Headache Medicine 2026, 17(1):34-42 ▪ p-ISSN 2178-7468, e-ISSN 2763-6178

Headache Medicine

DOI: 10.48208/HeadacheMed.2026.5

Review

Primary stabbing headache – a narrative review

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Edited by:
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Abstract

Introduction
Primary stabbing headache (PSH), also known as "ice-pick headache", is characterized by sudden, ultrashort stabs of head pain and may be under-recognized due to overlap with other headache disorders and mimics.

Objectives
To provide a narrative overview of PSH, summarizing epidemiology, proposed mechanisms, clinical features, differential diagnosis, taxonomic evolution across ICHD editions, and reported treatments.

Methodology
A targeted search in PubMed/MEDLINE, SciELO and LILACS was complemented by manual reference screening, including key references cited in ICHD-3 (section 4.7). Keywords related to PSH were combined with "clinical presentation", "epidemiology", "diagnostic criteria" and "treatment". Articles in English, Portuguese or Spanish were considered.

Results
Frequency estimates vary by definition and setting. Pediatric sources generally describe PSH as an uncommon diagnosis among children with recurrent headaches, with onset often during school-age years. In adults, estimates range from low values in population studies using stricter definitions to higher rates in community surveys eliciting ultrashort stabbing "jabs". Attacks last seconds and occur as single jabs or brief series, with variable topography and laterality. Associated symptoms may reflect comorbidity (especially migraine); prominent cranial autonomic features should prompt reassessment for trigeminal autonomic cephalalgias or secondary causes when red flags are present. Evidence for treatment is largely uncontrolled; indomethacin is most frequently reported, while other agents appear in small series.

Conclusion
PSH is generally benign, but its reported frequency and phenotype are heterogeneous across studies. ICHD-3 broadened diagnostic inclusion beyond V1 distribution, potentially improving clinical fit. Careful differential diagnosis remains essential in atypical presentations.

Keywords:
Primary stabbing headache
Ice pick headache
Primary headache disorders

Received: December 11, 2025
Revised: January 17, 2026
Accepted: February 23, 2026

Introduction

Primary stabbing headache (PSH), also referred to as "ice-pick headache", "jabs and jolts syndrome", or "ophthalmodynia periodica", is characterized by sudden, brief, stabbing pains that occur spontaneously, typically without an identifiable precipitating cause and without evidence of an underlying structural lesion or cranial nerve disorder (1). In the International Classification of Headache Disorders, 3rd edition (ICHD-3), PSH is classified under group 4 ("Other primary headache disorders") and must fulfill criterion E ("Not better accounted for by another ICHD-3 diagnosis") (1). Pain may involve trigeminal and extratrigeminal regions, can be unilateral or bilateral, and may shift location over time; in a minority of patients, pain may remain side-locked or fixed in a single location (1). Typical PSH is not associated with cranial autonomic symptoms and should be differentiated from trigeminal autonomic cephalalgias when autonomic features are prominent (1).

PSH was first described in 1964 by Lansche as "ophthalmodynia periodica", referring to sudden periocular stabbing pain (2). Subsequent terms have included "jabs and jolts" (3) and "ice-pick-like headache" (4), reflecting the characteristic ultrashort, stabbing pain quality. The aim of this study is to provide a narrative review of PSH, summarizing epidemiological and clinical aspects, proposed pathophysiological mechanisms, differential diagnosis, and the evolution of diagnostic criteria across ICHD editions.

Methodology

This is a narrative review informed by a targeted literature search in PubMed/MEDLINE, SciELO, and LILACS, complemented by manual reference screening. We used combinations of keywords related to primary stabbing headache, including "Stabbing headache", "idiopathic stabbing headache" combined with "clinical presentation". Articles published in English, Portuguese, or Spanish were considered.

Given the narrative nature of this review, study selection was guided by relevance to the clinical characterization, epidemiology, diagnostic criteria, differential diagnosis, and management of PSH. In addition, seminal publications cited in the ICHD-3 bibliography (Section 4.7: Primary stabbing headache) were reviewed and incorporated when relevant to the evolution of diagnostic criteria and clinical descriptions.

