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# ASSOCIATION BETWEEN CERVICOCEPHALIC KINESTHETIC SENSIBILITY AND CHARACTERISTICS OF MECHANICAL NECK PAIN

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**Key Words:** Mechanical Neck Pain, Kinesthetic Sensibility, Neck Proprioception.

## ABSTRACT

**Background**: Dysfunction of neck kinesthetic sensibility characterized by increased movement irregularities and movement errors during reposition tasks has been shown in middle-aged subjects with chronic neck pain. However, pain can also induce changes in muscle spindle discharge or the central output of the nervous system. **Aim of study:** To determine a relationship between impaired cervicocephalic kinesthetic sensibility and mechanical neck pain characteristics.

**Procedures:** Sixty patients with mechanical neck pain repositioned their heads to the neutral head position a in sagittal and transverse plane. When the subjects reach the reference position, the subject's relocation accuracy was measured in degrees using the CROM device. The Northwick neck pain questionnaire (NPQ) has proved to be a useful tool in neck pain studies, correlating with objective measurements of neck pain characteristics. **Results**: there was positive significant correlation between NPQ score and flexion, rotation reposition error. **Conclusion**: Disturbed kinesthetic sensibility was correlated with changes in the mechanical neck pain characteristics.

## INTRODUCTION:

Neck pain is a musculoskeletal symptom associated with disability and significant economic health costs. Neck pain has been classified as 1 of the top 2 largest reasons for disability caused by musculoskeletal pain conditions by the Global Burden of Disease studies. It has been reported that 70% of the general population will experience neck pain at some time during their lives; however, the global point prevalence is 4.9%[1].

Neck pain shows a high rate of recurrence and chronicity. Three out of 10 neck pain patients will develop chronic symptoms that last more than 6 months whereas 34% will show symptoms for more than 12 months[2].

Some studies have demonstrated an association between range, velocity and smoothness of cervical motion and patients' subjective reports of pain intensity and disability, and also fear of neck motion[3].

Some investigators assume that proprioception deficit might be a factor predisposing to pain and injury via poor motor control. Understanding the proprioceptive function alterations in the presence of chronic neck pain (CNP) thus seems necessary for evaluation and rehabilitation of these patients[4].

Several authors have speculated that imprecision in the proprioceptive system could contribute to or cause persistent pain, via peripheral and central mechanisms[5].

An impaired position sense disturbs both neuronal and muscular control of the normal cervical joint function, which may result in the untimely production of unbalanced muscle force and place the joint at risk of trauma [6].

Dysfunction of kinesthetic sensibility characterized by increased movement irregularities and movement errors during reposition tasks has been shown in middle-aged subjects with chronic neck pain. However, pain can also induce changes in muscle spindle discharge or the central output of the nervous system[7].

Disturbed kinesthetic sensitivity has been implicated in the functional instability of joints and their susceptibility to reinjury, chronic pain, and even degenerative joint disease[8].

The relationship of pain and changes in motor control has been shown in several studies and is seen as protective reaction of the body to limit provocation of the painful area. This, in the long run, can cause further damage, exacerbate the symptoms through peripheral and central nervous system sensitization (lowering of pain threshold), and promote dysfunctional movement patterns [9].

An important function of the cervical spine is quick and precise head movement in reaction to surrounding stimuli. Consequently, research into impairments associated with altered cervical kinematics, such as velocity and accuracy of movement, in those with neck pain has been gaining attention[3].

This study was designed to correlate cervicocephalic kinesthetic sensibility and characteristics of mechanical neck pain.

**Procedures:**

**I. Patients selection:**

Correlational study conducted on sixty subjects with mechanical neck pain. The subjects were diagnosed, and referred from a neurologist. The patients were selected from helmya military hospital. Ethical committee approval was obtained from the ethical committee of the Faculty of Physical Therapy, Cairo University, Egypt

**Inclusion criteria include:** the patients had insidious neck pain for 3 months. Their age ranged from 18 to 30 years. Neck pain was the main presenting complaint and neck movements reproduced neck pain. Patients had sufficient cognitive abilities that enables them to understand and follow instructions (Mini-Mental State Examination (MMSE) scale >24).

