MANAGING MIGRAINES

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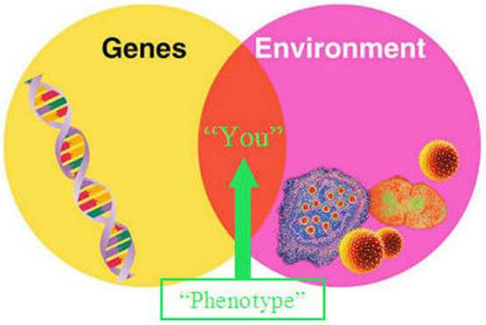
Headache Overview

- Migraine Background
- Epidemiology
- Headache Patterns
- Migraine
  - Criteria (with and without aura)
  - History
  - Physical Exam
  - Red Flags
  - Treatment
  - Resources

Migraine Background



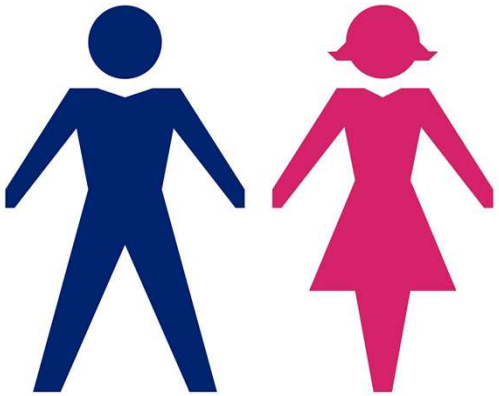
- **Primary neurologic disorder**
- **Multifactorial (environmental + genetic)**
- **Pathophysiologic mechanisms remain unknown**
  - Complex interaction of neural & vascular systems
  - Cortical spreading depression, abnormal neuronal excitability, trigeminal neurovascular activation, serotonin activity, inflammatory response
- **Genetic:**
  - Ca+ channel (CACNA1A)
  - Na channel (SCN1A)
  - Na/K pump (ATP1A2)
  - Mitochondrial dysfunction

Epidemiology

- **58% children** headache in the past year

- Migraine Prevalence
  - 1-3% of young children (3-7yo)
  - 8-23% in adolescent

- Male > female prior to puberty
- Female > male late adolescent



Headache Patterns

- **Acute**
- **Acute recurrent (or episodic)**
- **Chronic non-progressive**
- **Chronic progressive**

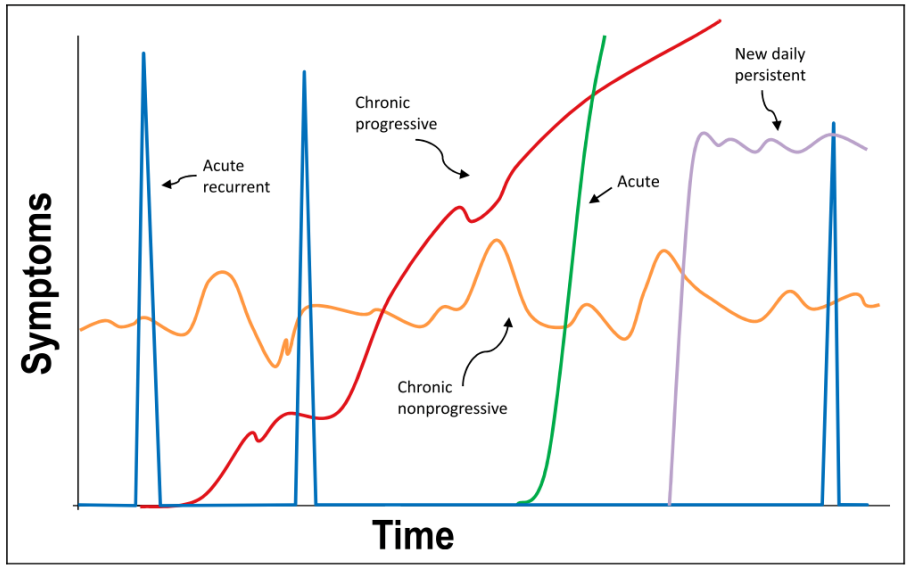


Figure. Headache patterns. (Adapted with permission from Rothner AD. The evaluation of headaches in children and adolescents. *Semin Pediatr Neurol*. 1995;2[2]:109–118.)

