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Assessing Pain Pressure Thresholds In Tension and Slacked Neural Positions

Abstract

BACKGROUND: In physical therapy practice, painful response to palpation has been used as a diagnostic indicator to identify the underlying mechanisms of pain. Aninterplay of mechanical hyperalgesia and psychological mechanisms may lead to a reduced pain threshold with palpation. Mechanical hyperalgesia may result from an increased mechanosensitivity of nociceptive afferents and reduced inhibition from central pathways.[7] For those who associate pain with a negative emotional state, such as pain catastrophizing behaviors or kinesiophobia (fear of movement), psychological mechanisms can contribute to decreased pressure pain thresholds (PPTs).[7] Prior research has identified a pressure pain algometer to be a reliable, valid, and clinically feasible diagnostic tool for testing PPTs in patients with mechanical neck pain, even when administered by a novice clinician.[6,7] It has also been identified that pain catastrophizing behaviors may be correlated with lower PPTs.[7] Additionally, there is a gap in the research regarding the use of PPT testing to assist in differentiating the underlying pain mechanisms in individuals with neck and arm pain, specifically when differentiating neurogenic versus mechanical origin. The purpose of this study was to compare PPTs in the upper extremity in both the neural tension and neural slack positions in healthy pain-free subjects and in a population of subjects currently experiencing neck or arm pain. The primary hypothesis was that subjects would experience lower PPTs in the Upper Limb Neurodynamic Test Median Nerve position (ULNT 1) compared to the resting position. Additionally, it was hypothesized that patients who were experiencing pain, having catastrophization of their pain, or demonstrating kinesiophobia would demonstrate lower PPTs than those who do not.

METHODS: This observational cohort study included 15 subjects (7 male, 8 female) recruited from the Ithaca College community in compliance with Ithaca College Institutional Review Board. Seven subjects self-identified as having arm or neck pain,

with the remaining 8 subjects denying any pain. Subjects completed The Numeric Pain Rating Scale, Pain Catastrophizing Scale, and the Tampa Kinesiophobia Scale to gather information on pain perception related to pain catastrophization and kinesiophobia..Neural tension was determined by taking a goniometric measure of elbow flexion in the ULNT1 position at the point of discomfort as identified by the subject. PPT data was collected using a pressure pain algometer (Algomed Computerized Pressure Algometer,Medoc Ltd., Durham, NC), , at a pressure of thirty kPa[1] at seven different points along the neck and one upper extremity,[3, 5, 8] as well as a familiarization point at the tibialis anterior muscle belly[7] for all participants. PPT data was collected with the arm at rest, and again in the ULTN1 position.
ANOVA and ANCOVA analyses will be carried out on the data collected.to compare PPTs between healthy patients and those experiencing neck and arm pain, as well as comparing the results between the two positions of the arm, and levels of catastrophized pain and kinesiophobia.

RESULTS: At the time of abstract submission, data has been collected, but not yet analyzed. Expected results for this study are multidimensional. The researchers expect to see a negative correlation between psychological variables and pain thresholds. Lower PPTs are also expected in subjects who present with neck and arm pain as compared to healthy subjects. Points may be identified that are more sensitive in individuals that present specifically with neurogenic neck and arm pain. It is likely that the points that are most sensitive in individuals with neurogenic pain will be over nerve sites, as opposed to soft tissue and bony sites. These results could aid in differentiating between mechanical and neurogenic neck and arm pain diagnoses.

DISCUSSION AND CONCLUSION: This study aims to determine if the ULNT and PPTs are tools that could aide in diagnosing neurogenic neck and arm pain. There is insufficient information in the literature to guide clinicians when interpreting responses to palpation in positions that place stresses on nervous and soft tissues. Additionally, there is limited evidence investigating the effects of psychosocial factors on PPTs, such as kinesiophobia and pain catastrophization. This study will assist in improving understanding of PPTs in relation to the patient’s condition and ultimately improving diagnosis and outcome.

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