the researcher found changes of U value in pre and post status. The pre value of U was 97.000 and post value of U was 76.500. The post P value was .197 which was not significant. This result din not show significant improvement ($P>0.05$). So null hypothesis was accepted for the between group analysis.

When carrying a plastic bag of groceries:

In, the within group analysis the researcher found, Z value of experimental group was 3.472 and P value was .001. Also the Z value of control group was 3.334. P value was .001. So, in within group analysis the result showed significant improvement ($p<0.05$) in both control and experimental group which meant the alternative hypothesis was accepted and null hypothesis was rejected.

In, the between group analysis the researcher found changes of U value in pre and post status. The pre value of U was 94.000 and post value of U was 78.000. The post P value was .224 which was not significant. This result din not show significant improvement ($P>0.05$). So null hypothesis was accepted for the between group analysis.

When your pains at its least:

In, the within group analysis the researcher found, Z value of experimental group was 2.831 and P value was .005. Also the Z value of control group was 3.213. P value was .001. So, in within group analysis the result showed significant improvement ($p<0.05$) in both control and experimental group which meant the alternative hypothesis was accepted and null hypothesis was rejected.

In, the between group analysis the researcher found changes of U value in pre and post status. The pre value of U was 74.500 and post value of U was 77.500. The post P value was .211 which was not significant. This result din not show significant improvement ($P>0.05$). So null hypothesis was accepted for the between group analysis.

When your pains at its Worst:

In, the within group analysis the researcher found, Z value of experimental group was 3.360 and P value was .001 . Also the Z value of control group was 3.017, P value was .003. So, in within group analysis the result showed significant improvement ($p<0.05$) in both control and experimental group which meant the alternative hypothesis was accepted and null hypothesis was rejected.

In, the between group analysis the researcher found changes of U value in pre and post status. The pre value of U was 101.500 and post value of U was 78.500. But The P value was .224 which was not significant. This result din not show significant improvement ($P>0.05$). So null hypothesis was accepted for the between group analysis.

Turn a doorknob or key:

In, the within group analysis the researcher found, Z value of experimental group was 1.633 and P value was .102 . Also the Z value of control group was 2.214 , P value was .027. So, in within group analysis the result showed significant improvement ($p<0.05$) in only control group which meant the alternative hypothesis was accepted and null hypothesis was rejected.

In, the between group analysis the researcher found changes of U value in pre and post status. The pre value of U was 81.500 and post value of U was 90.000. But The P value was .355 which was not significant. This result din not show significant improvement ($P>0.05$). So null hypothesis was accepted for the between group analysis.

Carry a briefcase by the handle:

In, the within group analysis the researcher found, Z value of experimental group was 3.449 and P value was .001 . Also the Z value of control group was 3.322, P value was .001. So, in within group analysis the result showed significant improvement ($p<0.05$) in both control and experimental group which meant the alternative hypothesis was accepted and null hypothesis was rejected.

In, the between group analysis the researcher found changes of U value in pre and post status. The pre value of U was 84.500 and post value of U was 76.000. But The P value was .171 which was not significant. This result din not show significant improvement ($P>0.05$). So null hypothesis was accepted for the between group analysis.

Lift a full coffee cup or glass of milk to your mouth:

In, the within group analysis the researcher found, Z value of experimental group was 1.961 and P value was .050 . Also the Z value of control group was 2.220, P value was .026. So, in within group analysis the result showed significant improvement ($p<0.05$) in both control and experimental group which meant the alternative hypothesis was accepted and null hypothesis was rejected.

In, the between group analysis the researcher found no changes of U value in pre and post status. The pre value of U was 90.500 and post value of U was 90.500 . But The P value was .439 which was not significant. This result din not show significant improvement ($P>0.05$). So null hypothesis was accepted for the between group analysis.

Open a jar:

In, the within group analysis the researcher found, Z value of experimental group was 3.336 and P value was .001 . Also the Z value of control group was 3.108, P value was .002. So, in within group analysis the result showed significant improvement ($p<0.05$) in both control and experimental group which meant the alternative hypothesis was accepted and null hypothesis was rejected.

In, the between group analysis the researcher found changes of U value in pre and post status. The pre value of U was 81.500 and post value of U was 69.000. But The P value was .110 which was not significant. This result din not show significant improvement ($P>0.05$). So null hypothesis was accepted for the between group analysis.

