



The Diagnosis in the Back of Your Head: Occipital Neuralgia vs Cervicogenic Headache

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Disclosures

- Consulting Fee (e.g., Advisory Board): Allergan, Amgen, Biohaven, Impel,
- Lilly, Revance, Satsuma, Stealth BioTherapeutics, Supernus, Takeda, Theranica

Learning Objectives

- Classify headaches based on International Headache Society Criteria
- Summarize an effective treatment plan including both pharmacological and non-pharmacologic interventions.
- Describe the variability in protocols used for cranial nerve blocks

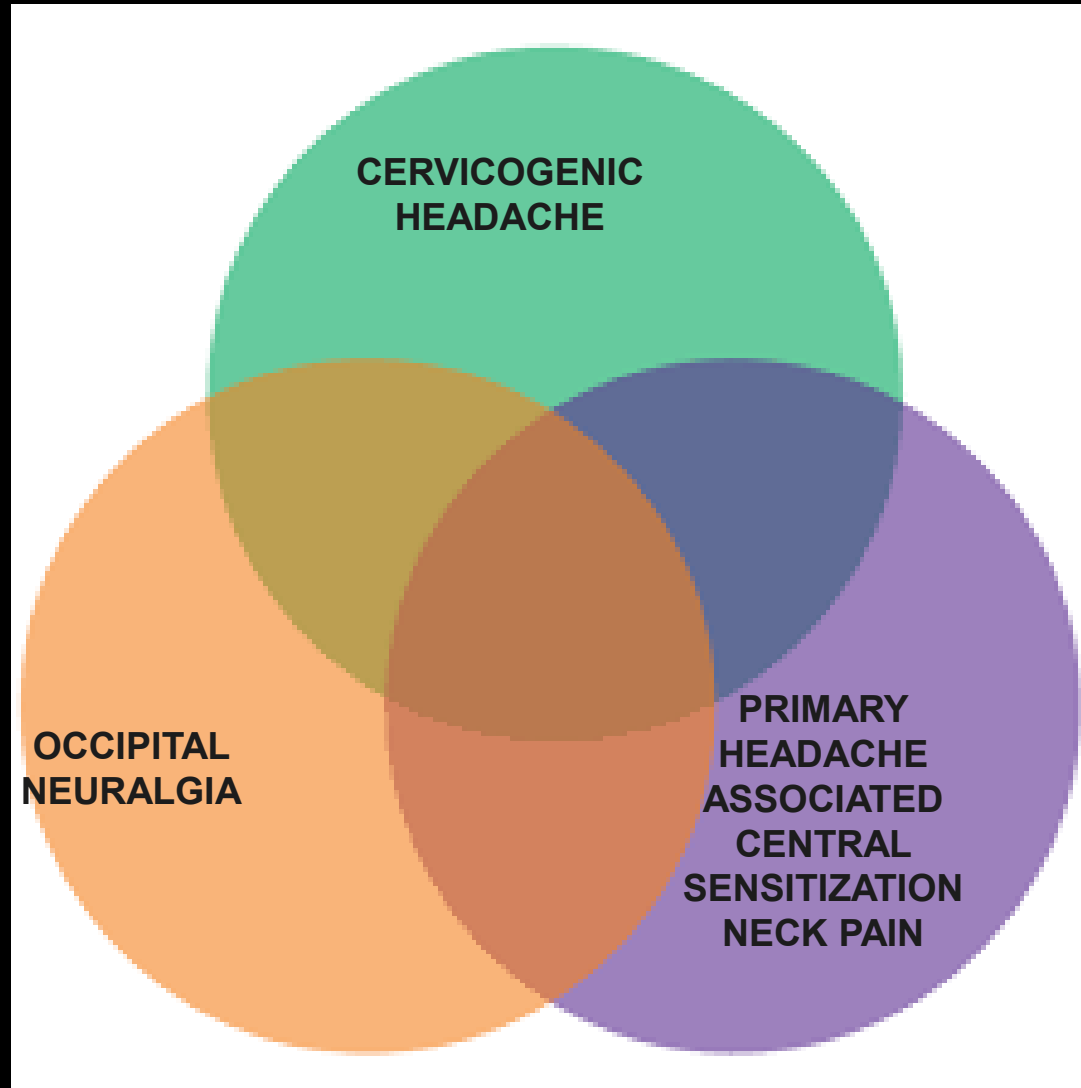
Headache = Alarm System for Head

- Headache → Alarm
- Light Sensitivity → Radio
- Sound Sensitivity → Air conditioning
- Nausea/Vomiting → Car going in reverse

