

# RECURRENT NECK PAIN AND HEADACHES IN PREADOLESCENTS ASSOCIATED WITH MECHANICAL DYSFUNCTION OF THE CERVICAL SPINE: A CROSS-SECTIONAL OBSERVATIONAL STUDY WITH 131 STUDENTS

Sue A. Weber Hellstenius, DC, MSc

## ABSTRACT

**Objective:** To identify if there were differences in the cervical biomechanics in preadolescents who had recurrent neck pain and/or headaches and those who did not.

**Methods:** A controlled comparison study with a convenience sample of 131 students (10-13 years old) was performed. A questionnaire placed students in the no pain group or in the neck pain/headache group. A physical examination was performed by a doctor of chiropractic to establish head posture, active cervical rotation, passive cervical joint functioning, and muscle impairment. The unpaired *t* test and the  $\chi^2$  test were used to test for differences between the 2 groups, and data were analyzed using SPSS 15 (SPSS Inc, Chicago, Ill).

**Results:** Forty percent of the children (*n* = 52) reported neck pain and/or recurrent headache. Neck pain and/or headache were not associated with forward head posture, impaired functioning in cervical paraspinal muscles, and joint dysfunction in the upper and middle cervical spine in these subjects. However, joint dysfunction in the lower cervical spine was significantly associated with neck pain and/or headache in these preadolescents. Most of the students had nonsymptomatic biomechanical dysfunction of the upper cervical spine. There was a wide variation between parental report and the child's self-report of trauma history and neck pain and/or headache prevalence.

**Conclusion:** In this study, the physical examination findings between preadolescents with neck pain and/or headaches and those who were symptom free differed significantly in one of the parameters measured. Cervical joint dysfunction was a significant finding among those preadolescents complaining of neck pain and/or headache as compared to those who did not. (*J Manipulative Physiol Ther* 2009;32:625-634)

**Key Indexing Terms:** Neck Pain; Headache; Child; Cervical Vertebrae; Chiropractic

Recurrent neck pain and headaches are among the most commonly occurring pain syndromes in childhood.<sup>1-4</sup> This is a concern because there has been an increase in prevalence of both neck pain and/or headaches in childhood and because these pain syndromes more often become chronic in adolescence as well as in adulthood.<sup>4-7</sup> Neck pain and/or headaches are a significant cause of morbidity in children both in terms of personal

suffering and the negative impact on participation in daily activities.<sup>8-10</sup> There are also significant economic consequences resulting from lost productivity as parents are home from work with sick children as well as the long term impact when a percentage of these children will not be fully productive as adults.<sup>6,7</sup>

There are several difficulties encountered when interpreting the literature in regards to neck pain and/or headaches in young children. There are very few studies investigating neck pain in preadolescents. One author suggests that neck pain fluctuates through preadolescence but that some children have persistent neck pain.<sup>11</sup> Headaches evolve and change in their presentation, duration and symptomatology through childhood transitioning into the types of headaches that we recognize in adults.<sup>12,13</sup> Headaches in preadolescents are more diffuse than those in adults and can be difficult to interpret or distinguish. Both neck pain and headache have an even sex distribution in preadolescence, but in adolescence, there is a significant rise in the prevalence of neck pain and headaches and a sex shift with female preponderance.<sup>2-4,14</sup>

Clinician in Private Practice, Stockholm, Sweden.

Postgraduate Lecturer in Chiropractic Paediatrics.

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Submit requests for reprints to: Sue A. Weber Hellstenius, DC, MSc, Wirsensv. 11, 186 50 Vallentuna, Sweden (e-mail: [dr.sue@telia.com](mailto:dr.sue@telia.com)).

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Studies investigating headaches in children classify recurrent headaches as either migraine or tension-type headaches according to the criteria proposed by the International Headache Society.<sup>15</sup> These criteria are based on adult headache symptomatology. It is not until adolescence that headaches take on adult-like characteristics. In younger children, headache symptoms are not specific to headache type.<sup>15</sup> Not surprisingly, headaches are commonly misdiagnosed in these children and statistics regarding prevalence rates of specific headaches are unreliable.<sup>14,16</sup> Furthermore, studies in children have not been uniform in their methods of headache classification nor in their inclusion criterion making comparison of prevalence rates difficult.<sup>17,18</sup> This is reflected in the wide range of prevalence rates quoted in studies: they are from as low as 6% to as high as 80%.<sup>16,19-28</sup>

