Chapter 16
Virtual Reality Interventions to Improve Function After Stroke

Miguel Pereira
https://orcid.org/0009-0002-7788-5815
ESS, Polytechnic of Porto, Portugal

Patrícia Oliveira
ESS, Polytechnic of Porto, Portugal

Manuela Gomes
ESS, Polytechnic of Porto, Portugal

Ângela Fernandes
CIR, ESS, Polytechnic of Porto, Portugal

Paula Portugal
CIR, ESS, Polytechnic of Porto, Portugal

Tiago Coelho
https://orcid.org/0000-0001-7847-2401
CIR, ESS, Polytechnic of Porto, Portugal

ABSTRACT

Stroke is the most common neurological disease and one of the most common fatal diseases in the world. Stroke patients suffer from several physical, cognitive, and sensory complications that impact their functionality and independence in daily activities and, consequently, can reduce their quality of life. Given this impact, it is important to assess the various ways to ensure effective and satisfactory rehabilitation for the stroke person. Virtual reality has been proven in recent times as a promising tool in stroke motor rehabilitation, being effective with its immersive elements and, at the same time, motivating patients. With all this in mind, this chapter aimed to analyze the current scientific evidence of Virtual Reality intervention for functional rehabilitation of stroke patients.

DOI: 10.4018/978-1-6684-9251-2.ch016

Copyright © 2024, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.

INTRODUCTION

Virtual Reality (VR) is a technology that is used in many fields and includes various devices, hardware and software. It is used in research, education, evaluation and therapeutic intervention. The growing number of publications shows the interest of researchers and clinicians in VR (Caiana et al., 2016). Since VR technology is seen as a potential method for stroke rehabilitation, it has recently been used mostly in clinical rehabilitation as it is considered a promising approach in stroke rehabilitation (Kannan et al., 2019; Lee, 2019; Leng et al., 2022; Oh et al., 2019; Zhang et al., 2021), due to its qualities of immersion, interactivity, and creativity (Aminov et al., 2018; Qian et al., 2020).

Post-stroke survivors' management requires early recovery intervention. It should begin as soon as the patient stabilizes and must continue after being back into the community (Bernhardt et al., 2008; Langhorne et al., 2018). Evidence suggests that the more they have access to their rehabilitation, the more benefits they have in their functionality and Quality of Life (QOL) (Mohd Nordin et al., 2014).

Stroke rehabilitation's finest efforts and outcomes may be undone if the community is not sufficiently mobilized (Björkdahl, 2007). When presented with a community-level rehabilitative opportunity, the incidence of functional deterioration can be reduced, with an improvement in Activities of Daily Living (ADL) (Legg, 2004; Walker et al., 2013). Additionally, patients can increase their QOL measures (Fjæartoft et al., 2004). Despite these benefits, it is necessary to include new motivational interventions, otherwise stroke survivors might not be motivated to continue repetitive and mundane therapy at home (Singh et al., 2013). VR can be a technology capable of performing self-administered exercises while bringing enjoyment and motivation to the rehabilitation (Ward et al., 2015).

Performing exercises with VR games in stroke survivors seems to be feasible and beneficial (Singh et al., 2017). Balance, functional mobility (Kim et al., 2016; Singh et al., 2013; Singh et al., 2012), and Upper Limb (UL) function (Hijmans et al., 2011; Singh et al., 2017) may be improved in stroke survivors who receive VR intervention in addition to standard physical rehabilitation (Ahmad et al., 2019). VR Games that mimic some aspects of standard neurorehabilitation programs could provide a platform for acquiring these skills. VR games could also be used as a substitute for certain parts of standard physical rehabilitation to maintain or further improve motor function and ADL in stroke survivors (Singh et al., 2013).

Treatment and rehabilitation compliance is an important factor to be considered in stroke treatment (Cheiloudaki & Alexopoulos, 2019). Therefore, VR rehabilitation has the potential to improve patient participation, provide intensive therapy, and reduce the need for health care professionals (O., 2012; Sveistrup, 2004). With all this in mind, this chapter aimed to analyze the current scientific evidence of VR intervention for functional rehabilitation of stroke patients.

MAIN FOCUS OF THIS CHAPTURE

Virtual Reality (VR)

The term Virtual Reality refers to the application of interactive simulations produced using computer hardware and software to provide people the chance to participate in settings that resemble and feel like actual-life situations and experiences (Weiss et al., 2006). The key concepts related to VR are immersion and presence. "Immersion" refers to the extent to which the user feels that they are in the virtual

32 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the product's webpage:
www.igi-global.com/chapter/virtual-reality-interventions-to-improve-function-after-stroke/334920?camid=4v1

Related Content

The Healing Effect of the Story: Gathering the Narrative Data of Patients Using Story Theory
Güven Soner (2022). *Narrative Theory and Therapy in the Post-Truth Era (pp. 211-218).*
www.igi-global.com/chapter/the-healing-effect-of-the-story/304942?camid=4v1a

The Impact of Art Therapy on the Elderly Population
Shira Davis (2023). *Exploring the Benefit of Creative Arts Therapies for Children, Adolescents, and Adults (pp. 110-124).*
www.igi-global.com/chapter/the-impact-of-art-therapy-on-the-elderly-population/323982?camid=4v1a

Social Alarms for Elderly Care: Opportunities and Challenges
Özge Kutlu and Sevinç Sütlü (2024). *Handbook of Research on Advances in Digital Technologies to Promote Rehabilitation and Community Participation (pp. 208-227).*
www.igi-global.com/chapter/social-alarms-for-elderly-care/334914?camid=4v1a

Spin Doctor in the Post-Truth Era: “Our Brand Is Crisis” Movie Example
Betül Baer (2022). *Narrative Theory and Therapy in the Post-Truth Era (pp. 161-174).*
www.igi-global.com/chapter/spin-doctor-in-the-post-truth-era/304938?camid=4v1a