Headache: A Ticket to the Brain Train

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Objectives

- Use basic cognitive tools to rapidly navigate the vast array of headache syndromes at the bedside
- Distinguish primary versus secondary headache syndromes while avoiding "diagnostic trainwrecks”
- Briefly review selected common headache syndromes
- Choose wisely...

International Headache Society

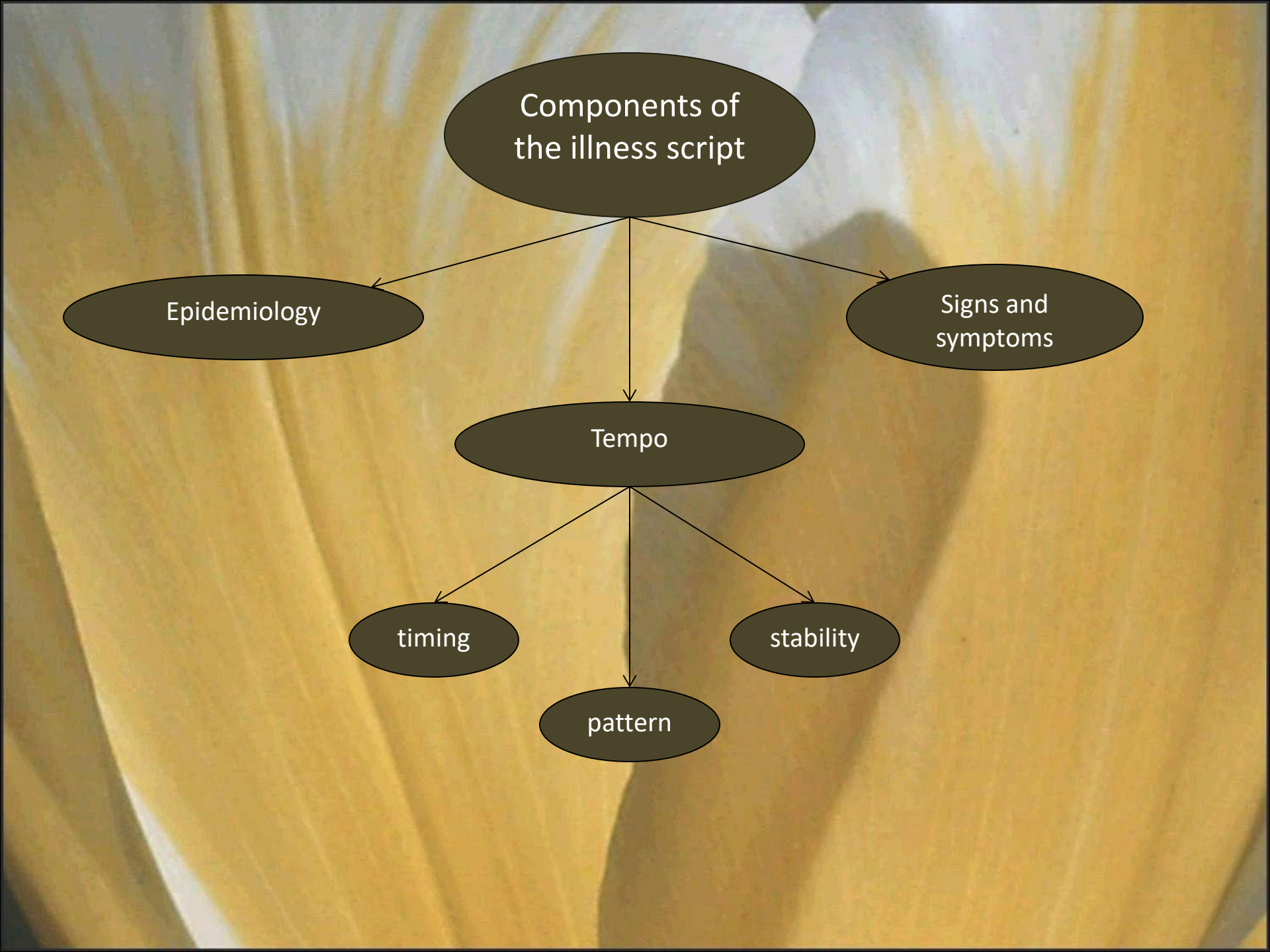
- ICHD-3 (the "short version") released in 2013.
  - 180 pages
  - 14 headache groups
    - 1-4: primary
    - 5-12: secondary
    - 13-14: cranial neuralgias / facial pain / others
    - Estimated total: 250-300 causes
    - All with defined diagnostic criteria
- Full version to be released soon… possibly to a theater near you?

Cephalalgia 2013; 33(9): 629-808.

Methods of Clinical Reasoning

- Probabilistic
- Pattern recognition
- Pathophysiologic

Griffin FM. UAB Medicine Grand Rounds; July 30, 1992.

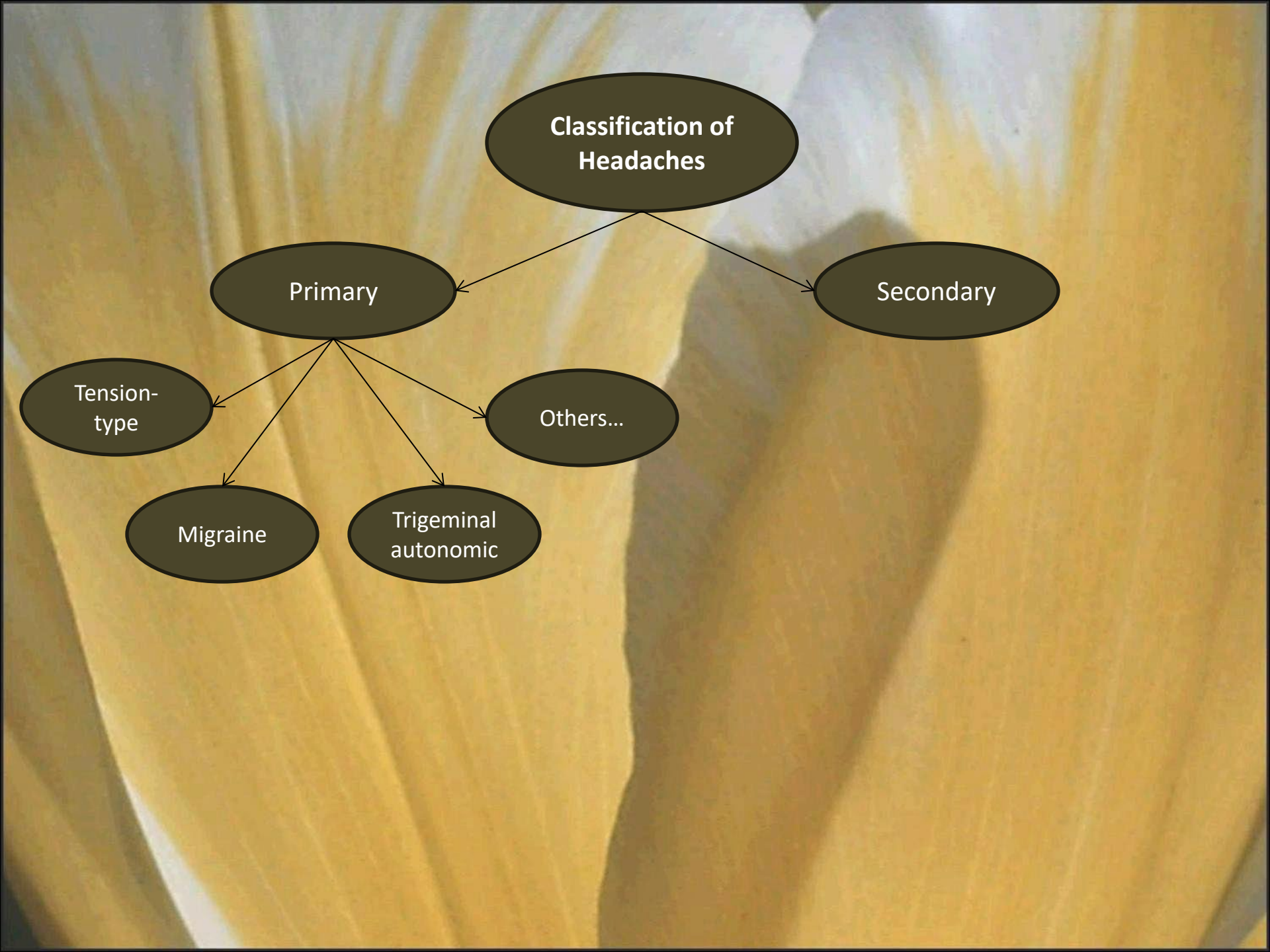

Components of the illness script
Epidemiology
Signs and symptoms
Tempo
timing
stability
pattern

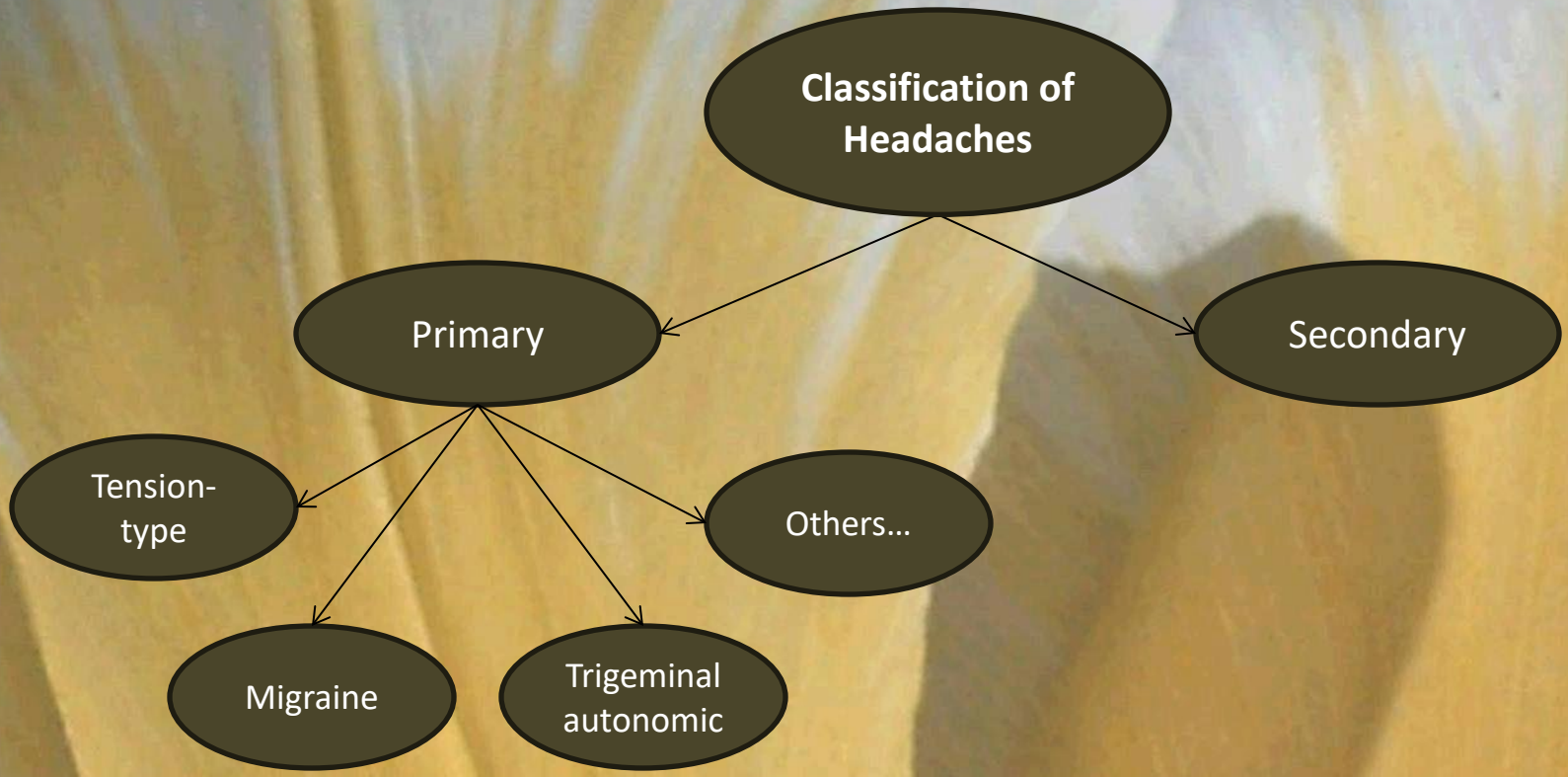
History - OLDCARTS

- Onset: sudden vs gradual
- Location
- Duration
- Character (nociceptive / neuropathic)
- Associated features
  - Other symptoms
  - Aggravating / relieving factors
- Referral
  - Past diagnosis / evaluation / treatment
- Temporal aspects
  - Timing
  - Pattern
  - Stability
- Severity: includes rapidity of progression and impact

