

## **Head Movements and Balance Analysis In A Virtual Environment For Reduced Falls and A Safer Occupational Environment.**

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**Abstract:** While balance rehabilitation for vestibular disorders has been studied in conjunction with virtual reality, virtual reality's applications in minimizing workplace falls are very few. We propose that virtual reality can help in reducing the number of occupational falls. Virtual reality provides an ideal environment very similar to the real world to understand the balance strategies employed by the central nervous system, and also helps to differentiate or integrate the behavior of various sensory inputs depending on our needs. Also, a virtual environment will give a better view of various sensory strategies and neuromuscular responses used by falling workers in an occupational setting. To reduce falls and improve balance, training was conducted in a virtual environment for nine sessions over the course of three weeks. The response of the subjects was recorded as performance scores in the virtual environment, EMG, head movements and balance scores. Our research shows that scores on standard balance tests improve after training in a virtual environment. The experimental results also show an increase in performance in the virtual environment (implying more familiarity with the environment). The improvement in balance tests in the real world suggest that this type of training could lead to less falls in the desired environment/occupation.