Headaches

Dr. Elliott Bogusz

Neurology FRCPC, CSCN (EMG)

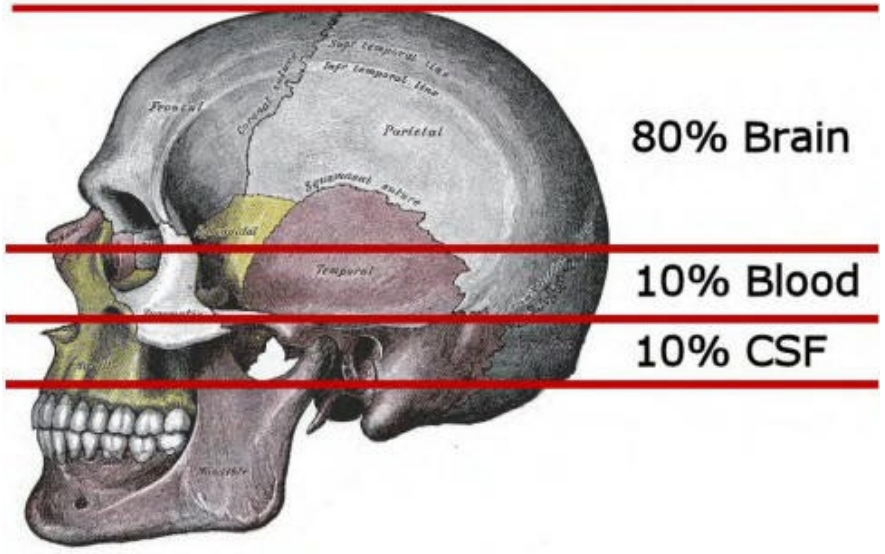
Outline

- Red Flags
- Diagnosis of Migraine/Tension Headache
- Headache Management
  - Lifestyle
  - Acute
  - Preventative
- Headache Diary
- Headache Referral
- Questions

HEADACHE

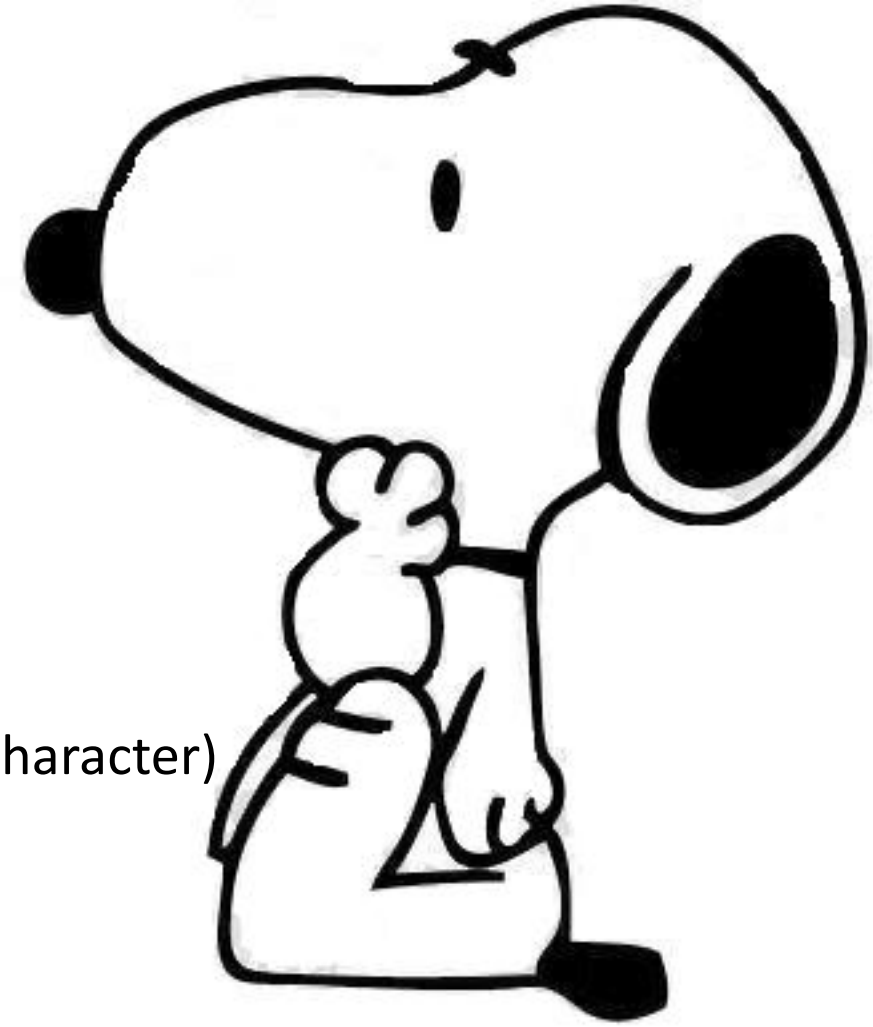
Broad Classification

- Primary Headache
  - Tension, migraine, trigeminal autonomic cephalgia
- Secondary Headache
  - Extracranial
    - Dissection, dental, sinusitis, glaucoma
  - Intracranial
    - Parenchyma – tumor, infection, trauma
    - Vascular – SAH (aneurysm), SVT, vasculitis (ie GCA), AVM, HTN
    - CSF – IIH, leak, obstructive hydro
  - Drugs
    - Caffeine/analgesia withdrawal, nitrates, CO



Red Flags - SSNOOPPP

- Systemic symptoms
  - constitutional sx, stiff neck
- Secondary risk factors
  - Cancer, HIV/immunocompromised, pregnancy
- Neurological symptoms/abN signs
- Onset
  - Thunderclap; new onset of chronic headache
- Older patient (new headache age>50)
- Previous headache different
  - Significant change in headache features (frequency/character)
- Positional component
  - Worse stand/supine, valsalva
- Provocative factors
  - Cough/exercise/sex



When to image (Choosing wisely Canada)

Uncomplicated Headache

The Canadian Association of Radiologists' headache guideline released in 2012 states that in the absence of the following features, imaging is not often helpful. These features significantly increase the likelihood of finding a major abnormality and justify requesting diagnostic imaging:

- Recent onset and rapidly increasing frequency and severity of headache
- Headache causing the patient to wake from sleep
- Associated dizziness, lack of coordination, tingling or numbness, new neurologic deficit
- New onset of a headache in a patient with a history of cancer or immunodeficiency

Case 1 - pregnancy

- 28F 32 weeks gestation with a history of migraine presents with new headache for 1week after a gastrointestinal illness and has developed some persistent left leg sensory symptoms. What are your top differential diagnosis?

1. Pituitary apoplexy
2. Subarachnoid hemorrhage
3. Dissection
4. Pre-eclampsia
5. Dural Sinus Venous Thrombosis

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Pituitary apoplexy **A**

Subarachnoid hemorrhage **B**

Pre-eclampsia **C**

Sinus Venous Thrombosis **D**

Secondary Headaches in Pregnancy

- Dural Sinus Venous Thrombosis
- Pre-Eclampsia
  - Posterior Reversible Encephalopathy Syndrome (PRES)
  - Reversible Vasoconstrictive Syndrome (RCVS)
- Pituitary Apoplexy
- SAH or intracranial hemorrhage
- Dissection
- Pseudotumor Cerebri
- Meningitis/Encephalitis

Thunderclap Headaches

- Aneurysm
- Pituitary Apoplexy
- Reversible Cerebral Vasoconstrictive Syndrome
- Exercise/Coital/Cough
- Dissection
- Idiopathic

Older patient

- Giant Cell Arteritis/Temporal arteritis
  - Jaw claudication, tender temples, prominent temporal arteries
  - Check baseline vision
- Ischemic/Hemorrhagic stroke
- Hypnic Headaches
- Cervicogenic

AM headaches

- Sleep apnea
- Migraine
- Intracranial space occupying lesion causing increased ICP
- Chronic daily headache

Case 2 – Positional

- 27M snowboarder present 1 month after trauma to the upper back with 3 days of new persistent holocephalic headache. Headache rated 6/10 with standing and gets to 8/10 after a few minutes, but rated 2/10 supine. Also notes with cough or bending over that headache is worse. What would you like to do?

1. Send to the neurologist outpatient
2. MRI brain outpatient
3. Send to the hospital
4. Give him a prescription for naproxen and suggest increasing his fluids.

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MRI brain outpatient

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Positional Headaches

- Idiopathic Intracranial Hypertension (pseudotumor cerebri)
  - Transient visual obscuration
  - Horizontal diplopia secondary VI palsy
  - Decreased visual acuity (need baseline ophto exam – fundi, OCT)
- Intracranial hypotension
  - Post lumbar puncture (investigational, epidural)
  - Post traumatic
  - Idiopathic
  - Treatment – analgesic, fluid++, caffeine, blood patch

Case 3 – to LP or not to LP

- 54F presents with mild fever, new moderate headache, confused and new memory deficits. No focal deficit on examination, scores 0 on delayed recall and has difficulty word finding. She has no menigismus signs (Babinski, Kernig, neck stiffness, head jolt accentuation).

