**TCVM Treatment of Vestibular Disease**

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**VESTIBULAR DYSFUNCTION**VESTIBULAR DYSFUNCTION**:** All veterinary species suffer from various forms of vestibular disease. Many of which require only recognition, while others represent significant diagnostic challenges. Although there are a number of diseases which can affect the vestibular system, generally we can break them down anatomically into peripheral and central disorders. With certain exceptions, peripheral diseases bear a better prognosis in most species than central vestibular disease. Partially due to this concern, vestibular diseases represent a large number of neurologic referrals. Often, it is only reassurance that the problem will pass that is necessary. Recognition of when to intervene is as important as when not too.

The **cardinal signs** cardinal signs of unilateral vestibular disease are head tilt, nystagmus (spontaneous abnormal eye movements), circling (toward the lesion in “tight” circles), and incoordination. This is because the vestibular system is an important part of the CNS balance control system. In order for animals to know how they are oriented in space, three neural systems must be functioning. The vestibular system, through the stimulus-response of the hair cells in the semicircular canals, reacts to angular acceleration and deceleration. The visual system allows the animal to focus on the horizontal and vertical, orienting in space. Finally, gravity is detected by pressure receptors in the skin, orienting the animal on up and down. While the vestibular system is a very important, it requires at least 2 of these orienting systems to function for the animal to negotiate within its environment. This can be important with vestibular disease, since, in acute disease, the nystagmus prevents the eyes from focusing on the horizon, effectively eliminating spatial orientation.

The **anatomic structures** anatomic structures involved in the vestibular system include the hair cells in the saccule and utricle (containing the semicircular canals), the vestibular portion of CN VIII, the vestibular nuclei in the brainstem and the flocculonodular lobe of the cerebellum. The vestibular nuclei send fibers forward in the medial longitudinal fasciculus (MLF) which coordinates ocular movements, projects fibers to the spinal cord as the vestibulospinal tract and descending MLF, projects fibers to the cerebellum, and sends fibers to various structures in the brainstem including the emetic center. Involvement of any of the portions of the vestibular system will result in signs of dysfunction. Most lesions result in loss of function and, hence, are ablative in nature. The signs develop due to the imbalance existing between the normal and abnormal sides.

The **nystagmus** seen in vestibular disease can be helpful in localizing the disease process. While horizontal and rotatory nystagmus can be seen with disease anywhere within the vestibular system, vertical and positional nystagmus are almost exclusively seen with central vestibular diseases. Moreover, horizontal nystagmus from peripheral vestibular disease oscillates with the fast-phase away from the direction of the head tilt. With central vestibular disease (particularly of the cerebellum), however, the fast-phase is toward the lesion. So although horizontal and rotatory nystagmus are not specific for peripheral disease, they are compatible with it. Vertical and positional nystagmus suggest the lesion is within the CNS and indicate the need for a thorough neurologic work-up.

Vestibular diseases can be **classified** into three major disease processes: idiopathic vestibular disease, inner ear disease, or central vestibular disease. The former 2 represent common forms of peripheral vestibular disease which need to be separated from each other and from central vestibular disease.

**Idiopathic Vestibular Disease:** Idiopathic vestibular disease represents an acute invasion of wind (heat) into the inner ear. This may be secondary to an external pathogen or secondary to internal winds from the liver. Nystagmus is a wind signs affecting the eyes which are under the control of the liver. The liver is directly associated with the external ear via its husband-pair, the gall bladder whose meridian passes the ears several times. The triple heater is also associated with the ear in that its meridian wraps around the ear. The kidney is also important for the neural functions (vestibular and hearing) of the ears and is associated with the ear through its husband-pair, the bladder whose meridian runs just above the ears. In addition, the heart is associated with the ears through its husband-pair, the small intestines, whose meridian ends in front of the ears. Ear problems can result in shen disturbance either by disruption of liver blood or by insult of the heart directly through the small intestine channel.

When wind invades the ear, there are local changes leading to imbalance and abnormal eye movements. This leads to shen disturbance and disrupts qi flow. The disruption of qi flow leads to perversion of stomach qi (probably from over-control of the liver on the stomach) leading to nausea and vomiting. Due to the acute nature, signs are very dramatic, but acupuncture can also be very helpful. TCM Treatment Principle: Clear wind and heat and calm the shen. Acupuncture Therapy: Clear wind and heat (GB-20, LI-4, LI-11, and GV-14). Calm the shen (PC-6, HT-7, GV-17, GV-20, and GV-21). Local points (TH-18, TH-18, TH-21, SI-19, GB-2, er jian, and an shen). Channel points (TH-4, SI-3, BL-66, GB-41, GB-43, and LIV-3). Also add constitutional points and points for specific deficiencies or excesses seen. TCM Herbal Therapy: Since this is an acute, regressive disease, no herbal support is likely to be as helpful as acupuncture. Once the signs have begun to clear, any underlying excess or deficiency can be treated appropriately.

