



# Effectiveness of manual cervical traction and mechanical cervical traction with neural mobilization in cervical radiculopathy

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## ABSTRACT

*Cervical radiculopathy is an entity which frequently presents with upper extremity pain associated with neurological symptoms caused by compression of nerve roots. The purpose of the study was to know effects of manual and mechanical cervical traction with neural mobilization (ULTT-1) in cervical radiculopathy.*

*The study was carried out with 30 samples from personal clinic, 15-15 sample is divided randomly into two groups for treatment. One group is treated with manual traction and neural mobilization and the second group is treated with mechanical traction and neural mobilization. The outcome measurement is taken by VAS for pain.*

*Both the traction with neural mobilization technique was almost equally effective in reducing pain and increasing ROM.*

**Keywords:** Manual cervical traction, Mechanical cervical traction, Neural mobilization.

## 1. INTRODUCTION

Cervical radiculopathy is a dysfunction of a nerve of the cervical spine. This is commonly known as pinched Nerve .in the neck it is a problem that results when a nerve in the neck is irritated as it leaves the spinal canal<sup>1</sup>.

Cervical radiculopathy although recognized early in the 20<sup>th</sup> century was first associated with disc pathology in the mid 1930<sup>th</sup> .it is most commonly caused by disc herniation of cervical spondylosis "WILLIAN DILLIAN" (2002) Studies that radiculopathy due to a herniated disc in 21.9% due to bone spurs or foraminal narrowing in 68% . the 7<sup>th</sup> and 6<sup>th</sup> cranial nerve root are the most commonly affected<sup>2</sup>.

The incidence of cervical radiculopathies by nerve root level is as follows; C7 (70%) C6(19%). previous studies or cervical radiculopathy demonstrate that two is peak exists, one in the 60s and 70s and one in the 20s .in the younger population cervical radiculopathy foraminal impingement of an existing nerve .in the older patients cervical radiculopathy often is a resulting of foraminal narrowing from osteophyte formation<sup>3</sup>.

In addition, soft tissue tightness, muscles spasm, or somatic dysfunction is causes of nerve compression in the neck. in primary symptom of cervical radiculopathy is pain that radiates outway of the neck and felt in the shoulder arm, chest, hands, numbness, tingling in fingers or hands and upper arm can be affected.history and physical testing (Spurling maneuver) will usually to diagnosed the radiculopathy and determined the root level involved<sup>4</sup>.

Various medical and surgical procedures have been known to treat cervical radiculopathy.eg .anti-inflammatory drugs, on narcotic, pain medicine, epidural steroid injection (nerve blocker) and one of the most common operations used in the anterior position etc.many conservative .approaches are being used and advocated to treat the cervical radiculopathy.They include heat and cold therapies, electric stimulation, isometric or stretching exercise, massage, cervical traction, neural mobilization techniques are the most frequently used by therapist around the world<sup>5</sup>.

Many researchers have investigated that effect of cervical traction and neural mobilization separately in cervical radiculopathy, every few researchers have been conducted comparing the to treatment method, cervical traction has been used for the m any years for cervical pain and radiculopathy in the cervical spine, the most reproducible result of traction is the elongation (cyriax at al) conducted that maniacal cervical traction is effective for patient with cervical rediculopathy<sup>6</sup>.

Neural mobilization technique has been success fully designed and categories by this technique is used to reduce the nerve intreptiment .according to BUTTAR , because of the continues tissue tract any limb movement must have mechanical consequences for trunk and the neuvoxix .any limb and body movement moves the nervous system can examine that is by neural traction test better described . Nerve tension position and mobilization technique for the nerves of the upper extremities, better and other believe that mobilized of a nerve that has restricted longitudinal movement often can be restored by using what they call”neural mobilization techniques” which technique is designed to free nerves for movement<sup>7</sup>.

