BALANCE THE SIXTH SENSE
VEDA

On the Level

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Quarterly Newsletter of the Vestibular Disorders Association

The Human Balance System—

A complex coordination of central and peripheral systems

By Lisa Haven, PhD, with contributions by Mary Ann Watson, MA, and F. Owen Black, MD, FACS

Good balance is often taken for granted. Most people don't find it difficult to walk across a gravel driveway, transition from walking on a sidewalk to grass, or get out of bed in the middle of the night without stumbling. However, with impaired balance such activities can be extremely fatiguing and sometimes dangerous. Symptoms that accompany the unsteadiness can include dizziness, vertigo, hearing and vision problems, and difficulty with concentration and memory.

What is balance?

Balance is the ability to maintain the body's center of mass over its base of support.[1] A properly functioning balance system allows humans to see clearly while moving, identify orientation with respect to gravity, determine direction and speed of movement, and make automatic postural adjustments to maintain posture and stability in various conditions and activities.

Balance is achieved and maintained by a complex set of sensorimotor control systems that include **sensory input** from vision (sight), proprioception (touch), and the vestibular system (motion, equilibrium, spatial orientation); **integration** of that sensory input; and **motor output** to the eye and body muscles. Injury, disease, or the aging process can affect one or more of these components.

Sensory input

Maintaining balance depends on information received by the brain from three peripheral sources: eyes, muscles and joints, and vestibular organs (Figure 1). All three of these sources send information to the brain in the form of nerve impulses from special nerve endings called *sensory receptors.*

Input from the eyes

Sensory receptors in the retina are called rods and cones. When light strikes the rods and cones, they send impulses to the brain that provide visual cues identifying how a person is oriented relative to other objects. For example, as a pedestrian walks along a city street, the surrounding buildings appear vertically aligned, and each storefront passed first moves into and then beyond the range of peripheral vision.

Input from the muscles and joints

Proprioceptive information from the skin, muscles, and joints involves sensory receptors that are sensitive to stretch or pressure in the

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surrounding tissues. For example, increased pressure is felt in the front part of the soles of the feet when a standing person leans forward. With any movement of the legs, arms, and other body parts, sensory receptors respond by sending impulses to the brain.

The sensory impulses originating in the neck and ankles are especially important. Proprioceptive cues from the neck indicate the direction in which the head is turned. Cues from the ankles indicate the body's movement or sway relative to both the standing surface (floor or ground) and the quality of that surface (for example, hard, soft, slippery, or uneven).

Input from the vestibular system

Sensory information about motion, equilibrium, and spatial orientation is provided by the vestibular apparatus, which in each ear includes the utricle, saccule, and three semicircular canals. The utricle and saccule detect gravity (vertical orientation) and linear movement. The semicircular canals, which detect rotational movement, are located at right angles to each other and are filled with a fluid called endolymph. When the head rotates in the direction sensed by a particular canal, the endolymphatic fluid within it lags behind because of inertia and exerts pressure against the canal's sensory receptor. The receptor then sends impulses to the brain about movement. When the vestibular organs on both sides of the head are functioning properly, they send symmetrical impulses to the brain. (Impulses originating from the right side are consistent with impulses originating from the left side.)

Integration of sensory input

Balance information provided by the peripheral sensory organs—eyes, muscles and joints, and the two sides of the vestibular system—is sent to the brain stem. There, it is sorted out and integrated with learned information contributed by the cerebellum (the coordination center of the

