

The Upper Limb Tension Test Used To Determine The Prevalence Of Nerve Most Commonly Involved In Cervical Radiculopathy In Computer Users

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Abstract

Introduction: -

Cervical radiculopathy is a malfunction of the cervical spinal nerves and/or the cervical spinal roots that is brought on by compression and inflammation of the nerve roots due to deterioration near the cervical foraminal region or as result of disc herniation. By using upper limb tension test assess the nerve most commonly involved in computer users having cervical radiculopathy. Aim: - To see prevalence of nerve mostly involved in upper limb in computer users by using upper limb tension test. Materials and method: - This is cross sectional (observational) study. Upper Limb Tension Test (ULLT) were done on 76 computer users having cervical radiculopathy. The test is perform for Median nerve, Musculocutaneous nerve, Radial nerve and ulnar nerve. Results:- Prevalence of nerve involved and it was found that 38 participants had involvement of Median nerve , 20 participants had involvement of Radial nerve , 13 participants had involvement of Ulnar nerve, 5 participants had involvement of Musculocutaneous nerve. Conclusion: - According to current study, it appears that in current study on upper limb tension test among computer users, it was found that the Median nerve was the most commonly involved nerve in case of cervical radiculopathy.

Keywords: - Cervical radiculopathy, Upper limb tension test(ULTT), Elvey test, Computer Users, Median nerve, Musculocutaneous nerve, Radial nerve, Ulnar nerve.

Introduction: -

Cervical radiculopathy is a compression and inflammation of cervical spinal nerve roots(1-4). The most frequent cause of cervical radiculopathy that results in C7 radiculopathy is degenerative alterations C6C7 level(1-5). Patients with cervical radiculopathy typically complain of arm pain while seeking treatment, as well as pain, numbness, tingling, and weakness in the upper extremity, which frequently results in severe functional limits and disability⁽⁶⁾. Elvey first described the upper limb tension test, which is why it is also known as the Elvey test, the brachial plexus tension test, or simply the upper limb tension test⁽⁷⁾. The four upper limb nerves—the Median, Musculocutaneous, Radial, and Ulnar nerves—are the primary targets of ULTT. If the symptoms return, there is a side-to-side difference in elbow extension of more than 10 degrees, the symptoms are either increased or decreased by cervical side bending on the ipsilateral or contralateral side, respectively. The ideal position for a computer user can be stated. Over your shoulders with your head up⁽⁹⁾. Postural analysis of computer users:- Head is upright and over shoulder. Shoulder should be relaxed and not raised. Elbows are bent at 90 degree and forearms should be in horizontal positions. Wrists are in straight position and supported on table. Eyes are looking downward and not bending front neck. Backrest of the chair should support the natural curve of the lower back. Thighs in horizontal positions with 90 degree or 110 degree angle at hip. Feet are flat on the floor or supported by footrest. ^[14]Aim: - To see the prevalence of nerve most commonly involved in upper limb in computer users by using upper limb tension test. Objective: - To asses for cervical radiculopathy with upper limb tension test.

Materials and Methodology: -

- Materials: - Plinth, Pen, Paper.
- Study design: - Cross Sectional (Observational) study.
- Study setting :- jalgaon
- Type of sampling :- convenient sampling
- Study population :- Computer users
- Sample size :- 76

Criteria for selection:-

- Inclusion Criteria: - Individual already diagnosed with cervical radiculopathy. Individual who are working on

computers more than 5-6 hrs a day. Individual with neck pain radiating into upper extremity. Age between 25-45 years. Both genders.

- Exclusion Criteria: - Patient with Trigger point over cervical region. Participants were excluded if they had any specific medical condition affecting the cervical spine (such as ankylosis spondylitis, infection, rheumatoid arthritis, osteoporosis). Traumatic injuries to upper limb and cervical spine. Participant undergone cervical surgery.

