Indian Journal of Medical & Health Sciences
Volume 2 Number 2, July - December 2015
DOI: https://dx.doi.org/10.21088/ijmhs.2347.9981.2215.1

Editorial

Therapeutic Efficacy of Peripheral Nerve Sliders in Cervicobrachial Pain Syndrome: Sliding towards Evidence versus Evidence towards Sliding

Nisha Rani Jamwal*, Senthil P. Kumar**

IJMHS (Jul-Dec 2015) 02 (02): 61-64 / ©Red Flower Publication Pvt. Ltd.

This editorial would aim to highlight the evidence-informed perspective for using peripheral nerve slider techniques as a treatment for cervicobrachial pain syndrome.

Definition of CBPS

Cervicobrachial pain syndrome (CBPS) is a non-specific neuromusculoskeletal disorder which characteristically present with cervical spine hypomobility and neural mechanosensitivity in people with mechanical neck-related arm pain (Jamwal and Kumar, 2015).

Evidence for Neural Tissue Mechanosensitivity in CBPS

Qunitner (1990) proposed 'stretch' as a causative mechanism in CBPS in their report of 22 patients who presented with pain followed the performance of a forceful activity (lifting, pulling or pushing) using one or both arms in the outstretched position. Their symptoms and the findings on physical examination were both consistent with stretch-induced damage to neural tissues related to the painful upper limb.

Author's Affiliation: * Senior Physiotherapist, Department of Physiotherapy, Fortis Super Speciality hospital, Phase-VIII, Mohali, Punjab **Professor & Principal, Maharishi Markandeshwar Institute of Physiotherapy and Rehabilitation (Maharishi Markandeshwar University), Mullana - Ambala-133207, Haryana.

Reprint Request: Senthil P Kumar, Professor & Principal, Maharishi Markandeshwar Institute of Physiotherapy and Rehabilitation (MMIPR), Maharishi Markandeshwar University (MMU), Mullana University Road, Mullana, Ambala, Haryana-133207

E-mail: senthilparamasivamkumar@gmail.com

Evidence for Neurodynamics in Examination of Neural Tissue Mechanosensitivity

Over the period of scientific evolution, the concept of adverse mechanical tension in the nervous system (Butler, 1989) had evolved into neurodynamics. Neurodynamics is a tissue-specific hands-on application of mechanics and physiology of the nervous system in evaluation and treatment of nerve-related symptoms using manual therapy (Shacklock, 1995). Neurodynamic dysfunctions are classified into nerve dysfunctions (sliding or tensioning) and interface dysfunctions (closing- reduced / excessive or opening- reduced / excessive) (Shacklock, 2005) which clinically manifest as nerve-related pain.

Clinical manifestations of peripheral nerve-related pain are often discussed in terms of positive and negative symptoms. Positive symptoms reflect an abnormal level of excitability in the nervous system and include pain, paresthesia, dysesthesia, and spasm. Negative symptoms indicate reduced impulse conduction in the neural tissues and include hypoesthesia or anesthesia and weakness (Baron et al, 2010; Nee and Butler, 2006).

Examination of neurodynamic dysfunctions includes nerve trunk palpation and neurodynamic testing (Elvey, 1997). Upper limb neural tension testing specifically assesses median, radial and ulnar nerves of upper limb in people who present with neck-related arm pain and nerve-related pain (Walsh, 2005).

While nerve trunk palpation is graded for tenderness due to palpation as 'mechanical allodynia', the five grades clinically used are: 0- no tenderness, 1- mild tenderness (pain on deep probing pressure), 2- moderate tenderness (pain on pressure),

and 3- severe tenderness (pain on touch / mild pressure), and 4- marked tenderness (do not allow touch / palpate) (Schmid et al, 2009).

Neurodynamic testing is monitored for normal and abnormal responses elicited during movement sequencing, in order to identify covert and overt stimuli based upon quality and quantity of reproduction of subjective symptoms (Butler and Gifford, 1989). In addition, the range of motion of last added movement component and associated muscle activity in antagonistic muscles are also indicators of clinical neurodynamic dysfunction.

Abnormalities of neurodynamic examination findings such as mechanical allodynia and neurodynamic test range of motion deficits were able to differentiate between Normal Subjects, Type-2 Diabetes Mellitus Subjects, Painless Diabetic Peripheral Neuropathy and Painful Diabetic Peripheral Neuropathy (Kumar et al, 2010c).

