THE INSTITUTE OF OPTOMETRY

"The Institute of Optometry is unique in being an independent self-financing charity dedicated to the promotion of clinical excellence, research, and education in optometry."
Roberson (1989)

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Taking the headache out of headaches

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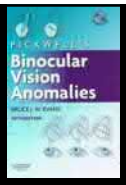
DISCLOSURE



- Funding for lectures, KOL/product feedback, research:
  - Alcon, American Academy of Optometry (UK), Association of Optometrists, Birmingham Focus on Blindness, Black & Lizars, Central (LOC) Fund, Cerium Visual Technologies, College of Optometrists, Coopervision, ESRC, General Optical Council, Hoya, International Institute for Colorimetry, Institute of Optometry, Iris Fund for Prevention of Blindness, Johnson & Johnson, Leightons, MRC, Norville, Optos, Paul Hamlyn Trust, Perceptive, Scrivens, Specsavers, Thomas Pocklington Trust.
  - Lecture content always my own
- Author of Pickwell's Binocular Vision Anomalies, editions 3-5
- i.O.O. Sales Ltd markets IFS Orthoptic Exercises, which the speaker designed, for which he receives a small royalty
- Community optometric practice in Brentwood, Essex

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Role of the optometrist

introduction

classification — diagnosis

visual triggers — visual treatment

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International Classification of Headache Disorders (ICHD-3, 2018)

Headaches

Primary	Secondary	Secondary (cont.)
1. Migraine	5. Head/neck trauma	10. Disorder of homeostasis (e.g., endocrine)
2. Tension	6. Vascular	11. Disorder of facial or cranial structures (inc. eye)
3. Cluster (Trigeminal autonomic cephalalgias)	7. Non-vascular intra-cranial disorder	12. Psychiatric disorder
4. Other primary headaches	8. Substances or their withdrawal	13. Painful lesions of cranial nerves (neuralgias) & other facial pain
	9. Infection	14. Other

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4.	**Other primary headache disorders**	
4.1	Primary cough headache	A10.8.1 Headache attributed to travel in space
4.1.1	Probable primary cough headache	
4.2	Primary exercise headache	
4.2.1	Probable primary exercise headache	
4.3	Primary headache associated with sexual activity	
4.3.1	Probable primary headache associated with sexual activity	
4.4	Primary thunderclap headache	
4.5	Cold-stimulus headache	
4.5.1	Headache attributed to external application of a cold stimulus	
4.5.2	Headache attributed to ingestion or inhalation of a cold stimulus	
4.5.3	Probable cold-stimulus headache	
4.5.3.1	Headache probably attributed to external application of a cold stimulus	
4.5.3.2	Headache probably attributed to ingestion or inhalation of a cold stimulus	
4.6	External-pressure headache	
4.6.1	External-compression headache	
4.6.2	External-traction headache	
4.6.3	Probable external-pressure headache	
4.6.3.1	Probable external-compression headache	
4.6.3.2	Probable external-traction headache	
4.7	Primary stabbing headache	
4.7.1	Probable primary stabbing headache	

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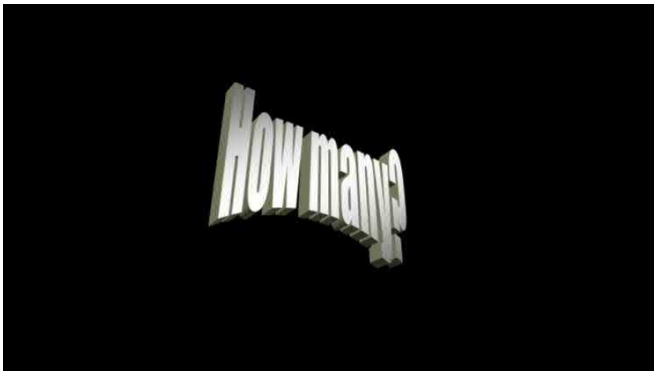

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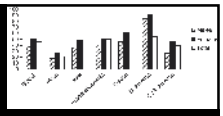
Prevalence in the real world



- Prevalence varies in different countries (Stovner et al., 2007)
- Marked difference in the two sexes (Lebedeva et al 2016)
- Marked effect of social groups & age (Lebedeva et al 2016)

Table 2. One-year crude prevalence of headache disorders according to ICHD-3 beta in blood donors, workers and students.

