KEEPING YOUR BALANCE
EVAL & MANAGEMENT OF INNER EAR BALANCE DISORDERS
Dr. Lily V. Hughes, Audiologist
Fairbanks Hearing & Balance Center at the ENT Clinic

THE STATS

Vestibular vertigo (inner ear) accounts for ⅓ of dizziness symptoms in the medical setting.
Dizziness/vertigo symptoms are ranked among the most frequent complaints in primary care but remains unexplained 40-80% of the time.

QUALITY OF LIFE

In a study...
• ⅓ of a sample of people, aged 65-75, reported that dizziness degraded their quality of life.
• 11.5% with chronic dizziness and 23.4% with chronic balance issues reported difficulty in performing activities of daily living (i.e. bathing, dressing, etc.).

QUALITY OF LIFE - FALLS

People with vestibular dysfunction can have a nearly 8 fold increase in the odds of falling!
Falls are the leading cause of fatal and non-fatal injuries in persons age 65 and older.
Medical care for balance disorders, including falls, exceeds $1 billion/yr in the USA!

THE PROFESSIONALS
WHO CAN HELP?

Physician:
- Primary Care Provider, Ear Nose Throat, Cardiology, Neurology, Endocrinology, Podiatry, Emergency Medicine

Allied Health Professional:
- Nurse practitioner, physician’s assistant, audiologist, physical therapist, occupational therapist, chiropractor

Alternative Providers:
- Naturopath, acupuncturist, massage therapist, nutritionist

THE EAR

The Vestibular System

VESTIBULAR SYSTEM

- 3 Semicircular Canals
  - Rotation (horizontal), lateral flex (lateral), and nodding (posterior)
  - Active movement of the head

- Otolith Organs
  - Utricle = horizontal
  - Saccule = Vertical
  - Position of the head when not in motion
Balance is dependent on many factors including sensory input from:

- Ears
- Eyes
- Sensory Systems

WHAT IS DIZZINESS?

What do you mean by “dizzy?”

- Lightheadedness
- “Swimming” sensation
- Loss of balance/Imbalance
- Feeling unsteady
- Spinning/motion (Vertigo)
- “Off”
- “Woozy”

ARE YOU EXPERIENCING ANY RELATED SYMPTOMS?

FURTHER DESCRIBE THE SYMPTOMS...

- Difficulty hearing?
- Noise in your ears?
- Does the noise change?
- Fullness or stuffiness?
- Does this change with position?
- Pain in your ears?
- Double vision or spots before the eyes?
- Blurred vision or blindness?
- Numbness of face and/or extremities?
- Weakness or clumsiness in arms or legs?
- Difficulty with speech?
- Difficulty with swallowing?
- Tingling around the mouth?

- Have you ever had ear surgery?
- Do you get dizzy after exertion or overexertion?
- Do you get dizzy when you have not eaten for a long time?
- Do you have a history of migraines, or a family history of migraines?
- Do you get upset, nervous, and anxious easily?
- How are your symptoms connected with your menstrual cycle?
- Did you recently get new glasses or contacts?

My dizziness is constant.

My dizziness is in attacks. If in attacks, how often?

How long do they last?

Do you have any warning that the attack is about to start?

Are you completely free of dizziness between attacks?

Do your dizziness occur only in certain positions?

Do you know of any possible cause of your dizziness? If so, what?

Did you ever injure your head or neck?

When did your dizziness first start?

Does anything make the dizziness worse? If so, what?

Does anything make the dizziness better? If so, what?
ASSOCIATED CONDITIONS

- Viral or bacterial infections;
- Foreign objects into the ear canal;
- Blood pressure changes;
- Vascular problems (i.e. Diabetes);
- Medicines or drugs;
- Central disorders (i.e. Multiple Sclerosis);
- Visual disorders;
- Head injury (i.e. concussion);
- Knee replacements/Joint issues...

WHEN IT’S AN EMERGENCY!

