

Cervical vertigo is a vertigo or dizziness that is provoked by a particular neck posture no matter what the orientation of the head is to gravity. For example, dizziness provoked by turning the head about the vertical axis, while sitting upright.

The precise incidence of cervical vertigo is controversial but it is estimated that 20-58% of patients who sustain closed-head injuries or whiplash experience late onset symptoms of dizziness, vertigo and dysequilibrium. Cervical vertigo is matter of considerable concern because of the high litigation related costs of whiplash injuries. Cervical vertigo from other causes is much less common.

When cervical vertigo is diagnosed, the usual symptoms are dizziness associated with neck movement. There should be no hearing symptoms (other than tinnitus) or hearing loss but there may be ear pain (otalgia). Brandt (1996) has recently reviewed this topic from a diagnostic perspective, and Wisely et al (2000) reviewed the physical therapy approach.

The precise incidence of cervical vertigo is controversial but it is estimated that 20-58% of patients who sustain closed-head injuries or whiplash experience late onset symptoms of dizziness, vertigo and dysequilibrium. In this regard, also note that driving disturbances are common in persons with chronic Whiplash associated vertigo (WAD), occurring in 73% according to Takasaki (Takasaki, Johnston et al. 2011) Cervical vertigo is matter of considerable concern because of the high litigation related costs of whiplash injuries. Cervical vertigo from other causes is much less common.

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POST-TRAUMATIC VERTIGO

[Timothy C. Hain, MD](#)

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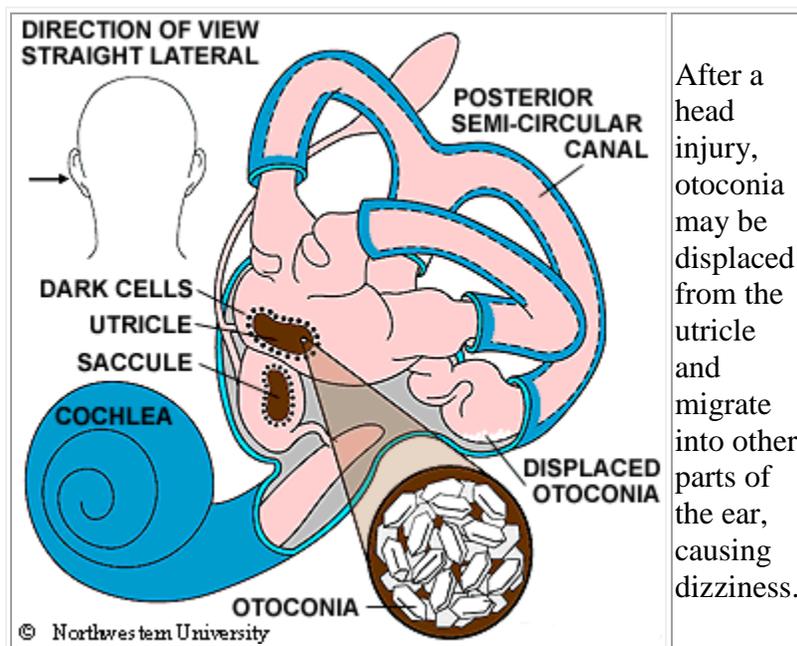
See also: [Post-traumatic hearing loss](#)

Head injuries are sustained by 5% of the population annually. Post-traumatic vertigo refers to dizziness that follows a neck or head injury -- while injuries to