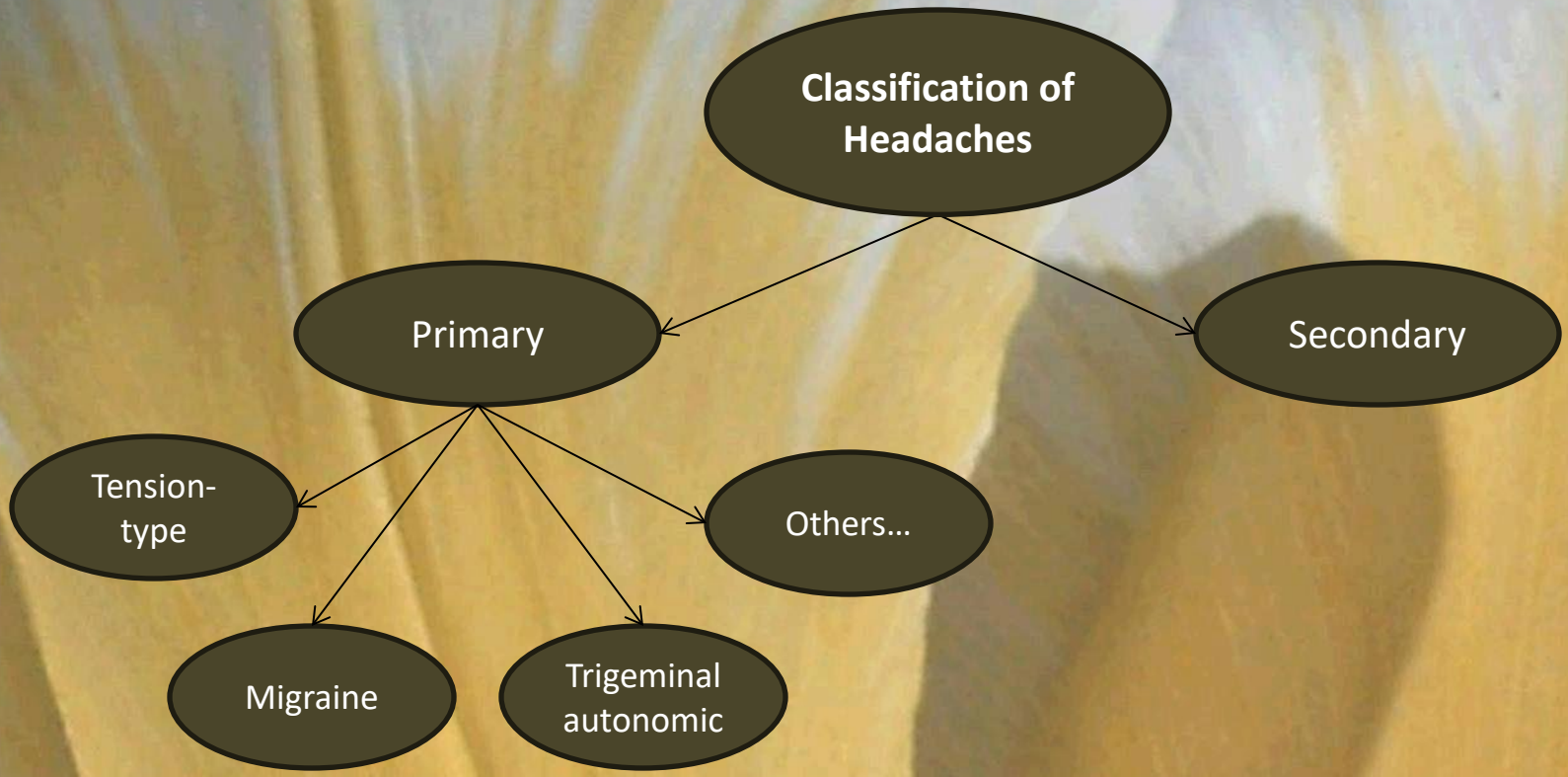
Horizontal vs Vertical Thinking

DISEASE	History	Physical findings	Diagnostic studies	Treatment	Prognosis
Migraine without aura					
Cluster headache					
Medication overuse headache					
Trigeminal neuralgia					


Classification of Headaches
Primary
Secondary
Tension-type
Others…
Migraine
Trigeminal autonomic

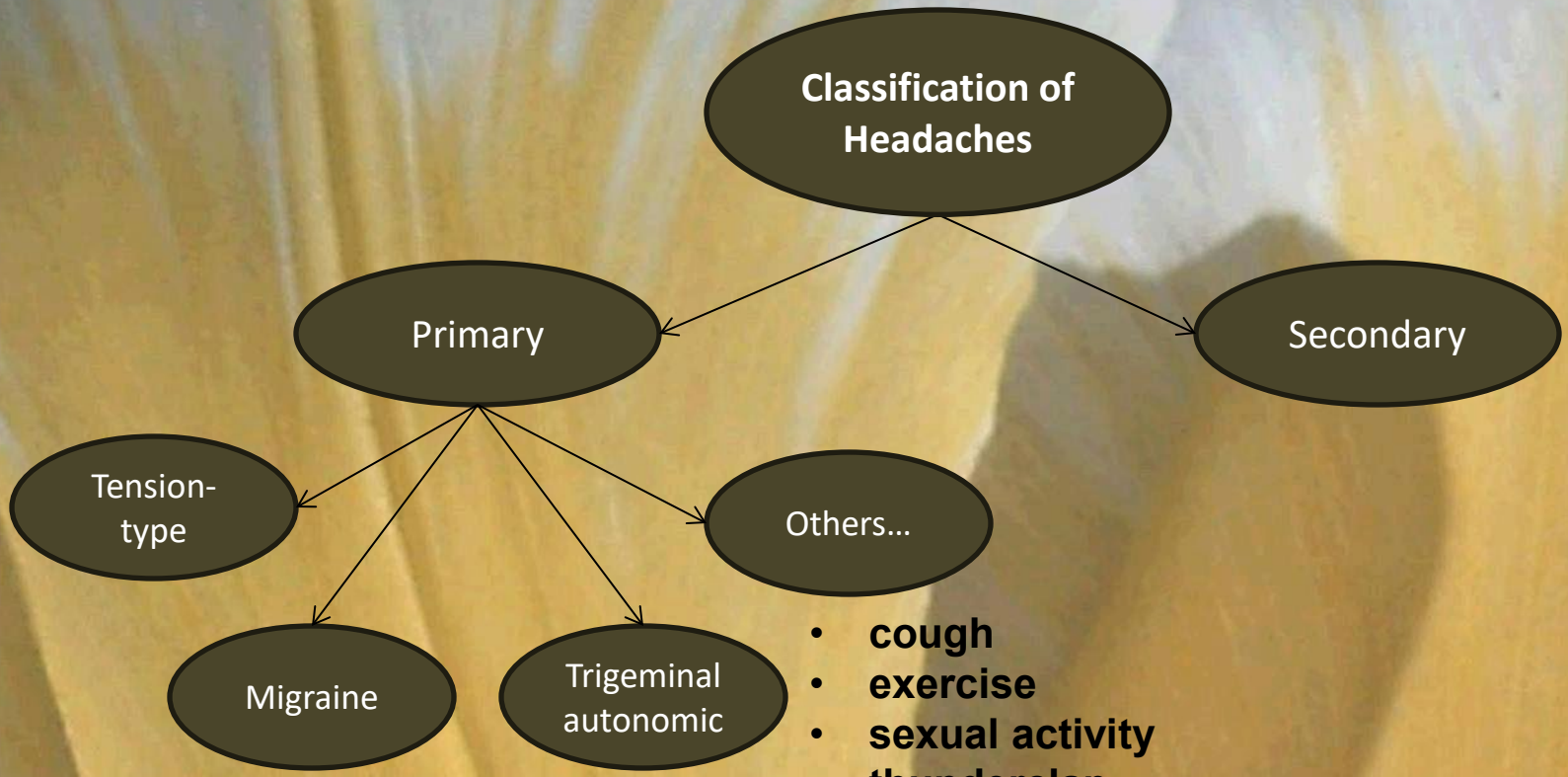


- **migraine w/ aura**
- **migraine w/o aura**
- **chronic migraine**
- **complicated migraine**
- **familial migraines**
- **unusual**
    - **ophthalmoplegic**
    - **retinal**
    - **basilar type**



- **cluster headaches**
- **paroxysmal hemicrania**
- **SUNCT***
- **others…**

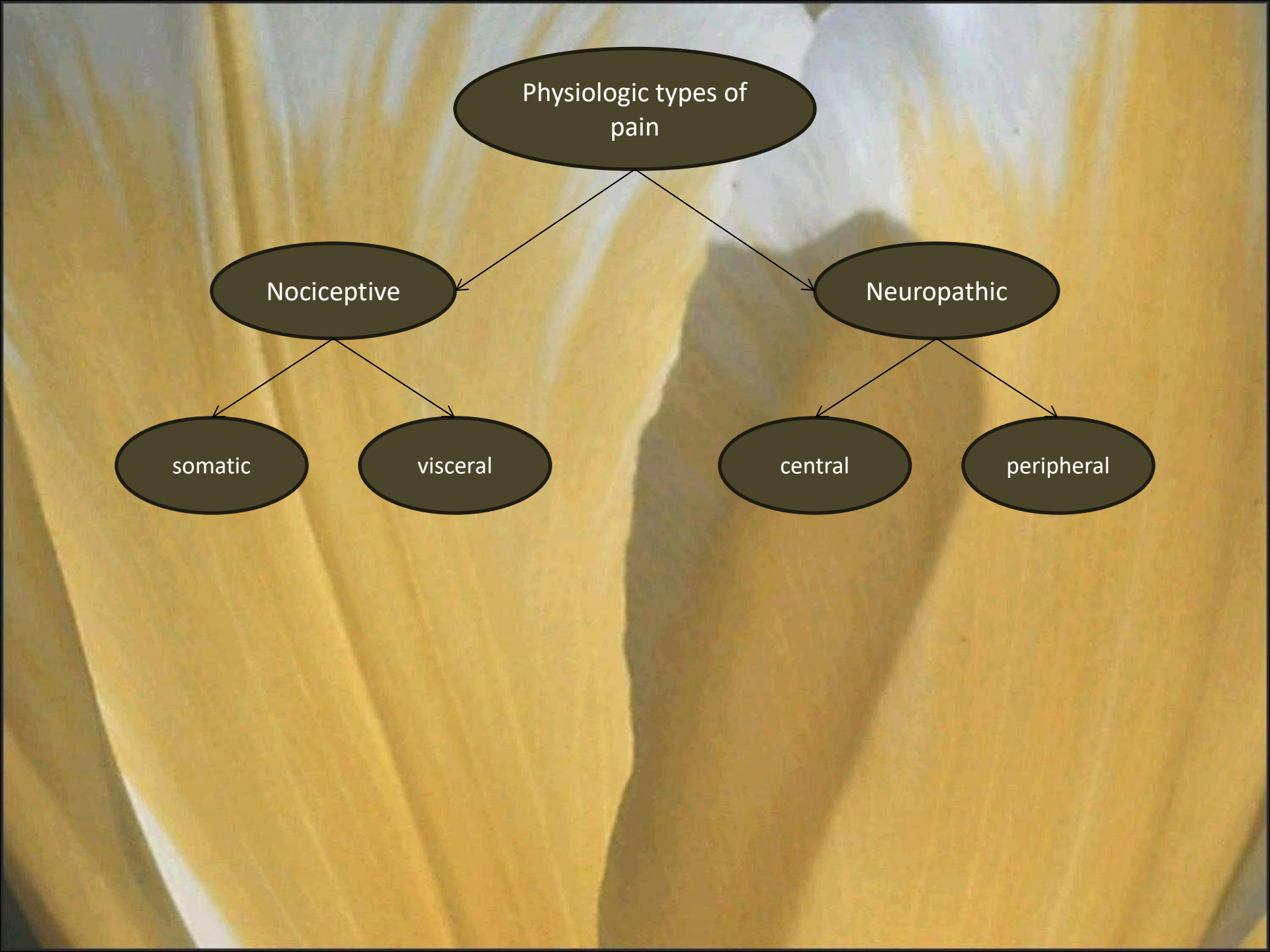
* Short-lasting Unilateral Neuralgiform Headache w/ Conjunctival injection and Tearing

