THE LITTLE GUIDE TO STRABISMUS & AMBLYOPIA

UNDERSTANDING EYE TURNS, LAZY EYES AND KNOWING WHAT YOU CAN DO TO MAKE VISION BETTER

Written by
eyecarekids vision & learning Optometrists

Hi there! Thanks for taking the time to read our guide on strabismus and amblyopia.

You're here now because your child or someone you love might have strabismus and/or amblyopia. Strabismus and amblyopia differ in that strabismus is related to the eye alignment, while amblyopia has to do with vision and clarity when viewing objects. They are closely related in that they determine how well a child sees.

We believe the first step to good eye health is being informed, so we've put together nuggets of valuable information on strabismus and amblyopia into this booklet which you can share with family and friends.

We hope you find our strabismus and amblyopia guide helpful. If you have any questions or if you're looking for a local optometrist who will ensure that your child will have their best vision despite strabismus and/or amblyopia, we'd love to see you at our practices.

We want you to know that just because your child has strabismus and/or amblyopia, things don't have to be hard for them or for you. We'll help you discover how vision therapy can help your child learn to use both eyes!

Warm regards,

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Strabismus and Amblyopia: The Difference Between the Two

Amblyopia (lazy eye) is often confused with strabismus (eye turn). Strabismus is when an eye is turned in, out, up or down and is related to eye alignment. On the other hand, amblyopia is related to the sharpness of the images in each eye. Some of the confusion may be due to the fact that strabismus can cause amblyopia.

Although they often co-exist, you can have strabismus only or amblyopia only.

What Is Strabismus?

Strabismus is a scientific term to describe the misalignment of the eyes. It is also referred to as “crossed eyes” (eye turns inward), “walled eyes” (eye turns outward) or a squint. The condition is most often caused by the brain’s inability to coordinate both eyes simultaneously, although sometimes it can be mechanical, e.g., muscle imbalances.

Somewhere early in the child’s development, the brain fails to develop binocularity—the ability to use both eyes at the same time. When strabismus occurs, a double image is seen by the brain. Children adapt by suppressing (turning off) the image from the turned eye, which can lead to amblyopia (lazy eye) as well as poorer visual-spatial and visual-motor ability.

There are certain risk factors that increase the risk of strabismus developing.

- **Family History:** Almost 50% of children with strabismus have a family member with strabismus
- **Refractive Error:** Children with significant long sightedness (hyperopia) may develop strabismus as they tend to focus to make things clear, which can cause the eyes to turn in.
- **Medical Conditions:** Children with certain medical conditions such as Down syndrome, cerebral palsy or head injury are more at risk of developing strabismus.

IMPORTANT: If anyone in the family has strabismus or amblyopia, do not hesitate to get all your children's eyes examined. Eye examination can be carried out on all children even as young as a few months old.

Early diagnosis leads to better outcomes.

What Causes Strabismus?

Each human eye has six external muscles that control the eye position and movement. To have normal binocular vision the position, neurological control and functioning of these muscles for both eyes must be perfectly coordinated.

When there are neurological or anatomical problems that interfere with the control and function of these muscles, strabismus occurs. The problem may originate in the muscles themselves or in the nerves or vision centres in the brain that control binocular vision.

Several things and/or events can cause strabismus. Aside from a muscle problem, they include genetics, inappropriate development of the "fusion center" of the brain, problems with the control center of the brain, injuries to muscles or nerves or other problems involving the muscles or nerves.
Surprisingly, most cases of strabismus are not a result of a muscle problem, but are due to the control system—the brain.

Different strabismus types have different causes. Each type has its own causes, characteristics and appropriate treatment plan.

Treatment should be directed at the source of the problem. Our optometrists or your ophthalmologist will determine if the strabismus is due to a spectacle problem or brain problem.

Forms of Strabismus

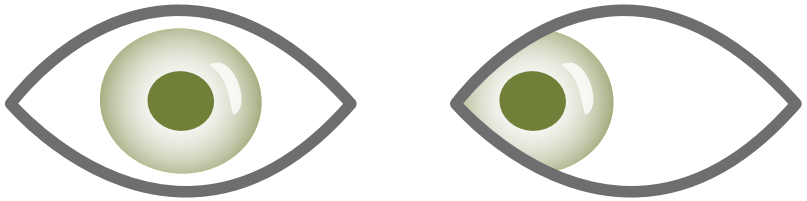
Strabismus is classified into many different forms.

Strabismus can be congenital or acquired

- **Congenital Strabismus:** This occurs early on in life; a baby is born with an eye turn or develops one within the first 3–6 months. In most cases surgery is needed to bring the eyes into alignment.
- **Acquired Strabismus:** This is more common and occurs around the age of 2–6.

Strabismus can affect the eyes in different directions.

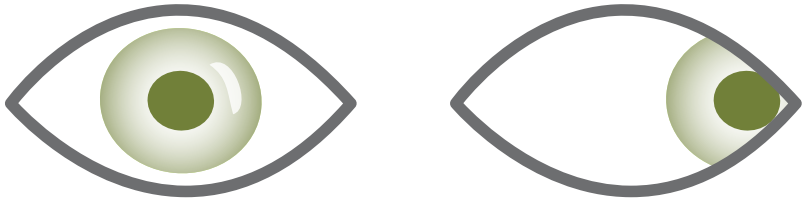
- **Esotropia:** Eyes turn in
- **Exotropia:** Eyes turn out
- **Hypertropia:** Eyes turn up
- **Hypotropia:** Eyes turn down



Esotropia

Strabismus can be constant or intermittent.

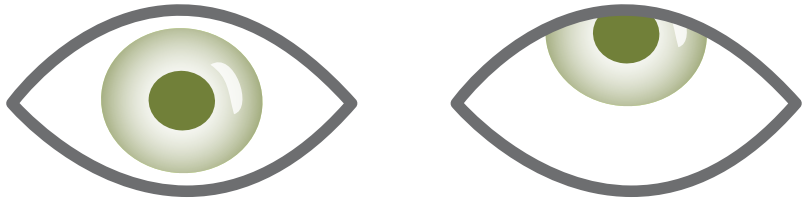
- **Constant:** Eye turn occurs all the time.
- **Intermittent:** Eye turn occurs some of the time. This may depend on what the child is looking at or how tired he/she is.



