EARLY CHILDHOOD VISUAL DEVELOPMENT

Dr. Catherine Chiarelli
Pediatric Optometrist

LEARNING: SIGNIFICANCE OF VISION

• Vision is a dominant process in the growth, development, and performance of children

• Eighty percent (80%) of what children learn is acquired through the visual processing of information

• Vision affects every aspect of a child’s development:
  – Gross and fine motor skills
  – Language skills
  – Imitation and repetition
  – Interaction and social skills
LEARNING: SIGNIFICANCE OF VISION

• Vision affects every aspect of a child’s learning:
  – Reading a book
  – Copying from the blackboard
  – Interacting in the playground & with gym equipment
  – Playing sports

VISION SKILLS THAT DEVELOP BEFORE A CHILD’S 1ST BIRTHDAY…

• Eye Movements: 2-3 months
• Accommodation: 2-3 months
• Contrast sensitivity: 2-3 months
• Colour vision: 3-4 months
• Stereopsis: 6 months
• Visual acuity: 8 months
• Refractive error: 12 months

RISK FACTORS FOR VISION PROBLEMS

• Pre-natal infections and trauma
• Premature birth
• Complications during delivery (long labour, oxygen deprivation)
• Childhood illnesses (viral diseases, high fever)
• Developmental / genetic syndromes
• Cerebral palsy
• Hearing impairment
• Family history of high refractive error, strabismus, amblyopia
### VISUAL MILESTONES

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Milestones</th>
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<tbody>
<tr>
<td>Birth to 1 month</td>
<td>Fixate briefly on bright lights or faces, although one or both eyes may wander out of position.</td>
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<tr>
<td>1-3 months</td>
<td>Watch your face when being talked to; follow moving objects horizontally; look towards new sounds.</td>
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<tr>
<td>3-5 months</td>
<td>Begin to reach for nearby objects; look at items held in his/her hand.</td>
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<tr>
<td>5-7 months</td>
<td>Begin to look for more distant objects and people around the room; have eyes straight most of the time.</td>
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<tr>
<td>7-12 months</td>
<td>Use accurate focusing, eye tracking and depth perception to locate, recognize and crawl towards objects of interest; attend to books and/or television for longer periods; imitate social gestures (smiling, waving, etc.).</td>
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<tr>
<td>12-18 months</td>
<td>Play hide-and-seek or peek-a-boo; point to pictures in books; build a tower of up to 4-5 cubes; circular strokes with a crayon.</td>
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<tr>
<td>18 months – 2 years</td>
<td>Hold a crayon with an adult grasp and make vertical and horizontal strokes easily; walk across changes in flooring (carpet to floor, stairs, inclines) without difficulty.</td>
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VISUAL MILESTONES

<table>
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<th>By age</th>
<th>Your child should...</th>
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<tbody>
<tr>
<td>2-3 years</td>
<td>Run, jump, hop, and skip with fewer trips or falls</td>
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<td>Begin to cut paper with scissors</td>
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<tr>
<td>3-5 years</td>
<td>Draw simple forms, print letters, colour within lines, cut and paste simple shapes</td>
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<td>Demonstrate visual experience by telling about places, objects or people seen elsewhere</td>
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PREVALENCE OF VISION PROBLEMS IN CHILDREN

- 10% of preschoolers
- 25% of children in grades K-6
- Higher prevalence in children at-risk:
  - Over 30% of aboriginal children
  - Up to 40% of deaf children
  - 50-75% of children with cerebral palsy
  - 50-80% of children with global developmental delay
  - Up to 90% of children with Down Syndrome

Children with vision problems...

A. May have speech delays.
B. May crawl or walk late.
C. May have difficulty interacting with others.
D. May have a short attention span for age.
E. All of the above.
SIGNS OF VISION PROBLEMS

- White pupil
- Droopy eyelid covering pupil
- Eye(s) misaligned or constant eye movement
- Squints or tilts head to one side
- Closes/covers one eye
- Rubs eyes; excessively sensitive to light
- Watery eyes; frequent eye infections
- Fails to reach visual/developmental milestones

SIGNS OF VISION PROBLEMS

- Difficulty with puzzles, building blocks/toys
- Difficulty recognizing letters, numbers
- Irregular sizing, spacing of printing
- Makes number, letter, word reversals
- Skips words or lines when reading
- Difficulty copying
- Extra effort to complete written work
- Blurred vision, double vision, headaches

When vision problems remain undetected...

