



Children and Their Vision

What parents and teachers need to know

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an eye exam?





The importance of eye exams for children

Vision is one of the most important senses for a child's development. Roughly 80% of what children learn is gained through vision, so it's important to start early to ensure that children have healthy eyes.

Children are at risk for vision problems if:

- there were health problems during pregnancy (such as measles, infections, toxemia, drug or alcohol abuse)
- they were born prematurely
- there were complications at birth (such as long labour, lack of oxygen)
- they had certain childhood illnesses (such as high fever, viruses)
- there is a family history of vision problems (such as lazy eye, crossed eyes, or wearing strong glasses)
- they have certain health conditions or developmental disabilities (such as cerebral palsy, Down Syndrome, hearing loss, developmental delay, Autism)

Vision affects every aspect of a child's development:

- Gross and fine motor skills (large and small muscle movements)
- Language skills
- Imitation (copying) and repetition (repeating)
- Interaction with people and social skills

Vision affects every aspect of a child's learning:

- Reading a book
- Copying from the blackboard
- Participating in classroom activities and discussions
- Maintaining attention and concentration
- Interacting in the playground
- Playing sports

Untreated vision problems can lead to:

- frustration with learning
- learning at a slower rate than other children
- behaviour and discipline problems
- possible special education needs
- negative self-image
- higher risk for school drop out
- lifelong disadvantages and underachievement

How to help children use their vision



Infants and toddlers

- Use toys and games to stimulate vision: mirrors and mobiles, stacking cups and rings, toys that move.
- Use board books with bright colours and big pictures.
- Play peek-a-boo.
- Use everyday items with bright colours and high contrast (such as black and white).
- Get an eye exam at age 6-12 months.
- Follow any advice given by the eye doctor.

Younger children

- This is the most important period for visual development.
- Use toys and games to stimulate vision like puzzles, mazes, dot-to-dot pictures, word searches, Where's Waldo?, construction toys, and card games.
- Read together every day.
- Limit the time your child spends in front of a screen (TV and computer games) to 2 hours per day total.
- Ensure your child gets proper nutrition and rest; healthy food and enough sleep helps healthy brain and eye development.
- Make sure your child gets eye exams at age 3 years and 5 years.
- Follow the eye doctor's advice: if eyeglasses are prescribed, make sure they are worn as the doctor recommends.

Older children

- Take 5-minute rest breaks for computer or study sessions longer than 30-45 minutes.
- Alternate computer and study sessions with fun (preferably outdoor) activities.
- Use eye protection for sports activities such as hockey, lacrosse, squash, etc.
- Use good lighting and reduce glare on screens and books; create a workspace that encourages good posture (sitting up straight); and make sure the viewing distance is not too close (at least 30-40 cm).
- Get proper nutrition and rest; enough sleep and healthy food support healthy eyes and good vision.
- Get eye examinations once every year.
- Follow the eye doctor's advice: if eyeglasses are prescribed, make sure they are worn as recommended; talk to the child's teacher about when the glasses should be used at school.





Myth or Fact?

It is normal for a baby's eyes to sometimes cross or wander out of alignment (normal position) during the first three months of life.



Fact

Eye alignment and coordination develop over the first 3-4 months of life. Any unusual eye movement that can still be noticed by 6 months should be seen by an eye doctor right away.

Delays in speech and language development can result from poor vision in early childhood.



Fact

Much of the early development of speech and language depends on information gained through watching facial expressions and lip movement. Young children with poor vision can't see these visual cues and are at risk for speech delays.

Too much blinking is a sign of an eye problem.



Fact

Blinking is a common sign of eye problems in children and may be caused by blurred vision, eye strain, allergies, infection, or light sensitivity. A complete eye examination can find the reason for the blinking so that it can be treated.

Jordan is too young for an eye examination – he cannot identify letters yet.



Myth


Vision tests using symbols or pictures are designed for children as young as six months of age. Other tests for eye coordination, the ability to focus, and eye health can be done at any age.

Damien will tell me if he can't see well.



