TORONTO EYE CLINIC

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The Toronto Eye Clinic
GUIDE TO UNDERSTANDING VISION PROBLEMS IN YOUNG CHILDREN

Terminology:

Visual Acuity refers to the clarity of vision or how well a child sees, measured at a distance of 20 feet (6 metres). Normal visual acuity is commonly termed "**20/20 vision".** (In Canada, the metric equivalent of 20/20 is 6/6.) A child with 20/20 vision can see clearly at 20 feet what an adult with normal vision can see at that distance. A child with 20/100 vision must be as close as 20 feet to see what an adult with normal vision can see at 100 feet. Visual acuity develops steadily throughout early childhood, and reaches adult-level by age 6-7 years. At age 4-5 years, visual acuity of 20/20 – 20/40 (6/6 – 6/12) is expected.

Refractive Error occurs when, due to the size and/or shape of the eyeball, images formed on the retina are not in sharp focus, resulting in blurred vision.

1. **Hyperopia** (Farsightedness): Hyperopia is a condition in which the eyes must exert extra focusing effort to see objects clearly, especially at close distances. Hyperopia results when the length of the eyeball is shorter than average. Most children have mild hyperopia, and, with a strong focusing ability, have no difficulty seeing clearly at all distances. However, children with severe farsightedness may experience fatigue, blurred vision, headaches, lack of concentration and/or crossed eyes.

2. **Myopia** (Nearsightedness) is a condition in which near objects are seen clearly however distant objects appear blurred. Myopia results when the eyeball is longer than average. Children who are born prematurely or have family members with severe myopia are more likely to develop myopia at a young age. Children with significant myopia often hold materials very close or move up close to objects to see them.

3. **Astigmatism** is a condition in which objects appear distorted or blurred, both at distance and at near. Astigmatism usually occurs when the cornea (front surface of the eye) is not evenly curved and is more "oval" than "round". It often occurs in combination with farsightedness or nearsightedness. Children with significant astigmatism often turn their head to the side when looking at objects, and may experience headaches or eyestrain with concentrated visual tasks.

Low degrees of refractive error may not require correction at a young age, since there are limited visual demands in preschool and kindergarten. The need for spectacle correction may be deferred until the child is older. High degrees of refractive error, however, may cause visual discomfort and may lead to the development of strabismus and amblyopia, if left untreated. In such cases, spectacles are needed for full to wear or for use with specific visual activities. In some cases, contact lenses may also be prescribed.

Strabismus is a condition in which the two eyes do not align properly. One or both eyes may turn in (esotropia), out (exotropia), up (hypertropia) or down (hypotropia). The eye turn may be present constantly or periodically. In some cases, the eye turn may be noticeable on direct observation; in other cases, professional assessment may be needed to detect the eye turn.
Strabismus causes a loss of binocular co-ordination, resulting in either double vision or suppression of the turned eye. (In suppression, the brain "turns off" the turned eye and elects to see only with the stronger eye.) There may be associated

difficulties with depth perception, eye-hand co-ordination and fine and/or gross motor skills. Common observations include:

• A tendency to cover one eye or turn the head when looking at things

• A tendency to trip over or bump into objects

• Difficulty holding a pencil or colouring within the lines

• Difficulty with construction toys such as Lego or building blocks

• Reduced attention for concentrated visual tasks

Strabismus may be treated with spectacles, visual exercises or eye surgery.

Amblyopia is the incomplete development of vision in one or both eyes, as a result of uncorrected refractive error or strabismus in early childhood. It is characterized by reduced vision at all distances, even with prescription spectacles. Untreated amblyopia may lead to functional blindness in the affected eye.

In many cases, there are no signs or symptoms of amblyopia, since the stronger eye can compensate for the weaker eye in many situations. In other cases, the signs and symptoms of amblyopia may be similar to those associated with strabismus.

Amblyopia is treated by stimulating the vision in the affected eye, often by using an eye patch or eye drop to temporarily block vision in the stronger eye. Such therapy is done in conjunction with treatment for the underlying cause of amblyopia (spectacles, contact lenses and/or eye surgery). Early treatment is important, as therapies are less effective after the age of 9 years.

Vergence Disorder refers to a dysfunction of the eyes' ability to turn either inward (convergence) or outward (divergence) when focusing on and tracking objects. Convergence insufficiency is the most common vergence

Accommodation Disorder refers to a dysfunction of the eye's ability to automatically change focus from seeing at a distance to seeing at near.
Symptoms of vergence and accommodation disorders include blurred vision, double vision, eyestrain, headache, fatigue and difficulty concentrating (particularly while reading).
Vergence and accommodative disorders may be treated with spectacles and/or visual exercises.

Colour Vision Deficiency is a congenital condition in which there is difficulty distinguishing certain colours, such as red and green, red and brown, blue and purple, or orange and yellow. The condition affects 8% of males and less than 1% of females; it is present at birth and remains unchanged throughout life.
Colour vision deficiency may interfere with learning in the classroom, since many learning materials rely heavily on colour perception.
There is no treatment to cure colour vision deficiency.

Eye Health Abnormality, while uncommon in children, may result from injury or hereditary / congenital conditions. Treatment is aimed at improving the eye condition and maximizing vision and visual development.