	Male (*n* = 1775)			Female (*n* = 1349)			All (*n* = 3124)		
Diagnosis[a]	Donors 33y (*n* = 523)	Workers 40y (*n* = 929)	Students 21y (*n* = 323)	Donors 33y (*n* = 484)	Workers 40y (*n* = 146)	Students 21y (*n* = 719)	Donors 33y (*n* = 1007)	Workers 40y (*n* = 1075)	Students 21y (*n* = 1042)
Migraine without aura	19 (3.6%)	41 (4.4%)	45 (13.9%)	74 (15.3%)	24 (16.4%)	202 (28.1%)	93 (9.2%)	65 (6.0%)	247 (23.7%)
Migraine with aura	4 (0.7%)	10 (1.1%)	2 (0.62%)	17 (3.5%)	3 (2%)	38 (5.3%)	21 (2.1%)	13 (1.2%)	40 (3.8%)
Chronic probable migraine	1 (0.2%)	0 (0%)	0 (0%)	3 (0.6%)	0 (0%)	1 (0.1%)	4 (0.4%)	0 (0%)	1 (0.1%)
Probable migraine	1 (0.2%)	1 (0.1%)	1 (0.3%)	0 (0%)	0 (0%)	9 (1.2%)	1 (0.1%)	1 (0.1%)	10 (0.9%)
Episodic TTH	307 (58.7%)	301 (32.4%)	250 (77.4%)	311 (64.3%)	94 (64.4%)	526 (73.2%)	618 (61.4%)	395 (36.7%)	776 (74.5%)
Chronic TTH	4 (0.8%)	1 (0.1%)	6 (1.9%)	7 (1.4%)	2 (1.4%)	26 (3.6%)	11 (1.1%)	3 (0.3%)	32 (3.1%)
Cluster headache	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.1%)	0 (0%)	0 (0%)	1 (0.1%)
Medication-overuse headache (analgesics)	0 (0%)	4 (0.4%)	6 (1.9%)	8 (1.6%)	0 (0%)	26 (3.6%)	8 (0.8%)	4 (0.4%)	32 (3.1%)

[a]Diagnoses are not mutually exclusive.

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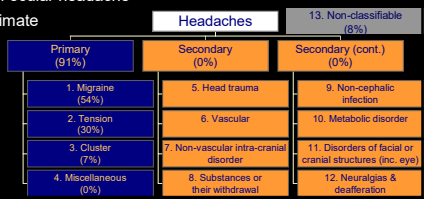
Never ask a clinician about prevalence!

- In a headache clinic sample of 100, no secondary headaches and most were migraine Leone et al (1993)
- In an "emergency room", 26% were secondary headaches & the most common primary headache was migraine Munoz-Ceron et al. (2019)
- In both studies, no cases of ocular headache
- BUT, optometrists over-estimate prevalence of headaches from ocular origin



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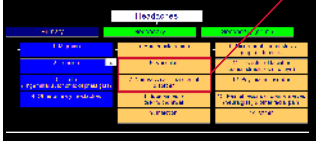
ICHD-3 (cont.)



- Secondary
  - 6. Vascular
    - 6.1 Ischaemic
    - 6.2 Haemorrhage (inc. sub-arachnoid)
    - 6.3 Vascular malformation (inc. aneurysm)
    - Arteritis
    - Hypertension
  - 7. Non-vascular intra-cranial disorder
    - Intracranial hypertension
    - intracranial hypotension
    - Intracranial infection
    - Intracranial inflamm. disease
    - Intrathecal injections
    - Intracranial neoplasm
    - Other intracranial disorder

- If sub-arachnoid haemorrhage:
  - Very severe (thunderclap), vomiting, photophobia
  - Bilateral

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Differential diagnosis: the signs

1. Essentially, know the typical, refer the atypical
2. "first or worst" rule
3. SNOOP
   a) **S**ystemic symptoms / signs / disease
   b) **N**eurological Disease
   c) **O**nset Sudden (thunderclap)
   d) **O**nset after the age of forty
   e) **P**attern change to the headaches

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International Classification of Headache Disorders (ICHD-3, 2018)

- Headaches
  - Primary
    - 1. Migraine
    - 2. Tension
    - 3. Cluster (Trigeminal autonomic cephalalgias)
    - 4. Other primary headaches
  - Secondary
    - 5. Head/neck trauma
    - 6. Vascular
    - 7. Non-vascular intra-cranial disorder
    - 8. Substances or their withdrawal
    - 9. Infection
  - Secondary (cont.)
    - 10. Disorder of homeostasis (e.g., endocrine)
    - 11. Disorder of facial or cranial structures (inc. eye)
    - 12. Psychiatric disorder
    - 13. Painful lesions of cranial nerves (neuralgias) & other facial pain
    - 14. Other

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- visual treatment

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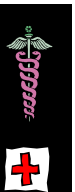
Migraine: should I refer them all?