1. No LP she has no head jolt accentuation
2. CT head
3. MRI head
4. Lumbar Puncture post CT head

JAMA, July 14, 1999—Vol 281, No. 2 175

Does This Adult Patient Have Acute Meningitis?

One of the most sensitive maneuvers in the diagnosis of meningitis is jolt accentuation of headache as described by Uchihara and Tsukagoshi.[17] Of 34 patients with pleocytosis in this study, 30 had meningitis and 4 had other conditions. Jolt accentuation of headache was present in 33 of these patients compared with 8 of 20 patients without pleocytosis, yielding a sensitivity of 97% and a specificity of 60%. The associated positive likelihood ratio was 2.4, and the negative likelihood ratio was 0.05. If we calculate the likelihood ratios specifically for those patients with meningitis, we obtain a sensitivity of 100%, a specificity of 54%, a positive likelihood ratio of 2.2, and a negative likelihood ratio of 0. In patients presenting with fever and headache, a lack of jolt accentuation of headache on physical examination may essentially exclude meningitis. The main limitation to widespread application of these

Clinical Neurology and Neurosurgery 112 (2010) 752–757

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journal homepage: www.elsevier.com/locate/clineuro

Accuracy of physical signs for detecting meningitis: A hospital-based diagnostic accuracy study

Swati Waghdhare, Ashwini Kalantri, Rajnish Joshi, Shriprakash Kalantri*

	Nuchal rigidity		Head jolt sign		Kernig's sign		Brudzinski's sign	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
Meningitis Present	39	60	6	93	14	85	11	88
Meningitis Absent	27	64	1	90	7	84	6	85
Sensitivity	39.4 (29.7, 49.7)		6.06 (2.26, 12.7)		14.1 (7.95, 22.6)		11.1 (5.68, 19)	
Specificity	70.3 (59.8, 79.5)		98.9 (94, 100)		92.3 (84.8, 96.9		93.4 (86.2, 975)	
LR +	1.33 (0.89, 1.98)		5.52 (0.67, 44.9)		1.84 (0.77, 4.35)		1.69 (0.65, 4.37)	
LR-	0.86 (0.7, 1.06)		0.95 (0.89, 1.0)		0.93 (0.84, 1.03)		0.95 (0.87, 1.04)	

Case 4 – Black, white and grey primary HA

- 35F healthy, history of headaches ~q2months when skipping meals/fluids. Last month develops 3 times per weak a bilateral severe headache lasting all day with photophonophobia but no nausea. No aura. No migraines in the family. Normal exam (including fundoscopy). What primary headache does she have?

1. Classic Migraine
2. Common Migraine
3. Tension headache

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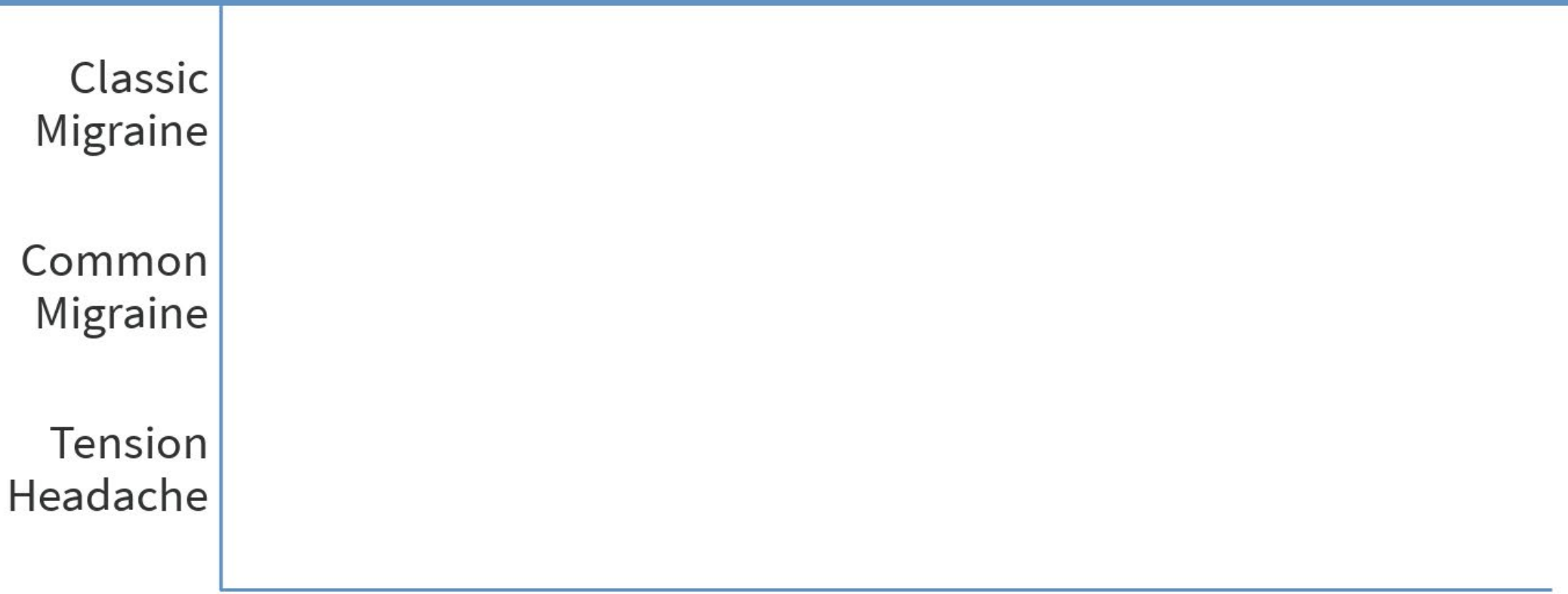

Migraine (vs Tension Headache)

4 hours **30min**

3 days **7 days**

2 of

1. unilateral location **BILATERAL**
2. pulsating quality **TIGHT/PRESSURE**
3. moderate or severe pain intensity **MILD**

NOT AGGREVATED by or causing avoidance of routine physical activity

1 of

NO nausea and/or vomiting

2. photophobia **OR** phonophobia

Visual aura

- Positive phenomena
  - Photopsias: spots, dots, stars, flashes/streak of light, simple geometric forms/patterns
  - Scintillating scotoma: arc/band with shimmering zigzag border
- Negative phenomena
  - Incomplete/complete loss of vision in portion/complete visual fields
  - Typically hemi distribution
- Consider PRES, RCVS, dissection

”Sinus Headache”

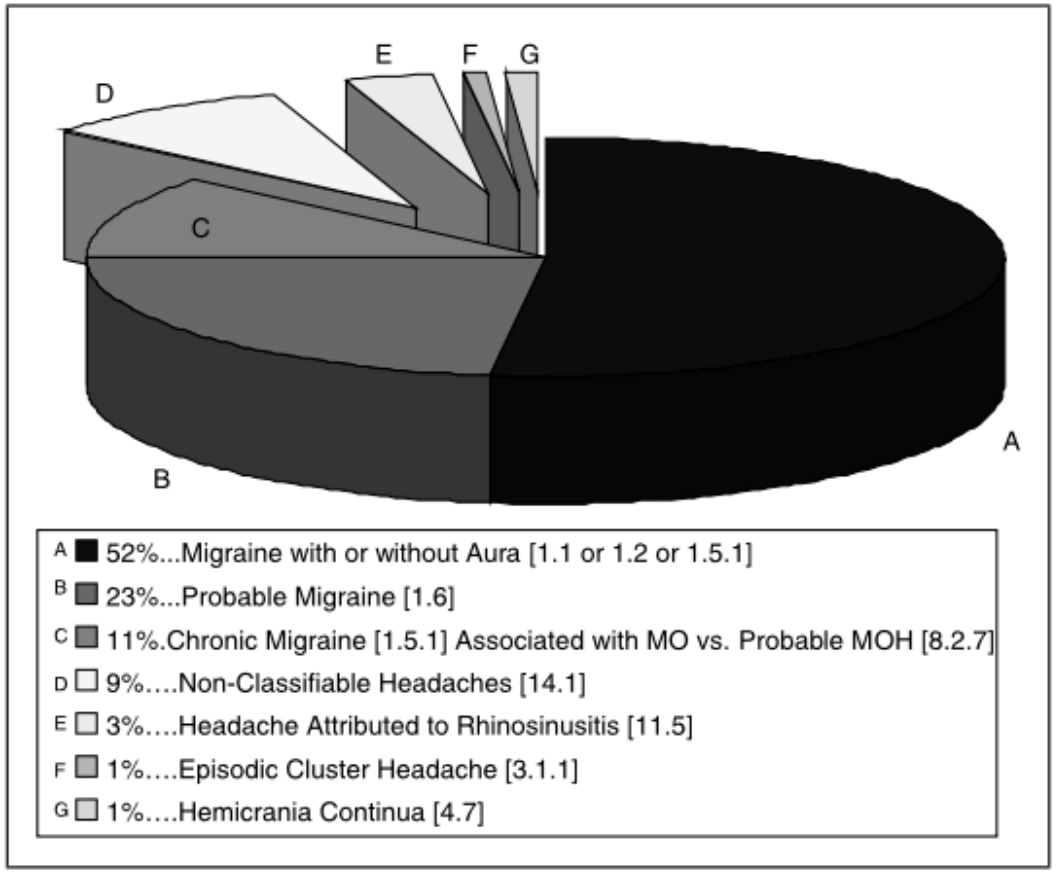

Fig 1.—Overview of actual IHS headache diagnosis that was being mistaken by subjects (n = 100) as “sinus headache.” (*Headache* 2007;47:213-224)