Myth

Young children usually don't know that they see differently than other children – they think that everyone sees the way they do.



Complete eye and vision examinations should be a regular part of every child's health care, like visits to the doctor and dentist.

Lennox has a problem with learning because he has attention deficit disorder (ADD), not because he can't see well.



Myth

Many of the signs and symptoms of ADD are similar to those of an eye coordination problem. Both conditions can make it difficult for a student to concentrate in class, to read, and to complete assignments. Treatment with eye exercises or glasses can improve your child's ability to complete school work successfully.

Hope's parents and older brother wear glasses – she may need glasses too.



Fact

Some vision problems (like nearsightedness, farsightedness, and astigmatism) are often hereditary. Early eye exams are very important when family members have vision problems.

Celeste doesn't want to wear her glasses – that must mean that she doesn't really need them.



Myth

New glasses can take some time to get used to. Some children may not want to wear their glasses because things may look a little 'funny' or the frame may feel strange (like new shoes). Encourage your child to keep wearing the glasses a little bit every day and soon they will get used to them.

Russell passed the vision screening test at the Health Fair – he doesn't need to have a complete eye exam.



Myth

A complete eye exam uses special equipment and procedures that are not part of a Health Fair vision screening. These extra tests are needed to adequately test vision and eye health. Up to 43% of children with vision problems can pass a vision screening test!

Sierra is doing fine in school – she doesn't need an eye exam.



Myth

Many children find ways to work extra hard to overcome vision problems. A child can work better and more comfortably if a problem is found and corrected.



A child's visual milestones

How well does your baby see? It is difficult to know how well a child sees early in life. Because infants and young children can't tell us about seeing difficulties, parents must watch a child's behaviour for early signs of vision problems. Reaching the following visual milestones on time is very important to a child's general development and school readiness, and to their life-long vision skills.

From birth to 1 month

A baby should stare briefly at bright lights or faces, although one or both eyes may wander out of position. Black and white shapes and lines (horizontal and vertical) are most stimulating to vision at this age.

1 to 3 months

A baby will begin to watch his or her parent's face when being talked to, and will look towards new sounds. The eyes will follow moving objects horizontally (side to side). Primary colours (red, blue, and green) and lights are most stimulating to vision at this age.

3 to 5 months

Many visual skills begin to develop. These include focusing, convergence (movement of both eyes in toward each other), 3D vision (ability to sense the distance of an object), and seeing differences between colours. A child will begin to reach for nearby objects and to look at items held in his other hand.

5 to 7 months

Eye-hand coordination (ability to control eye and hand movements together) develops rapidly between 5-7 months. The eyes should be straight most of the time by this age. A baby also begins to look for more distant objects, like at people around the room. At this age, parents should take their child for an eye exam by an optometrist (an eye doctor). The optometrist will check the health of the baby's eyes and see if the eyes are working together properly.

7 to 12 months

Many visual skills are fully developed by 7-12 months. A baby at this stage will use accurate focusing, eye tracking, and depth perception (sensing distance) to find, recognize, and move towards objects of interest. Babies can also pay attention to books and television for longer periods. Imitation of social gestures (copying smiling, waving, etc.) develops.



12 to 18 months

By 12-18 months, a baby shows more complex behaviours that involve vision. He or she can play hide-and-seek or peek-a-boo, and can point to pictures in books and see things that are the same or different in them. Eye-hand coordination is developed enough to build a tower of 4-5 cubes and to make circular marks with a crayon.

18 months to 2 years

Drawing ability improves between 18 months – 2 years. A child begins to hold a crayon with an adult grip, and makes vertical (up and down) and horizontal (side to side) marks easily. As his or her walking becomes more stable, a child is able to move easily across changes in flooring (carpet to floor, stairs, hills, etc.).

2 to 3 years

By 2-3 years, a child begins to copy play movements and learns to run, jump, hop, and skip with fewer trips or falls. By this age, eye-hand coordination is developed enough to build a tower of 10 cubes, copy a circle and a cross, and begin to cut paper with scissors. Children should have their eyes examined again by an optometrist to be sure they are seeing well and that their eyes are continuing to develop properly in preparation for school.

