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RESEARCH ARTICLE

TO COMPARE THE EFFECTIVENESS OF TWO DIFFERENT TECHNIQUES IN IMPROVING NON-SPECIFIC NECK PAIN, ROM AND DISABILITY IN PATIENT WITH NON-SPECIFIC NECK PAIN

Kavita, Preeti Devi and Jyoti

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Key words:-

ROM, NDI, VAS Goniometer, Non - Specific Neck Pain

Abstract

Background: The neck pain is a common cause of disability and health problem in the general population. It can be caused by the stress over the musculoskeletal system due to postural disorders and may also be associated with other causes such as inter vertebral disc herniation, nerve compression, or fracture. According to reports, the prevalence of neck pain ranges from 43% to 66.7% and rises with age.

Aims & Objectives: To compare the effectiveness of two different techniques in improving non-specific neck pain, ROM and disability in patient with non-specific neck pain.

Methodology: 30 Patients of non-specific neck pain were selected and the NDI Questionnaire were filled by patients for neck disability, pain Measured by VAS scale and range of motion measured by universal goniometer prior to the informed consent were asked to be filled by a patient. Then the subjects were divided into two groups. Mulligan mobilization technique were given to group A and isometric exercises were performed by patient itself in Group B for two weeks and the post assessment were taken and then data analyzed. Result The significant value is set up at $P < 0.005$. The values obtained from our study indicates that the result is significant and Group B have better effect than Group A that means isometric exercises are more effective than mulligan mobilization techniques in non-specific neck pain.

Conclusion: From the result we obtained that the isometric exercises is more effective than mulligan mobilization technique in non-specific neck pain.

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Introduction:-

The neck pain is a common cause of disability and health problem in the general population. Neck pain is one of the common musculoskeletal problem. Neck Pain can be caused by the stress over the musculoskeletal system due to postural disorders and may also be associated with other causes such as inter vertebral disc herniation, nerve compression, or fracture. Neck pain is a common problem in our society and it affects about 10% of the general population. Prevalence of Neck pain is reported to range from 43% to 66.7%, which increases along with aging (Shehri A et.al 2018). Neck pain is usually complex and encompasses several factors related to ergonomic, individual, behavioural, and psycho social aspects (Alansari m s2021). Prevalence of neck pain has an increasing trend up to 50 years followed by a decline and it has found to be more in females. With up to 37% of individuals developing persistent symptoms, neck pain is a condition that have a large economic burden on the health care

system. The majority of patients have “non-specific (simple) neck pain,” meaning that their symptoms are caused by postural or mechanical issues.

Etiological factors are poorly understood and are usually multi factorial, including poor posture, anxiety, depression, neck strain, occupational injuries, or sporting injuries. The majority of patients with neck pain have restricted movements.

Limited range of motion and a subjective feeling of stiffness may accompany neck pain, which is often precipitated or aggravated by neck movements or sustained neck postures (Mahajan R2012). Neck muscles help support the cervical spine and contribute to the movements of the head, neck, upper back and shoulders. Here are some of the key muscles attached to the cervical spine: Levator scapulae: The levator scapulae muscle is attached at the top four cervical vertebrae (C1 to C4) and runs down the side of the neck to attach at the top of the shoulder blade (scapula). This muscle helps with lifting the shoulder blade, bending the neck to the side and rotating the head. Sternocleidomastoid (SCM): The SCM muscle runs down the front of the neck to attach at the sternum and collar bone after being attached to the mastoid process, a tiny bone behind the ear.

Depending on whether one or both SCM muscles (one on each side of the neck) are contracted, the head can be rotated to side or the chin tilted upward. It is a large muscle that also helps and protect some fragile structures, such as the carotid artery. The prominent muscle is trapezius in the cervical, thoracic, and shoulder regions. Along the mid line it extends from the occiput into the lower ribs of the thoracic region, while laterally it extends as far as the acromion. Its anatomy and functions are of relevance both to clinicians and biomechanics interested in disorders and modelling of either the vertebral column, the shoulder girdle, or both. The trapezius muscle is used to rotate or turn the head, lift the shoulder blade, and stretch the head upward or neck backward. The erector spinae muscles are comprised by a number of muscles in the cervical spine. The muscles are essential for maintaining posture, turning the neck, and extending the neck backward.