Sinus disease

- Maxillary (ears/teeth pain, nasal/teeth palpation/percussion tender)
  - Purulent/mucus discharge, decreased smell, rhinorrhea (when chronic)
- Frontal (behind eye and for head)
  - Strong local pressure (worse on awakening and plastering day)
  - Sensitive to percussion
- Ethmoid (retro-orbital and temporal
  - eyes sensitive to pressure with normal optic exam
  - Purulent discharge at rear pharyngeal wall
  - Injury to eyelid swelling and chemosis)
- Sphenoid (orbital and vertex pain -> forhead, ear and mastoid)

Case 5 – Severe headache

- 40F smoker, new onset right sided retro-orbital severe headache and cannot seem to find a comfortable position. They last for 30minutes and improve (not resolve) when she takes indomethacin (took her husband gout meds), occur several times a day, accompanied by tearing and running nose. What do you suspect she has?

1. Migraines
2. Cluster headaches
3. Paroxysmal hemicrania
4. Tooth abscess
5. Sinus infection

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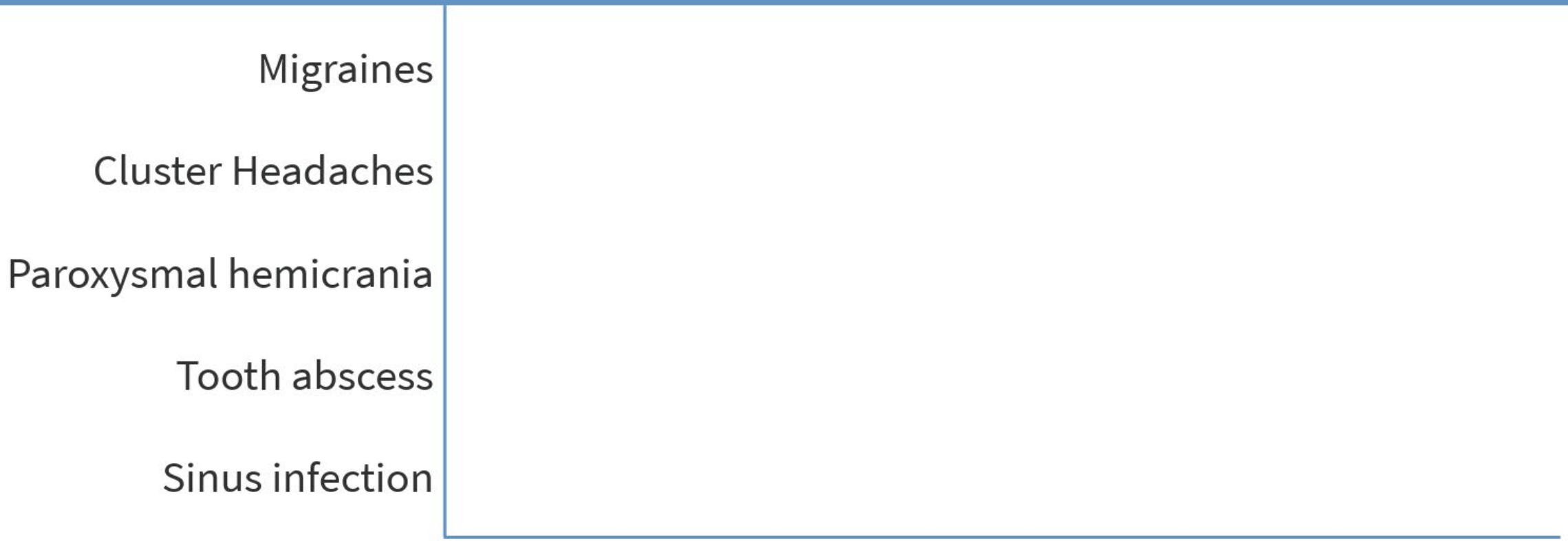
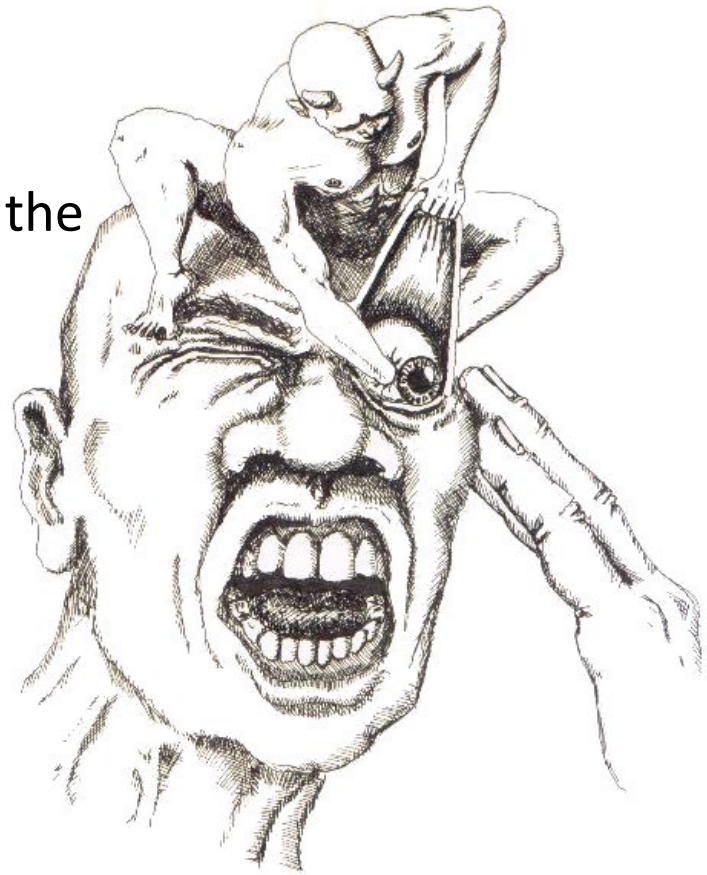


