COMPARING THE EFFICACY OF MULLIGAN MOBILIZATION TECHNIQUE AND PILATES PROGRAMME ON OUTCOME MEASURES OF SUBJECTS WITH CHRONIC NECK PAIN

Dissertation submitted in

The Partial fulfillment

For the degree of

MASTER OF PHYSIOTHERAPY

(Orthopaedics)

The TamilNadu Dr. M.G.R. Medical University

Chennai

May 2018

PSG COLLEGE OF PHYSIOTHERAPY

Coimbatore

PSG COLLEGE OF PHYSIOTHERAPY

Coimbatore

CERTIFICATE

This is to certify that the research work entitled **"COMPARING THE EFFICACY OF MULLIGAN MOBILIZATION TECHNIQUE AND PILATES PROGRAMME ON OUTCOME MEASURES OF SUBJECTS WITH CHRONIC NECK PAIN."** was carried out by **Reg. No. 271610242,** of P.S.G. College of Physiotherapy, towards the partial fulfillment for the degree of **MASTER OF PHYSIOTHERAPY (Physiotherapy in Orthopaedics)** affiliated to The Tamilnadu Dr. M.G.R. Medical University, Chennai.

Internal Examiner **External Examiner**

Date of Evaluation:

PSG COLLEGE OF PHYSIOTHERAPY

Coimbatore

CERTIFICATE

This is to certify that the dissertation work entitled **"COMPARING THE EFFICACY OF MULLIGAN MOBILIZATION TECHNIQUE AND PILATES PROGRAMME ON OUTCOME MEASURES OF SUBJECTS WITH CHRONIC NECK PAIN"** was carried out by **GOBINATH. C, Reg. No. 271610243** of P.S.G. College of Physiotherapy, Coimbatore, affiliated to The Tamilnadu Dr. M.G.R. Medical University, Chennai.

Prof. R.MAHESH, MPT (CARDIO).,
Principal
P.S.G. College of Physiotherapy
Coimbatore - 641 004.

Place: Coimbatore

Date:

PSG COLLEGE OF PHYSIOTHERAPY

Coimbatore

CERTIFICATE

This is to certify that the dissertation work entitled **"COMPARING THE EFFICACY OF MULLIGAN MOBILIZATION TECHNIQUE AND PILATES PROGRAMME ON OUTCOME MEASURES OF SUBJECTS WITH CHRONIC NECK PAIN"** was carried out by **GOBINATH. C, Reg. No. 271610242** of P.S.G. College of Physiotherapy, Coimbatore, affiliated to The Tamilnadu Dr. M.G.R. Medical University, Chennai, under our guidance.

PROJECT GUIDE
Mr. K. SARAVANAN, MPT (ORTHO).,
Associate Professor
P.S.G. College of Physiotherapy
Coimbatore - 641 004.

Place: Coimbatore

Date:

ACKNOWLEDGEMENT

I would like to express the deepest appreciation to **ALMIGHTY** for showering his blessings, who has always been my source of strength and who guides me throughout.

It would be better and fair to first devote my heartfelt thanks to **My Parents** and S**ister** for their indescribable love and support throughout my carrier.

I would like to express my sincere gratitude to **Prof. R. Mahesh, MPT, Principal,** PSG College of physiotherapy, Coimbatore for his encouragement and inspirations during the course of the study.

I am thankful to my project guides **Mr. K. Saravanan, MPT,** Associate Professor, for his encouragement and inspiration given throughout the study.

I am very grateful to **Dr.V.Ramamoorthy, M.D.,** Professor and HOD**,** Department of PMR, **Dr. B.K. Dinakar Rai**, **M.S.,** Professor and HOD, Department of Orthopedics & Orthopedic Surgery, PSG hospitals, Coimbatore for his encouragement, kind, calm and patient help throughout the study.

My special thanks to **Mrs. V. Mahalakshmi, MPT**, Post graduate Coordinator, who has guided me and helped me throughout my academic activities and dissertation completion

I express my gratitude to **Mrs. Y. Ashraf, MPT, Ms. Shanmugapriya, MPT, Mr. J. Raja Regan, MPT, Mr. M. Mahendiran**, **MPT, Mr. Nagaraj, MPT, Mrs. Sweety Subha, MPT, Mr.Malarvizhi, MPT,** for their timely help.

I am grateful to **Dr. Anil Mathew, Ph.D**, **Associate Professor**, Department of Biostatistics, PSG Institute of Medical Science and Research who helped in statistical method of data analysis.

I thank all the members of **Institutional Review Committee of Research**, College of Physiotherapy and **Human Ethics Committee** of PSG Institute of Medical Science and Research for their valuable suggestions to complete the dissertation.

My thanks and appreciation also go to the most esteemed, **My Friends, Colleagues**, **Seniors & Juniors** for sharing their knowledge, love, support and exclusive cooperation.

I also thank to all the staff members of the PSG College of Physiotherapy and Department of Physiotherapy for helping me to complete this project successfully.

Finally, I thank all the patients for their kind co-operation. Without their involvement this project would have not been possible.

ABBREVIATIONS

CNP	-	Chronic – Neck Pain
CR	-	Cervical Radiculopathy
CNR	-	Cervical Nerve Root
NPRS	-	Numeric Pain Ratting Scale
ROM	-	Range of Motion
NDI	-	Neck Disability Index
ULTT	-	Upper Limb Tension Test
CROM	-	Cervical Range of Motion
IVF	-	Inter Vertebral Foramen
F	-	Flexion
E	-	Extension
RLF	-	Right Lateral Flexion
LLF	-	Left Lateral Flexion
RCR	-	Right Cervical Rotation
LCR	-	Left Cervical Rotation

CONTENTS

LIST OF ANNEXURES

Annexure	Content
I	Ethical Committee Clearance Letter
II	Assessment form
III	Proforma
IV	Informed Consent (English and Tamil)
V	Assessment Tools
VI	Treatment Protocol

CHAPTER - I

INTRODUCTION

Neck pain is becoming increasingly more common in our society. The 12-month prevalence has been reported to be between 30-50 % [(1)] and lifetime prevalence as being approximately 70%[(2)] . The prevalence of neck pain increases with age and [(2)] is more common in females [(3)]. Contributing factors are poorly understood and are usually multi-factorial, including poor posture, anxiety, depression, neck strain, and sporting or occupational activities [(4)].

Neck pain is a frequent and disabling complaint in general population [(5)]. One of the most common causes of neck pain is mechanical dysfunction of cervical spine [(6)]. In the general population, up to 30% to 50% of adults will experience neck pain in any given year [(7)].Adolescents with neck pain are at high risk of having such symptoms in adulthood [(8,9)]. Neck pain can originate from disorders in the neck, such as neural tissue, uncovertebral or intervertebral joints, discs, bones, periosteum, muscles, and ligaments. Symptoms of neck pain may often be self-limiting within a few weeks of onset, although the natural course of neck pain remains unclear. Most often, however, no specific cause can be identified, and the symptoms are labeled Nonspecific [(10)]. It is found that abnormal muscle strength, endurance, and joint mobility may lead to abnormal biomechanics of body movement, causing abnormal physical load to various tissues including muscles, ligaments, and bone. Thus individuals with abnormal muscle strength, endurance, and joint mobility may be susceptible to musculoskeletal injury [(11)].

Multiple interventions have been used in the management of neck pain. A systematic review supports a combination of exercise and manual therapy (Gross et al., 2007) [(12)]. The evidence for exercise alone is conflicting. Some studies demonstrate a long-term effect (>1 year) from exercise (Jull et al., 2002; Evans et al., 2002)[(13,14)] while other studies show exercise to be effective in the short-term only (Stewart et al., 2007)[(15)]. A range of different types of exercise have been reviewed including specific low load endurance exercises for the deep cervical flexor muscles, scapular muscle retraining (Jull et al., 2002)[(13)], neck and upper limb strengthening, high tech MedX rehabilitative exercise (Evans et al., 2002)[(14)], stretching, aerobic and trunk and lower limb strengthening (Stewart et al., 2007)[(15)]. This huge variety is an indication of the lack of general consensus concerning the most effective exercise in the management of neck pain.

Pilates is a form of exercise that has become more widely used in recent years in both fitness and rehabilitation circles. Based on the teachings of Joseph Pilates and popular for decades in the dance medicine community, the Pilates method is a type of physical and mental conditioning using well designed and choreographed movements. Pilates pays special attention to the muscles which stabilize the joints, thus encouraging correct body mechanics [16]. It therefore strengthens the deep spinal stabilizing muscles, lengthens the spine, trains mind-body awareness and improves posture [17].

The key elements of these modified Pilates include activation of the lumbo-pelvic stabilizing muscles, correct ribcage/thoracic alignment, scapula-thoracic stabilization and lateral costal breathing. Pilates also encourages activation of the deep neck flexor muscles by encouraging a neutral position of the cervical spine with slight upper cervical flexion at the cranio-cervical junction. Joseph Hubertus Pilates original Principles and exercises comprised the following Breathing, Concentration, Control, Centering, Precision, flow.[18]

Mulligan's principle techniques are NAGS are Natural Apophyseal Accessory Glide applied to cervical spine with the patient passive. Reverse NAGS are applied to cervical spine with the patient passive. SNAGS are Sustained Natural Apophyseal Accessory Glides whereby the patient attempts to actively move a painful or joint stiffness through its range of motion whilst the therapist overlays an accessory glide parallel with treatment plane[19].MWMs are Mobilizations with movement and are applied to the peripheral joints. Physiological movements are a combination of rotation and glide, and glide is essential to pain free movement.

To date there are less evidence present for Pilates as an intervention for chronic neck pain, moreover no study has been found as comparing the Pilates intervention with Mulligan intervention in treating patients with chronic neck pain. The aim of this study is to evaluate the effectiveness of a 3-week Pilates programme and Mulligan mobilization technique on outcome measures in people with chronic neck pain of greater than 3 weeks duration.

1.1 NEED FOR THE STUDY

Pilates and Mulligan mobilization techniques combined with conventional physiotherapy are commonly applied for chronic neck pain, but there is lack of evidence on comparing the efficacy of Pilates and Mulligan mobilization technique combined with conventional physiotherapy in individuals with chronic neck pain, so this study sought to compare the efficacy of mulligan mobilization technique and Pilates programme on outcome measures in subjects with chronic neck pain.

1.2 OBJECTIVE

To compare the efficacy of Mulligan mobilization technique and Pilates programme on outcome measures of subjects with chronic neck pain.

1.3 HYPOTHESIS:

Null hypothesis: There will be no significant difference between the efficacy of Mulligan Mobilization Technique and Pilates programme in subjects with Chronic Neck Pain.

Alternative hypothesis: There will be significant difference between the efficacy of Mulligan Mobilization Technique and Pilates programme in subjects with Chronic Neck Pain.

1.4 OPERATIONAL DEFINITION:

Chronic Neck Pain:

The International Association for the Study of Pain (IASP) in its classification of chronic pain defines cervical spine as “pain perceived more than 12 weeks of duration anywhere in the posterior region of cervical spine, from the superior nuchal line to the thoracic spinous process”.

Pain:

An unpleasant sensory and emotional experience associated with actual or potential tissue damage.

Range of Motion:

Range of motion the measurement of movement around specific joint or body part.

Functional Activities:

Activities are required to perform the activities of daily living.

1.5 PROJECTED OUTCOME

Relaying on the literature review, it is expected that both Pilates and Mulligan mobilization techniques combined with conventional physiotherapy will significantly produce improvement in pain, range of motion and functional disability in individuals with Chronic Neck Pain.

CHAPTER – II

REVIEW OF LITERATURE

Rajesh Gautam et al.,2014, conducted study on effect of Maitland and Mulligan mobilization technique in improving neck pain, range of motion and disability. Total of 30 subjects were taken and divided randomly into three groups: Group A, group B, group C (each group with 10 subjects). Group A was under conventional therapy. Group Bunder Maitland mobilization techniques and group C under Mulligan mobilization technique. Treatment was given 4 times a week for total of 30 days. Pain, disability and ROM were assessed by numerical pain rating scale, NDI and universal goniometer. Assessment was done at 0, 15th and 30th day of treatment. ANOVA and Paired t-test were used. Statistical significance was set at 5% level. This study showed that mulligan mobilization is more effective in improving pain, ROM and disability. Although both experimental groups showed decrease in pain, disability and improved ROM but Mulligan mobilization was found to be more effective in improving pain, ROM and disability.

Germaine mallin et al.,2013, conducted study on effectiveness of 6 week Pilates programme on outcome measures in a population of chronic neck pain patients. Thirteen subjects were assessed on self-report tests; neck disability index (NDI), patient specific functional scale (PSFS), numerical rating pain scale (NRPS) and one objective measure; the abdominal drawing in test (ADIT). A statistically significant improvement was obtained in the disability outcomes (NDI and PSFS) at both 6 and 12 weeks. The NRPS also demonstrated statistical improvement at 12 weeks but not at 6. The minimal clinically important difference (MCID) is the score that reflects a change that is meaningful for the patient and this was achieved at 12-weeks for the NDI (>5 points), PSFS (>3 points) and NRPS (>2 points). Only 2 subjects reached normal levels in the ADIT at 12-weeks. The results of this pilot study suggest that Pilates has a role to play in reducing pain and disability in neck pain patients.

KaurInderpreet et al.,2003, conducted study of Effect Of Maitland Vs Mulligan Mobilizations Technique On Upper Thoracic Spine In Patients With Non-Specific neck Pain. 30 subjects were selected according to the inclusion and exclusion criteria were randomly divided into three groups: Maitland, Mulligan mobilization along with conventional treatment. Pre and post reading at0 day, 14th day and 21thday were recorded for NDI and NPRS scale. After three week protocol

it was found that all the three groups showed significant improvement in NDI and NPRS score within the group. The present finding shows that Group B (Maitland) shows significant improvements in the NDI score and Group C (Mulligan) would shows significant improvements in the NPRS scores in the patients with nonspecific neck pain. The present study shows that Maitland mobilization along with the conventional treatment prove to be more effective in improving NDI and NPRS scores in patients with nonspecific neck pain than Mulligan mobilization along with the conventional treatment.

Susan A. Reid et al., 2004, conducted study Effects of Cervical Spine Manual Therapy on Range of Motion, Head Repositioning, and Balance in Participants with Cervicogenic Dizziness. Participants 86, were randomly assigned to 1 of 3 groups: sustained natural apophyseal glides (SNAGs) with self-SNAG exercises, passive joint mobilization (PJM) with ROM exercises, or a placebo. Participants each received 2 to 6 treatments over 6 weeks. Manual therapy had no effect on balance or head repositioning accuracy. SNAG treatment improved cervical ROM, and the effects were maintained for 12 weeks after treatment. PJM had very limited impact on cervical ROM. There was no conclusive effect of SNAGs or PJMs on joint repositioning accuracy or balance in people with cervicogenic dizziness.

JaimeSalom-Moreno et al., 2004, conducted study immediate changes in neck pain intensity and widespread pressure pain sensitivity in patients with bilateral chronic mechanical neck pain. Fifty-two patients (58% were female) were randomly assigned to a thoracic spine thrust manipulation group or of thoracic non–thrust mobilization group. Pressure pain thresholds (PPTs) over C5-C6 zygapophyseal joint, second metacarpal, and tibialis anterior muscle and neck pain intensity (11-point Numerical Pain Rate Scale) were collected at baseline and 10 minutes after the intervention by an assessor blinded to group allocation. The results of this randomized clinical trial suggest that thoracic thrust manipulation and non–thrust mobilization induce similar changes in widespread PPT in individuals with mechanical neck pain; however, the changes were clinically small. We also found that thoracic thrust manipulation was more effective than thoracic non–thrust mobilization for decreasing intensity of neck pain for patients with bilateral chronic mechanical neck pain.

Ian A Young et al., 2009 conducted a study to examine the effects of manual therapy and exercise, with or without the addition of cervical traction, on pain, function, and disability in

patients with cervical radiculopathy. Patients with cervical radiculopathy (N 81) were randomly assigned to 1 of 2 groups: a group that received manual therapy, exercise, and intermittent cervical traction (MTEX Traction group) and a group that received manual therapy, exercise, and sham intermittent cervical traction (MTEX group). Patients were treated, on average, 2 times per week for an average of 4.2 weeks. Outcome measurements were collected at baseline and at 2 weeks and 4 weeks using the Numeric Pain Rating Scale (NPRS), the Patient-Specific Functional Scale (PSFS), and the Neck Disability Index (NDI). Results concluded that there were no significant differences between the groups for any of the primary or secondary outcome measures at 2 weeks or 4 weeks.

Mark Chan Ci En et al., 2008 conducted a study to evaluate the construct and content validity of the Neck Disability Index (NDI) and the Neck Pain and Disability Scale (NPAD) in patients with chronic, non-traumatic neck pain. Twenty patients completed a patient-specific questionnaire, the Problem Elicitation Technique (PET), followed by the NDI and NPAD. Content validity was assessed by comparing the items of the NDI and NPAD with problems identified from the PET. Construct validity of the fixed-item questionnaires was examined by establishing the correlation with each other, and with the PET score. Eleven common problems were identified by patients through the PET, of which six were 10 included in the NDI and seven included in the NPAD. The NDI and NPAD scores were strongly correlated, while the correlation between the PET and the fixed-item questionnaires was moderate.