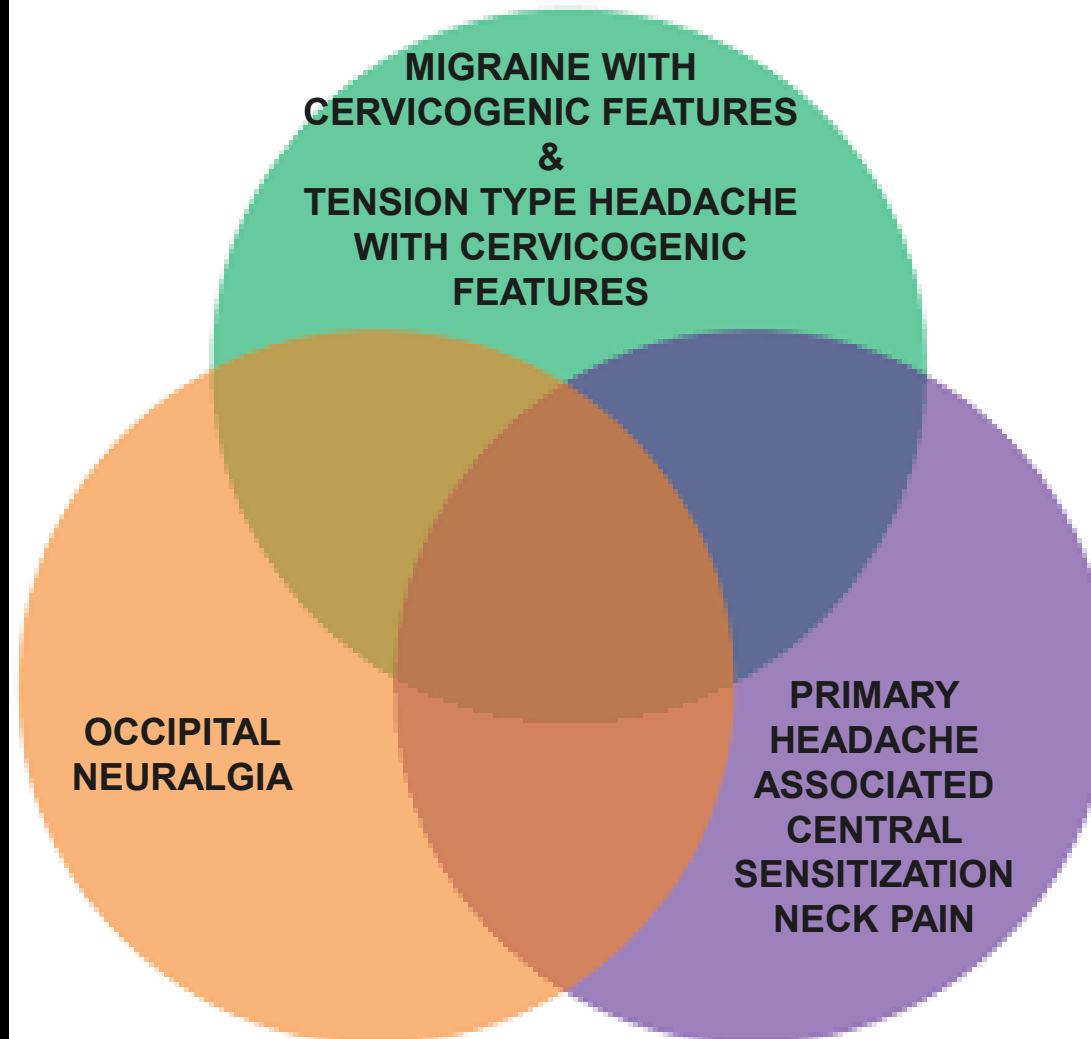
Headache Types

- Primary Headaches
 - Migraine
 - Cluster
 - Tension
- Secondary Headaches
 - Intracranial Tumors
 - Intracranial Hemorrhages
 - Meningitis
 - Pseudotumor Cerebri
 - Temporal Arteritis...

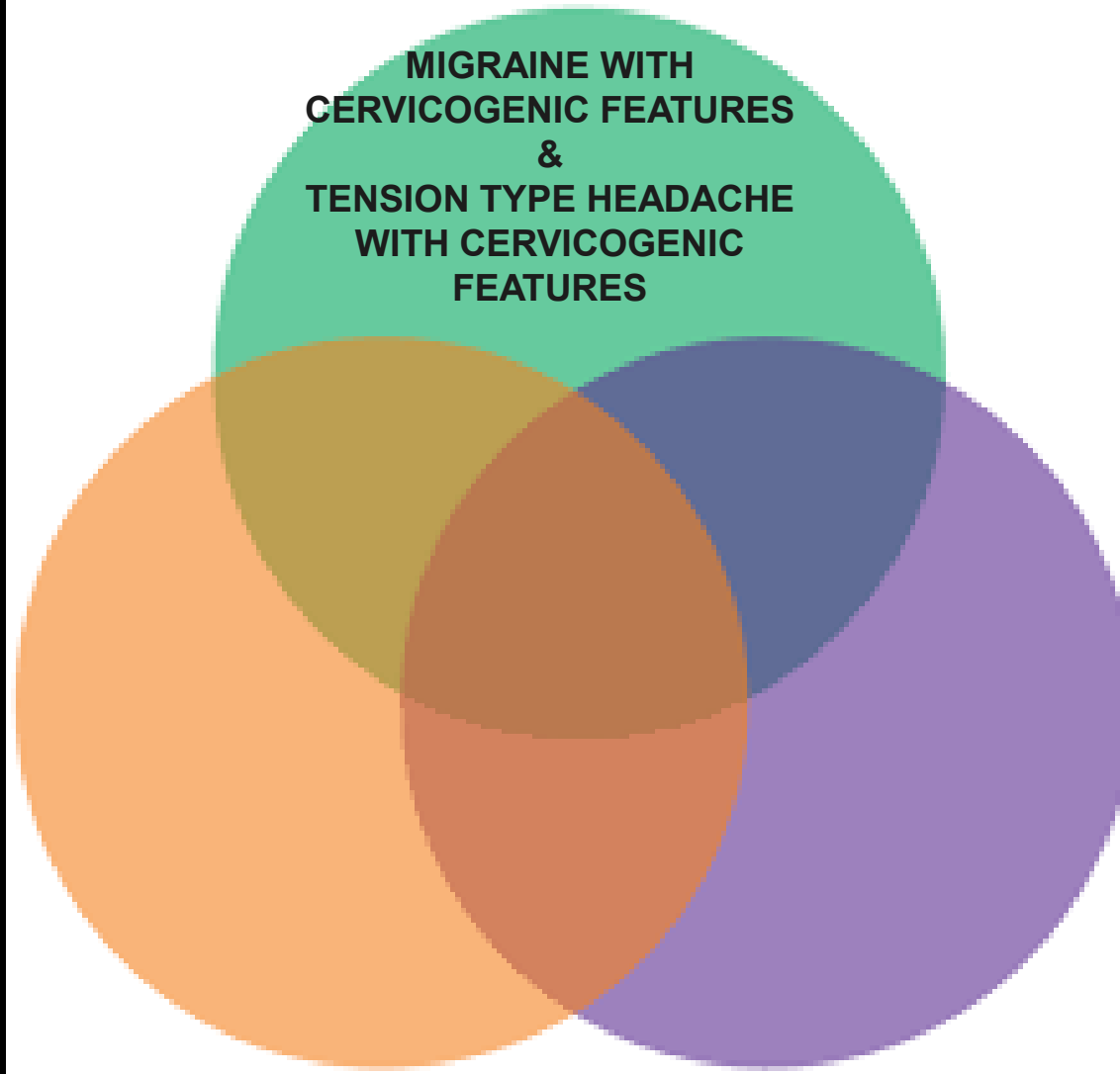
Neck Pain and Headache



Neck Pain and Headache



Neck Pain and Headache



Cervicogenic Headache Diagnostic Criteria

- Clinical and/or imaging evidence of a disorder or lesion within the cervical spine or soft tissues of the neck, known to be able to cause headache
- Evidence of causation demonstrated by at least two of the following:
 - Headache has developed in temporal relation to the onset of the cervical disorder or appearance of the lesion
 - Headache has significantly improved or resolved in parallel with improvement in or resolution of the cervical disorder or lesion
 - Cervical range of motion is reduced and headache is made significantly worse by provocative manuvres
 - Headache is abolished following diagnostic blockade of a cervical structure or its nerve supply
- Not better accounted for by another ICHD-3 diagnosis^{3;4;5}.

Headache Classification Committee of the International Headache Society (IHS). The International Classification of Headache Disorders, 3rd edition (beta version). Cephalalgia. 2013 Jul;33(9):629-808.

Cervicogenic Headache

- Imaging findings in the upper cervical spine are common in patients without headache
- Imaging findings can be suggestive but not firm evidence of causation
- Tumors, fractures, infections, and arthritis can all contribute to cervicogenic headache
- Headache caused by upper cervical radiculopathy may be due to convergence between upper cervical and trigeminal nociception

