1

On behalf of Vision Expo, we sincerely thank you for being with us this year.

Vision Expo Has Gone Green!

We have eliminated all paper session evaluation forms. Please be sure to complete your electronic session evaluations online when you login to request your CE Letter for each course you attended! Your feedback is important to us as our Education Planning Committee considers content and speakers for future meetings to provide you with the best education possible.

VISION EXPO

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Disclaimers

Paige Shoven has received honorarium from EssilorLuxiottica and neurolens.

All relevant relationships have been mitigated.

I work for EssilorLuxiottica

I previously worked for Neurolens

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Binocular Vision

1. Relating to, used by, or involving both eyes at the same time: binocular vision.

2. Having two eyes arranged to produce stereoscopic vision.

4

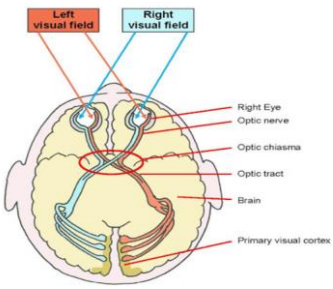
Two Eyes...ONE Brain

Binocularity or Stereopsis

Two eyes working together with your brain to make one image.

It is the ability to use two eyes together to focus on the same object, which is perceived as a single image when the images from each eye meet in the visual cortex of the brain.

When the images are fused into one, it is perceived as a three-dimensional object, maintaining its solidarity and position in space.



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Refractive system

The system in control of bending light rays as they pass through the different layers of the eye

- Tears
- Cornea
- Anterior Chamber
- Pupil
- Lens
- Vitreous Body
- Retina
- Optic Nerve

Tiny Curious Ants Prefer Lovely Violet Roses Obviously
https://www.youtube.com/watch?v=qiZ-galkeo8

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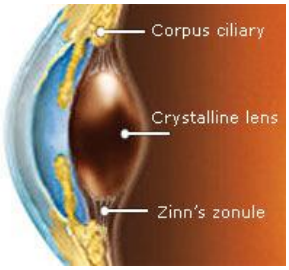

Accommodation System

the system in control of adjusting the crystalline lens elements to alter the refractive power and bring objects that are closer to the eye into sharp focus.

Provided by the coordinated operation of three elements

- the Corpus Ciliary Muscle
- the Zinn's Zonule and
- the Crystalline Lens

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Vergence System

The system in control of the actions of tracking an object as it moves closer (Convergence) and further away (Divergence)

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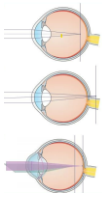
Refractive Disorders

Myopia – The eye is either too long or the cornea is too curved

Hyperopia – The eye is either too short or the cornea is too flat

Astigmatism – The cornea has an irregular curve



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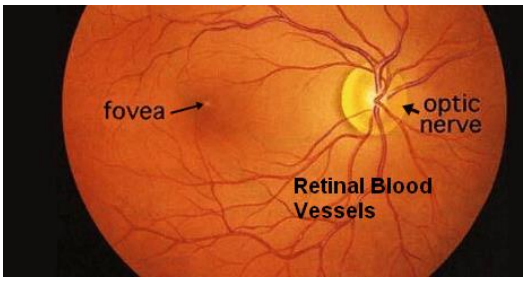

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Symptoms

Difficulty seeing
Vision Blurriness
Eye Strain
Burning or aching eyes
Headaches
Difficulty with Night Vision
Squinting

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Treatment Plans

Glasses
Single Vision
Computer
Progressives
Other Multifocal Designs

Contact Lenses
Soft
Hard
Scleral
Ortho- K

Surgery
Lasik
PRK

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Treatment – Surgery
More options today then ever before!

Small Incision – Sound waves break up the lens and uses a vacuum to clean before setting the new lens into place

Extracapsular – Larger incision, but can remove the lens in one piece

Laser Assisted – helps correct astigmatism

Fixed- Focus Monofocal – correct distance in both eyes or distance in one and near in the other

Accommodating Focus Monofocal – allows you to focus at different distances, like a youthful eye

Multifocal – like a multifocal contact lens

Toric – helps to correct astigmatism issues

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Treatment – There is no cure
Damage can not be reversed

To slow the progression doctors will prescribe supplements and vitamins

Anti -VEGF Drugs injected into the eye

Photodynamic therapy (PDT) using injections and laser treatments

Stem Therapy

New wearable technologies are available ORCAM

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Treatment –
Lower your eye pressure
Damage can not be reversed

Eyedrops

Oral Medication

Surgery
- Laser
- Filtering Surgery
- Drainage tubes/ shunts
- Minimally Invasive Glaucoma Surgery - MIGS (often in conjunction with cataract surgery)