- Reduced class participation
- Poorer problem solving abilities
- Limited use of information
- More concentration / behaviour issues
- Difficulties with conflict resolution

(TDSB studies)
When vision problems remain undetected...

- Frustration with learning
- Failure to learn at rate of peers
- Negative self image
- Possible special education
- Discipline problems/young offender risk
- Drop out

The percentage of children identified as having reading difficulties who have an uncorrected or unidentified vision problem is:

- 1%
- 10%
- 25%
- 60%

**DISTINCTION BETWEEN EYESIGHT AND VISION**

*Eyesight* is the ability to see objects clearly

*20/20 eyesight* simply means that, from a distance of twenty feet, a child can clearly see letters which are 1 cm in height
DISTINCTION BETWEEN EYESIGHT AND VISION

VISION is the ability to comfortably see and process visual information, and involves:

- Eyesight
- Eye teaming
- Eye focusing
- Eye motility
- Eye health
- Perception

CONDITIONS OF THE EYE

NEARSIGHTEDNESS

- Nearsighted children typically see well up close, but have difficulty seeing far away.
FARSIGHTEDNESS

- Farsighted adults typically see well far away, but have difficulty seeing up close.
- Farsighted children may see well at all distances but strain their eye muscles to focus.
ASTIGMATISM

• In an eye with Astigmatism, the cornea has an oval shape, like a football
• Can occur along with nearsightedness and farsightedness

BINOCULAR VISION (EYE CO-ORDINATION)

• Eye Teaming:
  – Strabismus
• Visual Efficiency Skills:
  – Focusing – accommodation
  – Motility – vergence, eye tracking, nystagmus
STRABISMUS: ESOTROPIA

VISUAL EFFICIENCY SKILLS
EYE HEALTH
• Common problems:
  – excessive tearing or blinking
  – crusty eyes
  – rubbing, itching eyes
  – red or swollen eyelids
  – frequent infection or styes

EYE HEALTH
• Some systemic diseases and/or their medications can affect the eyes…
  – diabetes
  – cerebral palsy
  – muscular dystrophy

EYE HEALTH
• Some serious eye conditions can exist without pain or any noticeable symptoms
• Only a trained eye doctor can diagnose:
  – congenital diseases
  – cataracts
  – retinoblastoma (tumours)
AMBLYOPIA (LAZY EYE)

- Failure for vision to develop in one or both structurally normal eyes due to previously uncorrected vision problems
- Occurs within the first 4 years of life (critical period)
- Most common causes:
  - large difference in focusing ability between the two eyes
  - constant strabismus
  - deprivation due to cataract, ptosis, etc.

Amblyopia

- 4th most common disability in children*
- 15,000 three-year-olds develop amblyopia yearly in Canada
- Responsible for loss of vision in more people under age 45 than all other ocular diseases and trauma combined
- Half of all children with amblyopia are diagnosed after age five when therapy is less effective

*Source: National Society to Prevent Blindness
What is the leading cause of vision loss in children?

A. Disease and pathology  
B. Trauma  
C. Hockey  
D. Amblyopia (Lazy Eye)  

TREATMENT: GLASSES

TREATMENT: CONTACT LENSES
It is important to distinguish between a Comprehensive Vision Examination and a Vision Screening.

VISION SCREENINGS

• Limited process – some screenings check distance vision only
• No national standards established
• Unreliable for children under the age of four
• As many as 43% of children with vision problems can pass a vision screening!

VISION SCREENINGS

• Can give parents a false sense of security
• When a screening reports that a child is seeing well, parents often assume that no further exam is required and fail to EVER take their child for a comprehensive eye exam
VISION SCREENINGS

• Fewer than 50% of children identified as needing further professional eye and vision care ever receive that care
• Of those that do, the average time between the screening and the exam is 18 months!

