

The ABCs of Pediatric Vision

Michelle J. Hoff, OD, FFAO, ABOM, FNAO
mhoff@sightlinecc.com
mhoff@parkview.edu



Isabel Kazemi, OD, FFAO
ikazemi@sightlinecc.com
ikazemi@parkview.edu

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Disclosures



- The content of this course was developed independently without commercial bias or influence
- We are the founding partners of SightLine Ophthalmic Consulting, LLC
- Our presentation contains images from the Visionix VX40 lens analyzer
- Essilor, Visionix - Consulting



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Course Objectives

- Pediatric population
- Eyewear market share
- Visual conditions
- Visual development
- Educating parents and children
- Treatment options
 - Frames
 - Lenses
 - Cases
- Marketing and displaying kids eyewear

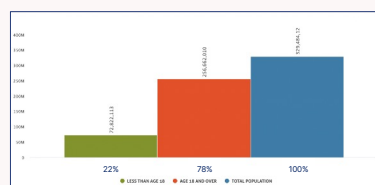


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Pediatric Population

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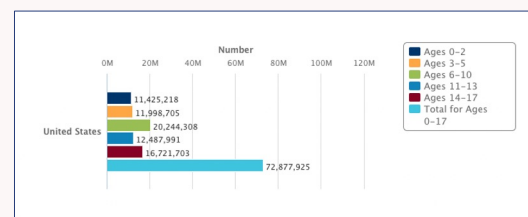
USA Pediatric Population



The Annie E. Casey Foundation, KIDS COUNT Data Center, datacenter.kidscount.org

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USA Pediatric Population Distribution by Age



Child Population - Kids Data.org

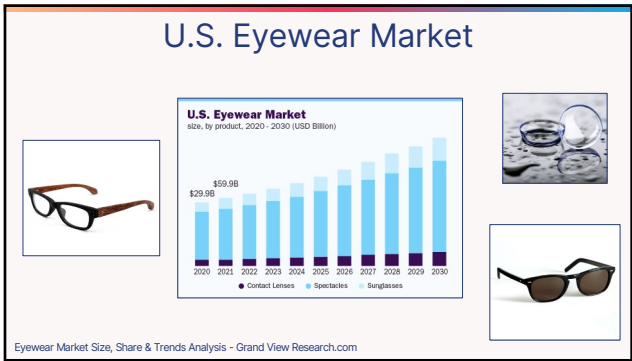
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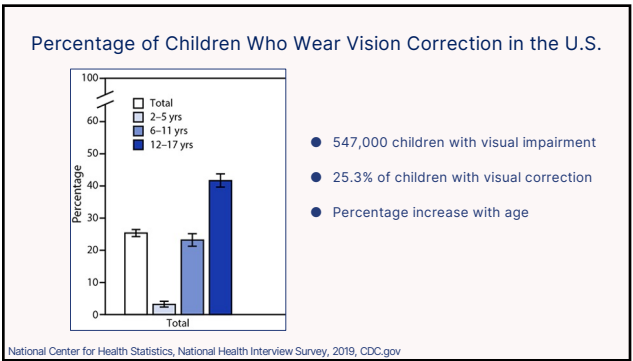
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What are the Consequences?

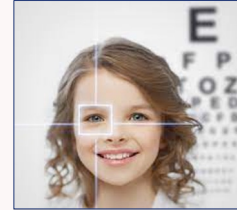


Children's Vision Care in the 21st Century & its Impact on Education, Literacy, Social Issues, & the Workplace: A Call to Action, Joel N. Zaba, Journal of Behavioral Optometry

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Most Common Visual Impairments

- Refractive Errors
 - Myopia
 - Hyperopia
 - Astigmatism
- Amblyopia (Lazy eye)
- Strabismus (Cross eyed)
- Binocular Vision Dysfunction (BVD)
 - Convergence Issues
 - Divergence Issues
- Accommodation Disorders
 - Insufficiency
 - Excess
 - Spasm

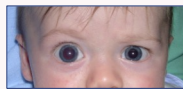


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Childhood Eye Diseases



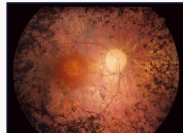
Congenital /Pediatric Cataract



Congenital/Pediatric Glaucoma



Retinoblastoma



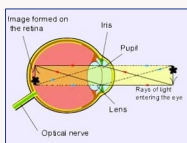
Retinitis Pigmentosa

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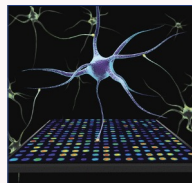
Visual Development

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Visual Processing = Learning



Visual processing

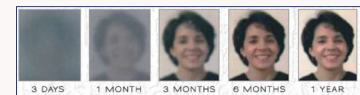


700 neural connections/second

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What do infants see?

