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The Relationship between Age, Gender and Core Stability in Cervicogenic Headache

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Abstract

Background: Cervicogenic headache is a secondary headache. It originates from the cervical spine and is typically chronic in nature. The deep cervical flexors muscles especially longus colli and longus capitis are more affected with this type of headache.

Aim of Study: To investigate if neck core stability in cervicogenic headache patients is related to a specific age and gender.

Methods: Sixty subjects diagnosed as cervicogenic headache of both genders participated in this study. Their ages ranged from 20 to 49 years. Pressure biofeedback unit was used for assessment of neck muscles core strength. The correlation between gender and neck muscles core strength was tested using Pearson-chi square; while the correlation between age and neck muscles core strength was tested using two-tailed Pearson correlation test.

Results: There was no statistical significant correlation between gender (p-value: .937), age (p-value: .438) and neck muscles core strength.

Conclusion: The weakness of the deep cervical flexors muscles in cervicogenic headache patients doesn't belong to a specific age or gender.

Key Words: *Cervicogenic headache – Deep cervical flexors – Neck core strength – Neck disability.*

Introduction

AMONGST all the headache patients, 15-20% suffer from cervicogenic headache and show similar symptoms as migraine and tension type headache [1]. But it is distinctive from other headaches as it originates from musculoskeletal problem in the area corresponding to the side of head where headache developed [2]. Poor posture has a leading role causing cervicogenic headache [3,4].

Common clinical characteristics of cervicogenic headache include unilateral headache without signs of side shift (pain consistently on the same side of the head); pain that is exacerbated with neck movements or abnormal postures; pain produced with pressure applied over the supero-posterior ipsilateral neck; ipsilateral neck, shoulder, or arm pain; and restricted cervical spine range of motion [5].

Cervicogenic headache patients generally have forward neck posture and deep cervical muscle weakening has high correlation from cranio-cervical joint analysis and muscular strength measurement studies [6,7]. Such state of cervical muscle increases stiffness and fatigue [8], and induces discomfort such as headache and cervical pain [9].

In addition, there is possible weakness or inhibition of deep neck flexors in cervicogenic headache and inappropriate coordination between different layers. This impairment may tend to disturbed neuromuscular control and decreased muscles endurance in cervicogenic headache patients [10].

Decreased muscle strength and endurance [11], as well as atrophy of the neck muscles were reported in patients with neck pain [12]. Three studies have shown that muscles changes can be reliably visualized in healthy subjects and patients suffering from different musculoskeletal disorders using ultrasound [13-15]. In studies conducted on cervical muscles, some reported muscle atrophy [12,15] and some other demonstrated decreased muscle strength and endurance in patients with neck pain [11].

A study indicated that the deep cervical flexors muscles including longus colli muscle, longus capitis, rectus capitis inferior and rectus capitis lateralis have major roles in maintaining cervical lordosis and providing cervical joint stabilization

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[16]. The dysfunction of deep cervical flexors muscles including lack of strength and endurance has been demonstrated in patients with chronic neck pain [17]. In addition, patients with idiopathic neck pain and those with whiplash injury have revealed significantly lower muscle performance in the craniocervical flexion test [18].

Patients and Methods

Patients:

Sixty patients referred by orthopedic surgeons diagnosed as cervicogenic headache participated in this study. Their ages ranged from 20 to 49 years. The inclusion criteria were: Positive cervical flexion rotation test [19], also; at least one of the followings: Unilaterality/unilateral preponderance of pain; non-symptomatic side co-involvement during intense headache was allowed [21], precipitation of attacks/exacerbations from sensitive spots in the neck, i.e. groove behind the mastoid processor tendon insertions in the occiput [21], precipitation of attacks/exacerbations by awkward positions of the neck [21].

Exclusion criteria:

A history of any of the following conditions:

1- History of previous surgery regarding the cervical spine.

2- History of vertebral fractures regarding the cervical spine or the skull.

3- History of any vertebral infectious disease.

This study was conducted at Tanan Family Medical Hospital, Qalyubia, Egypt. The study extended from August 2017 to March 2018.

Procedures:

1- Each subject was examined by the researcher for the inclusive and exclusive criteria. The neck muscles core strength was measured using the pressure biofeedback unit.

