Faculty of Medicine

University of Dhaka

EFFECTIVENESS OF MYOFASCIAL RELEASE (BICEPS BRACHI, PECTORALIS MAJOR, LATISSIMUS DORSI) TO REDUCE PAIN AMONG PATIENTS WITH TENNIS ELBOW

By

Md. Shahadat Hossain

Master of Science in Physiotherapy

Session: 2013-2014

Registration No:3455

Roll No:306

Department of Physiotherapy

Bangladesh Health Professions Institute (BHPI)

May 2016

Faculty of Medicine

University of Dhaka

EFFECTIVENESS OF MYOFASCIAL RELEASE (BICEPS BRACHI, PECTORALIS MAJOR, LATISSIMUS DORSI) TO REDUCE PAIN AMONG PATIENTS WITH TENNIS ELBOW

By

Md. Shahadat Hossain

Master of Science in Physiotherapy

Session: 2013-2014

Registration No: 3455

Roll No: 306

Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in Physiotherapy

Department of Physiotherapy

Bangladesh Health Professions Institute (BHPI)

May 2016

We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for acceptance of this thesis entitled, **"Effectiveness of myofascial release (Biceps brachi, pectoralis major, latissimus dorsi) to reduce pain among patients with tennis elbow'',** submitted by Md. Shahadat Hossain, for the partial fulfillment of the requirements for the degree of Master of Science in Physiotherapy.

Nasirul Islam

Associate Professor and Principal (acting)

BHPI, CRP, Savar, Dhaka-1343.

Firoz Ahmed Mamin

Assistant Professor of Physiotherapy

BHPI, CRP, Savar, Dhaka-1343

Dr. Jahangir Alam

Associate professor

Dept of Orthopaedics Surgery

National institute of Traumatology and Rehabilitation (NITOR)

Nasirul Islam

Associate Professor and Principal (Acting)

BHPI, CRP, Savar, Dhaka-1343.

Declaration Form

- This work has not previously been accepted in substance for any degree and is not concurrently submitted in candidate for any degree
- This dissertation is being submitted in partial fulfillment of the requirements for the degree of M.Sc. in Physiotherapy.
- This dissertation is the result of my own independent work/investigation, except where otherwise stated. Other sources are acknowledged by giving explicit references. A Bibliography is appended.
- I confirm that if anything identified in my work that I have done plagiarism or any form of cheating that will directly awarded me fail and I am subject to disciplinary actions of authority.
- I confirm that the electronic copy is identical to the bound copy of the Thesis.
- In case of dissemination the finding of this project for the future publication, research supervisor will highly concern and it will be duly acknowledged as graduate thesis.

Signature:……..

Name: Md. Shahadat Hossain……

Date:……...

Acknowledgement

First of all, I would like to pay my gratitude to ALLAH who has given me the ability to complete this project in time with success. The second acknowledgement must go to my family members who have always inspired me for preparing the project properly.

I am extremely grateful to my honorable and praiseworthy supervisor **Nasirul Islam**, Associate Professor of Physiotherapy& principal, BHPI, CRP, Savar, Dhaka for giving me his valuable time, his supervision and excellent guidance without which I could not able to complete this project.

I would like to express my gratitude to **Mohammad Anwar Hossain**, Associate Professor and Head of the Physiotherapy Department, CRP, Chapain, Savar, Dhaka for giving me permission for data collection.

I would like to express gratitude to **Md. Obaidul Haque**, Associate Professor & Head, Department of Physiotherapy, Bangladesh Health Professions Institute (BHPI); **Ehsanur Rahman**, Assistant Professor of Physiotherapy, BHPI, helping me in data analysis section in this study. I would also like to give my special appreciation to my respected teacher **Firoz Ahmed Mamin,** Assistant Professor of Physiotherapy, BHPI for his proficient guidance to carry out this study. My special thanks to all the staffs of Musculoskeletal Outdoor Unit of Physiotherapy Department. I am grateful to **Mohammad Shahidul Islam**, Senior Physiotherapist & OPD Incharge, Department of Physiotherapy, CRP, Savar, Dhaka and **S.M. Joynul Abedin,** Intern Physiotherapist, Department of Physiotherapy, CRP, Savar, Dhaka.

Table of Contents

Topic	Page No.
List of tables	i-iii
List of figures	iv-v
List of Abbreviations	vi
Abstract	vii
CHAPTER I: INTRODUCTION	**1-9**
1.1 Background Information	1-3
1.2 Justification of the study	4-5
1.3 Operational Definition	5
1.4 Research Question	6
1.5 Aim	7
1.6 Study Objectives	7
1.7 List of variables	8
1.8 Hypothesis	9
1.9 Null Hypothesis	9
CHAPTER II: LITERATURE REVIEW	**10-24**
CHAPTER III: METHODOLOGY	**25-33**
3.1 Study design	25-26
3.2 Study area	26
3.3 Study Period	26

3.4 Study population and sample	26-27
3.5 Sampling Technique	27
3.6 Inclusion criteria	27
3.7 Exclusion criteria	28
3.8 Data Processing	28-29
3.9 Data Analysis	29
3.9.3Ethical Issue	30-31
3.10 Treatment Regime	31-33
CHAPTER IV: RESULTS	**34-76**
CHAPTER V: DISCUSSION	**77-79**
CHAPTER VI: LIMITATIONS	80
CHAPTER VII: CONCLUSION AND RECOMMENDATION	**81-82**
7.1 Conclusion	81
7.2 Recommendations	82
References	**83-91**
APPENDIX	**viii-xxxv**
1. Informed Consent (Bangla)	**ix**
2. Questionnaire (Bangla)	**x-xx**
3. Informed Consent (English)	**xxi**
4. Questionnaire (English)	**xxii-xxxiii**
5. Permission Letter	**xxxiv-xxxv**

List of Tables

Table No.	Title	Page No.
Table 1	Mean age of the participants of experimental and control group	31
Table 2	Gender of the participants	32
Table 3	Occupation of the participants	33
Table 4	Part of elbow pain	34
Table 5	Repetitive or forceful activity	35
Table 6	Nature of pain	35
Table 7	Comparison of changes of pain on Numeric pain rating scale at rest between experimental and control group	36
Table 8	Comparison of changes of pain on Numeric pain rating scale during forceful wrist extension between experimental and control group	38
Table 9	Comparison of changes of pain on Numeric pain rating scale during a strong grasp between experimental and control group	40
Table 10	Comparison of changes of pain on Numeric pain rating scale during doing a task with repeated arm movement between experimental and control group	42
Table 11	Comparison of changes of pain on Numeric pain rating scale in cozen test between experimental and control group	43
Table 12	Comparison of changes of pain on Numeric pain rating scale during forceful middle finger extension between experimental and control group	45
Table 13	Comparison of changes of pain on Numeric pain rating scale during turn a doorknob or key or Open a jar between experimental and control group	46
Table 14	Comparison of changes of pain on Numeric pain rating scale during palpation to the affected side between	48

experimental and control group

Table 15	Comparisons of changes of muscle power on OXFORD Grade Scale during elbow flexion between experimental and control group	49
Table 16	Comparisons of changes of muscle power on OXFORD Grade Scale during elbow extension between experimental and control group	51
Table 17	Comparisons of changes of Range of Motion on goniometer during elbow flexion between experimental and control group	52
Table 18	Comparisons of changes of range of motion on goniometer during elbow extension between experimental and control group	54
Table 19	Comparisons of changes of Disability inTurn a doorknob or key between experimental and control group	55
Table 20	Comparisons of changes of Disability Carry a grocery bag or briefcase by the handle between experimental and control group	57
Table 21	Comparisons of changes of Disability Lift a full coffee cup or glass of milk to mouth between experimental and control group	58
Table 22	Comparisons of changes of Disability Open a jar between experimental and control group	60
Table 23	Comparisons of changes of Disability Pull up pants between experimental and control group	61
Table 24	Comparisons of changes of Disability Wring out a washcloth or wet towel between experimental and control group	63
Table 25	Comparisons of changes of Disability Personal activities (dressing, washing) between experimental and control group	65
Table 26	Comparisons of changes of Disability Household work (cleaning, maintenance) between experimental and control	67

group

Table 27	Comparisons of changes of Disability Work (job or everyday work) between experimental and control group	68
Table 28	Comparisons of changes of Disability Recreational or sporting activities between experimental and control group	70
Table 29	Variables of pain in statistically significance at the following level of significance	71
Table 30	Variables of muscle power in statistically significance at the following level of significance	72
Table 31	Variables of range of motion in statistically significance at the following level of significance	72
Table 32	Variables of disability in statistically significance at the following level of significance	73

List of Figures

Figure No.	Title	Page No.
Figure 1	Age Range of the Participants	32
Figure 2	Gender of total participants	33
Figure 3	Occupation of the participants	33
Figure 4	Part of elbow pain	34
Figure 5	Repetitive or forceful activity	35
Figure 6	Nature of pain	36
Figure 7	Reduction of pain in resting position, experimental and control group	37
Figure 8	Reduction of pain scale during forceful wrist extension, experimental and control group	39
Figure 9	Reduction of pain scale during a strong grasp, experimental and control group	41
Figure 10	Reduction of pain scale during doing a task with repeated arm movement, experimental and control group	43
Figure 11	Reduction of pain scale in cozen test, experimental and control group	44
Figure 12	Reduction of pain scale during forceful middle finger extension, experimental and control group	46
Figure 13	Reduction of pain scale during turn a doorknob or key or open a jar, experimental and control group	47
Figure 14	Reduction of pain scale during palpation to the affected side, experimental and control group	49
Figure 15	Comparisons of changes of muscle power on OXFORD Grade Scale during elbow flexion between experimental and control group	50
Figure 16	Comparisons of changes of muscle power on OXFORD Grade Scale during elbow extension between experimental and control group	52
Figure 17	Comparisons of changes of range of motion on goniometer during elbow flexion between experimental	53

	and control group	
Figure 18	Comparisons of changes of range of motion on goniometer during elbow extension between experimental and control group	55
Figure 19	Comparisons of changes of Disability in Turn a doorknob or key between experimental and control group	56
Figure 20	Comparisons of changes of Disability Carry a grocery bag or briefcase by the handle between experimental and control group	58
Figure 21	Comparisons of changes of Disability Lift a full coffee cup or glass of milk to mouth between experimental and control group	59
Figure 22	Comparisons of changes of Disability Open a jar between experimental and control group	61
Figure 23	Comparisons of changes of Disability Pull up pants between experimental and control group	62
Figure 24	Comparisons of changes of Disability Wring out a washcloth or wet towel between experimental and control group	64
Figure 25	Comparisons of changes of Disability Personal activities (dressing, washing) between experimental and control group	66
Figure 26	Comparisons of changes of Disability Household work (cleaning, maintenance) between experimental and control group	68
Figure 27	Comparisons of changes of Disability Work (job or everyday work) between experimental and control group	69
Figure 28	Comparisons of changes of Disability Recreational or sporting activities between experimental and control group	71

List of Abbreviations

BHPI	:	Bangladesh Health Professions Institute
CRP	:	Bangladesh Medical Research Council
BMRC	:	Center for the Rehabilitation of the Paralysed
WHO	:	World Health Organization
IRB	:	Institutional Review Board
TE	:	Tennis Elbow
LE	:	Lateral Epicondylitis
PT	:	Physiotherapy

Abstract

Purpose: The purpose of this study was, to assess the therapeutic effectiveness of myofascial release with conventional physiotherapy treatments among patients with tennis elbow. *Objectives:* To assess the effect on pain, muscle power, range of motion after introducing myofascial release for the patients with tennis elbow. To measure the severity of pain by using Numeric Pain Rating Scale, to find out the muscle power through OXFORD muscle grade, to find the range of motion through goniometer, to measure the disability through patient rated tennis elbow disability questionnaires after introducing myofascial release. *Methodology*: The study was an experimental design. Total 20 samples were selected conveniently then randomly assigned to two different groups for this study from outpatient of Musculoskeletal Unit, Physiotherapy Department, of Centre for the Rehabilitation of the Paralysed (CRP), Savar, Dhaka. Experimental Group received combination therapy of myofascial release with conventional physiotherapy while control group received conventional physiotherapy only. *Result*: The finding of the study was carried out by using non-parametric Mann-Whitney *U* test to compare the experimental and control group and analyzed by interpreting the probability level of significance of *U* value.

Significant differences between Pre and Post values of tennis elbow pain and functional disability components measuring through numeric pain rating scale and patients rated tennis elbow evaluation scale ($P<0.05$) by using Mann whitney U test showing the effectiveness of myofascial release in reducing elbow pain and improving functional disability scores. In this study muscle power and range of motion was not significant due to small sample size or less follow up sessions. *Conclusion*: The study concluded that myofascial releaseis significantly capable of producing beneficial effects on pain and disability reduction, pain related symptoms minimization in patients with tennis elbow.

Keywords: **Tennis Elbow, Myofascial Release, Conventional Physiotherapy.**

CHAPTER-I: INTRODUCTION

1.1 Background Information

Lateral epicondylitis or tennis elbow is a painful condition characterized by pain at the lateral side of the elbow, which increases during gripping, squeezing, repeated twisting movement, resisted wrist extension and it usually affects the dominant arm (Bisset, et al., 2005). Lateral epicondylitis was first described in 1873 by Mr. Runge (Trivedi et al., 2014). The aetiology of tennis elbow is poorly understood (Jones, 2009).It most commonly occurs due to damage to the common extensor tendon of the forearm (Trivedi, et al., 2014).

Rheumatic disorders are one of the most common health problems in both developed and developing countries. The prevalence of rheumatic disorders globally is between 11% to more than 50%. 28% of these condition result in disability. In Bangladesh, a study on the prevalence of rheumatic diseases in the adult population showed that musculoskeletal complaints was 26.1%, and 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., 2006). 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., 2001). 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).

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 painful condition of the elbow caused by overuse. Not surprisingly, playing tennis or other racquet sports can cause this condition. But several other sports and activities can also put at risk. Lateral epicondylitis is the medical term for the condition commonly known as “Tennis Elbow.” In the past, this condition was called “Lawn Tennis Arm.” Despite these popular terms, over 90% of patients diagnosed with lateral epicondylitis do not play tennis. Lateral epicondylitis is a common disease that affects a different range of people (Lalenti, et al., 2014).

Tennis elbow refers to a syndrome of pain centred over the common origin of the extensor muscles of the fingers and wrist at the lateral epicondyle. It was first reported in the literature in 1873 by Runge (Yerger, 1985). 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.

Barr, et al. (2009) showed that Lateral epicondylitis (tennis elbow) is a painful musculoskeletal condition which is considered to be due to over-use, over-stress or over-exertion of the wrist extensors of the forearm. It is often associated with individuals who have repetitive occupations and/or hobbies, affects the dominant hand and primarily occurs between the ages of 35 and 64 years. Dalyan, et al. (2006) stated that forceful repetitive activity does not need to be work-related to cause tennis elbow. For example, wheelchair users are also at risk for developing tennis elbow, although shoulder tendinopathies and carpal tunnel syndrome are more prevalent. Functional activities such as pressure reliefs, transfers, and wheelchair propulsion are the commonly reported aggravating activities associated with elbow pain.

The prevalence of Tennis Elbow is described to be 1-2 % in a general population between 30 and 64 years of age. The highest incidence is between 40 and 60 years of age and, 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).

1.2 Justification of the study

There is no research investigation to find out the efficacy of Myofascial release with conventional physiotherapy comparing with only conventional physiotherapy on tennis elbow patient. In CRP musculoskeletal unit, physiotherapists are using different treatments for tennis elbow patient. As we know true tennis elbow will take longer period of time for recovery and most of time its have a chance for recurrency. A large number of tennis elbow patients need better physiotherapy treatment, to improve their functional activity and also their healthy life in the community. In CRP musculoskeletal unit, physiotherapists were applied different treatment techniques for management of pain among patients with tennis elbow.Few physiotherapists have known about myofascial release and its efficacy. But there is no valuable research to evaluate the effectiveness of myofascial release on specific muscle group (Biceps brachi, latissimus dorsi, pectoralis major) for management of tennis elbow pain. This study will investigate the effectiveness of myofascial release on pain management commonly used by physiotherapists practicing in CRP for the management of tennis elbow patient. Since physiotherapy is a new profession and vitally important to apply evidence based treatment techniques to patient for better treatment. This will help the physiotherapist to modify, redesign and continue the service of patient with tennis elbow. Moreover to develop an evidence to help stronger the physiotherapy profession in Bangladesh and for special interest, researcher would like to do the study. There was limited evidence on myofascial release technique and there have no one who can conduct this type of research in Bangladesh. So researcher would like to do the study. The result of this study may help to guide Physiotherapists to give the best treatment in tennis elbow pain and quick recover from this pain. There are some researches and articles, which are published in this area. This study will help us to

know about the effectiveness of Myofascial release for patients with tennis elbow therebymany physiotherapists will be interested to apply this approach in future.

1.3 Operational Definition

1.3. a Myofascial technique: Myofascial Release is a specialised physical and manual therapy used for the effective treatment and rehabilitation of soft tissue and fascial tension and restrictions.'Myo' means muscle and 'fascia' means band. Fascia, an embryological connective tissue, is a 3D continuous web of elastin and collagen fibres surrounded by a viscous fluid called the ground substance. These two fibre types allow it to be very strong yet have a high degree of flexibility whilst the ground substance is a fluid transportation medium and acts a slide and glide mechanism between structures.

1.3. b Tennis elbow pain: Tennis elbow is an inflammation of several structures of the elbow. These include muscles, tendons, bursa, periosteum, and epicondyle (bony projections on the outside and inside of the elbow, where muscles of the forearm attach to the bone of the upper arm).

1.3. c Conventional physiotherapy: CommonTreatment techniques e.g. deep transverse friction massage, isometric exercise, eccentric exercise, slow passive stretching exercises, ball squeezing, TENS, UST that are conventionally preferred by physiotherapist for treatment of tennis elbow patient in a particular setting.

1.4 Reaearch Question

What is the effectiveness of myofascial release (Biceps brachi, pectoralis major, latissimus dorsi) to reduce pain among patients with tennis elbow?

1.5 Aim

The aim of the study is to find out effectiveness of myofascial release (Biceps brachi, latissimus dorsi, pectoralis major) with conventional physiotherapy for tennis elbow pain.

1.6 Objectives

1.6.1. General objective

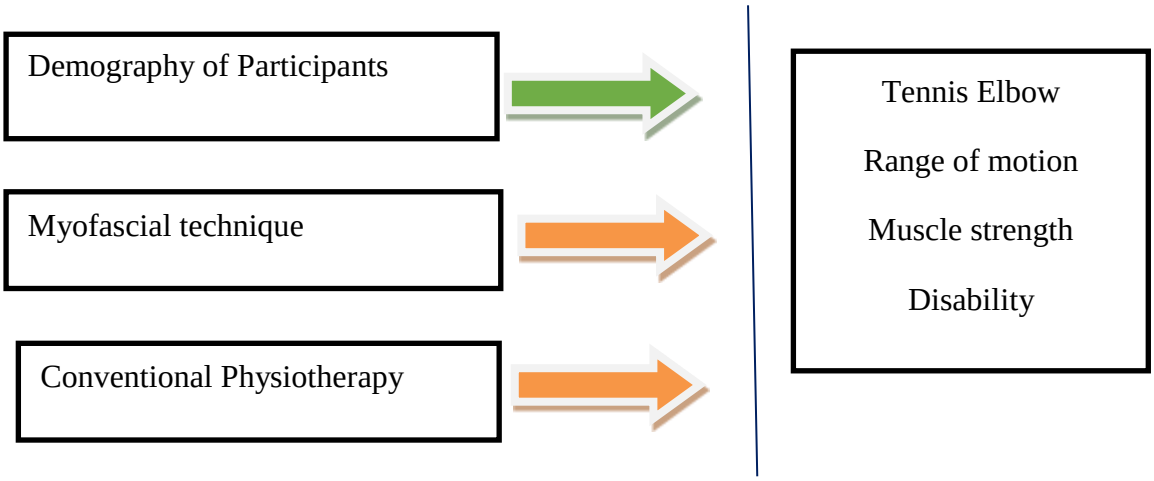
To identify the effectiveness of myofasial release (Biceps brachi, latissimus dorsi, pectoralis major) in reducing pain among patients with tennis elbow.

1.6.2. Specific objective

- To identify the effect of pain after introducing myofascial release on tennis elbow patients.
- To find out the muscle power after introducing Myofascial release.
- To determine the range of motion after introducing Myofascial release.
- To estimate the disability after introducing Myofascial release.

1.7 List of variables

Independent VariablesDependent Variable



1.8 Hypothesis

Myofascial release (Biceps brachi, pactoralis major, latissimus dorsi) along with conventional physiotherapy is better than only conventional physiotherapy for the treatment of tennis elbow pain.

1.9 Null hypothesis

Myofascial release(Biceps brachi, pactoralis major, latissimus dorsi) along with conventional physiotherapy is no more effective than only conventional physiotherapy for the treatment of patients with tennis elbow pain.

CHAPTER-II : LITERATURE REVIEW

Definition of tennis elbow:

Pain from the common tendinous origin of the forearm extensor muscles on the lateral elbow, traditionally known as tennis elbow (TE) is a common location of tendon pain. The incidence rate is estimated to 1-3% per year with a peak prevalence of 6.5% between 40 and 50 years of age (Abate, 2009). Most of the incidents heal within three months but about one third have a more protracted course and an estimated 17% of all cases still have symptoms after one year (Haahr, et al., 2003).

Types of tennis elbow:

Thomas (2000)**,** showed that**,** clinically, there are five types that define lateral epicondylitis: Type 1: a lesion of the muscular origin of the extensor carpi radialis longus, justproximal to the lateral epicondyle. This lesion is rare. Type 2: occurs either in isolation or along with type 5, and is the most frequent type of tennis elbow. It is an insertion tendopathy of the extensor carpi radialis brevis. Type 3: a tendonitis of the extensor carpi radialis brevis tendon at the level of the radial head. This lesion is also rare. Type 4: a sprain of the musculotendinous junction or proximal part of the muscle belly of the extensor carpi radialis brevis. This lesion is not found that frequently. Type 5: occurs frequently, but seldom in isolation. It is almost always seen in conjunction with type 2 tennis elbow. The origin of the extensor digitorum at thelaterodistal aspect of the lateral epicondyle is affected.Combinations of lesions often occur. A combination that is frequently observed is that of type 2 combined with type 4 or 5.

Consequence of tennis elbow pain:

Ljung, et al., (2004), stated that, Muscles connected to the outer side of the elbow (extensors) are responsible for: straightening the fingers, bending the wrist upwards, rolling the forearm into a palms-up position. There are weak points in the way tendons connect these muscles to the bone above the elbow. The points where the tendons attach are sometimes too small to handle the strong force of the powerful muscles. These tendons can get overloaded when the hand and forearm are used in strong, jerky movements such as gripping, lifting, or throwing. Tendons do not stretch when pulled. They are rope-like structures made of strong, smooth, shiny fibers. Strong forces or sudden impacts, however, can eventually tear their fibers apart in much the same way a rope becomes frayed. This type of injury is called a strain, and usually results in formation of scar tissue. Over time, strained tendons become thickened, bumpy, and irregular. Without rest and time for the tissue to heal, strained tendons can become permanently weakened. Damaged tendons can occur on either side of the elbow. When it happens on the outside of the elbow, which is most common, it is called tennis elbow.

Mechanism of tennis elbow pain:

The extracellular matrix of tendinosis tendons clearly differs from that of normal tendons. The normal tendon consists of connective tissue dominated by symmetrically organized collagen, water, proteoglycans and glycoproteins. The collagen and the proteins are produced by fibroblasts interspersed in the tissue. The normal tendon can withstand considerable tensile force and its strength is reinforced by intramolecular and intermolecular crosslinks. In tendinosis the collagen orientation is irregular, interspersed with calcifications, cartilage, fibrosis, hypervascularization and increased

innervation (Kingma, 2007). The proportion of collagen type I decreases, in favour of the less durable collagen type III. The fibroblasts of the normal tendon respond to stretching and deformation, known as mechano-transduction, with increased collagen turnover consisting of simultaneous synthesis and degradation, accompanied by release of tissue growth factors such as IGF, TGF and FGF along with inflammatory mediators such as prostaglandins, bradykinin, adenosine, IL-6 and IL (Kjaer, 2004). The increased matrix turnover results in a net synthesis of collagen in response to loading. This increase in tissue quantity and quality improves tissue strength and force transmission. In contrast, decreased levels of matrix metalloproteinases such as MMP-3, impair the matrix turnover in tendinosis. The tendinosis tissue also seems to respond to loading with exaggerated production of prostaglandins (Kjaer, 2005). In addition, there are reports in tendinosis of increased levels of neuropeptides such as glutamate, substance P, along with NMDA and neurokinin 1 receptors in the affected tissue, which may be part of peripheral sensitization. (Ljung,et al., 2004; Andersson, et al., 2008 & Alfredson, et al., 2001). The fibroblasts in tendons are supported by a pool of tendon stem cells (TSC) that differentiate into fibroblasts in response to stretching or deformation. Interestingly, over-stretch of TSC and high levels of prostaglandin E2 both result in differentiation of TSC into bone, fat and cartilage cells rather than fibroblasts (Zhang, et al., 2010). This may be part of the pathophysiological explanation for the degenerative findings in tendinosis. An acute inflammatory process attracts angiogenesis along with nerve sprouting (Hoe-Hansen, 2001; Alfredson, ey al., 2003). Related to release of growth factors such as vascular endothelial growth factor which, in the normal healing process, subsides over time. A halted inflammatory process, as suggested by the impaired matrix turnover

hypothesis, may explain why the tendinosis-affected tendon contains elements of hypervascularity and hyperinnervation (Hoe-Hansen, 2001).

