



**HEPMP**

HIGHER EDUCATION PAIN MEDICINE PROJECT

Strengthening Capacities for Higher Education of Pain Medicine in Western Balkan countries – HEPMP



Co-funded by the  
Erasmus+ Programme  
of the European Union

# TWO HUNDRED FACES OF HEADACHES

Jasna Zidverc-Trajkovic



UNIVERSITY OF BELGRADE  
SCHOOL OF MEDICINE



Neurology Clinic  
Clinical Center of Serbia

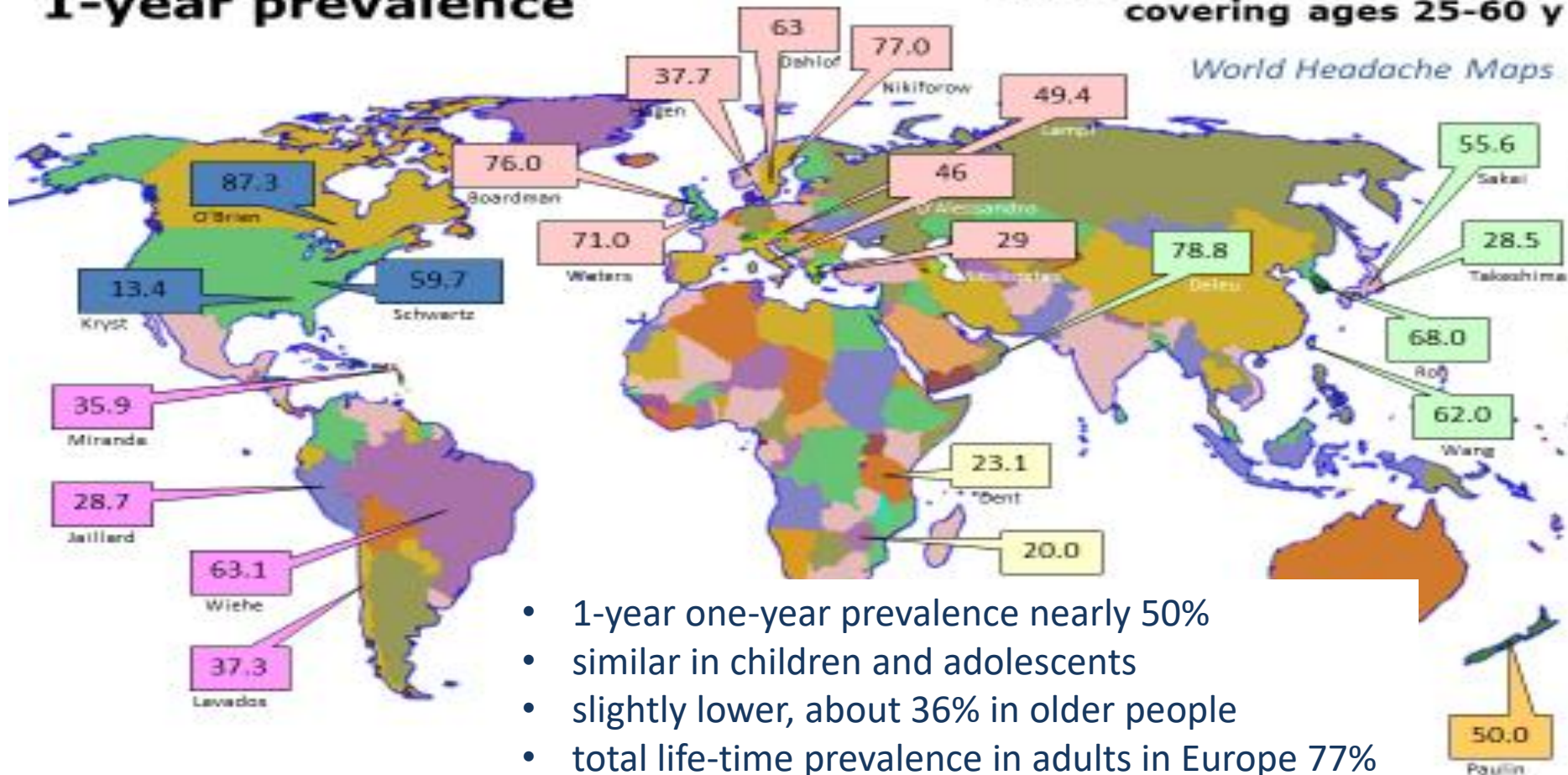
Pain - Terrifying lord of life, October 22<sup>nd</sup> 2018

Project number: 585927-EPP-1-2017-1-RS-EPPKA2-CBHE-JP (2017 – 3109 / 001 – 001)

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## Headache in adults: 1-year prevalence

## Population or community-based surveys of >500 participants covering ages 25-60 y



- 1-year one-year prevalence nearly 50%
- similar in children and adolescents
- slightly lower, about 36% in older people
- total life-time prevalence in adults in Europe 77%
- significant influence on global health, quality of patient's life, and financial resources of society

Project number

There are more than 200 different headache types.