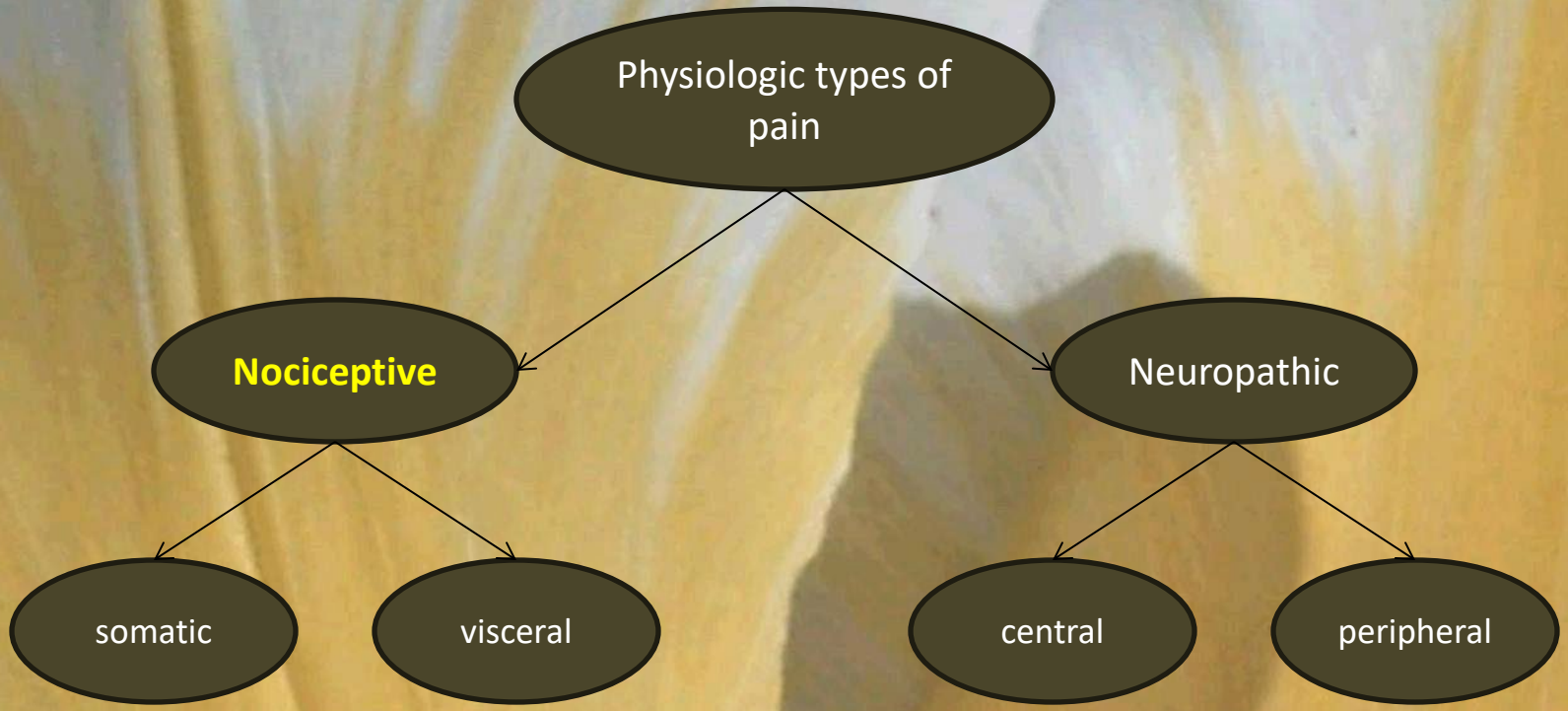


- **cough**
- **exercise**
- **sexual activity**
- **thunderclap**
- **cold-associated**
- **extrinsic pressure**
- **stabbing**
- **nummular**
- **hypnic**
- **others…**

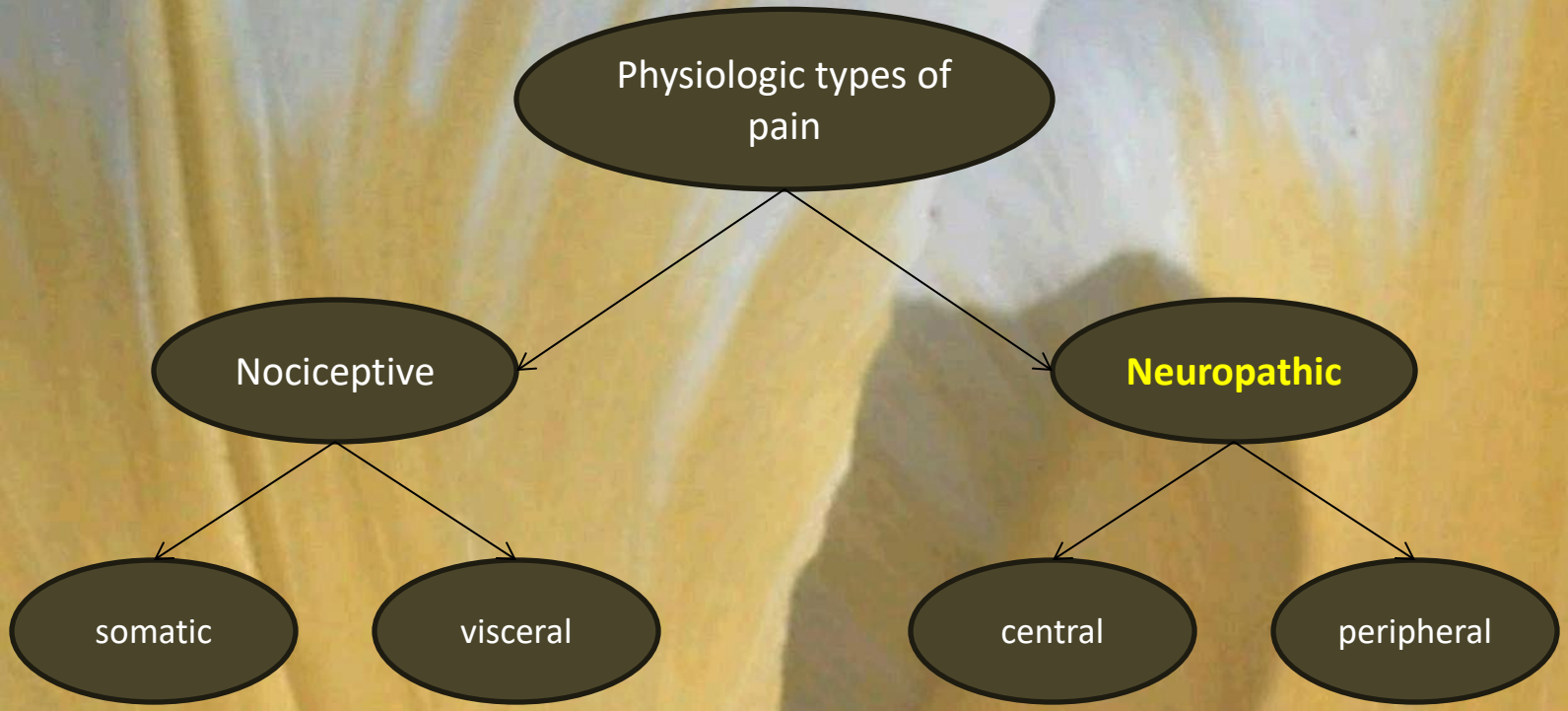
IHS Classification of Nonprimary Headaches

- Secondary headaches
  - Trauma / injury to head and/or neck
  - Cranial / cervical vascular disorder
  - Nonvascular intracranial disorder
  - Substance use / withdrawal
  - Infection
  - Disorder of homeostasis
  - Disorder of cranium, neck, eyes, ears, nose, sinuses, teeth, mouth, or other facial / cranial structures
  - Psychiatric
- Painful cranial neuropathies, other facial pains, other headaches


Physiologic types of pain
Nociceptive
Neuropathic
somatic
visceral
central
peripheral



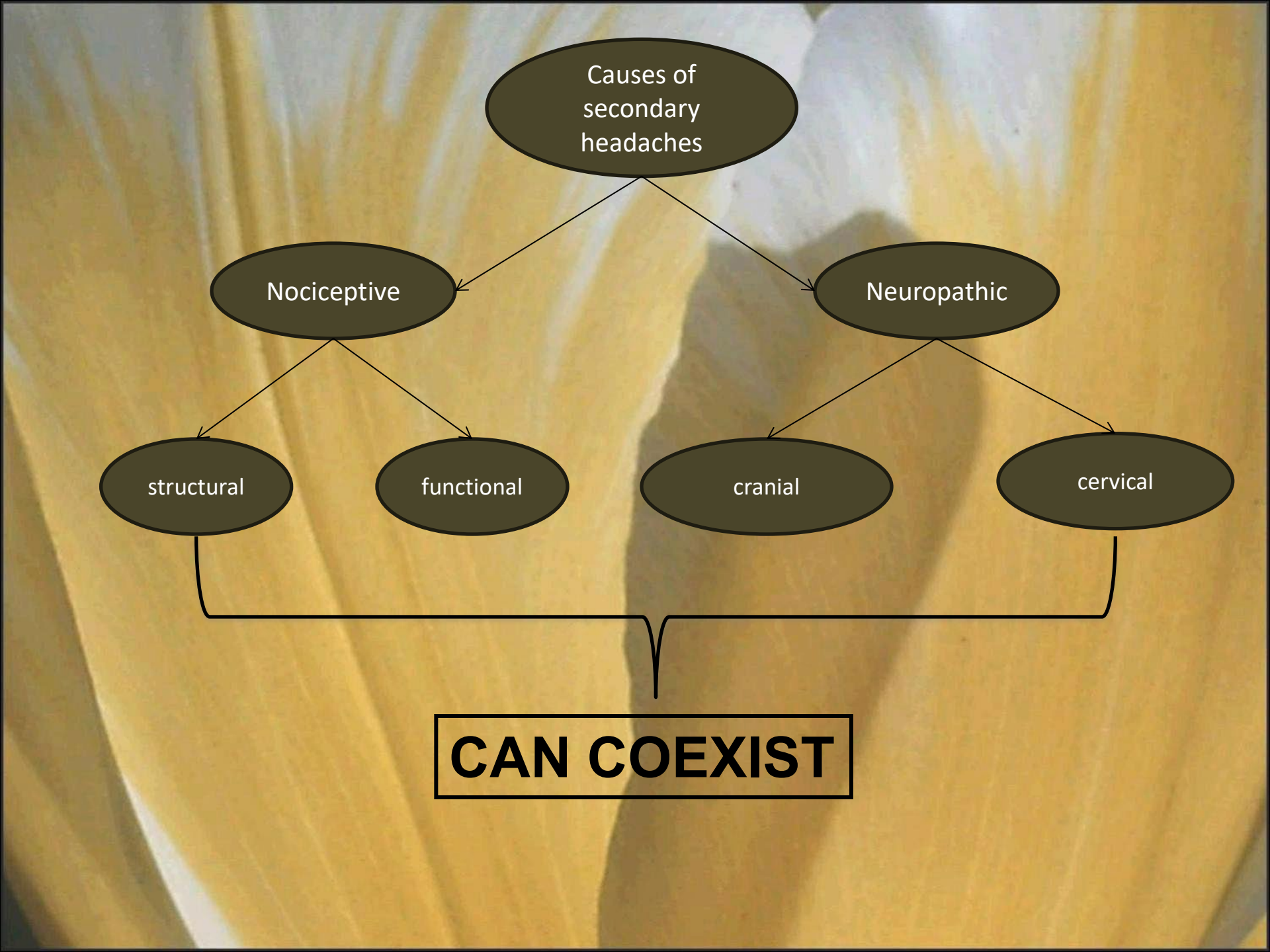
- **Results from activation by stimuli approaching or exceeding harmful intensity**
- **Normal physiologic transduction (physical stimulus to electrical signal)**
  - **Mechanical**
  - **Thermal**
  - **Chemical**