Pull up pants:

In, the within group analysis the researcher found, Z value of experimental group was 2.227 and P value was .023. Also the Z value of control group was 2.060, P value was .039. So, in within group analysis the result showed significant improvement ($p<0.05$) in both control and experimental group which meant the alternative hypothesis was accepted and null hypothesis was rejected.

In, the between group analysis the researcher found changes of U value in pre and post status. The pre value of U was 100.500 and post value of U was 103.000. But The P value was .920 which was not significant. This result din not show significant improvement ($P>0.05$). So null hypothesis was accepted for the between group analysis.

Wring out a washcloth or wet towel:

In, the within group analysis the researcher found, Z value of experimental group was 3.389 and P value was .001. Also the Z value of control group was 3.266, P value was .001. So, in within group analysis the result showed significant improvement ($p<0.05$) in both control and experimental group which meant the alternative hypothesis was accepted and null hypothesis was rejected.

In, the between group analysis the researcher found changes of U value in pre and post status. The pre value of U was 79.500 and post value of U was 64.000. But The P value was .067 which was not significant. This result din not show significant improvement ($P>0.05$). So null hypothesis was accepted for the between group analysis.

Personal activities (dressing, washing):

In, the within group analysis the researcher found, Z value of experimental group was 3.342 and P value was .001. Also the Z value of control group was 3.106, P value was .002. So, in within group analysis the result showed significant improvement ($p<0.05$) in both control and experimental group which meant the alternative hypothesis was accepted and null hypothesis was rejected.

In, the between group analysis the researcher found changes of U value in pre and post status. The pre value of U was 103.500 and post value of U was 93.000. But The P value was .595 which was not significant. This result din not show significant improvement ($P>0.05$). So null hypothesis was accepted for the between group analysis.

Household work (cleaning, maintenance):

In, the within group analysis the researcher found, Z value of experimental group was 3.458 and P value was .001. Also the Z value of control group was 3.224, P value was .001. So, in within group analysis the result showed significant improvement ($p<0.05$) in both control and experimental group which meant the alternative hypothesis was accepted and null hypothesis was rejected.

In, the between group analysis the researcher found changes of U value in pre and post status. The pre value of U was 85.000 and post value of U was 99.500. But The P value was .807 which was not significant. This result din not show significant improvement ($P>0.05$). So null hypothesis was accepted for the between group analysis.

Work (your job or everyday work):

In, the within group analysis the researcher found, Z value of experimental group was 3.501 and P value was .000. Also the Z value of control group was 3.225, P value was .001. So, in within group analysis the result showed significant improvement ($p<0.05$) in both control and experimental group which meant the alternative hypothesis was accepted and null hypothesis was rejected.

In, the between group analysis the researcher found changes of U value in pre and post status. The pre value of U was 79.000 and post value of U was 102.000. But The P value was .893 which was not significant. This result din not show significant improvement ($P>0.05$). So null hypothesis was accepted for the between group analysis.

Recreational or sporting activities:

In, the within group analysis the researcher found, Z value of experimental group was 3.535 and P value was .000. Also the Z value of control group was 3.087, P value was .002. So, in within group analysis the result showed significant improvement ($p<0.05$) in both control and experimental group which meant the alternative hypothesis was accepted and null hypothesis was rejected.

In, the between group analysis the researcher found changes of U value in pre and post status. The pre value of U was 102.500 and post value of U was 100.500. But The P value was .836 which was not significant. This result din not show significant improvement ($P>0.05$). So null hypothesis was accepted for the between group analysis.

CHAPTER – V DISCUSSION

The purpose of the study was to find out the effectiveness of a mill's manipulation for lateral epicondylitis To find out the pain intensity , To evaluate functional outcome of specific activities and to evaluate functional outcome of usual activities in case of lateral epicondylitis.

In this randomized control trial 29 participants with tennis elbow were randomized into two groups. There were 14 participants in the control group and 15 in the experimental group. Participants in the experimental group received an added mill's manipulation along with the conventional physiotherapy. But those who were in the control group they didn't get that specific treatment. After 6 sessions of treatment the researcher took the post data and then compared with the pre data.

The researcher measured the pain and the functional disability of the patient by patient rated tennis elbow evolution questionnaire. The study was analyzed by nonparametric Wilcoxon sign rank test & Mann-Whitney U test.

The researcher found significant improvement of pain intensity and functional disability in within the control and experimental group analysis by analyzing the pre and post data. During Wilcoxon sign rank test Most of the P values of post test were significant within the group. The P value were less than 0.05 in both of the post test group. So, researcher assumed that both conventional physiotherapy and experimental physiotherapy is effective to reduce pain and disability for patients the management of tennis elbow patient.

