Non-Pharmacologic Headache Relief

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Disclaimer

- I have no relevant financial relationships with the manufacturers of any commercial product(s) or provider(s) of commercial services discussed in this CME activity.
- I do not intend to discuss an unapproved/investigative use of a commercial product/device in my presentation.
- I am an AUTHOR of three books for which I hope some day to receive royalties:
  - HarperQuill, “The Holistic Pediatrician”
  - AAP, “Mental Health Naturally”
  - XLibris, “Addressing ADD Naturally”
Rationale? Headache is common and disabling and many kids want non-drug options

- Third most common pain complaint
- 90% Migraine or Tension-Type Headache
- 10% other: cervicogenic, myofascial pain, sinus, TMJ, eye, head trauma, tumor, hemorrhage, infection, pseudotumor, vasculitis
- Bio-Psycho-Social risks: DEPRESSION, Poor global physical health

Objectives:

- Describe the key elements of a headache diary and try at least one app to find your preferred strategy.
- Counsel patients on common triggers and preventive vitamins, minerals, and other DS.
- Counsel patients on the safety and effectiveness of mind-body therapies and refer to professionals.
- Describe the pros and cons of acupuncture, massage, and hypnosis in preventing pediatric HA and identify training opportunities.
Headache Diaries

Vitamins, Minerals, other DS

Mind-body strategies and apps

Acupuncture, Massage

Training, resources, references
Chronic Pain Basics

1. Track symptoms
2. Promote healthy lifestyle
Track Symptoms

- Headache Diary (includes triggers, diet, meds, etc.)
- MYMOP (Measure Yourself Medical Outcome Profile, 0-6)

How bad was your headache today? NRS

0 (none) 10 (disabling)

APPS
- Headache Diary Pro
- iHeadache
- Migralex
- MyPainDiary
- TracknShare
Integrative Medicine

Communication & Counseling Skills:
Track Symptoms – avoid triggers

Fundamentals: Healthy Habits in a Healthy Habitat

Primary care and safe interventions (supplements; biofeedback; massage)

Specialty Care: acupuncture
Integrative Approach – Patient-Centered Care

- Biofield
- Biomechanical
- Biochemical

Personalized Care

Lifestyle
AVOID/ TRACK TRIGGERS

- **Non-modifiable**: genetics, gender, weather
- **Semi-modifiable**: air pollution (including tobacco smoke, CO, SO2, NO2), menses
- **Modifiable**
  - Lack of sleep
  - Missing meals
  - Allergens
  - Foods – tyramine containing, nuts, cheese, smoked fish, artificial sweeteners, nitrate preservatives, MSG, caffeine withdrawal
  - Stress – physical, psychological

!!USE A HEADACHE DIARY!!

**APPs**
- Headache Diary Pro
- iHeadache
- Migralex
- MyPainDiary
- TracknShare
Fundamentals: Healthy Habits in a Health Habitat
Lifestyle Treatment Choices

- Avoid triggers
- Nutrition and supplements; don’t skip meals
- Exercise/sleep
- Environment
- Stress management
Avoid Food Triggers

- Clinical trial of 43 patients (Mansfield, *Ann Allergy*, 2004)
  - Allergy skin testing
  - 69% responded to diet modification (p<0.005)
  - People with IgE-specific food allergy benefit more from the elimination diet than people with negative skin tests.

- RCT in 30 migraine patients (Alpay, *Cephalgia*, 2010)
  - IgG tests against 266 foods (mean +24)
  - Significant reduction (50%) in migraines w/avoidance

- Clinical trial of 21 adults with migraine and IBS, mostly women (Aydinlar, *Headache*, 2013)
  - IgG antibody tests against 270 food allergens
  - Elimination diet for positives led to significant reduction in migraines and IBS symptoms

- 42 adults with migraine RXT: low fat vegan diet for 4 weeks, followed by 12 weeks elimination diet; much improved symptoms (Bunner AE, *J Headache Pain*, 2014)
Elimination Diet?

