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Assessment of Neurodynamic Testing in Individuals with Neck Pain.

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Abstract :

Background-

Neck pain is a commonly encountered musculoskeletal disorder with multifactorial etiology, often involving both mechanical and neural structures. While postural and muscular factors are routinely addressed in physiotherapy, the contribution of altered neural mobility is frequently underdiagnosed. Neurodynamic testing offers a clinical method to evaluate neural mechanosensitivity, while functional disability can be objectively assessed using standardized tools like the Neck Disability Index (NDI).

Objectives-

To assess neck pain in individuals using neurodynamic testing and NDI scoring to identify neurodynamic impairments, correlate neurodynamic findings with NDI scores, and highlight important clinical implications in physiotherapy management.

Method-

A cross-sectional observational study was conducted on 60 participants aged 18–60 years with neck pain lasting more than two weeks. All subjects underwent standardized upper limb neurodynamic tests (ULTTs) for median, radial, and ulnar nerves, and completed the NDI questionnaire. Data were analyzed using descriptive statistics, chi-square tests, and t-tests.

Result-

The right median nerve was the most commonly affected (68.33%). Tightness (68.33%) was more frequently reported than weakness (31.67%) as a limitation. Most participants experienced moderate pain (65%) and reported submaximal pain during testing. However, no statistically significant association was found between the nerve involved and pain severity, limitation type, or NDI score variation by gender.

Conclusion-

Although no significant statistical associations were found, neurodynamic testing revealed frequent involvement of the right median nerve and prevalent neural mobility impairments. When combined with subjective tools like the NDI, neurodynamic tests can enhance diagnostic precision and guide individualized physiotherapy interventions. The study supports the integration of neurodynamic assessments in routine clinical practice to improve outcomes in patients with neck pain.

Index terms: Musculoskeletal disorders, Neurodynamic testing, Median nerve, Neck pain, Neck disability Index, NDI, Functional disability, Physiotherapy assessment.

1. Introduction :

Neck pain is a common musculoskeletal problem that will affect a substantial proportion of people at some point in their lives. It may affect an individual at any age. As age differs so does the workload, structural and degenerative changes and thus the pain vary in intensity and disability accordingly in younger, middle and older adult group.[1] In addition to pain, individuals may experience complaints of discomfort with activity, inability to perform simple tasks, and reduced quality of life. This is multifactorial, meaning that joint mechanics are impaired due to mechanical restrictions as well as neural tissue involvement of any nature across multiple movement planes. The complexity of neck pain extends beyond simple anatomical structures to encompass the intricate relationship between mechanical and neural factors. When neural tissues become sensitized or restricted, they can significantly impact functional capacity even when structural damage appears minimal on imaging studies. This neurodynamic component helps explain why some patients with seemingly minor mechanical problems experience disproportionate disability and why traditional joint-focused treatments may provide incomplete relief. The multifactorial nature of neck pain requires a comprehensive assessment approach that considers both mechanical joint dysfunction and neural tissue involvement, as neural structures can become compromised through direct compression, tension, or inflammatory processes that alter their normal sliding and gliding mechanics.
Neurodynamic testing serves as a valuable tool for clinicians to standardize the evaluation of the peripheral nervous system's mobility and sensitivity. Tests like the Upper Limb Neurodynamic Tension Test (ULNTT) are designed to assess neural structures' response to varying degrees of mechanical stimulation. By identifying abnormal neurodynamic responses, clinicians can uncover patterns of mechanosensitivity that may be centrally contributing to a patient's symptoms. These tests provide a systematic method for evaluating how neural tissues respond to controlled mechanical stress, revealing subclinical neural dysfunction that may not be apparent through standard neurological examination but significantly contributes to functional limitations.

The identification of abnormal mechanosensitivity patterns through neurodynamic testing enables clinicians to develop targeted treatment strategies that address both mechanical and neural components of dysfunction. This dual approach recognizes that optimal outcomes often require interventions that restore normal neural mobility alongside traditional mechanical treatments. Understanding these neurodynamic patterns helps predict which patients may benefit from nerve-specific interventions . By identifying neurodynamic responses that are abnormal, patterns of mechanosensitivity may be uncovered which are centrally contributing to a patient's symptoms. A study by Schmid and Bruner evaluates clinical tests assessing peripheral nerve function and mechanosensitivity in the upper limb.Testing involves sensory evaluations, reflexes, manual muscle tests, and upper limb neural tension tests (ULNTs).The tests showed moderate to substantial reliability, with kappa values ranging from 0.45 to 0.68.Thus , clinical evaluations are deemed reliable for evaluating nerve function and mechanosensitivity, highlighting the need for further research.[2]

Figure no 1 : End positions of upper limb neurodynamic tests.