## Classification

- helps to evaluate and treat the disorder
- provide higher precision to epidemiological studies and clinical research

Implementation of new scientific results in Classification established headaches from being one of the worst-classified neurological diseases to being the best.

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# History of headache classification

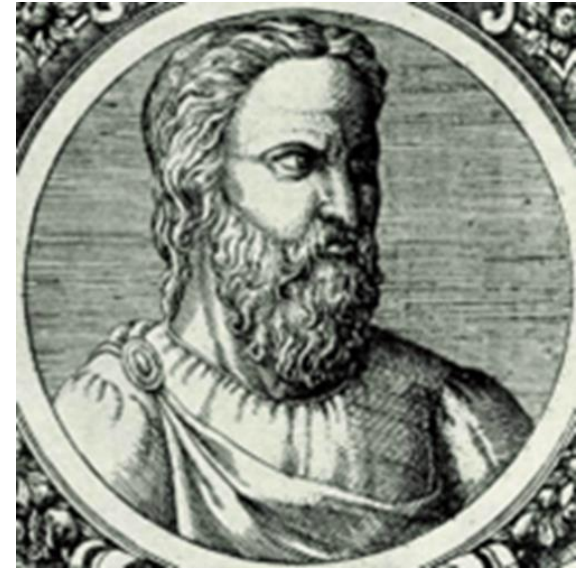
## The first headache classification

### ***Cephalea***

chronic, frequent, severe  
and long-lasting headache

### ***Cephalalgia***

less frequent and mild



Aretaeus from Cappadocia  
81- 138 year AD.

# History of headache classification

Thomas Willis

1672. *De Cephalalgia*

“... out or in skull, universal or partial;  
short-lasting, continual or intermittent;  
inconstant or undetermined; forward,  
backward or lateralized and occasional  
or permanent...”.



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# History of headache classification

## National Institute of Health

### **1962. Ad Hoc Committee on Classification of Headache**

Arnold Friedman, Knox Finley, John Graham, Charles Kunkle,  
Adrian Ostfeld i Harold Wolff

- was used in North America and some parts of Europe, was never internationally accepted and was not implemented in clinical practice.
- Imprecise headache definitions enabled different individual interpretations.

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# History of headache classification

## 1. **Vascular headache**

Classic migraine, common migraine, cluster, hemiplegic, ophthalmoplegic migraine, lower-half headache

## 2. **Muscle contraction headache**

## 3. **Combined headache:** vascular and muscle contraction

## 4. Headache of **nasal vasomotor reaction**

## 5. Headache of delusional, conversion or hypochondriacal states

## 6. Nonmigrainous vascular headache

## 7. **Traction** headache

## 8. Headache due to **overt cranial inflammation**

## 9-13. Headache due to diseases of ear, nose, sinus, teeth

## 14. Cranial **neuritides**

## 15. Cranial **neuralgias**

*Ad Hoc Committee on Classification of Headache. JAMA 1962; 179:717-718.*

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# History of headache classification

## Definition of migraine

“...recurrent attacks of headache with broad range of intensity, frequency and duration. Attacks are usually lateralized at onset, often associated with anorexia, and sometimes with nausea and vomiting, some of them are preceded or associated with sensitive, motor or mood disorders and usually is familiar...”



*Ad Hoc Committee on Classification of Headache. JAMA 1962; 179:717-718.*

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## History of headache classification

1982 International Headache Society – IHS

1985 Headache Classification Committee  
12 members, Jes Olesen



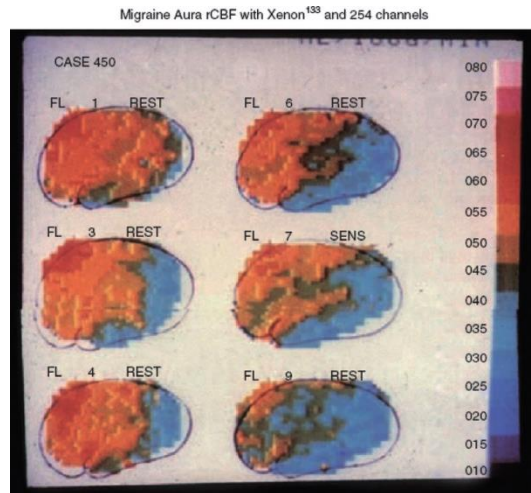
1988 International Classification of Headache Disorders  
**ICHD I**, San Diego

- 96 pages, 165 headache diagnosis
- operational diagnostic criteria for all headaches
- accepted by all national headache societies, WHO, WFNS
- translated into 22 languages and very soon entered everyday clinical practice and research.

