



## To compare the efficacy of cervical traction and neural mobilization on pain, disability and radicular symptoms in patients with C5-C6 radiculopathy.

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**ABSTRACT:** Cervical Radiculopathy is called as “Pinched Nerve”. It occurs when the nerve is irritated or compressed where it branches from spinal cord. Neck pain, Numbness, tingling sensation, weakness of arm and hand are the major clinical features of Cervical Radiculopathy. Methods- Patients were divided into two groups. Group A (20 participants) were treated with hot pack and intermittent cervical traction. Group B (20 participants) were treated with hot pack and neural butler mobilization. We measured the pain, disability and radicular symptoms of neck using NPRS, NDI and GROC scales at day 1 and end of 4<sup>th</sup> week. At the end of 4<sup>th</sup> week, data analysis was done using paired and un-paired t-test and significant results were found. Result-Comparison of post intervention at 4<sup>th</sup> week of treatment, there was a statistically significant difference in improvement in outcome measures between two groups. Group A participants have shown greater percentage of improvement than Group B. Conclusion- Intermittent cervical traction with hot pack was significantly effective in improving pain, disability and decreasing radicular symptoms in radiculopathy patients.

**KEYWORDS:** Cervical Radiculopathy, Neck Pain, Median Nerve, Cervical Traction, Neural Mobilization.

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### INTRODUCTION

Cervical radiculopathy is, by definition, a disorder of the cervical nerve root and most commonly is caused by a cervical disc herniation, spondylotic spur or cervical osteophyte or other space-occupying lesion, resulting in nerve root inflammation, impingement or both which may lead to chronic pain and disability (Kujiper BB et al. 2009). The commonest etiology for cervical radiculopathy follows an injury that reduces the intervertebral space and resulting in inflamed cervical nerve root. Patients with cervical radiculopathy exhibit typical symptoms of pain in the cervical region which radiates to the upper limb and all the way down till the fingers, as well as neurological signs along the nerve root distribution.

The average annual incidence rate of cervical radiculopathy is 83 per 100 000 for the population in its entirety, with an increased prevalence occurring in the fifth decade of life (203 per 100 000) (Eubanks JD 2010). Intervertebral disc are shock-absorbing cushions that are held responsible for taking all the loads into the spine. The cervical spine allows six degrees of freedom, and it was found flexion/extension is the most considerable motion that occurs in a sagittal plane (Callaghan et al 2007). Once the intervertebral disc absorbs the compression forces, the nucleus pulposus protrudes out through the weak & cracked annulus fibers. The inability of the nucleus pulposus to receive and redistribute the loads efficiently could result in disc degeneration, and in turn lead to herniation (Costi et al. 2002). There are seven vertebrae in the cervical spine; C5-6 and C6-7 are the most expected levels of cervical disc herniations reported among 90% of all cases (Constantoyannis et al. 2002). Compression of the nerve root because of disc herniations hindered the blood flow of the nerve root (Kobayashi S et al. 2003), this alteration of the microcirculation of the nerve lead to pain and release of inflammatory mediators. Furthermore, block of neural conduction, edema, and mechanical sensitization resulted also from compression of nerve root (Chen C1 et al. 2003).

Conservative treatment includes various exercise methods and physical therapy modalities such as hot therapy, Transcutaneous Electrical nerve Stimulation, Ultrasound and Laser. By applying appropriate treatment techniques in a creative and judicious manner, the physical therapist can do much to enhance the speed and degree of recovery from cervical Radiculopathy. More controlled studies, however, are needed comparing the combined effect of different forms of treatment.

Neural mobilization techniques helped in restoring the movement between the nerves and surrounding structures through the gliding movement. Therefore, the intrinsic pressures on the nervous tissue were decreased and consequently enhanced the nerve function (Ellis RF et al 2008). Neural mobilization affect the mechanical properties of peripheral nerves, and this alteration in nerve mechanics lead to direct effect on nerve physiology. Neural mobilization generate various amounts of longitudinal nerve excursion and strain (kumar V et al. 2013).