After calculating and analyzing the values of each group, the researcher then compared the post test values of each group with one another by Mann-Whitney U test. That was the actual comparison of the control and experimental group for LE patients.

In this test most of the variables were not significant. Though the post significance level is decreased from pre significance level so statistically the effectiveness is not clinically significant where ($P \leq 0.05$) to accept the alternative hypothesis..

The result was analyzed based on 6 sessions treatment. Sample size was too small to get an absolute outcome. Again, in the previous literatures showed that, treatment sessions must be continued up to 12 sessions to get a good outcome of the mill's manipulation. So, further study is needed regarding this issue.

(Stasinopoulus et al., 2006) made a comparison of the effectiveness of supervised exercise, Cyriax physiotherapy, and treatment with polychromatic noncoherent light in managing tennis elbow. The conclusion is supervised exercise consisting of static stretching and eccentric strengthening produced the largest effect in reducing pain and improving function rather than cyriax physiotherapy.

Another article stated that (Verhaar et al., 1996) comparison between the effects of corticosteroid injections with Cyriax physiotherapy in treating patients with tennis elbow. This showed that the corticosteroid injection was significantly more effective on the outcome measures pain, function, rather than Cyriax physiotherapy at the end of the treatment, but at after the end of treatment, there were no significant differences between the two treatment groups.

Limitation of the Study:

- Among the vast numbers of tennis elbow patients, the sample size was really very small, so the result is difficult to generalize among whole population as different people can have different life styles.
- Result was based on after 6 sessions of treatment, but in the previous literatures showed that if u want the best outcome from the patient, treatment must be continued up to 12 sessions. But according to the socio-economic texture of our country patient aren't eager to treat longer, that's why the outcome is not significant enough.
- Sometimes treatment sessions and exercise sessions were interrupted due to public holiday and recruit physiotherapists took leave in the data collection that may interrupt the result.
- Different participants had different capacity of exercise tolerance, but every participant took on the same exercise protocol. Exercise protocols would be better if participants were given different protocol according to their capacity.
- The mean age and gender of two groups were not same. That can affect the results.
- Clinical Physiotherapists who were providing physiotherapy treatment, they could give different treatments to different patients. That can change the result.
- The research project was done by an undergraduate student and it was his first research project. So, the researcher had limited experience with techniques and strategies in terms of the practical aspects of research. As it was the first survey of the researcher so might be there were some mistakes that overlooked by the supervisor and the honorable teacher

CHAPTER – VI CONCLUSION AND RECOMMENDATION

Although mill's manipulation is commonly used immediately after DTFM for the treatment of tennis elbow, but more study is needed regarding this issue. It was a quantitative study of randomized control trial. Among 29 patients 15 were in the experimental group and 14 were in the control group. Actually, both of the groups had significant change in pain and functional disability among the patients in pre and post treatment periods. Then researcher compared the results but no significant outcome came between the group analysis. The final result showed that mill's manipulation can't be significantly effective but might be used to treat along with the conventional physiotherapy treatment. Because of sample size being too short the absolute outcome didn't come again treatment sessions should be expended up to at least 12 sessions to get a good outcome, more research is needed to assess firstly its effectiveness and secondly the effects of both its components.

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বাংলাদেশ হেল্‌থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
Bangladesh Health Professions Institute (BHPI)
(The Academic Institute of CRP)

Ref:

Date:

CRP-BHPI/MRS/07/2020/399

31st January, 2021

Md. Ashfaquzzaman
4th year B.Sc. in Physiotherapy
Session: 2015-2016, Student ID: 112150279
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Subject: Approval of the thesis proposal "**Effectiveness of a Mill's manipulation for tennis elbow patient**" by ethics committee.

Dear Md. Ashfaquzzaman,
Congratulations.
The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application to conduct the above mentioned dissertation, with yourself, as the principal investigator. The following documents have been reviewed and approved.

Sr. No.	Name of the Documents
1	Dissertation proposal
2	Questionnaire (Bengali & English version)
3	Information sheet and consent form

The purpose of the study is to find out the nature of Physiotherapy practice in Bangladesh. The study involves use of a questionnaire to explore effectiveness of a mill's manipulation for tennis elbow patient that may take 15 to 20 minutes to answer the questionnaire and there is no likelihood of any harm to the participants. Data collectors will receive informed consents from all participants. Any data collected will be kept confidential. The members of the Ethics committee have approved the study to be conducted in the presented from at the meeting held at 8.30AM on March 01, 2020 at BHPI (23rd IRB Meeting).