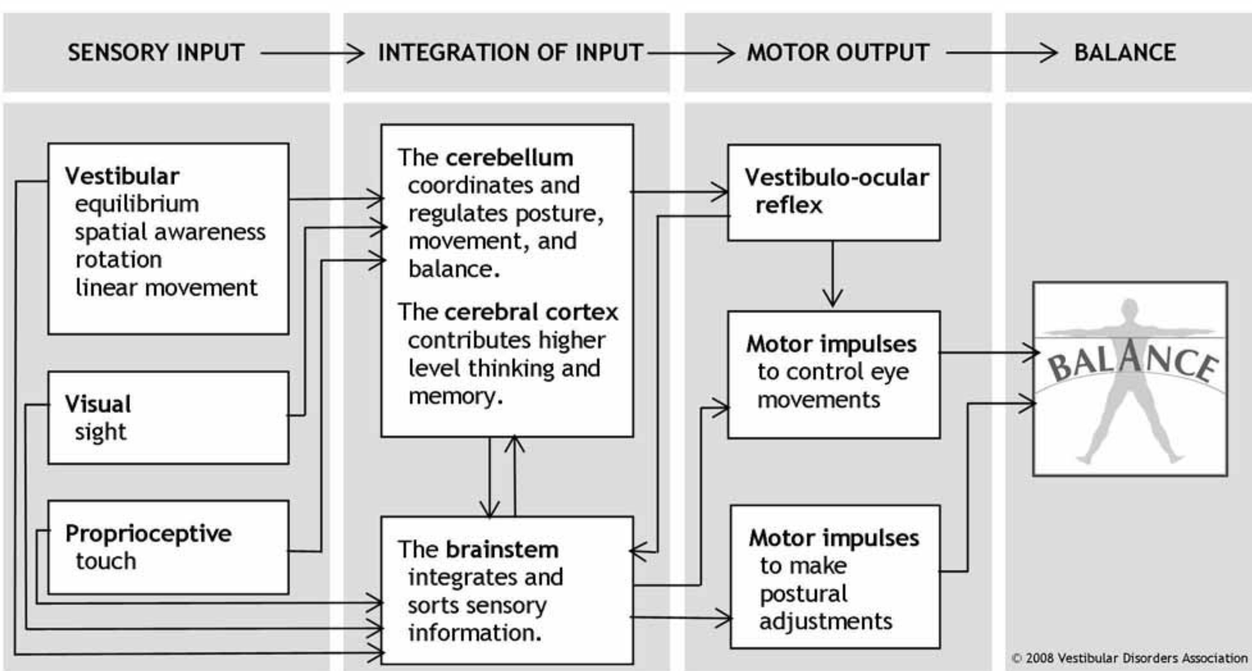

Figure 1. Balance is achieved and maintained by a complex set of sensorimotor control systems.

brain) and the cerebral cortex (the thinking and memory center). The cerebellum provides information about automatic movements that have been learned through repeated exposure to certain motions. For example, by repeatedly practicing serving a ball, a tennis player learns to optimize balance control during that movement. Contributions from the cerebral cortex include previously learned information; for example, because icy sidewalks are slippery, one is required to use a different pattern of movement in order to safely navigate them.

Processing of conflicting sensory input

A person can become disoriented if the sensory input received from his or her eyes, muscles and joints, or vestibular organs sources conflicts with one another. For example, this may occur for example, when a person is standing next to a bus that is pulling away from the curb. The visual image of the large rolling bus may create an illusion for the pedestrian that he or she—rather than the bus—is moving. However, at the same time the proprioceptive information from his muscles and joints indicates that he is not actually moving. Sensory information provided by the vestibular organs may help override this sensory conflict. In addition, higher level thinking and memory might compel the person to glance away from the moving bus to look down in order to seek visual confirmation that his body is not moving relative to the pavement.

Motor output

As sensory integration takes place, the brain stem transmits impulses to the muscles that control movements of the eyes, head and neck, trunk, and legs, thus allowing a person to both maintain balance and have clear vision while moving.

Motor output to the muscles and joints

A baby learns to balance through practice and repetition as impulses sent from the sensory receptors to the brain stem and then out to the muscles form a new pathway. With repetition, it becomes easier for these impulses to travel along that nerve pathway—a process called *facilitation*—and the baby is able to maintain balance during any activity. Strong evidence exists suggesting that such synaptic reorganization occurs throughout a person's lifetime of adjusting to changing motion environs.

