

Association Between Trapezius Muscle Tenderness and Tension-Type Headache in Female Office Workers: A Cross-sectional Study

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ABSTRACT

Objective: The purpose of the study was to determine the association between trapezius muscle tenderness and tension-type headache among female office workers.

Methods: Through a questionnaire survey, 256 female office workers with tension-type headaches reported the level of palpable tenderness (“no,” “some,” or “severe tenderness”) in the trapezius muscle. The number of days with headache (“0-7,” “8-14,” or “>14”), intensity (“low,” “moderate,” or “high”), duration of headache (“<8 hours per day,” “>8 hours per day,” and “all day”), and use of analgesic medications were reported. Odds ratio (OR) for tenderness in the trapezius muscle (“no/some” vs “severe tenderness”) as a function of days with headache, intensity of headache, duration of headache, and use of analgesic medications were calculated using a binary logistic regression controlling for age and body mass index.

Results: After adjustments for confounders, a strong association was found between the level of trapezius muscle tenderness and intensity of headache (moderate intensity, OR 2.45; 95% confidence interval [CI] 1.08-5.54; high intensity, OR 7.51 [95% CI 2.65-21.29]) and days with headache (>14 days, OR 4.75 [95% CI 1.41-15.89]). No association was observed for duration of headache or use of analgesic medications.

Conclusions: For the participants studied, there was a strong association between trapezius muscle tenderness and the level of intensity and the number of days with a headache among female office workers. No association was seen for duration of headaches or use of analgesic medications. (*J Manipulative Physiol Ther* 2018;xx:1-5)

Key Indexing Terms: *Headache; Neck Pain; Shoulder Pain; Musculoskeletal Pain*

INTRODUCTION

Tenderness and pain in the neck and shoulder muscles are common problems among people who have a sedentary

work life with extensive computer work,¹⁻⁴ and a link between computer work and development of muscular pain in these muscles has been suggested.^{5,6} Prior research has shown that pain in the neck and shoulder muscles is strongly correlated with clinically verified muscle tenderness.⁷ Particularly, tenderness in the trapezius muscle regularly occurs in conjunction with neck and shoulder pain,⁸ with 1 of the consequences being headaches.⁹

A tension-type headache (TTH) is the predominant type of headache and affects up to almost 80% of the general population and has a major socioeconomic impact.¹⁰⁻¹² In addition, many white collar workers have TTH.¹³ Although multiple factors are linked to TTH, myofascial tissues are considered to be 1 of the most important places of origin.¹⁴ Thus, a possible association between muscular tenderness and TTH may exist.^{15,16} Previous studies have shown that it is possible to induce TTH by inflicting pain on the trapezius muscle.^{17,18} Our laboratory has previously shown an association between pain in the neck and shoulder muscles and muscular tenderness among female office workers, where high levels of muscular pain were associated with high

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tenderness.¹⁹ Thus, it can be hypothesized that there would also be a strong association between trapezius muscle tenderness and TTH.

However, the relative importance for muscle tenderness on frequency, intensity, and duration of TTH remains debated because previous studies have shown conflicting results. Studies have demonstrated an increased muscular tenderness in the pericranial region in people with TTH²⁰ and that the level of tenderness is associated with both the frequency and intensity of TTH.²¹ However, a range of studies has found no association between muscular tenderness in the pericranial region and frequency, intensity, or duration of TTH.²²⁻²⁴

Therefore, the aim of this study is to determine if associations between TTH and tenderness in trapezius muscles in female office workers exists. The main hypothesis of the study was that a higher number of days with headache, prolonged daily duration of headache, and higher intensity of headache would be associated with trapezius muscle tenderness.

METHODS

Design and Participants

This study was registered with the Danish Data Protection Agency (journal number 2009-54-0737), according to Danish law (Act on Research Ethics Review of Health Research Projects, Section 14 [2]). The provision of information about the survey and its purpose, as well as the voluntary completion and return of the survey by participants constituted implied consent. All data were deidentified and analyzed anonymously. The study conformed to the Declaration of Helsinki. The survey was conducted in June 2009 among the female employees at 2 large office workplaces in Copenhagen, Denmark. A total of 1094 individuals were invited to answer the survey questionnaire, which concerned health and working conditions, and 653 replied, which corresponds to a response rate of 59.7%. Individuals with no headache, unknown headache, or migraine headache were excluded. From this sample, only females with TTH were included in the analysis, resulting in a total study population of 256.

Questionnaire

The participants were told to rate the tenderness of the neck and shoulder muscles in their dominant arm using manual palpation. The participants were provided with a picture showing the targeted muscle area and were instructed to lightly squeeze the muscle using the opposite hand. The tenderness was rated on a scale of “no tenderness,” “some tenderness,” and “severe tenderness.” The question about self-palpation of trapezius muscle tenderness had previously been validated in relation to pain intensity.¹⁹ The participants reported the number of days with a headache within the last month, using 3 response

Table 1. Demographics and Trapezius Muscle Tenderness in the Study Population of Female Workers With Tension-Type Headache (*n* = 256)

	Mean	SD	Percentage
Age	41.8	11.7	
BMI	23.9	4.5	
Trapezius muscle tenderness			
No			7.8
Some			61.7
Severe			30.5

BMI, body mass index; SD, standard deviation.

categories: “0 to 7 days,” “8 to 14 days,” and “more than 14 days.” Further, the participants reported the typical duration of headache per day within the last month using 3 response categories: “less than 8 hours,” “more than 8 hours,” and “all day.” Intensity of headache was determined using a scale from 0 (no pain at all) to 10 (worst pain imaginable). A score between 0 to 3, 4 to 6, and 7 to 10 were respectively categorized as low intensity, moderate intensity, and high intensity. Participants were asked to identify if they used analgesic medications targeted headaches. The headache questions have been developed and used in a training intervention study in collaboration with an expert (Professor Rigmor Jensen) in the field of headache diagnosis and rehabilitation.²⁵

Statistics

All statistical analyses were performed in SAS version 9.2 (SAS Institute Inc, Cary, North Carolina). A binary logistic regression reporting the odds ratio for tenderness in the trapezius muscle (dichotomized to no or some tenderness vs severe tenderness) as a function of days with headache, intensity of headache, duration of headache, and use of analgesic medications targeted to headaches was performed and controlled for age and body mass index. All of these variables were included in the same statistical model, for example, intensity of headache was controlled for days with headache and vice versa. Odds ratio, as well as 95% confidence intervals, were calculated with tenderness being the dependent variable. According to the definition of Chen et al, an odds ratio of 1.68, 3.47, and 6.71 would be defined as a weak, moderate, and strong association, respectively.²⁶

RESULTS

Table 1 shows that the study population of female workers with TTH were, on average, 42 years old and had a normal body mass index. More than 92% experienced

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