Causes of tennis elbow pain:

Whilst tennis elbow is the name given to this condition, most cases occur from activities unrelated to tennis. In tennis, the backhanded hitting is the cause of pain with shockwaves from an inappropriate backhand swing being transmitted up the muscle into the tendon. More commonly, this condition occurs as a work-related injury and may also occur with golf. In occupations such as labouring jobs, bricklayers, typists and keyboard operators, the cause of this is almost certainly repetitive overuse of the muscle associated with a continuous straining that does not allow time for healing (White, 2006).

Anatomy of elbow joint:

Malagelada, et al., (2014) stated that, the elbow is a complex joint consisting of three articulations: the humeroulnar, the humeroradial, and the proximal radioulnar joints. Although it is not a weight-bearing joint, it can be subjected to high loads when practicing racket or throwing sports, or in gymnastics. As a consequence of these continued sport activities, stability structures of the elbow can result affected. Elbow stability is provided by static and dynamic constraints. Static constraints or passive elbow stabilizers include the osteoarticular anatomy, the medial and lateral collateral ligament complexes, and the capsule. Dynamic constraints or active elbow stabilizers are the muscles that cross the elbow joint. Elbow joint is a joint made up of three bones: your upper arm bone (humerus)and the two bones in your forearm (radius and ulna). There are bony bumps at thebottom of the humerus called epicondyles. The

bony bump on the outside (lateralside) of the elbow is called the lateral epicondyle.Muscles, ligaments, and tendons hold the elbow joint together.Lateral epicondylitis, or tennis elbow, involves the muscles and tendons of yourforearm. Forearm muscles extend wrist and fingers. Forearm tendons— often called extensors — attach the muscles to bone. They attach on the lateralepicondyle. The tendon usually involved in tennis elbow is called the ExtensorCarpi Radialis Brevis (ECRB).

Clinical features of tennis elbow pain:

Lateral epicondylitis has an annual incidence of 1-3% within the general population (Wright, 2008). The difference between men and women on lateral epicondylitis is still controversial. Patients with lateral epicondylitis are typically 35 to 54 years. It's less common in people under 30 years. Symptoms last, on average, from 6 months to 2 years. 89% of the patients recover within 1 year without any treatment except perhaps avoidance of the painful movements. (Wright JG, 2008), (Cyriax & Smidt, 2010) Patients often report weakness in their grip strength or difficulty carrying objects in their hand, especially with the elbow extended. They have complaints of pain just distal to and localized tenderness over the lateral epicondyle. Patients will commonly have pain with palpation of the lateral epicondyle, resisted wrist, or second or third finger extension (Cozen's sign). (Bisset, 2010).

Diagnosis:

A positive sign is tenderness to palpation at the anterior epicondyle Cozen's sign: The patient is positioned with the upper extremity relaxed. The examiner stabilizes the patient's elbow with one hand and the patient is instructed to make a fist, pronate the forearm, and radially deviate the wrist. At last, the patient is instructed to extend the wrist against resistance that is provided by the examiner. An altenative is resisted

extension of the middle finger that can cause pain at the extensor carpi radialis brevis origin. The test is positive if the patient experiences a sharp, sudden, severe pain over the lateral epicondyle. Chair test: The patient grasps the back of the chair while standing behind it and attempts to raise it by putting their hands on the top of the chair back. Pain reproduction at the lateral epicondyle is a positive test. Mill's Test: The patient is positioned in standing with the upper extremity relaxed at side and the elbow extended. The examiner passively stretches the wrist in flexion and pronation. Pain at the lateral epicondyle or proximal musculotendinous junction of wrist extensors is positive for lateral epicondylitis. The coffee cup test (by Coonrad and Hooper) where picking up a full cup of coffee is painful (Cooper, 2006 & Bhargava, 2010).

Management:

Physical therapy:

There are different types of therapies to treat lateral epicondylitis, all with the same aim: reduce pain and improve function**.** The study of Nagrale et al., (2009), demonstrate that Cyriax physiotherapy is a better treatment compared to phonophoresis and exercise for treating lateral epicondylalgia. The cyriax physiotherapy group had significantly better scores for all measurements at follow up ($p<0.05$). (Mit & Nagrale, 2009) demonstrate that supervised exercise program may be the first treatment in managing tennis elbow in comparison to Cyriax physiotherapy. Much more studies should be done to prove the evidence of using manual treatment like Cyriax physiotherapy (Rajadurai et al., 2012).Physical therapy interventions including elbow joint mobilization with movement combined with exercise has been shown to have better results than corticosteroid injection at 6 weeks and to wait and see at 6 weeks but not 52 weeks. Recent research regarding

cervicothoracic joint mobilization in conjunction with local treatment for lateral epicondylalgia has shown improvements in strength, pain, and tolerance to activity compared to local treatment alone. (Cleland et al., 2005)**.**Physical therapy management including only the use of ultrasound, massage, and exercise has been shown to be no better than a "wait and see" treatment method. Activity modification, when possible, can help prevent recurrent episodes of lateral epicondylalgia, as well as use of a counterforce brace as needed (Smidt et al., 2002).

Myofascial release:

Upper limb plays an important role in everyone's daily life and hand is the effectors organ of the upper limb which supports it mechanically and allows it to adopt the optional position for any given action from the functional point of view (Puranik, 2009). Among the upper limb conditions, tennis elbow is one of the most significantly occurred conditions (Jones, 2009). According to Ebnezar (2003), a painful elbow syndrome comprises lateral, medial and posterior elbow symptoms; among them the one significantly noticed is the lateral tennis elbow which results from repetitive stress. Lateral epicondylitis is a condition of chronic musculoskeletal pain state and dysfunction of the muscle system (Vicenzino, et al., 2003).

Lateral epicondylitis is a painful and debilitating musculoskeletal condition characterized by lateral elbow pain, impacts substantially on society and challenges the healthcare industry (Bisset, et al., 2005). Lateral epicondylitis or tennis elbow has been recognized for over 100 years and is an enthesopathy of the common extensor origin at the elbow (Crowther, et al., 2002). The name lateral epicondylitis came from the writer's cramp and first distinguished by Mr. Runge in 1873 (Sharath, 2005). The

term tennis elbow was introduced in 1882 by Morris, but the condition was described in detail by Momberg in 1910 (Zeisig, 2008).

In both developed and developing countries in the world, rheumatic diseases is one of the largest health problems. In Bangladesh, a study on prevalence of rheumatic diseases in the adult population showed that the prevalence of musculoskeletal complaints was 26.1% and the incidence of tennis elbow is 2.77% (Hasan et al., 2009).

Tennis elbow is the most commonly diagnosed elbow condition and affects about 1-3% of the population in Canada (Amro, et al., 2010). 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 percent in women with the age range between 42 to 46 years. The incidence of lateral elbow pain in general practice is four to seven per 1,000 persons per year in the United Kingdom, the Netherlands, and Scandinavia (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).

Tennis elbow affects 1% to 3% of the adult population (Shamsoddini, et al., 2010) and only 5% of people relate to tennis suffering from tennis elbow (Sharath, 2005). It is a misnomer, often seen in non tennis players, although elbow pain is found in up to 50% of tennis players, where tennis elbow is encountered in 75–80% of cases and the incidence in general practice is 4–7 per 1000 per year, with 15% of workers involved in highly repetitive jobs reporting the condition (Jones, 2009).

In the study of rehabilitation, tennis elbow is a frequently employed clinical model of

musculoskeletal pain (Shamsoddini, et al., 2010), treated by many physical therapists in a variety of clinical settings and the successful conservative treatment of lateral epicondylitis generally aims to relieve pain, control inflammation, promote healing, improve local and general fitness, and control force loads (Noteboom, et al., 1994).

According to Kesson & Atkin (1998), the term tennis elbow encompasses a strain of the wrist extensor muscles, found in their common extensor origin at the anterolateral aspect of lateral epicondyle of the humerus. Vicenzino & Wright (1995) stated many analogous terms of tennis elbow, such as lateral elbow pain, lateral epicondylitis, rowing elbow, tendonitis of the common extensor origin, and peritendonitis of the elbow. Sharath (2005) suggested that, it is a pathological condition that commonly involves the tissue at tendinous origin of extensor carpi radialis brevis (ECRB), characterized by repetitive microtear and fibrosis and is also seen in the musculotendinous structure of the extensor carpi radialis longus (ECRL), extensor carpi ulnaris (ECU) and extensor digitorum communis (EDC).

Cyriax (1936) have classified tennis elbow on the basis of severity as follows- acute, following indirect trauma, where the disability results from an acute pain. The second type is subacute, which is the typical variety with gradual onset followed by vigorous exercise with the arm. The third one is chronic occupational type and one or more months may be required for full development. Another type is tennis elbow following direct trauma, which is not so common and the severity of which resembles the chronic variety. Kesson & Atkin (1998) discusses four types of tennis elbow according to the site of involvement - Type 1: inflammation at the supracondylar

ridge. Type 2: tenoperiosteal junction.Type 3: body of the tendon. Type 4: muscle belly. Among these types, type 2 is the most disabling variant and occurs frequently.

Alam (2008) stated that the commonest causative factor is found at over-use of elbow or repetitive concentric and eccentric contractions of the extensor muscles, which results biomechanical positional fault as a consequences of chronic overload of repetitive stresses (heavy lifting, repetitive hammering, scissoring, twisting, and in tennis players with backhand stroke & inadequate forearm extensor power and endurance). According to Zeisig (2008), microtrauma can occur due to fatigue after repetitive loads and can even occur if the loads are within the strength limits. Puranik (2009) stated that the possible etiologies are inflammation of the radial humeral bursa, synovium, periosteum and the annular ligament. Hutson (2001) reported that, in case of tennis players overload relates to the shake frequency, incorrect technique, particularly on the backhand and muscle imbalance or loss of flexibility.

Mackay, et al. (2003) also found the link of lateral epicondylis with chronic overuse injuries and Zeisig (2008) proposed that the mechanism of overuse injury accentuates from cumulative microtrauma that involves and weakens the structural and vascular elements of the tendon. Shamsoddini, et al, (2010) suggested that the basic pathological process involves the origin of common extensor tendon. Thomson, et al, (1932) stated that tearing at the tendon followed by production of inflammatory exudates results excessive fibrin formation that develops formation of fibrous tissue adhesion and finally results pain on being stretched and impairment of function.

Thomas (2010) stated that the symptoms of tennis elbow encompass various deformities and inflammations of the tissues and bones comprising the structure of elbow. Noteboom et al (1994) proposed that the anterior aspect of the lateral epicondyle and the lateral forearm exhibits significant tenderness. Zeisig (2008) have suggested that the most painful position is with straight elbow, and the second most painful position is maximal flexion of elbow, pain increases during gripping activities.

Brukner & Khan (1993) stated that the onset of pain may be acute or gradual. Stasinopoulos & Johnson (2004) stated that the pain, decreased grip strength and difficulties in activities of daily living are the common complaints. Zeisig (2008) proposed that stiffness may appear after remaining the elbow in one position for a prolong period of time, especially after sleeping or carrying load.

Mackay et al (2003) suggested that tennis elbow is generally diagnosed on clinical grounds and it is important to establish a robust, objective diagnosis for the management of tennis elbow properly. Vicenzino et al (2003) stated that the condition lateral epicondylitis is simple to identify with the key physical examination features that are reproduction of pain on direct palpation over the lateral epicondyle and pain provocation tests of forearm extensor muscle function. The two outcome measures that are frequently used and positive in the majority of cases are pressure pain thresholds and pain-free grip strength.

There are several special tests for diagnosing tennis elbow, such as cozen test, Mills test, middle finger extension test (Magee, 1987) resisted wrist extension test (Ebnezar, 2003), resisted radial deviation test, palpation test (Kesson & Atkin, 1998).

According to Hutson (2001), routine radiology or other forms of imaging is not so necessary, although radiographs may show faint calcification in the tendon in 7% of the cases and clinical ultrasound may be useful before surgery is considered.

Vicenzino & Wright (1995) present that it is a challenge to the clinician to treat tennis elbow, because many of the commonly used treatments are not supported by research. Jones (2009) stated that, a large number of treatments including physiotherapy have been proposed in respect of lack of understanding regarding its aetiology. Up to 30% of patients with tennis elbow are referred to physiotherapy in their primary care. Ebnezar (2003) divided the physiotherapy treatment for tennis elbow according to the acute and post acute phase. Amro et al (2010) have stated the traditional interventions, including NSAID, corticosteroid injection, cryotherapy in the acute stage, followed by heat in the more chronic stage, friction massage, rest, ultrasound (US), acupuncture, electrical stimulation, laser, counterforce bracing, shock wave therapy, lateral extensor release, progressive strengthening; and stretching exercise therapy. Dunkow et al, (2004) have suggested the initial treatment with rest, modification of activity, local splints, and steroid injection is effective enough for tennis elbow.

According to Zeisig (2008), as the symptoms become aggravated with activity, rest is an useful for pain relief. Corrigan & Maitland (1983) stated that, it is essential to explain to the patient that the condition is self-limiting over a long period of time and that other treatments will not often be helpful unless activity is curtailed. Ebnezar (2003) stated that an above elbow POP splint with elbow in 90 degree flexion and supination and the wrist in slight dorsiflexion is recommended for sound immobilization. According to Noteboom et al (1994), for both acute and chronic

phases of tennis elbow, cold application, either with ice massage, ice packs, or ethyl chloride spray is widely used.

Alam (2008) have stated that several authors have developed numerous manual therapy techniques for managing the cases of tennis elbow; procedure and indication of these different techniques vary with each author. According to Vicenzino, et al, (2007) Mulligan's Mobilization with Movement (MWM) produces its effects on tennis elbow by correcting positional faults of joints that occur as a result of injury or strain. Thomas (2010) claimed that deep transverse friction massage (DTFM) acts by mobilizing the soft tissues that acts by releasing and stretching the impaired tissue causing dysfunction. Brosseau, et al. (cited in Thomas, 2010) did a study on deep transverse friction massage for treating tendinitis and found that DTFM is effective for promoting rehabilitation. According to Joshi & Kotwal (1999), Manipulation is effective in cases where active use of extensor muscles produces pain and Alam (2008) states Mills manipulation acts by rupturing the adhesions to elongate the scar tissue. Stasinopoulos & Johnson (2004) did a literature review that purposes to describe Cyriax approach, its effectiveness and use in the treatment of tennis elbow and claimed that deep transverse friction in combination with mills manipulation is successful enough for treating tennis elbow.

Joshi & Kotwal (1999) states that gentle effleurage and kneading massage during the first two weeks and friction massage after 2-3 weeks is greatly helpful for managing tennis elbow. According to Corrigan & Maitland (1983), mobilization technique is effective to regain normal range of motion in case of loss of full passive extension and accessory movements. According to Jones (2009), in about 21% of cases of tennis elbow, orthotic devices (For example, braces or epicondylar clasps) are prescribed.

Biomechanical effect of forearm bracing is to reduce stress by producing direct effect on the origin of extensor carpi radialis brevis and Noteboom et al (1994) suggested that tennis elbow strap or counterforce armband are the most commonly used braces. Thomson et al (1932) stated that strapping completely around the forearm is helpful in daily living activities as it acts by reducing stress on the common extensor tendon.

Myofascial release is a soft tissue mobilization technique. If condition is treated in the acute stage, then symptoms will be aggravated. If treated in the chronic stage, the symptoms will alleviate. Myofascial release techniques stem from the foundation that fascia, a connective tissue found throughout the body, reorganizes itself in response to physical stress and thickness along the lines of tension. By Myofascial release there is a change in the viscosity of the ground substance to a more fluid state which eliminates the fascia's excessive pressure on the pain sensitive structure and restores proper alignment and this has been clarified by Suman, Khatri and Jeba (2009).

Guimberteau (2008) stated that Myofascial Release is a safe and very effective hands-on technique that involves applying gentle sustained pressure into the Myofascial connective tissue restrictions to eliminate pain and restore motion. In the word "Myofascial," "myo" refers to muscle and "fascia" is a continuous layer of connective tissue that spreads throughout the body. Fascia is like a three-dimensional web that extends from head to foot and protectively surrounds every muscle, bone, nerve, blood vessel, and organ in the body. A good way to envision fascia is to imagine slicing a grapefruit in half. After removing the fruit from the rind, it is easy to see all of the individual compartments that are left. These translucent walls give shape and definition to the object. Fascia in our bodies acts very similar to these compartment walls.

CHAPTER-III METHODOLOGY

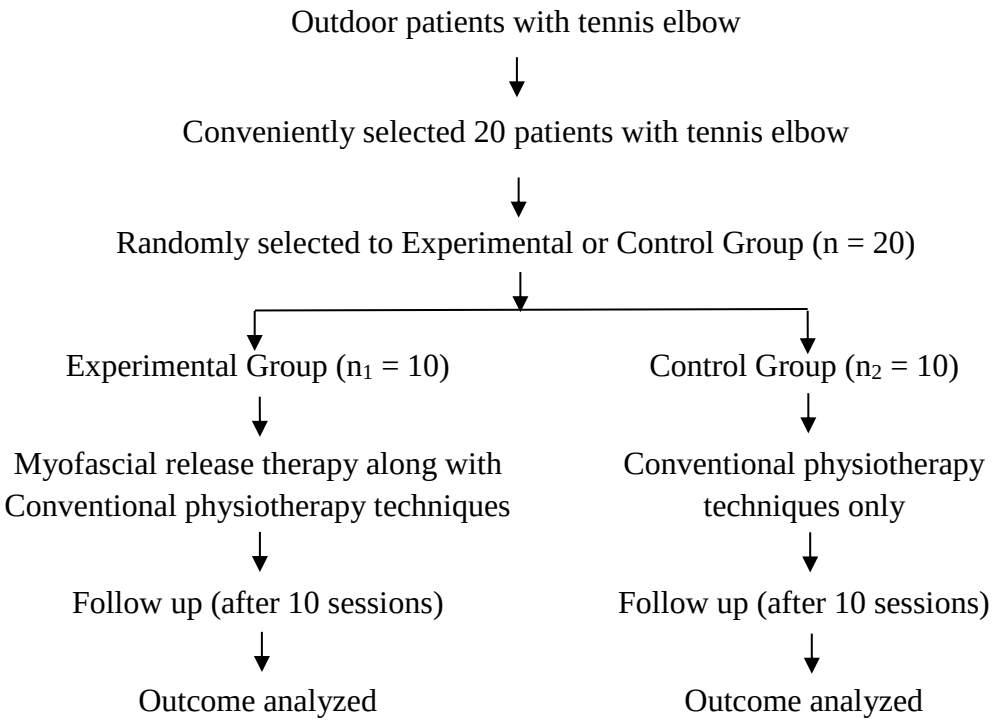
3.1 Study design

The study was conducted by using Randomized Control Trial (RCT). From the outdoor musculoskeletal unit patient with tennis elbow, 20 tennis elbow patients was randomly selected and then 10 patients with tennis elbow was randomly assigned to myofascial release therapy along with conventional physiotherapy group and 10 patients with tennis elbow to the only conventional physiotherapy group for this randomized controlled trial study. The study was a single blinded study which was conducted at musculoskeletal department of CRP, Savar, Dhaka. 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 x o (control group).

Depoy & Gitlin (2015) stated the design in the following way:

Trial Group	:	r	O_1	X_1	O_2
Control Group	:	r	O_3	X_2	O_3

Flow-chart of the phases of Randomized Controlled Trial



3.2 Study Area

The study was conducted in one setting. One setting is musculoskeletal department of CRP, Savar. This setting is specialized for musculoskeletal physiotherapy.

3.3 Study Period:

This study was conducted from October 2015 to May 2016.

3.4 Study population and sample

20 patients with tennis elbow was collected using convenience sampling from the outdoor physiotherapy department of Centre for the Rehabilitation of the Paralyzed (Savar). When the sample was collected they were given a numerical number such as 1, 2, 3, 4, etc. after worth researcher randomly was selected the odd number samples

and even number samples for the control and experimental group. Total 20 samples included in this study among them 10 patients for the experimental group (Received Myofascial release and conventional physiotherapy) and rest 10 patients for control group (Only conventional physiotherapy). 'Random assignment improves internal validity of experimental research' (Hicks 1997, p.46).

3.5 Sampling Technique

Simple random sampling technique was used of this study. 20 patients with tennis elbow pain who met the inclusion criteria selected conveniently from outpatient musculoskeletal unit of physiotherapy department of CRP, Savar, Dhaka. All the participants had an equal probability of assignment to any of two groups and then 10 patients was randomly assigned to trial group comprising of treatment approaches of myofascial technique combined with conventional physiotherapy techniques and 10 patients to the Control group was treated with only the conventional physiotherapy techniques for this study. The study was a single blinded technique. After the completion of sampling technique, the researcher was randomly assigned the participants into trial group and control group, because it improves internal validity of the thesis. In this study patients was blinded, in group allocation. The samples was given numerical number C_1, C_2, C_3 etc. for the control group and E_1, E_2, E_3 etc. for trial group.

3.6 Inclusion criteria

- Age group(14-60 year)
- Both sex
- Any tennis elbow pain patient with dysfunction.
- Tennis elbow pain in local tenderness.
- Patients who were willing to participate.

3.7 Exclusion criteria

- Patients with clinical disorder where Myofascial Release is contraindicated such as infective conditions of shoulder, dermatitis, malignancy,
- Diagnosis of tumor, fracture and osteoporosis.
- Surgery to the shoulder or elbow joint.

3.8. Data Processing

3.8.1 Data Collection Tools

- Record or Data collection form
- Informed Consent
- Structured questionnaire
- Papers, pen, and pencil

3.8.2 Measurement Tools

- 10 cm numeric Pain Rating Scale for measuring pain intensity in resting position
- Universal Goniometer to measure active range of motion in elbow joint.
- Manual muscle testing technique by using OXFORD muscle grade scale to assess the muscle strength of elbow joint.
- 100 point patients rated tennis elbow evaluation scale use, to measure the disability status, among patients with tennis elbow pain.

3.8.3 Data Collection Procedure

The study procedure was conducted through assessing the patient, initial recording, treatment and final recording. After screening the patient at the department, the patients was assessed by a graduate physiotherapist. 10 sessions of treatment was provided for every subject. The researcher divided all participants into two groups and was coded C_1, C_2, C_3, C_4, C_5 etc. for control group and E_1, E_2, E_3, E_4, E_5 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 and patient rated tennis elbow evaluation scale from. The same procedure was performed to take post-test at the end of 10 sessions of treatment. Researcher was provided the assessment form to each subject before starting treatment and after 10 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.

3.8.4 Duration of data collection

Within six weeks the researcher conducted research with the participant and collected data carefully.

3.9 Data Analysis

Statistical analysis was performed by using statistical package for social science (SPSS) version 20.

3.9.1 Statistical Test

For the significance of the study, a statistical test was carried out. Statistical analysis refers to the well-defined organization and interpretations of the data by systemic and mathematical procure and rules (DePoy & Gitlin, 2015).The Mann-Whitney *U*-test had done for the analysis of the reduction of pain after ten session treatment of both control and trial groups. Range of motion, muscle strength and neck disability scale was analyzed by unrelated *t* test.

The formula of Mann-Whitney *U*-test:

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

n_1 = The number of the subjects in trail group

n_2= The number of the subject in control group

n_x= The number of the subjects of the group with larger rank total

T_x= The larger rank total

3.9.2. Level of Significance

In order to find out the significance of the study, the "*p*" value was calculated. The *p* values refer to 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 level, the results are said to be significant.

3.9.3. Ethical Issues

The whole process of this research project was done by following the Bangladesh Medical Research Council (BMRC) guidelines and World Health Organization

(WHO) Research guidelines. The proposal of the dissertation including methodology was presented to the Institutional Review Board (IRB). Then the proposal of the dissertation including methodology was approved and obtained permission from the concerned authority of ethical committee of Bangladesh Health Professions Institute (BHPI). Again before beginning the data collection, researcher was obtaining the permission from the concerned authorities ensuring the safety of the participants. The researcher strictly maintain the confidentiality regarding participant's condition and treatments. The researcher was obtaining consent to participate from every subject. A signed informed consent form was received from each participant. The participants was informed that they have the right to meet with outdoor physiotherapist if they think that the treatment is not enough to control the condition or if the condition become worsen. The participants was 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 were not affect their treatment in the physiotherapy department and they still had got the same facilities. Every subject would have the opportunity to discuss their problem with the senior authority or administration of CRP and have any questioned answer to their satisfaction.