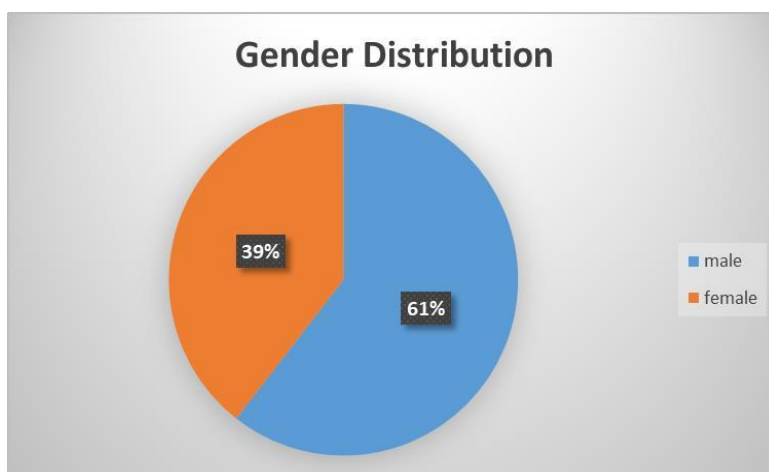
Procedure: -

- Median nerve:-Starting position: supine, edge of plinth. Procedure: fix shoulder girdle, shoulder abduction, forearm supination, wrist extension, shoulder Lateral rotation, elbow extension, cervical lateral flexion^[13].
- Musculocutaneous nerve: - Starting position: - supine. Procedure :- shoulder girdle depression, Elbow extension, shoulder external rotation , forearm supination, wrist and finger extension.^[13]
- Radial nerve: - Starting position: supine, edge of plinth. Procedure: fix shoulder girdle, elbow extension, shoulder medial rotation, forearm pronation, flexion wrist fingers thumb, shoulder abduction.^[13]
- Ulnar nerve: - Starting position: supine, edge of plinth. Procedure: wrist extension, forearm pronation, elbow flexion, fix shoulder girdle, shoulder abduction.^[13]

Result:

Table no. : - 1

Gender	Total no. of participants
Male	46
Female	30

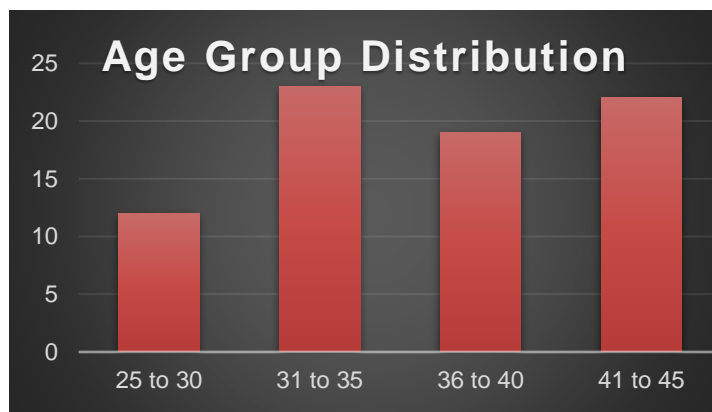


Pie chart no. 1

Table no.1 and Pie chart 1 Shows the gender distribution. There were total 76 participants out of which 46 were males and 30 were females.

Table. no 2

Age Group (In yr.)	Total no. of participants
25-30	12
31-35	23
36-40	19
41-45	22

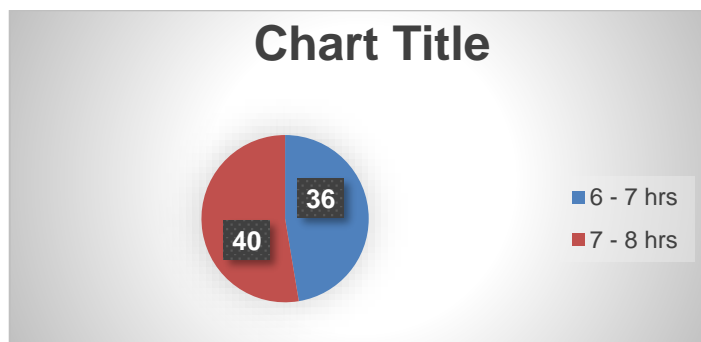


Graph no. 1

Table 2 and Graph 1 shows the Age group distribution, between 25 -30 years there were 12 participants , 31-35yrs there were 23 participants , 36-40yrs there were 19 participants and 41-45 there were 22 participants among 76 participants

