

# The classification of chronic daily headache in French children and adolescents: A comparison between the second edition of the International Classification of Headache Disorders and Silberstein-Lipton criteria

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**Abstract:** Few data are available on the applicability of both the criteria proposed by Silberstein and Lipton (S-L) and the International Classification of Headache Disorders-II (ICHD-II) in the classification of children and adolescents with chronic daily headache (CDH). The International Headache Society recently added revised criteria (ICHD-IIR) for chronic migraine to its Appendix. We retrospectively reviewed all charts of 34 children and adolescents (<17 years) with primary CDH presenting to the outpatient clinic of the University Department of Neuropediatrics of Lille between February 2004 and February 2006 and tried to classify their CDH according to both S-L criteria and the recently published ICHD-IIR. Thirty-two children (94%) and 33 children (97%) could respectively be successfully classified into one subtype of CDH according to the S-L classification and the ICHD-IIR. Transformed migraine was the most common diagnosis (61.8%), followed by new daily-persistent headache (20.6%) when the S-L criteria were used. Twenty-three children and adolescents (67.6%) could be classified under one of the migraine categories according to the ICHD-IIR classification. We think that both S-L and ICHD-II classifications, when used with detailed headache histories and diaries, are adequate to classify chronic daily headache in children and adolescents.

**Keywords:** chronic daily headache, classification, children, adolescents

## Introduction

Primary chronic daily headache (CDH) is defined as primary headaches occurring on more than 15 days per month for more than 3 months in the absence of organic pathology. In adults, the estimated prevalence of CDH is around 4% (ANAES 2003). The actual prevalence of CDH in children has not been determined yet, but is estimated to be around 0.9% (ANAES 2003). Recently, Wang and colleagues (2006) provided prevalence data on CDH in 12- to 14-year olds and found an overall prevalence of 1.5%. Medication-overuse was present in 20%.

The classification of CDH is controversial even although the criteria proposed by Silberstein and Lipton (S-L criteria) in 1994 (Silberstein et al 1994) and 1996 (Silberstein et al 1996) have been widely used. Silberstein and Lipton divided patients into four diagnostic categories: transformed migraine (TM), chronic tension-type headache (CTTH), new daily-persistent headache (NDPH), and hemicrania continua (HC). The second edition of the International Classification of Headache Disorders (ICHD-II) (HCC 2004) did not comprise any CDH category as such, but provided criteria for all four types of CDH: chronic migraine (CM), CTTH,

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NDPH, and HC. The ICHD-II criteria for CM required 15 or more migraine days per month, for at least 3 months, in subjects who were not overusing acute medication. Patients who would otherwise meet criteria for CM but overused medication were to be classified as probable CM with probable medication-overuse headache (MOH). It had been subsequently demonstrated that the criteria for CM were too restrictive, excluding the majority of patients with TM (Bigal et al 2006, 2007). Thus, the International Headache Society (IHS) recently added revised criteria (ICHD-IIR) for CM to its Appendix (HCC 2006). According to the ICHD-IIR, a diagnosis of CM can be made in individuals with at least 5 previous migraine attacks, who currently have 15 or more days of headache and 8 or more days of migraine and/or headaches that respond to specific acute migraine medications (compounds containing ergotamine, or triptans). Moreover, the ICHD-IIR deleted the diagnosis of probable CM. According to ICHD-IIR, if MOH is present, the individuals should not be classified as CM, but as having MOH (Silberstein et al 2005).

The first edition of the International Classification of Headache Disorders (ICHD-I) and the S-L criteria were compared in a sample of 638 adults with CDH. Though both systems could be applied, the S-L system was judged to be easier to use and more parsimonious (Bigal et al 2002). In children and adolescents, to our knowledge, only two studies tried to classify CDH according to the criteria of the ICHD-II. One study concluded that it remained difficult to use the criteria of ICHD-II for children with CDH seen in clinic-based setting (Wiendels et al 2005), the other stated that "most adolescents with CDH can be classified using the ICHD-II but problems do exist" (Bigal et al 2005, p 588). The objective of this study was to compare the S-L and ICHD-IIR criteria in clinical practice. It seems, to our knowledge, to be the first study using ICHD-IIR criteria to classify children and adolescents with CDH.

## Materials and methods

We retrospectively reviewed all charts of children and adolescents (<17 years) presenting with headache to the outpatient clinic of the Department of Neuropediatrics, University of Lille between February 2004 and February 2006. We identified patients with primary CDH, which was defined as headache for at least 4 hours a day (if untreated), at least 15 days per month for at least 3 months, without an underlying serious medical condition. To allow more in depth diagnostic evaluation, appropriate investigations were performed to exclude other aetiologies of headache,

if necessary. Children with secondary headaches were excluded and all patients with abnormal neurological examination results were also excluded.