The muscle group is comprised of the longuscapitus and longuscolli muscles, which run down the front of the cervical spine. The deep cervical flexor muscles are involved in flexing the neck forward as well as stabilising the cervical spine. Suboccipitals – comprised of four pairs of small muscles, the suboccipital muscles connect the top of the cervical spine with the base of the skull. The suboccipital are important for head extension and rotation (Slosar P, 2019). The neck is a slender column that can be subjected to a variety of bending loads in association with an axial load, the injury mode can be classified as comprehension, tension – extension, tension – flexion, comprehension – extension, comprehension flexion and lateral bending (Chen H, 2011). Mulligan applies movement in sympathy with physiological movement.

Mulligan’s principle techniques are NAGS, SNAG and MWMs (Mulligan 1993). NAGS are natural apophyseal accessory glides applied to the cervical spine with the patient passive. SNAG are sustained natural apophyseal accessory glides where by the patient attempts to actively move a painful or stiff joint through its range of motion whilst the therapist overlays an accessory glide parallel with the treatment plane. MWMs is the technique (mobilizations with movement) and are also applicable on the peripheral joints.

The underlying principle to MWMs is derived from Kaltenborn (Exelby 1995) who argued that joint surfaces are not fully congruent, physiological movements are a combination of rotation and glide, and glide is essential to pain free movement (Gautam R, 2014). Mulligan mobilizations reduce pain and improve functionality in many musculoskeletal conditions. Mulligan technique involves mobilization of the spine in weight bearing position, directing the mobilization parallel to the spine facet planes. In this technique spine mobilization is combined with movements of the peripheral joints to improve pain and radiculopathy resulting from cervical lesions (Khan S,A). Stretching involves the application of manual or mechanical force to elongate (lengthen) structures that have adaptively shortened and are hypomobile. Many physical benefits are thought to come from stretching, such as increased flexibility, reduced risk of injury, enhanced athletic or muscle performance, better running economy, healing promotion, and possibly delayed onset of muscle soreness. Stretching a muscle to the point of discomfort and maintaining the stretch for a while, then allowing the muscle to return to its usual resting length, is known as static stretching (Mahajan R 2012).

Aims and Objectives:-

Aims:-

To compare the effectiveness of two different techniques in improving non-specific neck pain, ROM and disability

Objectives:-

1. To find out the effectiveness of mulligan mobilization in improving non-specific neck pain, ROM and disability.
2. To find out effectiveness of static exercises in improving non-specific neck pain, ROM and disability.
3. To compare the effectiveness of two different techniques in improving non-specific neck pain, ROM and disability in patient with non-specific neck pain.

Hypothesis

Null Hypothesis:

1. There will be no significant effect of mulligan mobilization technique to reduce pain, disability and increases the active range of motion at cervical spine in non-specific neck pain
2. There will be no significant effect of static exercise to reduce pain, disability and increases the active range of motion at cervical spine in non-specific neck pain

Alternative Hypothesis:

1. There will be significant effect of mulligan mobilization technique to reduce pain, disability and increases the active range of motion at cervical spine in non-specific neck pain.
2. There will be significant effect of static exercises to reduce pain, disability and increases the active range of motion at cervical spine in non-specific neck pain.

Significance of the Study:

The study show the results that isometric exercise have significant result on non-specific neck pain which is beneficial and easy to learn by patient .These are easy to perform at home and office setups. Data will show the effect of mulligan mobilization on non-specific neck pain.It could be beneficial in the future in the terms of treatment of non-specific neck pain.

Methodology:-

Study Design:

Experimental study

Source of Collection of Data:

University Students

Sample Size:

30

Sampling methods:

Simple Random Sampling.

Inclusion Criteria:

- Age group between 18-25 years
- Patient with primary complaint of non-specific neck pain
- Pain of sufficient intensity (greater than 2 out of 10 on numerical pain scale)
- Tight neck muscles
- Both males and females are included

Exclusion Criteria:

- Osteoporosis
- Weight loss, fever, history of malignancy
- Inflammatory arthritis (AS)

- Structural abnormality effecting neck
- Patient taking anticoagulants
- Neck pain due to trauma
- Previous fracture
- Irradiated neck pain
- Neck pain associated with vertigo
- Diagnosed psychological disorders

Materials required:

Universal Goniometer
Revolving patient Stool
Stationary material

Variables:**Independent:**

- Mulligan mobilization
- Isometric exercises

Dependent Variables:

