BINOCULAR COORDINATION OF SACCADES DURING READING IN STRABISMIC CHILDREN

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INTRODUCTION
Reading is a major task and is essential for social and professional integration.
Approximately 2% of children under 7 years old suffer of strabismus (Williams C et al., 2008).

To our knowledge, there are few studies exploring binocular eye movements in strabismic children performing a reading task.

Objective: To examine binocular coordination of saccadic eye movements in strabismic children while they are performing a reading task and to compare these data with those recorded in a group of non-strabismic age-matched children.

Hypothesis: Impaired binocular sensory capabilities could cause poor binocular motor coordination during and after the saccades leading to delayed reading capabilities in children with strabismus.

MATERIALS/METHODS

Subjects
18 strabismic children from 6.8 to 16 years old (mean age: 10.2±3)
- 10 with binocular vision
- 8 without binocular vision
18 age-matched control children (mean age: 10.1±2.9)

Materials
Mobile Eyebrain Tracker (Mobile EBT®)
Non invasive medical device infrared camera.

Procedure
Children were seated in a chair at a fix distance of 58 cm from the screen. Children were asked to read a four-line text

RESULTS : SACCADE DISCONJUGACY

Saccade disconjugacy was significantly higher in strabismic children, with and without binocular vision, than in control age-matched children.

Also, saccade disconjugacy was significantly higher in strabismic children, without binocular vision, than in strabismic children with binocular vision.

RESULTS : POST SACCADES FIXATION DISCONJUGACY

Postsaccadic drift disconjugacy was significantly higher in strabismic children with and without binocular vision than in control age-matched children.

Also, postsaccadic drift disconjugacy was significantly higher in strabismic children without binocular vision than in strabismic children with binocular vision.

RESULTS : FIXATION TIME

Fixation time lasted significantly longer in strabismic children with and without binocular vision than in control age-matched children.

DISCUSSION

DISCONJUGACY DURING SACCADES AND FIXATION

These new results suggested that the relationship between the motor command of the saccades and the vergence sub-systems is deficient in strabismic children.

Furthermore, given that strabismic children with binocular vision showed a better coordination of saccades and of fixation, our study suggests that the presence of some binocular vision plays an important role in controlling binocular saccades coordination.

FIXATION TIME

Longer fixations in strabismic children could be caused by the large disconjugacy reported during the fixation period, thus delaying a proper linguistic processing.

Our data showed that binocular vision does not influence the duration of fixation. We suggest that the fixation time depends more on the deviation of ocular axis than on an abnormal sensory visual input. Such eye deviation could lead to a longer fixation time because of the difficulty of identifying each word.