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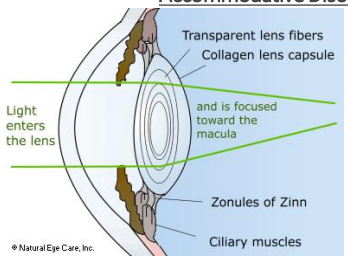
Accommodative Disorders



- **Presbyopia** – The gradual loss of your eyes' ability to focus on nearby objects
- **Accommodative Insufficiency** – The inability to sustain focus at near in relation to the patient's age.
- **Accommodative Excess or Spasm** – Excessive and uncontrolled constriction of the ciliary muscle.
- **Accommodative Infacility** - The inability to change the accommodation of the eye, both near and far, with enough speed to achieve normal function. Also known as accommodative inertia.

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ESCHENBACH

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Orthoptic Vision Therapist (covd.org)

Evaluating and treating patient with disorders of the visual system with an emphasis on binocular vision and eye movements

COVD College of Optometrists in Vision Development
Prevention • Enhancement • Rehabilitation

Vision therapists employed by Fellows are eligible to become Board Certified in vision development, vision therapy, and vision rehabilitation as Certified Optometric Vision Therapists (COVTs).

To be eligible for application to the COVT process, you must have experience working in a vision therapy office setting for a minimum of 2,000 hours. (about 1 year at 40 hrs/ week)

The process involves:
submitting responses to a series of Guided Study Open Book Questions on various clinical topics and successfully completing a multiple-choice written examination and oral interview.

Once you have applied for certification as an optometric vision therapist, you have up to four years to complete the certification process.

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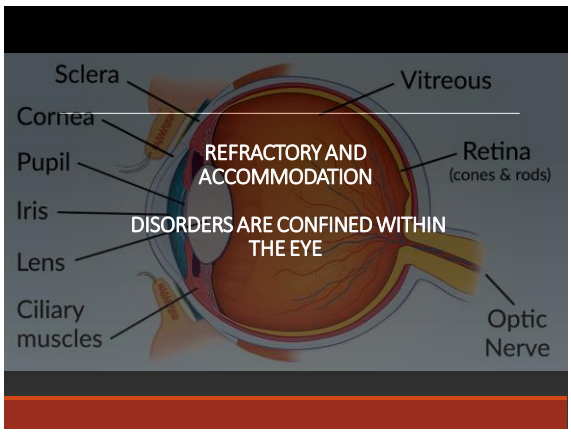

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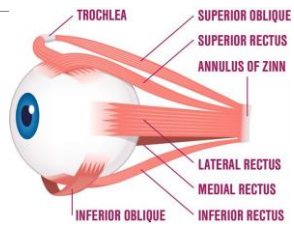
VERGENCE DISORDERS OCCUR WITH THE EXTRAOCULAR MUSCLES



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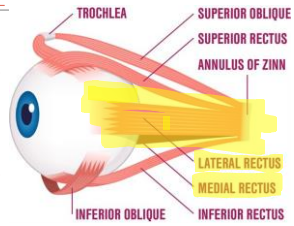
VERTICAL MOVEMENTS ARE CONTROLLED BY:

MEDIAL RECTUS
(MOVES THE EYE INWARDS TOWARDS THE NOSE)

AND

LATERAL RECTUS
(MOVES THE EYE OUTWARDS TOWARDS THE EAR)



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Superior Rectus (SR)
- Moves the eye Upwards
- Rotates the eye towards the nose
- Moves the eye inward

Inferior oblique (IO)
- Moves the eye upwards
- Rotates the eye towards the ear
- Moves the eye outward

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Inferior Rectus (IR)
- Moves the eye Downwards
- Rotates the eye towards the ear
- Moves the eye inward

Superior Oblique (SO)
- Rotates the eye towards the nose
- Move the eye downward
- Moves the eye outward

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Vergence Disorders

- Fixation
- Fusion
- Amblyopia
- Strabismus
- Exophoria
- Esophoria
- Convergence Insufficiency (CI)
- Convergence Excess (CE)
- Divergence Insufficiency (DI)
- Divergence Excess (DE)
- Vertical Heterophoria
- Visual Vestibular Integration

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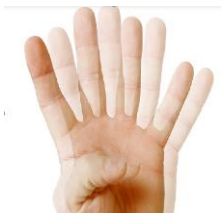
Diplopia or double vision occurs when an image falls off one or both fovea.

Therefore, when the brain detects diplopia, it triggers for a vergence movement to achieve binocular fixation.