**Inner Ear Disease:** Inner ear disease represents a more chronic invasion of wind, heat and damp into the ear. This is usually secondary to an external pathogen or can be secondary to stagnation caused by chronic internal problems. However, unlike idiopathic vestibular disease which is confined to the qi level, inner ear disease is usually deeper and involves the Ying and xue (blood) stages. Overall, the same internal connections and meridians are involved in the disease processes.

When wind and heat invades the ear, causing the initial signs, the heat boils the fluids and leads to the accumulation of damp or phlegm. Alternatively, the qi and blood stagnate leading to local heat which in turn leads to the accumulation of damp. TCM Treatment Principle: Quiet the wind, reduce the heat, disperse the damp, activate the blood to dissolve stagnation, and calm the shen. Acupuncture Therapy: Clear wind and heat (GB-20, LI-4, LI-11, GV-14, and ST-44). Calm the shen (PC-6, HT-7, GV-17, GV-20, and GV-21). Eliminate the damp and disperse the phlegm (SP-9 and ST-40). Activate the qi and blood (ST-36, Xin shu, SP-10, and BL-17). Local points (TH-18, TH-18, TH-21, SI-19, GB-2, er jian, and an shen). Channel points (TH-4, SI-3, BL-66, GB-41, GB-43, and LIV-3). Also add constitutional points and points for specific deficiencies or excesses seen. TCM Herbal Therapy: Inner ear disease secondary to Damp-Heat shows the tongue is red or purple with a yellow, greasy coating. The pulse is rapid (heat), wiry (liver) and slippery (damp). You can use *Long Dan Xie Gan Tang (Snake and Dragon)* or *Damp-Heat formula (bi xie sheng shi tang)*. The former formula clears the heat, soothes the liver, and moves the damp from the whole body, while the latter is more specific for the skin. If only the ears are involved, you might try *Ear itching formula* which also soothes the liver, clears heat and helps resolve stagnation, but contains an ear transporter (*luo shi teng*).

When the excess is secondary to blood stagnation (associated with swelling, structural disease and pain). The tongue is usually pale or purple with a white greasy coating. The pulse is wiry (liver) and slippery (damp). Treatment principles are to expel phlegm, extinguish the wind, open the orifice and invigorate the blood. Use *Ding Xian Wan* and *Tao Hong Si Wu San* (moves blood).

Once the excess is cleared, then you should look for any underlying deficiencies and treat these until resolved. You may also want to use Ear drop formula to help treat the external signs of ear infection. In addition, you can use a standard approach to treating and maintaining ears using a series of natural products to clean the ears and protect against pathogenic invasion. The general purpose of this procedure is to gently clean the ears, correct their pH to help prevent microorganisms from invading and provide an antibacterial, antifungal, anti-inflammatory agent to clear any existing problems. In the beginning, it may be necessary to use the solutions to clean the ears three times a day. After the problem is under control, daily or biweekly cleansing may be sufficient even in the worst initial cases. This should be used in conjunction with an “Integrative Program” to help improve the animal’s ability to heal from the inside, as well.

The initial solutions should be instilled into the ear. The ear can be manipulated to work the solution around in the ear canal. Then, the excess can be wiped away with a cotton ball. Usually, the animal will help by shaking the head. It is not advisable to use cotton swabs in the ear canal, unless specifically instructed to do so by your veterinarian, who has demonstrated the technique for you. Use the solutions in sequence, since this is how they are designed to work. The detergent solution gets rid of wax and debris. The vinegar solution adjusts the pH of the ear to normal. The vitaminE/garlic oil helps treat and prevent infection. It should not be used if the eardrum is ruptured.