3.10 Treatment Regime:

Six physiotherapists who are expert in treatment of musculoskeletal patient will be involved in treatment of patients. All the physiotherapists have the experience have more than five years, in the aspect of musculoskeletal physiotherapy. Among them three were male, and rest of three were female physiotherapist. Researcher was arrangingin service training to share the information. To practical demonstration regarding myofacial release including procedure, dose, intensity, frequency, repetition

and patient position. In addition the types, dose repetition, duration of conventional care including manual therapy, exercise therapy and elelctrotherapy was taken permission from head of Physiotherapy department, centre for the rehabilitation of the paralyzed (CRP).

A. Control Group:

a) Conventional physiotherapy techniques.

i. Manual therapy:

- Maitland Mobilization Grade-I,II, medial glide and lateral glide was used for reducing pain and improve soft tissue flexibility. 10 repetitions in each set, and total three sets.
- Mills manipulation was used away from the painful site. Three manipulation at a time with one minute rest, between each manipulation.

ii. Exercise therapy:

- Active elbow ROM exercises 10 repetitions in each direction with in pain free range.
- Stretching exercise at the point of tightness, and 5 second hold in one set, and total two sets at a time, and two munities rest between sets.
- Isometric elbow flexor strengthening exercise at initiated with 80% of maximum force with ten repetitions in each directions, and two munities rest between stating of new direction.

iii. Electro therapy:

- Ultrasound therapy for chronic tennis elbow pain with continuous mode for five to seven munities.

iv. Patients education and home advice:

- Counseling patient about this condition, anticipated type of recovery, avoiding the predisposing factors and home exercise including Stretching exercise, active ROM exercises. All home exercises were advised to perform 5 times per week.

B. Trial Group:

a) Conventional physiotherapy techniques plus

b) Myofascial release to pectoralis major muscle in which patient in supine lying. And expert physiotherapist was applied Myofascial release to pectoralis major muscle, 5 repetitions in one set, and total two sets at a time with two minutes rest between sets.

c) Myofascial release to biceps brachi muscle in which patient in supine lying. And expert physiotherapist was applied Myofascial release to biceps brachi muscle, 5 repetitions in one set, and total two sets at a time with two munities rest between sets.

d) Myofascial release to anterior aspect of latissimus dorsi in which patient in supine lying. And experienced physiotherapist who was working CRP for 5 years they were applied Myofascial release to latissimus dorsi muscle, 5 repetitions in one set, and total two sets at a time with two minutes rest between sets.

CHAPTER-IV RESULTS

Initially in the research, 20 patients were enrolled in the study. Among them, 10 in the Myofascial Release (Biceps brachi, latissimus dorsi, pectoralis major) with conventional treatment group (experimental group) and 10 in the only conventional treatment group (control group). The whole subject of both experimental and control group scored their pain on numeric pain rating scale, muscle power in OXFORD grade scale, range of motion in goniometer, disability in patient rated tennis elbow disability questionnaires before and after completing treatment.

Socio-Demographic Information

Table– 1 Age of the participants

Experimental Group		**Control Group**	
Subjects	**Age (Years)**	**Subjects**	**Age (Years)**
E1	41	C1	60
E2	65	C2	35
E3	65	C3	34
E4	60	C4	25
E5	31	C5	50
E6	54	C6	30
E7	14	C7	35
E8	21	C8	40
E9	45	C9	30
E10	24	C10	37
Mean Age	**42 years**	**Mean Age**	**37.6 years**

Mean age of the participants of experimental and control group

From the above mentioned table, it is obvious that mean age of participant in control group was 37.6 years and experimental group was 42 years age on average (Figure-1).

Figure – 1 Age Range of the Participants

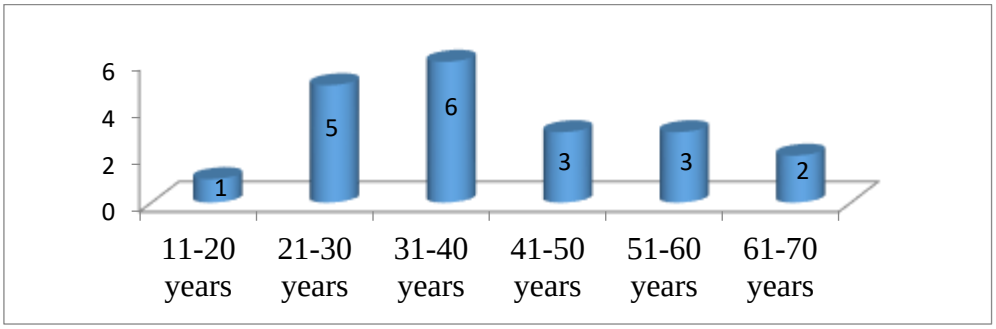
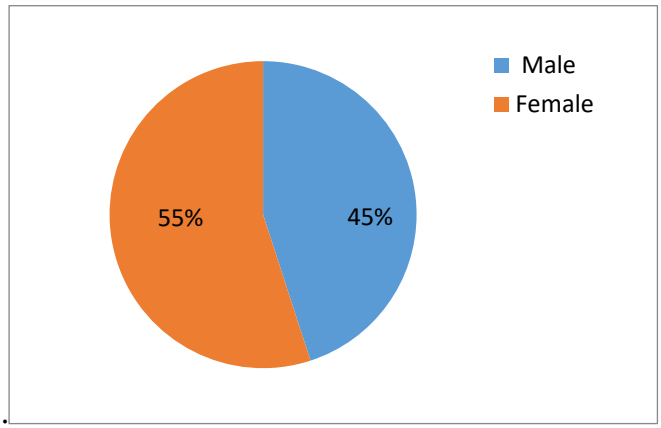


Table – 2 Gender of the participants

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	9	45.0	45.0	45.0
Female	11	55.0	55.0	100.0
Total	20	100.0	100.0	

From the above mentioned table, it is obvious that sex of participant in experimental and control group was male 45% and female 55% (Figure-2)

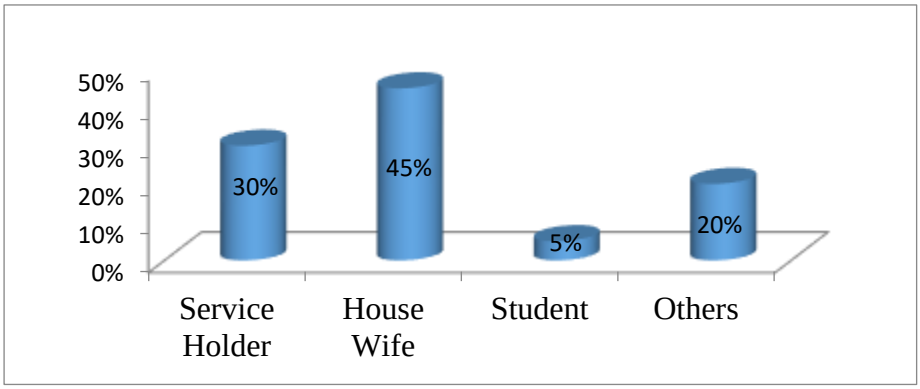
Figure – 2 Gender of total participants



Table–3. Occupation of the participants

	Frequency	Percent	Valid Percent	Cumulative Percent
Service holder	6	30.0	30.0	30.0
House wife	9	45.0	45.0	75.0
Student	1	5.0	5.0	80.0
Others	4	20.0	20.0	100.0
Total	20	100.0	100.0	

Figure–3 Occupation of the participants

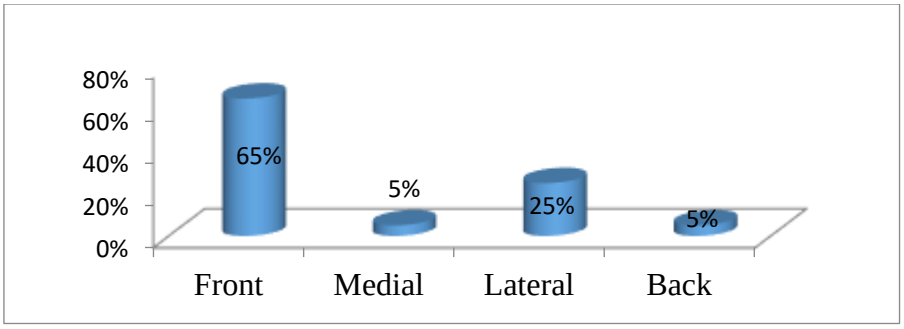


Table–4 :Part of elbow pain

	Frequency	Percent	Valid Percent	Cumulative Percent
Front	13	65.0	65.0	65.0
Medial	1	5.0	5.0	70.0
Lateral	5	25.0	25.0	95.0
Back	1	5.0	5.0	100.0
Total	20	100.0	100.0	

From the above mentioned table, it is obvious that 65%participant's pain in front, 5% participant's pain in medial, 25% participant's pain inlateral, and 5% participant's pain in back (Figure-4).

Figure – 4 Part of elbow pain



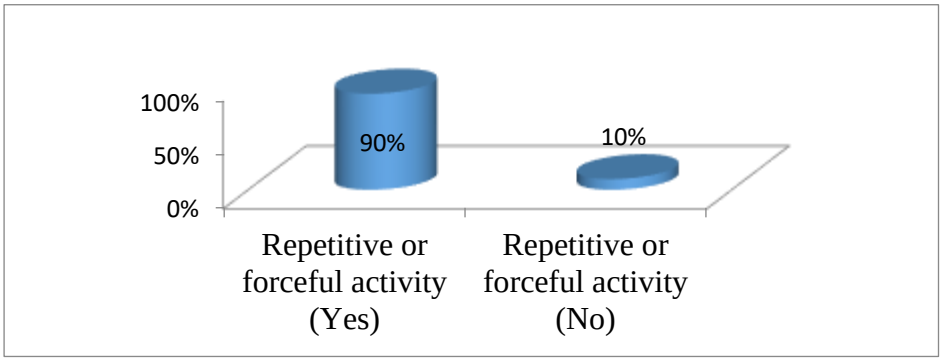
Repetitive or forceful activity:

Table–5 Repetitive or forceful activity

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	18	90.0	90.0	90.0
No	2	10.0	10.0	100.0
Total	20	100.0	100.0	

From the above mentioned table, it is obvious that 90% of participant's was do repetitive or forceful activity, and 10% of participants were do not repetitive or forceful activity (Figure-5).

Figure – 5 Repetitive or forceful activity

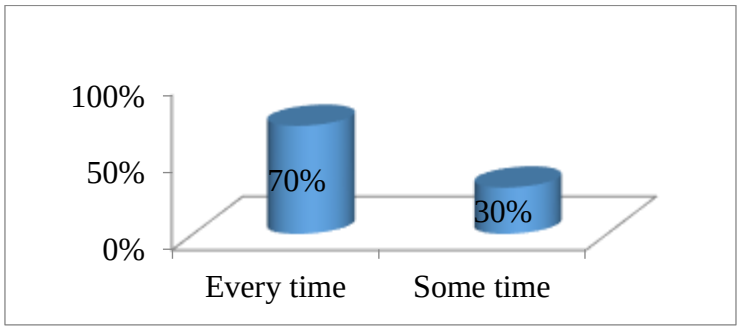


Table–6 Nature of pain

	Frequency	Percent	Valid Percent	Cumulative Percent
Every time	14	70.0	70.0	70.0
Some time	6	30.0	30.0	100.0
Total	20	100.0	100.0	

From the above mentioned table, it is obvious that 70% of participant'spain was in constant nature, and 30% of participant's pain was intermittent nature.(Figure-5).

Figure – 6 Nature of pain



Estimate Pain Status:

Comparisons of changes of pain on Numeric pain rating scale at rest between experimental and control group

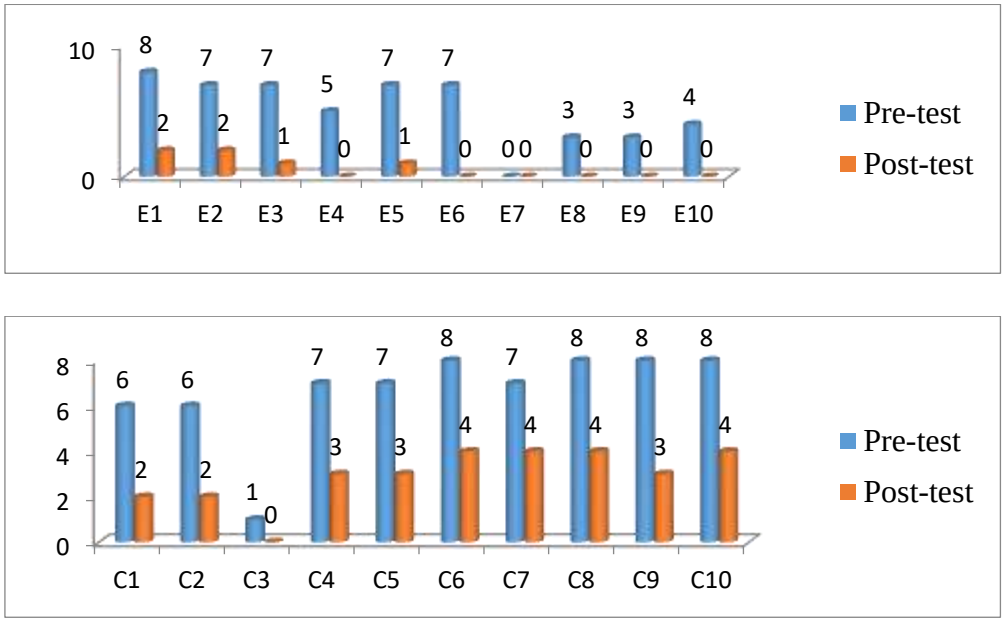
Table –7 Comparisons of changes of pain on Numeric pain rating scaleat rest between experimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**8**	**2**	**6**	**C1**	**6**	**2**	**4**
E2	**7**	**2**	**5**	**C2**	**6**	**2**	**4**
E3	**7**	**1**	**6**	**C3**	**1**	**0**	**1**
E4	**5**	**0**	**5**	**C4**	**7**	**3**	**4**
E5	**7**	**1**	**6**	**C5**	**7**	**3**	**4**

E6	**7**	**0**	**7**	**C6**	**8**	**4**	**4**
E7	**0**	**0**	**0**	**C7**	**7**	**4**	**3**
E8	**3**	**0**	**3**	**C8**	**8**	**4**	**4**
E9	**3**	**0**	**3**	**C9**	**8**	**3**	**5**
E10	**4**	**0**	**4**	**C10**	**8**	**4**	**4**
Mean	**5.1**	**0.6**	**4.5**	**Mean**	**6.6**	**2.9**	**3.7**

In this study,pre-test mean score of pain on Numeric pain rating scale at resting position was 5.1 in experimental group, 6.6 among control group. On post testscore after treatment showed that pain on Numeric pain rating scale had reduced in both groups (Figure-7). Above table shows us that in experimental group mean differences within subject was 4.5 whereas in control group mean differences within subject was 3.7

Figure – 7 Comparisons of changes of pain on Numeric pain rating scaleat rest between experimental and control group



Reduction of pain in resting position, experimental and control group

Comparisons of changes of pain on Numeric pain rating scale during forceful wrist extension between experimental and control group

Table – 8 Comparison of changes of pain on Numeric pain rating scaleduring forceful wrist extensionbetween experimental and control group

Experimental Group				**Control Group**			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**9**	**3**	**6**	**C1**	**8**	**3**	**5**
E2	**8**	**3**	**5**	**C2**	**9**	**3**	**6**
E3	**8**	**2**	**6**	**C3**	**6**	**2**	**4**
E4	**8**	**2**	**6**	**C4**	**9**	**4**	**5**
E5	**8**	**2**	**6**	**C5**	**9**	**4**	**5**
E6	**9**	**1**	**8**	**C6**	**7**	**3**	**4**
E7	**5**	**0**	**5**	**C7**	**9**	**4**	**5**
E8	**9**	**1**	**8**	**C8**	**7**	**3**	**4**
E9	**7**	**1**	**6**	**C9**	**9**	**4**	**5**
E10	**8**	**1**	**7**	**C10**	**7**	**4**	**3**
Mean	**7.9**	**1.6**	**6.3**	**Mean**	**8**	**3.4**	**4.6**

In this study, pre-test mean score of pain on Numeric pain rating scale at during forceful wrist extensionwas 7.9 in experimental group, 8among control group. On

post testscore after treatment showed that pain on Numeric pain rating scale had reduced in both groups (Figure-8). This table shows us that in experimental group mean differences within subject was 6.3 while in control group mean differences within subject was 4.6

Figure – 8 Reduction of pain scaleduring forceful wrist extension, experimental and control group

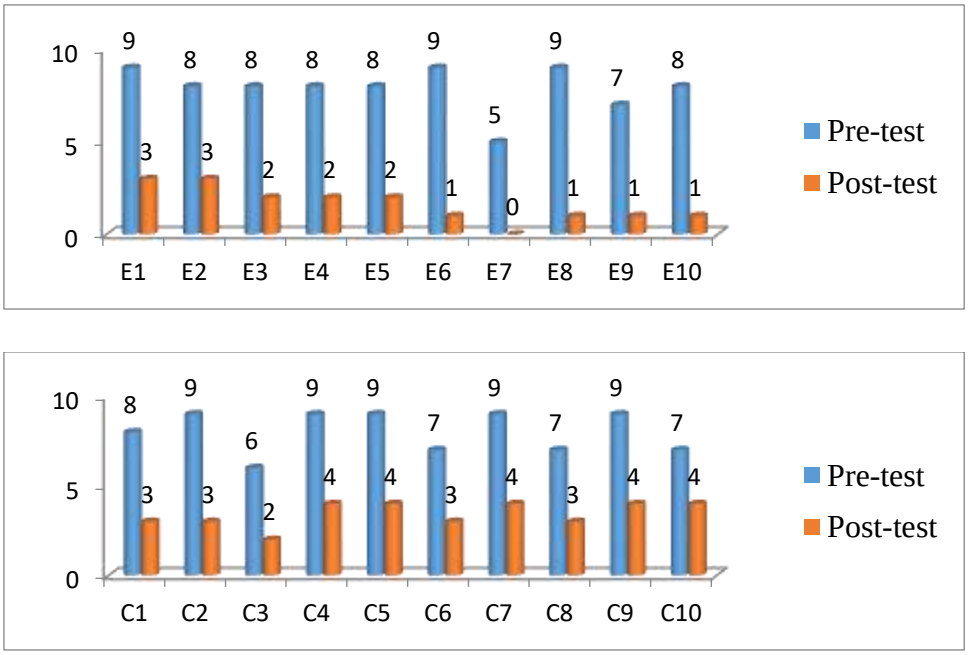


Table – 9 Comparisons of changes of pain on Numeric pain rating scale during a strong grasp between experimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**8**	**2**	**6**	**C1**	**8**	**2**	**6**
E2	**7**	**2**	**5**	**C2**	**8**	**3**	**5**
E3	**6**	**1**	**5**	**C3**	**5**	**1**	**4**
E4	**9**	**2**	**7**	**C4**	**8**	**3**	**5**
E5	**5**	**0**	**5**	**C5**	**8**	**2**	**6**
E6	**8**	**1**	**7**	**C6**	**7**	**3**	**4**
E7	**5**	**0**	**5**	**C7**	**8**	**4**	**4**
E8	**7**	**1**	**6**	**C8**	**9**	**4**	**5**
E9	**7**	**1**	**6**	**C9**	**7**	**3**	**4**
E10	**7**	**1**	**6**	**C10**	**7**	**3**	**4**
Mean	**6.9**	**1.1**	**5.8**	**Mean**	**7.5**	**2.8**	**4.7**

In this study, pre-test mean score of pain on Numeric pain rating scale at during a strong grasp was 1.1 in experimental group, 2.8among control group. On post testscore after treatment showed that pain on Numeric pain rating scale had reduced in both groups (Figure-9). This table shows us that in experimental group mean differences within subject was 5.8 although in control group mean differences within subject was 4.

Figure – 9 Reduction of pain scalеduring astrong grasp, experimental and control group

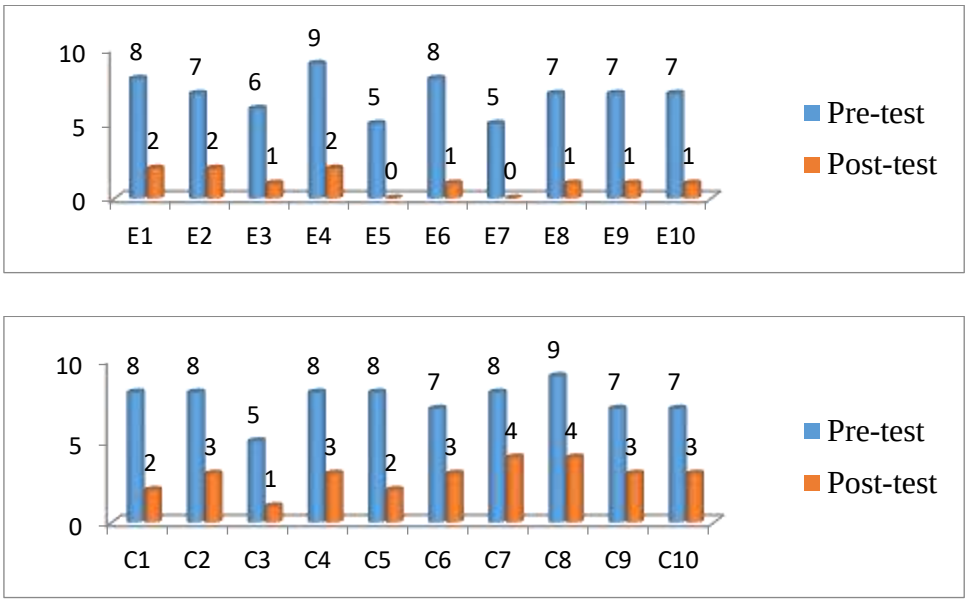


Table – 10 Comparisons of changes of pain on Numeric pain rating scale during doing a task with repeated arm movement between experimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**8**	**2**	**6**	**C1**	**9**	**3**	**6**
E2	**8**	**2**	**6**	**C2**	**7**	**4**	**3**
E3	**7**	**1**	**6**	**C3**	**6**	**1**	**5**
E4	**10**	**1**	**9**	**C4**	**9**	**4**	**5**
E5	**6**	**1**	**5**	**C5**	**9**	**3**	**6**
E6	**7**	**1**	**6**	**C6**	**7**	**3**	**4**
E7	**5**	**0**	**5**	**C7**	**8**	**3**	**5**
E8	**7**	**1**	**6**	**C8**	**8**	**4**	**4**
E9	**7**	**1**	**6**	**C9**	**8**	**4**	**4**
E10	7	**1**	**6**	**C10**	**8**	**4**	**4**
Mean	**7.2**	**1.1**	**6.1**	**Mean**	**7.9**	**3.3**	**4.6**

In this study, pre-test mean score of pain on Numeric pain rating scale at during doing a task with repeated arm movement was 1.1 in experimental group, 3.3among control group. On post testscore after treatment showed that pain on Numeric pain rating scale had reduced in both groups (Figure-10). This table shows us that in experimental group mean differences within subject was 6.1although in control group mean differences within subject was 4.6

Figure – 10 Reduction of pain scaleduringdoing a task with repeated arm movement, experimental and control group

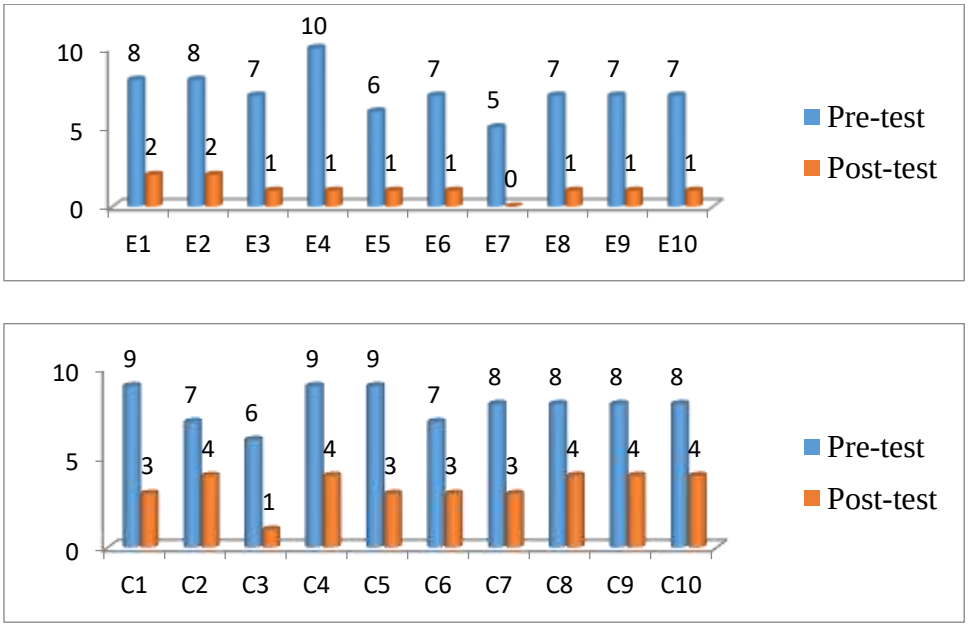


Table – 11 Comparisons of changes of pain on Numeric pain rating scale during making a fist with pronation of forearm, and radial deviation and extension of wrist while the examiner resists the motion (cozen test) between experimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**8**	**2**	**6**	**C1**	**9**	**3**	**6**
E2	**8**	**2**	**6**	**C2**	**8**	**4**	**4**