This pathway facilitation is the reason dancers and athletes practice so arduously. Even very complex movements become nearly automatic over a period of time. For example, when a person is turning cartwheels in a park, impulses transmitted from the brain stem inform the cerebral cortex that this particular activity is appropriately accompanied by the sight of the park whirling in circles. With more practice, the brain learns to interpret a whirling visual field as normal during this type of body rotation. Alternatively, dancers learn that in order to maintain balance while performing a series of pirouettes, they must keep their eyes fixed on one spot in the distance as long as possible while rotating their body.

Motor output to the eyes

The vestibular system sends motor control signals via the nervous system to the muscles of the eyes with an automatic function called the *vestibulo-ocular reflex.* When the head is not moving, the number of impulses from the vestibular organs on the right side is equal to the number of impulses coming from the left side. When the head turns toward the right, the number of impulses from the right ear increases and the number from the left ear decreases. The difference in impulses sent from each side controls eye movements and stabilizes the gaze during active head movements (e.g., while running or watching a hockey game) and passive

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The Human Balance System *(continued from page 3)*

head movements (e.g., while sitting in a car that is accelerating or decelerating).

The coordinated balance system

The human balance system involves a complex set of sensorimotor-control systems. Its interlacing feedback mechanisms can be disrupted by damage to one or more components through injury, disease, or the aging process. Impaired balance can be accompanied by other symptoms such as dizziness, vertigo, vision problems, nausea, fatigue, and concentration difficulties.

The complexity of the human balance system creates challenges in diagnosing and treating the underlying cause of imbalance. Vestibular dysfunction as a cause of imbalance offers a particularly intricate challenge because of the vestibular system's interaction with cognitive functioning,[2] and the degree of influence it has on the control of eye movements and posture.

References

1. Shumway-Cook A, Woollacott MH. *Motor Control: Theory and Practical Applications*. Philadelphia: Lippincott, Williams & Wilkins; 2001.
2. Hanes DA, McCollum G. *Journal of Vestibular Research* 2006;16(3):75–91.

Cyber Corner

Online streaming videos demonstrate BPPV head maneuvers treatment

Benign paroxysmal positional vertigo (BPPV) is a common cause of dizziness. It is caused by debris that has collected in the semicircular canals of the inner ear. BPPV is treated with a series of head maneuvers that move the problematic debris out of the semicircular canal so that false signals are not sent to the brain about spatial movement. In collaboration with the Delaware Biotechnical Institute in Newark, Delaware, Dr. Michael Teixido illustrates variations of these head maneuvers, including both a left and right canalith repositioning maneuver, the Semont Liberatory maneuver, and Brandt-Daroff exercises. These streaming videos are available at: www.dbi.udel.edu/MichaelTeixidoMD/patientInfo/BVVP.html

Inner ear 3-D models available online

Three-dimensional models of the human inner ear and surrounding structures are available online. These virtual models are presented with full rotation and transparency. The illustration of the temporal bone includes the bone and surrounding air spaces; perilymphatic and endolymphatic spaces (including the cochlear aqueduct and the endolymphatic duct and sac); sensory epithelia of the cochlear and vestibular labyrinths; ossicles and tympanic membrane; middle-ear muscle; carotid artery; and auditory, vestibular, and facial nerves. Other models show the anatomy of the round window membrane and adjacent cochlear structures, the cranial nerves and the carotid and vertebral arteries, and the incudostapedial joint complex. A grant from the National Institute on Deafness and Other Communication Disorders supported development of the models shown here: http://research.meei.harvard.edu/otopathology/3dmodels/index.html

Conferences & Training Opportunities

Conferences and meetings

32nd MidWinter Meeting of the Association for Research in Otolaryngology (ARO)
Feb. 14–19, 2009; Baltimore, MD; www.aro.org/mwm/mwm.html

2009 Annual Meeting of the American Auditory Society (AAS)
Mar. 5–7, 2009; Scottsdale, AZ; www.amauditorysoc.org/annual-meeting/reginfo.htm

2009 Annual Meeting of the American Academy of Audiology
Apr. 1–4, 2009; Dallas, TX; www.audiologynow.org

2009 Annual Conference & Expo of the American Occupational Therapy Association (AOTA)
Apr. 23–26, 2009; Houston, TX; www.aota.org/confandevents.aspx

