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Strabismus (Crossed Eyes)

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Crossed eyes, or strabismus as it is medically termed, is a condition in which both eyes do not look at the same place at the same time. It occurs when an eye turns in, out, up or down and is usually caused by poor eye muscle control or a high amount of farsightedness.

There are six muscles attached to each eye that control how it moves. The muscles receive signals from the brain that direct their movements. Normally, the eyes work together so they both point at the same place. When problems develop with eye movement control, an eye may turn in, out, up or down. The eye turning may be evident all the time or may appear only at certain times such as when the person is tired, ill, or has done a lot of reading or close work. In some cases, the same eye may turn each time, while in other cases, the eyes may alternate turning.

Maintaining proper eye alignment is important to avoid seeing double, for good depth perception, and to prevent the development of poor vision in the turned eye. When the eyes are misaligned, the brain receives two different images. At first, this may create double vision and confusion, but over time the brain will learn to ignore the image from the turned eye. If the eye turning becomes constant and is not treated, it can lead to permanent reduction of vision in one eye, a condition called amblyopia or lazy eye.

Some babies' eyes may appear to be misaligned, but are actually both aiming at the same object. This is a condition called pseudostrabismus or false strabismus. The appearance of crossed eyes may be due to extra skin that covers the inner corner of the eyes, or a wide bridge of the nose. Usually, this will change as the child's face begins to grow.

Strabismus usually develops in infants and young children, most often by age 3, but older children and adults can also develop the condition. There is a common misconception that a child with strabismus will outgrow the condition. However, this is not true. In fact, strabismus may get worse without treatment. Any child older than four months whose eyes do not appear to be straight all the time should be examined.

Strabismus is classified by the direction the eye turns:

- Inward turning is called esotropia
- Outward turning is called exotropia
- Upward turning is called hypertropia
- Downward turning is called hypotropia.

Other classifications of strabismus include:

- The frequency with which it occurs – either constant or intermittent
- Whether it always involves the same eye – unilateral
- If the turning eye is sometimes the right eye and other times the left eye – alternating.

Treatment for strabismus may include eyeglasses, prisms, vision therapy, or eye muscle surgery. If detected and treated early, strabismus can often be corrected with excellent results.

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What causes strabismus?

Strabismus can be caused by problems with the eye muscles, the nerves that transmit information to the muscles, or the control center in the brain that directs eye movements. It can also develop due to other

general health conditions or eye injuries.

Risk factors for developing strabismus include:

- **Family history** – individuals with parents or siblings who have strabismus are more likely to develop it.
- **Refractive error** – people who have a significant amount of uncorrected farsightedness (hyperopia) may develop strabismus because of the additional amount of eye focusing required to keep objects clear.
- **Medical conditions** – people with conditions such as Down syndrome and cerebral palsy or who have suffered a stroke or head injury are at a higher risk for developing strabismus.

Although there are many types of strabismus that can develop in children or adults, the two most common forms are accommodative esotropia and intermittent exotropia.

Accommodative esotropia often occurs because of uncorrected farsightedness (hyperopia). Because the eye's focusing system is linked to the system that controls where the eyes point, the extra focusing effort needed to keep images clear in farsightedness may cause the eyes to turn inward. Signs and symptoms of accommodative esotropia may include seeing double, closing or covering one eye when doing close work, and tilting or turning of the head.

Intermittent exotropia may develop due to an inability to coordinate both eyes together. The eyes may have a tendency to point beyond the object being viewed. People with intermittent exotropia may experience headaches, difficulty reading, and eye strain. They also may have a tendency to close one eye when viewing at distance or in bright sunlight.

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How is strabismus diagnosed?

Strabismus is diagnosed through a comprehensive eye exam. Testing for strabismus, with special emphasis on how the eyes focus and move, may include:

- **Patient History** – A patient history is obtained to determine any symptoms the patient is experiencing or the parent is observing, and to note the presence of any general health problems, medications taken, or environmental factors that may be contributing to the symptoms.
- **Visual Acuity** – Visual acuity measurements are taken to assess the extent to which vision may be affected. As part of the testing, you will be asked to read letters on distance and near reading charts. This test measures visual acuity, which is written as a fraction such as 20/40. When testing distance vision, the top number is the standard distance at which testing is done, twenty feet. The bottom number is the smallest letter size you were able to read at the twenty foot distance. A person with 20/40 visual acuity would have to get within 20 feet of a letter that should be seen at forty feet in order to see it clearly. "Normal" distance visual acuity is 20/20.
- **Refraction** – A refraction is conducted to determine the appropriate lens power needed to compensate for any refractive error (nearsightedness, farsightedness, or astigmatism). Using an instrument called a phoropter, your optometrist places a series of lenses in front of your eyes and measures how they focus light using a hand held lighted instrument called a retinoscope. Or the doctor may choose to use an automated instrument that automatically evaluates the refractive power of the eye. The power is then refined by the patient's responses to determine the lenses that allow the clearest vision.
- **Alignment and Focusing Testing** – How well your eyes focus, move and work together needs to be assessed. In order to obtain a clear, single image of what is being viewed, the eyes must effectively change focus, move and work in unison. This testing will look for problems that keep your eyes from focusing effectively or make it difficult to use both eyes together.
- **Examination of eye health** – The structures of the eye are observed to rule out any eye disease that may be contributing to strabismus. The health of the external and internal parts of the eye will be assessed using various testing procedures.

This testing may be done without the use of eye drops to determine how the eyes respond under normal seeing conditions. In some cases, such as for patients who can't respond verbally or when some of the eyes focusing power may be hidden, eye drops may be used. They temporarily keep the eyes from changing focus while testing is done.

Using the information obtained from these tests, along with results of other tests, your optometrist can determine if you have strabismus. Once testing is complete, your optometrist can discuss options for treatment.

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How is strabismus treated?

People with strabismus have several treatment options available to improve eye alignment and coordination. They include:

- eyeglasses or contact lenses
- prism lenses
- vision therapy
- eye muscle surgery

Eyeglasses or contact lenses may be prescribed for patients with uncorrected farsightedness. This may be the only treatment needed for some patients with accommodative esotropia. Once the farsightedness is corrected, the eyes require less focusing effort and may remain straight.

Prism lenses are special lenses that have a prescription for prism power in them. The prisms alter the light entering the eye and assist in reducing the amount of turning the eye has to do to look at objects. Sometimes the prisms are able to fully compensate for and eliminate the eye turning.

Vision therapy is a structured program of visual activities prescribed to improve eye coordination and eye focusing abilities. Vision therapy trains the eyes and brain to work together more effectively. These eye exercises help remediate deficiencies in eye movement, eye focusing and eye teaming and reinforce the eye-brain connection. Treatment may include office-based as well as home training procedures.

Eye muscle surgery can change the length or position of the muscles around the eye in an attempt to better align the eyes. Eye muscle surgery may be able to physically align the eyes so they appear straight. Often a program of vision therapy may also be needed to develop a functional improvement in eye coordination and to keep the eyes from reverting back to their previous condition of misalignment.

See Also

- [Clinical Practice Guidelines: Care of the Patient with Strabismus: Esotropia and Exotropia](#)