Casual or catastrophic
Clinical approach to Head ache

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Over view

- Introduction
- International classification
- Pathophysiology
- Primary head aches

Introduction

- Of all the painful states that afflict humans head ache is most frequent reason for seeking medical help.
- Global prevalence is about 30%
- 50-75 % adults aged 18–65 years in the world have had headache in the last year
- 30% or more have reported migraine

World Health Organization

Indian scenario

The Journal of Headache and Pain

BMC

J Headache Pain. 2015; 16: 67.
Published online 2015 Jul 22. doi: 10.1186/s10194-015-0549-x

PMCID: PMC4510104
PMID: 26197976

Headache disorders and public ill-health in India: prevalence estimates in Karnataka State

Girish B Kulkarni, Girish N Rao, Gopalkrishna Gururaj, Lars J Stovner, and Timothy J Steiner

Results

The observed 1-year prevalence of any headache was 63.9 %, with a female preponderance of 4:3. The age-standardised 1 year prevalence of migraine was 25.2 %; prevalence was higher among females than males (OR: 2.1 [1.7-2.6]) and among those from rural areas than urban (OR = 1.5 [1.3-1.8]). The age-standardized 1 year prevalence of TTH was 35.1 %, higher among younger people. The estimated prevalence of all headache on ≥15 days/month was 3.0 %; that of pMOH was 1.2 %, five-times greater among females than males and with a rural preponderance.

Burden of head ache

- Not only is headache painful, but it is also disabling.

- Substantial personal suffering,
- Impaired quality of life
- Financial cost
- The bulk of burden due to headache occurred in the 30–49 year age group, with a peak at ages 35–44 years

World Health Organization

- Global Burden of Disease Study led by the Institute for Health Metrics and Evaluation (IHME) at the University of Washington, Seattle (USA)

- Migraine on its own was found to be the 6th highest cause worldwide of years lost due to disability (YLD).

- Headache disorders collectively were 3rd highest

Common causes of head ache

Primary headaches

- Tention type headache 69%
- Migraine 16%
- Ideopathic stabbing 2%
- Cluster headache 0.1%
- Exertional 1%

Secondary Headaches

- Systemic infections 63 %
- Head injury 4 %
- Vascular disorders 1 %
- SAH < 1 %
- Brain tumor 0.1%

J Olesen et al: The headaches, 2005

Head ache Symptoms That Suggests a Serious Underlying Disorder

- Worst headache ever
- First severe headache
- Subacute worsening over days to weeks

- Abnormal neurologic examination
- Fever or unexplained systemic symptoms
- Vomiting that precedes headache

- Pain induced by bending, lifting,cough
- Pain that disturbs sleep, presents immediately upon awakening

- Known systemic illness
- Onset after age 55
- Pain associated with local tenderness eg: temporal artery

International Classification of Headache Disorders - ICHD-3

Part I: The primary headaches

1. **Migraine**
2. ***Tention type head ache***
3. **Trigeminal autonomic cephalalgias**
4. **Other primary headaches**

IHS Classification ICHD-3

Part II: The secondary headaches

5. Headache attributed to trauma or injury to the head and/or neck

6. Headache attributed to cranial or cervical vascular disorder

7. Headache attributed to non-vascular intracranial disorder

8. Headache attributed to a substance or its withdrawal

9. Headache attributed to infection

10. Headache attributed to disorder of homoeostasis

11. Headache or facial pain attributed to disorder of the cranium, neck, eyes, ears, nose, sinuses, teeth, mouth or other facial or cervical structure

12. Headache attributed to psychiatric disorder

IHS Classification ICHD-3

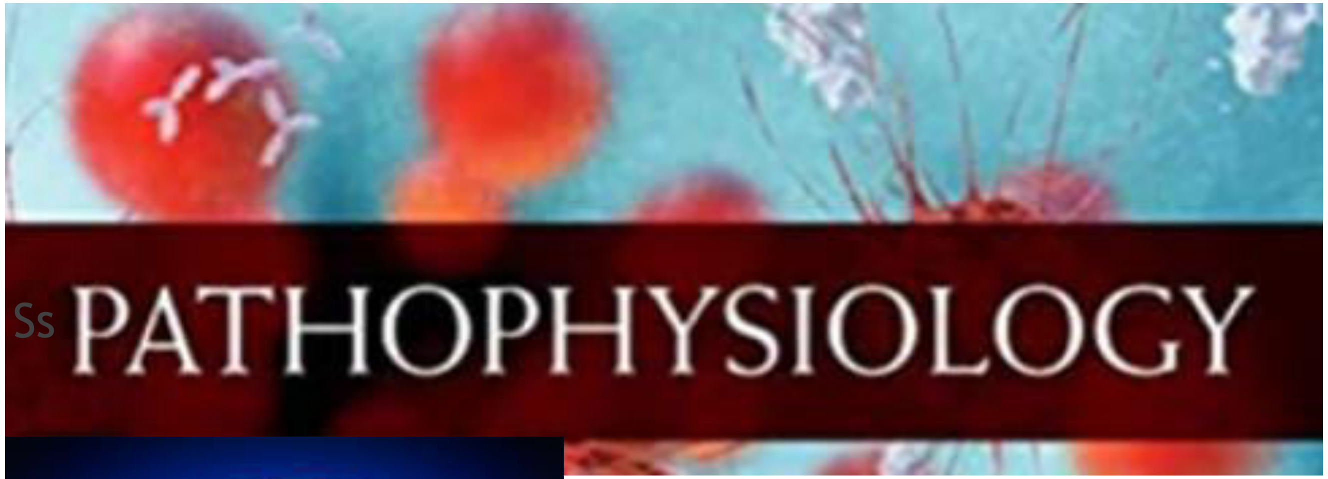
Part III: Neuropathies & Facial Pains and other headaches

