

## Virtual Reality in the Physical-Functional Recovery of Patients after Stroke: A Short Communication

Vitória Pereira<sup>1,2</sup>, Francisco Vinicius Fontenele<sup>1,2</sup>, Jordeane Araujo<sup>1</sup>, Elivelton Montelo<sup>1</sup>, Kaline Melo<sup>3,4</sup>, Silmar Teixeira<sup>3,4</sup>, Luan Correia<sup>1,5\*</sup> and Victor Hugo Bastos<sup>1,5</sup>

<sup>1</sup>Brain Mapping and Functionality Laboratory (LAMCEF/UFPI), Federal University of Piauí, Brazil

<sup>2</sup>Mauricio of Nassau University Center, Parnaíba, Brazil

<sup>3</sup>The Northeast Biotechnology Network (RENORBIO), Federal University of Piauí, Teresina, Brazil

<sup>4</sup>Brain Mapping and Plasticity Laboratory (LAMPLACE/UFPI), Federal University of Piauí, Parnaíba, Brazil

<sup>5</sup>Biomedical Sciences Program, PPGCBM, Federal University of Piauí, Parnaíba, Brazil

\*Corresponding author: Luan Correia, Biomedical Sciences Program, PPGCBM, Federal University of Piauí, Parnaíba, Brazil, Tel: +55-86-9-8829-1971; Email: luancorrelafisio@gmail.com

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### Short Communication

The Stroke is a neurological syndrome characterized by brain vascular alteration of ischemic or haemorrhagic order [1,2] and one of the main responsible for physical disabilities in the world, and morbidity and mortality among developed countries [3]. Recent epidemiological data show that around 17 million people per year in the world are affected [4], impairing directly the functional autonomy and consequently the quality of life. Among the changes observed in the after stroke stand out: the reduction of postural control and muscle weakness that lead to an abnormal gait pattern; imbalance and proprioceptive changes [5].

The literature indicates that in recent years, Virtual Reality (VR) was introduced to the neurological treatment with the aim of improving the level of functional capacity of after stroke patients. VR is based on the development of computerized scenarios similar to real life that provide visual, auditory and tactile feedback, in a safe and stimulating way, being created specific functions such as walking, dancing, jumping, activities that require fine motor coordination, among others [6,7]. The activities programmed in VR can motivate the patient with cerebral lesions to leave a repetitive pattern of functionality, as well as generate visual feedback to correct possible errors of movements and balance improvement [5]. In addition to the physical-functional recovery, the VR through tools such as video games, for example, has advanced as an auxiliary and promising tool for the treatment of cognitive disorders such as mood disorder and anxiety [1].

The study developed by Mazzoleni et al. [8] proposed by means of a, Xbox Kinect platform the movements to be tracked and analyzed so that the patient received information about the body posture and rearrangements to be performed in the movement. Sixteen volunteers exercised in front of a TV screen and were tracked by a camera that transmitted their movements to the avatar, allowing the therapy to be performed at home, in a practical and secure way. The results showed significant improvements in balance and gait, in addition to providing greater motivation in patients.

Park et al. [9] associated the training in VR to Xbox Kinect equipment to investigate the motor recovery of the lower extremities of chronic after stroke hemiplegic patients. Twenty volunteers were divided into two groups, one group received only 30 min of conventional physiotherapy and the other, 30 min of conventional physiotherapy more 30 min of therapy based on VR. By practicing the VR training, volunteers were placed at a distance of 1.5-2 m from the

Kinect sensor which is an infrared camera responsible for recognizing the players' positions and movements, while the games were performed which motivated the stroke individuals. The training duration lasted 6 weeks. The results showed efficiency in this approach, acting in the motor function improvement.

In conclusion, it is stated that the use of VR has increased in after stroke patients and that there are relevant findings that treatment can assist in relearning or resumption of impaired motor functions [10]. However, some of the criteria need to be better analyzed, for example, the fact that there is no definition regarding treatment protocols and the lack of standardization of equipment for such practice [11, 6]. Therefore, a lot of aspects related to the clinical use of VR in after stroke treatment need to be defined and investigated, observing their effects in the short and long term in the nervous and musculoskeletal system.

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