4 to 5 years

Skill increases by 4-5 years and a child will be able to draw simple forms, print letters, colour within lines, and cut and paste simple shapes. He or she will also talk about places, objects, or people seen in other places.



Identifying children with vision problems

Children rarely complain when they have vision problems because they don't know that their vision isn't normal. They think that everyone sees the world the way they do. Parents and teachers have an important responsibility to recognize the signs of vision problems in order to identify children who need a complete eye examination.

The difference between **eyesight** and **vision** must be understood:

Eyesight is simply the ability to see objects clearly. Perfect eyesight is described as 20/20. This is the ability to see letters 1cm in height from a distance of 20 feet.

Vision is the ability to comfortably see and process visual information. Vision involves eyesight, eye coordination, focusing, eye movement, eye health, and perception.



Draw

To spot vision problems, ask the following:

Does the child....

- ☐ Usually have watery eyes?
- ☐ Have crusty eyelids?
- ☐ Rub eyes frequently?
- ☐ Have frequent eye infections or styes?
- ☐ Blink more than normal?
- ☐ React strongly to light?
- ☐ Have blurred vision (either at a distance or near), especially after reading or close-up work?
- ☐ Have frequent headaches, double vision, or eye strain?
- ☐ Have an eye that turns in or out, up or down?
- ☐ Squint when looking at things?
- ☐ Turn or tilt head, or cover or close one eye, when looking at things?
- ☐ Have poor posture (not sitting up straight) when reading or writing?
- ☐ Place head close to book or desk when reading or writing?
- ☐ Move head more than normal when reading?
- ☐ Avoid close-up work or other visually demanding tasks?
- ☐ Have poor depth perception (ability to sense distance)?
- ☐ Have poor eye-hand co-ordination (using eye and hand movements together)?

- ☐ Have handwriting and drawing skills that are not at the expected level?
- ☐ Have trouble copying something from one place to another?
- ☐ Have trouble recognizing letters and numbers?
- ☐ Reverse letters and words when reading or writing?
- ☐ Lose place, skip lines, or use finger to keep place when reading?
- ☐ Repeat or skip words when reading?
- ☐ Confuse words with similar beginnings?
- ☐ Respond well in speaking, but have trouble putting the same information down on paper?
- ☐ Have trouble with spelling?
- ☐ Have trouble learning basic math concepts like size, magnitude, position?
- ☐ Have trouble concentrating on school work or other visually demanding tasks?
- ☐ Use more effort than normal to complete school work?
- ☐ Work hard but fail to achieve up to his or her level?

Any one, or a combination, of the above signs above may indicate a serious vision problem. A complete eye examination can identify the problem and begin a plan for treatment.

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What's involved in a child's eye exam?

What is an Eye Exam?

Children don't always know they have a vision problem. Most of the time, they think that everyone sees the way they do. All children need regular complete eye examinations to find out if they have healthy eyes and vision.

Young children don't have to know the alphabet or even speak to have their vision tested. Many vision tests use pictures or symbols familiar to preschoolers, and children can respond by naming, matching, or pointing. Other tests are done objectively so young children don't have to communicate to be checked.

A complete eye examination for children includes the following parts:

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1. Child's History

The optometrist (eye doctor) will review your child's health history, including prenatal conditions, birth history, current and past illnesses, and development milestones. The optometrist will ask you about any family history of eye conditions (particularly lazy eye, crossed eye, or wandering eye) and other relevant medical conditions. You will also talk about how your child is doing in school, sports, and other activities. You should tell the optometrist if you have any concerns or if you have noticed any problems with your child's eyes or vision.

This information helps to find out if your child is experiencing vision problems or is at risk for various eye conditions.

2. Visual Acuity (Sharpness)

Visual acuity is a measure of the sharpness of vision; it describes the amount of detail that a child can see and use in daily activities.