**Exclusion Criteria include:** Pregnant females, patients with tumors (spinal tumors), spinal fracture, polyneuropathy, caudaequina syndrome and cord compression, previous spinal surgery, degenerative spondylolisthesis and medically or psychologically unstable patients.

**II. Instrumentations:**

1- Cervical Range of Motion device (CROM) as an objective assessment device for cervicocephalic kinesthetic sensibility:

The cervical range of motion (CROM) device figure (1) is one of the tools available clinically to measure cervical ROM. The CROM device consists of a plastic frame placed on the head over the nose and the ears, secured by a Velcro strap[10].The cervical range of motion (CROM) device measures cervical ROM for rotation, flexion/extension, and lateral flexion using 3 separate inclinometers attached to a frame similar to eyeglasses : the first inclinometer in the transverse plane for rotation, the second inclinometer in the sagittal plane for flexion/extension, and the third inclinometer in the frontal plane for lateral flexion. The rotation inclinometer has a magnetic needle, whereas the flexion/extension and the lateral flexion inclinometers have gravity needles. A magnetic necklace is worn by the subject to produce the magnetic field required to move the rotation inclinometer's needle when the head is rotated. A moveable ring on each inclinometer is used to set the zero position. Finally, all the inclinometers are marked in 2° increments[11].


**Figure (1): CROM device.**

**2- The Northwick Park Neck Pain Questionnaire as an assessment method of pain characteristics:**

Among the different questionnaires available for out Come measures, the Northwick neck pain questionnaire (NPQ) has proved to be a useful tool in neck pain studies, correlating with objective measurements[12].The NPQ is a self-administered questionnaire which includes 9 sections on daily activities that may be affected by neck pain: intensity, sleeping, numbness, duration, carrying, reading/television, work, social and driving. The NPQ had three items linked to body function categories and five items linked to activity and participation categories. Two items (item 4: 'Duration of symptoms' and item 10: 'Comparison of current state with the last time the questionnaire was completed') could not be linked to any ICF category[13].Among the different questionnaires available for outcome measures, the NPQ has proved to be a useful tool in neck pain studies, correlating with objective measurements [14]. It has been validated in patients with neck pain in several countries and languages, and also with acceptable test–retest reliability[15]. The Arabic version of NPQ is valid, reliable and appropriate for use in Arabic-speaking patients with physiological neck pain in Egypt. Thus, this tool will be invaluable to clinicians and researchers working with neck pain patients in Egypt[16].

**III. Assessment Protocol:**

Our participants underwent the following battery of evaluation:

**Clinical assessment** includes: full history taking, general medical examination and neurological evaluation and general neurological examination sheet **(Appendix I).** On approval to participate in the study, all subjects signed an informed consent form after receiving full information on the purpose of study, procedure, possible benefits, privacy and use of data, and their rights to withdraw from the study when even they want. All subjects were evaluated using the same procedures.

**A. Assessment of cervicocephalic kinesthetic sensibility using CROM:**

**Figure (2): Assessment of rotation and flexion repositioning error**

The subjects sit upright in a comfortable position and looked straight ahead (i.e., in neutral head position) and advised not to move their shoulders for the rest of the test. The CROM was placed on top of the head and was attached posteriorly using the Velcro strap. The magnetic part of the unit was then placed so that it would set squarely over the shoulders. The investigator calibrated the CROM device to a neutral head position. For the cervicocephalic kinesthetic sensibility tests, subjects were asked to keep their head in the neutral position and were told to close their eyes throughout the subsequent tests. The test was the head-to-neutral head position repositioning test [17]. The subjects were instructed to turn their head fully to the left and back to what they believed to be the starting point in a controlled fashion without opening their eyes. When the subjects reached the reference position, the subject's relocation accuracy was measured in degrees using the CROM device. The repositioning tests were done in the sagittal and transverse planes. When the subjects reached the reference position, their relocation accuracy was measured in degrees using the CROM device. Each test trial position was carried out three times, and the average of the three trials was used for analysis. Joint position sense (JPS) was analyzed by calculating the angular displacement error of active angle repositioning of cervical movement (the absolute value of the difference between the reference angle and subject's reposition angle).

