Hearing Loss and Dizziness:

Assessment and Treatment overview

Lee Cottrell, Au.D.

Objectives

- Describe the prevalence of hearing loss and balance disorders
- Describe the physiologic and psychosocial impact of hearing loss and dizziness
- Understand the relationship between hearing loss, dizziness, and other health problems
- Understand health related costs of hearing loss and dizziness
- Apply guidelines for addressing hearing loss and dizziness in primary care settings

Prevalence of hearing loss

- 48 million Americans have measurable hearing loss
- More common in men than women
- More common in whites than blacks or Hispanics
- 20% of males aged 50-59
- 27% of adults 60-69
- 55% of adults 70-79
- 79% of adults 80+

All percentages given are for bilateral hearing loss

Prevalence of Balance Disorders

- 35% of adults over 40 have vestibular dysfunction
- 1 in 4 Americans (age 65+) falls each year
    - Total medical costs for falls = $50 billion in 2015
- 7-10% of population experiences vertigo at least once
- More common in women than men
- Prevalence increases with age
- Dizziness accounts for 5% of primary care clinic visits (estimated)

Dizziness

Categories of dizziness (from AAFP summary article 2010)

1. Vertigo – False sense of motion (approx. 50% of cases)
2. Disequilibrium – Off-balance or wobbling (up to 16%)
3. Presyncope – Blacking out (up to 14%)
4. Lightheadedness – Symptoms poorly described (10%)

Dizziness

1. Vertigo:
    - BPPV – Most common and easiest to treat
    - Vestibular Migraines – Increasingly recognized as a distinct and common condition
    - Vestibular neuritis / labrynthitis
    - Persistent Postural-Perceptual Dizziness (PPPD)
    - Meniere’s Disease
    - Vestibular schwannomas

Dizziness Assessment

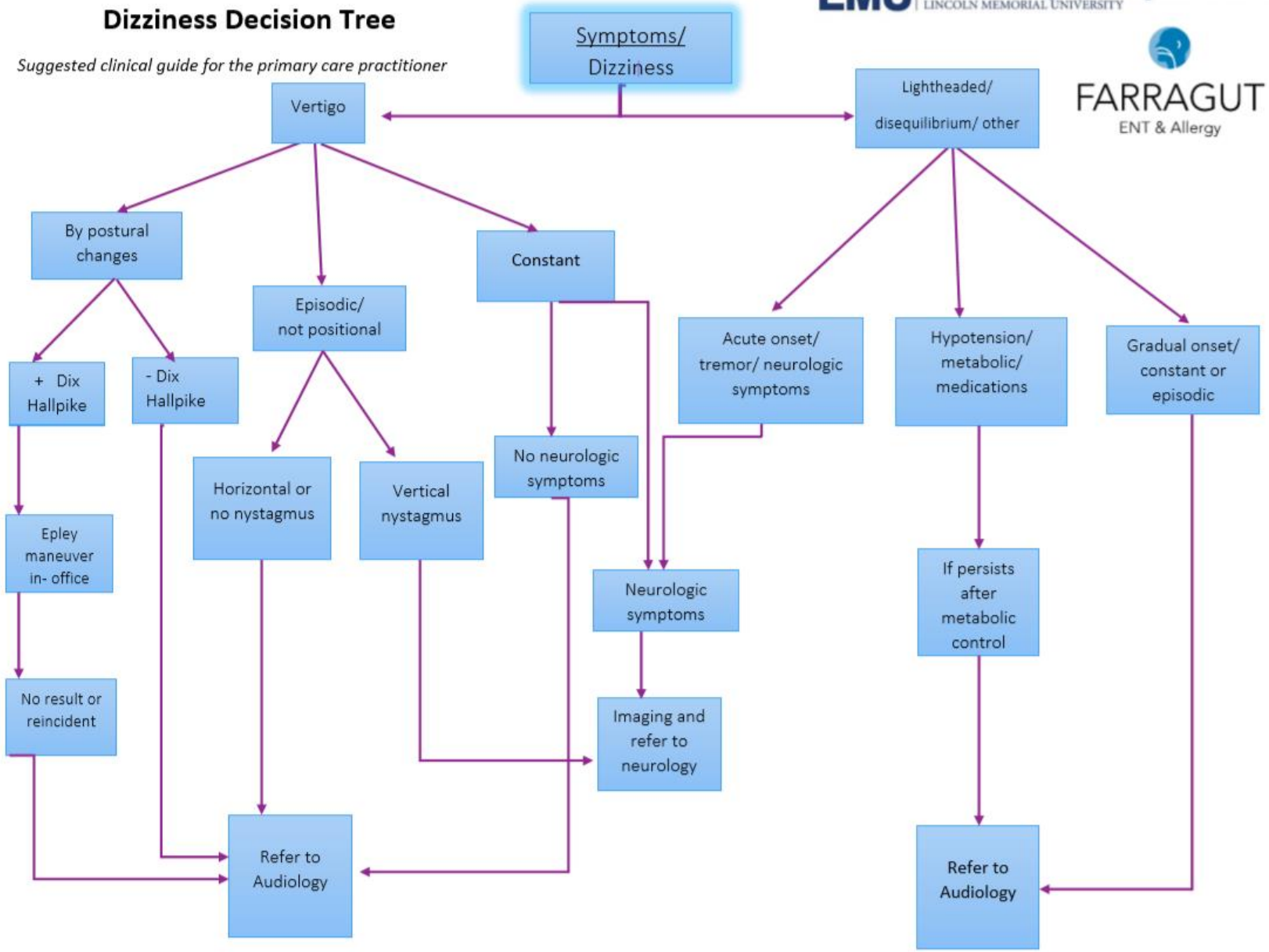
- In PCP setting:
  - Complete case history
  - Discussion of Medications – drug interactions, side effects, etc.
  - Observation of nystagmus – vertical or horizontal
  - Assessment of normal eye movements
  - Dix-Hallpike test *(with recording for CPT 92542)*
  - *Dizziness Decision Tree* – help patients get proper diagnosis and treatment as quickly as possible

