

Evidence in Action:

Diagnostic Testing Considerations in Pediatric Cervicogenic Headache

By Robert Vining, DC, and Janice Kane, DC

WE ARE ALL AWARE THAT CHILDREN COMMONLY COMPLAIN OF HEADACHES,¹ but determining a specific diagnosis can be challenging. That's partly because pediatric patients may not describe their symptoms as well as adults.² Therefore, we asked this question: "Is there a diagnostic test that helps classify headache in pediatric patients in the range of 6-12 years?" If an evidence-based diagnostic test is available, it may help providers diagnose and develop management strategies.

Cervicogenic headache is common in pediatric patients³ and is defined by the International Headache Society as a condition caused by cervical spine dysfunction that is usually accompanied by neck pain.³ We chose this type of headache because it is commonly seen in chiropractic offices. With these thoughts in mind, we performed a search for office-based tests to help substantiate a diagnosis of cervicogenic headache diagnosis in a pediatric patient.

An evidence-based consideration

A PubMed search using the terms pediatric AND headache AND posture produced only a few articles. Included in this list is an article authored by Budelmann et al.⁴ describing a cross-sectional study entitled: Is there a difference in head posture and cervical spine movement in children with and without pediatric headache? *Budelmann K, Von Pickartz H, Hall T. Eur J Pediatr. 2013 Oct;172(10):1349-56. doi: 10.1007/s00431-013-2046-z. Epub 2013 May 26. PMID: 23708260*

What happened in this study?

Investigators recruited 34 asymptomatic children from a high school and handball club in Germany and 30 symptomatic patients from physiotherapy departments in the Netherlands. Both groups had a mean age of 10 years (range of 6-12 years). Criteria utilized for probable cervicogenic headaches were patient reports of:

- 1) unilateral headache without side shift;
- 2) neck pain/stiffness associated with headache;
- 3) neck movement or postures precipitating headaches;

- 4) frequency of at least 1 headache per week; and
- 5) episodic or continuous headache for a minimum of three months prior to participation.⁵

Three procedures were performed with each patient in both groups:

- 1) active cervical range of motion, measured using a goniometer worn on the head;
- 2) craniovertebral angle measuring forward head posture from a digital photograph of a standing patient; and
- 3) pain response following the flexion-rotation test.

The flexion-rotation test is performed with the child supine, passively moving his or her head and neck into full flexion before rotating the head to the left or right. Head rotation occurs within the maximum comfortable range. Pain experienced following the test was reported using the colored analog scale (CAS), (a way to measure a child's pain) from which numbered values (0-10) were obtained.

The results showed active range of motion was generally reduced in those diagnosed with cervicogenic headaches compared with the asymptomatic group. The craniovertebral angle was lower for the headache group, indicating greater forward head posture. Pain following the flexion-rotation test was increased for the symptomatic group, but unchanged for asymptomatic patients.

Limitations to consider

This study was not conducted with blinded examiners, which increases the potential for bias. Each group of patients was recruited from two very different settings and examined by a single therapist at both sites. The study team mitigated this limitation somewhat by training examiners and assessing inter-examiner reliability prior to conducting the study. However, the article does not report if quality control measures were taken to ensure inter-examiner consistency during the study. Most asymptomatic children were recruited from a sports club, while the symptomatic children were recruited from physiotherapy departments. There could be differences in activity levels between these groups, which could conceivably

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affect ranges of motion and pain perception, and potentially influence results.

How useful is the evidence?

Is the evidence from this study strong enough to suggest a useful test for confirming/supporting the diagnosis of cervicogenic headache?

Range of Motion

All cervical ranges of motion were reduced in symptomatic patients. Normal ranges of motion for patients ages 3-12 from a study reported by Arbogast et al.⁶ were greater than the corresponding value reported for the symptomatic children in this (Budelmann's) study.⁴ Unfortunately, only mean ranges of motion were reported by Budelmann et al., making it more difficult to interpret and then compare range-of-motion findings for individual patients.

The study selection criteria potentially influenced results by selecting patients reporting painful symptoms associated with range of motion. Symptoms related to range of motion, however, are consistent with the current understanding of cervicogenic headache pathophysiology.⁷ Because a gold standard diagnostic test for cervicogenic headache does not yet exist, there is no clear answer to the question of how useful these findings are. Given our understanding of the condition, it is reasonable to consider reduced range of motion as evidence for the cervicogenic headache diagnosis.

Craniovertebral Angle

The craniovertebral angle, a measure of head posture, was reduced 4° in patients with cervicogenic headache using a measuring system with a 3.6° margin of error. Therefore, based on the results of this study, the craniovertebral angle measurement does not seem to have meaningful value as a diagnostic aid.

Flexion-rotation test

In the asymptomatic group, virtually no pain was reported immediately following the flexion-rotation test, while in the symptomatic group, average pain was reported as 3/10 (left) and 7/10 (right). Range of motion during the test was significantly decreased in the symptomatic group (right 35°, left 43°) when compared with the asymptomatic group (right 53°, left 52°). Results are possibly biased since symptomatic patients were chosen because they reported pain/stiffness with neck movement or postures. Nevertheless, pain provocation following the test in the headache group still appears

to provide the strongest evidence for use as a diagnostic aid.

None of the tests were studied in other headache types, so we don't know yet whether they can be used to help differentiate between other possible diagnoses. Future research should help DCs better understand how much to depend on cervical range of motion and the flexion-rotation tests for differential diagnosis. Until then, it may be worthwhile to consider these tests as tools to assist providers in supporting or challenging the diagnosis of pediatric cervicogenic headache. ■

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