The medical files were systematically reviewed to obtain clinical information. During the entire time period reviewed, the Center had been utilizing a uniform clinical intake form, which contained several multi-choice and fill-in-the-blank items. The following information was systematically collected: gender, age at onset of headaches, age at diagnosis of CDH, characteristics of headaches experienced (including frequency, duration, quality and location), aura (description and frequency), associated symptoms (nausea, anorexia, vomiting, photophobia, phonophobia, worsening with exertion, dizziness, red eyes, ptosis, tearing, and other), family history, and diaries. The spreadsheet contained also information regarding intensity of pain. In this study, intensity of pain referred to highest intensity of pain for the day and it was graded on a 4-point scale as severe, moderate, mild or no pain. Attempt was made to assess the temporal course of the events when headache became daily. CDH were classified according to the S-L criteria. Attempt was also made to subclassify CDH in children and adolescents in the recommended categories proposed by the ICHD-IIR, including CM (Appendix 1.5.1), CTTH (2.3), NDPH (4.8), and HC (4.7).

## Results

### Demographics and headache clinical characteristics

Two hundreds and six patients were seen for the first time for headache during the study period. We identified 34 children and adolescents with primary CDH (16.5%). There were 13 boys (38.2%) and 21 girls (61.8%), a ratio of 1:1.6. The sex ratio was 2.5 in TM and about 1 in other subtypes of CDH. The median age at headache onset was 9 years (range: 2.1–14.2 years). The median age at CDH onset was 11 years (range: 5.9–14.2 years). The median age at presentation to our outpatient clinic was 12.5 years (range: 6.0–16.9 years). At presentation, no patient in the study had received any form of prophylactic treatment especially for migraine. The main headache clinical characteristics of the 34 CDH are summarized in Table 1.

### Classification

The classification results of these 34 CDH are summarized in Table 2. Thirty-two children (94%) could be successfully classified into one subtype of CDH based on the S-L classification. Table 2 shows the diagnosis according to the S-L diagnostic criteria. TM was the most common diagnosis (61.8%), followed by NDPH (20.6%). In TM, the mean time interval for

**Table 1** Headache clinical characteristics (n = 34)

Location n (%)	Frontal	26 (76,5)
	Temporal	6 (17,6)
	Parietal	3 (8,8)
	Occipital	3 (8,8)
	Vertex	2 (5,9)
	Diffuse	4 (11,8)
	Unilateral	6 (17,6)
Type n (%)	Bilateral	29 (85,3)
	Pulsatile	20 (58,8)
	Pressure-like	4 (11,8)
Intensity n (%)	Other	5 (14,7)
	Unable to verbalize	7 (20,6)
	Light	16 (47,1)
	Moderate	5 (14,7)
Time of occurrence n (%)	Severe	11 (32,4)
	Variable	5 (14,7)
	During day only	28 (82,4)
Symptoms n (%)	Both during day and night	6 (17,6)
	Phonophobia	20 (58,8)
Symptoms n (%)	Photophobia	16 (47,1)
	Digestive symptoms	13 (38,2)
	Vertigo	5 (14,7)
	Pallor	9 (26,5)
	Aura	9 (26,5)

the transition of sporadic headaches into CDH was  $17 \pm 16$  months (0–11.7 years). Thirty-three children (97%) could be successfully classified into one subtype of CDH based on the ICHD-IIR. Table 2 shows the diagnosis according to the ICHD-IIR classification. The most common diagnosis in our sample was CM. This diagnosis was made in 17 cases.

The correlations between both systems in classifying these headaches are presented in Table 2. Nineteen of the 21 (90.5%) subjects belonging to the TM category, according to the S-L criteria, could be classified under one of the migraine categories according to the ICHD-IIR classification (14 CM, 4 migraine without aura (MO) (1.1) and/or migraine with aura (MA) (1.2), 1 probable MO (1.6.1)). By contrast, only 4 of the 7 NDPH (57.1%), according to the S-L criteria, could be classified in the corresponding category according to the ICHD-IIR classification. Conversely, in the 23 that could be classified under one of the migraine categories according to the ICHD-IIR classification (17 CM, 4 MO and/or MA, 2 probable MO) 19 (82.6%) fulfilled the criteria of TM, according to the S-L criteria. Only 3 (27.3%) of the 11 subjects verifying one of the CTTH categories (CTTH and/or probable CTTH [2.4.3]) according to the ICHD-IIR classification could be classified in the corresponding CTTH category according to the S-L criteria.

