

CHILDREN'S HEADACHE THROUGH DRAWINGS

LA CEFALEA PEDIATRICA ATTRAVERSO I DISEGNI

Clinical report

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*Federica Cernigliaro,¹ Salvatore Lo Cascio,¹
Simona Rena Tomasino,¹ Carola Meo,¹ Edvige Correnti,²
Giuseppe Santangelo,² and Vincenzo Raieli²*
¹Pro.M.I.S.E. Dipartimento Materno-Infantile "G. D'Alessandro"
Università degli Studi, Palermo
²UOC NPI-ISMEP -ARNAS CIVICO, Palermo

Summary

Headache is the most common neurological disorder in the paediatric population. The diagnosis of headache in children can be complicated by the presence of different clinical phenotypes than in adults and by the difficulty of young patients in verbally communicating their symptoms. Therefore, drawings in children can be of great value in the diagnosis of different types of headache. In addition, children project their unconscious into drawings, so features such as colour, size, body parts, light, darkness, line thickness, different shapes and various details can provide important information in clinical practice. This article provides a brief literature review and description of some clinical cases with the aim of encouraging the use of drawing in paediatric headache clinical practice.

Key words

Migraine, headaches, children, drawings

Riassunto

La cefalea è il più comune disordine neurologico nella popolazione pediatrica. La diagnosi di cefalea nei bambini può essere complicata dalla presenza di fenotipi clinici differenti rispetto agli adulti e dalla difficoltà dei piccoli pazienti nella comunicazione verbale dei sintomi.

Dunque, i disegni nei bambini possono essere di grande utilità nella diagnosi dei vari tipi di cefalea. Inoltre, I bambini proiettano il loro inconscio nei disegni, pertanto, caratteristiche quali colore, misure, parti del corpo, luci, oscurità, pesantezza del tratto, forme diverse e vari dettagli, sono in grado di fornire importanti informazioni nella pratica clinica. Questo articolo fornisce una breve revisione della letteratura e la descrizione di alcuni casi clinici, con lo scopo di incoraggiare l'utilizzo del disegno nella pratica clinica delle cefalee pediatriche.

Parole chiave

Eemicrania, cefalee, bambini, disegni

INTRODUCTION

Headache is one of the most debilitating problems and the most common neurological disorder in the paediatric population; it's a common cause of pain in children, affecting their mental and physical status, social life, school performance and quality of life.

The clinical diagnosis of headache is made according to the third edition of the International Classification of Headache Disorders (ICHD-3),¹ but the clinical manifestations may differ between adults and children. The approach to paediatric headache includes headache and medical history, family and social history, physical examination with complete neurological examination, various investigations and, in the presence of risk factors or red flags, neuroimaging to exclude secondary headache (clinical diagnosis).²

Different headache phenotypes and children's difficulty in verbal expression may complicate headache diagnosis. Therefore, children's drawings are useful in diagnosing the type of headache.

This article provides a literature review and some examples of clinical cases to encourage the use of drawings in the clinical practice of paediatric headache.

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REVIEW OF LITERATURE

In paediatric psychology, drawing is often used as a tool for analysing and exploring emotions, moods and fears, a true representation of the child's psychological and emotional insight, a direct access to their inner world.

Children project their unconscious into drawings, so features such as colour, size, body parts, light, darkness, line weight, different shapes and various details can provide important information in clinical practice. Thus, the clinician can use drawing as a more effective and direct form of expression and communication than verbal communication to understand the child's symptoms, perceptions and experiences. In addition, patients' drawings reveal their perceptions of the illness, which is useful in various pathologies, such as patients with heart problems.

For these reasons, drawings are considered a useful diagnostic tool, the value of which has been suggested in the differential diagnosis of headache: indeed, the literature offers us some examples of the veracity and effectiveness of "artistic" diagnosis as an aid to clinical diagnosis.