1. Pain.
2. Range of motion.
3. Disability.

Procedure:-

The subjects were selected as per the inclusion criteria and all of them will be explained about the study. A verbal and written consent was taken from the subjects. Subjects were informed the subject about the study. Neck disability index was filled by the subject. Visual analogue scale was used to measure pain and universal goniometer was used to measure the range of motion of neck. Pre assessment was taken. Subjects were selected as per the scoring result of neck disability index questionnaire. Subjects were divided into two group i.e group A and group B. Mulligan mobilization technique was given on group A and Isometric exercises were performed by other group. On the day 1, subject was be seated on the revolving patient stool and researcher was standing beside the subject .Put your thumb behind the mastoid process and traced slide down just inferior to the thumb. Once mastoid process was palpated then thumb can rotate toward back. With the other thumb apply overpressure forward in that straight plane. Then subject was rotating the neck to the left and pressure was maintained with subject's active motion to making it a mobilization with movement. Subject's symptoms were monitor throughout the movement. The subject can give over pressure with right hand (zygomatic Arch) and give further motion and come back slowly. Subjects were asked for pain. This procedure was repeated for 5 times and in two sets. There was 10 seconds gap between both the sets .On the other hand Group B subjects was do Isometric exercises with itself at home for 2times per day this was repeated for 2 weeks and then post assessment was taken.

Data Analysis:

The Data was analyzed using SPSS statistics software version 23. Pre & post mean \pm SD and significant value of both the group was calculated by applying paired t-test. Compare the post mean \pm SD and significant value of both the groups by applying Independent samples t-test. The significance level was set-up at $P < 0.05$.

Result:-

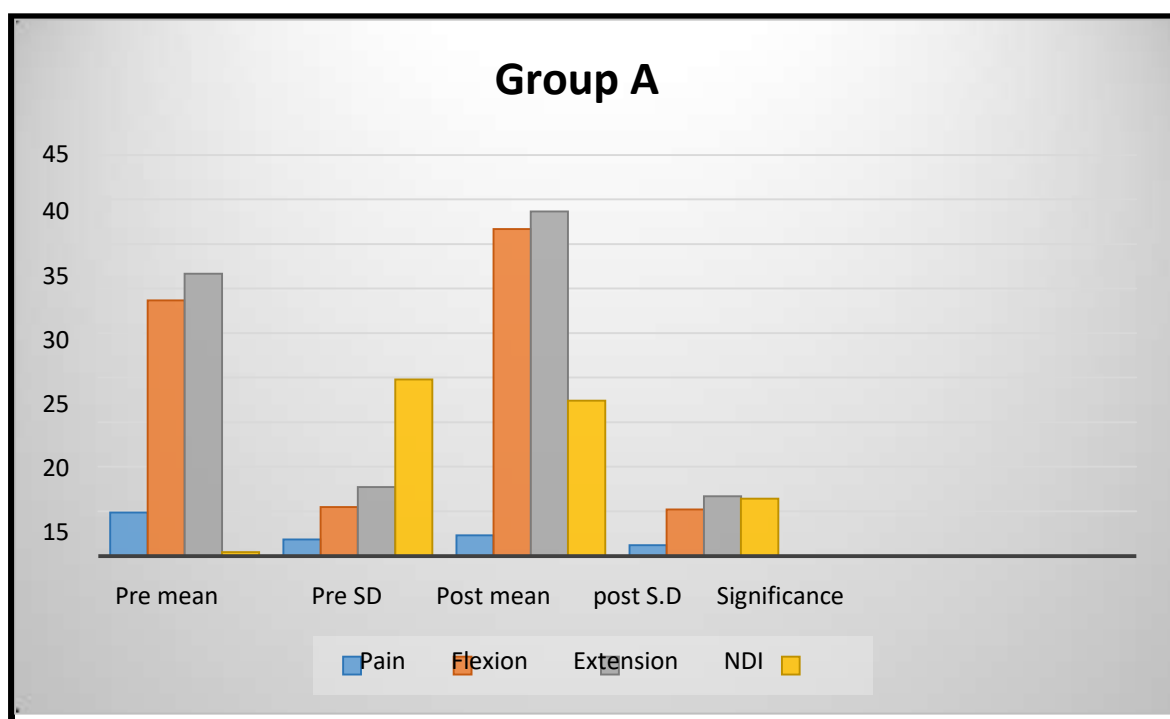
The study was conducted on 30 subjects with non-specific neck pain .The group A included 15 subjects with non-specific neck pain, who are given mulligan mobilization technique for 2weeks for 2 times per day, whereas the Group B included 15 subjects with non-specific neck pain, who are given Isometric exercises for 2 weeks for 2times per day. The subjects included the patient with age group of 18-25years.