**B. Evaluation of the characteristics of mechanical cervical pain using the Arabic version of the Northwick neck pain questionnaire (NPQ):**

The NPQ consisted of nine items including pain intensity, duration of symptoms, pins and needles or numbness at night, Pain affecting sleep, effect on social life, carrying, reading/watching television (TV), working/ housework, and driving [18]. For each item, there were five potential responses describing a greater degree of difficulty (0 = no difficulty to 4=severe difficulty). An overall percentage NDQ score was calculated by adding together the scores for each item (0–36) and calculating a percentage (total score/36 £ 100%). If items were not applicable, the total potential score was reduced (e.g. one item not applicable, total score out of 32). The NPQ had been validated in patients complaining of neck pain attending a rheumatology clinic in the United Kingdom (UK) where mean scores for each item were shown to correlate with intensity of pain[19].It had also been shown to have acceptable test–retest reliability [20]and sensitivity to change.

**Statistical Analysis**

Descriptive statistics in form of mean, standard deviation, minimum, maximum and frequency were conducted to present the measured variables. Pearson Correlation Coefficient was conducted to investigate the correlation between cervicocephalic kinesthetic sensibility (repositioning error) and NPQ. Guidelines for interpreting the correlation coefficient: 0 indicates no linear relationship. Values between 0 and 0.3 (0 and − 0.3) indicate a weak positive (negative) linear relationship. Values between 0.3 and 0.7 (-0.3 and -0.7) indicate a moderate positive (negative) linear relationship. Values between 0.7 and 1.0 (- 0.7 and -1.0) indicate a strong positive (negative) linear relationship. the level of significance for all statistical tests was set at $p < 0.05$. All statistical tests were performed through the statistical package for social studies (SPSS) version 22 for windows. (IBM SPSS, Chicago, IL, USA).

## RESULTS

**- General characteristics of the subjects:**

Sixty subjects with mechanical neck pain participated in this study. Their mean ± SD age, weight, height and BMI were 24.58 ± 3.12 years, 67.55 ± 5.56 kg, 165.66 ± 5.22 cm and 24.61 ± 1.73 kg/m² as shown in table 1 and figure 1-4.

**Table 1. Descriptive statistics for the age, weight, height and BMI of the study group.**

| | $\bar{X}$ ±SD | Maximum | Minimum |
|---|---|---|---|
| **Age (years)** | **24.58 ± 3.12** | **29** | **18** |
| **Weight (kg)** | **67.55 ± 5.56** | **80** | **57** |
| **Height (cm)** | **165.66 ± 5.22** | **177** | **157** |
| **BMI (kg/m²)** | **24.61 ± 1.73** | **27.54** | **20.08** |