13. Painful lesions of the cranial nerves and other facial pain

14. Other headache disorders

IHS Classification ICHD-3

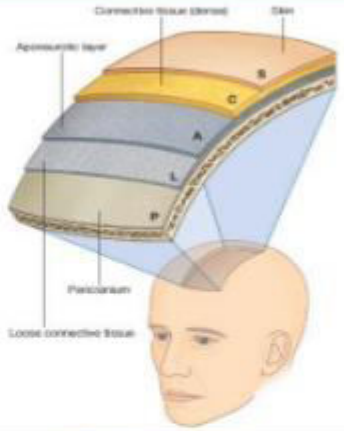
- Ss



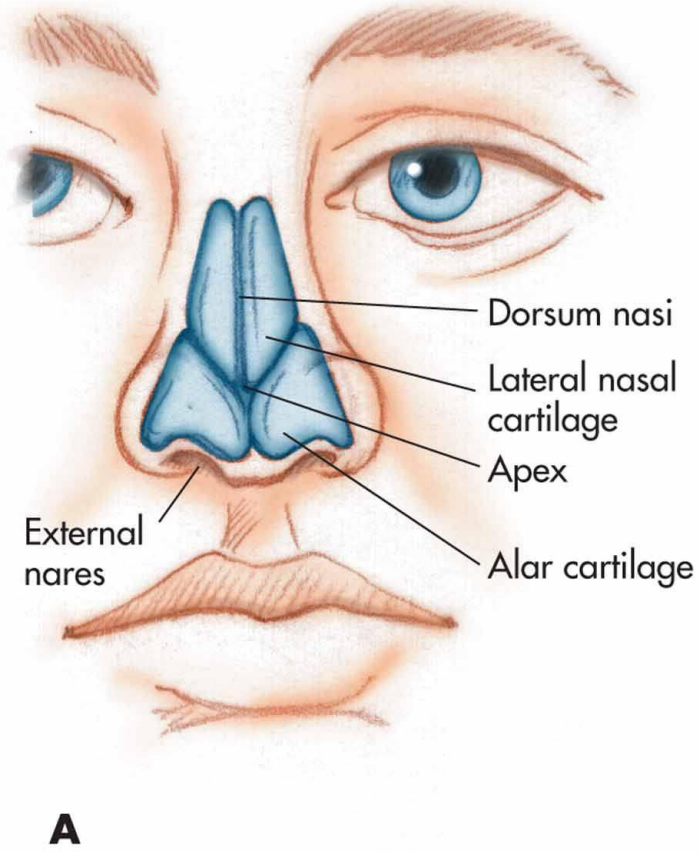
Pain sensitive cranial structures

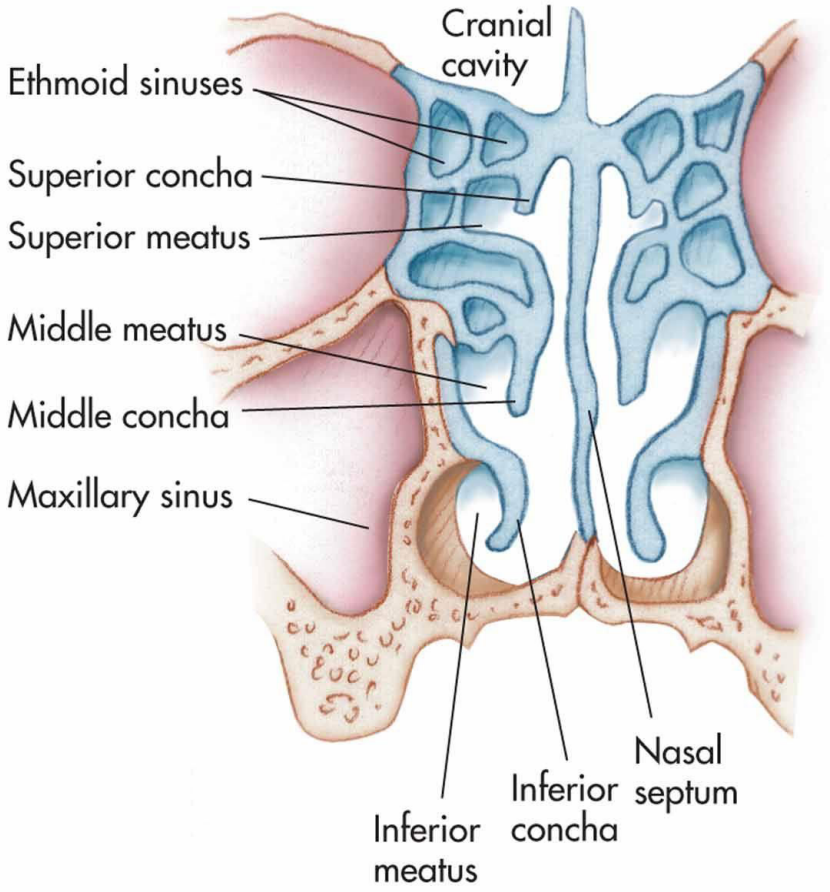
5 LAYERS OF SCALP

1. **S** – Skin
2. **C** – Cutaneous tissue (subcutaneous tissue)
3. **A** - Aponeurosis (Galea aponeurotica covering the occipito-frontalis muscle)
4. **L** – Loose areolar tissue (subaponeurotic tissue)
5. **P** – Pericranium (outer periosteum)

