International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426

Effect of Intermittent Cervical Traction Combined with Burst Tens on Pain and Disabilities in Patient with Cervical Radiculopathy-A Case Study

Neha Dubey

Physiotherapy Resident (Deptt of Physiotherapy, Faculty of Paramedical Sciences, UPUMS, Saifai, Etawah, U.P), India

Abstract: ***Background**: Cervical Spondylitis is a degenerative condition of cervical spine. It occur early in person pursuing white collar job or prolong faulty posture to neck strain with radiating pain in the upper limb because of keeping the neck constantly in one position while reading and writing. The osteophytes impinging on the nerve root give rise to radicular pain in the upper limb. The cervical radiculopathy is a problem that result when a nerve in the neck is irritated as it leaves the spinal canal. This condition usually occurs when a nerve root is being pinched by a herniated disc or a bone spur. Cervical radiculopathy commonly called 'pinched nerve'. Case Description: A 36yr moderately built male have been diagnosed with cervical Radiculopathy .On evidence of clinical examination & radiological changes. The patient chief complaints include radiating pain in the arm with moderate tenderness over paravertebral muscle and restriction in neck & shoulder movement. The pain exaggerates during moving the head and shoulder. The patient has radiating pain from cervical region covering C4 & C5 dermatomes. There is a loss of sensation on the same dermatomal distribution with muscle weakness. Material and methods: In this case , the patient is treated with burst tens and intermittent cervical traction simultaneously for 15 min followed by conventional physiotherapy in the form of hot pack (15 min) and neck isometrics (5 repetitions) a day . The treatment was continued for 4 weeks. Daily assessment was done. The prognosis was assessed using 5 point ordinal scale visual analogue scale [vas], neck disability index and goniometry. Outcome: The Patient was evaluated for the level of self reported pain before the commencement of the interventions and by the end of 2 weeks of intervention. The final result of the intervention was a successful outcome of being greater than 51.1% of improvement on the Neck disability index , a pain rating of <3/10 on the VAS and a perceived overall improvement score of 51.1%. Conclusion: Intermittent cervical traction combined with burst tens improves joint mobility, relives pain and improves functional mobility in case of cervical radiculopathy.***

Keywords: Cervical Traction Burst Tens, Radiculopathy, VAS, NDI

1. Introduction

Cervical Radiculopathy is an important subset of neck disorders, although less widespread than the common neck pain. Its severity in terms of pain and disability is much more as compared to general neck pain. [1],[2].It occur early in person pursuing white collar job or prolong faulty posture to neck strain with radiating pain in the upper limb because of keeping the neck constantly in one position while reading, writing etc.The osteophytes impinging on the nerve root give rise to radicular pain in the upper limb. It is a common clinical diagnosis classified as a disorder of nerve root and processed by marked nerve compression from herniated disc material or arthritic bony spur. This herniation results in radiating pain in neck and arm region along with numbness in distribution of specific nerve root. The most frequently involved nerve roots are C6 and C7 which are caused by C5-C6 or C6-C7 disc herniation [3], [4], [5], [6]. Although patients with cervical Radiculopathy may have complaints of neck pain, the most frequent reason for seeking medical assistance is arm pain [7], [8]. The first choice of management of cervical Radiculopathy is non-operative and various noninvasive interventions have been used with mixed results. However there is no study done to find out its effectiveness of a combination therapy in which intermittent cervical traction combined with burst mode of tens was used to find its effectiveness on patient with cervical Radiculopathy, So the objective of our study is to find out the effectiveness of Intermittent cervical traction combined with burst mode of tens on patient with cervical Radiculopathy.

2. Case Descriptions

This study was done in the physiotherapy OPD in Uttar Pradesh University of Medical Sciences, Saifai. A 36year old moderately build male have been diagnosed with unilateral cervical radiculopathy affecting left sided upper extremity with neck movement restrictions by the orthopedician and by the evidence of clinical examination using different test and radiological changes. The radiographic investigation report reveals that there is a bony spur (ostrophytes) which is pinching the spinal nerve at C5 and C6 vertebrae.