Adult eye examinations use letter charts to check visual acuity. However, young children may not know the letters or numbers or may be hesitant to identify them. Eye charts using pictures and symbols can check visual acuity in young children, even those who cannot yet speak or who are hesitant to respond.

Visual acuity is checked for each eye separately. This involves covering one eye at a time (with an occluder, eye patch, or parent's hand). Young children sometimes find this procedure a bit distressing – it can be helpful to practice at home so that your child feels comfortable when this is done during the exam.



While visual acuity of 20/20 is considered perfect for adults, it is normal for children to have different levels of visual acuity at different stages of development. Your optometrist can tell if your child's vision is at a normal level for his or her age.

3. Eye Coordination

Eye coordination includes eye alignment, movement, and tracking. It allows us to notice motion and depth.

To test eye coordination, the optometrist will observe the fixation and movement of your child's eyes. Your child may also try on different types of specialized 3D glasses to measure depth perception.

Turned eye, crossed eye, and wandering eye (Strabismus) are common causes of lazy eye (amblyopia). These must be identified and treated in early childhood to allow proper visual development.

4. Refraction (Focusing)

Refraction tests check for focusing problems (refractive errors) including nearsightedness, farsightedness, and astigmatism. Errors are corrected using eyeglasses.

For young children, to test for errors a light is shone into the eye and a series of lenses are used to focus the reflection from the retina. Eye drops may be used to dilate (enlarge) the pupil and relax the eye's focusing system, to make the procedure more accurate.

Older children may look through different lenses and choose which ones provide the clearest image.

Refraction changes as your child grows. The optometrist will tell if glasses are needed at any stage to allow your child to have proper vision.



...child's eye exam (continued)

5. Eye Health Examination

Healthy development of the physical structure of the eyes is necessary for good vision.

To evaluate eye health, different instruments are used to shine light into the eye to provide magnified views of the front and inside eye structures. Biomicroscopy, or slit-lamp examination, provides a magnified view of the anterior eye structures, including the conjunctiva, iris, crystalline lens and cornea. Ophthalmoscopy allows examination of the internal eye structures, including the retina, optic nerve, macula and fovea. Eye drops may be given to dilate (expand) the pupil so as to make the procedures more accurate.

Eye health testing also involves checking pupil reflexes, peripheral (side) vision, and colour vision.

While visual acuity of 20/20 is considered perfect for adults, it is normal for children to have different levels of visual acuity at different stages of development.



Some possible eye health problems in children include blocked tear ducts, eyelid inflammation (blepharitis), droopy eyelid (ptosis), pink eye (conjunctivitis), and congenital defects (including cataracts and problems with optic nerves or the retina).

6. Advice or Instructions

The optometrist will review your child's examination findings, along with the relevant history and any visual concerns, and will provide individualized advice for treatment and follow-up care.

What is the difference between a complete (comprehensive) eye examination and a vision screening?

A comprehensive eye examination includes all five parts listed above: vision and medical history, visual acuity (sharpness), eye coordination, refraction (focusing), and eye health. This complete checkup makes sure that any possible eye problems will be identified.

Vision screenings usually include only one or two vision tests, and cannot find all vision problems. Up to 43% of children with vision problems can pass a vision screening, so many problems might be missed.

Common vision problems in children



Refractive (Focusing) Error

Refractive error is the most common reason for blurred vision – it results from inaccurate focusing of light in the eye. There are three types of refractive error: farsightedness, nearsightedness, and astigmatism. Refractive error in children is treated with eyeglasses or (in special cases) contact lenses.

1. Farsightedness (Hyperopia)

Farsightedness occurs when the eyeball is too short. Extra effort is required to maintain clear vision, especially up close. Most children have mild farsightedness and can handle this focusing effort without difficulty. However, high degrees of farsightedness can cause headaches, fatigue, blurred vision, aching or burning eyes, and reduced concentration and reading ability. In some cases, focusing strain may be so severe that the eyes cross when attempting to focus. These symptoms usually occur with close up vision activities.