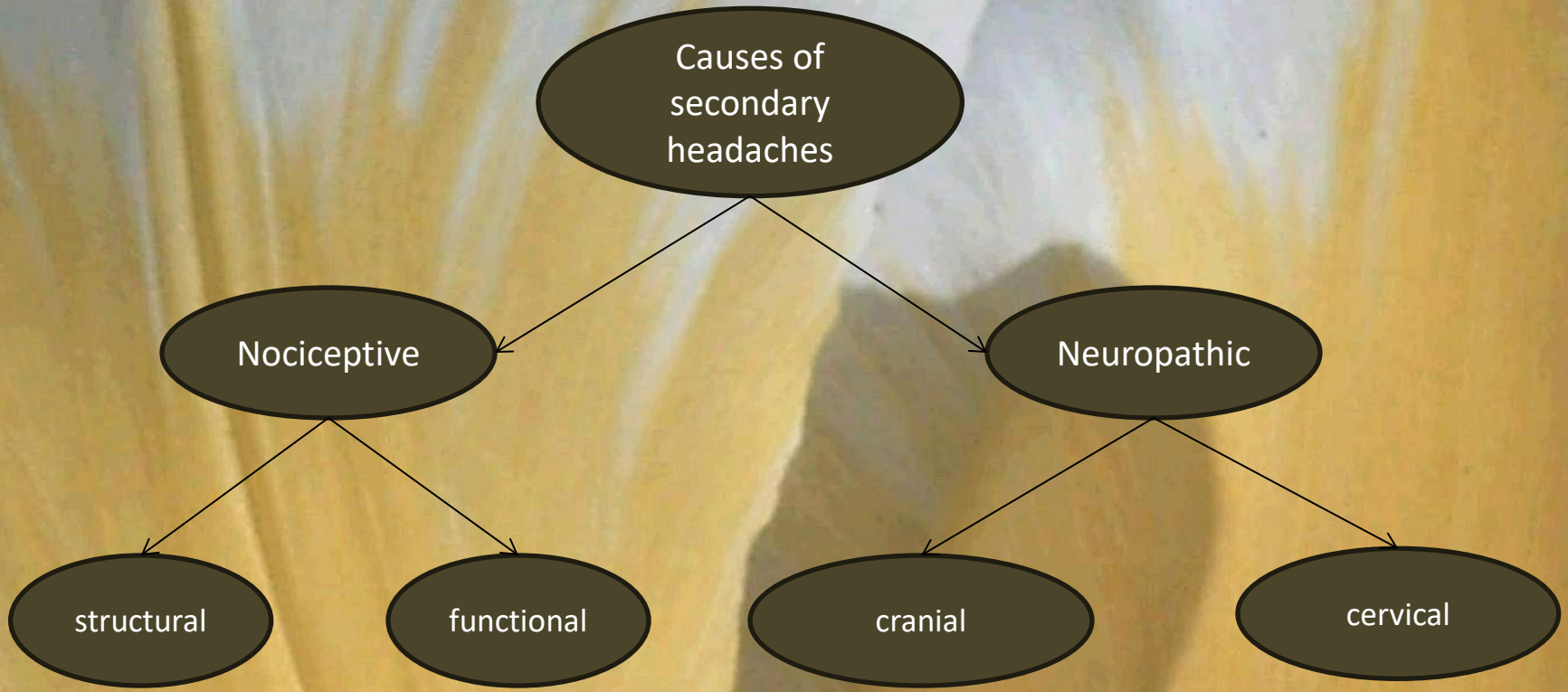


- **Neuronal hyperactivity due to disease / injury / dysfunction of nervous system**
- **Results from ectopic impulse generation / propagation**
- **Additional descriptors of pain / other sensory perception disturbances**

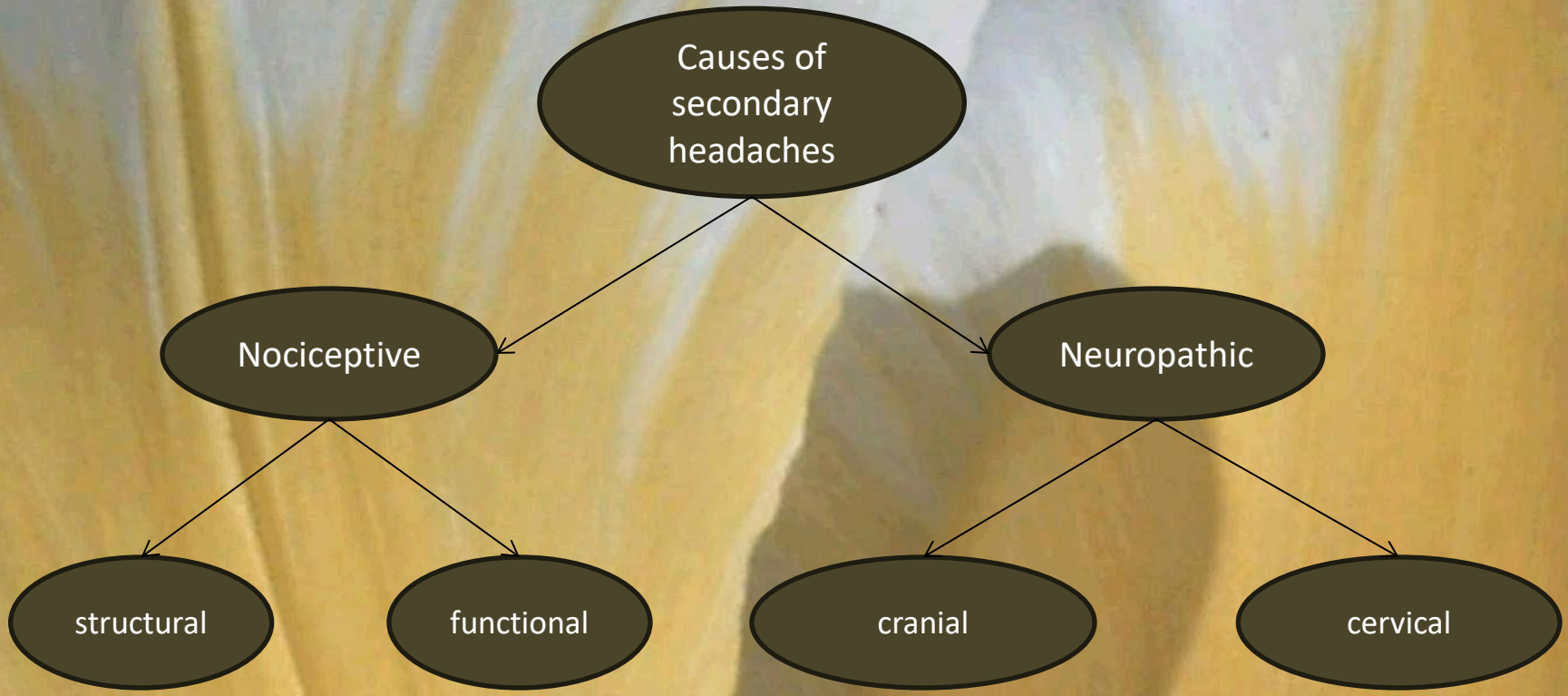
Pain-sensitive structures

- Skin
- Bone (periosteum) / muscle / joints
- Cranial nerves (V, VII, IX, X)
- Upper cervical roots (C_1 and C_2)
- Blood vessels
  - Proximal portion of arteries leaving Circle of Willis
  - Dural venous sinuses
- Meninges
- Sinuses
- Other structures (eyes, ears, nose, teeth)

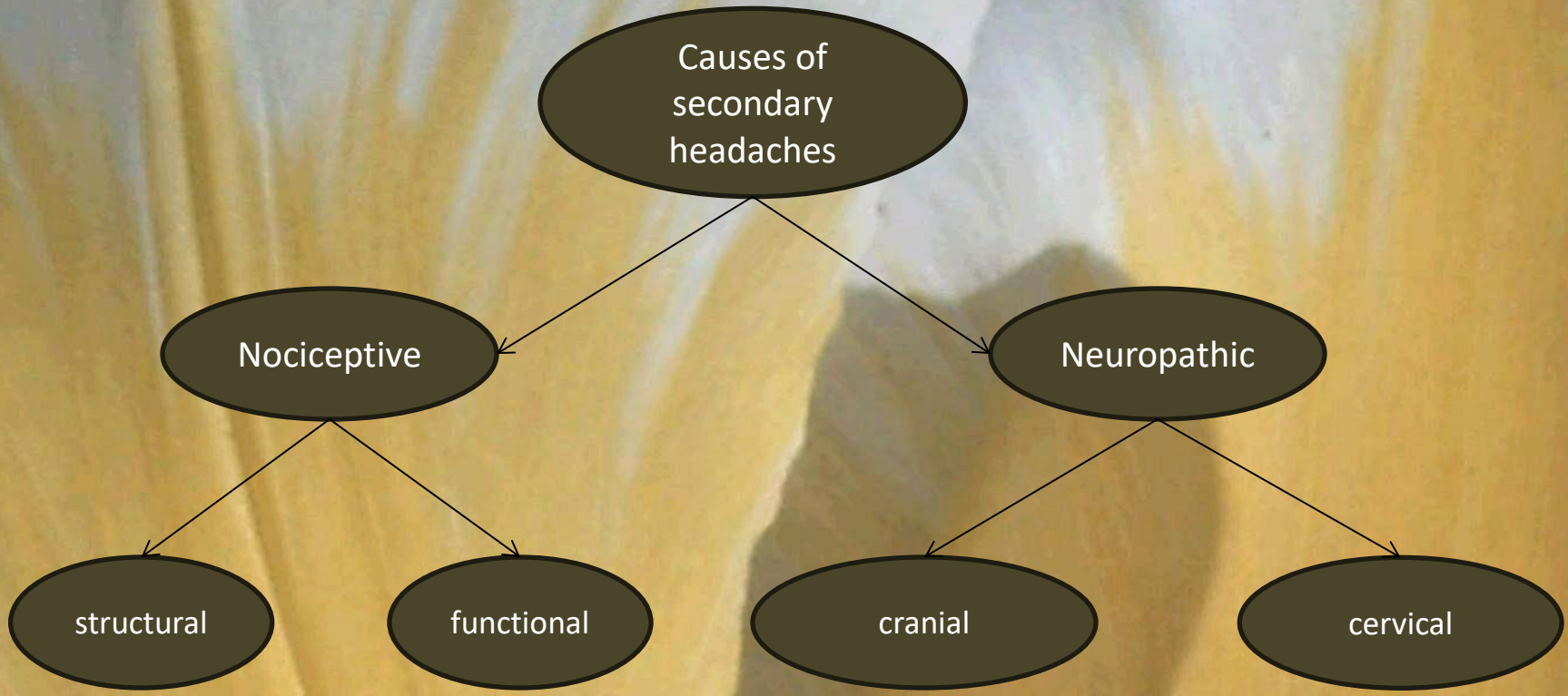

Causes of secondary headaches
Nociceptive
Neuropathic
structural
functional
cranial
cervical
CAN COEXIST