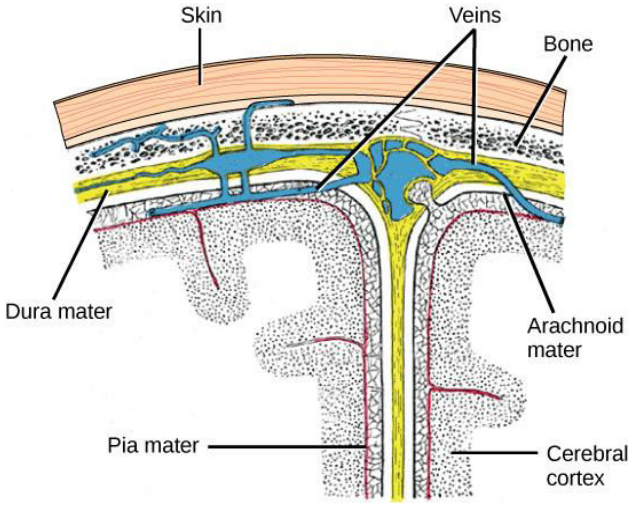


Eyes , Nose, Sinuses

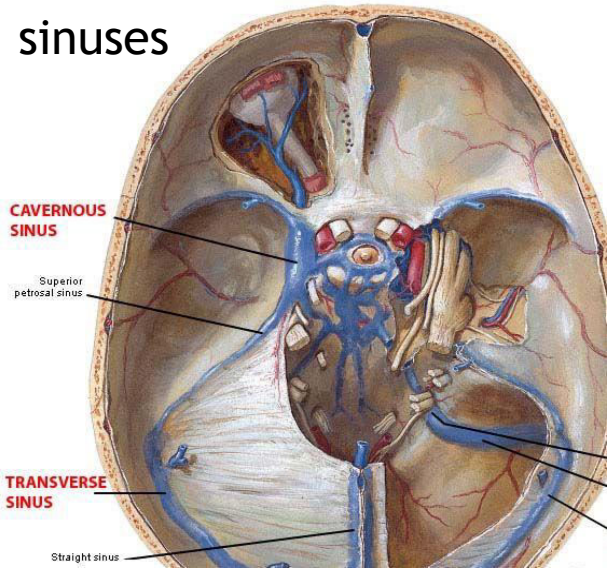


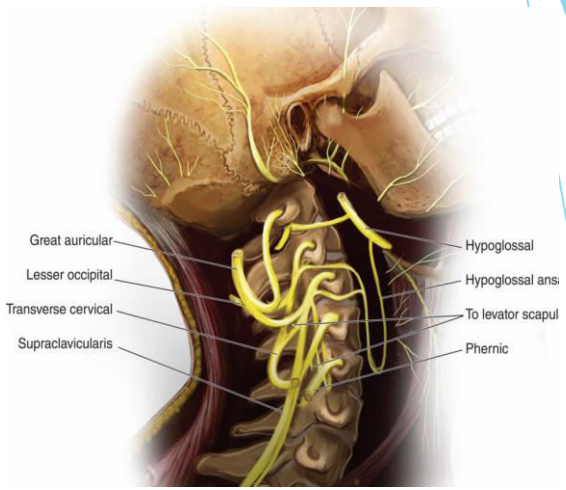


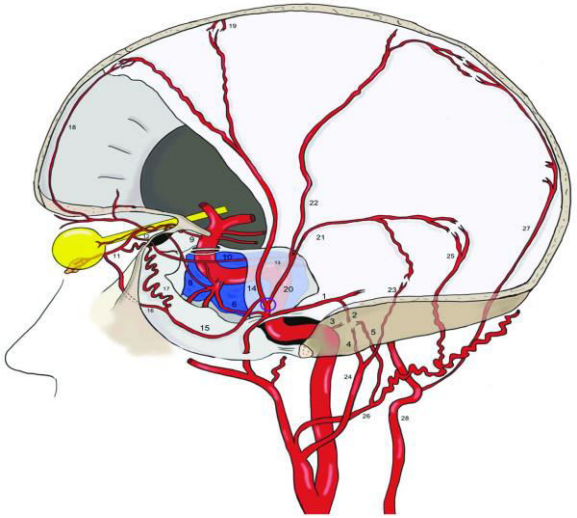
Meninges

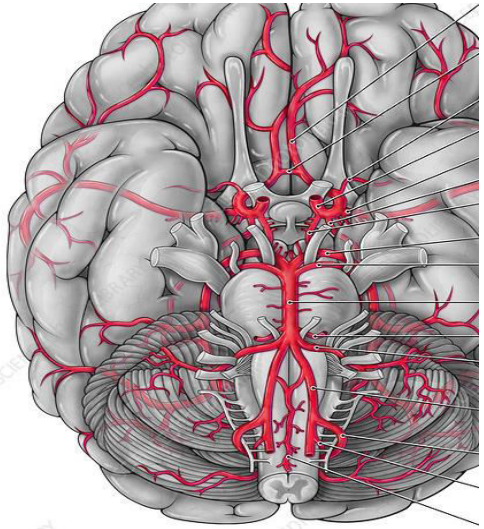


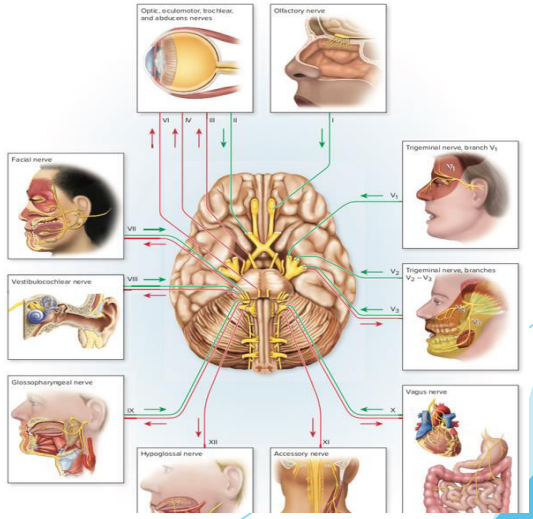
sinuses











Crania Structers that lack pain sensitivity

- Brain parenchyma
- Much of pia and arachnoid
- Ependyma
- Choroid plexes

Mechanisms of Cranial pain

- Traction on intracranial vessels,dura, dural sinuses:

  Ex: cerebral tumors

- Dilatation of intracranial or extracranial arteries :

  Ex: alcohol, nitrates in cured meat (hot dog), monosodium glutamate in Chinese foods, canned foods

- Increased pulsations of meningeal vessels activates pain sensitive structures with in the their walls, chemical irritation of pain receptors-serotonin and plasma kinins

  Ex: meningitis, acute rise in blood pressure

- Most strokes do not cause head pain
- Occlusion or dissection of vertebral arteries causes pain in the upper neck or post auricular area.
- Basilar artery thrombosis causes occipital pain, projected to frontal area.
- Occlusion of stem of MCA, dissection of carotid artery causes pain of ipsilateral eye, eyebrow and forehead.

- Infection or blockage of the paranasal sinuses

- Head ache of ocular origin :
  hypermetropia, astigmatism exerts sustained contraction of extraocular, frontal, temporal and occipital muscles.
- Myopia rarely causes head ache.