- Chest pains
- Numbness or tingling
- Falling or problems walking
- Weakness in the legs or arms
- Blurred vision
- Slurred speech
- Sudden hearing loss
- Severe neck stiffness
- Head trauma or injury
- High fever

PREPARING FOR YOUR APPOINTMENT

At Fairbanks Hearing & Balance Center

BEFORE YOUR APPOINTMENT

- Write down any symptoms you’re experiencing: duration and frequency of episodes; how long until you feel back to normal after an episode; etc.
- Write down key personal information: any major stresses or recent life changes.
- Make a list of all medications, as well as any vitamins or supplements, that you’re taking.
- Write down questions to ask your doctor, such as what’s the best next step in your diagnosis or treatment plan. Also, don’t hesitate to ask questions during your appointment.

AUDIOLOGY

- Case history and physical ear examination
- A comprehensive hearing test
  - Not only reveals the quality of your hearing, but also may help determine if the source of hearing problems is in the inner ear or the nerve that connects the inner ear to the brain
- Tinnitus evaluation (if necessary)
  - Pitch and loudness matching
EAR, NOSE, THROAT

- A complete and comprehensive history of the illness
- A complete and comprehensive ENT/Neurologic examination
- Recommendation for further studies or treatment as indicated by Audiologist

BALANCE TESTING

There are several tests that assess function of the inner ear. Some or all of these tests can yield abnormal results in a person with a balance disorder.
- Videonystagmography (VNG)
- Vestibular-Evoked Myogenic Potentials (VEMP)
- Rotary Chair Testing
- Posturography

VNG

- Evaluates balance function by assessing eye movement.
- While wearing infrared camera goggles, the patient is asked to perform 3 tasks:
  - Follow a series of target movements,
  - Move into various body and head positions,
  - And finally, warm and cool water or air are introduced into the ear canal while the pupil movement is measured.
- Abnormal findings are generally indicative on an inner ear disorder.

VEMP – COMING SOON!

- Measures the function of important sensors in the inner ear that help you detect acceleration movement.
  - These sensors have a slight sensitivity to sound and are connected to a neck reflex.
- While wearing sensors on the neck and an earphone in each ear, the patient is asked to:
  - Flex their neck muscle while a safe, loud sound is presented to one ear at a time.
  - The contractions measured serve as an indirect measure of inner ear function.
ROTARY CHAIR TESTING

- Like a VNG, this measures inner ear function based on eye movement.
- In this case, stimulus to your inner ear is provided by movement of a special rotating chair precisely controlled by a computer.

POSTUROGRAPHY

- This computerized test reveals which part of the balance system — vision; inner ear function; or sensations from the skin, muscles, tendons and joints — you rely on the most and which parts may cause problems.
- While wearing a safety harness, you stand in bare feet on a platform and are asked to keep your balance under various conditions.

ADDITIONAL TESTING

- **Imagining**
  - MRI = Excellent for soft tissue, spine, and brain...
  - CT = excellent for bone, chest, lungs...
- **Auditory Brainstem Response (ABR)**
  - This is a computerized test of the hearing nerves and hearing centers of the brain. It can help detect the presence of a tumor disrupting the function of auditory nerves.
MENIERE’S DISEASE

DEFINITION/SYMPTOMS

- An inner ear disorder that causes:
  - Spontaneous episodes of vertigo (sensation of spinning), lasting minutes to hours;
  - Fluctuating hearing loss;
  - Ringing/buzzing/roaring in the ear (tinnitus);
  - And sometimes a feeling of fullness or pressure in your ear.
- Typically affects only one ear.

DEFINITION/SYMPTOMS

- More likely to occur in people in their 40s and 50s, and is more likely to occur in women.
- Although considered a chronic condition, various treatment strategies can help relieve symptoms and minimize the disease’s long-term impact on your life.

CAUSES

- The cause of Meniere’s disease isn’t well understood.
- It appears to be the result of the abnormal volume or composition of fluid in the inner ear, but may be due to multiple factors.

TREATMENT - LIFESTYLE

- Dietary changes: limit salt and caffeine, be sure to eat regularly
- Manage stress/anxiety
- Manage migraines
- Smoking cessation
TREATMENT - MEDICAL

- Medications for vertigo (motion sickness/anti-nausea)
- Diuretics to reduce fluid retention
- Balance rehabilitation therapy
- Hearing aids
- Injected medications (steroids)
- Surgery

DEFINITION

- BPPV is one of the most common causes of vertigo, characterized by:
  - Brief episodes of mild to intense dizziness,
  - Triggered by specific changes in the position of your head (i.e., such as tipping your head up or down, lying down, turning over or sitting up in bed)
- It’s rarely serious except when it increases the chance of falls.