COMPREHENSIVE EYE EXAMS

Include assessment of:
- Ocular and health history
- Near vision for reading and writing
- Distance vision
- Refractive error
- Binocular vision
- Accommodation/focusing
- Motility and eye tracking
- Eye health

HISTORY

• Birth history (prematurity, complications during delivery)
• Achieving developmental milestones
• Progress at school
• Family history
• What signs / symptoms have been noticed?
Myth #1: “My child will tell me if he can’t see well.”

Fact: Young children don’t always know they see any differently than other children. They have nothing to compare to.

Myth #2: “My child is doing fine in school. She doesn’t need an eye exam.”

Fact: Many children find ways to work extra hard to overcome vision problems. Children may reach their full potential if an undetected problem is found and corrected.
DISPELLING THE MYTHS

Myth #3:

"I will have to wait until my child can read letters before he can do an eye examination."

Fact: An infant as young as six months of age can be examined. Many objective tests are used to check vision and eye health.

DISPELLING THE MYTHS

Myth #4:

"My child will be intimidated by the instruments and may not want to be examined."

Fact: Many optometrists have child-friendly tests including videos, fun shapes and colours that help children feel comfortable.

WHO CAN CHECK A CHILD’S VISION?

- Optometrists and ophthalmologists have special training and equipment to diagnose and treat eye conditions
- Optometrists provide primary eye care, ophthalmologists provide secondary and surgical care
WHO CAN CHECK A CHILD’S VISION?

• Some family doctors and pediatricians do partial eye examinations
• Opticians make and fit glasses and contact lenses; cannot perform eye examinations or write prescriptions

FREQUENCY OF CHILDREN’ S EYE EXAMINATIONS

• The OAO’s Recommended Guideline for Frequency of Children’s Eye Exams:
  – At 6 months of age
  – Before starting school
  – Every 12-24 months as recommended by an optometrist

What percentage of children start school without ever having had a comprehensive eye exam?

18%
36%
48%
85%
**Eye See…Eye Learn**

is an early childhood eye health and vision awareness program.

**OBJECTIVES**

- To detect, diagnose and treat children with vision problems before they begin grade one so that every child can see and learn to the best of his/her ability.

- To eliminate the barriers surrounding children’s eye care by providing free eyeglasses to any child participating in the Eye See…Eye Learn program who requires them.
ZERO FINANCIAL BARRIERS

- All children 19 years of age and under are covered by OHIP for a comprehensive eye exam every 12 months
- Top quality frames and lenses have been donated by industry partners for children participating in the Eye See…Eye Learn program
- Optometrists are waiving all dispensing fees for children receiving Eye See…Eye Learn eyeglasses

A NATIONAL INITIATIVE

- Eye See…Eye Learn was first introduced in Elk Island, Alberta in 2004 as a pilot project
- As a result of the pilot the Alberta Government ensured that the Eye See…Eye Learn Program was implemented province-wide with funding and full endorsement from Alberta Education and Children’s Services
- The Eye See…Eye Learn program is now expanding into all provinces across Canada

EYE SEE…EYE LEARN ONTARIO

- Eye See…Eye Learn information pamphlets are provided to all parents of JK children by the school teacher
- The pamphlets include general eye care information and a list of local optometrists
- In some schools, optometrists are present at Kindergarten registration nights to give further information to parents and teachers
**EYE SEE…EYE LEARN EXPANSION**

- The Eye See…Eye Learn program will be expanding to include Toronto for the 2014-2015 school year

**SPREAD THE WORD…**

- Help spread the word about the importance of vision and the ESEL program to parents, caregivers, colleagues and friends
- Fewer children will begin school with undiagnosed vision problems
- Vision problems will not be a barrier to a child’s educational success or learning ability
- We are investing in our future—OUR CHILDREN

**FOR MORE INFORMATION ON THE EYE SEE…EYE LEARN PROGRAM**

Contact:
Ontario Association of Optometrists
855-424-ESEL (3735)
Canadian Association of Optometrists
www.opto.ca
Resources Available Online:
www.EyeSeeEyeLearn.ca
Questions about children's vision?

Catherine Chiarelli
Pediatric Optometrist
Vision Institute of Canada
catherinechiarelli@rogers.com