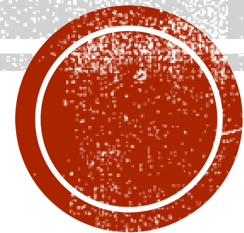
VERTIGO



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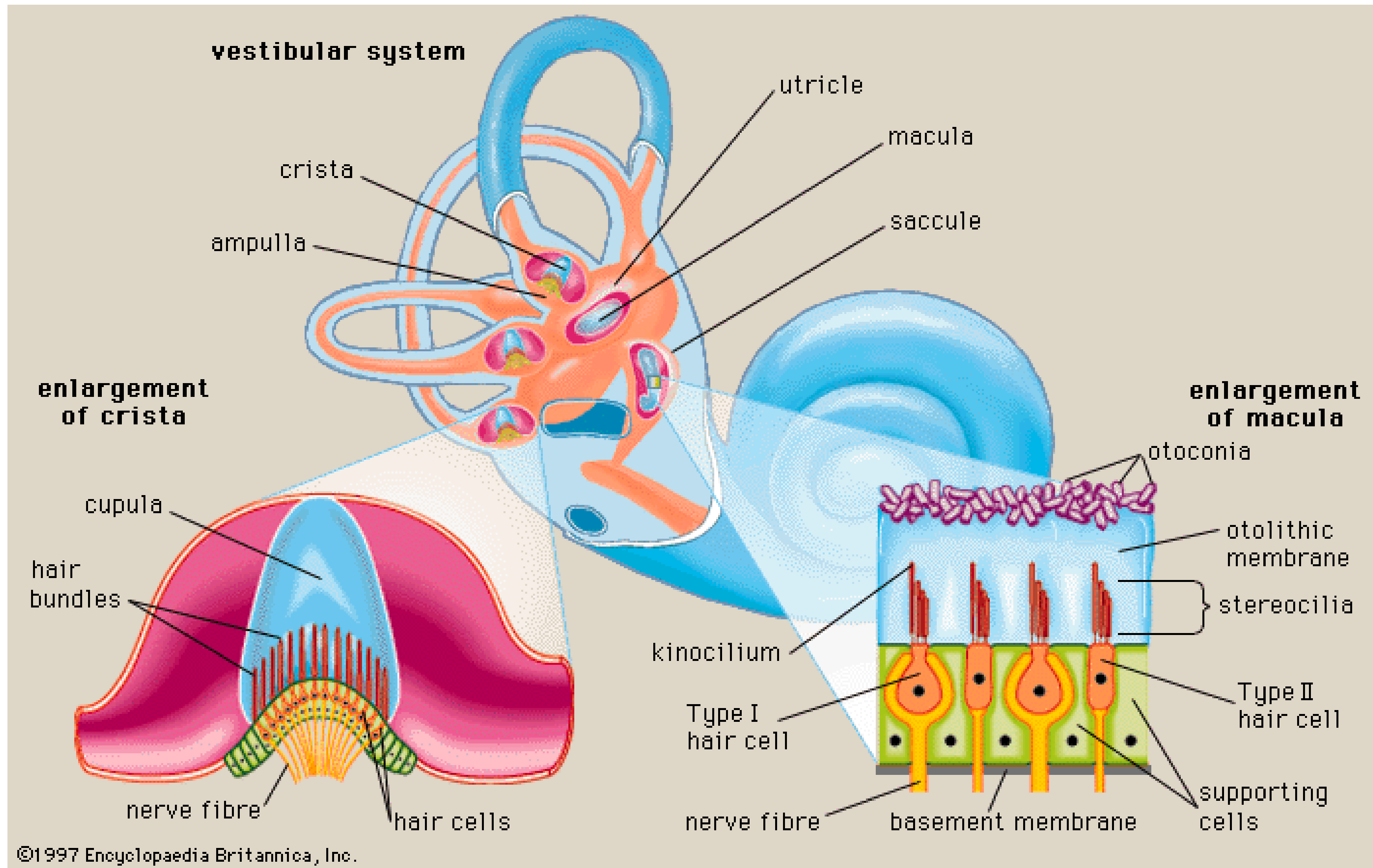

vestibular system
utricle
macula
crista
saccule
ampulla
enlargement of crista
enlargement of macula
otoconia
cupula
otolithic membrane
hair bundles
stereocilia
kinocilium
Type II hair cell
Type I hair cell
supporting cells
nerve fibre
hair cells
nerve fibre
basement membrane
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Semicircular canals :

- Detect agular head movment
- Changes eye movment to fixate images on the retina via the vestibuloocular reflex (VOR), during head movment

Otolith organ (utricle & saccule)

- Senses linear acceleration (inculding gravity)
- Produces compensatory postural changes in response to that movement
- Done through the vestibulospinal reflex (VSR)

VESTIBULO-OCULAR REFLEX

- When fixating a gaze each vestibular system is pushing the eye to the opposite direction
- Each vestibular system is pushing equally, however when one is stimulated, it takes over.
- Slow phase is due to semicircular canals and the fast phase is caused by the correction saccade from the brain
- Nystagmus are named after the direction of the fast phase.

