

# Children's drawings of headache pain were accurate for diagnosing migraine

Stafstrom CE, Rostasy K, Minster A. **The usefulness of children's drawings in the diagnosis of headache.** *Pediatrics.* 2002 Mar;109:460-72.

## QUESTION

In children and adolescents with headache, are their drawings of headache pain accurate for diagnosing migraine?

## DESIGN

Blinded comparison of children's drawings with clinical diagnosis.

## SETTING

A pediatric neurology clinic in Boston, Massachusetts, USA.

## PATIENTS

226 children who were 4 to 19 years of age (mean age 11.4 y, 54% girls) and had headache.

## DESCRIPTION OF TEST AND DIAGNOSTIC STANDARD

Children were given a blank, unlined, white piece of paper (8.5 × 11 inches) and a number 2 pencil with an eraser. They were asked to draw a picture of themselves having a headache, showing where the pain was, what the pain felt like, and any other changes or

symptoms that occurred before or during the headache. When children complained of having > 1 type of headache, they drew a separate picture for each type (235 drawings). 2 pediatric neurologists who were blinded to the children's clinical history analyzed the drawings. The diagnostic standard was a usual clinical evaluation including history, physical examination, formulation, and clinical diagnosis by a neurologist who did not view the drawings.

## MAIN OUTCOME MEASURES

Sensitivity and specificity for diagnosing migraine.

## MAIN RESULTS

130 children (58%) had migraine or mixed headache, and 96 children (42%) had non-migraine headache. The Table shows the

results. Drawing features that had a positive predictive value  $\geq 80\%$  for migraine were focal neurologic signs (100%); periorbital pain or sharp object to eye (100%); sleep or recumbency (95%); visual symptoms (scotoma or field defect [95%] and photophobia [91%]); nausea or vomiting (91%); severe pounding or throbbing pain (83.2%); and sonophobia (80%).

## CONCLUSION

In children and adolescents, drawings of headache pain were accurate for diagnosing migraine.

*Source of funding: No external funding.*

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### Test characteristics of children's drawings for diagnosing migraine\*

Sensitivity (95% CI)	Specificity (CI)	+LR	-LR
93% (87 to 97)	83% (74 to 90)	5.47	0.08

\*Diagnostic terms defined in Glossary; LRs and CI calculated from data in article.

## COMMENTARY

The study by Stafstrom and colleagues examined the correlation of children's drawings with an expert neurologist's diagnosis of migraine and nonmigraine headaches. Children may be able to communicate more effectively through pictures than verbally. Although several studies have used children's drawings to gain the perspective of children dealing with medical conditions, some related to migraine, this study is the first to investigate how their pictures might help with diagnosis.

The reference standard used for diagnosis of migraine was practical, but not generalizable. Rather than use a set of strict criteria such as those of the International Headache Society (IHS), this study used the opinion of 1 neurologist, who knew the IHS criteria but made the diagnosis "solely on clinical grounds." Using 1 neurologist's determination as the reference standard is practical and clearly reflects actual practice. The study's generalizability could have been improved, however, by using a set of explicit criteria or having  $\geq 2$  neurologists make an independent determination.

The method for obtaining the child's drawing was simple and reproducible. While the child drew, the physician interviewed the parent

about the child's medical history. This step could fit easily into a typical visit, without requiring extra time.

Similar to the reference standard, interpretation of the drawings were done by using neurologists' expert opinion, without reference to an explicit set of criteria. 2 neurologists independently rated the drawings. Agreement was excellent ( $\kappa = 0.92$ ) and suggests that other studies could reproduce these findings.

The negative likelihood ratio of 0.08 indicated that a nonmigraine picture would be especially helpful for ruling out migraine. The test helped less, however, in ruling out dangerous causes. Despite providing no information about headache duration or frequency, the pictures were surprisingly useful.

This study did not show that drawings could replace any step in the evaluation of a child's headache. Asking children to draw a picture of their headaches could fit into a routine visit, however, and could provide helpful supporting information from the child's point of view.

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