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Institute
OHSU

Double (Double) Vision and Prisms

The Basics of Diplopia


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Learning Objectives

- Differentiate between monocular and binocular diplopia
- Identify common causes of double vision
- Understand basic prism physics

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What is diplopia?



- Double vision, seeing two of the same objects simultaneously



- Binocular diplopia vs monocular – how to differentiate?


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Monocular vs Binocular?


- Take turns covering each eye!





- Binocular diplopia - double vision resolves by covering either eye
- Monocular diplopia - double vision resolves when the affected eye is covered


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Monocular Diplopia

- Diagnostic clue: double vision persists with one eye closed
- Common causes:
 - Refractive error
 - Cornea - dry eye  
 - Lens
 - Retina
- Treatment: PFATS, glasses, contact lenses, surgical intervention of affected eye
- I.e. not neuro-ophthalmology problem!




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Binocular Diplopia

- Common causes:
 - Supranuclear
 - Parkinson's, Progressive Supranuclear Palsy
 - Nuclear
 - Oculomotor, trochlear, abducens
 - Infranuclear
 - CN lesions in the cavernous sinus, muscular and neuromuscular junction
- Treatment: varies depending on cause



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CC: "I'm seeing double."

- How do you begin to approach this patient?

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CC: "I'm seeing double."

- History is KEY!
 - Monocular vs binocular
 - Direction
 - Duration
 - Location
 - Associated symptoms
 - History of eye turn or abnormal head position

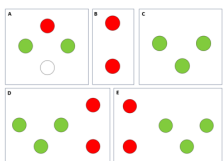
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Exam Tools and Techniques

• Sensory



• Motor


- EOM
- Cover testing or Maddox rod



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Maddox Rods




- Series of cylinders in a (usually red) lens
- Takes point source and makes it appear like a line that is perpendicular to the direction of the cylinders (i.e. if cylinders vertical, the line will appear horizontal)
- Remember that images are flipped + upside-down in the retina


Left Hyper




Right Hyper




No Vertical

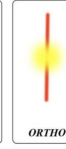




EXO



ESO



ORTHO


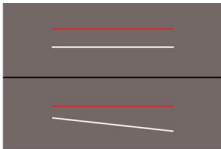
You have to make sure which eye Maddox Rod is placed over. If reversed, the n does not hold true anymore. The above is for Maddox over OD.

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Double Maddox Rods

- For torsion
- Red and white lens

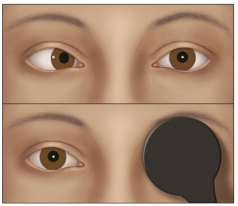

A
B



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Cover-Uncover Testing

- Tropia: **manifest** eye misalignment that is present all the time
- Phoria: **latent** eye misalignment that becomes apparent only during certain situations

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Alternate Cover Testing

- Using a prism over one eye can quantify the misalignment

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Prisms

- Prism: object used to deviate direction of light
- One prism diopter: deviation of 1 cm at a distance of 1 m from a prism.

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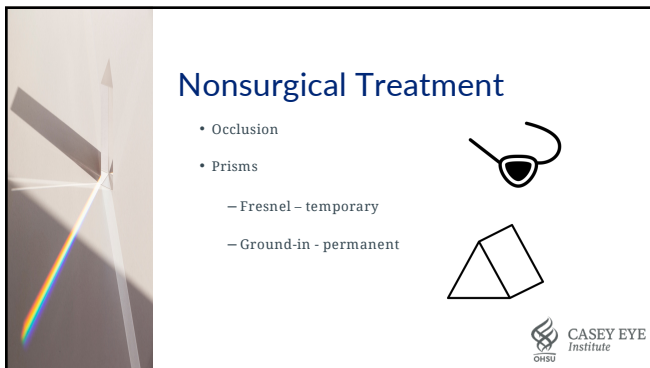
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Prisms

- Goal: binocular vision in primary gaze
- Orientation: Apex (point) in direction where eye is (or base is direction you want eye to go)
 - i.e. For exotropia: base in prism to correct
- Image goes towards apex

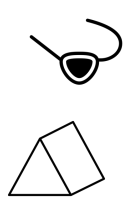
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Nonsurgical Treatment

- Occlusion
- Prisms
 - Fresnel – temporary
 - Ground-in - permanent



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When is diplopia an emergency?

- Anytime you suspect GCA
- Acute 3rd nerve palsy
 - Esp. pupil-involving



Right eye: Downward and outward gaze, dilated pupil, eyelid manually elevated due to ptosis
Left: Normal

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Thank You

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