- Raised intraocular pressure causes pain in the eye, forehead :
  iridocyclitis, acute angle closure glaucoma

Thunderclap Head ache

- Heada… …e of ber…
- U… …
- P…

Causes of thunderclap headache

1. Migraine
2. Cerebral venous thrombosis
3. Diffuse cerebral vasospasm (call-Fleming syndrome)
4. Accelerated hypertension
5. Pitutory apoplexy
6. Cocaine
7. Perimesencephalic SAH

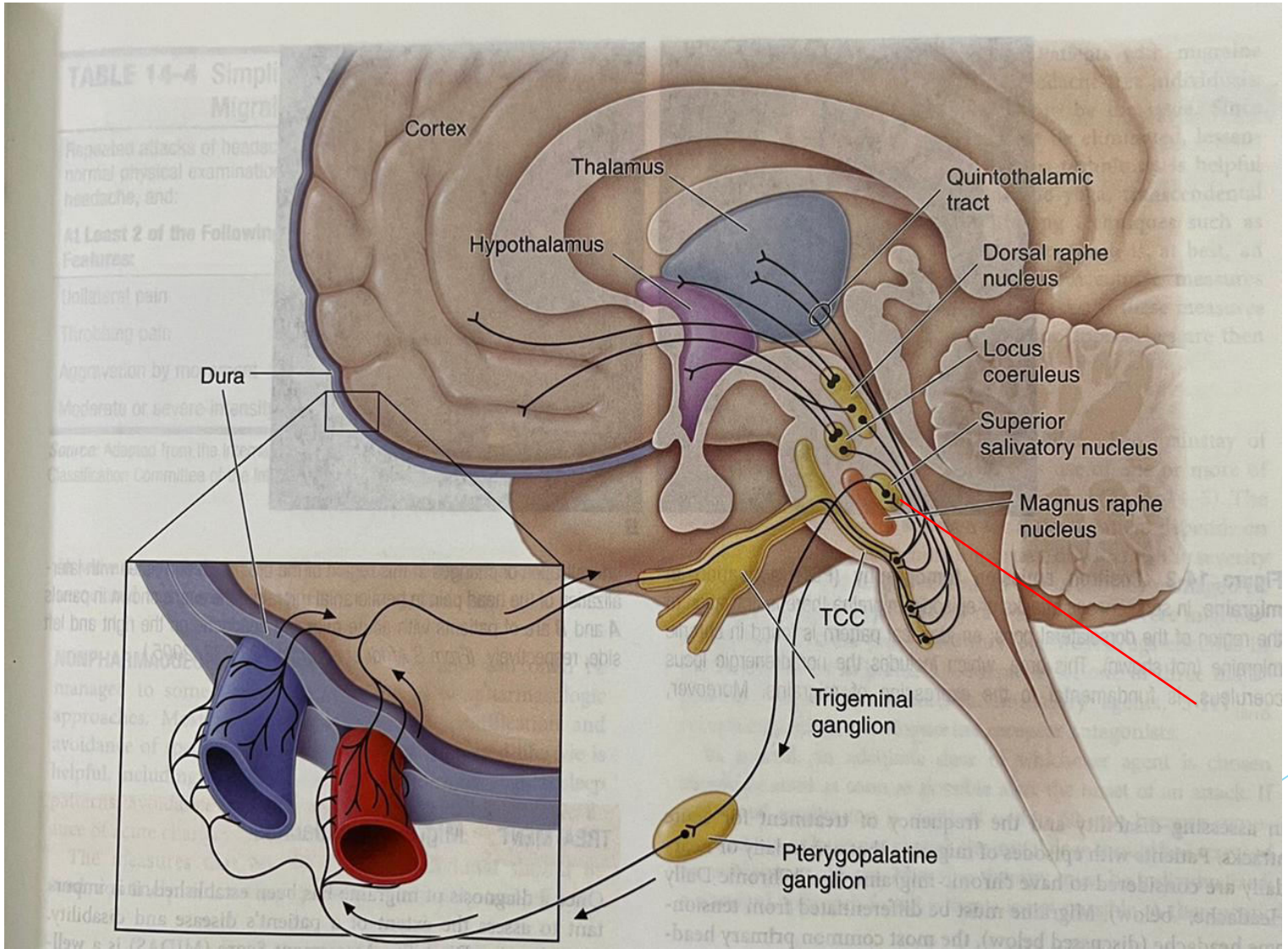
- Headaches on lying down :
  Sub dural hematomas
  Pseudo tumor cerebri

- Headache that accompany diseases of ligaments muscles, apophyseal joints in the upper cervical spine

Pathogenesis of Migrain :

- the key pathway for pain
- Trigeminovascular input
- Activation of cells in vascular terminations of trigeminal nerve and trigeminal nucleus
- Release of Calcitonin Gene Related Peptide (CGRP)

