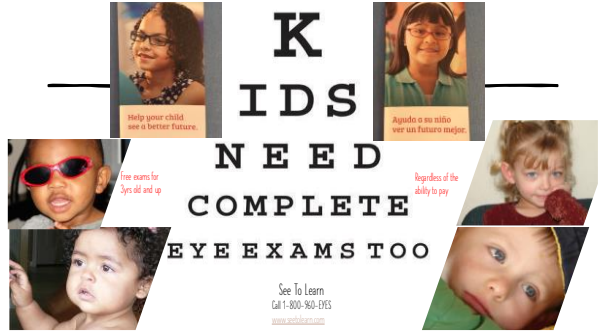


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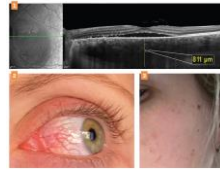


6

FOR THE KIDS!



7



8

STARTS WITH MOM

Pregnancy and postpartum ophthalmic changes can present a challenge

- Hormonal changes
- Lid changes... pigment disorder
- Subconjunctival hemorrhages
- Tears – viscosity and dehydration
- Cornea – increased thickness by 3%
- Temporary loss of accommodation
- Auto-immune, diabetes, thyroid, Graves disease
- Central Serous Chorioretinopathy
- Idiopathic intracranial hypertension, pituitary tumors, Preeclampsia

WHY SEE TO LEARN?

- Visual processing is key to more than 80% of everything we learn
- Nearly 30% of children in special needs have vision problems (vp)
- 1 of 5 children (20%) entering kindergarten have vp
- 70% of juvenile delinquents have vp
- 60% of adults in literacy programs have VP
- Even 20/20 programs don't guarantee a child is learning to his/her potential
- The percentage of children with an increase to 25% by age 10 and more than 30% by age 15

9

FACTS

- As stated from the 2000 AOA clinical practice guidelines for Pediatric Vision reported that there were 72.3 million under the age of 18 (26% of the overall population) and a growth rate of 13.7%
- Vision disorders 4th most common disability in US
- There are approx 39,000 practicing O.D.s = 1846 children per practice
- Only 31% of children rec'd comprehensive exams
- Vision is developing from birth to 20, from 20-40 vision is the most stable and after 40...well 😊

10

PRIOR TO APPT ASK PARENTS

- Complete forms prior to appt on-line of able
- Ask what is the best time of day for child
- Not after school, day has been too long
- When the child is sick reschedule
- Bring comfort toys
- Social stories...tell about the eye exam process
- Are there any special needs (autism, physical defects, etc.)



11



VISION IS A LEARNED CONCEPT

In the womb there is no light and light is required for vision to be established. Vision begins on the day of birth and does not stabilize until the child turns 20 - 21 yrs of age. Hormones impact vision development and there are a plethora of other factors that influence visual development, to include regular eye exams. So where do we begin?

12



VISION IS A LEARNED CONCEPT

- No light in the womb
- Vision begins to develop on day one of birth
- Nutrition
- Stimulation
- Growth and Development
- 80% of everything learned by a child is vision

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IMPACTING FACTORS

- Birth factors
- Nutritional Deficiencies
 - Vitamin A, B-12,
- Environmental
 - Activities
 - Video games*
 - Reading
 - Lighting

14



OVERVIEW

- Child growth and development
- Vision and Learning 80%
- Early detection
- Hormones and vision
- School screenings and state requirements
- Clinic screenings and Exams
- Inform and educate

15



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- The Affordable Care Act (ACA) requires insurance plans to offer pediatric services including vision services, through state health insurance exchanges, as one of the 10 required categories of essential health care benefits beginning January 1, 2014.
- Qualified health plans will provide coverage for timely vision screening for the early detection and treatment of eye and vision problems in the medical home. This includes maintaining a schedule of vision screening during childhood and adolescence. Ideally, these screenings are done in the pediatrician's office.

18

STATE REQUIREMENTS

http://www.michigan.gov/med4/0,4570,7-293_179_

Pediatric Vision Services Provided Under the ACA

- Each state is required to provide:
- Vision screenings in the medical home
- An annual fully-dilated comprehensive eye exam with refraction if required
- Correction of refractive error with eyeglasses and contact lenses
- Louisiana developing a digital plan for children's exams*

19

STATE REQUIREMENTS

- All county or district health departments have a Vision Screening Program which includes initial screening, retesting, and referral of children.
- Vision screening of pre-school and school-age children includes tests using screening and testing procedures approved by the Michigan Department of Community Health (MDCH):
 - Distance vision
 - Eye muscle balance
 - Near-vision
 - Far-vision
- These tests are used to screen pre-school and school-age children and in identifying children who may have vision problems that require additional evaluation and follow-up.
- A referral is made to an eye care professional after a child has failed one or more of the battery of vision screening tests or has an observable symptom. Follow-up for all referrals is conducted, helping to assure that care is received. Completed follow-up is reported to MDCH. At least ten percent of the children screened in Michigan are referred annually to an eye care professional.
- Of all children screened in Michigan annually, the Michigan Vision Screening Test Battery routinely identifies 10-15% of those screened as needing eye care.