Oshua A. Cleland et al., 2016 Conducted a case series is to evaluate the Manual therapy, Cervical traction and strengthening exercises in patients with cervical radiculopathy. Eleven consecutive patients with cervical radiculopathy on the initial examination were treated with a standardized approach, including manual physical therapy, cervical traction, and strengthening exercises of the deep neck flexors and scapula thoracic muscles. At the initial evaluation all patients completed self-report measures of pain and function, including a numeric pain rating scale (NPRS), the Neck Disability Index (NDI), and the Patient-Specific Functional Scale (PSFS). All patients again completed the outcome measures, in addition to the global rating of change (GROC), at the time of discharge from therapy and at a 6-month follow-up session. Ten of the 11 patients (91%) demonstrated a clinically meaningful improvement in pain and function at the 6-month follow-up.

LennardVoogt et al., 2014 conducted a systematic review was carried out following the PRISMA-guidelines. Outcome measure was pain threshold. A total of 13 randomized trials were included in the review. In 10 studies a significant effect was found. Pressure pain thresholds increased following spinal or peripheral manual techniques. In three studies both a local and widespread analgesic effect was found. No significant effect was found on thermal pain threshold.

Pinar Borman et al., 2008 conducted this study to examine its efficacy of intermittent cervical traction in chronic neck pain. Forty-two patients with at least 6 weeks of nonspecific neck pain were selected for the study. Each patient was randomly assigned to Group 1—receiving only standard physical therapy including hot pack, ultrasound therapy and exercise program and Group 2—treated with traction therapy in addition to standard physical therapy. The patients were reevaluated at the end of the therapy. The main outcome measures of the treatment were pain intensity by visual analog scale (VAS), disability by neck disability index (NDI), and quality of life. There were 21 patients in both groups. Both groups improved significantly in pain intensity and the scores of NDI and physical subscales of NHP at the end of the therapies ($p<0.05$). There was an association between NDI and VAS pain scores in both groups ($p<0.05$). In conclusion, no specific effect of traction over standard physiotherapeutic interventions was observed in adults with chronic neck pain.

Jellad et al., 2009 conducted a study to assess the effect of mechanical and manual intermittent cervical traction on pain, use of analgesics and disability during the recent cervical radiculopathy (CR). Thirty-nine patients were divided into three groups of 13 patients each. A group (A) treated by conventional rehabilitation with manual traction, a group (B) treated with conventional rehabilitation with intermittent mechanical traction and a third group (C) treated with conventional rehabilitation alone. They evaluated cervical pain, radicular pain, disability and the use of analgesics at baseline, at the end and at 1, 3 and 6 months after treatment. Results concluded that the treatment improves cervical pain, radicular pain and disability is significantly better in groups A and B compared to group C. The decrease in consumption of analgesics is comparable in the three groups. At 6 months improving of cervical and radicular pain and disability is still significant compared to baseline in both groups A and B. The gain in consumption of analgesics is significant in the three groups: A, B and C. In conclusion they

stated that Manual or mechanical cervical traction appears to be a major contribution in the rehabilitation of CR particularly if it is included in a multimodal approach of rehabilitation.

Thomas TW Chiut et al, 2011 conducted a study to investigate the efficacy of intermittent cervical traction in the treatment of chronic neck pain over a 12-week follow-up. Seventy-nine patients with chronic neck pain were randomly assigned to either experimental group or control group. Experimental group received intermittent cervical traction and control group received infrared irradiation alone; twice a week over a period of six weeks. Outcome measurements: The values of Chinese version of the Northwick Park Neck Pain Questionnaire (NPQ), verbal numerical pain scale (VNPS), and cervical active range of motion (AROM) were measured at baseline, six-week and 12-week follow-up. No significant differences were found between the two groups.

CHAPTER III

MATERIALS AND METHODS

3.1 MATERIALS:

- Goniometer
- Knee hammer
- Inch tape
- Assessment chart

3.2 STUDY DESIGN:

A Randomized clinical trial study design in which the subjects are randomly allocated into 2 groups (Group A and Group B) by Computer generated random numbers and pretest values of both groups were compared with posttest values in selected parameters over a period of time.

3.3 STUDY SETTING:

Department of Orthopedics & Department of PMR, PSG IMSR hospitals, Coimbatore.

3.4 HUMAN PARTICIPATION PROTECTION:

The study was reviewed and approved by institutional human ethics committee at PSG IMSR.

3.5 POPULATION/PARTICIPANTS:

32 individuals with chronic neck pain ranging from 18-45 years were selected using simple randomization method and 16 individuals were assigned to each group.

Group A: Mulligan Mobilization Technique

Group B: Pilates Neck programme

The above 2 groups will receive

- Conventional exercise – neck isometric exercises
- Home exercise – active neck exercises, moist heat packs

3.6 SAMPLING:

Computer generated random sampling method

3.7 CRITERIA FOR SAMPLE SELECTION

3.7.1 Inclusion criteria:

- The age group of 18 to 45 yrs
- NPRS greater than 2 and less than 8
- Baseline NDI score of 10% or greater
- The participants should read and sign the informed consent form

3.7.2 Exclusion Criteria:

- Shoulder pathology/ trauma
- Medical "Red flags"
- Contraindication to Mobilization or Pilates
- Structural abnormality affecting neck

3.8 STUDY DURATION:-

- Total duration of 8 months was adopted for this study.

3.9 TREATMENT DURATION:-

- 40 minutes per session, 3sessions per weeks, for 3 weeks

3.10 INSTRUMENT& TOOL FOR DATA COLLECTION:

- NPRS (Numerical Pain Rating Scale) for measuring neck pain
- Goniometer for measuring Cervical ROM
- NDI (Neck Disability Index) for measuring neck disability.

3.11 TECHNIQUE OF DATA COLLECTION:

Initial assessment was taken on the first day of intervention by using outcome measures. After obtaining the informed consent form, the Intervention was given to each group separately for 3 weeks. Final assessment was taken after the 3 weeks of Manual therapy treatment using same outcome measures. Comparison of pre test and post test values within the group and between the groups was done finally.

3.12 TECHNIQUE OF DATA ANALYSIS &INTERPRETATION:

Data collected from subjects were analyzed using paired ‘ t’ test to measure changes between pretest and posttest values of outcome measures within the group. Independent‘ t’test was used to measure changes between the groups.

Paired‘ t’test

$$SD = \sqrt{\frac{\sum (d - \overline{d})^2}{n-1}}$$

$$t = \frac{\overline{d}\sqrt{n}}{SD}$$

$\overline{d}$ = Calculated Mean Difference of pretest &post test values

SD = Standard Deviation

n = Number of samples

d = Difference b/w pretest &post test values

Independent ‘t’ test:

$$t = \frac{|\bar{x}_1 - \bar{x}_2|}{SD\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

Where,

$$SD = \sqrt{\frac{(n_1 - 1)SD_1^2 + (n_2 - 1)SD_2^2}{n_1 + n_2 - 2}}$$

X1 = Mean difference in Group A

X2 = Mean difference in Group B

SD = Combined standard deviation of Group A and Group B

n1 = Number of patients in Group A

n2 = Number of patients in Group B

SD1 = Standard Deviation of Group A

SD2 = Standard Deviation of Group B

METHODOLOGY FLOW CHART

CHAPTER – IV

DATA ANALAYSIS AND INTERPRETATION

Data analysis is the systemic organization and synthesis of research data and testing of research hypothesis using these data. Interpretation is the process of making sense of the results of a study and examining the implication (Polit& Belt, 2004). The pretest and posttest values for Groups A&B were obtained before and after intervention. The improvement in Pain was assessed using Numeric Pain Ratting Scale (NPRS), the improvement in neck range of motion was assessed using goniometer and the improvement in Functional disability was assessed using Neck Disability Index (NDI). The mean, standard deviation and Paired ‘t‘test values were used to find out whether there was any significant difference between pretest and posttest values within the groups.

Independent‘t’test is used to find the significant differences between the groups after intervention. Statistical analysis for the present study was done using SPSS version 16.0

TABLE: 1

PRE TEST AND POST TEST VALUES OF NUMERIC PAIN RATING SCALE IN GROUP A (n=16)

S.NO	**NPRS PRE TEST**	**NPRS POST TEST**
1.	7	7
2.	8	8
3.	8	8
4.	5	5
5.	7	7
6.	7	7
7.	6	6
8.	5	5
9.	6	6
10.	7	7
11.	5	5
12.	7	7
13.	6	6
14.	6	6
15.	6	6
16.	7	7

TABLE: 2

PRE TEST AND POST TEST VALUES OF NUMERIC PAIN RATING SCALE IN GROUP B (n=16)

S.NO	**NPRS PRE TEST**	**NPRS POST TEST**
1.	7	2
2.	7	2
3.	6	2
4.	8	2
5.	7	3
6.	7	2
7.	7	3
8.	7	2
9.	8	4
10.	6	2
11.	8	3
12.	6	1
13.	7	2
14.	7	3
15.	7	2
16.	8	3

TABLE: 3

Mean, Mean difference, Standard Deviation and Paired‘t’ test values of Numeric Pain Rating Scale (NPRS) for Groups A& B

Groups	Mean	Mean Difference	Standard Deviation	‘t’ Value	‘p’ Value
Group A					
Pre-test	6.44	4.23	0.87	19.75	p<0.05
Post-test	2.21				
Group B					
Pre-test	7.06	4.68	0.60	31.14	p<0.05
Post-test	2.38				

Based on Table 1, the mean difference of group A was found to be 4.23, Standard deviation was 0.87, the ‘t’ value using the paired ‘t’ test was 19.75 which was greater than the table value of 2.131 at P<0.05. In Group B the mean difference was 4.68, standard deviation was 0.60, the ‘t’value using the paired test was 31.14 which was greater than the table value of 2.131 at p<0.05. This shows there is a significant reduction in NPRS in both groups.

GRAPH: 1

PRE TEST AND POST TEST MEAN VALUES OF NPRS FOR GROUP A AND GROUP B

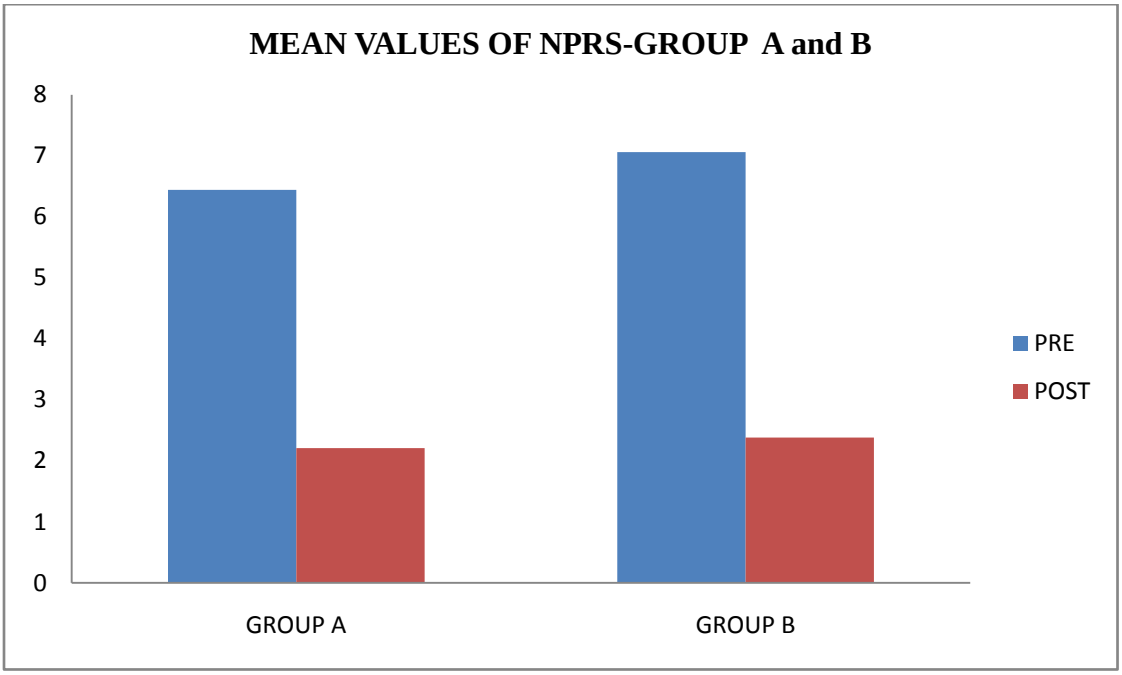


TABLE: 4

PRE & POST TEST VALUES OF NECK RANGE OF MOTION SCORE IN GROUP A (n=16)

S.No	ROM PRE TEST						ROMPOST TEST					
	F	E	RLF	LLF	RCR	LCR	F	EX	RLF	LLF	RCR	LCR
1.	60	50	30	30	60	50	70	60	40	40	70	55
2.	50	40	30	30	70	55	70	60	35	40	75	60
3.	70	50	25	30	70	60	80	60	30	35	75	65
4.	70	65	30	30	40	50	80	70	40	35	60	55
5.	60	60	30	30	60	50	70	70	45	45	70	55
6.	70	60	25	25	65	55	80	60	30	30	70	60
7.	70	50	25	25	70	50	80	60	30	30	80	60
8.	70	50	25	25	70	75	75	55	35	40	75	80
9.	65	60	30	30	60	45	70	65	40	40	70	55
10.	65	50	35	35	60	70	70	55	45	45	75	75
11.	60	50	30	30	45	50	65	55	40	40	60	60
12.	65	50	35	35	60	55	70	55	40	40	70	65
13.	50	40	30	30	70	55	60	50	45	45	80	60
14.	70	60	25	25	70	50	75	65	35	35	80	60
15.	70	50	25	25	75	60	80	70	30	30	80	65
16.	70	50	25	25	70	55	80	70	30	30	75	65

TABLE: 5

PRE & POST TEST VALUES OF NECK RANGE OF MOTION SCORE IN GROUP B (n=16)

S.No	ROM PRE TEST						ROMPOST TEST					
	F	E	RLF	LLF	RCR	LCR	F	EX	RLF	LLF	RCR	LCR
1.	70	50	30	30	65	50	75	50	40	40	70	55
2.	60	50	30	25	60	40	65	55	35	30	65	50
3.	70	50	30	30	55	50	80	60	35	40	55	55
4.	60	50	35	25	65	65	70	60	40	35	70	65
5.	60	50	30	30	55	60	70	60	40	35	60	60
6.	50	45	30	30	65	60	60	50	40	40	70	65
7.	50	45	30	30	60	50	60	50	40	40	70	70
8.	60	50	30	30	55	50	70	60	40	35	65	65
9.	60	50	35	35	55	50	70	60	40	40	65	60
10.	55	60	30	30	45	50	60	65	40	40	55	55
11.	60	50	35	35	60	50	70	60	40	40	70	60
12.	50	45	35	35	65	50	60	50	40	40	70	55
13.	65	45	25	25	50	45	70	50	30	30	55	60
14.	50	45	30	30	50	45	60	50	40	40	60	60
15.	60	50	30	30	60	50	70	60	40	40	70	55
16.	60	50	35	35	70	60	70	60	40	40	80	70

TABLE: 6

Mean, Mean difference, Standard Deviation and Paired 't'test values of Neck Range of Motion of groups A & B.

Groups	Mean	Mean Difference	Standard Deviation	't' Value	'p' Value
Group A (Neck Flexion) Pre-test Post-test	64.68 73.43	8.75	3.87	9.03	p<0.05
Group A (Neck Extension) Pre-test Post-test	52.18 61.25	9.06	6.11	5.92	p<0.05
Group B (Neck Flexion) Pre-test Post-test	58.75 67.50	8.75	2.23	15.65	p<0.05
Group B (Neck Extension) Pre-test Post-test	49.06 56.25	7.18	3.14	9.13	p<0.05
Group A (Neck RLF) Pre-test Post-test	28.43 36.87	8.43	3.52	9.58	p<0.05
Group A (Neck LLF) Pre-test Post-test	28.75 37.50	8.75	3.87	9.03	p<0.05
Group B (Neck RLF) Pre-test Post-test	31.25 38.75	7.50	2.58	11.61	p<0.05
Group B (Neck LLF) Pre-test Post-test	30.31 37.81	7.50	2.58	11.61	p<0.05

Group A (Neck RCR) Pre-test Post-test	62.50 73.12	10.62	4.42	9.60	p<0.05
Group A (Neck LCR) Pre-test Post-test	55.31 62.18	6.87	2.50	11.00	p<0.05
Group B (Neck RCR) Pre-test Post-test	58.43 65.62	7.18	3.14	9.13	p<0.05
Group B (Neck LCR) Pre-test Post-test	51.56 60.00	8.43	5.69	5.93	p<0.05

Based on Table 6, the mean difference of group A was found to be 8.75, Standard deviation was 3.87, the 't' value using the paired 't' test was 9.03 which was greater than the table value of 2.131 at P<0.05. In Group B the mean difference was 8.75, standard deviation was 2.23, the 't'value using the paired test was 15.65 which was greater than the table value of 2.131 at P<0.05. Both the group shows there is significant difference between the pre and post test values.

