

Serious games embedded in virtual reality as a visual rehabilitation tool for individuals with pediatric amblyopia: A protocol for a crossover randomized controlled trial.

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Background

Amblyopia is the most common developmental vision disorder. Traditional treatments target visual acuity deficits by patching the non-amblyopic eye, but their low compliance sometimes leads to residual amblyopia. Additionally, selective attention and motor skills deficits are not targeted by such treatments. Studies using serious games to treat vision skills have shown positive preliminary results. In this study, we designed a randomized controlled trial (RCT) to test the effectiveness of binocular function-focused serious games in a virtual reality (VR) environment to improve vision, attention, and motor skills in individuals with residual amblyopia.

Patients and Methods

Assessor-blinded crossover randomized controlled trial for individuals with residual amblyopia (n=30) and healthy controls (n=30) between 6-35 years old. VR-based serious games developed by Vivid Vision are compared to refractive correction, with a dose of 30 minutes/day, 5 days/week, over 8 weeks, in a home environment. The amblyopic cohort receives both treatments, randomizing the order according to their amblyopia type (anisometropic, strabismic, mixed). The control group only plays serious games. The evaluation (before and after each treatment with 2 months follow-up) includes basic vision (visual acuity, stereovision, interocular suppression), reading skills, audio-visual selective attention, and motor skills in a stereoscopic task. With electroencephalography we investigate treatment-derived brain activity changes during the tasks.

Results

This protocol is registered (NCT05114252) and under review by the ethics authority. Recruitment starts in 2022.

Conclusion

This paper describes the methodology of an RCT evaluating the effects of VR-based serious games on vision, attention and motor skills and their neuroplastic changes.