Results

The targeted search and manual reference screening identified key publications addressing the clinical phenotype, epidemiology, diagnostic criteria evolution, differential diagnosis, and management of primary stabbing headache (PSH). The main sources discussed and their key messages are summarized in Table 1.

Table 1. Key publications discussed in this narrative review

Citation and date	Title	Database	Summary
Kwon et al., 2023 (5)	Epicranial headache part 1: Primary stabbing headache	Pubmed	A narrative review on epidemiology, clinical pictures, differences between diagnostic criteria, treatment, prognosis, and pathophysiological hypotheses.
Özge et al., 2017 (6)	Experts' opinion about the primary diagnostic headache criteria of the ICHD-3rd edition beta in children and adolescents	Pubmed	Review of opinions of headache specialists in the description of the application of the ICHD-3 criteria. Influences include description of stabbing headaches, epidemiology, and location of pain.
Lee et al., 2016 (7)	Field testing primary stabbing headache criteria according to the 3rd beta edition of International Classification of Headache Disorders: a clinic-based study	Pubmed	A prospective clinical study of 280 patients reporting stabbing headache followed for 2 weeks. Emphasis was placed on the difference in ICHD-2 and ICHD-3 diagnostic criteria.
Fusco et al., 2003 (8)	Idiopathic stabbing headache: clinical characteristics of children and adolescents	Pubmed	Retrospective study of 23 patients (5–18 years), 12 men and 11 women with stabbing headache, from a group of 548 children and adolescents. Emphasis: clinical presentation and diagnostic criteria.
Soriani et al., 1996 (9)	Juvenile Idiopathic Stabbing Headache	Pubmed	A clinical study of 83 patients with idiopathic stabbing headache among 2543 pediatric patients with recurrent headache.
Ravishankar, 2021 (10)	Primary Headaches: Less Familiarity and more Missed Diagnosis	Pubmed	Review of stabbing headaches, analyzing diagnostic criteria, treatments, clinical presentation, and pathophysiology.
Reimers et al., 2024 (11)	Primary Stabbing Headache in Children and Adolescents	Pubmed	Narrative literature review of case reports and case series on prevalence, clinical characteristics, treatment, and prognosis.
Pareja and Sjaastad, 2010 (12)	Primary stabbing headache	Pubmed	Review of the clinical picture, epidemiology, diagnosis, pathogenesis, and treatment.
Fuh et al., 2007 (13)	Primary stabbing headache in a headache clinic	Pubmed	Cross-sectional study interviewing 80 patients with stabbing headache undergoing treatment at a tertiary center. Diagnoses were based on the ICDH-2 criteria and their relationship with migraine.
Prakash and Rathore, 2016 (14)	Side-locked headaches: an algorithm-based approach	Pubmed	On the differential diagnosis between strictly unilateral headaches, both primary and secondary.
Lenglart et al., 2023 (15)	Sudden onset headaches in paediatric emergency departments: diagnosis and management	Pubmed	A systematic review of sudden onset headaches in childhood in emergency units.
Gelfand and Goadsby, 2016 (16)	The Role of Melatonin in the Treatment of Primary Headache Disorders	Pubmed	The study on melatonin's role in treating primary headaches, including stabbing headache.
Myers et al., 2022 (17)	The spectrum of indomethacin-responsive headaches in children and adolescents	Pubmed	Review of indomethacin-responsive childhood headaches. Of 32 patients, two had stabbing headaches.
Sjaastad et al., 2001 (18)	The Vågå study; epidemiology of headache 1: The prevalence of ultrashort paroxysms	Pubmed	Cross-sectional epidemiological study with 1838 people with stabbing headache, its epidemiology and clinical characteristics.