Evidence for Neurodynamics in Treatment of Neural Tissue Mechanosensitivity

Neurodynamic therapeutic techniques included nerve sliders and tensioners, and longitudinal and transverse nerve massage (Hall and Elvey, 1999). The peripheral nerve massage was shown to influence vibration perception and thermal perception thresholds in healthy volunteers (Kumar et al, 2010a). Peripheral nerve sliders were demonstrated to have a multitude of beneficial therapeutic effects since they are gentler, performed in pain-free or middle range, improve longitudinal nerve excursion on its bed, without symptom provocation, or tensile loading (Coppieters and Butler, 2008).

Peripheral nerve sliders combined with nerve massage was demonstrated to produce substantial improvements in vibration perception and thermal perception thresholds in people with very painful chronic neuropathic condition namely diabetic peripheral neuropathy (Kumar et al, 2010b). Many recent systematic reviews (Kumar et al, 2011a;) and randomized clinical trial (Kumar et al, 2011b) have shown sufficient evidence to favor neurodynamic mobilization as an effective treatment for both short-term and long-term in a variety of musculoskeletal and neuropathic pain conditions.

Evidence for Neurodynamic Testing in CBPS

Van der Heide et al (2006) studied test-retest reliability and face validity of modified median neurodynamic test (ULNT-2) in 12 subjects with unilateral CBPS. The authors found that difference between sides in the elbow extension angle was associated with pain responses (P1 and P2), the type of pain responses, and the available elbow extension range of motion which suggested that this test had face validity for the assessment of the presence of heightened mechanosensitivity of neural tissues in patients with CBPS.

Evidence for Neurodynamic Treatment for CBPS

Marks et al (2011) investigated the expert recommendation that in patients with cervicobrachial pain, an initial mobilization of the mechanical interface is more effective than an initial neurodynamic treatment. Twenty patients with cervicobrachial pain were randomly assigned to one of two intervention groups to receive once either cervical mobilization at the dysfunctional mechanical interface or peripheral neurodynamic techniques. Pain, active cervical range of motion and neurodynamic were assessed before and after the intervention as well as one week later. Data showed significantly larger effects at follow-up for the cervical mobilization group regarding the extension (improvement of lateral flexion to the painful side and for the upper limb neurodynamic test 1.The study supports the experts opinion that in patients with cervicobrachial pain the initial treatment of the mechanical interface through cervical mobilization appears preferable to neurodynamic treatment.

Gupta et al (2012) studied the effectiveness of median nerve slider's neurodynamics for managing pain and disability in cervicobrachial pain syndrome 34 patients with age group of 18 to 40 year were taken & randomized into experimental group,(n=16) & conventional treatment comprising of neck and shoulder exercises & ergonomic advice. They found that median nerve slider techniques improved pain relief and reduced disability better than the conventional treatment group.

Chandan et al (2015) compared CLG mobilization versus median nerve tensioner mobilization on 20 CBPS patients who were given hot packs in addition to these treatments. The outcome measurements included pressure pain thresholds of median nerve measured at arm, elbow and forearm, pain intensity on VAS and functional limitations on DASH questionnaire. The authors found significant improvements in both groups without any between-group differences which suggested that both treatments were effective in CBPS in short-term.

Technique procedure- Treatment using Median Nerve Slider for CBPS

Peripheral Nerve s Slider (PNS) Technique

According to the description by Marks et al (2011) the PNS technique was individually chosen according to the positive neurodynamic test findings of movement sequencing and movement components. For example., arm symptoms reproduced by shoulder and elbow movements which upon testing showed median nerve sliding dysfunction (pain in middle-range neurodynamic testing) need to be addressed with PNS with shoulder and elbow components. The movements were chosen such that one movement produced convergence (tensioning the nerve) and other for divergence (relaxing the nerve), and the nerve slides longitudinally towards and away the tensioned point when those components were performed synchronously in an oscillatory manner. We chose to use one frontal / sagittal plane movement performed together with other transverse plane movement for the same, eg., shoulder internal rotation with elbow extension and shoulder external rotation with elbow flexion was the median nerve slider for patient with arm symptoms. Technique dosage was 3 sets of 15 repetitions performed with rest interval of 1 minute between each set.

Day-wise progression of application of PNS was done as per following:

Patient position

supine lying, arm by the side, no pillow required and body straight.

Therapist position

Stride standing, facing cephalic and parallel to patient with the near hip approximating the bed. The near foot placed forward.

Day 1: Two selected movement components were performed in isolation (only the two movements were performed with all other joints in relaxed position).

Day 2: Two selected movement components were performed with all other joints in initial-range neurodynamic test position.

Day 3: Two selected movement components were performed with all other joints were in mid-range neurodynamic test position.

Day 4: Two selected movement components were done and all other joints were in end-range neurodynamic test position.

Day 5: Two selected movement components were performed and all other joints were stretched in neurodynamic testing position.