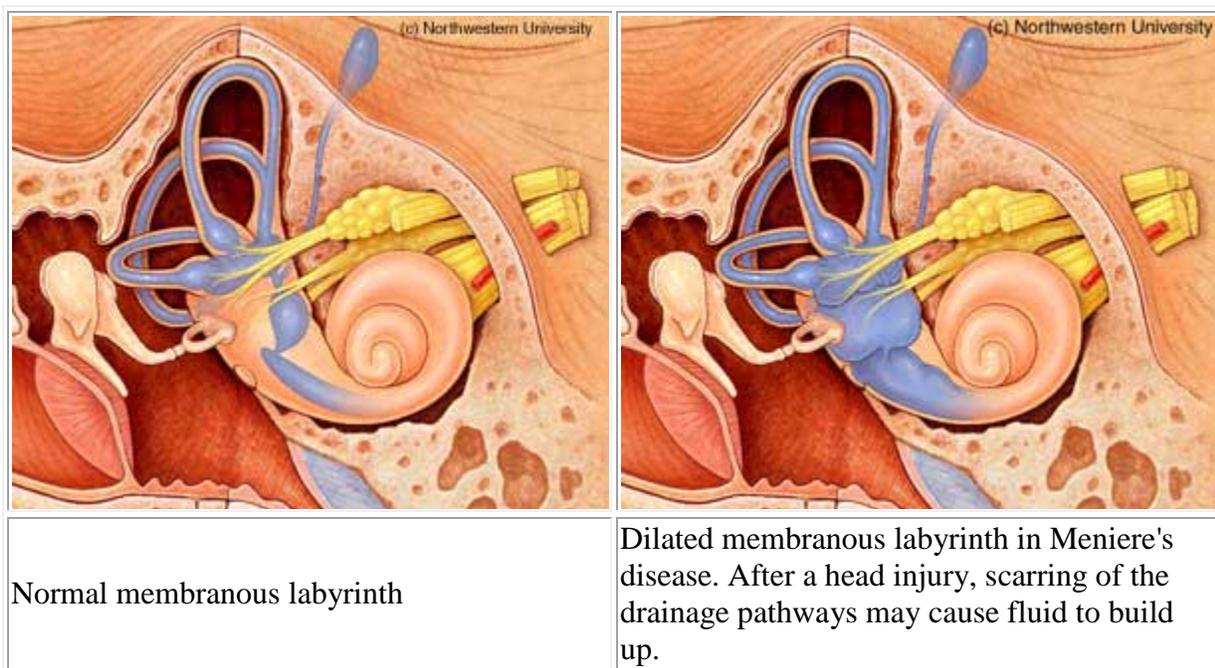
other parts of the body might in theory be associated with dizziness, in practice this is almost never the case.

Post-traumatic dizziness is associated with slower return to work, but there are conflicting data. Chamelian and Feinstein reported that dizziness, psychosocial functioning, and psychotropic/analgesic uses were significant and independent predictors of reemployment (2004). On the otherhand, Gottshall et al (2007), found no influence of dizziness on active duty status in the military at 1 year. In our opinion, dizziness is an adverse factor predicting return to employment.

Because of the high incidence of litigation associated with post-traumatic vertigo, most clinicians are extremely cautious in making this diagnosis. There are many potential causes of post-traumatic vertigo. A recent study performed in an otolaryngology setting suggested the following distribution of "primary" disorders: labyrinthine concussion (18), [rupture of the round window membrane -- fistula](#) (6), and [cervicogenic vertigo](#) (12). The secondary disorders included otolith disorders (5), [delayed endolymphatic hydrops](#) (12), and canalolithiasis (9)([BPPV](#)). (Ernst et al , 2005). Hoffer et al, (2004) grouped patients into "positional vertigo", migraine-associated dizziness, and "Spatial Disorientation" (a wastebasket category). It seems likely that the distribution differs according to the practice setting (e.g. neurology, otolaryngology, general medicine).



1. **Positional Vertigo**, and particularly [Benign Paroxysmal Positional Vertigo or BPPV](#), is the most common type of severe dizziness, and it is also common after head injury, occurring in about 28% of persons with post-traumatic vertigo (Hoffer et al, 2004). Even injuries that do not directly affect the head such as whiplash injury, have been reported to be associated with BPPV (Dispenza et al, 2010). BPPV is easily recognized by the pattern of dizziness that is brought only when the head is placed in certain positions. There are several good treatments for BPPV and the prognosis for this syndrome, in the proper hands, is excellent. It is also possible to have rarer causes of positional vertigo including mainly [utricle injury](#), vestibular atelectasis, and various forms of central vertigo caused by cerebellar or brainstem disturbances.