The intermittent traction method is effective for treating patients with cervical radiculopathy and the effects of the intermittent traction method may be superior to the effects of continuous traction (Constantoyannis et al. 2002). Several theories have been proposed to explain the possible clinical benefit of traction therapy. Distracting the motion segment is thought to change the position .disc-nerve interface (Knutson E et al 2008).

Thus this study was very much needed and it aimed to compare the efficacy of cervical traction and neural mobilization to reduce the pain and disability and to improve the well-being of the patients with cervical Radiculopathy.

## 1. MATERIALS AND METHODS

Patients were taken from the OPD of Dasmesh College of Physiotherapy Faridkot and OPD of Orthopaedics department of GGS medical college, Faridkot and written informed consent was received from all patients enrolled in the study. 40 patients between the ages of 40-60 were included according to inclusion criteria i.e. 1. Female patient having history of neck pain from last 6 weeks. 2. Neck Distraction test is positive. 3. Pain aggravated by cervical spine motion particularly extension. 4. Clinically diagnosed case from orthopaedician of C5-C6 cervical Radiculopathy.

Patients were divided into two groups. Group A (20 participants) were treated with hot pack and intermittent cervical traction. Group B (20 participants) were treated with hot pack and neural butler mobilization.

### PROCEDURE:

**GROUP A:** In this group 20 patients were treated simultaneously with hot pack and Cervical Traction. Patients were given treatment for 6 days per week for 4 weeks.

- **CERVICAL HOT PACK:** With the patient in fully comfortable position preferably supine lying; place standard cervical moist hot pack measuring 6-inches × 18-inches (Prentice W E 2018) maintained at temperature 55 degree Celsius by thermostat knob wrapped in 4 layers of towel for 20 minutes in each session (Funk D et al. 2001) Hot Pack was placed over cervical region C0-C7 covering paracervical region.
- **INTERMITTENT CERVICAL TRACTION:** subjects were instructed about the procedure and taken in supine lying on the treatment couch. The cervical spine was place at an angle of approximately 15 degrees of flexion with traction force to be 10% of subject's body weight. The on/off cycle set at 60/30 seconds. The traction was given for 9 minutes per session (Korhonen et al. 2003).

**GROUP B:** In this group 20 patients were treated simultaneously with hot pack and Neural Mobilization. Patients were given treatment for 6 days per week for 4 weeks.

- **CERVICAL HOT PACK:** With the patient in fully comfortable position preferably supine lying; place standard cervical moist hot pack measuring 6-inches × 18-inches (Prentice W E 2018) maintained at temperature 55 degree Celsius by thermostat knob wrapped in 4 layers of towel for 20 minutes in each session (Funk D et al. 2001) Hot Pack was placed over cervical region C0-C7 covering paracervical region
- **NEURAL MOBILISATION OF MEDIAN NERVE:** Patient was in supine lying position. The therapist stands on the affected side besides the patient and depress the shoulder with one hand while the elbow would be kept in 90 degrees of flexion and forearm in supination and wrist and fingers in extended position using other hand. Then patient's arm was passively taken into 90 to 100 degrees of abduction. This was followed by either the sliding or gliding procedure. When sliding of the nerve was to be done then alteration of elbow extension (loading median nerve) with wrist flexion (unloading median nerve) and elbow flexion (unloading median nerve) with wrist extension (loading median nerve) was performed for 6

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sets of repetitions. Each set was performed in a slow oscillatory manner (60 seconds) followed by 30 seconds rest. In the 60 seconds each time first 3 sets of sliding followed by 3 sets of gliding were given, followed by 30 seconds rest (Ragonese J 2009).

