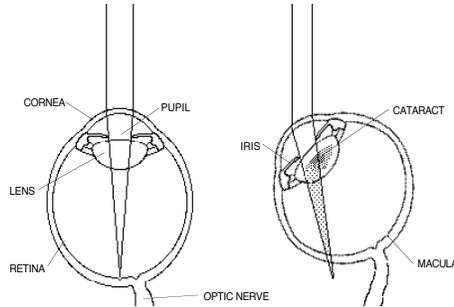


# AMBLYOPIA



The eye on the right is at risk for all three types of AMBLYOPIA. Rays of light enter the normal eye on the left, are bent by the cornea and the lens and are focused on the most precise part of the retina called the macula. Light entering the right eye is disrupted by a congenital cataract (*deprivational amblyopia*). Since the right eye is shorter than the left, light doesn't focus on the retina due to unequal far-sightedness (*refractive amblyopia*). Since the left eye is crossed (esotropia-type strabismus), incoming light fails to align on the macula (*strabismic amblyopia*).

Eye doctors and orthoptists want each child to grow up with the healthiest visual system possible. This goal requires the close cooperation of parents, pediatricians, primary doctors, optometrists, school nurses and health aids and the professionals who deal with visually impaired babies.

At birth, a normal infant has relatively poor vision in the range of 20/2000! Under normal conditions, the visual system improves so that 20/20 vision might be attained by school age and retained after age 10 years. The child's brain gradually learns the best vision it receives from the eyes over the first decade. Disruption of brain visual development is called AMBLYOPIA. A common, but ambiguous term for amblyopia is "lazy eye." If a child develops amblyopia and fails to receive intensive treatment before the age of ten, permanent brain visual loss results for one or each eye! Treatment of amblyopia is the specialty of orthoptists and pediatric ophthalmologists.

**CAUSES OF AMBLYOPIA:** Amblyopia can result from three main causes: 1) unformed images, 2) unfocused images and/or 3) misaligned images. All three are shown in the figure.

**Deprivational Amblyopia** is caused by untreated unformed image visual development. This may be due to congenital cataracts or opacities in the lens of one or both eyes. An infant with a cataract sees as if looking through a Kleenex®; light, dark and color or close large shapes are all that can be seen. Cataracts in infants need urgent care with surgical removal, optical rehabilitation with glasses or contact lenses (by age 1 week to 4 months) and a decade of close monitoring to attain best vision.

**Refractive Amblyopia** is caused by untreated poorly focused eyes. This can be due to high or unequal amounts of far-sightedness (hyperopia), near-sightedness (myopia), astigmatism or unequally focused eyes (anisometropia). Such children can be detected by distance vision chart failure when they become verbal (age 3-5). Ideally refractive amblyopia is detected and treated even earlier. Such children might like to sit close to TV or hold objects very close.

**Strabismic Amblyopia** is caused by misaligned eyes in children. Strabismus includes conditions commonly called "cross-eyed," "wall-eyed," or "squint." Rather than suffer with double vision, a child's brain

frequently suppresses or "turns off" the brain image from the non-dominant eye. Strabismic amblyopia can be treated by combinations of drops, glasses, patching and/or eye muscle surgery.

**DETECTION:** Within the first days after birth, part of each baby's first physical exam is the "red reflex" an abnormality of which could indicate cataract or tumor. A part of routine pre-school pediatric check-ups is observations of red reflex by **photoscreen** and Brückner Test, eye movements and alignment and the ability of each eye to independently follow and interesting object. Verbal children are given a picture or letter chart test on a wall-chart or with a device similar to Driver's exams. Severe amblyopic conditions should be detected in pre-verbal children using a Photoscreening device, also.

**TREATMENT:** An analogy can be drawn between amblyopia treatment and teaching a child to swim in the deep end. Until that child is old enough (10) and an experienced swimmer, a parent will either protect them with life-preservers, watch them very closely, or both depending on age. Combinations of **patching**, dilating eye drops (**Atropine**), **glasses** or eye muscle **surgery** act like life preservers for the visual development of one or both eyes and frequent eye exams is like close observation of a fledgling swimmer.

Amblyopia afflicts approximately 5% of children. With proper vision screening and early, persistent treatment, amblyopia should be entirely treatable. Infants' eyes should be examined as a part of their initial pediatric exam; cataracts or other serious causes of deprivational amblyopia can be detected at day one. Children who fail an eye screening by age one year should receive a thorough exam by an eye doctor including dilating drops, refraction and thorough retina and lens exam. We think, each child should receive at least one dilated eye exam before age 7 years even if no symptoms or vision screen failures are encountered. Our goal is to **Eliminate Amblyopia in Alaska**: detect and treat all amblyopia so children see as well as possible.

Drs. Robin Grendahl, Kevin Winkle, Robert Arnold, Kyle Smith  
Alaska Children's Eye & Strabismus  
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# CROSSED EYES (Esotropia)

Alaska Children's Eye & Strabismus

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**Definitions:** Strabismus is a term for misaligned eyes. More than a dozen types of crossing misalignment are called Esotropia. Out-drifting is called exotropia and updrifting is called hypertropia.

**Detection:** Parents and pediatricians often are first to notice crossing in a new-born or infant. The eyes may stay crossed, they may occasionally cross or the child may look with one eye while always crossing the other. When an eye turns in, it may look out poorly and it may show minimal white on the inside toward the nose. False crossed appearance (Pseudostrabismus) can occur when an infant's nasal skin fold covers the inside white of an otherwise straight eye. When a straight eye looks at a light, a reflection centers in the pupil and a dark red reflex is present as can be seen in some flash photographs. True crossing can be detected by abnormal light reflections and abnormal red reflexes (Brückner's Reflex).

**Sequelae:** Under normal conditions, we have very poor vision at birth (20/2000) in each eye and gradually develop good vision in each eye which remains permanent after age ten years. Depth perception from binocular vision is first measured by age 4 months and improves up to age ten years. If an eye has vision blocked (i.e. from juvenile cataract), or if the eye is poorly focused (i.e. from too much astigmatism or unequal farsightedness) or if the eyes remain misaligned (strabismus), then the brain will fail to learn good vision and will have absent or subnormal depth perception (Amblyopia). Pediatric ophthalmologists strive to prevent all forms of amblyopia but cannot do so without much help from parents.