Based on Table 6, the mean difference of group A was found to be 9.06, Standard deviation was 6.11, the 't' value using the paired 't' test was 5.92 which was greater than the table value of 2.131 at P<0.05. In Group B the mean difference was 7.18, standard deviation was 3.14, the 't'value using the paired test was 9.13 which was greater than the table value of 2.131 at P<0.05. Both the group shows there is significant difference between the pre and post test values.

Based on Table 6, the mean difference of group A was found to be 8.43, Standard deviation was 3.52, the 't' value using the paired 't' test was 9.58 which was greater than the table value of 2.131 at P<0.05. In Group B the mean difference was 7.5, standard deviation was 2.58, the 't'value using the paired test was 11.61 which was greater than the table value of 2.131 at P<0.05. Both the group shows there is significant difference between the pre and post test values.

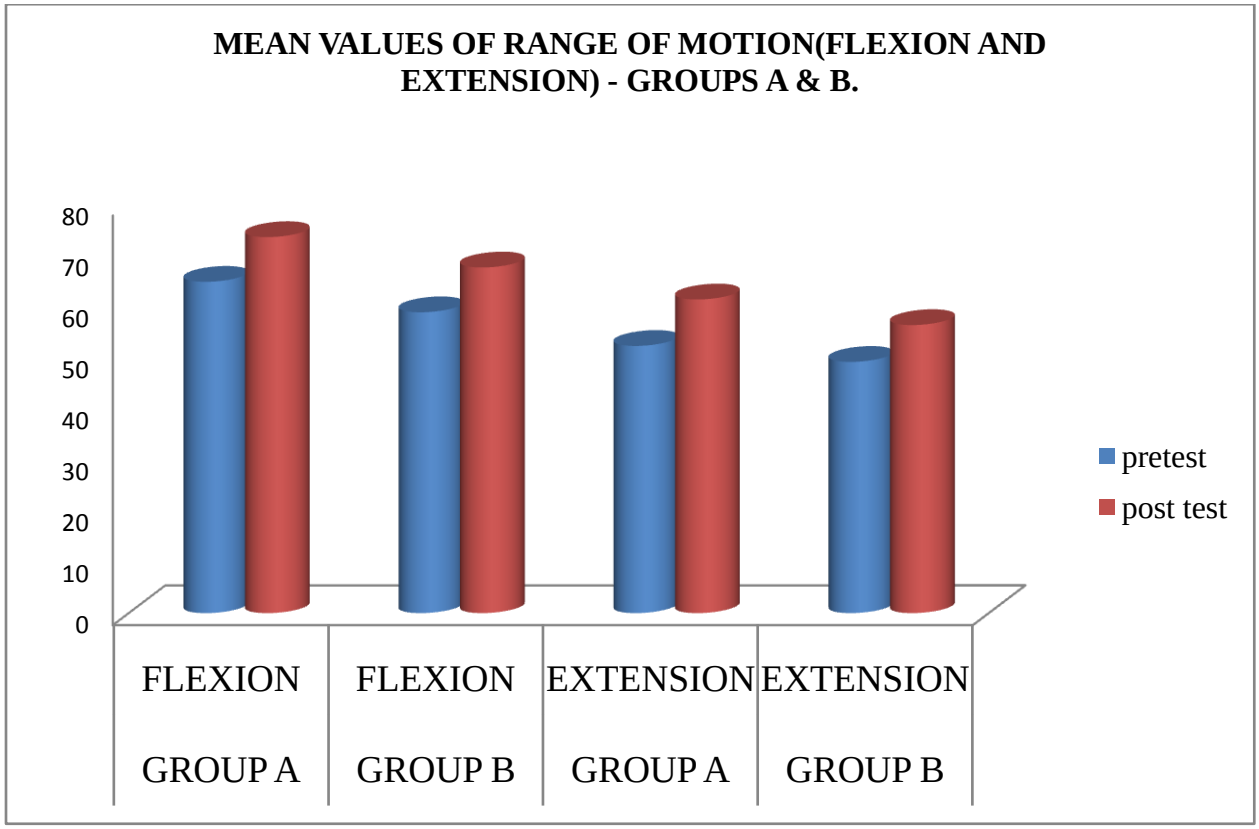
Based on Table 6, the mean difference of group A was found to be 8.75, Standard deviation was 3.87, the ‘t’ value using the paired ‘t’ test was 9.03 which was greater than the table value of 2.131 at P<0.05. In Group B the mean difference was 7.5, standard deviation was 2.58, the ‘t’value using the paired test was 11.61 which was greater than the table value of 2.131 at P<0.05. Both the group shows there is significant difference between the pre and post test values.

Based on Table 6, the mean difference of group A was found to be 10.62, Standard deviation was 4.42, the ‘t’ value using the paired ‘t’ test was 9.60 which was greater than the table value of 2.131 at P<0.05. In Group B the mean difference was 7.18, standard deviation was 3.14, the ‘t’value using the paired test was 9.139 which was greater than the table value of 2.131 at P<0.05. Both the group shows there is significant difference between the pre and post test values.

Based on Table 6, the mean difference of group A was found to be 6.87, Standard deviation was 2.50, the ‘t’ value using the paired ‘t’ test was 11.00 which was greater than the table value of 2.131 at P<0.05. In Group B the mean difference was 8.43, standard deviation was 5.69, the ‘t’value using the paired test was 5.40 which was greater than the table value of 2.131 at P<0.05. Both the group shows there is significant difference between the pre and post test values.

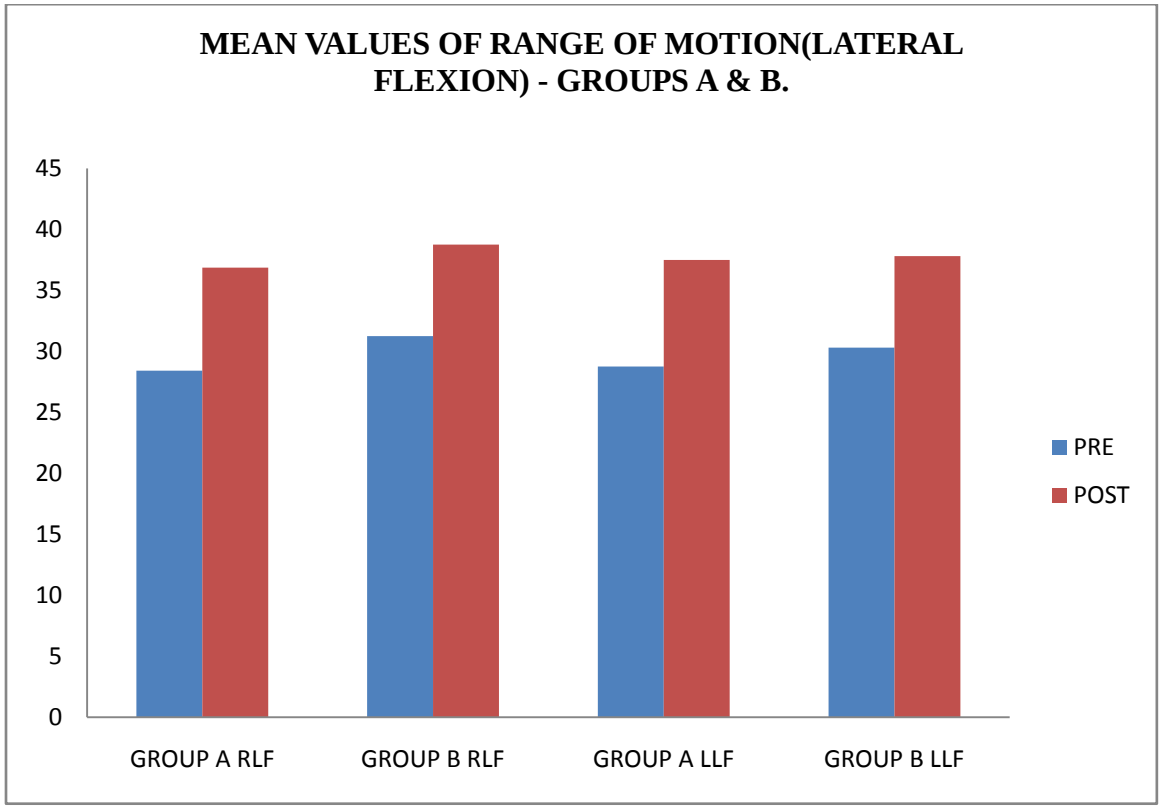
GRAPH:2

PRE TEST AND POST TEST MEAN VALUES OF RANGE OF MOTION (FLEXION AND EXTENSION) OF GROUPS A & B.



GRAPH:3

PRE TEST AND POST TEST MEAN VALUES OF RANGE OF MOTION (LATERAL FLEXION) OF GROUPS A & B.



GRAPH:4

PRE TEST AND POST TEST MEAN VALUES OF RANGE OF MOTION (CERVICAL ROTATION) OF GROUPS A & B.

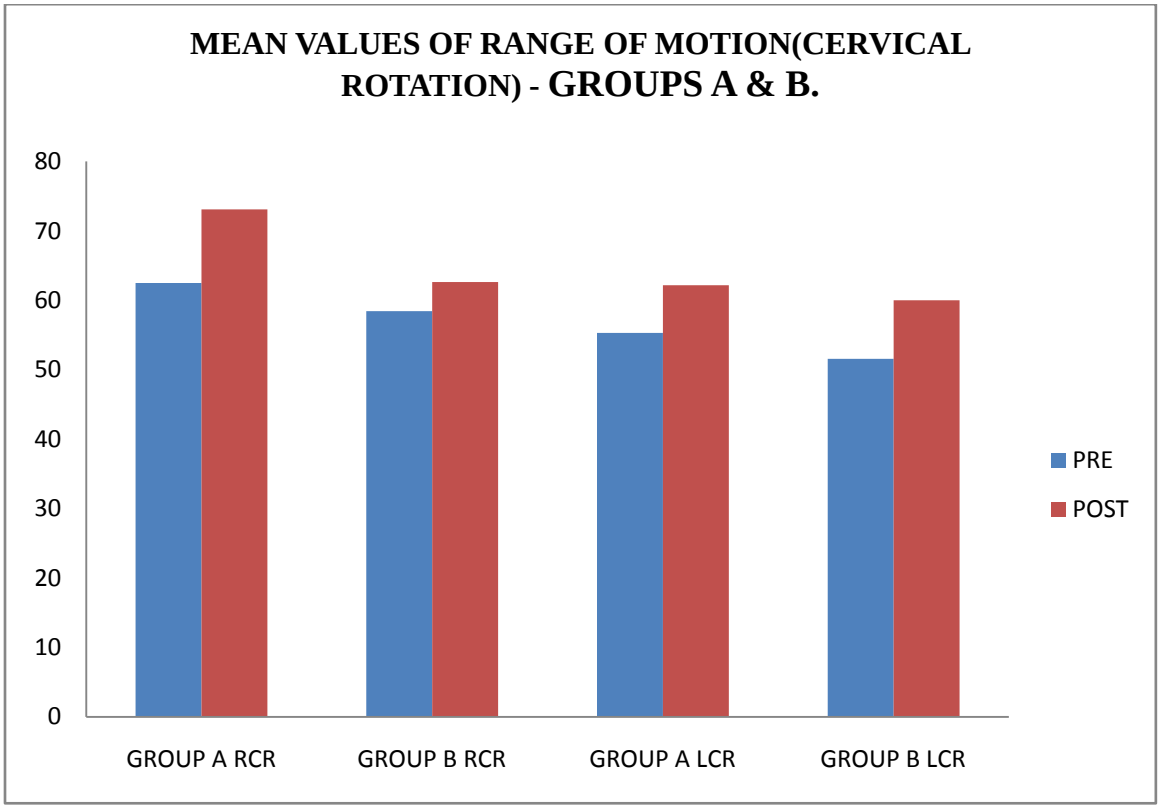


TABLE: 7

PRE & POST TEST VALUES OF NECK DISABILITY INDEX (NDI) SCORE IN GROUP A (n=16)

S. No	NDI PRE TEST	NDI POST TEST
1.	38	16
2.	34	6
3.	32	4
4.	42	24
5.	34	18
6.	50	14
7.	50	16
8.	28	8
9.	40	16
10.	36	6
11.	46	28
12.	40	20
13.	34	16
14.	42	24
15.	22	4
16.	40	20

TABLE: 8

PRE & POST TEST VALUES OF NECK DISABILITY INDEX (NDI) SCORE IN GROUP B (n=16)

S. No	NDI PRE TEST	NDI POST TEST
1.	34	4
2.	26	4
3.	26	2
4.	46	10
5.	34	8
6.	34	16
7.	36	18
8.	38	20
9.	48	16
10.	18	4
11.	32	14
12.	36	18
13.	34	14
14.	24	24
15.	26	8
16.	36	16

TABLE: 9

MEAN, MEAN DIFFERENCE, STANDARD DEVIATION AND PAIRED 't' TEST VALUES OF NECK DISABILITY INDEX (NDI) OF GROUPS A&B.

Groups	Mean	Mean Difference	Standard Deviation	't' Value	'p' Value
Group A					
Pre-test	38.00	23.00	6.28	14.64	$p<0.05$
Post-test	15.00				
Group B					
Pre-test	34.12	21.87	6.13	14.27	$p<0.05$
Post-test	12.25				

Based on Table 9, the mean difference of group A was found to be 23.00, Standard deviation was 6.28, the 't'value using the paired't'test was 14.64 which was greater than the table value of 2.131 at $p<0.05$. In Group B the mean difference was 25.87, standard deviation was 6.13, the 't'value using the paired test was 14.27 which was greater than the table value of 2.131 at $p<0.05$. This shows there is a significant reduction in NDI in both groups.

GRAPH: 5

PRE TEST AND POST TEST MEAN VALUES OF NDI FOR GROUP A AND GROUP B

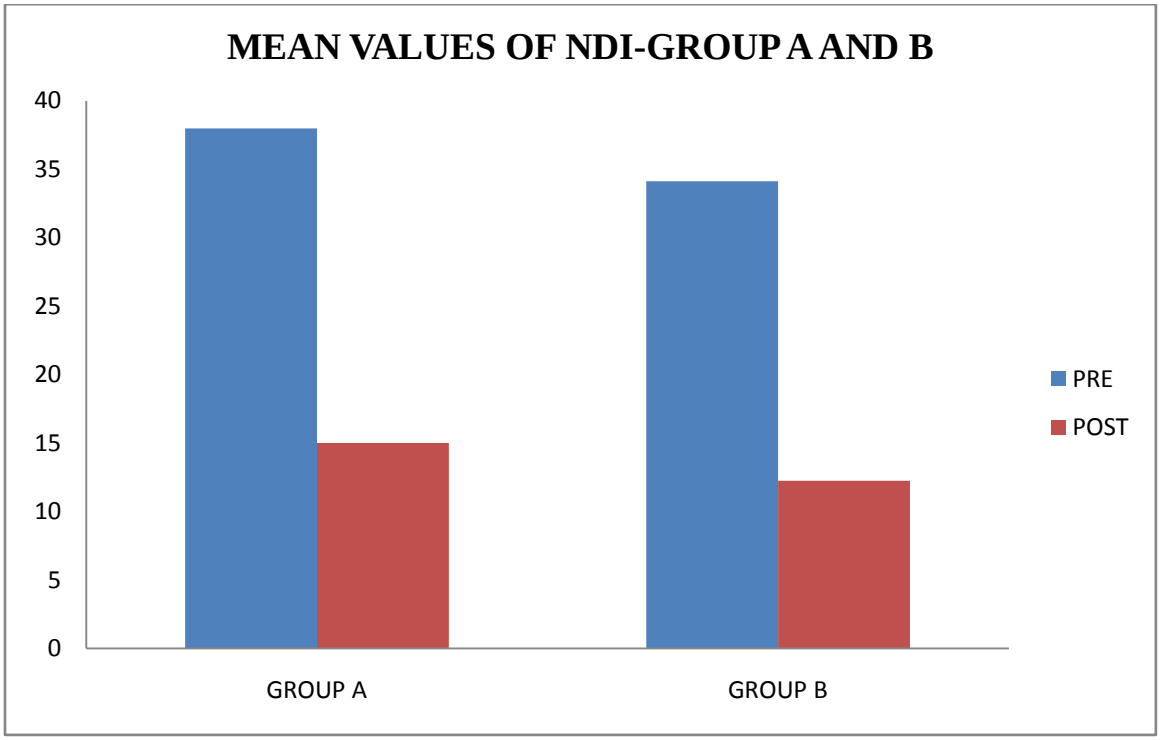


TABLE:10

COMPARING GROUP A & B USING INDEPENDENT 't'TEST

OUTCOME MEASURES	Mean Difference	Standard Deviation	't' Value	'p' Value
NPRS	0.25	0.88	0.87	p>0.05
RANGE OF MOTIONFLEXION	5.93	6.05	2.72	p<0.05
EXTENSION	5.00	6.45	2.39	p>0.05
RIGHT LATERAL FLEXION	1.87	5.73	1.16	p>0.05
LEFT LATERAL FLEXION	0.31	5.47	0.19	p>0.05
RIGHT CERVICAL ROTATION	7.18	7.04	3.03	P<0.05
LEFT CERVICAL ROTATION	2.18	7.06	0.95	p>0.05
NDI	2.75	7.51	1.09	p>0.05

The independent't' test was performed between group A and group B to analyze the significance of Mulligan mobilization technique and Pilates with conventional physiotherapy on pain, range of motion and functional disability in individuals with chronic neck pain.