#### OUTCOME MEASURES:

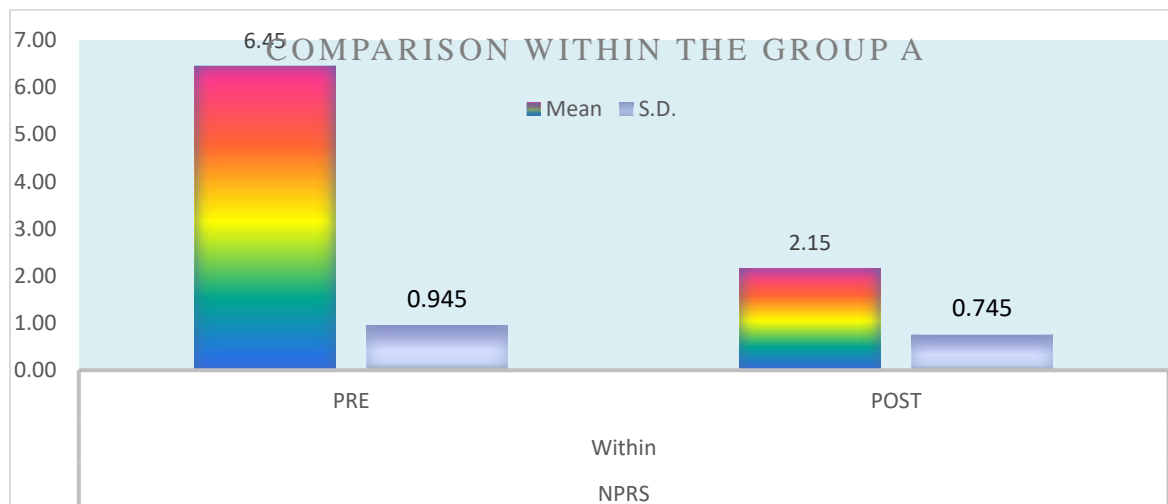
Patients were assessed at baseline and end of 4<sup>th</sup> week by:

- Numerical Pain Rating Scale (NPRS)
- NDI (Neck Disability Index)
- GROC (Global Rating of Change Scale )

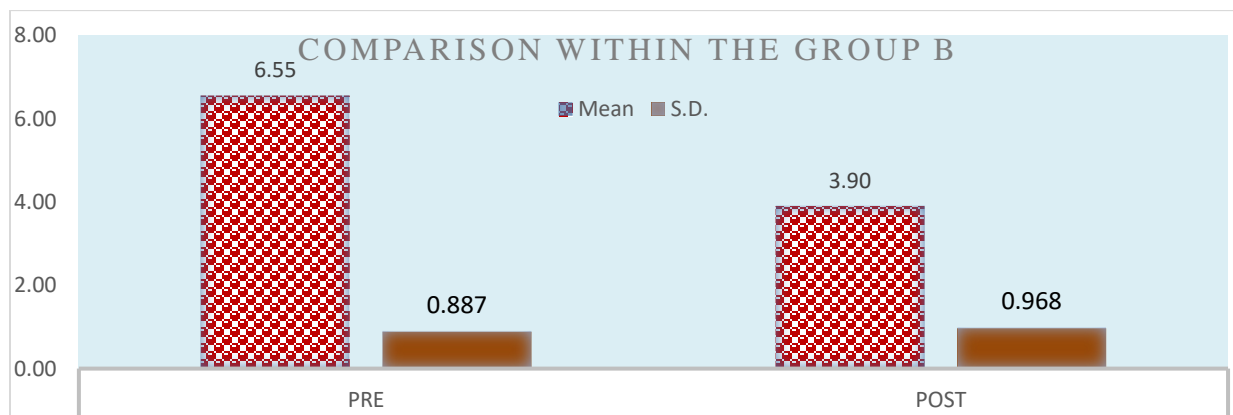
## 2. RESULTS

**STATISTICAL ANALYSIS:** The data was described as mean and standard deviation, for normally distributed data. Paired t-test was used to compare between variables within each group, while unpaired t-test was used to compare between two groups. The p value was set at level less than 0.05.

