Screening Children for Amblyopia and Strabismus

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Introduction

Strabismus and amblyopia are two of the most common visual problems that affect children. 1 out of 25 children in school will have strabismus, 1 out of 50 will develop amblyopia. In the young child, amblyopia is the most frequent cause of visual loss in one eye.
(Source: American Academy of Ophthalmology)

The key to the prevention of visual loss due to strabismus and amblyopia is early diagnosis and treatment.

Strabismus or crossed eyes is a misalignment of the eye muscles that causes one eye to deviate from its normal position. Amblyopia or lazy eye is impaired vision in one eye resulting from its lack of use.

Children do not outgrow true strabismus, they outgrow pseudostrabismus.

The Corneal Light Test
To perform this test one can use a direct ophthalmoscope to shine a light on the corneas of both eyes simultaneously while the child looks straight ahead. One is to compare the position of the two corneal light reflections. If one thinks that the eye is like a clock, the light reflection should hit at the same clock hour in both eyes.
**Bruchner Test**

First described by Bruchner in 1962 as a test useful in the diagnosis of small angle deviation and amblyopia in young uncooperative children (from a paper written by Drs. Andrea Tongue and Gerhard Cibis, Ophthalmology, October, 1981, volume 88, Number 10)

RED REFLEX gets its color from the choroid layer of the eye.

- Red reflex should always be seen bilaterally in all patients especially those in the nursery before discharge. If unable to evaluate a red reflex in a patient one drop of 2.5% Neosynephrine in both eyes can be used to dilate the pupils and obtain a better assessment of the red reflex.

- When viewing the red reflex the clarity and color should be symmetric between the two eyes.

- If a patient is nearsighted the red reflex will have a lighter color down below, more yellow in appearance.

- If a patient is farsighted the red reflex will be lighter in color, yellow at the top.

- If a patient does not have straight eyes the red reflex in one eye will be darker in color in the eye that is straight and lighter in color in the eye that is not straight.

- If a patient has a difference in the optics between the two eyes the red reflex will be more clear in the eye with the smaller amount of prescription.
Vision and Amblyopia

There are critical periods of time for vision development in children. The first is around five to six weeks of age. At that time the child develops a fixation reflex. Most children will be able to fixate on a target at that age. By three months of age the child should be able to follow a slow-moving target. By six months of age the eyes should be straight. Vision is like wet cement. When cement is first laid it is easy to change the shape of it, the same with visual acuity. Vision hardens and dries in place at about nine or ten years of age. There are always exceptions to this. Some lock in place earlier, some later.

Amblyopia is defined as a decrease in vision in one or both eyes. It is also called a “Lazy Eye”.

Any abnormality that prevents equal visual stimulation can cause an amblyopia. If the abnormality is significant one might have an amblyopia in both eyes.

Visual acuity should always be monitored in children every time they are seen in your office. Using the red reflex one can make sure that the reflex is the same intensity and clarity in both eyes each time the patient is seen. By two and a half or three years of age a child should be able to pick up the E game and one can obtain a visual acuity with the E game.

Normal visual acuity for someone five years of age or younger is 20/30.

I would be more concerned if there was a significant difference in the visual acuity between the two eyes as opposed to having blurred vision in both eyes.

When in doubt consult your friendly ophthalmologist.
Esotropia

Esotropia is defined as an inward deviation of one or both eyes. Many times infants will exhibit an unstable ocular motility until six months of age. A study done by Dr. Robert Nixon at the University of Indiana showed that many children will exhibit an inward turning of the eyes from birth to two months of age, then from two to six months of age, an outward turning of the eyes. Most of the time the eyes are straight but other times the child will exhibit either an inward or outward turning of the eyes. If the eyes are straight most of the time observation is the best treatment until six months of age. If there is a constant inward or outward turning of the eyes the child should be referred at any age. If there is crossing or wandering of the eyes after six months of age then the child should also be referred to an ophthalmologist.

One should look at the light reflection in both eyes as opposed to the amount of sclera showing between the bridge of the nose and the cornea. Many of these children will have a wide nasal bridge obscuring most of the sclera nasally. When the child looks to one side or the other eye closest to the nose will appear to be crossed.

