Telerehabilitation for the Evaluation and Management of a Dizzy Patient: A Mini-Review

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Abstract

Dizziness and vertigo are common, disabling symptoms, especially in older adults. They can negatively affect quality of life and independence of the person. Vestibular rehabilitation is a key treatment, but access is often limited by physical, geographic, and socioeconomic factors. Telerehabilitation has emerged as a viable alternative, particularly during the COVID-19 pandemic. This mini review synthesizes available evidence on vestibular telerehabilitation, focussing on feasibility, delivery methods, outcomes, and future directions. We have included commonly used outcomes measures like balance, gait, gaze stability, dizziness, psychological health, and quality of life. Findings suggest telerehabilitation is an effective alternative to in-person therapy. However, further research is needed to standardize protocols, evaluate cognitive outcomes, and ensure inclusivity across diverse populations. Digital innovations are a promising options for more accessible, patient-centered vestibular care.

Keywords: Telerehabilitation; Telehealth; Telemedicine; Vestibular Rehabilitation; Dizziness; Balance

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Introduction

Dizziness and vertigo are offending symptoms that can encompass a variety of sensations relating to perception of the body's relationship to space.[1] Dizziness can be a component symptom of a vestibular dysfunction along with vertigo, nausea, light-headedness or presyncope and imbalance.[2] It is one of the most common reasons for consultation affecting about 15-20% of adults yearly based on large population-based studies. Its prevalence is at 5%, with an annual incidence of 1.4%. Women are more predisposed than men and prevalence increase with age.[3] It has a negative effect on a person's well-being and quality of life (QOL) especially in the elderly population where it represents a dysfunction in more than one organ system.[2]

The evaluation and management of dizziness in clinical settings involve protocols that include head and body mobilization. Once a diagnosis is established, vestibular rehabilitation is typically recommended. Vestibular rehabilitation has been established as a safe and effective approach for vestibular disorders and is supported by moderate to strong evidence.[4] It is an exercise-based group of approaches based on the protocols developed by Cooksey and Cawthorne. However, for many patients, in-person rehabilitation may be inaccessible due to debilitating symptoms, safety concerns, financial constraints, or geographic barriers. In such cases, telemedicine offers a viable alternative for delivering care, enabling remote support for individuals who cannot access immediate in-person consultation. This mini review discusses the current trends, benefits, challenges and future directions on the use of vestibular telerehabilitation.

The digital era of vestibular rehabilitation

Telemedicine is the distant delivery of health services, by health care professionals using information and communication technologies for the exchange of information for the prevention, diagnosis and treatment of diseases.[5] Telerehabilitation includes the delivery of rehabilitation medicine services via information and communication technologies. This term encompasses a range of rehabilitation services that include assessment monitoring, prevention, intervention, supervision, education, consultation and counselling.[6] Many clinicians were already using telemedicine for the evaluation and management of dizziness. Hower, it became more popular during the COVID-19 pandemic.

The current practice of vestibular telerehabilitation

Telerehabilitation is currently being offered for multiple conditions. These include older adults with functional limitations, frailty, chronic dizziness, or balance disorders, adults with conditions such as chronic or unilateral vestibular dysfunction, benign paroxysmal positional vertigo (BPPV), multiple sclerosis, or mild cognitive impairment, and young adults with unilateral peripheral

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vestibular hypofunction. A variety of formats are employed to deliver these interventions, such as internet-based programmes, virtual reality (VR) systems, home-based computerized training platforms, and blended approaches that involve physiotherapist supervision. There are multiple methods and protocols based on neuroplasticity mechanisms through adaptation, habituation and substitution to improve visuo-vestibular interactions.

Printed instructions or software-guided modules are used to deliver the exercises remotely, while some clinicians also incorporate immersive or gamified elements. The management of vestibular dysfunction may include a multidisciplinary team which includes the neurologist, physiatrist, otolaryngologist, primary care physicians and allied rehabilitation professionals.