Epidemiology

Epidemiological estimates for primary stabbing headache vary substantially across studies, largely due to differences in case definitions, ascertainment methods, and clinical settings. In general, pediatric cohorts suggest PSH is an uncommon diagnosis among children with recurrent or chronic headache, whereas adult estimates range from low prevalence in population-based studies using stricter definitions to higher rates when ultrashort "stabbing/jab" phenomena are actively elicited in community surveys. Tables 2 and 3 summarize the main epidemiological descriptors reported for pediatric and adult populations, respectively.

Pediatric population

Across pediatric studies, reported prevalence generally ranges from approximately 1.5% to 9.9% depending on the cohort and diagnostic approach (6,11,15). Age of onset is commonly reported in school-age years, with several series describing mean onset around 8–10 years, and reviews summarizing onset typically between 7 and 11 years (6,8,9,11,15). Sex distribution appears variable across cohorts, with some studies reporting no clear predominance and others showing small differences that are difficult to interpret due to sample size and heterogeneity (8,9,11,15).

Table 2. Pediatric epidemiological descriptors reported in primary stabbing headache

Group	Source	What it provides	Key values
Review summaries (prevalence ranges)	Lenglart 2023 (systematic review)	Prevalence range (reviewed cohorts)	1.5%–3.5% (chronic headache cohorts)
	Reimers 2024 (narrative review)	Prevalence + typical age range (summary)	2.5%–9.9%; age ~7–11 years
	Özge 2017 (expert opinion)	Reported range (summary)	3%–5%; age ~10 years
Primary clinical cohorts (individual patient data)	Fusco 2003 (clinical series)	Age/sex in a clinic cohort	n=23; age 9; 12M/11F
	Soriani 1996 (clinical series)	Age/onset/sex in a clinic cohort	n=83; 8.4±3.6; onset 7±3.2; 43M/40F

Adult population

In adults, reported prevalence varies widely by setting and methodology. Reviews of population-based studies have described estimates around 0.2% to 2%, while community-based surveys that systematically question participants about ultrashort stabbing pains have reported substantially higher rates (35.2% in the Vågå community study) (12,18). Clinic-based proportions also vary markedly across countries and referral settings and are therefore not directly comparable to population estimates; these ranges are summarized in Table 3. Regarding sex distribution, some cohorts suggest a female predominance (Vågå ratio ~1.49), whereas reviews note that several population-based studies report similar rates between women and men. In clinical cohorts, PSH has been described predominantly in middle-aged adults, with reported mean ages commonly in the 50–60-year range (5).

Table 3. Adult epidemiological descriptors of primary stabbing headache (PSH) reported in key sources

Author (source)	Study type / setting	Population	Estimate (prevalence / age / sex)
Sjaastad et al., 2001 (18)	Community survey (population-based)	Adults 18–65 years, Vågå community (Norway)	Prevalence: 35.2% reporting ultrashort stabbing "jabs" • Sex: female predominance (≈1.49:1) • Age: not reported
Fuh et al., 2007 (13)	Headache clinic cohort	Patients evaluated in headache clinic	Age: 47.9 ± 17.3 years (13–83) • Sex: no predominance • Prevalence: not reported
Pareja and Sjaastad, 2010 (12) (review)	Review of population studies	Population-based studies (various)	Prevalence: ~0.2%–2% (population studies) • Age/Sex: not consistently reported
Lee et al., 2016 (7)	Prospective clinical study (clinic-based)	Adult patients in clinical setting	Age: 51 ± 13.3 years • Sex: women predominance (≈1.72:1) • Prevalence: not reported
Kwon et al., 2023 (5) (review summary)	Narrative review (multiple settings)	Multiple countries and settings	Prevalence estimates reported in review (heterogeneous settings): • Denmark (population): 2% (n=740) • China (university hospital outpatients): 1.5% (n=1219) • Spain (clinic-based): 5% (n=725) • Turkey (clinic-based): 12.6% (n=245) • Taiwan (clinic-based): 13% (n=872) • South Korea (clinic-based): 11% (n=1592) • Neurologist-based sample: 26.7% (setting-specific) • Age: ~50–60 years (review summary)

Clinical characteristics

Across clinical descriptions, PSH is characterized by sudden, brief, stabbing pains, often described as "as if struck by a sharp object", that can occur in single jabs or short series. Reported attack duration is typically seconds (often around 1–3 seconds), with less frequent reports of longer episodes in a minority of cases (5,8,9). Attacks are commonly irregular and unpredictable, alternating between symptomatic and asymptomatic periods, and frequency may range from occasional daily stabs to multiple episodes per day (5,9).