Trigeminal Cephalgia

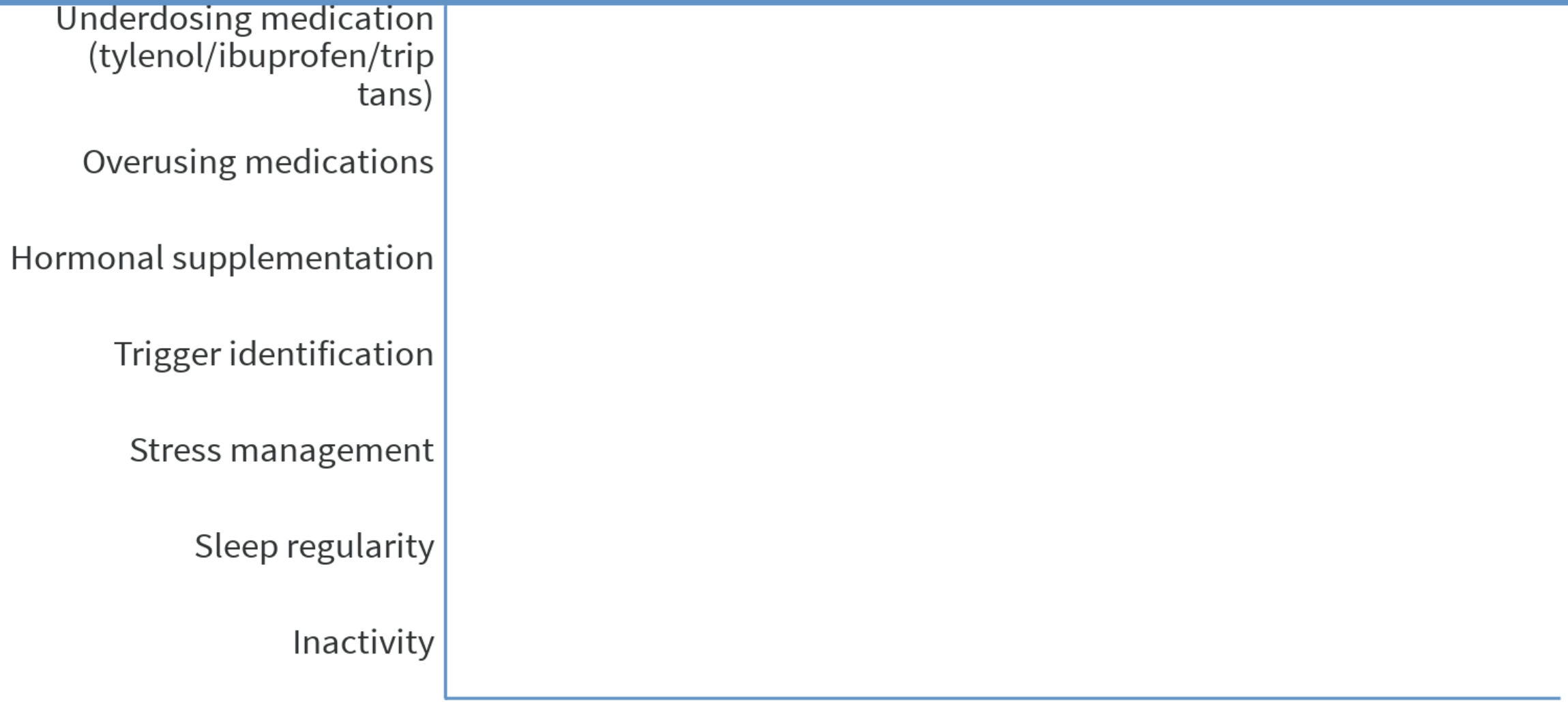
- Paroxysmal Hemicrania 2 -30 min (>5 day 50% of cases)
- Cluster 15 min – 3 hr (q2d – x8/day)
- Severe or very severe unilateral orbital, supraorbital and/or temporal pain
- Either or both of the following:

A. at least one of the following symptoms or signs, ipsilateral to the headache:
   1. conjunctival injection and/or lacrimation
   2. nasal congestion and/or rhinorrhoea
   3. eyelid oedema
   4. forehead and facial sweating
   5. forehead and facial flushing
   6. sensation of fullness in the ear
   7. miosis and/or ptosis

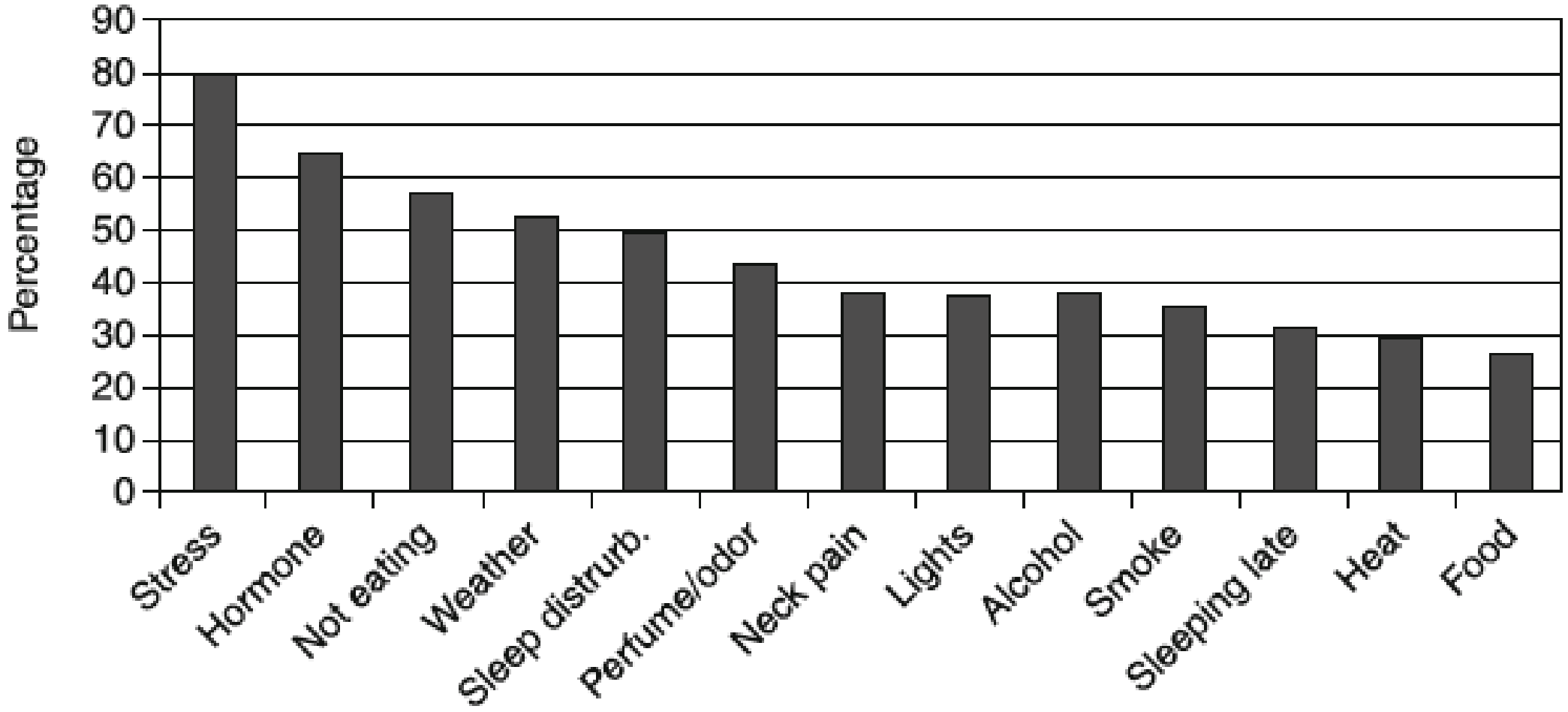
B. a sense of restlessness or agitation



Which are common issues in treating headache?



Migraine Triggers



Cephalalgia, 2007, **27**, 394–402

Menstrual headaches

- Fulfilling criteria for migraine without aura
- Attacks occurring on day - 2 to +3 in 2 of 3 consecutive cycles

- tends to be longer, severe and resistant to treatment
- Estrogen effects on CNS
  - Nociception, serotonin tone, increased NO, triggers CSD, reduction triggers prostaglandin secretion

Food

- Regular meals
- Trigger foods
  - Chocolate
  - Aged cheeses
  - Alcohol
  - MSG/hydrolyzed protein
  - Processed meats (nitrites)
  - Citrus

Role of caffeine in migraines

- Pain reliever
- Chronicity (doses >200mg/day)
- Withdrawal headache

- Factors shared with opioids
- Note all sources of caffeine (soda, tea, energy drinks, energy supplements)
- Trial cessation (or at least restriction)

Sleep

- Bedtime, sleep time, awakenings, wakeup time, get up time
- Estimated hours sleeping
- Restorative sleep
- Snoring, anxiety/panic, restless legs, pain
- Daytime fatigue

- Circadian rhythms – light from hand-held devices delays sleep onset
- Sleep hygiene – regular time weekend and weekdays

Sleep hygiene

- Maintain regular sleep–wake cycles on weekends/weekdays
- Dark, quiet and comfortable sleep environment
- Avoid stimulants and limit alcohol use
- Avoid psychological insomnia by relieving bed if not promptly returning to sleep
- Circadian rhythms – light from hand-held devices delays sleep onset

Physical Activity

- Target 30min, 3 times per week
  - Start 5min/day
  - Find something you enjoy
  - Get your heartrate up
- Equivalent to topiramate
- Match with good nutrition/hydration

Exercise as migraine prophylaxis: A randomized study using relaxation and topiramate as controls

Cephalalgia
31(14) 1428–1438

DOI: 10.1177/0333102411419681
cep.sagepub.com
SAGE

- 3 months (# reduced attack)
  - 3x/wk 40 min cycling (0.93)
  - x6 weekly session relaxation (0.83)
  - topiramate (max 200mg/day) (0.97)

Case 7 - Medications

- 29M with episodic daily headache has increasing use of Tylenol and ibuprofen, alternating medication every other day. Experiences migraine twice per week as well that respond well to triptan. Otherwise regular food, fluids, sleep and physical activity. What do you do next

1. It’s time for some cold turkey
2. More medication!
3. Time for a diary
4. Refer him to neurology pronto

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More medication!