**Accommodative Convergence:** The brain normally controls three eye functions at once; close focus (accommodation), turning each eye in to align on a near object (convergence) and pupil constriction. It is impossible to separate these normal brain functions. When we focus close, our eye should turn in. As a result of normal alignment of each eye, images are correctly projected to the brain resulting in normal visual development of each eye and the development of binocular vision and depth perception over the first ten years of life. Improper alignment of the eyes (strabismus) can result in poor development of the vision in the less preferred eye (amblyopia) and absent depth perception.

Near sighted people can easily focus on close objects but require glasses to see distance. When near sighted people use the focus muscles in their eyes, they focus even closer-up to the tip of the nose! Far sighted people are un-focused at distance and more so at near when they do not use the focus muscles in their eyes. In order to focus on a distant object they must use some eye focus power (accommodation). Far sighted people must use lots of focus muscle power to see near objects.

It is common for far-sighted children between the age of 18 months and 3 years to start crossing their eyes especially for near objects and when tired. This is because children start wanting to focus on details after age one, and the extra focus power required by the far-sighted child is connected in their normal brains with turning the eyes in. Usually, prescription of the correct far-sighted glasses (after dilated exam) will result in straight eyes for these children.

**Accommodative with increased AC/A:** While it is normal for our eyes to turn in a certain amount for a given amount of close focusing, some children demonstrate an exaggerated amount of crossing for a given amount of close focusing. This tendency resides in their brain. Bifocal glasses and an eye drop called phospholine iodide (PI) can help such patients. The PI drops and the bifocals make close focusing easier and therefore reduces the crossing tendency which is controlled by that child's brain. PI can cause little bumps in the pupil but the main complication of PI drops is the potential to prolong muscle relaxants during general anesthesia since the drop gets gradually absorbed into the body as well as the eyes. If your child is on PI drops, remember to notify your anesthesiologist in the event of surgery.

**Vergence amplitudes** (Jumping over a stick- analogy) Although most people appear to have straight eyes, most actually are compensating for small amounts of mis-alignment (phorias). The ability to make adjustments of phorias is called a vergence amplitude. A

vergence amplitude might be likened to being able to jump over a stick. Most of us can jump over a stick 10 inches off the ground or perhaps 15 inches but rarely can we jump 25 inches. The same for a persons ability to make adjustments for amounts of misalignment of the eyes measured in prism diopters. Two prism diopters is about the same as one degree. Most people can only adjust for 15 or less prism diopters of crossing and the more adjustment requires more effort. Some older people are plagued by doublevision because they lose their vergence amplitudes.

**Tendency to stay straight** (analogous to marriage for Billy Graham's wife Ruth and Elizabeth Taylor) We are born with tendencies to keep our eyes aligned. Some of us are born with very poor abilities to keep our eyes aligned (drift-tendency) which often results in early crossing of the eyes (essential infantile esotropia). Others may have had a mechanical reason for early crossing greater than their ability to compensate for it. Crossed eyes can almost always be straightened by glasses or surgery. Over time, some straightened eyes stay straight while others drift away from straight. Eye doctors are unable to know whether a cross-eyed child is a drifter or one who will stay straight until attempts have been made for the first few years to help the eye be straight. For those with a drifting tendency, good vision can usually be attained in each eye but even as an adult the eyes may continue to drift out, in or vertically. The tendency to keep our eyes straight might be likened to the future tendency of a maiden to stay married for life. The future Ruth Graham had a strong tendency to stay married while the future Elizabeth Taylor did not. We often don't know a given child's tendency to stay straight for several year, or in the case of Elizabeth Taylor, several attempts at marriage. Some children require several surgical procedures to keep their eyes reasonably straight.

**Essential Infantile Esotropia (EIE):** This is a common form of crossing which is also known as congenital esotropia. Not every child with this condition is born crossed, however. Most patients with EIE cross before age 6-12 months and do not have very much far-sightedness. Vertical misalignment can accompany EIE. In addition to crossing, An EIE patient may demonstrate more crossing up (A-pattern), more crossing down (V-pattern), overaction of the oblique muscles or up-drift tendency of each eye (DVD). Surgery is almost always required to allow straight eyes and prevention of amblyopia in an EIE patient.

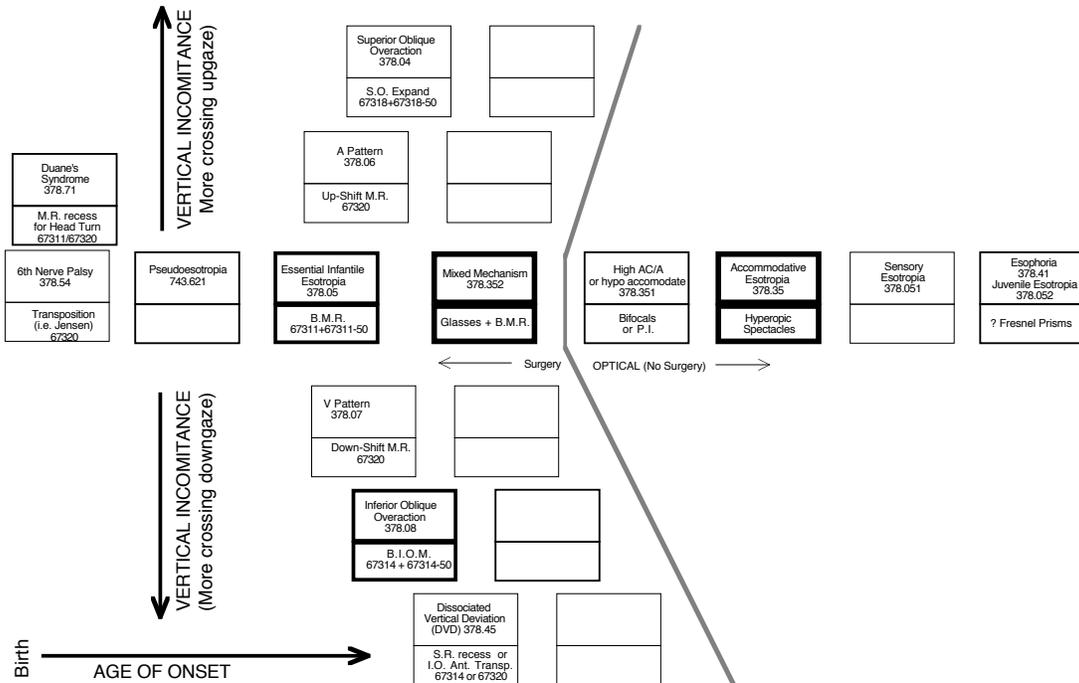
**Mixed Mechanism:** Several children are eventually found to have crossing partly treatable by glasses and partly requiring surgical treatment resemble EIE.