Pain intensity varies across cohorts and is most often described as mild-to-moderate or moderate-to-severe; in a cohort using a 0–10 visual analog scale, mean intensity around the mid-range has been reported (8,9). Pain location is heterogeneous and may involve trigeminal and extratrigeminal regions (fronto-ocular, fronto-temporal, temporal), with additional reports involving occipital or nuchal areas and distributions consistent with cranial nerves (8,9). Laterality is also variable: unilateral, bilateral, and side-shifting patterns have all been described (7–9,12,13).

A range of associated phenomena have been reported in some series (e.g., transient grimacing, vocalizations, touch allodynia), as well as symptoms that may reflect overlap with comorbid headache disorders (nausea, photophobia, phonophobia, dizziness/vertigo). Reported cranial autonomic symptoms such as lacrimation are uncommon and should prompt careful differential diagnosis for trigeminal autonomic cephalalgias or secondary causes when prominent (9,13,17). Potential triggers described across reports include poor sleep, stress, climate change, cold exposure, neck movement, and Valsalva-like maneuvers (coughing, straining, exertion, sexual activity) (9,12,13). PSH may follow a fluctuating course over weeks to months, with gradual reduction and periods of remission in some patients (12,15). In individuals with migraine, stabs may occur in the same cranial regions as migraine pain, suggesting clinical overlap in susceptible patients (8).

Evolution of diagnostic criteria

From Table 4 it's clear that the diagnostic criteria have undergone modifications.

Table 4. Evolution of diagnostic criteria for primary stabbing headache across ICHD editions

Diagnostic criteria	ICHD-1	ICHD – 2	ICHD -3
A	Pain is confined to the head and exclusively or predominantly felt in the distribution of the first division of the trigeminal nerve (orbit, temple, and parietal area).	Headache occurring as a single stab or series of stabs and fulfilling criteria B–D.	Head pain occurs spontaneously as a single stab or series of stabs and fulfill criteria B and C.
B	The pain is stabbing in nature and lasts for a fraction of a second. It occurs as single stabs or series of stabs.	Exclusively or predominantly felt in the distribution of the first division of the trigeminal nerve (orbit, temple, and parietal area).	Each stabbing lasts up to a few seconds.
C	It repeats itself at irregular intervals (hours a day).	The stabbing lasts up to a few seconds and recurs with irregular frequency, varying from once to several times a day.	The stabbing recurs with irregular frequency, from one to several times a day.
D	Diagnosis depends on excluding structural changes at the site of pain and in the distribution of the affected cranial nerve.	No accompanying symptoms.	No cranial autonomic symptoms.
E		Not attributed to another disorder.	Not better accounted for by another ICHD-3 diagnosis.

Changes in diagnostic criteria identified: ICHD-1 (1988): Idiopathic Stabbing Headache, transient stabbing pain lasting a fraction to several seconds, occurring without organic disease (19). ICHD-2 (2004): Idiopathic Stabbing Headache changed its nomenclature to Primary Stabbing Headache, and the absence of accompanying symptoms was required for diagnosis (20). ICHD-3 (2018): Pain as a single stabbing or a sequence of stabbing pains lasting a few seconds and occurring at irregular frequency without autonomic cranial symptoms (1).

Treatments

Table 5 shows the treatments used for PSH.

