**DOI:**https://doi.org/10.54393/pbmj.v5i7.629

PAKISTAN BIOMEDICAL JOURNAL

https://www.pakistanbmj.com/journal/index.php/pbmj/index

Volume 5, Issue 7 (July 2022)

**Original Article**

# Effect of Manual Cervical Traction and Inter-vertebral Foramen Opening and Combination of both Techniques in Patients with Cervical Radiculopathy: Randomized Control Trial

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## ARTICLE INFO

***Key Words:***

Cervical radiculopathy, posture, hectic work routine, patients

***How to Cite:***

Ali Bhutto, M. ., Farid Nasir, M. ., Imran , A. ., Gul Memon , A. ., Abdul Latif , F. ., Salahuddin , I. ., Mustafa , M. ., & Karim , S. . (2022). Effect of manual cervical traction and inter-vertebral foramen opening and combination of both techniques in patients with cervical rediculopathy:Randomized Control Trial: Manual Cervical Traction and Inter-Vertebral Foramen Opening Techniques . Pakistan BioMedical Journal, 5(7). https://doi.org/10.54393/pbmj.v5i7.629

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Received Date: 5th July, 2022
Acceptance Date: 14th July, 2022
Published Date: 31st July, 2022

## ABSTRACT

Cervical radiculopathy is the problem that probably every other person is complaining now a days and etiology is mostly age-related related posture and hectic work routine. **Objective:** Current trial was designed to associate the impact of cervical pull, foramen initial and both combined techniques on level of disablement, pain and range of motions of cervical spine in individuals having cervical radiculopathy. **Methods:** Sampling technique was non-probability and participants were allocated into 3 groups. A, B and C. Informed consent was taken and all subjects were instructed about the trial. Patients who were taking medications or denied to participate in study were excluded. Patients of age 30-50years who were not taking medication were included to conclude the impact of manual techniques. Patients were assigned into treatment groups based on inclusion criteria which is diagnosed MRI cervical radiculopathy unilateral upper extremity pain and numbness and 3 result test were positive out of 4. distraction test, Spurling Test, Ipsilateral rotation test and Upper-limb tension test. **Results:** In group A, mean age of subjects was 42.41±6.86 years, 40.95± 7.32 years in group B and 42.50±5.77 years in group C. 8(60%) participants were crabby of sharp and shooting pain in group A. 4(35%) describe the pain as burning and tingling and 1(5%) felt deep dull ache. In analysis of baseline and after completion of treatment assessment of each group, all variant determined considerable outcomes with p <0.05 in terms of Range of motion (ROMs) and neck pain. **Conclusion:** Manual techniques of cervical traction, intervertebral foramen opening and combination of both techniques have similar effect in improving neck ache, ROMs and disability level in patients suffering with cervical radiculopathy.

## INTRODUCTION

Cervical radiculopathy is the problem that probably every other person is complaining now a days and etiology is mostly age-related related posture and hectic work routine [1]. According to a survey its incidence rate is 85 % out of 10 thousand, annually and slightly more in male as compare to female [2]. Patients with cervical radiculopathy come with neck ache, weakness of neck muscles, tingling and numbing in upper limbs due to nerve compression or any other degenerated conditions [3]. Another most common reason of cervical radiculopathy is disc herniation in young adults with prevalence of 20% [4]. In disc herniation case patients usually complain of pain like needles and tingling sensation in one or both arms. Acute cervical radiculopathy is self-limited and 70% get improved by non-surgical I

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treatment such as traditional physical therapy and exercises. And patient get back to normal within days to weeks [4-5]. In some cases, patient does not recover and needs specific elevation and treatment. If it gets prolong or left untreated, symptoms get worse and can lead to paralysis [6]. Moreover, besides this other problem related to articulated structures such as capsular and ligament restriction, inflammation, disc compression due to degenerative changes with age [7-9]. Symptoms can be regenerate by applying Spurling test on affected side pf neck with lateral flexion, extension and rotation [10]. Neck ache is categorized in both chronic and acute based on the intensity and time period of pain. If pain continue less than six weeks, then we consider it acute pain and more than 3 weeks it would be called long-lasting discomfort [11,12]. Physical rehabilitation in addition with pull then technique of intervertebral foramen opening can diminishes the pain, joint stiffness and improve the range of motions [13]. Evidence showed that treatment based on multimodal may improve both acute and chronic neck pain [14,15]. Current trial was designed to associate the impact of cervical pull, foramen initial and both combined techniques on level of disablement, pain and range of motions of cervical spine in individuals having cervical radiculopathy.