E3	**6**	**1**	**5**	**C3**	**7**	**2**	**5**
E4	**9**	**1**	**8**	**C4**	**8**	**3**	**5**
E5	**6**	**1**	**5**	**C5**	**7**	**2**	**5**
E6	**8**	**2**	**6**	**C6**	**8**	**3**	**5**
E7	**2**	**0**	**2**	**C7**	**9**	**3**	**6**
E8	**8**	**1**	**7**	**C8**	**9**	**4**	**5**
E9	**7**	**1**	**6**	**C9**	**9**	**4**	**5**
E10	**8**	**2**	**6**	**C10**	**8**	**4**	**4**
Mean	**7**	**1.3**	**5.7**	**Mean**	**8.2**	**3.2**	**5**

In this study, pre-test mean score of pain on Numeric pain rating scale at during cozen test was 1.3 in experimental group, 3.2among control group. On post testscore after treatment showed that pain on Numeric pain rating scale had reduced in both groups (Figure-11). This table shows us that in experimental group mean differences within subject was5.7however in control group mean differences within subject was 5

Figure – 11 Reduction of pain scale in cozen test, experimental and control group

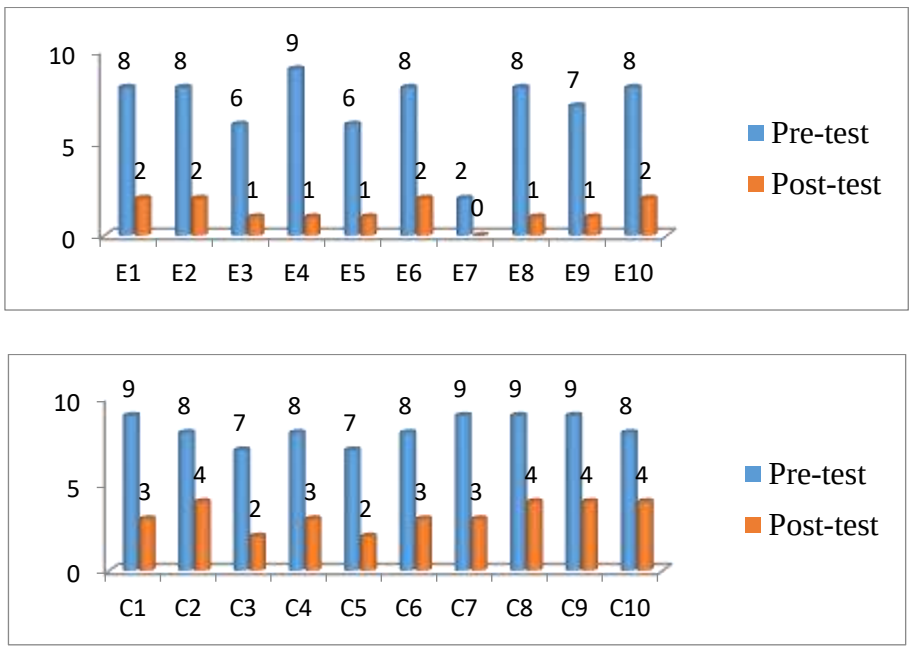


Table – 12:Comparisons of changes of pain on Numeric pain rating scale during forceful middle finger extension between experimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**8**	**2**	**6**	**C1**	**8**	**3**	**5**
E2	**7**	**3**	**4**	**C2**	**8**	**3**	**5**
E3	**8**	**1**	**7**	**C3**	**6**	**2**	**4**
E4	**9**	**1**	**8**	**C4**	**9**	**4**	**5**
E5	**7**	**1**	**6**	**C5**	**9**	**4**	**5**
E6	**8**	**1**	**7**	**C6**	**7**	**4**	**3**
E7	**2**	**0**	**2**	**C7**	**8**	**4**	**4**
E8	**8**	**1**	**7**	**C8**	**8**	**3**	**5**
E9	**7**	**0**	**7**	**C9**	**8**	**3**	**5**
E10	**6**	**1**	**5**	**C10**	**7**	**3**	**4**
Mean	**7**	**1.1**	**5.9**	**Mean**	**7.8**	**3.3**	**4.5**

In this study, pre-test mean score of pain on Numeric pain rating scale at during forceful middle finger extension was 1.1 in experimental group, 3.3among control group. On post testscore after treatment showed that pain on Numeric pain rating scale had reduced in both groups (Figure-12). This table shows us that in experimental group mean differences within subject was 5.9 while in control group mean differences within subject was 4.5

Figure – 12 Reduction of pain scale during forceful middle finger extension, experimental and control group

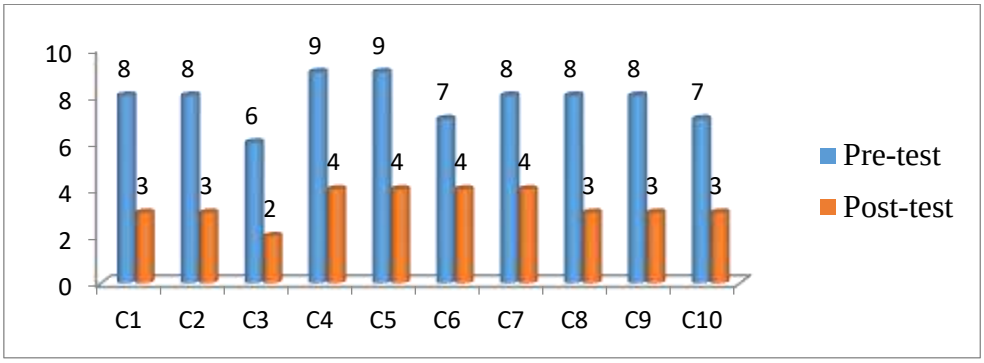


Table – 13 Comparisons of changes of pain on Numeric pain rating scale during Turn a doorknob or key or Open a jar between experimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**8**	**1**	**7**	**C1**	**7**	**2**	**5**
E2	**8**	**2**	**6**	**C2**	**7**	**3**	**4**
E3	**7**	**2**	**5**	**C3**	**4**	**2**	**2**
E4	**9**	**1**	**8**	**C4**	**8**	**3**	**5**
E5	**5**	**0**	**5**	**C5**	**7**	**3**	**4**
E6	**7**	**0**	**7**	**C6**	**8**	**4**	**4**
E7	**3**	**0**	**3**	**C7**	**8**	**4**	**4**
E8	**4**	**0**	**4**	**C8**	**9**	**4**	**5**
E9	**4**	**0**	**4**	**C9**	**8**	**4**	**4**
E10	**6**	**0**	**6**	**C10**	**8**	**4**	**4**
Mean	**6.1**	**0.6**	**5.5**	**Mean**	**7.4**	**3.3**	**4.1**

In this study, pre-test mean score of pain on Numeric pain rating scale at during turn a doorknob or key or Open a jarwas 0.6 in experimental group, 3.3 among control group. On post testscore after treatment showed that pain on Numeric pain rating scale had reduced in both groups (Figure-13). This table shows us that in experimental group mean differences within subject was 5.5 whereas in control group mean differences within subject was 4.1

Figure – 13 Reduction of pain scale during turn a doorknob or key or open a jar, experimental and control group

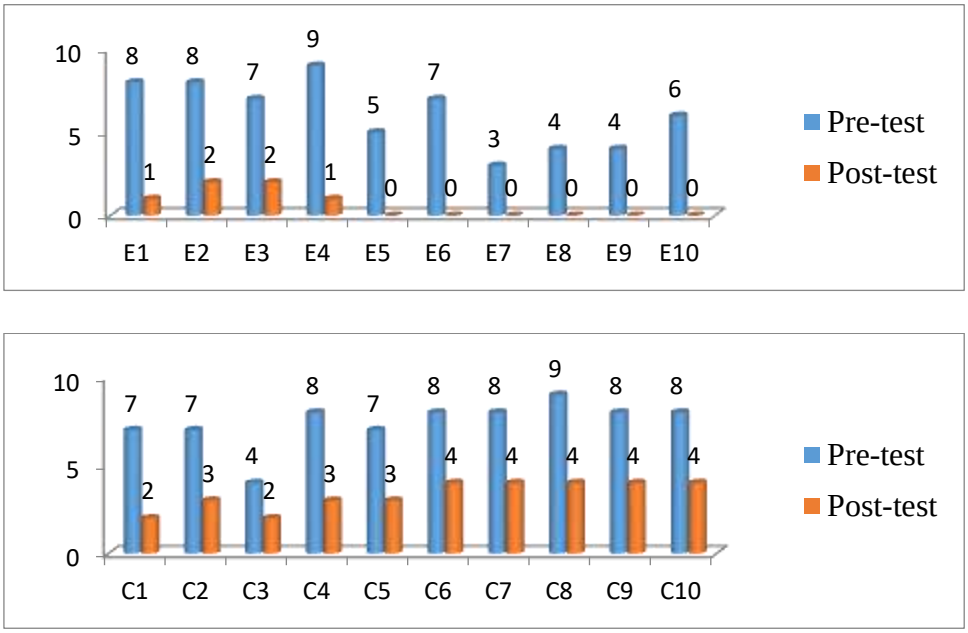
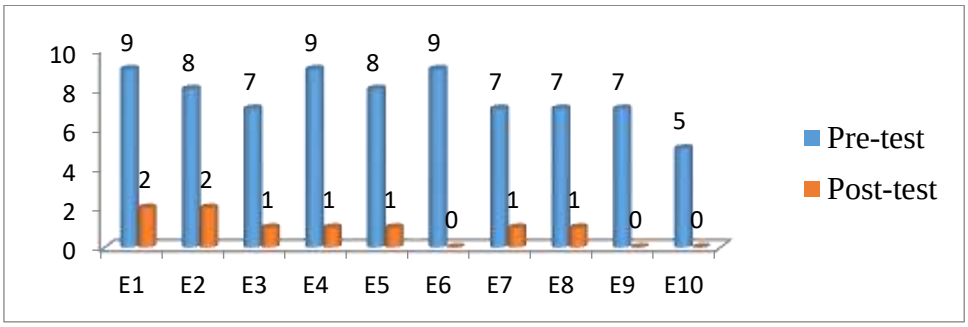


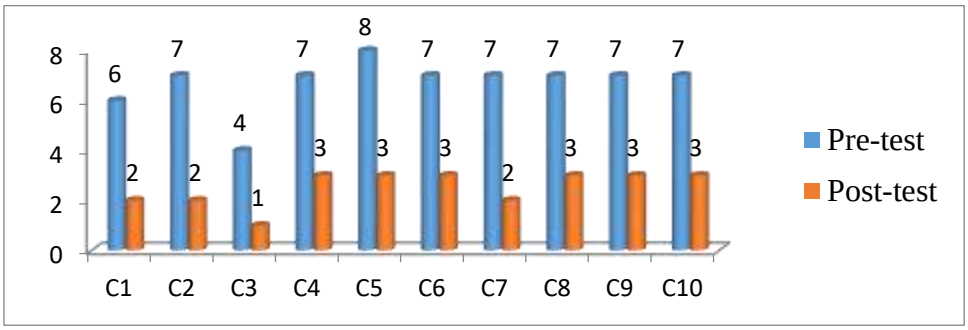
Table – 14 Comparisons of changes of pain on Numeric pain rating scale during palpation to the affected sidebetween experimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**9**	**2**	**7**	**C1**	**6**	**2**	**4**
E2	**8**	**2**	**6**	**C2**	**7**	**2**	**5**
E3	**7**	**1**	**6**	**C3**	**4**	**1**	**3**
E4	**9**	**1**	**8**	**C4**	**7**	**3**	**4**
E5	**8**	**1**	**7**	**C5**	**8**	**3**	**5**
E6	**9**	**0**	**9**	**C6**	**7**	**3**	**4**
E7	**7**	**1**	**8**	**C7**	**7**	**2**	**5**
E8	**7**	**1**	**8**	**C8**	**7**	**3**	**4**
E9	**7**	**0**	**7**	**C9**	**7**	**3**	**4**
E10	**5**	**0**	**5**	**C10**	**7**	**3**	**4**
Mean	**7.6**	**0.9**	**6.7**	**Mean**	**6.7**	**2.5**	**4.2**

In this study, pre-test mean score of pain on Numeric pain rating scale at during turn a doorknob or key or open a jarwas 0.9 in experimental group, 2.5 among control group. On post testscore after treatment showed that pain on Numeric pain rating scale had reduced in both groups (Figure-14). This table shows us that in experimental group mean differences within subject was 6.7 whereas in control group mean differences within subject was 4.2

Figure – 14 Reduction of pain scale during palpation to the affected side, experimental and control group





Estimate Muscle Power Status:

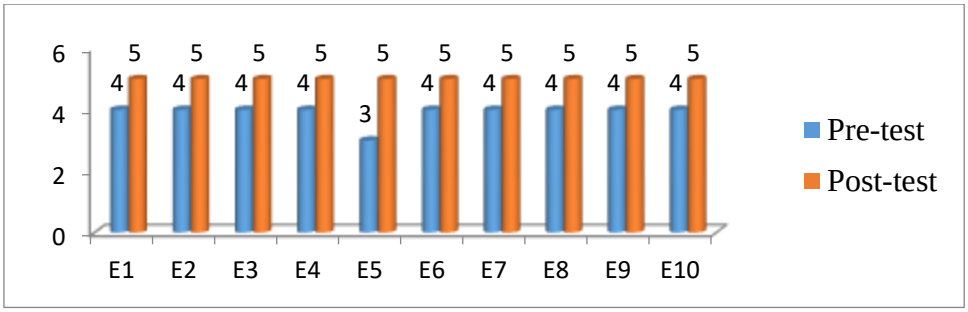
Table: 15 Comparisons of changes of muscle power on OXFORD Grade Scaleduring elbow Flexionbetween experimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**4**	**5**	**1**	**C1**	**4**	**5**	**1**
E2	**4**	**5**	**1**	**C2**	**3**	**5**	**2**
E3	**4**	**5**	**1**	**C3**	**4**	**5**	**1**
E4	**4**	**5**	**1**	**C4**	**5**	**5**	**0**
E5	**3**	**5**	**2**	**C5**	**3**	**5**	**2**
E6	**4**	**5**	**1**	**C6**	**4**	**5**	**1**
E7	**4**	**5**	**1**	**C7**	**4**	**5**	**1**

E8	**4**	**5**	**1**	**C8**	**3**	**4**	**1**
E9	**4**	**5**	**1**	**C9**	**4**	**5**	**1**
E10	**4**	**5**	**1**	**C10**	**4**	**5**	**1**
Mean	**3.9**	**5**	**1.1**	**Mean**	**3.8**	**4.9**	**1.1**

In this study, pre-test mean score of muscle power on OXFORD Grade Scaleduring elbow flexion was 5 in experimental group, 4.9 among control group. On post testscore after treatment showed that muscle power on OXFORD Grade Scalehad increased in both groups (Figure-15). This table shows us that in experimental group mean differences within subject was 1.1 whereas in control group mean differences within subject was 1.1

Figure – 15 Comparisons of changes of muscle power on OXFORD Grade Scaleduring elbow flexion between experimental and control group



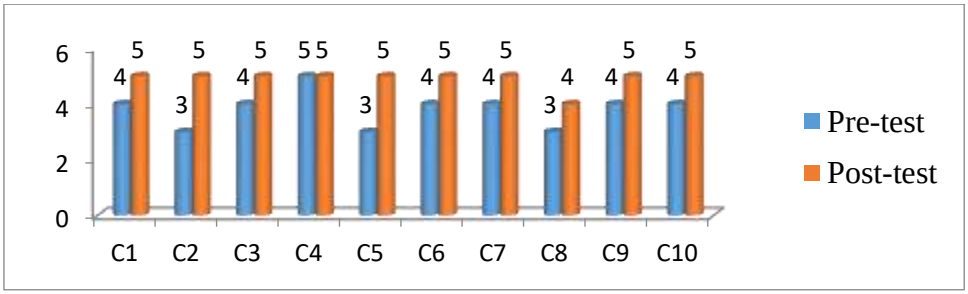
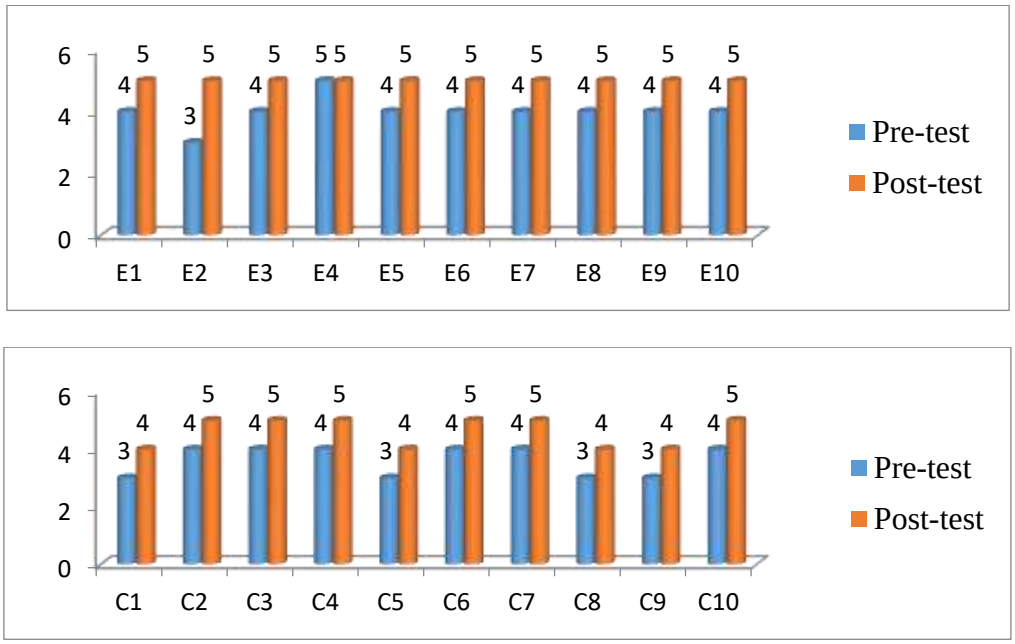


Table16: Comparisons of changes of muscle power on OXFORD Grade Scalеduring elbow Extension between experimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**4**	**5**	**1**	**C1**	**3**	**4**	**1**
E2	**3**	**5**	**2**	**C2**	**4**	**5**	**1**
E3	**4**	**5**	**1**	**C3**	**4**	**5**	**1**
E4	**5**	**5**	**0**	**C4**	**4**	**5**	**1**
E5	**4**	**5**	**1**	**C5**	**3**	**4**	**1**
E6	**4**	**5**	**1**	**C6**	**4**	**5**	**1**
E7	**4**	**5**	**1**	**C7**	**4**	**5**	**1**
E8	**4**	**5**	**1**	**C8**	**3**	**4**	**1**
E9	**4**	**5**	**1**	**C9**	**3**	**4**	**1**
E10	**4**	**5**	**1**	**C10**	**4**	**5**	**1**
Mean	**4**	**5**	**1**	**Mean**	**3.6**	**4.6**	**1**

In this study, pre-test mean score of muscle power on OXFORD Grade Scalеduring elbow extensionwas 5 in experimental group, 4.6 among control group. On post testscore after treatment showed that muscle power on OXFORD Grade Scalehad increasedin both groups (Figure-16). This table shows us that in experimental group mean differences within subject was 1 whereas in control group mean differences within subject was 1

Figure– 16 Comparisons of changes of muscle power on OXFORD Grade Scaleduring elbow extensionbetween experimental and control group



Estimate Range of Motion

Table 17 :Comparisons of changes of Range of Motion on goniometerduring elbow flexion between experimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**135**	**140**	**5**	**C1**	**135**	**140**	**5**
E2	**130**	**140**	**10**	**C2**	**135**	**140**	**5**
E3	**135**	**140**	**5**	**C3**	**135**	**140**	**5**
E4	**135**	**140**	**5**	**C4**	**135**	**140**	**5**
E5	**130**	**135**	**5**	**C5**	**130**	**130**	**0**
E6	**135**	**140**	**5**	**C6**	**135**	**140**	**5**
E7	**135**	**140**	**5**	**C7**	**135**	**140**	**5**

E8	**130**	**135**	**5**	**C8**	**130**	**135**	**5**
E9	**140**	**140**	**0**	**C9**	**135**	**140**	**5**
E10	**135**	**140**	**5**	**C10**	**135**	**140**	**5**
Mean	**134**	**139**	**5**	**Mean**	**134**	**138.5**	**4.5**

In this study, pre-test mean score of Range of Motion on goniometerduring elbow flexion was 139 in experimental group, 138.5 among control group. On post test score after treatment showed that Range of Motion on goniometerduring elbow flexion is increased in both groups (Figure-17). This table shows us that in experimental group mean differences within subject was 5 whereas in control group mean differences within subject was 4.5

Figure– 17 Comparisons of changes of range of motion on goniometerduring elbow flexion between experimental and control group

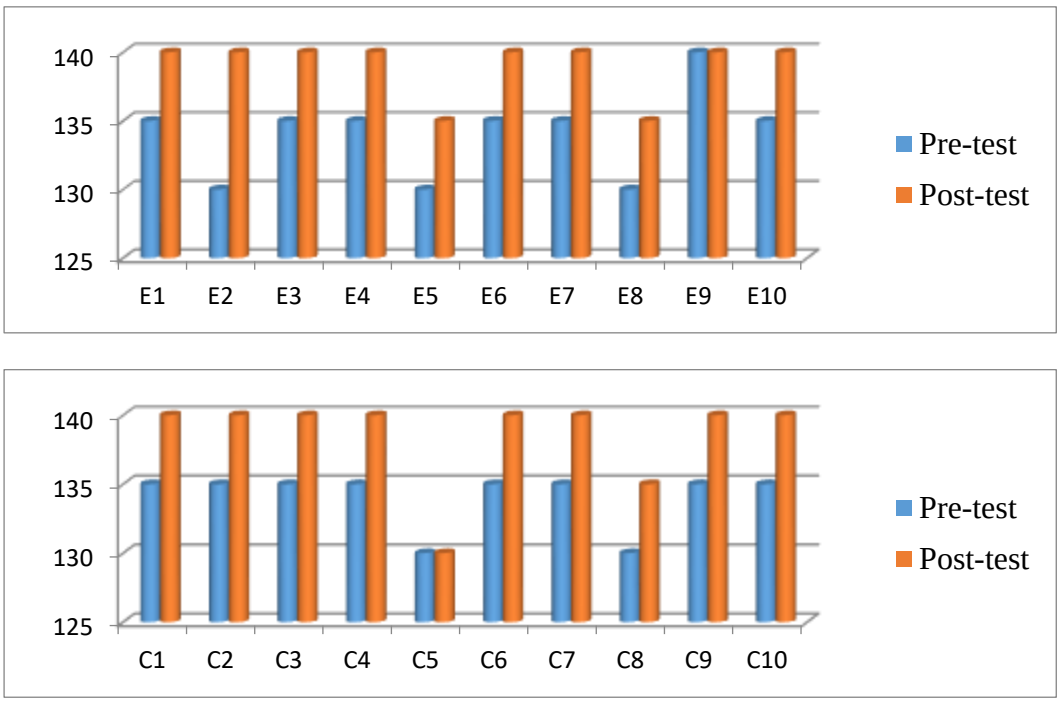
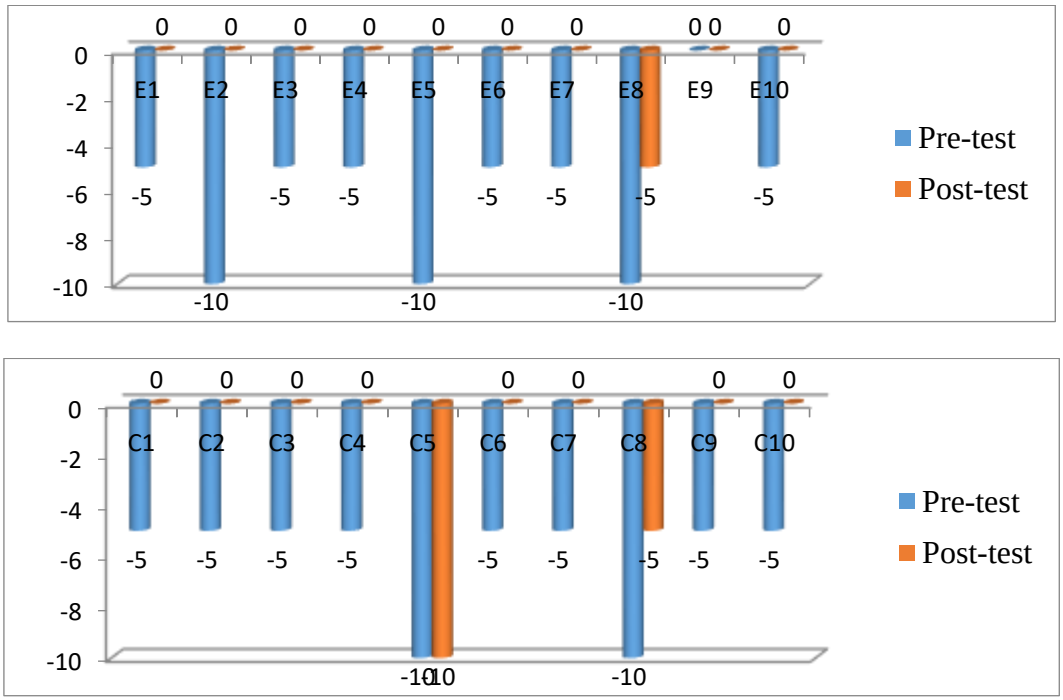


Table 18: Comparisons of changes of Range of Motion on goniometerduring elbow extensionbetween experimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**-5**	**0**	**5**	**C1**	**-5**	**0**	**5**
E2	**-10**	**0**	**10**	**C2**	**-5**	**0**	**5**
E3	**-5**	**0**	**5**	**C3**	**-5**	**0**	**5**
E4	**-5**	**0**	**5**	**C4**	**-5**	**0**	**5**
E5	**-10**	**0**	**10**	**C5**	**-10**	**-10**	**0**
E6	**-5**	**0**	**5**	**C6**	**-5**	**0**	**5**
E7	**-5**	**0**	**5**	**C7**	**-5**	**0**	**5**
E8	**-10**	**-5**	**5**	**C8**	**-10**	**-5**	**5**
E9	**0**	**0**	**0**	**C9**	**-5**	**0**	**5**
E10	**-5**	**0**	**5**	**C10**	**-5**	**0**	**5**
Mean	**-6**	**0**	**6**	**Mean**	**-6**	**-1.5**	**4.5**

In this study, pre-test mean score of Range of Motion on goniometerduring elbow extensionwas 0 in experimental group, 1.5among control group. On post tests score after treatment showed that range of motion on goniometerduringhad increased in both groups (Figure-18). This table shows us that in experimental group mean differences within subject was 6 whereas in control group mean differences within subject was

Figure– 18 Comparisons of changes of range of motion on goniometerduring elbow extensionbetween experimental and control group



Estimate Functional Disability:

Table 19: Comparisons of changes of Disability inTurn a doorknob or keybetween experimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subjects Difference**	**Subject**	**Pre-test**	**Post-test**	**Subjects Difference**
E1	**7**	**2**	**5**	**C1**	**7**	**3**	**4**
E2	**7**	**2**	**5**	**C2**	**7**	**2**	**5**
E3	**7**	**1**	**6**	**C3**	**4**	**1**	**3**
E4	**9**	**1**	**8**	**C4**	**7**	**3**	**4**
E5	**6**	**1**	**5**	**C5**	**7**	**2**	**5**
E6	**7**	**1**	**6**	**C6**	**8**	**2**	**6**
E7	**0**	**0**	**0**	**C7**	**8**	**3**	**5**

E8	**4**	**0**	**4**	**C8**	**7**	**3**	**4**
E9	**3**	**0**	**3**	**C9**	**8**	**3**	**5**
E10	**6**	**0**	**6**	**C10**	**7**	**3**	**4**
Mean	**5.6**	**0.8**	**4.8**	**Mean**	**7**	**2.5**	**1.5**

In this study, pre-test mean score of Disability inTurn a doorknob or keywas 0.8 in experimental group, 2.5 among control group. On post testscore after treatment showed that reduce disability in both groups (Figure-19). This table shows us that in experimental group mean differences within subject was 4.8 whereas in control group mean differences within subject was 1.5.