Exotropia

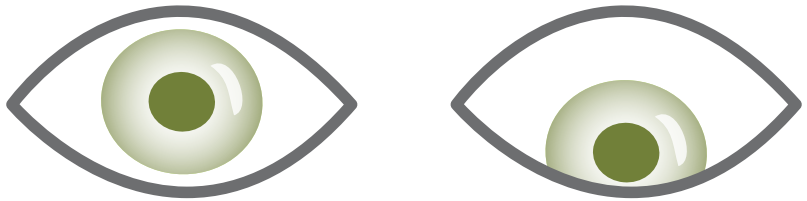
Large Angle Strabismus vs Small Angle Strabismus

An eye turn is generally a **large-angle strabismus** when the misalignment of the eye is large and obvious. The “angle” here refers to the angle of deviation between the line of sight of the straight eye and that of the misaligned eye. When an eye turn is less obvious, this is called a **small-angle strabismus.**



Hypertropia

When a large-angle strabismus is constant, it typically does not cause symptoms such as eye strain and headaches. Reason for this is because there is virtually no attempt by the brain to straighten the eyes. However, because of this, large-angle strabismus usually causes severe amblyopia in the turned eye if left untreated.



Hypotropia

Cases of small-angle strabismus that are less noticeable are the ones more likely to cause disruptive visual symptoms, especially if the strabismus is intermittent or alternating. Aside from headaches and eye strain, other symptoms may include discomfort and fatigue while reading and unstable or "jittery" vision. If small-angle strabismus is constant and unilateral, it can lead to significant amblyopia in the misaligned eye.

Both large-angle and small-angle strabismus can negatively affect the self-esteem of children and adults with the condition as it interferes with normal eye contact with others, causing them to feel embarrassed and awkward.
People with large-angle strabismus are usually recommended to undergo eye-muscle surgery for cosmetic purposes. Those with small-angle strabismus can benefit from noninvasive methods such as vision therapy.

In fact patients who had undergone surgery have been found to benefit significantly from vision therapy as an adjunct therapy post eye-muscle surgery.

False Strabismus: When Babies Appear to Have Crossed Eyes

Sometimes an infant or toddler can have the false appearance of an eye turning inward. This happens when the bridge of their nose is wide and flat, and there are skin folds in the corner of their medial (or inner) eyes. However, there is no problem with vision. This is called “false strabismus” or “pseudostrabismus”. As the child grows and the skull develops, the bridge of the nose narrows and the folds in the corner of the eyes disappear, so the appearance of a squint or crossed eyes also disappear.

Testing if it is false strabismus or true strabismus may involve shining a light into the child’s eyes. If there is no strabismus, the light’s reflection off of the pupil should be in the same position of each eye. If a true strabismus is present, the light reflexes don’t fall on the same position of each eye. However, this is not a definitive test as sometimes a “Positive Angle Kappa” occurs. This happens when the light reflection is not centred over the pupil as the eye looks at the light and instead reflects nasal to the centre, giving the appearance that the eye is deviated outwards. This would require further testing from an eye care professional.

It is very important to determine true from false strabismus because true strabismus can lead to permanent vision loss and is best treated early. Meanwhile, pseudostrabismus does not require treatment as the appearance tends to improve as the baby's facial features mature. Some children may retain a broad nasal bridge into adulthood, particularly among Asians.

Remember too that a baby with false strabismus may develop true strabismus later in life—another reason why regular eye tests should not be neglected.

What Is Amblyopia?

You may have heard of the term amblyopia, also known as a "lazy eye", and wonder what it actually means. We have two eyes that are meant to see the world equally. If one of the eyes is not seeing as well as the other one, this eye is not doing its job and is hence called lazy. The eye that is considered lazy experiences constant blurry vision that is not correctable with the appropriate spectacles or contact lenses. In Australia, the prevalence of amblyopia has been found to be between 1.4% and 3.6%.

Imagine a group discussion with one person not speaking at all or speaking a bit but being ignored by the other speakers. It's similar in the sense our brain needs to receive input from our eyes to process what they see, so if there is a disruption between the visual pathway between the eyes and the brain, then naturally one eye ends up being ignored.

In a fully functioning visual system, the brain combines two similar images into one complete image to allow you to see things clearly and in 3D. With amblyopia, the brain has suppressed (turned off) the vision from the lazy eye because of some factor that makes it difficult to combine the two images together. The brain will favour and choose to use the better eye, and vision will not develop equally. Children with amblyopia are unable to use their eyes together well and thus have difficulty with depth perception and the appreciation of 3D.

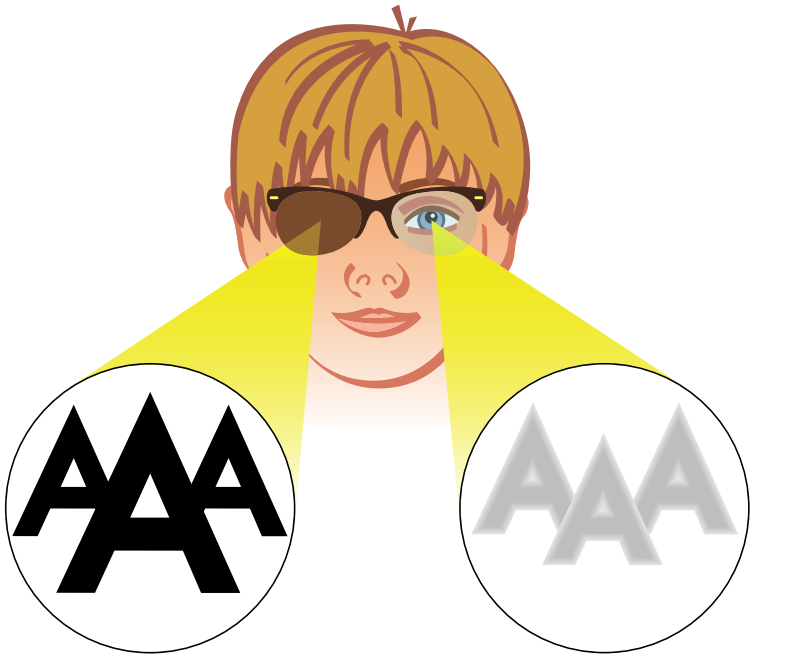
Although amblyopia almost always affects one eye, it may occur in both eyes as well. In this case, the brain fails to develop good vision in both eyes as images processed are always blurry, e.g., due to a high prescription in both eyes.

Causes of Amblyopia

Developmental Problems in the Brain

"Amblyopia results from developmental problems in the brain. When the parts of the brain concerned with visual processing do not function properly, problems ensue with such visual functions as the perception of movement, depth (depth perception), and fine detail (acuity, clear eyesight, sharp vision). Amblyopia is the most prevalent neurological defect of vision in children and adults, affecting 1-3 percent of the population." This is according to the researchers at New York University's Center for Neural Science.

