Demystifying Dizziness & Vertigo

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Outline

- The Problem with Dizziness
- Relevant Anatomy
- History: High & Low Value Questions
- Exam: Bedside Tips and Tricks
- Cases: Putting it Altogether

Differentiating Dizziness Pathologies

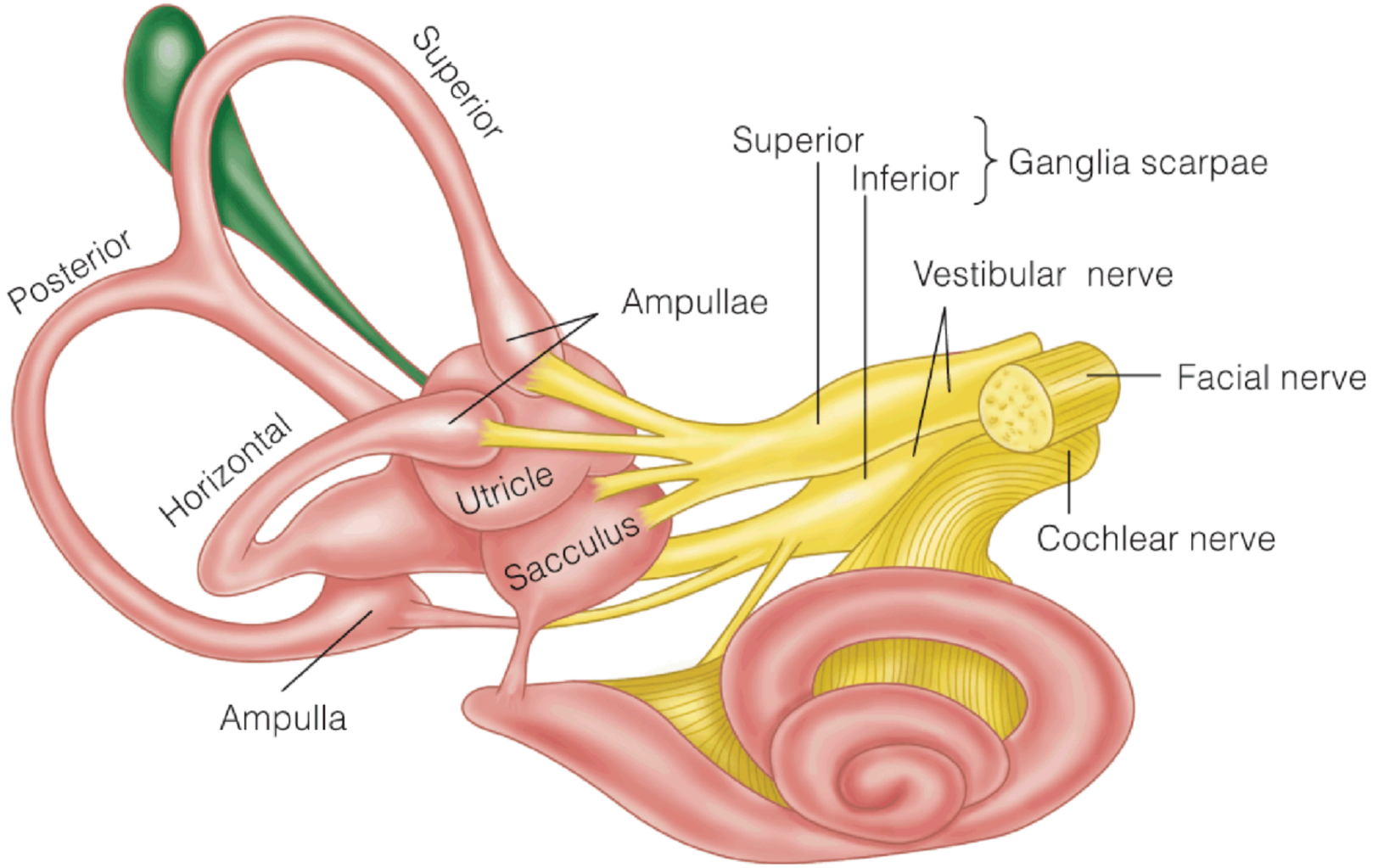
The Problem with Dizziness

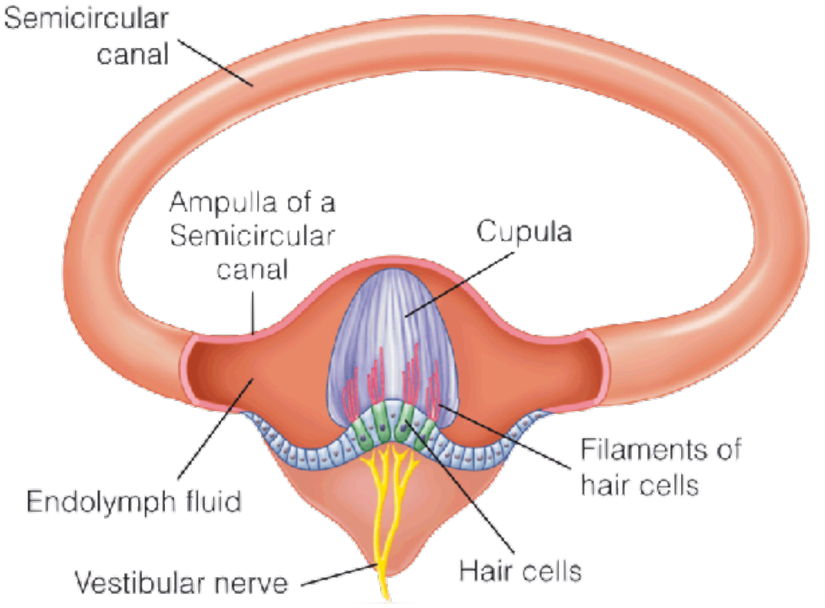
Benign paroxysmal positional vertigo
Labyrinthitis
Vestibular neuritis
Meniere’s disease
Superior semicircular canal dehiscence
Vestibular weakness
Multisensory instability
Autoimmune ear
Ototoxicity
Persistent postural positional dizziness
Neoplasm
Vestibular migraine
Post-concussion syndrome
Multiple sclerosis
Dysautonomia
Cerebrovascular ischemia
Vestibular paroxysmia
Orthostatic hypotension
Anxiety
Medication side effects