Figure – 19 Comparisons of changes of Disability inTurn a doorknob or keybetween experimental and control group

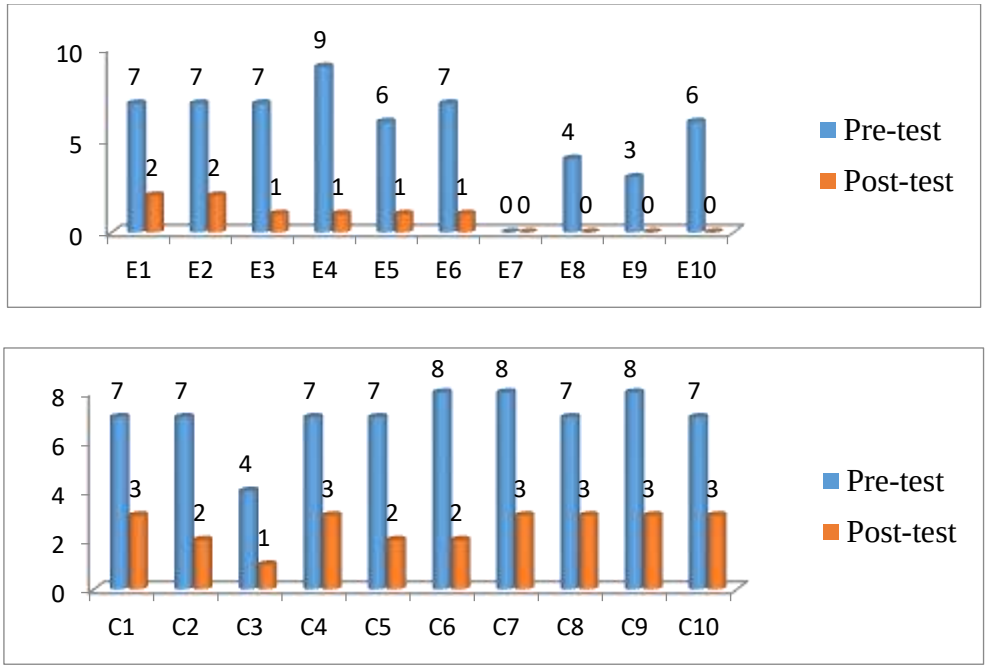


Table 20: Comparisons of changes of Disability Carry a grocery bag or briefcase by thehandle between experimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Difference**	**Subject**	**Pre-test**	**Post-test**	**Subject Difference**
E1	**8**	**2**	**6**	**C1**	**7**	**3**	**4**
E2	**7**	**2**	**5**	**C2**	**6**	**2**	**4**
E3	**8**	**1**	**7**	**C3**	**4**	**1**	**3**
E4	**6**	**0**	**6**	**C4**	**6**	**2**	**4**
E5	**6**	**1**	**5**	**C5**	**8**	**3**	**5**
E6	**7**	**1**	**6**	**C6**	**9**	**4**	**5**
E7	**5**	**0**	**5**	**C7**	**7**	**3**	**4**
E8	**7**	**1**	**6**	**C8**	**7**	**5**	**2**
E9	**7**	**1**	**6**	**C9**	**7**	**3**	**4**
E10	**7**	**1**	**6**	**C10**	**7**	**3**	**4**
Mean	**6.8**	**1**	**5.8**	**Mean**	**6.8**	**2.9**	**3.9**

In this study, pre-test mean score of Disability inTurn a doorknob or keywas 1 in experimental group, 2.9 among control group. On post testscore after treatment showed that reduce disability in both groups (Figure-20). This table shows us that in experimental group mean differences within subject was 5.8 whereas in control group mean differences within subject was 3.9

Figure – 20 Comparisons of changes of Disability Carry a grocery bag or briefcase by the handle between experimental and control group

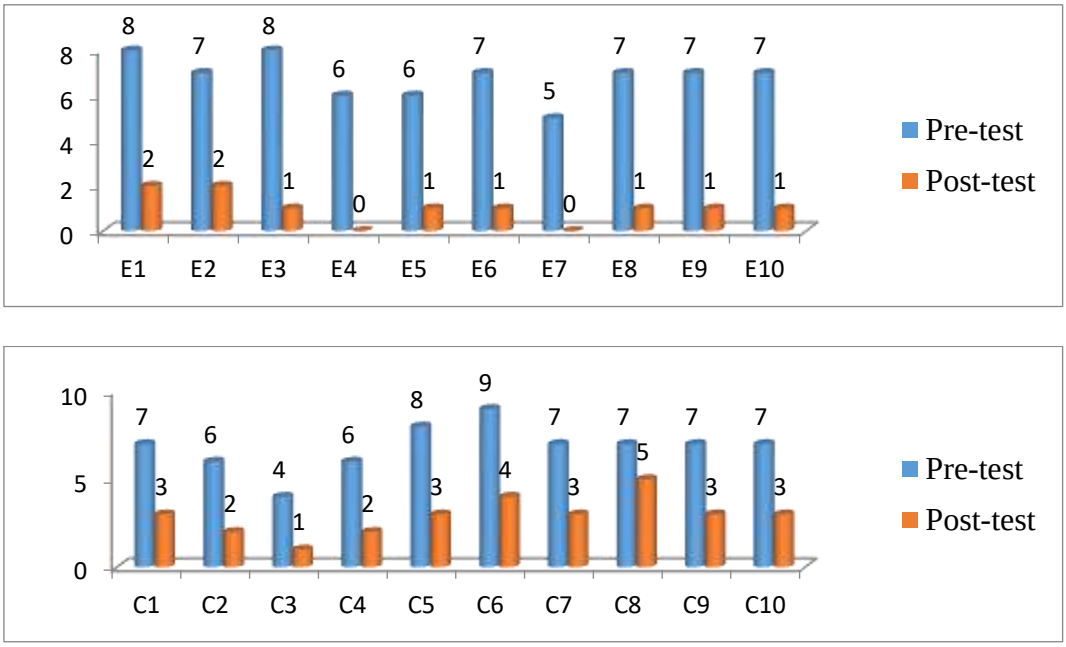


Table 21: Comparisons of changes of Disability Lift a full coffee cup or glass of milk to mouth between experimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Mean Difference**	**Subject**	**Pre-test**	**Post-test**	**Mean Difference**
E1	**8**	**2**	**6**	**C1**	**6**	**2**	**4**
E2	**8**	**2**	**6**	**C2**	**8**	**3**	**5**
E3	**7**	**1**	**6**	**C3**	**2**	**0**	**2**
E4	**8**	**1**	**7**	**C4**	**8**	**3**	**5**
E5	**5**	**0**	**5**	**C5**	**8**	**3**	**5**
E6	**6**	**1**	**5**	**C6**	**7**	**3**	**4**

E7	**5**	**0**	**5**	**C7**	**7**	**4**	**3**
E8	**3**	**0**	**3**	**C8**	**8**	**4**	**4**
E9	**4**	**0**	**4**	**C9**	**6**	**3**	**3**
E10	**6**	**0**	**6**	**C10**	**8**	**3**	**5**
Mean	**6**	**0.7**	**5.3**	**Mean**	**6.8**	**2.8**	**4**

In this study, pre-test mean score of Disability inTurn a doorknob or keywas 0.7 in experimental group, 2.8among control group. On post testscore after treatment showed that reduce disability in both groups (Figure-21). This table shows us that in experimental group mean differences within subject was 5.3 whereas in control group mean differences within subject was 4

Figure: 21 Comparisons of changes of Disability Lift a full coffee cup or glass of milk to mouth between experimental and control group

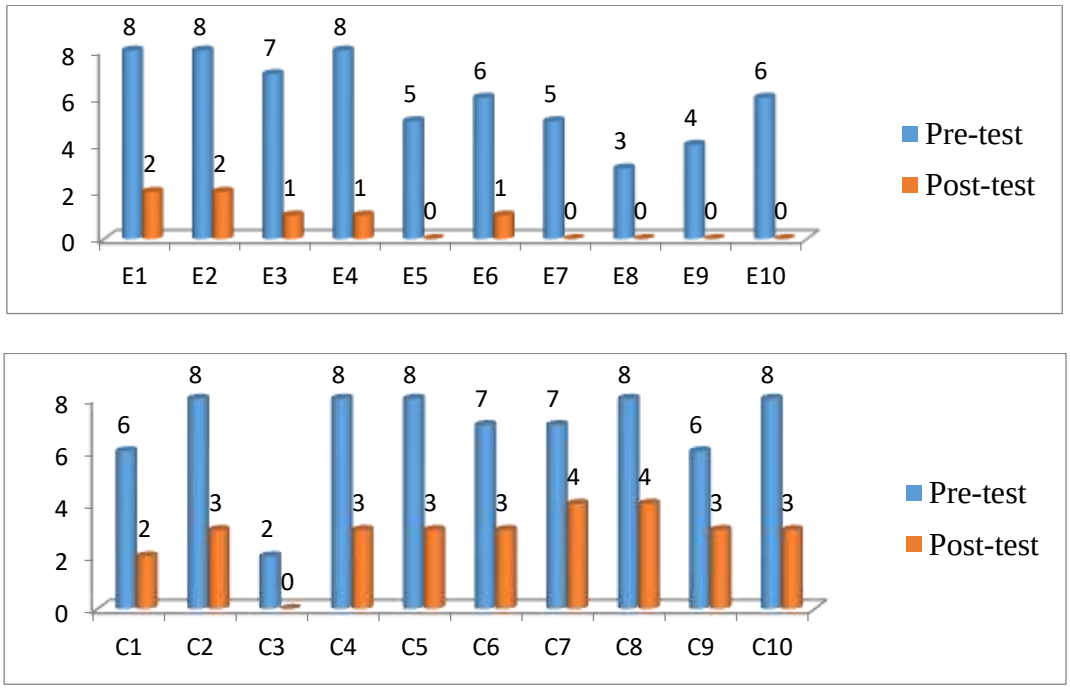


Table 22:Comparisons of changes of Disability Open a jar between experimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**7**	**2**	**5**	**C1**	**6**	**1**	**5**
E2	**7**	**2**	**5**	**C2**	**6**	**2**	**4**
E3	**6**	**1**	**5**	**C3**	**2**	**1**	**1**
E4	**7**	**0**	**7**	**C4**	**7**	**3**	**4**
E5	**5**	**0**	**5**	**C5**	**7**	**3**	**4**
E6	**5**	**1**	**4**	**C6**	**8**	**4**	**4**
E7	**4**	**0**	**4**	**C7**	**7**	**3**	**4**
E8	**2**	**0**	**2**	**C8**	**8**	**4**	**4**
E9	**3**	**0**	**3**	**C9**	**7**	**2**	**5**
E10	**5**	**0**	**5**	**C10**	**7**	**3**	**4**
Mean	**5.1**	**0.6**	**4.5**	**Mean**	**6.5**	**2.6**	**3.9**

In this study, pre-test mean score of Disability inOpen a jarwas 0.6 in experimental group, 2.6among control group. On post testscore after treatment showed that reduce disability in both groups (Figure-22). This table shows us that in experimental group mean differences within subject was 4.5 whereas in control group mean differences within subject was 3.9

Figure: 22 Comparisons of changes of Disability Open a jar between experimental and control group

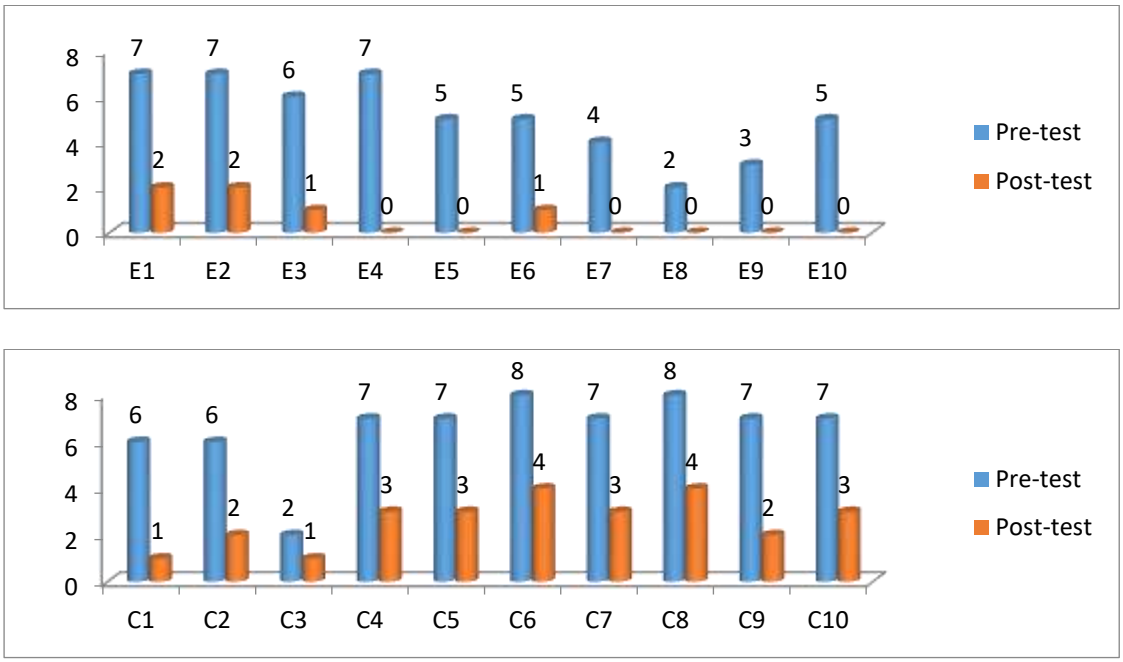


Table 23: Comparisons of changes of Disability Pull up pants between experimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**7**	**1**	**6**	**C1**	**5**	**2**	**3**
E2	**7**	**2**	**5**	**C2**	**7**	**3**	**4**
E3	**7**	**1**	**6**	**C3**	**1**	**0**	**1**
E4	**4**	**1**	**3**	**C4**	**8**	**2**	**6**
E5	**6**	**1**	**5**	**C5**	**8**	**4**	**4**
E6	**5**	**0**	**5**	**C6**	**8**	**3**	**5**
E7	**4**	**0**	**4**	**C7**	**6**	**4**	**2**

E8	**2**	**0**	**2**	**C8**	**7**	**5**	**2**
E9	**0**	**0**	**0**	**C9**	**7**	**3**	**4**
E10	**5**	**0**	**5**	**C10**	**8**	**3**	**5**
Mean	**4.7**	**0.6**	**4.1**	**Mean**	**6.5**	**2.9**	**3.6**

In this study, pre-test mean score of Disability inPull up pants was 0.6 in experimental group, 2.9among control group. On post testscore after treatment showed that reduce disability in both groups (Figure-23). This table shows us that in experimental group mean differences within subject was 4.1 whereas in control group mean differences within subject was 3.6

Figure-23 Comparisons of changes of Disability Pull up pants between experimental and control group

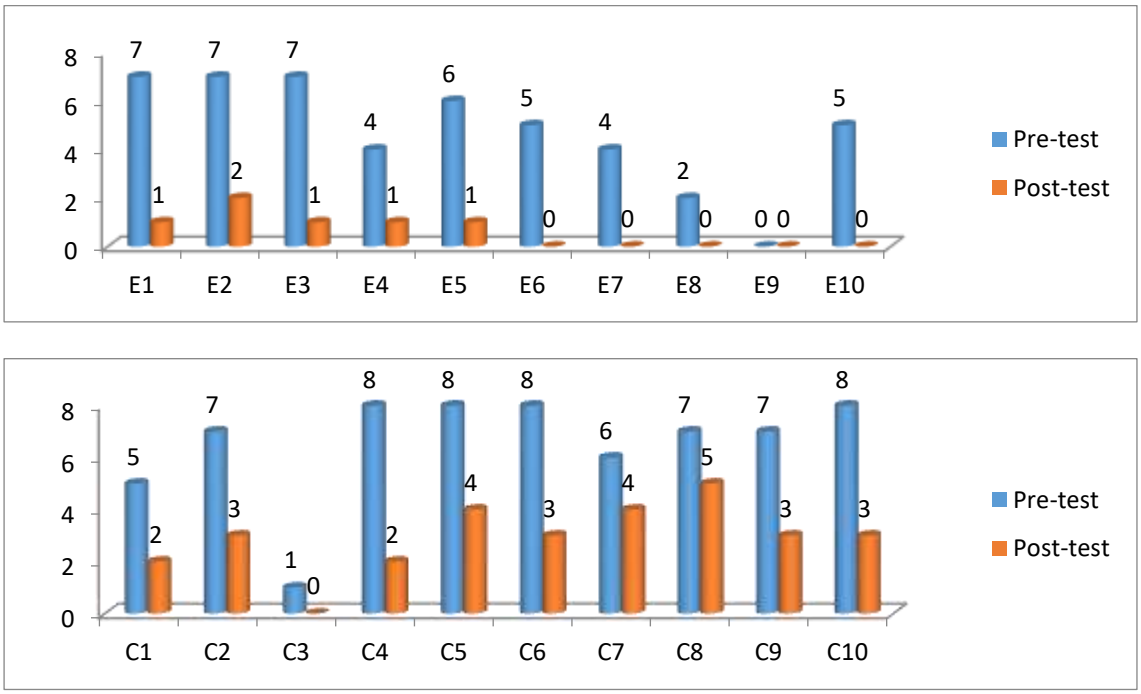


Table 24: Comparisons of changes of Disability Wring out a washcloth or wet towel between experimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**8**	**1**	**7**	**C1**	**7**	**1**	**6**
E2	**8**	**3**	**4**	**C2**	**7**	**3**	**4**
E3	**8**	**1**	**7**	**C3**	**4**	**0**	**4**
E4	**7**	**1**	**6**	**C4**	**9**	**4**	**5**
E5	**6**	**1**	**5**	**C5**	**9**	**4**	**5**
E6	**6**	**1**	**5**	**C6**	**9**	**3**	**6**
E7	**5**	**0**	**5**	**C7**	**8**	**4**	**4**
E8	**7**	**1**	**6**	**C8**	**9**	**5**	**4**
E9	**7**	**1**	**6**	**C9**	**9**	**3**	**6**
E10	**7**	**1**	**6**	**C10**	**7**	**4**	**3**
Mean	**6.9**	**1.1**	**5.8**	**Mean**	**7.8**	**3.1**	**4.7**

In this study, pre-test mean score of Disability inWring out a washcloth or wet towelwas 1.1 in experimental group, 3.1 among control group. On post testscore after treatment showed that reduce disability in both groups (Figure-24). This table shows us that in experimental group mean differences within subject was 5.8 whereas in control group mean differences within subject was 4.7

Figure:24 Comparisons of changes of Disability Wring out a washcloth or wet towel between experimental and control group

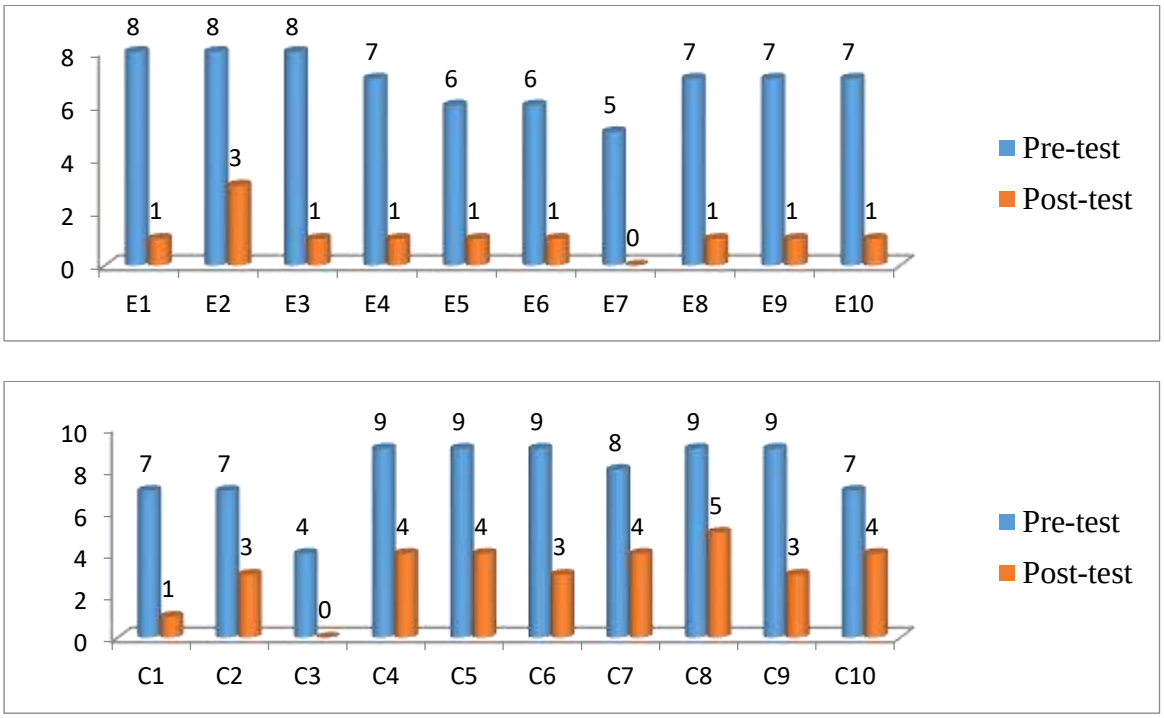


Table 25:Comparisons of changes of Disability Personal activities (dressing, washing)betweenexperimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**9**	**2**	**7**	**C1**	**6**	**3**	**3**
E2	**7**	**2**	**5**	**C2**	**6**	**2**	**4**
E3	**7**	**1**	**6**	**C3**	**2**	**2**	**0**
E4	**8**	**1**	**7**	**C4**	**8**	**3**	**5**
E5	**5**	**0**	**5**	**C5**	**7**	**3**	**4**
E6	**5**	**0**	**5**	**C6**	**9**	**4**	**5**
E7	**4**	**0**	**4**	**C7**	**7**	**3**	**4**
E8	**5**	**0**	**5**	**C8**	**7**	**3**	**4**
E9	**6**	**1**	**5**	**C9**	**8**	**3**	**5**
E10	**6**	**0**	**6**	**C10**	**8**	**4**	**5**
Mean	**6.2**	**0.7**	**5.5**	**Mean**	**6.8**	**3**	**3.8**