The Numeric pain Ratting Scale (NPRS), between the group were calculated using independent 't' test & the obtained 't' value is 0.87 which was lesser than that of table value of 2.042 at P>0.05.

The RANGE OF MOTION(FLEXION), between the groups were calculated using independent ‘t‘ test & the ‘t‘ value was 2.72 which was higher than the table value of 2.042 at P<0.05.

The RANGE OF MOTION(EXTENSION), between the groups were calculated using independent ‘t‘ test & the ‘t‘ value was 2.39 which was higher than the table value of 2.042 at P>0.05.

The RANGE OF MOTION(RIGHT LATERAL FLEXION), between the groups were calculated using independent ‘t‘ test & the ‘t‘ value was 1.16 which was lesser than the table value of 2.042 at P>0.05.

The RANGE OF MOTION(LEFT LATERAL FLEXION), between the groups were calculated using independent ‘t‘ test & the ‘t‘ value was 0.91 which was lesser than the table value of 2.042 at P>0.05.

The RANGE OF MOTION(RIGHT CERVICAL ROTATION), between the groups were calculated using independent ‘t‘ test & the ‘t‘ value was 3.03 which was higher than the table value of 2.042 at P<0.05.

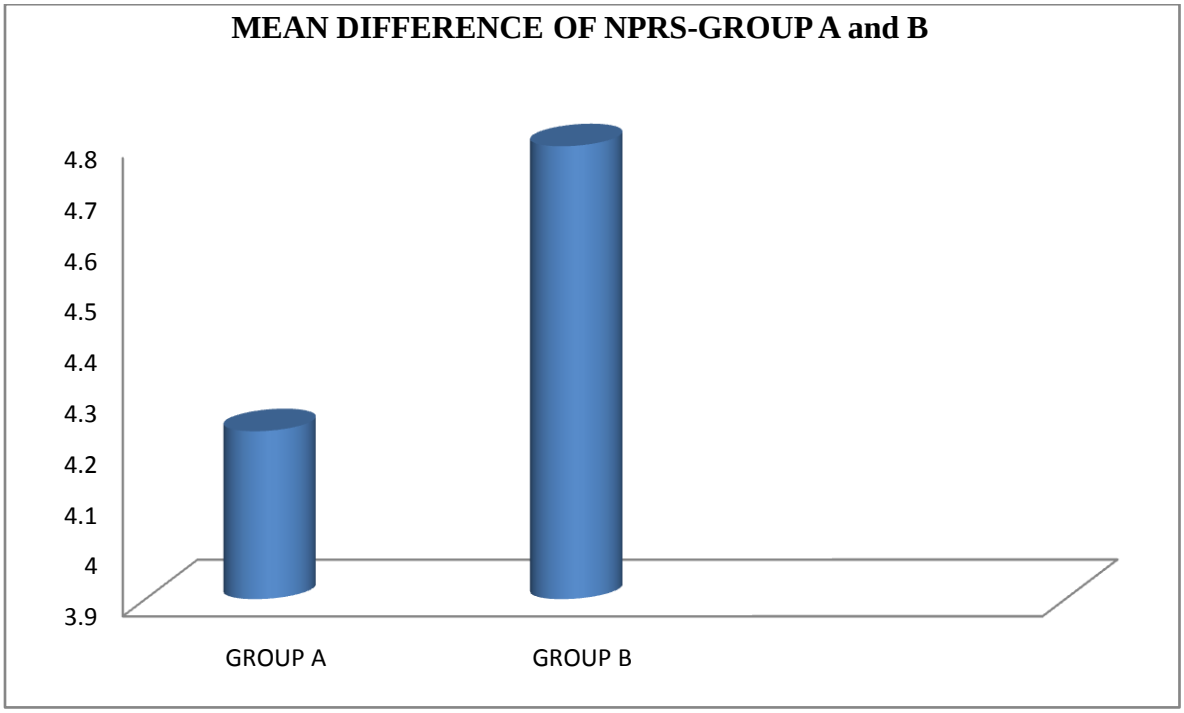
The RANGE OF MOTION(LEFT CERVICAL ROTATION), between the groups were calculated using independent ‘t‘ test & the ‘t‘ value was 0.95 which was lesser than the table value of 2.042 at P>0.05.

The Neck Disability Index (NDI), between the group were calculated using independent ‘t‘ test & the obtained ‘t‘ value is 1.09 which was lesser than that of table value of 2.042 at P<0.05.

The Independent‘t‘test was performed between Group A and Group B to analyze the significant difference for pain, range of motion and functional disability. Table 10 shows that there is significant difference in flexion, right rotation range of motion and there is no statistical difference in pain, extension ,right and left lateral flexion, left rotation range of motion, functional disability between Group A and Group B.

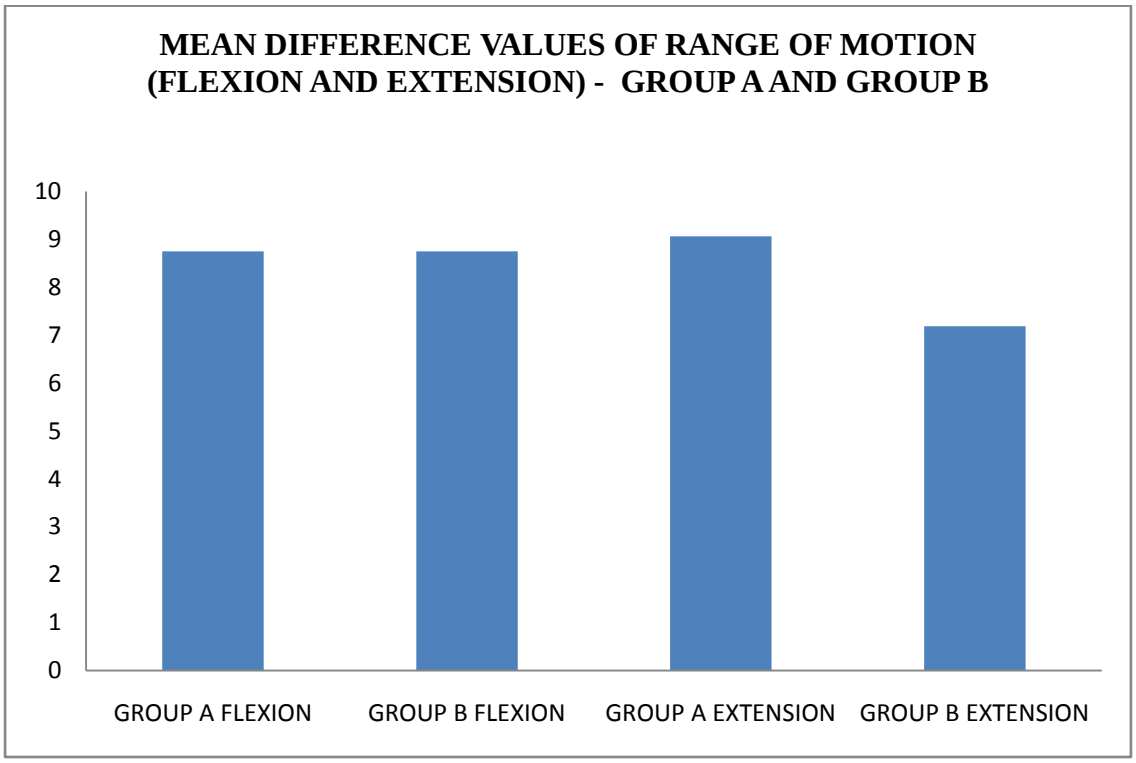
GRAPH: 6

MEAN DIFFERENCE OF PRE TEST AND POST TEST VALUES OF NPRS BETWEEN GROUP A AND GROUP B



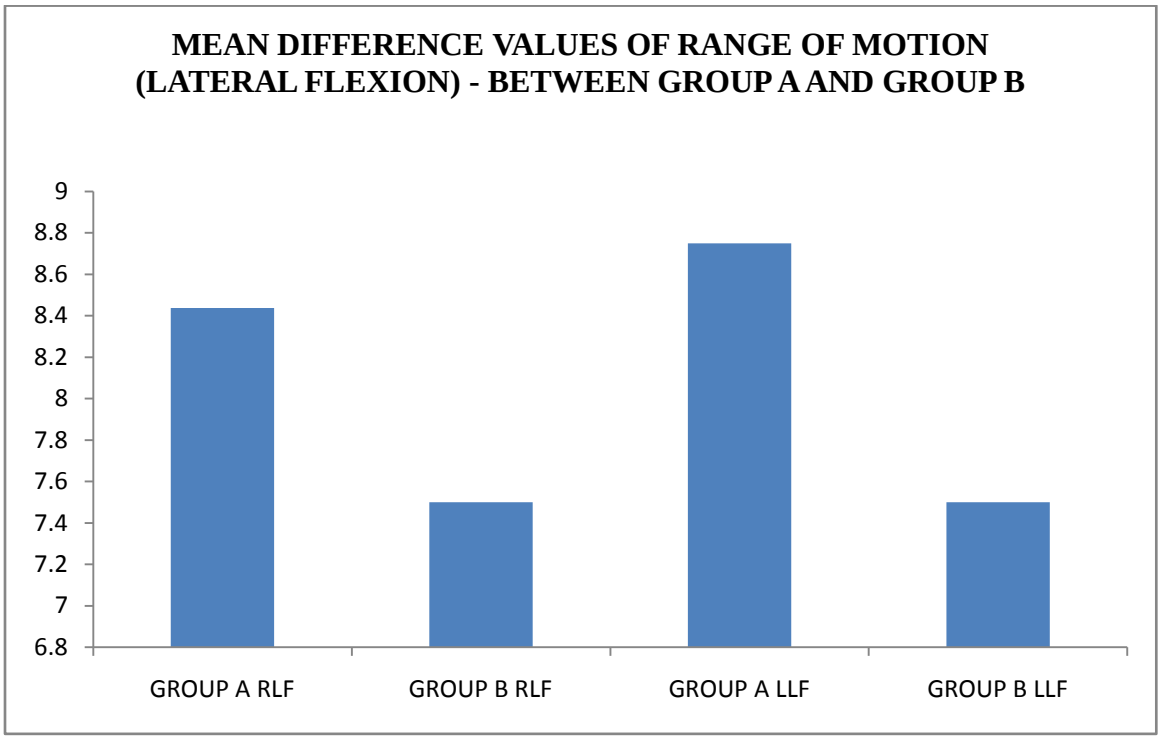
GRAPH: 7

MEAN DIFFERENCE OF PRE TEST AND POST TEST VALUES OF RANGE OF MOTION (FLEXION AND EXTENSION) OF BETWEEN GROUP A AND GROUP B



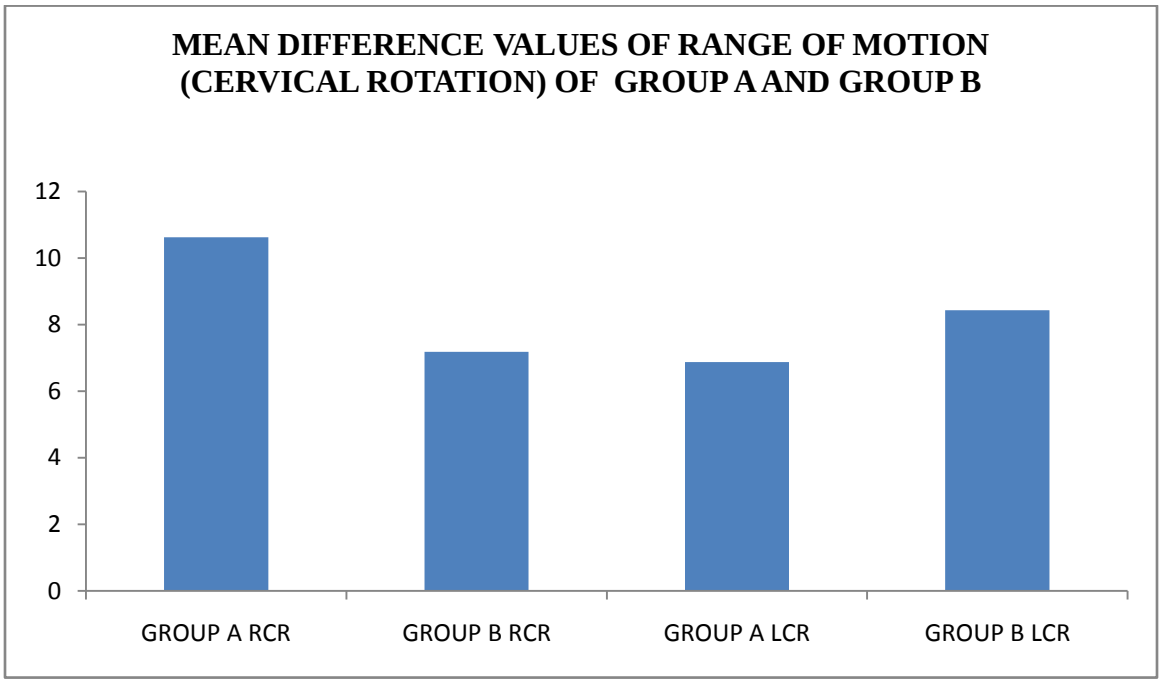
GRAPH: 8

MEAN DIFFERENCE OF PRE TEST AND POST TEST VALUES OF RANGE OF MOTION (LATERAL FLEXION) OF BETWEEN GROUP A AND GROUP B



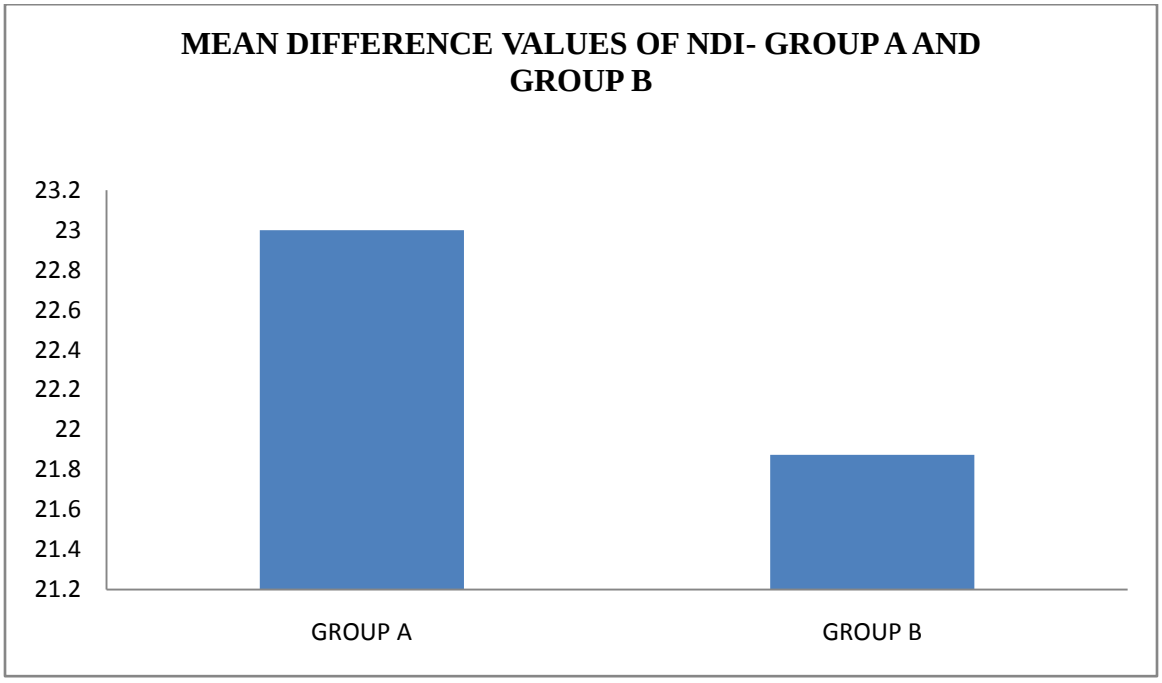
GRAPH-9

MEAN DIFFERENCE OF PRE TEST AND POST TEST VALUES OF RANGE OF MOTION (CERVICAL ROTATION) OF BETWEEN GROUP A AND GROUP B



GRAPH: 10

MEAN DIFFERENCE OF PRE TEST AND POST TEST VALUES OF NDI BETWEEN GROUP A AND GROUP B



CHAPTER V

RESULTS AND DISCUSSION

The aim of this study was to compare the efficacy of Mulligan Mobilization technique and Pilates programme combined with conventional physiotherapy on pain, range of motion and functional disability in individuals with chronic neck Pain.