- 88 children with migraines
- Trigger foods identified by reintroduction in 40 of the children
- 93% improved by eliminating trigger foods
- WORK WITH DIETITIAN (RD)


COMMON DIETARY TRIGGERS:

1. Fasting
2. Chocolate
3. Cheese
4. Alcohol
10-year use trends for individual non-vitamin, non-mineral natural products

8-year sales trends for individual non-vitamin, non-mineral natural products
Dietary Supplements: Migraine

- Butterbur- strong
- Vitamin B2- strong
- Mag citrate - strong
- CoQ10 - strong
- Fatty acids/fish oil -no
- Melatonin -no


Butterbur (*Petasites hybridus* root)

- Systematic review: 2 trials: 150 mg daily better than 100 mg daily (Agosti, 2006)
- AVOID butterbur with pyrrolizidine alkaloids: hepatotoxic!
- [https://nccih.nih.gov/health/butterbur](https://nccih.nih.gov/health/butterbur)
Supplements: **Vitamin B2**

- 200 mg BID with meals for 3 months -> 68% reduction in migraine attacks in RCTs (P<0.001)
- Side effect: yellow urine


Negative small studies on pediatric migraine; + for TTH (Bruijn J, *Cephalgia* 2010; MacLennan *J Child Neurol*, 2008)
Supplements: **Magnesium**

- 1 gram iv acutely or 300 – 500 mg daily po to prevent (aspartate, citrate, gluconate)
- Good dietary sources: soy beans, black beans, tofu, seeds, nuts, whole grains, shellfish (high fiber foods)
- Avoid taking Mg supps with Fe, Ca, Zn
- Side effect: Diarrhea
- May take months to benefit

Coenzyme Q-10

- Open label, 150 mg qd X 3 months; 62% had > 50% reduction in number of HA days
- Hershey Pediatric study - safe
  1. Measured CoQ10 in 1550 patients (avg. age 13 years)
  2. 33% with levels below reference range, given 1-3 mg/kg-d CoQ10
  3. Follow up 3+ months later: a) Signif increase in CoQ10 level; b) Signif decrease in HA disability (P<0.001)
- RCT of CoQ10 (100 mg) add on for 76 kids with migraines; faster improvement over first 4 weeks; no difference later

Rozen and Silberstein, Cephalalgia 22: 137-141, 2002
Hershey AD. Headache, 2007
Slater SK. Cephalalgia, 2011
Omega-6 Fatty Acids

- Linoleic Acid (18:2n-6)

  - (GLA) γ-Linolenic Acid (18:3n-6)

  - (DHGLA) Dihomo-γ-Linolenic Acid (20:3n-6)

  - (AA) Arachidonic Acid (20:4n-6)

Omega-3 Fatty Acids

- α-Linolenic Acid (18:3n-3)

  - Stearidonic Acid (18:4n-3)

  - Eicosatetraenoic Acid (20:4n-3)

  - (EPA) Eicosapentaenoic Acid (20:5n-3)

  - Docosahexaenoic Acid (22:6n-3)

Eicosanoids

- Leukotriene 4-series
  - Prostaglandins E₂
  - Thromboxanes A₂

- Eicosanoids
  - Leukotriene 5-series
    - Prostaglandins E₃
    - Thromboxanes A₃

Desaturases

- Δ-6 Desaturase
- Δ-5 Desaturase
- β-Oxidation
Fatty acids: **Omega 3s**

- Open studies -- it helps reduce headaches; RCTs – mixed results;
- Supplements – free from mercury, dioxins, PCBs; palatable
- 1000 – 2000 mg daily of EPA+DHA
- Fish Breath; at high doses, bleeding/bruising

Pradalier. *Cephalgia*, 2001
Melatonin

- **Mechanisms?**
  - Potentiates GABA; Modulates Ca entry into vascular smooth muscle cells
  - Modulates 5HT2 receptor – like B-blockers; inhibits the synthesis of pg E2 - inflammation mediator

- **Effective preventive** for cluster HA and HA associated with delayed sleep-phase syndrome

- Dosing 6-12 mg one hour hs

- Few side effects

- ConsumerLab reviews show consistent quality

  - Rozen. *Headache*, 2006
  - Rozen, *Neurology*, 2003
Feverfew?

  - Largest trial (N=218) showed reduction from 4.8 to 2.9 migraines/month compared with placebo reduction from 4.8 to 3.5 migraines/month (0.6 migraines/month difference, P<0.05)
  - Small trials found significant benefit
- Dosing: 125mg/day of the dried leaf standardized to a minimum 0.2% parthenolide
- Maximum effect after 4-6 weeks
- Adverse effects: Aphthous ulcers and gastrointestinal side effects in 5-15%; avoid during pregnancy
- Variability in products; combinations available with Mg, B2, ginger, others…
Ginkgo?