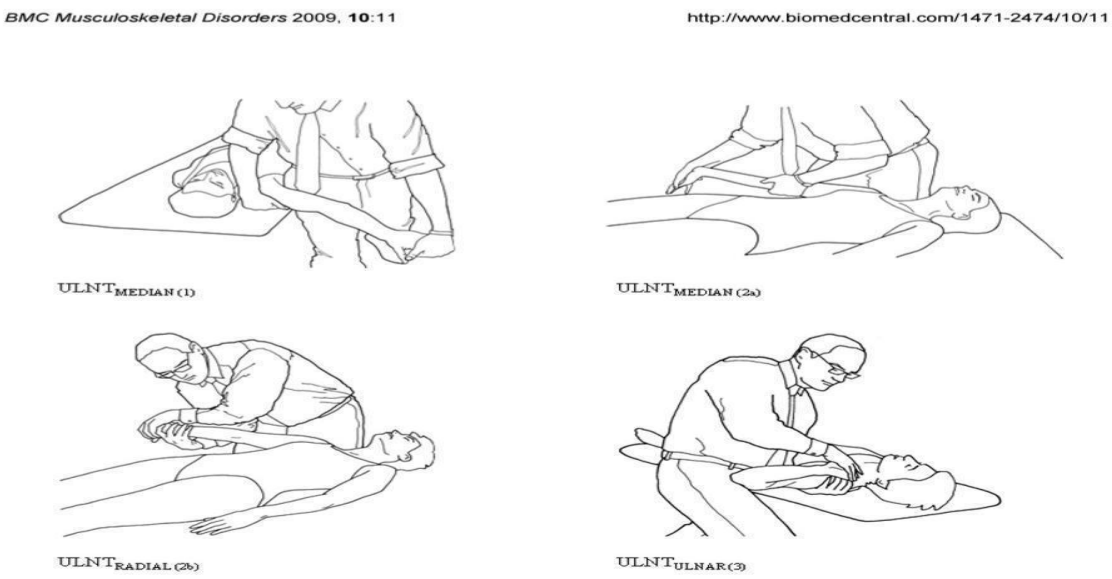


Figure 1
End positions of upper limb neurodynamic tests. Reprinted from Butler DS, The Sensitive Nervous System, Unley, DC, Australia: NOIgroup Publications, 2000, with kind permission.

Figure no 2 : Peripheral nerve palpation points.

BMC Musculoskeletal Disorders 2009, 10:11 http://www.biomedcentral.com/1471-2474/10/11

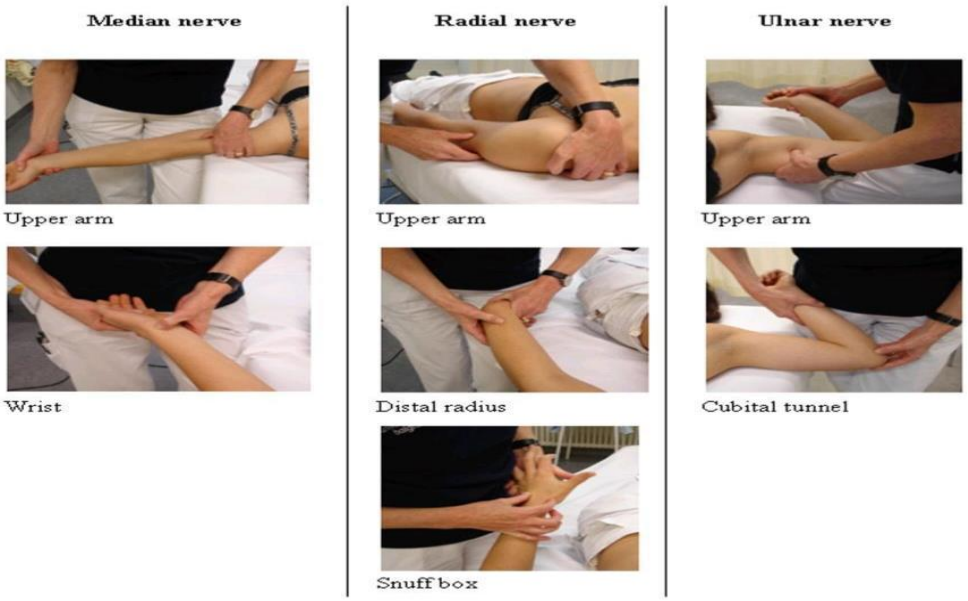


Figure 2
Peripheral nerve palpation points.

Self-reported outcome measures are an option that utilizes the patient view to evaluate the functional influence of a treatment protocol. Responsiveness is defined as the ability of the measurement tool in detecting clinical changes. The responsiveness value of a clinical measurement method is a key parameter for detecting changes resulting from a particular treatment. It is crucial for the preferred scales to have adequate responsiveness level to monitor the longitudinal change in a given treatment period. A responsive outcome measure should be capable of adequately reflecting clinically important change in patients' health conditions to guide treatment. Clinicians consider outcome measures when deciding whether to continue or change treatment protocols. Therefore, the responsiveness level of the scales becomes a cornerstone parameter in the follow-up studies and monitoring patients. Although different methods have been suggested for responsiveness measurements, there is no gold standard method among them.[3]

Apart from physical assessments, it is critical to understand how much a patient is affected by neck pain as it interferes with their daily function. The Neck Disability Index (NDI) is a well-validated tool that provides scores of functional disability due to neck pain in areas such as work, self-care, activities of daily living, and concentration. This patient-reported outcome measure captures the subjective experience of disability from the individual's perspective, complementing objective clinical findings to provide a comprehensive understanding of the condition's impact.

The NDIa well validated tool evaluates ten specific domains including pain intensity, personal care, lifting, reading, headaches, concentration, work, driving, sleeping, and recreation, with each section scored from 0 to 5 points. This multidimensional approach recognizes that neck pain affects various aspects of life beyond just physical symptoms, encompassing cognitive, occupational, and social functioning. By quantifying these functional limitations, the NDI helps clinicians prioritize treatment goals, monitor progress over time, and make informed decisions about treatment modifications based on patient-centered outcomes rather than solely relying on clinical test results. When combined with neurodynamic testing, the NDI creates a powerful assessment framework that bridges the gap between objective clinical findings and subjective patient experience. While neurodynamic tests identify specific neural tissue involvement and mechanosensitivity patterns, the NDI reveals how these impairments translate into real-world functional limitations. This dual approach ensures that treatment planning addresses both the underlying neurophysiological mechanisms and the patient's perceived disability, leading to more holistic and patient-centered care that targets meaningful functional improvements in daily activities.

According to Aljinovi´ and Barun, a study which compares neck-related disabilities among physiotherapists (PTs), family medicine specialists (FMs), and dentists. Neck pain was most prevalent in FMs (58.3%), followed by dentists (50.4%) and PTs (48.5%), with controls at 34.8%. NDI scores were significantly higher in PTs (14.6) and FMs (14.9) compared to controls (10.1), while dentists (11.9) showed no significant difference. Female PTs reported higher disability, but age and gender had no impact on dentists. The results highlight the need for preventive ergonomic strategies, particularly for PTs and FMs.[4]

Integrating that this study has assessed neck pain with NDI score combined with neurodynamic testing is aimed at dissecting physiologic dysfunction and subjective disability better and enhancing diagnostic accuracy, informing treatment strategies, and ultimately improving patient outcomes. The main goal was to understand this neurodynamic testing to identify problems early and improve treatment plans for neck pain. Recognizing this relationship could provide a basis for improved and more individualized physiotherapy interventions for individuals with neck-related disorders.

