

# Early Childhood Vision Screening- Who, when and why

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# Overview

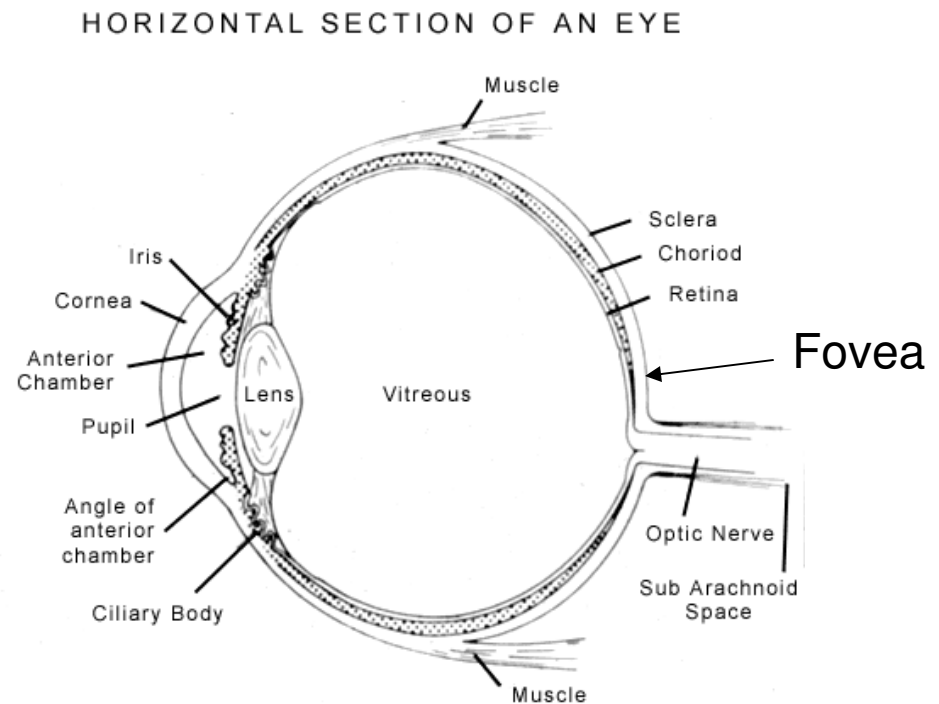
- Vision development
- Types of vision disorders
- Vision screening program



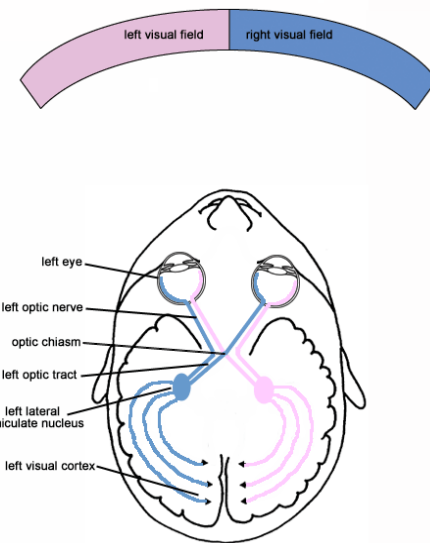
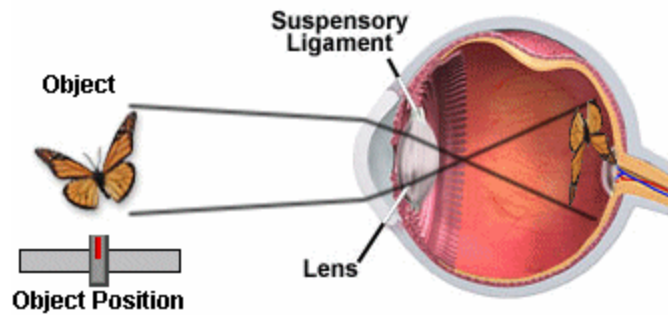
# Anatomy of the Eye

## Key Structures

- Sclera and Cornea
- Iris and Pupil
- Retina
- Cones and Rods
- Fovea
- Optic Nerve
- Anterior Chamber and Vitreous