20

MEDICAL HOME

- What is a Medical Home?
- A family-centered medical home is not a building, house, hospital, or home healthcare service, but an approach to providing comprehensive care. In this home, the pediatric care team works in partnership with a child's family to ensure that all of the medical and non-medical needs of the child are met.

[Children's Vision Benefits under ACA - Optometric Association of Louisiana \(optla.org\)](#)

21

FACTS

- No two children are alike!
- As stated from the 2000 AOA clinical practice guidelines for Pediatric Vision reported that there were 72.3 million under the age of 18 (26% of the overall population) and a growth rate of 13.7%.
- Vision disorders 4th most common disability in US
- There are approx 39,000 practicing O.D.s = 1846 children per practicing OD
- Only 31% of children rec'd comprehensive exams
- Vision is developing from birth to 20, from 20-40 vision is the most stable and after 40, well ☺

22

WISDOM FOR TEACHERS

- Vision issues are not always noticeable
- Vision disorders do not cause pain or discomfort
- A child is not born knowing what good vision is, so they don't realize how bad it is
- Near and distance vision must be checked



23

BEHAVIORAL ISSUES

- Eyes crossing
- Avoidance of close work
- Frequent rubbing/squinting
- Poor reading/handwriting
- Closing of one eye
- Head close to book
- Excessive rubbing of eyes
- Poor hand/eye coordination
- Developmental immaturity
- Head tilt when focusing



24

ASSOCIATED COMPLAINTS

- Headaches, nausea, dizziness
- Blurry or double vision
- Light sensitivity
- Sleepiness while reading
- Eye strain
- Print moving while reading
- Head tilts and posture issues



25

SIGNS OF POSSIBLE VISION PROBLEMS

- Independent eye turns
- Frequent blinking
- Posturing head and body
- Red, watering, encrusted eye lids, excessive blinking
- Blurred or double vision
- Photophobia, or eye strain
- Burning or itchy eyes
- Headaches, nausea, dizziness
- Print moving on the paper
- Behavioral Issues
 - Clumsy
 - Dislike or avoidance of close work
 - Short attention span
 - Poor handwriting
 - Closing/covering one eye
 - Close proximity to reading materials*
 - Always losing place when reading
 - Poor hand-eye coordination
 - Developing immaturity

26



27

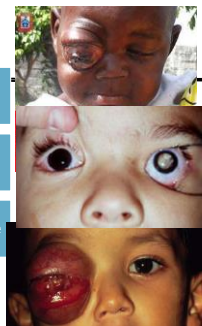
BABY FACTS

- The diagnosis of disease in infants and toddlers is more difficult than other patient categories, **they have no idea of what good vision looks like.**
- Standard procedures (i.e. biomicroscopy, tonometry, and indirect ophthalmoscopy) are more difficult on this population (soft or hard to palpation for IOP)
- You must keep the exam interesting to keep fixation with this population (**don't overstimulate**)
- 2010 Public Health Assoc recommended 6 mon, 2 yrs, and 4 years (**urged Pediatricians to advocate**)

28

INFANTSEE

30-50% of infants (under 12 months) have significant astigmatism	Ages 2-18 months (avg Rx 2 Diopters hyperopia)	Children 6-9 months follow lights
InfantSee Program	Shaking Baby Syndrome (SBS) reportable!	Neurological problems
Excessive refractive error	Eye alignment (strabismus)	Early morning or after naps are most effective for exams
Recommend parent bring a bottle (feed child prior to exam)		



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DETECTION AND TREATMENT OF RETINOBLASTOMA

- InfantSee Program
- Detection and treatment of retinoblastoma
Retinoblastoma is the most common cancer involving the eye and young children and the tenth-most common pediatric cancer. It affects one in every 20,000 American children.

Dr. Jenewein notes that retinoblastoma is a devastating condition and that children with this diagnosis often face decreased vision, loss of an eye, and even death.

