Dizziness in the Older Adult

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Objectives

- Discuss the prevalence of dizziness
- Identify different causes of dizziness, specifically those stemming from vestibular dysfunction
- Provide an overview of the anatomy and function of the vestibular system
- Describe changes that occur to the vestibular system with aging
- Discuss common vestibular disorders that can cause dizziness
- Describe the role of vestibular rehabilitation as a treatment option for dizziness
What is Dizziness?1,2,3

- According to the dictionary to be dizzy means, “having a whirling sensation in the head with a tendency to fall”
- Defined in some of the literature as “A subjective feeling of the illusion of movement, a disorientation of the body in space or postural instability”
- A broad term that can include a sensation of
  - Vertigo
  - Lightheadedness
  - Imbalance/disequilibrium/unsteadiness
  - Faintness
  - Fogginess
  - Floating
  - Swaying
  - Wooziness

https://www.express.co.uk/life-style/health/931809/feeling-dizzy-spells-sick-vertigo-tinnitus-menieres-disease
Prevalence of Dizziness$^{4,5,6,7}$

- Ranges from 20-30% depending on the definition of dizziness
  - 24% of people $>72$ years old experience dizziness in a US study
  - 30% of people $>65$ years old experience dizziness according to a UK study
  - 50% of people $>85$ years old experience dizziness in a study performed in Sweden
- Has a tendency to increase with age
- One of them most common reasons older adults go to the doctor’s office
  - 2.9% of visits in people $>65$ years old
  - 3.8% of visits in people $>75$ years old
- 2.6 million emergency room visits per year are associated with dizziness or vertigo
So why is this important?\textsuperscript{2,4,8,9,10}

- Dizziness interferes with ADLs in 30\% of people $>70+$ years of age
- Dizziness is a strong predictor of falls and recurring falls in older adults
  - Falls are the leading cause of hospital admission and accidental death in older adults

Causes of Dizziness\textsuperscript{3,7}

- Medication induced causes
- Psychiatric causes
- Cardiovascular/Metabolic causes
- Neurological Causes
- Changes in vision
- Vestibular dysfunction

The Vestibular System: Anatomy and Function$^{5,11,12}$

- Helps make up our system of equilibrium/sense of balance
- Located within our inner ear
- Peripheral vestibular apparatus
- Vestibulocochlear Nerve connects information from the apparatus to the processing centers in the brain

[Diagram of the inner ear and vestibular system]

Additional Systems That Control Balance

2 additional body systems, that work with the vestibular system to control balance

- Visual System
- Somatosensory System

http://www.compressiondesign.com/how-long-to-hold-a-yoga-poses/
Visual System

- Sensory receptors include rods and cones along retina that detect light impulses.
- Information sent to brain that identifies how a person is oriented in relation to other objects.

[Images of eye anatomy and retina structure]

http://specialtyicare.com/what-is-retina-specialist/
Vestibular Ocular Reflex (VOR)\textsuperscript{5}
Somatosensory System

- Proprioceptors and sensory receptors that respond to stretch/pressure along tissues send impulses to the brain, providing information on how that structure is oriented in relation to space
  - Present in our joints, muscles, skin
- Body regions that play a key role in our balance include:
  - Cervical Spine
  - Ankles

https://spartascience.com/resources/proprrioception-the-vital-part-of-the-warm-up
When one of these systems malfunction, it can contribute to dizziness and imbalance!
Changes that occur to these systems with aging

Vestibular
- Degenerative changes occur along the structures of the vestibular system
- VOR gain decreases - decreased visual acuity during head movement
- Decreased ability to adapt to loss of function/stresses on the vestibular system

Visual
- Acuity, Accommodation, and contrast sensitivity decline with age
- Decreased ability to adapt to dark environments

Somatosensory
- Slower reaction times
- Decreased sense of passive motion and vibration
Common Vestibular Disorders

Benign Paroxysmal Positional Vertigo (BPPV)

- Most common cause of vertigo
- Episodes of vertigo provoked by changes in head position
- Common symptoms include spinning sensation experienced with bed mobility, bending, looking up, turning head
- May also cause imbalance, nausea, vomiting

http://www.hearingandbalance.com/vestibular-system-anatomy.html
http://www.dr-li.net/BPPV.html
Common Vestibular Disorders\textsuperscript{3,4}

**Vestibular neuritis/labyrinthitis**

- Occurs when inflammation or an infection disrupts the structures of the inner ear which ultimately results in a faulty signal sent to the brain.
- Symptoms include sudden onset of persistent dizziness or room spinning sensation that can last for hours; nausea, vomiting, imbalance, difficulty with vision, tinnitus, hearing loss (only in labyrinthitis).

https://vertigodifferentiation.weebly.com/vestibular-neuritislabyrinthitis.html
Common Vestibular Disorders\textsuperscript{3,4}

Meniere’s Disease

(aka primary endolymphatic hydrops)

- Unknown cause
- Sudden, severe attacks of vertigo, fullness and/or ringing in the ears, and low pitch hearing loss
- Occurs when too much fluid production occurs in the vestibular apparatus

https://pacificspecialists.com/ears-hearing/menieres-disease/
Other Vestibular Causes of Dizziness$^3$

- Acoustic neuroma
- Mal de debarquement
- Migraine associated vertigo
- Perilymph fistula
- Structural deformities of the bones in the inner ear (superior semicircular canal dehiscence)
- Exposure to drugs causing ototoxicity
- Head injury
- Lack of blood flow to the inner ear
Treatment for Dizziness$^{3,5}$

**Vestibular Rehabilitation:** a specific type of physical therapy that focuses on exercise based treatments to reduce symptoms of dizziness and to improve balance through compensation.

- Gaze stabilization exercises: help to improve control of eye movements so vision can be clear while the head is in motion
- Habituation exercises: repeated exposure to specific movements or stimuli that triggers a person’s symptoms
- Balance exercises: help improve steadiness and reduce risk for falls
Vestibular Rehabilitation

Positional testing can also be performed followed by repositioning maneuvers also performed to treat BPPV

https://youtu.be/9SLm76jQg3g

https://bestpractice.bmj.com/topics/en-gb/880

https://youtu.be/9SLm76jQg3g
Vestibular Rehabilitation

In addition, it may include strengthening exercises to improve the function of the leg musculature to help with balance.

https://www.hep2go.com/exercise_editor.php?exId=14&userRef=gciaake

https://www.hep2go.com/exercise_editor.php?exId=543&userRef=gciaake
In conclusion, dizziness and imbalance caused by vestibular dysfunction can be treated with physical therapy to help improve symptoms and reduce risk for falls.
Questions?