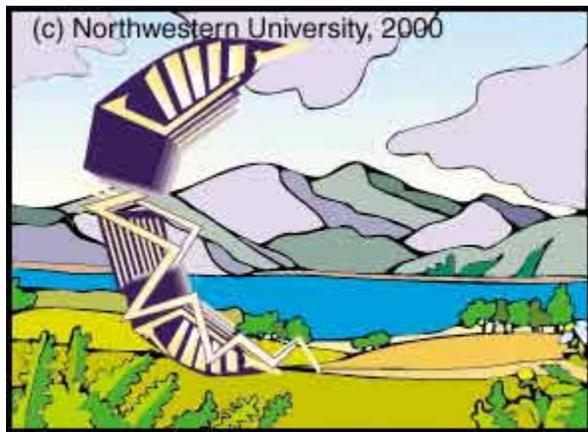
2. **Post-traumatic [Meniere's syndrome](#)** --Also sometimes called "hydrops".

Episodes of dizziness accompanied by noises in the ear, fullness, or hearing changes. Mechanism thought to be bleeding into inner ear, followed by disturbance of fluid transport. Onset of symptoms may vary from immediate to as long as one year later. There are frequently legal implications to this diagnosis. The probability of Menieres being reasonably attributed to post-traumatic mechanisms is a function of the severity of injury (severe makes more likely), the latency from the injury (longer is less likely), the presence of a pre-existing condition, and the presence of secondary gain. Persons with the Large

Vestibular Aqueduct syndrome ([EVA](#)) are felt to be more likely to develop these symptoms (Berettini et al, 2000).

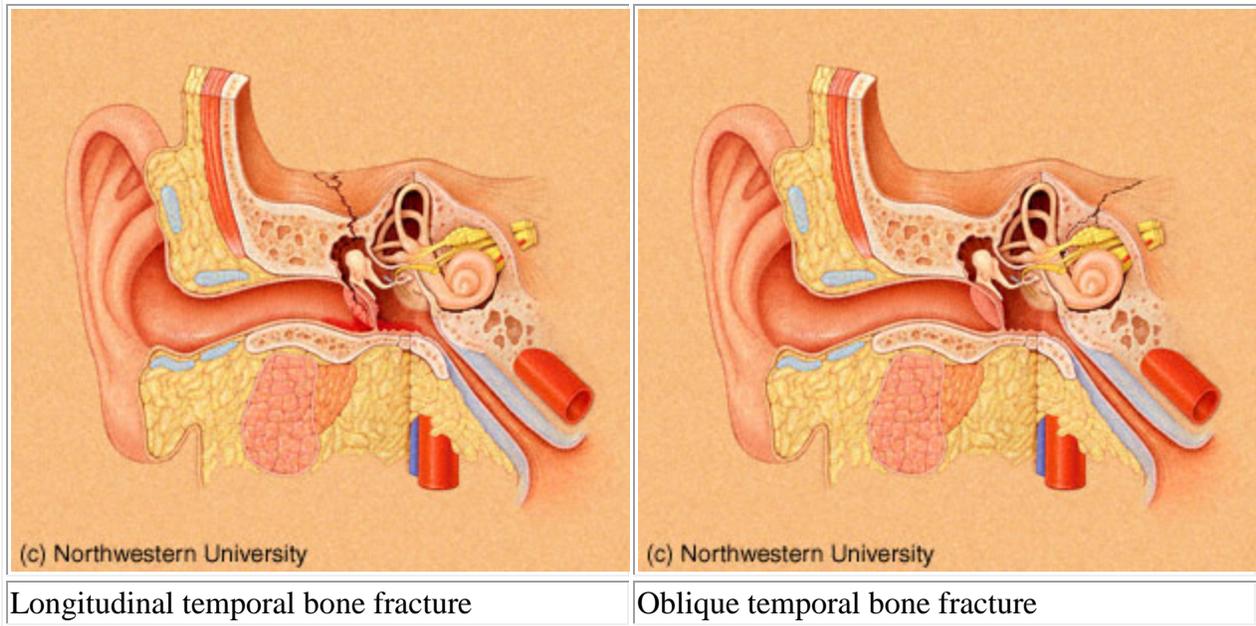
3. Labyrinthine "concussion".