Brainstem pathways that modulates sensory input



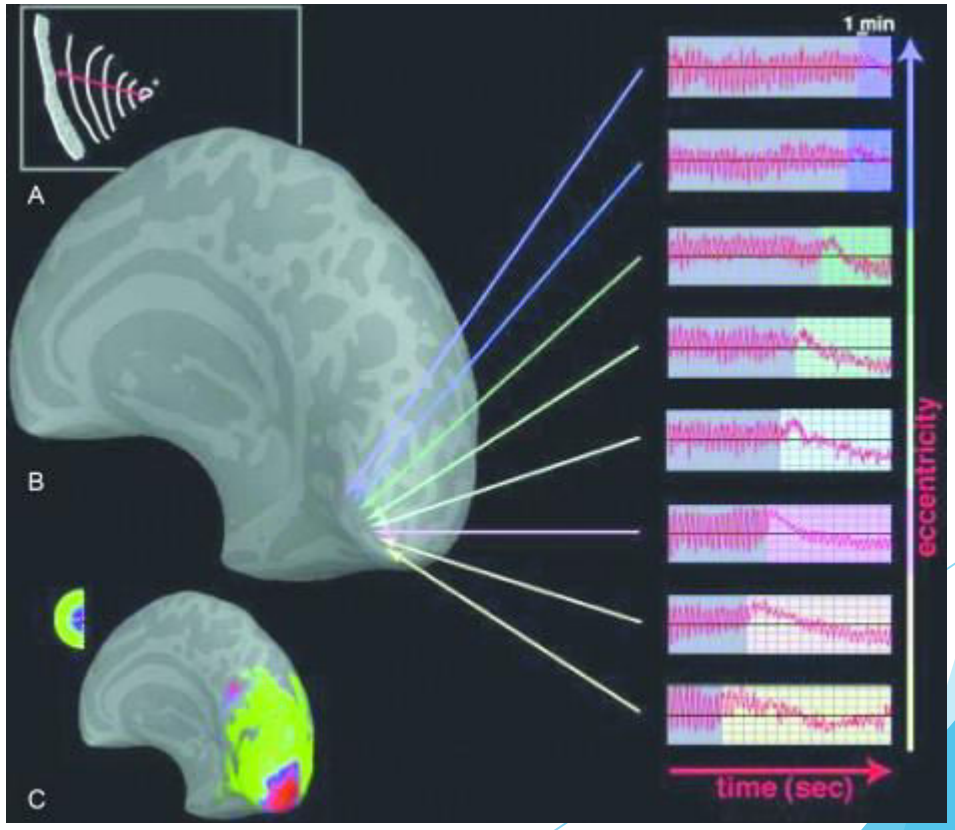
Other neurotransmiters

- 5 Hydroxytryptamine (5 HT)
- Dopamine - dopamine receptor hypersensitivity

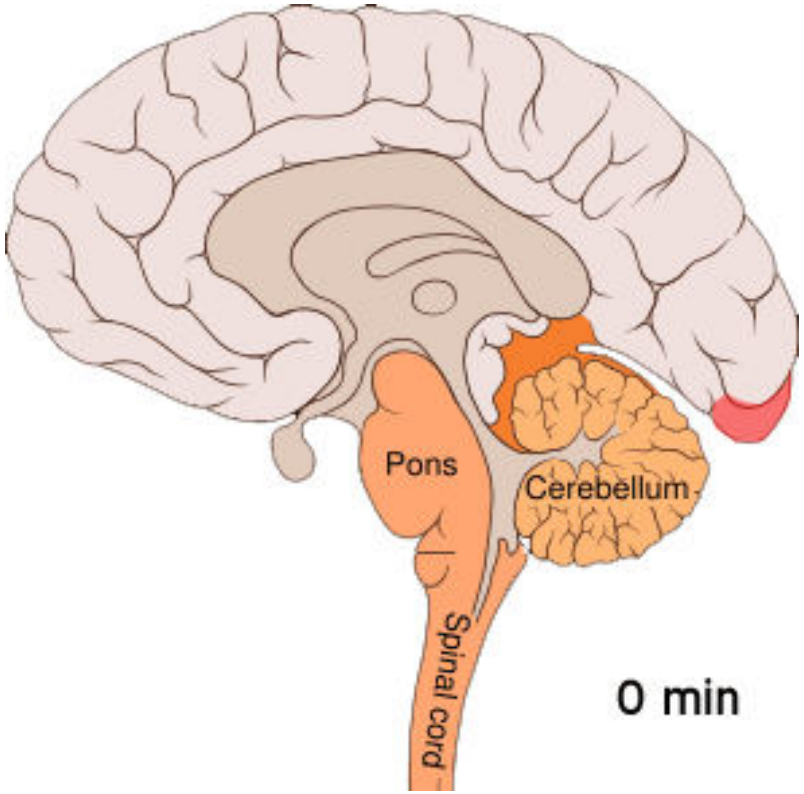
Phenomenon of “spreading cortical depression”

- First observed by Leao in experimental animals

-Noxious stimuli
- Vasoconstriction
- Spreading waves
- Inhibition of electrical activity of Cortical neurons



Spreading cortical depression



- Lashley, who plotted his own visual aura
- Regional reduction in the cerebral blood flow
- Begins in the one occipital lobe extends forward slowly(2.2 mm/min) as a wave of spreading olegemia

