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Recent Advancement in Physiotherapy for Treatment of Benign Paroxysmal Positional Vertigo: A Literature Review

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ABSTRACT

Introduction: This study focusing on innovative techniques such as vestibular rehabilitation with virtual reality (VR), BPPV simulation tools, and the universal repositioning maneuver VR-based interventions offer immersive and engaging environments to enhance patient outcomes, while simulation tools provide precise and controlled methods to aid in diagnosis and treatment planning This review evaluates the efficacy and practicality of these techniques, providing evidence-based insights to improve clinical applications and patient-centered care.

Aim: Ultimately, the study highlights the significance of interdisciplinary collaboration in advancing physiotherapy practices and enhancing the quality of life for individuals suffering from BPPV.

Method: This review integrates findings from study focused on the treatment of bppv with application of virtual reality (VR)-based vestibular rehabilitation to address residual symptoms following canalith repositioning procedures. VR rehabilitation involved immersive and interactive exercises aimed at enhancing neural plasticity and balance function. The VR group demonstrated superior reductions in symptoms and improved balance compared to conventional approaches The other recent treatment utilised 3D simulation technology to model otoconial debris movements during diagnostic and repositioning maneuvers. By incorporating fluid dynamics and 3D morphology of the inner ear, the simulation provided real-time visualisation of debris movements in the semicircular canals during maneuvers such as Epley and Semont. New approach is Universal Repositioning Manoeuvre (URM) using a 3D biomechanical model to evaluate its potential to treat single and multicanal BPPV. The study simulated otolith repositioning from all semicircular canals to the utricle using a simplified, four-step sequence. The model demonstrated the effectiveness of the URM in resolving canalolithiasis of the posterior, anterior, and lateral canals, as well as multicanal cases.

Result: Recent advancements in BPPV management, including Virtual Reality (VR)-based vestibular rehabilitation, 3D simulation-guided maneuver analysis, and the Universal Repositioning Manoeuvre, have shown promising results. VR rehabilitation significantly reduces dizziness and enhances balance by engaging patients in interactive exercises. The 3D simulation models optimise diagnostic accuracy and improve maneuver efficacy. The Universal Repositioning Manoeuvre simplifies treatment, addressing single and multicanal BPPV in a streamlined, four-step sequence. These techniques reduce residual symptoms, treatment time, and patient discomfort, offering innovative and accessible solutions to improve outcomes in BPPV care.

Conclusion: The integration of novel techniques such as VR-based vestibular rehabilitation, 3D simulation-guided maneuvers, and the Universal Repositioning Manoeuvre represents a paradigm shift in the treatment of BPPV. These advancements simplify care, address complex cases like multicanal BPPV, and offer accessible options for patients with physical limitations. Together, they enhance therapeutic e precision, efficiency, and patient adherence, contributing to superior long-term outcomes.

Implications: These advancements simplify BPPV treatment, enhance diagnostic accuracy, and improve accessibility for non-specialists and telehealth. They promise better patient outcomes, reduced healthcare costs, and improved adherence, setting a new standard in vestibular therapy.

Keywords: BPPV management, Vestibular rehabilitation, VR therapy, 3D simulation models, Universal repositioning manoeuvre, multicanal treatment, Otolith repositioning techniques, Innovative vestibular therapy

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