In 1983, Unruh³ used drawing to communicate with children in order to better understand their pain: young patients were asked to make two drawings, one of their pain and one of themselves in pain. These drawings were then categorised and subdivided according to content and colour, comparing the differences between patients with recurrent migraine and those with musculoskeletal pain: the former more often depicted themselves doing something to relieve the pain. The predominant colours were red and black, with no significant differences according to gender or age.

Categories of drawings:

Children's illustrations of pain included actions and tools (32%), personification of pain (19%), physiological representation of pain (5%), perceptual disturbances (6%), abstract representation of pain (25%), localisation (3%) and non-specific drawings (3%); children's illustrations of pain included the recipient of pain (11%), an agent that relieves pain (44%), emotions resulting from pain (40%), localisation (3%) and non-specific drawings (only 2%).

Stafstrom studies,^{4,5} have made a significant contribution to the diagnostic value of drawing by analysing hundreds of drawings and recognising the multitude of elements, information and details that emerge from these images. 226 drawings were classified as migraine or non-migraine by a paediatric neurologist who was unaware of the clinical history, while another paediatric neurologist made the clinical diagnosis based on the clinical history and objective examination. The drawings were compared with the clinical diagnosis: the results showed that the headache drawings had a sensitivity of 93.1%, a specificity of 82.7% and a positive predictive value of 87.1% for migraine.

Stafstrom discovered that children's illustrations of their headaches could complement the diagnosis of this disorder and differentiate between different types of headaches. Migraine patients often portrayed their excruciating pain through objects striking their head, alongside sad and anguished expressions. In contrast, tension-type headache sufferers drew elements such as bandages and head-binding material with fewer expressions of distress. Drawings play a crucial role in providing access to basic information that can be hard to obtain in children, particularly young ones. This enables accurate diagnostic classification and, subsequently, targeted therapeutic interventions.

Furthermore, Stafstrom⁵ found that headache drawings can be used to assess the clinical course and improvement after treatment longitudinally. Periodical evaluations of 111 children (66 females and 45 males) were conducted, which showed improvement in 99 patients through serial drawings.

Fifty-four children experienced improvement in both headache and drawings, while three children showed improvement in their drawings only.

Thirty-two children had no improvement in either category, and 11 children improved in headache only. The sensitivity of drawings for clinical improvement was considerable, at 0.83, and specificity was high, at 0.91. The predictive value of drawings for clinical improvement was 0.946, indicating strong potential for use in diagnostic procedures.

Many studies have reinforced and validated the utility of distinctive drawings for various types of headache.

For instance, Wolaczynska-Stanek⁶ emphasised the utility of children's drawings in diagnosing the type of headache: paediatricians and paediatric neurologists analysed over one hundred drawings. The findings revealed that children with migraines predominantly depicted needle-shaped elements, arrows, knives, etc., whereas children with tension-type headaches more commonly depicted compression and pressure elements. The category of 'other' headaches (somatoform disorders) often presents with a sensation of a swirling vortex in the head. Red and black colours have been identified as the most frequent choices used in drawings by individuals experiencing severe pain. However, the clinician's experience can significantly impact the interpretation of such drawings. This problem can be overcome by using a set of ready-made drawings (with characteristic pain presentations), which can be useful and facilitate inexperienced practitioners or children who do not like to draw.

Mosquera⁷ analysed children's drawings to identify migraine in headache patients. The study recruited 48 patients between ages 5 and 19 with headaches, who drew their experiences before and during the attack. These drawings were then analysed via artistic diagnosis by a paediatric neurologist. The patients underwent evaluation by an additional paediatric neurologist (referred to as 'clinical diagnosis') to determine the ability of the artistic diagnosis to predict the clinical diagnosis. The findings demonstrated that the artistic diagnosis independently predicted clinical diagnosis of migraine with a sensitivity of 69.6%, specificity of 88%, positive predictive value of 84.2%, and negative predictive value of 75.9%. This confirms the precision of artistic diagnosis for forecasting clinical diagnosis of migraine.