Comarison of Descriptive Data of Group Apre and Postreading:-

Table:- representing the mean and standard deviation and significance of group A

Variables	Pre Mean±S.D	Post Mean±S.D	Significance	
Pain		4.87±1.84	2.33±1.17	0.000
Flexion	28.6±5.49		36.6±5.23	0.000
Extension	31.6±7.71		38.6±6.67	0.000
Neck disability index	42.6± 19.8%		17.4± 6.44%	0.000

P value is significant at p<0.000



Graph:- Representing the mean and standard deviation and significance of group A

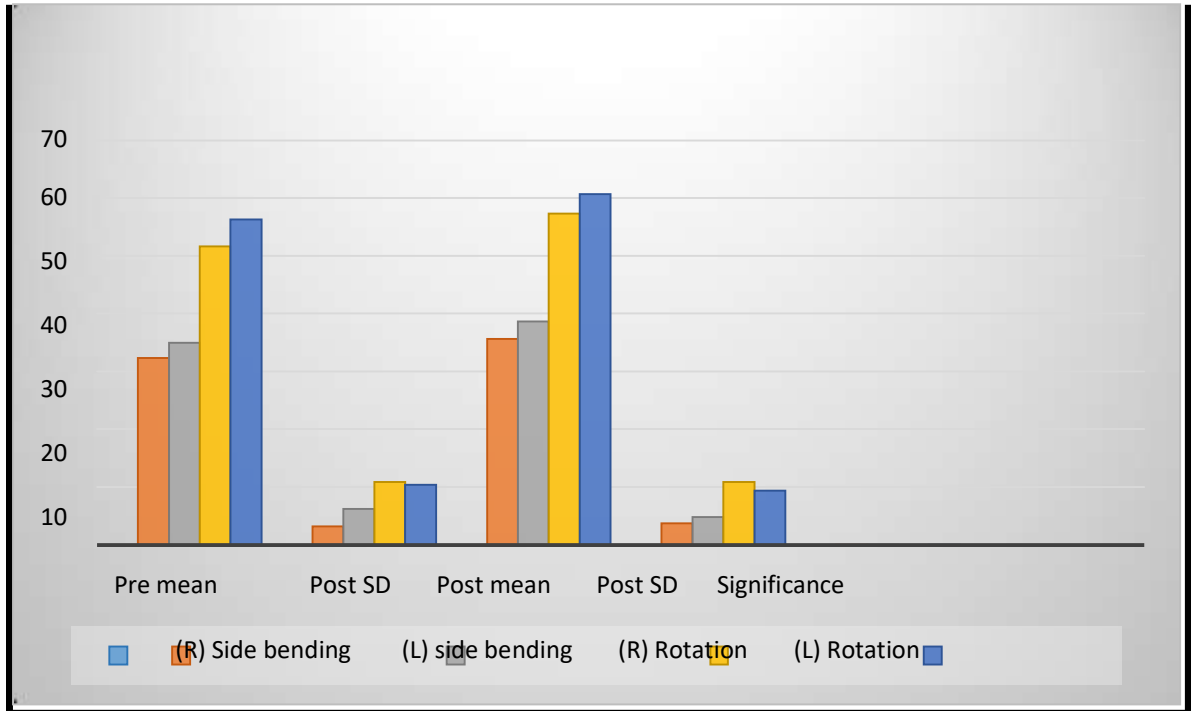
Paired sample t-test was used to find out significant difference for pain, flexion, extension and NDI. The result showed significant improvement in pain between pre (4.87±1.84) and post(2.33±1.175), flexion pre(28.6±5.49) and post(36.6±5.23), extension pre(31.6±7.71) and post(38.6±6.67) and NDI pre(42.6±19.84%) and post(17.4±6.44%) outcomes .

Table:- Representing the mean and standard deviation and significance of group A

Variables	Pre Mean±S.D	Post Mean±S.D	Significance
(R) side bending	32.3±3.20	35.6±3.71	0.001
(L)Side bending	35.0±6.26	38.6±4.80	0.001

(R) Rotation	51.6±10.9	57.3±10.9	0.000
(L)Rotation	56.3±10.4	60.6±9.42	0.001

P value is significant at p<0.001



Graph:- Representing the mean and standard deviation and significance of group A.