Anything that interferes with clear unobstructed vision in either eye



The healthy eye
is covered with a dark lens

The eye affected by Amblyopia
involves a blurred vision
and lack of perception of three-dimensionality

during the early or "critical" period of visual and brain development (birth to 6 years of age) can cause a lazy eye. In addition, interference to or lack of simultaneous use of both eyes together (binocular vision) can cause what is called a "suppression" or "inhibition" response in the brain. In some cases, this suppression pattern can result in a decrease in the vision in the blurry eye that cannot be corrected with glasses, lenses, or LASIK surgery. Again, it is important to understand that the loss of vision is taking place in the brain. That is, Lazy Eye (Amblyopia) is a neurological condition. Notably, current scientific research shows that the brain can change, develop, and recover at any age with occupational, physical, and visual therapies (Vision Therapy).

Anisometropia

Strabismus, Anisometropia, Blockage of Eye

The most common causes of amblyopia are:

- Constant strabismus (constant turn of one eye in any direction, but an inward turn or crossed eyes is much more common),
- Anisometropia (differences in vision and/or prescription between the two eyes) which leads to anismetropic amblyopia or refractive amblyopia, and/or
- Physical blockage of an eye due to cataract, trauma, lid droop (ptosis), blocked tear duct, etc.

Less common causes of lazy eye are reported to be congenital disorders and vitamin A deficiency.

"Suppression"

Frequent suppression (blocking out or ignoring) of one eye's image by the brain can lead to the development of a lazy eye condition.

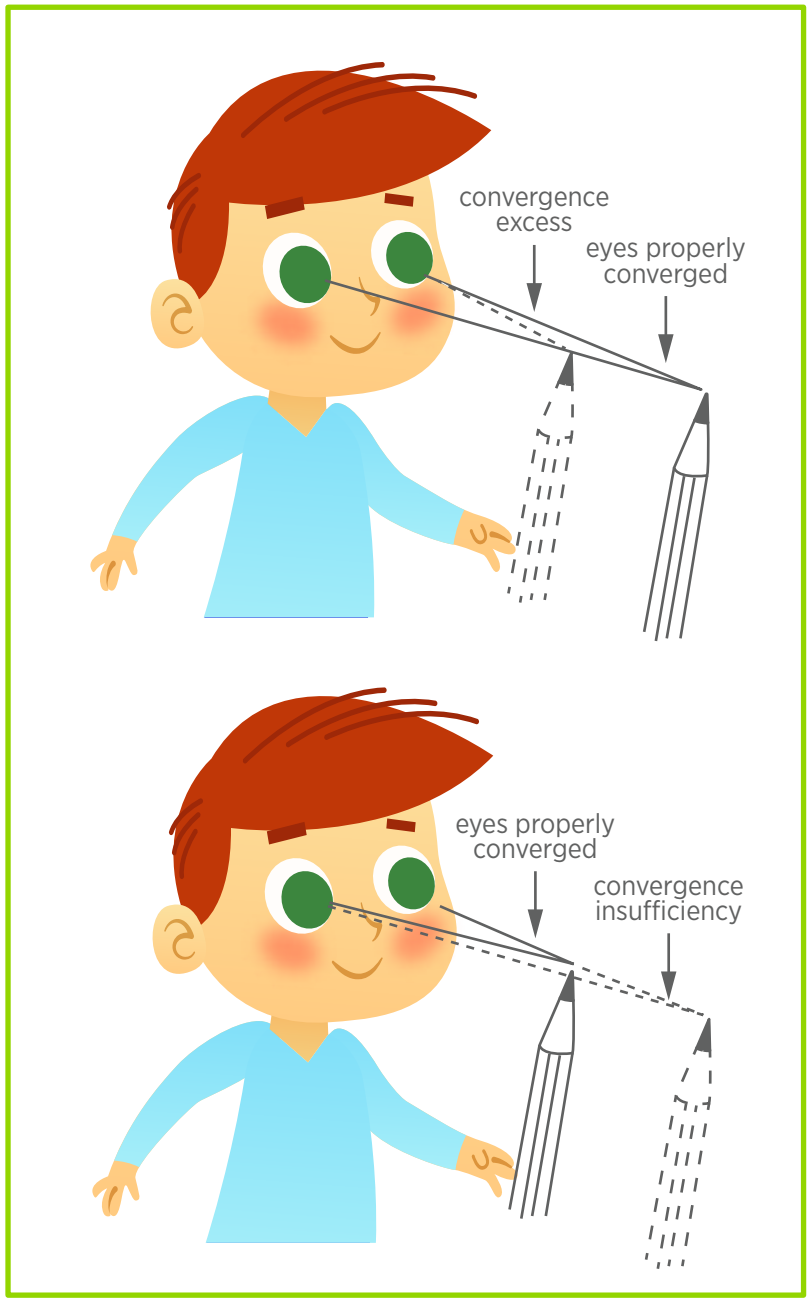
The following visual conditions can cause suppression:

- Strabismus: the two eyes do not aim at the same place, so the brain will suppress—block, ignore, inhibit—one eye in order to avoid confusion and/or double vision (diplopia). This type of lazy eye condition is easier to detect because there is an eye turn that is visible to the outside observer.

- Anisometropic Amblyopia: the two eyes have significant differences in eyesight, visual perception, or prescription (e.g., differences in astigmatism, nearsightedness, farsightedness, etc.). In this case, the brain perceives two mismatching images and opts to throw one out (suppress) to avoid rivalry between the two eyes or double vision (diplopia). This type of lazy eye often goes undetected and untreated because there can be no visible eye misalignment or the eye turn is occasional.

- Refractive Amblyopia (a type of anismetropic amblyopia): one eye sees clearly and the other eye sees blurry, so the brain suppresses the eye with the blur.

- Convergence Insufficiency: this common near vision disorder can cause suppression in one eye, but because the suppression is occasional (intermittent) and/or might alternate between one eye and then, the other, it rarely leads to a true lazy eye condition (Amblyopia).



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Forms of Amblyopia

Refractive Amblyopia: A lazy eye occurs because one eye has a much stronger prescription than the other eye. The differing blur from the difference in prescription makes it difficult for the brain to focus or fuse the images together. The brain thus decides it is less confusing if it suppresses the image of the eye with the stronger prescription. As such, messages from the weaker eye are blocked and the vision in this eye is left to deteriorate causing amblyopia.

Strabismus Amblyopia: When the eyes are not directed at the same target when fixating, the brain is sent two different images—one from the straight eye and one from the turned eye. The brain cannot cope with double vision, so it suppresses the image seen by the eye with the turn. This means the child adapts to only using his/her straight eye to see. This can lead to amblyopia.

