

## Dizziness/Vertigo

**Dizziness** is a symptom, not a disease. It may be defined as a sensation of **unsteadiness** or imbalance, a disorientation in relation to one's surroundings. Dizziness can have many different causes and varies from a mild unsteadiness to a **severe whirling** sensation known as vertigo. Dizziness may or may not be accompanied by a hearing impairment.

### **Maintaining Your Balance**

The **human balance system** is made up of four parts. The brain acts as a central computer receiving information in the form of nerve impulses (messages) from three inputs: the **eyes**, the **inner ears**, and the **muscles and joints** of the body (especially **neck and spine**). There is a constant stream of impulses arriving at the brain from these inputs terminals. All three systems function alone and yet work together to keep the body in balance.

The **eyes** give the brain information as to the position of the body relative to its surroundings. The receptors in the muscles and joints are called proprioceptors (**position sensors**). The most important ones are in the **head and neck**, (head position relative to the rest of the body), spine and ankle joints (body sway relative to the ground).

The **inner ear** balance mechanism has two main parts: the three semicircular canals and the vestibule, both filled with fluid. When the head moves, fluid within the inner ear moves and stimulates nerve endings that send impulses along the balance nerve to the brain. Those impulses are sent to the brain in equal amounts from both the right and left inner ears. Nerve impulses may be started by the semicircular canals when turning suddenly, or the impulses may come from the vestibule, which responds to changes of position, such as lying down, turning over or getting out of bed.

When one inner ear is not functioning correctly, the **brain** receives nerve impulses that are no longer equal, causing it to perceive this information as distorted or off balance. The brain sends messages to the eyes, causing them to move back and forth, making the surroundings appear to spin. It is this eye movement (called nystagmus) that creates a sensation of things spinning.

Remember to think of the brain as a computer with input feeding it constant up-to-date information from the eyes, inner ear and muscles and joints (proprioceptors). The brain itself is divided into several different parts. The **brainstem** processes the input. The brainstem is affected by two other parts of the brain, the cerebral cortex and the cerebellum.

The **cerebral cortex** is where past information and memories are stored. The **cerebellum**, on the other hand, provides automatic (involuntary) information from activities which have been repeated often, and contributes to balance. The brainstem receives all these nerve impulses: sensory from the eyes, inner ears, muscles and joints; regulatory from the cerebellum; and voluntary from the cerebral cortex. The information is then processed and fed back to the muscles of the body to help maintain a sense of balance. Because the cortex, cerebellum and brainstem can eventually become used to (ignore) abnormal or unequal impulses from the inner ear, **exercise may be helpful**. **Chiropractic adjustments** and exercise often **help the brain** to habituate to (get used to) the dizziness problem so that it does not respond in an abnormal way and does not result in the individual feeling dizzy. An example of habituation is seen with the ice skaters that twirl around, stop suddenly, and do not apparently have any balance disturbance.

### **Types of Dizziness**

Sensations of unsteadiness, imbalance or disorientation in relationship to one's surrounding may result from disturbances in the **ear, neck, muscles, joints, spine, eyes**, and **nervous system** connections of these structures or a combination of these.

#### **Neck Dizziness**

Neck Dizziness (**cervical vertigo**) results from abnormal or uncoordinated nerve impulses being sent to the brain from the **neck muscles and joints**. The neck muscles are constantly sending nerve impulses to the brainstem to help maintain **equilibrium**. **Spasm (tenseness)** of the muscles may result in an **abnormal nerve discharge**,

leading to **unsteadiness** or **dizziness**. This spasm may result from **injury**, from **arthritis** of the **spine**, or from **pressure on nerves** in the neck. **Chiropractic adjustments help this a great deal.**

### **Muscle-Joint Dizziness**

Muscle-joint dizziness is less common from limbs. Any disturbance of sensation arising from the muscle and joints in the limbs such as occurs in the muscular dystrophies and other abnormalities produce this type of unsteadiness. Such an example is the unsteadiness experienced when one tries to walk on a leg that has “gone to sleep.”

