# STRABISMUS

Strabismus (struh-biz-mus) is a broad medical term that refers to various misalignments (deviations) of the eyes, such as "crossed eyes". For the two eyes to properly align, they need to have similar vision and focusing ability, and the muscles that move them need to work together. Only then can a person have binocular vision and depth perception, meaning that the images from each eye are fused (blended) by the brain into a single image that appears three-dimensional.

If one eye does not look in the same direction as the other, binocular vision cannot exist. In a young child, the deviating eye may eventually lose its ability to see clearly. This is called amblyopia, or "lazy eye".

"Comitant strabismus," the type usually seen in children, means that no matter in what direction the eyes look, the amount of misalignment (deviation) is the same. This is in contrast to "incomitant strabismus," which means that the amount of deviation is constantly changing; depending on which direction you look.

Strabismus affects about two to four percent of all children (boys and girls equally) and tends to run in families.

## *What causes strabismus?*

Most often, there is no identifiable cause—the child is simply born with a misalignment or develops it early in childhood. But there are also many known causes, for example: one eye that is blind or has defective vision from birth (as from a congenital cataract); one eye that is extremely nearsighted, farsighted, or astigmatic, or the amount of eyeglass correction required by the two eyes is vastly different; one or more absent, injured, or defective nerves to the eye muscles, causing the muscles controlled by the nerve to function improperly; injury from trauma that damages any eye muscles or nerves; blindness from disease or injury. Intentionally crossing the eyes is never a cause of strabismus; the eyes cannot get "stuck" in a crossed position.

## *Types of strabismus*

The most common type, in which one eye turns inward ("crossed eyes"), is esotropia. It is also called "convergent strabismus" because the eyes converge or turn toward each other. With exotropia ("wall eyes"), one eye turns out; it is
also called "divergent strabismus". Less common are hypertropia (one eye turns upward) and hypotropia (one eye turns downward).

When it is always the same eye that deviates, the strabismus is called constant. If the deviation shifts from one eye to the other, it is called alternating. Alternating strabismus can be confusing to parents. You notice that one eye seems to turn at one moment, and just when you have concluded which one it is, the other eye seems to be the culprit.

"Adult-onset strabismus" is any misalignment that comes on after normal binocular vision has developed (usually by the age of eight). Unlike childhood strabismus, the adult type usually creates symptoms, such as double vision (diplopia), which may be accompanied by nausea.

## *What is a phoria?*

"Tropia" is another word for strabismus (as in esotropia). A phoria is a tendency for misalignment that is not usually apparent and is less serious. (It can only be found by covering one eye.) The brain automatically corrects this type of deviation, so that the eyes work together normally. The phorias are named in the same way as the tropias: esophoria (tendency for one eye to turn in), exophoria (out), hyperphoria (up), and hypophoria (down).

Most phorias cause no symptoms at all. But if the phoria is large, it requires great effort for the eyes to stay aligned and working together—to avoid seeing double—and this may cause eyestrain and headache. Sometimes, when the strabismus is intermittent, the eyes stay aligned some of the time, but lapse into misalignment (strabismus) when the brain loses control over the alignment. This is common with divergent strabismus ("wall eyes"). When the eyes appear straight, the misalignment is an exophoria, and when one eye deviates outward, it is an exotropia. This is more likely to occur late in the day, in the bright outdoors, or when you are ill. As the years go on, intermittent strabismus tends to become more constant and less intermittent.

## *Examination*

The eyes should be examined as soon as you even suspect that they might be crossing or wandering, no matter how small the misalignment might be. No child is too young to be seen and early care can prevent later heartache. The sooner treatment is begun, the better your child's chance for achieving normal vision in each eye and good binocular depth perception. Correction after the age of 6 or 7 is more difficult and the result less satisfactory.

A complete eye examination and refraction (measurement of vision and eye's optical system) involves the use of eye drops to dilate the pupils and temporarily paralyze the focusing mechanism. Eye movements, quality and degree of stereopsis (3-D vision), and the ability to recognize double vision will all be checked, depending on the age and cooperation of the patient. Determination of the cause may involve referral to other types of specialists.

## *Goals of Treatment*

For children, we would like to achieve normal appearance, good vision in each eye (with or without glasses), binocular vision, and depth perception. In adults, the goals are binocular vision (which eliminates double vision), and relief of any discomfort. If any adult has a childhood strabismus that was never treated, it is too late to improve any amblyopia or depth perception, so the goal may be simply cosmetic—to make the eyes appear to be properly aligned.

## *Treatment*

Treatment may consist of eyeglasses, patching, eye coordination exercises (called orthoptics) and/or surgery on the eye muscles. Eyeglasses, with or without patching, are almost always tried first. It can usually reduce the deviation. This is especially true for accommodative esotropia, a type of strabismus in which farsightedness is a major part of the problem. Infants who are only a few months old can wear eyeglasses. The glasses must usually be worn constantly, often for life. If surgery is thought necessary, it is designed to correct only the deviation that remains with the glasses on.

If the misalignment is slight or intermittent, orthoptics exercises alone may help.

"Patching" is a major part of treating infants and young children who have poor vision (amblyopia) associated with strabismus. A patch is placed over the normal (preferred) eye, to force the use of the deviant (amblyopic) eye until

vision improves and equalizes. Generally, surgery is postponed until that happens. In adults, a patch over one eye is one method of eliminating double vision. Prisms incorporated into the eyeglasses is another.

Surgery consists of tightening some eye muscles and loosening others, to change their pull on the eyeball and bring the eyes into alignment. Surgery is sometimes performed on infants as young as a few months of age when there is a good chance of obtaining binocular vision. Children require a general anesthetic. Adults often prefer a local, and are sometimes able to help the surgeon make the muscle adjustments by describing what they see. During the first month or two following surgery, exercises may be designed to redevelop the ability to use both eyes together normally.

The operation is quite safe, but does involve some risk, as does any surgery and anesthesia. If surgery is necessary in your case, the risks will be carefully explained to you along with the potential benefits.

In many cases of strabismus, more than one operation is necessary to obtain good eye alignment. Glasses may also be required after surgery to obtain the best possible visual result.

## *Prognosis*

The outcome of treatment is dependent on many factors, such as the type of strabismus, age of onset, and visual acuity of each eye. It often involves years of commitment and care. Most patients can obtain comfort and a highly acceptable appearance with good eye alignment; some also gain fully normal function, with coordinated use of both eyes (binocular fusion and depth perception). Each patient's potential for a good result is different. This fact must be well understood to avoid disappointment.