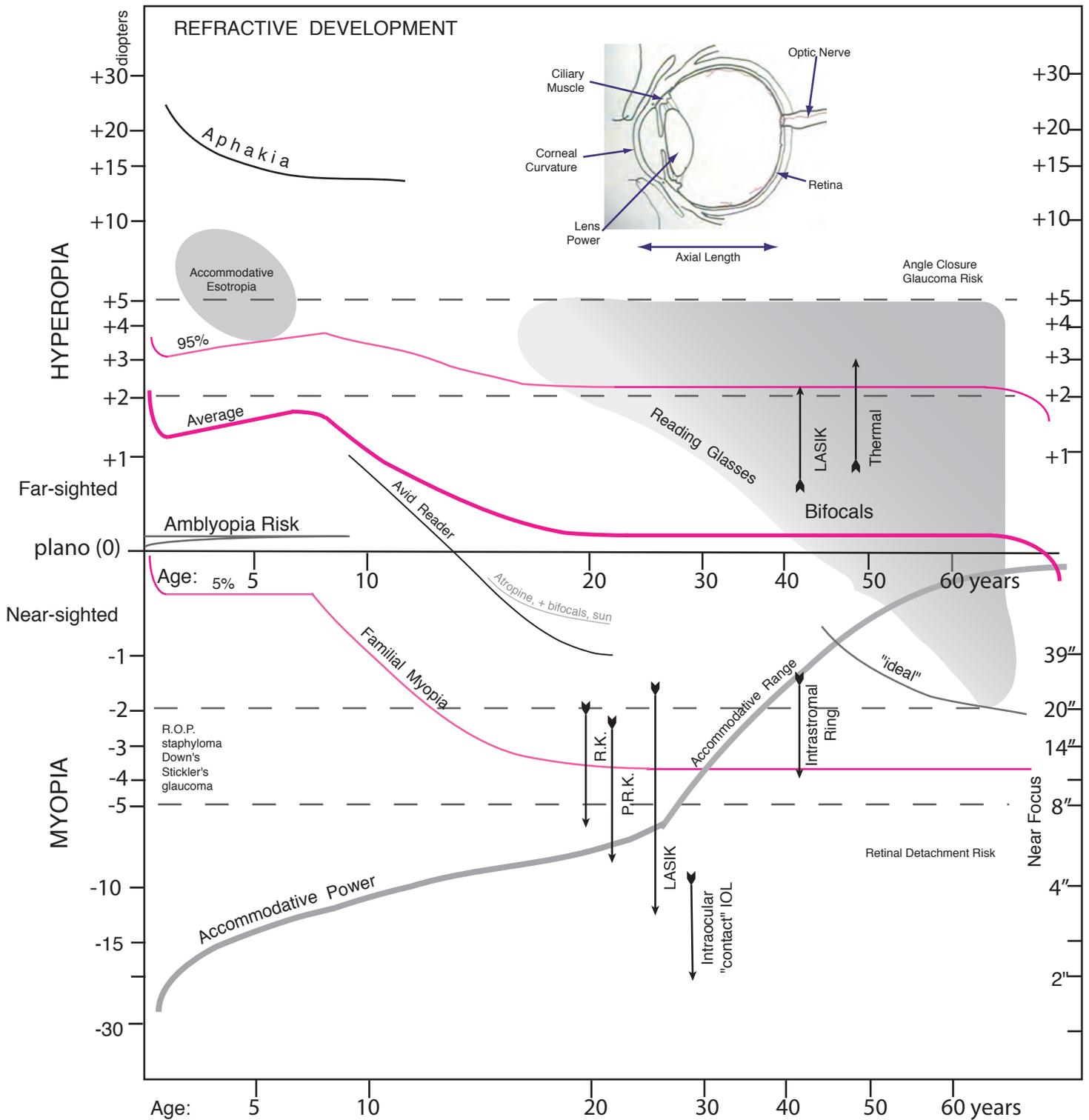
**Duane's Syndrome/ 6th Nerve Palsy:** The sixth nerve from the brain stem controls the muscle which pulls our eyes out. A weak sixth nerve can be a cause of an in-turning eye. If the sixth nerve weakness occurs before birth, that eye may not turn completely out. During development, some of the nerve from the in-turning muscle may attach to the out-turning muscle. In this condition (Duane's Syndrome) the eye doesn't turn completely out and the eye lids narrow when the eye turns in. Surgery is occasionally required to help the child look straight ahead.

**Sensory strabismus:** We keep our eyes straight by superimposing the images from each eye to avoid double vision. If one of our eyes sees very poorly, then that eye may drift out of alignment. Poor vision in a child's eye can be caused by poor development of the optic nerve or retina, potentially fatal retinal tumors, cataracts or infections. It is critical to fully examine any child whose eyes are not aligned.

**Esophoria/ Intermittent Esotropia:** Occasionally, some children have eyes that gradually drift in when the child is tired or day-dreaming. This may start at any age. Such crossing is compensated well when the child is alert enough to exert the muscle energy to pull the eyes back straight. Surgery or glasses are required only when the child has enough difficulty compensating for the drift.

**Prevalence:** Esotropia is the most common form of strabismus constituting 1/2 to 2/3 of all misaligned eyes. About 5% of people have strabismus. The more common types have bolder boxes in the figure below.





A dot (•) indicates No Astigmatism.  
 An arrow | signifies astigmatism.  
 90% of astigmatism < 2 diopters

**Farsightedness** and **Nearsightedness** depend on the length of the eye, the power of the lens, the pull of the ciliary muscles distorting the young flexible lens, and the curvature of the cornea. **Astigmatism** is usually due to an irregular curvature of the cornea; the front of the eye is more like the side of a football than the shape of a basketball (no astigmatism), **Presbyopia** is a gradual hardening of the crystalline lens so that the ciliary muscles can no longer distort it enough to focus on near objects.

# TEARING IN CHILDREN

Robert W. Arnold, M.D.

## The importance of tears:

Tears are an important part of the health and function of the eye. A smooth tear film is the most important optical surface of the eye. The continuous rinse of tears with their immunoglobulin-A provides an excellent barrier to infection and irritants. Without adequate tears, the eye can be blurry, infected, scarred and, eventually blind. A major cause of world blindness is dry eye!

Our tears are composed to three layers for optimum health. Mucous glands in the conjunctiva produce mucous adjacent to the eye surface. Oil glands in the lids produce an oil layer on the outside to prevent evaporation. Sandwiched between the mucous and oil is the salt-water layer normally produced by multiple small glands. Pain, cold wind and emotions can cause an outpouring of extra salt water from the large gland under the brow. Some infants do not well-up with tears even when crying; their large glands are not yet fully functional but the eyes are safely protected by multiple small glands.