In the ever-growing population presenting with musculoskeletal degeneration and thus not meeting the criterion, this research hopefully fills an important gap in clinical assessment. Many patients experience significant functional limitations and pain despite normal imaging findings or absence of clear structural pathology, highlighting the need for more sensitive evaluation methods. Neurodynamic testing offers a way to identify subtle neural tissue involvement that might otherwise be overlooked in standard musculoskeletal examinations, providing clinicians with additional diagnostic information to guide treatment decisions.

Combining neurodynamic assessment with symptoms to provide a more comprehensive clinical assessment of neck pain is the goal in this research. This integrated approach recognizes that neck pain is rarely caused by a single factor but rather results from complex interactions between mechanical, neural, and psychosocial elements. By incorporating both objective neurodynamic findings and subjective disability measures, clinicians can develop a more complete understanding of each patient's condition, leading to more targeted and effective treatment strategies that address the specific contributing factors identified through comprehensive assessment.

2. Materials and Methodology:

Study Design:

A cross-sectional observational qualitative study design was chosen to assess the presence and patterns of neurodynamic impairments in individuals with neck pain. This design allowed the investigators to examine the correlation between neurodynamic test findings and self-reported functional disability (NDI score) at a single point in time.

Study Setting and Duration:

The study was conducted at the School of Physiotherapy, D.Y. Patil Deemed to be University, Navi Mumbai, over a period of two months. Participants were recruited from outpatient physiotherapy departments, academic settings, and voluntary response.

Participants and Sample Size:

A total of 60 participants aged between 18 to 60 years with neck pain persisting for more than two weeks were included. The sample size was determined based on feasibility and literature-supported observational study designs for neurodynamic testing.

Inclusion criteria :

Age within 18-60 years of age.
Neck pain for more than 2 weeks.
Individuals of both genders.
Individuals willing to participate in study .

Exclusion criteria:

Post operative cases of cervical spine : laminectomy , decompression, fusion , discectomy.
Diagnosed cervical myelopathy .
Recent neurological trauma : spinal cord injury, nerve root avulsion , head trauma.
Cervical instability: Individuals with brace.
Cervical Ankylosing spondylosis , spondylolisthesis , spondylitis.
Systemic Neuromuscular condition : Parkinson disease , Multiple sclerosis, ALS , Stroke .
Presence of Malignancy in the cervical region.
Recent Cervical Trauma (more than 3 months) : Whiplash , Fracture , falls in cervical region.
Cognitive Impairment : Alzheimer's disease , dementia affecting communication.
Uncontrolled hypertension and Cardiovascular conditions.
Vertigo and vestibular disorders.

Assessment Tools:

1. Neurodynamic Testing
The standard Upper Limb Neurodynamic Tests were administered to assess mechanical sensitivity and mobility of the median, radial, and ulnar nerves. Positive tests included the symptoms, range limitations, and side-to-side asymmetry in responses.

2. Neck Disability Index (NDI)
A self-reported, validated questionnaire used to evaluate the extent of disability due to neck pain. It includes 10 items covering personal care, lifting, reading, headaches, concentration, work, driving, sleeping, and recreational activity. Each item is scored from 0 to 5, with higher scores indicating greater disability.

Procedure:

Participants who met the eligibility criteria were provided with a participant information sheet and consent form. Following consent:

Basic demographic data were recorded (age, gender, occupation).
Participants underwent standardized neurodynamic testing for all three major upper limb nerves on both sides, and responses were documented (positive/negative, pain onset by submaximal pain, limitation).The NDI questionnaire was completed by each participant.

Ethical Considerations:

The study adhered to ethical standards as per the ICMR guidelines. Written informed consent was obtained. The research was approved by the institutional ethical committee of D.Y. Patil Deemed to be University.

Statistical Analysis:

Descriptive statistics (mean, SD, frequencies, and percentages) were used for demographic and baseline characteristics.Chi-square tests were employed to identify associations between pain severity and nerve involvement, and between NDI categories and neurodynamic limitations.
Independent t-tests were used to assess gender-wise differences in NDI scores.
Significance level was set at $p < 0.05$.

3. Data Analysis and Result :

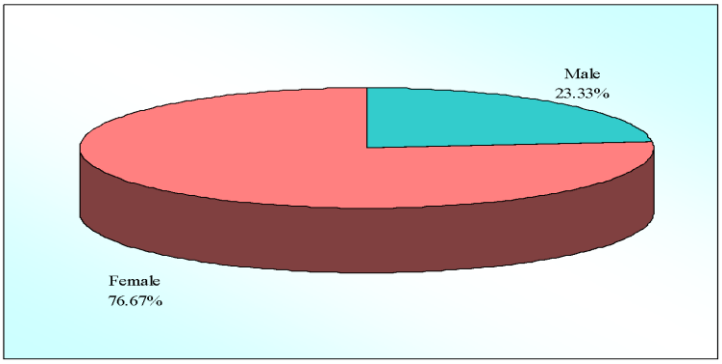
Demographics and Pain Severity:

1) Table: Age wise distribution of patients

Age groups	No of patients	% of patients
20-29yrs	31	51.67
30-39yrs	12	20.00
40-49yrs	8	13.33
>=50yrs	9	15.00
Total	60	100.00
Mean	32.60	
SD	12.47	

Interpretation:
The majority of participants were aged 20–29 years (51.67%).

2) Figure: Gender wise distribution of patients



Interpretation: Out of 60 participants, a large proportion were female (46 individuals) and remaining 14 individuals were males.