Spondylosis refers to age-related degenerative changes within the spinal column, which in the cervical spine may be asymptomatic or can present as pure axial neck pain, cervical radiculopathy, cervical myelopathy, or cervical myeloradiculopathy. Radiological evidence of asymptomatic cervical spondylosis is seen frequently, with an incidence of 50% over the age of 40 and 85% over the age of sixty. Unfortunately, neck pain and radiculopathy are relatively common, with about two-thirds of the UK population having neck pain at some point in their lives, and 34% of responders in a Norwegian survey of 10,000 adults having experienced neck pain in the previous year. Nonsurgical treatment is usually the most appropriate course of initial management, with operative intervention being reserved for moderate to severe myelopathy, or cases with unremitting and progressive symptoms that have failed medical treatment. Despite the high incidence of symptomatic cervical degeneration and the widespread use of nonoperative techniques to treat this condition, the number of comparative trials in the literature is small and usually of poor quality. In this paper, we attempt to summarise the recommendations of the literature with regards to treating symptomatic cervical spondylosis, including cervical radiculopathy and mild myelopathy<sup>8</sup>.

Cervical or neck pain is a general term used to designate any musculoskeletal disorder in the cervical region. Various pathologies encompass that generic definition and are most commonly related to degenerative changes or inflammation of cervical structures such as intervertebral discs, articular facets joints or nerve roots. Neck pain is a very common, disabling and costly condition. According to a review by the Neck Pain Task Force pertaining the prevalence of neck pain in industrialized countries, annual prevalence is situated within 30 to 50% in adult populations. In accordance with these results, in Canada, a bi-annual prevalence of 54% has been reported <sup>9</sup>.

Manual cervical traction technique can be caused for the purposes of stretching the muscles and the facet joint capsules and widening the intervertebral foramina. The value of manual traction is that the angle of pull, head position, and placement of force (via specific hand placements) can be controlled by the therapist: thus the force can be specifically applied with minimum stress to regions that should not be stretched<sup>23</sup>

## **2. MATERIAL AND METHODS**

30 subjects in betweeOn the age group of 30-55 years, both male and females. Convenient sampling. It is taken from the college of applied education and health sciences and LLRM College Meerut.

### **Inclusion Criteria**

Age group of 30-35 years. Subject who have radiating symptoms (C6 –C7 radiculopathy). Subjects who are having symptoms for at least 2 months (sub-acute stage) Purely nonsurgical subject.

### **Exclusion criteria**

Traumatic cases, Acute inflammation, Rheumatoid Arthritis, Osteoporosis, Malignancy, Hyper mobility. Subjects who are having a problem for more than 1 year. Subjects who are having the radial nerve and ulnar nerve involvement. Subject who are having C5 radiating. Frozen shoulder. Vertebro basilar insufficiency syndrome.

### **Method:-**

Assessment and treatment procedure:

After taking written consent all the subjects were evaluated using standard evaluation Performa. The assessment was done then patients were excluded and included according to inclusion and exclusion criteria.

After the assessment, the subject was conveniently assigned to 2- groups.

- Group-A Subjects were given Manual traction and median nerve mobilization for 15 days.
- Group-B Subjects were given Mechanical traction and median nerve mobilization for 15 days.

### **The treatment procedure for group A**

In group A all the subject were given:

- Hot pack for 10 min.

- Manual cervical traction 5-6 repetition.
- Neural mobilization of the median nerve.

NOTE- The traction force and grade of mobilization was same to all patients of the group: A

- The position of the patient for manual cervical traction: -supine lying.
- Grip the neck with the on hand and stable, on the other hand, apply the traction manually and patient fills comfortably. Check that the patient is aligned proper pull.

**Technique:** Upper limb tension test 1 (ULTT1)

The position of the patient; patient lying supine with the affected side at the side of the couch, cervical spine in neutral.  
The position of the therapist: therapist standing by the side of patient-facing the head end of the couch.

Neural mobilization of median nerve based primarily on the work of David Butler was given to the subjects. Before application of neural mobilization, ULTT-1(Median nerve) was check and assessed to inclusion criteria only those subjects were included who are having normal shoulder ROM. After examination of ULTT-1, using the ULTT-1 as a treatment tool for mobilization of the median nerve, the patient upper extremity was taken through.