Black, white, and 50 shades of gray



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What's Normal? Birth -24 months

Vergence: Accurate at 3 months
Accommodation: Developed at 3-4 months
Stereopsis: Developed at 3-4 months
Color Vision: Developed at 3-4 months



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Normal Range of Refractive Error

Hyperopia

AGE	Normal
6 months	0 - 3.00D
9 months	0 - 2.25D
12 months	0 - 2.00D
18 mos	0 - 2.00D
24 mos	0 - 2.00D
30 mos	0 - 1.75D
36 mos	0 - 1.75D
48 mos	0 - 1.75D

Astigmatism

AGE	Normal
5mos - 3 Years	0 - 1.75D
3Year - 5 Year	0 - 1.25D

Anisometropia

AGE	Normal
5mos - 5 Years	0 - 0.75D

Myopia

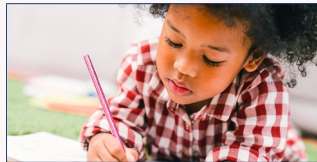
AGE	Normal
5mos - 5 Years	No myopia

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Preschool Children 2-5 Yrs

Fine tuning visual motor skills
 Continue developing new skills

- Building blocks stacking
- Playing with balls
- Drawing and Coloring



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Amblyopia

Potentially Amblyogenic Refractive Errors

Isometropia	Diopters
Astigmatism	>2.50 D
Hyperopia	>5.00 D
Myopia	>8.00 D
Anisometropia	Diopters
Astigmatism	>1.50 D
Hyperopia	>1.00 D
Myopia	>3.00 D

Amblyopia "lazy eye" = a unilateral or bilateral condition in which the best corrected visual acuity is poorer than 20/20 in the absence of any obvious structural anomalies or ocular disease.

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Amblyopia Treatments

- Spectacles
- Contact Lenses
- Patching
- Pharmaceuticals
- Vision Therapy

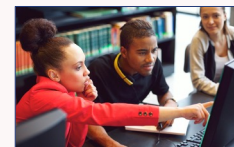


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School Age Children 6-18 Yrs

- Reading
- Writing
- Computers
- Sports

- Good visual acuity at distance and near
- Focusing ability
- Binocular vision/Eye tracking
- Eye-hand coordination
- Visual perception

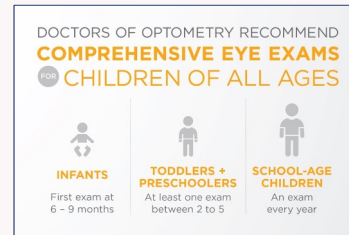


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Educating Parents and Children

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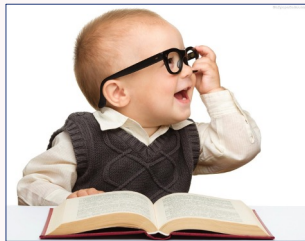
When should children get an eye exam?



National Poll on Children's Health, CS Mott Children's Hospital, University of Michigan

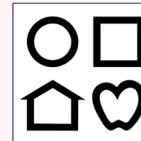
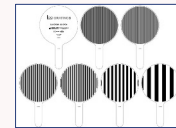
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With regard to eye exams,
children are **NOT** little adults



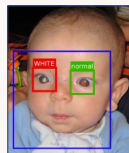
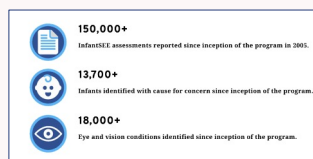
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Pediatric Eye Exam Tools



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InfantSee Program



<https://www.infantsee.org>

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Vision screenings \neq Eye Exams



An eye examination is essential
for **back-to-school** success!