Tears require active blinking to cover the eye. The eye must shut completely during sleep to avoid areas of drying. Eventually tears leave the eye through the nasolacrimal duct system (Figure 1). Tears find their way to the nose and eventually are swallowed.

## Causes of tearing

Excess tearing in children is most commonly caused by a blocked tear duct. Also known as **nasolacrimal duct (NLD)** obstruction, the tearing is associated with a white eye and discharge. Excess tearing is also a symptom of several other serious eye diseases. Painless tearing with matter (mucopurulence) can also be caused by bacterial or viral **conjunctivitis** ("Pink Eye"). Infections, foreign bodies or damage to the cornea (**keratitis**) will cause a painful, red eye and excess tearing. Tearing can be caused by abnormal lid shape or misaligned eyelashes rubbing the eye. Inflammation on the inside of the eye (**uveitis**) will cause a painful red eye with tearing. The hallmark of vision-threatening **congenital glaucoma** (high eye pressure) is a steamy cornea with excess clear tearing. Abnormal rearrangement of nerves in the face can increase tearing or cause tears while eating (Crocodile Tears). Inadequate blinking may result in excess tearing. Excess tearing may also be caused by visual disturbances causing blur or double vision.

## Anatomy

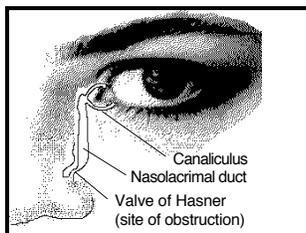


Figure 1. The Anatomy of the Tear System.

At the nasal side of each eyelid is a tiny opening (**punctum**) leading to a narrow **canaliculus** (Figure 1). Canaliculi from upper and lower lids combine and empty into the nasolacrimal sac. The **Valve of Hasner** separates the bottom of the sac from the nose. Nasolacrimal Duct Obstruction is due to a membrane or bony blockage of the Valve of Hasner. There are also Rosenmüller valves in the canaliculi which prevent tears and air from flowing back toward the eye. If all three valves are blocked at birth, a blue cyst forms at 1-2 days of life requiring urgent treatment to prevent serious infection (**Dacryocoele**).

## Frequency and Natural Course of NLD Obstruction

More than 6% of newborns have nasolacrimal duct obstruction in at least one side. NLD obstruction is more common in children with frequent ear infections. With conservative observation, and occasional antibiotic drops, almost all cases of NLD obstruction clear by age 7 months or 18 pounds (Figure 2). Spontaneous resolution occurs because most obstructions are due to a membrane at the Valve of

Hasner which stretches and opens with facial bone growth. Rarer NLD obstructions are caused by tight bones blocking the Valve of Hasner.

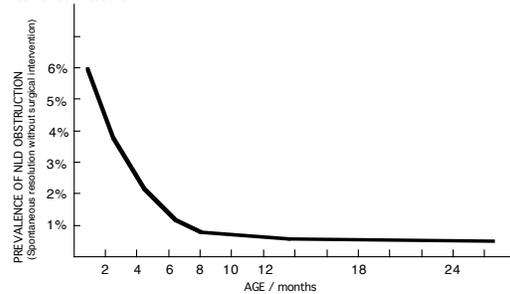


Figure 2. The Natural history of congenital nasolacrimal duct obstruction.

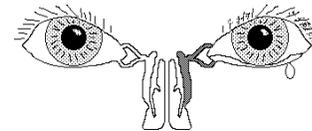


Figure 3. Left nasolacrimal duct obstruction caused by bony obstruction at the Valve of Hasner.

These will persist with episodes of excess tearing and discharge for years. Occasionally the tear sac infections burst into surrounding tissues adjacent to the eyeball causing a life-threatening infection (**Orbital Cellulitis**). Gentle massage of the nasal side of the lids in NLD obstruction is recommended by many pediatricians. This technique helps mix antibiotic drops with the infections in the tear sac. Be careful to massage the tear sac GENTLY, since overzealous massage can produce orbital cellulitis.

## Treatment- The "Farson Modification"

Persistent NLD obstructions and dacryocoeles are treated by gently passing a flexible, metal probe through the punctum, canaliculus, sac and Valve of Hasner. In newborns, this can be done awake with the head held firmly to avoid accidental trauma to the canaliculus. Larger infants usually require a brief anesthetic; intubation prevents aspiration of pus and blood. In case of NLD obstruction probed later than 8 months, approximately 15% re-obstruct. To avoid this complication, a silicone stent can be passed and left in place so the Valve of Hasner can heal open (Figure 4).

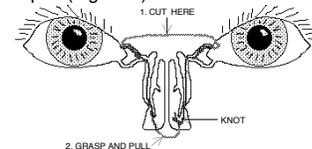


Figure 4. Silicone stent intubation as treatment for nasolacrimal duct obstruction. The "Farson" modification allows easy home removal since each side is treated with one silicone loop. The external portion of the stent is cut and pulled for removal after one month as an outpatient.

Dr. Clyde Farson of the Alaska Native medical Center suggested a modification of silicone intubation for NLD obstruction (both sides with one silicone tube stent) which is easily removed at home by parents. The "Farson" modification saves time and money especially for families living long distances from their eye doctor.

## Conclusion

Most children see well because they have adequate, protective tears. Inadequate amount or distribution of tears can cause serious illness. Excess tearing can also indicate serious eye disease. Fortunately, excess tearing in babies is usually due to nasolacrimal duct obstruction, most cases of which spontaneously resolve in 7 months. Atypical or persistent tearing symptoms should be brought to the attention of your pediatrician.

# WARNING SIGNS IN CHILDRENS' EYES

## Guidelines for childhood eye exams:

The American Academy of Pediatrics and the American Association for Pediatric Ophthalmology and Strabismus agree that all children should have their eyes examined by the pediatric- or family doctor: 1) at birth, 2) at regular check-ups with vision testing using verbal charts before school. At least one thorough exam by an eye doctor including cycloplegic refraction and dilated retina check should be done before the age of five even in children who do not show signs of eye problems. Since brain visual development can be seriously and adversely affected before the age of 8-10 years and persistent intervention is critical for 5% of children. Urgent or more frequent eye exams are indicated you see one or more of the following **Warning Signs** in a preverbal child.

**Lack of fixation:** After a few weeks of age, a normal baby should be able to look at your face and follow your eyes as you move from side to side. Even before that, a normal baby will quickly close both eyes when exposed to bright light.