- 50 women with migraines in open trial showed decreased migraines and duration (D’Andrea, *Neurol Sci*, 2009)
- Combined with CoQ10, B2, Mg, open label trial decreased migraines 50% in school-age kids over 3 months (Esposito, *Neurol Sci*, 2011)
- Open trial of 25 migraineurs taking acutely with aura, showed decrease in aura duration, and 20% had no pain after aura (Allais, *Neurol Sci*, 2013)

ALL OPEN EUROPEAN trials

Not ready for pediatric prime time
Switching to Stress-Management
Stress management

- Stress is common
- Stress triggers/worsens pain
- Reducing stress helps 50% - 70% of headache sufferers

Managing stress:
- Biofeedback
- Hypnosis
- Meditation
Biofeedback

Peripheral Temperature
Heart Rate Variability
Skin Conductance
Biofeedback

- Use of electronic equipment to measure and feedback information about physiologic functions—which are then modulated in desirable direction
- Goal-balancing ANS (& CNS) activity
- “video-games for your body” kid-friendly
- 2007 meta-analysis showed > 50 controlled trials of BF for HA; EFFECTIVE!
- Strong treatment effect that persists for over 12 months after training

Allen Pediatr Ann, 2004
Kaushik R. Complement Ther Health Med, 2005
Trautman. Cephalgia, 2006
Nestoriuc. Pain, 2007
Hypnosis/Guided Imagery

- Hypnosis: “A state of consciousness involving focused attention and reduced peripheral awareness characterized by an enhanced capacity for response to suggestion.” APA Division 30 Definition, 2014

- Guided Imagery involves using the imagination to promote relaxation, changes in attitude or behavior, and encourages physical healing. AKA-visualization.
Hypnosis – Prevention

- Superior to propranolol or placebo in juvenile classic migraine prevention (next slide)
Hypnosis : Headache

- Children 6 to 12 years with classic migraine
- RXT: propranolol vs. placebo for 3 months each
- Then hypnosis training
- FU 6 months more
- Placebo period 13.3 HA/3 mos
- Propranolol: 14.9 HA/3 mos
- Hypnosis: 5.8 HA/3 mos
- P<0.05 hypnosis superior

Olness. Pediatrics. 1987
Contraindications to Hypnosis

- Ignoring underlying disorder
- Used for fun or entertainment
- The problem is more effectively treated with another modality (e.g. medication)
- Patient is psychotic, acutely depressed
- Patient (child) does not want to engage in hypnosis (but parent wants them to)
Autogenic Training

- Form of hypnosis
- Repeat phrases
  - My hands and arms are heavy and warm
  - My legs and feet are heavy and warm
  - My heartbeat is calm and regular
  - My breathing is easy and free
  - My forehead is cool
  - My belly is relaxed
- Reduces need for headache medication
- Reduces frequency of migraine attacks

Zsombok. *Headache*, 2003
OSU Integrative Medicine/ Clinical Services/ Guided Imagery
Mindfulness

- Case report – significant benefits of MBSR training in woman with migraine and HTN (Oberg, 2013)
- Mindfulness-based stress reduction training; 6 weeks for chronic tension type headache showed significant reduction in HA frequency in small pilot (Cathcart, 2014)
- Mindfulness helps adults with migraines (Wells R. Headache, 2014)
Bodywork: PT/Massage/DC

- May be helpful for stress-tension related headaches (massage)
- PT/LMT/DC as effective as beta-blockers and topiramate for preventing migraine (Chaibi, 2011; systematic review); opposite view (Posadzki, 2011)
- DC may be useful for trauma-related headache (gymnast or post-MVA)
- Evidence is methodologically poor and mixed results (Arnadottir 2013)
Acupuncture

- Linde, 2009 Cochrane review for TTH
  - 11 trials with 2317 participants
  - Statistically and clinically significant benefits over 3 months follow-up

- Linde, 2009 Cochrane review migraine
  - 22 trials with 4419 participants
  - Statistically and clinically significant benefits over 3 months follow-up compared with TAU; fewer adverse effects than similarly effective prophylactic drugs
Suggested activities