### Medication-overuse headache

Eighteen (52.9%) patients had a history of MOH (n = 14) or probable MOH (n = 4) (Table 2). None of them had MOH at the time we classified them. These patients had mainly a diagnosis of TM, according to the S-L classification: in the 21 subjects with a diagnosis of TM, 11 had a history of MOH and 2 of probable MOH (13/21; 61.9%) whereas in the 13 remaining subjects, 3 had a history of MOH and 2 of probable MOH (5/13; 38.5%).

**Table 2** S-L classification and correlations between S-L criteria and ICHD-IIR criteria

S-L criteria	History of MOH	N	Total	ICHD-IIR	N
TM	Absent	8	21	CM	12
		11		CM	2
	Probable	2		CTTH	1
				CTTH MO	1
				CTTH MO	1
				CTTH MO MA	2
				Probable CTTH	1
				CTTH Probable MO	1
				CTTH	3
CTTH	Absent	2	4	CTTH	3
	Present	1			
	Probable	1		Probable MO	1
NDPH	Absent	6	7	NDPH	4
	Present	1		CM	3
	Probable	0			
Non-classified	Absent	0	2	Probable CTTH	1
	Present	1			
	Probable	1		Non-classified	1

**Abbreviations:** S-L, Silberstein-Lipton; MOH, medication-overuse headache; ICHD-IIR, International Classification of Headache Disorders, 2nd edition revised criteria; TM, transformed migraine; CTTH, chronic tension-type headache; NDPH, new daily persistent headache; CM, chronic migraine; MO, migraine without aura; MA, migraine with aura.

## Discussion

To our knowledge this study is the only French series of CDH in children. There were about 1.5 new cases of CDH per month referred for the first time in our tertiary headache center, over a period of 2 years. Table 3 compares demographics and age at diagnosis with other series. One strength of the present study was the availability of structured clinical records. With this amount of information we were able to classify the vast majority of patients using the Silberstein-Lipton system (94%) and the ICHD-IIR system (97%). With the reserve that our sample size is small, the present study shows that both classifications could be used to classify children and adolescents with CDH. These results differ from those of Wiendels and colleagues (Wiendels et al 2005). In a sample of 79 patients, they were able to classify only 35% of patients with the ICHD-II system. To our knowledge, the only study so far which tried to compare both classifications (S-L and ICHD-II classifications) in children and adolescents is the series by Bigal and colleagues (2005). This sample was greater (170 adolescents) and the mean age older (15.1 years) than in our sample (10.5 years), but we can note similarities with our results. Bigal and colleagues (2005) managed to classify 100% of patients according to S-L criteria; 68.8% had TM, 21 % NDPH and 10% CTTH, whereas the respective figures were 61.8%, 21.9% and 12.5% (of the patients classified under one of the S-L categories) in our sample. In contrast to these data, in the series by Wiendels and colleagues (2005), a majority of patients had CTTH according to the ICHD-II criteria. In the series by Bigal and colleagues (2005), 70.9% of the adolescents could be classified using a single ICHD-II diagnosis (84.8% in our sample). There was no case of HC in Bigal's series nor in ours. HC is a very rare entity in children, as only 2 cases have been reported to far (Fragoso et al 1998; Benzecry de Almeida et al 2004). We must further stress that both Wiendels and colleagues (2005) and Bigal and colleagues (2005) used the ICHD-II criteria.

There was generally good accordance between both systems at one digit level, except for CTTH. Considering S-L criteria,

90.5%, 75%, and 57.1% of the subjects belonging respectively to the TM, CTTH and NDPH categories could be classified under one of the corresponding categories of the ICHD-IIR classification. Conversely, the figures were satisfactory for the migraine (and/or probable migraine), and NDPH categories, but not for CTTH (and/or probable CTTH): 82.6%, 100%, and 9.1% of the subjects that could be respectively classified under one of the categories of the ICHD-IIR classification could be classified under one of the corresponding categories of the S-L criteria. In the Bigal series (Bigal et al 2005), the proportion of adolescents with TM+ (ie, TM with MOH), TM- (ie, TM without MOH), NDPH and CTTH who met ICHD-II criteria for CM (and/or probable CM), NDPH and CTTH were 84%, 68.7%, 51.2%, and 100%, respectively. Correlations were poor at two digits level and beyond for each headache category.

Our CDH had mainly migraine characteristics as it is the case in the series of Hershey and colleagues (2001). In most cases, as the headache frequency increased, the patient had more difficulty describing the pain. Diagnosis category changed, particularly when using ICHD-IIR criteria, and it resulted in an increase of CTTH. Thus, it seems, with the reserve of our sample size, that the conclusion by Bigal and colleagues (2007), in adult CDH, stating that the ICHD-IIR significantly improved the criteria for CM (HCC 2006), can equally apply to children and adolescents.