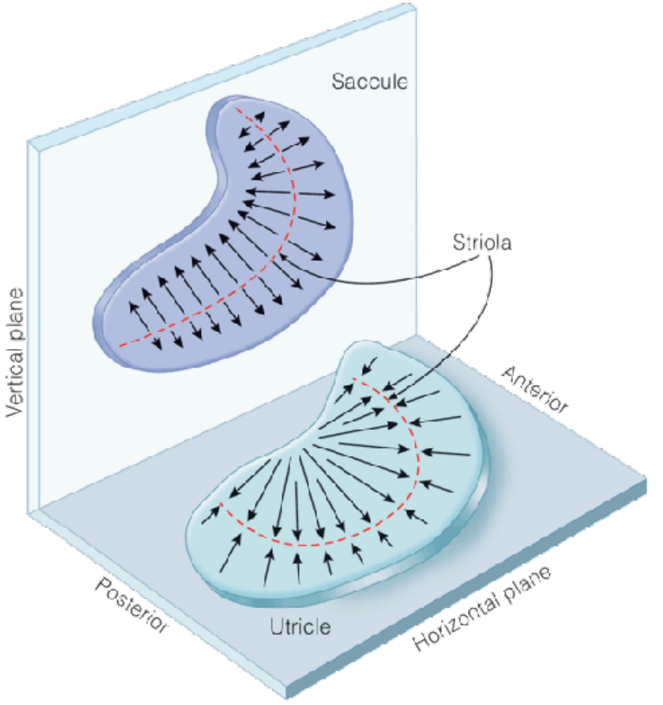
Relevant Anatomy

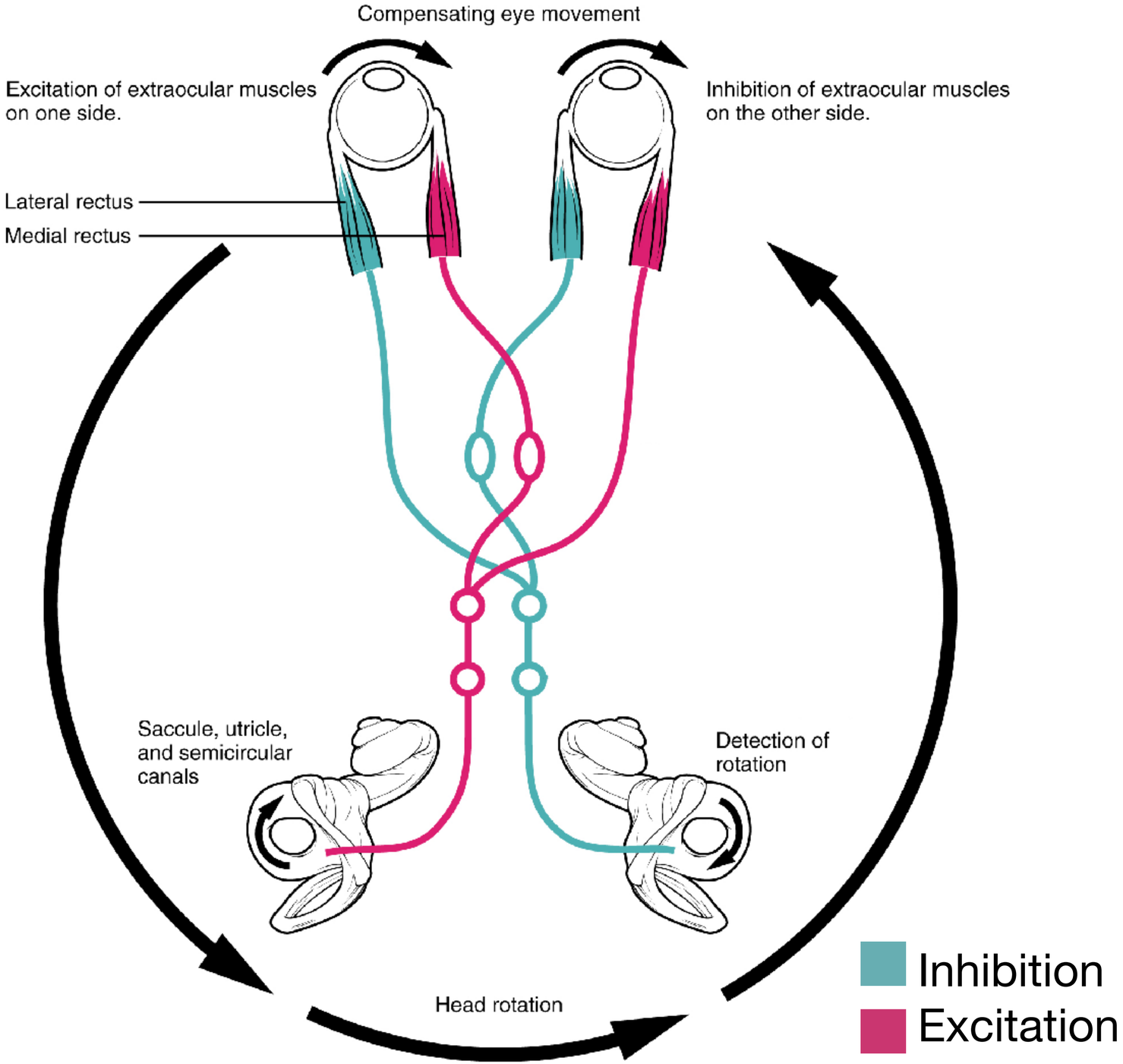
Necessary systems

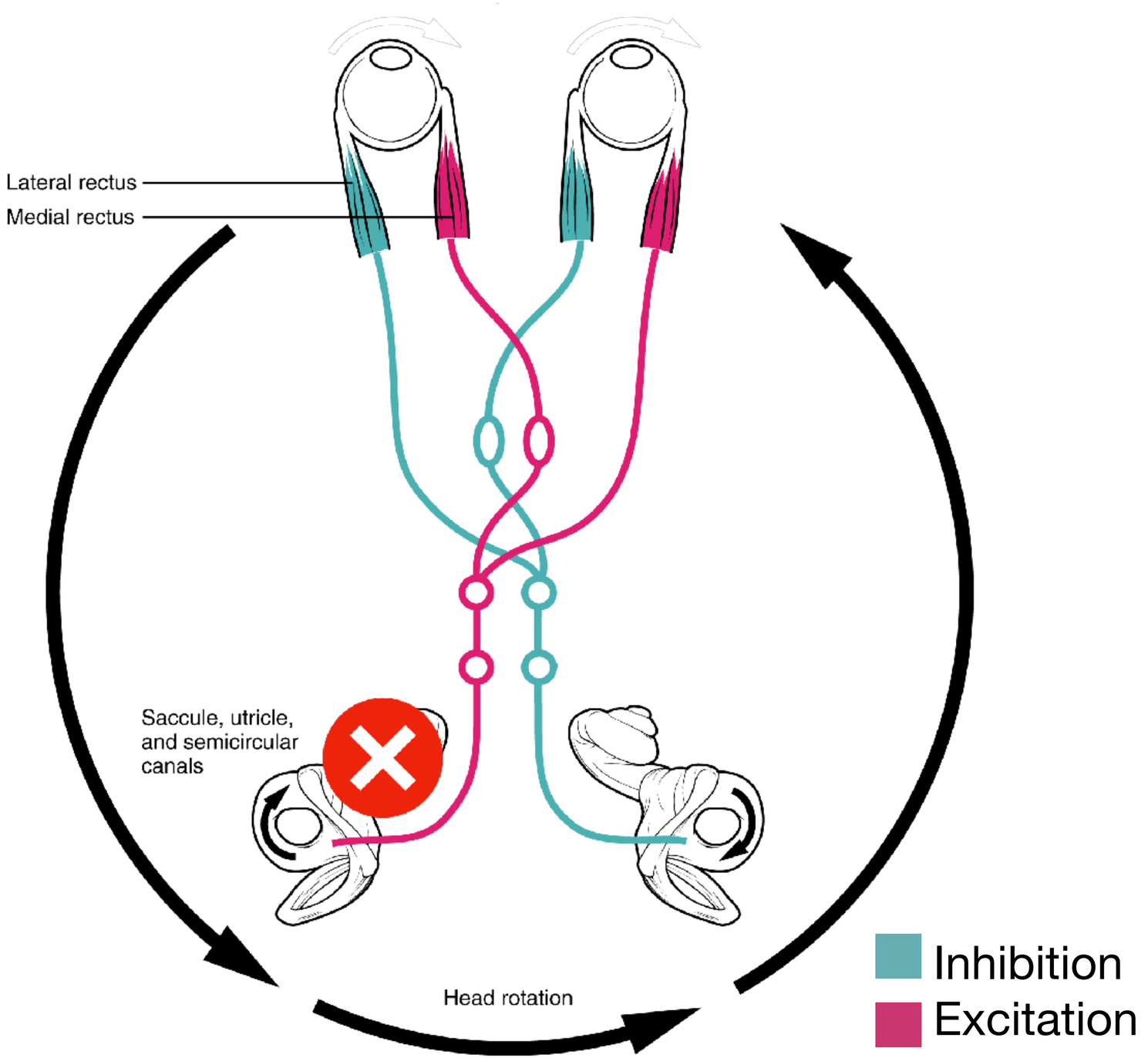
- Vestibular
- Vision
- Musculoskeletal
    - Strength
    - Sensation
    - Proprioception
- Central integration


Superior
Posterior
Superior
Inferior
Ganglia scarpae
Ampullae
Vestibular nerve
Facial nerve
Horizontal
Utricle
Sacculus
Cochlear nerve
Ampulla


Semicircular canal
Ampulla of a Semicircular canal
Cupula
Filaments of hair cells
Endolymph fluid
Hair cells
Vestibular nerve


Saccule
Striola
Vertical plane
Anterior
Posterior
Utricle
Horizontal plane


Compensating eye movement
Excitation of extraocular muscles on one side.
Inhibition of extraocular muscles on the other side.
Lateral rectus
Medial rectus
Saccule, utricle, and semicircular canals
Detection of rotation
Head rotation
Inhibition
Excitation


Lateral rectus
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Saccule, utricle, and semicircular canals
Head rotation
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Relevant Anatomy
FUNctional Facts

Vestibular End Organs

- Only relay what the HEAD is doing.
- Other receptors necessary to tell where the head is in relation to the body
    - If dysfunction in other receptors, can lead to dysequilibrium

Central Adaptation

- Loss of or change in a peripheral labyrinth will lead to central adaptation