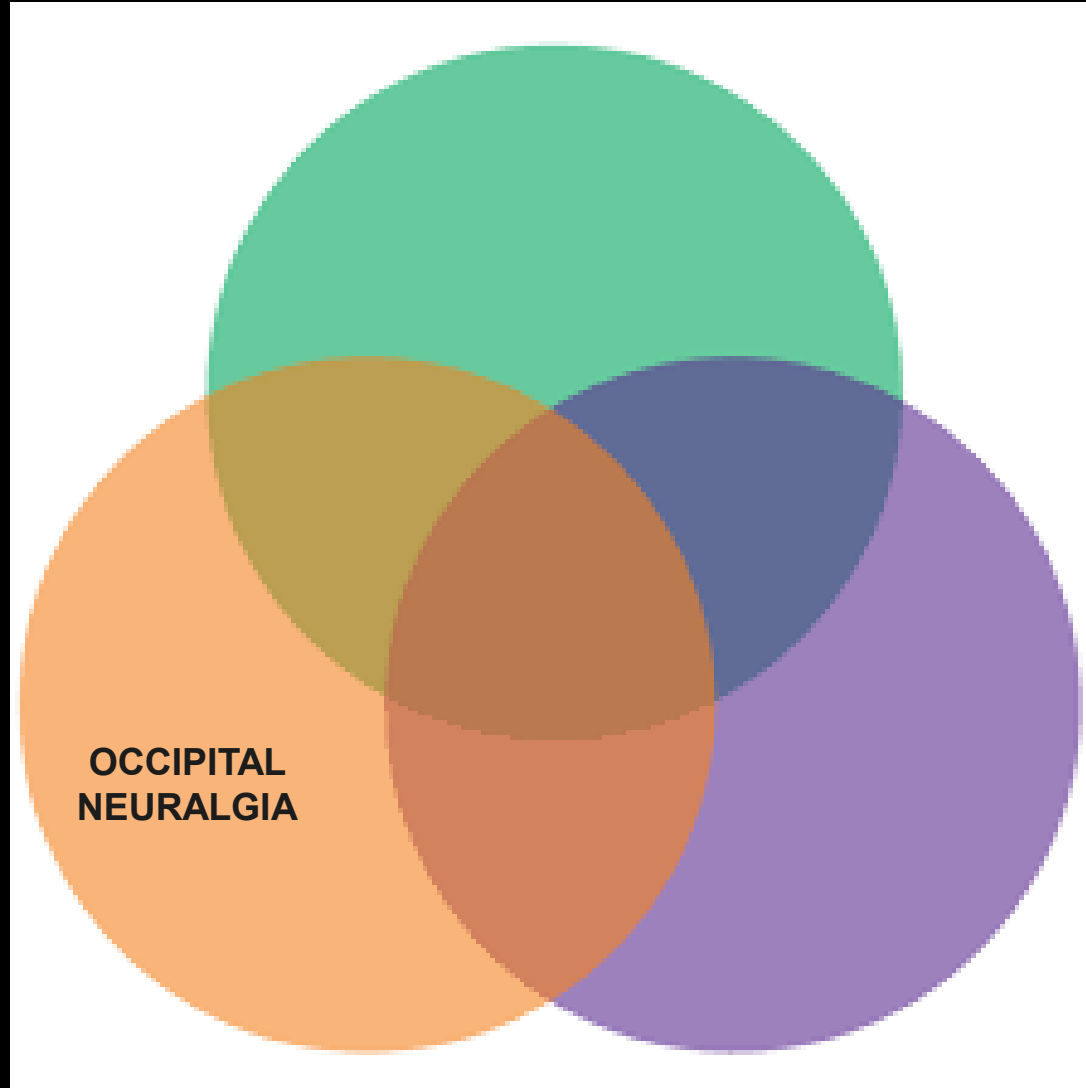
Headache Classification Committee of the International Headache Society (IHS). The International Classification of Headache Disorders, 3rd edition (beta version). Cephalalgia. 2013 Jul;33(9):629-808.

Cervicogenic Headache

- Features that favor cervicogenic headache over migraine and Tension-type headache
 - Side-locked pain
 - Provocation of typical headache by digital pressure on neck muscles and by head movement
 - Posterior-to-anterior radiation of pain
- “Migrainous features such as nausea, vomiting and photo/phonophobia may be present with cervicogenic headache”
- In clinical practice, most patients have a past history of migraine or tension type headache
 - Cervicogenic pathology develops later in life and serves as a trigger

Headache Classification Committee of the International Headache Society (IHS). The International Classification of Headache Disorders, 3rd edition (beta version). Cephalalgia. 2013 Jul;33(9):629-808.

Neck Pain and Headache



Occipital Neuralgia Diagnostic Criteria

- A. Unilateral or bilateral pain fulfilling criteria B-E
- B. Pain is located in the distribution of the greater, lesser and/or third occipital nerves
- C. Pain has two of the following three characteristics:
 - 1. recurring in paroxysmal attacks lasting from a few seconds to minutes
 - 2. severe intensity
 - 3. shooting, stabbing or sharp in quality
- D. Pain is associated with both of the following:
 - 1. dysaesthesia and/or allodynia apparent during innocuous stimulation of the scalp and/or hair
 - 2. either or both of the following:
 - a) tenderness over the affected nerve branches
 - b) trigger points at the emergence of the greater occipital nerve or in the area of distribution of C2
- E. Pain is eased temporarily by local anaesthetic block of the affected nerve
- F. Not better accounted for by another ICHD-3 diagnosis.

Headache Classification Committee of the International Headache Society (IHS). The International Classification of Headache Disorders, 3rd edition (beta version). Cephalalgia. 2013 Jul;33(9):629-808.

Occipital Neuralgia Exam

- Exam maneuvers to perform...
 - Occipital Tinel's sign demonstrating pain/paresthesias along nerve distribution
 - Neck passive range of motion elicits pain
 - Best results: Lancinating pain occurs with tinel's and PROM when patient denies any significant headache otherwise

Occipital Neuralgia and Migraine

- 35 consecutive occipital neuralgia cases, 15 had both occipital neuralgia and migraines
 - Chances are good that many patients with migraines and occipital neuralgia are only being diagnosed with migraine

Mathew PG, Robbins L. Cranial neuralgia vs entrapment neuropathy decompression ... better names than migraine trigger site deactivation surgery. *Headache*. 2015 May;55(5):706-10.

Sahai-Srivastava S, Zheng L. Occipital neuralgia with and without migraine: Difference in pain characteristics and risk factors. *Headache*. 2011;51:124-128.

Occipital Neuralgia Prevalence Study

- 800 consecutive patients (648 women) presenting to the Cambridge Health Alliance Headache Clinic with a chief complaint of headache
 - ~25% (n=195) had a diagnosis of occipital neuralgia in addition to another headache disorder
 - Chronic Migraine was the most common co-diagnosis
 - Tinel Positive in ~ 75% (n=146) of patients with occipital neuralgia
 - Isolated ON was present in 15.38% (n = 30) of patients
 - Odds of ON were higher in patients with chronic migraine vs episodic migraine, elevated body mass index, and higher age at presentation. Undiagnosed or inadequate treatment of ON can increase the frequency and intensity of other comorbid headache disorders.
- Prevalence Abstract: “The Diagnosis in the Back of Your Head: The Prevalence of Occipital Neuralgia in Community Hospital Based Headache Clinic”

Mathew PG, Najib U, Khaled S, Krel R. Prevalence of occipital neuralgia at a community hospital-based headache clinic. *Neurol Clin Pract.* Dec 2019; 10.1212/CPJ.0000000000000789.

NERVE BLOCKS

- Generally safe, well tolerated office based procedures
- Can be performed for the acute treatment of numerous headache disorders.
- Can have prolonged effects beyond the duration of the injected anesthetic at times lasting weeks to months

Afridi SK, Shields KG, Bhola R, Goadsby PJ. Greater occipital nerve injection in primary headache syndromes--prolonged effects from a single injection. *Pain*. 2006 May;122(1-2):126-9

NERVE BLOCK COMPOSITION

- Nerve blocks are performed with an anesthetic with or without a steroid
- Anesthetic is usually lidocaine, bupivacaine, or a combination.
 - 0.75% bupivacaine is my preference
- Steroids added can include methylprednisolone and triamcinolone
- Steroid alone proven to be useful, but lack of immediate relief makes this less successful;

Ambrosini A, Vandenheede M, Rossi P, Aloj F, Sauli E, Pierelli F, Schoenen J. Suboccipital injection with a mixture of rapid- and long-acting steroids in cluster headache: a double-blind placebo-controlled study. *Pain*. 2005 Nov;118(1-2):92-6.