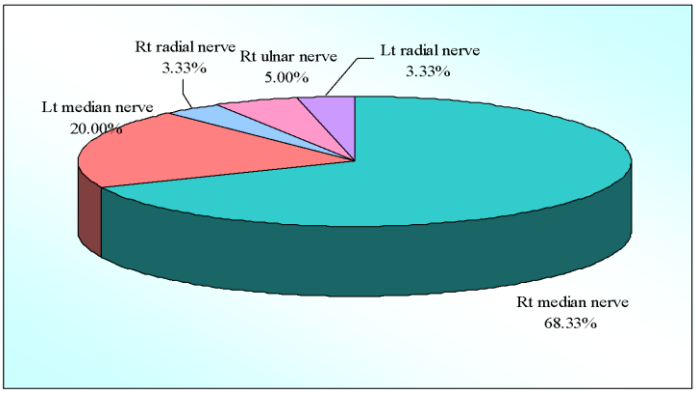
3) Table: Severity of neck pain wise distribution of patients

Severity	No of patients	% of patients
Mild	15	25.00
Moderate	39	65.00
Severe	6	10.00
Total	60	100.00

Interpretation:
Most participants reported moderate neck pain (65%), followed by mild (25%) and severe (10%).

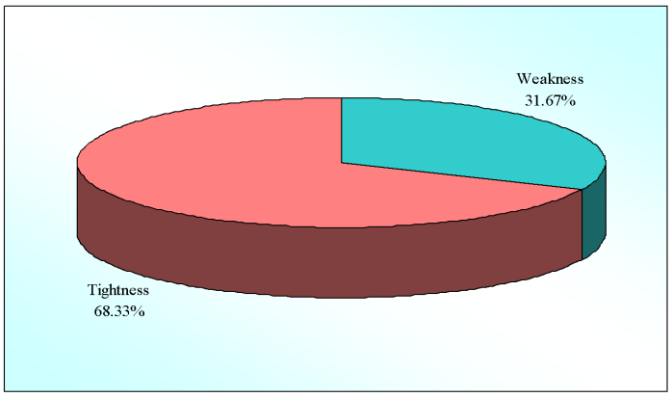
Neurodynamic Test Findings:

1) Figure: Nerve affected wise distribution of patients



Interpretation:
The right median nerve showed the highest involvement that includes 41 participants followed by the ulnar (3 participants) and radial nerves (4 participants) out of 60 participants.

2) Figure: Limitation wise distribution of patients



Interpretation:
Out of 60 participants , 41 individuals had observed Tightness which was more frequently than weakness as a primary limitation.

3) A . Table: Submaximal pain status wise distribution of patients

Submaximal pain status	No of patients	% of patients
Full	51	85.00
Half	9	15.00
Total	60	100.00

3) B. Table: Onset pain status wise distribution of patients

Onset pain status	No of patients	% of patients
Full	34	56.67
Half	26	43.33
Total	60	100.00

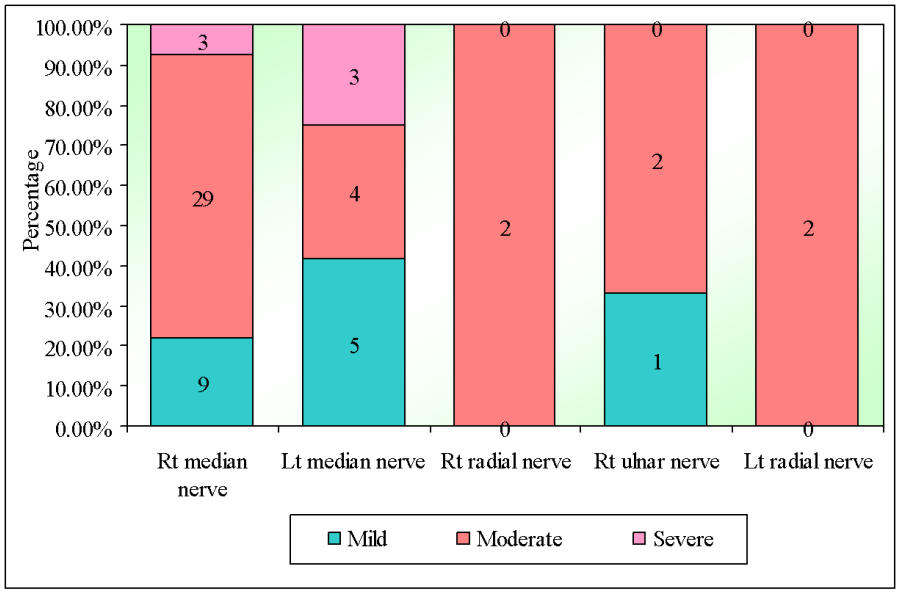
Interpretation: Pain characteristics were recorded based on angle of onset and submaximal pain.
Full pain onset was observed in 56.67% and Submaximal pain reported in 85% at test end range.

Statistical Outcomes:

1) Table: Association between Severity of neck pain with nerve affected

Nerve affected	Severity of neck pain						Total
	Mild	%	Moderate	%	Severe	%	
Rt median nerve	9	21.95	29	70.73	3	7.32	41
Lt median nerve	5	41.67	4	33.33	3	25.00	12
Rt radial nerve	0	0.00	2	100.00	0	0.00	2
Rt ulnar nerve	1	33.33	2	66.67	0	0.00	3
Lt radial nerve	0	0.00	2	100.00	0	0.00	2
Total	15	25.00	39	65.00	6	10.00	60
Chi-square=9.0780, p=0.3360							