### **Ear Dizziness**

Ear Dizziness results from disturbances in the circulation or fluid pressure in the inner ear chambers or from direct pressure on the balance nerve that transmits impulses from the inner ear to the brain. The inner ear is about the size of a pea and is extremely sensitive. There are two inner ear chambers: one for **hearing (cochlea)** and one for **balance (vestibule and semi-circular canals)**. These chambers contain a fluid that bathes the delicate nerve endings. These nerve endings are stimulated when there is movement of the fluid. Nerve impulses are then transmitted to the brainstem by the hearing and balance nerves. Any disturbance in pressure, consistency or circulation of the inner ear fluids may result in acute, chronic or recurrent dizziness, with or without hearing loss and head noise. Likewise, any disturbance in the blood circulation to this area or to the nerve may result in similar symptoms. Dizziness may also be produced by over-stimulation of the inner ear fluids such as one encounters when he/she spins very fast and then stops suddenly.

### **Ear Dizziness: Symptoms**

Any disturbance affecting the function of the inner ear or its central connections may result in dizziness, hearing loss or tinnitus (head noise). These symptoms may occur singly or in combination, depending upon which functions of the inner ear are disturbed. Ear dizziness may appear as a **whirling or spinning sensation (vertigo)**. It may last seconds, minutes or hours, and is frequently aggravated by head motion or sudden position change. **Nausea** and **vomiting** may occur, but one does not lose consciousness as a result of inner ear dizziness.

### **Central Dizziness**

Central Dizziness is an unsteadiness brought about by **failure of the brainstem** to **coordinate** or interpret correctly the nerve impulses that it receives. An example of this is the **“swimming feeling”** or unsteadiness that may accompany congestion or a circulation problem in the brainstem. The **circulatory inefficiency**, producing unsteadiness, with or without hearing impairment, may be due to **age, metabolic or allergy, a mild stroke, tumors or injury**. This same type of problem can be due to **stress, tension or depression**. A feeling of **pressure or fullness** in the head and ears is common under these circumstances.

### **Visual Dizziness**

Eye muscle imbalance or vision problems may produce unsteadiness. An example of this is the unsteadiness which may result when one attempts to walk while wearing glasses belonging to another individual. Another example of visual dizziness is that occasionally produced if one is seated in a car, looking out the side window at passing objects. The eyes respond by sending a rapid series of impulses to the brain indicating that the body is rotating. On the other hand, the ears and the muscle-joint systems send impulses to the brain indicating that the body is not rotating, only moving forward. The brainstem, receiving these **confused impulses** (from the eyes indicating **rotation**, from the ears and muscle-joint systems indicating **forward motion**), sends out equally confused orders to the various muscles and glands that may result in **sweating, nausea and vomiting**. In this situation when one sits in the front seat looking forward, the eyes, ears and muscle-joint systems work more in uniform and one is less likely to develop **motion sickness**.

### **Postural Dizziness (lay, sit, stand)**

Positional change dizziness is a common form of balance disturbance due to **circulatory changes**. It is characterized by a sudden brief feeling of **lightheadedness upon standing**. It takes a few seconds for the heart to overcome the gravity change and pump blood to the brain. Arising from bed slowly usually minimizes the disturbance. This can be a sign of metabolism problems, low blood pressure or nutritional deficiencies.

### **Benign Positional Vertigo**

In this condition a patient experiences a sudden burst of severe whirling (vertigo) with changes of head and body position. It lasts briefly (5-60secs) and may be accompanied by nausea, rarely vomiting. It can occur when looking up, lying down, or rolling over in bed. However, the dizziness may not occur every time. Symptoms come and go, but is usually self limiting. The disorder is thought to result from dislodgement of **fine calcium crystals (otoliths)** from the delicate balance sense organ, the utricle. With changes of head position, the crystals tumble and result in an inner ear fluid shift causing vertigo. The cause may be from trauma, aging, infection, or unknown reasons. Treatment may consist of watchful waiting, physical **therapy (canalith repositioning maneuver)**, sedatives, or rarely surgery.

### **WARNING**

Persons subject to dizziness should exercise caution when swimming. Buoyancy of the water results in essentially a weightless condition, and visual orientation is greatly impaired if one's head is under water. As a result, orientation depends almost entirely on the inner ear balance canals. An attack of dizziness at this time could be very dangerous. If this happens in the water: relax and surface. Note bubbles always rise and give cue of which way is up if disoriented under water.

