ATLANTIC BALANCE and DIZZINESS CENTRE

Vestibular Examination

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Outline

- Dizziness Differentiation
- Vestibular Disorders
- Assessment
- When and Where to Refer

Atlantic Balance and Dizziness Centre

Private physiotherapy clinic – est 2008

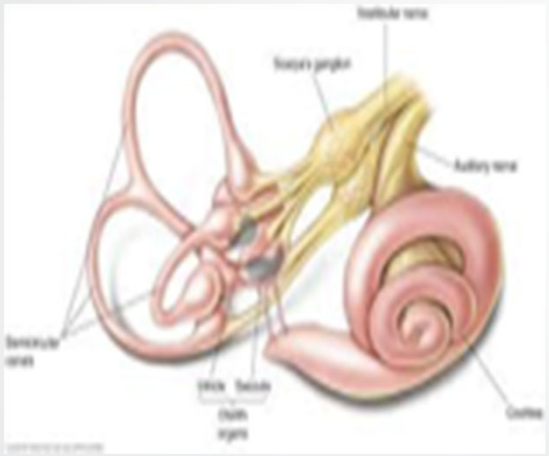
Vestibular and Neuro Rehab

ENT and Audiology


Balance Clinic
Hearing Clinic

The Balance System

- Vestibular
- Visual
- Somatosensory



What happens if there is an imbalance in those systems?

Dizziness

"A disturbed sense of relationship to space; a sensation of unsteadiness and a feeling of movement in the head; lightheadedness; disequilibrium; vertigo"

- Miller-Keane, 1997

What do you mean…Dizzy?

- Lightheaded, faint
- Off-balance
- Clumsy
- Unable to concentrate
- Weak
- Leaning
- Trouble focusing
- Disorientated
- Anxious
- Floating
- Confused
- Shaky
- Nauseated
- Sweating
- Fatigue/exhausted
- Spinning
- Pulling to one side

Problem with Dizzy Patients

- **Blood pressure**
  - High or low
- **Cardiac**
  - Arrhythmias
- **Neurological**
  - CVA, Tumor, MS, Migraines
- **Endocrine**
  - Thyroid, Pituitary, Adrenal
- **Medications**
  - Blood pressure, antidepressants, analgesics
- **Metabolic**
  - Hypoxia, Hypoglycemia, dehydration
- **Aging**
  - Degeneration, neuropathy, dementia
- **Psychogenic**
- **Vestibular**

What is the flavour of Dizziness?

Dizziness comes in 4 basic flavours (Drachman, 1972)

1) Presyncope

2) Disequilibrium

   A) Gait

   B) Global

3) Vertigo

4) Psychogenic

Presyncope

”Nearly blacking out”, ”nearly fainting”

Lasting seconds to minutes

- Orthostatic hypotension
- Cardiac arrhythmias
- Dehydration
- Medications
- Hyperventilation/Anxiety

Not Vestibular

Most likely Cardiology

Disequilibrium

A feeling of imbalance

1. **Gait disequilibrium**
   - Only unstable when standing
   - Neurological
2. **Global disequilibrium**
   - A pervasive feeling of imbalance
   - Potentially vestibular

Vertigo

- A sensation of rotation or movement of one's self or of one's surroundings in any place
- The illusion of movement
- Spinning, rocking, tilting, floor dropping
- Likely vestibular dysfunction

Psychogenic

- Will describe symptoms as “spacey or disconnected”
- Feeling removed from reality
- Often associated anxiety or depression
  - Can benefit from counselling
- Can be secondary to previous vestibulopathy

Problem with this model alone

Patients who present to ER have trouble reliably describing dizziness (Newman-Toker, 2007)

- Description depended on how the question was asked

Serious pathology (ie cardiac, brainstem) can present as vertigo (Demiryoguran, 2006; Newman-Toker, 2006)

What is accompanying the "dizziness"?

- CNS – weakness, numbness, ataxia, abnormal muscle tone, 3D – diplopia, dysphagia
- Vestibular – hearing loss, aural pressure, tinnitus, autophony
- Migraine – headache, aura, nausea, photo/phonosensitivity
- Panic – SOB, palpitations, hyperventilation

Timing and Trajectory

How long do the symptoms last?

- Seconds, hours, days

How often does it occur?