## METHODS

This study is single-blind randomized control study. Study was carried out in setting of Benazir bhutto hospital, Rawalpindi. Duration was almost six months (jan 2017-july 2017). Patients of both gender were included with upper limb numbness or pain. Sample size was calculated through Epi-tool level 3, with 95% confidence interval (CI), and pore 80%, based on the primary measure which is, the Neck Disability Index (NDI) [13]. Sampling technique was non-probability and participants were allocated into 3 groups. A, B and C. Informed consent was taken and all subjects were instructed about the trial. Patients who were taking medications or denied to participate in study were excluded. Patients of age 30-50years who were not taking medication were included to conclude the impact of manual techniques. Patients were assigned into treatment groups based on inclusion criteria which is diagnosed MRI cervical radiculopathy unilateral upper extremity pain and numbness and 3 result test were positive out of 4: distraction test, Spurling Test, Ipsilateral rotation test and Upper-limb tension test. In patients got opening of intervertebral foremen intervention, Group B were treated with manual cervical traction while group C received both interventions of intervertebral foramen opening and cervical traction. These trial was for 3 weeks and 3 sessions per week. In intervertebral foramen technique, therapist's hand and fingers twitch the neckline to move the incomplete part of neck. At the meantime, actions remained implemented. Session was carried out in3 sets of 10 repetitions [9]. In Patient was asked to lying in supine position. Cervical traction, chin was held by physiotherapist. And 25-degree neck flexion forced was applied by therapist. Total time for traction was 10 min in which 10 secs for pull and 5 secs for rest [13,15]. Before getting treatment patients received hot pack for 15 minutes at posterior side of neck. Numeric pain rating scale (NPRS), Neck disability index (NDI) and patients specific fictional scale (PSFS) were used to measure the outcomes. Inclinometer was used to measure the ROMs of cervical. Assessment was carried out as pre and post 3 weeks of treatment. No subject was drop out in Group A and B while group C had one participant dropout. Analysis was done by SPSS 21. Normality was checked by Shaprio Wilk test after test parametric and non-parametric test were applied in among groups and for within groups, paid t test was used. In the term of mean and SD data was presented with p values.

## RESULTS

23(70%) patients were male and 17(30%) patients were female in sample. In group A, mean age of subjects was 42.41±6.86 years, 40.95± 7.32 years in group B and 42.50±5.77 years in group C. 8(60%) participants were crabby of sharp and shooting pain in group A. 4(35%) describe the pain as burning and tingling and 1(5%) felt deep dull ache. In analysis of baseline and after completion of treatment assessment of each group, all variant determined considerable outcomes with p <0.05 in terms of Range of motion (ROMs) and neck pain. (Table 1)

| Variables | G1 Pre | G1 Post | G2 Pre | G2 Post | G3 Pre | G3 Post |
|---|---|---|---|---|---|---|
| | Mean±SD | Mean±SD | Mean±SD | Mean±SD | Mean±SD | Mean±SD |
| NPRS | 7.1±1.03 | 2.5±0.9 | 7.5±0.67 | 3.08±0.79 | 7.5±0.892 | 2.9±1.18 |
| NDI | 19.5±5.3 | 9.5±3.7 | 22.4±4.6 | 10.6±3.38 | 2.06±6.3 | 10.7±4.3 |
| PSFS | 5.9±1.08 | 8.8±0.4 | 5.8±1.15 | 8.31±1.20 | 6.13±1.23 | 8.3±0.76 |

NDI, NPRS, PSFS: STD: Standard Deviation, Right, Left, P-value <0.05

**Table 1:** Baseline and after treatment analysis in terms of mean & SD of all groups

7(56%) subjects were having shooting and sharp pain, and 6(46%) of subjects felt red-hot and prickly feelings in group B. While in group C 6(40%) participants had burning and shooting pain. 9(64%) patients describe aching in neck which was travel down to the right side of upper limb, 5(35%) complained about pain in the left upper limb as shown in Table 2.

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| Variables | G1 | G2 | G3 | P-value |
|---|---|---|---|---|
| | Mean±SD | Mean±SD | Mean±SD | |
| NPRS | 2.58±0.90 | 3.08±0.79 | 2.94±1.18 | 0.45 |
| PSFS | 8.80±0.44 | 8.37±1.201 | 8.83±0.67 | 0.33 |
| NDI | 9.58±3.77 | 0.67±3.60 | 10.75±4.37 | 0.71 |
| Active flexion | 52.33±3.79 | 53.42±2.57 | 51.31±4.27 | 0.34 |
| Active extension | 41.92±3.75 | 41.08±6.43 | 44.38±6.61 | 0.31 |
| Rt side flexion | 41.33±5.92 | 41.50±5.60 | 39.94±3.58 | 0.66 |
| Lt side flexion | 40.33±5.74 | 44.67±3.82 | 38.88±5.18 | 0.01* |
| Rt t side rotation | 58.02±6.97 | 55.33±4.11 | 56.44±8.65 | 0.63 |
| Lt side rotation | 61.58±5.80 | 65.17±4.60 | 63.00±8.72 | 0.44 |