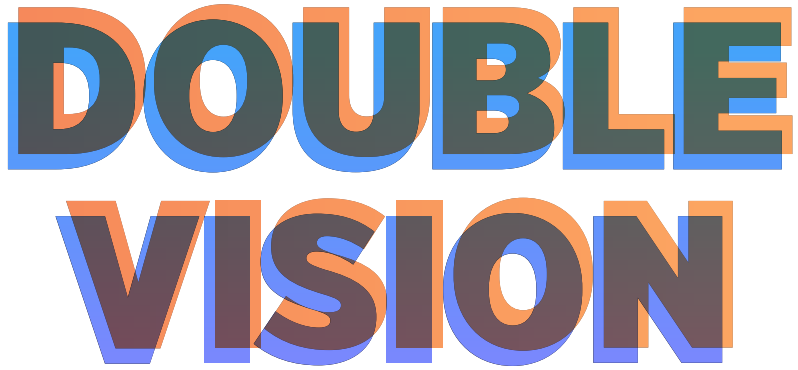
Esotropia is a form of strabismus in which the eye turns inward towards the nose.

Stimulus Deprivation: Often a lazy eye occurs as a result of a stimulus depriving the eye of sight at an early age. This can be in the form of a cataract occurring at birth or a ptosis (drooped lid) that stops light from entering the eye. This stunts the development of normal vision, causing the brain to suppress the underdeveloped image from the deprived eye leading to amblyopia.

Seeing Double?

What is Double Vision?

When both eyes are misaligned, they aim at two different targets, causing two non-matching images to be sent to the viewer's brain. When the brain accepts and uses two non-matching images at the same time, this results in double vision (or binocular diplopia).



Double vision is dangerous to survival, so the brain naturally protects it from occurring. In its attempt to avoid double vision, the brain will eventually disregard one of the mismatching images. This means the brain will ignore one eye.

Because of the brain's ability to suppress one eye, a person's double vision can appear to go away without medical evaluation or treatment. However, the causes of the double vision are very likely still present and that loss of vision in one eye has probably occurred due to lack of treatment. When vision in one eye is lost, the person has also lost normal depth perception and stereovision. However, the loss of vision could be temporary and treatable.

Double vision is not a minor complaint! When double vision occurs, seek a complete visual evaluation from an eye care professional who specialises in binocular (two-eyed) vision.

Two possible and different causes of double vision:

1. The most common cause of double vision is misalignment of the two eyes due to functional problems in the visual system. This type of double vision is called binocular diplopia.

2. A structural defect in the eye's optical system is a much less common cause of double vision. Cataracts, for example, might cause such a defect. In this case, diplopia can appear in only one eye; this is called monocular diplopia.

Bear in mind that double vision can be a symptom of many different visual conditions that affect children and adults such as strabismus, convergence insufficiency or visual conditions related to head injuries.

A much less common cause of double vision is cataracts. The clouding of the eye's natural lens can cause light rays to scatter in different directions, creating "ghost images".

What Is Stereovision?

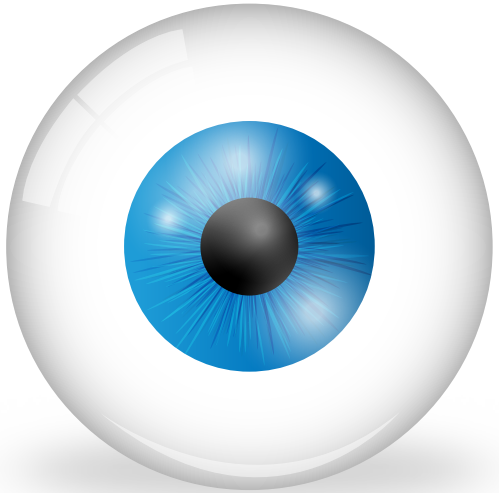
Stereovision is an exciting part of the normal human vision. Two seeing eyes means seeing two views. When these two views are fused in the brain into one image, that's stereovision (also called stereoscopic vision or stereopsis).

Unlike some animals like fish or horses, human beings have two eyes that are located side by side in the front of their heads. This close side-by-side positioning enables each eye to take a view of the same area from a slightly different angle. The two eye views have plenty in common, but each eye picks up visual information that the other doesn't.

To demonstrate the slightly differing angles of view of each eye, do this game:

The Eye Hop Game

1. Centre your nose over the blue eye (iris) on the right.
2. Close one eye and put your thumb several inches in front of your nose. Position your thumb so it completely hides the blue eye on the screen.
3. Now switch eyes. Close your open eye and open the other.
4. Watch the eye hop!



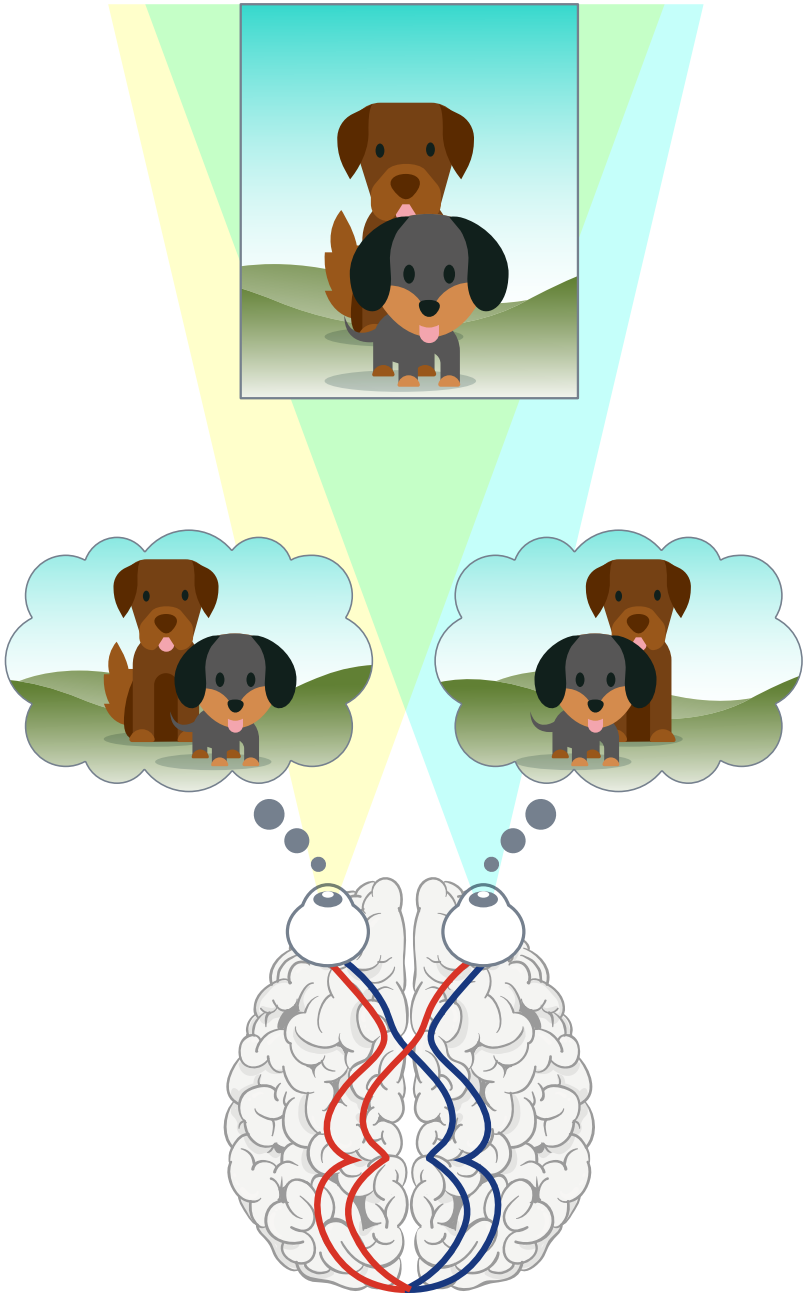
Two eyes means seeing 3D!