**Jerking Eye Movements:** As a baby begins to fix his/her eyes, they should rest steadily without jerking side-to-side or up-and-down. Such persistent or intermittent eye movements called "nystagmus" can indicate brain dysfunction or subnormal visual potential.

**White Pupil:** The pupil is the hole in the iris through which light enters the back of the eye and the retina. Under normal conditions, the pupil is black or it may appear reddish-orange in photographs. A white or discolored pupil can indicate a cataract or a life-threatening tumor in the eye.

**Slow or unequal pupils:** The pupils should be round, roughly equal in size and each should get larger in the dark and smaller in bright light. Irregular pupils can indicate serious eye disease or abnormal development. Unequal or slowly reacting pupils may indicate retinal or brain disease.

**Excess Sensitivity to light:** Called "photophobia," this can be caused by harmful inflammation in or on the eye or by an abnormally functioning retina.

**Redness:** Inflammation and infection in or on the eye will cause the tiny blood vessels overlying the white sclera to dilate causing an injected, red appearance. A broken blood vessel on the eye ball may make a bright red blood blister which is usually not as serious unless caused by trauma.

**Drooping Lid:** Abnormalities of the brain or tissue around the eye ball may cause one or both lids to droop (ptosis) or retract. Other children have a drooping lid

at birth which may cause vision loss secondary to astigmatism.

**Misalignment:** Days to weeks after birth, a baby's eyes should be aligned (most of the time) on interesting objects, near and far, left and right, and up and down. Any persistent misalignment called "strabismus" will usually cause vision loss (amblyopia) and may be due to nerve or brain problems.

**Head Tilt:** When a baby's eyes are better aligned in one direction than another, a head tilt or head turn may result.

**Swelling around the eyelids:** Lumps, changes in color or swelling around the eyes and lids can be caused by tumors or life-threatening infections.

**Pain or headache:** Inflammation or high pressure in an eye can cause pain ranging from a dull ache to excruciating and radiating back to the rest of the head. In addition, the eyes may be involved in the cause or diagnosis of some other kinds of headache.

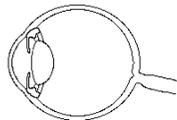
**Excess tearing:** Blocked tear ducts are not the only cause of excess tearing (Alaska Parenting News, February 1995). Serious inflammations, blurry vision and nerve problems are also possible reasons.

**Squinting or frequent blinking:** Partially closed eyelids may produce temporary improvement some types of blurry or double vision. Frequent blinking may occur with eye inflammation or allergies or with neurologic disorders.

**Moving close to see:** A baby's eyes can focus much closer than an adults. However, children who persistently sit close to the TV, or who hold objects close to their eyes may have significant visual impairment.

**Large Eyes:** Congenital glaucoma may cause very large eyes.

When children begin to talk, the health of their eyes becomes less of a mystery. Even before that, your pediatric care giver should be able to rapidly screen even the most wiggly of infants for most of these serious problems (1) or children can be Photoscreened (2). If parents or primary doctors remain concerned, or if the Photoscreen is abnormal, children should then see the eye doctor.



The infant eye: the cornea and lens should be capable of focusing light from near and far objects through the pupil allowing the retina to send an image to the brain.

## DENIAL OF VISION

(ICD-10 F44.6 or H47.619) 2016

Children and adults will occasionally complain of decreased vision even though a thorough examination of the anatomy and subconscious physiology of the eye reveals either no defects or inconsistent results. This is defined as "denial of vision", a form of cerebral visual deficiency.

An analogy can be made between the eye and a camera. The visual system can be compared to a video camera (the eye), cables (optic nerves), the video player (the brain) and a monitor screen (the occipital cortex). In order to actual "see", someone awake and alert must be observing the monitor screen and doing something about it (i.e. reading the eye chart, looking at a small object and following it with eye movements). The difference is that the video system is not alive and our eyes and brain are. We need oxygen, nutrients, blood, blood vessels, etc to see.

If we are asleep, our eyes can be open and looking at an event but we don't "see" it. The same can happen with disruptions of our brain alertness by seizures in epilepsy. Other times, our awareness of vision can be obscured by anxiety or fear.

In adults, blurring or decreased vision often brings up fears of a stroke or brain tumor. This may also be true for very young children though they may not verbalize it so well. A cycle of moderately or temporarily decreased vision may produce fear, leading to decreased awareness of vision, and more fear, etc.

Seeing well requires good eyes, a good brain, alertness, self esteem and a lack of fear. The analogy for seeing is being able to drive from Anchorage to Kenai in the winter. Even if you have an excellent car, and get started well, you will never get to Kenai if you slip off the highway and become high-centered on a February snow berm near Girdwood. The other cars, even some rusty old beaters, are driving by. The car becomes frustrated. The car worries it will never get there. Gunning the engine causes the rear wheels to spin in mid-air. The gas gauge, a measure of self esteem, drops. Often, if you have time, Denial of Vision will improve over time without any special treatment. This is like letting the snow berm melt and driving to Kenai in April. Further diagnostic testing sometimes slows the recovery of vision. This is like having a mechanic drain the fuel tank and radiator to check for too much or little water- resulting in less gas to drive when you get going again. Positive encouragement fills the gas tank. Avoid watching the progress of the other cars. Sometimes reading or distance glasses can give a little boost (like shoveling and pushing the car off the berm); glasses usually are not needed in the long run.

Alaska Children's EYE & Strabismus

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## Reading Problems and Pediatric Ophthalmology

Reading is one of the most important scholastic skills to which children must adapt or learn. Reading usually requires vision (focused, steady images of letters and words) and many higher brain functions. A psychological problem in which information is much more slowly acquired and processed by reading than other avenues is called "Dyslexia"<sup>1</sup>. Check [www.schwablearning.org](http://www.schwablearning.org). School psychologists can test for dyslexia.

Children who are in the early grades and have difficulty reading should have an eye examination to detect glasses problems such as farsightedness or astigmatism or problems with comfortable alignment of the eyes on the printed page. Often children with reading problems have excellent vision and are suffering from a problem of visual memory processing. This non-visual type of reading problem may be associated with other learning disabilities or can be isolated to reading (dyslexia). While some people believe you just have smooth "tracking" (pursuit movement), speed reading is actually composed of rapid changes in fixation on groups of words (saccadic eye movement). Many children with uncontrollable jumping (nystagmus) of their moderately poor seeing eyes are able to read rapidly and accurately if they hold the material close enough to their eyes.