The Institutional Ethics committee expects to be informed about the progress of the study, any changes occurring in the course of the study, any revision in the protocol and patient information or informed consent and ask to be provided a copy of the final report. This Ethics committee is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964-2013 and other applicable regulation.

Best regards,

Muhammad Millat Hossain
Assistant Professor, Dept. of Rehabilitation Science
Member Secretary, Institutional Review Board (IRB)
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

CRP-Chapain, Savar, Dhaka-1343, Tel : 7745464-5, 7741404
E-mail : principal-bhpi@crp-bangladesh.org, Web: bhpi.edu.bd, www.crp-bangladesh.org

Permission Letter

Date: 31st January,2021

Head

Department of Physiotherapy

Centre for the Rehabilitation of the Paralysed (CRP) Chapain,

Savar, Dhaka. -1343.

Through: Head, Department of Physiotherapy, BHPI.

Subject: Prayer for seeking permission to collect data for conducting research project.

Sir,

With due respect and humble submission to state that I am Md. Ashfaquzzaman, a student of 4th year B.Sc. in Physiotherapy at Bangladesh Health Professions Institute (BHPI). The Ethical committee has approved my research project entitled: **"Effectiveness of a Mill's manipulation for Tennis Elbow patient"** under the supervision of Mohammad Anwar Hossain, Associate Professor, Department of Physiotherapy, BHPI. I want to collect data for my research project from the Department of Physiotherapy at CRP. So, I need permission for data collection from the Musculoskeletal (MS) unit of Physiotherapy Department at CRP (CRP, Savar, Dhaka. -1343 and CRP-Mirpur,Dhaka-1216). I would like to assure that anything of the study will not be harmful for the participants.

I, therefore pray and hope that your honor would be kind enough to grant my application and give me permission for data collection and oblige thereby.

Yours faithfully,

Md. Ashfaquzzaman

Md. Ashfaquzzaman

4th year

B.Sc. in Physiotherapy

Class Roll: 08, Session: 2015-16

Bangladesh Health Professions Institute (BHPI)

(An academic Institution of CRP)

CRP-Chapain, Savar, Dhaka. -1343

Approved

31/1/21

MOHAMMAD ANWAR HOSSAIN
Senior Consultant &
Head of Physiotherapy Dept
Associate Professor, BHPI
CRP, Savar, Dhaka-1343

Recommended from BHPI

Shofiq
15.06.21

Md. Shofiqul Islam
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সম্মতিপত্র

(অংশগ্রহণকারীকে পড়ে শুনাতে হবে)

আসসালামু আলাইকুম,

আমি মোঃ আশফাকুজ্জামান , বাংলাদেশ হেলথ প্রফেশন ইন্সটিটিউটের বি.এস.সি ইন ফিজিওথেরাপি কোর্সের চতুর্থ বর্ষের একজন ছাত্র। অধ্যায়নের অংশ হিসেবে আমাকে একটি গবেষণা সম্পাদন করতে হবে এবং এটা আমার প্রাতিষ্ঠানিক কাজের একটি অংশ। নিচের তথ্যাদি পাঠ করার পর অংশগহনকারীদের গবেষণায় অংশগ্রহনের জন্য অনুরোধ করা হল।

আমার গবেষণার বিষয় হল **টেনিস এলবো রোগীর উপর একটি মিলস ম্যানিপুলেশন এর কার্যকারিতা।**

এই পরীক্ষামুলক গবেষণার মাধ্যমে আমি টেনিস এলবো রোগীদের দৈনন্দিন কাজকর্ম ও জীবন যাপনের ক্ষেত্রে কেমন ব্যথা ও অসুবিধা হয় তা পরিমাপ করব এবং মিলস ম্যানিপুলেশন চিকিৎসাটি তাদের ব্যথা ও অসুবিধা কমানোর জন্য কতটা উপযোগী তা পরিমাপ করবো।

