
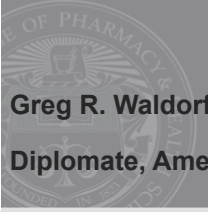



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Glasses: Considerations For People With Developmental Disabilities


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History

- **21 years in private practice**
 - Developmental disabilities
 - Pediatric low vision
- **2 years MCPHS School of Optometry**
- **Developing Special Populations course at MCPHS**
- **Developmental Disability Clinic in Eye and Vision Center on Worcester campus (open this summer)**
- **This lecture is a reflection on my experience**
 - Struggles some patients have with glasses
 - Guilt caregivers / family members have when their patient / loved one doesn't wear glasses
 - Practical suggestions / solutions



Goals of This Presentation

- Review normal refractive errors
- Explain how glasses for refractive errors work
- Review possible side effects from glasses
- Discuss solutions to help adjust to new glasses
- Environmental modifications to assist vision *without* glasses
- Briefly discuss prisms and their use in glasses

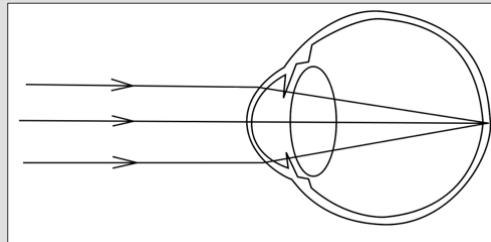


Refractive Errors



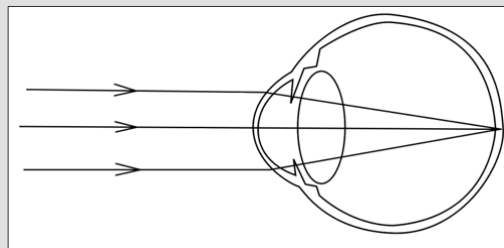
Emmetropia

- Parallel light entering the eye focuses on the patient's retina without the patient having to accommodate (focus)
- 25% of the population is emmetropic
- Have good vision at distance and near (before their early 40s)



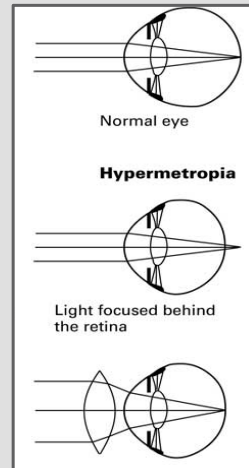
Refractive Errors

- Any refractive error that is not emmetropia is referred to as *ametropia*
- **Ametropias**
 - Hyperopia (farsightedness)
 - Myopia (nearsightedness)
 - Astigmatism



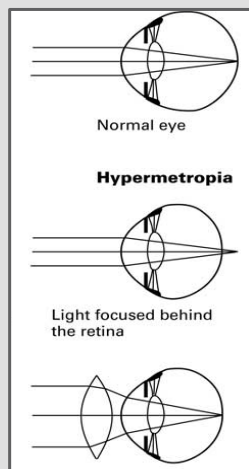
Hyperopia (Farsightedness)

- Eye is short; parallel light falls *behind* retina when the eye is not accommodating
- The hyperopic eye can accommodate (focus) to compensate for hyperopia...but there are limits
- Most common refractive error; 50-60% of the general adult population
- Most uncorrected hyperopes see clearly at distance and near
- Some have difficulties with near vision



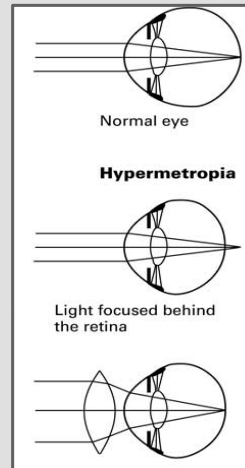
Hyperopia (Farsightedness)

- Low amounts of hyperopia rarely problematic
- Large amounts of hyperopia make it difficult for the eye to maintain image clarity for long periods of time
- Near vision becomes more difficult with age
- Plus powered lenses will move the image to the retina, reducing the eyes need to accommodate (focus)