LMU DeBusk College of Osteopathic Medicine
LINCOLN MEMORIAL UNIVERSITY

FARRAGUT
ENT & Allergy

Dizziness Decision Tree

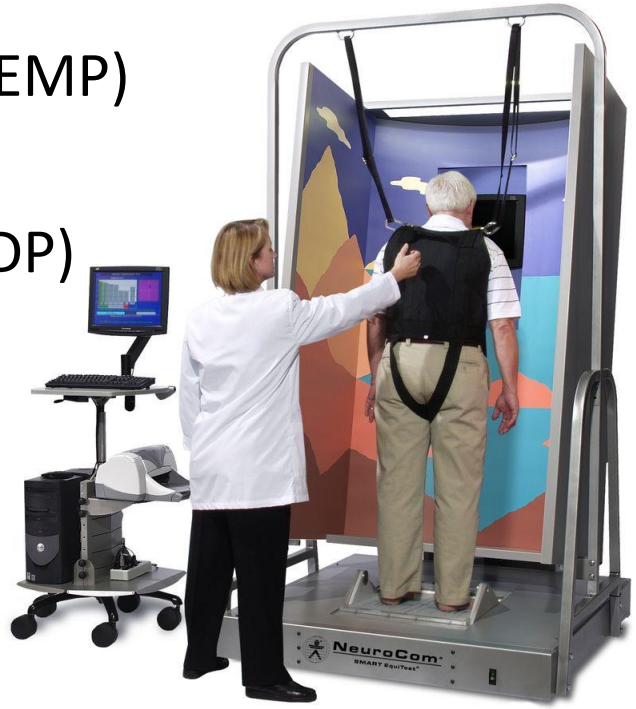
Suggested clinical guide for the primary care practitioner



Dizziness Assessment

In Audiology / ENT Setting

- Videonystagmography (VNG)
- Caloric irrigations and/or Rotational Testing
- Video Head Impulse Testing
- Vestibular evoked myogenic potentials (VEMP)
- Electrocochleography (ECOG)
- Computerized dynamic posturography (CDP)
- *And more…*