### NPRS WITHIN GROUP ANALYSIS



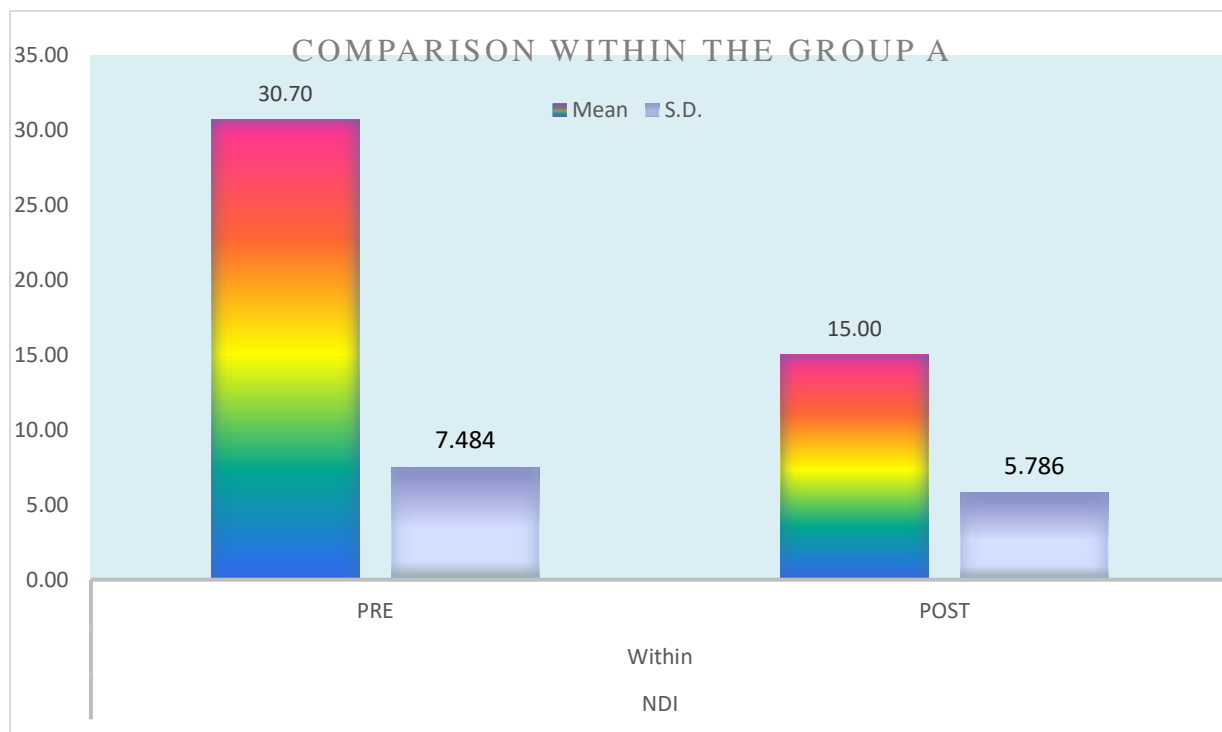
**Table No 1.1:** describes the comparison of pre and post protocol mean value of NPRS within **Group A**. Where Pre-intervention mean/SD was 6.45/0.945 and that of Post-intervention was 2.15/0.745. The value of paired test calculated was 33.664 which was statistically significant, at  $p < 0.001$ .



