

Impact of Audio Vestibular Degeneration on Gait Parameters in Elderly Individuals

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ABSTRACT

Introduction: Age-related audio vestibular degeneration is a progressive degenerative condition affecting the auditory and vestibular systems in elderly individuals, leading to impaired locomotor control and altered gait performance. Although gait abnormalities are frequently observed in elderly individuals with vestibular dysfunction, limited studies have comprehensively evaluated the association between audio vestibular degeneration and spatiotemporal gait characteristics.

Aim: To determine the association between audio vestibular degeneration and spatiotemporal gait characteristics in elderly individuals.

Materials and Methods: A cross-sectional observational study was conducted among 60 community-dwelling elderly individuals aged 60-88 years. Participants were categorised into three age groups: Group I (60-69 years), Group II (70-79 years), and Group III (≥ 80 years). The severity of audio vestibular degeneration was assessed using the B.A.R.E. test. Gait parameters, including step length, stride length, cadence, stance phase duration, and double-support time, were evaluated using a three-dimensional gait analysis system. Statistical analysis included one-way ANOVA, Pearson correlation

analysis, and an independent-samples t-test with a significance level set at $p < 0.05$.

Results: The findings demonstrated significant deterioration in gait performance with increasing age and severity of audio vestibular degeneration ($p < 0.001$). Significant negative correlations were observed between B.A.R.E. scores and gait parameters, including step length ($r = -0.850$), stride length ($r = -0.815$), and cadence ($r = -0.829$), indicating reduced gait efficiency among elderly individuals with greater vestibular degeneration. Conversely, stance phase duration ($r = 0.752$) and double-support time ($r = 0.805$) increased significantly with worsening vestibular dysfunction, reflecting a more cautious gait pattern and reduced dynamic stability.

Conclusion: Audio vestibular degeneration significantly affects gait performance in elderly individuals and contributes substantially to impaired mobility and increased fall risk. Early identification and targeted vestibular rehabilitation interventions may help improve gait performance and functional mobility in elderly individuals.

Keywords: Ageing, Fall risk, Gait analysis, Locomotion, Vestibular dysfunction.

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