2- The neck muscles core strength was measured using the pressure biofeedback unit Fig. (1). The cranio cervical flexion test was performed with the patient in supine crook lying with the neck in a neutral position (no pillow) such that the line of the face was horizontal and a line bisecting the neck longitudinally was horizontal to the testing surface Fig. (1). The uninflated pressure sensor was placed behind the neck so that it abuts the occiput and was inflated to a stable baseline pressure of 20mmHg, a standard pressure sufficient to fill the space between the testing surface and the neck but not push the neck into a lordosis. The device provided the feedback and direction to the patient to perform the required five stages of the test. The patient was instructed that the test is not one of strength but rather one of precision [20].

3- The movement was performed gently and slowly as a head nodding action (as if saying "yes"). The Cranio cervical flexion test tests the activation and endurance of the deep cervical flexors in progressive inner range positions as the patient attempted to sequentially target five, 2mmHg progressive pressure increases from the baseline of 20mmHg to a maximum of 30mmHg as well as to maintain a isometric contraction at the progressive pressures as an endurance task. Performance was scored via the pressure level that the patient was able to achieve (activation score) and hold for 10 repetitions of 10-second duration [20].

Fig. (1): The craniocervical flexion test.

Results

Sixty patients participated in this study. For statistical analysis, there were divided into group I=30 males and group II=30 females. The mean neck core stability for group I was (23.87 ±2.097), for group II was (24.07±2.318) and for both groups together was (23.97±2.194). Table (1), Fig. (2).

Un-paired *t*-test was used to compare between the two groups. The results revealed that there was no statistical significant difference between males and females considering the neck core strength. *p*-value was .7 and *t*-value was 0.381. Table (1).

The correlation between gender and neck core strength was tested using the Pearson chi-square test. The *p*-value for all sixty patients was .937, which indicated that there is no significant correlation between gender and core strength. Table (1).

Sixty patients participated in this study. For statistical analysis, there were divided into group I=20 patients, group II=21 patients and group III=19 patients. The mean neck core stability for group I was (23.9±2.38), for group II was (24.28 ±2.31), for group III was=(23.68±2.91) and for all 3 groups together was (23.97±2. 194). Table (2), Fig. (3).

One-way ANOVA test was used to compare between the three groups. The results revealed that there was no statistical significant difference between the three groups considering the neck core strength. F-value was .38 and p-value was 0.69. Table (2).

The correlation between age and neck core strength was .438 which indicates that there was no significant correlation between age and neck core strength and the strength of this correlation was weak and in the negative direction (–0.102). Table (2).

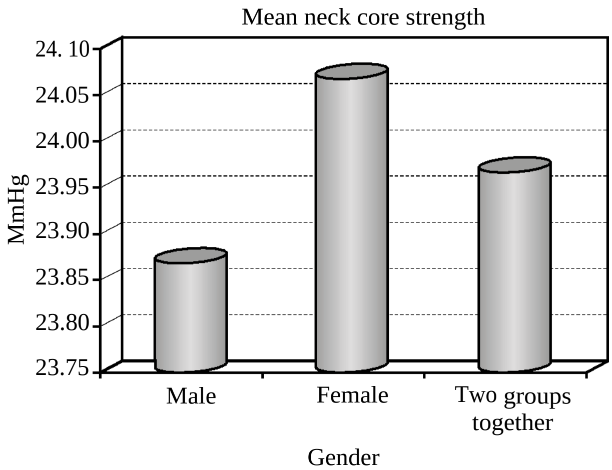

Fig. (2): Mean neck muscles core strength in relation to gender.

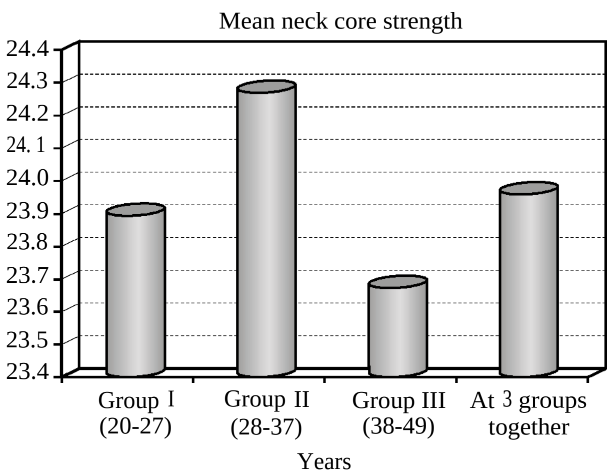

Fig. (3): Mean neck muscles core strength in relation to age.