The sequence of movements used during testing, this mobilization involved positioning very similar to that used for the median nerve test, that would place the greatest amount of tension on the median nerve and produce the greatest movement to the median nerve. The mobilization was performed by flexing and extending the elbow. The mobilization performed gently, extending the elbow is just into the range where the patient felt but no pain and flexing the elbow to the point where the patient felt no tension. 6-7 mobilization was done emphasizing the median nerve. The patient did not report any pain during mobilization. If any discomfort or any signs were produced; the range of elbow extension is reduced. A grade of treatment, the amplitude of mobilization and progression was individualized based on irritability and severity of the patient's symptoms.

Treatment was given 15 days.

The subjects were assessed on 0 day and 10<sup>th</sup> day.

#### **The treatment procedure for group B:**

In a group the all the subject were given:

- hot pack for 10 mints
- Cervical traction for 15 mints.
- Neural mobilization of the median nerve.

NOTE: The traction force and grade of mobilization was same to all patient of the group –B

Potion of patient for cervical traction: supine lying.

Head position: the head position of all subject were in 30-degree flexion. Apply the head halter and fit the patient comfortably. Attach the halter to the traction unit. Check that the patient aligned proper pull. Set the controls and then activate the unit.

Types of application: Intermittent:

Hold time: 10 sec

Rest time: 10 sec

Duration: 10 sec.

#### **Neural mobilization of the median nerve.**

NOTE- The traction force and grade of mobilization was same to all patients of the group: -A

The position of the patient for manual cervical traction: -supine lying.

Grip the neck with the on hand and stable, on the other hand, apply the traction manually and patient fills comfortably. Check that the patient is aligned proper pull.

**Technique:** Upper limb tension test 1 (ULTT1)

The position of the patient; patient lying supine with the affected side at the side of the couch, cervical spine in neutral.

The position of the therapist: therapist standing by the side of patient-facing the head end of the couch.

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### 3. RESULT

#### T-Test

#### Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	GroupAPREVAS	6.3333	15	1.17514	.30342
	GroupAPOSTVAS	5.6000	15	1.18322	.30551
Pair 2	GroupAPREROM	159.3333	15	24.91892	6.43404
	GroupAPOSTROM	164.0000	15	22.53569	5.81869
Pair 3	GroupBPreVAS	6.3333	15	.97590	.25198
	GroupBPOSTVAS	4.3333	15	1.17514	.30342
Pair 4	GroupBPREROM	153.0000	15	23.28396	6.01189
	GroupBPOSTROM	170.0000	15	15.81139	4.08248

Table 4.1 illustrates that

- VAS

In group A, the Mean value of VAS pre is 6.33 and VAS post is 5.60 where as in group B mean value VAS pre is 6.33, VAS post is 4.33. By the pair T –test mean value of VAS of the group is compared. In the study pain relief (measured by VAS score) was least great in group B after treatment. we found that mean value of group A and B after 15 days that there slight difference in both groups.

- Range of motion

In group A mean value of ROM pre is 159.33, ROM post is 164.00 where is group B mean value ROM pre is 153.00, ROM post is 170.00 by Duchans mean test .mean value of ROM of the group are compared to each other which shows group B is good recovery then group A in this study ROM (measured in degree) was greater in groups B during 1 day and continuous to 15 days.

In summery, there was an increase in ROM of shoulder flexion and pain relief during mechanical traction and ULTT-1 in the group B.

The groups are significant but there was deference in between mean value of groups B and A. So group B and group A shows a better result.

### 4. DISCUSSION

Clinically, the aim of the present study was to find out the relatively more efficiently method between manual and mechanical traction with neural mobilization in the management of cervical radiculopathy in this study, pain arising from the neck and referred to one of the upper extremity was taken into consideration all the subjects were conventionally selected and divided into two groups A received manual traction,neural mobilization and conventional physiotherapy and group B received mechanical traction, neural mobilization, and conventional physiotherapy. The assessment was done on the day -1 of intervention and reassessed after 15 days of intervention VAS score of group A had shown an overall percentage of 18 %, group B had an overall percentage decrease of 32%. ROM scores of group A had an overall percentage decrease 30% group B had an overall decrease 34%.<sup>13</sup>

Percentage change had shown that slight improvement was seen in both group manual and mechanical traction with neural mobilization.<sup>15</sup>

The result of the present study support the null hypothesis that there is no significant difference between manual and mechanical traction with neural mobilization in decreasing pain, and improving ROM in patients with cervical radiculopathy .<sup>18</sup>