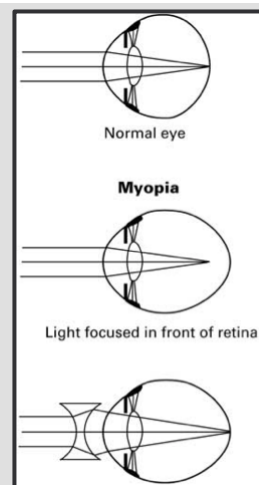
Symptoms of Uncorrected Hyperopia

- May cause avoidance of or struggles with near tasks (work or pleasure)
 - Near vision is blurry
 - May cause eyestrain and/or headaches
 - Behind the eyes
 - Temporal headaches
 - Tire quickly
- Large uncorrected amounts can cause blurred distance *and* near vision
 - Impact distance tasks (work or pleasure); end of day
 - Impact near tasks (work or pleasure); all day
 - May contribute to strabismus (misalignment of the eyes)



Myopia (Nearsightedness)

- Eye is long; parallel light falls *in front of* the retina when the eye is not accommodating
- Image cannot be focused into clarity like the hyperopic eye (if eye focuses, image becomes **MORE** blurry)
- Causes *blurred distance vision*
- Near vision is unaffected
- Myopia occurs in 25-30% of the general population



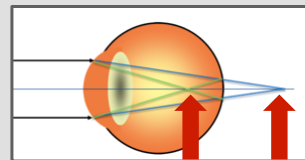
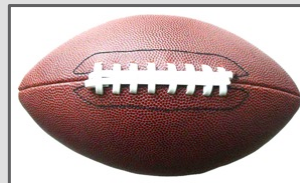
Symptoms of Uncorrected Myopia

- Squinting to see objects at distance
- Hold objects / reading material close
- Uncorrected myopia (moderate to high amounts)
 - Impact mobility
 - Reduced contrast sensitivity
 - Blur of floor and surfaces
 - Impact distance tasks
 - Work demands
 - Identifying faces
 - Watching television



Astigmatism

- The cornea (clear, front surface of the eye) is shaped more like a football than a basketball
- Parallel light entering the eye falls inside (or outside) the eye as two distinct images
- 23-27% in adults 20-50
- 50% of adults ≥ 60 years
- Can occur on its own but usually present with hyperopia or myopia



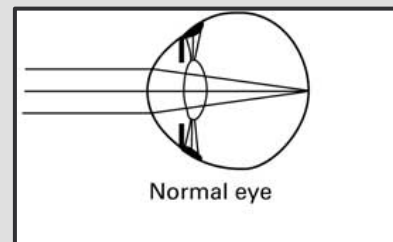
Symptoms of Uncorrected Astigmatism

- Blurry vision at both distance and near
- Patients may squint to see at distance and near
- May contribute to eyestrain and headaches
- Patients report “shadowing” or “doubling” of vision



Presbyopia

- Focusing system of the eye hardens
- Reading / near tasks becomes difficult
- Emerges in early 40s and “levels off” in late 50s
- Requires reading glasses, bifocals, or multifocals



Symptoms of Uncorrected Presbyopia

- Symptoms will be present in persons > 40 years of age
- Blurry near vision
 - Holds near items at increasing distances
 - Arms become “too short”
- Reduced ability to perform near tasks
- Squinting at near
- Eyestrain / Headaches



Glasses



Sensory Integration and Glasses

Patient's *Sensory System*

- Can patient tolerate a frame on their face?
 - Bridge of nose
 - Cheeks
 - Over and behind ears
 - Strap behind head
- Can patient tolerate environmental magnification / minification / distortion of newly prescribed glasses?
- Can patient tolerate the FULL glasses prescription?



Patient's Muscle Tone

- Low muscle tone
 - May have more difficulty with near point work – accommodative lag
 - Down Syndrome
 - Cerebral Palsy
- Bifocal *may* help
 - Reading / Near tasks
 - Communication devices
- Bifocal *may* create problems (mobility)
- Consider reading only glasses for near
 - Prescription reading glasses
 - OTC reading glasses
- Slight adjustments to working distance (increase when possible)



Accommodative Lag

- **Low muscle tone**
 - Eye focusing system (accommodation) “lags” behind near task
 - Contributes to difficulty with near point work



When Considering Glasses...