- Central neurological adaptation takes about 72 hours
- Followed by a longer period of functional adaptation that is related to the patients own activity

History
Chart Check

Medication used

Headache history

Vascular disease history

Psychiatric history

Proprioception

Drug	Type of Dizziness	Mechanism
Aminoglycosides, cisplatin	Vertigo, dysequilibrium	Damage to vestibular hair cells
Tranquilizers	Intoxication	CNS depression
Antiepileptics	Dysequilibrium	Cerebellar toxicity
Antihypertensives, diuretics	Near syncope	Postural hypotension, reduced cerebral blood flow
Amiodarone	Dysequilibrium, oscillopsia	Unknown
Alcohol	Intoxication, dysequilibrium, positional vertigo	CNS depression, cerebellar toxicity, change in cupular and endolymphatic specific gravity
Methotrexate	Dysequilibrium	Brainstem and cerebellar toxicity
Anticoagulants	Vertigo	Hemorrhage into inner ear or brain

CNS, Central nervous system

History
Peripheral vs Central

Peripheral

- More common*
- Temporary
- Sudden onset
- Horizontal torsional nystagmus, suppressed with fixation
- BPPV, Meniere's, Vestibular neuritis, Labyrinthitis, Herpes zoster oticus, Semicircular canal dehiscence

Central

- Less Common*
- Constant
- Gradual/Subacute onset
- +/- Neurological symptoms (ataxia, dysarthria, diplopia, limb/facial weakness)
- +/- Risk factors for vascular disease
- Vestibular migraine, CVA, TIA, vertebrobasilar insufficiency, neoplasm, MS