Although PNS technique was explained for median nerve, it is imperative that similar procedures could be used for other nerves albeit limited evidence for their application. However, future studies aimed at exploring the need and impact of PNS are necessary for an evidence-informed neurodynamic therapy in CBPS.

References

1. Baron R, Binder A, Wasner G. Neuropathic pain: diagnosis, pathophysiological mechanisms, and treatment. Lancet Neurol. 2010; 9(8): 807-19.
2. Butler D, Gifford L. The Concept of Adverse Mechanical Tension in the Nervous System Part 2: Examination and Treatment. Physiotherapy, 1989; 75(11): 629-36.
3. Chandan S, Sen S, Arfath U. Effect of Cervical Lateral Glide over Neural Tissue Mobilization for Median Nerve In Case Of Patients with Cervico-Brachial Pain Syndrome. Int J Health Rehab Sci. 2015; 4(1): 37-48.
4. Coppieters MW, Butler DS. Do sliders slide and tensioners tension? An analysis of neurodynamic techniques and considerations regarding their application. Man Ther. 2008; 13(3): 213-21.
5. Elvey RL. Physical evaluation of the peripheral nervous system in disorders of pain and dysfunction. J Hand Ther. 1997; 10(2): 122-9.
6. Gupta R. The effectiveness of median nerve slider's neurodynamic for managing pain and disability in cervicobrachial pain syndrome. Indian J Physiother OccupTher. 2012; 6(1): 127-32.
7. Hall TM, Elvey RL. Nerve trunk pain: physical diagnosis and treatment. Man Ther. 1999; 4(2): 63-73.
8. Kumar SP, Adhikari P, Jeganathan PS. Immediate effects of longitudinal vs. Transverse tibial nerve massage on vibration perception thresholds and thermal perception thresholds in asymptomatic subjects: A pilot randomized clinical trial. Physiotherapy and Occupational Therapy Journal .2010a; 3(1): 13-23.
9. Kumar SP, Adhikari P, Jeganathan PS, D'Souza SC. Immediate effects of nerve sliders and nerve massage on vibration and thermal perception thresholds in patients with painful diabetic peripheral neuropathy- a pilot randomized clinical trial Physiotherapy and Occupational

Therapy Journal. 2010b; 3(2): 35-49.

10. Kumar SP, Adhikari P, Jeganathan PS, D'Souza SC, Misri ZK. Comparison of Neurodynamic Examination Findings in Normal Subjects, Type-2 Diabetes Mellitus Subjects, Painless Diabetic Peripheral Neuropathy and Painful Diabetic Peripheral Neuropathy- A Cross-sectional study. International Journal of Neurology and Neurosurgery. 2010c; 2(1): 5-18.
11. Kumar SP, Adhikari P, Jeganathan PS, Kumar V. Neurodynamic mobilization for neuropathic pain- a review of current evidence. Journal of Indian Association of Physiotherapists 2011a ;9(1): 32-9.
12. Kumar SP, Adhikari PMR, Prabhu MM. Efficacy of Tibial nerve neurodynamic mobilization for neuropathic pain in type-II Diabetes mellitus- A Randomized Controlled Trial. Indian J PhysiotherOccupTher. 2011b; 5(4): 189-92.
13. Marks M, Schottker-Koniger T, Probst A. Efficacy of cervical spine mobilization versus peripheral nerve slider tecniques in cervicobrachial pain syndrome-a randomized clinical trial. J PhysTher. 2011; 4: 9-17.
14. Nee RJ, Butler DS.Management of peripheral neuropathic pain: Integrating neurobiology, neurodynamics, and clinical evidence. PhysTher Sport. 2006; 7(1): 36-49.
15. Quintner J. Stretch-induced cervicobrachial pain syndrome.Aust J Physiother. 1990; 36(2): 99-103.
16. Schmid AB, Burnner F, Luomajoki H, Held U, Bachmann LM, Kunzer S, Coppieters MW. Reliability of clinical tests to evaluate nerve function and mechanosensitivity of the upper limb peripheral nervous system.BMC Musculoskeletal Disorders 2009, 10: 11.
17. Shacklock M. Neurodynamics. Physiotherapy, 1995; 81(1): 9-16.
18. Shacklock M. Clinical neurodynamics- a new system of neuromusculoskeletal examination and treatment.Churchill Livingstone, 2005.
19. Van der Heide B, Bourgoin C, Eils G, Garnevall B, Blackmore M. Test-Retest Reliability and Face Validity of a Modified Neural Tissue Provocation Test in Patients with Cervicobrachial Pain Syndrome. J Manual Manipulative Ther 2006; 14(1): 30-6.
20. Walsh MT. Upper limb tension testing and mobilization: fact, fiction and a practical approach. J Hand Ther. 2005; 18(2): 241-58.