Visual Acuity and Contrast Sensitivity Improvement in Cases of Congenital Nystagmus Using NeuroVision™ (RevitalVision LLC.) Technology: A Retrospective Multinational Multicenter Case Series.

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Introduction

Congenital Nystagmus (CN) is a rhythmic involuntary oscillatory movement of one or both eyes. Similar to strabismus, CN patients lack effective cortical stimulation during the critical early childhood period[1]. Studies have shown, that perceptual learning with NeuroVision Correction Technology can effectively treat adult amblyopia[2,3]. This paper describes the treatment of 28 patients with CN using perceptual learning program.

Method

Twenty eight patients with CN (18 males and 10 females) were enrolled, and treated with NeuroVision™ treatment (RevitalVision LLC, KS). Data was collected from 16 clinics in 5 countries. Baseline Best Corrected Visual Acuity (BCVA) was 6/9 to 6/60. Within the group, 5 patients had albinism. One Patient was diagnosed with Punctata Albescens. Only two patients received medication during treatment period. The patients age range was 11 to 51 (mean 24.8).

Technological background

The NeuroVision technology is a non-invasive, perceptual learning program employing visual stimulation and facilitation of neural connections in the visual cortex, involving a computerized visual training regimen using Gabor patches (figure 1), to improve contrast sensitivity and visual acuity.

The fundamental stimulation-control technique is called "Lateral Masking" (figure 2), where collinearly oriented flanking Gabors are displayed in addition to the target Gabor image.

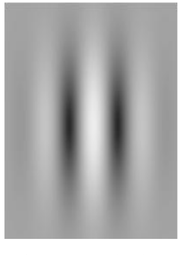

Figure 1: Gabor Patch

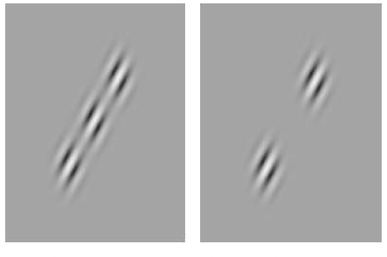

Figure 2: Lateral Masking images

Results

23 of the 28 patients treated showed improvement in BCVA. The average improvement was 2 Snellen lines (range 0-5) (figure 3). Contrast sensitivity improved in 9 out of 10 patients tested, mostly in low spatial frequencies. Eight patients obtained at least 6/12 vision in their better eye, allowing them to meet the driving license criteria for the first time in their lives.

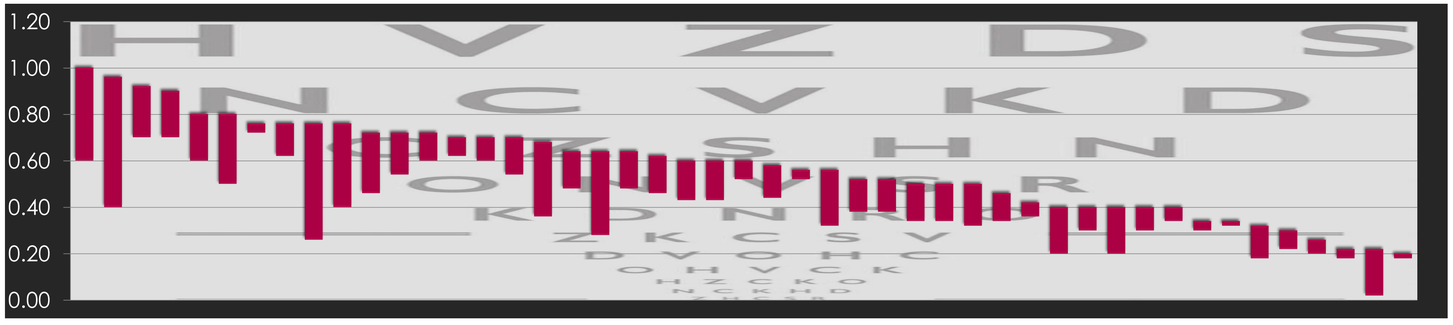

Figure 3: Distribution of BCVA gain from baseline to treatment end in the 47 eyes which showed acuity improvement (X-axis: CN individual eye, Y-axis: LogMar equivalent BCVA, bold represent total visual gain).

Discussion

To the best of our knowledge this is the first report to show improvement in visual acuity and contrast sensitivity following perceptual learning treatment in patients with CN. Since NeuroVision was shown to effectively improve vision in adult amblyopia by reducing suppression and inducing facilitations and lateral interactions in cortical activity[4], it is not unlikely that a similar process occurs in CN. Although this study was not controlled, the average improvement in visual acuity of Congenital Nystagmus patients is in correlation to previous prospective, double blind and controlled studies, using Neurovision technology for Amblyopia treatment[2], which may suggest an amblyopic component in this condition[1]. These encouraging results, can serve as an indication for further study on the subject.

References

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