

# Virtual Reality as Treatment Method for Knee Osteoarthritis - Short Review

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## Abstract

Virtual reality is computer-generated technology for therapeutic uses and rapidly growing in popularity. This review focused on the outcomes of the study show that virtual reality as treatment approach is a safe and acceptable therapy providing participants with satisfaction and motivation to exercise. Therapists are using VR to help people rehabilitate from osteoarthritis, strokes and injuries. The efficiency of Virtual Reality treatment was observed in patient with OA knee and many other diseases. Virtual reality approach Physical rehabilitation focuses on pain treatment, gait re-education, body balance improvement, increased mobility, and muscular strength development. Because of VR and modern technology, this activity should be done quickly and safely under the supervision of the therapist. Virtual reality is cost-effective of VR headsets and the expansion of Virtual reality apps. Using virtual reality to create fascinating and demanding settings can help you active and interested in your rehab.

**Keywords:** virtual reality, oculus quest, rehabilitation, knee osteoarthritis, physiotherapy.

## INTRODUCTION

The use of virtual gadgets is for physical, psychological and physiological healthcare purposes is referred to as virtual reality therapy. virtual reality headsets and the development of VR app, there has been a shift in the way people think about reality, VR therapy has become more practicable and reasonable. Virtual reality as treatment applications can be used to teach patients how to do actions that will help them overcome difficulties and recover from injuries and other conditions. Because of the adaptability of the brain, Neuro Therapy Virtual Reality claims that playing games can help you make better brain connections as you work toward certain goal (1).

VR is advanced technology in medical sciences results in a gradual initiation of computer interventions into rehabilitation. New technologies in rehabilitation were developed from the simplest forms of electronic platforms and motion capture devices and virtual reality technology. The technologies varies from non-expensive, popular gaming platforms to highly specialized systems with hardware and software platforms. Because of virtual reality and new innovation, this activity should be done quickly, conveniently, and safely, and under the supervision of the therapist .(2) Virtual reality is an computer- based environment that seems and feels real. Users can use custom-made devices to engage with a virtual environment. Games may provide you with a technology to operate or virtual flooring steps to be followed. Virtual Reality depend on the amount of physical sensations created, the degree of involvement with the virtual world, the dependability of artificial ingredients, and the user's separation from outside impulse (3). Virtual reality is a relatively new device that some therapists are using into their practise. The use of VR in rehab may have boosted the functional mobility of patients. Virtual reality as treatment approach may inspire you to participate in physical therapy. During your rehabilitation you are more likely to motivated as it is fun and enjoyable. These technologies could be helpful to physiotherapy in a variety of ways. People with a wide range of conditions may benefit from its usage. Using virtual reality to create fascinating and demanding settings can help you to concentrate and interested in your treatment, as well as help your physical therapist discover new approaches to put your body to the stress in order to improve your mobility and muscular endurance. Because virtual reality is such a newer type of rehab treatment, there is only low confidence that it is safe. Initial research suggests that using VR in physical therapy applications carries lower risk. Virtual

reality app allows gamers to participate in training exercises and "exercise" without becoming physically exhausted or causing harm(4) .

In this study current study show that virtual as treatment approach is a safe and appropriate therapy with minimal side effects which provide participants with satisfaction and motivation to exercise.

### 1. Virtual reality

Virtual reality improving the pain and motor coordination, which increases patient functional independence and the standard of living in patient with knee osteoarthritis. A game similar to this was used to improve muscle, body balance, and ROM in lower limbs. Patients with knee OA took part in the game by moving their legs and torso in different directions, shifting their body weight to the sensory cushions they were standing on. Exercises were graded on three degrees of difficulty, with visual and aural biofeedback providing feedback on how well they were performing. The purpose of Virtual workouts was to improve balance and coordination while also increasing range of motion and muscle strength. Patients used a virtual reality headset and motion sensors were attached to the operated limb. They conducted exercises that included active flexion and extension of the operated knee while playing a game that simulated boat rowing. Virtual Reality Training (VRT) is a promising field for health care, with the potential to improve training in a variety of condition. In physical therapy services, particularly Virtual reality training, are having a substantial impact on the care of osteoarthritis and many other condition (5). In studies patients with osteoarthritis in knee, the efficiency of VR rehabilitation was observed. Physical rehabilitation for osteoarthritis and many other condition focuses on pain treatment, gait training, body balance improvement, limb joint proprioception, increased mobility, and muscular strength development (6).

