Perceptual Learning Improves Vision and Binocularity in Adults with Amblyopia and Nystagmus

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- Purpose

To improve visual acuity and binocularity of adults with amblyopia and nystagmus using perceptual learning computer based program.

Background

- A computer software that uses **perceptual learning** repetitive exposure of the visual cortex to a specific stimulus was used to improve contrast sensitivity and thus visual acuity and stereopsis in adults with amblyopia and nystagmus.
- The software uses the **Gabor patch**, a sophisticated mathematical formulation, that causes **excessive stimulation** of the primary visual cortex.
- Adding to Gabor patch two similar targets on both sides in a specific distance (flankers) further facilitates the neural response.
- First the software **maps the patient specific cortical deficiencies** like contrast sensitivity, orientation, frequency, target displacement etc. then the software apply Gabor patch with flankers to **stimulate** the deficient neurons in a repetitive manner.
- The subjects are training at home in front of a computer **3-4 times a week**, each session last **30 minutes**.
- The software is **adjusting** the training for each patient's specific visual deficiencies and progress from session to session.







Methods

This is a Prospective controlled randomized trial. 2 groups: Amblyopia and Nystagmus

The software maps specific cortical deficiencies







Amblyopia

• Double blinded

- 60 patients- 45 treatment :15 sham treatment
- VA 6/9 to 6/30
- Age 9–55 (average 24y)
- 40 sessions in 3 months (3–4 sessions in a week)
- No more then 8PD of strabismus

Spatial Frequency Local Orientation Contrast

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Nystagmus

Global Orientation Target Displacement

article's subject matter or methods mentioned.

• 40 patients – 30 treatment :10 control (follow up only) • VA 6/12 to 6/60 • Age 9–55 (average 20.4y) • 60 sessions in 4 months (3–4 sessions in a week)

Target-Flankers Separation