# How We See

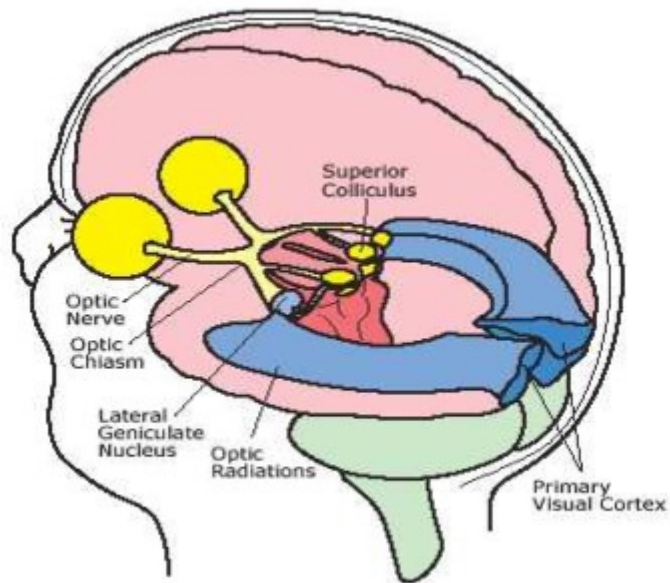


LIGHT RAYS → CORNEA → PUPIL → LENS → RETINA →  
OPTIC NERVE → VISUAL PATHWAY (to the visual cortex of the brain)

# How Sight Develops

- Vision is 'learned' in the early years.
- By 6 months - infants learn to focus, track, see colors, learn depth perception and eye-hand coordination.
- By 12 months - infants have 'adult-like' vision.





- During toddler years - vision skills continue to develop e.g. eye-hand-body coordination, fine motor skills and visual motor skills needed to learn to read.
- By about 8 years - eyesight development is complete and can't be easily changed.

# Vision Screening Program - Objectives

1. To identify possible visual defects (amblyopia, strabismus, refractive errors) in preschool age children and/or kindergarten age children.
2. To facilitate treatment and care for preschool age children and/or kindergarten age children with identified visual defects.



# Vision Disorders that May be Detected by Screening

**AMBLYOPIA (Lazy eye)**

**STRABISMUS (Crossed eyes)**

**REFRACTIVE ERRORS**

- **Hyperopia**
- **Myopia**
- **Astigmatism**





# Amblyopia

“Lazy eye”

- Visual acuity (usually in one eye) is decreased as a result of abnormal visual development in infancy and early childhood
- There is no apparent cause for the decreased vision, the cornea, lens, retina and optic disc are normal
- Vision loss ranges from mild to severe
- It is the most common cause of monocular vision loss in children and young adults

# Risk Factors for Amblyopia

- Strabismus
- Uncorrected refractive errors
- Cataracts, corneal lesions or ptosis