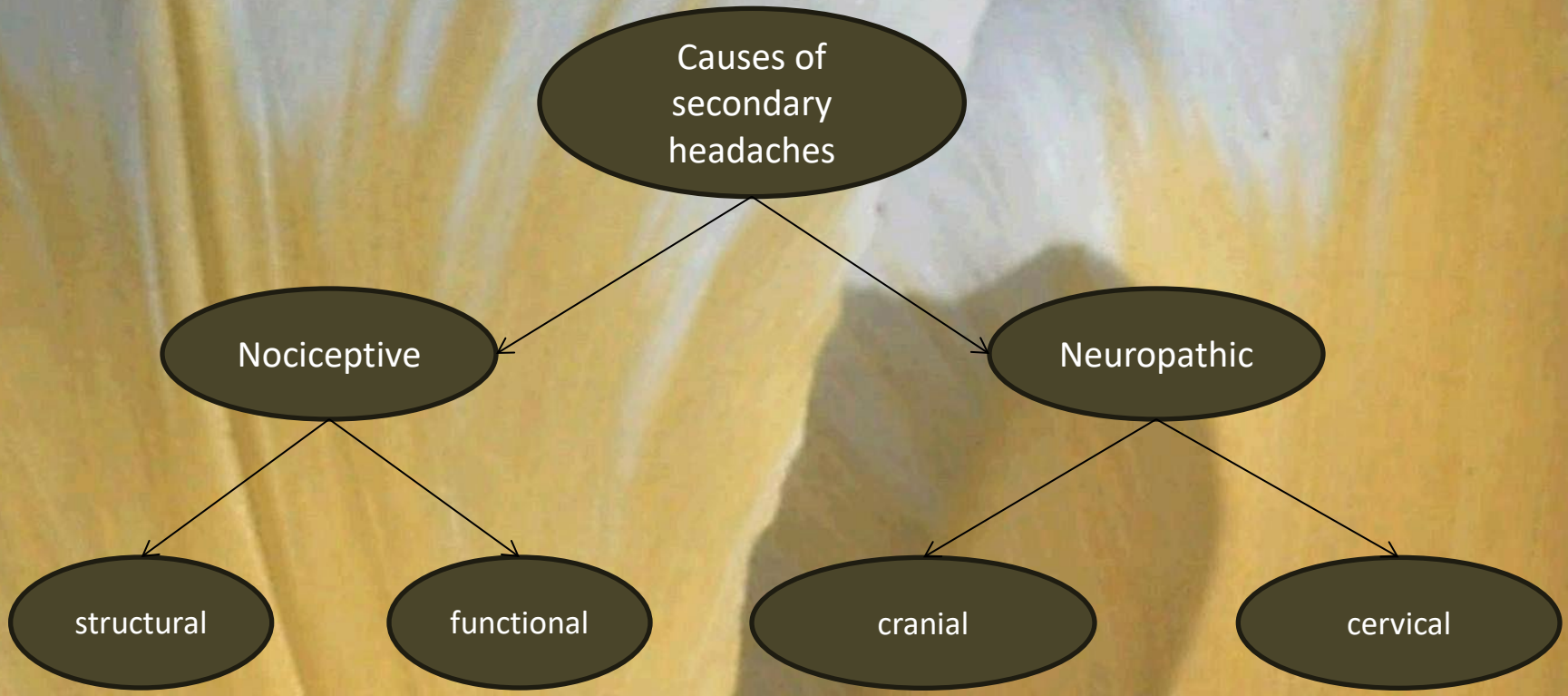
- **Bone / soft tissue / joint**
- **Blood vessel**
  - **Arterial**
  - **Venous (inc venous sinuses)**
- **Meningeal**
  - **Chemical**
  - **Physical**
- **Eyes**
- **Ears**
- **Nose**
- **Sinuses**
- **Teeth**



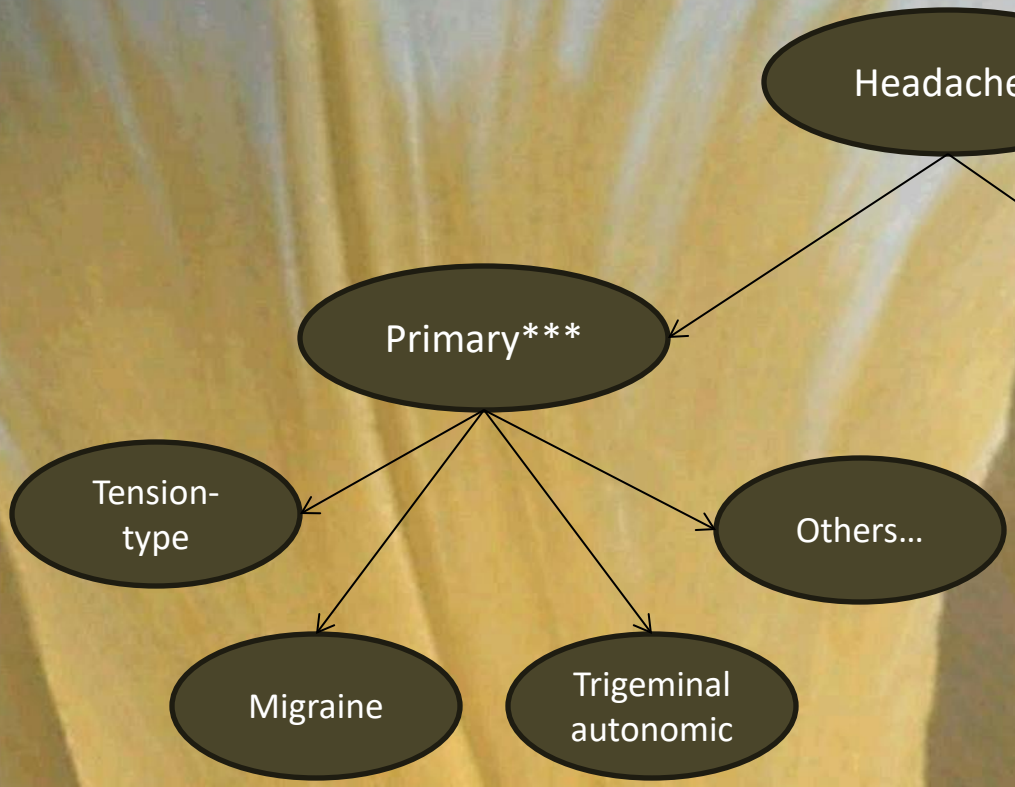
- **Substance use / withdrawal**
- **Medication overuse**
- **Homeostasis**
  - **Ventilation**
  - **Oxygenation**
  - **Toxic**
  - **Metabolic**
- **Psychiatric**



- **Trigeminal neuralgia**
- **Glossopharyngeal neuralgia**
- **Nervus intermedius neuralgia**
- **Epicranial neuralgia syndromes**



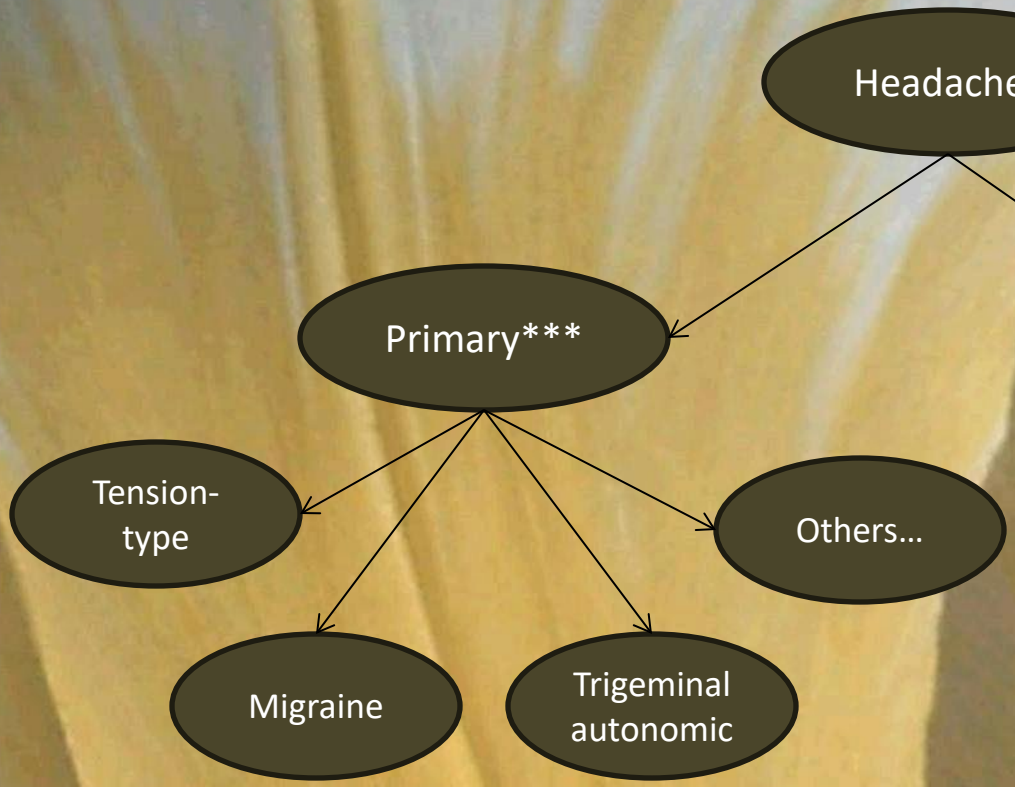
- **Occipital neuralgia**
- **Others…**



*** *"The above must not be accountable by another disorder."*

HISTORY

- sudden onset
- lack of past headaches
- trauma (recent or remote)
- age > 50 yrs
- location / pattern of spread
- exacerbating factors
- associated symptoms
  - neurologic
  - non-neurologic
    - infection
    - neoplastic
    - autoimmune
- family history (+/-)
- visual changes
- medical history
  - immunosuppression
- medications (+/-)
- exposures



EXAMINATION

- **NEW neurologic findings**
- **encephalopathy**
- **meningismus**
- **abnormal vital signs**
- **toxic appearance**
- **ophthalmologic findings**
  - **visual acuity**
  - **visual fields**
  - **oculomotor assessment**
  - **papilledema**
- **evidence of trauma**
- **evidence of systemic disease**

****** "The above must not be accountable by another disorder."***

Tension type headache (TTH)

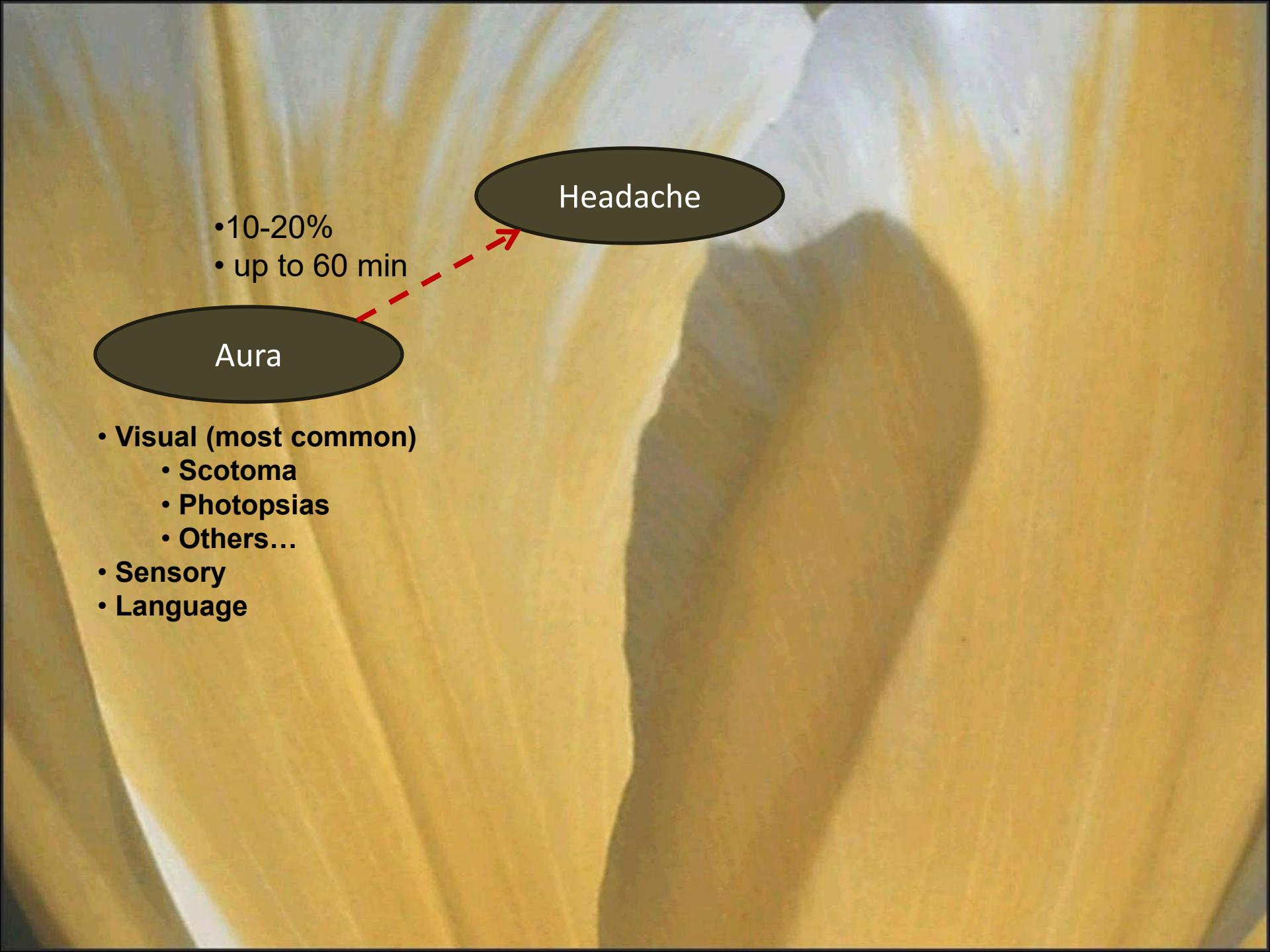
- Highest lifetime prevalence / socioeconomic impact
- Least distinct / least studied
- Episodic vs chronic
  - Different pathophysiologic mechanisms
  - Sustained muscle contraction is NOT universal or required.
- Classic description
  - 30 minutes to 7 days
  - Two (or more) of:
    - Bilateral location
    - Pressing / nonpulsatile quality
    - Mild-moderate intensity
    - Not worsened by physical activity
  - Absence of:
    - Nausea / vomiting
    - Photophobia / phonophobia