**$\bar{X}$ : Mean SD: Standard Deviation**

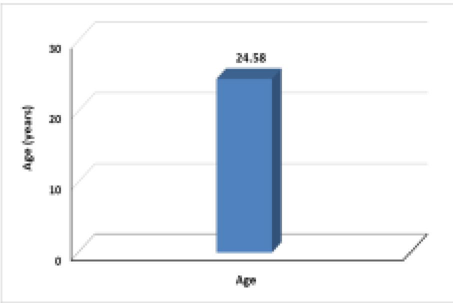


***Figure (1).* Mean age of the study group**

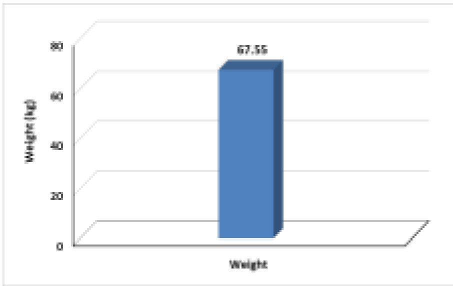


***Figure (2).*Mean weight of the study group.**

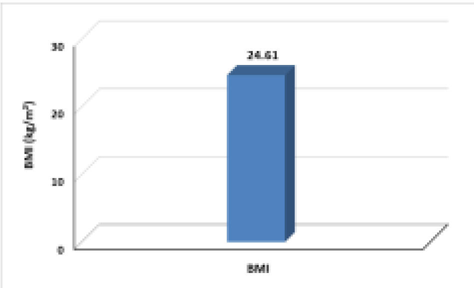


***Figure (3).* Mean height of the study group.**

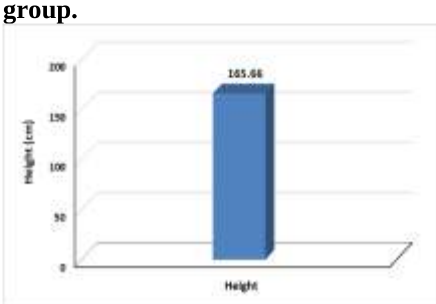


***Figure (4).* Mean BMI of the study group.**

**- Sex distribution:**

The sex distribution of the study group revealed that there were 13 females with reported percentage of 22% while the number of males was 47 with reported percentage of 78% as shown in table (2) and demonstrated in figure (5).

**Table 2. The frequency distribution of sex in the study group:**

| | Sex distribution | |
|---|---|---|
| | Females | Males |
| No. (%) | 13 (22%) | 47 (78%) |
| Total | 60 (100%) | |

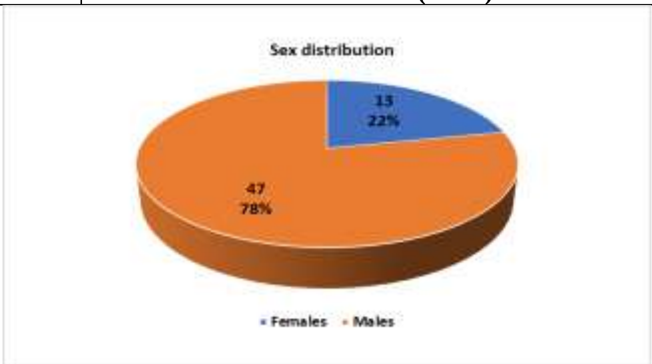


***Figure (5).*** **Sex distribution of the study group.**

**- Descriptive statistics of NPQ score of the study group:**

The mean ± SD NPQ score of the study group was 23.99 ± 9.92 with a minimum value of 9.37 and maximum value of 50 as shown in table 3 and figure 6.

**Table 3. Descriptive statistics of the NPQ score of the study group:**

| | $\bar{X}$ ±SD | Minimum | Maximum |
|---|---|---|---|
| NPQ score | 23.99 ± 9.92 | 9.37 | 50 |

$\bar{X}$ **: Mean** **SD: Standard Deviation**

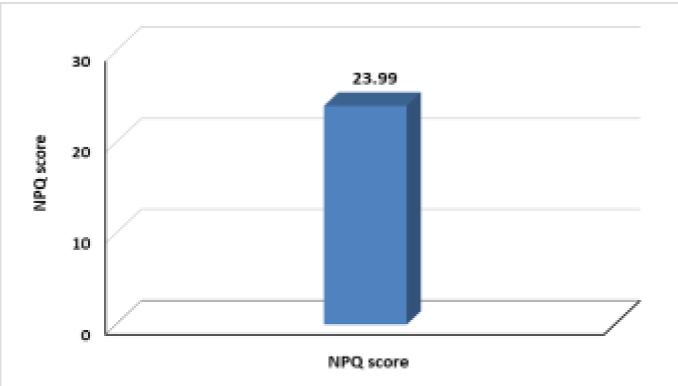


***Figure (6).*** **Mean NPQ score of the study group.**

**- Descriptive statistics of repositioning error in head to neutral position test:**

**Flexion reposition error**

The mean ± SD flexion reposition error of the study group was 2.61 ± 2.17 degrees with a minimum value of 0 degrees and maximum value of 11 degrees as shown in table 4 and figure 7.

**Extension reposition error**

The mean ± SD extension reposition error of the study group was 3.45 ± 1.97 degrees with a minimum value of 0 degrees and maximum value of 8 degrees as shown in table 4 and figure 7.

**Right rotation reposition error**

The mean ± SD right rotation reposition error of the study group was 2.45 ± 1.96 degrees with a minimum value of 0 degrees and maximum value of 9.3 degrees as shown in table 4 and figure 7.

**left rotation reposition error**

The mean ± SD left rotation reposition error of the study group was 3.16 ± 2.18 degrees with a minimum value of 0 degrees and maximum value of 10.6 degrees as shown in table 4 and figure 7.