- **Patient's mobility**
 - Will glasses contribute to mobility issues?
- **Patient's muscle tone**
 - Low muscle tone; issues with near vision
 - Will glasses cause issues with activities of daily living (ADL)?
- **Patient's ADL – tell prescribing doctor**
 - Visual demands at all ranges
 - Distance demands
 - Near demands
 - Intermediate demands

Glasses for Hyperopia

Glasses for hyperopia relax the accommodative (eye focusing) system

POTENTIAL ISSUES

- Moderate to high powered glasses magnify the environment
- High powered glasses cause “pincushion distortion” of the environment

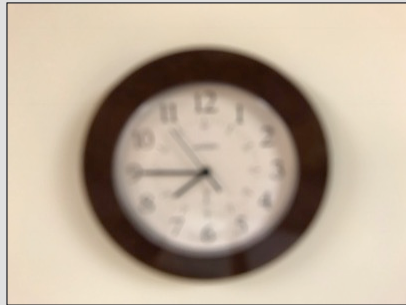


Glasses for Hyperopia

- **Mobility**
 - Unlikely to cause mobility issues
 - Only moderate to high prescriptions
 - Patient should adjust without much difficulty
- **Muscle tone**
 - Will **STRONGLY** benefit patients with low muscle tone
 - Will improve their distance vision (particularly as the day progresses)
 - Will improve their near vision
- **ADL**
 - Benefit patients that have jobs / hobbies requiring clear near vision
 - Communication devices



Myopia



Uncorrected Myopia
Distance Vision



Corrected Myopia
Distance Vision



Glasses for Myopia

Glasses for myopia improve distance vision

POTENTIAL ISSUES

- Minify the environment
- High powers can cause “barrel distortion” of the environment
- If patient has low muscle tone (accommodative lag) or is ≥ 40 years, these lenses can *cause issues with near vision*
 - *Near work is suddenly difficult*



Glasses for Myopia

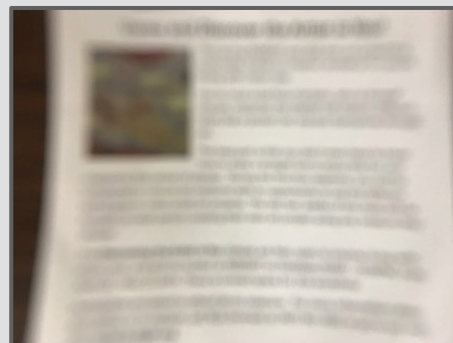
- **Mobility**
 - Minification of environment can cause some issues with mobility
 - Judging steps, stairs, curbs
 - Should resolve with continued use of glasses
- **Muscle tone**
 - *Likely* impact near vision
 - Myopic eye is built to see at near
- **ADL**
 - Will improve distance vision
 - May contribute to near vision issues



Myopia + Low Muscle Tone



Uncorrected Near Vision



Myopia-Corrected Near Vision



Glasses for Astigmatism

Correct for football-shaped cornea

POTENTIAL ISSUES

- Environmental distortion
- Vertical and horizontal lines in environment (door frames / steps) may appear skewed

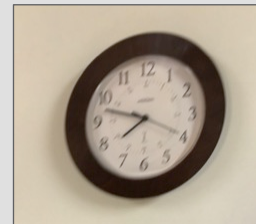
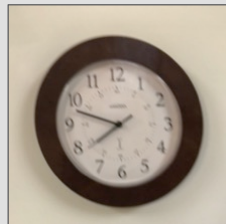


Uncorrected Astigmatism



Glasses for Astigmatism

- Corrected astigmatism can cause the appearance of environmental distortions
- Tolerance varies from patient to patient



Glasses for Astigmatism

- Distortions may appear worse with head movements
- “Swimming” sensation

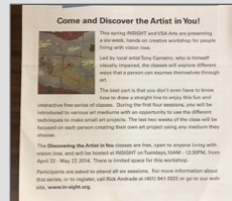
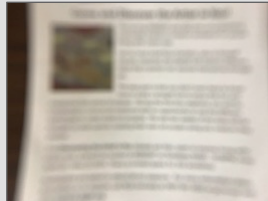


Glasses for Astigmatism

- **Mobility**
 - Depends on power of prescription
 - Depends on patient adaptation
- **Muscle Tone**
 - May contribute to some issues with near vision
- **ADL**
 - Will improved distance AND near vision

Glasses for Presbyopia

Correct for hardening accommodative (eye focusing) system



POTENTIAL ISSUES

- Corrected presbyopia with bifocals / multifocals can lead to short term issues with mobility
 - Bifocal makes the ground appear higher
 - Use caution on stairs / steps
 - Multifocals cause lateral and inferior peripheral distortion
 - Allow adaptation period (few days to weeks)



