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Virtigo, Dizziness, and Balance written by Dr. Natan Bauman

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Vertigo, Dizziness, and Balance

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Honor a physician with the honor due him for the uses which ye may have of him; for the Lord hath created him.

—Ecclesiasticus 38: 1–2

It is estimated that 90 million Americans will report balance-related symptoms to their physicians at least once in their lifetimes, and 7 million people seek medical assistance every year for treatment of episodic dizziness.¹ These statistics demonstrate that varied forms of vertigo, dizziness, and loss of balance constitute a significant health problem in the United States. By the age of 65, 30 percent of the total population will experience at least one episode of dizziness.² Because of the prevalence of these symptoms, one entire chapter is dedicated to the review of this common health problem among seniors, so that they are able to cooperate with their physicians and better understand and cope with these medical problems.

What is dizziness? We all remember the days of our childhoods when we stepped down from the merry-go-round and the world was spinning around us. Then it was fun—now it is an inconvenience and sometimes a threatening affliction. Whether we are affected by a single episode or by reoccurring dizziness symptoms, it is a disorienting, unpleasant experience limiting walking, driving, and other activities. Moreover, as long as we do not know the cause of the episode, we are concerned whether it is a signal of a life-threatening condition or an event not to worry
about. Since there are many potential causes for these symptoms, it is a
challenge for the physician to determine the origin of the reported
discomfort and to succeed at a correct diagnosis and an appropriate
treatment.

Mrs. N., 81 years of age, developed persistent dizziness that was not
alleviated in spite of adequate rest and a healthy diet. She consulted her
physician who examined her and found her in good health. However,
the symptoms continued, and Mrs. N. consulted two other doctors. One
found her vital signs unremarkable; the other inquired about her medi-
cation. Mrs. N. reported that she was using a tranquilizer, prescribed by
an out-of-town doctor where she attended the funeral of her sister. The
sedative medication was the cause of her dizziness; when it was discon-
tinued and substituted by another brand, her symptoms subsided. She
realized that sharing all information with doctors is essential for a fast
and accurate diagnosis and treatment.

Because there are varied types of vertigo, the patients should
describe their sensations in detail: some are experienced as a dizziness
or blackout, some feel as if one is falling down, backward, or sideward
or just spinning uncontrollably around. In some cases, additional sym-
toms are reported, such as nausea, loss of hearing or vision, headache,
or tinnitus.

Doctors treating these conditions range from general practitioner to
neurologist, otolaryngologist, otologist, otoneurologist, to other
experts.

The description of the symptomatology of the balance loss and
related disorders highlighted in this chapter is intentionally free of
medical terminology and of excessive anatomic details, as the purpose
here is to empower the readers by a general understanding of symp-
toms so that they may better understand and identify them should they
ever be affected by it. Also, it will help them to discuss treatment alter-
natives with their physicians from an informed position.

There are three major categories of vertigo and loss of balance based
on different etiologies:
• peripheral vestibular disorders;
• presyncope disorders;
• disequilibrium disorders.
We will review their causes, symptoms, and treatment possibilities:

*Peripheral vestibular disorders* refer to dizziness resulting from a dysfunction in the vestibular system of the inner ear that processes information about equilibrium related to imbalance. This system is part of an extraordinary communication network between several major players, our ears, eyes, feet, and cerebellum, that constantly exchange information with each other regarding our motions: The eyes send messages to the brain about one’s position; the organism in the ear, known as the vestibular labyrinths, forwards the messages to the cerebellum via cranial nerves about the position our feet experience, and the brain processes the information. The end result of this complex exchange is our sense of balance. Any disturbance in the communication of this triumvirate may cause vertigo, dizziness, or other symptoms of disequilibrium.

The vestibular labyrinth is an exquisite system consisting of semicircular canals that contain fluids and nerves in the form of fiberlike hairs. Attached to them are calcium crystals called otoconia that pressure the hair by their weight as we move around. The otoconia are in charge of detecting the gravity of the head’s motion and conveying information to the brain. It is a common experience that healthy people who are traveling by car or train and read while the vehicle is in motion experience sudden nausea or dizziness. How is this possible? While the eyes are looking at a book that is not moving, the ear labyrinth is sensing the motion of the vehicle and sends a different message to the brain. The discrepancy of information to the brain causes instant dizziness, often accompanied by nausea, that ceases when the reading is discontinued. This example of vestibular disorder demonstrates that balance is maintained as long as the ear, the eyes, and the brain flawlessly cooperate. However, if one of the messengers fails, loss of balance follows.