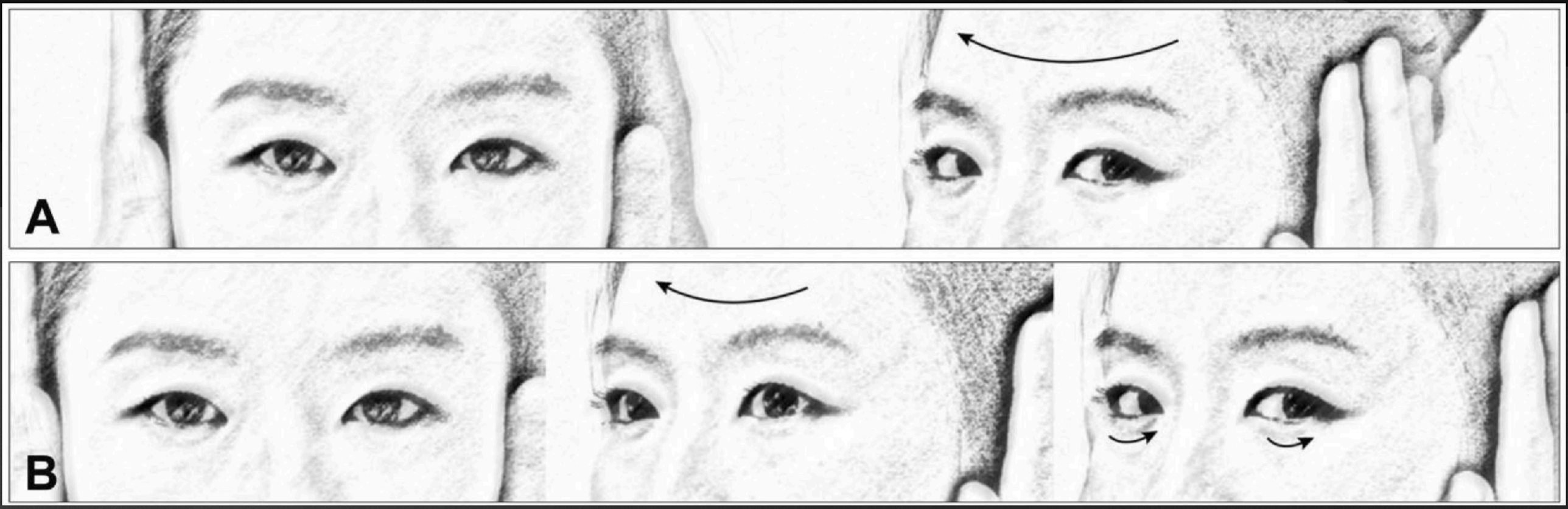
History

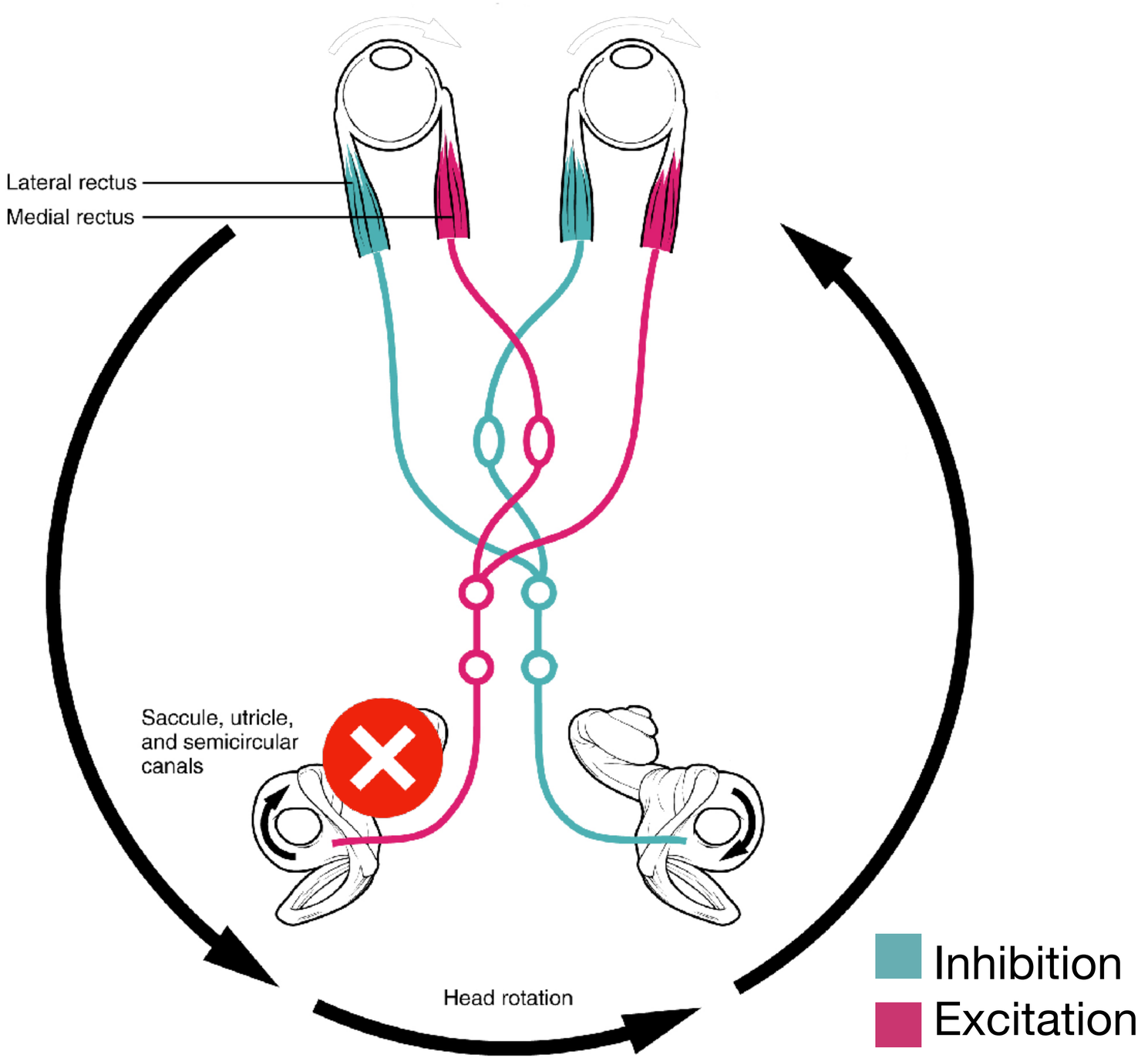
High Value Questions

1. Without using the word dizzy, what does it feel like?
2. Is this multiple recurrent OR Big event that you just can’t over?
    - Total number of events? Last event?
3. Duration of attack?
4. Provoked or Spontaneous?
5. What else comes with it?

