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**18/MHS02/106**

**NURSING**

**PHS212**

**Assignments;** Discuss the physiology of balance

Balance is mediated by the vestibular nuclei in the brain stem the labyrinth (a part of the inner ear), is a major organ of our vestibular (balance) system

The three semicircular canals of the labyrinth is associated with sensing rotary motion. the brain senses the direction and speed of rotation of the head by the movement of fluid in the semicircular canals. Balance is maintained by the interactions between the labyrinth and other systems in the body, such as the visual and skeletal systems.

The main inputs into the balance system are the:

1 vestibular labyrinths

2 visual system (eyes)

3 somatosensory system, especially proprioception

the main outputs from the vestibular nuclei are:

1 vestibulo-ocular:

2 permitting reflex eye movements related to posture

3 vestibulo-spinal which supply:

i anti-gravity muscles in the lower limbs

ii reflex arcs which control gait

# **The Physiology Of [Balance:](https://www.britannica.com/science/proprioception) Vestibular Function**

The [vestibular system](https://www.britannica.com/science/vestibular-system) is the sensory apparatus of the [inner ear](https://www.britannica.com/science/inner-ear) that helps the body maintain its postural [equilibrium](https://www.britannica.com/science/proprioception). The information furnished by the vestibular system is also essential for coordinating the position of the [head](https://www.britannica.com/science/head-anatomy) and the movement of the eyes. There are two sets of end organs in the inner ear, or labyrinth: the [semicircular canals](https://www.britannica.com/science/semicircular-canal), which respond to [rotational](https://www.britannica.com/science/rotation-physics) movements (angular acceleration); and the [utricle](https://www.britannica.com/science/utricle) and [saccule](https://www.britannica.com/science/saccule)within the [vestibule](https://www.britannica.com/science/vestibule-ear), which respond to changes in the position of the head with respect to gravity (linear acceleration). The information these organs deliver is proprioceptive in character, dealing with events within the body itself, rather than exteroceptive, dealing with events outside the body, as in the case of the responses of the cochlea to [sound](https://www.britannica.com/science/sound-physics). Functionally these organs are closely related to the cerebellum and to the reflex centres of the [spinal cord](https://www.britannica.com/science/spinal-cord) and [brainstem](https://www.britannica.com/science/brainstem) that govern the movements of the eyes, neck, and limbs.

## **Disturbances of the [vestibular system](https://www.britannica.com/science/vestibular-system)**

The relation between the vestibular apparatus of the two ears is [reciprocal](https://www.merriam-webster.com/dictionary/reciprocal). When the head is turned to the left, the discharge from the left horizontal canal is decreased, and vice versa. Normal posture is the result of their acting in cooperation and in opposition. When the vestibular system of one ear is damaged, the unrestrained activity of the other causes a continuous false sense of turning ([vertigo](https://www.britannica.com/science/vertigo)) and rhythmical, jerky movements of the eyes ([nystagmus](https://www.britannica.com/science/nystagmus)), both toward the uninjured side. When the vestibular hair cells of both inner ears are injured or destroyed, as can occur during [treatment](https://www.britannica.com/science/ototoxic-drug) with the [antibiotics](https://www.britannica.com/science/antibiotic)gentamicin or [streptomycin](https://www.britannica.com/science/streptomycin), there may be a serious disturbance of posture and gait ([ataxia](https://www.britannica.com/science/ataxia)) as well as severe vertigo and disorientation. In younger persons the disturbance tends to subside as reliance is placed on vision and on proprioceptive impulses from the muscles and joints as well as on cutaneous impulses from the soles of the feet to compensate for the loss of information from the semicircular canals. Recovery of some injured hair cells may occur.

HOW IS BALANCE MAINTAINED;

The balance system works with the visual and skeletal systems (the muscles and joints and their sensors) to maintain orientation or balance.

Note below.. the ear is responsible for balance.