Vestibular disorders are recognized under several diagnostic categories with slightly different symptoms:

- Benign paroxysmal positional vertigo is a frequently reported condition, caused by the tiny otoconia crystals when they break and roam in the fluid of the vestibular labyrinth. They disrupt the normal flow of balance to the brain until they are repositioned through therapy to a sack called a utricle where they cannot interfere.

  Mr. R. was a vigorous accountant, 78 years of age, who still was practicing in his firm. He ascribed the occasional bout of dizziness to working
too hard at his computer. However, a medical examination indicated
otherwise: The loss of balance was caused by dislodged otoconia crystals
pressing their hairlike receptors in the vestibular labyrinth. Mr. R. was
treated by a therapist who used several maneuvers to reposition the crys-
tals to an adjacent sack of utricle where they could not interfere with the
balance. Mr. R. practiced some of the maneuvers at home whenever he
experienced dizziness.

If any senior wants to reinforce the repositioning exercise at home, we
recommend caution, as more harm than benefits can be done by indepen-
dent treatment.

- Vertigo can also be caused by the inflammation of the inner ear, particu-
larly the labyrinth. This condition, known as neuronitis or labyrinthitis,
causes intense vertigo that often lasts for days and may include other
symptoms, such as nausea and vomiting. The treatment includes rest in
the supine position. The etiology is not known, but it is assumed that it
could be caused by a virus as it frequently follows a viral infection in other
parts of the body. Appropriate exercise is usually prescribed for this con-
tdition, and recovery follows after the intervention.

- Ménière’s disease is characterized by sudden episodes of vertigo that
usually last several hours and are accompanied by tinnitus and progressive
hearing loss. This disorder is caused by intermittent swelling of the
labyrinth. The etiology of this condition is unknown. Patients have to be
treated by a doctor who will recommend comprehensive audiometry
with specialized balance testing and medication to reduce the hearing loss
and vertical symptoms. Approximately 80 percent of patients reportedly
recover spontaneously within five years, but many of them will continue
to experience occasional vertigo after the main condition has been
resolved.

- Vestibular migraine is usually experienced by individuals of all ages who are
sensitive to motion. It can be triggered by a sudden change of position,
riding in a vehicle, or traveling by plane or boat. A migraine may accom-
pany vertigo for several minutes, or the condition may last several days.
It is reassuring to know that vertigo is rarely a symptom of a more serious
problem and can be treated by doctors rather successfully. However, do
not diagnose yourself on the basis of information you read or receive from
friends; consult a professional as soon as you can to eliminate misdiagnosis.
It is of interest to mention that a headache is sometimes experienced
following vertigo or vice versa, and at other times only vertigo occurs; this
explains why it is sometimes difficult to distinguish vestibular migraine
from other pathologies, for example, a brain tumor.
• Acute peripheral vestibulopathy is characterized by a single acute onset of severe vertigo, nausea, vomiting, and ataxia. This common clinical condition affects people of all ages and lasts from several hours to several days. The therapy consists of bed rest and appropriate medication prescribed by the treating physician.

Presyncope disorders include varied types of dizziness that are not related to the vestibular conditions, but rather are caused by an insufficient cardiovascular system. The symptoms are experienced as light-headedness without losing consciousness, nausea, pale skin, blurred vision, and a sense of dizziness.

The common diagnostic entities follow:

• Orthostatic hypotension is a common cause of dizziness among seniors. It frequently occurs after quickly standing from a sitting position as a result of inadequate blood flow. When a sudden drop in blood pressure does not meet the brain’s minimum requirement, loss of consciousness may follow. The symptom is often preceded by blurred vision or a “blackout” sensation, feeling of weakness, faintness, and occasionally passing out. The balance is restored after one sits or lies down and the systolic blood pressure resumes its normal flow. The underlying cause of the hypotension is either atherosclerosis or arrhythmia.

Mrs. W., 64 years of age, was dedicated to her family. Before every holiday, she did shopping for her children and many grandchildren, looking for bargains in overcrowded department stores. While standing in a long line at a checkout counter, she suddenly felt weak, dizzy, her vision was blurred, and she was passing out. After sitting for about 30 minutes, her dizziness subsided. She felt much better after she was examined at a walk-in medical center in the neighborhood and was told that her dizziness was not a symptom of a transient ischemic attack, but rather a result of her heart’s inability to pump blood vigorously enough to provide the brain with needed oxygenation. The medication prescribed by physicians for the treatment of presyncope includes antihypertensive drugs and elastic venous compression stockings; other medications are considered if they do not interfere with potential congestive heart failure, hepatic cirrhosis, or renal failure.