Almost all of the information obtained from studies of neck pain and/or headache in children comes from questionnaires, but the validity of assessing pain retrospectively in children has been disputed.<sup>29-31</sup> Age appropriate daily pain diaries have been found to be most accurate in assessing the duration, intensity and frequency of pain in children.<sup>29-32</sup>

Most of the studies of children with recurring neck pain and/or headaches focus on the association with adverse psychological factors. The literature suggests that children with psychological problems have an increased prevalence of somatic pain including neck pain and headaches.<sup>33-35</sup> Laurell et al<sup>3</sup> investigated the relationship between psychosocial factors and headache in school children and, in contrast to other previous studies, concluded that anxiety and depression were not significantly associated with headaches in younger school children.<sup>1,36-41</sup>

Among preadolescents with neck pain, a relationship between the frequency of neck pain and the frequency of headache has been documented.<sup>4</sup> Faulty sitting posture in school, particularly prolonged neck flexion and static postures, were associated with neck pain and headaches in this age group.<sup>42,43</sup> Preadolescents diagnosed with migraine headache had associated pericranial, neck, and shoulder muscle tenderness, while those classified as having tension-type headache did not.<sup>44</sup>

In adults, mechanical dysfunction of the cervical spine can be the primary cause of recurrent neck pain and/or headaches and has been termed cervicogenic headache.<sup>45-47</sup> The findings in adults with cervicogenic headache include faulty head posture, cervical joint dysfunction (CJD), trigger points (TPs) in associated cervical paraspinal muscles, and reduction in cervical range of motion.<sup>45,48-53</sup> Forward head posture is a deviation from normal which strains the upper cervical spine and can be a cause of neck pain and headache.<sup>54-56</sup> Trigger points or focal points of increased tension in a muscle, when present in the cervical spine, can also lead to neck pain and/or headaches.<sup>57-64</sup> Studies indicate that the upper cervical spine is the primary area of dysfunction in adults with cervicogenic headache.<sup>46,50,51,65-72</sup>

These factors are not only a cause of neck pain and/or headache, but they can initiate or exacerbate both migraine headaches and tension-type headaches.<sup>57-59,63,64,66-68</sup> Cervicogenic headaches commonly become chronic. This is thought to be the result of the production of proinflammatory cytokinins which contribute to neuronal sensitization resulting in chronic pain syndromes.<sup>63,73,74</sup>

Because the cervical spine influences all three headache types, its importance should not be underestimated.<sup>58,60,75</sup> The contribution of dysfunctional mechanics of the cervical spine to neck pain and headaches has been investigated to some extent in adults but, thus far, has not been studied in preadolescents. The intention of this study was to investigate whether preadolescents presenting with recurrent neck pain and/or headaches had different physical findings than preadolescents who are symptom free, particularly in regards to faulty head posture, reduced cervical rotation, focal areas of tension in cervical paraspinal muscles, and CJD.

## METHODS

This was a cross-sectional observational study investigating whether preadolescents with neck pain and/or headache differed from preadolescents who did not have neck pain or headache in physical examination findings including head posture, active cervical rotation, palpation of cervical paraspinal muscles, and cervical joint functioning. Subjects were selected from a convenience sample of students at a municipal school in a middle-class suburb outside of Stockholm, Sweden. Information was gathered from students in a questionnaire (Appendix A) which was completed in school; an informed consent form with additional questions for parents (the parents were asked separately if their child had neck pain and/or headaches and also if their child had experienced trauma to the head or neck); and a physical examination by a blinded, experienced chiropractor of students.

The inclusion criteria were students who: were in the fourth, fifth, and sixth grades; agreed to participate; had written consent from a parent or guardian; had completed the questionnaire; and had the ability to communicate verbally. Exclusion criteria were students who: were undergoing treatment for a systemic or infectious disease; at any time expressed unwillingness to participate; and/or did not have parental consent.

The questionnaire was completed by 131 students (100%). It was adapted from questionnaires found in the literature investigating characteristics of headaches and neck pain.<sup>36-39</sup> It was pilot-tested on a group of 10-year olds (n = 10) to ensure that the youngest students had no problem understanding the questions and the alternatives provided. The questions concerned the duration and frequency of pain, associated symptoms, medication use, and initiating or exacerbating factors. For average pain intensity and pain at

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