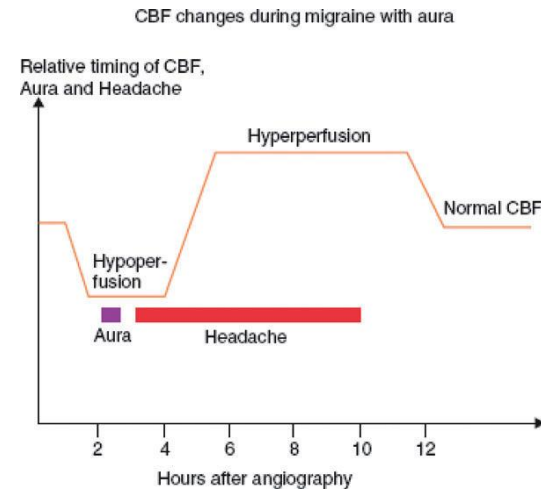
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## Division of migraine on scientific ground



*Lauritzen and Olesen 1981-4*



*Olesen et al. 1990*

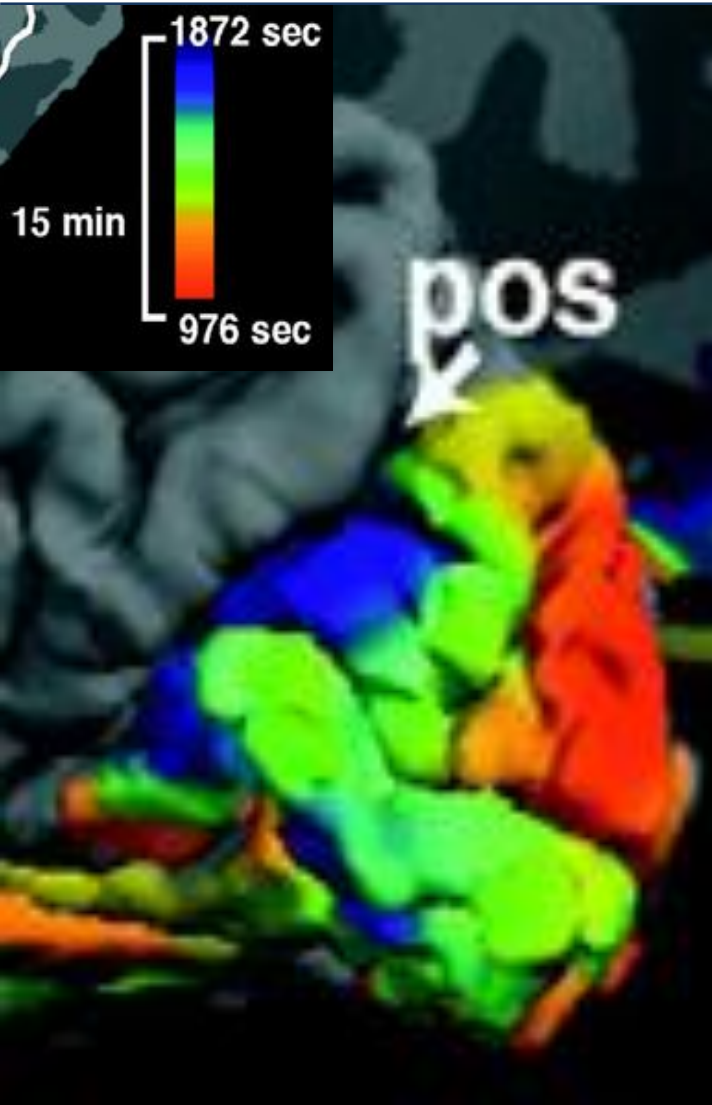
**Before aura** – focal hyperemia

**Aura and the beginning of headache** – decreased flow (oligemia) spreading from occipital region forward during 15-45 min

**Recovery of headache and flow**

Blood flow changes were not noted during migraine without aura.

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## Aura – BOLD fMR

- aura provoked by exercises
- spreading from occipital region
- $3.5 \pm 1.5$  mm/min
- gradual onset and gradual disappearance
- prove that CSD generates aura in human cortex.

*Hadjikhani N. et al. 2000*

Bilateral occipital hypoperfusion during **migraine without aura** was demonstrated.