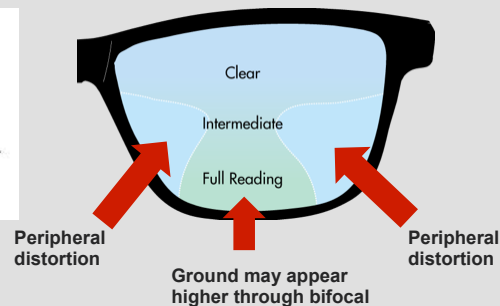
Bifocals and Multifocals

Line Bifocal



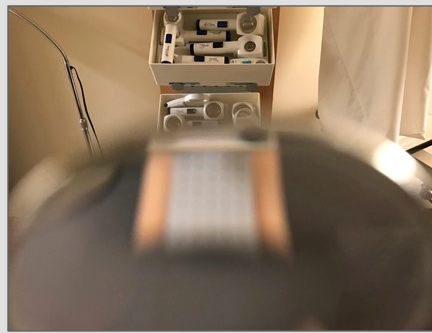
Ground may appear higher through bifocal

Multifocal



Glasses for Presbyopia

Line Bifocal Simulation



Glasses for Presbyopia

Multifocal Simulation



Glasses for Presbyopia

- **Mobility**
 - Distorted / elevated inferior visual field (bifocal and multifocal)
 - Peripheral side distortion with multifocal lenses
- **Muscle Tone**
 - Will help with intermediate (multifocal) and near (bifocal and multifocal)
- **ADL**
 - Improve vision at near ranges
 - Reduce eyestrain and headaches from near work / hobbies



Adjusting to Glasses

Simple Solutions



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Sometimes *LESS IS MORE*

- Prescribing less than the full amount of power can make it easier to adjust to new glasses
- There is ***no need*** to push full-power in patients over seven-years of age
- Particularly true with older patients that have never worn glasses
 - Myopia
 - Astigmatism
 - Hyperopia
- Discuss this option with the doctor



Frames

- Durable
- Lightweight
- Fits patient's face structure
- Flex hinge frame
- Reduced sensory awareness



Build Up Wear-Time

- There is ***no need*** to push full-time use of glasses in patients over seven-years of age
- Build up can be slow
- Build up can be task specific
- Start build up with seated (non-mobile) tasks



Environmental Modifications

Assisting Vision Without Glasses



Problems With Distance Vision

- If myopic, reduce distance between person and far point demand
 - Modify distance visual demands at work
 - It is OKAY to sit closer to the television
- Allow myopic patient to hold items close
 - Does NOT hurt their eyes
 - Books
 - Pictures
 - Objects




Problems With Near Vision

- If hyperopic or presbyopic, modify near working distance by increasing it
- Use slant board
- Enlarge near text or pictures
- Use inexpensive OTC reading glasses
 - OTC glasses do not damage the eyes
 - OTC glasses do not cause eyes to become worse




Slant Board






Apply What We Have Learned

Down Syndrome and Cerebral Palsy



Down Syndrome

- Low to moderate hyperopia; estimated to occur in 8-23% of population
- Low muscle tone; bifocal consideration (correct distance AND near)
- Astigmatism occurs in 18-25% of patients
- Myopia is least prevalent, but if present, it tends to be severe
- Moderate percentage of Down Syndrome patients have strabismus (23 - 44%); 88% of these have esotropia (eye turn in)
- Glasses prescribed for *maximum plus power* may help with eye alignment (reduce eye turn in)



Cerebral Palsy

- **Variable muscle tone**
- **If muscle tone is low:**
 - Reading glasses for near tasks only
 - Prescription glasses
 - Inexpensive OTC reading glasses
- **Hyperopia is more prevalent than myopia (3:1)**
 - Bifocals or reading glasses may benefit patient
 - Be mindful of potential mobility problems with bifocal / multifocals



Prism

What is it? What does it do?

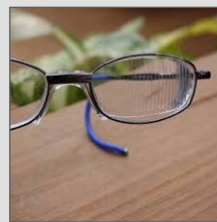
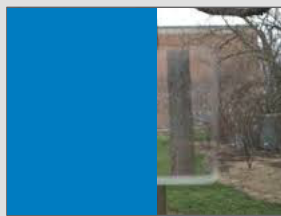


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Prism

Prism *moves* images in the environment

- Visual field loss – moves image from affected field into unaffected field
- Double vision – can eliminate double vision
 - Post-TBI
 - Neurological event



Prism





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QUESTIONS?
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