The most evaluated physical performance outcomes in these patients include gait speed, gait parameters, balance, postural control, and gaze stability. Vestibulo-ocular reflex gain and functional range of motion are also frequently assessed. Dizziness, vertigo, visual preference, and perceived difficulties were frequently reported as symptom-related outcomes. Other psychological and psychosocial outcomes, include anxiety, depression, dread of falling, satisfaction, perceived confidence and QOL.

Majority of the studies include adults to older adults and very few on the younger age groups. One reason would be the increased prevalence of dizziness among the older population.[7] The causes of dizziness in the older population are multifactorial with benign paroxysmal positional vertigo as the most frequent form followed by Meniere's disease. Aging causes a deterioration of the peripheral and central systems that maintain postural stability hence here is an increased risk of falling for these patients as well as the fear of suffering the consequences of a fall.[8,9] Nonetheless, the effects of vestibular rehabilitation do not differ with respect to the patient's age.[10]

Literature suggests that females have more dizziness and undergo vestibular rehabilitation as compared to males. Yardley et al documented that 12.7% of women in their sample reported debilitating dizziness compared to 8.4% of men. However, women did not report more self-perceived disability, anxiety and depression than men.[11]

The benefits of vestibular telerehabilitation

The clinical presentation of benign causes of dizziness can resemble life-threatening neurologic conditions. Therefore, prompt and thorough evaluation is essential. The early implementation of a vestibular rehabilitation programme prevents the long term sequalae that may lead to anxiety, impairment in activities of daily living and depression.[12]

Vestibular exercises are found to be effective in treating patients with vestibular dysfunction, cerebellar dysfunction, head injury, Parkinson's disease and anxiety. Improvements are reported in dizziness reduction, balance, gait, activities of daily living, visual impairments and QOL.[10]

A major advantage of vestibular telerehabilitation is the consistent access to services, periodic reassessment, education and modifications of home programmes for up-to-date intervention.[13] Telerehabilitation allows for treatment of the acute phase of diseases by substituting the traditional face-to face approach in the patient-rehabilitation interaction. It can cover for concerns of time and space overcoming the barriers of in-person rehabilitation for specific situations. It is a cost-effective option for healthcare delivery, and it allows the patients to perform physiotherapy at home without compromising safety. The use of a home-based virtual reality protocol may be a safe option to address visual-ocular reflex gain, postural control and improve QOL in patients whom the presence of cognitive decline could hinder the achievement of the goal of rehabilitation.[14]

Challenges to the use of vestibular telerehabilitation:

Although vestibular telerehabilitation has many advantages, there is a gap in the specifics in terms of process, dosage and delivery. There is a need to further evaluate the usefulness of virtual reality both for home-made devices and for more sophisticated equipment.[14]

Some personal factors may reduce patient's engagement in early vestibular rehabilitation. These may include the inability to navigate spaces due to dizziness and vertigo, safety concerns such as falls and low tolerance to moving vehicles, difficulty in access and geographical concerns. Majority of the studies are intervention based with limited available literature on the diagnostic use of telerehabilitation for vestibular rehabilitation hence there can be delays in the management due to lack of definitive diagnosis.

Future directions of vestibular telerehabilitation

Due to the rapidly emerging advancements in digital healthcare, vestibular telerehabilitation is likely to evolve further. Using advances in technology, protocols for diagnostic vestibular telerehabilitation can be further refined and wearable devices can address concerns for falls. Grillo et al., recommend that new studies should include more subgroups and analysis of the different modes of telerehabilitation (synchronous Vs. asynchronous, remote support, and monitoring).

Data from these would be necessary to establish standard protocols for platforms, programmes and dosages.

Expanding the evaluation to different subgroups of patients with vestibular dysfunction and to investigate telerehabilitation with greater methodological rigor.[15]

Conclusion

Vestibular telerehabilitation is a practical, accessible, and effective alternative to traditional in-person therapy for patients with dizziness and balance disorders. It has the potential to deliver comparable or superior outcomes in physical, psychological, and QOL measures. Further research is needed to refine delivery methods, establish standardized protocols, and explore its use across diverse populations and cognitive profiles. As digital health continues to evolve, vestibular telerehabilitation can be a valuable tool in improving the reach and continuity of vestibular care.

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