

# What Is Strabismus?

Strabismus is a visual problem in which the eyes are not aligned properly and point in different directions. One eye may look straight ahead, while the other eye turns inward, outward, upward, or downward. The eye turn may be consistent, or it may come and go. Which eye is straight (and which is misaligned) may switch or alternate.



Strabismus is a common condition among children. About 4 percent of all children in the United States have strabismus. It can also occur later in life. It may run in families; however, many people with strabismus have no relatives with the problem.

**Infantile esotropia**, where the eye turns inward, is the most common type of strabismus in infants. Young children with esotropia cannot use their eyes together. **Accommodative esotropia** is a common form of esotropia that occurs in children usually 2 years or older. In this type of strabismus, when the child focuses the eyes to see clearly, the eyes turn inward. This crossing may occur when focusing at a distance, up close or both.

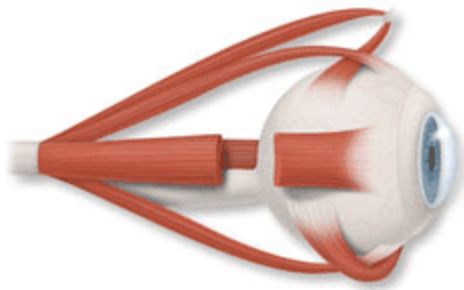
Exotropia, or an outward-turning eye, is another common type of strabismus. This occurs most often when a child is focusing on distant objects. The exotropia may occur only from time to time, particularly when a child is daydreaming, ill or tired. Parents often notice that the child squints one eye in bright sunlight.



*Exotropia. Notice the outward-turning eye.*

## Strabismus Causes

Six eye muscles, controlling eye movement, are attached to the outside of each eye. In each eye, one muscle moves the eye to the right, and one muscle moves the eye to the left. The other four muscles move it up or down and at an angle.



To line up and focus both eyes on a single target, all of the muscles in each eye must be balanced and working together. In order for the eyes to move together, the muscles in both eyes must be coordinated. The brain controls these muscles.

With normal vision, both eyes aim at the same spot. The brain then combines the two pictures into a single, three-dimensional image. This three-dimensional image gives us depth perception.

When one eye is out of alignment, two different pictures are sent to the brain. In a young child, the brain learns to ignore the image of the misaligned eye and sees only the image from the straight or better-seeing eye. The child then loses depth perception.

Adults who develop strabismus often have double vision because their brains have already learned to receive images from both eyes and cannot ignore the image from the turned eye. A child generally does not see double.

Strabismus is especially common among children with disorders that may affect the brain, such as:

- Cerebral palsy;
- Down syndrome;
- Hydrocephalus;
- Brain tumors;
- Prematurity.

A cataract or eye injury that affects vision can also cause strabismus. The vast majority of children with strabismus, however, have none of these problems. Many do have a family history of strabismus.

## Strabismic amblyopia

Good vision develops during childhood when both eyes have normal alignment. Strabismus may cause reduced vision, or amblyopia, in the misaligned eye.

The brain will pay attention to the image of the straight eye and ignore the image of the crossed eye. If the same eye is consistently ignored during early childhood, this misaligned eye may fail to develop good vision, or may even lose vision. Strabismic amblyopia occurs in approximately half of the children who have strabismus.

Amblyopia can be treated by patching or blurring the stronger eye to strengthen and improve vision in the weaker eye. If amblyopia is detected in the first few years of life, treatment is usually successful. If treatment is delayed, amblyopia may become permanent. As a rule, the earlier amblyopia is treated, the better the result for vision.

## Strabismus Symptoms

The main sign of strabismus is an eye that is not straight. Sometimes children will squint one eye in bright sunlight or tilt their head to use their eyes together.

### **Pseudostrabismus**

The eyes of infants often appear to be crossed, though actually they are not. This condition is called pseudostrabismus. Young children often have a wide, flat nose and a fold of skin at the inner eyelid that can make eyes appear crossed. This appearance of pseudostrabismus may improve as the child grows. A child will not outgrow true strabismus. An ophthalmologist can distinguish true strabismus and pseudostrabismus.

## Strabismus Diagnosis

Strabismus can be diagnosed during an eye exam. It is recommended that all children between 3 and 3½ years of age have their vision checked by their pediatrician, family practitioner or an individual trained in vision assessment of preschool children. Any child who fails this vision screening should then have a complete eye exam by an ophthalmologist (Eye M.D.).

If there is a family history of strabismus or amblyopia, or a family history of wearing thick eyeglasses, an ophthalmologist should check vision even earlier than age 3. After a complete eye examination, an ophthalmologist can recommend appropriate [treatment](#).

## Strabismus Treatment

Treatment for strabismus works to straighten the eyes and restore binocular (two-eyed) vision. In some cases of strabismus, eyeglasses can be prescribed for your child to straighten the eyes. Other treatments may involve surgery to correct the unbalanced eye muscles or to remove a cataract. Patching or blurring the strong eye to improve amblyopia is often necessary.

Very young children with esotropia usually require surgery to realign the eyes.

For accommodative esotropia, glasses reduce the focusing effort and often straighten the eyes. Sometimes bifocals are needed for close work. If significant crossing of the eyes persists with the glasses, surgery may be required.