<http://www.infantsee.org/about-us/about-us/press-releases/child-retinoblastoma-and-early-eye-exams.html>

30

BABY (0-1 YEAR) EXAM FREQUENCY

- First exam - 6 months or first sign of eye trouble
- Black and white contrast
- 1 ft is the focusing distance
- Consider sleep schedule
- Don't overwhelm or over-stimulate
- Dim room highlight target



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EXAMINATION TABLE FOR INFANTS (HAVE FUN)

- Patient/family health history
- Developmental history
- Family eye history
- Visual acuity (fixation) toys: be careful with noisy ones...
- Obvious defects
- Teller Acuity Cards
- Auto-refraction
- Opaque occluder



32

BABY LEARNING (1 FOOT)

- Games
 - Learning
 - Learning games
 - Colors (black and white)
- Parents
 - Eye contact (ease into)
 - Sound (not too loud)
 - Room lights on target
 - Caution with over-stimulation
- Mobiles
 - Face down to baby
 - Baby safe mirrors
 - Crib
 - Car
 - Play area



33



Tracking and fixation training for infants

INFANTS SAMPLE TEST

34



GROWTH AND DEVELOPMENT

- Children are not born knowing the difference between good and bad vision
- Early Detection and Prevention is a must
- 6 months, 3 years, and prior to starting school are the recommended intervals

35

COMPUTER USE

- Blue Light Protection
- Computer and iPad Use
- Education:
 - Parent
 - Child
 - School/Teachers



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PRE-SCHOOL CHILDREN

- Have the necessary psychological development
- Use matching task @ 6 meters
- 3 diopter of astigmatism
- 30-50% loses astigmatism by age 5
- Low limits of anisometropia
- Static retinoscopy
- Cycloplegic retinoscopy
- Monocular Estimation Method (MEM)
- Color Vision Test Please Allen Color Test (PACT), Mr. Color Test, Color Vision Made Easy,
- Visual Acuity
 - Lea Symbols chart
 - Broken Wheel Acuity Cards
 - HOTV Test
 - Denver Developmental Screening Test (DDST)
 - Developmental Test of Visual Motor Integration (DVTMI)

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EXAMINATION TABLE FOR PRE-SCHOOLER'S



• HOTV AND LEA Symbols



39

Two rare genetic conditions make an unusual beauty. ...see more



40

CHILDREN VISION PROGRAM FOR 2022

The Year of Children's Vision  Prevent Blindness  BLUTECH LENSES Blue Light Protection. Perfected.™

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CHILDREN...CONT

- Most children with vision problems have accommodative or binocular anomalies
- School performance:
 - Eyestrain, blurred vision
 - Double vision, loss of place, skipped lines, and reading defects

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KIDS NEED COMPLETE EYE EXAMSTOO



43

BEFORE THE APPOINTMENT

- What is the best time of the day for the child
- Try not to schedule after school when the child is exhausted
- Patient **SHOULD NOT** be sick, sleepy, or tired (sensitive to nap times)
- Parents should bring comfort toys, treats, snacks
- Avoid distractions - including siblings
- Get patient in and out ASAP... try not to make
- Aroma therapy

EXAM HELPFUL HINTS

- Snellen
 - Both eyes about the same
 - An opaque occluder less intimidating
- Fix and Follow Test
 - Symmetry
- Blink To Light
 - Caution with light
- Objects - one look/one object
- Red reflex
- IOP - soft to palpation
- Cornea - loud or cloudy (glaucoma)



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45

CHILDREN

Visual Acuity (VA) with test	Plex Lens test	IOP	Cover test
Wack-a-Ball test	New Point of Convergence (NPC)	Positive and negative fusional vergence	Accommodative amplitude and facility
MEM microscopy	Stereopsis	Screeners rule out non-compliance/diversion • Stability of fixation	IC/A and facility

17 SKILLS

1. Eye Movement Control
2. Simultaneous Focus at Far
3. Sustaining Focus at Far
4. Simultaneous Focus at Near
5. Sustaining focus at Near
6. Simultaneous Alignment at Far
7. Sustaining Alignment at Far
8. Simultaneous Alignment at Near
9. Sustaining Alignment at Near
10. Central Vision (Visual Acuity)
11. Peripheral Vision
12. Depth Awareness
13. Color Perception
14. Gross Visual-Motor
15. Fine Visual-Motor
16. Visual Perception
17. Visual Integration

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EXAMINATION TABLE FOR CHILDREN

Establish	Establish rapport
Ask	Ask the child if they know their ABCs
Eliminate	Eliminate distractions
Encourage	Always encourage



Broken Wheel Acuity Test

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GROWTH AND ACUITY

- Children do not understand bad vision
- Children learning rates vary
- Bilingual homes children normally slower
- Environment
- Screenings vs Exams



48



CHILDREN AND COMPUTER GAMES

Kids who stare at portable video games or who use computers throughout the day at school also can experience eye problems related to computer use, especially if the lighting and computer position are less than ideal.