61st Annual Meeting of the American Academy of Neurology (AAN)
Apr. 25–May 2, 2009; Seattle, WA; www.aan.com/go/am

Advanced training for professionals

Vestibular Rehabilitation: Emphasizing Treatment Interventions
Gaye W. Cronin, OTD, OTR
Jan. 23–24, 2009; Phoenix, AZ
www.educationresourcesinc.com

Introduction to Vestibular Rehabilitation
Laurie Swan, PhD, DPT, PT
Amy Yorke, MPT, PT, NCS
Dec. 6–7, 2008; San Francisco, CA
info@glseminars.com

Dizziness and the Unbalanced Patient
Wendy Wood, MPT
Dec. 6–7, 2008; Ft. Lauderdale, FL
www.healthclick.com/courses/nas29.cfm

Vestibular Assessment and Rehabilitation Therapy Licensing Course
Susan J. Herdman, PT, PhD, FAPTA
Jan. 26–31, 2009; Cape Town, South Africa
christine.rogers@uct.ac.za

Vestibular Rehabilitation
Jeff Walter, PT, DPT, NCS
Feb. 27–28, 2009; Downers Grove, IL
Apr. 25–26, 2009; Somerville, NJ
www.educationresourcesinc.com

3rd Annual Univ. of Pittsburgh Advanced Vestibular Rehabilitation Course
Joseph M. Furman, MD, PhD
Mar. 6–8, 2009; Pittsburgh, PA
www.shrs.pitt.edu/cms/school/newsitem.asp?id=609

Vestibular Testing for the Practicing Physician—American Academy Neurology
Robert Baloh, MD; Ronald Tusa, MD, PhD;
Timothy C. Hain, MD; Terry Fife, MD
Apr. 29, 2009; Seattle, WA; http://am.aan.com

Advances in Vestibular Rehabilitation: A Competency-Based Course
Susan J. Herdman, PT, PhD, FAPTA
Aug. 13–14, 2009; Atlanta, GA
vimoore12@aol.com

Educators: If you would like your course or conference listed in *On the Level* and/or on our Web site (www.vestibular.org/for-professionals/conferencestraining.php), please send details, including contact information, to info@vestibular.org.

News Briefs

Dizziness and vestibular disorder screening

Two studies recently assessed current clinical practices for accurately evaluating dizziness. Researchers at Johns Hopkins (Baltimore) interviewed 1,342 patients who had been screened for dizziness; of these, 872 (65%) had been dizzy in the past 7 days, or had been previously bothered by dizziness. Among these patients, 44% considered dizziness to be a major or partial reason for seeking care. When responding to a multipart question designed to pinpoint their type of dizziness, most of this group described their dizziness vaguely: 62% of this group selected more than one type, and 54% failed to pick a type that corresponded to their own description. Additionally, of 218 patients who did not identify vertigo, spinning, or motion as a problem during questioning, 70% later confirmed that they actually did experience "spinning or motion" after direct questioning, and 52% changed the single best descriptor of their dizziness after retesting minutes later. The researchers concluded that the traditional approach used with patients with dizziness produced unclear, unreliable, and inconsistent responses, and recommended an investigation of alternative approaches emphasizing timing and triggers over type.

—Newman-Toker DE, Cannon LM, Stofferahn ME, Rothman RE, Hsieh YH, Zee DS. *Mayo Clinic Proceedings* 2007;82(11):1329–1340

Dizziness and vestibular impairment inconsistently evaluated

Vestibular dysfunction is thought to be the underlying cause of dizziness in up to 45% of patients who report it. However, health care providers do not consistently screen for vestibular disorders when evaluating dizzy patients. The variation in evaluation methods used by health care providers was studied by researchers at the Atlanta VA Medical Center (Georgia). Their review of the medical records of 157 patients who had been diagnosed with dizziness revealed that 69% of providers use the patient's description of the dizziness in identifying its cause, but that percentage varied significantly across disciplines. For example, 84% of audiologists asked patients for a self-description of their dizziness, but only 33% of geriatricians did. In addition, nearly 90% of all providers failed to screen for benign paroxysmal positional vertigo (BPPV) by examining for positional nystagmus. Primary care physicians referred 22% of patients with dizziness to a specialist (neurotologist); geriatricians referred 17%, and emergency-room physicians referred 16%. The researchers concluded that a lack of compliance with recommended screening practices likely contributes to underdiagnosing and undertreating vestibular impairments. They advocate for better dissemination of treatment guidelines in order to improve health care and patients' access to it.

