Examination findings in vertiginous patient that suggest the need for referral to a physician

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Historical findings suggesting it isn't BPPV

- Dizzy upright only (cardiac)
- Headache (migraine, tumor)
- Secondary gain (malingering)

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Orthostatic Hypotension

- About equal to all vestibular dizziness combined
- Cardiovascular (23-43%)
  - Orthostatic hypotension
  - Arrhythmia

Orthostatic Hypotension, dysautonomia

- Blood pressure drops by 20 or more points standing
- Pulse rises 20 or more points on standing
- No positional nystagmus

Neurological Disorders associated with postural dizziness

- Migraine
- Cerebellar disturbances
- CSF leak

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Migraine & Vertigo: Prevalence

- Migraine:
  - 10% of U.S. population has Migraine†
  - 20-30% of women childbearing age
- Vertigo: 35% of migraine population.*
- Migraine + vertigo (MAV):
  - ~ 3.5% of U.S. pop.
  - ~ 10% of women of childbearing age

† Lipton and Stewart 1993; Stewart et al, 1994

*Kayan/Hood, 1984; Selby/Lance, 1960; Kuritzky, et al, 1981

Diagnosis of MAV
Nystagmus

- No definitive pattern
- Often low amplitude downbeating or upbeating nystagmus, commonly present during positional testing
- Also commonly seen upright
- ? Due to cerebellar disturbance

Polensek, S. H. and R. J. Tusa (2010). "Nystagmus during attacks of vestibular migraine: an aid in diagnosis." Audiol Neurootol **15(4): 241-246.**

Diagnosis of MAV
Clinical judgment

- Headaches and dizziness
- High index of suspicion in women of childbearing age. Perimenstrual pattern.
- Good response to medication –
  - Venlafaxine, verapamil, topiramate

Cerebellar Disorders associated with postural dizziness

- Cerebellar disturbances
  - Cerebellar structural lesions (stroke, tumor)
  - Chiari
  - Paraneoplastic
  - MS and many other structural CNS

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Cerebellar/Brainstem Eye signs

- Saccades - - inaccurate, too fast, INO
- Gaze – strong nystagmus, rebound
- Spontaneous Nystagmus – unusually directed
- Positional nystagmus – not in canal planes

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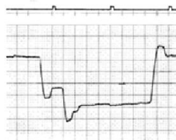
Overshoot dysmetria

- Usually cerebellar lesion
- Occasionally paretic eye fixation
- Never peripheral vestibular lesion



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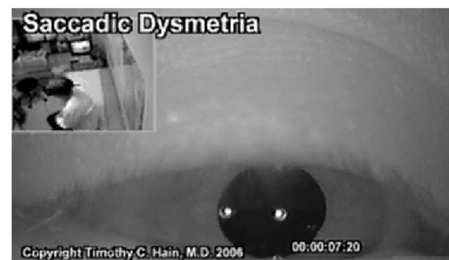
Saccadic Dysmetria



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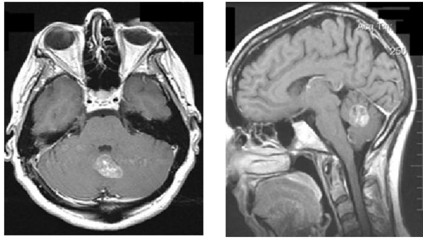
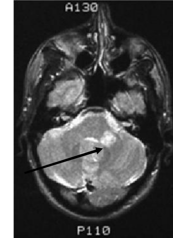
Vermis lesion



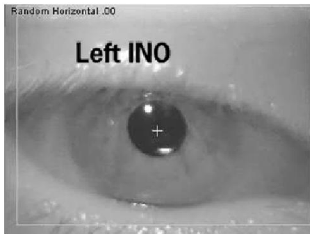
Multiple Sclerosis (MS)

- No single pattern
- Multiple lesions distributed in time and space



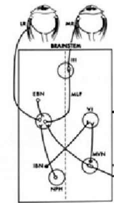
Multiple Sclerosis (MS)

- INO is common in MS



INO (Internuclear ophthalmoplegia)

- Brainstem lesion of MLF
- Most commonly seen in MS
- Slowing of adducting saccades
- Overshoot of abducting eye



