

## Research Assessment #7

**Date: November 6th, 2020**

**Subject: “Efficacy of Virtual Reality Rehabilitation after Spinal Cord Injury:  
A Systematic Review”**

**MLA citation(s): De Araújo, Amanda Vitória Lacerda, et al. “Efficacy of Virtual Reality  
Rehabilitation after Spinal Cord Injury: A Systematic Review.” BioMed Research  
International, Hindawi Limited, 13 Nov. 2019. EBSCOhost,  
<http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=139642253>. Accessed 6  
Nov. 2020.**

These unprecedented times have redefined normalcy and not only has it been hard for everyone, but it has also become extremely difficult for SCI patients to recover as a major part of rehabilitation is creating a motivating environment with caring individuals around you. So how can patients be treated from home?

During an interview with Mrs. Katlyn Butler, an occupational therapist for SCI patients, she explained a new type of treatment plan, using virtual reality, or more popularly known as VR. Although this was new information, it made perfect sense to make use of technology to facilitate treatment. Furthermore, especially during current times, a trip to the hospital is not only frightening but may also be detrimental as spinal cord injuries may cause immune deficiency within many patients. However, with VR there is a lot of growth for development, as the patient can regain the feeling of using their limbs, it has low-risk rates and virtual reality is very common that patients can even play with friends, family, or even their therapist. Moreover, to gain a broader perspective and understanding of the quality of VR treatment, I read “Efficacy of Virtual Reality Rehabilitation after Spinal Cord Injury: A Systematic Review”. Within this article, the author, Amanda Vitória Lacerda De Araújo, reviewed over 500 articles about clinical studies regarding the effectiveness of VR therapy to combine the knowledge and to deduce the

general viewpoint of VR therapy and how it is used. Unfortunately, it was quite difficult at first as many of the studies were focused on older males, rather than young people. Nonetheless, after some deep research, they were able to discover findings that included a larger adult range (18-60) with a more diverse range of genders and types of injuries. In general, the average time taken for VR therapy was between 10-40 minutes. Although, in general, VR can be played for longer without adverse effects, the low therapy time was set so the patient does not experience muscle fatigue. This is because, after an accident, patients tend to experience muscle spasticity which causes their muscle tissue to become too tight due to lack of movement, if the muscles are over exhausted, and can cause inflammation or sickness which would be fatal to the patient themselves. Even though the rate of fatality due to prolonged virtual reality therapy time is quite low, precaution is taken for the benefit of the patient's health. Besides regulations on times, therapists also tend to follow a set of guidelines when choosing games or activities for the patient. Their main goal is to improve gait training, balance, and aerobic respiration through virtual stimulation. For example, a therapist may choose a virtual soccer match instead of a chess game because when a patient plays a virtual soccer match, similar brain centers used for leg movement, light up because the patient has an intent to kick the ball and they can also see a ball in front of them, so their motivation to push themselves will be higher. Throughout their research, it was found that VR therapy is truly effective not only improving the patient's physical motor function therapy but also their mental state as they can experience independence. This research is greatly beneficial as the goals of therapy can go beyond motor function, patients can play games where they have a "normal" life by doing general activities, like going to the mall, going to a concert, driving a car, without having to depend on other people.

This research was immensely impactful for my original work as I was able to discover VR therapy as a potential platform for teens with SCI. As mentioned before, spinal cord injuries are extremely hard for teens to deal with but at the same time, teens have a higher chance of recovering but due to lack of motivation and a good support system, many teens tend to

disregard therapy. However, with VR they would be introduced to a virtual network of friends that patients could connect with, and they would be encouraged, specifically teenagers, to continue therapy because they can have fun while rehabilitating. For further research, it would be helpful to know if there was a type of game that provided more success than others and it would also be interesting to delve deeper into how 4D VR therapy, which included games that can provide vibrations when touching something, affect the patient as well.

Annotations: <https://kami.app/0dNvm6a9ibIj>