*Denuelle et al. 2007*

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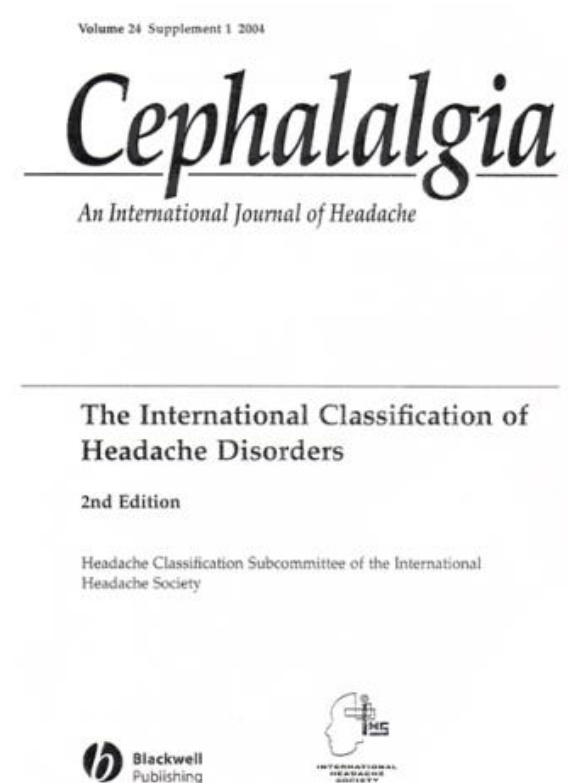


# History of headache classification

2003. The second revision of the Classification  
– **ICHD-II**

15 working groups with 3-10 experts,  
Jes Olesen

- 160 pages, 194 headache diagnosis
- hierarchically organized on 3(4) levels
- codes of ICD-10 were added to headache codes.



*Cephalalgia 2004; 24 (suppl. 4): 9-160.*

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## ICHD-II

1.2	G43.1	Migraine with aura
1.2.1	G43.10	Typical aura with migraine headache
1.2.2	G43.10	Typical aura with non-migraine headache
1.2.3	G43.104	Typical aura without headache

1.5	G43.3	Complications of migraine
1.5.1	G43.3	Chronic migraine
1.5.2	G43.2	Status migrainosus
1.5.3	G43.3	Persistent aura without infarction
1.5.4	G43.3	Migrainous infarction
1.5.5	G43.3	Migraine-triggered seizures

### *Diagnostic criteria:*

- Headache (tension-type-like and/or migraine-like) on  $\geq 15$  days per month for  $>3$  months<sup>2</sup> and fulfilling criteria B and C
- Occurring in a patient who has had at least five attacks fulfilling criteria B-D for 1.1 *Migraine without aura* and/or criteria B and C for 1.2 *Migraine with aura*
- On  $\geq 8$  days per month for  $>3$  months, fulfilling any of the following<sup>3</sup>:
  - criteria C and D for 1.1 *Migraine without aura*
  - criteria B and C for 1.2 *Migraine with aura*
  - believed by the patient to be migraine at onset and relieved by a triptan or ergot derivative
- Not better accounted for by another ICHD-3 diagnosis.

*Cephalalgia* 2004; 24 (suppl. 4): 9-160.

*Headache Classification Committee, 2006.*

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## ICHD-II

### Hypnic headache

*Diagnostic criteria:*

- A. Recurrent headache attacks fulfilling criteria B-E
- B. Developing only during sleep, and causing wakening
- C. Occurring on  $\geq 10$  days per month for  $>3$  months
- D. Lasting  $\geq 15$  minutes and for up to 4 hours after waking
- E. No cranial autonomic symptoms or restlessness
- F. Not better accounted for by another ICHD-3 diagnosis.

### Primary thunderclap headache

*Diagnostic criteria:*

- A. Severe head pain fulfilling criteria B and C
- B. Abrupt onset, reaching maximum intensity in  $<1$  minute
- C. Lasting for  $\geq 5$  minutes
- D. Not better accounted for by another ICHD-3 diagnosis.