- History is the single most important element in the diagnosis.

- 75% of diagnosis is through history

- The most important questions to address :

1. Is it true vertigo ?
2. Is it central or peripheral ?
3. Should the patient be refered urgently or routine ?

DDX

Peripheral

- Benign paroxysmal positional vertigo (BPPV)
- Meniere's disease
- Vestibular neuritits
- Labrythitis
- Ototoxicity (esp. Aminoglycosides)

*Psychogenic

Central

- Vertebrobasilar insufficiency
- Wallenberg syndrome (PICA syndrome)
- Basilar migrane
- Cerebeller disease
- MS
- Tumors of the brain stem
- Cervical vertigo

CHARACTER OF DIZZINESS ?

- Vertigo ? Disequilibrium ? Light-headedness ?
- Vertigo : spinning in circles, world spinning around you ? Tumbling ? Rocking sensation ?
- Disequlibrium : imblanace, clumsy, uncoordinated, fear of falling (central)
- Light-headedness: faint, giddy, presyncopial

Pattern of dizziness ?

- Continuous or episodic ?

Time course ?

- Seconds ?
- Minutes ?
- Hours ?
- Days ?

* This is exceedingly valuable, as most vestibular diseases produce stereotypical attacks of consistent duration

- BPPV = brief, last seconds up to one minute
- Meniers disease = 15 minutes to hours
- Vestibular neuritis =hours to days
- Labrynthitis : hours to days
- Ischemic attacks : minutes to days

EVENTS ASSOCIATED WITH THE DIZZINESS ?

- Head/ ear trauma ?
- Barotrauma ?
- URTI?
- Ototoxic medications ?
- Ear infection ?

* These point to a peripheral cause of vertigo

ACCOMPANYING SYMPOTMS

Peripheral

- Hearing loss
- Tinnitus
- Aural fullness
- Hyperacusis
- Autophony

- General : nasuea and vomitting

Central

- Headaches
- Loss of consciousness
- Blurred vision
- Numbness
- Weaknes
- Dysphasia
- Dysphagia
- Ataxia
- Photo/phonophobia
- Seizures

EXACERBATING FACTORS

- Head movement, head position = BPPV
- Migrane triggers : sleep pattern, caffiene, menstrual cycles = vertiginous migrane
- Raising from chair after prolonged sit : orthostatic hypotension causing light headedness
- Hyperventilation = psychogenic, CPA tumor, MS

PAST MEDICAL/SURGICAL HISTORY

- Ear surgery = peripheral
- Head trauma = peripheral + central
- Diabetes = central
- Migraine = central
- CVS risk factors = central
- Brain surgery

Drugs : aminoglycosides, chemotharpeutic agents, NSAIDS, antihypertensives, neuropleptics

Family history

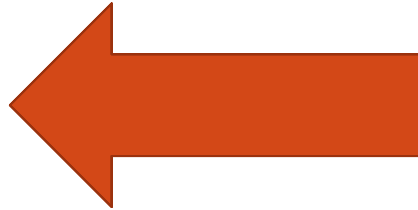
- Migraine
- CVS disease
- Neoplasia

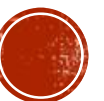
Social history

- Smoking
- Alcohol
- Occupation
- Caffiene intake

EXAMINATION

1. Spontaneous nytagmus
2. gaze evoked nystagmus
3. Saccades
4. Smooth pursuit
5. Fixation suppression
6. Head impulse/head heave te
7. Head shake
8. Dynamic visual acuity
9. Dixhallpike
10. Cerebellar exam
11. Full neurological exam
12. Gait/posture





NYSTAGMUS

- Comment on the following

1. Waveform : jerky (i.e fast and slow phase), pendular
2. Direction : horizontal, vertical, torsional
3. Effect of fixation (peripheral)

NYSTAGMUS

Peripheral

- Latency (2 -20 sec)
- Duration less than 1 min
- Direction is fixed
- Fatiguable
- Sever vertigo
- Intense (specially when looking at direction of fast phase)
- Follows plain of scc involved