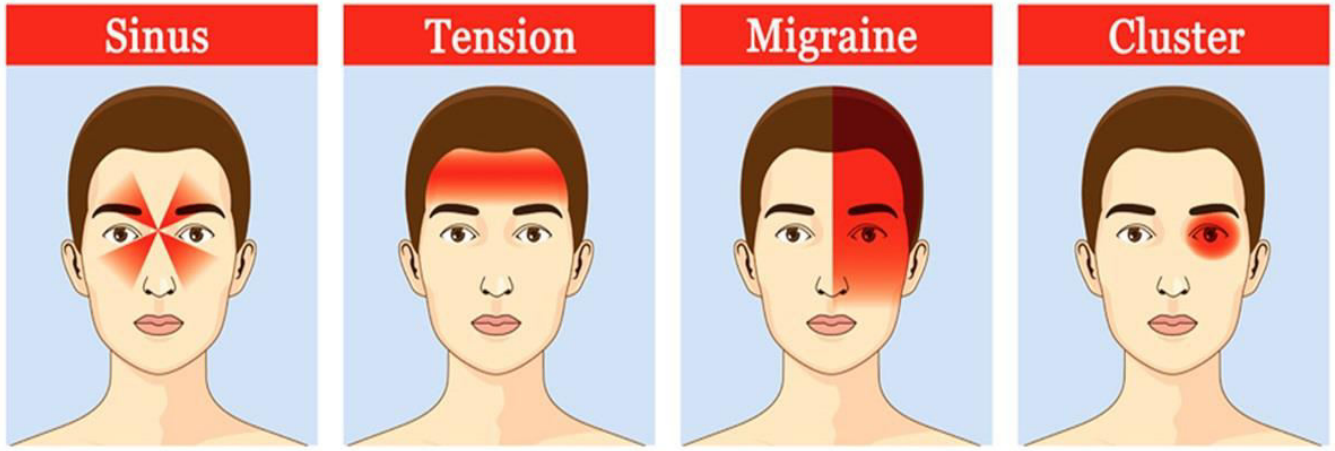
Migraine genes :

1. Cav 1, 2 (P/Q)-type voltage gated calcium channel CACNA1A gene

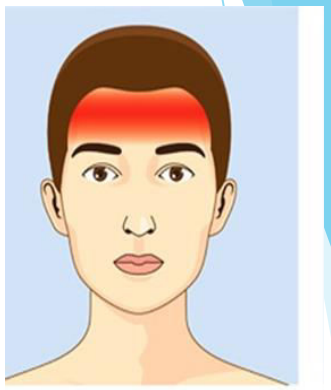
2. Na+ K+ ATPase ATP1 A2 gene

3. Neuronal voltage-gated Sodium channel SCN1A gene

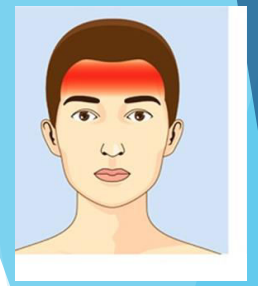
common headache types



Tension type headache

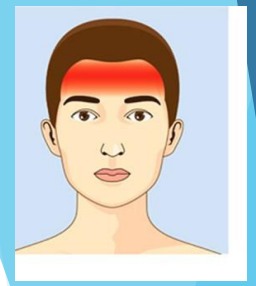


- Most common variety of headache
- Usually bilateral with occipitonuchal, temporal, or frontal predominance
- Dull aching, band like sensation around the head
- Sometimes more on one side

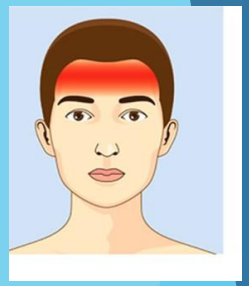


- most commonly in middle aged patients.
- female predominance

- Lance and Curran et al, 75% of TTH patients had symptoms of depression



- How to differentiate TTH from Migraine without aura ?
- Persistent throbbing quality is absent
- Does not interfere with daily activities
- No nausea, photophobia, phonophobia
- May persists for days, months, or even years.
- Present throughout the day.



- What is the underlying mechanism of pain in TTH ?

- Excessive contraction of the cranio cervical muscles (EMG studies does not proved)
- Sakai et al, by using laser devise found out that pericranial and trapezues muscles are hardened
- recently Nitric oxide has been implicated in the genesis of TTH.

these are intesting but speculative ideas

Treatment of TTH

- Simple analgesics
- Anti-depressent drugs- Amitryptaline
- Meditation, relaxation technics.

Migraine Headache

- Second most common cause of head ache
- A begine, episodic, recurring syndrome of headache associated with other symptoms of neurologic dysfunction in varying admixures.