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Acute Treatment

MEDICATION OVERUSE HEADACHE

- Mild to moderate migraine headache
  - Tylenol 1000mg +/- metoclopramide
- All severity migraines
  - Ibuprofen 400mg
  - ASA 1000mg +/- metoclopramide
  - Diclofenac 50mg
  - Naproxen 550mg or 875mg

<15 days/month

Consider quick release formulations

Acute Treatment

MEDICATION OVERUSE HEADACHE

- Triptans
  - Short acting (MSP covered) – Sumatriptan, Rizatriptan
  - Longer acting – Frovatriptan, Naratriptan
  - Repeat dose in 2hr for short-acting and 4hr for long-acting
  - Try different triptan if 1st ineffective
    - Studies of almotriptan, eletriptan and naratriptan after sumatriptan failure
  - Combine with NSAID (particularly naproxen)
- Avoid narcotics (T#3, oxycodone, morphine)
- Avoid caffeine added (Excedrin/Anacin)

<10 days/month

Medication Overuse Headache

- Chronic Migraine
  - 15 headache/month, 4+hr/day, x3 months
  - Episodic migraine can convert to chronic migraine particularly with medication overuse, but this is reversible
- Risk factors
  - Caucasion, low education, previous marriage, obesity, diabetes, arthritis, top quartile of caffeine use, stressful life events, head injury, snoring, medication overuse, high baseline headache frequency
  - Less reversion with <high school education, caucasion, 25-31 headache days
- Different medications
  - 5 days/month with opiates

Continuum Lifelong Learning Neurol 2012;18(4):807–822.

Headache Diary/Calendar/App

Month

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	T
Headache 0 1 2 3*																																
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STABLE Prev																																
NEW prev																																
Notes																																

Number of days for each HA severity				
0	1	2	3	Tot

Total number of days with any acute medication intake

Quick reminder:

Headache severity: 0 = headache free day 1= mild, can function 2=moderate, slowed 3= severe cannot function * = miss work or personal activity

Effectiveness of acute tx: S = success P = pa E = side effects

Acute treatment: taken as needed for an attack / dache frequency

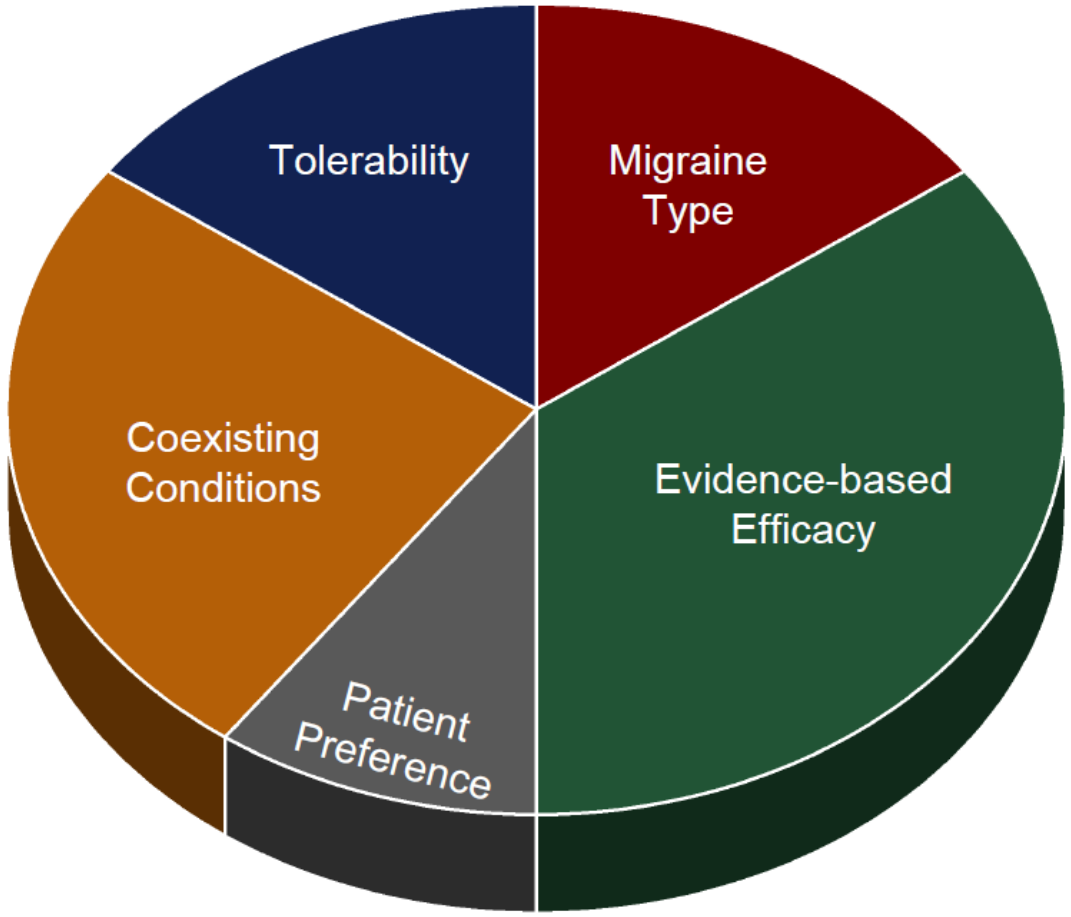
Migraine Prophylaxis

- Outpatient/office visits decrease from 35-50%
- Emergency room visit decreased 50-80%
- CT scans reduced by 75%
- MRI scans reduced by 88%

- Interfere with patient QOL & daily routine
- 4+ attacks/month OR 8 headache days/month
- Failure/contra-indication/overuse of acute treatments

Headache 2003;43(3):171-178
Headache 2007;47(4):500Y510

Prophylaxis selection



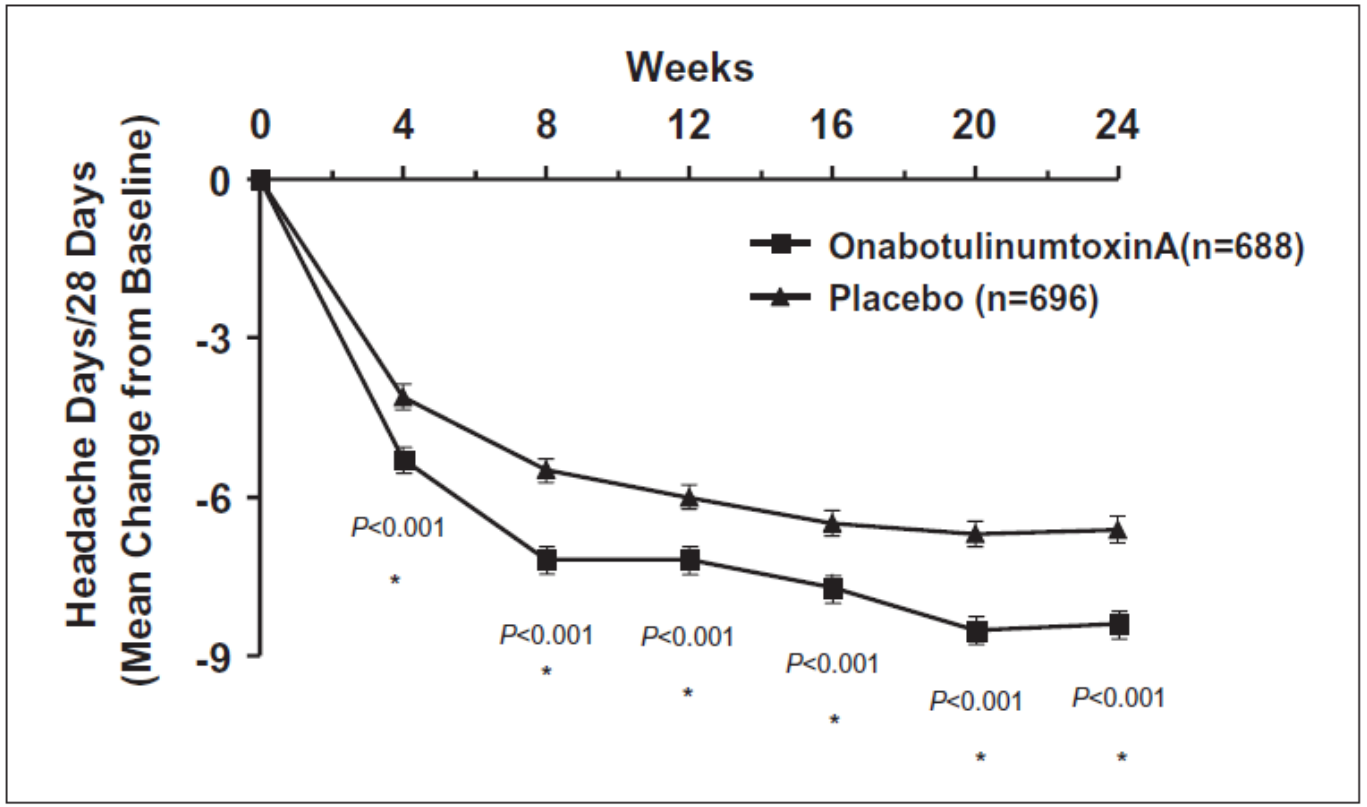
Dietary Supplements

- Riboflavin (Vitamin B2) 200–400mg/day
  - Side effects: Yellow urine, polyuria and diarrhea
- Petasites (ButterBur Root) 50mg TID or 75mg BID
  - Side effects: Burping
  - Contain pyrrolizidine alkaloids, which are hepatotoxic and carcinogenic
- Magnesium 600 mg daily
  - Start at 300 mg and titrate to 600 mg
  - Side effects: Diarrhea
- Coenzyme Q 10 300 mg/day
  - Start at 100 mg and increase qweekly 100mg