- Migraine is third most prevalent disorder in the world (GBD2010)
- Typical migraine does not need neuro-imaging (American Academy of Neurology,1994; Detsky et al., 2006; Davies, 2018)
- If diagnosis is obvious, no need for medical investigation
  - Letter of information to GP
- If not very frequent, try analgesics first
  - See GP if not fully effective
- Instruct to use diary
  - Identify any triggers → prevention

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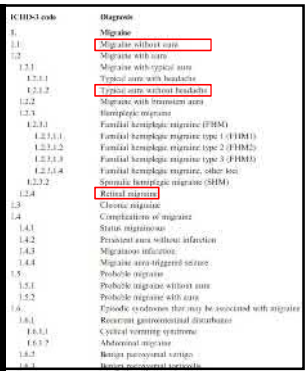
MIGRAINE WITHOUT AURA: at least 5 attacks which:

- last 4-72 hrs (untreated)
- have at least 2 of the following:
  - unilateral
  - pulsating
  - moderate/severe
  - aggravated by routine physical activity
- during HA at least 1 of the following
  - nausea and/or vomiting
  - photophobia and phonophobia

That's it!



IHS (2018), ICHD-3

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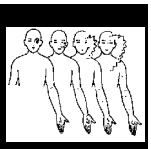
MIGRAINE WITH AURA: 2+ attacks with:



- fully reversible aura symptoms
  - e.g., vision, sensory, speech/language, motor, brainstem, retinal
- at least 3 of the following:
  - at least one aura symptom develops gradually over 5mins+ and/or
  - two or more symptoms occur in succession
  - each symptom lasts 5-60min
  - at least one aura symptom is unilateral
  - at least one aura symptom is positive
  - aura accompanied and/or followed with 60min by HA

IHS (2018), ICHD-3

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Optometric correlates of migraine

- Subtle pupillary anomalies (Harle & Evans, 2004;Harle et al., 2005)
- Little evidence of visual field defects or increased risk of glaucoma (Harle & Evans, 2006a;Harle & Evans, 2005)
- Slightly higher prevalence of astigmatism and anisometropia (Harle & Evans, 2004;Harle & Evans, 2006c)
- Slightly higher prevalence of heterophoria and fixation disparity, but not usually a trigger (Harle & Evans, 2004;Harle & Evans, 2006b)
- The strongest visual correlate of migraine is pattern glare, which can be a migraine trigger (Harle & Evans, 2004;Harle et al., 2006)

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Pattern glare

- High prevalence in:
  - Visual stress
  - Migraine
  - Photosensitive epilepsy
  - Autism

DO NOT VIEW THIS IF YOU HAVE EPILEPSY OR MIGRAINE

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Vision & headache: *Coloured filters*

- Pattern glare is prevalent in migraineurs (Wilkins et al., 1984; Marcus and Soso, 1989 Evans et al., 2002; Harle et al., 2006)
- "what may be inherited in migraineurs is an abnormal biological threshold to a variety of visual stimuli" (Wray et al., 1995)
- review of evidence linking Meares-Irlen Syndrome, visual stress, photosensitive migraine & epilepsy (Wilkins, 1995)
- of 323 people seen in IoO SpLD clinic, 53% had more than 6 HA a year. 45% of these had at least 3 "associated factors" suggesting migraine (Evans et al., 1999)

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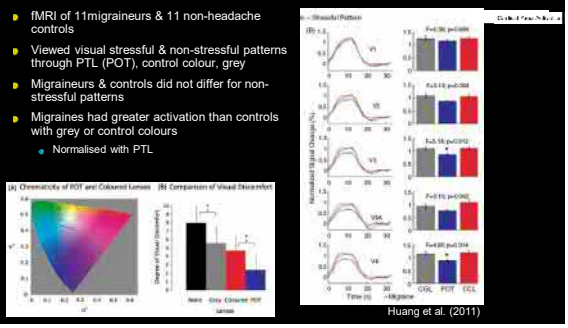
PTL reduce cortical hyperactivation in migraine