• Hyperventilation syndrome is another type of presyncope that frequently occurs in individuals of any age who overload their brains with an
excessive amount of oxygenation. Such patients are usually anxious, hard-driven individuals who start to hyperventilate when they are excited or are in stressful situations. Hyperventilation is often a sign of underlying anxiety disorder.

A young secretary complained of the occasional feeling of dizziness, blurred vision, and the feeling of passing out after she volunteered to sing in a church choir. The accelerated demand for breathing, together with an ambition to excel, led to overbreathing and hyperventilation. The reassurance of her physician about her condition and its management reduced her anxiety and fainting spells.

- **Vasovagal presyncope** is very similar to orthostatic hypotension. This episode of light-headedness or dizziness frequently occurs in hot, crowded rooms while the affected person is standing. The symptom is caused by the dilation of arterioles and may occur in healthy people of any age. The best approach to this condition is to avoid places that could lead to an episode of dizziness.

- **Cardiac presyncope** is another cause of dizziness. It is due to varied heart conditions that might be undiagnosed. Light-headedness or dizziness can be an indication of more serious heart disorders such as coronary ischemia, even if the patient does not report chest pain or other coronary symptoms. I would recommend a thorough examination of the cardiovascular system by a medical professional to avoid any potential risks.

- **Micturition presyncope** is the usual cause of a “dizzy spell” after seniors get up at night to empty their bladders. Sudden vertigo is due to the vasodilatation that may occur at the end of urination, which results from a drop in systolic blood pressure and causes a decrease in cerebral perfusion.

- **Hypoglycemia** is not a cause of true dizziness, but is mentioned here because patients experience similar symptoms as those reported under presyncope. Hypoglycemia is a metabolic irregularity diagnosed in individuals who are diabetic, prediabetic, or hypersensitive to carbohydrates. They may experience fainting or near fainting spells because their serum glucose dips too low, typically below 17 mg. Medical diagnosis and treatment are warranted.

*Disequilibrium disorders* represent a complex systemic category of symptoms of different etiology from the vestibular and presyncope disorders. This class consists of a range of diseases that interfere with the sensory input of organs, their central integration, and the brain’s motor response to it. The disequilibrium is caused by one or more
diseases; therefore, it is difficult to diagnose the condition when multiple sensory difficulties are reported.

Seniors experiencing disequilibrium frequently do not feel dizzy or nauseous, but rather report that they are unsteady and insecure when walking and typically tend to hold on to a railing or other people who accompany them.

In systemic disequilibrium, the role of the central nervous system plays a major role as a master coordinator of the sensory input from pertinent organisms, mainly the eyes, the ears, the vestibular system, the feet, and the cerebellum.

Messages from the eyes are the most important factor in informing the brain about one’s position, environment, and intended motions. While we walk, we need to see clearly where we are and control the spatial dimensions so that we may move forward safely. It is a common experience that walking at night through a familiar room may cause disorientation and dizziness. Failing vision is a cause of miscommunication with the cerebellum that cannot control our motions and consequently is the cause of many falls. These falls do not have to happen, if timely care is provided when sight begins to show decline.

The distortion of the visual messages may be caused by head trauma, retinopathy, retinoblastoma, degeneration of the macula, glaucoma, and also degenerative conditions such as multiple sclerosis. Those who have had a head trauma in the past must report it to their physicians so that it may be considered in the diagnostic formulation.

The ears are more relevant to our equilibrium than we might imagine. The degenerative diseases of the vestibular system, such as a slowly growing neoplasm (acoustic neuronal) or toxins (aminoglycoside antibiotics), neuropathies as in diabetes mellitus and idiopathic sensory hearing loss, can contribute to the disequilibrium disorders. If we want to test the importance of hearing for balance, we may insert earplugs and walk in a department store or on the streets. The diminishing hearing capacity will distort the ear-cerebellum communication and result in unsteady balance. If the cerebellum does not get the correct messages, it cannot adequately control the motor movements. 

The motor movements are determined by the cerebellum and executed by the central nervous system. In the case of a degenerative condition such as Parkinson’s disease, neoplasm, or alcohol-related syndrome, a gait disorder will result. Alzheimer’s disease, Creutzfeldt-Jacob
disease, multiple sclerosis, renal failure, and impairments of the central nervous system may also cause loss of balance. It is a well-known fact to doctors that people suffering from dementia often complain of dizziness.

As is apparent from the aforementioned information, the central nervous system’s functioning is vital for sustaining a steady equilibrium.