Caution with Steroids

- Avoid in patients with...
 - Cushing's syndrome, glaucoma, cutaneous atrophy, alopecia
- Avoid in cosmetic areas
 - Facial cosmetic disfigurement
- Avoid short interval serial injections
 - No more frequently than 3 months

1. Lambru G1, Lagrata S, Matharu MS. Cutaneous atrophy and alopecia after greater occipital nerve injection using triamcinolone. *Headache*. 2012 Nov-Dec;52(10):1596-9.
2. Tripathi RC, Parapuram SK, Tripathi BJ, Zhong Y, Chalam KV. Corticosteroids and glaucoma risk. *Drugs Aging*. 1999 Dec;15(6):439-50.

Positioning

- Occipital nerve blocks
 - Prone
- Auriculotemporal/Supraorbital/Supratrochlear nerve blocks
 - Supine
- Ensure patient and provider are comfortable
 - Improves patient tolerance
 - Reduces provider fatigue over multiple procedures
 - Stable head limits needle torque while in skin and needle sticks
 - Syncope/seizure risk

Ambrosini A, Vandenheede M, Rossi P, Aloj F, Sauli E, Pierelli F, Schoenen J. Suboccipital injection with a mixture of rapid- and long-acting steroids in cluster headache: a double-blind placebo-controlled study. *Pain*. 2005 Nov;118(1-2):92-6.

Reasons to Perform Nerve Blocks

- Neuralgiaform pain in a single nerve distribution
 - Occipital Neuralgia...YES
 - Cervicogenic Headache...No...but possibly useful
- Termination of a bad migraine cycle
- Termination of a cluster period (with steroid)
 - Can try with any TAC, limited evidence
- Routine office visit if time permits and pain is present
- Preventative therapy in a refractory patient

Nerve Block Central Effects

- Peripheral nerve blocks may modulate central pain structures
- In one study, occipital nerve blocks were performed in the setting of an acute migraine with improvement of
 - Migraine pain
 - Brush allodynia in the trigeminal nerve distribution
 - Photophobia

Young W, Cook B, Malik S, Shaw J, Oshinsky M. The first 5 minutes after greater occipital nerve block. Headache. 2008;48:1126-1128.

Occipital Neuralgia Nerve Block Study

- 119 subjects diagnosed with ON received 6cc nerve blocks with 0.75% bupivacaine and 20mg triamcinolone
- 41 returned for follow-up with all data fields populated in follow-up notes
 - Sex: Female: 34, Male: 7
 - Average Age at Presentation: 45.56 (Range:18-80)
 - Average BMI: 28.19 (Range: 19.46-39.95)
 - Diagnosis:
 - Isolated ON:6/41
 - Co-Existing Headache Disorder 35/41
 - Laterality:
 - Bilateral: 29
 - Exclusively Right: 5, Exclusively Left: 9

Occipital Neuralgia Nerve Block Study (cont'd)

- 41 returned for follow-up with all data fields populated in follow-up notes
 - Complete remission of ON lancinating pain average duration: 206.95 days (Range: 4-840 days)*
 - Pain may not have returned by their last follow-up, so even these duration recordings do not reflect the true duration of benefit.
- Nerve blocks are underutilized by physicians for the diagnosis and treatment of ON and consideration should be given to utilizing larger volumes (6cc)
 - Large volume blocks can have a hydro-dissecting effect on tissues surrounding the nerve leading to nerve decompression
 - Pain remission can last months, years, or indefinitely in some cases
- Therapeutic Abstract: “One and Done: The Remission of Occipital Neuralgia After Large Volume Nerve Blocks”
 - Publication pending

Mathew PG, Najib U, Khaled S, Krel R. One and Done: A Case Series of Large Volume Occipital Nerve Blocks for the Treatment of Occipital Neuralgia. American Academy of Neurology Annual Meeting, Philadelphia, PA, May 2019, American Headache Society Annual Scientific Meeting, Philadelphia, PA, July 2019.



One and Done: A Case Series of Large Volume Occipital Nerve Blocks for the Treatment of Occipital Neuralgia

Paul G. Mathew, MD, DNBPAS, FAAN, FAHS^{1,2,3}, Umer Najib, MD, FAHS⁴, Shaoleen Khaled, BS⁵, Regina Krel, MD⁶



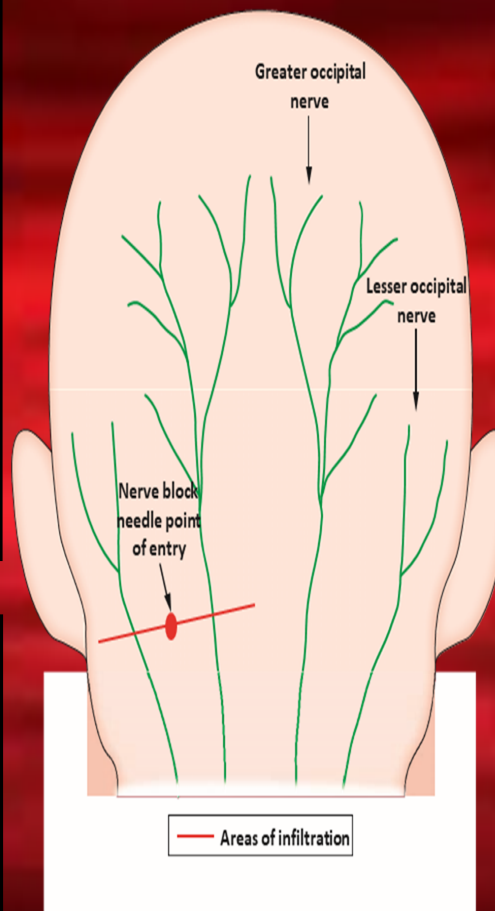
¹Brigham and Women's Hospital, Department of Neurology, John R. Graham Headache Center, Boston MA, ²Harvard Vanguard Medical Associates, Braintree, MA, ³Harvard Medical School, Boston, MA, ⁴West Virginia University School of Medicine, Morgantown, WV, ⁵St. George's University, School of Medicine, Grenada, WI, ⁶Hackensack Meridian School of Medicine at Seton Hall University, Nutley, NJ

BACKGROUND:

Occipital neuralgia (ON) is a paroxysmal disorder involving lancinating pain that originates in the neck or skull base with superior radiation towards the apex and ear. Isolated ON is uncommon, but ON can more commonly occur in patients with another primary headache disorder like migraine. A response to a nerve block (NB) is part of the diagnostic criteria for ON. NBs have been widely used for both diagnostic and therapeutic purposes for patients suffering from ON. However, there is high variability among providers in terms of technique, medications, and doses when performing NBs. As such, the duration of benefit can be variable.

METHODS:

This is a single center, IRB approved, retrospective chart review of NBs performed between 2010 to 2015 on patients who were diagnosed with probable occipital neuralgia. Each NB consisted of 5.5 ml of 0.75% bupivacaine and 0.5 ml of triamcinolone acetonide (20mg). Probable ON was defined as meeting criteria for ON except for response to NB, which was to be determined.