Defined as a non-persistent hearing or labyrinthine disturbance which follows a head injury, not caused by another mechanism. A hearing loss or a nystagmus must be present to make this diagnosis with a reasonable degree of medical certainty. While the name implicates an inner ear disturbance, this symptom complex may be impossible to differentiate from other entities. For example, it might be difficult to differentiate a labyrinthine "concussion" from an eighth nerve stretch injury, although newer testing modalities may help (e.g. [VEMP](#)).

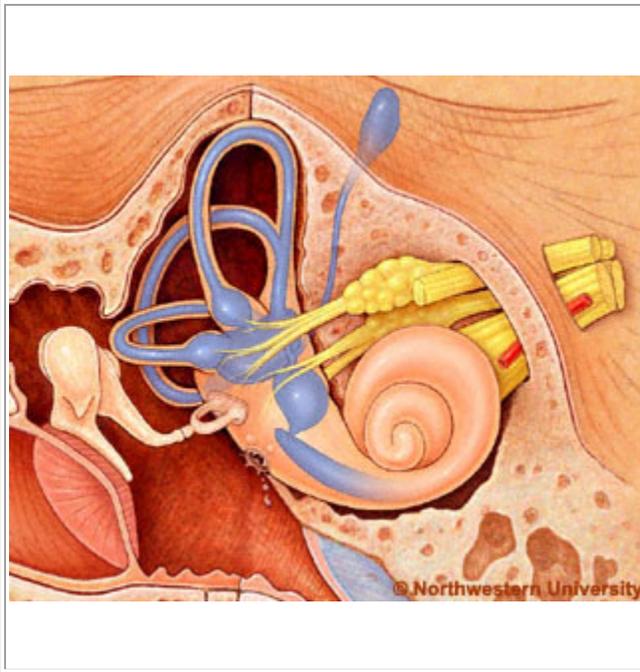


4. [Post-traumatic migraine](#). Dizziness combined with migraine headaches. Migraine has been reported as common as 41% in persons with posttraumatic vertigo (Hoffer et al, 2004) Headaches and vertigo are common after head injuries. The main difficulty in this situation is to determine whether they are related or coincidental. It may also be difficult to distinguish post-traumatic headaches (which are very common), from migraine. The lack of a "litmus test" for Migraine, other than perhaps response to triptan medication, makes this diagnosis tenuous.

5. [Cervical Vertigo](#). Imbalance following a severe neck injury. While nearly all dizziness specialists agree that cervical vertigo does exist, there is controversy regarding the frequency with which it occurs (Brandt T, 1996). Several theories exist as to the mechanism, the main ones being: 1). Vascular compression 2). Alteration of sensory input to the vestibular system. See later section on Whiplash.



6. **Temporal bone fracture.** Severe dizziness after the injury, with skull or temporal bone CT scan indicating a fracture. Often accompanied by hearing loss or peripheral facial weakness (Bell's Palsy). Temporal bone fractures, especially the oblique variety (see above), may impair hearing and cause dizziness. There often is blood seen behind the ear-drum (hemotympanum). Either a conductive or sensorineural hearing loss may be present. Vestibular deficits are also common, especially in the oblique variety. Bilateral vestibular problems are exceedingly rare. Treatment is conservative. Prophylactic antibiotics are given, usually for 4 weeks. Myringotomy and insertion of a ventilating tube may be indicated, especially for serious otitis that persists after one month (Pulek and Deguine, 2001).



Round window fistula. A membrane "blows out" between the inner and middle ear, causing dizziness and possibly also hearing loss.

7. **Perilymph fistula**. Usually symptoms of imbalance and dizziness provoked by straining or blowing the nose. People with fistula may also get dizzy with loud noises (called Tullio's phenomenon). The frequency to which this syndrome occurs is controversial, but general opinion holds that it is rare.

7. **Psychogenic vertigo**. There are many possibilities.

Factitious vertigo is complaints of vertigo in an attempt to gain a sick role.

Psychogenic vertigo is vertigo related to psychological causes such as depression, anxiety. Anxiety and depression may result from traumatic brain injury that creates a self-perpetuating psychological reaction (Alexander, 1998). Post-traumatic stress disorder (PTSD) can result in reexperiencing and hyperarousal symptoms (King et al, 1998; Stein, 2002).