### Hemicrania continua

*Diagnostic criteria:*

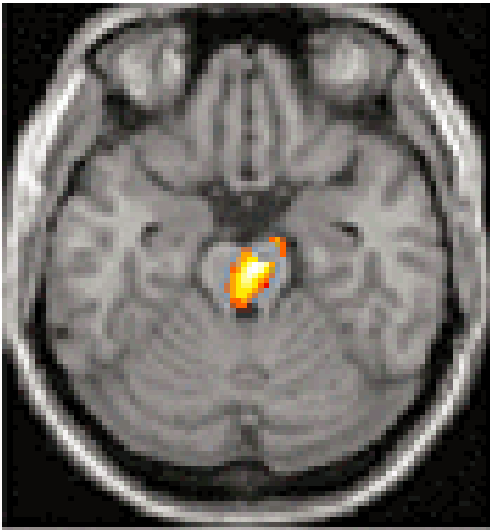
- A. Unilateral headache fulfilling criteria B-D
- B. Present for  $>3$  months, with exacerbations of moderate or greater intensity
- C. Either or both of the following:
  - 1. at least one of the following symptoms or signs, ipsilateral to the headache:
    - a) conjunctival injection and/or lacrimation
    - b) nasal congestion and/or rhinorrhoea
    - c) eyelid oedema
    - d) forehead and facial sweating
    - e) forehead and facial flushing
    - f) sensation of fullness in the ear
    - g) miosis and/or ptosis
  - 2. a sense of restlessness or agitation, or aggravation of the pain by movement
- D. Responds absolutely to therapeutic doses of indomethacin<sup>1</sup>
- E. Not better accounted for by another ICHD-3 diagnosis.

*Cephalalgia 2004; 24 (suppl. 4): 9-160.*

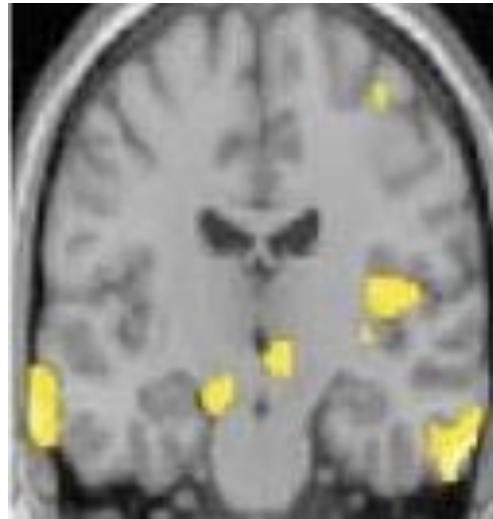
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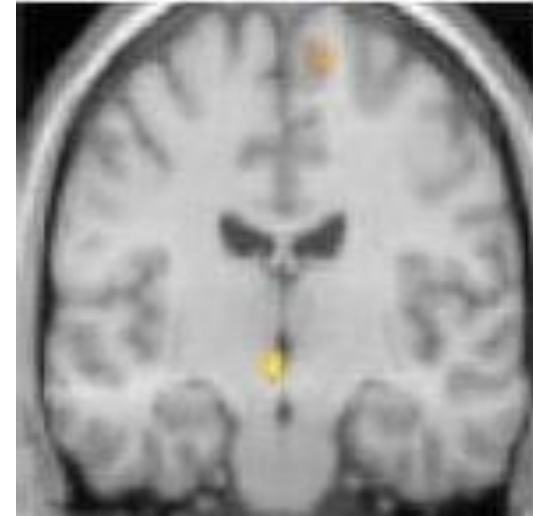
## 3.4 Hemicrania continua - fMRI



*Weiller et al. 1995*



*Matharu et al. 2004*



*May et al. 1998*



## ICHD-II

### Medication-overuse headache (MOH)

#### *Diagnostic criteria:*

- Headache occurring on  $\geq 15$  days per month in a patient with a pre-existing headache disorder
- Regular overuse for  $>3$  months of one or more drugs that can be taken for acute and/or symptomatic treatment of headache<sup>1</sup>
- Not better accounted for by another ICHD-3 diagnosis.



- headache attributed to disorders of homeostasis
- headache attributed to psychiatric disorders.
- stronger connection between symptomatic headache and causative disorder was enabled by results of research.

*Cephalalgia 2004; 24 (suppl. 4): 9-160.*

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# History of headache classification

2013 The third revision

– **ICHD-III beta**

18 working groups with 7-12 experts,  
Jes Olesen

- 180 pages, > 200 headache diagnosis
- test some entities in clinical practice
- harmonize with ICD-11



*Cephalalgia 2013; 33: 629-808.*

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# History of headache classification