Treatment for amblyopia depends on the cause



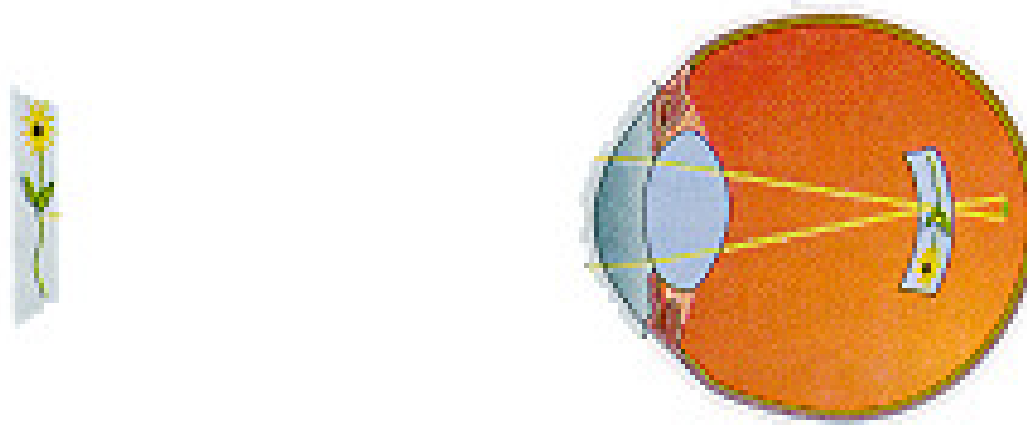
# Strabismus



## “Crossed Eyes”

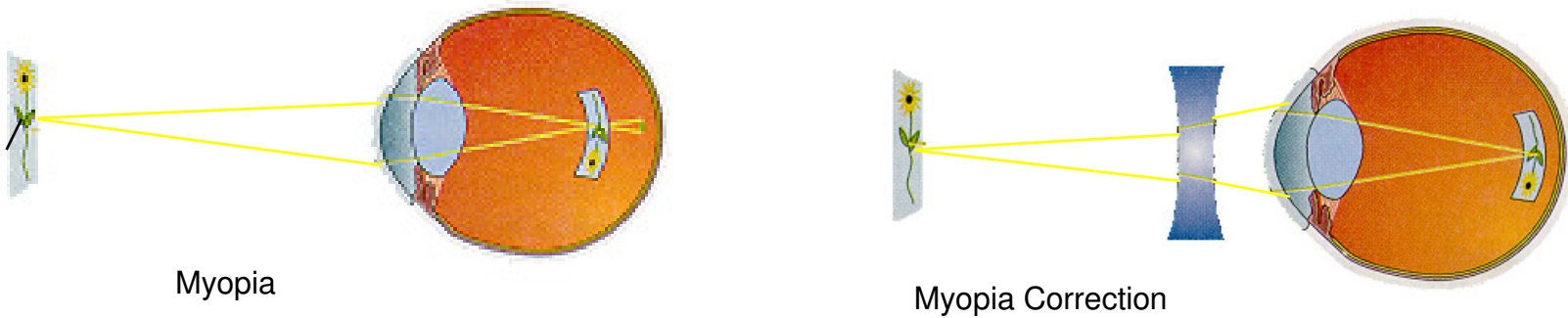
- when one or both eyes turns in, out, up or down,
- usually caused by poor eye muscle control
- often first appears before age 21 months but may develop as late as age 6
- Treatment may include glasses, patching (or atropine) and surgery

# Refractive Errors



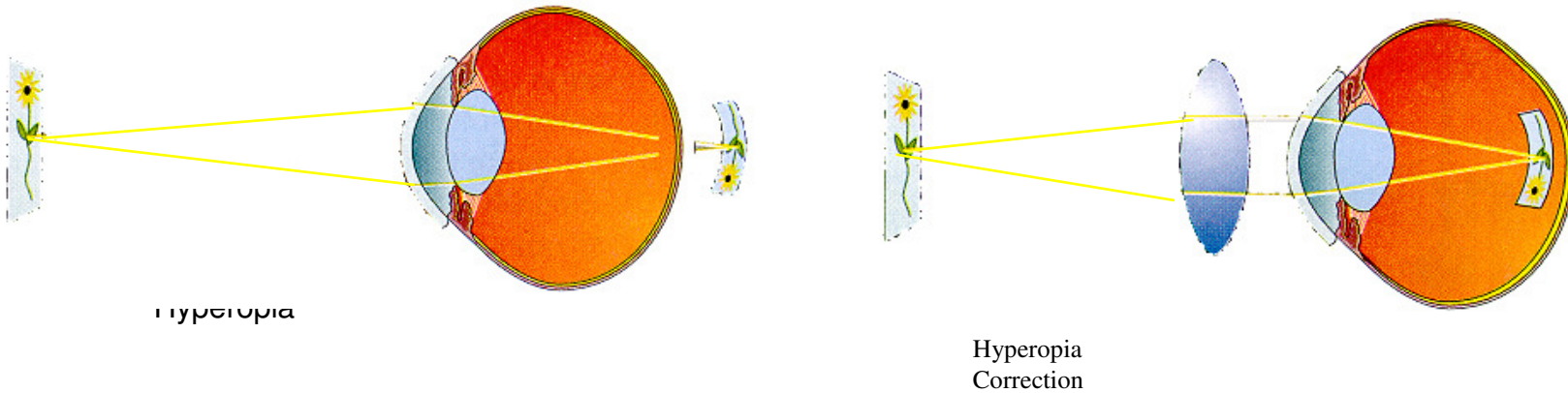
- Refraction -- Eye's optical properties
- Cornea + Lens = Eye's Optical System
  - Purpose -- Sharply focus images onto retina
- Refractive error -- unclear focus
- 3 Major Refractive Errors:

# Myopia or Near-sightedness



- Images far away are out of focus
- Near images in focus
- The eye is too long for its **optics**

# Hyperopia or Farsightedness

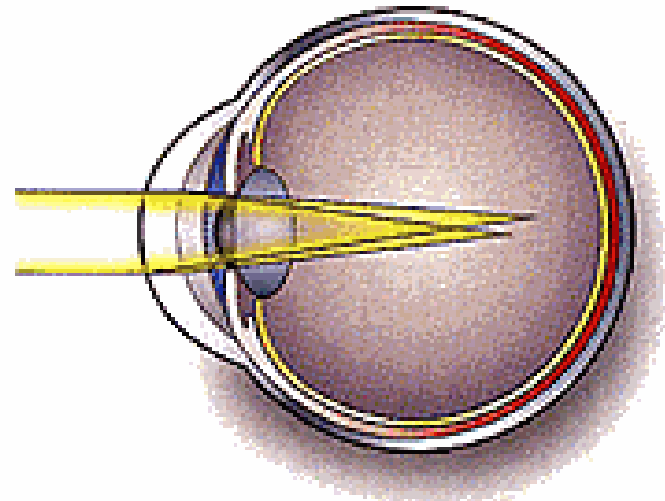


- Near objects out of focus
- Far off objects in focus
- The eye is too short for its optics



# Astigmatism

- **Front surface of eye is slightly irregular preventing a sharp focus on the retina**
- **‘Cylinder’ measures the irregular focus of the eye**



Astigmatism

# How Common Are These Conditions?

American Academy of Ophthalmology estimates:

- Amblyopia prevalence: 2% to 4%
- Strabismus prevalence: 4%

US Task Force on Preventative Services estimates the prevalence of all vision defects including refractive errors to be 7%-8.2%.

Extrapolating this to the approximately 40,000 children born in BC each year leads to estimates of 2,800 children with visual impairment, of which 1200 have amblyopia per age cohort.

# Signs of Vision problems

- Red, itchy or watery eyes
- Squinting, rubbing the eyes or repeated blinking
- Turned eye (cross-eye)
- Covering or closing one eye
- Sensitivity to light
- Lack of concentration
- Holding things (toys or books) too close
- Lack of interest in books and television
- Bumping into things
- Drooping upper eyelid

# Vision Screening in BC

- Case Finding of children under 3 with vision concern
- Screening of 3 and 5 year olds
- Referral to eye doctor for full eye exam and ongoing follow-up



# What is Vision Screening?

- Vision Screening is a simple test used to indicate whether a possible vision problem exists
- Screening does **not** result in a definitive diagnosis but merely indicates the need for further testing by vision professionals
- Typically used as a universal measure – provides an examination of asymptomatic children in order to classify them as likely or unlikely to have a vision condition

# Why are we screening?

- Some vision problems like lazy eye (amblyopia) or crossed eyes (strabismus) can be treated most effectively in young children.





# Who Are We Screening?

- Universal screening of kindergarten age children
- Expanded pilots for vision screening 3 year old children to be implemented this year
- The kindergarten screening program is a temporary program until universal preschool age [\[1\]](#) vision screening is realized.

# What Screening Tests will be Used?

The following screening tools have been selected for vision screening preschool age and kindergarten age children:

The Welch Allyn SureSight Vision Screener in combination with the Randot Preschool Stereotest;

**OR**

The H.O.T.V 10 foot vision chart in combination with the Randot Preschool Stereotest.



