World Academy of Science, Engineering and Technology
International Journal of Health and Medical Engineering
Vol:16, No:01, 2022

Virtual Reality in COVID-19 Stroke Rehabilitation: Preliminary Outcomes

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Abstract : Background: There is growing evidence that Cerebral Vascular Accident (CVA) can be a consequence of Covid-19 infection. Understanding novel treatment approaches are important in optimizing patient outcomes. Case: This case explores the use of Virtual Reality (VR) in the treatment of a 23-year-old COVID-positive female presenting with left hemiparesis in August 2020. Imaging showed right globus pallidus, thalamus, and internal capsule ischemic stroke. Conventional rehabilitation was started two weeks later, with virtual reality (VR) included. This game-based virtual reality (VR) technology developed for stroke patients was based on upper extremity exercises and functions for stroke. Physical examination showed left hemiparesis with muscle strength 3/5 in the upper extremity and 4/5 in the lower extremity. The range of motion of the shoulder was 90-100 degrees. The speech exam showed a mild decrease in fluency. Mild lower lip dynamic asymmetry was seen. Babinski was positive on the left. Gait speed was decreased (75 steps per minute). Intervention: Our game-based VR system was developed based on upper extremity physiotherapy exercises for post-stroke patients to increase the active, voluntary movement of the upper extremity joints and improve the function. The conventional program was initiated with active exercises, shoulder sanding for joint ROMs, walking shoulder, shoulder wheel, and combination movements of the shoulder, elbow, and wrist joints, alternative flexion-extension, pronation-supination movements, Pegboard and Purdo pegboard exercises. Also, fine movements included smart gloves, biofeedback, finger ladder, and writing. The difficulty of the game increased at each stage of the practice with progress in patient performances. Outcome: After 6 weeks of treatment, gait and speech were normal and upper extremity strength was improved to near normal status. No adverse effects were noted. Conclusion: This case suggests that VR is a useful tool in the treatment of a patient with covid-19 related CVA. The safety of newly developed instruments for such cases provides new approaches to improve the therapeutic outcomes and prognosis as well as increased satisfaction rate among patients.

Keywords : covid-19, stroke, virtual reality, rehabilitation
Conference Title : ICMTIHCP 2022 : International Conference on Medical Technology Innovations and Health Care Productivity
Conference Location : New York, United States
Conference Dates : January 28-29, 2022