Physical Exam

Head Impulse test

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Physical Exam

Gaze Evoked Nystagmus

Peripheral

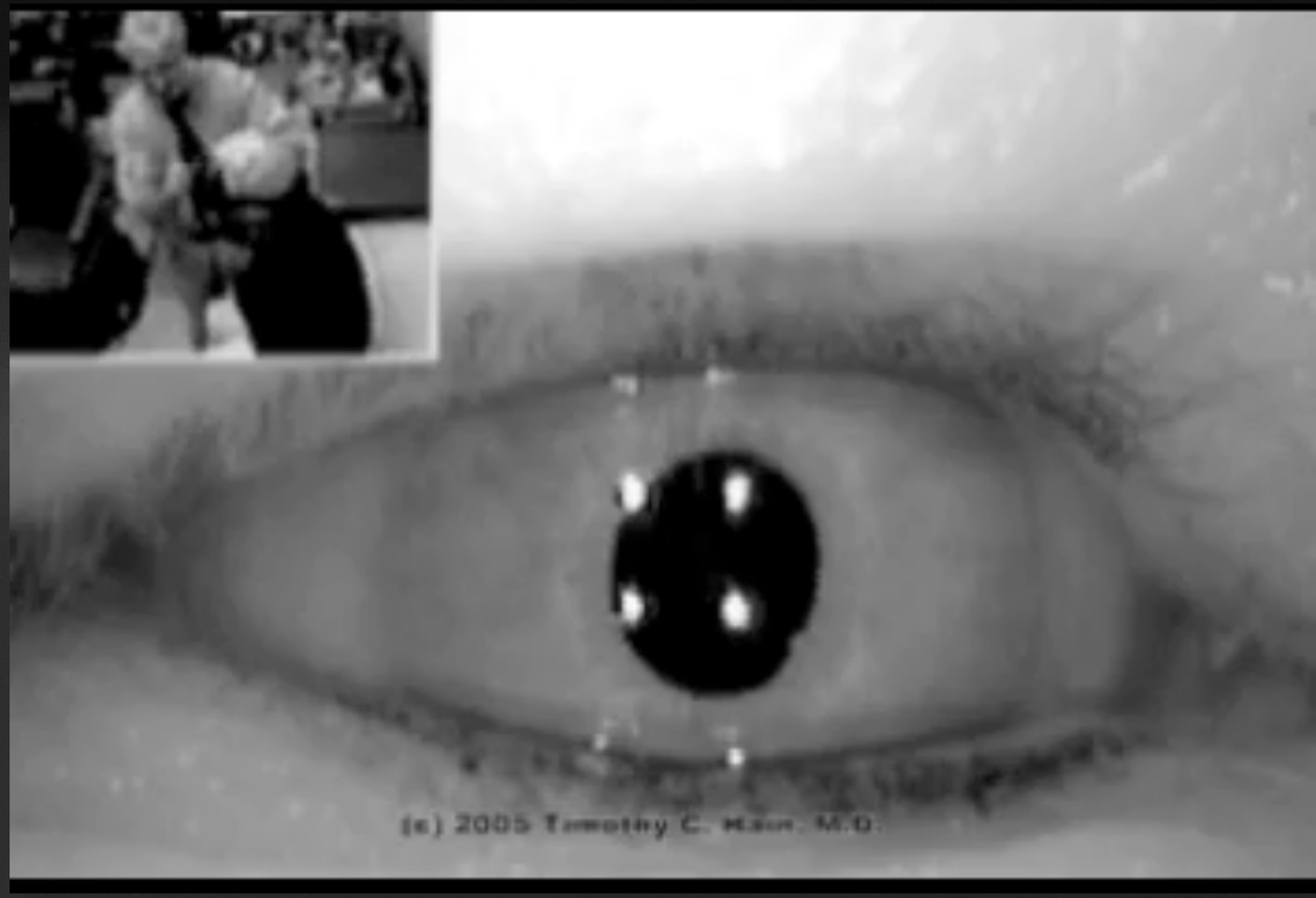
- Horizontal plane
- Nystagmus named for quick phase
- Quick phase towards unaffected ear
- Worsen towards quick phase, decreases towards slow phase