(Information about the HOTV is in the appendix of the manual)

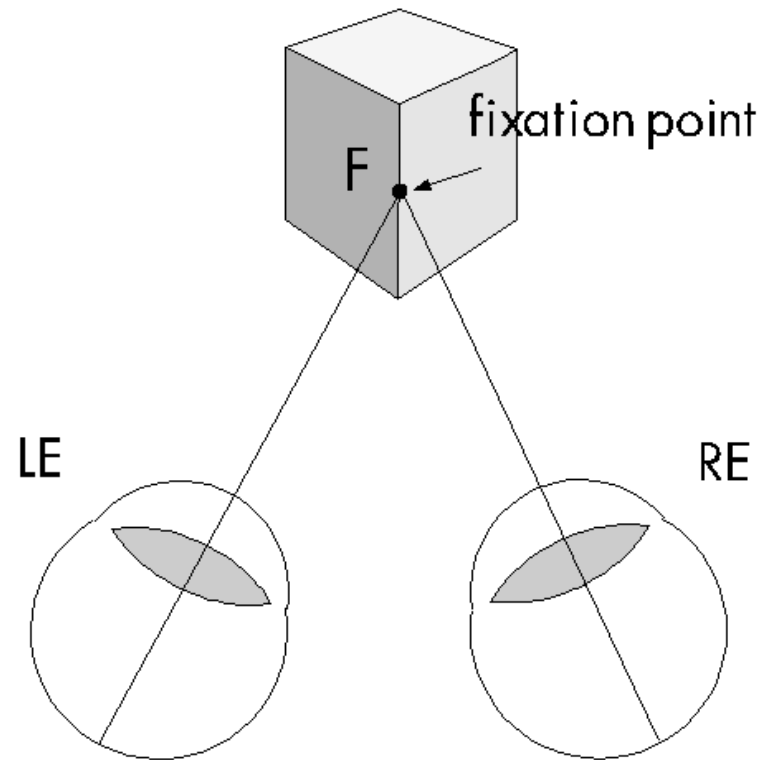
# Welch Allyn Vision Screener

- Lightweight, portable, handheld screening device.
- Objective (eliminates the need for the child to respond).
- Instrument displays a measurement of refraction for each eye.
- It automatically screens for common vision problems, including:
  - near and farsightedness (myopia/hyperopia),
  - astigmatism (asymmetrical focus), and
  - anisometropia (unequal power between eyes).



# Stereopsis Vision Screening

- Fusion is the mental ability to blend two similar images and see them as one.
- A stereopsis test is used to determine one's degree or grade of fusion in relation to 3-dimensional vision.
- Purpose of a stereopsis test is to measure how minutely the two eyes can discern differences in the distances of objects from the observer.



# Randot Preschool Stereotest

Used for determining stereopsis and designed for:





- Children as young as 2 years of age;
- Children who are non-verbal.



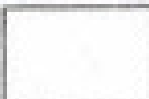



# Procedure for Randot Preschool Stereotesting

## RANDOT PRESCHOOL STEREOTEST

**Booklet #3**





	
	

Top panel - 800  
sec. of arc





	
	

Bottom - 400  
sec. of arc

**Booklet #1**

Top panel - 200  
sec. of arc

Bottom - 100  
sec. of arc

**Test:** start with Booklet #3 top panel and move down when child correctly identifies at least 2 out of 3 test objects in each panel.

**Record:** record best (smallest) stereopsis result in sec. of arc

**Refer:** if unable to pass stereopsis at 100 sec. of arc



# Healthy Kids Program

## BC Healthy Kids Program

*What it means for children*



The BC Healthy Kids Program helps low income families with the costs of basic dental care and prescription eyewear for their children. Eligible clients include dependent children under 19 years of age who receive Medical Services Plan (MSP) premium assistance through the Ministry of Health.

**Optical** – Children are eligible for prescription eyeglasses (lenses and basic frames) once in a twelve-month period. All prescriptions must be current and meet the program criteria. Further information is available from your optical supplier. Children's eye examinations are covered by MSP.

The BC Healthy Kids Program does not cover orthodontic treatment and/or contact lenses.

# What's happening

- Vision screening for 3-year olds is taking place from February to June 2009.
- We are engaging in a variety of outreach activities across VCH to connect with families of 3-year olds.

# Raising awareness

- A promotion campaign is underway to inform parents and caregivers that all 3-year old children need to have their vision screened.
- We are using posters, bookmarks, websites and newspapers ads to increase awareness of this free screening program.

# Screening Activities

- Screening in preschools and daycares
- Screening at community events
- Clinics at health centre





# Thank you!