—Polensek SH, Sterk CE, Tusa RJ. *Medical Science Monitor* 2008;14(5):CR238–CR242

Astronaut technology for better balance

NASA scientists recently developed an assistive device to improve balance called the iShoe. Originally designed for astronauts to use after extended flights in zero gravity, an iShoe insole contains sensors that read and record how well a person is balancing. Such data may also be helpful to specialists as they develop personalized physical therapy for patients to improve their balance. The researchers are currently seeking funding to test and market the iShoe; once it is obtained, they predict that the device could be for sale in as little as 18 months for an estimated $100 per unit.

—*Associated Press Online*, 7/31/2008

Genetic susceptibility for gentamicin-induced vestibular dysfunction

Approximately 5% of patients who are administered the antibiotic gentamicin (GM) experience vestibular ototoxicity that results in a balance dysfunction. Scientists from the Dept. of Kinesiology at the Univ. of Maryland (College Park) sought to identify susceptibility genes associated with GM-induced vestibular dysfunction. They evaluated a group of 137 people who had physician-confirmed vestibular dysfunction attributed to GM administration. Controls consisted of 127 healthy, age-matched individuals without vestibular dysfunction or balance impairment. DNA was collected from all subjects, and potentially susceptible genes were identified primarily for their roles in oxidative stress. Analysis of the role of single genes and the interaction among genes revealed that the NOS3 (ENOS) p.Glu298Asp polymorphism was significantly associated with GM-induced vestibular dysfunction, and that the best predictor of GM-induced vestibular dysfunction was a three-gene combination of NOS3 (p.Glu298Asp), GSTZ1 (p.Lys32Glu), and GSTP1 (p.Ile105Val). The researchers concluded that carriers of risk alleles at these genes have increased susceptibility to GM-induced vestibular dysfunction.

—Roth SM, Williams SM, Jiang L, Menon KS, Jeka JJ. *Journal of Vestibular Research* 2008;18(1):59–68

IRA tax advantage for donors

The US Senate recently passed legislation that renews and extends a tax provision that allows older donors to receive a tax break when they give charities money from their individual retirement accounts (IRAs). Under this extension, individuals who are age 70½ or older can make direct gifts from an IRA to a qualified charity (such as VEDA) without including the distribution in income. This allows the donation to count towards the investor's required minimum distribution without forcing the donor to pay tax on the distribution. In order to qualify for benefits under this extension, the donor must transfer the gift directly from the IRA to VEDA, and the total IRA gift(s) cannot exceed $100,000 per year. For more information about whether this is appropriate for you, please contact your tax and financial advisors and let them know that you would like to donate to VEDA with a "qualified charitable distribution" from your IRA.

Healthy volunteers needed for balance study

Researchers at the Human Spatial Orientation Laboratory and Human Balance Disorders Laboratory at Oregon Health and Science Univ. (Portland, OR) seek healthy individuals to serve as age-matched controls for patients with neurological involvement for studies in balance function (IRB # 177, 675, 811, 1065, and 2487). Participants must be 18–80 years of age, in excellent general health, and have no history of dizziness or balance problems. In exchange for each two- to four-hour session, participants will be paid. If interested, please contact Triana Nagel-Nelson at (503) 418-2602, or Megan Lockwood at (503) 418-2618.

> Scientists who would like to submit a posting for research subjects may send a brief description of the study and contact information to: veda@vestibular.org.