49



CHILDREN ENCOUNTER CVS

The name for eye problems caused by computer use is computer vision syndrome (CVS). CVS is not one specific eye problem. Instead, the term encompasses a whole range of eyestrain and pain experienced by computer users

50

Blue Light: Who Is Impacted? Children

- Clear crystalline lens, no natural protection
- Shorter arms, larger pupils
- Hold devices closer
- Contacts out blink rate in half

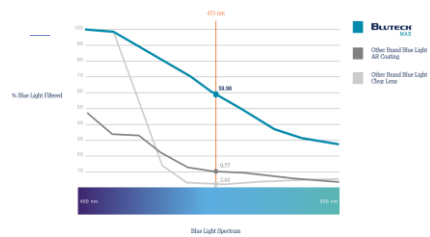
"Melatonin levels fell twice as much as adults when exposed to the same amount and intensity of light."

<https://www.somnology.com/news/2007/11/27/112559.htm>



51

The Solution



Blue light from backlit devices and artificial lights peaks @ 455 nm.

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CHILDREN CONT...

- Vision is developed
- 0-20 years of age
- Rarely complains about vision
- Have a very high AC/A
- Can go years uncorrected
- Can torture themselves

**K
IDS
NEED
COMPLETE
EYE EXAMSTOO**

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CHILDREN CONT...

Children often have a limited degree of self-awareness. Many children keep performing an enjoyable task with great concentration until near exhaustion (e.g., playing video games for hours with little, if any, breaks). Prolonged activity without a significant break can cause eye focusing (accommodative) problems and eye irritation

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KIDS USE DIGITAL DEVICES MORE THAN PARENTS THINK

83% OF KIDS SAY: "I Use My Device More Than 3 Hours Per Day!"

40% OF PARENTS SAY: "My Child Uses His/Her Device More Than 3 Hours Per Day!"

TOO MUCH SCREEN TIME CAN LEAD TO DIGITAL EYE STRAIN BY KEEPER

80% OF PARENTS SAY: "My Child Uses His/Her Device More Than 3 Hours Per Day!"

TO REDUCE SYMPTOMS OF DIGITAL EYE STRAIN Remember 20-20-20

TAKE A 20 SECOND BREAK EVERY 20 MINUTES LOOK AT SOMETHING 20 FEET AWAY

NEARLY 9/10 OF CHILDREN IN A FULL HOUR WITHOUT TAKING A VISUAL BREAK

55

PARENTS CONCERNS

Parents are worried. Nearly a third say they're concerned that computers and handheld electronics may damage their child's eyesight. And 53% of parents believe 3D viewing may be harmful, according to a survey by the American Optometric Association



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PAST MEDICAL CONDITIONS

- Patching
- Surgeries
- Retinoblastoma
- Chronic illness
- Systemic diseases
- Known medical allergies
- Down Syndrome
- Cerebral Palsy
- Intellectual Disorder (ID)
- Visual impairment
- Autism
- Developmental defects

7-year-old boy who comes just for myopia control, in whom we find a small retinoblastoma by the LWVF Optos retinography.

PHOTO DOCUMENTATION

57

INJURY HISTORY

- Sticks
- Falls
- Car accidents
- Head trauma



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GENETICS

There is no data that supports the fact that your mom and dad wear glasses, that you will wear glasses or visa versa



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TEENS

- Growth and hormones
- Fashion is critical
- Sports and functionality
- Hygiene



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HARMFUL EFFECTS OF VAPING



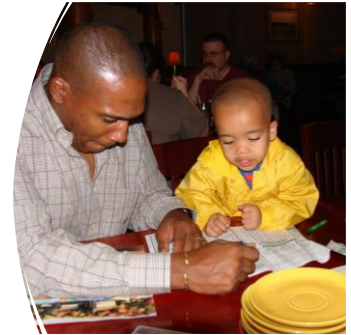
<http://www.theinhalationmuseumforchildhealth.org>

- Vaping fluid is packed with other chemicals. In addition to nicotine, vaping fluid components include acrolein (2-propanal), an aldehyde that severely limits regulatory T-cells - a mechanism that can thereby activate and contribute to chronic dry eye disease (DED).⁴
- Carriers and flavor additives can also cause lung toxicity and directly activate the transit receptor potential (TRP) of the ocular surface immune system and corneal nerves.⁵