2014 Classification was translated into Serbian

National Headache Society of Serbia

Nacionalno udruženje za glavobolje Srbije - **NUGS**

#### U prevodenju učestvovali

Bošković Željko, dr med., specijalista neurologije  
Klinika za neurologiju, Vojnomedicinska akademija u Beograd  
Jančić Jasna, doc. dr med. sci., specijalista neuropsihijatrije  
Klinika za neurologiju i psihijatriju za decu i omladinu, KC Srbije, Medicinski fakultet, Univerzitet u Beogradu  
Jovanović Mirjana, mr med. sci., specijalista neuropsihijatrije  
Institut za mentalno zdravlje, Odsjek za epilepsije i kliničku neurofiziologiju, Beograd  
Kopitović Aleksandar, doc. dr med. sci., primarijus specijalista neuropsihijatrije  
Klinika za neurologiju, KC Vojvodine, Medicinski fakultet, Univerzitet u Novom Sadu  
Ljubisavljević Srdan, asist. dr med. sci., specijalista neurologije  
Klinika za neurologiju, KC Niš, Medicinski fakultet, Univerzitet u Nišu  
Maid Ksenija, specijalista neurologije  
Partner i konsultant privatne prakse SHO VASCULAR Beograd  
Mitrović Aleksandra, dr med.  
Migrena centar, KBC Zvezdara, Beograd  
Nešković Maja, dr med. specijalista neurologije  
Odeljenje neurologije, KBC Zemun  
Pejović Sanja, dr med., specijalista neurologije  
Klinika za neurologiju, Vojnomedicinska akademija u Beogradu  
Podgorac Ana, dr med., istraživač saradnik  
Medicinski fakultet Univerziteta u Beogradu  
Radojčić Aleksandra, dr med. specijalista neurologije  
Klinika za Neurologiju, KC Srbije  
Rakić Dejan, dr med. specijalista neurologije  
Odeljenje neurologije, Zdravstveni centar Užice  
Simić Svetlana, doc. dr med. sci., specijalista neurologije  
Klinika za neurologiju, KC Vojvodine, Medicinski fakultet, Univerzitet u Novom Sadu  
Sretenović Srdan, mr med. sci., specijalista neurologije  
Migrena centar, KBC Zvezdara, Beograd  
Veselinović Nikola, dr med.  
Klinika za neurologiju, KC Srbije  
Zidveć Trajković Jasna, doc. dr med. sci., specijalista neurologije  
Klinika za neurologiju, KC Srbije, Medicinski fakultet, Univerzitet u Beogradu



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# ICHD-III beta

## 1.2 Migraine with aura

- A. At least two attacks fulfilling criteria B and C
  - B. One or more of the following fully reversible aura symptoms:
    1. visual
    2. sensory
    3. speech and/or language
    4. motor
    5. brainstem
    6. retinal
  - C. At least two of the following four characteristics:
    1. at least one aura symptom spreads gradually over  $\geq 5$  minutes, and/or two or more symptoms occur in succession
    2. each individual aura symptom lasts 5-60 minutes<sup>1</sup>
    3. at least one aura symptom is unilateral<sup>2</sup>
    4. the aura is accompanied, or followed within 60 minutes, by headache
  - D. Not better accounted for by another ICHD-3 diagnosis, and transient ischaemic attack has been excluded.
- A. At least two attacks fulfilling criteria B and C
  - B. One or more of the following fully reversible aura symptoms:
    1. visual
    2. sensory
    3. speech and/or language
    4. motor
    5. brainstem
    6. retinal
  - C. At least three of the following six characteristics:
    1. at least one aura symptom spreads gradually over  $\geq 5$  minutes
    2. two or more aura symptoms occur in succession
    3. each individual aura symptom lasts 5–60 minutes<sup>1</sup>
    4. at least one aura symptom is unilateral<sup>2</sup>
    5. at least one aura symptom is positive<sup>3</sup>
    6. the aura is accompanied, or followed within 60 minutes, by headache
  - D. Not better accounted for by another ICHD-3 diagnosis.



*Li D, Christensen AF, Olesen J. 2015; 35: 748–756.*

## 3.1 Cluster headache

- C. Either or both of the following:
  1. at least one of the following symptoms or signs, ipsilateral to the headache:
    - a) conjunctival injection and/or lacrimation
    - b) nasal congestion and/or rhinorrhoea
    - c) eyelid oedema
    - d) forehead and facial sweating
    - e) forehead and facial flushing ←
    - f) sensation of fullness in the ear ←
    - g) miosis and/or ptosis
  2. a sense of restlessness or agitation

*de Coo IF. Et al. 2016; 36:547-51.*

*Cephalalgia 2013; 33: 629-808.*

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## 2018 Actual Classification – **ICHD-3**

- New diagnostic criteria for rare headache disorders such as primary cough, exercise and sexual headache, thunderclap headache, stabbing, nummular, hypnic and new daily persistent headache.
- New entity is introduced – headache attributed to reversible cerebral vasoconstriction syndrome, aeroplane headache.
- New forms: persistent headaches attributed to arterial dissection or ischemic stroke.
- Revised criteria for headaches attributed to disturbances of cerebrospinal fluid.