Vestibular rehab therapists wanted

North Coast Physical Therapy in Oceanside, California, seeks a full-time physical therapist with experience in balance and vestibular rehabilitation therapy. For further information, please contact Donna Hamel, 3633 Vista Way, Ste. 101, Oceanside, CA 92056; phone: (760) 729-7298; fax: (760) 729-7206.

News about VEDA

VEDA celebrates 25 years of service

This year the Vestibular Disorders Association (VEDA) celebrates its 25th anniversary! VEDA is a nonprofit organization founded in Portland, Oregon, in 1983 and chartered as a national organization in 1987. VEDA's mission is to serve people with vestibular disorders by providing information, offering a support network, and elevating awareness of the challenges associated with these disorders. In celebration of our important work about inner ear balance disorders, we've rewritten our explanatory document about the intricate human balance system. The new document includes information contributed by VEDA's first managing director, Mary Ann Watson, MA, and F. Owen Black, MD, FACS, a member of VEDA's Board of Medical and Scientific Advisors.

Board nominations open in January

Nominations for the 2009–2010 Board of Directors of the Vestibular Disorders Association (VEDA) will be accepted in January and February. The volunteer board seeks members committed to fundraising and contributing to policy decisions. Nominees must be willing to participate in four to six teleconference or onsite meetings per year and to personally support the organization's financial goals. Election of board members takes place via ballots mailed to members in the spring newsletter. To nominate a candidate for VEDA's Board of Directors for a three-year term that will begin in June 2009, please request a nomination form by sending an e-mail to info@vestibular.org or by writing to VEDA, PO Box 13305, Portland, OR 97213.

Letters

Computer monitors and digital TVs

Dear Editor: The understanding of vestibular problems that was reflected in the summer 2008 *On the Level* article, "Computer Monitors and Digital Televisions: Display Selection Considerations with Visual Sensitivity from Vestibular Disorders," was great. Yes, the information will help me to select a computer monitor and TV. But even more important to me are the details in the article about the problems I face daily with monitors and TVs. You hit them all: flicker, bright light, contrast, motion on the sides, jittering images, and others. It's hard for others to understand how sick you can get from watching a computer monitor, TV, or movie screen (and from shopping for one). Your article will help people with vestibular problems to communicate their needs to others. Thank you. —*Suzanne Johnson, Lakewood, Colorado*

Editor's note: VEDA wrote this article in response to receiving an increasing number of requests about computer monitors and other devices involved with work productivity. These inquiries come from people with vestibular disorders and the health professionals who treat them, as well as from insurance companies, employers, and attorneys. VEDA's mission includes providing information and increasing public awareness of the challenges of vestibular disorders. We very much appreciate hearing feedback about the value of our efforts.

Clinical Observations

Distinguishing Between Mal de Débarquement Syndrome and Migraine-Associated Vertigo

By Robert Slater, MD

Mal de débarquement syndrome (MDDS) and migraine-associated vertigo (MAV) have some common features but they are not the same.

Classic MDDS affects both men and women but is more common in women. It occurs immediately after or within a few days of travel and is experienced as a sensation of continuous or near continuous series of discrete movements such as rocking, bobbing, or swaying—not unlike the motion of a boat. Typically, this sensation is not changed when the person moves about, but sometimes it is. However, it usually decreases when a person returns to the initiating activity (such as a boat ride) or rides in an automobile. MDDS also occurs in healthy individuals after travel but lasts only a few hours or days at the most, which suggests that there is no permanent physical injury or damage associated with it.

Migraine-associated vertigo (MAV) can take many different forms. The most typical form involves discrete attacks of vertigo (a spinning sensation) that start intensely and decrease over a period of hours or days. These may be accompanied by a sensation of rocking or spinning, and classic migrainous symptoms such as headache, nausea and vomiting, and flashing or blurred vision. MAV can also be characterized by lingering symptoms of lightheadedness and instability, and is thus occasionally confused with MDDS, which also shares these symptoms.