The patient complaints of sharp shooting electrical pain that runs down the left shoulder upto the thumb region. The patient found difficulty in turning head to either direction (Left sided > right sided) because of pain patient was unable to raise the hand for grooming activites. The pain aggravates while doing any activity and resting is a relieving factor since 1 month. There is not a known history of BP and hypertension with any past history detected. The patient is on medication. He further explained the pain intensity revert to its original state once the drug effect reduces. He did not find stability in his condition and visited to UPUMS, Saifai OPD for further treatment.

3. Examinations

Pain in the neck associated with radiation into the ipsilateral arm (Lt Side) along with loss of sensation in the same dermatomal distribution. On examination tenderness was

noticed over from C5 – C7 spinal vertebrae and paravertebral muscle. Post evaluation it was assessed that the pain aggravates more in prolong head bent position and with moving in either directions (Lt Side >RT side). The relieving factor was rest and placing ointment on that specified area. On observing the attitude, the neck was slightly tucked forward with shoulder protraction. On examination the cervical distraction test and spurling test was positive.

In cervical distraction test, the Patient lies supine and neck is comfortably positioned. The therapist one hand is placed around the forehead and the other on the occiput. On slightly flexing the patient's neck and pulling towards the torso of examiner, a distraction force is applied. A test is positive as patient symptoms reduce with traction. The neural foramen, joint capsules and neck extensor muscles are being tested in this procedure [9] .This test has been utilized in a cluster of special tests to more accurately identify cervical radiculopathy with a "clinical prediction rule [10].

In Spurling Test the patient position is sitting and therapist stand behind stabilizing the opposite shoulder with affected side head bend adding axial compression to it .A test is positive if the symptoms reproduces. This test is used to assess cervical nerve root compression causing Cervical Radiculopathy[11].There are different ways of performing this test the version which provoke arm symptoms best are with neck in extension ,lateral flexion and axial compression[12]. To differentiate the abnormal ranges from the normal one, goniometry was performed both Active range of motion (AROM) and Passive range of motion (PROM).The ranges are listed in the Table-1. Further evaluation is done using MMT; the grades are listed in Table -2

Table 1: Ranges of Motion of shoulder joint and Neck region.

ROM (in degrees)	Left AROM	Right AROM	Left PROM	Right PROM
Flexion (180 degrees)	150	180	160	180
Abduction (180 degrees)	150	180	165	180
ER (90 degrees)	50	90	55	90
Neck flexion (50 degrees)	40		45	
Neck Extension (60 degrees)	40		45	
Neck side bending(45 degrees)	40	40	45	45
Neck rotation (80 degrees)	45	60	50	65

Table 2: Grades of MMT for shoulder joint and Neck region

MMT	LEFT	RIGHT
Shoulder flexion	4/5	5/5
Shoulder Extension	5/5	5/5
Shoulder Abduction	4/5	5/5
Shoulder ER	4/5	4/5
Elbow Extension	5/5	5/5
Elbow Flexion	5/5	5/5
Neck flexion	4/5	
Neck Extension	4/5	
Neck side bending	4/5	4/5
Neck Rotation	4/5	4/5

4. Interventions

The patient is treated with Burst mode of TENS in supine position. We select pulsed current with bi phasic shape of pulse with phase duration of 100 us, frequency 100 Hz and burst mode of 2 Hz (10 pulses per bursts) and we gradually increases the amplitude until the strong muscle contraction was produced. The duration of the treatment was 15 min. Simultaneously we kept rolled towel under the neck of the patient to maintain the neck in15 degree flexion. A traction force of 1/10 of the body weight was applied .Traction hold time was 10 min and rest time 5 minutes simultaneously for 15 min followed by conventional physiotherapy in the form of HOT PACK (10 min) and active neck exercises was performed for, lower and middle trapezius, serratus anterior (10 min), neck isometrics (5 repetitions each directions) (15 min) and shoulder Pendular exercises (10 minutes). The frequency of the treatment was 5 days / week for 2 weeks with 1 hour treatment session. The treatment was continued for 2 weeks.