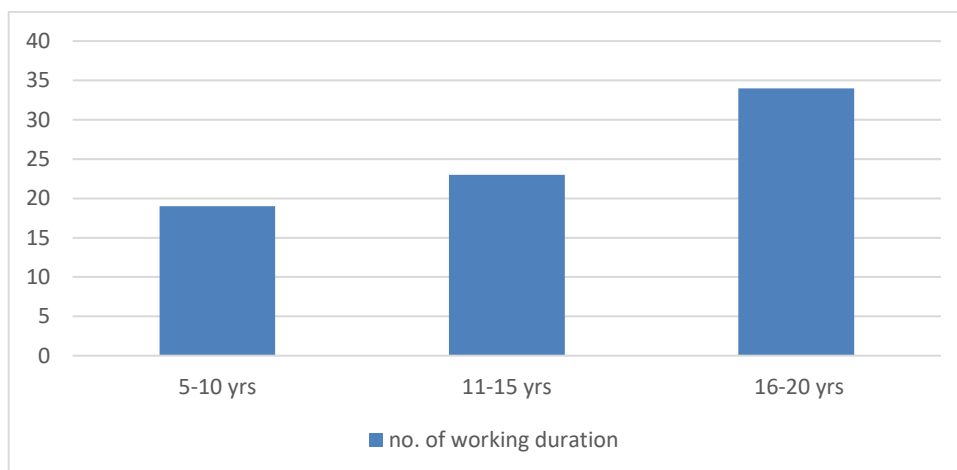
Table no. 3

No. of working hours /Day	Total No. of participants
6-7 hrs	36
7-8 hrs	40



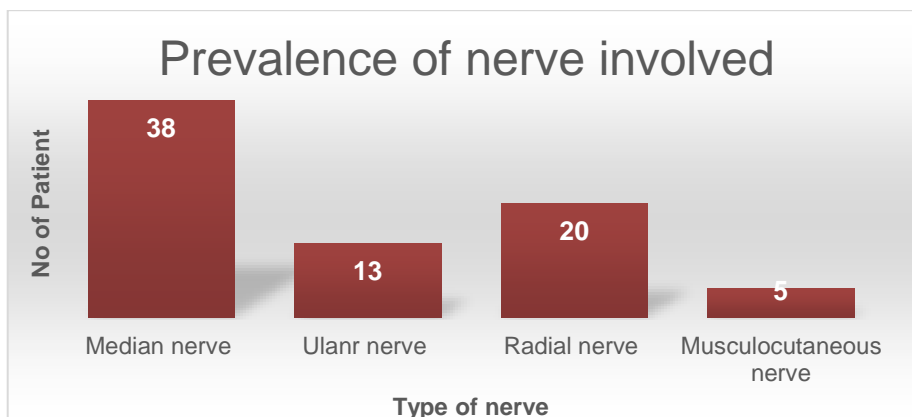
Pie chart no. 2

Table.3 and Pie chart no.2 shows the Number of working hours per day and it was found that 36 participants worked for 6-7hrs, 40 participants worked for 7-8hrs



Graph no 2

Table.4 and Graph no. 2 shows the Number of working duration and it was found that 19 participants had worked for 5-10yrs, 23 had worked for 11-15 yrs and 34 had worked for 16-20yrs.



Graph no. 3

Table no. 5

Prevalence of nerve involved	Total no of participants
Median Nerve	38
Musculocutaneous Nerve	5
Radial Nerve	20
Ulnar Nerve	13
Prevalence of nerve involved	Total no of participants
Median Nerve	38
Musculocutaneous Nerve	5
Radial Nerve	20
Ulnar Nerve	13

Table 5 and Graph no.3 Shows Prevalence of nerve involved and it was found that 38 participants had involvement of the Median Nerve, 20 participants Radial Nerve, 13 had involvement of Ulnar Nerve and 5 participants had involvement of Musculocutaneous Nerve.

DISCUSSION

A clinical disorder called cervical radiculopathy is brought on by the compression of the cervical nerve roots. Cervical radiculopathy can have a wide range of clinical signs, including discomfort, sensory impairments, motor deficits, weakened reflexes, or any combination of the aforementioned. Similar to this, there are other pathophysiological mechanisms that can lead to cervical nerve root dysfunction.^[18]The present study was carried out with the aim to see which nerve is most commonly involved in cervical radiculopathy by using upper limb tension test in computer users. Initially the sample size was found to be 76. In our study a total 46 male and 30 female were included .(table no.1)In our study following results were obtained ,In age group between 25 -30 years there were 12 participants , 31-35yrs there were 23 participants , 36-40yrs there were 19 participants and 41-45 there were 22 participants among 76 participants. (Table No.2)In evaluation of working hours per day it was found that 36 participants worked for 6-7hrs, 40 participants worked for 7-8hrs.(Table 3).In evaluation of working experience 19 participants had worked for 5-10yrs , 23 had worked for 11-15 yrs and 34 had worked for 16-20yrs.(Table No.4).From all upper limb tension tests performed on participants (as mentioned in procedure) it was found that 38 participants had involvement of the Median Nerve , 20 participants Radial Nerve , 13 had involvement of Ulnar Nerve and 5 participants had involvement of Musculocutaneous Nerve.(Table No.5) Compression of the cervical nerve root is part of the path anatomy of cervical radiculopathy Herniation of disk material or bony osteophytes that impinge on the cervical nerve root can cause compression of the nerve root. According to epidemiological studies, the C7 root (C6-7 herniation), C6 (C5-6 herniation), and C8 (C7-T1 herniation) nerve roots are the most frequently afflicted. Impingement of the nerve root by disc material likely leads to nerve damage both by mechanical and chemical pathways. Mechanically, compression of the nerve likely leads to localized ischemia and nerve damage. Equally important, however, is the chemical cascade triggered by the nucleus pulposus on the nerve Disc degeneration and the local ischemia triggers a pro-inflammatory cascade mediated by tumor necrosis factor-alpha (TNF-α), interleukin factor-6 (IL-6), and matrix metalloproteinases (MMPs). This cascade leads to further sensitization and increased pain in the area^[18].The disc material pressing against the nerve root is likely to cause mechanical and chemical