Central

- No latency
- More than 1 min
- Direction changing
- Non fatiguable
- Non or silght vertigo
- Not as intense

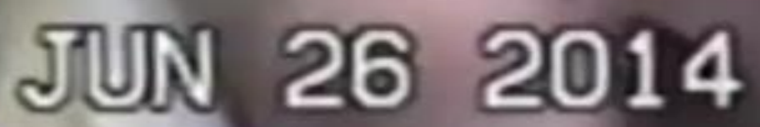
HEAD IMPULSE TEST

- Action :

Ask patient to fixate on a target on the wall or on examiner's nose while examiner moves the patient's head to each side. Look for movement of pupil during head movment and refixation saccade

- Interpretaion:

The eye drifts with the head and a correction saccade is required from the brain, due to loss of VOR.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PERIPHERAL VERTIGO

Menier's disease

- Bouts of vertigo (minutes to hours) associated with

1. Aural fullness
2. Tinnitus
3. Hearing loss
4. Falls of Tumarkin (drop attacks, no LOC) and complete recovery

Vestibular neuritis

- Severe vertigo
- Nausea vomitting ++
- Lasting days
- No hearing impairment
- Viral infection of vestibular ganglion
- Self limitting

PERIPHERAL VERTIGO

- Labrythitis :

Infection of the labryrinth (hearing and vestibular system)

There is sever vertigo and hearing loss

Casused by infection of the labyrinth from CNS or ear

Can lead to destruction that is irrevesable

BPPV

- The commonest cause of vertigo accounting for 40% of patients presenting with vertigo
- Caused by otoconia dislodging from utricle to posterior semicircular canal.
- Classic symptoms :

1. Vertigo lasting seconds
2. Brought on by head turning, head lifting or rolling in bed
3. May be asscociated with nausea and vomitting

- May be proceeded by URTI, or head trauma
- No hearing loss
- No neurological symptoms

Posterior Semicircular Canal

Utricle

Displaced Otoconia

Otoconia

Cochlea

BPPV

Benign Paroxysmal Positional Vertigo

B

otoconia

otolithic membrane

kinocilium

stereocilia

hair cells

upright section of the utricular macula

displaced section of the utricular macula

head upright

head bent forward

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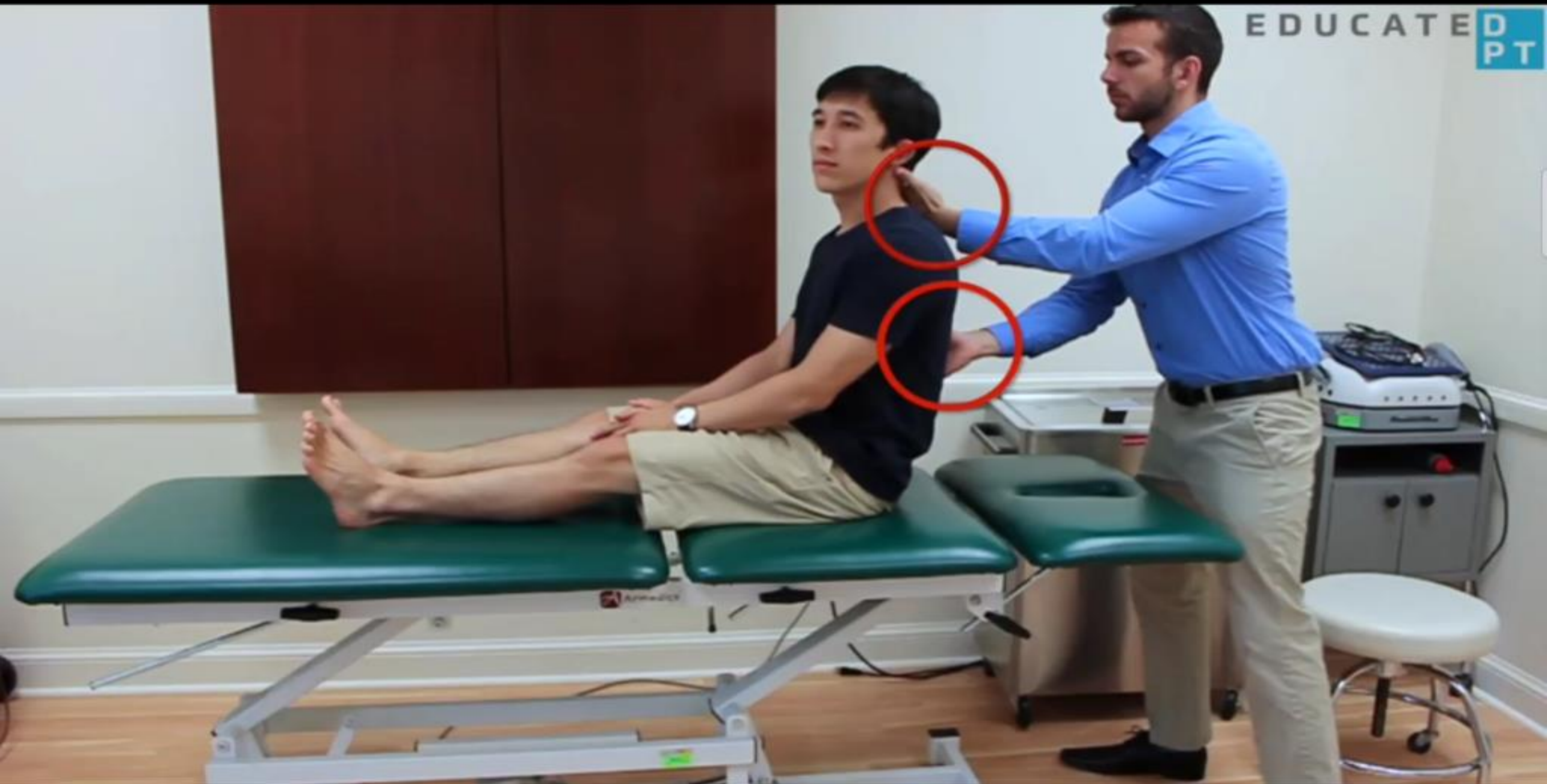
BPPV