5. Outcome Measurement

The Patient was evaluated for the level of self reported pain before the commencement of the interventions and by the end of 2 weeks of intervention.

The pain was measured using a numeric rating visual analogue scale (NRVAS). The patient was instructed to choose a number from 0 to 10 that best describes the current pain in which 0 means no pain and 10 means worst possible pain[13] .The common format is a horizontal line.[14]. Similarly the NRS is used for describing pain severity extremes and for detecting neck disability; NDI (Neck Disability index) scale is used. It is a self report scale to measure neck pain in which each section is scored on a 0 to 5 rating scale in which zero means 'No pain' and 5 means 'Worst imaginable pain'. The test can be interpreted as a raw score with a maximum score of 50 or as a percentage. A higher score indicates more patient-rated disability. Vernon & Moir (1991) interpretated that 0-4points (0-8%) means no disability,5-14points (10 – 28%) means mild disability,15-24points (30-48%) means moderate disability,25-34points (50- 64%) means severe disability, and 35-50points (70-100%) means complete disability[15].

6. Result

Initially in the first 2 days, the patient presented with no reported change in symptoms which continued as neck pain radiating upto thumb, and pain with turning head in either directions (Lt >Rt).At the day third day of treatment the patient reported a short term relief in symptoms but indicated that this relief is subsided once he indulge in field work, and that the pain threshold get severely returned.

On the day sixth of treatment, the patient pain aggravates as he gone through some occupational exertion in the field, where he works which results in reappearing of the symptoms. The patient is asked to minimize the loaded work duration till the terminal stages of treatment.

During the seventh and eighth day of treatment, the patient reported moderate radiating pain but in prolongs head bending position the pain becomes fairly severe.

When presenting to the tenth treatment session, he reported mild radiating pain along with ability to perform recreational activites, Mild pain in lifting and turning head in either directions.

In the final treatment session, he reported very mild pain with movement and no radiation pain, easily read newspaper with head bend position for sometimes, can perform usual work and ability to perform grooming activities.

A re-evaluation was performed in the last session post treatment, these measured were used to assess the outcomes of the intervention techniques and reported a patient perceived Neck disability score of 66.6% (30/45) and post 2 weeks of treatment session, a difference in the score of 15% (07/45) is noticed .A total of 51.1% recovery is recorded with the treatment which is considered lower than the initial assessment. In NDI one section is not applicable. So a score of 45 is taken in the study. The overall rating of improvement was reported by the patient as being at 51.1% of recovery. The patient reported improved tolerance for ADL activities like recreational, self care and concentration to slight symptoms which is considered as an improvement from slight to severe symptom reported at the time of the initial evaluation.

Objective measurements taken at the time of re-evaluation demonstrate improved shoulder and neck range of motion and muscular strength. The external rotators improved but were graded as 4/5. Full pain free movement was obtained and all special tests, including Spurling's and cervical distraction test were found to be negative. Positive findings included minimal tenderness over Para-spinal muscles and mild cervical pain with resisted flexion abduction and external rotation. Pain, according to the VAS was reported as 10/10 and at the time of re-evaluation 2/10, representing an improvement of 8 points from the initial evaluation as seen in (Table-3).

A successful outcome was defined as being greater than 50% improvement on the Neck disability index , a pain rating of <3/10 on the VAS and a perceived overall improvement score of > 51.1%.

Table 3: Results of Pre and Post test Scores with overall rate of improvement

Scales	Pre-test	Post-test
NDI	66.6%	15.5%
Pain (VAS)	10/10 Worst	2/10 (Post 2 weeks)
Overall rate of improvement		51.1%

7. Discussion

Many protocols were used as alone or in combination for the conservative management of neck pain such as heat therapy, Ultrasound, TENS, exercises including Manipulations, use of orthotics such as cervical collar. Most of the literature concentrates on neck pain in general way and a very few are available which are focusing on cervical radiculopathy specifically.

One of the common protocols used for the management of cervical radiculopathy is a combination of TENS followed by Neck exercises. Cervical traction has also been used increasingly as the distraction achieved in the cervical vertebrae help reducing the impingement on the nerve roots by osteophytic spurs or herniated discs.

