Title : **To redesign and fabricate a vestibular stimulator for Brain Injured children**

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Introduction:

The vestibular system is considered to play an integral role in the control of posture and balance. Some simple therapeutic equipment are available to stimulate the vestibular system. These equipments usually stimulate the system in limited direction and position. They do not provide appropriate support during stimulation, hence, they are difficult and unsafe to use. Often the child is afraid of the equipment and therapists or parents have difficulty using those equipments. As a result, vestibular therapy is usually omitted from therapeutic program of brain injured child.

Methodology:

A special device based on ergonomics concern (user-centered, safety, adjustability, effective, attractive to eye ,suitable material,...) was redesigned and redeveloped called Vestibular Stimulator in the University of Social Welfare and Rehabilitation Sciences, Tehran, to stimulate vestibular organ passively in different directions with a digitally controlled speed (first prototype was designed and implemented at IITB, 2007).Dimensions of different parts of vestibulator were obtained from anthropometric survey on brain injured children with 2-12 years old.

Results:

The vestibular stimulator is an apparatus for controlling vestibular stimulation.It can operate linear vestibular stimulation in each two dimensions of movements. In the sagittal plane the seat of vestibular bed can move up- down directions with course ±50 cm and the velocity up to 15mm/s, and forward –backwarddirection with course ±90cm and the velocity up to 13mm/s. In the horizontal plane, side to side (tilting) movements can be run with ±20o, up to 8.5o/s.The rotational vestibular stimulation can be performedfrom 0.001 to 0.5 Hz and in each clockwise and counter-clockwise direction. The vestibulator was registered in the Industrial Property Office and confirmed with Ministry of Health and Medical Education-Iran(Reference number: 73250 date: 2014/2/1).

Conclusion:

The main advantage of this apparatus is thatprovides the stimuli similar to that which the subject will experience in daily living, thesubject can receive vestibular stimulation independentlyin each position. Anotheradvantage is;the user has full control over acceleration, velocity and amplitude, and can configure his/hers own protocols. Therefore, designing a device based on ergonomics concern and rehabilitation intervention can promote rehabilitation ergonomics.