Each eye captures its own view. These two separate images are sent on to the brain for processing. When the two images arrive simultaneously in the back of the brain, they are united into one picture.

The mind combines the two images by matching up the similarities and adding in the small differences. The small differences between the two images add up to a big difference in the final picture!

The combined image is more than the sum of its parts. It is a three-dimensional stereo picture.

The word "stereo" comes from the Greek word "stereos" which means firm or solid. With stereovision, you see an object as solid in three spatial dimensions—width, height and depth—or x, y and z. It is the added perception of the depth dimension that makes stereo vision so rich and special.



Why Stereovision Is Important

Stereovision probably evolved as a means of survival. Stereovision enables us to see where objects are in relation to our own bodies with much greater precision—especially when those objects are moving towards or away from us in the depth dimension. We can see

a little bit around solid objects without moving our heads and we can even perceive and measure "empty" space with our eyes and brains.

Some examples of occupations that depend heavily on stereovision: Architect, Surgeon, Dentist, Waitress, Driver, Baseball player

Some general actions that depend heavily on stereovision:

- Reaching out to shake someone's hand
- Pouring liquid into a container
- Stepping off a curb or step
- Throwing, catching or hitting a ball
- Driving and parking a car
- Planning and building a three-dimensional object
- Threading a needle and sewing

Try this simple test to know if you have stereovision. It only takes a minute.

The Framing Game

The Framing Game can tell you whether both your eyes are turned on at the same time (binocular vision). See the instructions on the right side:

1. Centre your nose over the blue green eye (iris) above.
2. Focus your eyes on the single blue green eye.
3. Put your free thumb in front of your nose.
4. Continue to focus on the eye. If both eyes are on, you will see two thumbs framing one eye.
5. Now, switch your focus to your thumb. You should see two solid clear eyes framing one thumb.

Were you successful? It means both your eyes are “on” and you can see 3D.

Did you have problems? If yes...

- Follow the instructions again, paying close attention to where you're focussing your eyes.
- If you wear lenses, try it without them.
- Can't see two thumbs (or two eyes)? Or do you see two thumbs, but one thumb is blurrier, higher or lower than the other? Does one thumb of the two thumbs disappear and reappear? Or does one thumb appear faint, like a ghost image? Any one of these signs could be an indicate that you might have a vision problem or a problem with depth perception.
- You may want to consider having a comprehensive eye test which includes the testing of binocular vision.
- Don't give up. You don't have to have perfect binocular vision to attempt 3D viewing.

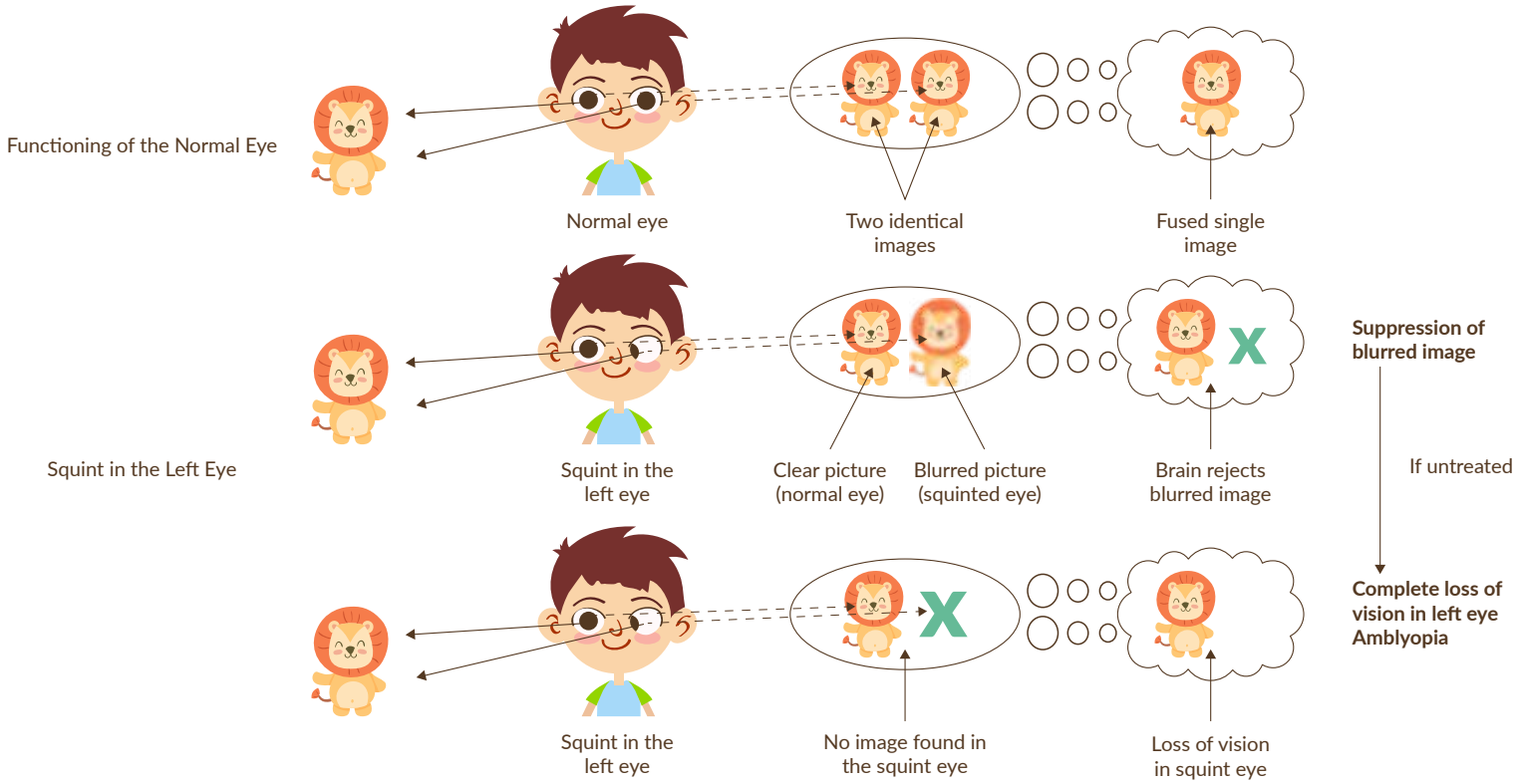
In order to see 3D and with stereo depth perception, your brain has to use the visual information from both eyes. If the two eye views are too different and cannot be matched up, the brain will be forced to make a choice. It will reject all or part of the information from one eye. The brain is able to ignore, suppress or turn off visual information it can use.