আমি প্রতিজ্ঞা করছি যে, এই গবেষণা আপনার জন্য ঝুঁকিপূর্ণ হবে না এবং আপনার কোন ক্ষতি করবে না। গবেষণা চলাকালিন সময়ে কোন রকম দ্বিধা বা ঝুঁকি ছাড়াই আপনি এটাকে বাদ দিতে পারবেন। এই গবেষণায় প্রাপ্ত তথ্য সম্পূর্ণ ভাবে গোপনীয় থাকবে এবং অংশগ্রহনকারীর ব্যক্তিগত তথ্য অন্য কোথাও প্রকাশ করা হবে না। যদি আপনার এই গবেষণা সম্পর্কে কোন জিজ্ঞাসা থাকে তবে আপনি যোগাযোগ করতে পারেন আমার সাথে অথবা আমার সুপারভাইজার মোঃ আনোয়ার হোসেন, সহযোগী অধ্যাপক, ফিজিওথেরাপি বিভাগের প্রধান, সি আর পি, সাভার, ঢাকা-১৩৪৩।

শুরু করার আগে কি আপনার কোন প্রশ্ন আছে? আমি কি তাহলে শুরু করতে পারি?

হ্যা ☐ না ☐

অংশগ্রহনকারীর স্বাক্ষরঃ..... তারিখঃ.....

তথ্য সংগ্রহকারীর স্বাক্ষরঃ..... তারিখঃ.....

English Questionnaire

Research Title: Effectiveness of a Mill's manipulation for the patient of Tennis Elbow.

Personal details:

Name: Date:

ID No:

Contact No:

Address:

present-

Permanent-

Give a tick mark (√) on the correct option.

Part-A: Socio-demographic information:

Serial	Question	Response
1	Age	……years
2	Sex	1. Male 2. Female
3	Marital Status	1. Married 2. Unmarried 3. Widow 4. Divorced 5. Separated
4	Educational Qualification	1. Illiterate 2. Primary school complete 3. SSC pass 4. HSC pass 5. Graduation pass 6. Post-Graduation pass
5	Occupation	1. Housewife 2. Service holder 3. Day labor 4. Business 5. Plumber 6. Painter 7. Carpenters 8. Cook 9. Butcher 10. Housekeeper

		11.Tennis player 12.Others
6	Living place	1. Urban 2. Semi urban 3. Rural
7	Family type	1. Single 2. Joint
8	Family members	……..
9	Hand dominant	1. Right 2. Left
10	Income (per month)	

Part B- Injury Related information:

1. What is the main issue that brought you in today?

   i. Pain in elbow
   ii. Weakness of the forearm muscle
   iii. Numbness or tingling in your arm
   iv. Decrease grip strength
   v. Recent injury or trauma

2. How long has the current problem been going on?

   …….

3. Which side is involved?

   i. Right
   ii. Left
   iii. Both

4.Which part of elbow is your site of pain?

   i. Front
   ii. Medial
   iii. Lateral
   iv. Back

5. Do you perform any repetitive or forceful tasks or movements?

i. Yes
ii. No

If yes, what kind of repetitive or forceful tasks or movements do you perform?

……

Part-C (1)-Pain status:

(MacDermid, 2005), used a scale to rate the pain status and functional disability experienced by patients. It is known as **Patients Rated Tennis Elbow Evaluation Questionnaire.**

Basic activities:

0= No pain, 1-3= Mild pain, 5= Moderate pain, 7-10=worst possible pain feeling experienced by patients.

This portion of questionnaire will be filled by the patient using a black or blue color ball pen. If the patient struggles to understand the meaning of a question, physiotherapist is requested to clear the meaning of certain portions.

Rate your pain											
	No pain										Worst Imaginable
When you are at rest	0	1	2	3	4	5	6	7	8	9	10
When doing a task with repeated arm movement	0	1	2	3	4	5	6	7	8	9	10
When carrying a plastic bag of groceries	0	1	2	3	4	5	6	7	8	9	10
When your pains at its least	0	1	2	3	4	5	6	7	8	9	10
When your pains at its worst	0	1	2	3	4	5	6	7	8	9	10

Part- C (2)- Functional disability status:

Basic activities:

0= No functional difficulty,

1-3= Mild functional difficulty

5= Moderate functional difficulty

7-10=worst possible functional disability feeling experienced by patients.

This portion of questionnaire will be filled by the patient using a black or blue colour ball pen. If the patient struggles to understand the meaning of a question, physiotherapist is requested to clear the meaning of certain portions.