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**Cephalalgia**  
An International Journal of Headache

**ICHD-3**

International Headache Society  
www.ihs-headache.org  
journals.sagepub.com/home/cep

*Cephalalgia 2018; 38: 1–211.*

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## Principles of ICHD

- Diagnosis are hierarchically organized
- Level of classification according to diagnostic purpose

Code	Headache	Level of classification
<b>1</b>	<b>Migraine</b>	<b>first</b>
<b>1.1</b>	<b>Migraine without aura</b>	<b>second</b>
<b>1.2</b>	<b>Migraine with aura</b>	
<b>1.2.1</b>	<b>Migraine with typical aura</b>	<b>third</b>
<b>1.2.2</b>	<b>Migraine with brainstem aura</b>	
<b>1.2.3</b>	<b>Hemiplegic migraine</b>	
<b>1.2.3.1</b>	<b>Familial hemiplegic migraine</b>	<b>fourth</b>
<b>1.2.3.2</b>	<b>Sporadic hemiplegic migraine</b>	
<b>1.2.3.1.1</b>	<b>Familial hemiplegic migraine type 1</b>	<b>fifth</b>
<b>1.2.3.1.2</b>	<b>Familial hemiplegic migraine type 2</b>	
	....	

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## Principles of ICHD

The **phenotype** of headache is always classified headache that is currently present, or that has been presented within the last year. For genetic studies or some other purposes all headache types that occurred during the lifetime of the patient could be diagnosed.

**Each headache type** is separately diagnosed and coded

The patient could receive several headache diagnosis at the same time, for example:

- 1.1 Migraine without aura
- 2.2 Frequent episodic tension-type headache and
- 8.2 Medication overuse headache.

Diagnosis are listed according to the importance for patient.

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# Structure of ICHD

## Part One: The Primary Headaches

1. Migraine
2. Tension-type headache
3. Trigeminal autonomic cephalalgias
4. Other primary headache disorders

## Part Two: The Secondary Headaches

### Introduction

5. Headache attributed to trauma or injury to the head and/or neck
6. Headache attributed to cranial and/or cervical vascular disorder
7. Headache attributed to non-vascular intracranial disorder
8. Headache attributed to a substance or its withdrawal
9. Headache attributed to infection
10. Headache attributed to disorder of homoeostasis
11. Headache or facial pain attributed to disorder of the cranium, neck, eyes, ears, nose, sinuses, teeth, mouth or other facial or cervical structure
12. Headache attributed to psychiatric disorder

## Part Three: Painful Cranial Neuropathies, Other Facial Pain and Other Headaches

13. Painful lesions of the cranial nerves and other facial pain
14. Other headache disorders

## Appendix

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## Structure of ICHD

### For every headache entity:

- Previously used terms
- Description of entity
- Diagnostic criteria (A-E) with notes
- Comments
- Bibliography

Due to precise inclusion and exclusion criteria, specificity > sensitivity.

For particular diagnosis, the patient has to fulfill ALL criteria.

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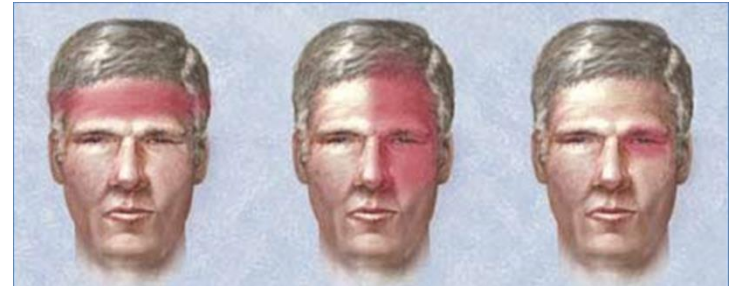
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# Structure of ICHD

## Part One: The Primary Headaches

1. Migraine
2. Tension-type headache
3. Trigeminal autonomic cephalalgias
4. Other primary headache disorders



Diagnosis is based on symptoms – headache features

- monthly frequency
- intensity
- quality
- duration
- localization
- associated phenomena

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# Structure of ICHD

## Part Two: The Secondary Headaches

### Introduction

5. Headache attributed to trauma or injury to the head and/or neck
6. Headache attributed to cranial and/or cervical vascular disorder
7. Headache attributed to non-vascular intracranial disorder
8. Headache attributed to a substance or its withdrawal
9. Headache attributed to infection
10. Headache attributed to disorder of homoeostasis
11. Headache or facial pain attributed to disorder of the cranium, neck, eyes, ears, nose, sinuses, teeth, mouth or other facial or cervical structure
12. Headache attributed to psychiatric disorder

Diagnosis of secondary headaches relay on causative disorder.