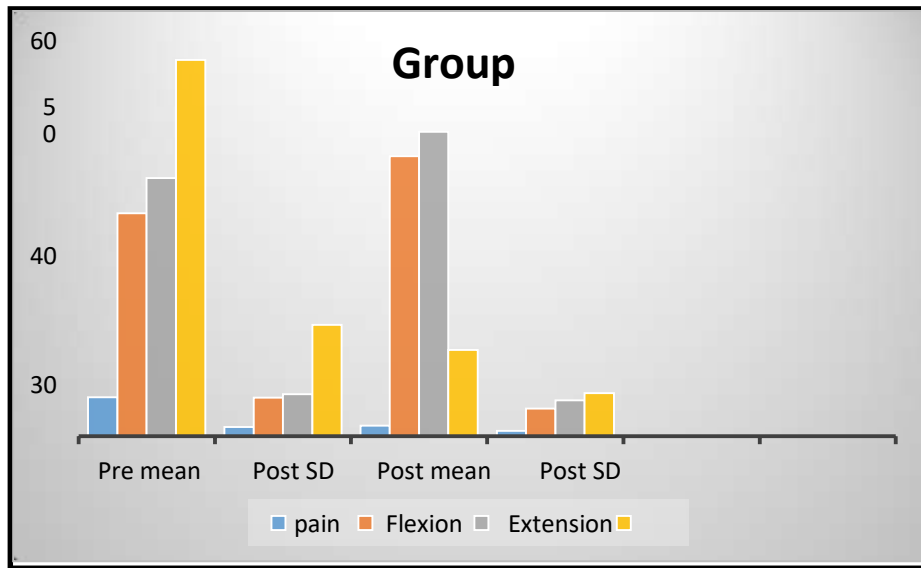
Paired sample t-test was used to find out significant difference for (R) side bending,(L)side bending, (R) Rotation and (L) Rotation . The result showed significant improvement in (R)side bending between pre (32.3±3.20) and post(35.6±3.71),(L) side bending pre (35.0±6.26)and post (38.6±4.80) ,(R)Rotation pre(51.6±10.9) and post (57.3±10.9)and (L)Rotation pre(56.3±10.4) and post (60.6±9.42) outcomes.

Comarison Of Descriptive Data Of Group B Pre And Post Reading:

Table:- Representing the mean and standard deviation and significance of group B.

Variables	PreMean±S.D	PostMean±S.D	Significance
Pain	5.87±1.35	1.53±0.743	0.000
Flexion	33.6±5.81	42.3±4.16	0.000
Extension	39.0±6.32	46.0±5.41	0.000
NDI	56.8±16.8%	13.0±6.50%	0.000

P value is significant at p<0.000

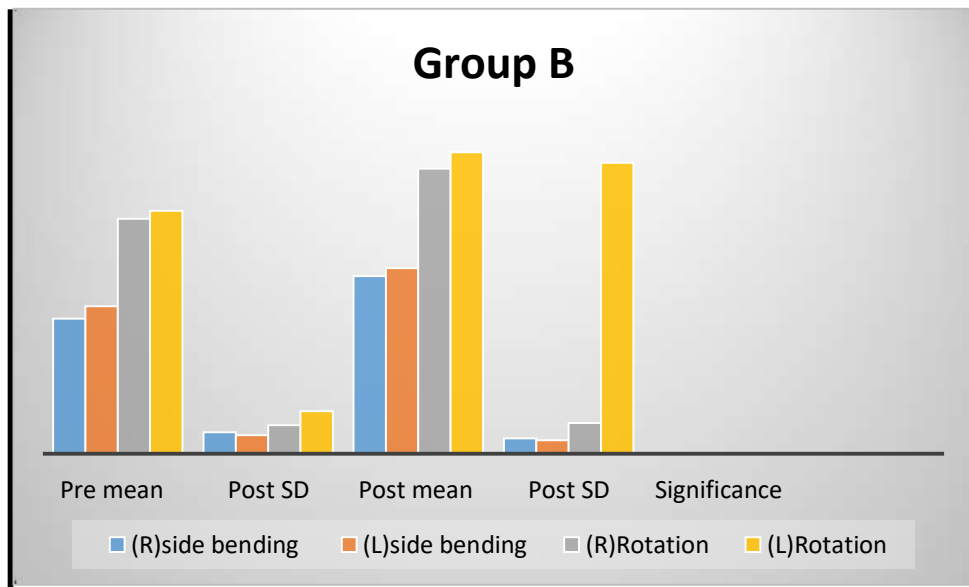


Graph:- Representing the mean and standard deviation and significance of group B.