- One episode or frequent

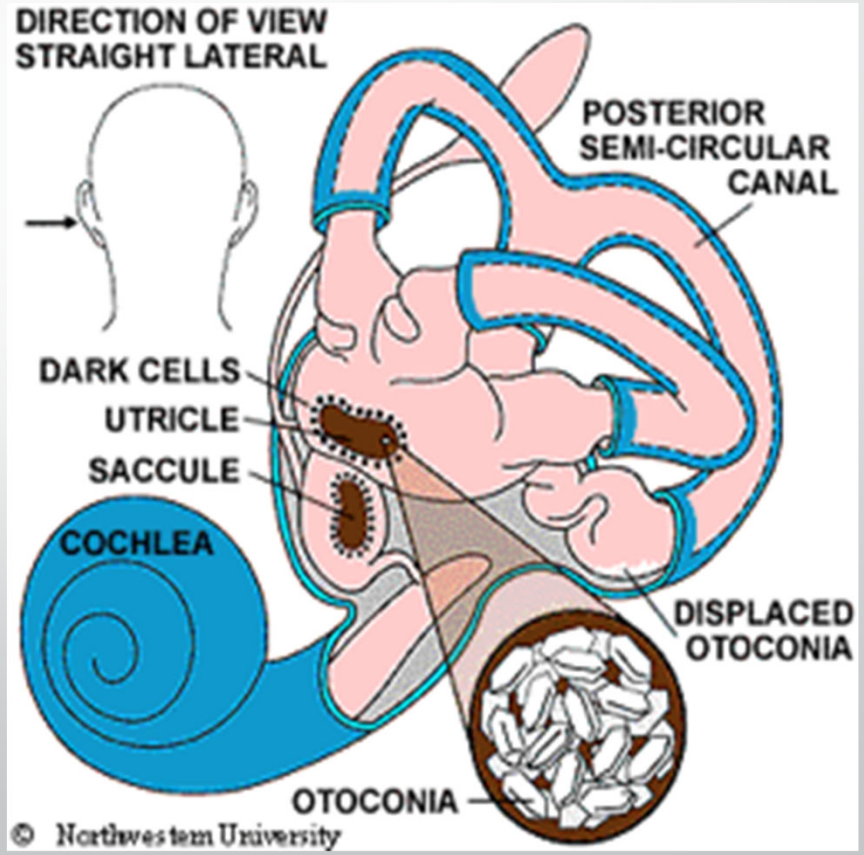
How has it changed since onset?

