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Also, remember that this Presentation is intended to be used in conjunction with the lecture presented in class, as well as readings in the assigned textbook. I’ve made every attempt to provide the most up-to-date and accurate information available, but by itself should not be used as medical advice. Please consult your eye doctor. Forward questions or comments about this presentation to me:

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The author has no financial interest in any of the products herein.
3D Vision Services at the Pacific EyeClinic Beaverton

http://ex3d.com/whyex3d.php

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VPI Conference, June 7, 2012
The world’s first 3D vision clinic opened at the end of August, 2011

Over the past 10 months, we have worked to perfect techniques to treat 3D problems

They are largely elegant 19th-century optics using 21st-century equipment

http://www.pacificu.edu/optometry/patients/clinics/beaverton.cfm
At the Beaverton Eye Clinic, we have mostly digital targets that allow for qualitative evaluation of optical treatments.

For reasons both practical and purposeful, we’ve largely moved beyond the stereo-diamond.

I have been experimenting with ways to prescribe prism to restore 3D vision.
Dissociated phorias, or measuring deviation of the eyes without allowing fusion, will yield **too much** prism to prescribe.

There are formulas called “comfort criteria” meant to convert these larger numbers to something tolerable to the patient.

Which are the dissociated eye posture tests?

Dissociated Phorias – Not Directly Prescribable!

- Alternate cover test neutralization with prism bar (no fusion)
- Von Graefe phorias (vertical prism dissociation)
- Maddox rod (shown), especially horizontal (first degree fusion) – might only work for verticals deviations


http://www.pacificu.edu/optometry/ce/courses/15876/sportsvisionpg2.cfm
Associated Phorias – Prescribable!

Using FILTERS:
- Red lens only (B)
- Red-green anaglyphs
- Red-blue anaglyphs
- Polaroids

Usually these filters will not give you the same phoria as dissociative techniques -- and should be ortho- on asymptomatic patients

http://www.bernell.com/product/4021/
Red Lens Targets (at far and near)

http://www.mstech-eyes.com/general/smart_system_20_20

http://iefusa.org/Catalog/SRS_FRONT/ProdDetail.php?product_id=31
Active 3D and Associated Phorometry

- Are 3D flicker glasses associated or dissociated?
- They are probably some sort of hybrid
- Like a very rapid alternating cover test at just above the critical flicker fusion (CFF) frequency

http://www.simplyelectricals.co.uk/samsung-ssg-3300cr.html
Notice as light is increased from starlight (scotopic) to daylight (photopic, our ability to see flicker increases.

This graphical representation of the Ferry-Porter Law

My 3D Vision Testing Routine

- Mounted next to the M&S Technologies digital eye chart at the far end of the lane (~16’ from chair) is 55” LG plasma 3D TV
- Uses active 3D flicker
- Along with immersive THX sound, it is used to evaluate a prism Rx and distance stereo-

Our high-end, digital movie projector uses active LCD flicker glasses and a PS3.
These allows even the most easily-suppressed eye to see in very rapid succession.
With THX surround sound, it should allow for better stereo-localization.
But where do we get referrals?

http://fond-d-ecran-gratuit.org/wallpaper-3d-de-sonic/
Front-Page Oregonian Article from Last Christmas Eve

Types of Patients We See

1. Vertical Deviations
2. Outward Deviations
3. Inward Deviations

http://en.wikipedia.org/wiki/Prism_(optics)
1. Vertical Deviations

- I have found that this is most common reason 3D vision is lost.
- These patients often present with the chief complaint of motion sickness.
- Trochlear nerve palsies are the most common congenital palsy, but also easily acquired in even mild head trauma.

http://www.ophthobook.com/chapters/neuroophthalmology
Motion Sickness Case #1

- 63 YOF, computer engineer
- Can’t read on MAX train, but would prefer to take it to work rather than drive downtown
- Low myopia
- 1Δ right vertical deviation (up)
- Congenital? FAT scan!
Motion Sickness Case #2

- 55 YOF, motion sickness when whale watching, no depth perception when parallel parking
- Duration: lifelong
- Habitual head tilt to right shoulder
- Rx: Low farsightedness, moderate bifocal power, and very small vertical deviation (0.50Δ BD OS)
Vertical Deviation #1