**Table 4. Descriptive statistics of repositioning error in head to neutral position test:**

| Repositioning error (degrees) | $\bar{X}$ ±SD | Minimum | Maximum |
|---|---|---|---|
| Flexion | 2.61 ± 2.17 | 0 | 11 |
| Extension | 3.45 ± 1.97 | 0 | 8 |
| Right rotation | 2.45 ± 1.96 | 0 | 9.3 |
| Left rotation | 3.16 ± 2.18 | 0 | 10.6 |

$\bar{X}$ **: Mean** **SD: Standard Deviation**

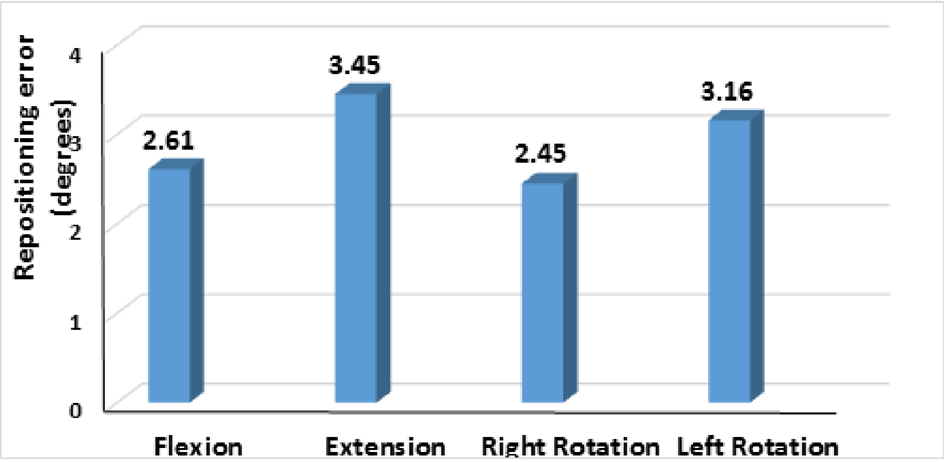


**Figure (7). Mean repositioning error in head to neutral position test of the study group.**

**I- Relationship between NPQ score and repositioning error in head to neutral position test of the study group:**

The correlation between NPQ score and flexion reposition error was moderate positive significant correlation (r = 0.511, p = 0.0001). (Table 6, figure 9).

The correlation between NPQ score and extension reposition error was weak negative non-significant correlation (r = -0.008, p = 0.95). (Table 6, figure 10).

The correlation between NPQ score and right rotation reposition error was moderate positive significant correlation (r = 0.330, p = 0.01). (Table 6, figure 13).

The correlation between NPQ score and left rotation reposition error was weak positive significant correlation (r = 0.274, p = 0.03). (Table 6, figure 14).

**Table 6. Correlation between NPQ score and repositioning error in head to neutral position test of the study group:**

| | Repositioning error (degrees) | r value | p value | Sig |
|---|---|---|---|---|
| NPQ score | Flexion | 0.511 | 0.0001 | S |
| | Extension | -0.008 | 0.95 | NS |
| | Right rotation | 0.330 | 0.01 | S |
| | Left rotation | 0.274 | 0.03 | S |