Table 5. Reported treatments for primary stabbing headache (PSH) in the literature (uncontrolled evidence)

Author (source)	Medication	Dose / Regimen	Evidence / Outcome
Fuh et al., 2007 (13) – Clinical based cross-sectional study	Indomethacin	25–75 mg/day	74% positive response.
	Rofecoxib (COX-2 inhibitor)	50 mg/day	68% response. Historical report; not routinely used in current clinical practice.
Myers et al., 2022 (17) - Retrospective case series	Indomethacin	1.1–5.4 mg/kg/day (pediatrics)	Symptom resolution reported in 2 pediatric cases
Fusco et al., 2003 (8) – Retrospective clinical study	Paracetamol (acetaminophen)	Standard analgesic dose	Good response reported in 12 children.
Gelfand & Goadsby, 2016 (16) - Narrative review	Melatonin	3–12 mg (at night)	3 adult patients reported improvement in a small uncontrolled series.
Kwon et al., 2023 (5) – Narrative review	Gabapentin	Not specified in the review	Reported benefit in case reports/series, particularly when indomethacin is not tolerated.
	Botulinum toxin A	Local injection	Reported benefit in open-label data in selected chronic/fixed-location cases.
Pareja and Sjaastad, 2010 (12) – Clinical Review	Nifedipine	Not specified	Reported benefit in an isolated case report.
	Celecoxib		Mentioned as a COX-2 inhibitor option in narrative sources; evidence is limited.

Note: Most treatment data derive from uncontrolled observations (case reports/series and narrative summaries). Reported doses and response descriptions vary and should be interpreted cautiously.

Discusion

This narrative review provides an updated overview of primary stabbing headache (PSH), focusing on epidemiological descriptors, proposed pathophysiological mechanisms, clinical phenotype, differential diagnosis, taxonomic evolution, and therapeutic approaches. As expected for a narrative synthesis, findings should be interpreted considering heterogeneity in study designs, settings, and case definitions across literature.

Epidemiological aspects

Reported frequency estimates for PSH vary widely across studies. In pediatric sources, PSH is generally described as an uncommon diagnosis among children with recurrent headaches, with proportions ranging approximately from 2.5% to 9.9% in selected cohorts (6,11,15). In adults, estimates range from low prevalence in population-based studies using stricter definitions to substantially higher rates in community surveys that actively elicit ultrashort stabbing "jabs", which may not be equivalent to strict ICHD-based PSH diagnosis (5,12,18). Therefore, these estimates are not directly comparable and should be interpreted as reflecting differences in ascertainment and diagnostic thresholds rather than true epidemiological contradictions.

Regarding age, pediatric sources commonly report onset during school age (often around 7–11 years), while adult cohorts frequently describe PSH in middle-aged individuals (commonly in the 50–60 year range), although PSH may occur across the lifespan (5,7,11,15,18). Sex distribution across cohorts remains inconsistent, with several studies suggesting no clear predominance; this contrasts with migraine (female predominance) and cluster headache (male predominance), but comparisons should be cautious due to differences in case definitions and study settings (5,7–9,11,12,15,18).

Pathophysiology and pathogenesis

The pathophysiology of primary stabbing headache (PSH) remains uncertain. Proposed mechanisms include hyperexcitability of peripheral free nerve endings, which could lead to spontaneous discharges, and dysfunction or loss of nociceptive Schwann cells, potentially influencing pain perception (5,11). These hypotheses are primarily based on indirect observations and analogy with conditions involving focal irritation or inhibition of nociceptive pathways (inflammatory or demyelinating disorders) and should be interpreted as theoretical frameworks rather than established mechanisms (5,11).

Clinical aspects

Across reports, PSH is consistently characterized by sudden, ultrashort stabbing pains occurring in single jabs or brief series, with variable laterality and heterogeneous cranial topography (5,9,13,18). Some publications also describe associated symptoms such as nausea, photophobia/phonophobia, dizziness, or discomfort, which may reflect overlap with comorbid headache disorders (particularly migraine) or nonspecific accompanying features rather than defining characteristics of PSH (9,13).