A vision screening is not a comprehensive eye exam

- 75%** Up to 75% of school vision screenings miss vision problems.
- 61%** 61% of children found to have eye problems through screenings never visit the doctor.
- 15%** Fewer than 15% of preschool children receive an eye exam by a professional.
- 4%** School vision screenings give less than 4% comprehensive eye exam.

Visit aaa.org/doctor-locator to find an AOA-member doctor of optometry near you!

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RESOURCES

InfantSee
Affordable Care Act (ACA)
Managed Vision Care (MVC) programs



Pediatric Visual Demands



Near work



Sports



Computers



Digital devices

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Visual Skills

Skills needed for academic and athletic success:

- Visual Acuity
- Accommodation
- Eye Teaming and Tracking
- Eye Hand Coordination
- Visual Perception

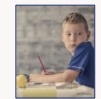


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What to Look For

Signs and symptoms of a potential vision problem:

- Complaints of discomfort and fatigue
- Frequent eye rubbing or blinking
- Short attention span
- Avoiding reading and other close activities
- Frequent headaches
- Covering one eye
- Tilting the head to one side
- Holding reading materials close to the face
- An eye turning in or out
- Seeing double
- Losing place when reading
- Difficulty remembering what he or she read
- Difficulty with motor skills



Complete list: American Optometric Association: Eye Health for Life

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Treatment Options

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Frames

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Visual Solutions

What do parents want?

1. Durability
2. Warranty
3. Cost



What do kids want?

1. Fashion trends
2. Variety of colors
3. Familiar Brands



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Frames: Zero to 5 Years Old



- Safe
- Proper fit
- Durable



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Frames: 6 to 9 Years Old



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Frames: 10 Years Old and Up



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Proper Frame Fit

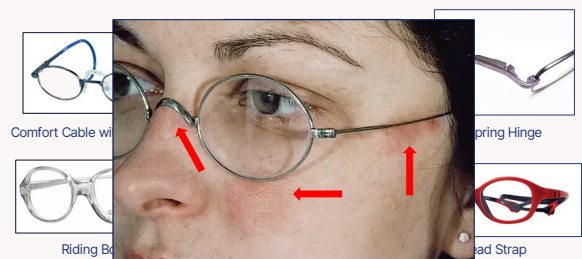


- Proper frame width
- Eyes centered
- Well fit bridge design
- Appropriate temple length and style

Select a frame with the proper fit to avoid excess adjustments on dispense to and the need to re-select a different frame after the lenses have been made.

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Frame Anatomy



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Sports Eyewear



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Sports Related Eye Injuries

Sport	Total Injuries	0-14 years old	15+ years old
* Basketball	4,597	985	3,632
* Water/Pool activities	4,565	2,637	2,198
* Guns: air, gas, spring, BB	3,612	1,632	1,980
Baseball/Softball	2,109	1,121	988
Football	959	483	476
Bicycling	2,495	668	1,827
Soccer	1,618	404	1,214

Sports injuries by age 2020, Prevent Blindness.org

* = Top 3 sports injuries

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The Right Protection

ASTM F803

- Baseball/Softball
- Basketball
- Field Hockey
- Lacrosse
- Racquet sports
- Soccer



ASTM F513: Face Mask on Helmet

- Ice Hockey
- Street Hockey
- Swim Goggles
- Water Polo

American Society for Testing and Materials (ASTM)
American National Standards Institute (ANSI)

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Resources



REC SPECS



HILCO vision



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Lenses



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Lens Material



Safety First

Lens Type	Index	Abbe	Specific Gravity	Impact Resistance	UV Protection
Glass	1.523	59	2.54	poor	No
CR-39	1.498	58	1.32	good	No
Trivex	1.530	46	1.11	excellent	Yes
Polycarbonate	1.586	30	1.20	excellent	Yes

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Lens Treatments



No ARC vs. ARC



Blue Blockers

- Reduces glare
- Allows others to see eyes and reactions
- Extended warranty

- Coating vs Filter
- Clear vs slight yellow vs bluish purple reflection
- Prescribe?