**r value: Pearson correlation coefficient** **p value: Probability value** **S: Significant** **NS: Non-significant**

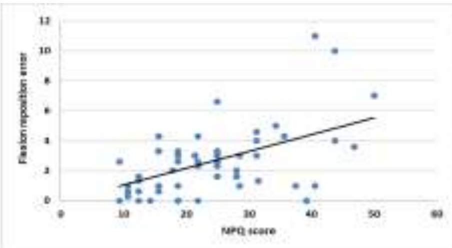


***Figure (9).*** **Correlation between NPQ score and flexion reposition error in head to neutral position.**

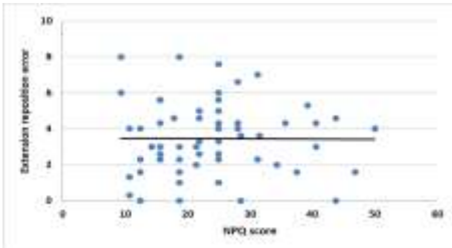


***Figure (10).*** **Correlation between NPQ score and extension reposition error in head to neutral position.**

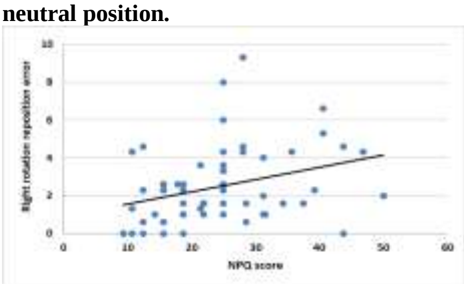


***Figure (13).*** **Correlation between NPQ score and right rotation reposition error in head to neutral position.**

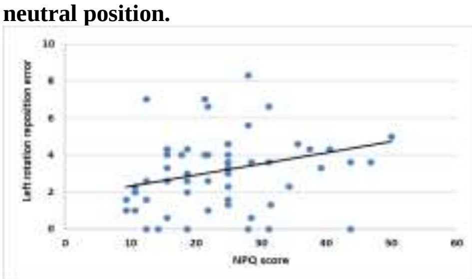


***Figure (14).*** **Correlation between NPQ score and left rotation reposition error in head to neutral position.**

# DISCUSSION:

The present study revealed that individuals with higher NPQ score could not reproduce the neutral head position (NHP) as accurately when repositioning their head. The results of the present work revealed that there was positive significant correlation between NPQ score and flexion, rotation repositioning to neutral and non-significant correlation between NPQ score and extension repositioning to neutral. Rix and Bagust found that people with chronic idiopathic neck pain were significantly worse than healthy controls when performing relocation to the neutral head position from flexion ($p<0.03$). There were no significant differences between groups ($p>0.05$) for relocation tasks from neck extension [21]. In the present work, measurement was limited to the age between 18 and 30-year-old to limit the impact of age on JPS, such that as age increases, joint position sense (JPS) reduces[22]. To measure cervical proprioception, this study implemented the active head repositioning to neutral position, which was previously used by several authors in clinical settings and was found to be a reliable method. The number of testing trials or movement repetitions in each direction was limited to three to minimize the effect of fatigue of cervical muscles on joint position error (JPE). Different authors recommended a greater number of trials in each testing direction to improve the reliability of position sense measurement, but increasing the number of repetitions could possibly lead to increased pain and fatigability, which might alter the test results of JPEs in subjects with mechanical neck pain. Recurrent episode of neck pain has reported to induce changes in the cervical mechanoreceptor function and to affect the muscle spindle sensitivity. A modified interpretation of neck proprioceptive signals in the center nervous system could also result in an offset in the egocentric reference frame and interfere with the central control over the activation of muscles. Accordingly, the diminished mechanoreceptor and muscle spindle function, and the central misinterpretation of the proprioceptive inputs could lead to the loss of cervicocephalic kinesthetic acuity[7].Arimi found no association between cervical JPE and flexor muscle size and endurance. The most direct conclusion on this finding might be that the proprioceptive functioning of the cervical muscles, believed to be the most important proprioceptive afferent source of the neck, performs independently from its structure and force-generating capabilities. Spinal or supraspinal mechanisms had been proposed to be involved in proprioceptive impairment in idiopathic CNP , which explains the lack of relationship between muscle structure and proprioceptive functioning.[23]. Previous laboratory studies had provided compelling evidence that pain is capable of inducing changes in muscle spindle discharge and the proprioceptive properties of brainstem neurons. Disturbance of the proprioceptive system has been shown to interfere with motor control and it has been suggested that aberrant motor control might expose the spinal components to abnormal and repetitive strain Numerous authors had also reported an altered pattern of motor control in patients with neck pain; However, given the cross-sectional nature of our study, it cannot be determined whether the decrease observed in cervicocephalic kinesthetic sensibility is a cause or result associated with changes in neck pain characteristics. It is possible that neck pain and proprioceptive deficiency may both sustain and perpetuate one another.

## APPENDX 1

### NEUROLOGICAL EXAMINATION CHECKLIST

(Sheet 1 of 2)

(See text of Appendix 5A for examination procedures and definitions of terms.)