Think of the eye like a clock. If the light reflection hits one eye at two o’clock, it should hit the other eye at two o’clock if the eyes are straight.
Accommodative Esotropia

Accommodative esotropia is the most common type of strabismus. Almost ½ of all cases of strabismus are secondary to accommodative esotropia. The vast majority of these children are farsighted and thus slightly blurred. When they attempt to focus to clear the blurred image, an inward deviation of one eye is noticed. The crossing is noticed more frequently at a close range as opposed to when the child is looking in the distance. The vast majority of these children are kept straight with their farsighted prescription. As long as their eyes are straight with the glasses, no surgery is indicated. Sometimes bifocals are necessary if the amount of near crossing is greater than the amount of distance crossing.
Exotropia

Exotropia is defined as outward deviation of one or both eyes.

When a parent tells you that a child’s eyes are wandering out, believe the parents. The best way to elicit the wandering out is to have the patient look at least twenty feet away. When the patient does this he will relax his convergence and an exotropia, if present, will be manifest. Most patients control their exotropia very well with the convergence. When you look at them in your office at a close range they are using their convergence to keep their eyes straight.

When they are playing outside, looking off in the distance, many times parents will tell you that their child will close one or the other eye. Some children will see double when the eye wanders out and this double vision is made worse in bright light.

The reason children with exotropia might see double more often than kids with esotropia is that the esotropic angle is more constant so the brain is better able to adapt and suppress the image from the deviated eye. A patient with exotropia will have a variable wandering. Some children have more difficulty in suppressing the double image. Most children with exotropia can control their wandering and are not a surgical candidate.
Duane’s Syndrome

Duane’s syndrome is a restrictive retraction syndrome of three types. The most common type is Type One.

Type One usually affects females and involves the left eye.

These patients have abducting or pulling out to the side of the left eye.

If you have them follow a target when the affected eye looks toward the nose, the eyelids, upper and lower lids, will be closer together than when the affected eye tries to look to the outside.

There have been reports of many patients with Duane’s syndrome who have had an absence of the sixth nerve and the sixth nerve nucleus so that the lateral rectus muscle is not enervated by that nerve. The lateral rectus muscle instead has a branch of the third nerve enervating it. When the child looks toward the nose and fires the medial rectus muscle, the lateral rectus muscle is also stimulated; the eye is pulled toward the nose and also pulled back into the orbit. Thus, the eyelids come closer together. This is the retraction part of the syndrome.

No surgery is indicated if the child’s head and eyes are straight.
Duane’s Syndrome

Superior oblique palsy is a common cause of torticollis.

If one sees a child with a head tilt, the first test to perform is to straighten the head and see if the eye opposite the tilt elevates. The children will tilt their heads to eliminate double vision.

It is essential to have these children evaluated as early as possible by an ophthalmologist and to surgical intervention as early as possible so as to minimize neck and back musculoskeletal changes secondary to a head tilt.
Treatment for Strabismus and Amblyopia

The primary goal of treatment is improvement in vision of the amblyopic eye. Glasses if necessary should be worn. Surgery is indicated if a residual amount of strabismus persists after the visual acuity is equal between the two eyes and a proper up-to-date glasses prescription is worn.
Obstructed Nasolacrimal Systems

Many newborns will exhibit an increase in clear tear and possibly mattering in one or both eyes. The whites of the eyes are usually clear. The parents will say that tears will drip over the lower eyelid onto the face. Sometimes the child will wake with the eyelids matted shut. If one looks at the lower lids of the affected eye the skin will look irritated.

Digital massage of the nasolacrimal sac can help to evacuate the sac and provide a reservoir for tears to drain for awhile, thus keeping the lower lid clear. When the water layer of the tears evaporate, mucus and an oily mixture are left behind which is rather sticky along the lashes and lower eyelid.

Most of these kids will clear by one year of age with conservative medical treatment that includes digital massage of the affected nasolacrimal sac six to eight times a day followed by Tobrex eye solution at bedtime if there is mattering during the day.

A dilation, probing and irrigation of one or both of the nasolacrimal systems can be done earlier if the patient is having other surgery done or if the patient has extensive mattering, is extremely uncomfortable or has a dacrocystocele which is difficult for the parents to compress.

Glaucoma

Children with glaucoma can also present with tearing however these children will have larger corneas and globes. The child is very uncomfortable. There is very little mattering associated with the tearing.
Cataracts

Cataracts can also cause Amblyopia. The estimated incidences of cataracts in infants are about 1 per 1000 births. If the child does not have equal visual stimulation between the two eyes as in a unilateral cataract, amblyopia can develop. It is important to monitor the red reflex not only in the nursery but at every examination in your office using the direct ophthalmoscope. Any lenticular opacity will be seen as a black spot in the media.