Carrol et al (2001); Slukka KL et al (2005) explained that the tens produces analgesic effects in neck and radiating pains. The possible mechanism of non-acute pain relief by low rate TENS at motor level stimulation is peripheral block or activation of central inhibition. The induction of rhythmic contraction may also activate the endogenous opiate mechanisms of analgesia. The magnitude of the induced muscle contraction varies from barely perceptible to extremely strong [16],[17].

Joghataei & Arab (2004) ; Olivero WC et al (2002), Cleland JA et al (2005) well documented in their studies about the effect of mechanical intermittent cervical traction on reducing neck and arm pain and neck disability in cervical radiculopathy [18], [19], [20]. The treatment variation might be due to different parameters and the flaws in the research designs as suggested in the review of Graham et al (2006) [21].

The possible mechanism of reduction in neck and arm pain by intermittent cervical traction might be by unloading the components of the spine by stretching muscles, ligaments and functional units, reducing adhesions within the Dural sleeve, nerve root decompression within the central foramina, and increasing joint mobility. Swezey RL stated that the traction force decreases intervertebral disc pressure, reduces tonic muscle contraction and improved vascular status in the epidural space and perineural structures [22]. Nikander R et al reveals that the neck exercises plays a crucial role in diminishing chronic neck pain in cervical radiculopathy conditions [23].

The study revealed that the Intermittent cervical traction combined with burst mode of tens improves joint mobility, relives pain and improves functional mobility in case of cervical radiculopathy.

Though there are no previous studies which support this result but we can conclude that the possible mechanism by which it reduces pain such as reducing intervertebral disc pressure, nerve root decompression, and increasing joint mobility is when added to the analgesic effects of burst mode of Tens in reducing pain and improving functional mobility. The duration of the was short for only 2 weeks and the results applied to short term only with a single case report which might differ in the longer run with large sample collection and data size.

As the measurements were handheld so the possibility of human error which might affect the reliability. There is a scope for further study and I strongly suggest that the long term study with bigger sample and large frequency can make the results more reliable. A group study should be taken with

large sample size to improve the consistency of results. More research is necessary with larger sample for (a) proper standardization of treatment interventions (b) For better parameters of outcome measurements to validate the relative merits of the protocols used.

8. Conclusion

This case report describes the individual outcomes of a 36 year-old moderately built male who diagnosed with unilateral cervical radiculopathy affecting left sided upper extremity with neck movement restrictions. The aim of treatment design is to eliminate the targeted pain, to improve functions and ROM with increasing the strength of the musculature.

The final result of the intervention was a successful outcome of being greater than 51.1% of improvement on the Neck disability index , a pain rating of <3/10 on the VAS and a perceived overall improvement score of 51.1%.

The success denoted through this case study supports the current evidence in that there is ample low-level evidence to support the use of intermittent cervical traction along with burst mode of tens for patients presenting with cervical radiculopathy and the need for higher-level research studies is warranted. Benefits of this form of research include the ability to use an evidence-based approach of treatment and broaden one's scope of practice. This case study helps to demonstrate the potential benefits of additional treatment techniques in patient management. Cervical traction with burst mode of application plays an important adjunct with the conventional exercise program is being supported throughout the evidence and will be an area of further research and focus.

We conclude that intermittent cervical traction with burst mode of tens should have a place in the management of cervical radiculopathy and neck exercises in reducing pain with reducing neck disability and improving activities of daily living.

9. Acknowledgements

Authors would like to thank the Department of Orthopaedics and Physiotherapy in UP university of medical sciences, Saifai and the participants for their support. Authors acknowledge the great help received from the scholars whose articles cited and included in references of this manuscript. The authors are also grateful to authors / editors / publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed. Authors are grateful to IJSR editorial board members and team reviewers who have helped to bring quality to this manuscript.

10. Conflict of Interest

Authors agree that there was no source of conflict of interest.