In this study, pre-test mean score of Disability inPersonal activities (dressing, washing)was 0.7 in experimental group, 3 among control group. On post testscore after treatment showed that reduce disability in both groups (Figure-25). This table shows us that in experimental group mean differences within subject was 5.5 whereas in control group mean differences within subject was 3.8

Figure-25 Comparisons of changes of Disability Personal activities (dressing, washing) between experimental and control group

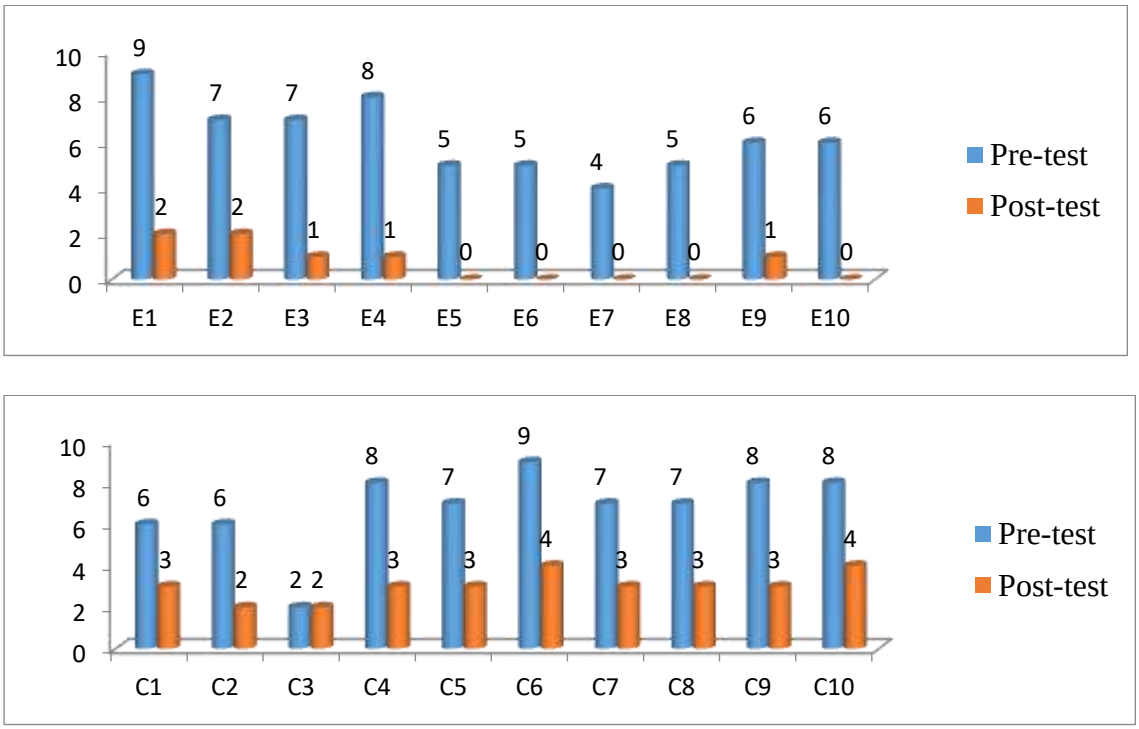


Table 26: Comparisons of changes of Disability Household work (cleaning, maintenance)betweenexperimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**8**	**2**	**6**	**C1**	**8**	**2**	**6**
E2	**7**	**2**	**5**	**C2**	**7**	**2**	**5**
E3	**7**	**1**	**6**	**C3**	**4**	**1**	**3**
E4	**7**	**1**	**6**	**C4**	**8**	**3**	**5**
E5	**6**	**0**	**6**	**C5**	**8**	**4**	**4**
E6	**6**	**1**	**5**	**C6**	**8**	**3**	**5**
E7	**0**	**0**	**0**	**C7**	**8**	**3**	**5**
E8	**7**	**0**	**7**	**C8**	**8**	**4**	**4**
E9	**7**	**1**	**6**	**C9**	**7**	**3**	**4**
E10	**6**	**1**	**5**	**C10**	**8**	**4**	**4**
Mean	**6.1**	**0.9**	**5.2**	**Mean**	**7.4**	**2.9**	**4.5**

In this study, pre-test mean score of Disability in Household work (cleaning, maintenance)was0.9in experimental group, 2.9among control group. On post testscore after treatment showed that reduce disability in both groups (Figure-26). This table shows us that in experimental group mean differences within subject was 5.2 whereas in control group mean differences within subject was 4.

Figure- 26 Comparisons of changes of Disability Household work (cleaning, maintenance) between experimental and control group

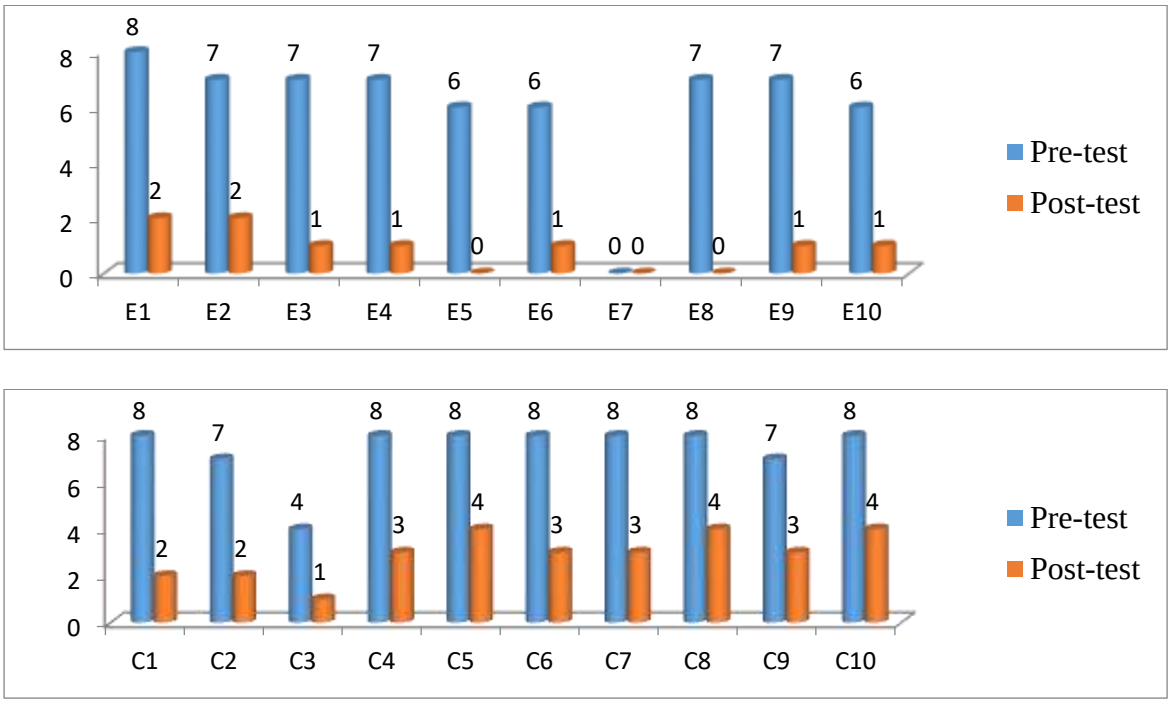


Table 27: Comparisons of changes of Disability Work (job or everyday work)betweenexperimental and control group

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**8**	**1**	**7**	**C1**	**7**	**3**	**4**
E2	**7**	**2**	**5**	**C2**	**7**	**3**	**4**
E3	**8**	**1**	**7**	**C3**	**4**	**1**	**3**
E4	**8**	**1**	**7**	**C4**	**8**	**3**	**5**
E5	**5**	**0**	**5**	**C5**	**7**	**2**	**5**
E6	**6**	**1**	**5**	**C6**	**8**	**3**	**5**
E7	**0**	**0**	**0**	**C7**	**7**	**5**	**2**
E8	**0**	**0**	**0**	**C8**	**8**	**4**	**4**

E9	**6**	**1**	**5**	**C9**	**7**	**4**	**3**
E10	**7**	**1**	**6**	**C10**	**8**	**5**	**3**
Mean	**5.5**	**0.8**	**4.7**	**Mean**	**7.1**	**3.3**	**3.8**

In this study, pre-test mean score of Disability inWork (job or everyday work) was 0.8 in experimental group, 3.3 among control group. On post testscore after treatment showed that reduce disability in both groups (Figure-27). This table shows us that in experimental group mean differences within subject was 4.7 whereas in control group mean differences within subject was 3.8

Figure- 27 Comparisons of changes of Disability Work (job or everyday work) between experimental and control group

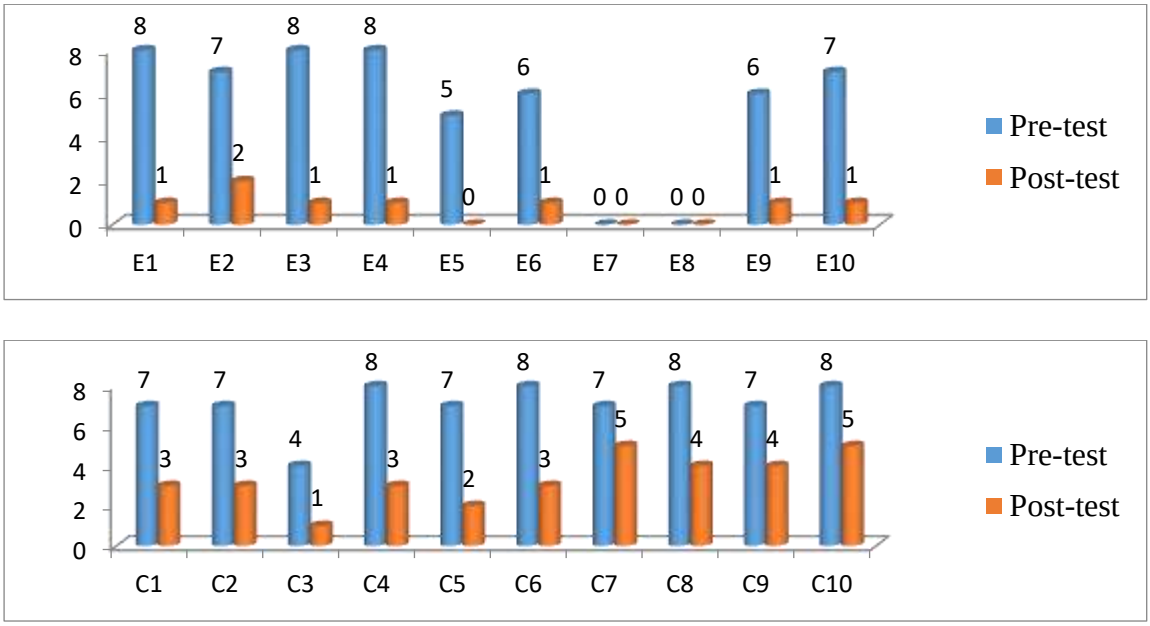


Table 28: Comparisons of changes of Disability Recreational or sporting activitiesbetween experimental and control group-

Experimental Group				Control Group			
Subject	**Pre-test**	**Post-test**	**Subject Differences**	**Subject**	**Pre-test**	**Post-test**	**Subject Differences**
E1	**7**	**1**	**6**	**C1**	**6**	**3**	**3**
E2	**7**	**2**	**5**	**C2**	**6**	**2**	**4**
E3	**7**	**1**	**6**	**C3**	**4**	**1**	**3**
E4	**0**	**0**	**0**	**C4**	**7**	**4**	**3**
E5	**6**	**0**	**6**	**C5**	**7**	**2**	**5**
E6	**6**	**0**	**6**	**C6**	**7**	**2**	**5**
E7	**5**	**0**	**5**	**C7**	**6**	**3**	**3**
E8	**0**	**0**	**0**	**C8**	**6**	**3**	**3**
E9	**0**	**0**	**0**	**C9**	**6**	**3**	**3**
E10	**6**	**0**	**6**	**C10**	**6**	**3**	**3**
Mean	**4.4**	**0.4**	**4**	**Mean**	**6.1**	**2.6**	**3.5**

In this study, pre-test mean score of Disability in Recreational or sporting activitieswas 0.4 in experimental group, 2.6among control group. On post testscore after treatment showed that reduce disability in both groups (Figure-28). This table shows us that in experimental group mean differences within subject was 4 whereas in control group mean differences within subject was 3.5

Figure-28 Comparisons of changes of Disability Recreational or sporting activities between experimental and control group

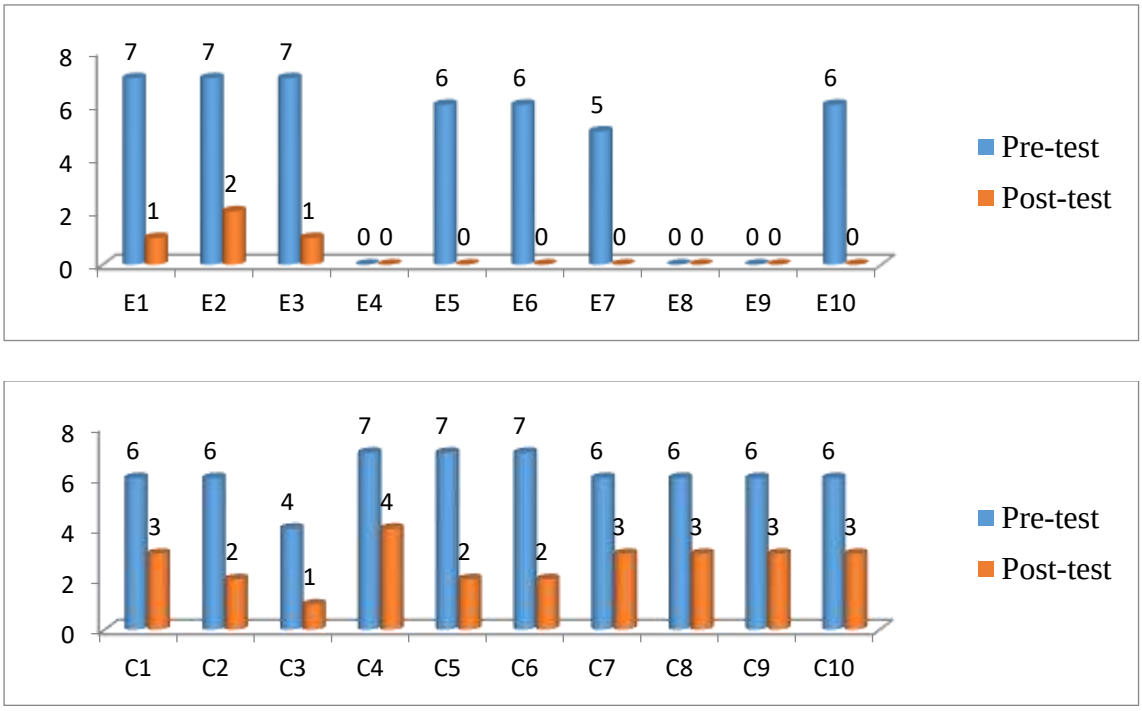


Table 29: Variables of pain in different functional position in statistically significance at the following level of significance

No.	Variables	Observed "U" value	Observed "P" value	Significant/Not Significant
01	pain is at resting position	9	<.05=23	Significant
02	pain during forceful wrist extension	13	<.05=23	Significant
03	pain during a strong grasp	8.5	<.05=23	Significant
04	pain when doing a task with repeated arm movement	5.5	<.05=23	Significant
05	Pain at cozen test	4	<.05=23	Significant

06	pain during forceful middle finger extension	4	<.05=23	Significant
07	pain during Turn a doorknob or key or Open a jar	2	<.05=23	Significant
08	pain on palpation	7.5	<.05=23	Significant

Table 30: Variables of muscle power in statistically significance at the following level of significance

No.	Variables	Observed "U" value	Observed "P" value	Significant/Not Significant
01	Elbow Flexion	45	<.05=23	Not Significant
02	Elbow Extension	30	<.05=23	Not Significant

Table 31: Variables of range of motion in statistically significance at the following level of significance

No.	Variables	Observed "t" value	Observed "P" value	Significant/Not Significant
01	Active ROM for elbow flexion	.0	<.05=1.0	Not Significant
02	Active ROM for elbow extension	.00	<.05=1.0	Not Significant

Table 32: Variables of disability in statistically significance at the following level of significance

No.	Variables	Observed "U" value	Observed "P" value	Significant/Not Significant
01	Turn a doorknob or key	7	<.05=23	Significant
02	Carry a grocery bag or briefcase by the handle	7	<.05=23	Significant
03	Lift a full coffee cup or glass of milk to your mouth	8.5	<.05=23	Significant
04	Open a jar	8	<.05=23	Significant
05	Pull up pants	8.5	<.05=23	Significant
06	Wring out a washcloth or wet towel	22	<.05=23	Significant
07	Personal activities (dressing, washing)	2	<.05=23	Significant
08	Household work (cleaning, maintenance)	6.5	<.05=23	Significant
09	Work (your job or everyday work)	4.5	<.05=23	Significant
10	Recreational or sporting activities	3.5	<.05=23	Significant

CHAPTER-V DISCUSSION

The purpose of this study was to evaluate the effectiveness of myofascial release withconventional physiotherapy compare to only conventional physiotherapy for tennis elbow. In this experimental study 20 patients with tennis elbow were randomly assigned to the experimental group and to the control group. Among these 20 patients, 10 patients were included in the experimental group who received myofascial release with conventional physiotherapy and the rest of the 10 patients were included in the control group, who received conventional physiotherapy only. Each group attended for 10 sessions of treatment within four weeks in the physiotherapy outdoor department of CRP, Savar in order to demonstrate the improvement. The outcome of pain was measured by using numeric pain rating scale, the outcome ofmuscle power was measured by using in OXFORD grade scale, the outcome of range of motion was measuring throughGoniometer,and the outcome of disability wasmeasured by patient rated tennis elbow disability questionnaires. The analysis of significance was carried out by using non-parametric Mann-Whitney *U* test (U=9; U=13; U=8.5; U=5.5; U=4; U=4; U=2; U=7.5;$U \leq 23$; $n_1=n_2=10$) for pain and (U=7; U=7; U=8.5; U=8; U=8.5; U=22; U=2; U=6.5;U=4.5; U=3.5;$U \leq 23$; $n_1=n_2=10$) for functional disability andto compare the efficacy of myofascial release along with conventional physiotherapy and only conventional physiotherapy for the management of patients with tennis elbow. By using non-parametric Mann-Whitney *U* test on the data the results were found to be significant ($p < 0.05$ for a two-tailed hypothesis). The null hypothesis was rejected. This means that myofascial release along with conventional physiotherapy is more effective than conventional physiotherapy only for reduction of pain and disability in patients with tennis elbow. The researcher found significant improvement of pain and disability measurement In Experimental group, but no significant was

found among muscle power and in terms of range of motion. Ajimsha et al. (1012) conducted a single blind RCT to investigate the effect of myofascial release vs. shum ultrasound on pain and function in 65 computer professionals suffering from chronic lateral LE. Both groups were similar in baseline characteristics such as gender, age, body mass index, seniority and duration of symptoms. The interventions were three days per weeks for four weeks. They use patient rated tennis elbow evaluation for measurement of pain. They concluded that MFR technique is more effective than control group.Khuman et al. (2013) did an experimental study on 30 participants with chronic lateral epicondylitis, of myofascial release technique and outcome measures were decrease pain, improve functional performance and improve grip strength. Results showed that the myofascial release technique significantly improved pain, grip strength and functional activity.Trividi et al. (2014) did an experimental study on 36 patients with LE to investigate the comparison of active releasing technique and myofascial release technique on pain, grip strength and functional performance. They concluded that after 12 sessions of treatment both active release technique and myofascial release technique were effective in the treatment of chronic lateral epicondylitis but myofascial release technique was found superior than active release technique.In this research, researcher found improvement in reduction of pain during rest, pain in forceful wrist extension, forceful grip, repeated arm movement, cozen test, middle finer test, during turning a doorknob or open a jar, on palpation in experimental group than the control group. In this study,researcher also found that reduce the disability in Turn a doorknob or key, Carry a grocery bag or briefcase by the handle, Lift a full coffee cup or glass of milk to mouth, Open a jar, Pull up pants, Wring out a washcloth or wet towel, Personal activities (dressing, washing),

Recreational or sporting activities, Work (your job or everyday work), Household work (cleaning, maintenance) in experimental group than the control group.

There was very limited evidence on myofascial release technique on tennis elbow. But knowing of effectiveness of myofascial release technique on different mechanical pain , researcher was interested to conduct this study at CRP.Study may also be significant on elbow range of motion and muscle strength if 15-20 sessions treatment will be provided to patient.

CHAPTER-VI LIMITATION

The study was conducted with 20 patients of tennis elbow, 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.

Experimental bias was not controlled in this study because this study includes only one single blinded study and here therapists were not blinded. It is limited by the fact daily activities of the subject were not monitored which could have influenced. Researcher only explored the effect of myofascial release after 10 sessions, so the long term effect of myofascial release was not explored in this study.

Data was collected only from CRP for a short period of time which will affect the result of the study to generalize for wider population.

There was no available research done in this area in Bangladesh. So, relevant information about tennis elbow patient with specific intervention for Bangladesh was very limited in this study.

CHAPTER-VII CONCLUSION AND RECOMMENDATION

7.1Conclusion

The result of this experimental study have identified the effectiveness of conventional physiotherapy with myofascial release are better treatment than the conventional physiotherapy alone for reducing pain and disability in tennis elbow patient. Participants in the experimental group showed a greater benefit than those in the control group, which indicate that the conventional physiotherapy with myofascial release can be an effective therapeutic approach for patient with tennis elbow.

Myofascial release technique is used along with conventional physiotherapy that aims to reduce pain on lateral epicondyle, to facilitate rehabilitation program. It is a cost effective treatment alternative for many common injuries & overuse syndrome which is effective for restoring the joint play and for establishing proper structural alignment. So it may become helpful for patients with tennis elbow to determine myofascial release with conventional physiotherapy as intervention for reducing the features of tennis elbow.

From this research the researcher wishes to explore the effectiveness of myofascial release along with conventional physiotherapy to reduce the features of patient with tennis elbow, which will be helpful to facilitate their rehabilitation and to enhance functional activities.

7.2 Recommendation

The following recommendations could increase the validity and improve the results of this study:

A larger study involving increased number of participants may increase the significance of results.

Collection of further data on mechanics of injury, level of chronicity and specific grade of injury.

Future study should include a multiple blinding procedure of data collection to maintain intra-rater reliability.

Future study should include more treatment sessions/ time measure of improvement in both experimental and control group.

The narrowing of variables such as age, gender, race in order to increase validity.

Further motivation to controlled clinical trials with sufficient time.

It could be also suggested that for future studies can be carried out with comparable patient variables with emphasis on ergometrics and functional levels.

Total Words:13,020

References

Abate, M., Silbernagel, K. G., Siljeholm, C., Di Iorio, A., De Amicis, D., Salini, V., (2009), Pathogenesis of tendinopathies: inflammation or degeneration?,*Arthritis RessearchTherapy,*11:pp.235. doi: 10.1186/ar2723.

Alam, N., (2008). A study on the effectiveness of Mc Connell's taping with cyriax approach & mulligan mobilization on chronic lateral epicondylitis. Rajib Ghandhi University of Health Sciences, Bangalore.

Alfredson H, Forsgren S, Thorsen K, Fahlstrom M, Johansson H, Lorentzon R. Glutamate NMDAR1 receptors localised to nerves in human Achilles tendons. Implications for treatment?*Knee Surg Sports Traumatol Arthrosc* 2001;9:123-126.

Alfredson H, Ohberg L, Forsgren S. Is vasculo-neural ingrowth the cause of pain in chronic Achilles tendinosis? An investigation using ultrasonography and colour Doppler, immunohistochemistry, and diagnostic injections.*KneeSurg Sports Traumatol Arthrosc 2*003;11:334-338.

Amro, A., Diener, I., Bdair, W. O., Hameda, I. M., Shalabi, A. I., and Ilyyan, D. I., (2010). The effects of mulligan mobilisation with movement and taping techniques on pain, grip strength, and function in patients with lateral epicondylitis. Hong Kong Physiotherapy Journal, 28:19-23.

Andersson G, Danielson P, Alfredson H, Forsgren S. Presence of substance P and the neurokinin-1 receptor in tenocytes of the human Achilles tendon. *RegulPept* 2008 9;150:81-87.

Barr, S., Cerisola, F.L., and Blanchard, V., (2009). Effectiveness of corticosteroid injections compared with physiotherapeutic interventions for lateral epicondylitis: A systematic review. Database of Abstracts of Reviews of Effects, 95(4): 251–265.