**Table 2:** (ANOVA) test presents post intervention analyses of following variables

4(31%) participants complained about continue pain and 9 out of 69% felt pain in episodes I group A. In Group B, 1(7%) felt constant symptoms and 12(93%) had irregular discomfort. 6(43%) felt continuous discomfort and8(57%) describe intermittent pain in group C as shown in Table 3. (cervical lateral rotation improved in all groups.

| Variables | Group 1 & 2 | Group 1 & 3 | Group 2 & 3 |
|---|---|---|---|
| NPRS | 0.31 | 0.29 | 0.81 |
| PSFS | 0.18 | 0.45 | 0.91 |
| NDI | 0.24 | 0.82 | 0.26 |
| Active flexion | 0.71 | 0.22 | 0.19 |
| Active extension | 0.41 | 0.51 | 0.11 |
| Rt side flexion | 0.91 | 0.41 | 0.41 |
| Lt side flexion | 0.04** | 0.46 | 0.02** |
| Rt t side rotation | 0.41 | 0.81 | 0.51 |
| Lt side rotation | 0.1 | 0.61 | 0.41 |

**Table 3:** Between Groups comparison along with p values

## DISCUSSION

One of the most common cause of neck disability is cervical radiculopathy and its prevalence is on peak in 4 to 5th decade of age [16]. There is lack of evidence in literature to define the significance of best interventional approach [17]. To treat the complications linked to cervical radiculopathy, control- interventional trial was done to determine the impact if treatment strategies. Outcomes of current study showed the significance in terms of mean and SD from pre to the post last session of treatment in NDI, PSFS & NPRS scales. Moreover, ROMs get improved, decrease in neck pain and joint stiffness is also found. These results are being supported by various previous researches [18]. A study showed that by using manual traction and manual foramen opening technique is very beneficial to improve the movements and pain in neck. Based on an outcome of previous study, result has shown that effect of each technique is equally beneficial as both combined techniques. But patients presented significant improvement in movements those get both therapies in combine. It was seen that each 3 groups presented statistically significant progresses in NPRS scaler after intervention of 3 weeks ($p<0.01$) and same in case of NDI scale. Analysis of individual group presented extremely positive results in regards to neck pain, improvement in ROMs and disability, showing that combination of therapy in these participants is an effective strategy. This also support that we can use these techniques without limitation in any stage of cervical radiculopathy. Numerous researches have proved that both these techniques either separately or as combination therapy would show promising outcomes in patients with cervical radiculopathy [19]. Each intervention decompresses the nerve compression and expand the foramen. These rehabilitative techniques both improves the stiffness in joints and tenderness in tissues. Same results were seen in the current study. Another study indicated the same findings of manual traction on disability, pain and radiculopathy of cervical spine. Subjects were back to normal functions and pain was diminished. Participants presented significance in measures [20]. The outcomes of the current research may also determine the best possible guidelines for clinical practice for treatment of cervical radiculopathy. Small sample size with both acute and chronic conditions is considers as limitation. Duration was also short. A study with prolong time duration and with a large population size is recommended.

## CONCLUSION

Manual techniques of cervical traction, intervertebral foramen opening and combination of both techniques have similar effect in improving neck ache, ROMs and disability level in patients suffering with cervical radiculopathy.

## REFERENCES

[1] Vernon H, Humphreys K, Hagino C. Chronic mechanical neck pain in adults treated by manual therapy: a systematic review of change scores in randomized clinical trials. Journal of Manipulative and Physiological Therapeutics 2007 Apr; 30(3):215-27. doi: 10.1016/j.jmpt.2007.01.014.

[2] Thoomes EJ. Effectiveness of manual therapy for cervical radiculopathy, a review. Chiropractic and Manual Therapies 2016 Dec; 24:45. doi: 10.1186/s12998-016-0126-7.

[3] Olivero WC, Dulebohn SC. Results of halter cervical traction for the treatment of cervical radiculopathy: retrospective review of 81 patients. Neurosurgical focus 2002 Feb; 12(2): ECP1. doi: 10.3171/foc.2002.12.2.4.

[4] Tonosu J, Inanami H, Oka H, Takano Y, Koga H, Yuzawa Y, et al. Factors related to subjective satisfaction following microendoscopic foraminotomy for cervical radiculopathy. BMC Musculoskeletal Disorders. 2018 Jan; 19(1):30. doi: 10.1186/s12891-018-

**DOI:**https://doi.org/10.54393/pbmj.v5i7.629

1947-4.

[5] Woods BI, Hilibrand AS. Cervical radiculopathy: epidemiology, etiology, diagnosis, and treatment. Journal of Spinal Disorders and Techniques 2015; 28(5): E251-9. doi: 10.1097/BSD.0000000000000284.