In a clinical situation, distinguishing between MDDS and MAV is complicated because MDDS appears to occur more often in individuals who also have migraine. The two disorders may co-exist in the same patient. The ability to distinguish MDDS from MAV is further complicated by the possible presence of common secondary symptoms that include anxiety, depression, panic attacks, and tinnitus.

Clinically evident hearing loss is not seen with MDDS or MAV. However, results of vestibular function tests are always normal in MDDS, but may be abnormal in MAV.

Treatment for the two disorders may have some overlapping components. Antidepressant and anti-anxiety drugs may help both MDDS and MAV because they address the accompanying psychological symptoms and may also suppress the integration of vestibular sensory information in the brain stem. This decreases the annoying sensation of movement, regardless of the presence of accompanying anxiety or depression.

Antimigraine agents such as beta blockers and calcium channel blockers will help only migrainous disorders. Antiseizure medications, such as valproate (Depakote) and topirimate (Topamax) help treat migraine and may occasionally be useful in treating MDDS because of their tendency to stabilize brain circuitry by slowing the pace

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"Clinical Observations" provides health professionals with an opportunity to share information about diagnosis and treatment experiences. Its purpose is to expand awareness about the identification and treatment of vestibular disorders, and to offer a forum for presenting general observations (as opposed to individual case studies). Professional members of VEDA may submit articles to: Editor, *On the Level,* VEDA, PO Box 13305, Portland, OR 97213. Space limitations may restrict the number of submissions printed.

Thank You

Contributions and pledges: We thank the following individuals and organizations for their generous pledges and donations to VEDA received August 21 through October 31, 2008. Donations received after that date will be listed in the next newsletter.

Advocates ($250 to $499)

Lisa Haven PhD
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Anonymous (2), Al Bowman DPT, Gaye W. Cronin OTD OTR *in honor of Atlanta Ear Clinic Office Manager Vicky Cooper*, Michele Di Pietro *in honor of Claire Haddad*, Prudential Foundation Matching Gifts and Suzanne Luzzi, Carolyn Shaw PT and Parksville Physiotherapy Clinic, Nancy Trotic *in honor of VEDA Director Lisa Haven*

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Anonymous (1), Gilberte Bernard, Tracy Colahan, Dorothy Coughlin, Alison Harrell, Barbara Horstmann, Joan Lewis, Gail MacColl, Christine Melcher, Mary Meyers, Grieke Moran, Natalie Pusateri MPT, Sue Fisher Seeger, The Terebessy Family *in honor of Lisa Haven, PhD*

Contributors ($10 to $49)

Anonymous (1), Janice Barnes, Donna Corrigan, Richard Finn Jr., Bruce Franklin, Bronislawa Garman (*self*), Mary Ellen Gray, Timothy C. Hain MD and Chicago Dizziness and Hearing, Gerald Hawley, Laura Kenworthy, Don Kropp, Mike McCormick, Thomas McDonough, Carola Michael, Judy Moore, Camille Obnamia, Molly Parrish, Charlotte Robinson, Jeannie Ruiz, Mary Sanders, Judith Stellato *in honor of Katherine Quickenton*, Susan Tepper, Lavon Urbonas, Dominick Vigliarolo, Margaret Werrell, Catherine Zugar

In memory of Barbara J. Phillips (May 29, 1958–September 13, 2008)

Robert Bremner and Rodman Realty Company, Rosina Bremner, Wendy Donald, Karen Donlin, Kathryn Hewitt, Louis Mueller (To learn more about this gift, see story on page 11.)

In-kind contributors

F. Owen Black MD FACS, Robert Slater MD ■

Clinical Observations *(continued from page 9)*

of electrical signal transmission and reception in neurons. The use of depressants such as benzodiazepine has been observed to help a few patients prevent recurrent MDDS when a maximally tolerated dose is started at least two hours prior to beginning travel and maintained over the course of travel. Vestibular rehabilitation often benefits MAV patients but rarely helps those with MDDS. Cognitive and behavioral therapy may also be useful in treating MAV because it can help patients cope with symptoms and reduce their disability, in addition to possibly helping prevent MAV recurrences.