Migraine (W/O Aura) Criteria

The International Classification of Headache Disorders (ICHD) – 3rd Edition

A. At least **5 attacks** fulfilling criteria B-D

B. Last **4-72 hr** (untreated or unsuccessfully treated)

C. Headache has at least **2 of the following 4** characteristics:

- 1. unilateral location
- 2. pulsating quality
- 3. moderate or severe pain intensity
- 4. aggravation by or causing avoidance of routine physical activity (eg, walking or climbing stairs)

D. During headache at least **1** of the following:

- 1. nausea and/or vomiting
- 2. photophobia and phonophobia

E. Not better accounted for by another ICHD-3 diagnosis

Migraine + Aura

Most children do not have aura!

- If they do, not all headaches are with aura
- Occur mostly < 30 minutes before
- Last 5 - 60 minutes
- Completely reversible, recurrent over time

- **Visual Aura**
  - Photopsia, Alice in Wonderland syndrome, scotomata, transient blurry vision, zig-zag lines, scintillations

- **Sensory Aura**
  - Abnormal sensation (worms crawling), tingling, numbness, confusion, weakness, amnesia, or aphasia

Migraine (W/Aura) Criteria

The International Classification of Headache Disorders (ICHD) – 3rd Edition

A. At least **2 attacks** fulfilling criteria B and C

B. **One or more** of the following fully reversible aura symptoms:

- Visual
- Retinal
- Brainstem
- Sensory
- Motor
- Speech and/or language

C. At least **2/4** characteristics:

- At least 1 aura sx spreads gradually over ≥5 min, and/or 2+ sx occur in succession
- Each aura symptom lasts 5-60 min
- At least one aura symptom is unilateral
- The aura is accompanied, or followed within 60 min, by headache

D. Not better accounted by another ICHD-3 dx, and TIA has been excluded.

ICHD Migraine Subtypes

- **1. Migraine**
  - **1.1 Migraine without aura**
  - **1.2 Migraine with aura**
    - 1.2.1 Migraine with typical aura
      - 1.2.1.1 Typical aura with headache
      - 1.2.1.2 Typical aura without headache
    - 1.2.2 Migraine with brainstem aura
    - 1.2.3 Hemiplegic migraine
      - 1.2.3.1 Familial hemiplegic migraine (FHM)
        - 1.2.3.1.1 Familial hemiplegic migraine type 1 (FHM1)
        - 1.2.3.1.2 Familial hemiplegic migraine type 2 (FHM2)
        - 1.2.3.1.3 Familial hemiplegic migraine type 3 (FHM3)
        - 1.2.3.1.4 Familial hemiplegic migraine, other loci
      - 1.2.3.2 Sporadic hemiplegic migraine
    - 1.2.4 Retinal migraine
  - **1.3 Chronic migraine**
  - **1.4 Complications of migraine**
    - 1.4.1 Status migrainosus
    - 1.4.2 Persistent aura without infarction
    - 1.4.3 Migrainous infarction
    - 1.4.4 Migraine aura-triggered seizure
  - **1.5 Probable migraine**
    - 1.5.1 Probable migraine without aura
    - 1.5.2 Probable migraine with aura
  - **1.6 Episodic syndromes that may be associated with migraine**
    - 1.6.1 Recurrent gastrointestinal disturbance
      - 1.6.1.1 Cyclical vomiting syndrome
      - 1.6.1.2 Abdominal migraine
    - 1.6.2 Benign paroxysmal vertigo
    - 1.6.3 Benign paroxysmal torticollis

Migraine History

- Challenging
  - Children have difficulty describing episodes
- When did they headaches begin – any associated events

- **SOCRATES**
  - **S**ite
  - **O**nset
  - **C**haracter – types
  - **R**adiation
  - **A**ssociated Symptoms
  - **T**ime –time of day, duration, patterns
  - **E**xacerbating / Alleviating Factors
  - **S**everity - better, worse, same

Migraine History

- **Family History**
  - History of headaches (any type!)
  - Extended family
- **Social**
  - HEADSS
- **Lifestyle**
  - Sleep, meals, caffeine intake, activity
  - Medication (OCP)