FUNCTIONAL DISABILITY	
A. **SPECIFIC ACTIVITIES**	No Difficulty 0 1 2 3 4 5 6 7 8 9 10 Unable To Do
Turn a doorknob or key.	0 1 2 3 4 5 6 7 8 9 10
Carry a briefcase by the handle.	0 1 2 3 4 5 6 7 8 9 10
Lift a full coffee cup or glass of milk to your mouth.	0 1 2 3 4 5 6 7 8 9 10
Open a jar.	0 1 2 3 4 5 6 7 8 9 10
Pull up pants.	0 1 2 3 4 5 6 7 8 9 10
Wring out a washcloth or wet towel.	0 1 2 3 4 5 6 7 8 9 10

B. **USUAL ACTIVITIES**: .	
1. Personal activities (dressing, washing)	0 1 2 3 4 5 6 7 8 9 10
2. Household work (cleaning, maintenance)	0 1 2 3 4 5 6 7 8 9 10
3. Work (your job or everyday work)	0 1 2 3 4 5 6 7 8 9 10
4. Recreational or sporting activities	0 1 2 3 4 5 6 7 8 9 10

Comments:

Date: …… **Signature of examiner: ……**

বাংলা প্রশ্নপত্র

গবেষণার শিরোনামঃ টেনিস এলবো পেশেন্টের উপর একটি মিলস ম্যানিপুলেশন এর কার্যকারিতা ।

ব্যক্তিগত তথ্য –

নামঃ..... তারিখঃ.....

আইডি নং.....

যোগাযোগঃ.....

বর্তমান ঠিকানাঃ

.....

.....

স্থায়ী ঠিকানাঃ

.....

.....

অংশ কঃ আর্থ-জনসংখ্যার তথ্য

দয়া করে সঠিক উত্তরে টিক(✓) চিহ্ন দিন

সিরিয়াল	প্রশ্ন	প্রতিক্রিয়া
১.	বয়স	..... বছর
2	লিঙ্গ	১. ছেলে ২. মেয়ে
৩	বৈবাহিক অবস্থা	১. বিবাহিত ২. অবিবাহিত ৩. তালাকপ্রাপ্ত ৪. বিধবা ৫. পৃথক
৪	শিক্ষাগত যোগ্যতা	১. নিরক্ষর ২. প্রাথমিক শিক্ষা সম্পন্ন ৩. এস.এস.সি পাশ ৪. এইচ.এস.সি পাশ ৫. স্নাতক পাশ ৬. স্নাতরকোত্তের পাশ ৭. অন্যান্য.....

৫	পেশা	
৬	বাসস্থান	১. নগর অঞ্চল ২. মফঃস্বল শহর ৩. গ্রাম্য অঞ্চল
৭	পারিবারিক প্রকারভেদ	১. অণু পরিবার ২. যৌথ পরিবার
৮	পরিবারের সদস্য সংখ্যা	……..
৯	যে হাতে বেশি কাজ করে	১. ডান ২. বাম
১০	পরিবারিক মাসিক আয়	

অংশ খ- আঘাত সংক্রান্ত তথ্যঃ

১. আপনার প্রধান সমস্যা কোনটি যার জন্য আপনি আজকে এখানে এসেছেন?

- কনুই ব্যথা
- হাতের মাংসপেশিতে দূর্বলতা
- হাত অবশ মনে করা
- হাত মুঠ করার শক্তি কমে যাওয়া
- সাম্প্রতিক কোন আঘাতের জন্যে

২. বর্তমান সমস্যা কত দিন ধরে চলছে?

.....

৩.কোন পার্শ্ব জড়িত?

- ডান
- বাম
- উভয়

৪. কনুই এর কোন অংশে ব্যাথা?

- সামনে
- ভিতরের দিকে
- বাইরের দিকে
- পিছনে

৫. আপনি কি হাত দিয়ে পুনরাবৃত্তিমূলক বা কোন ভারী কাজ করেন?

- হ্যাঁ
- না

যদি করে থাকেন তাহলে কেমন পুনরাবৃত্তিমূলক বা ভারী কাজ করেন?

.....

অংশ গ(১)- ব্যথা সংক্রান্ত: (প্রাক পরীক্ষার ডাটা)

MacDermid, 2005, ব্যথার অবস্থা এবং ক্রিয়ামূলক অক্ষমতা,রোগীদের দ্বারা অভিজ্ঞতা পরিমাপের জন্য একটি স্কেল ব্যবহার করেন।এর নাম Patient Rated Tennis Elbow Evaluation Questionairre.