Such visual suppression will most likely happen when someone has strabismus and/or amblyopia.

What Happens If Strabismus and Amblyopia Are Not Treated?

Some parents get a false impression that a child may “outgrow” a squint. However, if a child with strabismus is not treated at the appropriate time, amblyopia occurs, which eventually leads to permanent loss of vision.

It is important for children to develop equal vision in both eyes in order for them to function normally. Good sight and two-eyed vision are vital for children to succeed in school, sports, or any other activity that requires clear vision, good hand-eye coordination, and strong depth perception. When children with untreated amblyopia grow to be adults, their choice of career may be limited and, if they are unlucky enough to lose vision in their one good eye, they could be visually impaired or legally blind for life.



Vision Therapy: Our Treatment of Choice

Used to treat: Strabismus & Amblyopia

Glasses, patching and surgery are not enough.

It is well known that glasses, occlusion and atropine treatment are considered standard treatment for strabismus and amblyopia in children. Surgery can be successful in treating congenital turns and sometimes necessary for cosmetic straightening.

Research

In a scientific study by Dr Fitzgerald and Krumholtz, the value of including vision therapy in treating amblyopia is illustrated. They found:

- **Patients with glasses only:** 50% maintained visual acuity improvement
- **Patient with patching and glasses:** 60% maintained visual acuity improvement
- **Patient with patching, glasses and optometric vision therapy:** 100% maintained visual acuity improvement

However, such treatment fails to address two important aspects:

- Glasses, patching, and surgery may improve visual acuity (what you can read on the letter chart) and the eyes may appear straight, **however, this does not address how well the two eyes can work together as a team.** Hence often after patching is stopped, vision is not maintained, or after surgery although the eyes look straight, the worse eye is still "switched off" and the eye turn can reappear after surgery.
- The brain directs and controls the eyes as well as processes visual information. For example, in amblyopia the brain needs to be re-taught to stop suppressing the weaker/turned eye and begin to accept visual input from it to allow functional vision.

Vision Therapy for Different Needs

Visual Skills Vision Therapy is to help both eyes function together as a team. These kids tend to have convergence/ accommodative insufficiencies. These issues can include difficulty with **eye teaming, eye focussing, and eye tracking problems.** Kids with these struggles can greatly benefit from this form of vision therapy.

Developmental Vision Therapy: Did you know that **learning difficulties** can be vision-related? Does your child still reverse letters? Do they struggle with sight words or **spelling words**? Is reading a chore and not fun? Have you tried tutoring or extra lessons and it's still not helping? Developmental Vision Therapy might be the missing link.

Strabismus/Amblyopia Therapy: Children with an **eye turn (strabismus)** or a **lazy eye (amblyopia)** have difficulty using the eyes together as a team. They struggle with depth perception and other visual skills symptoms. Vision Therapy can help them learn how to maximise their visual potential and make them see better!

Vision Therapy Works for Adults Too!

Vision therapy can be done at any age!

Some parents are told that strabismus and amblyopia can only be corrected when the child is very young, usually up to the age of 6, the time when a child's visual system is still naturally "moldable". Some doctors feel that if treatment is not undertaken during this "critical stage" of development, the amblyopia becomes fixed and untreatable. Parents of older children or adults are often told that it is too late to treat the problem.

Good news! New research has disproven this completely. The reason is "neuroplasticity", which simply means our brains can learn new ways of processing as long as we are alive. It is not impossible to improve strabismus and amblyopia in older children and adults through vision therapy.

One reason vision therapy is often effective in adults is their motivation to improve their visual abilities. They are also more likely to provide detailed feedback. So even though a majority of

vision therapy seems to be focussed on children, several adults who tried vision therapy have reported dramatic improvements in their vision and improved their quality of life.

One example is a 48-year old woman named Susan Barry whose life was transformed through vision therapy. In her landmark book “Fixing My Gaze”, Susan showed that it’s never too late for vision therapy to help you improve your eyes and your life.

Vision therapy has helped post-brain-injury patients as well. Many adult patients who had been told “it’s too late now” or “you’ll have to learn to live with it” have positive outcomes with vision therapy.

How Is Vision Therapy for Strabismus and Amblyopia Different?

Strabismus and Amblyopia therapy corrects the cause of the brain’s inability to align and use both eyes together. During therapy, the patient’s brain is trained to stop suppressing the lazy eye and the visual pathways from brain to eyes are improved so the patient can keep both eyes aligned. Finally the brain is taught to fuse the images coming in from both eyes for normal binocular (“two-eyed”) vision. As a result we aim to make it more comfortable for the brain to use both eyes together rather than suppressing one eye.

The gains achieved in vision therapy are permanent. This is because once the child’s brain learns binocularity, or how to fuse the images from both eyes, the child’s visual system is restored close to normal.

Binocular fusion is the glue which permanently holds the visual system in place, simply because it's easier to see correctly than to have each eye fighting each other to see separately. Binocular fusion keeps the eyes from drifting out of alignment, and because there is no longer a need for the lazy eye to suppress, its sharpness of vision is not lost over time.

Outcomes of Vision Therapy: What Can You Expect?

- Improved ability to control an eye turn
- Improved distance judgment and 3D vision (depth perception)
- Improved learning ability, reading level and speed
- Improved symptoms of headaches, sore eyes, double vision

What is Involved in Vision Therapy?

☐ **Comprehensive Eye Examination (30 minutes)**

This includes a thorough check of your child's vision, visual skills, and eye health.

After the eye examination, your optometrist will discuss their findings and give you the best recommendations. This may include spectacles, further tests and/or vision therapy.