- fMRI of 11migraineurs & 11 non-headache controls
- Viewed visual stressful & non-stressful patterns through PTL (POT), control colour, grey
- Migraineurs & controls did not differ for non-stressful patterns
- Migraines had greater activation than controls with grey or control colours
  - Normalised with PTL



Huang et al. (2011)

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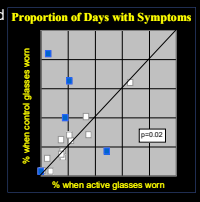
Double-masked placebo-controlled trial of Precision Tints in people with migraine

INTRODUCTION: the first double-masked placebo-controlled trial of precision tinted lenses for migraine

RESULTS: Precision Tinted lenses reduce frequency of migraines for reasons that cannot be solely attributed to a placebo

IMPACT: a new use for the Intuitive Colorimeter

Wilkins, Patel, Adjamian, Evans (2002)



BUT: probably <10% of migraineurs need PTL Harle (2007)

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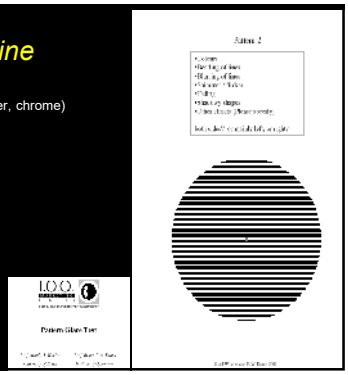
Visual triggers for migraine

- Glare (Debney, 1984)
  - Sun reflections (water, beach, snow, paper, chrome)
  - Bright lights
  - Windows [e.g., blinds]
- Flicker (Debney, 1984)
  - Sun through trees/railings/etc
  - Stroboscopes (e.g., clubbing)
  - Faulty fluorescent lights [& non-faulty]
  - Television or cinema
  - Light in traffic tunnels
  - Flashlights or headlights
- Patterns (Wilkins, 1995)
  - Carpets, escalators, shirts
  - Text



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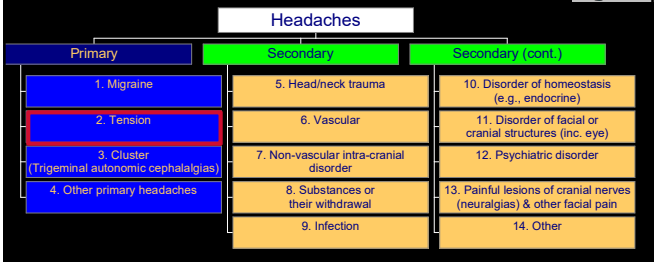
International Classification of Headache Disorders (ICHD-3, 2018)



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Tension-type headache: >10 attacks which:

- last 30 mins - 7 days
- have at least 2 of the following:
  - bilateral
  - pressing/tightening (not pulsating)
  - mild/moderate (inhibits, not prohibits, daily activities)
  - not aggravated by routine physical activity
- both of the following
  - no nausea or vomiting
  - not both photophobia & phonophobia
- frequent, infrequent, and chronic varieties

IHS (2018), ICHD-3

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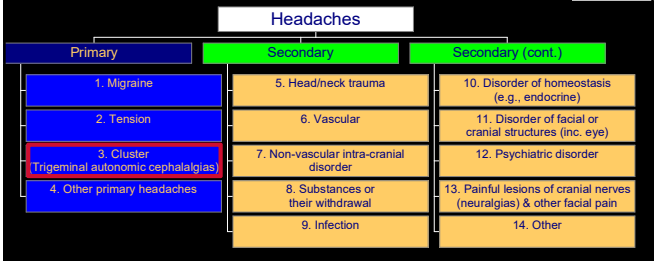
International Classification of Headache Disorders (ICHD-3, 2018)



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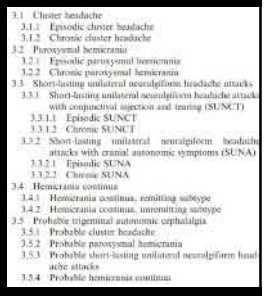
CLUSTER HA: 5+ attacks which:

- severe unilateral orbital, supraorbital and/or temporal pain lasting 15-180mins untreated
- HA associated with at least 1 of the following:
  - ipsilateral conjunctival injection and/or lacrimation
  - ipsilateral nasal congestion and/or running nose
  - ipsilateral eyelid oedema
  - ipsilateral forehead and facial sweating
  - ipsilateral miosis and/or ptosis
  - sense of restlessness and/or agitation
- frequency of attacks: 1 every other day to 8 per day



IHS (2018), ICHD-3

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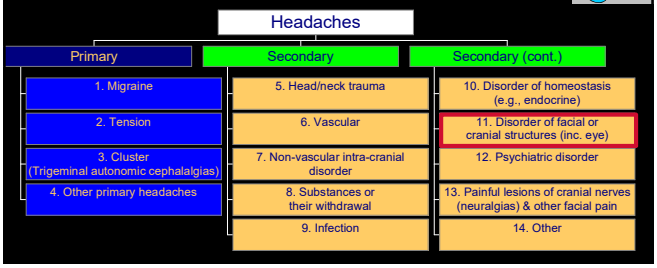
International Classification of Headache Disorders (ICHD-3, 2018)



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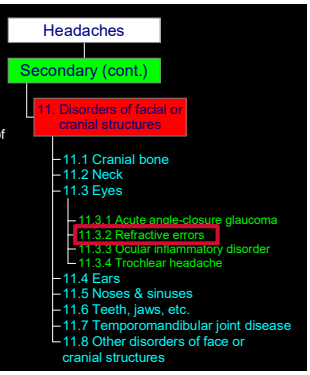
International Classification of Headache Disorders (ICHD-3)

- Compared with ICHD-2:
  - Relegated heterophoria to Appendix "because of insufficient evidence of their existence"



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11.3 EYES:
11.3.2 Refractive errors

- un- or mis-corrected Rx
- absent on wakening, worse with prolonged relevant tasks
- evidence of causation
  - Temporal relation to Rx
  - Improves after Rx corrected
  - Aggravated by prolonged visual tasks
  - Improves when task discontinued

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Asthenopia headache: received wisdom

- "Headache is the commonest symptom associated with eyestrain. This occurs in almost every possible variety"
- All "obscure headaches" should have eye exam before medical treatment. Rule out:
  - Environmental factors
  - Refractive error
  - Binocular vision anomaly
  - IOP, fields, discs, vessels (Duke-Elder, 1970)
- No form of headache is specific to eye-related disorders (Ball, 1982)

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Headache diary

Enter every headache you experience in the table below. Impact ratings can be graded as: none, mild, severe, totally disabled
Intensity ratings can be graded as: mild, moderate, severe, very severe. Tick any of the "triggers" that describe your activities before the headache. "Hormonal" refers to certain times in women's monthly cycle. "flickering" refers to flickering fluorescent lights, discos, or lights flickering through trees; "patterns" refers to striped patterns. When you have completed the table, if any frequent triggers become apparent then try avoiding these. If visual stimuli (flickering, patterns, reading) are triggers then precision tinted lenses may help. At Cole Martin Tregaskis Optometrists we have a special instrument, the Intuitive Colorimeter, to test for these; please telephone for an appointment.

Date	Time	Impact	Intensity	Medicine Taken	Dosage	Time to Relief	Hormonal	Bright lights	Tiredness	Computer	Chocolate	Bad sleep	Bad diet	Flickering	Patterns	Reading	Comments

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Role of the optometrist

- classification
- diagnosis
- visual triggers
- visual treatment

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Conclusions

- Optometrists can diagnose commonplace headaches
  - Know the normal: refer the abnormal asap
- Refractive errors or binocular vision anomalies can trigger headaches
- Precision tinted lenses help some people with headaches (migraine)
  - These people usually know they have visual triggers

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A personal perspective: Dr Optometry

- In 2008 the Institute of Optometry launched a Doctor of Optometry degree in collaboration with London South Bank University
- 5 year part time professional doctorate
  - Year 1 has 13 taught days & 2 assignments
  - Year 2 has 8 taught days & 2 assignments
  - Years 3-5 are supervised doctoral research
    - Research most likely to be clinical, in practice
- "the ultimate qualification for UK optometrists"

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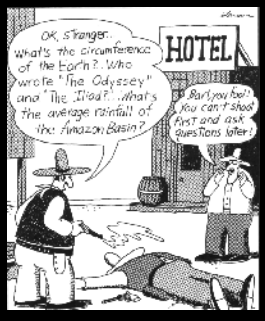

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