2. Nearsightedness (Myopia)

Nearsightedness occurs when the eyeball is too long or the front surface of the eye (cornea) has too much curve. Close up objects are seen clearly but far away objects appear blurred. Children will often squint when viewing the blackboard, television or movie screen, or during outdoor activities. Nearsightedness is more common in children whose parents have it and in children born prematurely. It may get worse as the eye grows throughout childhood. Good viewing habits can help to reduce it. It is important for children to avoid holding books too closely, and to balance close vision activities or screen time with recreational and outdoor play.

3. Astigmatism

Astigmatism occurs when instead of being round, the shape of the front surface of the eye is more oval or football-shaped. Images at all distances may be distorted or blurred. A child may also have headaches and eyestrain, especially with demanding visual activities.



...vision problems (continued)




Turned Eye, Crossed Eye, Wandering Eye (Strabismus)

Strabismus is a condition in which the eyes are not properly lined up with each other. One or both eyes may turn in, out, up, or down. This may occur constantly or only during certain situations, such as when the child is tired or doing close up vision activities. It is often hereditary, and is caused by eye muscle weakness or too much strain in the eye's focusing system. Children with Strabismus may have double vision or poor depth perception, and may show poor coordination with handwriting, sports, or even stairs. They may develop a tendency to turn or tilt their head, or to close one eye when looking at things. Treatment for Strabismus should start as early as possible, since children will not outgrow it. Treatment may involve eyeglasses, prisms, eye exercises, or, in some cases, surgery.

Lazy Eye (Amblyopia)

Amblyopia is most often caused by Strabismus or a high degree of refractive error (usually in only one eye) that is not identified and treated at a young age (generally before age 5-6 years). The affected eye sends abnormal signals to the brain, interfering with the normal development of eye-brain neural connections. Amblyopia is really a "lazy brain," since the brain ignores these abnormal signals and "sees" only with the good eye. Children with Amblyopia may noticeably favour one eye and may tend to turn their head to one side, have poor depth perception, or bump into objects on one particular side. Amblyopia is preventable if identified and treated at an early age. Treatment may involve eyeglasses, eye exercises, and/or "patching" of the good eye. Treatment before age



5-6 years gives the best results. However, recent studies show that some improvement can be achieved as late as the teenage years.

Eye Coordination

Eye coordination is the ability of the eyes to work together as a team – it keeps the eyes lined up and allows proper eye tracking and depth perception. Weakness in eye coordination is usually caused by a poor visual development or eye muscle control. In rare cases, it can be caused by injuries or diseases. Children with weak eye coordination must make extra effort to maintain proper alignment and focus. This results in double vision, headaches, eye and body tiredness, dizziness, and trouble concentrating and reading. Children may have poor handwriting or eye-hand coordination and may tend to skip lines or lose their place while reading. Treatment involves eyeglasses, prisms, and/or eye exercises.

Accommodation

Accommodation is the eye's focusing ability; it allows the eye to maintain clear focus at a normal reading distance and also to accurately change focus from one distance to another. Weakness in accommodation may be caused by general tiredness, long periods of close up vision tasks, or some general health conditions (such as iron deficiency). It results in blurred vision, tiredness, and trouble concentrating during visual tasks such as adjusting from blackboard to page. Accommodation problems are correctable with eyeglasses and/or eye exercises.



Colour Blindness (Colour Vision Deficiency)

Colour vision deficiency is an inability to see some colours, usually shades of red and green. It is a common inherited condition, affecting 8% of males and 0.5% of females.

Although there is no cure for colour vision deficiencies, the use of coloured filters may improve it in some cases. It is important to identify it at a young age, since many learning materials used in the classroom are colour-coded. Children may be wrongly suspected of having a learning disability when they have trouble understanding such materials. Colour vision deficiency may also affect future career choices, since there are colour vision requirements for such jobs as air traffic controllers, pilots, police officers, lab technicians, and electricians.

Contact the Canadian Association of Optometrists
for an eye doctor in or near your community.

Call 1 888 263 4676 or visit www.opto.ca



A vision and eye health message from the Vision Institute of Canada in partnership with:



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