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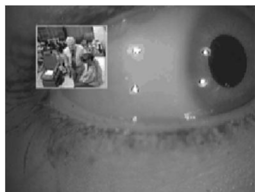
Case

- 14 year old girl
- Very unstable gait
- headaches
- Darting eyes



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Opsoclonus

- “dancing eyes-dancing feet” pediatric syndrome (Kinsbourne)
- Neuroblastoma
- Paraneoplastic syndrome
- West Nile

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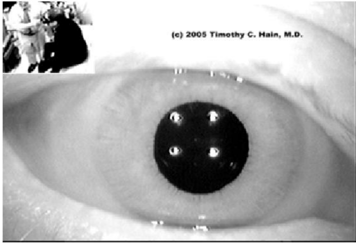
Voluntary Nystagmus – looks similar to opsoclonus



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Gaze Testing

- Move finger to the limits of lateral gaze (bury sclera) – if can't bury, may have oculomotor palsy
- Move finger to limits of vertical gaze
- Do eyes reach end-gaze ?
- Is there end-gaze nystagmus ?
- Is there rebound nystagmus ?

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Rebound

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Rebound Nystagmus

- Nearly always cerebellar lesion
- Rarely congenital
- Method of separating out cerebellar GEN from sedative effect or congenital nystagmus

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Non-vestibular spontaneous nystagmus the common variants Latent Nystagmus

- Found in persons with congenital esotropia
- changes direction according to viewing eye (Cross-cover test)
- Viewing eye beats laterally
- Intent to view controls direction (pseudoscope)
- Always have "lazy" eye

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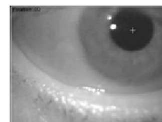
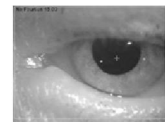
Case



In light



In dark

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Congenital Nystagmus

- One/1000 population
- Present from early age
- Usually worse in light
- PT is not useful
- Rehab significance is to avoid confusing it with central nystagmus or vestibular nystagmus.

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Non-vestibular spontaneous nystagmus: the common variants

- "Wrongly" directed primary position nystagmus
  - Downbeat
  - Upbeat
  - Torsional

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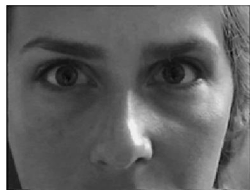
Downbeating

- Chiari (MRI)
- Cerebellar (especially remote effect) – get a CXR
- Idiopathic/drug



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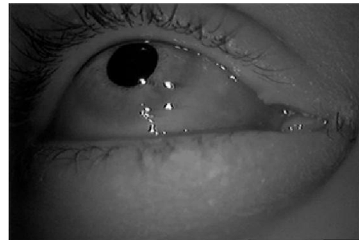
Torsional



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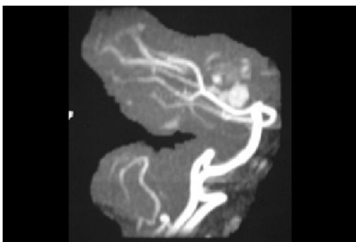
The cause



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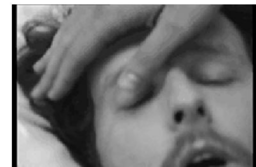
Upbeating

- Smoking (slight)
- Paxil (slight)
- Wernickes
- BPPV variants ?
- Vestibular neuritis variants
- Central vertigo – Migraine ?



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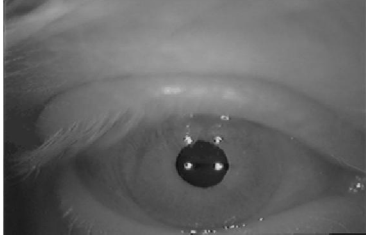
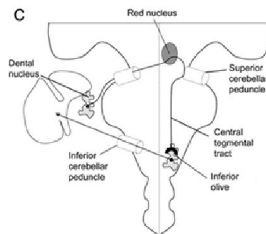
Non-Jerk nystagmus



Something else was moving too

Oculo Palatal Myoclonus

- Fairly common disorder
- Pendular nystagmus
- Palatal myoclonus
- Triangle of Guillain Molleret



Cerebellar tumor Case

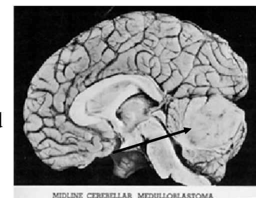
- 35 year old man
- Became dizzy and presented to clinic
- Frenzel exam showed low-amplitude DCPN. Was given Log-roll exercises.
- Even worse one week later.
- Ophthalmoscopy showed papilloedema
- MRI showed cerebellar ependymoma
- Radiologist drove patient to ER and was operated that day.

