

Functional Outcome Measures in VR-Based Art Therapy for Stroke Survivors

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Introduction

Stroke remains a significant global health challenge, often leaving survivors with physical, cognitive and emotional impairments that profoundly affect their quality of life. Rehabilitation strategies have evolved to incorporate innovative technologies, such as Virtual Reality (VR), to enhance recovery outcomes. VR-based art therapy represents a novel intersection of creative expression and advanced technology, offering a unique approach to address both motor and psychological deficits in stroke survivors. By immersing patients in interactive, virtual environments where they can engage in artistic activities, this therapy leverages neuroplasticity and emotional engagement to promote functional recovery. Functional outcome measures standardized tools used to assess improvements in physical, cognitive and daily living activities are critical in evaluating the efficacy of such interventions. These measures provide objective data on progress, guiding clinicians in tailoring rehabilitation plans. The integration of VR-based art therapy with robust functional outcome assessments holds promise for enhancing stroke rehabilitation, particularly by fostering motivation and measuring tangible improvements in survivors' abilities [1].

Description

VR-based art therapy involves the use of virtual environments where stroke survivors can create art through digital interfaces, such as headsets, motion-tracking controllers, or touchscreens, designed to accommodate motor limitations. This approach is particularly effective for engaging patients who may struggle with traditional rehabilitation exercises due to physical or motivational barriers. The immersive nature of VR allows survivors to practice fine motor skills, such as grasping or drawing, in a controlled yet stimulating environment that can be adjusted to their abilities. For instance, programs like Tilt Brush or custom-designed art applications enable patients to paint or sculpt in 3D space, promoting repetitive movements that enhance motor recovery. Functional outcome measures, such as the Fugl-Meyer Assessment (FMA) for motor function or the Barthel Index for activities of daily living, are used to quantify improvements in these areas. These tools assess metrics like range of motion, strength and independence in tasks like dressing or eating, providing a clear picture of how VR art therapy contributes to physical recovery. Additionally, the engaging and creative aspects of art-making in VR can boost adherence to therapy, as patients often find the process enjoyable and less monotonous than conventional exercises, leading to more consistent participation and better outcomes.

Beyond motor benefits, VR-based art therapy addresses psychological

cognitive challenges, which are equally critical in stroke rehabilitation. Many survivors experience depression, anxiety, or cognitive deficits, such as impaired attention or memory, which can hinder recovery. The creative outlet provided by VR art therapy fosters emotional expression and reduces stress, while the interactive environment stimulates cognitive processes like problem-solving and spatial awareness. Functional outcome measures tailored to these domains, such as the Montreal Cognitive Assessment (MoCA) for cognitive function or the Hospital Anxiety and Depression Scale (HADS) for emotional well-being, help evaluate the therapy's impact on non-motor outcomes. Studies, such as those by Shamri Zeevi (2021), highlight how VR art therapy engages adolescents and adults alike, promoting emotional resilience and cognitive engagement through immersive creative tasks. By combining these psychological benefits with motor practice, VR art therapy creates a holistic rehabilitation approach. The use of objective measures ensures that improvements in mood, cognition and daily functioning are tracked systematically, allowing clinicians to adjust therapy parameters such as task complexity or session duration to maximize benefits. This dual focus on physical and psychological recovery, supported by rigorous outcome assessments, underscores the potential of VR-based art therapy as a transformative tool in stroke rehabilitation [2].

Conclusion

VR-based art therapy offers a promising avenue for stroke rehabilitation, blending creative expression with cutting-edge technology to address both motor and psychological impairments. By leveraging immersive environments, this approach enhances engagement and promotes neuroplasticity, leading to measurable improvements in function. Functional outcome measures, such as the Fugl-Meyer Assessment, Barthel Index and Montreal Cognitive Assessment, provide critical data to evaluate progress in motor skills, daily activities and cognitive-emotional health. These tools ensure that VR art therapy is not only engaging but also effective, offering objective evidence of its impact. As technology continues to advance, integrating VR-based art therapy with standardized outcome measures can revolutionize stroke rehabilitation, empowering survivors to achieve greater independence and emotional well-being through a personalized, holistic approach.

Acknowledgement

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Conflict of Interest

None.

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