Bhargava AS, Eapen C, Kumar SP. Grip strength measurements at two different wrist extension positions in chronic lateral epicondylitis-comparison of involved vs. uninvolved side in athletes and non athletes: a case-control study. Sports Med Arthrosc Rehabil Ther Technol. 2010 Sep 7;2:22.

Bisset L, Beller E, Jull E, Brooks P, Darnell R, Vicenzino B. Mobilisation with movement and exercise, corticosteroid injection, or wait and see for tennis elbow: randomised trial. BMJ 2006;doi:10.1136/bmj.38961.584653. B

Bisset, L., Paungmali, A,, Vicenzino, B., and Beller, E., (2005). A systematic review and meta-analysis of clinical trials on physical interventions for lateral epicondylagia. British Journal of Sports Medicine, 39: 411–422.

Bisset, L., Paungmali, A., Vicenzino, B., and Beller, E., (2005). A systematic review and meta-analysis of clinical trials on physical intervention for lateral epicondylalgia. British Journal of Sports Medicine, 39:411-422.

Bisset, L., Paungmali, A., Vicenzino, B., and Beller, E., (2005). A systematic review and meta-analysis of clinical trials on physical intervention for lateral epicondylalgia. British Journal of Sports Medicine, 39:411-422.

Brukner, P., and Khan, K., (1993). Clinical Sports Medicine. Sydney: McGraw-Hill Book Company.

Buchbinder, R., Green, S., and Struijs, P., (2007). Tennis elbow: clinical evidence concise. American Family Physician, 75(5):701-702.

Buller, M.D., Lalenti, M.D., Marc, N. and Leonard, T., (2014).Lateral Epicondylitis. Reviews at Library of Medicine, Library of Medicine, 27: 268–78.

Cleland JA, Flynn TW, Palmer JA. Incorporation of manual therapy directed at the cervicothoracic spine in patients with lateral epicondylalgia: a pilot clinical trial. J Man and Manip Ther. 2005;13(3):143-151.

Cooper, G., (2006) Pocket guide to musculoskeletal diagnosis. New Jersey: Humana Press,

Corrigan, B., and Maitland, G. D., (1983). Practical Orthopedic Medicine. Oxford: Butterworth-Heinemann.

Crowther, M. A. A., Bannister, G. C., Huma, H., and Rooker, G. D., (2002). A prospective, randomised study to compare extracorporeal shock-wave therapy and injection of steroid for the treatment of tennis elbow. The Journal of Bone and Joint Surgery, 84B(5):678-679.

Cyriax JH. The pathology and treatment of tennis elbow. J Bone Joint Surg 1936; 18: 921–40, 2010

Cyriax, J. H., (1936). The pathology and treatment of tennis elbow. Journal of Bone and Joint Surgery, 18(4): 921-941.

Dalyan, M., Cardenas, D., and Gerard, B., (2006).Upper extremity pain after spinal cord injury. Spinal Cord, 37:191-195.

Dunkow, P. D., Jatti, M., and Muddu, B. N., (2004).A Comparison of open and percutaneous techniques in the surgical treatment of tennis elbow. The Journal of Bone and Joint Surgery, 86B(5): 701-704.

Ebnezar, J., (2003). Essentials of Orthopedics for Physiotherapists. New Delhi: Jaypee Brothers Medical Publishers.

Haahr, J. P., Andersen, J. H., (2003), Prognostic factors in lateral epicondylitis: a randomized trial with one-year follow-up in 266 new cases treated with minimal occupational intervention or the usual approach in general practice. *Rheumatology(Oxford, England)*, 42: pp.1216-1225.

Hasan, S. A., Rahim, M.A., Siddiq, M. A. B., Hossain, M. S., Taslim, A., Paul, S., Barua, A., Hassan, M. U., Islam, M. M. N., and Haq, S. A., (2009). Study of spectrum of rheumatic diseases in the department of physical medicine and rehabilitation, Chittagong medical college hospital, Bangladesh. Journal of Chittagong Medical College Teachers Association, 20(1): 6-11.

Hasan, S.A., Rahim, M.A., Siddiq, M.A.B., Hossain, M.S., Taslim, A., Paul, S., Barua, A., Hassan, M.U., Islam, M.M.N., and Haq, S.A., (2009). Study of spectrum of rheumatic diseases in the department of physical medicine and rehabilitation, Chittagong Medical College Hospital, Bangladesh, Journal of Chittagong Medical College Teachers Association, 20(1):6-11.

Hoe-Hansen C. *Subacromial inflammation; Clinical and experimental studies.*PhD dissertation in medicine. Linkoping: University of Linkoping; 2001.
Hutson, M., (2001). Sports Injuries Recognition and Management., New York: Oxford University Press.

Jones, V. A. L., (2009). Physiotherapy in the management of tennis elbow: a review, British Elbow and Shoulder Society. Shoulder & Elbow, 1: 108–113.

Jones, VAL., (2009). Physiotherapy in the management of tennis elbow: a review. Shoulder & Elbow, 1:108-11.

Joshi, J., and Kotwal, P., (1999). Essential of Orthopedics and Applied Physiotherapy. New Delhi: Churchill Livingstone.

Kesson, M., and Atkins, E., (1998). Orthopaedic Medicine: A Practical Approach. Oxford: Butterworth-Heinemann

Khuman, P.R., Trivedi, P., Devi, S., Sathyavani, D., Nambi, G., and Shah, K., (2013). Myofascial in chronic lateral epicondylitis: A randomized controlled study. International Journal of Health and Science and Research, 3(7):45-52.

Kingma, J. J., Knikker, D. R., Wittink, H. M., and Takken T., (2007), Eccentric overload training in patients with chronic Achilles tendinopathy: a systematic review. *British Journal of Sports Medicine,*41(6): pp.1-5.

Kjaer M, Langberg H, Miller BF, Boushel R, Crameri R, Koskinen S, et al. Metabolic activity and collagen turnover in human tendon in response to physical activity. *J Musculoskel Neuronal Interact* 2005;5:41-52.

Kjaer, M., (2004), Role of extracellular matrix in adaptation of tendon and skeletal muscle to mechanical loading.*Physiol Rev,* 2004;84:649-698.

Kryger, A. I., Lassen, C. F., and Andersen, J.H., (2007)."The role of physical examinations in studies of musculoskeletal disorders of the elbow." Occupational and Environmental Medicine, 64(11): 776-781.

Labelle, H., Guibert, R., Joncas, J., Newman, N., Fallaha, M., and Rivard, C., (1992).Lack of scientific evidence for the treatment of lateral epicondylitis of the elbow-an attempted meta-analysis. The Journal of Bone and Joint Surgery, 74B(5):646-65.

Labelle, H., Guibert, R., Joncas, J., Newman, N., Fallaha, M., and Rivard, C., (1992). Lack of scientific evidence for the treatment of lateral epicondylitis of the elbow- an attempted meta analysis. The Journal of Bone and Joint Surgery, 74B(5):646-651.

Lalenti, M.D., Marc, N. Leonard, T. and Buller, M.D., (2014).Lateral Epicondylitis. Reviews at Library of Medicine, Library of Medicine, 27: 268–78.

Leclerc, A., Landre, M.F., and Chastang, J.F., (2001). Upper-limb disorders in repetitive work. Scandinavin Journal of Work Environment & Health, 27: 268–78.

Ljung BO, Alfredson H, Forsgren S. Neurokinin 1-receptors and sensory neuropeptides in tendon insertions at the medial and lateral epicondyles of the humerus. Studies on tennis elbow and medial epicondylalgia.*J Orthop Res* 2004;22:321-327.

Ljung, B. O., Alfredson, H., and Forsgren, S., (2004), Neurokinin 1-receptors and sensory neuropeptides in tendon insertions at the medial and lateral epicondyles of the humerus.Studies on tennis elbow and medial epicondylalgia.*Journal of Orthopdic Research*, 22:pp.321-327.

Mackay, D., Rangan, A., Hide, G., Hughes, T., and Latimer, J., (2003). The objective diagnosis of early tennis elbow by magnetic resonance imaging. Occupational Medicine, 53:309–312.

Magee, D. J., (1987). Orthopedic Physical Assessment. Philadelphia: W.B. Saunders Company.

Malagelada, F., Dalmau-Pastorb, M., Vegac, J., and Golanob, P., (2014), Elbow anatomy, Sports Injuries, DOI 10.1007/978-3-642-36801-1_38-1.

Malik S. S., Ahmad,Z., Siddiqui, N. Abdus, S., Tytherleigh, M. G., and Rushton, N., (2013). Instructional Review: Shoulder And Elbow A Review Of Pathology And Management. Bone Joint Journal, 95: 1158–64.

Mit V. Nagrale; Christ opher R. Herd; Shyam Ganvir; Gopichand Ramteke,Cyriax Physiotherapy Versus Phonophoresis with Supervised Exercise in Subjects with LateralEpicondylalgia: A Randomized Clinical Trial, J Man Manip Ther. 2009; 17(3): 171-178 Level of evidence:1B

Noteboom, T., Cruver, R., Keller, J., Kellogg, B., and Nitz, A., (1994). Tennis elbow: a review, Journal of Orthopedic & Sports Physical Therapy, 19(6):357-366.

Punnett, L., and Wegman, D. H., (2004) Work-related musculoskeletal disorders: the epidemiologic evidence and the debate. Journal of Electromyography and Kinesiology 14:13–23

Puranik, V. K. C., (2009). A comparative study to analyze the effect of low level laser therapy and ultrasound therapy in patients with lateral epicondylitis, Rajib Ghandhi University of Health Sciences, Bangalore.

Rajadurai Viswas, Rejeeshkumar Ramachandran, and Payal Korde Anantkumar, “Comparison of Effectiveness of Supervised Exercise Program and Cyriax Physiotherapy in Patients with Tennis Elbow Lateral Epicondylitis): A Randomized Clinical Trial”, The ScientificWorld Journal Volume 2012, Article ID 939645, 8 pages doi:10.1100/2012/939645 Level of evidence: 1B

Shamsoddini, A., Hollisaz, M. T., and Hafezi, R., (2010). Initial effect of taping technique on wrist extension and grip strength and pain of individuals with lateral epicondylitis. Iranian Rehabilitation Journal, 8(11): 24-28.

Sharath, U. R., (2005). Combined effect of wrist manipulation and elbow taping in patients with tennis elbow.Rajiv Gandhi University of Health Sciences, Bangalore.

Shiri, R.E., Viikari-Juntura, H., Varonen and Heliovaara, M., (2006). "Prevalence and determinants of lateral and medial epicondylitis: a population study." American Journal of Epidemiology, 164(11): 1065-74.

Shmushkevich, Y., and Kalichman, L., (2013). Myofascial pain in lateral epicondylalgia: A review. Journal of Body Work and Movement Therapies, 17:434-439.

Silva, R. T., (2008). "Tennis elbow: survey among 839 tennis players with and without injury." Journal of Medicine and Science, 13(1): 36-41.

Smidt N, Van der Windt DAWM, Assendelft WJJ, Deville WLFM, Korthals-de Bos IBC, Bouter LM. Corticosteroid injections, physiotherapy, or a wait-and-see policy for lateral epicondylitis: a randomised controlled trial. LANCET. 2002;359:657-662.

Smidt, N., Assendelfet, W., Anola, H., Malmivaara, A.G., and Buchbinder, R., (2003). Effectiveness of physiotherapy treatment for lateral epicondylitis: a systematic review. Taylor & France’s Health Sciences, 35:51-62.

Smidt, N., Assendelfet, W., Anola, H., Malmivaara, A.G., and Buchbinder, R., (2003). Effectiveness of physiotherapy treatment for lateral epicondylitis: a systematic review. Taylor & France’s Health Sciences, 35:51-62.

Stasinopoulos, D., and Johnson, M. I., (2004). Cyriax physiotherapy for tennis elbow. British Journal of Sports Medicine, 38:675-677.

Stasinopoulos, D., and Johnson, M.I., (2004). Cyriax physiotherapy for tennis elbow. British Journal of Sports Medicine, 38: 675-677.

Struijs, P.A.A., Kerkhoffs, G.M.M.J., Assendelft, W.J.J., and Dijk, C.N.V., (2004). Conservative treatment of lateral epicondylitis brace versus physical therapy or a combination of both-A randomized clinical trial. American Journal of Sports Medicine, 32(2):462-469.

Thomas, T., (2010). Effectiveness of diamond taping and deep friction massage in the treatment of lateral epicondylitis- a comparative study. Rajib Ghandhi University of Health Sciences, Bangalore.

Thomas, W. K., (2000), Differential assessment of elbow joint, *Athletic therapy today*, 5(3), pp. 6-11.

Thomson, A., Skinner, A., and Piercy, J., (1932). Tidy's Physiotherapy. Oxford: Butterworth-Heinemann.

Trivedi, P., Sathiyavani, D., Nambi, G., Khuman, R., Shah, K., and Bhatt, P., (2014). Comparison of active releasing technique and myofascial release technique on pain grip strength and functional performance in patient with chronic lateral epicondylitis. International Journal of Physiotherapy and Research, 2(3):488-94.

Vicenzino, B., and Wright, A., (1995). Effects of a novel manipulative physiotherapy technique on tennis elbow: a single case study. Manual Therapy, 1:30-35.

Vicenzino, B., Brooksbank. J., Minto, J., Offord, S., and Paungmali, A., (2003). Initial effects of elbow taping on pain-free grip strength and pressure pain threshold. Journal of Orthopedic & Sports Physical Therapy, 33(7):401-407.

Vicenzino, B., Paungmali, A., and Teys, P., (2007). Mulligan's mobilization-withmovement, positional faults and pain relief: current concepts from a critical review of literature. Manual Therapy, 12: 98–108.

White, G., (2006), Tennis Elbow: a systemic review, Surgery Sports Medicine, 23(2): pp. 12-15.

Wright JG. Evidence-based orthopaedics: the best answers to clinical questions. Philadelphia: Saunders Elsevier, 2008.

Yerger, B., and Turner, T. (1985). Percutaneous extensor tenotomy for chronic tennis elbow: an office procedure. Orthopaedics, 8: 1261-3.

Zeisig, E., (2008). Tennis elbow: sonographic findings and intratendinous injection treatment, Umea University, Sweden.

Zhang J, Wang JH. Mechanobiological response of tendon stem cells: Implications of tendon homeostasis and pathogenesis of tendinopathy. *J Orthop Res* 2010;28:639-643.

Appendixes

1. Informed Consent (Bangla)
2. Questionnaire (Bangla)
3. Informed Consent (English)
4. Questionnaire (English)
5. Permission Letter

সম্মতিপত্র

আসসালামুয়ালাইকুম / নমস্কার, আমি মোহাম্মাদ শাহাদাৎ হোসেন, ঢাকা বিশ্ববিদ্যালয়ের চিকিৎসা অনুষদের অধিভুক্ত বাংলাদেশ হেলথ প্রফেশনস্ ইন্সিটিটিউট এর এম.এস.সি ইন ফিজিওথেরাপি কোর্সের চূড়ান্ত বর্ষের একজন শিক্ষার্থী। অধ্যায়নের অংশ হিসেবে আমাকে একটি গবেষণা সম্পাদন করতে হবে এবং এটা আমার প্রাতিষ্ঠানিক কাজের একটা অংশ। নিম্নোক্ত তথ্যাদি পাঠ করার পর অংশগ্রহণকারীদের গবেষণায় অংশগ্রহনের জন্য অনুরোধ করা হলো।আমার গবেষণার বিষয় হল **"মায়োফেসিয়াল রিলিসের দ্বারা টেনিস এলবো রোগীদের ব্যথা কমানোর ক্ষেত্রে কার্যকারি কী না?"** এই পরীক্ষামূলক গবেষণার মাধ্যমে আমি একটি অনুমান পরীক্ষা করব যে,টেনিসএলবো ব্যাথার রোগীদের ক্ষেত্রে শুধুমাত্র প্রচলিত ফিজিওথেরাপি অপেক্ষা প্রচলিত ফিজিওথেরাপির সাথেমায়োফেসিয়াল রিলিস কার্যকারি কী না"। আমার গবেষণার উদ্দেশ্য হলো থেরাপি দেবার পূর্বে ও পরে রোগীদের ব্যথা, রেঞ্জঅফ মোশন, কনুই এরমাংসপেশির সক্ষমতার তথ্যবলী, ওকর্মকান্ডেঅক্ষমতানির্ণয় পরিমাপ করা। আমি যদি আমার গবেষণাটি সার্থকভাবেসম্পূর্ণ করতে পারি তবে যেসব রোগীরা টেনিস এলবোরব্যাথার রোগে ভুগছেন তারা উপকৃত হবেন এবং এটি হবে একটি পরীক্ষামূলক প্রমাণ।গবেষণাটি সম্পাদনের জন্য, আমার তথ্য সংগ্রহ করা প্রয়োজন হবে। গবেষণার ক্ষেত্র বিবেচনা করে আপনার মাঝে আমার গবেষণায় অংশগ্রহণ করার জন্য প্রয়োজনীয় বৈশিষ্ট্য লক্ষ্য করা গেছে। এজন্য, আপনি আমার গবেষণার একজন সম্মানিত অংশগ্রহণকারী হতে পারেন এবং আমি আপনাকে আমার গবেষণায় অংশগ্রহন করতে অনুরোধ জানাচ্ছি।

আমি প্রতিজ্ঞা করছি যে,এই গবেষণা আপনার জন্য ঝুঁকিপূর্ণ হবে না অথবা আপনার কোন ক্ষতি করবে না। গবেষণা চলাকলীন সময়ে কোন রকম দ্বিধা বা ঝুঁকি ছাড়াই যেকোন সময়ে আপনি এটাকে বাদ দিতে পারবেন। এই গবেষণার প্রাপ্ত তথ্য সম্পূর্ণভাবে গোপনীয় থাকবে এবং অংশগ্রহণকারীর ব্যক্তিগত তথ্য অন্য কোথাও প্রকাশ করা হবে না।

যদি আপনার গবেষণা সম্পর্কে কোনো জিজ্ঞসা থাকে তবে আপনি অনুগ্রহপূবক যোগাযোগ করতে পারেন গবেষকমোহাম্মাদ শাহাদাৎ হোসেন, অথবা নাসিরুল ইসলাম, অধ্যাক্ষ, বিএইচপিআই, সিআরপি, সাভার, ঢাকা-১৩৪৩ এর সাথে।

শুরু করার আগে আপনার কি কোন প্রশ্ন আছে ?

আমি কি শুরু করতে পারি ?

☐ হ্যাঁ ☐ না

অংশগ্রহণ কারীর স্বাক্ষর ও তারিখ .....

গবেষকের স্বাক্ষর ও তারিখ .....

সাক্ষীর স্বাক্ষর ও তারিখ .....

প্রশ্নাবলী

পর্ব-ক: সামাজিক- বৈষয়িক তথ্যবলী

এইপ্রশ্নগুলোএকজন ‘টেনিসএলবো’ রোগেআক্রান্তরোগীরব্যাথাপরিমাপেরজন্যসাজানোহয়েছে, এইপর্বেরোগীপয়েন্টেরবামে (√) চিহ্নদিয়েদিবেন , কিন্তুবিশেষক্ষেত্রেনীলবাকালোকালিরকলম দিয়ে ফিজিওথেরাপিস্টেরসাহায্যনিতেপারেন।

কোডঃ তারিখঃ

রোগীর নামঃ রোগীর আইডিঃ

ঠিকানাঃ

মোবাইলঃ

প্রশ্নসমূহ	উত্তর
১। রোগীর বয়স	মাস..... বৎসর..... দিন.....
২। লিঙ্গ	☐ পুরুষ= ১ ☐ মহিলা= ২
৩। পেশা	☐ টেনিস প্লেয়ার = ১ ☐ চাকুরিজিবী = ২ ☐ ব্যবসায়ী = ৩ ☐ গৃহিণী = ৪ ☐ ছাত্র/ছাত্রী= ৫ ☐ অবসর = ৬ ☐ অন্যান্য …… (উল্লেখ করুন) = ৭
৪। প্রধান কোন কারণে আপনী আজ এখানে এসেছেন?	☐ কনুইতেব্যাথা = ১ ☐ সম্মুখবাহুরপেশিরদুর্বলতা = ২ ☐ বাহুতেঅবসতাবাঝিঁঝিঁকরা = ৩ ☐ সাম্প্রতিকআঘাত = ৪ ☐ বিকলতা = ৫

৫। কনুই এর কোন অংশে ব্যাথা হয়?	☐ সামনে = ১ ☐ ভিতরেরদিকে =২ ☐ বাইরেরদিকে = ৩ ☐ পিছনে =৪
৬। আপনি কি পুনরাবৃত্তিক বা বলপূর্বক কোন কাজ করেন?	☐ হ্যাঁ = ১ ☐ না= ২
৭। ব্যথার শুরুর অবস্থা থেকে এখনকার ব্যথা কি অবস্থায় আছে?	☐ ভাল হচ্ছে = ১ ☐ খারাপ হচ্ছে = ২ ☐ একই রকম আছে = ৩
৮। বর্তমান সমস্যাটা কত দিন ধরে আছে?	☐ সবসময়= ১ ☐ মাঝেমধ্যে= ২
৯। এই পর্যন্ত কি কি চিকিৎসা নিয়েছেন?	☐ ডাক্তাররে চিকিৎসা= ১ ☐ ফিজিও থেরাপি= ২ ☐ প্রদাহনাশকওষুধ = ৩ ☐ ইঞ্জেকশন = ৪ ☐ ব্রেস = ৫ ☐ সার্জারী = ৬ ☐ ঝারফোঁক = ৭ ☐ মালিশ = ৮ ☐ অন্যান্য =৯
১০। উপরোক্ত ব্যবস্হা এই সমস্যার জন্য আগে কত বার নিয়েছেন?	
১১। কত সময় আগে আপনি এই সমস্যার জন্য ব্যবস্হা নিয়েছেন?	দিন..... মাস..... বৎসর.....

চিকিৎসা পূর্ববর্তী উপাত্ত সমূহ

পর্ব খ: ব্যাথারধরণ

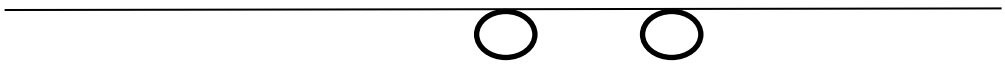
এই প্রশ্নাবলী 'টেনিসএলবো' রোগীদের জন্য তৈরি হয়েছে।রোগীদের অনুভূত ব্যাথার মাত্রা বোঝার জন্য McCaffery et al. (1999) একটি সাংখ্যিক স্কেল ব্যবহার করতেন। এটা সাংখ্যিক পেইন রেটিং স্কেল নামে পরিচিত। স্কেলটি ০-১০ সীমায় ১০ সেমি লম্বা। এখানে ০ মানে ব্যাথা নাই, ১-৩ বোঝায় অল্প ব্যাথা, ৩-৫ মানে ব্যাথা অনেক এবং৬-১০ মানে রোগীর সম্ভাব্য সবচেয়ে খারাপ ব্যাথার অনুভূতি।

প্রশ্নাবলির এই সেকশনে রোগিকে কাল বা নীলকালির বলপেন দিয়ে পূরণ করতে হবে। রোগী প্রসণ না বুঝতে পারলে সেই অংশটুকু বুঝিয়ে দিতে ফিজিওথেরাপিস্টকে অনুরোধ করা হচ্ছে।

০-১০সীমার মাঝে আপনার কনুই এর গড় ব্যাথার পরিমাণ সংখ্যার উপর বৃত্তাংকন করুন। ০ মানে ব্যাথা নেই এবং ১০ মানে ব্যাথায় সবচেয়ে খারাপ অনুভুতি।

উদাহরণস্বরুপ-

যদি কারো ব্যাথার সীমা ৭ এবং ৯ এর মধ্যে থাকে, তাহলে সে এভাবে বৃত্তাংকন করবেঃ



০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

০ মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথা এবং (৭-১০) মানে মারাত্মক ব্যাথা।

১।বিশ্রাম কালে আপনার ব্যাথা কতটা তীব্র হয়?

০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

০মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথা এবং (৭-১০) মানে মারাত্মক ব্যাথা।

২।জোড় পুর্বক কব্জির প্রসারনে ব্যাথার তীব্রতা কেমন?

০১২৩৪৫৬৭৮৯১০

০ মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথাএবং (৭-১০) মানেমারাত্মকব্যাথা।

৩।শক্ত মুঠি ধরার সময় ব্যাথা কেমন?

০১২৩৪৫৬৭৮৯১০

০মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথা এবং (৭-১০) মানে মারাত্মক ব্যাথা।

৪।বাহুর কোন পুনরাবৃত্তিক কাজ করার সময় ব্যাথা কেমন?

০১২৩৪৫৬৭৮৯১০

০মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথাএবং (৭-১০) মানে মারাত্মক ব্যাথা।

৫।সম্মুখ বাহু উপুড় করে মুস্টিবদ্ধ করার সময়, এবং রেডিয়াল ডেভিয়েশন এবং কব্জির প্রসারনের সময় পরীক্ষক বাধা দিলে ব্যাথার তীব্রতা কেমন (cozen test)?

০১২৩৪৫৬৭৮৯১০

০মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথা এবং (৭-১০) মানে মারাত্মক ব্যাথা।

৬। বলপূর্বক মধ্যাংগুলির প্রসারনে ব্যাথার তীব্রতা কেমন?