Balance Manager®
EquiTest®
NeuroCom®

CDP: 6 test conditions

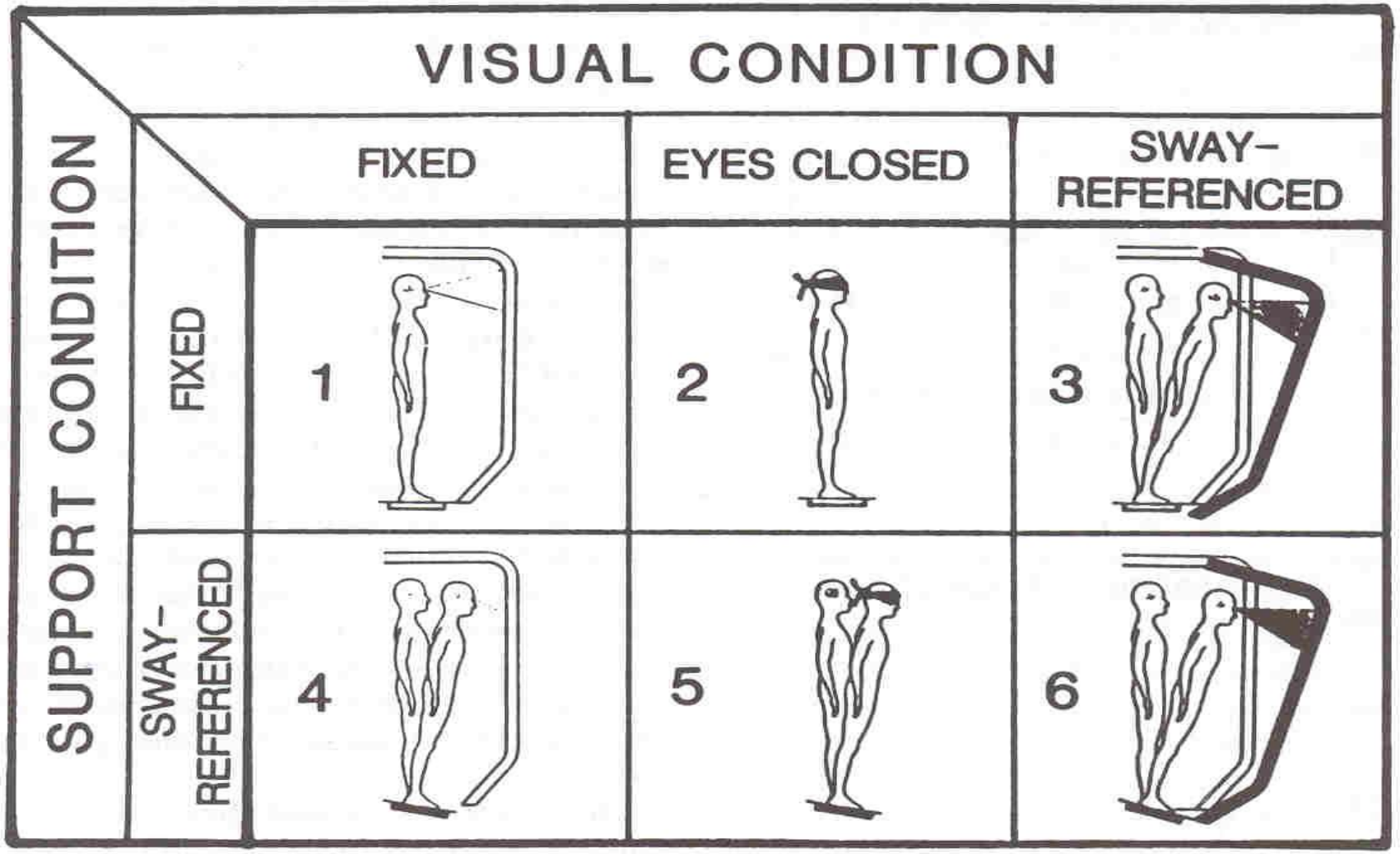


FIG 13–8.
The SOT protocol showing the six sensory test conditions.