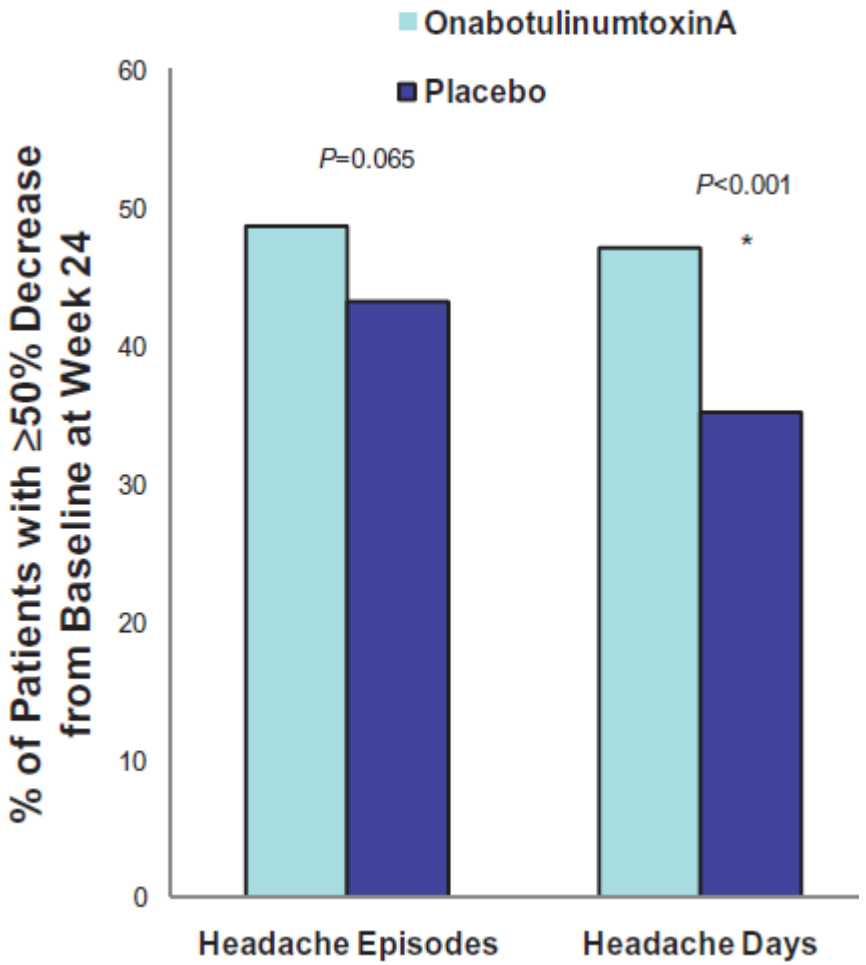
Migraine Prophylaxis

- Beta blockers
  - Propranolol 80-160mg/day (divide BID/TID for IR, DAILY for CR)
    - Nadolol start 20-40mg up to 160mg/day
    - Metoprolol 50mg BID up to 200mg/day
  - Contra-indication: asthma
  - Side Effects: Bradycardia, Fatigue, Lowers Max Exertion
- Anti-Epileptics
  - Topirimate 50-100mg/day (Start 25mg QHS, titrate up by 25mg q2weeks)
  - Contra-indications: kidney stones
  - Side Effects: Weight Loss, Parasthesia, Cognitive Slowing
- Tri-cyclic Antidepressants
  - Amitriptyline (start 10mg QHS and titrate 10mg q1-2weeks)
  - Side Effects: anti-muscarinic, anti-andrenergic, drowsiness, weight gain

Botulinum toxin

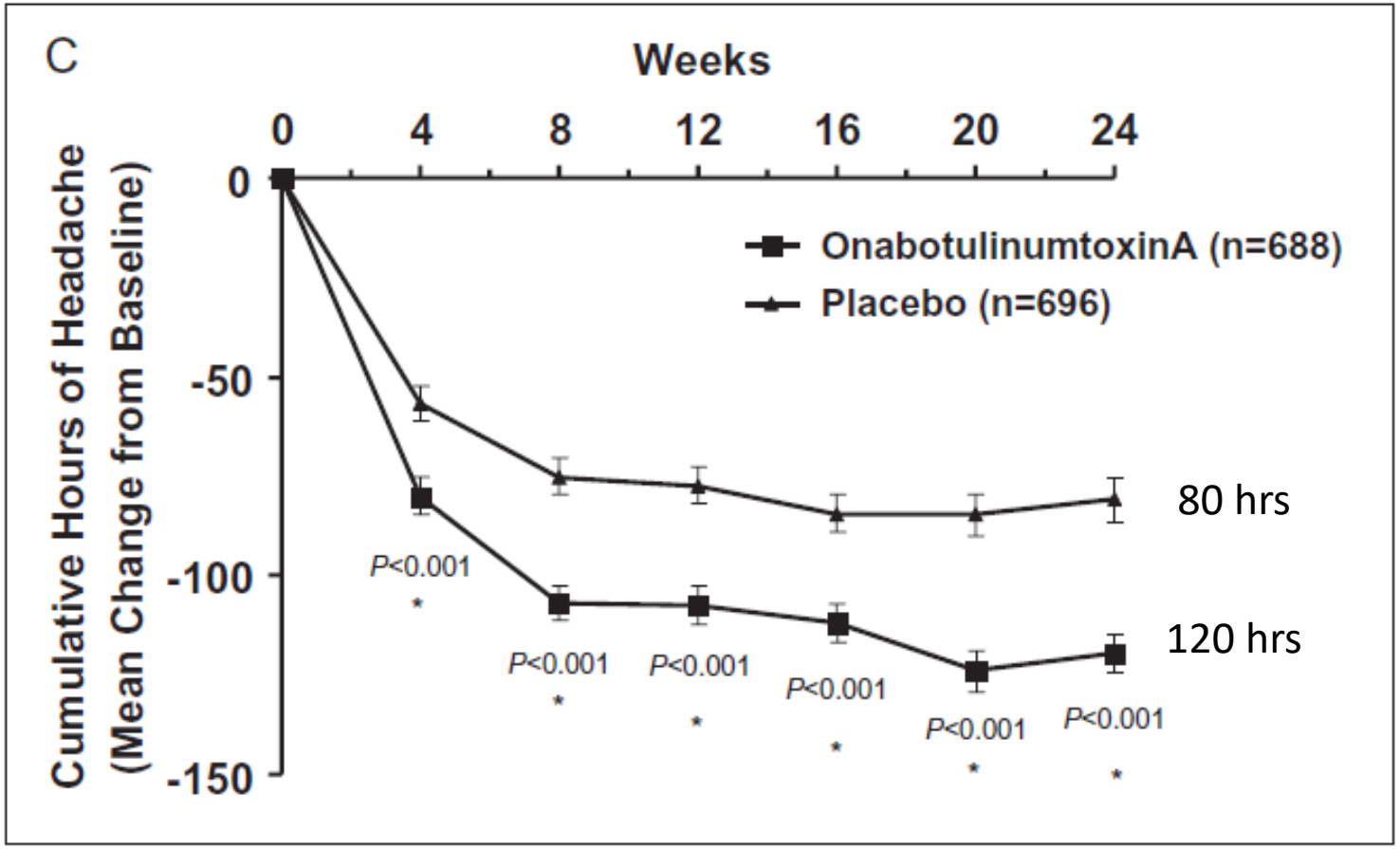


Primary outcome



Headache 2010;50:921-936

Botulinum toxin – most significant results



Headache 2010;50:921-936

Botulinum Cost

- ~$360-380 for 100 units (Costco)
- ~$400 for 200 units (Walmart)

Cefaly

Cefaly® Anti-migraine Device

4.5 (52)

Item #283776

Your Price $299.99

Shipping & Handling Included

Features:

- Provides a prevention treatment program to increase the production of endorphins and raise the trigger threshold of the pain for a result of less frequent migraines
- Can replace or reduce the consumption of medication
- Has an “attack” program to block present pain & provide relief during a migraine

Qty 1 Add to Cart

The estimated delivery time will be approximately 7 - 10 business days from the time of order.