With exotropia, though glasses, exercises, patching or prisms may reduce or help control outward-turning of the eye in some children, surgery is often needed.

### How is strabismus surgery done?

The eyeball is never removed from the socket during any kind of surgery. The ophthalmologist makes a small incision in the tissue covering the eye to reach the eye muscles.

The eye muscles are detached from the wall of the eye and repositioned during the surgery, depending on which direction the eye is turning. It may be necessary to perform surgery on one or both eyes.

Recovery time is rapid. Children are usually able to resume their normal activities within a few days.

After surgery, glasses may still be required. In some cases, more than one surgery may be needed to straighten the eyes.

## Strabismus Surgery

In some cases of strabismus in children and adults, [strabismus treatment](#) consists of [glasses](#), prisms, patching or blurring of one eye, botulinum toxin injections, or a combination of these treatments. Other times, eye muscle surgery is necessary to straighten the eyes.

In children with some types of constant strabismus, early surgery may be recommended to improve the chance of restoring or promoting normal binocular vision.

In adults, eye alignment surgery is not strictly cosmetic. Cosmetic surgery is enhancement surgery, such as restoring youthful appearance in a normal aging person. Eye alignment surgery restores normal appearance and is considered reconstructive. There are many other benefits beyond restoring normal appearance: improved depth perception or binocular vision, improved visual fields, eliminating or minimizing double vision and improved social function — as eye contact is hugely important in human communication. It is important to discuss the goals and expectations of the surgery with your [ophthalmologist \(Eye M.D.\)](#).

During strabismus surgery, one or more of the eye muscles are strengthened, weakened or moved to a different position to improve alignment. Strabismus surgery is usually performed as an outpatient procedure and does not require an overnight hospital stay.

## Preoperative tests for strabismus surgery

Before surgery, a specialized examination called a sensorimotor examination will be performed in the Eye M.D.'s office to assess the alignment of the eyes to determine which muscles are contributing to the strabismus and which muscles need to be altered (weakened, strengthened, or moved) to improve the alignment of the eyes. Prisms are used to measure the degree of the strabismus. These preoperative tests help guide the surgeon in determining the surgical plan. Often both eyes require surgery, even if only one is misaligned. Sometimes the exact surgical plan is determined based on findings at the time of the surgery, especially in reoperations.

## Medications and strabismus surgery

Strabismus surgery rarely causes significant bleeding. However, some surgeons may suggest that you stop taking blood thinners, aspirin, aspirin-containing products, ibuprofen or certain nutritional supplements that can affect bleeding for a week before the surgery. Withholding these medications should also be discussed with the prescribing doctor to assess the risk of NOT taking the medication. If a pain medication is necessary during this time, acetaminophen (Tylenol) can be used as a substitute.

## The strabismus surgery procedure

Strabismus surgery in children requires general anesthesia. Before surgery, a medication is often given to children to alleviate their anxiety of being separated from their parent. In adults, the procedure can be done with general or local anesthesia. Either way, the patient must fast for about eight hours before the procedure. For this reason, pediatric cases are often scheduled in the early morning.

The eye is never removed to perform the surgery. The eyelids are gently held open with a lid speculum. A small opening is made through the conjunctiva (the mucous membrane surface of the eye) to access the muscle. The muscle is then weakened, strengthened or moved to change its action with dissolvable sutures. Most strabismus surgeries are less than one to two hours; however, the patient will be at the surgery center for several hours including pre-operative and post-operative care.

## Adjustable sutures

In standard strabismus surgery, the muscle is weakened, strengthened or moved and a permanent knot is placed. In adults, there is the added advantage that an adjustable suture can be used. Instead of a permanent knot, a temporary knot is placed. After the surgery, with the patient awake, alignment can be reassessed, and if necessary, adjustments can be made before a permanent knot is placed to minimize the chance of an over-correction or under-correction. This is typically done the day of or the day after the surgery.

## After surgery

Any patient that has surgery, whether under general anesthesia or local anesthesia with sedation, needs to be monitored after surgery. Children can return to school after two days. Adults should not drive the day of surgery or the day after and may need up to a week before returning to work. You may have double vision that can last hours to days or a week or more, rarely longer. Exercise caution with activities like driving if you have double vision.

Pain is minimal and usually over-the-counter medicines, such as ibuprofen (Motrin) or acetaminophen (Tylenol), and cool compresses are adequate. Adults and older children may need prescription pain medicine.

The main restriction after strabismus surgery is not swimming for two weeks.

The eye will be red for one to two weeks, rarely longer, especially if it is a reoperation.

## Potential risks of strabismus surgery

The chance of any serious complication from strabismus surgery that could affect the sight or well-being of the eye is exceedingly rare. However, there are risks with any surgery, including:

- Sore eyes;
- Redness;
- Residual misalignment;
- Double vision;
- Infection;
- Bleeding;
- Corneal abrasion;
- Decreased vision;
- Retinal detachment;
- Anesthesia-related complications.

## How successful is strabismus surgery?

Strabismus surgery is a common procedure and most patients will see a large improvement in the alignment of their eyes after surgery. In some cases, you may need additional surgery or prism glasses to optimally align the eyes. Each case of strabismus is unique and should be discussed with your Eye M.D. to understand the goals and expectations of surgery.