A total of 32 chronic neck Pain patients in the age group of 18-45 years participated in the study. The participants who satisfied the selection criteria were randomly assigned into two groups. Measurements were taken at baseline using the Numeric Pain Ratting Scale (NPRS), Range of Motion (ROM) and Neck Disability Index (NDI) for both groups. One group received Mulligan Mobilization technique combined with conventional physiotherapy and the other group received Pilates programme combined with conventional physiotherapy for 3 weeks. At the end of 3 weeks, participants again underwent the evaluation using same outcome measures. Statistical analysis for the present study was done using SPSS version 16.0

Statistical analysis done using paired' test shows that there is a significant difference between pretest and posttest analysis of Mulligan mobilization technique with conventional physiotherapy of Group A on pain, flexion and extension and left lateral flexion, cervical rotation range of motion, functional disability. The 't' and p values of pain ware 19.75 and 0.000, flexion range of motion are 9.03 and 0.000, extension range of motion are 5.92 and 0.000, right lateral flexion range of motion are 9.58 and 0.000,left lateral flexion range of motion are 9.03,right cervical rotation are 9.60,left cervical rotation range of motion are 11.00 and 0.000, functional disability are 14.64 and 0.000 respectively. Hence there is significant improvement in mulligan mobilization technique with conventional physiotherapy in treating patients with chronic neck pain.

Statistical analysis done using paired't' test shows that there is a significant difference between pretest and posttest analysis of Pilates programme with conventional physiotherapy of Group A on pain, flexion and extension and left lateral flexion, cervical rotation range of motion, functional disability. The 't' and p values of pain ware 31.14 and 0.000, flexion range of motion are 15.65 and 0.000, extension range of motion are 9.13 and 0.000, right lateral flexion range of motion

are 11.61 and 0.000, left lateral flexion range of motion are 11.61, right cervical rotation are 9.13, left cervical rotation range of motion are 5.40 and 0.000, functional disability are 14.27 and 0.000 respectively. Hence there is significant improvement in Pilates programme with conventional physiotherapy in treating patients with chronic neck pain.

But the study is intended to compare the efficacy of Mulligan mobilization technique and Pilates programme to outcome measures of chronic neck pain. Statistical analysis done using Independent't' test shows that there is no difference on pain, extension, right and left lateral flexion, left rotation range of motion, functional disability and there is difference in flexion and right rotation range of motion in Mulligan mobilization technique with conventional physiotherapy of group A than Pilates programme with conventional physiotherapy of group B.

Mobilizations shows a significant reduction in NPRS scores, the results related to Mulligan McNair et al that SNAGS applied to patients with chronic neck pain in the upright sitting position and reported a considerable decrease in pain, less difficulty in movement and reduces stiffness. It may well be that the thoracic spine is ideally suited to SNAGS and therefore may be the treatment of choice in acute presentations of thoracic pain when the zygapophyseal joints are implicated. Rather than just using SNAGS to improve end range of motion, they may also have a role in correcting acute postural deformity [(20)].

Edmonston and Singer (1997)[(21)] stated "The SNAG's technique described by Mulligan is of particular importance in the context of painful movement dysfunction associated with degenerative changes. These techniques facilitate pain free movement throughout the available range and since movement is under control of patient, reduce the potential problems associated with end range passive movements in degenerative motion segments.

Exelby (1995)[(22)] argues that the zygoapophyseal joints guide the spine and so improving their glide by applying NAGs and SNAGs will improve the range of spinal movement.

An agitated central nervous system may cause soft tissue pain even after the tissues have recovered from strain. Mechanoreceptors over react to sudden stretching of connective tissue in an acute injury and continue to fire for longer than the protective mechanism warrants. The alterations in muscle tone then misalign the joint that, in turn, transmits proprioceptive stimuli to the already excited central nervous system thereby perpetuating its own malfunction. Manual

therapy may re-establish a normal lower level of proprioceptive stimulation or 'mobilisation induced analgesia' (Zusman 1985)[23].

To date Pilates research is lacking. The effects of Pilates in normal and dancers has been studied and positive effects have been demonstrated in terms of improved flexibility, core stability, posture and strength (Segal and Hein,2004; Herrington and Davies, 2005; Kuo et al., 2009)[24-26]. With regard to clinical populations, much of the research has concentrated on the effects of Pilates on low back pain. There is some evidence demonstrating a reduction in pain and disability levels although the methodological qualities of the studies are poor (Rydeard and Leger, 2006; Donzelliet al., 2006)[27,28]. To date there are no studies looking at Pilates as an intervention for chronic neck pain.

This pilot study offers preliminary evidence that Pilates can effect long-term changes in pain and disability in a chronic neck pain population. There was a clinically significant difference in NRPS, and NDI scores at 3 week follow up with the Pilates intervention. Ninety two percent of this study population is female. Anecdotally females are more likely to participate in Pilates classes and an analysis of the research on Pilates reveals that participants are mostly female (Segal and Hein, 2004; Herrington and Davies, 2005)[24,25]. In addition, the incidence of neck pain is higher in females than in males, which ties in with the profile of this study population (Fejer et al., 2006)[3].

This is in keeping with the literature with Von Tulder et al. (2000)[29]reporting that the incidence of neck pain is greatest around the age of 50, while Bovimet al. (1994)[30]found that the prevalence of neck pain increases with age. With regard to work status, none of the participants reported an inability to work because of their neck pain. Participants in this pilot study were involved in activities such as kayaking, cycling, tai chi and swimming. These sports require good mobility of the cervical spine or control of the head on trunk and may be protective of neck pain.

Physical activity also reduces stress levels and studies have shown an interaction between high stress and low physical activity levels as increasing the risk for neck pain (Korhonen et al., 2003)[31]. The improved pain and disability scores are supported by studies conducted in patients with chronic low back pain using Pilates (Rydeard and Leger, 2006; Donzelli et al.,2006)[27,28]. There are no studies looking at Pilates as an intervention in neck pain but strengthening exercises

and deep cervical muscle and scapular retraining have been shown to be effective (Evans et al., 2002; Jull et al., 2002)[32,33].subjects were instructed to continue the exercises at home for 20 min, 3 times a week. A longer follow up period may yield more significant results as subjects continue to improve. Study where people with neck pain were found to have altered trunk control. It has been suggested that similar mechanisms underlie both neck muscle dysfunction in neck pain and trunk muscle dysfunction in low back pain and that spinal pain may cause similar effects regardless of the level of the spine that pain is experienced.

5.1 LIMITATIONS OF THE STUDY:

- There was a lack of long term follow up of patients to find out the carry over effects of the intervention.
- The study measures only pain, range of motion and functional disability.
- No blinding was done.
- Small sample size.
- Smaller age group people have a lesser disability and lesser difference in their quality of life.

5.2 SUGGESTIONS FOR FUTURE RESEARCH:

- The Further studies can be done in large samples because if more the sample size used, greater would be the significance.
- Further research is needed in the clinical setting to evaluate the effects of manual therapy techniques combined with manual cervical traction in terms of CROM.
- The study can be conducted with bilateral chronic neck pain individuals.
- The future studies can be added with other outcome measures to assess the functional disability in chronic neck Pain individuals.
- Long term follow-up can be done to determine the effect of intervention.
- Study can be performed with repeated measures with weekly assessment
- Study can be performed with different treatment techniques for elderly patients with chronic neck pain.

CHAPTER VI

SUMMARY AND CONCLUSION

This study was conducted to compare the efficacy of Mulligan mobilization technique and Pilates programme on outcome measures of subjects with chronic neck pain.

Thus the statistical analysis of data concluded that Group A and Group B are effective on treating pain, Neck Range of motion and functional disability on comparing the pre test and post test values. But on comparing both groups proved that only neck flexion and right neck rotation range of motion is effective on Group A than Group B. Pain, neck extension, right and left neck lateral flexion, left neck rotation and functional disability has shown no difference between groups. Hence the results show both the groups were effective in treating chronic neck pain.

BIBLIOGRAPHY

1. **Strine, T.W., 2007. Hootman JM.**US national prevalence and correlates of low back pain and neck pain among adults. Arthritis Rheum 57, 656e665

2. **Bovim, G., Schrader, H., Sand, T., 1994.** Neck pain in the general population. Spine 19 (12), 1307e1309.

3. **Fejer, R., Kyvik, K.O., Hartvigsen, J., 2006.** The prevalence of neck pain in the world population: a systematic critical review of the literature. European Spine Journal 15, 834e848.

4. **Binder, A.I., 2004.** Cervical pain syndromes. In: **Isenberg, D.A., Maddison, P.J., Woo, P., Glass, D.N., Breedveld, F.C. (Eds.)**, Oxford Textbook of Rheumatology, third ed. Oxford Medical Publications, Oxford, pp. 1185e1195.

5. **HaldemanS**. Spinal manipulative therapy in sports medicine. Clinics in Sports Medicine,1986,5:277- 293.

6. **Walser RF, Meserve BB, BoucherTR.** The Effectiveness of Thoracic Spine Manipulation for the Management of Musculoskeletal Conditions: A Systematic Review and Meta-Analysis of Randomised Clinical Trials. The Journal of Manual& Manipulative Therapy 2009;17(4):237-246.

7. **Haldeman S, Carroll LJ, and Cassidy JD:** Introduction Mandate: the empowerment of people with neck pain. The Bone and Joint Decade 2000–2010 TaskForce on Neck Pain and Its Associated Disorders. Spine. 2008;33(Suppl):S8–S13.

8. **Guzman J, Hurwitz EL, Carroll LJ, Haldeman S, Cote P, Carragee EJ et al:** A New Conceptual Model of Neck Pain: Linking Onset, Course, and Care: The Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders. Journal of Manipulative and Physiological Therapeutics 2009, 32(2, Supplement1):S17-S28.

9. **Sander M:** Ergonomics and the management of musculoskeletal disorder. 2ed. **St. Louis: Butterworth; 2004.**

10. **Gargan M, Bannister G:** The rate of recovery following whiplash injury. European Spine Journal1994;3:162–4.

11. **Paungmali A, OLeary S, Souvlis T, Vicenzino B:**Hypoalgesic and sympathoexcitatory effects of mobilization with movement for lateralepicondylalgia. PhysTher 2003;83:374-83.

12. **Gross, A.R., Goldsmith, C., Hoving, J.L., Haines, T., Peloso, P.,MAker, P., Santaguida, P., 2007. Myers C**. Conservative managemen of mechanical neck disorders: a systematic review. Journal of Rheumatology 34, 1083e1102

13. **Jull, G., Trott, P., Potter, H., Niere, K., Shirley, D., Emberson, J., Marschner, I., Richardson, C., 2002.** A randomised controlled trial of exercise and manipulative therapy for cervicogenic headache. Spine 27 (17), 1835e1843.

14. **Evans, R., Bronfort, G., Nelson, B., Goldsmith, C.H., 2002.**Twoyear follow up of a randomised controlled trial of spinal manipulation and two types of exercise for patients with chronic neck pain. Spine 27 (21), 2383e2389.

15. **Stewart, M.J., Maher, C.G., Refshauge, K.M., Herbert, R.D., Bogduk, N., Nicholas, M., 2007.** Randomised controlled trial of exercise for chronic whiplash-associated disorders. Pain 128, 59e68.

16. **Bass, M., 2005.** The Complete Classic Pilates Method, p. 4.

17. **Herman, E., 2004.** Pilates Props Workbook. Ulysses Press, USA, pp. 10e11.

18. **.Joseph Hubertus pilates – 2009;**book of teaching pilates for posuturalfaults,illnessand injury; a practical guide.ISBN;978-0-7506-5647.

19. **Exelby, L.** Mobilisation with movement: a personal view. Physiotherapy, 1995; 81(12):724-729.

20. **Guez M, Hildingsson C, Nilsson M, Toolanen G**. The prevalence of neckpain: a population-based study from northern Sweden. ActaOrthop Scand.2002;73:455–459. doi: 10.1080/00016470216329. [PubMed] [Cross Ref].

21. **EdmonstonS.** Anatomical and biomechanical consideration for manual therapy. Manual Ther.2(3)123-131

22. **Exelby, L. (1996).** Peripheral mobilisation with movement. Manual Therapy, 1(13), 118-126.

23. **Zusman M.** Reappraisal of a proposed neurological mechanism for relief of joint pain with passive movements. physiotherapy theory and practice.1985;1:64-70

24. **Segal, N.A., Hein, J., 2004. Basford JR** the effects of Pilates training on flexibility and body composition: an observational study. Archives of Physical Medicine and Rehabilitation 85 (12), 1977e1981

25. **Herrington, L., Davies, R., 2005.** The influence of Pilates training on the ability to contract the transversusabdominus muscle in asymptomatic individuals. Journal of Bodywork and Movement Therapies 9 (1), 52e57.

26. **Kuo, Y.L., Tully, E.A., Galea, M.P., 2009.** Sagittal spinal posture after Pilates-based exercise in healthy older adults. Spine 34 (10), 1046e1051.

27. **Rydeard, R., Leger, A., 2006.** Smith D Pilates-based therapeutic exercise: effect on subjects with non-specific chronic low back pain and functional disability: a randomised controlled trial. The Journal of Orthopaedic and Sports Physical Therapy 36 (7), 472e484

28. **Donzelli, S., Di Domenica, E., Cova, A.M., Galletti, R., Giunta, N., 2006.** Two different techniques in the rehabilitation treatment of low back pain: a randomised controlled trial. EuraMedicophys42 (3), 205e210

29. **Von Tulder, M.W., Goossens, M., Hoving, J.L., 2000.** Non-surgical treatment of chronic neck pain. In: Nachemson, A.L., Johnsson, E. (Eds.), Neck and Back Pain, first ed. Lippincott Williams &Wilkins, Philadelphia, PA. 38

30. **Bovim, G., Schrader, H., Sand, T., 1994.** Neck pain in the general population. Spine 19 (12), 1307e1309.

31. **Korhonen, T., Ketola, R., Toivonen, R., Luukonen, R.,Hakkanen, M., Viikari-Juntura, E., 2003.** Work related and individual predictors for incident neck pain among office employees working with video display units. Occupational and Environmental Medicine 60, p475e482.

32. **Evans, R., Bronfort, G., Nelson, B., Goldsmith, C.H., 2002.**Twoyearfollow up of a randomised controlled trial of spinal manipulation and two types of exercise for patients with chronic neck pain. Spine 27 (21), 2383e2389.

33. **Jull, G., Trott, P., Potter, H., Niere, K., Shirley, D., Emberson, J., Marschner, I., Richardson, C., 2002.** A randomised controlled trial of exercise and manipulative therapy for cervicogenic head ache. Spine 27 (17), 1835e1843.

ANNEXURE I

PSG Institute of Medical Sciences & Research
Institutional Human Ethics Committee
Recognized by The Strategic Initiative for Developing Capacity in Ethical Review (SIDCER)
POST BOX NO. 1674, PEELAMEDU, COIMBATORE 641 004, TAMIL NADU, INDIA
Phone : 91 422 - 2598822, 2570170, Fax : 91 422 - 2594400, Email : ihec@psgimsr.ac.in

To
Mr Gopinath C
II Year MPT
Guide/s: Mr K Saravanan
PSG College of Physiotherapy
Coimbatore

Ref: Project No.17/117

Date: October 27, 2017

Dear Mr Gopinath,

Institutional Human Ethics Committee, PSG IMS&R reviewed and discussed your application dated 03.04.2017 to conduct the research study entitled "*Comparing the efficacy of Mulligan Mobilization technique and Pilates programme on outcome measures of subjects with chronic neck pain*" during the IHEC review meeting held on 21.04.2017.

