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Striking the Right Balance: Article Summary for ‘Sounds Disrupt Balance in People with Vestibular Disorders, Student Finds’

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In this edition of “Striking the Right Balance,” Michael Vekasi, AuD, R.Aud, Aud(C), FAAA provides an overview of an article on the role of sound in disrupting balance for people with inner ear disorders, with special permission to reprint from The Hearing Review.

Michael Vekasi, AuD, R.Aud, Aud(C), FAAA coordinates the “Striking the Right Balance,” feature which will cover the latest information on ‘all things vestibular.’ If you would like to be more involved in all things vestibular, please check out and like our Facebook page by searching for “CAA National Vestibular Special Interest Group” within Facebook. You can also reach us by email at CAAvestibular@gmail.com.

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A research article published by Lubetzky, Cosetti, Harel, Sherrod, Wang, Roginska, et al. (2025) was recently summarized in The Hearing Review (2025). The researchers looked at how people with unilateral vestibular hypofunction, compared to healthy controls, integrated sound and visual cues for balance in a virtual reality (VR) immersive subway environment. They found that the **addition of contextually-accurate sounds, to a standing balance task in simulated real-life, increased sway in people with vestibular hypofunction** but not in healthy controls (Lubetzky, Cosetti, Harel, Sherrod, Wang, Roginska, et al., 2025).

In addition to the findings of this article, this research highlights a novel use of VR in vestibular testing. The use of VR has previously been used mostly in conjunction with the management or

rehabilitation of vestibular hypofunction. This research article demonstrates the expanded functionality of VR to benefit clinicians and their patients for both the assessment and treatment of balance problems.

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Sounds Disrupt Balance in People with Vestibular Disorders | The Hearing Review

Summary: A new study reveals that auditory stimuli, like subway sounds or white noise, significantly impact balance in individuals with vestibular hypofunction, suggesting a need to integrate sound into balance assessment and therapy.

Takeaways

1. **Auditory Impact on Balance**: Research shows that sounds, particularly in combination with moving visuals, can worsen balance issues in people with unilateral vestibular hypofunction.

1. **Virtual Reality Experiment**: Participants in a simulated subway environment demonstrated increased body sway when exposed to audio, highlighting the vestibular system's sensitivity to auditory inputs.

1. **Implications for Therapy**: Incorporating real-world sounds and challenging visual cues into balance training could enhance interventions for vestibular disorders, with portable VR headsets offering a promising tool for assessment and treatment.

The vestibular system is a network of organs in the inner ears that detects the motions and position of the head. The brain uses this information, along with inputs from the eyes and joints, to maintain the body's balance.

Visual information has long been proven to affect balance—for example, strobe lights and swirling images can cause instability—but a new study published in *PLOS ONE* shows that sounds can also be a disruptive factor for those who have vestibular hypofunction, a vestibular system disorder resulting in impaired balance.

"People with vestibular hypofunction have difficulty in places like busy streets or train stations where the overwhelming visual information may cause them to lose balance or be anxious or dizzy," says lead author Anat Lubetzky, associate professor of physical therapy at NYU Steinhardt School of Culture, Education, and Human Development. "Sounds are not typically considered during physical therapy, making our findings particularly relevant for future interventions."

The researchers conducted an experiment with 69 participants divided into two groups: healthy controls and individuals with unilateral vestibular hypofunction (affecting one ear).

Participants wore a virtual reality headset that simulated the experience of being in a New York City subway. As they experienced the sights and sounds of the "subway," they stood on a platform that measured their body movement (known as sway), while the headset recorded their head

movement, two indicators of balance. Participants were provided with different subway scenarios: static or moving visuals paired with silence, white noise, or recorded subway sounds.

The results revealed that for the group with vestibular hypofunction, the moving visuals accompanied by audio (either white noise or subway sounds) resulted in the greatest amount of sway. This sway was evident by the body's forward and backward movements, as well as head movements left to right, and head tilts upward and downward. Audio conditions did not affect the balance of the healthy individuals.

"What we've learned is that sound should be included as part of both the assessment of balance and intervention programs," says Lubetzky. "Because balance training is known to be task-specific, ideally, these should be real sounds related to patients' typical environments and combined with salient and increasingly challenging visual cues. Portable virtual headsets are a promising tool for both assessing and treating balance problems."

References

1. Lubetzky AV, Cosetti M, Harel D, Sherrod M, Wang Z, Roginska A, et al. (2025) Real sounds influence postural stability in people with vestibular loss but not in healthy controls. PLoS ONE 20(1): e0317955. https://doi.org/10.1371/journal.pone.0317955

1. Medical Xpress (2025). *VR subway experiment highlights role of sound in disrupting balance for people with inner ear disorder* [Website Resource]. Retrieved from: https://medicalxpress.com/news/2025-01-vr-subway-highlights-role-disrupting.html

1. The Hearing Review (2025). *Sounds disrupt balance in people with vestibular disorders, study finds* [Website Resource]. Retrieved from:

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