The challenges presented by distinguishing between and treating MDDS and MAV are further complicated by MDDS-like syndrome. MDDS-like syndrome (sometimes referred to as “nonclassical MDDS”) has all the typical features of MDDS except that its occurrence does not appear to relate to an immediately preceding travel activity. It causes symptoms for a person who is walking and turning, but not to the same degree experienced by a person with a vestibular disorder that causes a dramatic increase in symptoms with head motion.

A definitive diagnosis of MDDS (with or without MAV) is reasonable if a sensation of rocking and swaying is preceded by some sort of travel. If such symptoms occur in the absence of recent travel, a special form of MAV (labeled with the proposed term *MDDS-like syndrome*) may be the appropriate diagnosis.

This submission by the author includes content that appeared in “MdDS, MAV, and MdDS-like Syndrome Distinguishable Disorders?”, *Mal de Debarquement Support News* (Vol. 27, April, 2008), published by the MdDS Balance Disorder Foundation.

Tribute to Barbara J. Phillips

By Karen Donlin

Barbara J. Phillips (1958–2008) had bacterial endocarditis, an infection impacting the heart valves and parts of the heart muscle's inside lining. She was treated for this life-threatening condition with open-heart surgeries and high doses of the antibiotic gentamicin, administered intravenously over an extended period of time, which damaged her inner ear because of its ototoxic effect.

The resulting vestibular disorder profoundly changed her life. She was unable to coordinate movement and balance when walking. She lost some hearing, and her sight was impaired by oscillopsia, a bouncing visual effect. At one point, her imbalance caused her to fall down a flight of stairs, fracturing her skull and leading to seizures.

Prior to her illness, Barb was outgoing and athletic. However, due to her vestibular disorder, she became unable to enjoy even simple activities such as riding a bike, and she faced many challenges at work. As a critical care nurse at Philadelphia Hospital, she was highly regarded by her peers. However, because of the vestibular disorder, her ability to perform her duties was questioned. When hospital officials received reports that she was observed staggering and weaving, they forced her to undergo demoralizing drug and alcohol testing more than once. Despite passing these tests with flying colors and obtaining recommendations and letters of good standing from the physicians with whom she worked, she was let go from her position, which she'd held for about 12 years. This was a defining moment for her. She became withdrawn and depressed. Although she continued working as a nurse elsewhere, it was not at the level to which she was accustomed.

For those unfamiliar with vestibular disorders, this story may seem exaggerated, but it is all too common. Vestibular issues impacted Barb's life so profoundly that when she died, her husband and our family wanted something positive to come from her experiences. By asking friends and coworkers to donate to the Vestibular Disorders Association in Barb's memory, we hope to promote awareness about vestibular disorders and support those who are facing similar challenges.

Support Groups

Atlanta, GA: In celebration of Balance Awareness Week (September 14–20), the Atlanta Vestibular Disorder Support Group invited a fitness instructor to conduct a class on balance, motor planning, and coordination exercises, all coordinated to music. Exercises were performed from a seated position, producing a fun and safe workout. After the class, the participants reported that they felt better and really enjoyed the activity. *Contact:* Gaye W. Cronin, OTD, OTR, (404) 851-9093, earclinic@mindspring.com.

San Jose, CA: A new support group is forming here. The meeting location and schedule have not yet been determined. For further information please contact the organizers. *Contact:* Al Mofrad, MS, (408) 826-9476, amofrad@sbvsg.com.

Additional information about support groups for each state of the US and region of the world may be found online at www.vestibular.org/support-groups/find-support-group.php.

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Consider renewing online at: https://vestibular.org/shop/

Annual membership (includes newsletter subscription):

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❑ Check *(payable to VEDA in US funds)*

❑ Visa ❑ MasterCard ❑ American Express

Name ______________________ Telephone or e-mail ______________________

Billing address of credit card, if different from printed below (*required* for card verification) ______________________

Credit card number ______________________
Expiration date (month/year) ______________________

*If you send us your payment with this form, please include the address label printed below, which includes your VEDA number.

11/08