Vertigo simulated or exaggerated in an attempt to obtain compensation is known as "malingering". Binder et al (1996) have noted that "money matters", especially in persons with mild head trauma, as disability is partially correlated with financial incentive (effect size = 0.47). Paniak et al (2002), noted that compensation seekers/recievers report symptom incidence and severity as approximately 1 standard deviation higher than persons who were not seeking or receiving financial compensation.

8. [Epileptic](#) vertigo. Vertigo due to brain injury, typically the part of the temporal lobe that processes vestibular signals. Loss of consciousness usually occurs at the time of injury and vertigo is generally accompanied by altered consciousness (Tusa et al, 1990). The typical symptom is "quick spins", although this symptom has other potential causes (BPPV, vestibular neuritis). Treatment is with anticonvulsants. Topirimate and Keppra are a particularly good medications for this condition as they are also useful in [Migraine](#).

9. Diffuse axonal injury (DAI). Pure deceleration forces can produce diffuse axonal injury (Gennarelli et al, 1982). In some individuals who come to autopsy after a twisting type injury of the head on neck, small areas of bleeding (petechial hemorrhage), and interruption of neuronal circuits (axonal damage) can be found. Complaints of dizziness attributed to brainstem injuries which cannot be imaged with a good MRI. This is an autopsy diagnosis -- it cannot be made with certainty prior to death. Historically, significant DAI is not felt to occur in awake humans who do not report loss of consciousness. A thirty minute loss seems likely to be needed for a significant DAI (Alexander, 1998).

10. **Postconcussion syndrome.** Concussion comes from the Latin word, "to shake violently" (Webster). There are many problems with use of the word "[concussion](#)", due to the extremely broad definition adopted in the literature. See this page for more commentary.

Most concussions in adults are caused by direct blows to the head. However, it is also accepted that occasionally, such as in the "shaken baby" syndrome, concussions can occur without a direct blow to the head after a very forceful acceleration/deceleration.

In any case, while dizziness and nausea symptoms accompanying the entity called "concussion" in the literature usually resolve over 6 weeks, cognitive symptoms and headaches persist longer. Hoffer et al (2004) suggested that symptoms persisted an average of 39 weeks -- about 9 months, and that return to work usually occurred at about 16 weeks. Occasionally symptoms are permanent. As noted above, in many cases, chronic symptoms are psychological in origin. Balance symptoms after concussion generally resolve by 10 days (Peterson et al, 2003)

11. [Whiplash injury syndrome](#). This diagnosis is discussed in detail on a separate page.

Diagnosis of post-traumatic vertigo

First the doctor will want to know exactly when and how the head or neck was injured, and the character of the dizziness (i.e. spinning ? unsteadiness ? confusion ?). He/she will want to know if you were unconscious and the duration of time. Did the airbag deploy ? There is a significant incidence of vertigo and hearing disturbance after [airbag deployment](#) (Yaremchuck and Dobie RA. 2000). All available records from the emergency room or hospital where you were seen after the injury should be obtained and shown to your doctor. This is especially important when there is litigation as much may depend on small details.

Next, a specialized examination for dizziness will be performed. Balance will be measured, often with [moving platform posturography](#). A search for "[nystagmus](#)" will be made, related to head and/or neck position or to vibration of the neck. You may be checked for pressure sensitivity with [the fistula test](#).

Laboratory tests will be ordered. In most instances these will include an audiogram, [ENG](#), possibly an MRI scan or CT scan of the inner ear (temporal bone CT scan). If available, a [VEMP](#) may be useful. An EEG may be obtained for persons with paroxysmal cognitive symptoms suggestive of epilepsy. In patients with hearing disturbance, an "[ECochG](#)" may be done. [Moving platform posturography](#) is helpful to quantify balance deficits.

Psychological testing is sometimes done in persons who have entirely normal test results. They can document interactions between symptoms and personality as well as cognitive difficulties. Such testing is often useful in sorting out the situation when patients are in litigation and could benefit from an appearance of ill health.

Treatment of post-traumatic vertigo

Treatment is individualized to the diagnosis. Treatment usually includes a combination of [medication](#), changes in life style, and possibly [physical therapy](#). Occasionally, surgery may be recommended.

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