**Detergent Solution:**

* 1 drop of “free” dishwasher soap
* 8 ounces of water

**Vinegar Solution:**

* 1 ounce apple cider vinegar
* 3 ounces of water

**VitaminE/garlic oil:**

* crush one clove of garlic (use press) into
* 1 ounce of extra virgin olive oil
* let sit overnight at room temperature
* pour oil into dropper container
* add content of a 1000 IU vitamin E capsule
* use 2-3 drops in the ear canals, plus 1-2 on the pinnae

**Central Vestibular Disease**Central Vestibular Disease**:** Whenever anything else is seen other than the signs above, one must consider the likelihood that the problem is due to central vestibular disease. Additional cranial nerve deficits, proprioceptive deficits and motor deficits indicate brainstem damage affecting the vestibular nuclei and sensor and motor pathways which course through the vestibular region of the brainstem. In addition, the nystagmus seen in central vestibular disease will often be vertical or positional in nature, supporting the location of the disease process within the brainstem or cerebellum. If there is whole body and head tremors, the lesion is likely to be within the flocculonodular lobe of the cerebellum. While diseases which affect the peripheral vestibular system are usually good diseases; that is, diseases which regress without treatment or which respond to appropriate antibiotic therapy, most central vestibular diseases carry a less optimistic prognosis.

The major causes of central vestibular disease are inflammatory/infectious diseases or neoplasia. Organophosphate intoxication, liver disease (with metabolic brainstem degeneration) and thiamine deficiency can occasionally result in central vestibular disease (depending upon the species of animal), but these causes are far less than the inflammatory or neoplastic causes. In dogs, canine distemper virus, granulomatous meningoencephalitis, toxoplasmosis, neosporidiosis, aspergillosis, cryptococcosis, steroid-responsive meningoencephalitis, Lyme’s disease, Rocky Mountain spotted fever and ehrlichiosis are the most common inflammatory and infectious diseases recognized. In the cat, FeLV, FIP, and cryptococcosis are the most common infectious diseases. Any of the primary brain tumors can occur in dogs, while only meningiomas are common in cats. Cats who are not eating and stressed can easily develop thiamine deficiency and this should not be overlooked in treating sick cats with vestibular signs.

Diagnosis of central vestibular disease involves the minimal data based for inner ear disease, but must be expanded to include a chemistry profile, a CSF tap and analysis (including species specific titers) and, often, advanced brain-imaging techniques, such as MRI examination. Since CSF cytology is important in assessing central vestibular disease and advanced imaging techniques are needed, central vestibular disease crosses “the referral line”, the point in assessing disease which may require the interaction or interpretation of a neurologist.

The treatment and prognosis for central vestibular disease depends upon the cause. In neoplasia, biopsy may help determine whether radioablative surgery might be useful. Unfortunately, the brainstem is not an area amenable to conventional neurosurgery. In small animals, bacterial infections causing central vestibular disease are uncommon. Rickettsial infection is also rare. In cats, cryptococcosis may respond to therapy whether with remission or control of the neurologic signs. In dogs, fungal diseases usually progress in spite vigorous treatment. Toxoplasmosis may be controllable for a period in the dog and treatable in the cat. Canine distemper virus infection may run its course and stop or be chronic and progressive. FeLV and FIP infections are generally, rapidly progressive. Granulomatous meningoencephalitis (GME) will respond temporarily to corticosteroid therapy, but ultimately progress. Steroid-responsive meningoencephalitis can be controlled with medication for long periods in the dog. Finally, organophosphate intoxication and thiamine deficiency may respond to appropriate therapy.

**TCM Pattern:** Central vestibular diseases like many other problems in the central nervous system can be highly variable as to cause including excess conditions or deficiencies. They can be inflammatory which is most likely secondary to invasion of external pathogens at the xue level and include wind, heat and damp or wind and cold. Blood stagnation can lead to mass formation and cause central vestibular disease. Liver and kidney yin deficiency and kidney jing deficiency also can lead to central vestibular problems. Therefore, you should identify what you see (tongue and pulse) and treat accordingly. It can also help to know for sure what the Western diagnosis is, since there are TCM herbal approaches that can be used based upon these findings. In fact, I highly encourage traditional veterinarians to seek this information before treating, as well.

**Acupuncture Therapy:** Based upon findings for constitutional issues, 8 principle and Zang-Fu indications.

**References:**

1. Blekher T, Yamada T, Yee RD, Abel LA. Effects of acupuncture on foveation characteristics in congenital nystagmus. Br J Ophthalmol 1998;82:115-120.
2. Magnusson M, Johansson K, Johansson BB. Sensory stimulation promotes normalization of postural control after stroke. Stroke 1994;25:1176-1180.