Patient's Name: ______________ Date/Time: ______________

Describe pain/numbness: ______________

**HISTORY**

Type of dive last performed: ________ Depth: ________ How long: ________

Number of dives in last 24 hours: ______________

Was symptom noticed before, during or after the dive? ______________

If during, was it while descending, on the bottom or ascending? ______________

Has symptom increased or decreased since it was first noticed? ______________

Have any other symptoms occurred since the first one was noticed? ______________

Describe: ______________

Has patient ever had a similar symptom before? ________ When: ________

Has patient ever had decompression sickness or an air embolism before? ____ When: ________

### MENTAL STATUS/STATE OF CONSCIOUSNESS

**COORDINATION**

Walk: _____
Heel-to-Toe: _____
Romberg: _____
Finger-to-Nose: _____
Heel Shin Slide: _____
Rapid Movement: _____

**CRANIAL NERVES**

Sense of Smell (I): _____
Vision/Visual Fld (II): _____
Eye Movements, Pupils (III, IV, VI): _____
Facial Sensation, Chewing (V): _____
Facial Expression Muscles (VII): _____
Hearing (VIII): _____
Upper Mouth, Throat Sensation (IX): _____
Gag & Voice (X): _____
Shoulder Shrug (XI): _____
Tongue (XII): _____

**STRENGTH** (Grade 0 to 5)

**Upper Body**

Deltoids L _____ R _____
Latissimus L _____ R _____
Biceps L _____ R _____
Triceps L _____ R _____
Forearms L _____ R _____
Hands L _____ R _____

**Lower Body**

**Hips**
Flexion L _____ R _____
Extension L _____ R _____
Abduction L _____ R _____
Adduction L _____ R _____

**Knees**
Flexion L _____ R _____
Extension L _____ R _____

## APPENDX II

استبيان (نورثويك بارك) لألم الرقبة

التاريخ: التوقيع: الاسم:

الرجاء قراءة ما يلي: قد تم تصميم هذا الاستبيان للحصول على معلومات عن مدى تأثر اعمال الحياة اليومية بألم الرقبة . من فضلك أجب عن كل سؤال بعلامة واحدة فقط توضع في المربع بما يناسب حالتك. نحن ندرك انه قد يتبين تناسب اجابتين لك فى قسم واحد ولكن يرجى وضع علامة واحدة تكون الاقرب لوصف مشكلتك.

قسم 1: شدة الألم بالرقبة

أ - ليس لدي أي ألم في هذه اللحظة
ب - ألمي خفيف جدا في هذه اللحظة
ت - ألمي متوسط في هذه اللحظة
ث - ألمي شديد في هذااللحظة
ج - ألمي الاسوء على الاطلاق في هذه اللحظة

قسم 2: ألم الرقبة أثناء النوم

أ - لا يؤثر الالم على نومي اطلاقا
ب - الالم يؤدي الى اضطراب نومى أحيانا
ت - الالم يؤثر على نومى بشكل منتظم
ث - الالم جعل نومى اقل من 5 ساعات
ج - الالم جعل نومى اقل من ساعتين

قسم 3 : الوخز و الخدر فى الذراعين ليلا

أ - ليس لدي وخز او خدر في الليل
ب - لدي وخز او خدر بشكل غير مستمر في الليل
ت - الوخز او الخدر يؤثر على نومي بشكل منتظم
ث - الوخز او الخدر جعل نومى اقل من 5 ساعات
ج - الوخز او الخدر جعل نومى اقل من ساعتين

قسم 4 : مدة الأعراض

أ - لدي شعور طبيعي في رقبتي و ذراعايا طوال اليوم
ب - لدي أعراض في رقبتي أو ذراعي اثناء المشي ، و تستمر الأعراض أقل من ساعة
ت - الأعراض موجودة تظهر و تختفي من ساعة الى اربع ساعات
ث - الأعراض موجودة تظهر و تختفي لفترة تزيد على اربع ساعات
ج - الأعراض موجودة بشكل مستمر طوال اليوم

قسم 5 : حمل الأشياء

أ - أستطيع ان احمل أشياء ثقيلة دون ألم إضافي
ب - أستطيع أن احمل أشياء ثقيلة، لكنها تسبب لي ألما إضافيا
ت - الألم يمنعني من حمل الأشياء الثقيلة، ولكن أستطيع ان احمل الاشياء متوسطة الوزن
ث - أستطيع أن أرفع الأجسام خفيفة الوزن فقط
ج - لاأستطيع رفع أي شيء على الإطلاق

قسم 6 : قراءة و مشاهدة التليفزيون

أ - أستطيع القيام بذلك متى أريد بدون مشاكل
ب - أستطيع القيام بذلك متى أريد بشرط أن أكون في وضع مناسب
ت - أستطيع القيام بذلك متى أريد ، ولكن ذلك يسبب لي ألما إضافيا

ث - الألم يسبب لي التوقف عن القيام بذلك سريعا
ج - الألم يمنعني من القيام بذلك على الإطلاق

قسم 7 : العمل / الأعمال المنزلية، الخ.