Physical Exam

Gaze Evoked Nystagmus

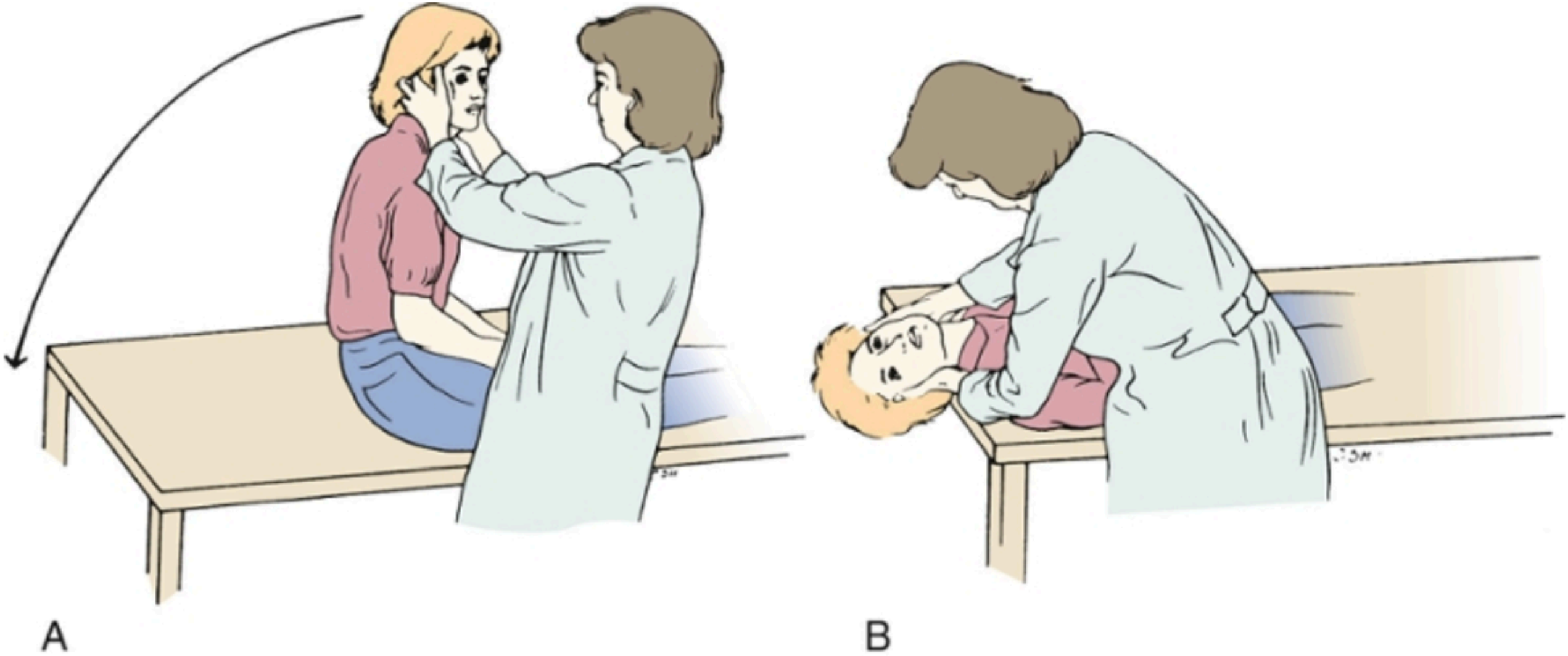
Central

- Nystagmus can occur is any plane
- Down beating is common
- Quick phase reversal
- Drugs, cerebellar lesions, muscle fatigue