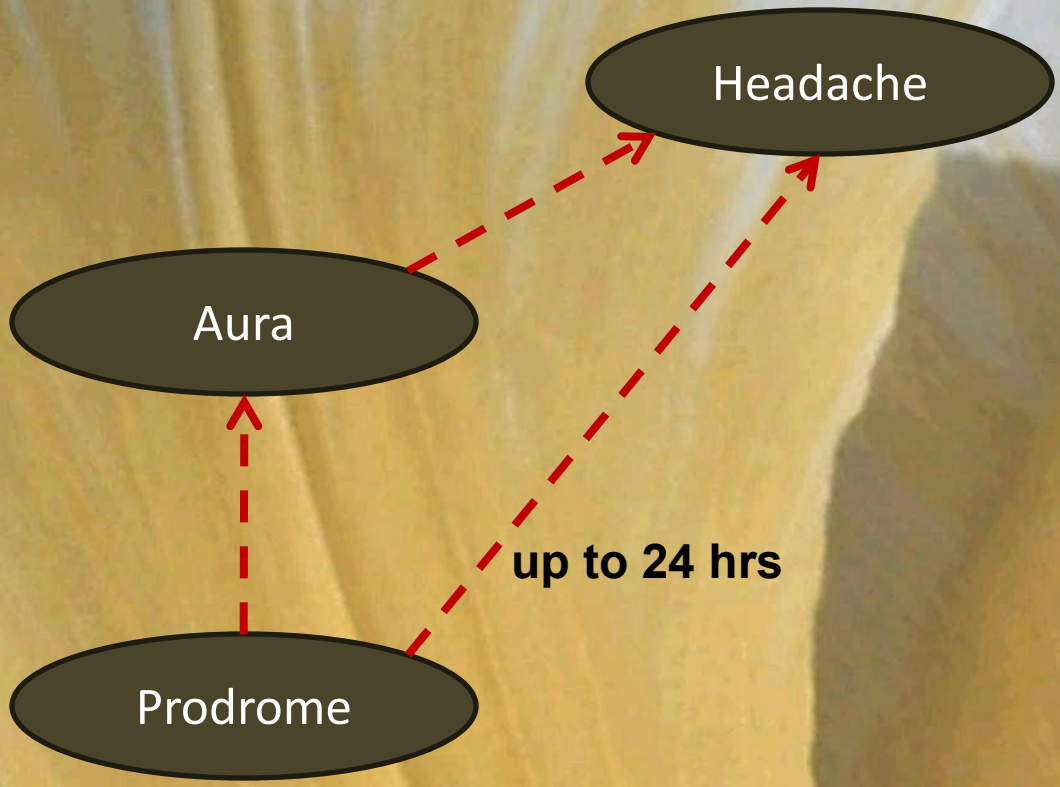
Overview of migraines

- Epidemiology
  - Women > men / “rule of 90s” / prevalence
- Pathogenesis
  - Vasogenic theory
  - Neurogenic theory
- Subtypes
  - Migraine w/ aura
  - Migraine w/o aura – most common
  - Others
    - Familial
    - Complicated
    - Chronic
    - Unusual…

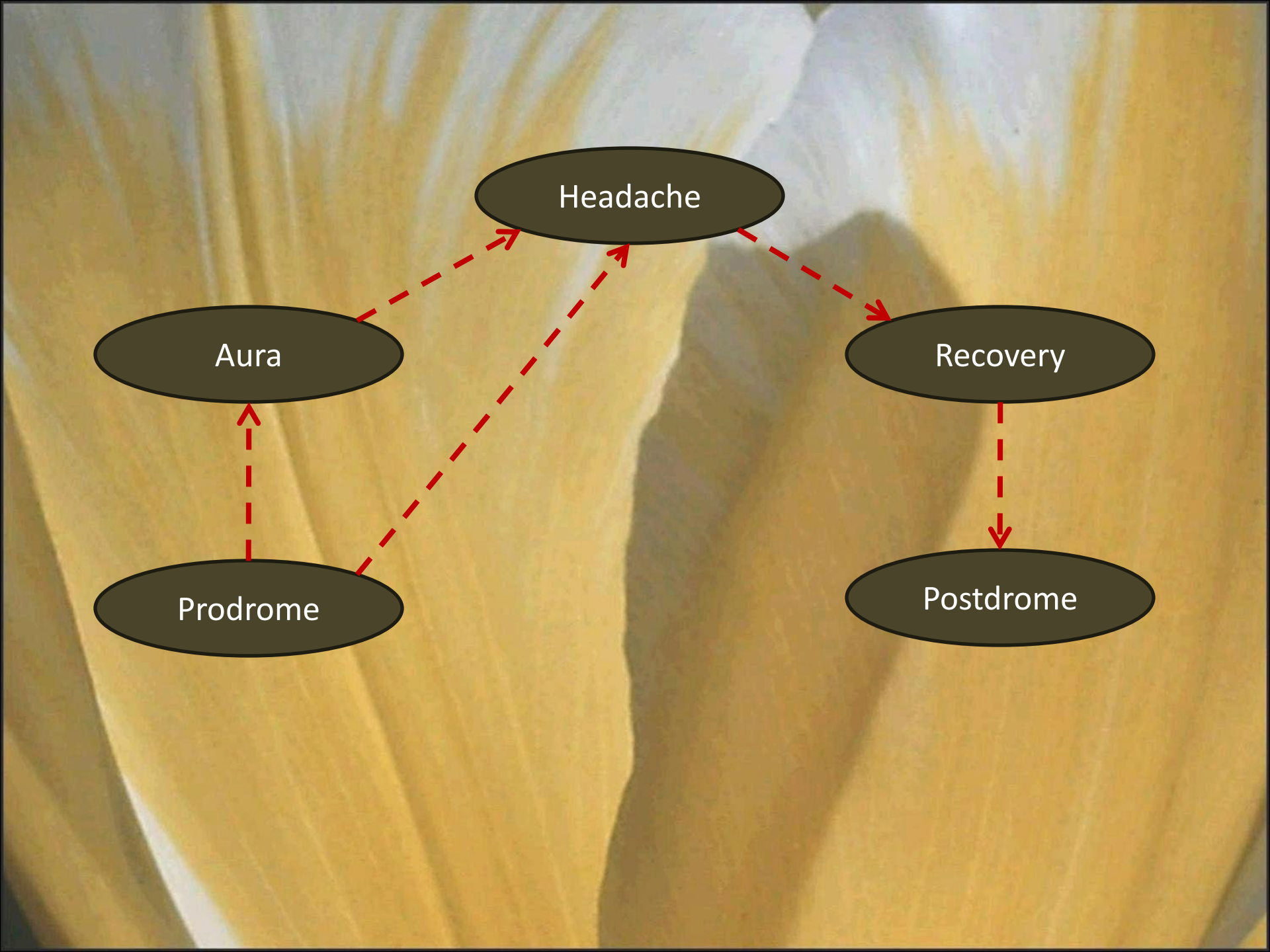
Headache

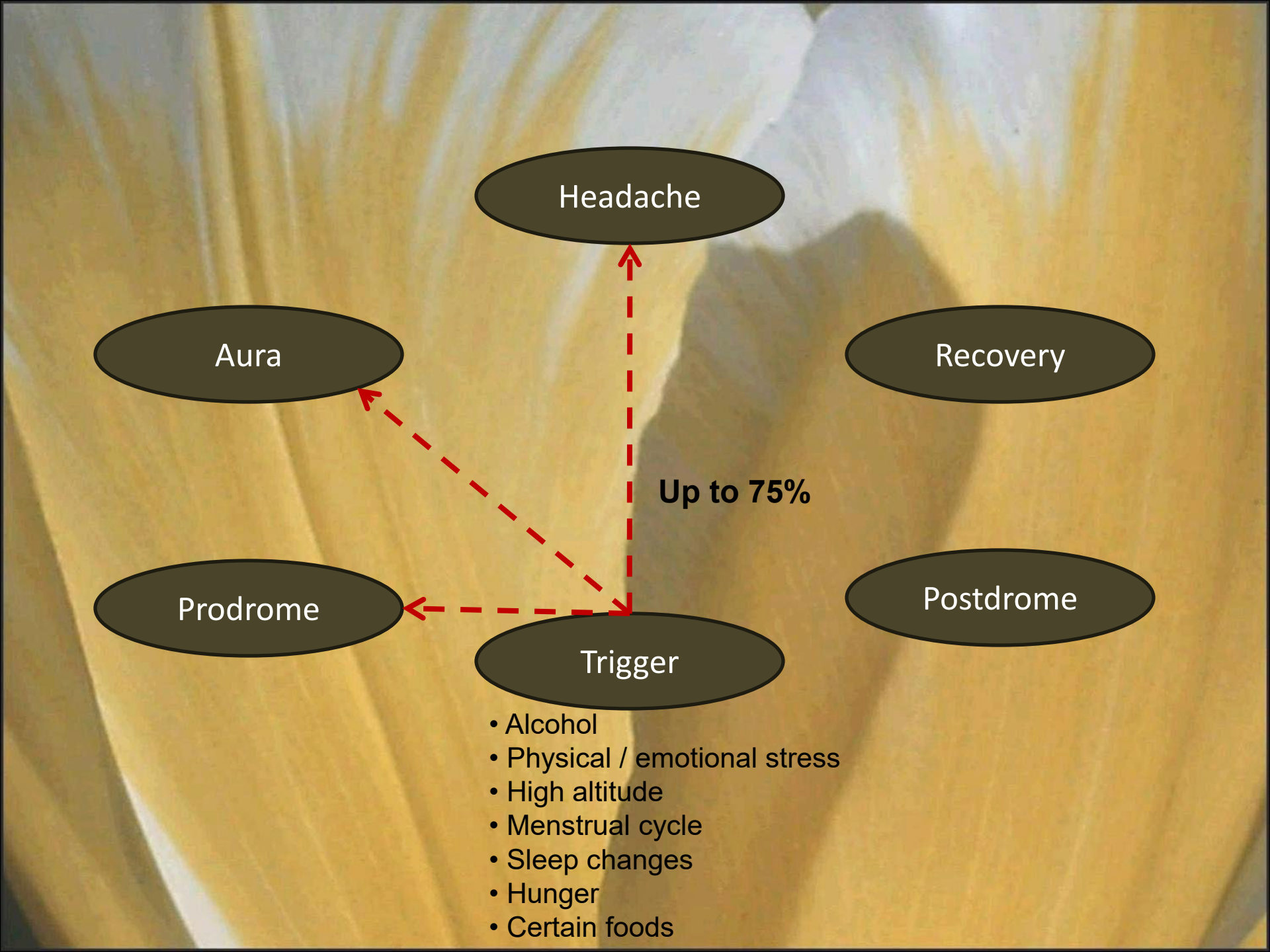
- Moderate-to-severe
- Slowly escalating
- Often pulsatile
- Lasting 4-72 hours
- Unilateral (up to 40% bilateral)
- Worsened by routine physical activity
- Photophobia and phonophobia
- Nausea / vomiting
- Need at least 5 bouts to fit criteria