Figure: Association between Severity of neck pain with nerve affected

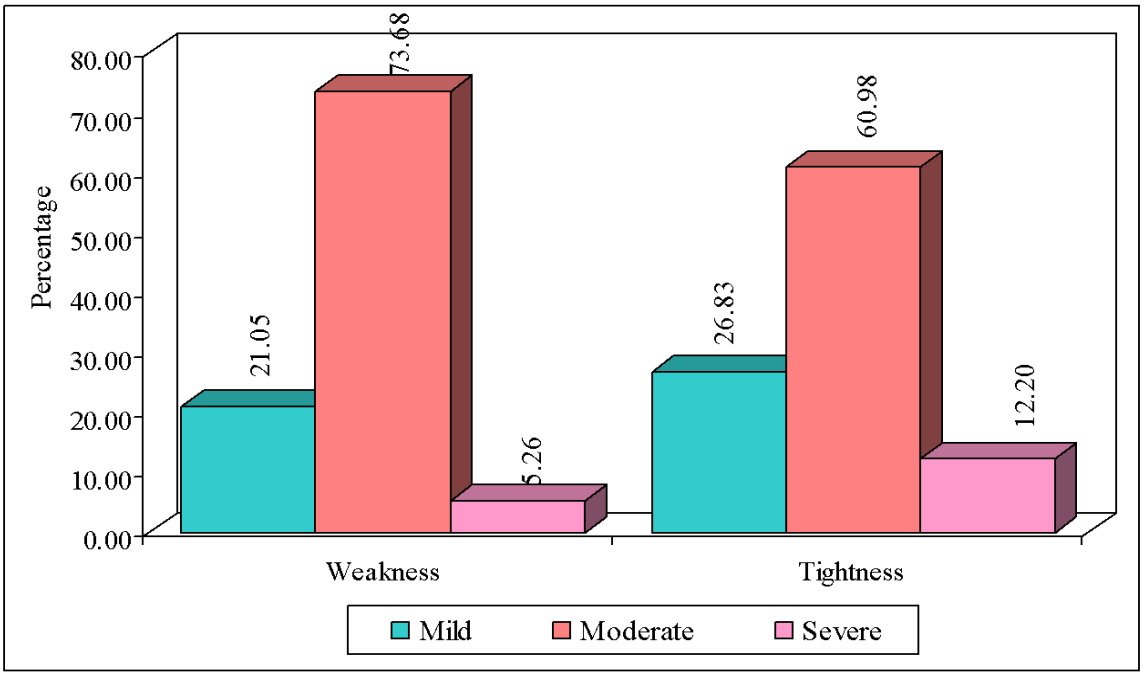


Interpretation: No significant association between nerve affected and pain severity
($\chi^2 = 3.405$, $p = 0.336$)

2) A. Table: Association between Severity of neck pain with Limitation

Limitation	Severity of neck pain						Total
	Mild	%	Moderate	%	Severe	%	
Weakness	4	21.05	14	73.68	1	5.26	19
Tightness	11	26.83	25	60.98	5	12.20	41
Total	15	25.00	39	65.00	6	10.00	60
Chi-square=1.1200, p=0.5710							

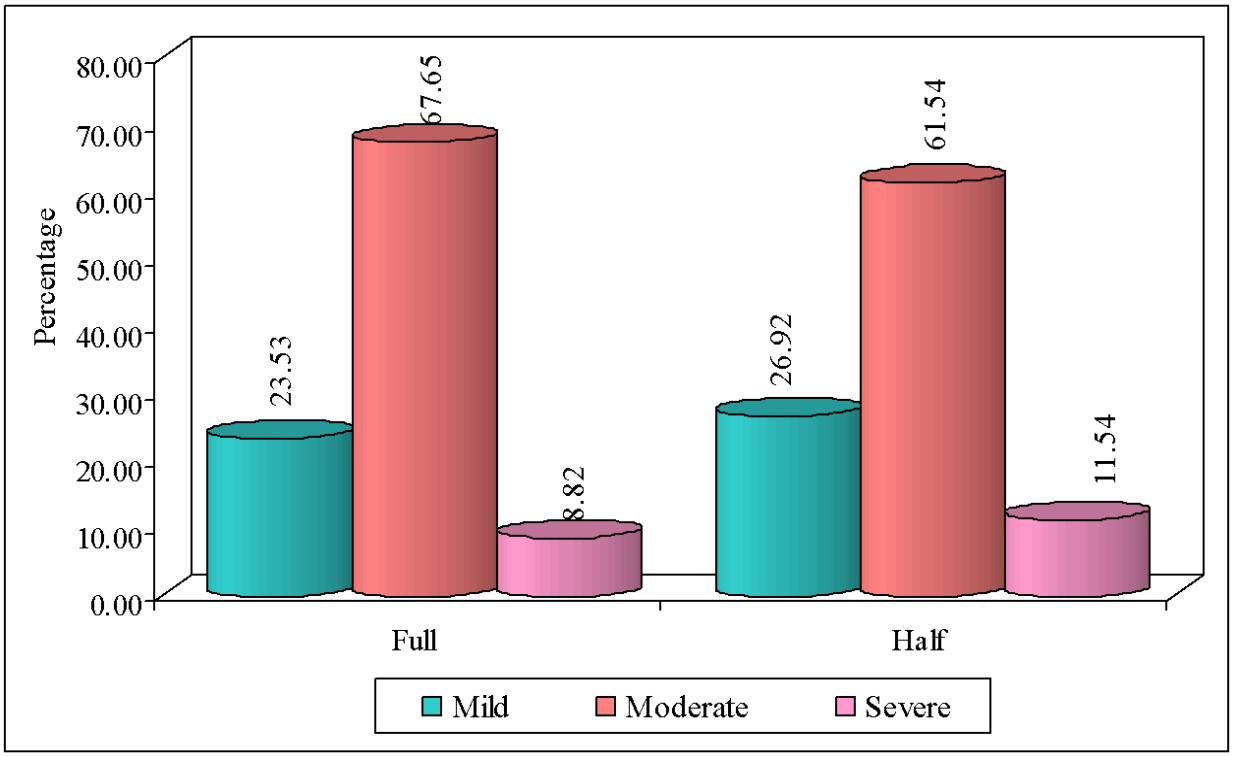
Figure: Association between Severity of neck pain with Limitation