- Recommend an app to track symptoms
- Ask about and suggest avoiding triggers like fatigue and missing meals
- Ask about diet and consider eliminating food triggers – work with a dietitian
- Consider supplements of Magnesium, Vitamin B2, Coenzyme Q10, SAFE butterbur
- Refer patients to psychologist or counselor who can help with stress management skills
- Consider referral for acupuncture, massage/bodywork
Resources

- http://mind-bodyhealth.osu.edu
- http://go.osu.edu/guidedimagerypractices

Books
- Be the Boss of Your Body” Series www.freespirit.com

HealthJourneys: CD/MP3 (fee) – guided imagery

Biofeedback Fun
- www.wilddivine.com (Healing Rhythms)
- www.heartmath.com (Inner Balance; EmWave)

Training

- American Society for Clinical Hypnosis
Resources: Articles


Extra slides to answer questions
*Diet and Migraine*

- **Regularization of meals**
  - Normalize blood sugar (glycemic index)

- Elimination Diet 1: Caffeine, cheese, nuts, chocolate, shellfish, onions, aspartame, wine, beer, dairy, processed meats
- Elimination Diet 2: Lamb and rice – add back
- Reduction in omega-6 fatty acids – red meats
- Increase in omega-3 fatty acid intake – fish oil
Magnesium - mechanism

- Ionized magnesium levels low in 50% of MHA patients
- Migraines associated with platelet aggregation, serotonin release
- Magnesium reduces platelet aggregation
- Magnesium decreases the affinity of serotonin for vascular receptor sites
- Magnesium acts as an NMDA receptor (glutamate receptor) antagonist
  - NMDA receptors & pain transmission
  - Inhibits one type of neuronal spreading depression in experimental models

* OPTIONAL SLIDE – for participant reference
* Consequences of Reduced Mg++

- Vasoconstriction of scalp arteries
- Reduced affinity of serotonin receptors
- Lower threshold for activation of N-methyl-d-aspartate receptors
- Enhanced platelet aggregation and serotonin release
* Trials with Mg++ Supplements

- An infusion of 1.0 g of magnesium sulfate in 40 patients with acute migraine
  - 52% responded to therapy
  - 86% of the responders had low serum ionized Mg++ levels
  - 16% of the non-responders had low serum ionized Mg++ levels.

* Trials with Mg++ Supplements

- Four trials with oral magnesium supplementation
- Three of the four showed efficacy
- The one negative trial used a poorly absorbed magnesium salt which resulted in diarrhea
* Feverfew

- Feverfew (Tanacetum parthenium)
- 270 adult migraine patients
- 70% reduction in intensity and frequency of migraine
- Other trials have not been as promising but all show benefit of feverfew > placebo
- Variability in quality of products!


Valerian

- Used for sleep, anxiety
- 150-300 mg of dried root hs or tid
- Few side effects
- Avoid prolonged use – rebound headache
- Used during headache
- Smells very bad
Mind/Body Training and Certification

- Society For Developmental and Behavioral Pediatrics Annual Pediatric Hypnosis Training
- American Society for Clinical Hypnosis
- Society for Clinical and Experimental Hypnosis
- International Society for Hypnosis
- Academy for Guided Imagery
**Biofeedback - Example**

- Blanchard - 116 patients with migraine
- Assigned to either thermal biofeedback, thermal biofeedback with relaxation training, or pseudomeditation, headache monitoring
- Six month follow-up
- 51% of the subjects in the thermal biofeedback groups improved in frequency compared to 5% and 22% for the monitoring and pseudomeditation groups

* HRV Biofeedback - Resources

- www.heartmath.com
- www.heartmath.org
- www.aapb.org
- www.stresseraser.com
- www.bcia.org
- www.stens-biofeedback.com
*Biofeedback-Temperature*

- Theory-the more relaxed, the lower sympathetic nervous system activity, the more peripheral blood flow, hands and feet warm up

- Resources
  - Dermatherm Bands Sharn, Incorporated [www.sharn.com](http://www.sharn.com)
  - BioDots
    - [www.futurehealth.org](http://www.futurehealth.org)
    - [www.cliving.org](http://www.cliving.org)
  - Digital Temp Portable Units
    - [www.thoughttechnology.com](http://www.thoughttechnology.com)
Heart Rate Variability (HRV)

2.5 seconds of heart beat data

- 70 BPM, 0.859 sec.
- 76 BPM, 0.793 sec.
- 83 BPM, 0.726 sec.
Emotions and the Heart

Heart Rate

Time (Seconds)
Massage for Migraines

- Massage improves blood flow and decreases inflammation, relaxes muscles, reduces stress, provides tangible social support.
- Can combine with physical therapies such as ice, heat; aromas (peppermint).
- RCT for migraines showed significantly decreased frequency and improved sleep.