The following documents were reviewed and approved:

1. Project Submission form
2. Study protocol (Version 1 dated 03.04.2017)
3. Informed consent forms (Version 2 dated 25.10.2017)
4. Data collection tool (Version 2 dated 20.10.2017)
5. Permission letter from concerned Heads of Department
6. Current CVs of Principal investigator, Co-investigators
7. Budget

The following members of the Institutional Human Ethics Committee (IHEC) were present at the meeting held on 21.04.2017 at College Council Room, PSG IMS & R between 2.30 pm and 4.30 pm:

Sl. No.	Name of the Member of IHEC	Qualification	Area of Expertise	Gender	Affiliation to the Institution Yes/No	Present at the meeting Yes/No
1	Mrs Y Ashraf	MPT	Physiotherapy	Female	Yes	Yes
2	Dr. S. Bhuvaneshwari (Member-Secretary, IHEC)	MD	Clinical Pharmacology	Female	Yes	Yes
3	Mr Gowpathy Velappan	BA., BL	Legal Advisor	Male	No	Yes
4	Dr A Jayavardhana	MD	Clinician (Paediatrics)	Male	Yes	Yes
5	Mr P Karuppuchamy	M Phil in PSW	Social Scientist	Male	Yes	Yes
6	Dr G Malarvizhi	M Sc, Ph D	Nursing	Female	Yes	No

Recognized by The Strategic Initiative for Developing Capacity in Ethical Review (SIDCER)
POST BOX NO. 1674, PEELAMEDU, COIMBATORE 641 004, TAMIL NADU, INDIA
Phone : 91 422 - 2598822, 2570170, Fax : 91 422 - 2594400, Email : ihec@psgimsr.ac.in

7	Mr. R. Nandakumar (Chairperson, IHEC)	BA., BL	Legal Expert	Male	No	Yes
8	Dr. Parag K Shah	DNB	Clinician (Ophthalmology)	Male	No	Yes
9	Mrs P Rama	M Pharm	Non-Medical (Pharmacy)	Female	Yes	No
10	Dr. Seetha Panicker	MD	Clinician (Obstetrics & Gynaecology)	Female	Yes	No
11	Dr. S. Shanthakumari	MD	Pathology	Female	Yes	Yes
12	Dr. Sudha Ramalingam (Alternate Member-Secretary, IHEC)	MD	Public Health, Epidemiology, Genetics	Female	Yes	Yes
13	Mrs. Swasthika Soundararaj	MBA	Lay person	Female	No	Yes
14	Dr. D. Vijaya	M Sc, Ph D	Basic Medical Sciences (Biochemistry)	Female	Yes	No

The study is approved in its presented form. The decision was arrived at through consensus. Neither PI nor any of proposed study team members were present during the decision making of the IHEC. The IHEC functions in accordance with the ICH-GCP/ICMR/Schedule Y guidelines. The approval is valid until one year from the date of sanction. You may make a written request for renewal / extension of the validity, along with the submission of status report as decided by the IHEC.

Following points must be noted:

1. IHEC should be informed of the date of initiation of the study
2. Status report of the study should be submitted to the IHEC every 12 months
3. PI and other investigators should co-operate fully with IHEC, who will monitor the trial from time to time
4. At the time of PI's retirement/intention to leave the institute, study responsibility should be transferred to a colleague after obtaining clearance from HOD, Status report, including accounts details should be submitted to IHEC and extramural sponsors
5. In case of any new information or any SAE, which could affect any study, must be informed to IHEC and sponsors. The PI should report SAEs occurred for IHEC approved studies within 7 days of the occurrence of the SAE. If the SAE is 'Death', the IHEC Secretariat will receive the SAE reporting form within 24 hours of the occurrence
6. In the event of any protocol amendments, IHEC must be informed and the amendments should be highlighted in clear terms as follows:
    a. The exact alteration/amendment should be specified and indicated where the amendment occurred in the original project. (Page no. Clause no. etc.)
    b. Alteration in the budgetary status should be clearly indicated and the revised budget form should be submitted
    c. If the amendments require a change in the consent form, the copy of revised Consent Form should be submitted to Ethics Committee for approval
    d. If the amendment demands a re-look at the toxicity or side effects to patients, the same should be documented

PSG Institute of Medical Sciences & Research
Institutional Human Ethics Committee

Recognized by The Strategic Initiative for Developing Capacity in Ethical Review (SIDCER)
POST BOX NO. 1674, PEELAMEDU, COIMBATORE 641 004, TAMIL NADU, INDIA
Phone : 91 422 - 2598822, 2570170, Fax : 91 422 - 2594400, Email : ihec@psgimsr.ac.in

e. If there are any amendments in the trial design, these must be incorporated in the protocol, and other study documents. These revised documents should be submitted for approval of the IHEC and only then can they be implemented

f. Any deviation-Violation/waiver in the protocol must be informed to the IHEC within the stipulated period for review

7. Final report along with summary of findings and presentations/publications if any on closure of the study should be submitted to IHEC

Thanking You,

Yours Sincerely,

SECRETARY
PSG IMS&R
COIMBATORE-641004.
INSTITUTIONAL HUMAN ETHICS COMMITTEE

Dr D Vijaya
Member - Secretary
Institutional Human Ethics Committee

ANNEXURE II

ASSESSMENT FORM

Subject Number:

Date of Assessment:

Date of Admission:

Demographic data:

Name:

Age:

Sex:

Occupation:

IP/OP Number:

Address:

Contact Number:

Subjective Assessment:

Chief complaints:

Present medical history:

Past medical history:

Personal history:

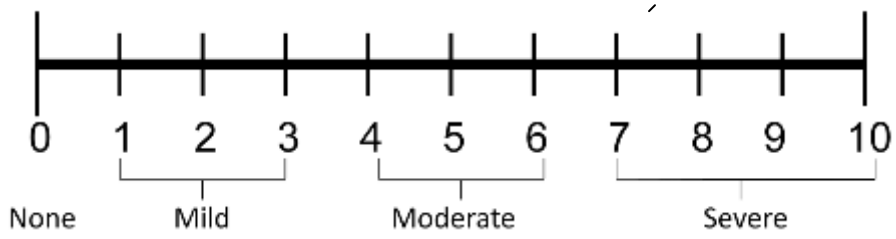
Associated Problems

Pain history:

a) Pain:
   - Site:
   - Side:
   - Onset:
   - Duration:
   - Type:
   - Aggravating factors:
   - Relieving factors:

b) Grading of pain:

   NUMERIC PAIN RATING SCALE: (NPRS)



Objective Assessment:

On Observation:

- ❖ Built:
- ❖ Posture:
- ❖ Muscle wasting:
- ❖ Deformity:
- ❖ Gait:
- ❖ External appliances:
- ❖ Topical changes:
- ❖ Attitude of limbs:

On Palpation:

- Tenderness:
- Muscle spasm:
- Warmth:
- Swelling:
- Myofascial nodules:
- End-feels:

On Examination:

Range of motion (Goniometer)

MOVEMENT	**Active**		**Passive**	
Cervical flexion				
Cervical extension				
Cervical lateral flexion	**R:**	**L:**	**R:**	**L:**
Cervical rotation	**R:**	**L:**	**R:**	**L:**

Muscle power: (Manual Muscle Testing grades)

MUSCLE GROUP	POWER	
Cervical Flexors		
Cervical Extensors		
Cervical lateral flexors	Right:	Left:
Cervical rotators	Right:	Left:

MUSCLE GROUP	RIGHT	LEFT
Shoulder flexors		
Shoulder extensors		
Shoulder abductors		
Shoulder adductors		
Shoulder medial rotators		
Shoulder lateral rotators		
Elbow flexors		
Elbow extensors		
Wrist flexors		
Wrist extensors		

Sensation:

- Superficial sensation:
- Deep sensation:

Reflex: (Wexler's grading)

REFLEX	RIGHT	LEFT
Biceps jerk		
Triceps jerk		
Brachioradialis jerk		

Muscle girth: (Inch Tape)

AREA	RIGHT(cm's)	LEFT(cm's)
Arm		
Forearm		

Special tests:

- ❖ Spurling test / foraminal compression test
- ❖ Distraction test
- ❖ Adson test
- ❖ Wallenberg test / vertebral artery test

Functional assessment:

- ❖ Neck Disability Index

PROVISIONAL DIAGNOSIS:

PHYSIOTHERAPY MANAGEMENT:

OBJECTIVES:

TREATMENT PLAN:

A) Short term goal:

B) Long term goal

TREATMENT GIVEN:

ANNEXURE III

FOLLOW UP CHART

Name :

Age :

Sex :

IP/OP Number :

Date of 1st Assessment :

Date of follow up :

Specific complaints:

Treatment plan:

Results	Pre-Test	Post-Test
Numeric Pain Rating Scale		
Neck Disability Index		

Date: Therapist signature

ANNEXURE –IV

PSG Institute of Medical Science and Research, Coimbatore
Institutional Human Ethics Committee
INFORMED CONSENT FORMAT FOR RESEARCH PROJECTS

I Gobinath.C, am carrying out a study on the topic:**"Comparing the Efficacy of Mulligan Mobilization Technique and Pilates programme on outcome measures of subjects with Chronic Neck Pain''**as part of my research project being carried out under the aegis of the Department of Orthopaedics& Physical Medicine and Rehabilitation.

My research guide is: Mr.Saravanan.K, Associate professor, PSG College of Physiotherapy.

The justification for this study is:

Chronic neck pain is the most relevant form of musculoskeletal disorder. Current literatures shows moderate evidence on Pilates programme for neck pain. To our knowledge, no study has investigated the efficacy of Mulligan mobilization technique and Pilates programme on neck pain patients. Therefore the need of the study is to investigate the efficacy of Mulligan mobilization technique and Pilates programme in treatment of patients with Chronic neck pain for the following outcomes: Pain intensity, Range of motion and Functional disability.

The objectives of this study:

1. To determine the effects of Mulligan Mobilization Technique (MMT) on pain, range of motion and functional activities in subjects with Chronic Neck Pain.

2. To determine the effects of Pilates Programme on pain, range of motion and functional activities in subjects with Chronic Neck Pain.

3. To comparing the effects of Mulligan Mobilization Technique and Pilates Programme on pain, range of motion and functional activities in subjects with Chronic Neck Pain.

Sample size: 32

Study volunteers / participants are subjects with Chronic Neck Pain of age group of 18-45 years.

Location: Department of Orthopaedics and Department of PMR, PSG Hospitals.

We request you to kindly cooperate with us in this study. We propose collect background information and other relevant details related to this study. We will be carrying out:

Initial interview: 45 minutes.

Clinical examination (specify details purpose)**: YES**
Blood sample collection: Specify quantity of blood being drawn: _____ml. **NOT APPLICABLE**
No. of times it will be collected: _____. **NOT APPLICABLE**

Whether blood sample collection is part of routine procedure or for research (study) purpose:

1. Routine procedure 2. Research purpose **NOT APPLICABLE**

Specify **purpose**, discomfort likely to be felt and side effects, if any: _____**NOT APPLICABLE** _____

Whether blood sample collected will be stored after study period: Yes / No, it will be destroyed **NOT APPLICABLE**

Whether blood sample collected will be sold: Yes / No **NOT APPLICABLE**

Whether blood sample collected will be shared with persons from another institution: Yes / No **NOT APPLICABLE**

Medication given, if any, duration, side effects, purpose, benefits: **NOT APPLICABLE**

Whether medication given is part of routine procedure: Yes / No (If not, state reasons for giving this medication) **NOT APPLICABLE**

Whether alternatives are available for medication given: Yes / No (If not, state reasons for giving this particular medication) **NOT APPLICABLE**

Final interview: 45 minutes.

If **photograph t**aken, purpose: **yes,** without revealing the identity of yours we want to publish it in the project book, conferences and journals.

Data collected will be stored for a period of 5 years. We **will not use** the data as part of another study.

Benefits from this study:

- Pain will be reduced.
- Range of motion will be improved.
- Neck Functional activities will be improved

Risks involved by participating in this study: There are minimal risks or discomforts will be experienced during this study. The discomforts are stretch pain and exercise induced pain. If pain persists hot pack will be applied to relief pain.

How the **results** will be used:
Peer-reviewed scientific journals
Conference presentation
Internal report
The data collected during the study will be used without revealing your identity. Your identity will be confidential even if the results of the study are published.
If you are uncomfortable in answering any of our questions during the course of the interview, **you have the right to withdraw from the interview / study at anytime.** You have the freedom to withdraw from the study at any point of time. Kindly be assured that your refusal to participate or withdrawal at any stage, if you so decide, will not result in any form of compromise or discrimination in the services offered nor would it attract any penalty. You will continue to have access to the regular services offered to a patient. You will **NOT** be paid any remuneration for the time you spend with us for this interview / study. The information provided by you will be kept in strict confidence. Under no circumstances shall we reveal the identity of the respondent or their families to anyone. The information that we collect shall be used for approved research purposes only. You will be informed about any significant new findings - including adverse events, if any, – whether directly related to you or to other participants of this study, developed during the course of this research which may relate to your willingness to continue participation.

Consent: The above information regarding the study, has been read by me/ read to me, and has been explained to me by the investigator/s. Having understood the same, I hereby give my consent to them to interview me. I am affixing my signature / left thumb impression to indicate my consent and willingness to participate in this study (i.e., willingly abide by the project requirements).

Signature / Left thumb impression of the Study Volunteer / Legal Representative:

Signature of the Interviewer with date: Witness:

Contact number of PI: 8148293099

Contact number of Ethics Committee Office: 0422 4345818

பூ. சா. கோ மருத்துவக் கல்லூரி மற்றும் ஆராய்ச்சி நிறுவனம், கோவை

மனித நெறிமுறைக் குழு

ஒப்புதல் படிவம்

தேதி:

செ,கோபிநாத், ஆகிய நான் பூ. சா. கோ மருத்துவக் கல்லூரியின் / மருத்துவமனையின்இயன்முறைமருத்துவத்துறையின் கீழ், **"நாள்பட்ட கழுத்துவலி நோயாளிகளுக்கு, முல்லிகன் அணிதிரட்டல் நுட்பம்மற்றும் பிலேட்ஸ் திட்டத்தின் மூலம் வலி, இயக்கம்மற்றும் செயல்திறனை தீர்மானித்தல்"** என்ற தலைப்பில் ஆய்வு மேற்கொள்ள உள்ளேன்.

என் ஆய்வு வழிகாட்டி:கு. சரவணன், இணைப் பேராசிரியர், பூ. சா. கோ இயன்முறைமருத்துவக் கல்லூரி

ஆய்வு மேற்கொள்வதற்கான அடிப்படை:

நாள்பட்ட கழுத்துவலி ஒரு நோயியல் நிலையில் இருந்து கடுமையான வலியைத் தந்து கழுத்தின் இயக்கத்தை குறைக்கிறது.அது மட்டுமின்றி இவ்வலியானது கழுத்தை சுற்றியுள்ள தசைகளுக்கும் பரவி கழுத்தின் அன்றாட செயல்திறனை பாதிக்கிறது.இதனால்முல்லிகன் அணிதிரட்டல் நுட்பம்மற்றும் பிளேட்ஸ் திட்டம் சக்தியின் மூலம் கழுத்தின் எலும்புகளில்மற்றும் நரம்புகளில் காணப்படும் அழுத்ததை குறைத்து வலியை நீக்கி கழுத்தின் இயக்கம்மற்றும் அன்றாட செய்திறன் அதிகரிக்கும் என எதிர்பார்க்கப்படுகிறது.

ஆய்வின் நோக்கம்:

1. நாள்பட்ட கழுத்துவலி நோயாளிகளுக்கு, முல்லிகன் அணிதிரட்டல் நுட்பம் கொண்டு கழுத்துவலி, கழுத்தின் இயக்கம்மற்றும் செயல்திறனை தீர்மானித்தல்.
2. நாள்பட்ட கழுத்துவலி நோயாளிகளுக்கு, பிலேட்ஸ் திட்டம் கொண்டு கழுத்துவலி, கழுத்தின் இயக்கம்மற்றும் செயல்திறனை தீர்மானித்தல்.
3. ஒப்பீட்டு திறன் மூலமாக, நாள்பட்ட கழுத்துவலி நோயாளிகளுக்கு, முல்லிகன் அணிதிரட்டல் நுட்பம்மற்றும் பிலேட்ஸ் திட்டம் கொண்டு கழுத்துவலி, கழுத்தின் இயக்கம்மற்றும் செயல்திறனை தீர்மானித்தல்.

ஆய்வில்பங்கு பெறும் நபர்களின் எண்ணிக்கை: 32

ஆய்வில்பங்கு பெறுவோர் மற்றும் வயது: 18 - 45 வயதுக்குட்பட்ட,நாள்பட்ட கழுத்துவலி நபர்கள்.

ஆய்வு மேற்கொள்ளும் இடம்:எலும்புமற்றும்மூட்டு சிகிச்சை பிரிவு, புனர்வாழ்வு மருத்துவ துறை, பூ. சா. கோ. மருத்துவமனை, கோயம்புத்தூர்.

இந்த ஆய்வில் எங்களுடன் ஒத்துழைக்குமாறு கேட்டுக்கொள்கிறோம். நாங்கள் சில தகவல்களை இந்த ஆய்விற்காக சேகரிக்க உள்ளோம்.

ஆய்வு செய்யப்படும் முறை:

இந்த ஆய்வின் மொத்த கால அளவு 8 மாதங்கள். முதலில் நாள்பட்ட கழுத்துவலி உள்ள நபர்களை இரண்டுகுழுக்களாக பிரித்துக் கொள்ளப்படும்.பின்னர் கழுத்துவலி கழுத்தின் இயக்கம்மற்றும் கழுத்தின் அன்றாட செயல்திறன் ஆகியவை மதிப்பிடப்படும்.பின்னர் முதல் குழுவிற்குமுல்லிகன் அணிதிரட்டல் நுட்பம்மற்றும் இரண்டாவது குழுவிற்கு பிலேட்ஸ் சிகிச்சை 40 நிமிடம் வீதம் வாரம் 3 நாட்களுக்கு, 3 வாரத்திற்கு சிகிச்சை அளிக்கப்படும்.இறுதியில் எடுக்கப்படும்மூன்றவது வார முடிவுகள், ஆரம்ப மதிப்பீட்டுடன் ஒப்பிடப்படும்.