Paired sample t-test was used to find out significant difference for pain, flexion, extension and NDI. The result showed significant improvement in pain between pre (5.87±1.35) and post(1.53±0.743), flexion pre (33.6±5.81) and post (42.3±4.16) ,extension pre (39.0±6.32) and post (46.0±5.41)and NDI pre(56.8±16.8%) and post (13.0±6.50%) outcomes.

Table:- Representing the mean and standard deviation and significance of group B.

Variables	PreMean±S.D	PostMean±S.D	Significance
(R) side bending	28.3±4.49	37.3±3.20	0.000
(L) Side bending	31.0±3.87	39.0±2.80	0.000
(R)Rotation	49.3±5.93	59.8±6.43	0.000
(L)Rotation	51.0±8.90	63.3±61.1	0.000
P value is significant at P<0.000			



Graph:- Representing the mean and standard deviation and significance of group B.

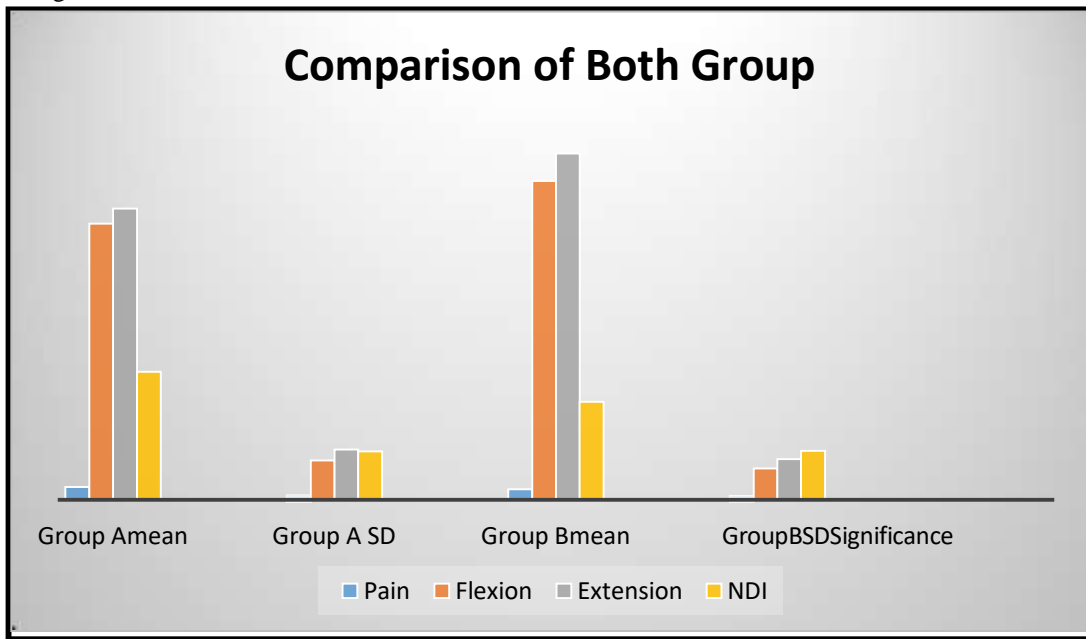
Paired sample t-test was used to find out significant difference for (R) side bending, (L) side bending, (R) Rotation and (L) Rotation. The result showed significant improvement in (R)side bending between pre (28.3±4.49) and post(37.3±3.20),(L) side bending pre (31.0±3.87)and post (39.0±2.80) ,(R)Rotation pre(49.3±5.93) and post (59.8±6.43) and (L)Rotation pre(51.0±8.90) and post (63.3±6.1) outcomes.

Comparison Of Descriptive Data Of Both The Group Post Test Reading:-

Table:- Representing the post mean, standard deviation and significance of both group.

Variables	Pre Mean±S.D	Post Mean±S.D	Significance
Pain	1.73±0.59	1.40±0.507	0.096
Flexion	36.6±5.23	42.3±4.16	0.006
Extension	38.6±6.67	46.0±5.41	0.313
NDI	17.0±6.44%	13.0±6.50%	0.115

P value is significant for pain at p<0.096,
 P value is significant for flexion at p<0.006,
 P value is significant for extension at P<0.313,
 P value is significant for NDI at P<0.115