As with any other task, if a child has reasonable ability to see the printed page, improved reading is a product of persistent PRACTICE. Any learning method lacking practice will fail. The motivated, well-rested, attentive child will make appropriate strides with practice. Under certain circumstances, however, a potentially capable child will become discouraged and will not read up to potential due to unmotivated practice. For many elementary school children, the translated European comic series "Tintin" and "Asterix and Obelisk" are great motivators.

Consider reading to be one of several different learning tasks such as hurdling on an educational "track team." Some kids love to run hurdles. Others are better shot-putters (which might be an analogy for learning to draw). With respect to the task of reading, we want every kid on the educational "track team" to be better hurdlers. A good coach can take a runner of any initial interest and ability and encourage them to practice hurdles so their performance will be better at the end of the season. A poor coach might discourage the shot-put type by direct comparison with an initial hurdle-lover and further humiliate by disallowing any fun time in the non-hurdling favorite event.

A psychologist named Helen Irlen coined the term "Scotopic Sensitivity Syndrome" and marketed spectacles with colored tints aimed at improving reading speed and efficiency. While there is no objective test of the eyes to determine which tint a person might prefer, some adults even think colored tints allow them to better discern words and letters on a "busy" page of sentences. I have objected to the Irlen process for three important reasons: 1) Cost; the simple tinted spectacles are inexpensive to make, but have been sold for high prices by Irlen (initially \$800 per pair) and the Irlen-trainees have often made much money promoting the expensive glasses for all kinds of poor performance at school, 2) Self esteem; slow readers already think poorly of their abilities- being forced to wear funny colored glasses in school torpedoes their motivation, and 3) "crutch diagnosis-" Scotopic Sensitivity Syndrome has not been clinically proven or well-defined - many children given this "diagnosis" by a lay Irlen screener lose even more motivation to try in school. Our solution: Children with reading concerns should have a thorough eye examination emphasizing refractive error (cycloplegic), accommodation, alignment at distance and near, comitance, color vision and overall health. If no other problems are identified and addressed, children can try to read through a tinted film that is placed on the page, not on the child's face. A large assortment of photographers colored acetate filters can be obtained from Edmund Scientific Company (609)547-8880 • [www.edsci.com](http://www.edsci.com) • Book of 100 Colored Filters (small NT39-417 \$9.25; large NT39-418 \$37.50) Phone: (800) 363-1992, Fax: (856) 573-6233). If your child chooses one particular color, you can order many more pages for minimal cost. If your child does NOT prefer any colors, consider donating your set to a school.

Robert W. Arnold, M.D.

1. Shaywitz S. Dyslexia. *Sci Am*. 1996;275:98-104.

Goldberg, HK, Drash PW: The Disabled Reader. *J Pediatr Ophthalmol* 1968; 5:11-24.

"Overcoming Dyslexia" by Sally Shaywitz (ISBN 0375400125, Knopf Publisher)

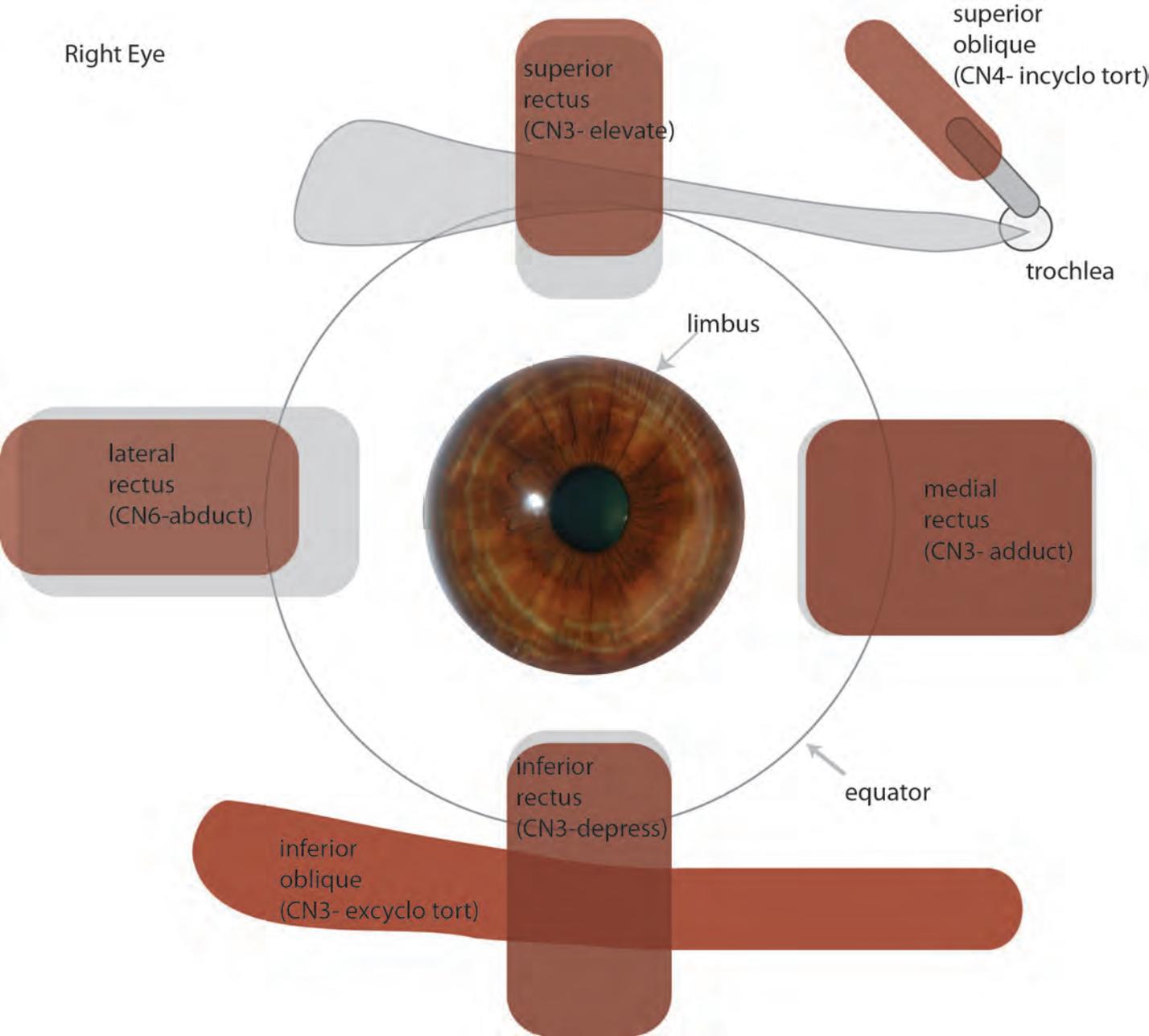
<http://www.nichd.nih.gov/publications/pubskey.cfm?from=nrp>