முதன்மை நேர்காணல்: 45 நிமிடங்கள்

இந்த ஆய்வில் கிடைக்கும் தகவல்கள் **5 வருடங்கள்** பாதுகாக்கப்படும்.இந்த தகவல்கள் வேறு ஆய்விற்குப் பயன்படுத்தப் பட மாட்டாது.

சுகாதாரக் கல்வி: அமர்வுகள்: வாரத்திற்கு 3 முறை வீதம் 3 வாரங்கள் ஒரு அமர்வுக்கான நேரம்: 40 நிமிடங்கள்

மருத்துவ பரிசோதனைகள்: உண்டு

இரத்த மாதிரி சேகரிப்பு: இல்லை

இரத்த மாதிரி எடுப்பதுவழக்கமான சிகிச்சைக்காகவோ அல்லது இந்த ஆய்விற்காகவோ:

பொருந்தாது

இதனால் ஏற்படக் கூடிய அசௌகரியங்கள் / பக்க விளைவுகள்: இதனால் எந்த அசௌகரியமோ, பக்க விளைவுகளோ ஏற்படாது.**பொருந்தாது**

இரத்த மாதிரிகள் ஆய்விற்குப்பின் பாதுகாத்து வைக்கப்படுமா? ஆம் / இல்லை, அழிக்கப்படும்: **பொருந்தாது**

சேகரிக்கப்பட்ட இரத்தம் விற்கப்படுமா? ஆம் / இல்லை **பொருந்தாது**

சேகரிக்கப்பட்ட இரத்தம் வேறு நிறுவனத்துடன் பகிர்ந்து கொள்ளப்படுமா? ஆம் / இல்லை: **பொருந்தாது**

மருந்துகள் ஏதேனும் கொடுக்கப்படவிருந்தால் அவை பற்றியவிவரம் (கொடுக்கப்படும் காரணம்,காலம், பக்க விளைவுகள், பயன்கள்): **பொருந்தாது**

மருந்துகள் கொடுக்கப்படுவதுவழக்கமான சிகிச்சை முறையா?: ஆம் / இல்லை (இல்லை என்றால்கொடுக்கப்படும் காரணம்) **பொருந்தாது**

கொடுக்கப்படும்மருந்துகளுக்குமாற்று உள்ளதா?: ஆம் / இல்லை (ஆம் என்றால் இந்த குறிப்பிட்ட மருந்து கொடுக்கப்படும் காரணம்) **பொருந்தாது**

ஆய்வில் பங்குபெறுவதால் ஏற்படும் பலன்கள்:

- நாள்பட்ட கழுத்துவலி குறையும் என எதிர்பார்க்கப்படுகிறது.
- கழுத்தின் இயக்கம் அதிகரிக்கும் என எதிர்பார்க்கப்படுகிறது.
- கழுத்தின் செயல்திறன் அதிகரிக்கும் என எதிர்பார்க்கப்படுகிறது.

ஆய்வினால்பங்கேற்பதால் ஏற்படும் அசௌகரியங்கள் / பக்க விளைவுகள்: இந்த ஆய்வினால் தங்களுக்கு எந்த விதமான அபாயங்களும் அசௌகரியங்களும் ஏற்படாது. கழுத்து தசைப் பயிற்சியின் போது ஏதேனும் வலி ஏற்பட்டால் அதற்கு வெந்நீர் ஒத்தடம் கொடுக்கப்படும்.

ஆய்வின் முடிவுகள் எந்த முறையில் பயன்படுத்தப்படும்?

அகநிலை அறிக்கை, கலந்தாய்வுகளில் சமர்ப்பிப்பு, உணர்வு ஆற்றல், பத்திரிக்கைகள் ஆய்வில் சார்ந்த ஆராய்ச்சி பத்திரிக்கைகள்.

இந்த ஆய்வின் கேள்விகளுக்கு பதிலளிப்பதோ, இரத்த மாதிரிகள் அல்லது திசு மாதிரிகள் எடுப்பதிலோ உங்களுக்கு ஏதேனும் அசௌகரியங்கள் இருந்தால், எந்த நேரத்தில் வேண்டுமானாலும் ஆய்விலிருந்து விலகிக்கொள்ளும் உரிமை உங்களுக்கு உண்டு. ஆய்விலிருந்து விலகிக்கொள்வதால் உங்களுக்கு அளிக்கப்படும் சிகிச்சை முறையில் எந்த வித பாதிப்பும் இருக்காது என்று உங்களுக்கு உறுதியளிக்கிறோம். மருத்துவமனையில் நோயாளிகளுக்கு அளிக்கப்படும் சேவைகளை நீங்கள் தொடர்ந்து பெறலாம். இந்த ஆய்வில்பங்கேற்க ஒப்புக்கொள்ளுவதால் வேறு எந்த விதமான கூடுதலான பலனும் உங்களுக்குக் கிடைக்காது. நீங்கள் அளிக்கும் தகவல்கள் இரகசியமாக வைக்கப்படும். ஆய்வில்பங்கேற்பவர்கள் பற்றியோ அவர்கள் குடும்பத்தைப் பற்றியோ எந்தத் தகவலும் எக்காரணம் கொண்டும் வெளியிடப்படாது என்று உறுதியளிக்கிறோம். நீங்கள் அளிக்கும் தகவல்கள் / இரத்த மாதிரிகள் / திசு மாதிரிகள் அங்கீகரிக்கப்பட்ட ஆய்விற்குமட்டுமே பயன்படுத்தப்படும்.இந்த ஆய்வு நடைபெறும் காலத்தில் குறிப்பிடத்தகுந்த புதிய

கண்டுபிடிப்புகள் அல்லதுபக்க விளைவுகள் ஏதும் ஏற்பட்டால் உங்களுக்குத் தெரிவிக்கப்படும்.இதனால் ஆய்வில் தொடர்ந்து பங்கு பெறுவது பற்றிய உங்கள் நிலைப்பாட்டை நீங்கள் தெரிவிக்க ஏதுவாகும்.

ஆய்வுக்குட்படுபவரின் ஒப்புதல்: இந்த ஆய்வைப்பற்றிய மேற்கூறிய தகவல்களை நான் படித்து அறிந்து கொண்டேன் / ஆய்வாளர் படிக்கக் கேட்டுத் தெரிந்து கொண்டேன். ஆய்வினைப்பற்றி நன்றாகப் புரிந்து கொண்டு இந்த ஆய்வில்பங்கு பெற ஒப்புக்கொள்கிறேன்.இந்த ஆய்வில்பங்கேற்பதற்கான எனது ஒப்புதலை கீழே கையொப்பமிட்டு, கை ரேகை பதித்து நான் தெரிவித்துக் கொள்கிறேன்.

பங்கேற்பாளரின் பெயர், முகவரி:

பங்கேற்பாளரின் கையொப்பம் / கை ரேகை / சட்டப்பூர்வ பிரதிநிதியின் கையொப்பம்:

தேதி :

ஆய்வாளரின் கையொப்பம்:

தேதி :

ஆய்வாளரின் தொலைபேசி எண்: 8148293099

மனித நெறிமுறைக் குழு அலுவலகத்தின் தொலைபேசி எண்: 0422-4345818

ANNEXURE – V

ASSESSMENT TOOLS

Numeric Pain Rating Scale

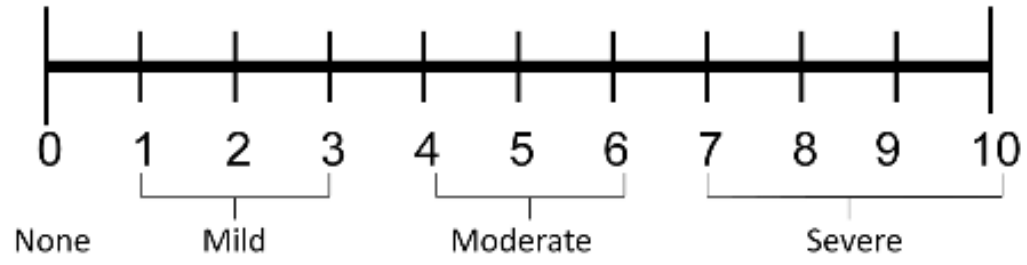
General Information:

The patient is asked to make three pain ratings, corresponding to current, best and worst pain experienced over the past 24 hours.

The average of the 3 ratings was used to represent the patient's level of pain over the previous 24 hours.

Patient Instructions (adopted from (McCaffery, Beebe et al. 1989):

"Please indicate the intensity of current, best, and worst pain levels over the past 24 hours on a scale of 0 (no pain) to 10 (worst pain imaginable)"



NECK PAIN DISABILITY INDEX QUESTIONNAIRE

PLEASE READ*: This questionnaire is designed to enable us to understand how much your neck pain has affected your ability to manage your everyday activities. Please answer each section by circling the ONE CHOICE that most applies to you. We realize that you may feel that more than one statement may relate to you, but *PLEASE JUST CIRCLE THE ONE. CHOICE WHICH MOST CLOSELY DESCRIBES YOUR PROBLEM RIGHT NOW.

SECTION 1 - Pain Intensity **A I have no pain at the moment.** **B The pain is very mild at the moment.** **C The pain is moderate at the moment.** **D The pain is fairly severe at the moment.** **E The pain is very severe at the moment.** **F The pain is the worst imaginable at the moment.**	***SECTION 6 - Concentration*** **A I can concentrate fully when I want to with no difficulty.** **B I can concentrate fully when I want to with slight difficulty.** **C I have a fair degree of difficulty in concentrating when I want to.** **D I have a lot of difficulty in concentrating when I want to.** **E I have a great deal of difficulty in concentrating when I want to.** **F I cannot concentrate at all.**
SECTION 2 -Personal Care (Washing, Dressing, etc.) **A I can look after myself normally without causing extra pain.** **B I can look after myself normally, but it causes extra pain.** **C It is painful to look after myself and I am slow and careful.** **D I need some help, but manage most of my personal care.** **E I need help every day in most aspects of self care.** **F I do not get dressed, I wash with difficulty and stay in bed.**	***SECTION 7 - Work*** **A I can do as much work as I want to.** **B I can only do my usual work, but no more.** **C I can do most of my usual work, but no more.** **D I cannot do my usual work.** **E I can hardly do any work at all.** **F I cannot do any work at all.**
SECTION 3 - Lifting **A I can lift heavy weights without extra pain.** **B I can lift heavy weights, but it gives extra pain.** **C Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned, for example, on a table.** **D Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned.** **E I can lift very light weights.** **F I cannot lift or carry anything at all.**	***SECTION 8 - Driving*** **A I can drive my car without any neck pain.** **B I can drive my car as long as I want with slight pain in my neck.** **C I can drive my car as long as I want with moderate pain in my neck.** **D I cannot drive my car as long as I want because of moderate pain in my neck.** **E I can hardly drive at all because of severe pain in my neck.** **F I cannot drive my car at all.**
SECTION 4 - Reading **A I can read as much as I want to with no pain in my neck.** **B I can read as much as I want to with slight pain in my neck.** **C I can read as much as I want to with moderate pain in my neck.** **D I cannot read as much as I want because of moderate pain in my neck.** **E I cannot read as much as I want because of severe pain in my neck.** **F I cannot read at all.**	***SECTION 9 - Sleeping*** **A I have no trouble sleeping.** **B My sleep is slightly disturbed (less than 1 hour sleepless).** **C My sleep is mildly disturbed (1-2 hours sleepless).** **D My sleep is moderately disturbed (2-3 hours sleepless).** **E My sleep is greatly disturbed (3-5 hours sleepless).** **F My sleep is completely disturbed (5-7 hours)**
SECTION 5 - Headaches **A I have no headaches at all.** **B I have slight headaches which come infrequently.** **C I have moderate headaches which come infrequently.** **D I have moderate headaches which come frequently.** **E I have severe headaches which come frequently.** **F I have headaches almost all the time.**	***SECTION 10 - Recreation*** **A I am able to engage in all of my recreational activities with no neck pain at all.** **B I am able to engage in all of my recreational activities with some pain in my neck.** **C I am able to engage in most, but not all of my recreational activities because of pain in my neck.** **D I am able to engage in a few of my recreational activities because of pain in my neck.** **E I can hardly do any recreational activities because of pain in my neck.** **F I cannot do any recreational activities at all.**

COMMENTS:_____

_____

_____

NAME: _____ **DATE:** _____ **SCORE:** _____

கழுத்து வலி இயலாமை குறியீட்டு கேள்வித்தாள்

உங்கள் கழுத்து வலி அன்றாட வாழ்க்கை செயல்பாடுகளை நிர்வகிக்க உங்கள் திறனை எவ்வாறு பாதித்துள்ளது என்று நாங்கள் அறிந்து கொள்ள இந்த கேள்வித்தாள் தயவு செய்து எல்லா பிரிவிலும் உங்களுக்கு பொருந்தும் கட்டத்திலும் பதிலளிக்க வேண்டுகிறோம். எந்த ஒரு பிரிவிலும் இரண்டு அல்லது அதற்கு மேற்பட்ட அறிக்கை சரியாக தோன்றின் மிகவும் நெருக்கமாக உங்கள் பிரச்சனைகளை விவரிக்கும் பெட்டியில் குறிக்கவும்.

பிரிவு 1: வலி தீவிரம்

I. எனக்கு இப்போது வலியே இல்லை
II. வலி இப்போது மிகவும் லேசாக உள்ளது
III. வலி இப்பொது மிதமாக உள்ளது
IV. வலி இப்போது கடுமையாக உள்ளது
V. வலி இப்போது மிகவும் கடுமையாக உள்ளது.
VI. வலி இப்போது கற்பனை செய்ய முடியாத மோசமான நிலையில் உள்ளது

பிரிவு 2: தனிப்பட்ட பதுகாப்பு (சலவை, ஆடை அணிதல்)

I. நான் பொதுவக கூடுதல் வலி இல்லாமல் நானே பார்த்துக் கொள்ள முடியும்
II. நான் பொதுவாக என்னை நானே கவனித்துக் கொள்ள முடியும் ஆனால் அது கூடுதல் வலியை கொடுக்கும்.
III. என்னை நானே கவனித்துக் கொள்ள வலியை கொடுக்கும். எனவே கவனமாகவும் மெதுவாகவும் செய்கிறேன்.
IV. எனக்கு சிறிது உதவி தேவைப்படும் ஆனால் எனது தனிப்பட்ட பாதுகாப்பை நானே நிர்வாகித்துக்கொள்கிறேன்.
V. எனது சுய பாதுகாப்பின் பெரும்பாலானவற்றில் தினமும் உதவி தேவை.
VI. நான் கஷ்டப்பட்டு தயாராகவும், கழுவுதல் மற்றும் படுக்கையில் இருக்க வேண்டி உள்ளது

பிரிவு 3: தூக்குதல்

I. கனமான எடையை வலி இல்லாமல் என்னால் தூக்க முடியும்.
II. நான் கனமான எடையை தூக்குவேன் ஆனால் வலி அதிகமாக இருக்கும்.
III. தரையிலிருந்து பொருட்களை எடுக்க வலி ஏற்படுகிரது ஆனால் மேசையில் இருந்து எடுத்துக்கொள்ள முடிகிறது.
IV. கனமான எடைகளை தூக்கும்போது வலி தடுக்கிறது ஆனால் லேசான அல்லது நடுத்தர எடைகள் தூக்கும் வகையில்; வசதியாக அமைக்கப்பட்டிருந்தால் என்னால் நிவகிக்க முடியும்.
V. என்னால் மிகவும் லேசான (குறைவான) எடையை மட்டுமே தூக்க இயலும்.
VI. என்னால் எதையும் தூக்க முடியாது.

பிரிவு 4: படித்தல்

I. கழுத்து வலி இல்லாமல் என்னால் இயன்ற வரை படிக்க இயலும்.
II. என்னால் இயன்ற வரை படிக்கும் போது கழுத்தில் லேசான வலி ஏற்படும்.
III. என் கழுத்தில் மிதமான வலி இருக்கும்போது எவ்வளவு வேண்டுமானாலும் படிக்க முடியும்.
IV. என் கழுத்தில் மிதமான வலி இருக்கும்போது என்னால் இயன்ற வரை படிக்க இயலவில்லை.
V. என் கழுத்து வலியினால் என்னால் கடினப்பட்டு படிக்க முடிகிறது.
VI. என்னால் படிக்கவே முடியவில்லை.

பிரிவு 5: தலைவலி

I. எனக்கு எந்த தலைவலியும் இல்லை.
II. எனக்கு எப்போதாவது லேசான தலைவலி வரும்.
III. எனக்கு எப்போதாவது மிதமான தலைவலி வரும்.
IV. எனக்கு மிதமான தலைவலி அடிக்கடி வரும்.
V. எனக்கு கடினமான தலைவலி அடிக்கடி வரும்.
VI. எனக்கு எப்போதும் தலைவலி இருந்து கொண்டே இருக்கும்.