References

[1] Ellenberg MR, Honet JC, Treanor WJ. Cervical radiculopathy. Arch Phys. Med Rehabil. 1994; 75:342-352.
[2] Wainner RS, Gill H: Diagnosis and non operative management of cervical Radiculopathy: J Orthop Sports Phys.Ther. 2000 Dec; 30(12):728-44.
[3] Hunt WE, Miller CA. Management of Cervical radiculopathy. Clin Neuro-Jur. 1986; 33:485-502
[4] Yu YI, Woo E, Huang CY, Cervical Spondylotic myelopathy and radiculopathy. Acta Neurol Scand. 1987; 75: 367-73.
[5] Abdulwahab S. The effect of reading and traction on patients with cervical radiculopathy based on electrodiagnostic testing. J Neuromusculoskeletal Syst. 1999; 7:91-96.
[6] Henderson C, Hennessy R. Posterolateral foraminatomy as an exclusive operative technique for cervical radiculopathy: a review of 846 consecutively operated cases. Neurosurgery. 1983; 13:504.
[7] Daffner SD, Hilibrand AS, Hanscom BS, Brislin BT, Vaccaro AR, Albert TJ. Impact of neck and arm pain on overall health status Spine.2003; 28; 2030-2035.
[8] Honet JC, Puri K. Cervical radiculitis: treatment and results in 82 patients. Arch Phys Med Rehabil.1976; 57:12-16.
[9] Hoppenfeld, Stanley. Physical Examination of the Spine & Extremities. Pg 126- 127.
[10] Wainers et al 2003 -- Wainner RS, Fritz JM, Irrgang JJ, Boninger ML, Delitto A, Allison S. Reliability and diagnostic accuracy of the clinical examination and patient self-report measures for cervicalradiculopathy. Spine. 2003;28(1):52-62.
[11] Konin JG, Wiksten DL, Isear JA, Brader H. Special Tests for Orthopedic Examination. Thorofare: SLACK Incorporated; 2006.
[12] Anekstein Y, Blecher R, Smorgick Y, Mirovsky Y. What is the best way to apply the Spurling test for cervical radiculopathy? Clin.Orthop.Relat.Res. 2012;470(9):2566-2572.
[13] Rodriguez CS.Pain measurement in the elderly : a review .Pain Manag Nurs2001;2:38-46
[14] Johnson C. Measuring pain.visual analog scale versus numeric pain scale :what is the difference ? JChiropr Med2005;4:43-4
[15] Vernon H, Mior S. The neck disability index: A study of reliability and validity. Journal of Manipulative and Physiological Therapeutics, 1991, 14:409-15.
[16] Carrol EN, Badura AS. Focal intense brief transcutaneous electric nerve stimulation for treatment of radicular and postthoracotomy pain. Arch Phys Med Rehabil. 2001; 82:262- 4.
[17] Sluka KA, Bailey K, Bogush J, Olson R, Ricketts A. Treatment with either high or low frequency TENS reduces the secondary hyperalgesia observed after injection of kaolin and carrageenan into the knee joint. Pain. 1988; 77(1): 97-102.
[18] Joghatataei MT, Arab AM, Khaskar H. The effect of cervical traction combined with conventional therapy on grip strength on patients with cervical radiculopathy. Clin Rehabil. 2004; 18:879-887.

[19] Olivera WC, Dulebohn SC. Results of halter cervical traction for the treatment of cervical radiculopathy: retrospective review of 81 patients. Neurosurg Focus. 2002; 12: clinical part 1.
[20] Cleland JA, et al: Manual Physical therapy Cervical traction, and strengthening exercise in patients with cervical radiculopathy: a case series: J Orthop Sports Phys. Ther. 2005; 35(12):802-11.
[21] Graham N, Gross AR, Goldsmith C. Mechanical traction for mechanical neck disorders: A systematic review. J Rehabil Med. 2006; 38(3): 145-152.
[22] Swezey RL, Swezey AM, Warner K. Efficacy of home cervical traction therapy. Am J Phys Med Rehabil. 1999; 78(1): 30-32.
[23] Nikander R, Malkia E, Parkkari J, Heinonen A, Starck H, Ylinen J. Dose-response relationship of specific training to reduce chronic neck pain and disability.