Mazzotta⁸ assessed headache characterization designs, categorising the designs of 67 patients into tension-type headache or migraine by two child neuropsychiatrists who were blinded to the clinical data. To gauge their influence, the designs were segregated among three different age cohorts. Moreover, a control group of 90 subjects was also included. The study outcomes depicted that the designs exhibited a sensitivity of 85.71 and 81.48 percent, specificity of 81.48 and 85.71 percent, and positive predictive value of 85.71 and 81.48 percent, in order, for migraine and tension-type headache.

These results signify that the designs could be employed in the diagnostic pathway and differential diagnosis of headaches.

A further study analysed additional aspects of drawings,⁹ such as size and darkness, to gather greater detail and information regarding the pain experienced by young patients.

Sixty-five university students with chronic headaches were requested to visually represent their pain, and the outcome revealed that larger and darker drawings were linked to increased emotional distress and sadness, more severe pain, and negative emotions concerning their medical state. Therefore, the drawings were an expression of the child's perception and experience, not just their pain.

Baeyer investigated the use of pain maps (body maps or dummies)¹⁰ or pain drawings to obtain information about the location of algic symptoms in children and adolescents. This study suggests that pain maps may help children to identify the location of pain symptoms, although the available data are uncertain. However, their use seems more appropriate for children aged 8 years and over (although younger children can use them with adult support).

Another study showed the relevance of pictures drawn by children with migraine with aura:¹¹ Five adolescents (aged 14 to 18 years) with migraine with visual aura were asked to draw their visual symptoms, either by directly drawing a picture or by modifying the design of another picture. By drawing, they were able to describe their visual aura in terms of images, the stage of the aura and the different visual perceptions. This is information that is usually not clearly explained by adolescents. This study suggests that the diagnosis of migraine with visual aura and its follow-up in patients younger than 18 years could be aided by drawing their visual aura.

In 2019, Buture developed a new visual screening tool with six drawings depicting headache-related pain ¹² that 150 healthy patients rated as mild, moderate, severe or excruciating. They rated two drawings as excruciating, one as severe, one as moderate/severe, one as moderate and one as mild. Then 116 headache sufferers (16 with cluster headache and 100 with migraine) were asked to choose which picture best described the severity of their headache attacks: 69% of the cluster headache participants and 52% of the migraine participants chose a picture that the healthy participants had described as excruciating. Thus, this screening tool did not discriminate between headache types, but was useful in identifying pain severity, suggesting the possibility of using visual aids to assess headache severity.

In clinical practice, drawings are also useful in providing important information about the localisation of pain: Figure 1 shows the precise location of pain drawn by an 11-year-old boy suffering from trochlear migraine, which also describes its intensity, type and extent; Figure 2 shows the location of pain drawn by a 12-year-old boy.¹³

We can also derive important information about the visual aura: for example, one study analysed a clinical case of polyopia in which an 8-year-old girl saw her mother's image quadrupled exclusively on the right side for 30 minutes, followed by the usual migraine. Her drawing was very comprehensive, explanatory and clear.¹⁴

Figure 3, Figure 4 and Figure 5 show the feelings and needs of these children during the headache attack, allowing us to share in their experience of pain and their emotions: figure 3 illustrates the need to take medication to relieve the headache; Figure 4 shows the need to stay in bed, away from light and noise; Figure 5 shows the expression of discomfort, suffering and sadness during the pain experience.

CLINICAL REPORT

We analysed the clinical cases of two of our young patients: a girl with migraine and cyclic vomiting and a 7-year-old girl with cranial autonomic symptoms (CAS). They were also asked to draw their pain and their feelings about experiencing pain.

The first clinical case concerns a little girl with episodes of severe frontal headache, associated with photophobia and phonophobia, with the need to stay in bed, lasting about two hours, with irregular frequency, since the age of 2.5 years. At the age of 3 years, she presented with periodic episodes of repeated vomiting every 70 days, followed by dizziness and, after a few hours, severe abdominal pain. For these reasons, she made numerous visits to the paediatric emergency department. At the age of 4, she suffered from high-frequency headaches, for which he was treated with melatonin, riboflavin and flunarizine, with resolution of the headache.