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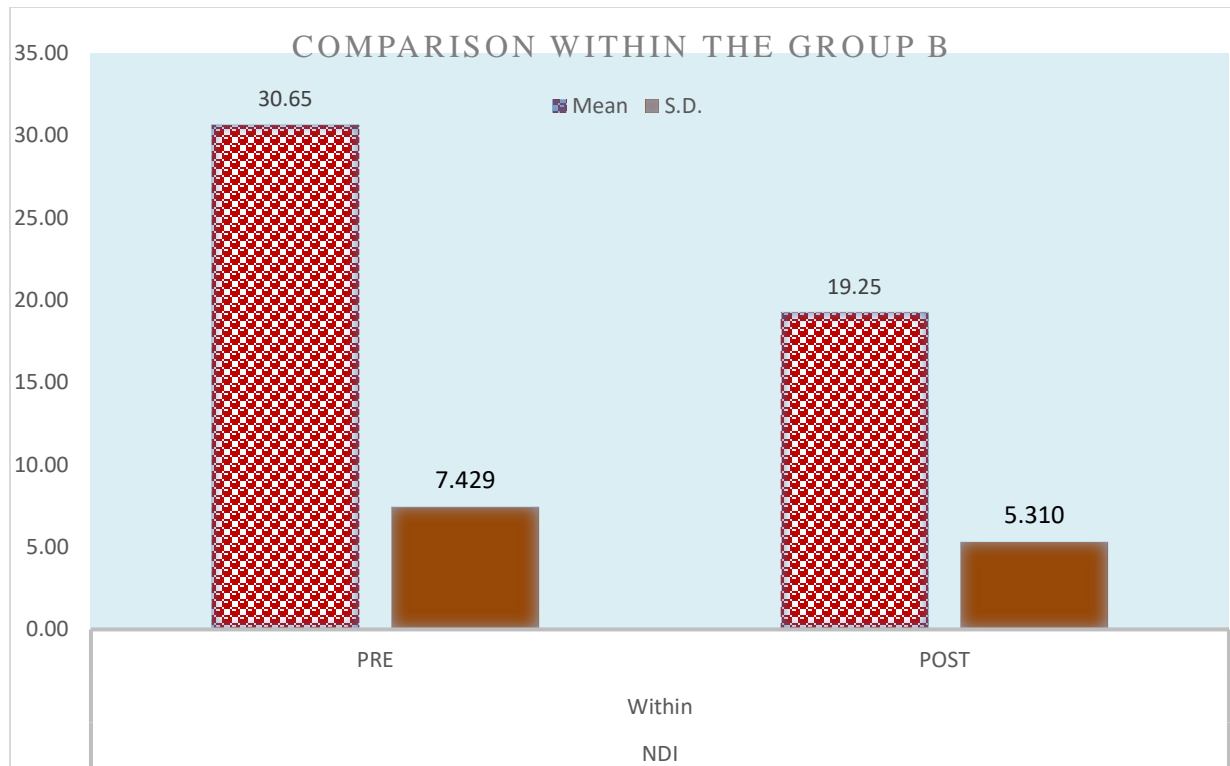
**Table No 1.2:** describes the comparison of pre and post protocol mean value of NPRS within **Group B**. Where Pre-intervention mean/SD was 6.55/0.887 and that of Post-intervention was 3.90/0.968. The value of paired test calculated was 14.582 which was statistically significant, at  $p < 0.001$

#### NDI WITHIN GROUP ANALYSIS



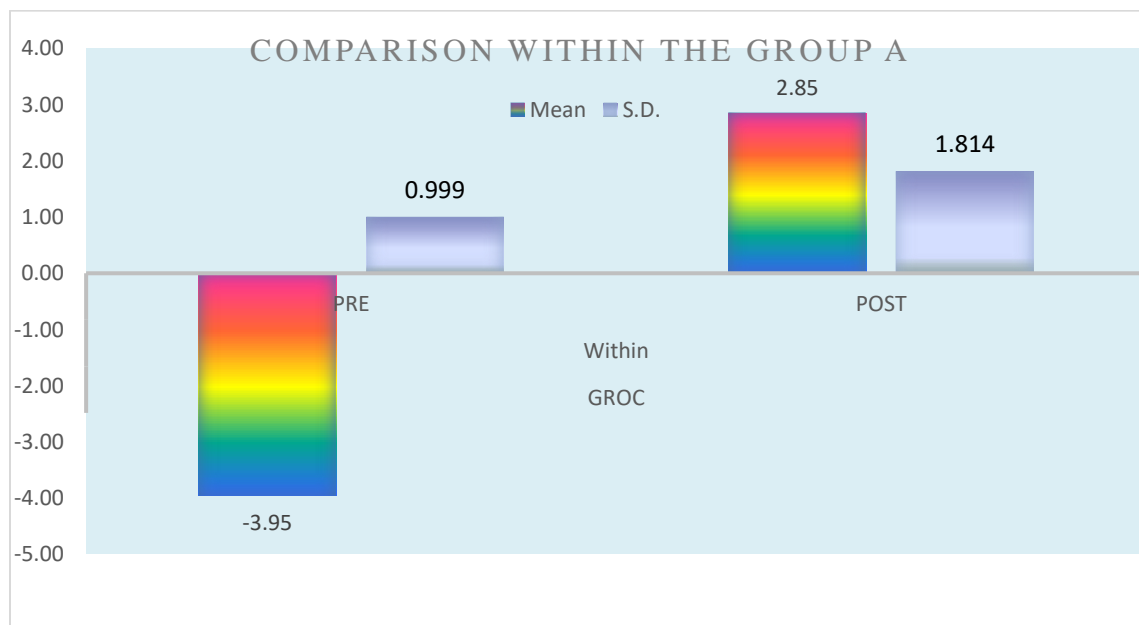
**Table No 2.1:** describes the comparison of pre and post protocol mean value of NDI within **Group A**. Where Pre-intervention mean/SD was 30.70/7.484 and that of Post-intervention was 15.00/5.786. The value of paired test calculated was 15.223 which was statistically significant, at  $p < 0.001$