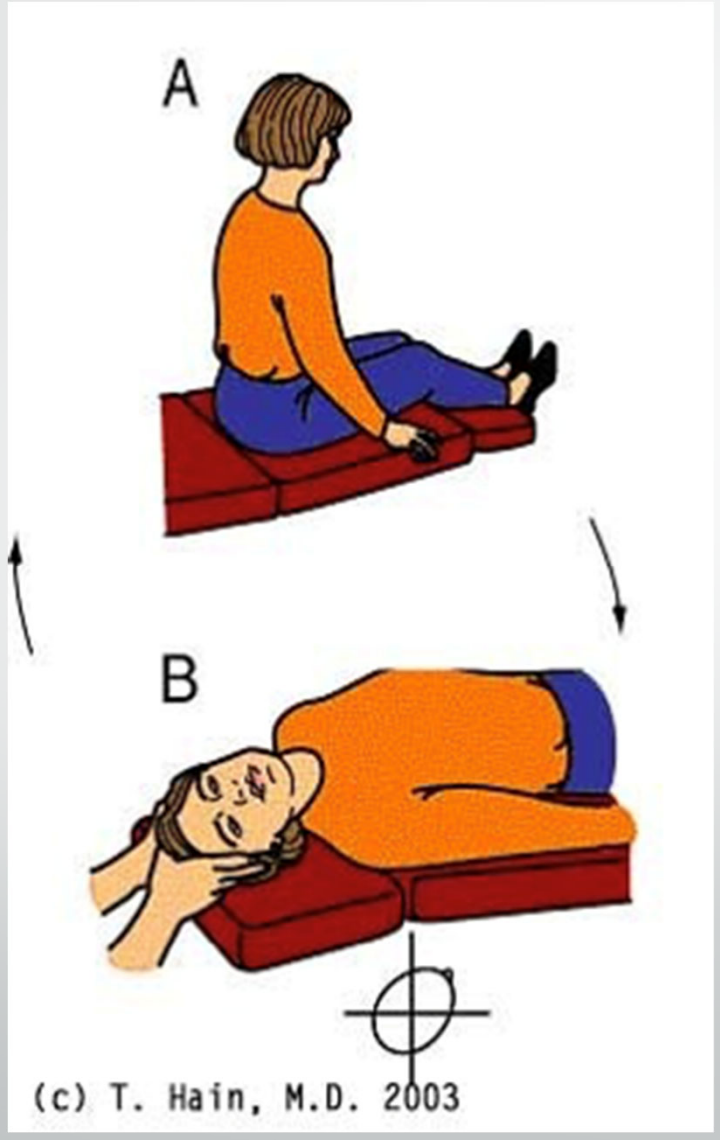
- Improving or worsening

Conditions

Benign Paroxysmal Positional Vertigo (BPPV)

- Otoconia from utricle displaced into semicircular canal
- Inertial changes caused by debris motion
- Nystagmus and vertigo caused by pitch plane motion
  - Looking up
  - Lying down
  - Turning in bed
- Vertigo lasting < 60 seconds
  - Nausea, imbalance
- Will often self-limit motion

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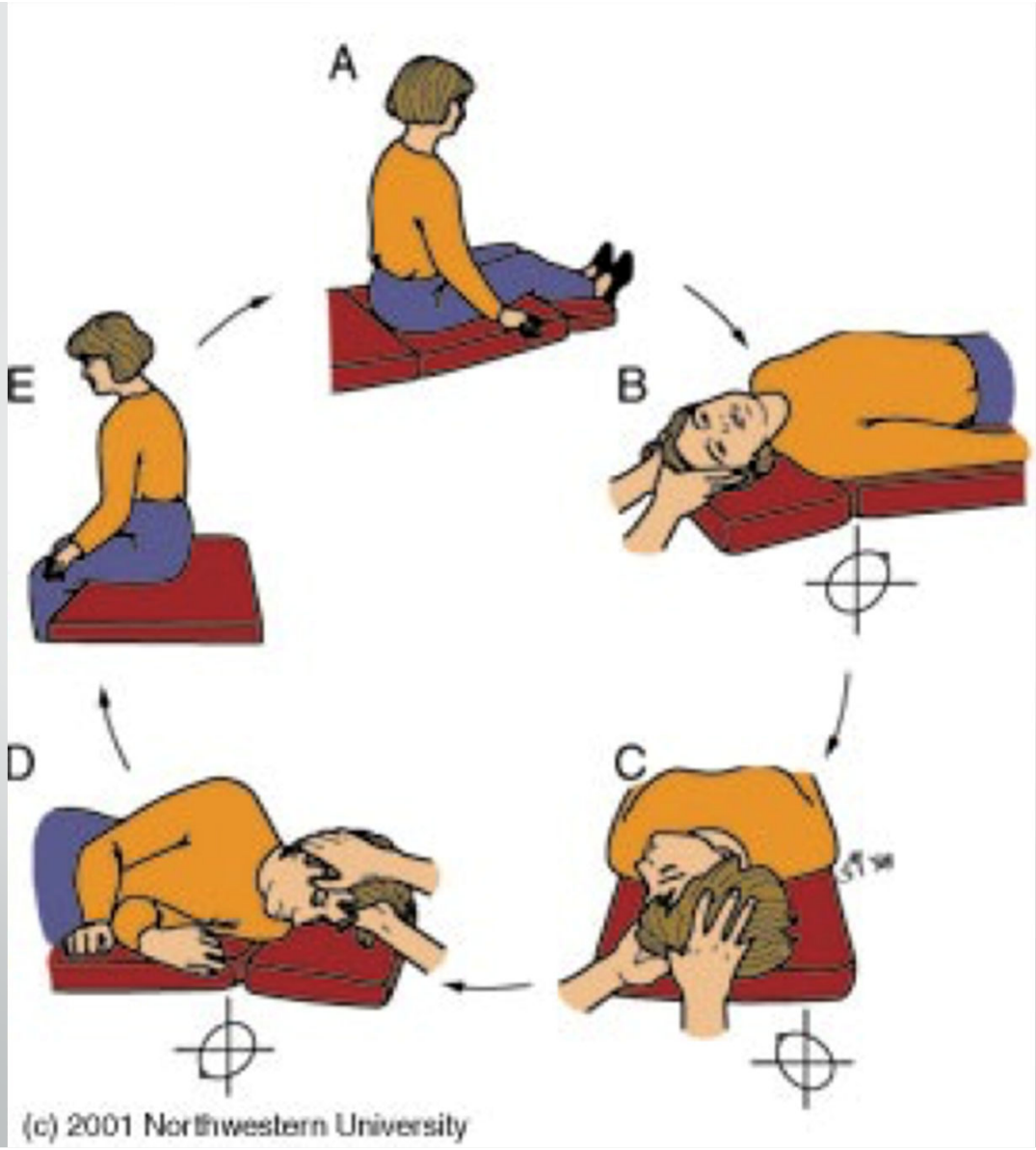
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Canalith Repositioning Maneuveur Efficacy