Migraine Physical Exam

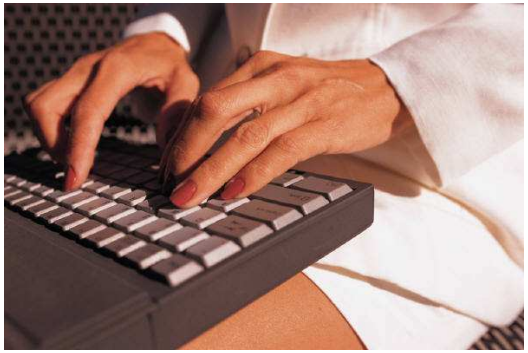
- **Growth Parameters**
- **Vitals**
- **HEENT**
  - Palpate, trigger points, allodynia, dental, nuchal rigidity
- **Derm**
  - neurocutaneous syndromes, systemic disease, cutting
- **Neuro**
  - Mental status
  - Cranial nerves - fundi
  - Tone, power, reflexes, sensation
  - Gait, coordination

*Note focal abnormalities, asymmetries, nerve palsies

RED FLAGS for Secondary Headache

- **Systemic sx:** weight loss, fever, rash, joint pain
- **Secondary RF:** cancer, genetic, immunosuppression, hypercoagulable, neurocutaneous, rheum
- **Neuro sx**: abnormalities or asymmetries on neuro exam
- **Onset:** sudden severe headache
- **Pattern change**: progressive, severity, frequency, new
- **Triggers:** Straining, coughing, sneezing, valsalva
- **Sleep-related:** waking patient, always present in AM

Investigations



- **CT scan**
  - Hemorrhage or fracture
- **Brain MRI**
  - Structure, infection, inflammation, ischemia, mass lesion
- **Work-Up**
  - Systemic disease, meningitis, thyroid disease
  - Elevated ICP with <u>normal</u> neuroimaging
    - LP with opening pressure
    - Assess CSF indices

Neuroimaging Guidelines

- **Not recommended**
  - If recurrent headaches with normal neuro exam
- **Recommended**
  - Abnormal neuro exam, seizures, or both
  - + Red Flags, ie. Recent onset severe, change, associated features

Management Domains

1) **Preventative Management**
   - Non Pharmacologic
     - Headache diary
     - Lifestyle modification – SMART
   - Pharmacologic
     - Nutraceuticals
     - Prescription
2) **Acute headache management**
3) **Complementary treatments**
4) **Referral**

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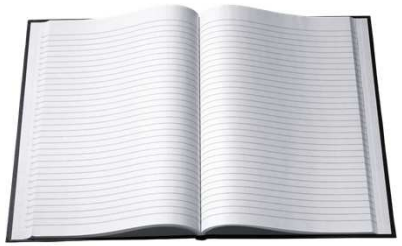
Preventative Management – Headache Diary



- Keep a headache diary
  - Track frequency, duration
  - Tracks triggers or stressors
  - Track medication use and response

- Multiple Methods:
  - Calendar
  - iPhone – MigraineBuddy or ecoHeadache
  - Android – migraine.com

Preventative Management – Lifestyle Modification

Table 6. SMART Headache Management

Sleep	Regular and sufficient sleep
Meals	Regular and sufficient meals, including breakfast and good hydration
Activity	Regular (but not excessive) aerobic exercise
Relaxation	Relaxation, stress reduction, and management
Trigger avoidance	Avoid triggers such as stress, sleep deprivation, or other identified triggers

Preventative Management - Sleep

- Irregular or lack of sleep → MIGRAINE
  - Regular
  - 8-12 hours a night
  - Avoid fluctuations
  - Sleep hygiene

Preventative Management - Meals

- Skipping meals → MIGRAINE

- Regular meals: 3x / day, 1-3 snacks
- Hydration: 4 - 6 glasses of water
- Monitor coffee, tea, soda, caffeine intake
- Monitor for food triggers

Preventative Management - Activity

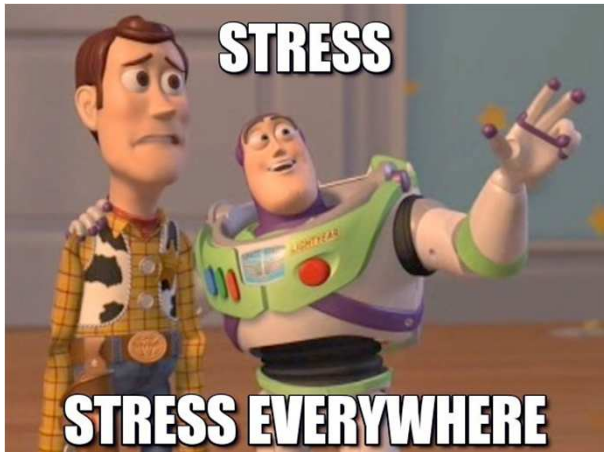
- Too much or inconsistent exercise → MIGRAINE