- 63 YO, Flute Player
- Sees double when reading x 15 years
- ‘Worst it’s ever been’
- (+)Hx Carpal Tunnel Syndrome
- 4D myopia, moderate astigmatism, full-power bifocal
- Dx: 5Δ vertical deviation, prism split between eyes
This patient sees double, right image large, fuzzy, up and to the left
Getting worse, wears glasses maladjusted
Can cross eyes to bring them together horizontally, not vertically
Scoliosis and plantar fasciitis, FHx stroke (mother)
Dx: Presumed oculomotor nerve partial paresis in right eye
Rx: Horizontal and vertical prism (5Δ BI and 3Δ BU OD) at near, with more (5Δ) vertical at far

http://bjo.bmj.com/content/88/7/969.1/F1.large.jpg
4. Symptomatic Outward Deviations

- “The use of acrylic refractive prism shared evenly on each eye would be optimal method to minimize the reduction of stereoacuity during the prismatic therapy for intermittent exotropia.”


http://www.ophthobook.com/chapters/neuroophthalmology
Outward Deviation Case #1

- 46 YOM, physical therapist
- Wants to be police reservist, needs better stereo-
- Dx: Partial oculomotor nerve palsy in right eye
- Only gross (200") stereopsis with small vertical and horizontal prisms (1Δ BD OS and 2Δ BI)
- The patient shown has a lot more!
Outward Deviation Case #2

- 83 YO, closing left eye to drive, read x 2 years
- Had cataract surgery in 2003 with implanted lenses to allow the right eye to see close without glasses
- Dx: Presumed mild oculomotor palsy in right eye, caused by anesthetic injection
- Rx: Mild horizontal and vertical prism (4Δ BI and 1Δ BU OD)

http://www.studio-office.com/blog/uploaded_images/EY
2. Inward Deviation at Far Only

- Eso- at far only is rare but can be hard to treat with divergence therapy
- Acute concomitant esotropia was seen in 69 patients undergoing heroin detoxification

http://www.drugs.com/pro/methadone-solution.html
Inward Deviation at Far Case #1

- 71 YOM, retired insurance actuary
- Has had cataract surgery on both eyes leaving one image 7% larger than the other (aniseikonia)
- Eyes are moderate misaligned inward (5-6Δ BO)
- Contact lenses fail

Inward Deviation at Far Case #2

- 78 YOM, horizontal diplopia since cataract surgery OD
- Relieved by right head turn
- Pseudophakia
- Dx: Right abducens palsy secondary to cataract surgery OD
- Rx 7Δ BO, 1Δ BD OD, low CHA

http://meded.ucsd.edu/clinicalimg/eyes_cn6_palsy3.htm
3. Inward Deviation Near & Far

- When symptomatic, crossed eyes at far and near is easy to treat with prism because patients can wear prism at all distances.
- Sometimes, we see a patient with jiggly eyes (latent nystagmus) who needs moderate convergence-inducing prism (6Δ BO).

http://www.ophthobook.com/chapters/neuroophthalmology
56 YOF, reading books is nearly impossible
Works on a computer all day (12+ hours)
Lazy right eye since childhood, acuities 20/25 in right eye
Only needs glasses for reading, but has small vertical deviation along with crossed eyes (3Δ Hyper OS, 2Δ BO)
Baha Implant in left ear (?)

54 YOF, sees 20/60 in right eye with strong farsighted prescription (+7D SE) and 20/40 in the left with moderate Rx (+4.50 SE)

Blur when driving, turns head to read in bed with no-line bifocals

Contact lenses relieve it

Rx weak vertical and strong crossed-eye prism (2Δ BD OD, 10Δ BO) gives patient proper depth perception out the window (SILO)

http://avserver.lib.uthsc.edu:8080/Medicine/eye_exam/page51.htm
Optical Solutions: Marchon EX3D Specs?

- For those who only have symptoms when watching 3D movies and TV, we can prescribe these for part-time wear.
- Unlike other 3D glasses, these have UV protection but CAN'T take prescription lenses or prism, my main treatment modality.

http://news.cnet.com/8301-17938_105-20038497-1.html
Questions?

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