RESULTS:

N:119 subjects diagnosed with ON and received NB
 41 subjects returned for follow-up with a completed note with all data fields below
 -Sex: Female: 34, Male: 7
 -Average Age at Presentation: 45.56 (Range:18-80)
 -Average BMI: 28.19 (Range: 19.46-39.95)
 Diagnosis: Isolated ON:6/41 Co-Existing Headache Disorder 35/41
 Laterality: Bilateral: 29, Exclusively Right: 5, Exclusively Left: 9
 Complete remission of ON lancinating pain average duration: 206.95 days (Range: 4-840 days)*

*Pain may not have returned by their last follow-up, so even these duration recordings do not reflect the true duration of benefit. No long term side effects were noted after a single NB.

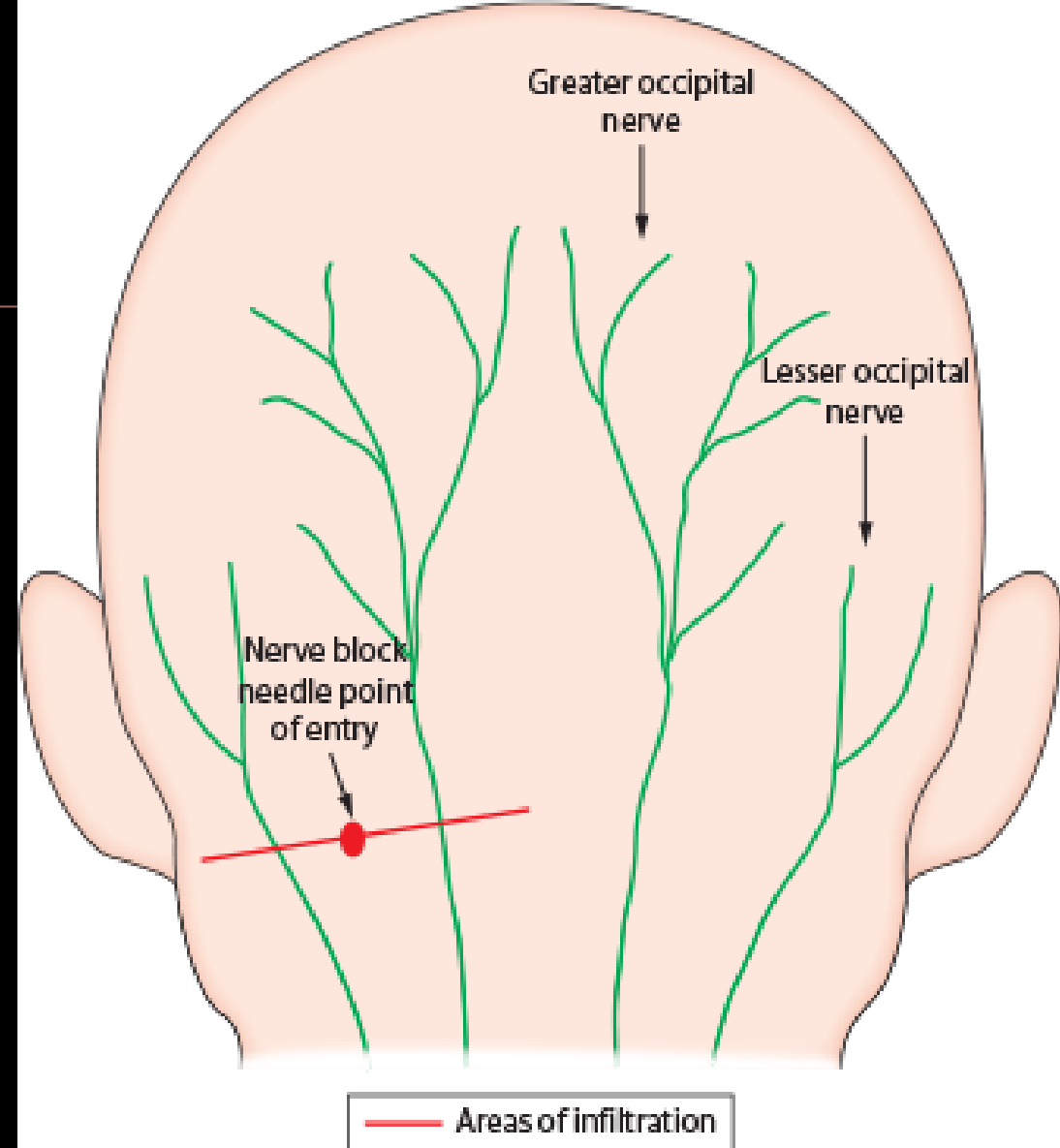
CONCLUSIONS:

Nerve blocks are underutilized by physicians for the diagnosis and treatment of ON, but consideration should be given to utilizing larger volumes and steroids. A possible mechanism of action is that the pressure generated by injecting the solution is causing an expansion of tissue planes. This tissue plane expansion may result in nerve decompression, which can directly correlate in long duration of benefit and even complete resolution in certain patients. Future studies are needed to compare high volume vs low volume NB efficacy.

REFERENCES:

- Mathew PG. Cranial Peripheral Nerve Blocks. In: Principles & Practice of Pain Medicine, 3rd Ed, Bajwa ZH, Wootton RJ, Warfield CA (Ed). McGraw-Hill, 2016 (Artwork by Paul G. Mathew).
- Mathew PG, Najib U, Khaled S, Krel R. The Diagnosis in the Back of Your Head: The Prevalence of Occipital Neuralgia at a Community Hospital Based Headache Clinic. American Headache Society Annual Scientific Meeting, San Francisco, CA, June 2018.

Occipital Nerve Block Prone, 6cc Per Side



Artwork by,
Paul G. Mathew, MD, DNBPAS, FAAN, FAHS

Source: Zahid H. Bajwa, R. Joshua Wootton, Carol A. Warfield:
Principles and Practice of Pain Medicine, 3rd Edition
www.accessanesthesiology.com
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How do you treat refractory occipital neuralgia?

- Anti-convulsants
- Tricyclics
- Large volume peripheral nerve blocks
- Cervical branch blocks
- Radiofrequency ablation
- Stimulator placement
- External occipital nerve stimulation

Occipital Nerve Decompression Surgery

- Performed by plastic surgery
- Resection of small portion of semispinalis capitis muscle and shielding of the nerve with a subcutaneous flap (fat pad)
- If there is contact between the occipital artery and occipital nerves, the artery is at times also resected
- Labeled as migraine trigger site deactivation surgery by some surgeons

Mathew PG. A critical evaluation of migraine trigger site deactivation surgery. Headache. 2014 Jan;54(1):142-52.

Critic of the Critic

- Insult to study neurologists
- Two separate diagnoses cannot co-exist at the same time in the same patient.
 - That would be like having carpal tunnel syndrome and cervical radiculopathy at the same time

Guyuron B. A discussion of "critical evaluation of migraine trigger site decompression surgery". Headache. 2014 Jun;54(6):1065-72.

MIGRAINE PRE-SURGERY EVALUATION

- Doppler Evaluation
 - Headache point of origin identified with 1 finger by patient
 - Site is explored with Doppler.
 - If an arterial Doppler signal is identified at the site, it is considered an active arterial trigger site.

Guyuron B, Nahabet E, Khansa I, Reed D, Janis JE. The Current Means for Detection of Migraine Headache Trigger Sites. Plast Reconstr Surg. 2015 Oct;136(4):860-7.