Your optometrist may recommend further binocular vision assessment (around $30, health fund rebate available).

☐ **Vision Therapy**

- Administered in 3-month term. Most patients require 2–4 terms of therapy, while complex problems may take longer to treat.
- You will begin with a vision therapy orientation session. Following that, you will begin with 10 weekly 45-minute in-office sessions. You will be expected to do 15–20 minutes of vision therapy at home every day.
- Equipment packs are included at the beginning of the vision therapy program, allowing your child to practice in their own time.

What to Expect from My First Vision Therapy Session?

Commence with a vision therapy orientation session

- Meet your vision therapist who can explain more about vision therapy and clarify any questions you might have.
- Discuss goals you want to achieve by the end of the therapy.
- Your vision therapist will demonstrate some visual activities and exercises.
- You will be introduced to the equipment bag.
- 10 appointments for the following sessions will be organised.

Further Resources on Vision Therapy

Books

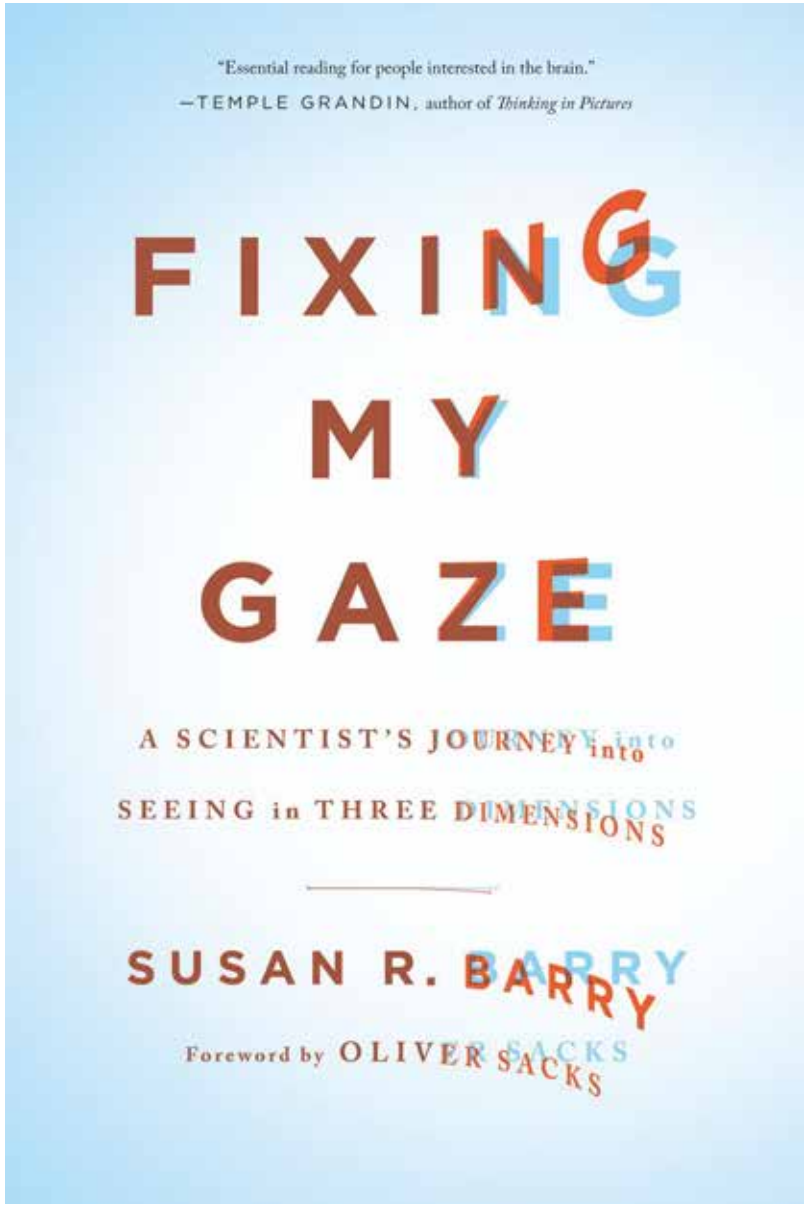
Fixing my Gaze - A Scientist's Journey into Seeing in Three Dimensions

By Susan Barry

Susan describes the astonishing experience of gaining 3D stereovision at the age of 48 after a lifetime of seeing in only two dimensions.

After intensive vision therapy, Susan was able to experience a new view of the world. Challenging conventional wisdom that the brain is programmed for life during a critical period in childhood, Susan offers a poignant account of our capacity for change.
"The snow was falling lazily around me in large, wet flakes. I could see the space between each flake, and all the flakes together produced a beautiful three-dimensional dance. In the past, the snow would have appeared to fall in a flat sheet in one plane slightly in front of me. I would have felt like I was looking in on the snowfall.

But, now, I felt myself within the snowfall, among the snowflakes. I watched the snow fall for several minutes, and, as I watched, I was overcome with a deep sense of joy.
A snowfall can be quite beautiful – especially when you see it for the first time."