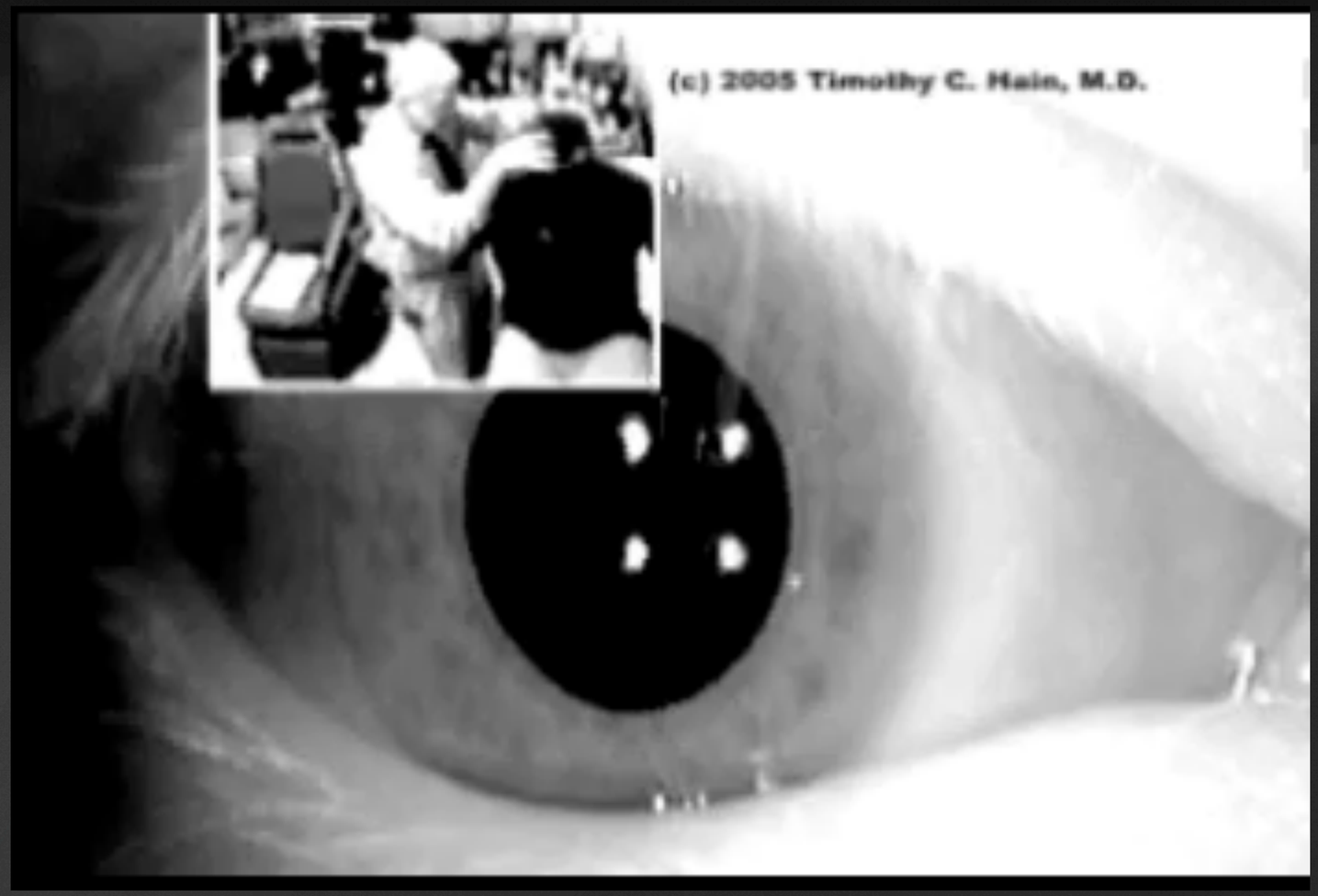
Physical Exam

Dix-Hallpike



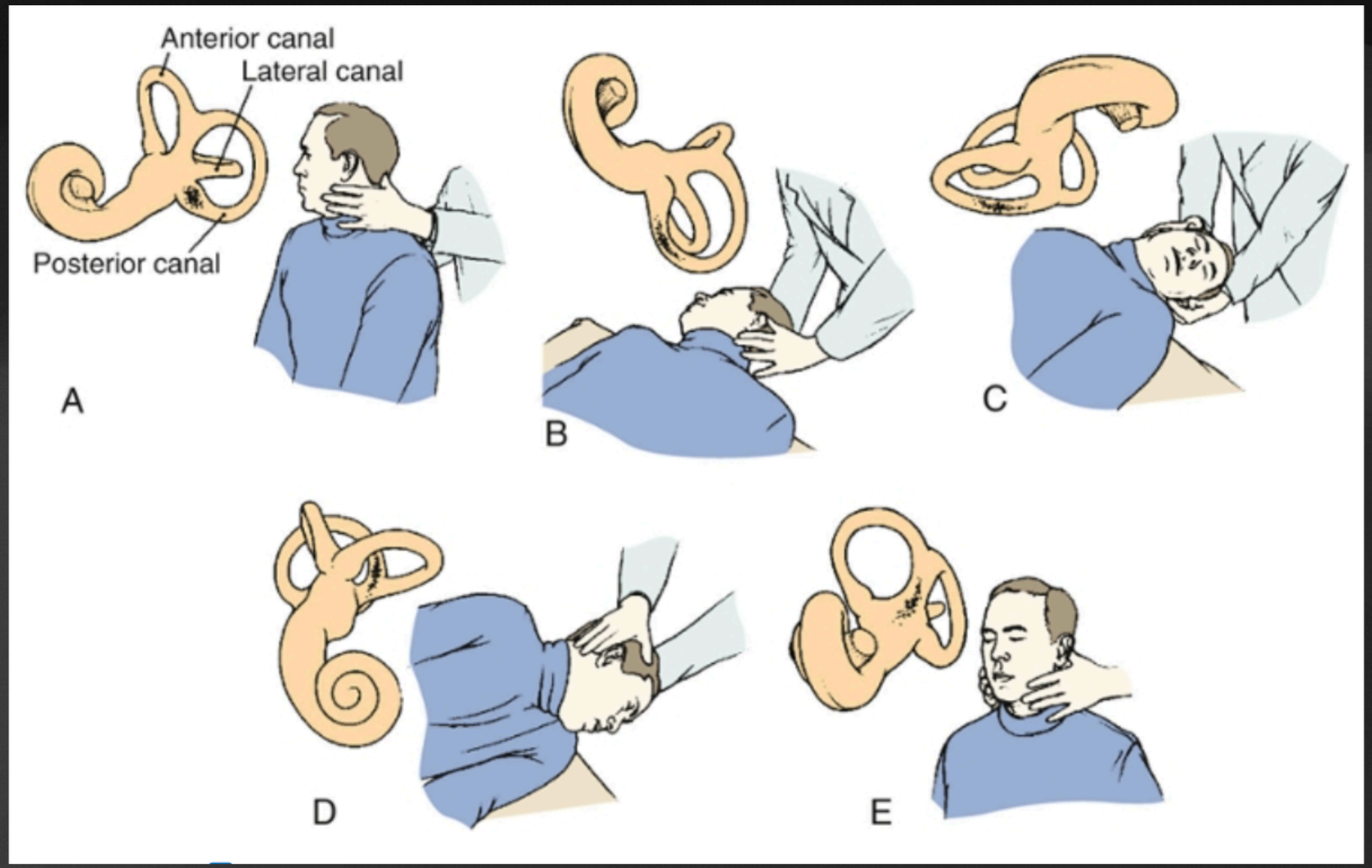
Physical Exam

Dix-Hallpike



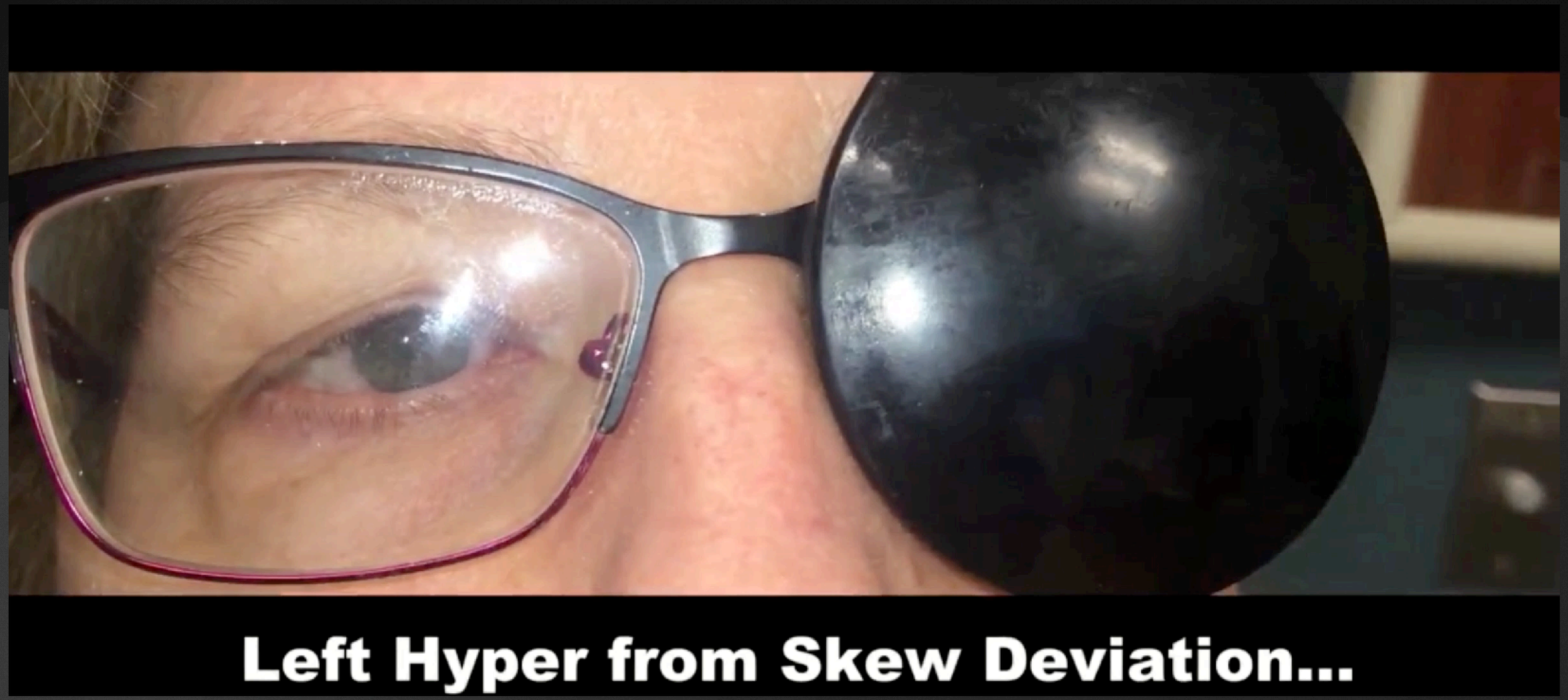
Physical Exam

Epley Maneuver



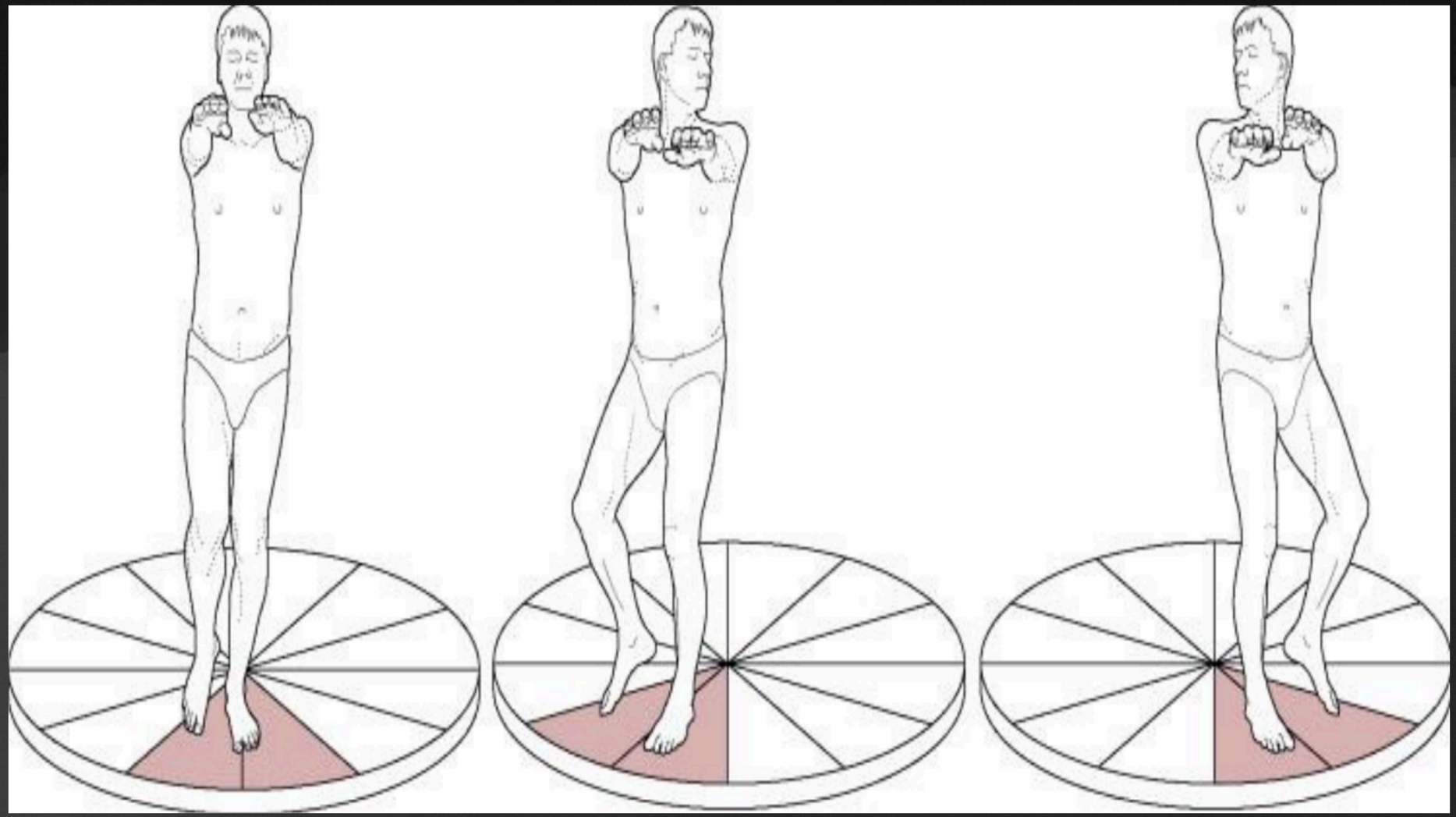
Physical Exam

Test of Skew



Physical Exam

Fukuda/Unterberger step test



Treatment

Diet/Lifestyle

- Low sodium intake
- Activity
- Walking mobility aids

Physical therapy

- Epley maneuver
- Vestibular rehabilitation

Medical therapy

- Vestibular suppressants
- Steroids
- Migraine therapies

Surgical therapy

- Chemical ablation
- Vestibular nerve resection
- Inner ear surgery

Vestibular Migraine

- Born in 2009, with consensus criteria published in 2012
- On average, occurs 8.4 yrs after first Migraine
- Episodes are spontaneous, positional, or visual
- Hearing lossr ported by 25% of patients (non-fluctuating)
    - High statistical risk of sudden hearing loss
- No specific testing abnormalities

Persistent Postural Perceptual Dizziness

- Born in 2014, classification criteria published in 2017
- Occurs secondary to a vertiginous event, either oto- or neurogenic
- Symptoms, > 3 mo