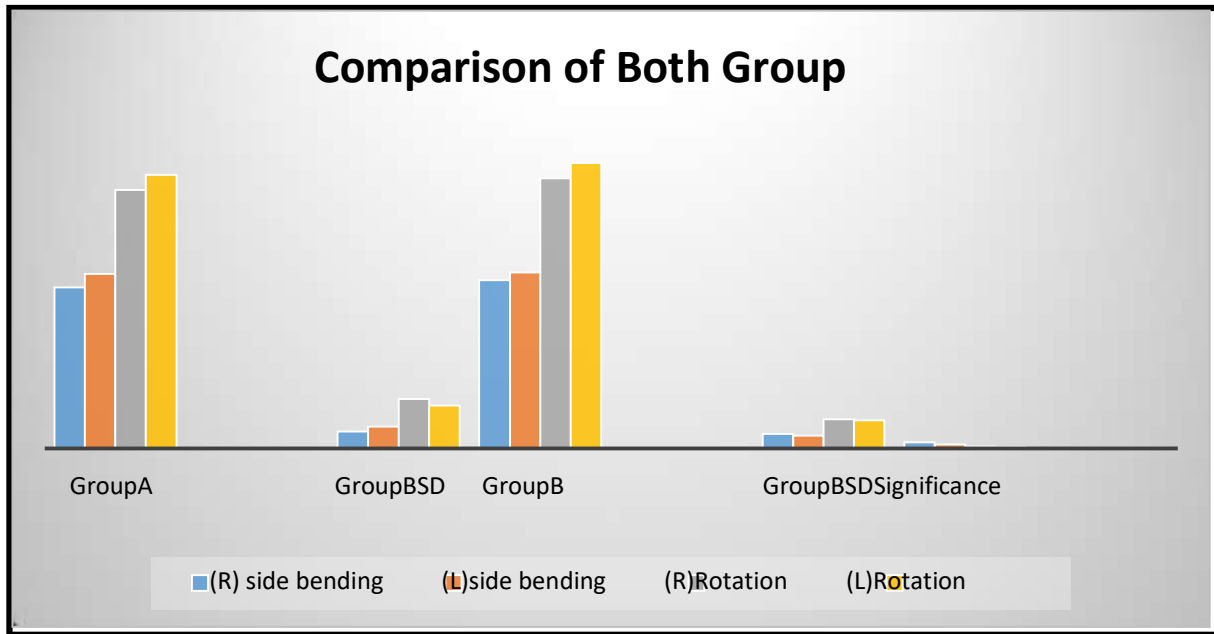
Graph:- Representing the mean and standard deviation and significance of both group.

Independent samples t-test was used to find out significant difference between post reading of both the groups for pain, flexion, extension and NDI. The result showed significant improvement in pain between group A post (1.73±0.59) and group B post(1.40±0.507),flexion group A post (36.6±5.23) and group B post (42.3±4.16) ,extension Group A post (38.6±6.67) and Group B post(46.0±5.41) and NDI group A post(17.0±44.7%) and Group B post(13.0±6.50%) outcomes.

Table:- Representing the mean and standard deviation and significance of both group.

Variables	Pre Mean±S.D	Post Mean±S.D	Significance
(R)side bending	35.6±3.71	37.3±3.20	0.313
(L) side bending	38.6±4.80	39.0±2.80	0.849
(R)Rotation	57.3±10.9	59.8±6.43	0.360
(L) Rotation	60.6±9.42	63.3±6.17	0.326

p value is significant for (R) side bending at p<0.313, p value is significant for (L)Side bending at p<0.849, p value is significant for(R)Rotation at p<0.360, p value is significant for (L)Rotation at p<0.326



Graph:- Representing the mean and standard deviation and significance of both group.

Independent samples t-test was used to find out significant difference between post reading of both the groups for (R) side bending, (L) side bending, (R) Rotation and (L) Rotation. The result showed significant improvement in (R) side bending between group A post (35.6 ± 3.71) and group B post (37.3 ± 3.20), (L) side bending group A post (38.6 ± 4.80) and group B post (39.0 ± 2.80), (R) Rotation Group A post (57.3 ± 10.9) and Group B post (59.8 ± 6.43) and (L) Rotation group A post (60.6 ± 9.42) and Group B post (63.3 ± 6.17) outcomes.

Discussion:-

The purpose of the study is to compare the effect of mulligan mobilization technique and isometric exercises on non-specific neck pain. This study was conducted on 30 subjects in two groups with non-specific neck pain which includes patients age group A (20.47 ± 1.68) and Group B (20.27 ± 1.94) out of which 60% are males and 40% are females. The patients were included on the basis of inclusion and exclusion criteria. On the group A mulligan mobilization technique were performed and Group B were asked to do isometric exercises.