## Conclusion

We conclude that the majority of CDH in childhood and adolescence seen at our tertiary care institution could be classified both with the S-L and ICHD-IIR criteria and think that both classifications, when used with detailed headache histories and diaries, are adequate to classify CDH in children and adolescents in clinical practice. Our results confirm those of Bigal and colleagues (2005), but with a sample of a younger age and using the more recent ICHD-IIR. Conducting a prospective study would be interesting to determine if these conclusions concerning a tertiary headache center referral can apply to the general French pediatric population.

**Table 3** Demographics and age at diagnosis

	Abu-Arafah	Galli	Moore	Wiendels	Seshia	Chakravarty	Hershey	Our series
Percentage female	55	63	90	59	65	27	54	61.8
Age at diagnosis (range)	3.3–15.8	7–17	7–16	2–15	5.5–20	8–15	3–18	6–16.9
Percentage of CDH/referral for headaches	32	19	3	38	31	6*	35	16.5

**Abbreviation:** CDH, chronic daily headache.

**Notes:** \*Of all primary headaches seen in the age group.

## References

- Abu-Arafeh I. 2001. Chronic tension-type headache in children and adolescents. *Cephalgia*, 21:830–6.
- [ANAES] Agence Nationale d'Accréditation et d'Evaluation en Santé. 2003. Recommandations pour la pratique clinique. CCQ-Céphalées chroniques quotidiennes. Prise en charge diagnostique et thérapeutique de la migraine chez l'adulte et l'enfant. *Rev Neurol*, 159:126–35.
- Benzecry de Almeida D, Afonso Cunali P, Larocca Santos H, et al. 2004. Chronic paroxysmal hemicrania in early childhood: case report. *Cephalgia*, 24:608–9.
- Bigal ME, Sheftell FD, Rapoport AM, et al. 2002. Chronic daily headache in a tertiary care population: correlation between the International Headache Society diagnostic criteria and proposed revisions of criteria for chronic daily headache. *Cephalgia*, 22:432–8.
- Bigal ME, Rapoport AM, Tepper SJ, et al. 2005. The classification of chronic daily headache in adolescents—a comparison between the second edition of the international classification of headache disorders and alternative diagnostic criteria. *Headache*, 45:582–9.
- Bigal ME, Tepper SJ, Sheftell F, et al. 2006. Field testing alternative criteria for chronic migraine. *Cephalgia*, 26:477–82.
- Bigal M, Rapoport A, Sheftell F, et al. 2007. The International Classification of Headache Disorders revised criteria for chronic migraine—field testing in a headache specialty clinic. *Cephalgia*, 27:230–4.
- Chakravarty A. 2005. Chronic daily headache in children and adolescents: A clinic based study from India. *Cephalgia*, 25:795–800.
- Fragoso YD, Machado PC. 1998. Hemicrania continua with onset at an early age. *Headache*, 38:792–3.
- Galli F, Patron L, Russo PM, et al. 2004. Chronic daily headache in childhood and adolescence: clinical aspects and a 4-year follow-up. *Cephalgia*, 24:850–8.
- [HCC] Headache Classification Committee. 2004. The international classification of headache disorders, cranial neuralgia and facial pain, 2nd Edition. *Cephalgia*, 24 (Suppl 1):1–160.
- [HCC] Headache Classification Committee; Olesen J, Bousser MG, Diener HC, et al. 2006. New appendix criteria open for a broader concept of chronic migraine. *Cephalgia*, 26:742–6.
- Hershey AD, Powers SW, Benti AL, et al. 2001. Characterization of chronic daily headaches in children in a multidisciplinary headache center. *Neurology*, 56:1032–7.
- Moore AJ, Shevell M. 2004. Chronic daily headaches in pediatric neurology practice. *J Child Neurol*, 19:925–9.
- Seshia SS. 2004. Chronic daily headache in children and adolescents. *Can J Neurol Sci*, 31:319–23.
- Silberstein SD, Lipton RB, Solomon S, et al. 1994. Classification of daily and near-daily headaches: proposed revisions to the IHS criteria. *Headache*, 34:1–7.
- Silberstein SD, Lipton RB, Sliwinski M. 1996. Classification of daily and near-daily headaches: field trial of revised IHS criteria. *Neurology*, 47:871–5.
- Silberstein SD, Olesen J, Bousser MG, et al. 2005. The International Classification of Headache Disorders, 2nd Edition (ICHD-II)—revision of criteria for 8.2 Medication-overuse headache. *Cephalgia*, 25:460–5.
- Wang SJ, Fuh JL, Lu SR, et al. 2006. Chronic daily headache in adolescents: prevalence, impact, and medication overuse. *Neurology*, 66:193–7.
- Wiendels NJ, van der Geest MC, Neven AK, et al. 2005. Chronic daily headache in children and adolescents. *Headache*, 45:678–83.