- Begins in childhood, adolascence, early adult life
- Female preponderance 15:6(5:2)

- **International classification of headache disorders ICHD-3**

- **1.1 Migraine without aura (common migraine)**

- **1.2 Migraine with aura (classic or neurolgic migraine)**
  - **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 (SHM)**
  - **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

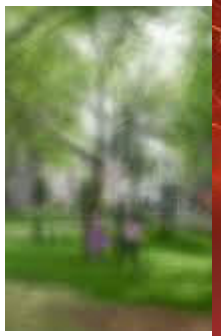
Characteristics of Migraine attack

- Preceded by vague premonitory changes in mood and appetite
- Throbbing, unilateral, in 1/3 bilateral
- If it is migraine with aura, ushered in by a disturbance of nervous function , visual symptoms.

Numbness , tingling of lips, face, and hand
Weakness of leg or arm,dysarthria, mild aphasia,slight confusion,- ocuurs relatively slowly. DD-TIA,Seizure.

visual symptoms of aura

- Scintillating lights
- Visual loss
- Scotomas
- Lasts for 30mts



- In few minutes to hours, headache sets in.
- Slow rising, reaches peak in 30 minutes last for 3-72 hours
- Nausea , vomiting, photophobia, phonophobia, osmophobia

If the pain is severe patient prefers to lie down in quite dark room and tries to sleep.

Migraine triggers

- glare
- Bright lights
- Sounds
- Hunger, chacolates,cheese, fatty foods etc,
- Excess caffine or caffine withdrawal
- Excess Stress, Physical exertion,
- Stormy weather,
- Hormonal changes during menstrual cycles

Knowledge of specific triggers helps in management of Migraine

Simplified diagnostic criteria for Migraine

Repeated attacks of headache lasting 3-72 hours, normal physical exam

At least 2 of the following:

1. unilateral pain
2. throbbing pain
3. moderate to severe intensity
4. aggravated by movement

Plus at least 1 of the following :

a) nausea/ vomiting

b) photophobia and phonophobia

source : ICHD and IHS

Migraine variants

Basilar Migraine:

- Less common form of migraine syndrome
- Usually occurs in children with family history of migraine, adults wide age range
- First visual symptoms
- Vertigo
- Staggaring gait
- Incoordination of limbs
- Tingling of hands, around mouth
- Lasts for 10-30 min
- Followed by headache

Benign and transient

- Ophthalmoplegic migraine:
  - recurrent unilateral head aches
  - external ophthalmoplegia
  - 6th nerve may involve
- Ocular/ Retinal Migraine :
  - uniocular visualdisturbance
  - scotomas
  - Retinal arterioles attenuation

Familial hemiplegic migraine

- usually occurs in infants and children, rarely in adults
- episodes of unilateral paralysis
- headache
- other neurological disorders may present in the family
- cerebellar ataxia, nystagmus

Treatment of migraine

- Non pharmacological management
- Acute attack treatments
- Prophylactic therapies

Acute attack treatments

Step wise approach

1. Simple analgesics : single or in combinations

2. Triptanes : Sumatriptan, Zolmitriptan,Riza

3. dopamine antagonists : Metaclopramide
   Prochlorperazine

- Calcitonine Gene Related Peptide (CGRP) inhibitors

- Ubrelvy (Ubrogepant): Approved Dec 23, 2019

  Initial dose: 50 to 100 mg orally, once

  -After 2 hours, a second dose may be taken if needed

  Maximum dose: 200 mg in 24-hour period

- Nurtec ODT (Rimegepant sulfate): Approved Feb 27, 2020.

  75 mg orally

Prophylactic treatment of Migraine:

- Betablockers : Metaprolol, Propronolol
- Antiepileptic drugs : Sodium valproate, Topiramate
- Seretonergic drugs : Methyserzide, Flunarizine
- Tricyclic antidepressants : Amitriptyline,Nortriptyline
- Monoclonal antibodies :Erenumab (Aimovig)

  70 mg subcutaneously once a month

Cluster Head ache

- Rare form of primary headache
- Deep retro-orbital ,unilateral pain
- Daily bouts of 1-2 attacks, for 8 to12 weeks/yr
- Male to female ratio 3:1
- Normal in between the attacks

Associated features of cluster Head ache

- Ipsilateral cranial parasympathetic activation
- Lacrimation
- Conjunctival injection
- Rhinorrhea
- Nasal congetion
- Ptosis due to cranial sympathetic dysfunction

- Differential diagnosis of cluster headache

- SUNCT : Sudden onset Unilateral Neurolgiform headaches with Congenctival injection and Tearing

- SUNA : Sudden onset Unilateral Neurolgiform headache with Autonomicfeatures

Treatment of cluster headache

Acute attacks : Sumatriptan, Zolmitriptan nasal administration

100% oxygen at 10-12 liters/min for 15 to 20 min

Prednisone 1mg/kg tapering over 3weeks

Preventive Therapy : Verapamil 80-160mg/day, lithium 400mg/day

Topiramate 100mg/day

Gabapentin 1200mg/day

THANK YOU