Table (1): Correlation of gender and neck muscles core strength.

Gender	G.I (Male) n=30	G.II (Female) n=30	Total n=60
Neck core strength:			
Mean ± SD	23.87±2.097	24.07±2.318	23.97±2.194
Min-max	22-28	22-28	22-28
t-test			0.381
p-value			0.7
Chi square test			.130a
p-value			0.937

Table (2): Correlation of age and neck muscles core strength.

Age (years)	G.I (20-27) n=20	G.II (28-37) n=21	G.II (38-49) n=19	Total n=60
Neck core strength:				
• Mean ± SD	23.9±2.38	24.28±2.31	23.68±1.92	23.97±2.194
• Min-max	22-28	22-28	22-28	22-28
• F-value				0.38
• p-value				0.69
• Pearson two-tailed test				–0.102
• p-value				0.438

Discussion

The purpose of this study was to investigate if neck core stability in cervicogenic headache patients; related to a specific age or gender.

The correlation between gender and neck core strength was tested using the Pearson chi-square test. The p-value for all sixty patients was .937, which indicated that there is no significant correlation between gender and core strength.

The correlation between age and neck core strength was .438 which indicates that there was no significant correlation between age and neck core strength and the strength of this correlation was weak and in the negative direction (–0.102).

The findings of present study have been supported by the work of Seung et al., (2018) **[22]** who found the characteristics of cervicogenic headache in ages ranging from 20 to 42 years old with no significance dominance of one gender on another.

Also, the findings of present study have been supported by the work of Walmsley et al., (1996) **[23]**; Dvorak and Jiri (1998) **[24]**; Castro et al., (2000) **[25]** who found that age did not significantly influence mobility during the flexion rotation test. One explanation for this is that the upper cervical spine undergoes minimal age-related degenerative changes, in comparison to joints lower in the cervical spine. As the flexion rotation test is purported to measure C1/2 mobility, age-related degenerative changes in the lower cervical spine should not influence the mobility during this movement [26].

Results of the present study disagree with that of Sjaastad and Bakketeig (2008) [21] who found that there was male predominance following the criteria of the cervicogenic headache international study group criteria.

In constant, Nilson (1995) [27] found that there was female predominance following the criteria of the international headache society that disagree with the current study.

Conclusion:

The neck muscles core strength in cervicogenic headache patients does not follow a specific gender or age cluster.

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العلاقة بين العمر، النوع والثبات الآساسى فى الصداع عنقى المنشآ

الهدف: الهدف من هذه الورقة البحثية هو البحث عما إذا كان هناك إرتباط بين الثبات الآساسى لعضلات الرقبة فى حالات الصداع عنقى المنشاَ وبين فئة عمرية آو نوع معين؟

الآشخاص والآدوات: شارك فى هذه الدراسة ستون شخصا تم تشخيص إصابتهم بالصداع العنقى المنشاَ من كلا الجنسين. تراوحت آعمارهم بين ٢٠ و ٤٠ سنة. تم إستخدام وحدة الضغط المرجعية لتقييم القوة الآساسية لعضلات الرقبة. تم إختبار العلاقة بين النوع والقوة الآساسية لعضلات الرقبة بإستخدام إختبار مربع كاى لبيرسون. فى حين تم إختبار العلاقة بين العمر والقوة الآساسية لعضلات الرقبة بإستخدام إختبار إرتباط بيرسون ثنائى الذيل.

النتيجة: لم يكن هناك إرتباط معنوى إحصائى بين النوع (*p*-value: .937) والعمر (*p*-value: .438) والقوة الآساسية لعضلات الرقبة.

الإستنتاج النهائى: إن ضعف عضلات الرقبة العميقة القابضة فى حالات الصداع العنقى المنشاَ لا ينتمى إلى عمر آو جنس محدد.