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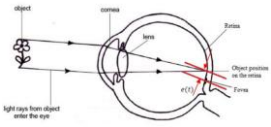
Fixation: the act of positioning an image on the **fovea**, a small depression in the retina where vision is the best.



The brain uses **Saccades**, tiny fast movements of the extraocular muscles, to position an object it is looking at onto the fovea

Pursuits are smaller eye movements that act as a locking mechanism to keep the slow-moving object images on the fovea.

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Fusion: the blending of two images —one from each eye— and perceiving them as one image.

First grade of fusion is the ability to superimpose two different images and perceive them as one composite image.

For example: One fovea sees a picture of a lion while the other fovea sees a picture of a cage; the brain, however, perceives the image of a lion **in** the cage.

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Fusion: the blending of two images —one from each eye— and perceiving them as one image.

Second grade of fusion is the ability to maintain the blending of two similar images from the two foveae into a single perception as the images move off the foveae.

This form of fusion is two-dimensional vision (2D).

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Fusion: the blending of two images —one from each eye— and perceiving them as one image.

Third grade of fusion is **stereopsis** . When the fovea of each eye is looking at the same object, each eye will see a slightly different image since the foveae are about three inches apart.

Stereopsis is achieved when the brain fuses these two images into one and the object is perceived in depth. This form of vision is three-dimensional vision (3D)

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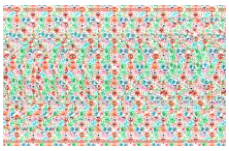
Stereopsis Test



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Tropias vs Phorias

Tropias: is a misalignment of the eyes that is always present. Even when the eyes are both open and trying to work together, large angle misalignments are apparent. A **tropia** is the resting position that your eyes go to when covered or when fusion is broken by

Phorias: is a misalignment of the eyes that only appears when binocular viewing is broken, and the two eyes are no longer looking at the same object. The misalignment of the eyes starts to appear when a person is tired, therefore it is not present all the time.

An occluder is used to test for tropias and phorias at the optometrist office

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Amblyopia (Lazy Eye)

A disorder of sight in which the brain fails to process inputs from one eye and over time favors the other eye.

It results in decreased vision in an eye that otherwise typically appears normal.
- A patient's visual acuity can be worse in one eye.

In extreme cases, the brain will **suppress**, or turn off, the vision of the amblyopic eye.

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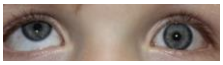
Strabismus (Crossed Eye)

An Extreme misalignment of the eyes

Hypertropia: An ocular misalignment that occurs when one eye looks like it is higher than the other or looking above the other.



Hypotropia: An ocular misalignment that occurs when one eye looks like it is lower than the other or looking below the other.

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Strabismus (Crossed Eye)

An Extreme misalignment of the eyes

Exotropia: An ocular misalignment that occurs when one or both eyes looks like it is turning out towards the patient's ear

Esotropia: An ocular misalignment that occurs when one eye or both eyes looks like it is turning in toward the patient's nose

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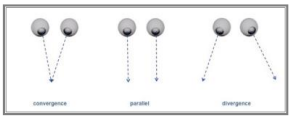
Vergence: is the action of both foveae, one from each eye, tracking an object as it moves closer (convergence) and further way (divergence).



Normal retinal correspondence occurs when the fovea of each eye is receiving the image at the same time.

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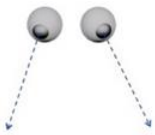
The Basics: Standard Prism helps these patients
If eyes have the same amount of phoria or misalignment at all distances

Convergence
ESOPHORIC (ESO)
Eyes naturally turn in,
Use BASE OUT to correct

11% of Patients are Esophoric

Parallel
ORTHOPHORIC (ORTHO)
Eyes naturally align
where they should

2% of Patients or Orthophoric



Divergence
EXOPHORIC (EXO)
Eyes naturally turn out,
Use BASE IN to correct

87% of Patients are Exophoric

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Convergence Insufficiency (CI)

Patients who are EXO at distance and MORE EXO at near

A patient has insufficient convergence to work close without having symptoms

Not enough converging – the eyes sit too far out at near and BI prism is needed to correct

They have difficulty maintaining the convergence needed

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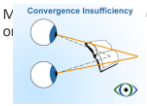
Primary CI

Most common form of CI

Small exophoria measurements

M y stress o



Secondary CI

Brought on by
- Presbyopia
- Uncorrected Myopia
- Intermittent Exotropia
- Vertical muscle defects
- Parkinson's Disease
- Some Autoimmune diseases