[6] Donk RD, Verbeek ALM, Verhagen WIM, Groenewoud H, Hosman AJF, Bartels RHMA. What's the best surgical treatment for patients with cervical radiculopathy due to single-level degenerative disease? A randomized controlled trial. PLoS One. 2017 Aug; 12(8): e0183603. doi: 10.1371/journal.pone.0183603.

[7] Miller J, Gross A, D'Sylva J, Burnie SJ, Goldsmith CH, Graham N, Haines T, Brønfort G, Hoving JL. Manual therapy and exercise for neck pain: a systematic review. Manual Therapy. 2010 Aug; 15(4):334-54.doi.org/10.1016/j.math.2010.02.007

[8] Young IA, Michener LA, Cleland JA, Aguilera AJ, Snyder AR. Manual therapy, exercise, and traction for patients with cervical radiculopathy: a randomized clinical trial. Physical Therapy. 2009 Jul; 89(7):632-42. doi: 10.2522/ptj.20080283.

[9] Khan RR, Awan WA, Rashid S, Masood T. A randomized controlled trial of intermittent Cervical Traction in sitting Vs. Supine position for the management of Cervical Radiculopathy. Pakistan journal of medical sciences quarterly 2017 Dec; 33(6):1333-1338. doi: 10.12669/pjms.336.13851.

[10] Bukhari SR, Shakil-ur-Rehman S, Ahmad S, Naeem A. Comparison between effectiveness of mechanical and manual traction combined with mobilization and exercise therapy in patients with cervical radiculopathy. Pakistan journal of medical sciences. 2016 Jan; 32(1):31.

[11] Romeo A, Vanti C, Boldrini V, Ruggeri M, Guccione AA, Pillastrini P, Bertozzi L. Cervical Radiculopathy: Effectiveness of Adding Traction to Physical Therapy-A Systematic Review and Meta-Analysis of Randomized Controlled Trials. Physical Therapy. 2018 Apr; 98(4):231-242. doi: 10.1093/physth/pzy001.

[12] Colombo C, Salvioli S, Gianola S, Castellini G, Testa M. Traction therapy for cervical radicular syndrome is statistically significant but not clinically relevant for pain relief. A systematic literature review with meta-analysis and trial sequential analysis. Journal of clinical medicine. 2020 Oct; 9(11):3389.

[13] Iyer S, Kim HJ. Cervical radiculopathy. Current Reviews in Musculoskeletal Medicine 2016 Sep; 9(3):272-80. doi: 10.1007/s12178-016-9349-4.

[14] Fritz JM, Thackeray A, Brennan GP, Childs JD. Exercise only, exercise with mechanical traction, or exercise with over-door traction for patients with cervical radiculopathy, with or without consideration of status on a previously described subgrouping rule: a randomized clinical trial. Journal of Orthopaedic & Sports Physical Therapy. 2014 Feb; 44(2):45-57. doi: 10.2519/jospt.2014.5065.

[15] Waldrop MA. Diagnosis and treatment of cervical radiculopathy using a clinical prediction rule and a multimodal intervention approach: a case series. Journal of Orthopaedic & Sports Physical Therapy. 2006 Mar; 36(3):152-9. doi: 10.2519/jospt.2006.36.3.152.

[16] Puentedura EJ, Cleland JA, Landers MR, Mintken PE, Louw A, Fernández-de-Las-Peñas C. Development of a clinical prediction rule to identify patients with neck pain likely to benefit from thrust joint manipulation to the cervical spine. Journal of Orthopaedic & Sports Physical Therapy. 2012 Jul; 42(7):577-92. doi: 10.2519/jospt.2012.4243.

[17] Cleland JA, Whitman JM, Fritz JM, Palmer JA. Manual physical therapy, cervical traction, and strengthening exercises in patients with cervical radiculopathy: a case series. Journal of Orthopaedic & Sports Physical Therapy. 2005 Dec; 35(12):802-11. doi: 10.2519/jospt.2005.35.12.802.

[18] Langevin P, Desmeules F, Lamothe M, Robitaille S, Roy JS. Comparison of 2 manual therapy and exercise protocols for cervical radiculopathy: a randomized clinical trial evaluating short-term effects. Journal of Orthopaedic & Sports Physical Therapy. 2015 Jan; 45(1):4-17. doi: 10.2519/jospt.2015.5211.

[19] Minkalis AL, Vining RD, Long CR, Hawk C, de Luca K. A systematic review of thrust manipulation for non-surgical shoulder conditions. Chiropractic and Manual Therapies 2017 Jan; 25:1. doi: 10.1186/s12998-016-0133-8.

[20] Page MJ, Green S, McBain B, Surace SJ, Deitch J, Lyttle N, et al. Manual therapy and exercise for rotator cuff disease. Cochrane Database of Systematic Reviews 2016 Jun; 2016(6):CD012224. doi: 10.1002/14651858.CD012224.