أ - أستطيع القيام بأعمالي المعتادة دون ألم إضافي
ب - أستطيع القيام بأعمالي المعتادة، ولكن ذلك يسبب لي ألما إضافيا
ت - الألم يمنعني من القيام بأعمالي المعتادة فلا اعمل الا نصف الوقت المعتاد

ث - الألم يمنعني من القيام بأعمالي المعتادة فلا اعمل الا ربع الوقت المعتاد
ج - الألم يمنعني من العمل إطلاقا

قسم 8 : أنشطة اجتماعية

أ - حياتي الاجتماعية طبيعية ولا تسبب لي أي ألم إضافي
ب - حياتي الاجتماعية طبيعية و لكن تزيد من درجة الألم
ت - قيد الألم حياتي الاجتماعية، ولكن مازلت قادرا على الخروج
ث - قيد الألم حياتي الاجتماعية فى المنزل
ج - ليس لدي حياة اجتماعية بسبب الألم

قسم 9 : القيادة (إن وجدت)

أ - أستطيع القيادة كلما لزم الأمر بدون مشقة
ب - أستطيع القيادة كلما لزم الأمر، ولكن بمشقة
ت - ألم الرقبة او تصلبها يمنعان القيادة في بعض الأحيان
ث - ألام او تصلب الرقبة يعيق قدرتى على القيادة في كثير من الاحيان
ج - لا أستطيع القيادة على الإطلاق بسبب أعراض الرقبة

قسم 10: مقارنة بآخر مرة أجبت على هذاالسؤال، هل الم الرقبة الخاص بك

أ - أفضل بكثير
ب - أفضل قليلا
ت - نفس الشيء
ث - أسوأ قليلا
ج - أسوأ بكثير

## CONCLUSION:

The present study has provided further evidence that impairments of cervicocephalic kinesthetic sensibility is associated with higher scores of Northwick neck pain questionnaire. Future research should consider the effects of proprioceptive training in the management of mechanical neck pain.

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## العلاقة بين الإحساس الحركي للرقبة وخصائص آلام الرقبة الميكانيكية

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**المقدمة:** – خلل الحساسية الحركية للرقبة يتميز بزيادة عدم انتظام الحركة وأخطاء الحركة أثناء مهام إعادة الوضع وقد ظهر في الأشخاص في منتصف العمر الذين يعانون من آلام الرقبة المزمنة. **الهدف من الدراسة** :لتحديد العلاقة بين ضعف الحساسية الحركية للرقبة وخصائص آلام الرقبة الميكانيكية. **الطرق:** أجريت هذه الدراسة على ستين شخص يعانون من آلام الرقبة الميكانيكية بإعادة وضع رؤوسهم إلى وضع الرأس المحايد في المستوى السهمي والعرضي.

عندما تصل وضع الراس إلى الموضع المرجعي، تم قياس دقة وضع الراس بالدرجات باستخدام جهاز CROM.أثبت استبيان نورثويك لألم الرقبة أنه أداة مفيدة في دراسات آلام الرقبة، حيث يرتبط بالقياسات الموضوعية لخصائص آلام الرقبة. **النتائج:** أظهرت النتائج ما يلي: – توجد علاقة ارتباط موجبة معنوية بين درجة استبيان نورثويك وخطأ الانثناء، وبين درجة استبيان نورثويك وخطأ تغيير موضع الدوران. **الخلاصة:** ان الحساسية الحركية المضطربة للرقبة مرتبطة بتغير خصائص آلام الرقبة الميكانيكية.

**الكلمات الرئيسية:** آلام الرقبة الميكانيكية، الحساسية الحركية للرقبة