67-94% success rate compared to 0-33 % for no treatment (Lynn, 1995; Lempert, 1997; Froehling, 2000)

1-3 visits – 74.8%, 93.8%, 98.4%

(Macias et al, 2000)

If not successful with Epley – need to look at other canals

Vestibular Neuronitis

- Viral infection of vestibular portion of cranial nerve VIII
- Sudden onset of room spinning lasting continuous for 1-3 days
- Associated nausea, vomiting and imbalance
- No audiological symptoms typical
  - If hearing loss can suspect labyrinthitis
- Gradual improvement over several weeks

Treatment for Vestibular Neuritis

Exercises designed to help promote CNS compensation

- Static and dynamic balance training (Horak, 1992)
- Gaze stabilization (Herdman, 2003)
- Motion desensitization (Norre 1980, Shepard 1993)
- Treatment of secondary deficits

Meniere's Disease

- Episodic vertigo lasting 20 minutes to 24 hours
- Fluctuating unilateral SN hearing loss
- Unilateral roaring tinnitus
- Unilateral aural fullness
- Audiogram – low frequency SN hearing loss

Treatment for Meniere's

- Low sodium diet (<1500 mg)
- Avoid nicotine, caffeine, alcohol
- Diuretic
- Serc (8-24 mg TID)
- Intratympanic steroids
- Intratympanic Gentamicin

***vestibular rehab**

Vestibular Migraine

Episodic vertigo lasting 5 min to 72 hours

- Possible tinnitus, aural fullness and subjective hearing loss

Present or previous migraine history

One or more migraine feature with 50% of the vertigo episodes

- Single sided pulsing headache, worsened by routine activity
- Visual aura
- Phonophobia, photophobia

Audiogram should be normal

Treatment for Migraine

Trigger management

- Foods, stress, sleep, weather

Medications

- Ca channel blockers, B blockers, SSRI,SNRI

Vestibular rehab

- Balance and motion desensitization

Lifestyle counseling

- Hydration, nutrition, sleep, stress, exercise

Assessment of the Dizzy Patient

Subjective questionnaire

Dizziness Handicap Inventory

- Score out of 100
- Measures perceived level of disability due to dizziness
- 0-30 = mild handicap
  31-60 = moderate handicap
  61-100 = severe handicap

Cranial Nerve Scan

- II – pupil reflex
- III, IV, VI – smooth pursuit and saccades
- V – facial sensation
- VII – Smile and Frown
- VIII – Audiogram
- IX – Gag
- XI – Trapezius strength
- XII – Tongue protrusion