Cerebellar tumors

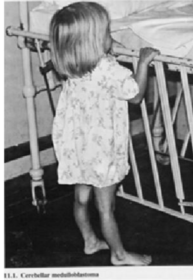
- Slowly growing tumor can present with dizziness without much else.
- In author’s experience, most look like mild lateral-canal BPPV
- This is the riskiest group - - without MRI, can fail to diagnose.

Cerebellar Medulloblastoma

- Mainly affects children
- Begins in cerebellar nodulus -- vestibulocerebellum
- Hydrocephalus (projectile vomiting) and cerebellar signs.
- Treat with resection, chemotherapy and radiation.
- 5 year survival – 80%


MIDLINE CEREBELLAR MEDULLOBLASTOMA

This child is holding onto the bed rail due to ataxia from a medulloblastoma

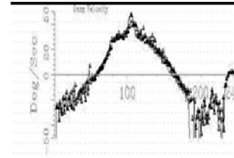


Severe ataxia

Strong positional nystagmus

Surgical treatment

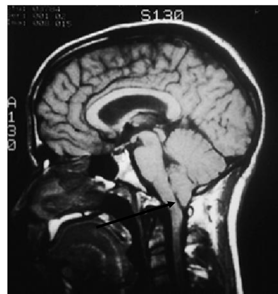
Periodic Alternating Nystagmus (PAN)



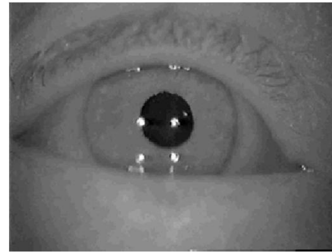
Congenital and acquired forms. Acquired form usually from cerebellar nodulus lesion (such as medulloblastoma). Usual period is 200 sec. Responds to medication, but not to PT.

Chiari Malformation: Case

- Dock worker gets dizzy when lifts heavy boxes
- Examination: unsteady, downbeating nystagmus.
- MRI showed cerebellar tonsils lower than foramen magnum.

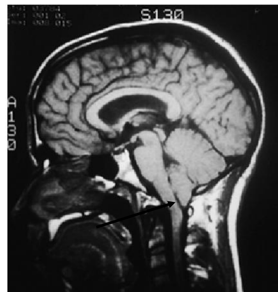


Downbeating Nystagmus may be clue to underlying cerebellar degeneration or Chiari



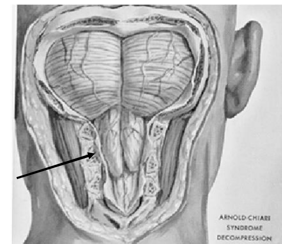
Chiari Malformation

- Cerebellar tonsils herniate downward
- Adult onset
- Straining or coughing produces headache or fainting
- Unsteadiness
- Nystagmus



Chiari Malformation
Treatment: Suboccipital decompression

Arrow points to tonsils. This surgical exposure is larger than would be used in real operation



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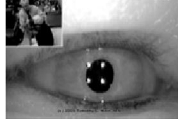
Paraneoplastic syndromes

- Remote effect of cancer
- Associated with lung and breast cancer
- Vestibulo-cerebellar syndrome – dominated by
  - Ataxia
  - Nystagmus (particularly downbeating)
- May be related to cellular immunity



CSF pressure problems Orthostatic symptoms

- CSF leak
  - Post-LP dizziness/nausea/headache
  - Post-epidural dizziness/hearing loss/tinnitus
  - Idiopathic
- No nystagmus

Cervical Nystagmus (vascular ?)

