

Training Vergence Ranges Using Vivid Vision

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Introduction

- As virtual reality becomes more prevalent its use and potential for vision therapy looks promising.
- There currently is little research studying the effectiveness of virtual reality in vision therapy settings and as of the start of our study only one other that specifically looks at Vivid Vision.
- Previous research has shown that vergence ranges can be expanded using traditional in office vision therapy. This study intends to assess the effectiveness of using virtual reality technology in training vergence ability.

Methods

- Participants were selected from Michigan college of Optometry and could include staff, faculty, and students if they were between the ages of 18 and 35 and have not had any previous vision therapy
- All subjects underwent a baseline exam which included measuring distance and near visual acuity, distance and near cover test, near stereo acuity, vergence ranges via prism bar at distance and near, and vergence facility at near
- Subjects were then randomized to group one or group two using a random number generator. Group one received active therapy and group two received placebo therapy
- Three virtual reality therapy programs from Vivid Vision's software were used that provided a variable stimulus demand inducing either convergence or divergence. The programs were Barnyard Bounce, Bubbles step vergence, and Bubbles jump vergence
- Each subject was to undergo eight therapy sessions of thirty minutes each where they played Barnyard Bounce for ten minutes, Bubbles step vergence for ten minutes (five minutes training convergence and five minutes training divergence), and Bubbles jump vergence for ten minutes. The placebo group's therapy was identical but lacked any vergence demand.
- After the completion of eight therapy sessions distance and near visual acuity, distance and near cover test, stereo acuity, vergence ranges, and vergence facility were to be measured again.

Results

- Baseline data was collected on seven subjects with a mean age of 22.8 years old. Data can be seen in Table 1 below.
- Unfortunately, research was discontinued due to SARS-CoV-2 pandemic protocols. Before research was discontinued, four of eight scheduled sessions were completed with all subjects.

Table 1: Subject Baseline Entrance Data

	Mean	Std. Dev.
Distance CT	1.71 XP	1.28 XP
Near CT	3.14 XP'	1.55 XP'
Near Stereo Acuity	23.57"	6.93"
Distance BI ranges	0.86^/7.71^/5.14^	2.10^/1.67^/1.46^
Distance BO ranges	6.57^/23.43^/15.43^	6.02^/8.42^/3.95^
Near BI ranges	11.71^/18.86^/15.71^	4.46^/5.30^/5.06^
Near BO ranges	9.71^/27.86^/22.29^	8.51^/10.08^/7.83^
Near Vergence Fac.	15.79 cpm	5.32 cpm

Conclusions

- Subjects were engaged, and found the technology interesting.
- Subjects assigned activities with vergence demand reported feeling as if their eyes had "received a workout". This response was not noted in the placebo group.
- Vivid Vision was found lacking in key areas of feedback normally used in traditional office-based therapy. Program activities were also sparse in opportunities to provide effective coaching.
- Overall, the subjects' participation was passive, and relied heavily on external program stimuli.
- Vivid Vision may not be the most effective tool for early vergence therapy, or when used in isolation of traditional office-based therapy.
- However, with patients who have learned proper internal responses to the feedback that Vivid Vision offers, it may be a highly effective tool in increasing and maintaining convergence/divergence ranges.

References

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