ICHD-3 emphasizes the absence of cranial autonomic symptoms in typical PSH; therefore, when prominent autonomic features are reported (lacrimation), careful reassessment is warranted (1). In such cases, clinicians should consider alternative diagnoses, especially trigeminal autonomic cephalalgias (SUNCT/SUNA) or secondary headache disorders, particularly when red flags or atypical features are present (5,10,14). Longitudinal data remain limited, and further prospective studies would help clarify the natural history, predictors of remission, and factors associated with persistence (8,9,11).

Differential diagnosis

Differential diagnosis is essential because brief stabbing cranial pain can occur in multiple primary and secondary headache disorders. Primary mimics include nummular headache (localized coin-shaped pain with chronicity), occipital neuralgia (pain along nerve distribution with tenderness and potential response to anesthetic blocks), and trigeminal autonomic cephalalgias (typically severe unilateral attacks lasting minutes and accompanied by cranial autonomic symptoms) (5). Secondary causes should be considered when clinical presentation is atypical (late onset, abnormal neurological examination, systemic symptoms, progressive course, fixed side-locked pattern, or new red flags). Several conditions have been reported in association with stabbing pain presentations in the literature and are detailed in ICHD-3, emphasizing the importance of clinical judgment and appropriate investigation when indicated (1,5).

Taxonomic evolution

Changes across ICHD editions reflect an effort to improve clinical fit and diagnostic clarity. The transition from "idiopathic stabbing headache" to "primary stabbing headache" and the removal of restrictive localization assumptions (previously emphasizing the first trigeminal division) broadened case recognition to include extratrigeminal sites, aligning criteria with phenotype variability observed in clinical cohorts. Neuroimaging is not routinely required in typical PSH presentations with a normal neurological examination; however, it should be considered when red flags or atypical features raise suspicion for secondary causes (8,11). EEG is also not routinely indicated and should be reserved for contexts in which a seizure mimic is clinically suspected (8,11).

Treatment

Treatment decisions are individualized and depend on symptom burden and clinician judgment. Overall, therapeutic evidence is largely uncontrolled and based on clinical experience, small

series, and case reports. Indomethacin is the most frequently reported option, while other agents (COX-2 inhibitors/celecoxib, melatonin, gabapentin, nifedipine, and simple analgesics) have been described in selected contexts (8,10–13,15–17). These reports should be interpreted cautiously, and prospective studies using standardized outcomes are needed to clarify effectiveness, tolerability, and long-term safety (11,12).

Future research directions

Future studies should prioritize prospective designs using standardized ICHD-3–based phenotyping and transparent ascertainment methods to improve comparability across cohorts and settings. Key gaps include (i) clearer separation between ultrashort stabbing "jabs" elicited in community surveys and strict ICHD-based PSH diagnosis in clinical cohorts; (ii) pediatric-specific characterization, including validation of duration and laterality thresholds and the role of "probable PSH"; and (iii) longitudinal follow-up to better define natural history, recurrence patterns, and predictors of persistence or remission. Additionally, controlled or pragmatic trials with predefined outcomes are needed to clarify the effectiveness and tolerability of commonly reported therapies (e.g., indomethacin, melatonin, gabapentin, COX-2 inhibitors), as current evidence is largely based on small series and case reports. Finally, mechanistic studies integrating neurophysiology and translational approaches may clarify whether distinct pathways underlie different PSH phenotypes and help refine diagnostic boundaries.

Conclusion

PSH is generally a benign primary headache disorder characterized by ultrashort stabbing pains with variable topography and laterality. Reported frequency estimates vary substantially across studies due to differences in definitions and settings. ICHD-3 criteria broaden diagnostic inclusion by allowing pain beyond the first trigeminal division, potentially improving clinical fit.

Careful differential diagnosis and appropriate investigation are essential in atypical presentations or when red flags are present.

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Authors contribution: All authors contributed to the conception of the work, performing acquisition, analysis, and interpretation of data, drafting and critically reviewing the intellectual content for final approval of the version to be published, and have responsibility for all aspects of the work.
Conflict of interest: The authors declare that there is no conflict of interest.
Funding: This research received no specific funding from any funding agency in the public, commercial, or not-for-profit sectors.