১-ব্যথার অবস্থা

স্বাভাবিক কার্যকলাপঃ

০= ব্যথা নেই ১-৩=সামান্য ব্যথা ৫=মাঝামাঝি ব্যথা ৭-১০= তীব্র ব্যথার অনুভূতি

প্রশ্নাবলি এই অংশে,রোগীর একটি কালো বা নীল রঙ বলপেন ব্যবহার দ্বারা পূরণ করতে হবে,রোগী একটি প্রশ্নের উত্তর বুঝতে না পারলে ফিজিওথেরাপিস্ট তা পরিষ্কার করবে।

আপনার ব্যথার পরিমান করুন	
	ব্যথা নেই তীব্র ব্যথা
স্বাভাবিক বিশ্রামে থাকাকালীণ আপনার ব্যথার তীব্রতা কেমন?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
যখন বার বার হাত দিয়ে একই কাজ করেন তখন আপনার ব্যথার তীব্রতা কেমন?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
যখন বাজারের প্লাস্টিকের ব্যাগ বহন করেন তখন আপনার ব্যথার তীব্রতা কেমন?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
আপনার ব্যথা যখন সামান্য ছিল তখন আপনার ব্যথার তীব্রতা কেমন?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
আপনার ব্যথা যখন সবচেয়ে খারাপ ছিল তখন আপনার ব্যথার তীব্রতা কেমন ?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

পর্ব –গ (২) কার্মিক অসুবিধা অবস্থা:

স্বাভাবিক কার্যকলাপঃ

প্রশ্নাবলী এই অংশে,রোগী্র একটি কালো বা নীল রঙ বলপেন ব্যবহার দ্বারা পূরণ করতে হবে.রোগীর একটি প্রশ্ন এর অর্থ বুঝতে না পারলে, ফিজিওথেরাপিস্ট তা পরিষ্কার করবে।

কার্মিক অসুবিধা			
১। নির্দিষ্ট কার্যকলাপঃ .	অসুবিধা নেই	মাঝামাঝি অসুবিধা	কাজ করতে না পারা
দরজার হাতলের এবং চাবি চালু করতে?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০		
হাতল দ্বারা একটি ব্রিফকেস বহন করতে?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০		
আপনার হাত দিয়ে একটি পূর্ণ কফি কাপ বা দুধের গ্লাস উত্তোলনে কেমন অসুবিধা হয়?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০		
একটি পাত্র খুলতে কেমন অসুবিধা হয়	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০		
প্যান্ট পরতে কেমন অসুবিধা হয়?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০		

কাপড় কাছতে বা ভিজা গামছা মোচড় দিতে কেমন অসুবিধা হয়?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
২। **সাধারণ** কার্যকলাপঃ .	
ব্যক্তিগত কার্যক্রম (কাপড় পরতে, ওয়াশিং)	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
গৃহস্থালী কাজ (পরিষ্কার, রক্ষণাবেক্ষণ)	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
কাজ (আপনার চাকরী বা দৈনন্দিন কাজ)	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
বিনোদনমূলক এবং ক্রীড়া কার্যক্রমে	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

অংশ ঘ(১)- ব্যথা সংক্রান্ত: (পরীক্ষার পরের ডাটা)

MacDermid, 2005, ব্যথার অবস্থা এবং ক্রিয়ামূলক অক্ষমতা,রোগীদের দ্বারা অভিজ্ঞতা পরিমাপের জন্য একটি স্কেল ব্যবহার করেন।এর নাম Patient Rated Tennis Elbow Evaluation Questionairre.

(১)-ব্যথার অবস্থা

স্বাভাবিক কার্যকলাপঃ

০= ব্যথা নেই ১-৩=সামান্য ব্যথা ৫=মাঝামাঝি ব্যথা ৭-১০= তীব্র ব্যথার অনুভূতি

প্রশ্নাবলি এই অংশে,রোগীর একটি কালো বা নীল রঙ বলপেন ব্যবহার দ্বারা পূরণ করতে হবে,রোগী একটি প্রশ্নের উত্তর বুঝতে না পারলে ফিজিওথেরাপিস্ট তা পরিষ্কার করবে।

আপনার ব্যথার পরিমান করুন	
	ব্যথা নেই তীব্র ব্যথা
স্বাভাবিক বিশ্রামে থাকাকালীণ আপনার ব্যথার তীব্রতা কেমন?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
যখন বার বার হাত দিয়ে একই কাজ করেন তখন আপনার ব্যথার তীব্রতা কেমন?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
যখন বাজারের প্লাস্টিকের ব্যাগ বহন করেন তখন আপনার ব্যথার তীব্রতা কেমন?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
আপনার ব্যথা যখন সামান্য ছিল তখন আপনার ব্যথার তীব্রতা কেমন?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
আপনার ব্যথা যখন সবচেয়ে খারাপ ছিল তখন আপনার ব্যথার তীব্রতা কেমন ?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