nerve injury. It is likely that localized ischemia and nerve injury result from mechanical compression of the nerve. The chemical chain reaction started by the nucleus pulposus on the nerve, however, is just as significant. A pro-inflammatory cascade mediated by tumor necrosis factor-alpha (TNF-), interleukin factor-6 (IL-6), and matrix metalloproteinases (MMPs) is set off by disc degeneration and the local ischemia. This chain of events causes the area to become more sensitive and painful.^[18] A study conducted by Majid Ghasemi et al, with a title the value provocative tests in diagnosis of cervical radiculopathy in which they found that Shoulder Abduction Test and Spurling Test were more specificity (85%) compared to ULTT, while ULTT was more sensitivity (60.46% in acute and 35.29% in chronic). Hence they concluded that ULTT is suitable for screening of CR, while SAT and ST can support diagnosis.^[21]

Conclusions

According to the current study , it appears that in current study on upper limb tension tests among computer users , it was found that the median nerve was the most commonly involved nerve in case of cervical radiculopathy. This suggests that there may be higher prevalence of median nerve involvement among computer users experiencing this condition. It was evident that extended use of computer by the participants in poor ergonomic positions will modify neck posture, placing an unnecessary strain on cervical spine , in which leads to entrapment of nerve which commonly entrapment of Median Nerve.

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Reference

1. Crette S, Fehlings MG. Cervical radiculopathy. *N Engl J Med* 2005;353:392-9.
2. Radhakrishnan K, Litchy WJ, O'Fallon WM, Kurland LT. Epidemiology of cervical radiculopathy. A population-based study from Rochester, Minnesota, 1976 through 1990. *Brain* 1994;117:325-35.
3. Abbed KM, Coumans JV. Cervical radiculopathy: Pathophysiology, presentation, and clinical evaluation. *Neurosurgery* 2007;60:S28-34.
4. Kuijper B, Tans JT, Schimsheimer RJ, van der Kallen BF, Beelen A, Nollet F, et al. Degenerative cervical radiculopathy: Diagnosis and conservative treatment. A review. *Eur J Neurol* 2009;16:15-20.
5. Heiskari M. Comparative retrospective study of patients operated for cervical disc herniation and spondylosis. *Ann Clin Res* 1986;18:57-63.
6. Tanaka Y, Kokuban S, Sato T. (i) Cervical radiculopathy and its unsolved problems *Current orthopaedics* 1998;12:1-6.
7. Magee DJ. Orthopaedic physical assessment. 5th edition. Elsevier publication
8. Elvey RL: The investigation of arm pain. In Boyling JD, Palastanga N (eds): *Grieve's modern manual therapy: the vertebral column*, 2nd ed. Edinburgh, 1994, Churchill Livingstone.
9. Butler DS: *Mobilisation of the nervous system*, Melbourne, 1991, Churchill Livingstone.
10. Nakki A, Battie MC, Kaprio J. Genetics of disc-related disorders: current findings and lessons from other complex diseases. *Eur Spine J.* 2014;23(3):354.
11. Lauren Polcaro; Matthew Charlick; Daniel T. Daly. *Anatomy, Head and Neck: Brachial Plexus*
12. Eubanks, JD. *Cervical Radiculopathy: Nonoperative Management of Neck Pain and Radicular Symptoms.* *American Family Physician* 2010;81,33-40.
13. Michelli Belotti Bersanetti, ' Camila Gorla,' and Aline Mendonca Turcil.
14. Nikita Fedorov *Ergonomics and Posture for computer Users.*
15. According to Wainner et al. (2003)
16. According to Apelby- Albrecht et al (2009)
17. 7th edition of *Orthopedic Physical Assessment* by David Magee, published by Elsevier in 2020, uses an updated method from Elvey to label the ULTTs.
18. Sravisht Iyer1 & Han Jo Kim1 *Cervical radiculopathy.*
19. G. Rajesh, K. Ramana*, Vignesh Srinivasan, A. Kumaresan, Prathap Suganthirababu,S. Promotha and Jagatheesan Alagesan.
20. Prevalence of impaired upper extremity neural mobility among smart device users during the COVID-19 pandemic.
21. Majid Ghasemi, Khodayar Golabchi, Seyed Ali Mousavi, Bahador Asadi, Majid Rezvani1, Vahid Shaygannejad, Mehri Salari. *The value of provocative tests in diagnosis of cervical radiculopathy.*