AHS Position Statement



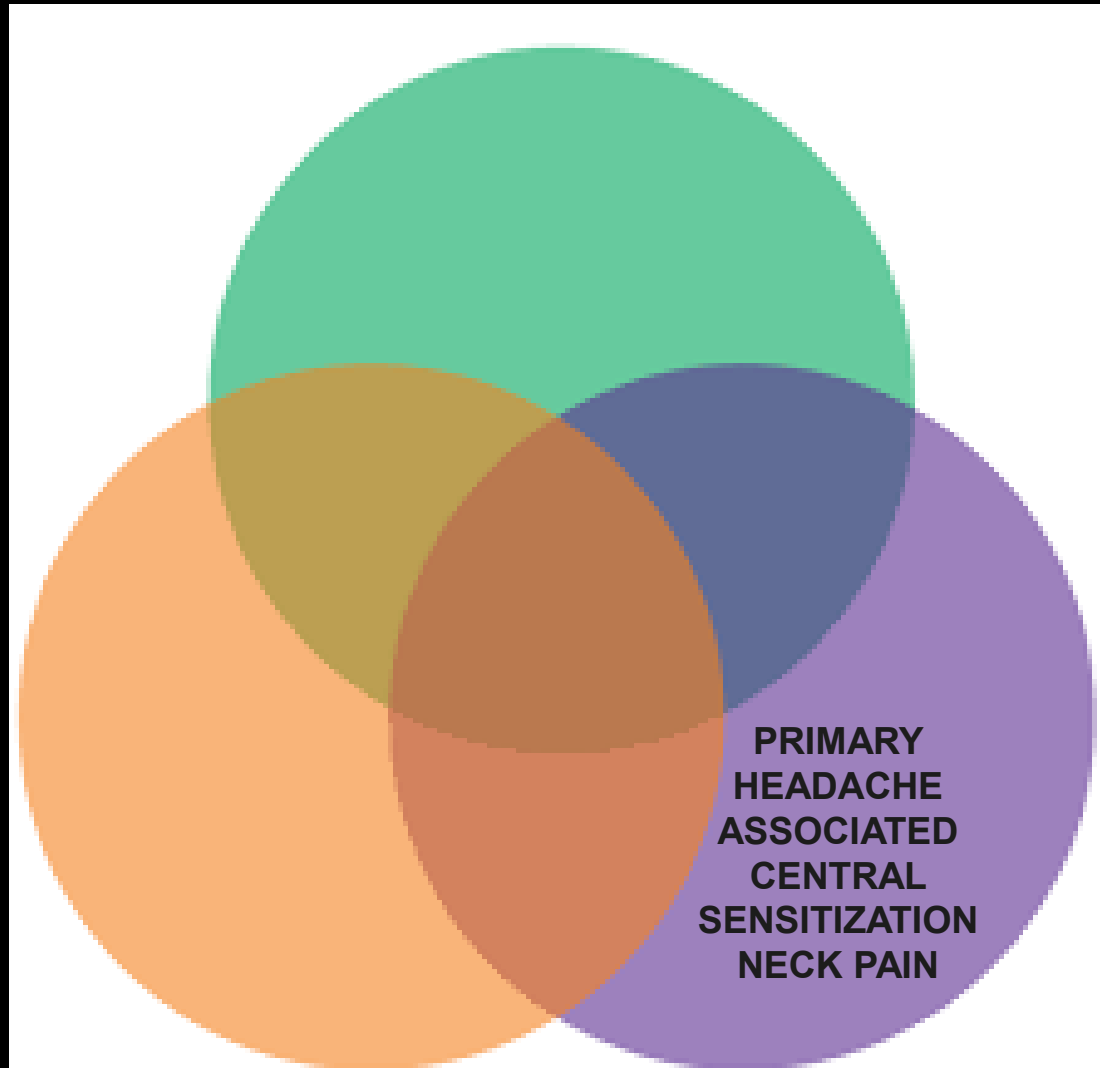
MT ROYAL, NJ (April 13, 2012) – In light of several recent news items about the growing use of surgical interventions in migraine treatment, the American Headache Society has issued the following statement. Unfortunately, there is no cure for migraine. Many therapies, including medications, alternative therapies and surgical interventions, are aimed at reducing migraine frequency or stopping the pain and associated symptoms after they’ve begun, but none are “cures”. In light of recent news reports about the growing use of surgical intervention in migraine, the American Headache Society® is urging patients, healthcare professionals and migraine treatment specialists themselves, to exercise caution in recommending or seeking such therapy. In our view, surgery for migraine is a last-resort option and is probably not appropriate for most sufferers. To date, there are no convincing or definitive data that show its long-term value. Besides replacing the use of more appropriate treatments, surgical intervention also may produce side effects that are not reversible and carry the risks associated with any surgery. It also can be extremely expensive and may not be covered by insurance. Most importantly, it may not work for you at all. The hallmarks of good therapies are: proven results in randomized controlled trials with adequate numbers of subjects, data reviewed and published in established peer-reviewed publications, reproducible results by other investigators, regulatory approval where appropriate, and endorsement by key opinion leaders and professional organizations in the field of headache medicine and migraine.

AHS Position Statement (Cont'd)