2) B. Table: Association between Severity of neck pain with Angle of pain onset

Angle of pain onset	Severity of neck pain						Total
	Mild	%	Moderate	%	Severe	%	
Full	8	23.53	23	67.65	3	8.82	34
Half	7	26.92	16	61.54	3	11.54	26
Total	15	25.00	39	65.00	6	10.00	60
Chi-square=0.2610, p=0.8780							

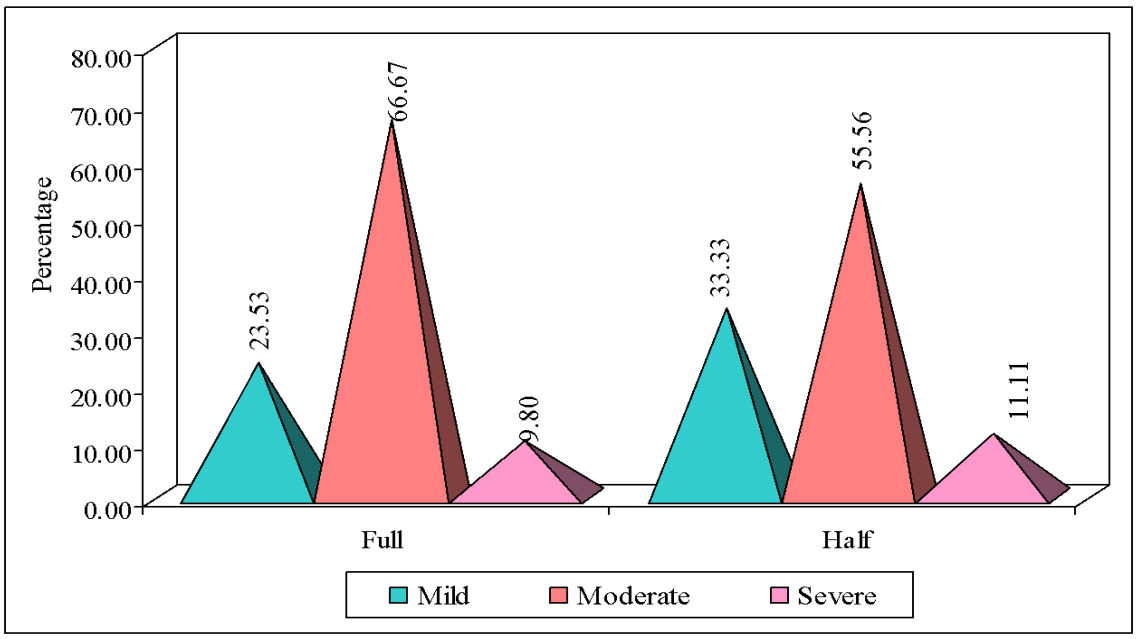
Figure: Association between Severity of neck pain with Angle of pain onset



2) C. Table: Association between Severity of neck pain with Angle of submaximal pain

Angle of submaximal pain	Severity of neck pain						Total
	Mild	%	Moderate	%	Severe	%	
Full	12	23.53	34	66.67	5	9.80	51
Half	3	33.33	5	55.56	1	11.11	9
Total	15	25.00	39	65.00	6	10.00	60
Chi-square=0.4520, p=0.7980							

Figure: Association between Severity of neck pain with Angle of submaximal pain

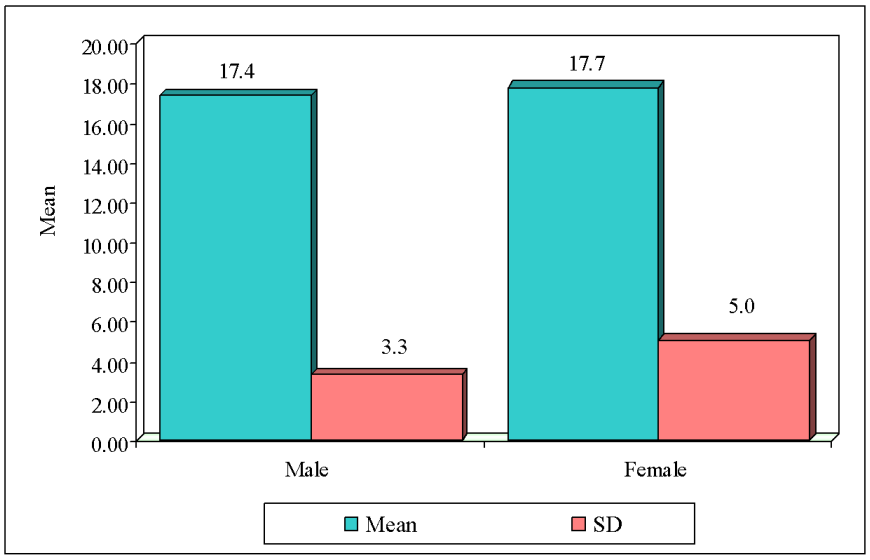


Interpretation: No significant association between limitation (tightness/weakness) and pain severity ($\chi^2 = 1.127$, $p = 0.571$)

3) Table: Comparison of male and female with NDI scores by t test

Gender	n	Mean	SD	SE	t-value	P-value
Male	14	17.36	3.30	0.88	-0.2676	0.7899
Female	46	17.74	5.00	0.74		

Figure: Comparison of male and female with NDI scores



Interpretation: No significant gender difference in NDI scores ($t = 0.269$, $p = 0.789$)

Summary:

These findings suggest that while neurodynamic impairments are common in individuals with neck pain, there was no statistically significant correlation between the nerve affected or symptom severity and the extent of functional disability (NDI). However, the clinical value of these findings lies in their diagnostic role to detect subtle neural mobility issues not otherwise detected in routine musculoskeletal assessments.