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Photochromatic Lenses



Performance study:

- n= 50 children ages 10-15 y.o.
- 88% chose to continue to wear photochromic
- Clear = Photochromic indoor activities
- Photochromatic better for outdoor activities

Evaluation of the performance of photochromic spectacle lenses in children and adolescents aged 10 to 15 years; Clin Exp Optom

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Single Vision Lens Design



- Spherical - low Rx's
- Aspheric - +/-4.00
 - 35-45% thinner, lighter, flatter
 - More beneficial for plus lenses
 - Some benefits for minus lenses
- Atoric- high plus and minus cylindrical lenses
 - Wider field of view
 - Thinner, lighter
 - Decreases off axis effects with eye movements

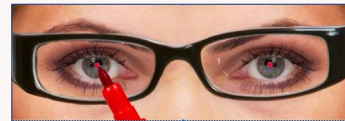


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Single Vision Lenses

Vertical Fitting Height Measurements

Vertical Fitting Height = The measurement in millimeters
From the center of the pupil to the lowest/deepest part of the visible lens



- When to specify VFHs
- Freeform / Digital
 - Anisometropia

Martin's Rule of Tilt
Lower OC 1mm for every 2° of Panto tilt
Frame angle default = 8° angle

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Multifocals



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Accommodative and BV Disorders

Condition	Treatment
Insufficiency	(+) Lenses @ Near
Infacility	VT (+) Lenses @ Near
Spasm	VT (+) Lenses @ Near
Ill-Sustained	(+) Lenses @ Near
Exophoria	Prism, VT
Esophoria	(+) Lenses, Prism
Gross Convergence Insufficiency	VT
Convergence Excess	(+) Lenses, Prism
Vertical Phoria	Prism



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Lens Designs for Rxing Near Plus



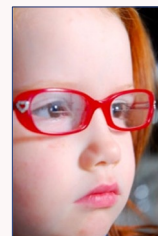
Lenses	Benefits	Limitations
Single Vision Near	Wide Field of View	Distance Blur
Bifocal	Wide Field of View	Cosmesis Image Jump
PAL (Short Corridor)	Cosmesis	Small Reading Area Narrow Corridor Cost
SV Distance with Near Power Boost	Wide Field of View Cosmesis Lower Cost	(Practically None)

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Multifocals: Segmented/Lined



Proper fit

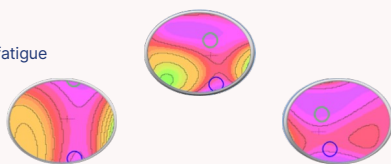


VFH:
Preschool=Fit at bottom of pupil
School Age=2 mm above lower lid

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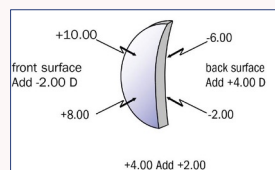
Variable Power Lens Designs

- Lens Design
 - Dual vs All Back Surface
- Progressive
 - Short Corridor
 - Fixed Corridor
- Powerboost/Anti-fatigue

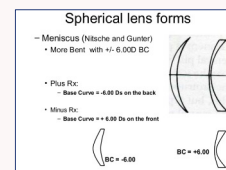


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Dual Surface (DS) vs All Back Surface (ABS)



Dual Surface



All Back Surface

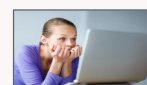
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Multifocals: Progressive Lenses

Hoya	Zeiss	Shamir
ID LifeStyle3 Urban, Indoor, Outdoor 11,12,13,14,VL	SmartLife Individual Balanced, Intermediate, Near Short 14 Medium 16 Long 18	Autograph Intelligence 11,13,15,18,V
Dual Surfaced	All Back Surface	All Back Surface
Array 2 BKS 11,13,15,17,VL		
All Back Surface		





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Multifocals: Powerboost/Anti-fatigue



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Multifocals: Powerboost Lenses/Anti-fatigue

Power Boost Lenses		Boost at the Bottom
	Digital 500	+0.50
	Digital 750	+0.75
	Digital 1000	+1.00
	Digital 1250	+1.25
	Eyezen +1	+0.40
	Eyezen +2	+0.60
	Eyezen +3	+0.85
	Eyezen +4	+1.10
	Hoya Sync 5	+0.57
	Hoya Sync 9	+0.95
	Hoya Sync 13	+1.32
	Relieve 50	+0.50
	Relieve 70	+0.70