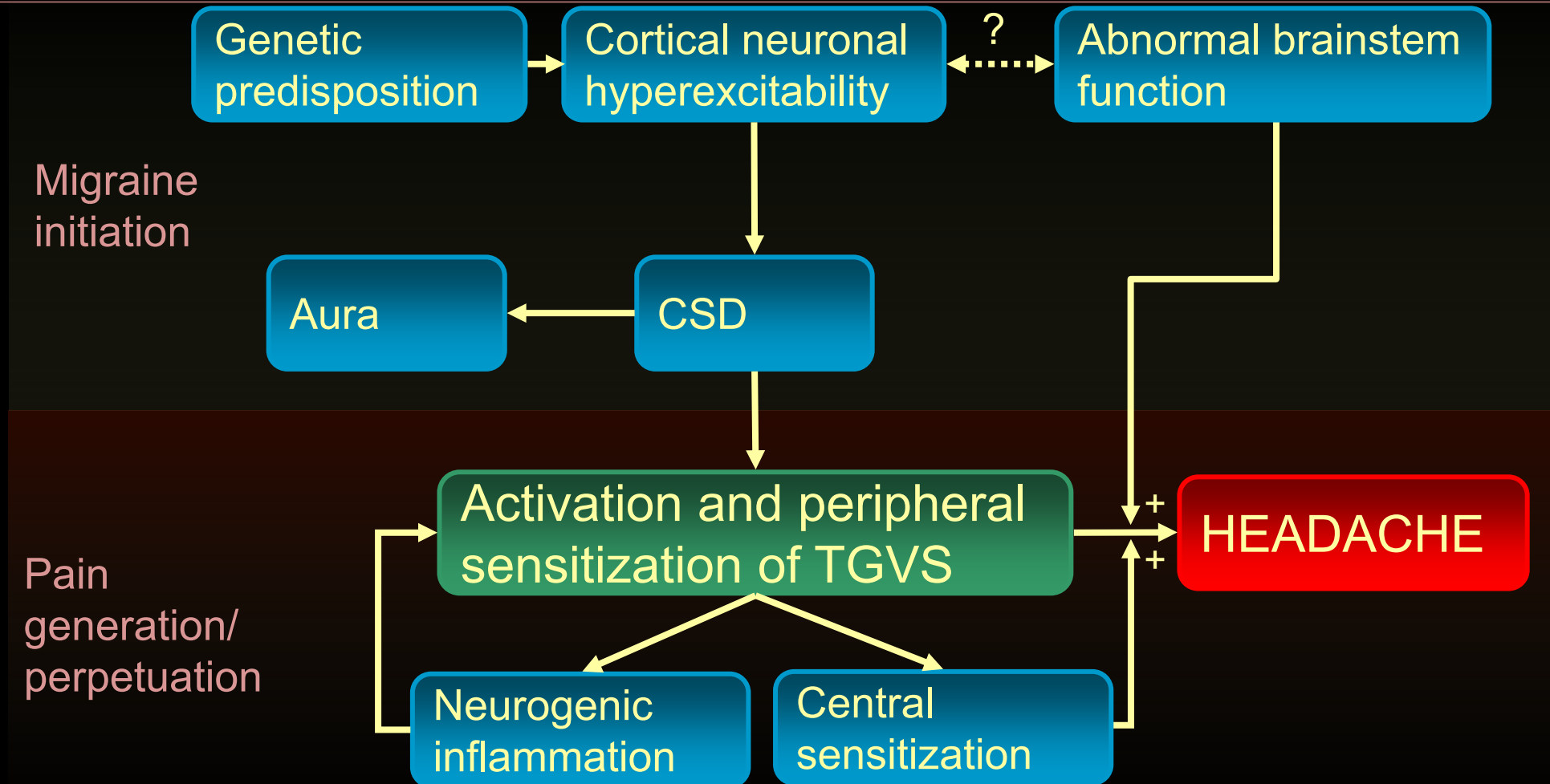
- The search for effective treatments and ultimately a cure for migraine is a primary goal of the American Headache Society and American Migraine Foundation. We will continue to advocate for the advancement of migraine science for the more than 36 million Americans and millions of others around the world who suffer with this sometimes highly disabling disease. The American Headache Society® is a professional society of health care providers dedicated to the study and treatment of headache and facial pain. The Society's objectives are to promote the exchange of information and ideas concerning the causes and treatments of headache and related painful disorders. Educating physicians, health professionals and the public and encouraging scientific research are the primary functions of this organization. AHS activities include an annual scientific meeting, a comprehensive headache symposium, regional symposia for neurologists and family practice physicians, publication of the journal Headache and sponsorship of the AHS Committee for Headache Education (ACHE).

www.americanheadachesociety.org

Neck Pain and Headache



Migraine Pathophysiology



Central Sensitization

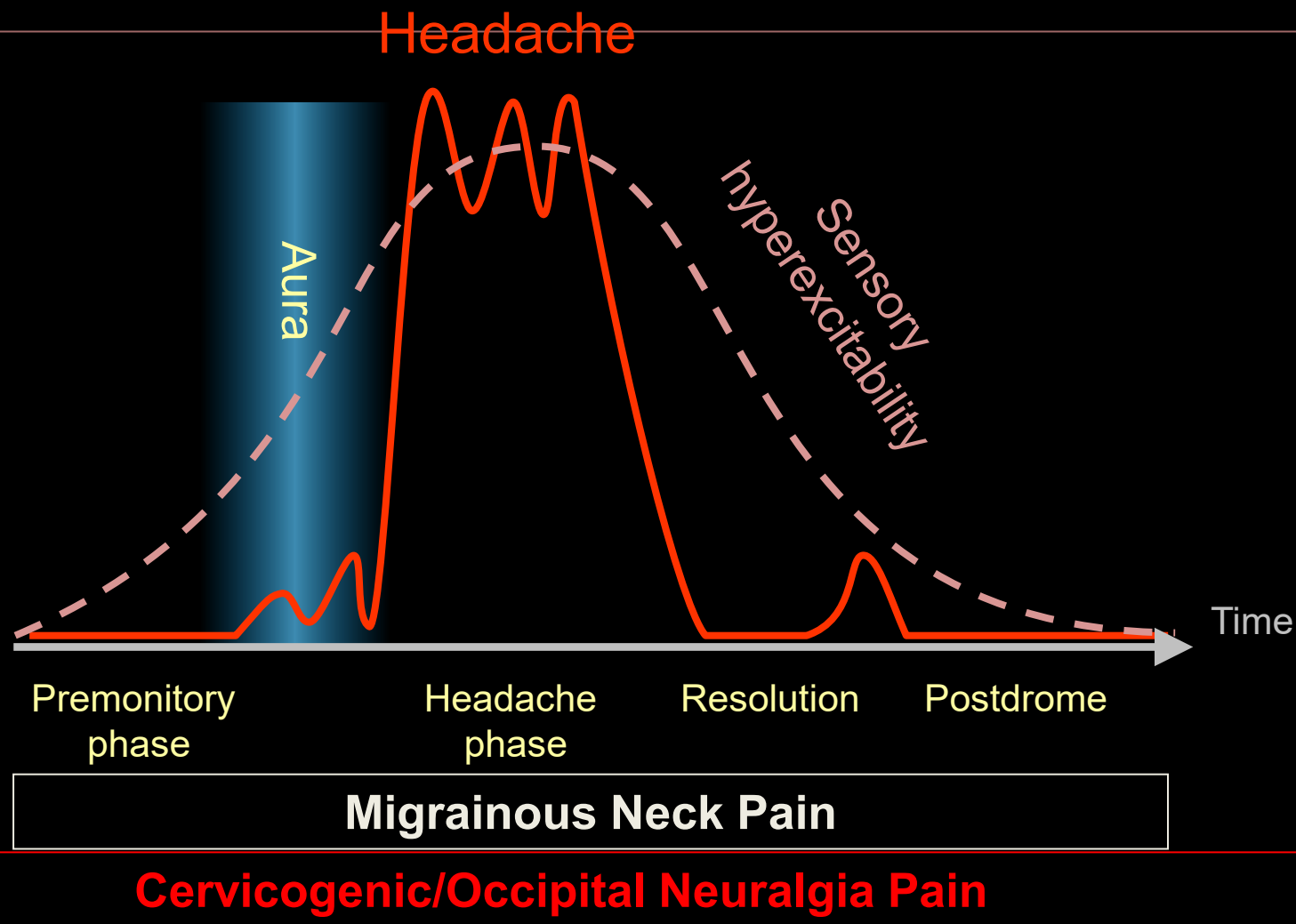
- Non-noxious sensory input are uncomfortable or even painful
 - Photophobia
 - Phonophobia
 - Nausea
 - Osmophobia
 - Kinesiophobia
 - Dizziness/Vertigo
 - Cutaneous Allodynia
 - Afferents from joints and muscles

Is Allodynia Playing a Role?

- Cutaneous Allodynia
 - Non-noxious skin stimulation causing an unpleasant or painful response
 - Combing/styling hair
 - Shaving your face
 - Wearing eyeglasses, contact lenses
 - Wearing earrings, necklaces, tight clothes
 - Taking a shower with water hitting face
 - Resting face on a pillow on the side of the headache
 - Being exposed to heat (e.g., cooking, placing heating pads on your face)
 - Being exposed to cold (e.g., breathing through your nose on a cold day, placing ice packs on your face)
 - Prevalence estimates of over 90% in chronic migraine patients

Mathew PG, Cutrer FM, Garza I. A touchy subject: an assessment of cutaneous allodynia in a chronic migraine population. J Pain Res. 2016 Feb 24; 9:101-104.