SENSORY ANALYSIS

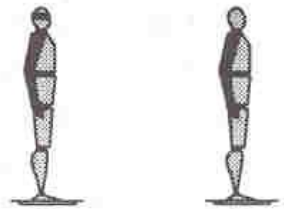
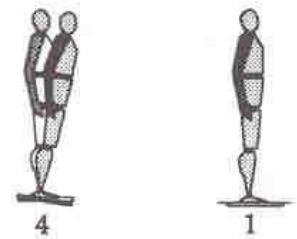
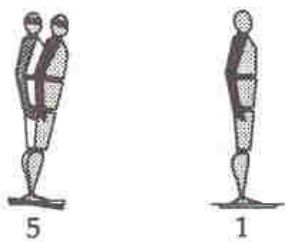
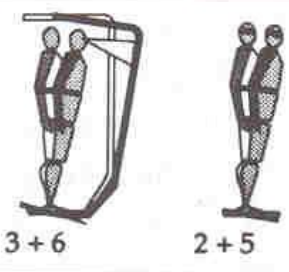
RATIO NAME	TEST CONDITIONS	RATIO PAIR	SIGNIFICANCE
SOM Somatosensory	 2 1	$\frac{\text{Condition 2}}{\text{Condition 1}}$	**Question:** Does sway increase when visual cues are removed? **Low scores:** Patient makes poor use of somatosensory references.
VIS Visual	 4 1	$\frac{\text{Condition 4}}{\text{Condition 1}}$	**Question:** Does sway increase when somatosensory cues are inaccurate? **Low scores:** Patient makes poor use of visual references.
VEST Vestibular	 5 1	$\frac{\text{Condition 5}}{\text{Condition 1}}$	**Question:** Does sway increase when visual cues are removed and somatosensory cues are inaccurate? **Low scores:** Patient makes poor use of vestibular cues, or vestibular cues unavailable.
PREF Visual Preference	 3 + 6 2 + 5	$\frac{\text{Condition 3 + 6}}{\text{Condition 2 + 5}}$	**Question:** Do inaccurate visual cues result in increased sway compared to no visual cues? **Low scores:** Patient relies on visual cues even when they are inaccurate.

FIG 13–12.
Sensory analysis ratios and their functional meaning.

Dizziness Treatment

- In PCP setting:
  - Adjustment of Medications (Meclizine for everyone?)
  - Canalith repositioning maneuvers (Epley) for BPPV (CPT 95992)
  - Referrals as appropriate

Dizziness Treatment

- Vestibular rehab therapy
  - Compensation and retraining are highly effective with the proper diagnosis
  - *In general, advise patients Do Not lie down in darkness*
  - *More movement = faster recovery*
- Migraine therapies for vestibular migraine
- Steroids for vestibular neuritis / labrynthitis
- Salt restriction, intratympanic dexamethasone, endolymphatic sac decompression (Meniere's Disease)

Hearing Loss

EFFECTS OF HEARING LOSS

- Impaired audibility
- Impaired temporal resolution
- Impaired spectral resolution
- Frustration in communication
- Increased effort of listening
- Social isolation
- Decline in overall quality of life
- Reduced performance and earnings in workplace

EFFECTS OF HEARING LOSS OVERALL HEALTH

- Increased risk of dementia/cognitive decline
- Increased risk of falls and injuries related to falls
- Increased risk of depression

Hearing Loss Assessment

In PCP Setting

- Hearing loss and tinnitus questions at intake
- Recommend full hearing evaluation at age 50
- Standardized questionnaire for screening/Medicare exams (HHIE-S)
- In-office screening and testing – Tympanometry, OAE, automated screeners
- Referrals to audiology / collaboration with audiology

HHIE

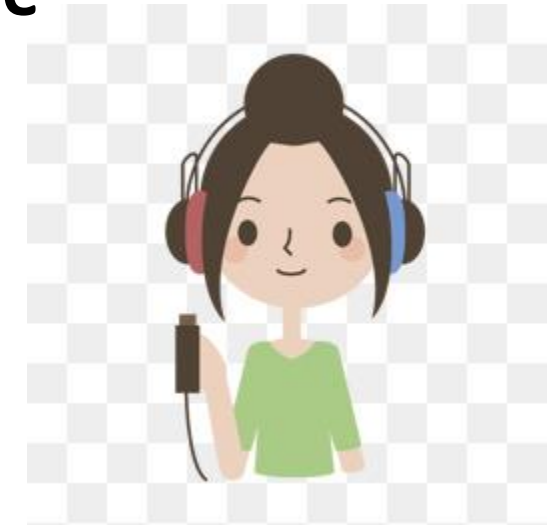
Hearing Handicap Inventory – Screening Questionnaire

	Item	Yes (4 pts)	Sometimes (2 pts)	No (0 pts)
E	Does a hearing problem cause you to feel embarrassed when meeting new people?	_____	_____	_____
E	Does a hearing problem cause you to feel frustrated when talking to members of your family?	_____	_____	_____
S	Do you have difficulty hearing when someone speaks in a whisper?	_____	_____	_____
E	Do you feel handicapped by a hearing problem?	_____	_____	_____
S	Does a hearing problem cause you difficulty when visiting friends, relatives, or neighbors?	_____	_____	_____
S	Does a hearing problem cause you to attend religious services less often than you would like?	_____	_____	_____
E	Does a hearing problem cause you to have arguments with family members?	_____	_____	_____
S	Does a hearing problem cause you difficulty when listening to TV or radio?	_____	_____	_____
E	Do you feel that any difficulty with your hearing limits or hampers your personal or social life?	_____	_____	_____
S	Does a hearing problem cause you difficulty when in a restaurant with relatives or friends?	_____	_____	_____
	TOTAL SCORE = _____ (sum of the points assigned to each of the items)			