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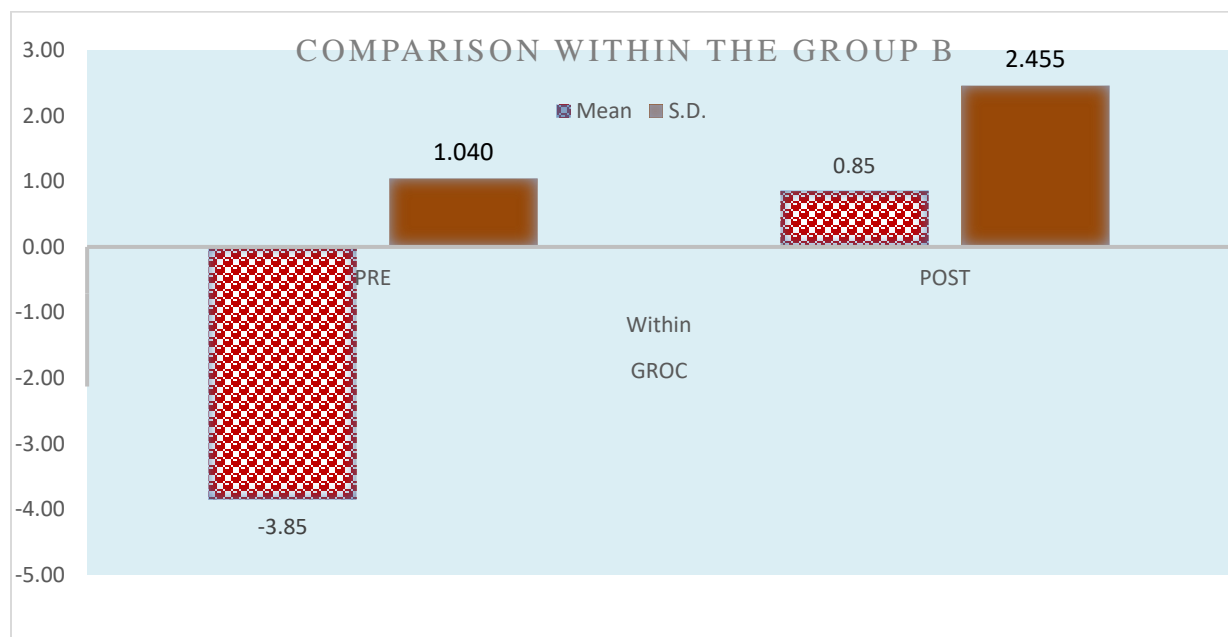
**Table No 2.2:** describes the comparison of pre and post protocol value of NDI within **Group B**. Where Pre-intervention mean/SD was 30.65/7.429 and that of Post –intervention was 19.25/5.310. The value of paired test calculated was 11.242 which was statistically significant, at  $p < 0.001$

### GROC WITHIN GROUP ANALYSIS



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**Table No: 3.1** describes the comparison of pre and post protocol value of GROC within **Group A**. Where Pre-intervention mean/SD was -3.95/0.999 and that of Post -intervention was 2.85/1.814. The value of paired test calculated was 26.406 which was statistically significant, at  $p < 0.001$ .