SYMPTOMS

- Immediate onset of vertigo following a provoking movement.
- Duration is brief (<1 minute).
- You may feel lightheadedness, or unsteadiness following the episode.
- You may have a sensation of blurred vision associated with the sensation of vertigo.
- Nausea and vomiting are possible.
CAUSES

About 50%, professionals cannot find a specific cause for BPPV.

Risk factors include:
- Age >60,
- Head injury,
- Balance disorder that may make you more susceptible to BPPV.

RISK FACTORS

TREATMENT

- Canalith repositioning maneuver
- Surgical

VESTIBULAR DISORDERS

Neuritis and Labyrinthitis

DEFINITION

A disorder that affects the cranial nerve of the inner ear.
- This nerve sends balance and head position information from the inner ear to the brain.
- When this nerve becomes swollen (inflamed), it disrupts the way the information would normally be interpreted by the brain.
  - In neuritis, just balance portion of the nerve is affected.
  - In labyrinthitis, hearing and balance portions are affected.

SYMPTOMS

- Sudden, severe vertigo for hours-days;
- Initial nausea and vomiting;
- Dizziness and balance difficulties that last days-weeks;
- Sudden hearing loss and tinnitus (labyrinthitis);
- Concentration difficulties;
- Inability to tolerate quick movements following episode.
CAUSES

- Viral infection of the inner ear,
- Swelling around the vestibulocochlear nerve (caused by a virus),
- Or a viral infection that has occurred somewhere else in the body.
  - Herpes virus (causes cold sores, shingles, chickenpox),
  - Measles,
  - Flu,
  - Mumps,
  - Hepatitis,
  - And polio.

TREATMENT

Managing symptoms:

- Reduce nausea – drugs may be given. If severe enough, patients may be admitted to the hospital and given IV fluids to treat dehydration.
- Reduce dizziness – vestibular suppressant drugs may be used.
  - Should be used no longer than three days; not recommended for long-term use and may make recovery more difficult.
- Sometimes steroids are also used.

Treating a virus.

- If a virus is thought to be the cause of the vestibular neuritis, antiviral medicine such as acyclovir is used.
- Antibiotics are not used to treat vestibular neuritis because this disorder is not caused by bacteria.

Balance rehabilitation program.

- If symptoms last longer than a few weeks, a vestibular physical therapy program may be recommended.

Hearing loss rehabilitation.

- Sudden hearing loss and tinnitus can be detrimental to concentration, localization, and quality of life.
- Implant and traditional hearing device systems now exist.
TODAY’S SOCIETY IS MORE ACTIVE THAN EVER...

- Every year, more than 2 million Americans fall and sustain serious injury.
- $3 billion dollars in health care costs...
  - Not including pain, disability, lawsuits, loss of independence, deterioration in well-being, and impact on other family members!

WHO’S MORE LIKELY TO FALL?

After the age of 50:
1. Cells begin to deteriorate
2. Muscle strength begins to decreases
3. Tendons and ligaments lose flexibility and limit motion
4. Artery hardening is accelerated
5. Additive side-effects from increased medication intake

YOUR HEALTH

1. Have hearing and vision check-ups regularly.
2. Get up slowly.
3. Use a cane or walker to help maintain balance on uneven ground or slippery surfaces.
4. Exercise to improve your strength, muscle tone, and coordination.

AT HOME

- Keep walking paths clear.
- Never stand on a chair.
- Be sure stairways have sturdy hand rails.
- Install grab handles and nonskid mats where necessary.
- Use shower chairs and bath benches.
- Avoid walking in the dark.

MORAL OF THE STORY...

- ...you do NOT have to live with dizziness!
- 85% of all dizziness and balance problems can be accurately diagnosed and successfully treated following a thorough evaluation.
THANK YOU!

Lily Hughes, AuD
Board Certified Audiologist

Fairbanks Hearing & Balance Center
Medical Dental Arts
1995 Lathrop St. Suite 104
907-456-7768