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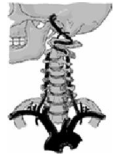
Cervical vertigo – vascular variant



- In author's experience, very rare condition
- Upright nystagmus after 10-20 sec delay
- Same nystagmus supine or upright.

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Otological Disorders associated with postural dizziness, outside of BPPV

- Positional Alcohol Nystagmus (PAN)
- Superior Canal Dehiscence

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Positional alcohol nystagmus (the other PAN)

Situation -- you go out drinking, and manage to put away 6 beers. You come home and feel pretty good. As soon as you hit the sheets, the world starts to spin.

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Positional alcohol nystagmus (the other PAN)

- Similar to lateral canal BPPV
- Cupula is lighter than endolymph at beginning
- Cupula is heavier than endolymph later
- Occasionally seen in malingerers in clinic, and in ER.

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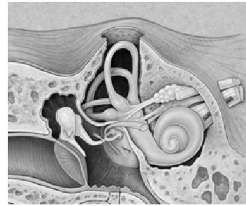
SCD (superior canal dehiscence)

Fluctuating condition

No rehab until after surgery

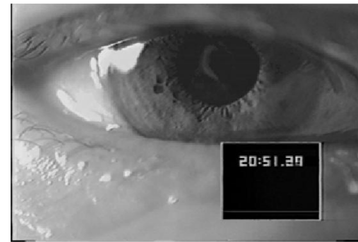


- Superior Canal Dehiscence

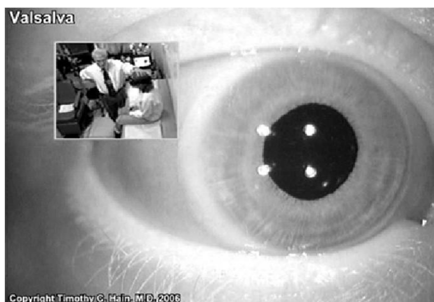
Case: WS

Retired plastic surgeon, with impaired hearing related to war injuries, found that when he went to church, when organ was playing, certain notes made him stagger. His otolaryngologist noted that during audiometry (with hearing aid in), certain tones reliably induced dizziness and a mixed vertical/torsional nystagmus. This "Tullio's phenomenon" could be easily reproduced experimentally. MRI scan was normal.

Tullio in SCD

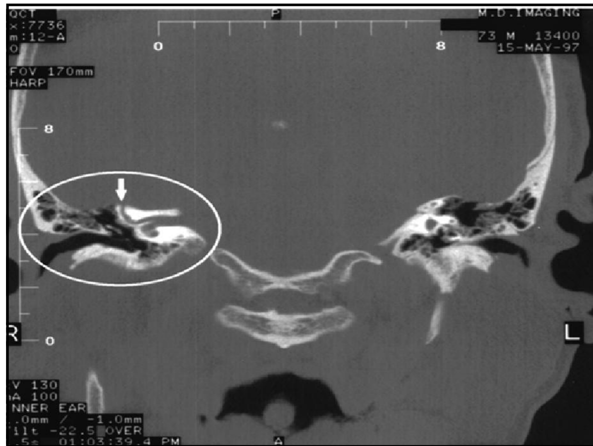


Valsalva in SCD



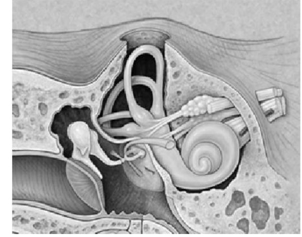
Diagnosis of SCD

- History of sound and pressure sensitivity
- Valsalva test is easiest bedside test
- Temporal Bone CT scan (high resolution)



Superior Canal Dehiscence

- Treatment:
  - Do nothing
  - Surgical
    - Plug
    - Resurface
    - Plug and cement



To summarize: Types of positional dizziness that are either not reasonable rehab candidates or benefit from a combined approach

- Orthostatic hypotension – need higher BP
- Migraine - -need medication
- Brain tumors - -need surgery
- Fluctuating inner ear conditions – intractable to PT

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More

Hain, T.C. Approach to the patient with Dizziness and Vertigo. Practical Neurology (Ed. Biller), 2002, 2007. Lippincott-Raven

www.dizziness-and-balance.com