*Treating the underlying issue could help with the CI symptoms

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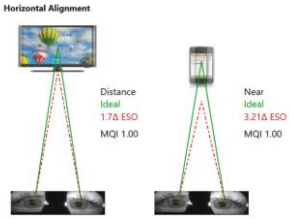

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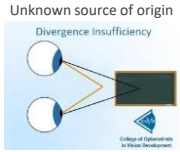
Primary DI

Most common form of DI

Unknown source of origin



Secondary DI

Appears in conjunction with other neurological disorders
- Encephalitis
- Intercranial hypertension
- Miller – Fisher Syndrome (a rare, acquired nerve disease that is a variant of Guillain-Barré syndrome)
- Intracranial mass lesions

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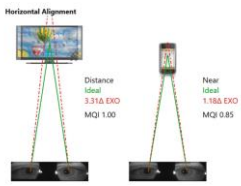
Divergence Excess (DE)

Patients who are EXO at distance and LESS EXO at near

Patients can complain of diplopia at distance but have less issues at near

Patients might intermittently suppress the vision from one eye to stop the diplopia at distance



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Horizontal Phoria Vergence Disorders

Vergence Disorder	Distance	Near
Basic Exophoria	EXO	EXO
Basic Esophoria	ESO	ESO
Convergence Insufficiency	EXO	**EXO**
Convergence Excess	ESO	**ESO**
Divergence Insufficiency	**ESO**	ESO
Divergence Excess	**EXO**	EXO

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Syntonic Phototherapy

The more than 70-year-old science of using colors in small time frames, up to 10 minutes, to correct visual problems.

Usually prescribed in conjunctions with vision therapy

Red and orange can treat Amblyopia

Green and Yellow can treat Esophoria

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The Evolution of Prism


Standard Prism


Slab-off Prism


Fresnel Prism


Contoured Prism

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Usually prescribed when a patient complains of diplopia (double vision)

Uses the same value throughout the entirety of the lens

Can be ordered Base In/Base Out or Base Up/Base Down

Corrects Vertical and Horizontal misalignments

Can be in one lens or divided between both lenses

Discovered by Sir Isaac Newton in the 1660's

Added into the glasses RX in the 1930's

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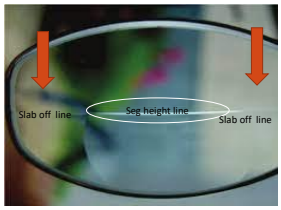
Slab Off Prism (Ben Franklin invented bifocals in the 1770's)



A technique used to neutralize unwanted prism effect when looking down the bifocal.

Used when lens powers between each eye is greater than 3 diopters

Allows the near image not to appear to jump

Can be added to a FT lens or a PAL (in some instances, ask your lab)

Applied to the most minus or least plus

Corrects vertical prism only

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Fresnel prism is usually used for temporary usage (recovering TBIs)

Usually applied to only one lens

Attaches like a sticker using water to activate the adhesive

Needs to be traced and applied at either 0°or 180° line

Discovered by Augustin Jean Fresnel in 1822

Hillary Clinton following her TBI in 2012

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Contoured Prism

90% of patients have a greater misalignment at near than they do at distance

Allows for more base in prism at near than at distance

Think a progressive lens design that uses prism instead of power as the user looks down the lens

Only available from neurolens, using the neurolens measurement device

82% of patients report a decrease in painful symptoms
54% say they are significantly reduced or completely gone!

First patent in 2006 by Dr. Jeff Krall

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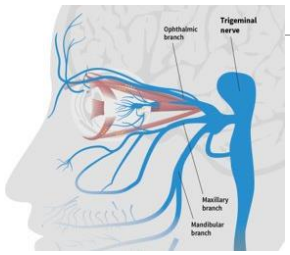

Visual Vestibular Integration

Visual (eye)

Vestibular (ear)

Integration (together)

How your eyes and ears work together to help the brain know where you are as a person in relation to other objects around you either stationary or in motion

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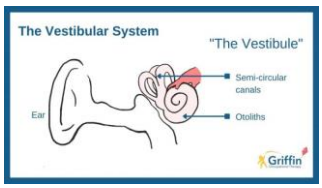

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The visual vestibular system can keep the horizon steady, no matter where you move, your gaze is stabilized in a large part.

In part 2 of the 'What is Sensory Integration' series we are unpacking the Vestibular System with STAR Institute's Associate Director, Virginia Spielmann. – Denver Colorado

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Achieving Binocularity

COMES WITH MANY SOLUTIONS, IT IS OUR JOB TO FIND THE RIGHT ONE FOR OUR INDIVIDUAL PATIENTS!

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