

Effectiveness of 4 Weeks Progressive Inhibition of Neuromuscular Structure (PINS) Technique with Conventional Treatment in Cervical Radiculopathy Patient: A Case Study

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ABSTRACT

This case study presents the comprehensive physiotherapy management of a 45-year-old male patient named diagnosed with cervical radiculopathy. The aim of this study was to evaluate the effectiveness of progressive inhibition of neuromuscular structures technique with conventional interventions in reducing pain, symptoms, energy and posture, actions and activities, enhancing muscle strength and quality of life in patient. Baseline assessments revealed severe pain, increasing symptoms in arm and forearm during Median nerve tension test, significant functional limitations. The treatment plan incorporated Progressive inhibition of neuromuscular structure technique, exercise therapy, pain management techniques and education/self-management strategies. Pain management techniques included therapeutic hydrocollator packs and TENS, while Exercise therapy encompassed stretching, strengthening, and postural correction exercises. Education and self-management strategies focused on ergonomics, postural education, and a home exercise program. Evaluation of outcomes demonstrated significant improvements in pain intensity, symptoms, energy and posture, actions and activities, muscle strength and functional limitations decreased. The patient's quality of life also improved.

Keywords: Cervical radiculopathy, Progressive Inhibition of Neuromuscular Structures, Conventional treatment, cervical radiculopathy impact scale

INTRODUCTION

Cervical radiculopathy is a disorder of a cervical nerve root(1) and is common in the general population, with an annual incidence of approximately 83 per 100,000(2). Patients with cervical radiculopathy often report neck pain; however, they most frequently seek treatment to address their arm pain(1,3,4). People with neck pain combined with upper extremity symptoms experience greater levels of disability than do people with neck

pain alone(4). Authors have suggested that patients with neck and arm pain should be treated more expeditiously in order to avoid the further negative impact on mental health status associated with chronic symptoms(4) More than half of all instances damage the C7 nerve root, which is the one that is most usually impacted. About one-fourth of cases involve the C6 nerve root(5). A neurodynamic evaluation measures the length and movement of various nervous system parts. The Upper Limb Tension

Tests (ULTTs) are intended to exert stress on the upper limb's neurological components. The goal of the test is to determine whether the median nerve, C5, C6, or C7 nerve roots are the cause of the patient's sore shoulder and arm. (6)

In cervical radiculopathy about 90 percent of patients complained of pain in the neck and rhomboid region.(6) Myofascial trigger points are a common phenomenon in people with cervical radiculopathy and spinal neck discomfort.(6,8) Certain muscles frequently develop trigger points as a result of cervical disc injuries at particular levels.(6) An increased number of trigger points (tender points) are present on the affected side of the body with a tendency to the muscles innervated by that nerve root in cervical radiculopathy.(6) Also as postulated by Gunn, myofascial pain is caused by spondylotic radiculopathies.(8)

One method that treats muscle dysfunction and myofascial trigger points is progressive inhibition of neuromuscular structures (PINS). Inhibition comes in different forms, one of which is progressive inhibition of neuromuscular structures (PINS). progressive inhibition of neuromuscular structures includes palpating myofascial trigger points along a neuromuscular structure and employing ischemia compression to gradually deactivate those trigger points.(9)

While preliminary reports suggest that a multimodal treatment approach may be beneficial for patients with cervical radiculopathy, exactly which interventions should be included in this approach, and in what combination, requires further research. Thoughts on progressive inhibition of neuromuscular structures as they relate to cervical radiculopathy, however, have not yet undergone in-depth research. Particularly little study has been done on the application of progressive inhibition of

neuromuscular structures to patients with spinal radiculopathy.

The purpose of this case report is to describe the evaluation, clinical decision-making process, and treatment of a patient with cervical radiculopathy.

CASE DESCRIPTION

A 45-year-old male electrical engineer was referred to physiotherapy by his primary care physician with a diagnosis of left-sided Cervical Radiculopathy. His primary complaint was left-sided neck pain that radiated distally down his left arm to his elbow, forearm and fingers, the pain had begun approximately three to four weeks prior. The patient fell down on his left shoulder and reported feeling a neck stretch, with neck and arm pain. He described the pain as a burning in the neck and a deep ache into the left arm that was aggravated by activities at work including lifting, typing on keyboard, driving, and assuming a slouching posture. He stated that his symptoms generally increased over the course of the day and that he had difficulty getting to sleep at night, and difficulty in activities of daily living. He stated that medicines temporarily reduced his symptoms and his dose of drugs is over and started a constant pain. The patient worked full time requiring activities such as prolonged sitting in front of the computer, typing on keyboard, and driving; however, he had to modify his pace at work and generally experienced increased pain by the end of the work day. The patient's goals were to decrease pain in his shoulder, arm and forearm, increase his neck mobility, perform normal work activities without limitation, and sleep without disturbance. The patient had a full spine MRI, which showed a mild diffuse intervertebral disc bulge at levels C3–C4, C4–C5, and C6–C7.



The patient completed self-report measures. The Numeric Pain Rating Scale (NPRS) was used to measure pain intensity, the pain reported by the patient was 7/10. The NPRS has demonstrated acceptable levels of reliability and validity(10). The CRIS cervical radiculopathy impact scale is a

newly developed self-report questionnaire that covers the measurement of symptoms and limitations in patients with cervical radiculopathy due to irradiating pain, tingling sensations, and sensory loss in the arm in combination with neck disability. (11)

PATIENT SELF REPORT MEASURES	PRE-TREATMENT SCORE
NPRS	7/10
CRIS subscale 1	69.44
Subscale 2	67.86
Subscale 3	22.83

NPRS=Numeric Pain Rating Scale
 CRIS=Cervical Radiculopathy Impact Scale

Physical Examination

Median nerve tension test was performed with modification in the sequencing of standard neurodynamic test at lower degrees of glenohumeral abduction and external rotation. Outcome measures used were angle of elbow extension for median nerve at the point of pain onset indicated by \OP" (Onset of Pain). (12) The ROM of elbow extension at the onset of pain was measured with a standard goniometer. The patient reported reproduction of his familiar pain in the neck and upper arm at 22° of elbow extension while the left side was tested. Moving the neck into an ipsilateral side bend or the wrist from full extension to neutral lessened this discomfort. With merely a stretching sensation in the front forearm, the right side could be moved to 0° of elbow extension during the ULNT.