The Natural Course of a Typical Migraine Attack



Is Neck Pain a Migraine Symptom?

- Prospective 487 subjects with episodic migraine (73.1 % females; 77 % had migraine without aura).
 - 338 patients (69.4 %) reported neck pain during the migraine phase.
 - 184 patients (group A; 54.4 %) noticed neck pain at onset of headache
 - 118 patients (group B; 24.2 %) reported NP within 2 h before the headache phase
 - In group B we found a high proportion of typical migraine associated symptoms and NP progressed into the headache phase in 82.2 %.
 - 36 patients (group C; 7.4 %) experienced NP 2-48 h before the headache phase.
- Neck pain is a very common feature of migraine attacks and is more likely to be part of the migraine attack than a prodromal migraine symptom.

Lampl C, Rudolph M, Deligianni CI, Mitsikostas DD. Neck pain in episodic migraine: premonitory symptom or part of the attack? J Headache Pain. 2015;16:566.

A Case...

- A 40 year old woman presents to the office with headache
- History of infrequent but severe headaches since the age of 14
- Holocephalic, throbbing 8/10 pain
- Photophobia, phonophobia, nausea, vomiting

Case Continued....

- About 10 years ago, headaches started to become more frequent and severe
- Denies trauma, illness, or any other triggering event
- Currently has daily headache
- Topiramate, amitriptyline, and topamax have helped but have not taken the pain away

Case Continued....

- Physical examination unremarkable except for a positive Tinel's sign over right occiput...
- What other questions do you want to ask?
 - Does head turning or contact trigger this pain?
 - Is chronic neck pain/stiffness also an issue?
 - What do you do for a living?
 - What are your hobbies?
 - Have you ever seen physical therapy?
 - Is exercise or stretching part of your daily/weekly routine?

Preventative Treatment

- Antiepileptic drugs
 - Topiramate (obesity), valproate, gabapentin (neuropathy)
- Tricyclic antidepressants
 - Amitriptyline, nortriptyline (sleep dysfunction)
- Botulinum toxin injections (treatment failure of above)
 - FDA approved for chronic migraine
- CGRP monoclonal antibodies (Mabs)
 - FDA approved for episodic and chronic migraine

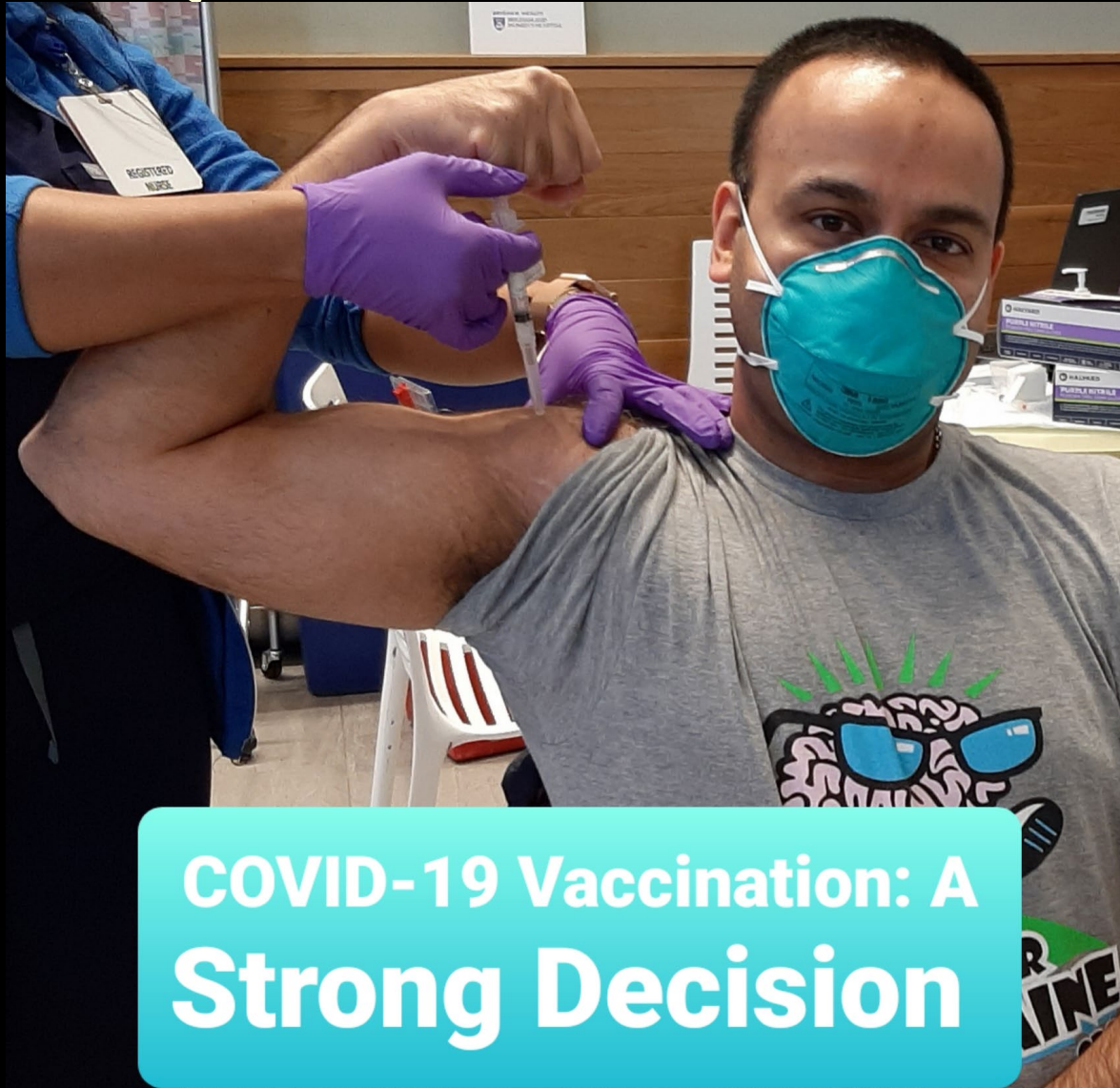
Under the Influence

- Neurologists have a duty to influence the behavior of our plastic surgery colleagues
 - Do not operate on people who have migraine as their only headache/head pain diagnosis (ESPECIALLY EPISODIC)
 - Make sure the patient fails best medical management, which should always include large volume nerve blocks
 - Only operate in areas of clear neuralgiaform pain that is restricted to the boundaries of a particular nerve
 - The guidance of a knowledgeable neurologist or headache specialist can improve patient selection, and reduce inappropriate surgery with unfortunate side effects
 - No improvement, worsening pain, bothersome numbness, anesthesia dolorosa, itching

Conclusions Regarding Occipital Neuralgia and Cervicogenic Headache

- There are many treatments for these conditions
- Medication trials should start at a low dose, and titrations should be fast/slow based on patient preference and side effects
- Combination therapies should be considered
- Do not hesitate to refer patients to another provider for treatments that you may not provide
- “Failure of nerve blocks” does not mean “Failure of nerve blocks”
- AHS has issued a position statement on migraine surgery for a reason

QUESTIONS???



**COVID-19 Vaccination: A
Strong Decision**