Virtual exercises has been proven to increase the range of knee movement. The enhancement of the range of motion and muscle mass is an objective evaluation of a knee function. The outcomes of the current study show that virtual reality rehabilitation is a safe and acceptable therapy which providing participants with satisfaction and motivation to exercise(7). For improving of life therapists choose technology that helps the patient improve certain skills and targeting individual problems with VR- based physical therapy and rehabilitation.

### 2. Oculus quest

Virtual reality system is a type of biotechnology that help users to interact with software by moving their limbs. It is kind of treatment use as rehabilitation approach. Virtual reality therapy has been hailed as an innovative way to improve patient health. Oculus quest is innovation that permits patients to immerse themselves in a virtual environment. This allows you to engage you in a virtual reality while also allows you to interact with it reality through the use of the patient's motions. This can also help rehabilitation by relieving discomfort and diverting attention away from pain anxieties, as well as decreasing stress levels(8). When you put on a Virtual reality headgear with motion sensors, the world outside disappears. It's replaced by a virtual world or environment that you can enter, walk around in, and connect with immediately and totally. The experience is real, and your brain perceives it as such(9). The Neuro Rehab Virtual reality have developed training exercises for use during rehabilitation which make rehab more enjoyable. Because time is limited, this is especially important for patients who have survived a stroke, severe brain injury, or other illnesses. Overall, 100% of the subjects improved, with up to 95% stating that they felt substantially more calm and 70% claiming that their pain had decreased after wearing the headset. (10)

### 3. Effect of Virtual reality (oculus quest) in osteoarthritis

Osteoarthritis is a form of degenerative joint disease characterised by inflammation at affected joint. It's the most common form of arthritis, and it's also one of the most main causes of disability. More than one- third of the population suffers from OA, which is one of the top most debilitating diseases. In OA knee when cartilage become degrade bone becomes weaker which cause joint pain and movement difficulties. Joint pain and tightness, as well as muscle weakness in lower extremities are serious risk factors for mobility restrictions, resulting in a diminished healthy life for people affected with osteoarthritis. Virtual reality (VR) is a type of comprehensive sensory experience that uses the human senses to imitate the physical reality. For the five human senses, Immersive virtual reality must display synthetic stimuli that are comparable from natural ones. In a virtual reality session can not only see and control visual effects on the screen, but also hear and touch them(11-25). Virtual reality users have been able to detect perceptions of command over a virtual body, making them feel "embodied" in a virtual body (26-35). Virtual reality gaming can provide more useful and varied movement than traditional exercise program that consist of simple motions.

Virtual reality immersive games have been shown to improve coordination and postural stability and reduces pain and shows the good commercial distribution in rehabilitation(13). The oculus quest which is use in rehab in patient with knee osteoarthritis and injuries. Oculus quest is a science-based tool that helps patients to immerse themselves in a virtual space. This allows you to engage yourself in a virtual worlds while also letting you to interact with it in a realistic manner depending on the patients' movements(36-41). Virtual reality has improve physical rehabilitation results in both healthy and clinical population. VR exercise can enhance the psychological and physical benefits of physical activity while also increasing the probability of long-term exercise adherence. When done properly, VR can be a more realistic and effectual approach to build and maintain healthier lifestyle and improve quality of life in humans (42).

## Summary

The present review aimed at virtual reality significantly affects the process of rehabilitation of patient suffer from OA and different conditions. An assessment of knee function is the improvement of ROM and muscular endurance in extremities. Its decreased mobility is a sign of worsening knee osteoarthritis, and quick range-of- motion restoration is critical. Training has been shown to improve knee range of motion. Virtual reality approach Physical rehabilitation for knee osteoarthritis focuses on improve, gait, body balance, increased mobility, and increase muscular strength. Virtual reality improves the physical function of patients with OA knee, as well as patients with other disorders. According to the findings of this study, virtual reality as a treatment has been evaluated as a safe and acceptable method with no negative effects.

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