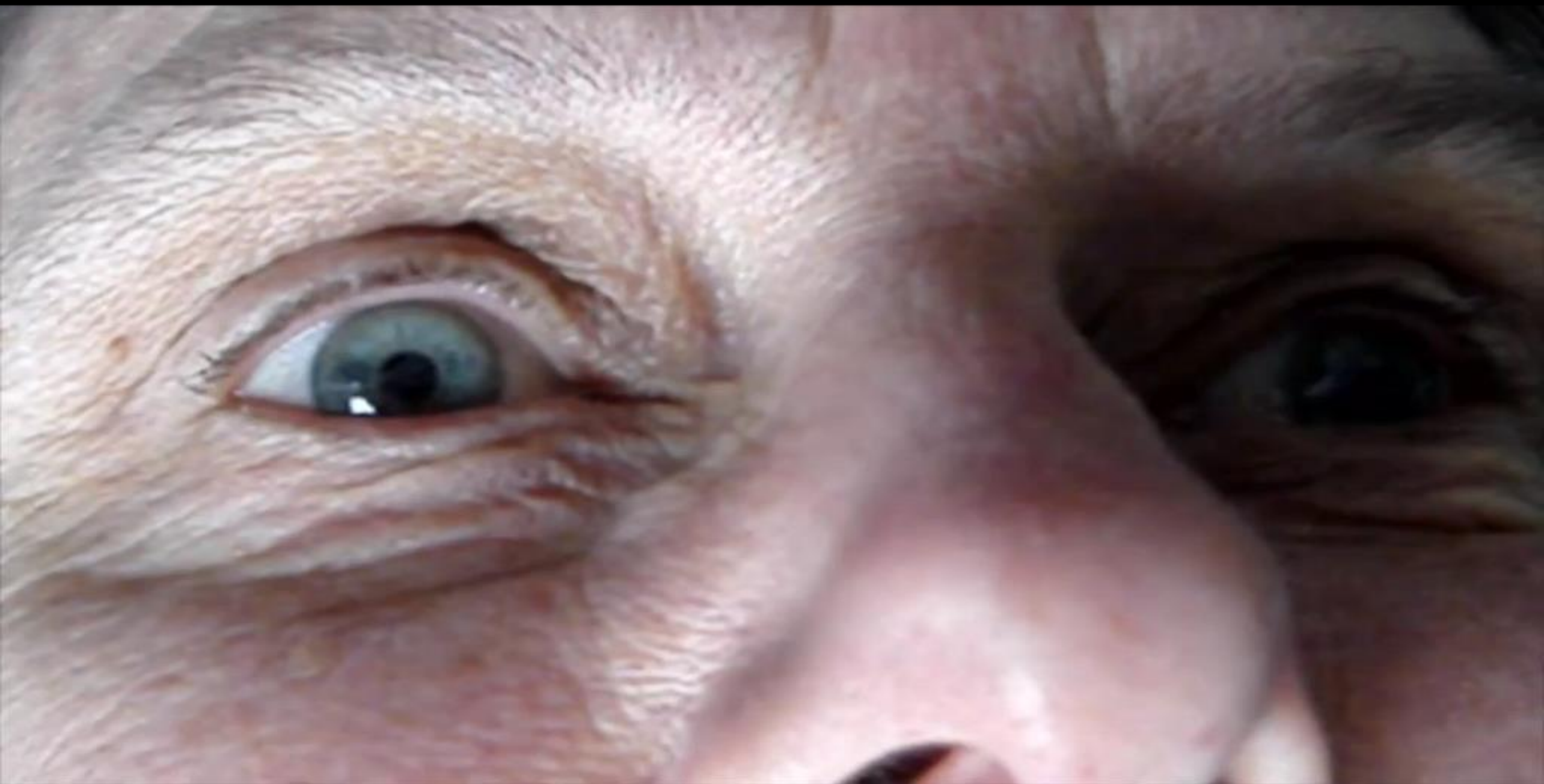
- Diagnosed with dix hallpike maneuver
- Treated with Eply's Maneuver
- No medications no betaserc no stugeron