Mr. E., 71 years of age, recovered from a stroke remarkably well. Prompt rehabilitation and medical care immediately after the event regenerated his facial flexibility and voice, but his left leg was weaker and less sensitive. Mr. E. tended to use his right leg more frequently as the stronger and more sensitive extremity, but complained of reduced postural reflexes when walking. Since the neurological findings indicated the absence of vestibular pathology, the therapy focused on retraining of the communication network between the cerebellum and the nerves in his extremities. One of the exercises that helped considerably to improve his gait was walking in front of a mural mirror and coordinating the visual messages with the physiological experience. This daily 30-minute procedure was so successful that Mr. E. was able to later perform a well-balanced walk with closed eyes.

In order to protect the interplay of activities that our organisms have to produce to maintain balance, we need to make sure that our vision, hearing, proprioception, and the central nervous system are as healthy as possible. Availability of sophisticated medical technology frequently improves vision and hearing to normal levels. We can overcome to a large extent the resistance for self-improvement if we avoid thinking that it is “too late” or we are “too old” and work with determination on controlling our balance and our lives.

The Mayo Clinic Newsletter recommends that patients report the following symptoms to their doctors:

- an unusual type of headache or head injury;
- blurred vision;
- hearing loss;
- speech impairment;
- tinnitus;
- leg or arm weakness;
- loss of consciousness;
- fever higher than 101°F (38.3°C);
• a very stiff neck;
• chest pain or rapid (or slow) heart rate
• falling and difficulty walking,
• numbness and tingling;^9
• do not forget to inform your doctor(s) about all the medications, vitamins, and supplements you are taking—this can make a difference in the diagnosis.

A number of studies estimate the percentage of falls in seniors 65 years of age and older to be up to 50 percent. Falls are the sixth leading cause of death with a rate of 8.5 percent in 100,000 people between the ages of 65 and 74. The numbers increase to 56.7 percent per 100,000 in those aged 75 and older.^10 The statistics further inform us that 1 percent of falls result in hip fracture, which amount to 200,000 cases per year.^11 In addition, falls cause soft tissue injuries and such fractures as pelvis, humerus, or wrists that are also reported as a contributing factor in nursing home admissions and as an altering factor in the lifestyle of the senior population.

The good news is that you do not need to be part of the above statistics if you maintain your health in good condition and treat symptoms before they become diseases and morbidities. Falls can be to a large extent prevented by increased awareness of what causes them. As indicated in this chapter, the capacity for a stable balance and elimination of dizziness and vertigo can be to a large extent controlled or reduced by early prevention and treatment of diseases of the eyes, ears, vestibular, cardiovascular, and central nervous systems, as well as early communication with the treating physicians. We have great technologies available for improving hearing with hearing aids; visual problems can be corrected surgically or by nonsurgical procedures, and an array of medications exists to treat or delay the progression of degenerative diseases.

The wear and tear of organisms can be alleviated to a large extent by lifestyle and care for general maintenance of which good balance is only a part.

But sometimes, even with the best medical care and self-discipline, an illness, such as a stroke, may happen. Fast action is needed to start rehabilitation. Consequences of stroke frequently include paralysis of legs, sensory loss, and visual dysfunction that affect the balance. While
the realization of the damage may first cause hopelessness, we should
never give up. A vigorous treatment program may lead to considerable
improvements in functioning that is worth the effort. Kirk Douglas, a
charismatic Hollywood actor, suffered a stroke that affected not only
several organs, but also his vocal cords—the tool of his profession.
In spite of a bleak prognosis, he did not give up, but started to train with
perseverance and creativity until he was again able to walk and talk.
He relied less on the company of people and was often training alone
in his pool together with his dog who became his best companion.
Douglas appeared in one or more films following his rehabilitation
and become a symbol of hope and encouragement to those who are
ready to give up: Beyond modern technologies, medicine, and perseve-
rance, it is the spirit over matter that counts.

Pope John Paul II is another example of one living an active lifestyle
while affected by a degenerative condition. He suffered from Parkin-
son’s disease for several years, but did not allow the dysfunction to
inhibit his apostolic mission and traveled all over the world almost until
his death.

Some seniors who experience difficulties with walking due to inade-
quate balance, dizziness, or vertigo or other related conditions some-
times use their disabilities as an excuse to lean on their spouses or
other family members and friends. It is unfortunate that they are giving
up on themselves or tend to take it easy and ask for assistance even
when they could help themselves with some effort. By doing so, they
are increasing day by day their dependency on others, thus diminishing
their chances of rehabilitation.

We all make choices that determine our destinies. The fear of loneli-
ness, illness, or death paralyzes us and produces emotional and spiritual
inertia, also known as a slow death syndrome. The other choice is the
way of courage, faith, and hope that have the power to overcome anx-
xiety and fears and elevate us above entropy.

How to reach the road leading toward mastery of the decay is the
theme of the next chapter.