Compare Product

Share

Cefaly® Electrodes 2 x 3-pack

★★★★★ 5.0 (9)

Item #283777

Your Price $36.99

Shipping & Handling Included

Features:

- For use with Cefaly® Anti-migraine Device

Qty 1 Add to Cart

The estimated delivery time will be approximately 7 - 10 business days from the time of order.

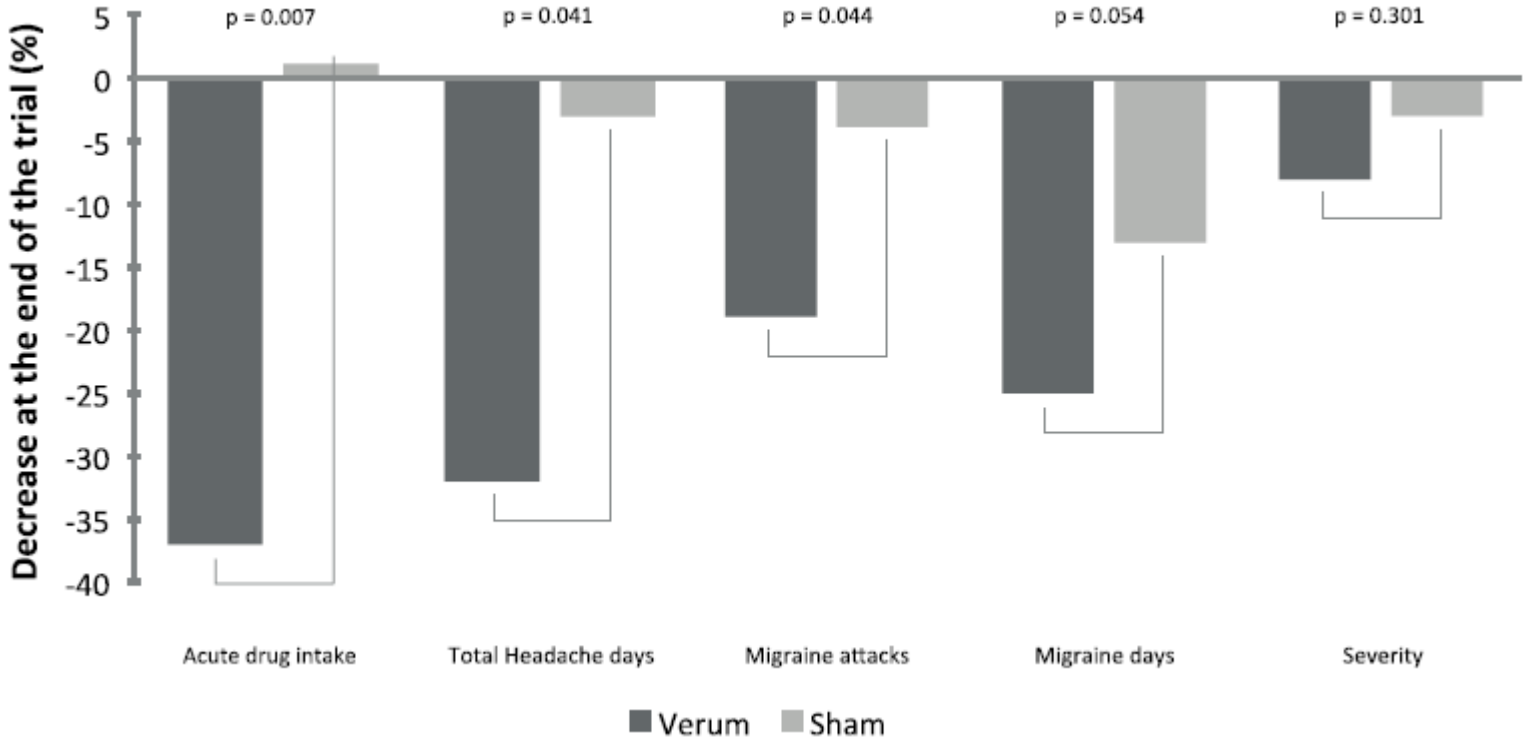
Compare Product

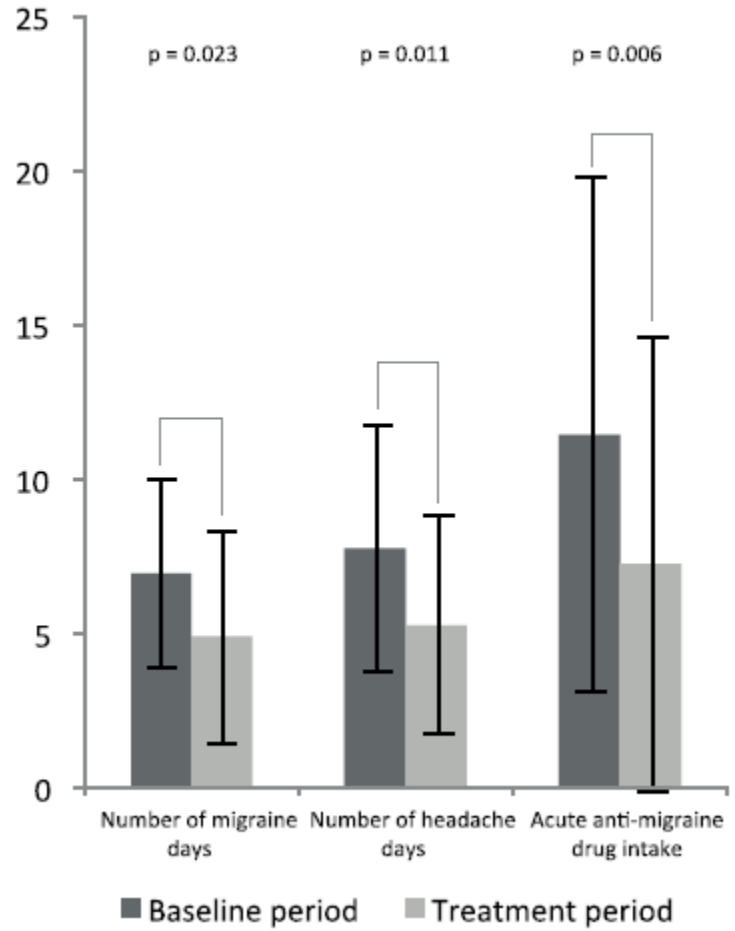
Share

Add to List

20 uses/electrode = $110/year

PREMICE Trial – Cefaly device 67 pts





Case 8 - Trauma

- 32F working in 3D animation. Post MVA developed numbness/tingling from the neck down most notable in her hands, increased by walking but have subsided after 3 months. Additional 2-3 headache/wk with photophonophobia and nausea treated with vimovo and tramacet. Visual or eye/head movement induced nausea, motion sickness.

Headache secondary to traumatic head injury

- Headaches less than 3 months
- Developed within 7 days after the following
  1. Injury to the head
  2. Regaining consciousness following head injury
  3. Discontinuation of medications that impair her ability to sense or report headache

Prognosis

- If patient's have headaches 3 months post-TBI, they do not improve over the next 9 months.
- History of pre-head injury headache at greatest risk for post-TBI headache
- Therefore considered for early aggressive intervention

Migraines = mild TBI symptoms

- Headache
- Sensory sensitivity
- Nausea
- Fatigue
- Mood changes
- Cognitive dysfunction

Objective changes post TBI

- MRI–cavum septum pellucidum, hippocampal atrophy, increased perivascular space, diffuse axonal injury, cortical atrophy, ventricular enlargement, pituitary atrophy, cerebral contusions, disrupted white matter tracts
- Resting state network functional connectivity abnormalities

When to refer to neurology

- SSNOOPPP Red flags
- For primary headaches
  - Migraine when refractory 2 triptan and/or 2 preventative treatment trials
  - Greater Occipital Nerve Blocks – tension, cluster, migraine
  - Botulinum Toxin
  - Trigeminal Autonomic Cephalgia treatments
  - Refractory Trigeminal Neuralgia treatments

- Thoughts?