### **Diagnosing the Cause of Dizziness**

Dizziness may be caused by any disturbance in the inner ear, the balance nerve or its central connections. This can be due to a disturbance in circulation, fluid pressure or metabolism, infections, neuritis, drugs, injury or tumors. An extensive evaluation is required at times to determine the cause of dizziness. The tests necessary are determined at the time of examination, and may include detailed hearing and balance tests (electronystagmography, posturography, rotary chair), CAT scan or MRI, blood tests and metabolic and allergic evaluations. A general physical examination and neurological tests may also be advised. Often, a therapeutic trial of chiropractic care produces a resolution of symptoms from certain types of dizziness. The object of our evaluation is to be certain that there is no serious or life-threatening disease, and to pinpoint the cause of the problem. This lays the groundwork for effective treatment or referrals for other tests.

### **Trauma**

Whiplash or injury to the head can result in dizziness due to damage to the spine, muscles, inner ear and brain. The unsteadiness is at times prolonged, and may or may not be associated with hearing loss and head noises.

### **Infection: Symptoms**

Imbalance due to ear infection is usually abrupt and severe in onset often associated with nausea and vomiting. Such imbalance may occur with or without hearing impairment. The infection may be caused by either a virus or bacteria.

### **Metabolic Disturbances and Allergies**

Metabolic disturbances and allergies can produce dizziness, with or without associated hearing loss, by interfering with the function of the inner ear or its central connections. Occasionally, hearing loss may occur without the presence of dizziness.

The most common metabolic disturbances result from **decreased thyroid function, abnormal sugar tolerance** and inhalant or food **allergies**. Thyroid dysfunction is diagnosed by blood tests. Treatment consists of thyroid hormone. Abnormal sugar tolerance is diagnosed by blood sugar studies (glucose tolerance test). Treatment consists of diet control, with or without drug therapy.

Allergies may be diagnosed by blood tests and skin tests with inhalants and foods. Treatment consists of elimination of offending agents when possible.

### **Perilymphatic Fistula**

Dizziness, with or without hearing impairment, may result in perilymphatic fistula, a leak of the inner ear fluid into the middle ear through one of the two inner ear windows. The "hole" may appear spontaneously or may follow a head injury, a sudden change in atmospheric pressure (barotrauma; airplane, scuba diving) or ear surgery.

### **Meniere's Disease**

Meniere's Disease is a common cause of repeated attacks of dizziness. It is due to increased pressure of the inner ear fluids. Fluids in the inner ear chambers are constantly being produced and absorbed by the circulatory system. Any disturbance in this delicate relationship results in over-production or under-absorption of the fluids. This leads to increased fluid pressure (hydrops) that in turn produces dizziness which may or may not be associated with fluctuating hearing loss and tinnitus. Fortunately, this usually affects only one ear, but can effect both.

### **Meniere's Disease: Symptoms**

Hearing loss and head noise usually accompany the attacks. The attacks of dizziness may occur suddenly and without warning. Violent spinning, whirling and falling, associated with nausea and vomiting, are common symptoms. A sensation of pressure and fullness in the ear is usually present.

### **Circulation Changes**

Any interference with the circulation to the delicate inner ear structures or their central connections may result in dizziness, at times with hearing loss and tinnitus. These circulatory changes may be the result of blood vessel spasms, partial or total blockage or rupture with bleeding.

### **Occlusion**

As one gets older, the blood vessel walls tend to thicken due to an aging process known as arteriosclerosis. This thickening results in partial blockage, with a gradual decrease of blood flow to the inner ear structures. This may result in deterioration of the delicate inner ear balance structures. The balance mechanism usually adjusts to this, but at times persistent unsteadiness develops.

Complete occlusion of an inner ear blood vessel (thrombosis, clot) results in acute dizziness often associated with nausea and vomiting. Symptoms may persist for several days, followed by a gradual decrease of dizziness over a period of weeks or months, as the opposite unaffected ear takes over the function of the involved ear.

## **Treatment**

Treatment of dizziness due to changes in blood pressure or circulation can consist of anti-dizziness medication or medication to effect circulation. One with dizziness should avoid drugs that constrict the blood vessels such as caffeine (coffee) and nicotine (tobacco). Emotional stress, anxiety and excessive fatigue should be avoided as much as possible. Chiropractic adjustments help some causes of dizziness. For other causes we can refer to local ENT doctors that specialize in this treatment.

