

Name: Akintunde Dolapo Ayomide.

Matric No: 18/mhs02/033.

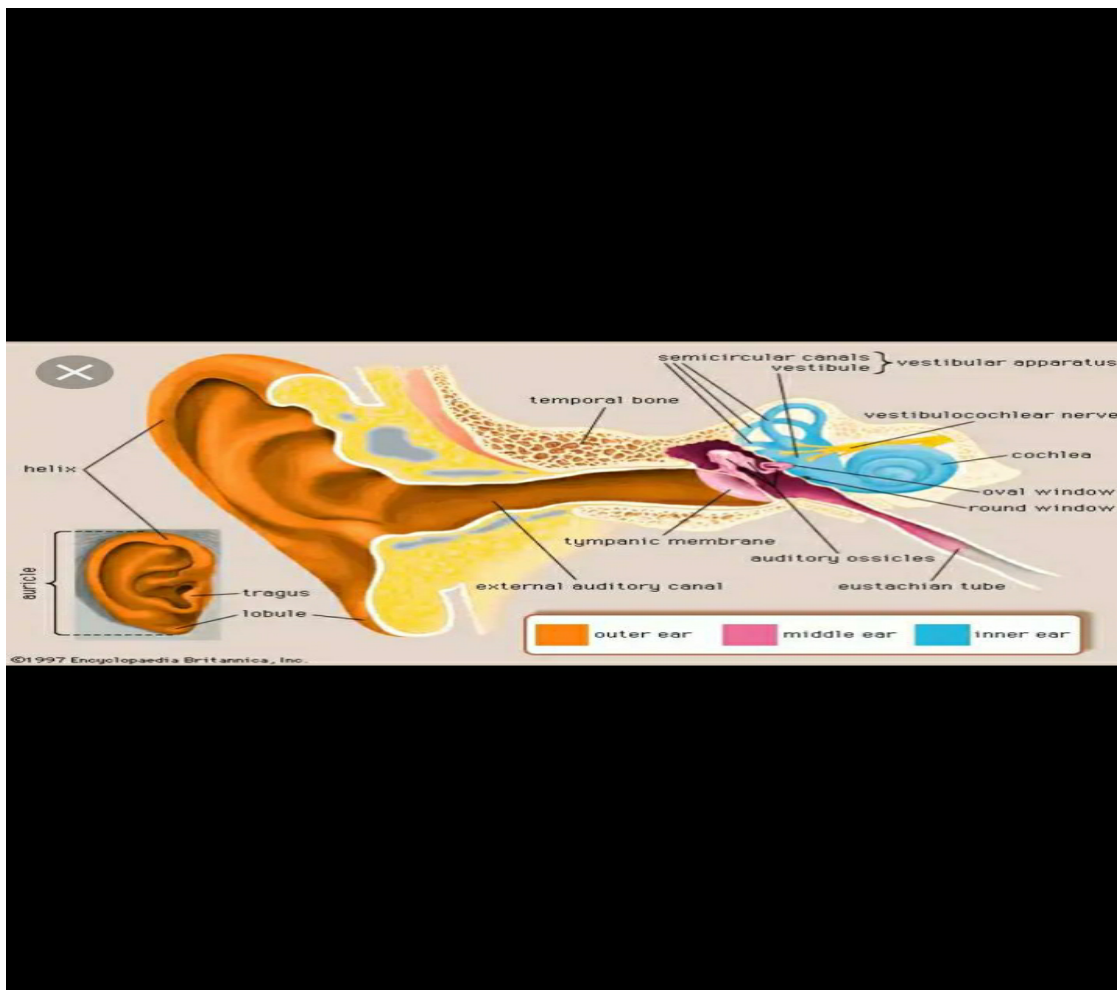
Department/Level: Nursing/200Level.

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DISCUSS THE PHYSIOLOGY OF BALANCE.

The semicircular canals and the vestibule (utricle and saccule) are concerned with balance. Any change of position of the head causes movement in the perilymph and endolymph, which bends the hair cells and stimulates the sensory nerve endings in the utricle, saccule and ampullae. The resultant nerve impulses are transmitted by the vestibular nerve which joins the cochlear nerve to form the vestibulocochlear nerve. The vestibular branch passes first to the vestibular nucleus, then to the cerebellum.

The cerebellum also receives nerve impulses from the eyes and proprioceptors (sensory receptors) in the skeletal muscles and joints. Impulses from these three sources are coordinated and efferent nerve impulses pass to the cerebrum and to skeletal muscles. This results in awareness of body position, maintenance of upright posture and fixing of the eyes on the same point, independently of head movements.



- 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 rotatory 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 labyrinth.
 2. Visual system (eyes).
 3. Somatosensory system, especially proprioception.
- The main outputs from the vestibular nuclei are;
 1. Vestibulo-ocular;
 - Permitting reflex eye movement related to posture.
 2. Vestibulo-spinal which supply;
 - Anti-gravity muscles in the lower limbs.
 - Reflex arcs which control gait.