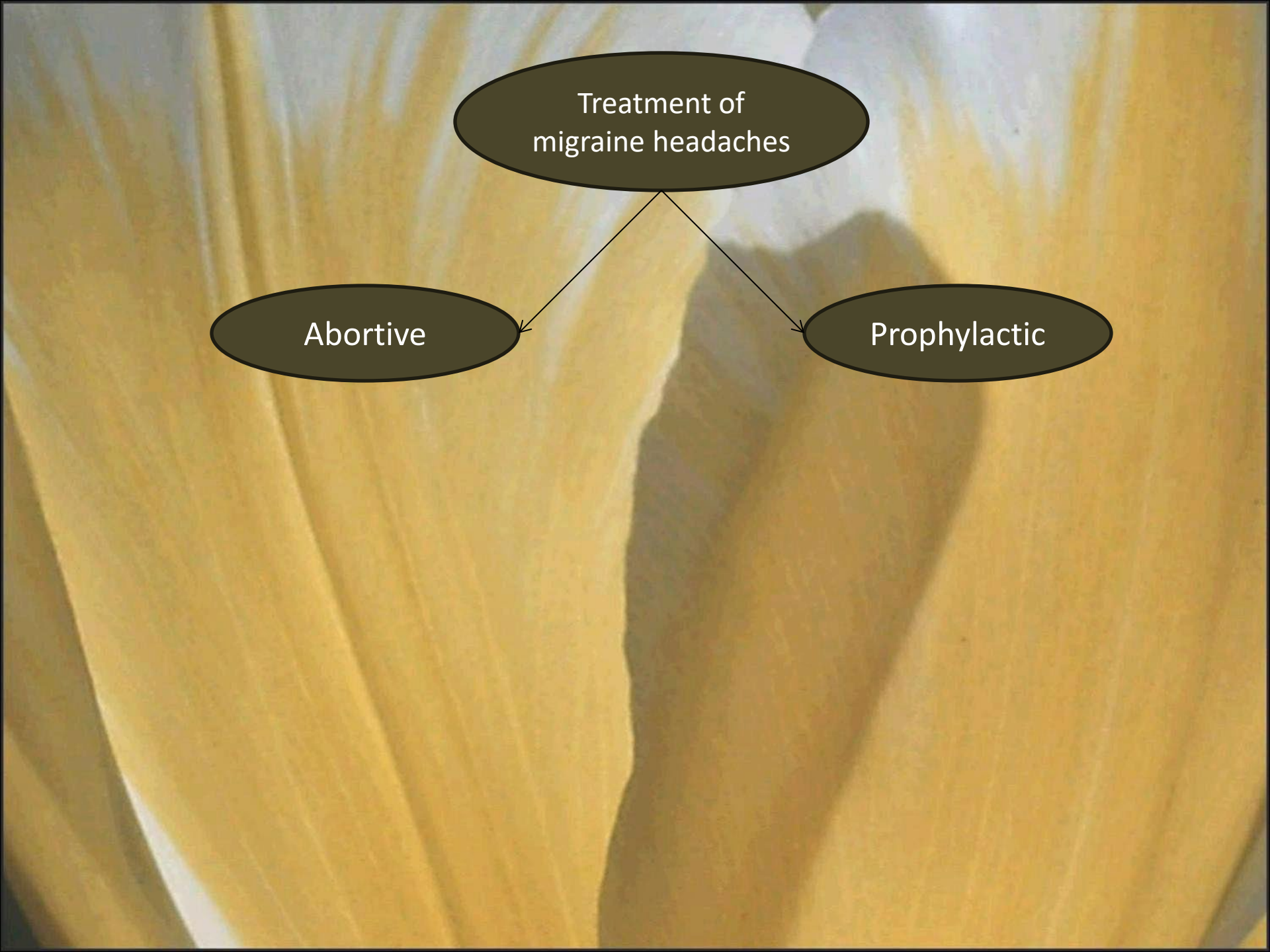

Headache
•10-20%
• up to 60 min
Aura
• Visual (most common)
• Scotoma
• Photopsias
• Others…
• Sensory
• Language

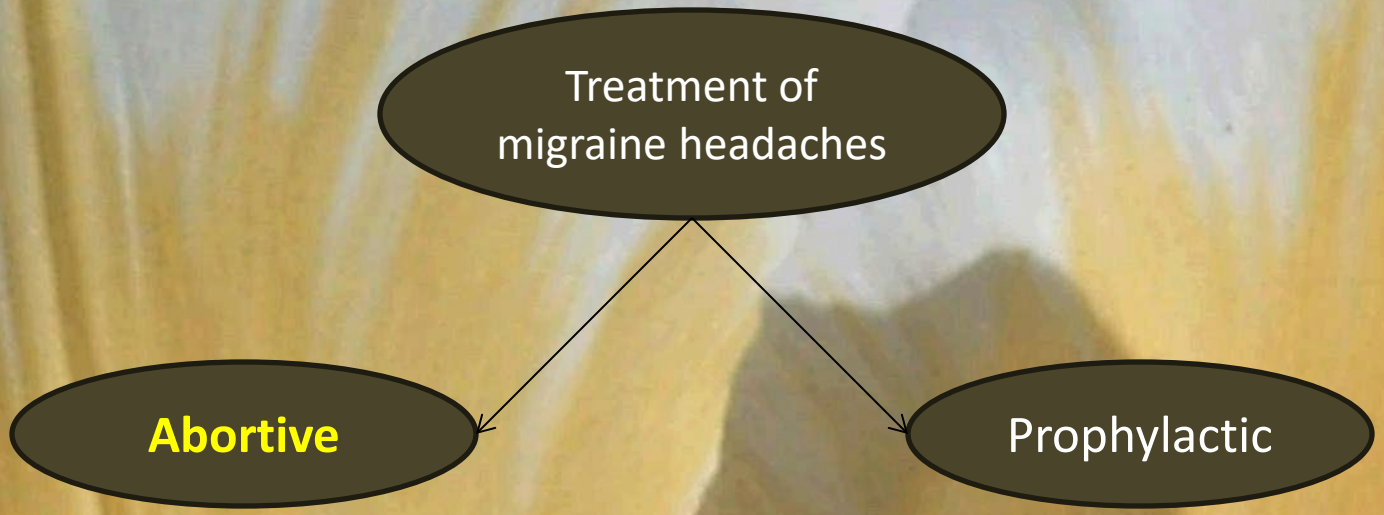


- 60-70% of all patients
- Fatigue, depression
- Sleep changes
- Food cravings
- Difficulty concentrating
- Mood changes
- Neck discomfort

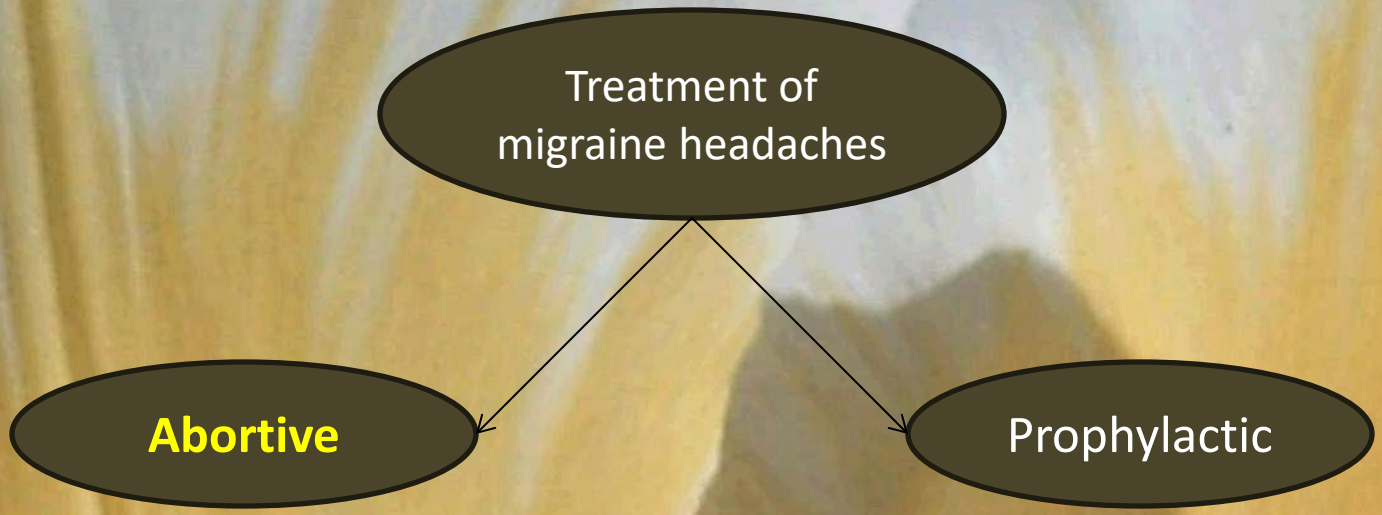

Headache
Aura
Recovery
Prodrome
Postdrome


Headache
Aura
Recovery
Up to 75%
Prodrome
Postdrome
Trigger
• Alcohol
• Physical / emotional stress
• High altitude
• Menstrual cycle
• Sleep changes
• Hunger
• Certain foods

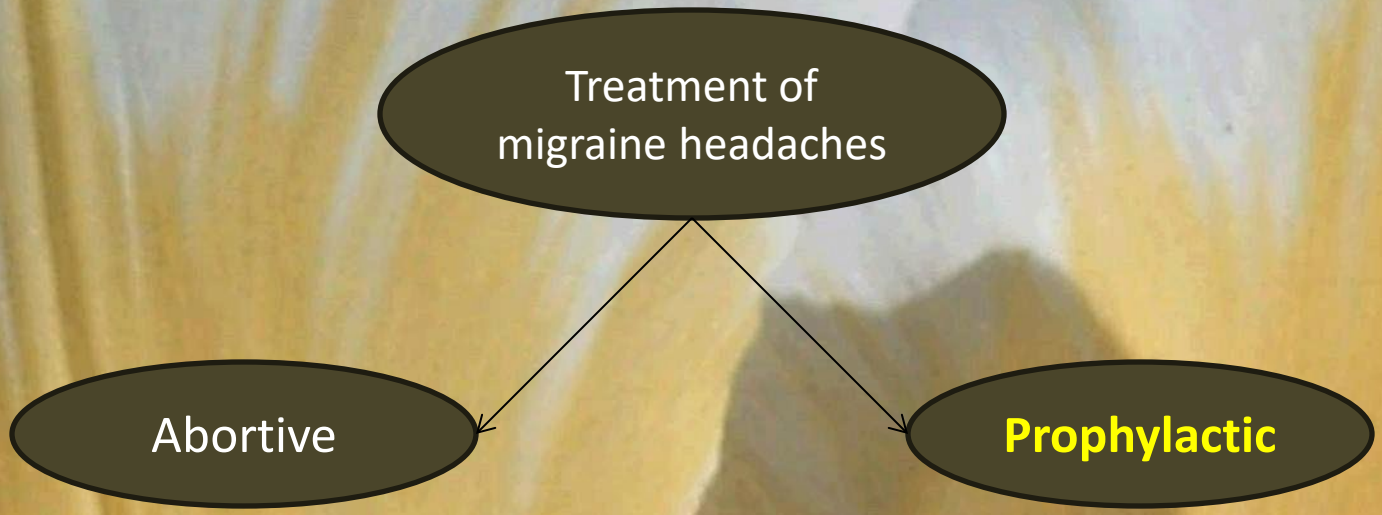

Treatment of migraine headaches
Abortive
Prophylactic



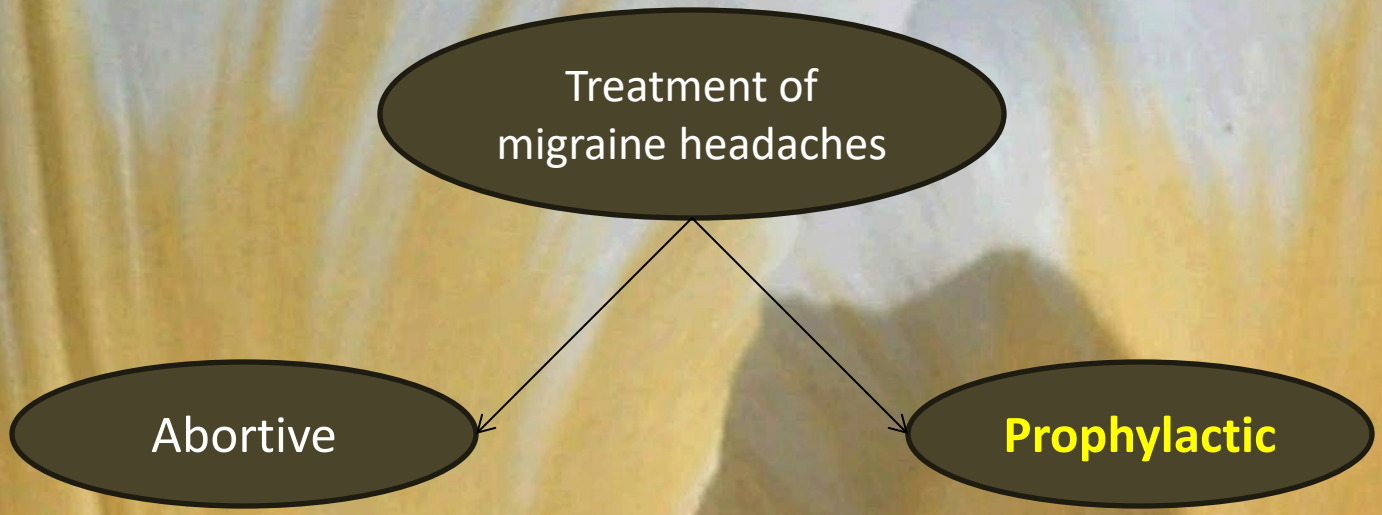
- **Importance of early treatment**
  - **Treatment during aura remains controversial**
- **Route of administration (many options)**
- **Presence of vomiting – adjuvant antiemetics**
- **Coexisting processes that may alter options**
  - **Cardiovascular / cerebrovascular disease**
  - **Pregnancy**
  - **Potential drug interactions**
- **Role of combination therapy**
- **Potential need for rescue therapy**
- **Do not abandon a class just because one agent is ineffective**



