



## Relationship between cutaneous allodynia, cervical muscle strength and endurance in women with migraine

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### Introduction

Migraine is a primary headache disorder with generalized neuronal hyperexcitability. Migraine individuals have a high prevalence of cutaneous allodynia, neck pain, and reduced cervical isometric strength. Lower isometric strength is also known to correlate with greater severity of cutaneous allodynia. However, the correlation between cervical muscle endurance and cutaneous allodynia is not yet known.

### Objective

To evaluate the correlation between cervical muscle strength and endurance with cutaneous allodynia in migraine women.

### Methods

Seventy migraine women were recruited by local community advertisements. Were included women aged between 18 and 55 years and migraine diagnosis. An experienced neurologist diagnosed potential participants with migraine according to the third edition of the International Classification of Headache Disorders (ICHD-3). Participants were excluded if they underwent an anesthetic nerve block; presented with any other concomitant headache, such as cervicogenic or tension-type headache, degenerative cervical conditions, or history of trauma at the neck and face, or pregnancy.

The Multi Cervical Rehabilitation Unit (MCU) was used to assess cervical isometric muscle strength and cervical muscle endurance. The assessment of cervical isometric strength was obtained through three repetitions of the movement in flexion, extension, and lateral flexion. The endurance of cervical flexors and extensors muscles was obtained using 50% of the maximum voluntary isometric contraction. The MCU is a device with excellent reliability (ICC 0.92–0.99) for assessing cervical muscle strength and endurance.

Cutaneous allodynia was evaluated using the Allodynia Symptom Checklist (ASC-12), a reliable, quick, and simple tool with excellent psychometric properties, compound of 12 questions that allows to classify the severity of cutaneous allodynia. The questionnaire was validated for the Portuguese language and it is able to diagnose and classify allodynia in the Brazilian population, in order to facilitate the identification of symptoms in a reliable and fast manner (ASC-12). For data analysis, Spearman's correlation coefficient ( $\rho$ ) was calculated, and the correlation was classified as weak ( $\rho < 0.30$ ), moderate ( $\rho$  between 0.30 to 0.70), and strong ( $\rho > 0.70$ ). This study was approved by local research ethics (process 10100/2017).

### Results

A moderate and significant negative correlation was demonstrated between muscle strength in flexion ( $\rho = 0.30$ ;  $p = 0.01$ ), extension ( $\rho = -0.33$ ;  $p = 0.005$ ) and left lateral flexion ( $\rho = -0.34$ ;  $p = 0.004$ ) with cutaneous allodynia. For muscle strength and allodynia, we found a weak positive correlation for cervical extensors ( $\rho = 0.29$ ;  $p = 0.02$ ).

### Conclusion

Our results showed that higher severity of cutaneous allodynia is related to lower strength to flexion, extension, and left lateral flexion in migraine patients. However, the severity of allodynia does not related to the worse cervical muscle endurance.

**Keywords:** Headache, Fatigue, Cervical spine, Migraine disorders.