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Case Examples

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CASE 1

Dr. Brown Eyes
123 Sunshine St.
Amazing, CA 98765



NAME Annie ADDRESS _____ DATE _____

Rx

		SPHERICAL	CYLINDRICAL	AXIS	PRISM	BASE
D.V.	O.D.	+1.00	DS			
	O.S.	+1.00	DS			
N.V.	O.D.	+1.00				
	O.S.	+1.00				





Remarks _____

DR. _____

FM-1075

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Multifocals: Powerboost Lenses/Anti-fatigue

Power Boost Lenses		Boost at the Bottom
	Digital 500	+0.50
	Digital 750	+0.75
	Digital 1000	+1.00
	Digital 1250	+1.25
	Eyezen +1	+0.40
	Eyezen +2	+0.60
	Eyezen +3	+0.85
	Eyezen +4	+1.10
	Hoya Sync 5	+0.57
	Hoya Sync 9	+0.95
	Hoya Sync 13	+1.32
	Relieve 50	+0.50
	Relieve 70	+0.70

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Dr. Brown Eyes
123 Sunshine St.
Amazing, CA 98765



NAME Annie ADDRESS _____ DATE _____

Rx

		SPHERICAL	CYLINDRICAL	AXIS	PRISM	BASE
D.V.	O.D.	+1.00	DS			
	O.S.	+1.00	DS			
N.V.	O.D.					
	O.S.					

Remarks Zeiss Digital 1000

DR. _____

FM-1075

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CASE 2

Dr. Brown Eyes
123 Sunshine St.
Amazing, CA 98765



NAME Sophie ADDRESS _____ DATE _____

Rx

		SPHERICAL	CYLINDRICAL	AXIS	PRISM	BASE
D.V.	O.D.	-0.75	-0.50	010		
	O.S.	-1.00	-0.50	170		
N.V.	O.D.	+0.75				
	O.S.	+0.75				





Remarks _____

DR. _____

FM-1075

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Multifocals: Powerboost Lenses/Anti-fatigue

Power Boost Lenses		Boost at the Bottom
	Digital 500	+0.50
	Digital 500	+0.75
	Digital 1000	+1.00
	Digital 1250	+1.25
	Eyezen +1	+0.40
	Eyezen +2	+0.60
	Eyezen +3	+0.85
	Eyezen +4	+1.10
	Hoya Sync 5	+0.57
	Hoya Sync 9	+0.95
	Hoya Sync 13	+1.32
	Relieve 50	+0.50
	Relieve 70	+0.70



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CASE 2

Dr. Brown Eyes
123 Sunshine St.
Amazing, CA 98765



NAME Sophie
ADDRESS _____ DATE _____

		SPHERICAL	CYLINDRICAL	AXIS	PRISM	BASE
D.V.	O.D.	-0.75	-0.50	010		
	O.S.	-1.00	-0.50	170		
N.V.	O.D.					
	O.S.					

Remarks Eyezen +3

DR. _____

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Marketing and Displaying Kids Eyewear

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Appeal to the Kids



- Kid friendly waiting area
 - Toys
 - Books
 - Treasure Chest

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Displaying the Frames

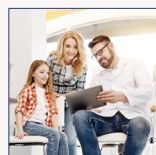


- Display at a lower level
- Include Sports and Sun eyewear
- Promote second pair sales
 - General Wear
 - Sports
 - Sun



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Communication is Key



- Speak directly to the child
- Explain the Rx to parent and child
- Consider bundling or free lenses with 2nd pair
- Discuss Warranty

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Dispensing is the Key to Success



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Key Takeaways

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Take Home Points



Untreated vision problems lead to:

- Poor school performance
- Low self-esteem, emotion and antisocial behavior
- Incarceration

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Take Home Points

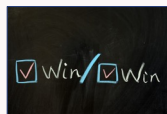


Healthy Habits:

- Balanced diet
- Outdoor time
- UV protection/ Safety eyewear
- Monitor screen time/ 20-20-20 Rule

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Everyone WINS!



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THANK YOU! Thank you very much

Isabel Kazemi, OD, FAAO
ikazemi@sightlinecc.com
ikazemi@berkeley.edu

Michelle J. Hoff, OD, FAAO, ABOM, FNAO
mhoff@sightlinecc.com
mhoff@berkeley.edu

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