পর্ব –ঘ(২) কার্মিক অসুবিধা অবস্থা:

স্বাভাবিক কার্যকলাপঃ

প্রশ্নাবলী এই অংশে,রোগী্র একটি কালো বা নীল রঙ বলপেন ব্যবহার দ্বারা পূরণ করতে হবে.রোগীর একটি প্রশ্ন এর অর্থ বুঝতে না পারলে, ফিজিওথেরাপিস্ট তা পরিষ্কার করবে।

কার্মিক অসুবিধা			
১। নির্দিষ্ট কার্যকলাপঃ .	অসুবিধা নেই	মাঝামাঝি অসুবিধা	কাজ করতে না পারা
দরজার হাতলের এবং চাবি চালু করতে?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০		
হাতল দ্বারা একটি ব্রিফকেস বহন করতে?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০		
আপনার হাত দিয়ে একটি পূর্ণ কফি কাপ বা দুধের গ্লাস উত্তোলনে কেমন অসুবিধা হয়?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০		
একটি পাত্র খুলতে কেমন অসুবিধা হয়	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০		
প্যান্ট পরতে কেমন অসুবিধা হয়?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০		

কাপড় কাছতে বা ভিজা গামছা মোচড় দিতে কেমন অসুবিধা হয়?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
২। **সাধারণ** কার্যকলাপঃ .	
ব্যক্তিগত কার্যক্রম (কাপড় পরতে, ওয়াশিং)	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
গৃহস্থালী কাজ (পরিষ্কার, রক্ষণাবেক্ষণ)	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
কাজ (আপনার চাকরী বা দৈনন্দিন কাজ)	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
বিনোদনমূলক এবং ক্রীড়া কার্যক্রমে	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

মন্তব্যসমূহ:

তারিখ: .... পরীক্ষকের স্বাক্ষর:.....

Conventional Physiotherapy Treatment for Tennis Elbow patient:

1. Deep Transverse Friction Massage

   10 min/every alternative day (3times/week).

2. Stretching exercise

   a. Flexor group of the muscle of the forearm

   b. Extensor group of the muscle of the forearm

   15 sec hold 5-6 rep,3 times/day.

3. Concentric strengthening exercise

   10-12 rep/1 set.

4. Eccentric strengthening exercise

   10rep/1 set.

5. Taping

   3 times in a week.

6. Ice compression

   5-7 min ,3times/day.

7. Ultrasound

   5min.

18/11/2020

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Research Title:

Effectiveness of a Mill's manipulation for Tennis Elbow patient.

Experimental Physiotherapy Guideline:

Mill's manipulation:

Mill's manipulation is the most common manipulative technique used by physiotherapists.

Cyriax state that it should be performed immediately after the DTFM provided that the patient has a full range of passive elbow extension. If passive elbow extension is limited, the manipulative will affect the elbow joint, rather than the common extensor tendon, possibly causing traumatic arthritis.

It is defined as a passive movement performed at the end of range—that is, once all the slack has been taken up—and is a minimal amplitude, high velocity thrust.

Procedure of applying Mill's manipulation:

1.Position the patient on a chair with a backrest and stand behind the patient.

2.Support the patient's arm under the crook of the elbow with the shoulder joint abducted to 90˚ and medially rotated. The forearm will automatically fall into pronation.

3.Place the thumb of your other hand in the web space between the patient's thumb and index finger and fully flex the patient's wrist and pronate the forearm.

4.Move the hand supporting the crook of the elbow on to the posterior surface of the elbow joint and, while maintaining full wrist flexion and pronation, extend the patient's elbow until you feel that all the slack has been taken up in the tendon.

5.Step sideways to stand behind the patient's head, taking care to prevent the patient from leaning away either forwards or sideways, which would reduce the tension on the tendon.

6.Apply a minimal amplitude, high velocity thrust by simultaneously side flexing your body away from your arms and pushing smartly downwards with the hand over the patient's elbow.(Stasinopoulos and Johnson, 2004).

Dosage:

A single manipulation immediately after the DTFM which is carried out once each visit.

(prabhakar et al., 2013).

Effectiveness:

1.It is done to elongate the scared tissue by rupturing adhesions within the teno-osseous junction making the area mobile and pain free. (prabhakar et al., 2013).

2.It can be claimed that Mill's manipulation is mostly used in clinical practice for the promotion of tissue healing. (Stasinopoulos and Johnson, 2004).

Mill's manipulation

Treatment session:

This treatment should be extended up to 6 sessions.