Gelbernon et al has explained pathophysiology of cervical radiculopathy through tourniquet effect which say that when tissue pressure is as low as 30-50 mmHg, The pressure on the neural structure rises and flow of blood in veins decreases thus venous fluid stagnates causing further rise in pressure and edema to form around the axon since fluid cant enter the nerve and arterial blood can still enter the swelling develops further.<sup>21</sup>

Ian A. Young .at all (2006) say that mechanical cervical traction to a multimodal treatment program of manual therapy and exercise yields no significant additional benefit to pain, function, or disability in patients with cervical radiculopathy. Adding mechanical traction to exercise for patients with cervical radiculopathy resulted in lower disability and pain, particularly at long-term follow-ups. Julie M .at al (2011), combined therapy of kinesio taping or cervical traction posture pump with an exercise program are effective in improving the absolute rotatory angle, pain intensity and function neck disability in mechanical neck dysfunction more than exercise alone.

Reem S Dawood et al. In the 1970s and 1980s, we noted 3 key features of poor methodology in 5 studies: (i ) all 5 studies had poor methodological quality (less than 3/5 on the scale by Jadad et al., (17));(ii ) 80% (4/5) of these studies did not have long-term follow-up, that is one year or greater; and (iii ) 66% (3/5) of these studies had small sample size and low power. There has been little progress in this regard over the last decade; an additional 5 RCTs were conducted. Of these, only one study was of high methodological quality, 2 had long-term follow-up, and 3 also had an adequate sample size. We do not have much confidence in the evidence of this review.<sup>17</sup>

One larger study could either support or refute the findings on intermittent traction to improve quality U Mohammad et al 2012 A variety of treatment options are found in the literature with unauthenticated results. Recent literature supports such protocols involving multiple interventions. Of these interventions, core neck muscles strengthening exercises form an important part when combined with cervical traction.<sup>21</sup> Results of the present study also supported the fact that cervical traction is more useful when it is combined with core muscle strengthening in a multi modal approach. More research work is needed to establish the effects of cervical traction with neck strengthening exercises in the long-term follow up. Further research is also warranted on evaluating the effects of these exercises alone.<sup>23</sup>

S smirti , K Sandeep (2013) The analyses of significance was carried out by using an Unpaired t-test to compare the effectiveness of nerve mobilization treatment on pain as compared to conventional physiotherapy Results were found to be significant for t- value at p-value 0.0

It can be concluded that both the intervention are effective therapeutic options in the treatment of cervical radiculopathy. This result shows that treatment given to patients in Group A is more effective than that of Group B i.e. nerve mobilization is more beneficial in improving the pain in patients with cervical radiculopathy.

N Gopal k pooja et al (2013) The result indicates that Cervical Spine Mobilization and Thoracic Spine Manipulation was effective in all three measures when compared to control groups. However, the subjects in group 2, who received Thoracic Spine Manipulation, intermittent cervical traction and strengthening exercise showed better improvement in reducing neck pain, improving Grip Strength & neck disability when compare to Cervical Spine Mobilization group (p<0.05).

C Parteek J Nikita et all (2011) say that neck range of motion and decrease in neck disability level within two therapeutic interventions that are intermittent cervical traction combined with neck strengthening exercises and neural mobilization combined with neck strengthening exercises.

Thus Neural mobilization combined with neck strengthening exercises as well as Intermittent cervical traction can be administered for individuals with cervical radiculopathy but between-group findings do not give a clear idea about which treatment approach is superior to another treatment approach

## **5. CONCLUSION**

From this study, I, Summarize that mechanical cervical traction and manual traction with neural mobilization techniques were almost equally efficient in reducing pain and increasing range of motion, As no significant effect was seen between then so no technique is relatively more efficient than other in the treatment of cervical radiculopathy.

Any one of this technique can be applied to patients with cervical radiculopathy either along with conventional physiotherapy or together with conventional physiotherapy.

