Saccadic latency [ms] is normal in 2AFC: subject reports perceived position of top and bottom parts. Inaccurate other one saccadic Vergence

Results
In amblyopes inter-saccadic vergence is aberrant, particularly with horizontal saddles. Additionally, horizontal vergence is more variable in amblyopes than in normals. These findings suggest a disruption in binocular coordination.

Background
As we fixate objects of interest, eye-movement commands drive vergence, thereby enabling fusion, single images. Previous work [1] showed that the visual system exploits statistical regularities in the natural environment [2] to direct eye alignment at the end of saccades. People diverge when making upward saccades and converge when making downward saccades. These biases are consistent with natural-scene statistics [1]. In these reports, all subjects had normal binocular vision. We now investigate this behavior in subjects with amblyopia.

Measuring Intra-saccadic Vergence

Apparatus
- Binocular eye tracking (Eyelink II)
- Large calibration screen
- LED fixation targets

Procedure
- Binocular Monocular (DVE; Non-dominant eye; NE)
- Vertical and horizontal saccades

Stimulus intercued contrast conveys to indicate subject’s intercued imbalance.

Measuring Ocular Balance

Subjects
5 normals (normal or corrected-to-normal acuity)
5 amblyopes (strabismic or non-strabismic)

Eye Movement Analysis
The Eye Movement Analysis toolbox [6] to extract vergence, latency, gain and the main sequence.

Conclusion
- Binocular eye movements in stereo-anomalous subjects are more variable than in normal subjects.
- Reduced perceptual capability in amblyopes is correlated with binocular oculomotor errors.
- Evaluation of the coordination of binocular eye movements could be useful for screening young, non-cooperative patients, for early intervention.

Binocular coordination and interocular balance in Amblyopia
Agostino Gibaldi, Avi M Aizenman, Dennis M. Levi, Martin S. Banks – School of Optometry & Vision Science, University of California at Berkeley

References