  - Undetectable persistent sway/instability, worse in standing position, with head movements, and/or with complex visual stimuli
  - Presence of illness or emotional shock at symptom onset
  - Anxiety, agoraphobia
- Not all chronic dizziness is PPPD

Case #1

25 yo F. First ever attack of an acute, severe, spinning, spontaneous, vertigo. Affected continually while presenting to the ED.

- **HX**: - PMH. No associated otologic or neurologic symptoms.
- **PE**: + Horizontal nystagmus at rest. Worsens with gaze to right, resolves with gaze to left.

    + Head impulse test w/ left corrective saccade.

    + Fukuda

    - Dix-Hallpike

Case #2

30 yo M. Spinning with dysequilibrium experiencing spontaneous recurrent episodes lasting between 30 minutes to several hours.

- **HX**: + HA, nausea. - Weakness, ataxia.
  + Aural fullness. + Hearing loss, denies fluctuating hearing
- **PE**: - Bedside vestibular testing.
  Normal tuning fork testing.

Case #3

57 yo F. Daily persistent dysequilibrium experienced when doing ambulatory activities.

- **HX**: + Vertigo event, 2-3 years ago. Rx Valium, now d/c
  - Neurologic symptoms
  + Anxiety, Avoids crowded places and action movies
- **PE**: - Bedside vestibular testing.