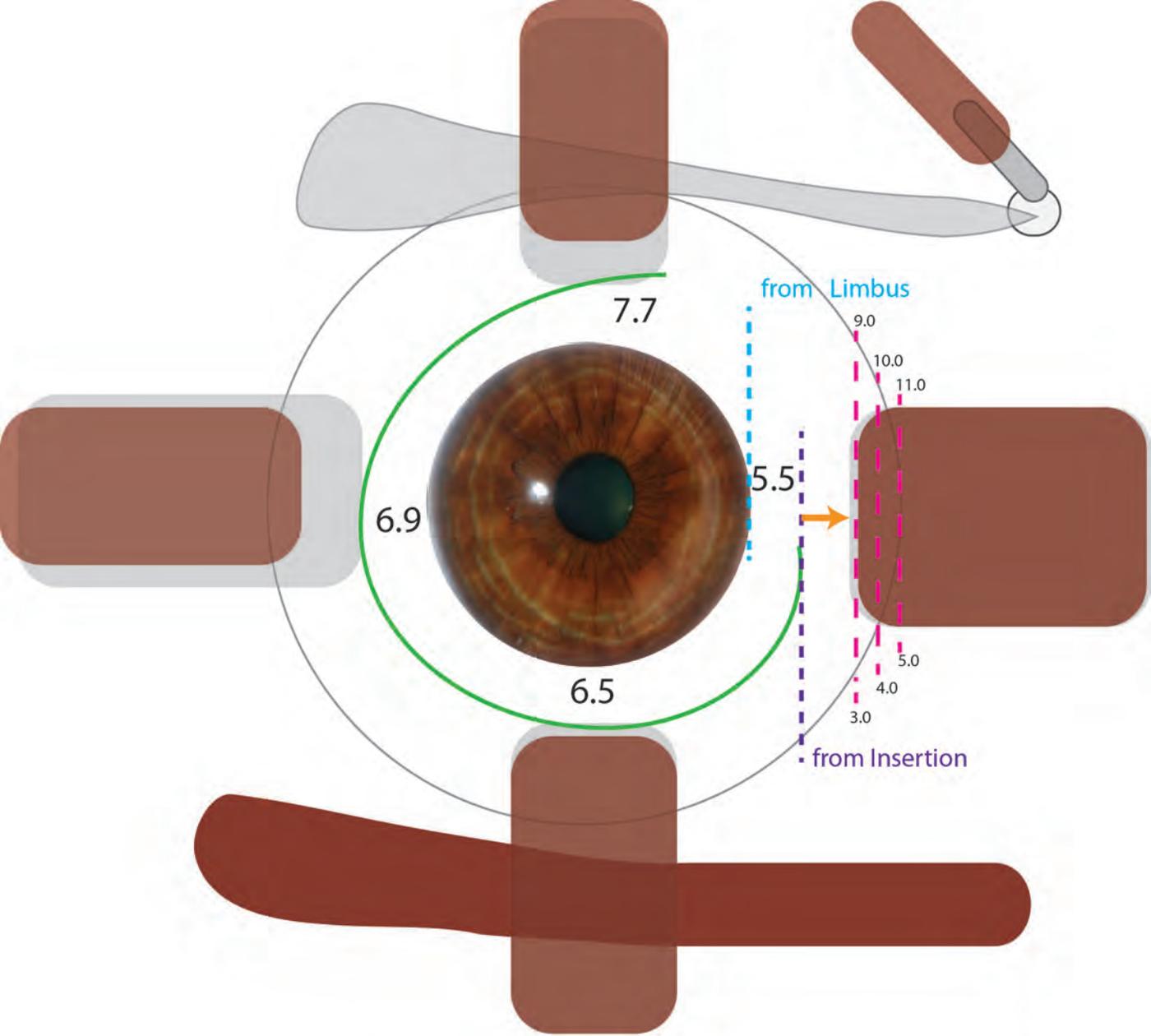
Aoccdnrig to rscheearch at Cmabrigde uinervtisy, it deosn't mttær waht oredr the ltteers in a wrod are, the olny iprmoetnt tihg is taht the frist and lsat ltteres are at the rghit pclae. The rset can be a tatol mes and you can sitll raed it wouthit a porbelm. Tihs is bcuseae we do not raed ervey lteter by it slef but the wrod as a wlohe.

<http://www.mrc-cbu.cam.ac.uk/personal/matt.davis/Cmabrigde/>

Rawlinson, G. E. (1976) The significance of letter position in word recognition. Unpublished PhD Thesis, Psychology Department, University of Nottingham, Nottingham UK.