## **6. REFERENCES**

- [1] Barbara kuijper, Anita beelen, frans nollet.A cervical collar or physiotherapy versus wait and see policy for recent onset cervical radiculopathy: British medical journal 2009; 339:b3883
- [2] Mohammad Taghi joghataei.The effect of cervical traction combined with conventional therapy on grip strength on patients with cervical radiculopathy: clinical rehabilitation 2004;18:879-887
- [3] Joshua A.cleland,julie m. whitman,julie m. fritz,jessica a. palmer.manual physical therapy, cervical traction and strengthening exercises in patients with cervical radiculopathy: journal of orthopedic and sports physical therapy.2005;35:802-811
- [4] Ronald schenk,talisha bhaidani,mellisa boswell.The inclusion of mechanical diagnosis and therapy in the management of cervical radiculopathy.journal of manual and manipulative therapy2008 vol.16 no.1,e2-e8

- [5] Tal-Akabi et al. An investigation to compare the effectiveness of carpal bone mobilization and neurodynamic mobilization as methods of treatment for carpal tunnel syndrome *Manual Therapy* (2000) 5(4), 214±222
- [6] Jeffrey Alan Schroder, MPT, Manual Therapy, and neural mobilization: Our Approach and Personal Observations. *orthopedic practice* vol.16;4:04
- [7] Richard F! Di Fabio, Ph.D., PT, Neural mobilization: The impossible, *Journal of orthopaedic and sports physical therapy* 2001;31(5):224-225
- [8] RD Lea. The range of motion measurement: *journal of bone and joint surgery*
- [9] Vernon H, Mior S The Neck Disability Index: a study of reliability and validity. *Manipulative Physiol Ther* 1992 Jan;15(1)
- [10] David S. Butler et al. The mobilisation of the Nervous system. Churchill livingstone, 1991
- [11] Anton F Lenssen, Reproducibility of goniometric measurement of the knee in the in-hospital phase following total knee arthroplasty *BMC Musculoskeletal Disorders* August 2007
- [12] Jason David Eubanks Cervical Radiculopathy: Nonoperative Management of Neck Pain and Radicular Symptoms [www.aafp.org/afp](http://www.aafp.org/afp). January 1, 2010 Volume 81, Number 1
- [13] William C. Oliver, M.D., And Scott C. Dulebohn, M.D Results of halter cervical traction for the treatment of cervical radiculopathy: a retrospective review of 81 patients *Neurosurg Focus* **12 (2)**: Clinical Pearl 1, 2002,
- [14] Jennifer A klaber Moffett, Randomized trial of a brief physiotherapy intervention compared with usual physiotherapy for neck pain patients: outcomes and patients' preference *BMJ*. 2005 January 8; 330(7482): 75. doi: 10.1136/bmj.38286.493206.82.
- [15] John M. Rhee et al, Cervical Radiculopathy *J Am Acad Orthop Surg* 2007; 15:486-494
- [16] Anke I Langenhorst, The Effect of neural mobilization on symptoms of ulnar entrapment neuropathy; *Orthopedics Manipulative Therapist's Group of the South African Society of Physiotherapy, Johannesburg* October 2009
- [17] Krysia Dziedzic Etal Effectiveness of Manual Therapy or Pulsed Shortwave Diathermy in Addition to Advice and Exercise for Neck Disorders: A Pragmatic Randomized Controlled Trial in Physical Therapy Clinics, *American College of Rheumatology, Vol. 53, No. 2, April 15, 2005, pp 214–222 DOI 10.1002/art.21087*
- [18] Birgitta Helmersen Ackelman and Urban Lindgren Validity and Reliability of a modified version of the neck disability index; *J Rehabil Med* 2002; 34: 284–287
- [19] Joshua A Cleland Etal, Predictors of Short-Term Outcome in People with a Clinical Diagnosis of Cervical Radiculopathy, *Journal of the American Physical Therapy Association, July 26, 2007*
- [20] Clinical Policy Bulletin: Cervical Traction Devices Number: 0453
- [21] Michael shacklock. *clinical neurodynamics* 2005.
- [22] Dr. Andrea BIALOCERKOWSKI, Mr jayce Gilbert. The effectiveness of nerve mobilization in the management of Adults with upper quadrant neurogenic pain. *The center for Allied Health Evidence* 2005
- [23] Kisner. *Therapeutic exercise*, 4th edition.