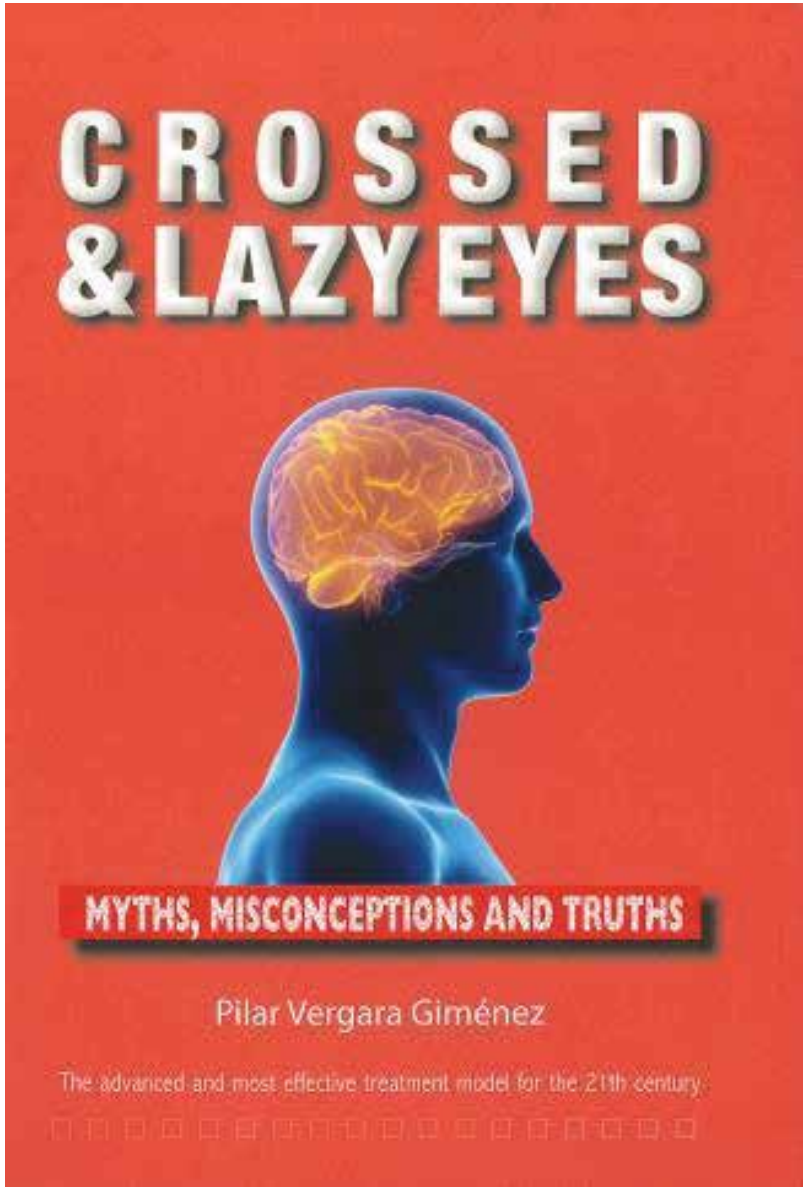


Crossed & Lazy Eyes – Myths, Misconceptions and Truths

By Pilar Vergara

"The objective of this book is to share the most up-to-date knowledge in the field of vision science, with the goal of introducing many new, exciting, and effective treatment options for amblyopia and strabismus..."

A must-read for anyone interested in learning more about how vision therapy can help people with this visual condition!



Websites

Range of research papers explaining evidence for vision therapy and vision and learning problems:
https://www.acbo.org.au/for-patients/evidence

Visit our website for more vision therapy stories:
http://www.eyecarekids.com.au/newsite/vision-therapy-stories-strabismus/

What Are the Other Management Options Available?

Here are other management options for strabismus and amblyopia. These may be advised either separately or in conjunction with vision therapy.

These include:

- Glasses
- Patching
- Atropine
- Surgery

Glasses

Used to treat: Strabismus & Amblyopia

Glasses are important to correct the vision so that the brain has a chance to use and coordinate the two eyes well. In amblyopic cases, glasses allow the brain to pay more attention to the "weaker" amblyopic eye.

Patching

Used to treat: Amblyopia

Early diagnosis and prompt intervention is critical to effectively treat amblyopia. The only way to treat amblyopia is by giving the lazy eye a chance to see by covering the good eye. The most practical way to do this is by wearing a patch over the good eye. By patching the good eye, it allows the weaker eye to be stimulated and vision to develop.

Studies have shown that for effective treatment, it should be commenced before a child turns 10-12. **Patching treatment is aimed at improving vision. If there are any existing eye turns, this will not be treated.**

Atropine

Used to treat: Amblyopia

As an alternative to patching, atropine 1% eye drops can be used. The drops dilate the pupil and paralyse the focusing muscles in the good eye, causing blurred vision and forcing the amblyopic eye to work. The benefit of atropine is improved compliance compared to patching. However, side effects need to be considered and monitored closely.

Atropine injection ampoule

Atropine Guide

PEDIG studies recommended the use of atropine 1% once a day 2 days a week (e.g., weekends). The studies carried out was tested on children 3 years old, hence, is not suitable for those under this age.

Atropine should not be used if your child suffers from heart problems or has a high fever.

Points to Remember:

- Store atropine in a safe place, out of reach and sight of children.
- Do not swallow.
- Store at room temperature (< 25 degrees).
- Do not use if expired.
- Wash and dry your hands before instilling drops.
- Allow the school to know about the treatment and that one eye will be dilated.

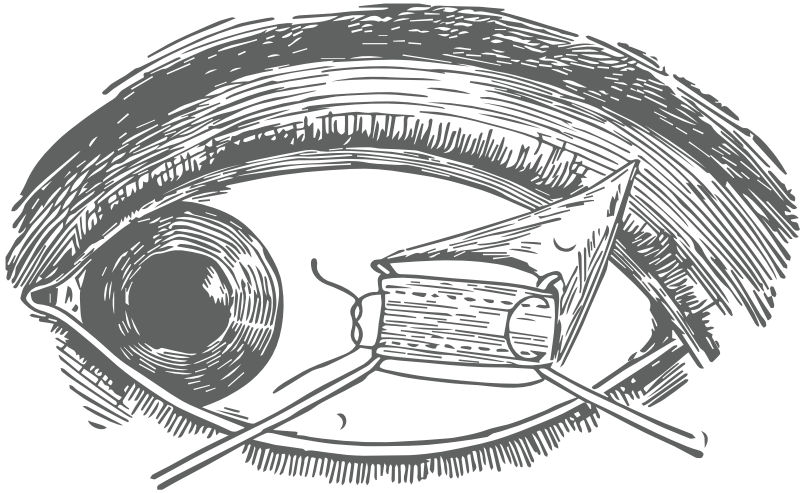
Surgery

Used to treat: Strabismus

Strabismus surgery is a cosmetic alignment of the eyes and, in some cases, is an important part of treatment for people suffering from this condition (congenital, large constant turns). Eye muscles are cut and adjusted to change the position of the eyes. However, 95% cases of strabismus are not muscular problem and lies at the level of brain control.

"Most strabismus is the result of an abnormality of the poorly understood neuromuscular (including brain) control of the eye movement. Less commonly, a problem with the actual eye muscle causes strabismus." (American Association for Paediatric Ophthalmology and Strabismus)

Therefore, it is important to consider that while surgery improves cosmetic appearance, it does not necessarily address the cause of the issue—that the brain is unable to coordinate the eye. This is a reason why patients' eyes can deviate again after surgery.



Eye muscle surgery cosmetically aligns the eyes so they look straight but does not correct the inability to use both eyes together.

REFERENCES

Strabismus and amblyopia are common, but quite complex eye conditions that affect the eyes and brain centres that making a guide about these two conditions based on our common knowledge and empirical study alone is not enough.

The following websites have been very useful in providing us with intellectual assistance which allowed us to produce quality patient education content which you will read in this guide:

1. www.aapos.org
2. www.strabismus.org
3. www.covd.org
4. www.vision3d.com
5. www.lazyeye.org
6. www.allaboutvision.com

Book an appointment
with our behavioural optometrist today!

www.eyecarekids.com.au