Then result was calculated to compare both the techniques on Pain, ROM and NDI. After the comparison, the Independent samples t-test was used to analysis and the P value is set up at 0.005. The values obtained from our study indicates that the result is significant and Group B is better effect than Group A. It shows that isometric exercises are more effective than mulligan mobilization techniques at non-specific neck pain.

After conducting this study, a significant result is obtained. The Group A post result for pain were (1.73 ± 0.59) respectively and Group B post result for pain were (1.40 ± 0.507). The mean results were significant after the application of Independent samples t-test ($P < 0.096$). The result proved that the isometric exercises are significantly useful in reducing the pain in non-specific neck pain. (Yang et al, 2022) conducted a study on Effects of isometric training on the treatment of patients with neck pain A meta-analysis. Isometric training was superior to the control group. Increased effects on visual analogue scale and range of motion were observed with over 20 isometric training interventions. Isometric exercise is a powerful tool for reducing neck pain, enhancing neck function, increasing joint mobility.

The study result of Group A for post Flexion (36.6 ± 5.23), Extension (38.6 ± 6.67), (R) side bending (35.6 ± 3.71), (L) side bending (38.6 ± 4.80), (R) rotation (57.3 ± 10.9), (L) rotation (60.6 ± 9.42) respectively and Group B post result for flexion (42.3 ± 4.16), extension (46.0 ± 5.41), (R) side bending (37.3 ± 3.20), (L) side bending (39.0 ± 2.80), (R) Rotation (59.8 ± 6.43) and (L) rotation (63.3 ± 6.17). The mean results were significant after the application of Independent samples t-test (0.006, 0.313, 0.313, 0.849, 0.360, 0.326). The result proved that the isometric exercises

are significantly useful in improving the ROM. Sbardella,Set.al(2021) was proposed a study on Muscle Energy Technique in the Rehabilitative Treatment for Acute and Chronic Non-Specific Neck Pain: a systematic review. Twenty-one papers according to inclusion and exclusion criteria were selected: 15 studies about non-specific acute neck pain and 6 studies about non-specific chronic neck pain . According to this investigation , the MET strategy works well in conjunction with a typical rehabilitative approach to enhance cervical range of motion in patients with chronic neck pain and acute neck pain.

The Group A post result for NDI(17.0 ± 6.44) and The Group B post result for NDI(13.0 ± 6.50). The mean results were significant after the application of Independent samples t-test ($p < 0.115$).The result proved that the isometric exercises are significantly useful in reducing the disability in non-specific neck pain. Khan.KZ et, al, (2022) was conducted a study on effect of post-isometric relaxation versus myofascialrelease therapy on pain, functional disability, ROM ,Qol in the management of non specific neck pain: a randomized controlled trial.Based on an analysis of the baseline characteristics, it was found that both groups had the same age and gender i.e. a total of 60 participants were included in this research study 30in each group. With a mean of $32.4(5.0)$ years, there were 20(33.3%) men and 40(66.7%) females among the 60 patients.

Participants in the post isometric group demonstrated significant improvement ($P < 0.025$) in VAS, NDI ,Cervical extension , left side rotation ranges and Qol (social domain) at the 2week follow-up compared with those in the myofascial group. Moreover, the myofascial group showed noticeably reater improvement in the CROM (flexion, left and right side bending) mean score.

The study demonstrated patients with non specific neck pain can benefit from the post isometric relaxation with significant improvement in pain, disability, cervical ROM, and Quality of life compared with myofascial release therapy.

Limitations Of The Study

- 1.Small sample size.
- 2.Sample is specific in Patient with primary complaint of non-specific neck pain.
- 3.Sample is specific in younger age (18-25).
- 4.Sample is specific in Pain of sufficient intensity (greater than 2 out of 10 on numerical pain scale).

Future scope of the study

The study can be added certain new things such as added some other exercises, technique increasing the time duration and increase the number of repetitions. The study can be conducted on large sample size and on different type of conditions. We can increase the time duration to 15 sec for better Results. Evaluation of other muscles that can improve pain, disability and quality of life . Assessment can also be done after every week of session.

Conclusion:-

From the result we obtained that the isometric exercises is more effective than mulligan mobilization technique. Isometric exercises help to improve in pain, ROM and neck disability. It can be release the tightness of neck muscles. Combining isometric exercises with other techniques in physiotherapy can be very effective method to get rid of non-specific neck pain. However the sample size can be increased to show a high significant value. The purpose of increasing the ROM, improvement in pain and neck disability is fulfilled as the result found was significant.

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