Eye Movement Control and Brain Function in Children with FASD


Background
Prenatal alcohol exposure is a major, preventable cause of behavioural and brain problems in children. Despite lots of research, a unique phenotype* for children affected by prenatal alcohol exposure is not available. We do know that the developing brain is a major target for alcohol and this can lead to problems with learning and memory, social communication, attention, and sensory-motor skills.

*An individual’s observable characteristics or traits that result from their specific genetic make-up and the way our environment can change the way these genes act.

The full range of negative effects produced by prenatal alcohol exposure is referred to as Fetal Alcohol Spectrum Disorder (FASD). FASD is a major public health concern and it may occur as frequently as 2-5 per 100 live births1.

Problem
To identify an individual with FASD, many tests are used to evaluate the brain injury, growth and facial features2. This procedure requires specialized training, a very large time commitment, and is not easily available to people who live outside of major city centres. New ways of identifying brain injury in the FASD population are needed. Recently, eye movement control has been used to test brain function in other developmental disabilities. Our group has demonstrated that problems in eye movement control can be measured in children with FASD3.

Research Question
➢ Can psychometric* test scores and saccadic** eye movement measurements be used to identify brain injury in children with FASD?

*Measurement of knowledge, abilities and attitudes.
**Saccades are fast eye movements that redirect the eye to an area of interest.

What did we do?
In this multi-centre study, each child completed psychometric tests and saccadic eye movement tasks.

Psychometric tests measured:

- Working memory
- Short term memory

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• Visuospatial skills (includes depth perception, face/shape recognition, following a map, reading)
• Language
• Math skills

Depending on age, each child completed the following saccadic eye movement tests that evaluated:
• Sensory processing
• Attention
• Impulse control/resisting temptation
• Adapting to changing situations (cognitive flexibility)
• Spatial working memory

What did we find?
Preliminary results revealed significant differences between children with FASD and typically developing children in:
• Fine and gross motor skills
• Accuracy
• Impulse control/resisting temptation
• Visual and spatial information processing

Why is this important?
- This study gives us more information about the brain injury associated with FASD, and this will help with developing intervention programs for specific disabilities.