Range of motion of elbow	Pre treatment score
	22°

INTERVENTION-

Progressive inhibition of neuromuscular structure technique was applied on the patient every alternate day for 4 weeks. Two connected points, named primary and endpoints, were palpated using the index fingers of both hands.

Spots were located along neuromuscular structure in the most and least sensitive regions, respectively. When an area of least sensitivity (endpoint) was identified, a mild ischemic compression was performed with the index finger of one hand without releasing the pressure until the course of treatment was complete. After locating the primary point, a second sensitive point was located with the middle finger of the same hand close to the endpoint without releasing the index finger's pressure.

When the middle finger's pressure was found to be more sensitive than the index finger's, the index finger's pressure was reduced while the middle finger's pressure was kept constant without reducing the endpoint pressure.

Before the third location was found, this continued for 30 seconds. The neuromuscular continuum was repeatedly explored along similar patterns for each of the identified sensitive spots until the final point, located around 2 cm from the endpoint, was discovered. The pressure was applied to the final and endpoint locations simultaneously for 30 seconds before being released.(10)



In addition to Progressive inhibition of neuromuscular structure technique, conventional treatment was given, the exercises were given for 6 days per week for 4 weeks.

The exercise regimen includes cervical ROM exercise, trapezius stretching, isometric strengthening of cervical muscles, scapular retraction, and protraction exercise, shoulder shrugs, chin tucks and therapeutic modality Transcutaneous Electrical Nerve Stimulation (TENS).

Patient position – Sitting on a chair

1. Chin Tuck Exercise:
2. Scapular retraction Exercise:
3. Isometric Exercises of cervical muscles—Self-Resistance
4. Cervical range of motion exercise
5. Trapezius muscle stretching exercise-
6. Shoulder shrugs
7. Transcutaneous Electrical Nerve Stimulator-
Therapist position- therapist standing in side of the patient (walk standing)
Mode- conventional TENS
Frequency- 60 Hz
Time- 15 min
8. Hydrocollator pack- for 10 min

Exercise	Hold	Repetition	Sets
1) Cervical ROM exercise	2 sec	10	1
2) Chin tucks	10 sec	10	1
3) Shoulder protraction retraction	5 sec	10	1
4) Isometric strengthening	10 sec	5	1
5) Shoulder shrugs	5 sec	10	1
6) Cervical muscles stretching	30 sec	2	1

RESULT

After four weeks of treatment session, the patient demonstrated improvement in function and pain. The NPRS decreased from a 7/10 to 3/10. The score of Cervical Radiculopathy Impact Scale decreased from subscales 1 - 69.44 to 25.09 subscale 2 – 67.86 to 33.33 and subscale 3 – 22.83 to 9.67. Both the scale results were improved.

Relative pain-free elbow extension ROM in the modified ULNT was seen, from 23° to approximately equal opposite side 7°. The patient reported that he was a *very great deal better* at the end of the session. The treatment was effective in reducing pain, symptoms, improving energy and posture, improvement in activities of daily living, enhancing muscle strength and quality of life in patient.

Cervical radiculopathy impact scale (CRIS)					
Subscale 1: Symptoms		Subscale 2: Energy and Postures		Subscale 3: Actions and Activities	
First day	end of 4 weeks	First day	end of 4 weeks	First day	end of 4 weeks
69.44	25.09	67.86	33.33	22.83	9.67
Numerical pain rating scale (NPRS)			ELBOW RANGE OF MOTION		
First day	end of 4 weeks	First day	end of 4 week		
7	3	23°	7°		

DISCUSSION

The radiating pain symptoms were decreased in the patient after applying PINS technique and conservative treatment. The PINS was used by Musa Sani Danazumi et al. in 2019 on patient with lumbar PIVD and in combination with spinal mobilization

with movement and found relieve in patients symptoms. (13) Progressive inhibition of neuromuscular structures includes palpating myofascial trigger points along a neuromuscular structure and employing ischemia compression to gradually deactivate those). trigger points. The

approach's focus is on identifying the tissue changes brought on by dysfunction and treating patients based on palpatory assessment and their feedback. Progressive inhibition of neuromuscular structures has been shown to lessen radiating discomfort. The use of Progressive inhibition of neuromuscular structures to apply ischemic compression to sensitive neuromuscular structures may also produce a counterirritant effect, which inhibits the transmission of pain through the spinothalamic tract by means of large, fast-conducting afferent fibres in the dorsal horn of the spinal cord and collateral fibres in the substantia gelatinosa or nearby interneurons. By stimulating nearby tissues in this way, pressure reduces the sensitivity of the initial painful site, relieving pain and other symptoms.(10) PINS combined with conventional treatment can be included in the management of cervical radiculopathy patients.

CONCLUSION

In this instance, a multi-pronged approach comprising postural education, PINS technique, and therapeutic exercise was linked to a noteworthy reduction in pain and tingling, enhanced cervical mobility, decreased symptoms during MNT elbow extension, improvement in functional ability, and better performance in activities of daily living of the patient. According to this research, patients may benefit more or have better results when therapeutic exercise is combined with the progressive inhibition of neuromuscular structure approach.

Declaration by Authors

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