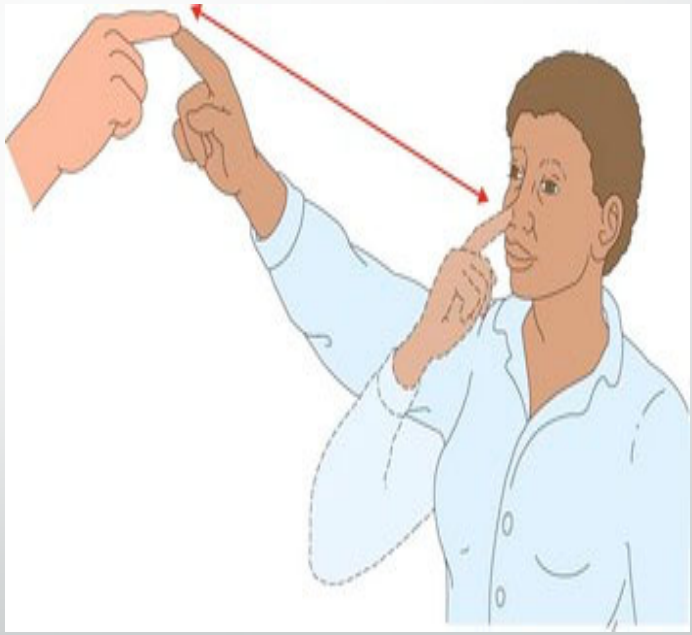
Cerebellar Screening

Upper Extremity

- Finger-to-nose
- Alternating hand movements

Lower Extremity

- Heel-to-shin
- Alternating toe tapping



Static Balance

Modified Clinical Test for Sensory Integration and Balance (CTSIB)

- Romberg with eyes open and closed – 30 seconds
- Repeated with foam surface
- Identify strategy for balance

Dynamic Balance

- Timed Up and Go Test (TUG)
- Functional Reach Test
- Fukada Step Test

Dynamic Balance

Timed Up and Go Test (TUG)

Correctly identifies 87% of fallers

- Rise from sitting, walk three meters, turn around, walk back and sit
- >11.1 sec –increased falls risk – Vestibular Disorders (Whitney, 2004)

Dynamic Balance

Functional Reach Test

- Standing close to wall, arm extended to 90 degrees
- Reach as far forward as possible without taking step
- < 18.5 cm indicates falls risk (Thomas et al, 2005)

Dynamic Balance

Fukada Step Test

- Client marches on the spot and then is asked to close their eyes for 30 sec.
- Need to assess safety with this test
- > 30 degree veer to the side is suggestive of a vestibular hypofunction to that side

Vestibular Ocular Reflex (VOR)

Halmagyi Head Thrust (Halmagyi, 1988)

- Hold patient's head and they stare at your nose
- Head is oscillated side to side
- Quick, short thrust to the left and right

Halmagyi Head Thrust

Positive = corrected saccade required to refixate on target

Sensitivity 71% for unilateral vestibular loss, 84 % for bilateral loss (Grine et al, 2000)

VOR – Dynamic Visual Acuity

- Patient sits 4 meters from ETDRS eye chart
- Testing VOR
- Reads the chart with head static
- Repeat with head oscillating at 2 Hz/sec

Dynamic Visual Acuity

- Normal is 0-2 lines lost
- >3 lines is associated with unilateral vestibular loss
- >6 lines is associated with bilateral vestibular loss
  - Herdman, 2008

Vestibular Testing – High Tech

Nystagmus Testing – IR Goggles

- Spontaneous and gaze
- Pressure Testing
- Head Shaking
- Dix-Hallpike and Horizontal Roll

Assessment of Falls Risk

Team approach

- We are all responsible for identifying the high risk fallers
- Multifactorial – vision, hearing, ROM/strength, medication, footwear, environmental
- Essential to have a team approach and refer when appropriate
- Striking the Right Balance: Current Fall Prevention Strategies in Audiology Practice (Cdn Audiologist vol 4, iss 6 2017)

Activities Specific Balance Confidence Scale (ABC) – Tinetti et al 1990

- Subjective questionnaire – 16 items
- “How confident are you that you will not lose your balance or become unsteady when you…?”
- Zero = no confidence, 100 = completely confident
- Low scores predictive of falls risk

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Sit to Stand

- Completed without using arms
- Sit to stand 5x
- > 13 sec is a predictor of falls

Gait

- Dynamic Gait Index (Shumway Cook, 1995)
- Functional Gait Assessment (Whitney, 2004)

Gait speed

- Timed 20 ft walk – both a preferred and a maximal walking speed
- Can be compared to age matched normal values
- Slow speed linked to increased falls risk

When to refer on to ENT?

Vertigo in the presence of hearing loss – particularly asymmetrical

Vestibular physiotherapy not locally available

When to refer to vestibular physiotherapy?

- If you are not comfortable with treatment
- Patient assessed to be at high falls risk
- Balance problem with general mobility
- Lower extremity arthritis/weakness, core weakness

In conclusion

- Don’t let the client use the word dizzy – pin them down
- Timing/aggravating activities
- Neuro findings
- General movement- gait/balance
- Specific vestibular testing
- Interdisciplinary approach to falls management