- **Simple analgesics**
  - **NSAIDs likely preferred**
- **Triptans**
  - **Many options / many routes**
  - **Combination with simple analgesics > monotherapy**
  - **Cardiovascular concerns**
- **Dihydroergotamine**
  - **Cardiovascular concerns**
  - **Cannot use with triptan**
- **Calcitonin gene-related peptide (CGRP)**
  - **Direct antagonists (- gepant)**
  - **Monoclonal antibodies**
- **Adjuvants**
  - **Antiemetics**
  - **Dexamethasone**



- **Recurrent episodic migraine vs chronic migraine**
  - **HEADACHE DIARY**
  - **“15-day rule”**
  - **“The Big Three”**
    - **Beta blockers**
    - **Anticonvulsants**
    - **Antidepressants**
  - **Other options depend on the diagnosed category**
    - **Can transform from episodic to chronic**
- **Choice of agent**
  - **Patient preference / Cost**
  - **Comorbidities / Other current medications**
- **Chronic migraine – botulinum toxin becomes another option**
- **Role of nonpharmacologic management**



- **Beta blockers**
  - **Propranolol has the strongest evidence**
- **Antidepressants**
  - **TCAs – especially amitriptyline**
  - **SNRIs**
- **Antiepileptics**
  - **Topiramate**
  - **Valproic acid**
  - **Lamotrigine**
  - **Others(?)**
- **Beyond "The Big Three"**
  - **Botulinum toxin (chronic migraine)**
  - **CGRP antagonists (- gepants // - mabs)**
  - **Others…**

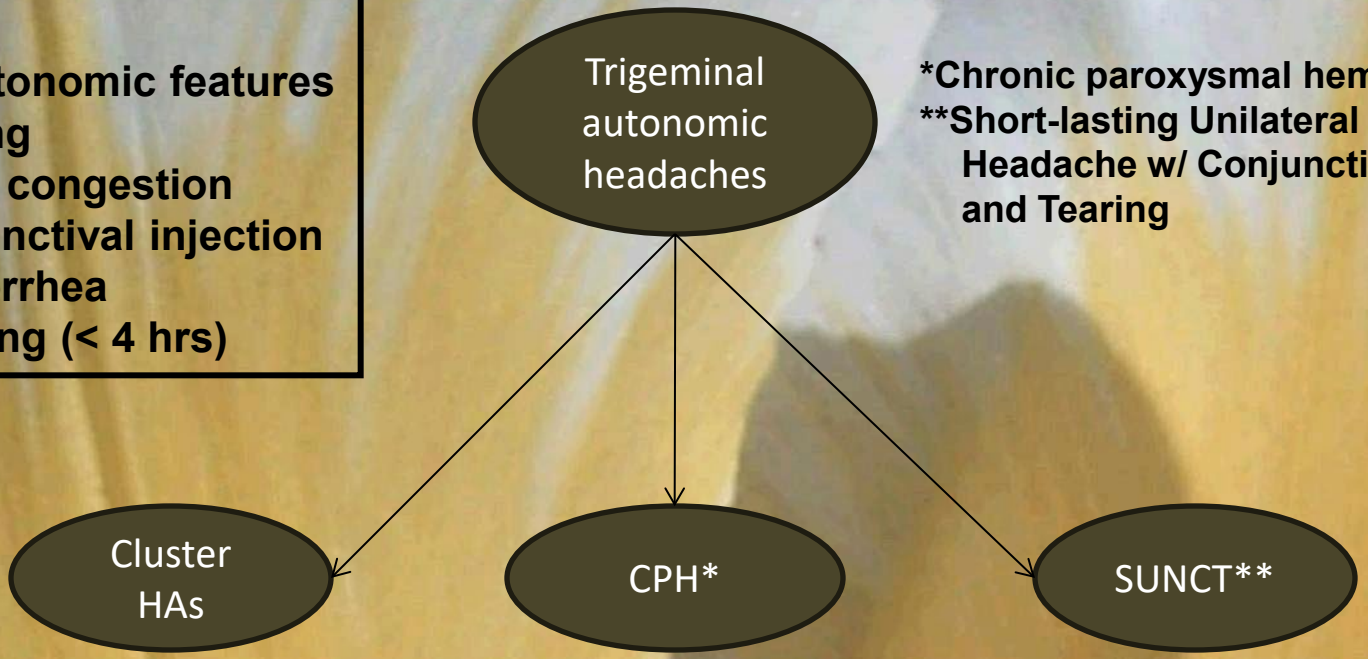
Cluster headaches

- Attacks occur in series (cluster periods) – weeks to months.
- Remissions may last months to years.
- Age= 20-40 yrs / men > women / FHx uncommon.
- Headache pattern
  - Abrupt onset and rapid intensification
  - Severe to excruciating strictly unilateral pain
  - Orbital / supraorbital / temporal locations
  - 15-180 minutes / 1-6 times daily / 4-8 weeks
  - Associated autonomic features – nausea NOT common…
    - Nasal congestion early / rhinorrhea later
    - Conjunctival injection / tearing / Horner syndrome
    - Others (bradycardia, etc)
  - Almost all occur at night
  - Worse with immobility / patients prefer to move while in pain.

Important distinctions

	Migraines	Clusters
ONSET	Gradual	Sudden
TIMING	Mostly daytime	Mostly at night
LOCATION	30-40% bilateral	Unilateral
DURATION	4-72 hrs	Up to 3 hours
OTHER FEATURES	• Can generalize • Possible nasal congestion	• Horner's • Severe nasal congestion
GENDER	Women > men	Men > women
GENETICS	+++	Minimal
POPULATION	Common	Very uncommon
NATURAL HISTORY	Better over time	Worse over time
EFFECT OF BETA BLOCKERS AND TCAs	Beneficial	None

- Unilateral
- Cranial autonomic features
  - Tearing
  - Nasal congestion
  - Conjunctival injection
  - Rhinorrhea
- Short-lasting (< 4 hrs)



*Chronic paroxysmal hemicrania
**Short-lasting Unilateral Neuralgiform Headache w/ Conjunctival injection and Tearing

Average duration	1 hour	15 minutes	1 minute
Average frequency	1-6X/d	5-25X/d	30-100X/d
DOC	Verapamil Corticosteroids Others…	Indomethacin	AEDs

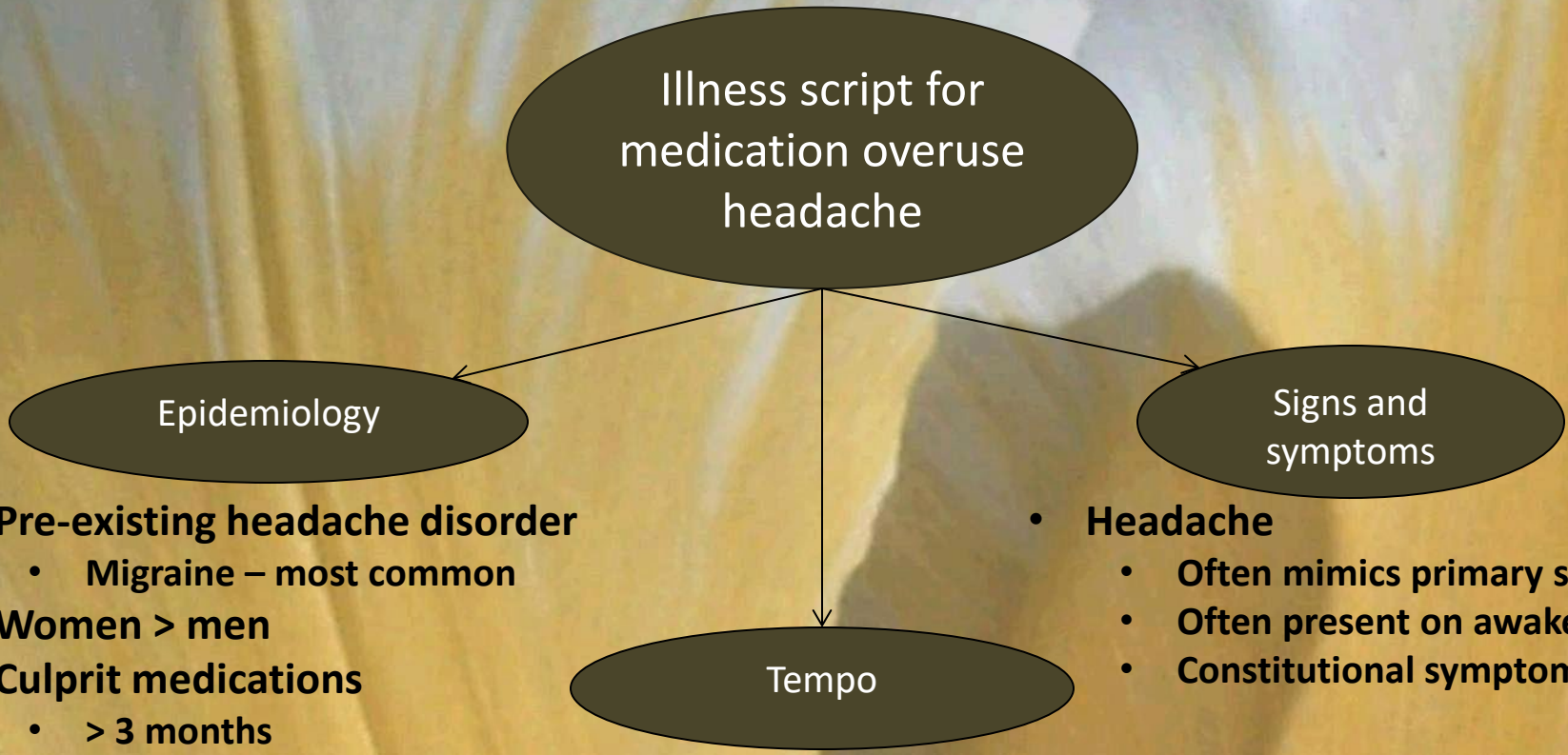
<u>Acute</u> – triptans, oxygen, intranasal lidocaine, octreotide

<u>Cluster headaches</u>= 15-180 min / 1-6X a day / 4-8 weeks / 1-3X a year

ABIM / AHS – choosing wisely

- Do not perform neuroimaging tests in patients with stable headache pattern that meets migraine criteria
- Do not perform CT scanning when MRI is available, except in emergency setting
- Do not recommend surgical inactivation of migraine trigger points outside a clinical trial
- Do not prescribe opioid or butalbital- containing medications as first line for recurrent headaches
- Do not recommend prolonged or frequent use of OTC analgesics for recurrent headaches


When too much of a good thing becomes bad…



- Highest risk meds: opioids, butalbital, simple analgesics, caffeine, triptans
- Pathophysiology: genetic, central sensitization, impaired modulation, behavioral
- Prevalence: 1% of general population but up to 50% of chronic daily HA patients

Wrapping it up…

- The great majority of headaches are primary.
  - TTH > migraine >> TAC
  - Importance of understanding the illness script for each
- Secondary headaches are *less common*, *quite numerous*, and *potentially serious*.
  - Mechanisms and pain-sensitive structures
  - History and examination findings of concern -- *NOT C/W primary HA*
- Headache types may coexist in a given patient.
- Headache symptoms may overlap between causes.
- When developing your assessment and plan...
  - Ask the three questions
  - Beware of the illness script “red flags”
  - Choose wisely
  - Prevent medication overuse headaches