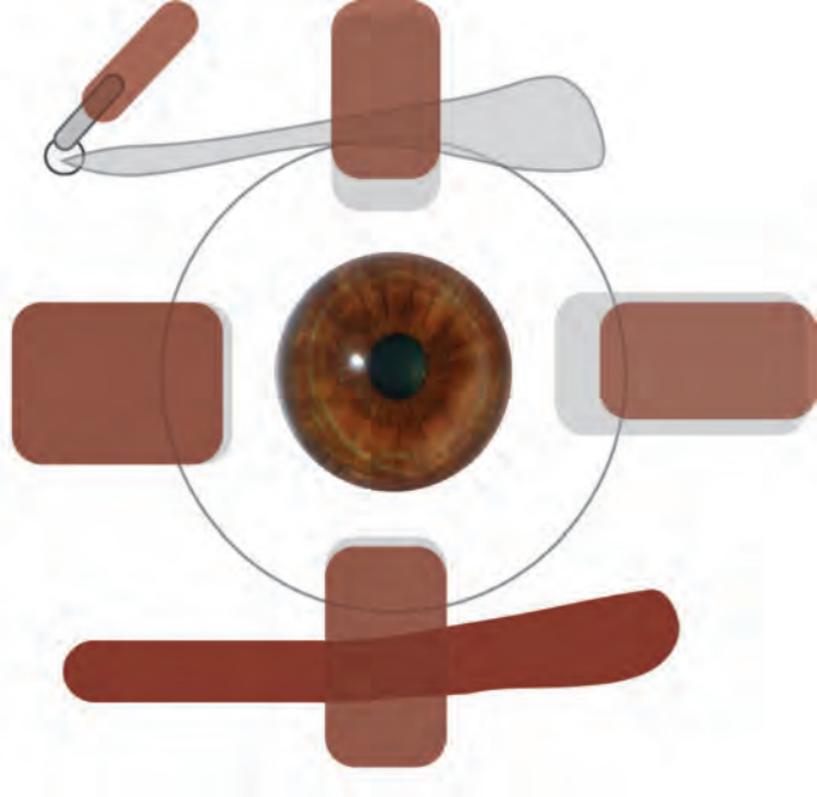
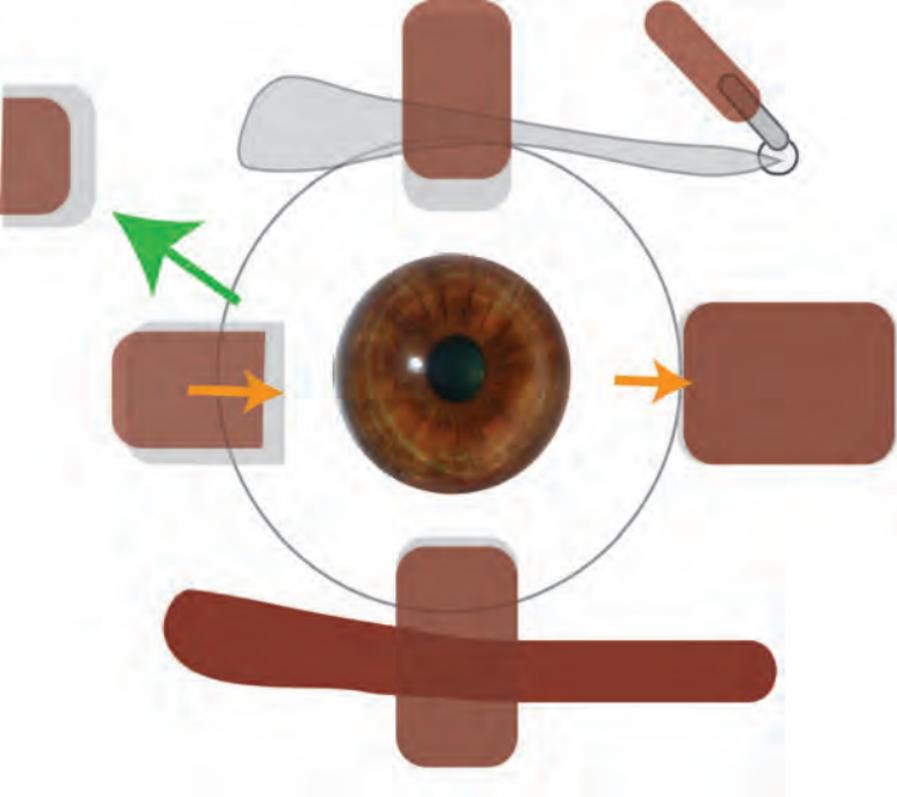
Right Eye





Spiral of Tillaux (5,6,7,8)

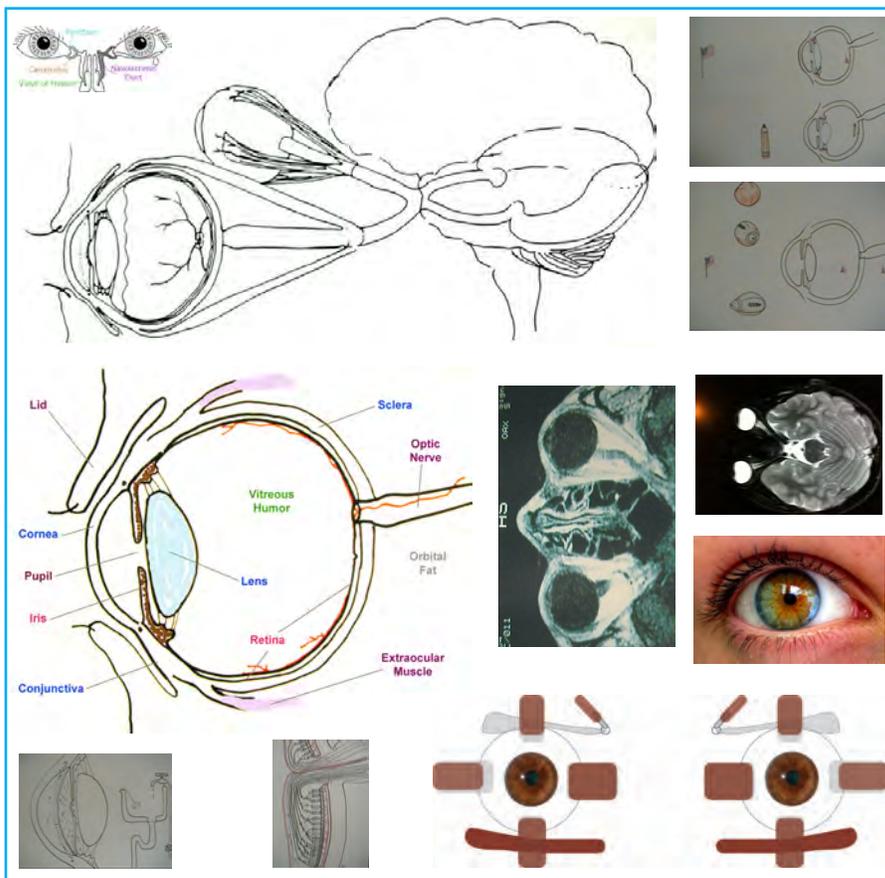
Recession Amount



right lateral rectus muscle resection and right medial rectus recession  
recess-resect right eye for esotropia  
R&R right eye

Lid  
orbit  
conjunctiva  
nasolacrimal duct  
punctum  
canaliculus  
Tenon's capsule  
extraocular muscle  
MR  
LR  
SR  
IR  
SO  
IO  
[levator]

cornea  
sclera  
aqueous humor  
iris  
ciliary body  
zonules  
lens  
vitreous  
retina  
macula and fovea  
retinal vessels  
optic nerve  
chiasm  
optic radiation  
occipital cortex



**Surgery Videos:**

Chalazion  
Ptosis  
Trichiasis  
Orbital cyst  
Nasolacrimal duct  
Cataract  
Glaucoma

Strabismus:  
rectus recession  
rectus tightening  
adjustable suture  
transposition  
inferior oblique  
superior oblique  
chemo-denervation

Enucleation

Retinopathy of Prematurity  
Amblyopia occluder

Preparation for surgery  
Post-operative Care

<https://vimeo.com/showcase/1865095>

[www.AlaskaChildrensEye.com](http://www.AlaskaChildrensEye.com)