- Regular routine
- Moderate - vigorous
- 60 minutes daily

Preventative Management - Relaxation

- Stress → MIGRAINE
  - Good stress – holiday, friends, travel
  - Bad – bullying, exam, social issues

- Reading, bath, music, visualization, mindfulness
- Physical activity
- Consult mental health
- Lots of resources available!



Resources – Relaxation

Smart Phone Apps

- **Breathing Zone**
  - Teaches patients of all ages how to do diaphragmatic breathing
- **Healing Buddies Comfort Kit**
  - Teaches children a variety of relaxation techniques
- **Take a Chill – Stressed Teens**
  - Teaches teens strategies to cope with stress which may help to cope with headache pain
- **Stop, Breathe and Think**
  - Teaches meditation techniques

Resources - Relaxation

Websites

- Relaxation resources
  - www.dawnbuse.com
- Websites on mindfulness therapy:
  - www.anxietybc.com (mind shift app)
  - www.Smilingmind.com.au
  - www.neuronovocentre.com

Preventative Management – Trigger Avoidance

- Food and environmental triggers → MIGRAINE

- Caffeine, artificial coloring, sweeteners, MSG
- Scents or chemicals
- Weather changes
- Lights or computer screens
- Excessive sun
- Motion sickness

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Preventative Management – Pharmacologic Treatments

When to consider this?

- If **>4 days** of disabling headaches per month
- Goal is 50% decrease in headaches
- Takes at least 4-6wk for full benefit
- Titrate up
- Reassess at 6 months

Preventative Treatment - **Nutraceuticals**

Take 2-4 months to work!

- Mg citrate or oxalate: 300-450mg per day
- Riboflavin (vitamin B2): 200-400 mg per day
- Coenzyme Q10: 100-200mg per day
- Melatonin: 1-6mg QHS

Preventative Treatment - **Prescription**

- **More studies needed in this area!**
  - Evidence from adult trials
  - Analysis does not support the same findings in children

- AAN - **Flunarizine** (CCB)
- CHAMP 2016 - **No difference, Amitryptyline, Topiramate & Placebo**

Choice - based on comorbid factors

- **TCA -** Amitryptyline / Nortriptyline
- **Antiepileptics -** Topiramate, Valproic Acid, Gabapentin
- **Antihypertensives -** Propanolol, Verapamil
- **Cyproheptadine**

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Management - Acute Headache

Drugs for the acute treatment of migraine in children and adolescents (Review)

Richer L, Billinghurst L, Linsdell MA, Russell K, Vandermeer B, Crumley ET, Durec T, Klassen TP, Hartling L

Management - Acute Headache

Goal – intervene early!

1. **OTC Meds:**
   - Ibuprofen (no evidence for Tylenol)
2. **Triptans:**
   - No difference between types
3. **Antiemetic**
   - Gravol
4. **Attack Pack**
   - Medication, water, snack

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Management - Complementary Treatments

- Biofeedback therapy
- Relaxation techniques
- Hypnosis
- Acupuncture, acupressure
- Physical therapy
- Massage therapy
- Rekki
- Aromatherapy

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When to Refer to Neurology

- Diagnostic uncertainty
- Evidence of red flags
- Focal or unique neurological findings
- Uncertainty regarding patient management
- Non-responders to usual preventative or acute measures

Take Home:

- **Migraine**
  - Common phenomenon 8-23% adolescents
  - Refer back to criteria if ever unsure
  - R/A for red flags!

- **Management**
  - Preventative & Acute options
  - Diary, SMART, nutraceuticals, prescription, complementary
  - Phone apps, websites
  - Always the option to seek advice or refer

Resources - Headaches

American Migraine Foundation

- www.americanmigrainefoundation.org

Canadian Headache Society

- www.headachenetwork.ca

National Headache Foundation

- www.headaches.org

Kidshealth

- www.kidshealth.org

Pain Retreat

- www.painretreat.net

Thank you!

Special thanks to Dr. Suzanne Christie!