Up to the age of six years (when follow-up was stopped), migraine equivalents persisted with the same sequence and repetition of refractory symptoms and with the same periodicity, but with a reduction in duration to less than 36 hours. Instrumental and neuroimaging studies such as CT scan, EEG and others were negative. At the age of 4.5 years, this patient drew two pictures: the first (Figure 6) showing her feelings of pain, discomfort and sadness; the second (Figure 7) showing herself without pain, happy and smiling. This is a case of periodic vomiting.

Periodic syndromes are occasional and recurrent disorders characterised by pain and/or autonomic symptoms, often associated with migraine.¹⁵ They include recurrent gastrointestinal disorders, cyclic vomiting syndrome, abdominal migraine, benign paroxysmal vertigo and benign paroxysmal torticollis. For example, cyclic vomiting is a periodic syndrome that may be associated with migraine and is characterised by episodic attacks (at least five) of severe nausea and vomiting (at least four per hour), usually stereotyped in the individual and with a predictable time of onset. The attacks last from one hour to 10 days and may be associated with pallor and lethargy. There is complete resolution of symptoms between attacks.¹

CONCLUSION

There is limited research examining the potential of drawing as a tool to evaluate therapy effectiveness and quality of life in young patients with headaches. Further exploration of drawing techniques is necessary to fully comprehend their benefits. Additionally, ready-made illustrations and drawings depicting headache pain could assist inexperienced clinicians and patients with language barriers or who are unable to express themselves verbally.

CONFLICT OF INTERESTS

The authors declare no conflict of interests
Informed consent was obtained from the parents of all subjects. According to local ethical guidelines, no formal approval by hospital's ethics committee was required.
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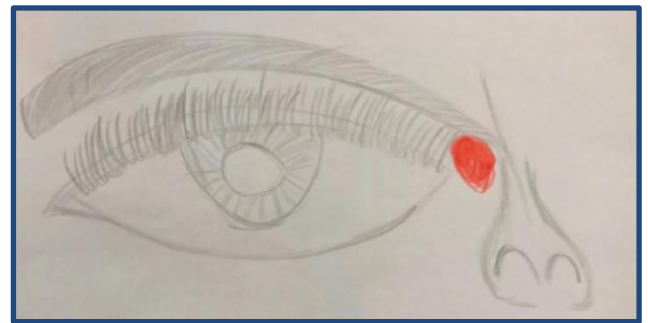


Figure 2 Pain localization pictured by a 12-years-old child.
Raieli et al. *The Pediatric Trochlear Migraine: Diagnostic and Therapeutic Implications*. *J. Clin. Med.* 2022, 11, 2826

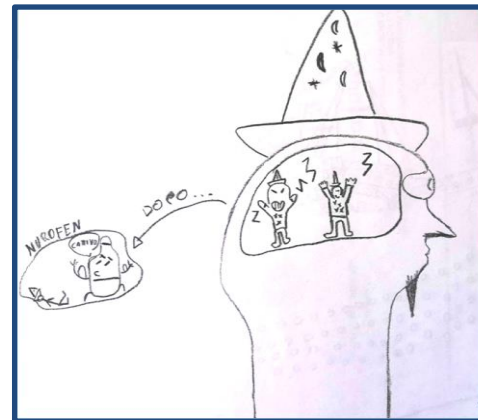


Figure 3 Need to take a drug to relieve headache.
Cernigliaro et al. Drawing in children with headache: usefulness and accuracy in clinical practice. Headache Journal. June 2023



Figure 4 Need to stay in bed, away from light and noise.
Cernigliaro et al. Drawing in children with headache: usefulness and accuracy in clinical practice. Headache Journal. June 2023



Figure 5 The expression of discomfort, suffering and sadness during the experience of pain.
Cernigliaro et al. Drawing in children with headache: usefulness and accuracy in clinical practice. Headache Journal. June 2023

Figure 6
 Pain feelings pictured by a 4,5-years-old girl.



Figure 7
 Free-pain feelings pictured by a 4,5-years-old girl.





Figure 8

Free-pain feelings pictured by a 4,5-years-old girl

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