E = Emotional; S = Social

Interpretation of Score:
0-8 suggests no hearing handicap
10-24 suggests mild-moderate hearing handicap
26-40 suggests significant hearing handicap

Hearing Loss Assessment



Audiology Setting

- Audiometry
- Tympanometry / immittance testing
- Otoacoustic Emissions
- Speech-in-Noise Evaluations
- Tinnitus Evaluations
- Auditory Brainstem Response (ABR)
- Electrocochleography (ECOG)
- *And more…*

Hearing Loss Treatment

Auditory Training – computer based listening programs

Assistive Listening Devices

Hearing Aids

Cochlear Implants

Bone conduction implants

Hearing aids:

- Improve overall quality of life
- Improve speech understanding
- Improve ease of listening
- Provide increased auditory stimulation
- Provide relief from tinnitus
- Decrease the risk of falls*
- Decrease the risk of dementia*

**Limited data on these topics*

Do Hearing Aids Work?

- Success vs. Failure
  - Failure = hearing aids are not used, are not helpful, not recommended
  - Success = hearing aids are used regularly, are helpful, are recommended
  - Factors affecting success include:
    - Duration of hearing loss
    - Quality of hearing aids
      - Manufacturer X = 96% satisfaction
      - Overall satisfaction = 79%
    - Quality/expertise of hearing care
    - Collaboration of care

Hearing aids:
Too Expensive?

- Hearing loss costs more than hearing aids
- Insurance coverage of hearing aids is becoming the norm, rather than the exception
- Regulatory changes are putting downward pressure on hearing aid prices
- New companies are entering the hearing aid market
- Industry and technology changes are exciting, but can be confusing to patients.

Questions / Comments

References

- Helene Amieva , PhD. “Self-Reported Hearing Loss, Hearing Aids, and Cognitive Decline in Elderly Adults: A 25 Year Study”
- Frank R. Lin, MD, PHD. Hearing Loss and Cognitive Decline in Older Adults
- Baran Acar, et. Al. Effects on Hearing Aids on Cognitive Functions and Depressive Signs in Elderly Adults
- Thomas Lunner, Mary Rudner, and Jerker Ronnberg. Cognition and Hearing Aids
- S. Arlinger. Negative Consequences of Uncorrected Hearing Loss
- Richard F. Uhlmann. Relationship of Hearing Impairment to Dementia and Cognitive Dysfunction in Older Adults
- Florence CS, Bergen G, Atherly A, Burns ER, Stevens JA, Drake C. Medical Costs of Fatal and Nonfatal Falls in Older Adults. Journal of the American Geriatrics Society, 2018 March, DOI:10.1111/jgs.15304

References

- JAMA Internal Medicine. Frank R. Lin, MD,PhD. Hearing Loss and Cognitive Decline in Older Adults. (http:archinte.jamanetwork.com/article.aspx?articleid=1558452#qun defined)
- John Hopkins Medicine. Hearing Loss Accelerates Brain Function Decline in Older Adults. 2013 (http://www.hopkinsmedicine.org.news/media/releases/hearing_loss_accelerates_brain_function_decline_in_older_adults)
- Yuri Agrawal, Bryan K. Ward, and Lloyd B. Minor. Vestibular dysfunction: Prevalence, impact and need for targeted treatment. Journal of Vestibular Research. 2013; 23(3): 113-117.
- Robert E. Post, M.D., Lori M. Dickerson, PharmD. Dizziness: A Diagnostic Approach. American Family Physician. 2010;82(4):361-368. 2010

References

- The Hearing Review. Hearing Loss Linked to Accelerated Brain Tissue Loss (http://hearing review.com/news/22228-hearing-loss-linked-to-accelerated-brain-tissue-loss/)
- Alzheimer's Association. 2011 Alzheimer's Disease Facts and Figures (http://www.alz.org/downloads/facts_figures_2011.pdf.)
- University of Pennsylvania- Pereiman School of Medicine. Johnathan Peele, PhD. 2011. (www.sciencedaily.com/releases/2011/08/110831115946.htm)