4. Discussion :

Neck pain is a common and complex clinical problem with multiple causes. While mechanical problems like joint stiffness and muscle imbalance are commonly evaluated, the role of nerve mobility problems is often overlooked. Neurodynamic testing, particularly Upper Limb Neurodynamic Tests (ULTTs), allows clinicians to assess the mechanical relationship between peripheral nerves and surrounding musculoskeletal tissues. This study explored using neurodynamic testing alongside the Neck Disability Index (NDI) in individuals with neck pain to evaluate both objective nerve-related problems and the patient's perceived disability.

Our results showed that right-sided median nerve involvement was the most common pattern, found in over 68% of cases. This finding matches previous evidence that dominant-hand use and poor upper body posture in students and office workers often lead to nerve tissue strain, particularly affecting the median nerve. Although no statistically significant relationship was found between pain severity and neurodynamic variables, this lack of correlation should not be interpreted as clinically unimportant. The repeated presence of right-sided median nerve signs in females and younger participants may indicate a postural or ergonomic connection that requires attention in preventive physiotherapy.

The large proportion of students and young professionals affected in this study is concerning given their long exposure to screens, poor desk posture, and prolonged sitting — all of which are risk factors for neck and arm stress and nerve mobility restrictions. These individuals may not yet experience high disability but are at risk of developing chronic pain conditions if underlying nerve issues are missed. Neurodynamic testing thus becomes a critical screening tool in this population, potentially identifying at-risk individuals before they develop significant disability.

Comparing our findings with existing literature, similar trends have been observed by Schmid et al. and Akaltun et al., where neurodynamic problems were frequent in non-traumatic neck and upper limb conditions. However, these studies often combined neurodynamic testing with imaging or nerve function tests like EMG for diagnostic confirmation. In contrast, our study relied entirely on clinical testing and patient-reported outcomes, which, while more practical and cost-effective, may lack the diagnostic accuracy of imaging. Still, clinical tests remain the first-line tools in real-world settings, especially in resource-limited environments.

The clinical implications of these findings extend beyond simple diagnosis to treatment planning and intervention strategies. Traditional physiotherapy approaches for neck pain often focus on joint mobilization, muscle strengthening, and postural correction. However, the presence of neurodynamic impairments suggests that nerve-specific interventions should be incorporated into

treatment protocols. Techniques such as nerve gliding exercises, neural mobilization, and tension release maneuvers may be particularly beneficial for patients showing positive neurodynamic signs, potentially addressing the root cause rather than just the symptoms.

The integration of neurodynamic testing into clinical practice also supports the movement toward precision medicine in physiotherapy. Rather than applying generic treatment protocols, clinicians can use neurodynamic findings to customize interventions based on the specific neural structures involved and the type of limitation identified. This personalized approach may lead to more efficient treatment outcomes and reduced treatment duration, benefiting both patients and healthcare systems.

Finally, this study emphasizes the necessity of integrating neurodynamic testing into routine musculoskeletal assessments, especially for neck and upper limb complaints. By combining objective tests (ULTTs) with subjective scales (NDI), clinicians can form a comprehensive profile of each patient. This improves clinical reasoning, facilitates personalized rehabilitation planning, and potentially shortens recovery time by addressing not just the symptoms but the contributing nerve factors. While our data do not establish cause-and-effect relationships, they open the path for more comprehensive research and advanced clinical protocols.

5. Conclusion :

The present study explored the relationship between neurodynamic impairments and functional disability in individuals with neck pain using objective clinical tests and subjective outcome measures, revealing no significant statistical associations but demonstrating frequent right median nerve involvement and prevalence of tightness as limiting factors. Though the absence of statistically significant correlations requires cautious interpretation due to study limitations, neurodynamic testing when combined with the Neck Disability Index (NDI) remains clinically valuable and supports comprehensive physiotherapy evaluation and individualized intervention planning.

6. Limitations :

Small sample size:
The relatively small sample size constrains the study's ability to detect meaningful relationships between variables and reduces confidence in the statistical significance of the results. Additionally, with a limited participant pool, there is an increased risk of missing clinically important but modest effects that could emerge in larger, more representative samples.

Single-center study:
Recruiting all participants from a single physiotherapy institution may have resulted in a narrow group of patients with similar backgrounds or types of neck pain. This limits how well the study results can be applied to patients in different healthcare settings or those with different characteristics. The findings may not represent the broader population of people experiencing neck pain.

Lack of advanced diagnostic validation:
The study's reliance on clinical neurodynamic testing alone, without confirmatory diagnostic tools like electromyography (EMG) or MRI, limits the ability to objectively verify nerve involvement or underlying pathology. The lack of objective diagnostic confirmation reduces confidence in the accuracy of identifying which participants actually have nerve-related neck pain versus other causes.

Cross-sectional design limits causality:
The cross-sectional design captures data at only one time point, preventing assessment of symptom progression or treatment outcomes over time. This limits the ability to establish causal relationships or determine how test results predict long-term recovery, which would require longitudinal follow-up studies.

No long-term follow-up:
The study did not include follow-up assessments to observe symptom progression, recurrence, or treatment response over time. This limits insight into whether the identified neurodynamic impairments were transient, persistent, or influenced by therapeutic intervention, reducing understanding of their long-term clinical relevance.

7. Future Scope:

Future studies should explore larger, more diverse populations. Longitudinal designs, ergonomic assessments, and integration of neuroimaging or electrophysiological tools may enhance clinical applicability and accuracy.

8. Clinical Relevance :

Neurodynamic tests should be integrated into physiotherapy evaluations for neck pain to screen for nerve mobility issues. Early identification of such impairments can guide targeted interventions, improving patient outcomes and preventing chronicity.