Resources

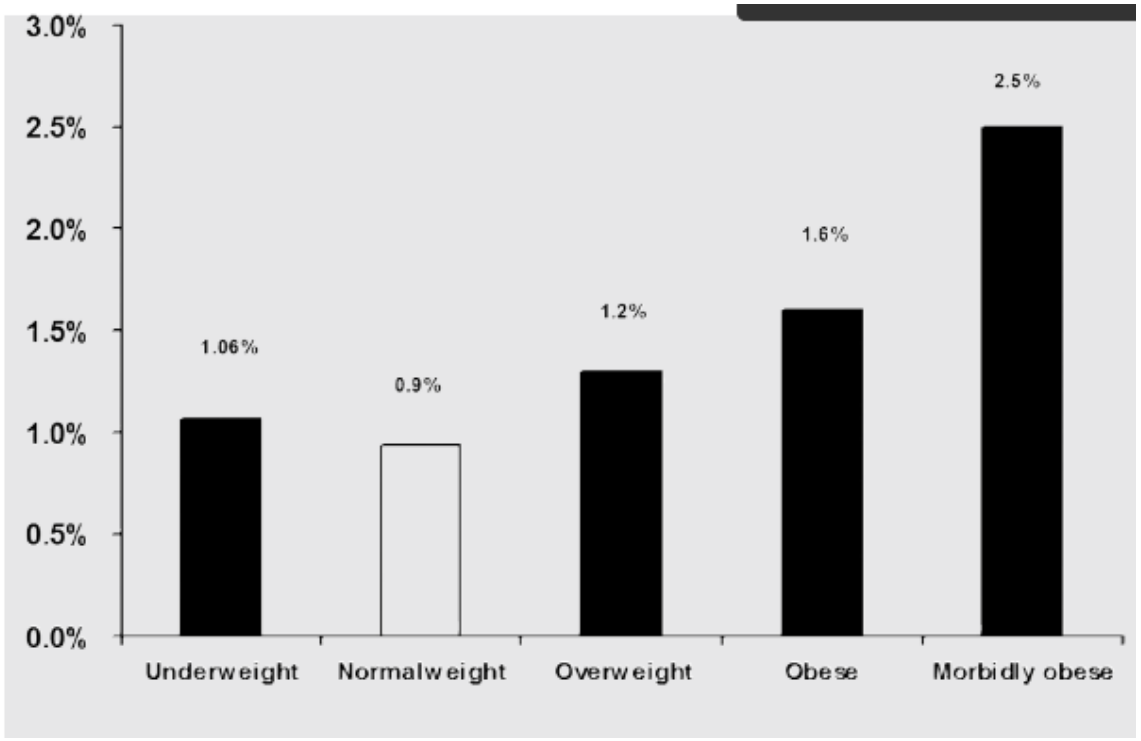
- www.migrainecanada.org
  - Well organized information with short evidence based blurbs

- www.migrainetrust.org

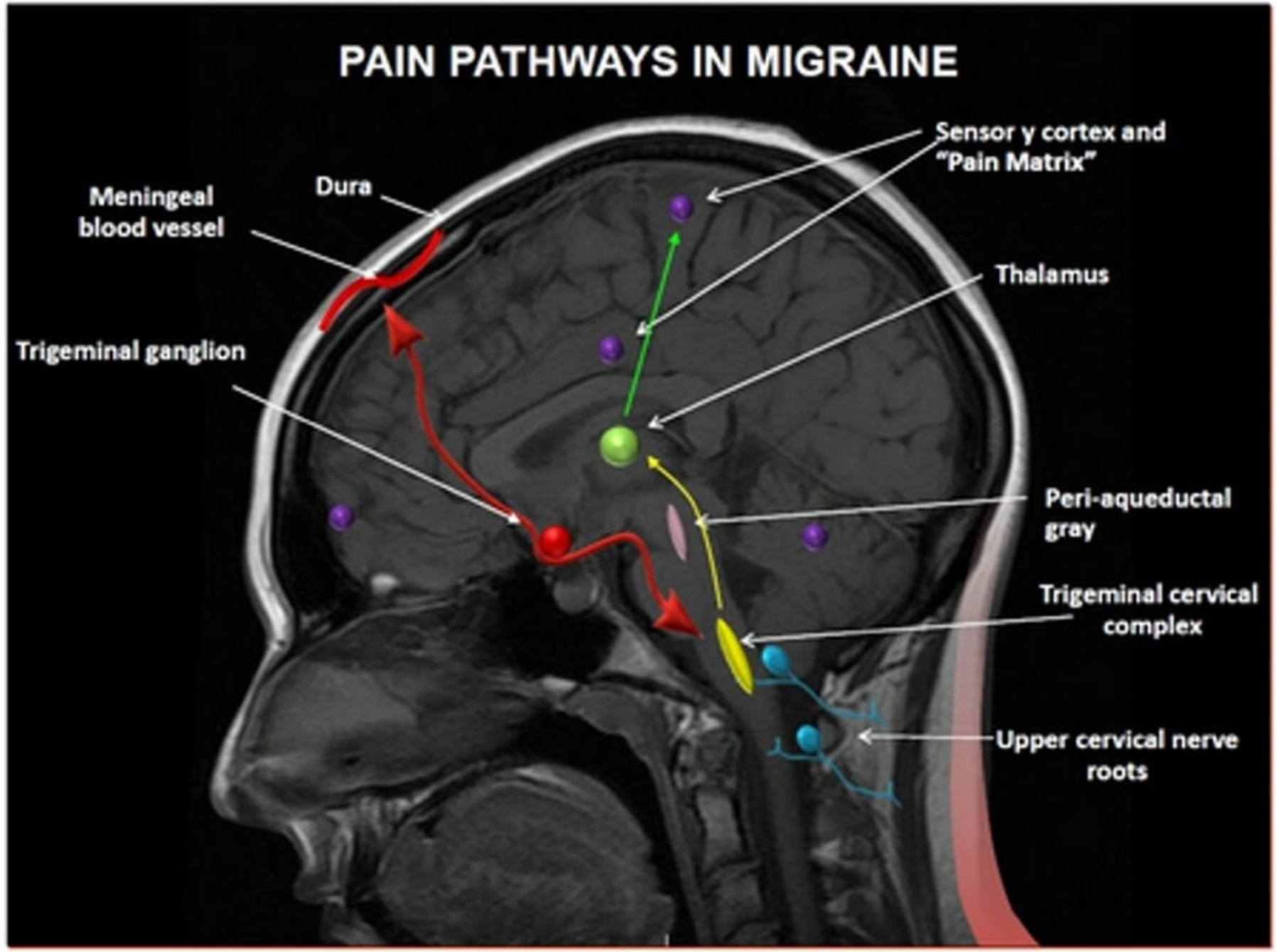
Questions?

Obesity Migraine Study

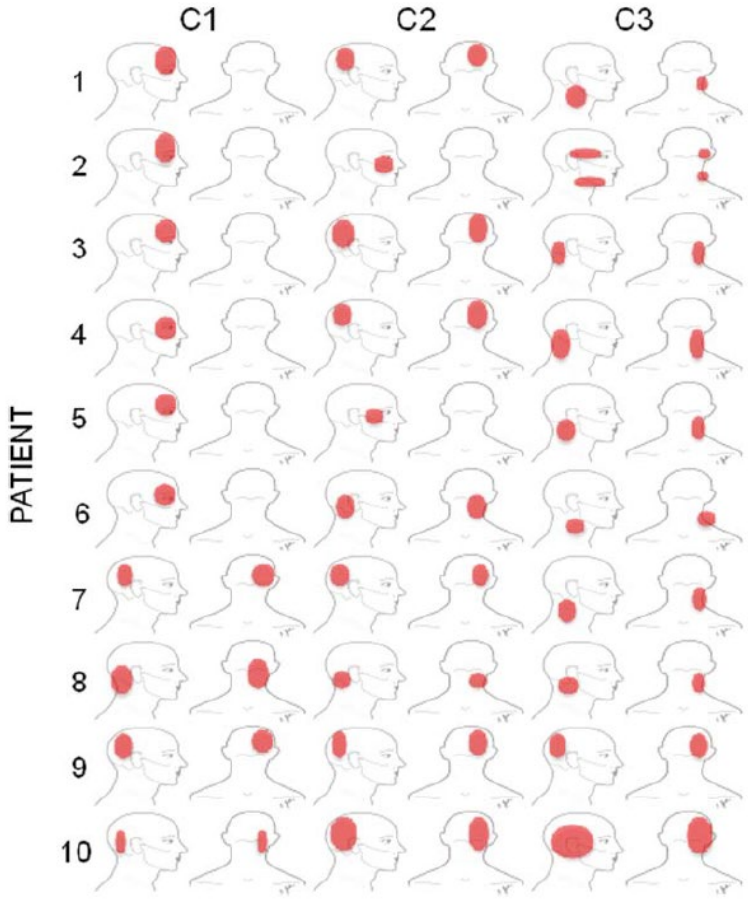
BMI	10–14 headaches per month (HFEM)
normal	4.4%
overweight	5.8%
obese	13.6%
Severely obese	20.7%



NEUROLOGY 2007;68:1851-1861


PAIN PATHWAYS IN MIGRAINE
Sensor y cortex and "Pain Matrix"
Dura
Meningeal blood vessel
Thalamus
Trigeminal ganglion
Peri-aqueductal gray
Trigeminal cervical complex
Upper cervical nerve roots

Cervicogenic Headaches



ANN NEUROL 2013;74:145–148

Questions