**Table No: 3.2** describes the comparison of pre and post protocol value of GROC within **Group B**. Where Pre-intervention mean/SD was -3.85/1.040 and that of Post -intervention was 0.85/2.455. The value of paired test calculated was 9.440 which was statistically significant, at  $p < 0.001$

#### COMPARISION BETWEEN GROUPS

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
NPRSPRE	1	20	6.45	0.945	0.211
	2	20	6.55	0.887	0.198
NPRSPOST	1	20	2.15	0.745	0.167
	2	20	3.9	0.968	0.216
NDIPRE	1	20	30.7	7.484	1.673
	2	20	30.65	7.429	1.661
NDIPOST	1	20	15	5.786	1.294
	2	20	19.25	5.31	1.187
GROCPRE	1	20	-3.95	0.999	0.223
	2	20	-3.85	1.04	0.233
GROCPOST	1	20	2.85	1.814	0.406
	2	20	0.85	2.455	0.549

#### **4.DISCUSSION**

The present study was undertaken to compare the efficacy of Intermittent Cervical Traction and Butler Neural mobilization in C5-C6 Cervical Radiculopathy. Data collected showed highly significant improvement in NPRS, NDI AND GROC in patients of Cervical Radiculopathy. Thus it can be concluded that Hot Pack along with Intermittent Cervical Traction is beneficial in reducing pain, neck disability and radicular symptoms in patients with Cervical Radiculopathy. Cervical Traction along with Hot Pack achieved greater improvement than Neural Mobilization along with Hot Pack. The results of study concluded that there was highly significant reduction in pain, disability and radicular symptoms. Hence on the basis of our between group analysis of data (Paired t-test) we can say that both groups got improvement in pain, disability and radicular symptoms but our within group data analysis (unpaired t- test) we can say that group A showed better improvement than group B on pain, disability and radicular symptoms.

Our results support the finding of previous studies indicating that Cervical Traction is beneficial in improving pain, neck disability and Radicular symptoms in patients with Cervical Radiculopathy. Traction causes distraction of articular surfaces, unloads the components of the spine by stretching muscles, ligaments, reduce adhesions within the dural sleeve, relieve nerve root compression within the central foramina, decreases pressure within intervertebral discs, relieves tonic muscle contraction and improves vascular status within the epidural space and perineural structures (Takasaki H et al. 2009). In group B the improvement could be because of Neural Mobilization Techniques that used to normalize the CNRs (cervical nerve root) structure and function via the possible reduction of nerve adherence, facilitation of nerve gliding and decreased neural mechano-sensitivity.

There are evidences from various literatures demonstrating the importance of hot pack, Intermittent cervical traction and Butler neural mobilization which aimed to reduce pain, neck disability and radicular symptoms. There are three benefits of traction: distraction to increase the intervertebral space, tensing of the posterior longitudinal vertebral ligament and suction to draw the disc protrusion towards the center of the joint (Pellecchia GL et al. 1994). Thus cervical traction was one of the interventions that can reduce pain and radicular symptoms and disability of the person.

#### **4. CONCLUSION**

This study concluded that cervical traction was beneficial than neural mobilization. This study has shown that cervical traction is effective in reducing pain, disability and radicular symptoms in patients with C5-C6 radiculopathy. This study also shows that Cervical Traction is safe, effective and well tolerated by patient with cervical radiculopathy. It was best analyzed by using numeric pain rating scale, neck disability index and global rating of change scale. Patients receiving intermittent cervical traction along with hot pack showed significant decrease of pain, disability and radicular symptoms as compared to patients who were receiving butler neural mobilization.

#### **LIMITATIONS OF STUDY:**

1. Subjects with wide range group between 40 to 60 years of age were considered for the study, thus results cannot be generalized to individual age.
2. The study sample size was relatively small.
3. Dosage of treatment parameters of the individual treatment techniques in the study was not standardized according to individual patients.
4. Only unilateral cases were taken for study.
5. External factors affecting the progress cannot be controlled.
6. Cofounding variables like external factors were not considered.
7. The study subjects physical function, emotional factors and environmental factors were not considered.
8. The study did not define the time for how much cervical spine movements should be avoided.

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