9. Acknowledgement:

We would like to thank all participants for their contributions to this research

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11. Annexure:

NDI scale :

NECK PAIN DISABILITY INDEX QUESTIONNAIRE

Patient Name: _____ Date: _____

PLEASE READ: This questionnaire is designed to enable us to understand how much your neck pain has affected your ability to manage your everyday activities. Please answer each section by circling the **ONE CHOICE** that most applies to you. We realize that you may feel that more than one statement may relate to you, but **PLEASE JUST CIRCLE THE ONE CHOICE WHICH MOST CLOSELY DESCRIBES YOUR PROBLEM RIGHT NOW.**

SECTION 1 – Pain Intensity

A I have no pain at the moment.
B The pain is very mild at the moment.
C The pain is moderate at the moment.
D The pain is fairly severe at the moment.
E The pain is very severe at the moment.
F The pain is the worst imaginable at the moment.

SECTION 2 – Personal Care (Washing, Dressing, etc.)

A I can look after myself normally without causing extra pain.
B I can look after myself normally, but it causes extra pain.
C It is painful to look after myself and I am slow and careful.
D I need some help, but manage most of my personal care.
E I need help every day in most aspects of self-care.
F I do not get dressed, I wash with difficulty and stay in bed.

SECTION 3 – Lifting

A I can lift heavy weights without extra pain.
B I can lift heavy weights, but it gives extra pain.
C Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned, for example, on a table.
D Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned.
E I can lift very light weights.
F I cannot lift or carry anything at all.

SECTION 4 – Reading

A I can read as much as I want to with no pain in my neck.
B I can read as much as I want to with slight pain in my neck.
C I can read as much as I want to with moderate pain in my neck.
D I cannot read as much as I want because of moderate pain in my neck.
E I cannot read as much as I want because of severe pain in my neck.
F I cannot read at all.

SECTION 5 – Headaches

A I have no headaches at all.
B I have slight headaches which come infrequently.
C I have moderate headaches which come infrequently.
D I have moderate headaches which come frequently.
E I have severe headaches which come frequently.
F I have headaches almost all the time.

SECTION 6 – Concentration

A I can concentrate fully when I want to with no difficulty.
B I can concentrate fully when I want to with slight difficulty.
C I have a fair degree of difficulty in concentrating when I want to.
D I have a lot of difficulty in concentrating when I want to.
E I have a great deal of difficulty in concentrating when I want to.
F I cannot concentrate at all.

SECTION 7 – Work

A I can do as much work as I want to.
B I can only do my usual work, but no more.
C I can do most of my usual work, but no more.
D I cannot do my usual work.
E I can hardly do any work at all.
F I cannot do any work at all.

SECTION 8 – Driving

A I can drive my car without any neck pain.
B I can drive my car as long as I want with slight pain in my neck.
C I can drive my car as long as I want with moderate pain in my neck.
D I cannot drive my car as long as I want because of moderate pain in my neck.
E I can hardly drive at all because of severe pain in my neck.
F I cannot drive my car at all.

SECTION 9 – Sleeping

A I have no trouble sleeping.
B My sleep is slightly disturbed (less than 1 hour sleepless).
C My sleep is mildly disturbed (1-2 hours sleepless).
D My sleep is moderately disturbed (2-3 hours sleepless).
E My sleep is greatly disturbed (3-5 hours sleepless).
F My sleep is completely disturbed (5-7 hours).

SECTION 10 – Recreation

A I am able to engage in all of my recreational activities with no neck pain at all.
B I am able to engage in all of my recreational activities with some pain in my neck.
C I am able to engage in most, but not all of my recreational activities because of pain in my neck.
D I am able to engage in a few of my recreational activities because of pain in my neck.
E I can hardly do any recreational activities because of pain in my neck.
F I cannot do any recreational activities at all.

A=0 B=1 C=2 D=3 E=4 F=5

PATIENT'S SCORE: _____
 # OF SECTIONS COMPLETED × 5
Total Score: _____ × 100 = _____ % DISABILITY

Patient Signature: _____ Date: _____
Therapist Signature: _____ Date: _____

Fairbanks CT, Cooper C, Davies JB, O'Brien JP. *The Oswestry low back pain disability questionnaire*. Physio Ther 1980;66:271-273.

INSTRUCTIONS FOR COMPLETING THE NECK DISABILITY INDEX (NDI)

1. All patients 15 years of age and older with a primary complaint of neck pain (i.e., cervical or occipital) must complete a Neck Disability Index (NDI) form. It is recommended that the NDI be used at baseline (i.e., at the time of the initial visit for an episode of care) and every 4 weeks thereafter or with each new Treatment Form submission. The Disability Index forms are used within the treatment program to measure patient progress. The patient may leave certain questions blank if they don't apply.

2. The NDI was developed in 1989 by Howard Vernon and has become a standard instrument for measuring self-rated disability due to neck pain. Each of the 10 sections is scored from 0 – 5. The maximum score is therefore 50.

Each NDI Section is scored as follows:
A = 0 points
B = 1 point
C = 2 points
D = 3 points
E = 4 points
F = 5 points
Maximum points = 50

Points are interpreted as:
0 – 4 points = no disability
5 – 14 points = mild disability
15 – 24 points = moderate disability
25 – 34 points = severe disability

34 points = complete disability

Example: Scoring 15 – 24 points out of a possible 50 points (the RAW SCORE) equates with **moderate disability**.

3. Enter the total number of points from all 10 sections (the RAW SCORE, **not** a percentage**) into the Neck Disability Index Score section of the Treatment (TX) Form.

4. Retain all completed NDI forms in the patient's file. **DO NOT SEND** the actual forms to Prism Health Networks, Inc. unless requested.

Remember: At least a **5-point change** is required to be clinically meaningful. Patients often do not score the items as zero, once they are in treatment. It is common to find that patients continue to score between 5 and 15 despite having made excellent recovery (e.g., they may be back to work). The practitioner should avoid the trap of "treating till zero" as this is not supportable based on current evidence.

**The obtained score can be multiplied by 2 to produce a percentage score.

Vernon H, Mior S. *The Neck Disability Index: A study of reliability and validity*. J Manipulative Physiol Ther 1991;14:409-415.

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