EDUCATED
DPT

DIX HALLPIKE MANEUVER

- When turned to the affected side :
- Patient will start becoming dizzy
- Nystagmus :

1. Upbeating (fast phase up)
2. Slow phase down
3. Rolling (torsional) towards the affected ear (geotropic ie towards the ground)
4. Latency
5. Fatiguable



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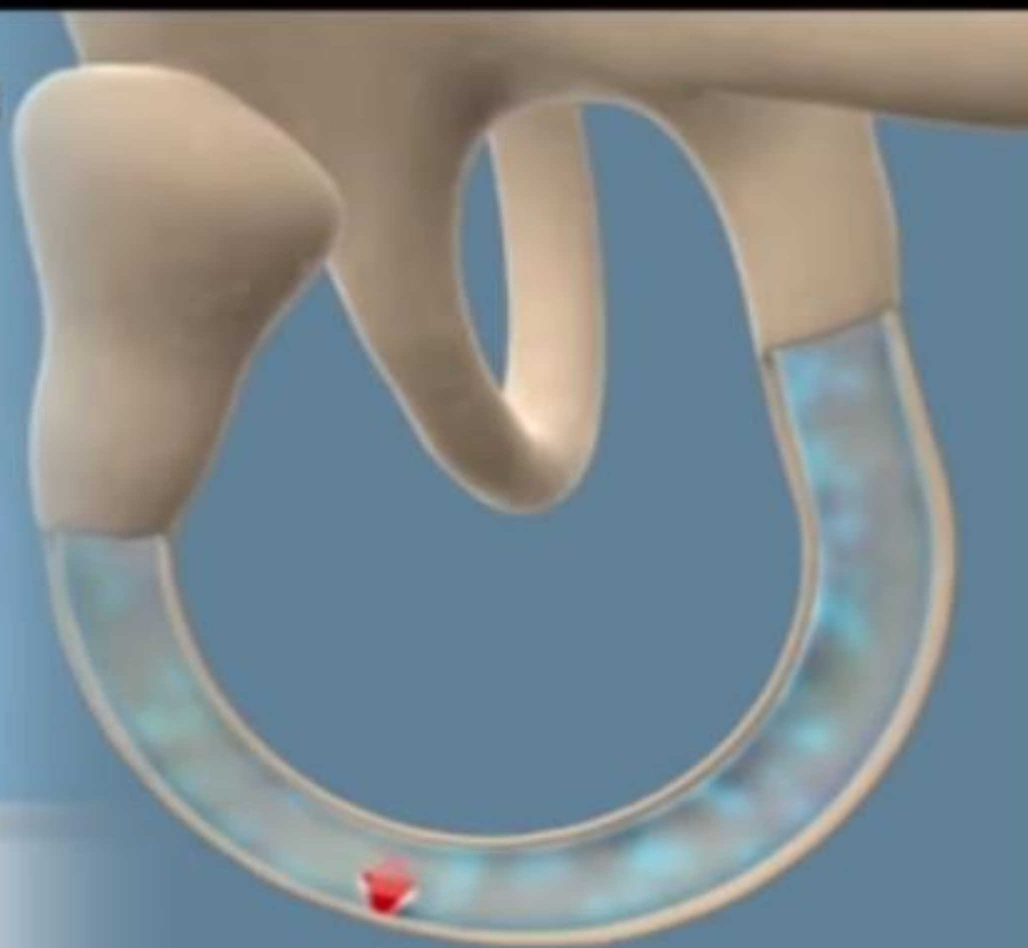

Thank you