பிரிவு 6: கவனம்

I. எந்தவித கஷ்டமும் இல்லாமல் என்னால் முழு கவனம் செலுத்த முடியும்.
II. முழு கவனம் செலுத்தும் போது சற்றே கடினம் ஏற்படும்.
III. கவனம் செலுத்தும்போது கடுமையான வலி ஏற்படுகிறது.
IV. நான் கவனம் செலுத்த வேண்டும் போது அதிக கடுமையான வலியால் சிரமம் ஏற்படுகிறது.
V. நான் கவனம் செலுத்த வேண்டுவதில் பெரும் சிரமம் ஏற்படுகிறது.
VI. என்னால் எதிலும் கவனம் செலுத்த முடியவில்லை

பிரிவு 7: வேலை

I. நான் எவ்வளவு வேலை வேண்டுமானாலும் செய்ய முடியும்.
II. எனது வழக்கமான வேலைகளை மட்டுமே என்னால் செய்ய முடியும் ஆனால் அதிகமாக செய்ய முடியாது.
III. நான் என் எல்லா வகையான வழக்கமான வேலைகளையும் செய்ய முடியும் ஆனால் அதிகமாக செய்ய முடியாது.
IV. நான் என் வழக்கமான வேலைகளை செய்ய முடியாது.
V. நான் கடினப்பட்டு வேலைகளை செய்கிறேன்.
VI. என்னால் எந்த ஒரு வேலையையும் செய்ய முடிவதில்லை.

பிரிவு 8: வாகனம் ஓட்டுதல்

I. நான் எந்த கழுத்து வலியும் இல்லாமல் என் மகிழ்வுந்தை ஒட்ட முடியும்.
II. என் கழுத்து லேசான வலி இருப்பினும் எனது மகிழ்வுந்தை எவ்வளவு தூரம் வேண்டுமானாலும் ஓட்ட முடிகிறது.
III. என் கழுத்தில் மிதமான வலி இருப்பினும் என்னால் எவ்வளவு தூரம் வேண்டுமானாலும் என் மகிழ்வுந்தை ஓட்ட முடிகிறது.
IV. என் கழுத்தில் மிதமான வலி ஏற்படும் போது மகிழ்வுந்தை என்னால எவ்வளவு தூரம் வேண்டுமானாலும் ஓட்ட முடிவதில்லை.
V. என் கழுத்தில் கடுமையான வலி இருக்கும் போது மிகவும் கஷ்டப்பட்டு மகிழ்வுந்தை ஓட்ட வேண்டியுள்ளது.
VI. என்னால் மகிழ்வுந்தை ஓட்ட முடிவதில்லை

பிரிவு 9: தூங்குதல்

I. நான் எந்த பிரச்சனையும் இன்றி தூங்க முடியும்.
II. என் தூக்கம் சற்றே கலையும் (1 மணி நேரத்திற்கும் குறைந்த அளவு தூக்கமின்மை)
III. என் தூக்கம் சற்றே அதிகம் கலையும் (1-2 மணி நேரத்திற்கும் குறைந்த அளவு தூக்கமின்மை)
IV. என் தூக்கம் மிதமாக கலையும் (2-3 மணி நேரம் தூக்கமின்மை)
V. என் தூக்கம் அதிகமாக கலையும் (3-5 மணி நேரம் தூக்கமின்மை)
VI. என் தூக்கம் முழுவதுமாக கலைந்துவிடும் (5-7 மணி நேரம் தூக்கமின்மை)

பிரிவு 10: பொழுதுபோக்கு

I. நான் எந்த கழுத்து வலியுமின்றி அனைத்து பொழுதுபோக்கு நடவடிக்கைகளிலும் ஈடுபட முடியும்.
II. என் கழுத்தில் சிறிது வலி இருப்பினும் நான் அனைத்து பொழுதுபோக்கு நடவடிக்கைகளிலும் ஈடுபட முடியும்.
III. என் கழுத்து வலியால் எல்லா வழக்கமான பொழுதுபோக்கு நடவடிக்கைகளிலும் ஈடுபட முடியாது ஆனால் ஓரளவு அதிகமாக ஈடுபட முடியும்.
IV. என் கழுத்து வலியால் ஒருசில வழக்கமான பொழுதுபோக்கு நடவடிக்கைகளில் மட்டும் ஈடுபடமுடியும்.
V. நான் கஷ்டப்பட்டு எனது பொழுதுபோக்கு நடவடிக்கைகளில் ஈடுபட முடிகிறது.
VI. என்னால் எந்த வித பொழுதுபோக்கு நடவடிக்கையும் செய்ய முடிவதில்லை

கருத்துக்கள்: _____

_____

பெயர்: _____ தேதி: _____/_____/_____ மதிப்பெண்_____

ANNEXURE – VI

TREATMENT PROTOCOL

WEEK	GROUP A	GROUP B
1ST WEEK	Mulligan mobilization (NAGS,SNAGS) NAGS will be given with 2-3 hertz (for less than 6 repetition) and SNAGS for 6 repetition in 3 sets. the mobilizations will be repeated for less than six times. conventional physiotherapy-Active exercise 10 counts ×5 times,Isometrics 10 counts ×5 times, Moist pack. Conventional physiotherapy will be taught as home program.	Pilates programme- Subjects will be individually assessed by the principal investigator and will be taught the10 beginner Pilatesexercises . (Hip Twist Level ,Double leg stretch Level 1&2) conventional physiotherapy-Active exercise 10 counts ×5 times,Isometrics 10 counts ×5 times, Moist pack. Conventional physiotherapy will be taught as home program.
2ND WEEK	Mulligan mobilization (NAGS,SNAGS) NAGS will be given with 2-3 hertz (for less than 6 repetition) and SNAGS for 6 repetition in 3 sets. the mobilization will be repeated for less than six times. Conventional physiotherapy-Active exercise 10 counts ×8 times,Isometrics 10 counts ×8 times, Moist hot pack. Conventional physiotherapy will be taught as home program.	Pilates programme-Subjectswill be individually assessed by the principal investigator and will be taught the10 beginner Pilatesexercises . (One leg stretch Level 1,Clam Level 1,Shoulder Bridge Level 1) Conventional physiotherapy-Active exercise 10 counts ×8 times,Isometrics 10 counts ×8 times, Moist hot pack. Conventional physiotherapy will be taught as home program.
3RD WEEK	Mulligan mobilization (NAGS,SNAGS) NAGS will be given with 2-3 hertz (for less than 6 repetition) and SNAGS for 6 repetition in 3 sets. the mobilization will be repeated for less than six times. Conventional physiotherapy-Active exercise 10 counts ×810 times,Isometrics 10 counts ×10 times, Moist hot pack. Conventional physiotherapy will be taught as home program.	Pilates programme- Subjects will be individually assessed by the principal investigator and will be taught the10 beginner Pilatesexercises . (Scissors Level 1, Arm openings Level 1Breast stroke prep Level 1& 2) Conventional physiotherapy-Active exercise 10 counts ×810 times,Isometrics 10 counts ×10 times, Moist hot pack. Conventional physiotherapy will be taught as home program.

Treatment duration: three weeks

Treatment session: 3 sessions per week

Group A: Mulligan Mobilization Technique

Group B: Pilates programme

Both groups will receive conventional physiotherapy

Group A: Mulligan Mobilization Technique

Procedure:

Position of the Patient:

Patient sitting upright with head in neutral.

Position of the Therapist:

Therapist stands behind the patient.

Technique:

Mulligan mobilization (NAGS, SNAGS) NAGS will be given with 2-3 hertz (for less than 6 repetition) and SNAGS for 6 repetition in 3 sets. The mobilization will be repeated for less than six times and then movement will be reassessed.

Cervical NAGS:

NAGS involves a mid to end-range facet joint mobilization applied anterocranially along the plane of treatment within the desired joint, combined with a small amount of manual traction .the purpose of this treatment is to increase the movement within the spine ,and decrease the symptomatic pain..

Cervical SNAGS:

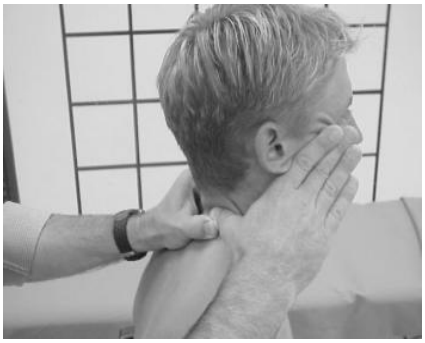
SNAGs are Sustained Natural Apophyseal Glides. Pain-free spinal manual therapy treatment techniques involving concurrentAccessory joint gliding and active physiological movement, withoverpressure at end--range

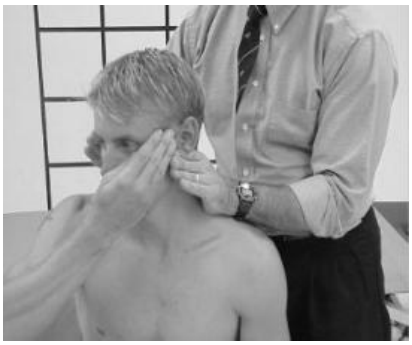
Rotation:

Contact: medial border distal phalanx of right thumb on articularpillar, left thumb contacts other side of right thumb to provide theMobilizationforce.

Glide: up toward the right eyeball in the plane of the facet.

Movement: patient rotates right and provides overpressure withhand on cheek while PT maintains glide through the entire movement. It can be repeated on the opposite side.



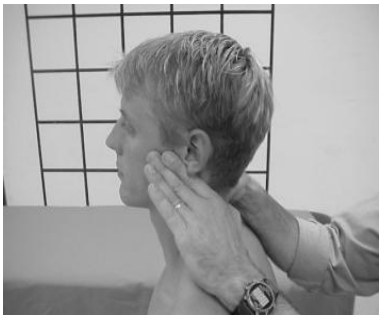


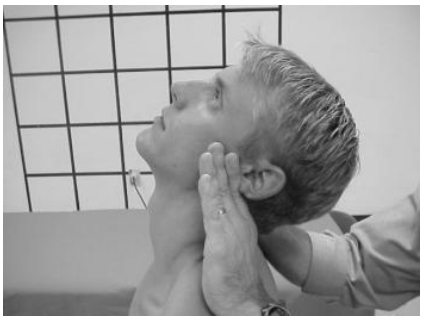
B. Extension

Contact: medial border distal phalanx of one thumb on SP, otherthumb contacts other side of thumb to provide the mobilizationforce.

Glide: up centrally toward the eyeballs in the plane of the facets.

Movement: patient extends while PT maintains glide through the entire movement.





Group B:Pilates Programme

The Programme involves 16 subjects who will be attending Pilates class thrice weekly for 3 weeks. Subjects will be individually assessed by the principal investigator and will be taught the 10 beginner Pilates exercises.

10 BEGINNER EXERCISES

HIP TWIST

Position of the Patient: Supine lying.

Position of the Therapist: Therapist stands at side to patient

Technique: Right knee moves away from and then towards midline while maintaining a neutral spine position. This challenges rotational control of the lumbar spine .

DOUBLE LEG STRETCH LEVEL 1

Position of the Patient : Supine lying.

Position of the Therapist : Therapist stands at side to patient

Technique: Arms are lowered overhead as far as control of the ribcage and pelvis can be maintained.

DOUBLE LEG STRETCH LEVEL 2

Position of the Patient : Supine lying.

Position of the Therapist : Therapist stands at side to patient.

Technique: As for level 1 but simultaneously sliding the left heel along the mat away from the body.

ONE LEG STRETCH

Position of the Patient : Supine lying.

Position of the Therapist : Therapist stands at side to patient

Technique: The left heel slides along mat extending left leg without allowing the pelvis to anteriorly tilt.

CLAM LEVEL EXERCISE

Position of the Patient :side lying.

Position of the Therapist : Therapist stands at side to patient.

Technique: Posterior fibres of gluteus medius are isolated as the top knee is slowly lifted towards the ceiling while keeping the pelvis still.

SHOULDER BRIDGE

Position of the Patient : Supine lying.

Position of the Therapist: Therapist stands at side to patient.

Technique :Pelvis is posteriorly tilted as the lumbar and thoracic spines are mobilized in to flexion.

SCISSORS LEVEL EXERCISE

Position of the Patient : Supine lying.

Position of the Therapist : Therapist stands at side to patient.

Technique The left knee is lifted over the hip (90 degrees angle at knee and hip) while keeping the pelvis in neutral.

ARM OPENINGS EXERCISE

Position of the Patient: side lying.

Position of the Therapist: Therapist stands at side to patient.

Technique: The uppermost arm is lifted away from the body to open the upper chest and rotate the thoracic and lumbar spine.

BREAST STROKE PREP LEVEL

Position of the Patient: prone lying.

Position of the Therapist: Therapist stands at side to patient

Technique: Shoulder blades glide gently downwards away from the ears while lifting the arms 4-5 cm off the mat.

BREAST STROKE PREP LEVEL 2

Position of the Patient :. prone lying

Position of the Therapist : Therapist stands at side to patient.

Technique :As for level 1 with the upper body lengthened off the mat to hover the breastbone 3 cm from the floor while maintaining a neutral lumbo-pelvic position. Keep the back of the neck long. This exercise retrains co-activation of the deep neck flexors and extensors with upper, lower trapezius and serratus anterior.

CONVENTIONAL PHYSIOTHERTAPY:

Active exercise – 10 repetitions in all direction in pain free range.

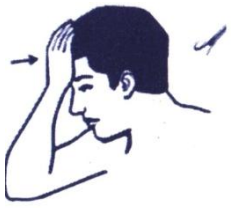
Isometrics -5-10 seconds brief but maximum contraction each held 5-16 seconds for flexors, extensors, side flexors and rotators.

Moist hot or cool packs: sitting position for 15 minutes on cervical region with head resting on table with a pillow.

Isometrics neck exercise:

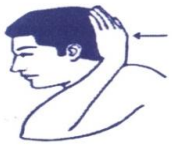
Neck Flexing:

Bend your neck slightly forward and put your hand on your forehead. Try to bend your head forward while pushing back with your hand. Hold for 10 seconds.



Neck Extension:

Keep your up and your neck straight and place your hands at the back of your head. Try to push your head backwards while pushing forward with your hands. Hold for a count of 10 seconds.



Side Bending:

Keep your head straight and your chin level. Put your right hand on the right side of your head. Try to bring your head down to your right shoulder while pushing up with your right hand. Hold for 10 seconds. Repeatthe Side Bending, but to the left side with your left hand.

Rotation

Put your left hand at chin level and turn your head slightly to the right. Put your right hand on the right side of your face Turn your head to the right while pushing it back with your right hand. Hold for a count of 10 seconds. Repeatthe Rotation Exercise, but on the left side of your faceand with left hand.

Active exercise:

Moist hot pack:

Clarification for home exercise monitoring

Exercise protocol

3 sessions/ week for 3 weeks

Every week 1st day patient will be asked to come to PMR or Orthopedics OPD

1st week

- 1st day patient will be assessed.
- 1st day program will be performed under the supervision of the therapist with guidance.
- Alternateday's patient will be performing the exercise at home under the supervision of the care taker.
- Therapist will also monitor the exercise program through regular calls.

2ndweek

- 1st day program will be performed under the supervision of the therapist with guidance.
- Alternate day's patient will be performing the exercise at home under the supervision of the care taker.

3rd week

- 1st day program will be performed under the supervision of the therapist with guidance.
- Alternate day's patient will be performing the exercise at home under the supervision of the care taker.
- Last day patient will be asked to come to PMR or Orthopedics OPD and will be reassessed for the results.

ABSTRACT

COMPARING THE EFFICACY OF MULLIGAN MOBILIZATION TECHNIQUE AND PILATES PROGRAMME ON OUTCOME MEASURES OF SUBJECTS WITH CHRONIC NECK PAIN

Background and Introduction: Neck pain is a frequent and disabling complaint in general population. One of the most common causes of neck pain is mechanical dysfunction of cervical spine. Although diverse methods have been proposed for increasing cervical range of motion, joint mobilization has been confirmed as effective in several studies. The current study will compare the effect of two different treatment protocols i.e., Mulligan mobilization and Pilates programme along with conventional physiotherapy treatment patients with chronic neck pain. This study tries to find out new effective method for reducing the problem of pain.

Method: 32 subjects were selected according to the inclusion and exclusion criteria were randomly divided into two groups: Mulligan mobilization, Pilates programme along with conventional physiotherapy. Treatment wasgiven 3 sessions a week for three weeks. Pain, functional disability and ROM were assessed by Numerical Pain Radiating Scale (NPRS), Neck Disability Index (NDI) and Universal Goniometer.paired ‘ t’ test and independent ‘t’ test were used.

Results: After three week protocol it was found that all the two groups showed significant improvement in NPRS, ROM and NDI score within the group. The present finding shows that Group A (Mulligan) shows significant improvements in the flexion and right cervical rotation of range of motion than group B (Pilates).

Conclusion: The present study shows that Mulligan mobilization and Pilates programme along with conventional physiotherapy aids in treating the pain, range of motion and functional disability of patients with chronic neck pain.

Key Words: Mulligan, Pilates, chronic neck pain.