Lawler SP. Ann Behav Med, 2006
Pieovesan. Arq Neuropsiquiatr, 2007
* Hypnosis Misconceptions

- Patient is under control of the hypnotherapist
- Patient is unaware of surroundings and/or activities around him/her
- Patients defenses are impaired (there is improved access to subconscious material)
- Symptoms are masked
- Patient can be forced to do things they would not normally do
Children Enjoy It

- To teach self hypnosis for a specific purpose (such as reduction of pain or elimination of a habit) involves helping young children focus on their natural thinking styles.

- Kids move in and out of altered states and imaginary activities all the time. Think IMAGINARY PLAY!

- The child is in control.

- We serve as the teacher or coach.

- Offer choices and options.

- The child can use this skill when he or she chooses.

- Ask that parents not remind the child to practice self hypnosis; it’s up to the child/adolescent
Osteopathy - Headache

- Five of six studies showed positive results for tension, cervicogenic and post-traumatic HA (Hoyt, Jensen, Boline, Bove, Bogaards)
- No studies specifically for migraine
- No control groups or long term results
- Two of 6 studies: results comparable to use of tricyclics without manipulation

Hoyt. *J Am Osteopath Assoc*, 1979
Chiropractic

- Commonly used
- Older studies support use of chiropractic in migraine; frequency and severity were reduced
- Little other evidence supporting use in headache of different types

Tuchin. *Australas Chiropr Osteopathy*, 1997
Biofield Therapies

- Rapid increase in use and availability of Healing Touch, Therapeutic Touch, Reiki, QiGong, Polarity Therapy

- Open trial of Healing Touch showed improvement in headaches after 3 treatments in 12/13 patients
  

- One RCT showed decreased tension headache pain
  
  Keller E. *Nurs Res*, 1986
Acupuncture for Chronic Daily Headache – UNC study

- RCT of usual medical care vs UMC + acupuncture
- Medical care alone: no change
- Medical care + acupuncture
  - Improvement in HIT scale (functioning)
  - Improvement in limitations, social functioning and general mental health domains (SF-36)
  - 3.7 times >likely to report reduced suffering

Coeytaux R. *Headache*, 2005
Witt. *Cephalgia*, 2008 – COST EFFECTIVENESS
Acupuncture – Migraine
Reviews involving > 1000 patients

- Acupuncture benefits adults and pediatric patients in preventing migraines
- NOT for acute treatment
- 1-2 treatments weekly for 4-6 weeks
- Effects last at least 6 months
- Side effects rare

Melchart et al. *Cephalalgia*, 1999
Acupuncture: Mechanism of Action

- The documented effects of acupuncture include:
- 1) Release of opioids in the central nervous system
- 2) Changes in regulation of blood flow, blood pressure, body temperature, and alterations in immune function.
*Mechanism of Action*

- Functional MRI: Single point stimulation
  - Activation of occipital lobes with lateral foot VA1 stimulation
  - Reduction in limbic structure activity with true acupuncture (pressure sensation)
  - Activation of somatosensory cortex with sham point activation or painful response to needling
*Mechanism of Action: According to Biomedicine Pain

- Release of opioid-like substances into CSF
- Substance P, neurokinin A, neuropeptide Y
- Serotonergic and dopaminergic systems activated
- Descending pain inhibitory systems activated
- Thalamic relay nuclei inhibition
- Dorsal root entry zone inhibition
*Acupuncture for Headache

- 5 or more weekly 20-40 minute sessions
- Electrical stimulation
- Prolonged benefit after 6-10 weeks
- 70% respond to acupuncture -frequency

Morrisy, H et al. Headache 43, 221-228, 2003
**Acupuncture**

<table>
<thead>
<tr>
<th>30 patients 6 treatments in 4 weeks</th>
<th>Pain Score Reduction %</th>
<th>Medication Use Reduction %</th>
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<tr>
<td>Acupuncture Benefits at 1 year</td>
<td>43%</td>
<td>38%</td>
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