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# Structure of ICHD

## Part Three: Painful Cranial Neuropathies, Other Facial Pain and Other Headaches

- 13. Painful lesions of the cranial nerves and other facial pain ←
- 14. Other headache disorders

## Consensus between the IHS and IASP - syndromes of painful lesions

- Neuralgia and neuropathy – differences in clinical presentation and treatment approaches
- Central and peripheral neuropathic pain
- Presumed etiology: *classic*, idiopathic and secondary.

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# Structure of ICHD

## Appendix

- Headache entities with insufficient criteria to be extracted as separate and recognized entities.
- Alternative sets of diagnostic criteria for some entities with accepted criteria that are placed in the main body of the Classification.
- The first step to discard from the Classification those disorders that are traditionally considered as headache entities but without sufficient evidence until now.



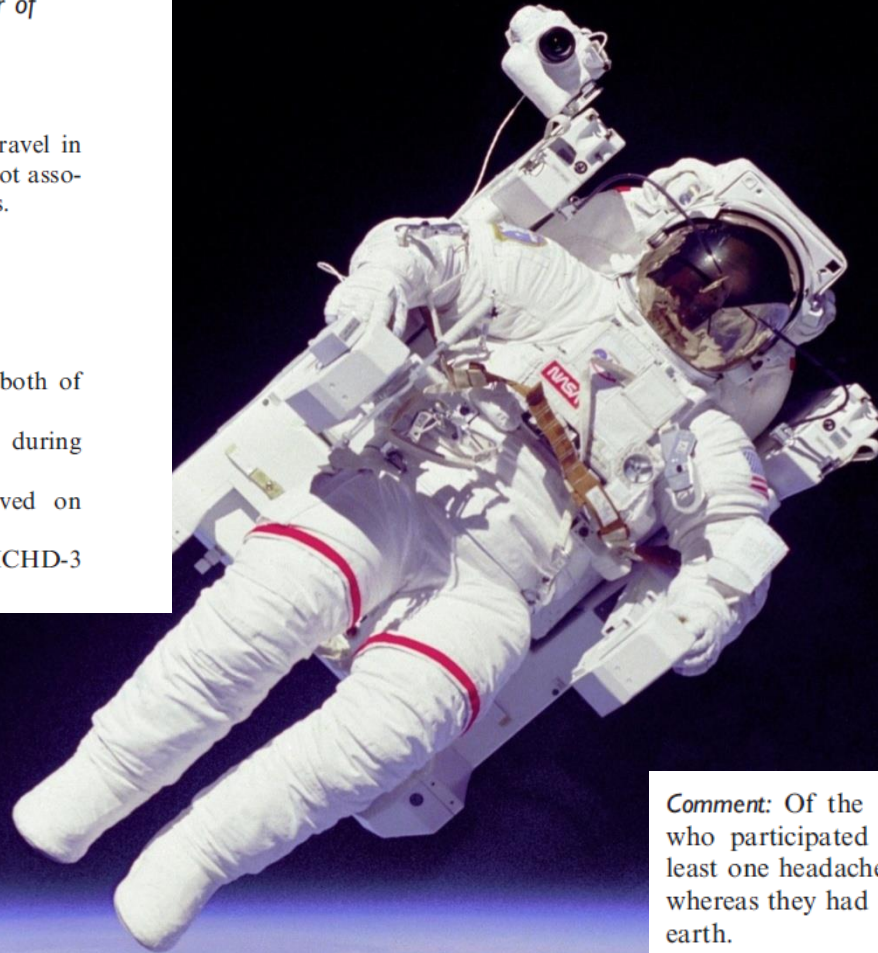
*A10.8 Headache attributed to other disorder of homoeostasis*

*A10.8.1 Headache attributed to travel in space*

*Description:* Non-specific headache caused by travel in space. The majority of headache episodes are not associated with symptoms of space motion sickness.

*Diagnostic criteria:*

- A. Any new headache fulfilling criterion C
- B. The subject has travelled through space
- C. Evidence of causation demonstrated by both of the following:
  1. headache has occurred exclusively during space travel
  2. headache has spontaneously improved on return to earth
- D. Not better accounted for by another ICHD-3 diagnosis.



*Comment:* Of the 16 male and one female astronauts who participated in a survey, 12 (71%) reported at least one headache episode experienced while in space, whereas they had not suffered from headache when on earth.

*Vein et al. 2009.*

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