০১২৩৪৫৬৭৮৯১০

০মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথা এবং (৭-১০) মানে মারাত্মক ব্যাথা।

৭। ডোর নব বা চাবি ঘুরানো বা জার খুলতে গেলে ব্যাথা কেমন হয়?

০১২৩৪৫৬৭৮৯১০

০মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথা এবং (৭-১০) মানে মারাত্মক ব্যাথা।

৮। আক্রান্ত অংশে ধরলে ব্যাথা কেমন হয়?

০১২৩৪৫৬৭৮৯১০

০মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথা এবং (৭-১০) মানে মারাত্মক ব্যাথা।

চিকিৎসা পূর্ববর্তী উপাত্ত সমূহ

পর্ব গ: গতির পরিসীমা নির্ণয়

এইপর্বে কোন ফিজিওথেরাপিস্ট বা পরীক্ষক কাল বা নীলকালির বলপেন দিয়ে পূরণ করবে এবং গনিওমিটার দিয়ে রেঞ্জ অফ মোশন নির্ণয় করবে।

১।আক্রান্ত কনুই সক্রিয় সংকোচনে রেঞ্জ কত?

…….. ডিগ্রী।

২।আক্রান্ত কনুই সক্রিয় প্রসারণে রেঞ্জ কত?

…….. ডিগ্রী।

৩। আক্রান্ত কনুই পরোক্ষ সংকোচনে রেঞ্জ কত?

…….. ডিগ্রী।

৪।আক্রান্ত কনুই পরোক্ষ প্রসারনে রেঞ্জ কত?

…….. ডিগ্রী।

চিকিৎসা পূর্ববর্তী উপাত্ত সমূহ

পর্ব ঘ: কনুই এরমাংসপেশির সক্ষমতার তথ্যবলী

১। কনুইএর মাংসপেশির সক্ষমতার বর্তমানে কতটুকু আছে ?**(OXFORD Grade Scale)**

ফ্লেক্সসন .....
এক্সটেন্সান .....

চিকিৎসা পূর্ববর্তী উপাত্ত সমূহ

পর্ব উ: কর্মকান্ডেঅক্ষমতানির্ণয়

	সমস্যা নেই										করতে পারে না
চাবি বা ডোরনব ঘুরানো	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০
বাজারের ব্যাগ বা ব্রিফকেস এর হাতলে ধরে তোলা	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০
এককাপ কফি বা এক গ্লাস দুধ আপনার মুখ পর্যন্ত নেয়া	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০
জার খোলা	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০
প্যান্ট উপরে তোলা	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০
ভিজা কাপড় বা তোয়ালে নিংড়ানো	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০

ব্যক্তিগত কাজ (জামা পরা, ধোয়া)	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০
গৃহস্থালি কাজ	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০
আপনার চাকরি বা দৈনন্দিন কাজ	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০
খেলাধুলা বা বিনোদন মূলক কাজ	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০

এখানে ০-১০ সীমায় ব্যাথা অনুযায়ী নাম্বারে বৃত্তাংকন করতে হবে। ০ মানে রোগী কোন সমস্যার সম্মুখিন হন নি আর ১০ মানে তিনি করতে পারেন নি বা খুব অসুবিধা হয়েছে।

চিকিৎসা পরবর্তী উপাত্ত সমূহ পর্ব খ: ব্যাথার ধরণ

এইপ্রশ্নাবলী 'টেনিসএলবো' রোগীদের জন্য তৈরি হয়েছে।রোগীদের অনুভূত ব্যাথার মাত্রা বোঝার জন্য McCaffery et al. (1999) একটি সাংখ্যিক স্কেল ব্যবহার করতেন।এটা সাংখ্যিক পেইন রেটিং স্কেল নামে পরিচিত।স্কেলট ০-১০সীমায়১০সেমিলম্বা।এখানে ০মানে ব্যাথা নাই, ১-৩বোঝায় অল্পব্যাথা, ৩-৫মানে ব্যাথা অনেক এবং৬-১০মানে রোগীর সম্ভাব্য সবচেয়ে খারাপ ব্যাথার অনুভূতি।

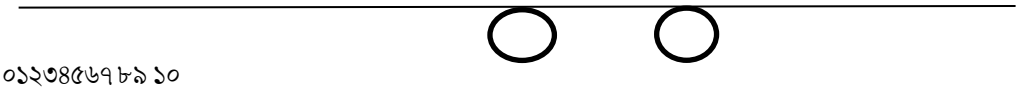
প্রশ্নাবলির এই সেকশনে রোগিকে কাল বা নীল কালির বলপেন দিয়ে পূরণ করতে হবে। রোগী প্রসণ না বুঝতে পারলে সেই অংশটুকু বুঝিয়ে দিতে ফিজিওথেরাপিস্টকে অনুরোধ করা হচ্ছে।

০-

১০ সীমার মাঝে আপনার কনুই এর গড় ব্যাথার পরিমাণ সংখ্যার উপরবৃত্তাংকন করুন। ০ মানে ব্যাথা নেই এবং ১০ মানে ব্যাথায় সবচেয়ে খারাপ অনুভুতি।

উদাহরণস্বরুপ-

যদি কারো ব্যাথার সীমা ৭ এবং ৯ এর মধ্যে থাকে, তাহলে সে এভাবে বৃত্তাংকন করবে:



০১২৩৪৫৬৭৮৯১০

০ মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথাএবং (৭-১০) মানে মারাত্মক ব্যাথা।

১। বিশ্রাম কালে আপনার ব্যাথা কতটা তীব্র হয়, ১০ সেশন চিকিৎসার পর?

০১২৩৪৫৬৭৮৯১০

০মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথা এবং (৭-১০) মানে মারাত্মক ব্যাথা।

২।জোড় পুর্বক কব্জির প্রসারনে ব্যাথার তীব্রতা কেমন, ১০ সেশন চিকিৎসার পর?

০১২৩৪৫৬৭৮৯১০

০ মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথা এবং (৭-১০) মানে মারাত্মক ব্যাথা।

৩।শক্ত মুঠি ধরার সময় ব্যাথা কেমন?

০১২৩৪৫৬৭৮৯১০

০মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথা এবং (৭-১০) মানে মারাত্মক ব্যাথা।

৪। বাহুর কোন পুনরাবৃত্তিক কাজ করার সময় ব্যাথা কেমন, ১০ সেশন চিকিৎসার পর?

০১২৩৪৫৬৭৮৯১০

০মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথা এবং (৭-১০) মানে মারাত্মক ব্যাথা।

৫।সম্মুখ বাহু উপুড় করে মুস্টিবদ্ধ করার সময়, এবং রেডিয়াল ডেভিয়েশন এবং কব্জির প্রসারনের সময় পরীক্ষক বাধা দিলে ব্যাথার তীব্রতা কেমন (cozen test), ১০ সেশন চিকিৎসার পর

০১২৩৪৫৬৭৮৯১০

০ মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথাএবং (৭-১০) মানে মারাত্মক ব্যাথা।

৬। বলপূর্বক মধ্যাংগুলির প্রসারনে ব্যাথার তীব্রতা কেমন, ১০ সেশন চিকিৎসার পর?

০১২৩৪৫৬৭৮৯১০

০ মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথা এবং (৭-১০) মানে মারাত্মক ব্যাথা।

৭।ডোরনব বা চাবি ঘুরানো বা জার খুলতে গেলে ব্যাথা কেমন হয়, ১০ সেশন চিকিৎসার পর?

০১২৩৪৫৬৭৮৯১০

০ মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথা এবং (৭-১০) মানে মারাত্মক ব্যাথা।

৮। আক্রান্ত অংশে ধরলে ব্যাথা কেমন, ১০ সেশন চিকিৎসার পর?

০১২৩৪৫৬৭৮৯১০

০মানে ব্যাথা নেই, (১-৩) মানে অল্প ব্যাথা, (৪-৬) মানে বেশি ব্যাথা এবং (৭-১০) মানে মারাত্মক ব্যাথা।

চিকিৎসা পরবর্তী উপাত্ত সমূহ

পর্ব গ: গতিরপরিসীমানির্ণয়

এই সেকশন কোন ফিজিওথেরাপিস্ট বা পরীক্ষক কাল বা নীলকালির বলপেন দিয়ে পূরণ করবে এবং গনিওমিটার দিয়ে রোম নির্ণয় করবে।

১।আক্রান্ত কনুই সক্রিয় সংকোচনে রেঞ্জ কত, ১০ সেকশন চিকিৎসার পর?

…….. ডিগ্রী।

২।আক্রান্ত কনুই সক্রিয় প্রসারণে রেঞ্জ কত, ১০ সেশন চিকিৎসার পর?

…….. ডিগ্রী।

৩।আক্রান্ত কনুই পরোক্ষ সংকোচনে রেঞ্জ কত, ১০ সেশন চিকিৎসার পর?

…….. ডিগ্রী।

৪।আক্রান্ত কনুই পরোক্ষ প্রসারনে রেঞ্জ কত, ১০ সেশন চিকিৎসার পর?

…….. ডিগ্রী।

চিকিৎসা পরবর্তী উপাত্ত সমূহ

পর্ব ঘ: কনুই এরমাংসপেশির সক্ষমতার তথ্যবলী

কনুইএর মাংসপেশির সক্ষমতার বর্তমানে কতটুকু আছে ?**(OXFORD Grade Scale)**

ফ্লেক্সসন .....
এক্সটেন্সান .....

চিকিৎসা পরবর্তী উপাত্ত সমূহ

পর্ব উ: কর্মকান্ডেঅক্ষমতানির্ণয়

(১০ সেশন চিকিৎসার পর)

	সমস্যা নেই										করতে পারেনা
চাবি বা ডোরনব ঘুরানো	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০
বাজারের ব্যাগ বা ব্রিফকেস এর হাতলে ধরে তোলা	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০
এক কাপ কফি বা এক গ্লাস দুধ আপনার মুখ পর্যন্ত নেয়া	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০
জার খোলা	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০
প্যান্ট উপরে তোলা	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০
ভিজা কাপড় বা তোয়ালে নিংড়ানো	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০
ব্যক্তিগত কাজ (জামাপরা, ধোয়া)	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০
গৃহস্থালি কাজ	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০
আপনার চাকরি বা দৈনন্দিন কাজ	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০
খেলাধুলা বা বিনোদনমূলক কাজ	০	১	২	৩	৪	৫	৬	৭	৮	৯	১০

এখানে ০- ১০ সীমায় ব্যাথা অনুযায়ী নাম্বারে বৃত্তাংকন করতে হবে। ০ মানে রোগী কোন সমস্যার সম্মুখিন হন নি আর ১০ মানে তিনি করতে পারেন নি বা খুব অসুবিধা হয়েছে।

Consent Form

Assalamualaikum\ Namashker,

I am Mohammad Shahadat Hossain, Final part of M.Sc. in Physiotherapy student of Bangladesh Health Professions Institute (BHPI) under the Faculty of Medicine, University of Dhaka. To obtain my Master's degree, I have to conduct a research project and it is a part of my study. The participants are requested to participate in the study after a brief of the following.

My research title is **" effectiveness of MyofascialRelease (Biceps brachi, latissimusdorsi, pectoralis major) to reduce pain among patients with Tennis Elbow?"** Through this study I will find the Does effectiveness of myofascial Release (Biceps brachi, latissimusdorsi, pectoralis major) along with other physiotherapy for the treatment of Patients with Tennis elbow. If I can complete this study successfully, patients may get benefits who are suffering fromTennis elbow.

To fulfill my research project, I need to collect data. So, you can be a respected participant of this research. I want to meet you a couple of sessions, during your regular therapy schedule. Given that exercises would be pain free and safe for you.

I would like to inform you that this is a purely academic study and will not be used for any other purposes. I assure that all data will be kept confidential. Your participation will be voluntary. You may have the rights to withdraw consent and discontinue participation at any time of the experiment. You also have the rights to answer a particular question that you don't like.

If you have any query about the study or right as a participant, you may contact with researcher Mohammad Sahadat Hossain, Dept. of Physiotherapy orNasirul Islam,Principal, BHPI, CPR, 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 participant and date ……..

Signature of the researcher and Date……..

Signature of the witness and Date……..

Questionnaire (English)

SECTION-A: Subjective Information

This questionnaire is developed to measure the pain of the patient with Tennis Elbow, and this section will be filled (√) mark in the left of point by, patients but in special consideration physiotherapist using a black or blue pen.

Code No:Date:

Patient'sname:Patient's ID:

Address:

Mobile number:

Questions	Answer
1. Age	……..years ……month ……..day
2. Sex	o Male=1 o Female=2
3. Occupation	o Tennis player =1 o Service holder =2 o Businessman =3 o House wife =4 o Student =5 o Retires =6 o Others =7
4. What is the main issue that brought you in today?	o Pain in elbow =1 o Weakness of the forearm muscle =2 o Numbness or tingling in your arm =3 o Recent injury =4 o Deformity =5
5. What part of your elbow hurts	o Front =1 o Medial =2 o Lateral =3 o Back =4

6. Do you perform any repetitive or forceful tasks ormovements?	o Yes =1 o No =2
7. Is now the pain, from being of starting pain?	i. Improving =1 i. Worsening =2 i. Staying the same =3
8. How long stay the current problem been going on?	o Every time =1 o Sometime =2
9. What treatments that you have tried until?	o Medical treatment= 1 o Physiotherapy =2 o Pain killer =3 o Injection =4 o Brace= 5 o Surgery =6 o Traditional medicine =7 o Massage =8 o Others =9
10. How time you take treatment, for this problem?	
11. How long time you take treatment, for this problem?	……..years ……month ……..day

Before Treatment (Pre-Test)

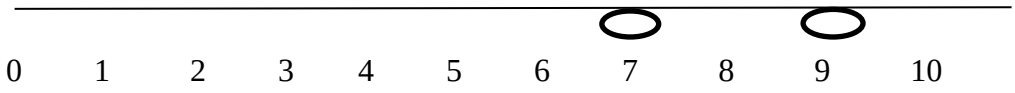
SECTION-B: Pain Status

This questionnaire is designed for tennis elbow patients. McCaffery et al. (1999) used a numeric scale to rate the pain status experienced by patients. It is known as Numeric Pain Rating Scale. The scale is a 10cm long scale ranging from 0-10. Here a zero (0) means no pain, 1-3 indicates mild pain, 3-5 indicates that pain is in moderate state and 6-10 is worst possible pain feeling experienced by patients.

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

Rate the average amount of pain in your elbow by encircling the number that best describes your pain on a scale from 0-10. A zero (0) represents no pain and a ten (10) represents worst pain you have ever experienced.
For example-

If any participant has pain between 7 to 9 at Numeric Pain Rating Scale than he/ she will fill up:



A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe pain.

1. How severe your pain is at resting position?

0 1 2 3 4 5 6 7 8 9 10

A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe pain.

2. How severe is your pain during forceful wrist extension?

0 1 2 3 4 5 6 7 8 9 10

A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe pain.

3. How severe is your pain during a strong grasp?

0 1 2 3 4 5 6 7 8 9 10

A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe pain.

4. How severe is your pain when doing a task with repeated arm movement?

0 1 2 3 4 5 6 7 8 9 10

A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe pain

5. How severe is your pain when making a fist with pronation of forearm, and radial deviation and extension of wrist while the examiner resists the motion (cozen test)?

0 1 2 3 4 5 6 7 8 9 10

A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe pain

6. How severe is your pain during forceful middle finger extension?

0 1 2 3 4 5 6 7 8 9 10

A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe pain

7. How severe is your pain during Turn a doorknob or key or Open a jar?

0 1 2 3 4 5 6 7 8 9 10

A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe

8. How severe is your pain on palpation to the affected side?

0 1 2 3 4 5 6 7 8 9 10

A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe

Before Treatment (Pre-Test)

SECTION-C: Estimate the range of motion

This section of questionnaire will be filled by the physiotherapist or examiner using a black or blue coloured ball pen and measure ROM by using Goniometer.

1. How Active ROM of Affected Elbow at Flexion?

…….. Degrees

2. How Active ROM of Affected Elbow at Extension?

…….. Degrees

3. How Passive ROM of Affected Elbow at Flexion?

…….. Degrees

4. How Passive ROM of Affected Elbow at Extension?

…….. Degrees

Before Treatment (Pre-Test)

SECTION-D: Estimate Muscle Power

How much muscle power in elbow? (OXFORD Grade Scale)

Flexion.....

Extension.....

Before Treatment (Pre-Test)

SECTION-E: Estimate Functional Disability

	No Difficulty										Unable to do
Turn a doorknob or key	0	1	2	3	4	5	6	7	8	9	10
Carry a grocery bag or 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
Personal activities (dressing, washing)	0	1	2	3	4	5	6	7	8	9	10
Household work (cleaning, maintenance)	0	1	2	3	4	5	6	7	8		10
Work (your job or everyday work)	0	1	2	3	4	5	6	7	8		10
Recreational or sporting activities	0	1	2	3	4	5	6	7	8		10

Here, by circling the number that best describes difficulty on a scale of 0-10. A zero (0) means Patient did not experience any difficulty and a ten (10) means it was so difficult, were unable to do it at all.

After Treatment (Post-Test)

SECTION-B: Pain Status

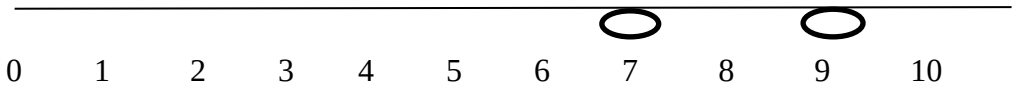
This questionnaire is designed for tennis elbow patients. McCaffery et al. (1999) used a numeric scale to rate the pain status experienced by patients. It is known as Numeric Pain Rating Scale. The scale is a 10cm long scale ranging from 0-10. Here a zero (0) means no pain, 1-3 indicates mild pain, 3-5 indicates that pain is in moderate state and 6-10 is worst possible pain feeling experienced by patients.

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

Rate the average amount of pain in your elbow by encircling the number that best describes your pain on a scale from 0-10. A zero (0) represents no pain and a ten (10) represents worst pain you have ever experienced.

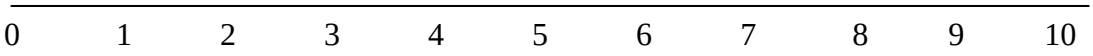
For example-

If any participant has pain between 7 to 9 at Numeric Pain Rating Scale than he/ she will fill up:



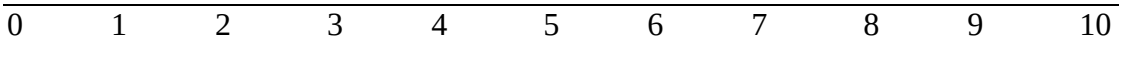
A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe pain.

1. How severe your pain is at resting position, after 10 section treatment?



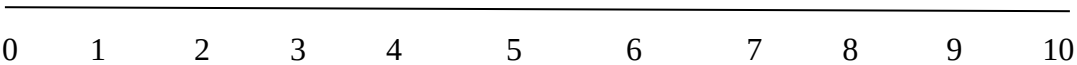
A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe pain.

2. How severe is your pain during forceful wrist extension, after 10 section treatment?



A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe pain.

3. How severe is your pain during a strong grasp, after 10 section treatment?



A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe pain.

4. How severe is your pain when doing a task with repeated arm movement, after 10 section treatment?

0 1 2 3 4 5 6 7 8 9 10

A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe pain

5. How severe is your pain when making a fist with pronation of forearm, and radial deviation and extension of wrist while the examiner resists the motion (cozen test), after 10 section treatment?

0 1 2 3 4 5 6 7 8 9 10

A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe pain

6. How severe is your pain during forceful middle finger extension, after 10 section treatment?

0 1 2 3 4 5 6 7 8 9 10

A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe pain

7. How severe is your pain during Turn a doorknob or key or Open a jar, after 10 section treatment?

0 1 2 3 4 5 6 7 8 9 10

A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe

8. How severe is your pain on palpation to the affected side, after 10 section treatment?

0	1	2	3	4	5	6	7	8	9	10

A Zero (0) means no pain (1-3) means mild pain (4-6) means moderate pain and (7-10) means severe.

After Treatment (Post-Test)

SECTION-C: Estimate the range of motion

This section of questionnaire will be filled by the physiotherapist or examiner using a black or blue coloured ball pen and measure ROM by using Goniometer.

1. How Active ROM of Affected Elbow at Flexion, after 10 section treatment?

…….. Degrees

2. How Active ROM of Affected Elbow at Extension, after 10 section treatment?

…….. Degrees

3. How Passive ROM of Affected Elbow at Flexion, after 10 section treatment?

…….. Degrees

4. How Passive ROM of Affected Elbow at Extension, after 10 section treatment?

…….. Degrees

Before Treatment (Post -Test)

SECTION-D: Estimate Muscle Power

How much muscle power in elbow? (OXFORD Grade Scale)

Flexion.....

Extension.....

After Treatment (Post-Test)

SECTION-E: Estimate Functional Disability

(This measure after 10 session of treatment)

	No Difficulty										Unable to do
Turn a doorknob or key	0	1	2	3	4	5	6	7	8	9	10
Carry a grocery bag or 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
Personal activities (dressing, washing)	0	1	2	3	4	5	6	7	8	9	10
Household work (cleaning, maintenance)	0	1	2	3	4	5	6	7	8		10
Work (your job or everyday work)	0	1	2	3	4	5	6	7	8		10
Recreational or sporting activities	0	1	2	3	4	5	6	7	8		10

Here, by circling the number that best describes difficulty on a scale of 0-10. A zero (0) means Patient did not experience any difficulty and a ten (10) means it was so difficult, were unable to do it at all.

Permission Letter

February 28, 2016
Head of Physiotherapy Department
Center for the Rehabilitation of the Paralysed (CRP)
Savar, Dhaka-1343.
Subject: Regarding permission to collect data from musculoskeletal unit to conduct a research project.
Through: Course Coordinator, MSc in Physiotherapy Program.
Sir,
Greetings from Bangladesh Health Professions Institute (BHPI).
It is your kind attention that Bangladesh Health Professions Institute (BHPI)- an academic institute of CRP, has been conducting M.Sc. in Physiotherapy under Faculty of Medicine of University of Dhaka (DU) since 2014. My thesis entitled "Does Myofascial Release (Biceps brachi, latissimus dorsi, pectoralis major) reduce pain among patients with Tennis Elbow?" under honorable supervisor, Md. Nasirul Islam, Principal (Acting), Bangladesh Health Professions Institute (BHPI). The purpose of study is to identify does myofascial release reduce pain among patients with tennis elboe? It is a randomised control trial type of experimental research study. Data collection will require the patients and a small space of your reputed musculoskeletal unit and will occur for six weeks from 20th February, 2016. Data collectors will receive informed consents from all participants. Any data collected will be kept confidential. Ethical approval is received from the Institutional Review Board (IRB) of Bangladesh Health Professions Institute. I have chosen musculoskeletal Unit to collect required data. Now I am looking for your kind approval to start my data collection. I would like to assure that anything of my research project will not harmful for the participant.

Therefore I look forward to your cooperation by giving me permission for data collection at musculoskeletal unit, CRP, Savar.

Yours faithfully

(Md. Shahadat Hossain)
Part-2, M. Sc. in physiotherapy Program
Session: 2013-14
BHPI, CRP, Savar, Dhaka-1343

Approved
28/02/16
Mohammad Anwar Hossain
Associate Professor &
Head of Physiotherapy Dept.
CRP, Chapain, Savar, Dhaka-1343

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

Ref. CRP/BHPI/IRB/02/16/026 *Date:* 27.02.2016

To
Md. Shahadat Hossain
Part – II, M.Sc. in Physiotherapy
Session: 2013-2014, DU Reg. No: 3455
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Subject: Approval of the thesis proposal on "Effectiveness of myofascial release (biceps brachi, pectoralis major, latissimus dorsi) to reduce pain among patients with tennis elbow" by IRB.

Dear Md. Shahadat Hossain,
The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application on January 11, 2016 to conduct the above mentioned thesis, with yourself, as the Principal investigator. The Following documents have been reviewed and approved:

SL#	Name of the Documents
1	Thesis Proposal
2	Questionnaire
3	Information sheet & consent form.

Since the study involves questionnaire have no likelihood of any harm to the participants and aiming to see the effectiveness of myofascial release (biceps brachi, pectoralis major, latissimus dorsi) to reduce pain among patients with tennis elbow, the members of the Ethics committee has approved the study to be conducted in the presented form at the meeting held at 08:30 AM on February 25, 2016 at BHPI.

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 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,

S M Ferdous Alam
Assistant Professor
Member Secretary, Institutional Review Board (IRB)
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

সিআরপি-চাপাইন, সাভার, ঢাকা-১৩৪৩, বাংলাদেশ, ফোন ঃ ৭৭৪৫৪৬৪-৫, ৭৭৪১৪০৪ ফ্যাক্স ঃ ৭৭৪৫০৬৯
CRP-Chapain, Savar, Dhaka-1343, Tel : 7745464-5, 7741404, Fax : 7745069, E-mail : contact@crp-bangladesh.org, www.crp-bangladesh.org