61

VISION AND LEARNING

- Give the child things that are exciting for them, things that keep their attention
- Routine practice



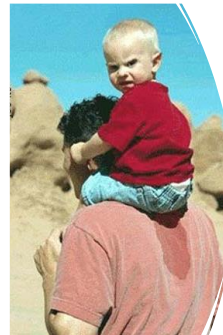
62

HORMONES AND VISION

- Hormones have a significant impact on the everything...
- Pregnant women, children and growth spurts
- Medical condition



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SCHOOL SCREENINGS AND STATE REQUIREMENTS

- Each state has its own set of medical requirements, you must your state requirements
- Pediatricians perform screenings
- American Public Health Association recommends exams at 6months, 2 and 4 yrs of age
- Healthy People 2010 to improve national health

CLINIC SCREENINGS AND EXAMS

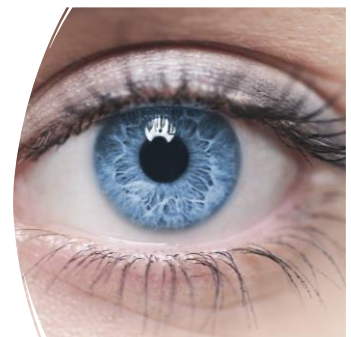
- Cover Test (not as reliable, child must participate, is a position of gaze test)
- Hirschberg Test (most successful in children 6 months or younger)
- Krimsky Test (prisms with Hirschberg test)
- Bruckner test (presence of Bruckner Reflex identifies positive for strabismus)
- Versions (tracking a target, binocular assessment)
- Near Point Convergence (tracking a target in toward the child)
- Pupillary Response Test (tracking a target in toward the child)



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STANDARD PRE-TEST

1. pupil measurement testing
2. visual acuity with and without current Rx
3. pupillary reflexes
4. ocular mobility tests*
5. near point convergence
6. amplitude of accommodation
7. range of accommodation
8. cover tests
9. stereopsis
10. color vision screening
11. observation of the external adnexa
12. pin-hole acuity



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PARENT AND CHILD EDUCATION

- Children are not born knowing what good vision is
- Routine exams are necessary
- Parents need to be educated on eye exams
- Constant monitoring is a parent's responsibility
- Health fairs are excellent public opportunities



67

UPDATED JUNE 10, 2014.

Infants are not born with a complete visual systems but must learn how to see. A child's vision will develop throughout the first year of life, and will be monitored at each well-baby appointment, assuring important milestones are met. Below are the top five milestones in vision development.



68

1. FOCUSING ABILITY

Most infants can focus accurately by two to three months of age. The ability to focus requires special eye muscles to change the shape of the lens in order to form clear images. Before two months of age, an infant is capable of focusing objects both near and far, but not very well. It takes time for the eye muscles to learn how to avoid focusing "too close" or "too far away" from near or far objects.



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2. EYE COORDINATION AND TRACKING

A baby usually develops the ability to track and follow a slow-moving object by three months of age. Before this time, an infant will follow large, slow-moving objects with jerky motions. A three-month-old can usually track an object quite smoothly. A baby should begin to follow moving objects with the eyes and reach for things at around four months of age.



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3. DEPTH PERCEPTION

Depth perception is the ability to judge objects that are nearer or farther than other objects. Depth perception is not present at birth. It is not until the third to fifth month that the eyes are capable of working together to form a three-dimensional view of the world.

* Binocular vision disorders and serious



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4. SEEING COLOR

An infant's color vision is not as sensitive as an adults. It is hard to tell if babies can distinguish colors because their eyes might be attracted by the brightness, the darkness, or the contrast of an object against its surroundings, and not by the color alone. By two to six weeks of age, however, a baby can distinguish two highly contrasted colors, such as black and white.



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5. OBJECT AND FACE RECOGNITION

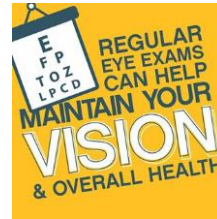
An infant is born with the ability to see facial features at arm's length but is attracted instead to high-contrast borders of objects. For example, a baby will gaze at the edge of a face or the hairline when looking at a human face. By two to three months of age, a baby will begin to notice facial features, such as the nose and mouth. By three to five months, most babies can differentiate between mother's face and a stranger's face.

Source: Infant Vision Lab, The Luman Kennedy Stearn Center, Milestones in Visual Development, University of Massachusetts Medical School 08 Jun 2007



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GROWTH AND DEVELOPMENT



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AUTISM CONT...

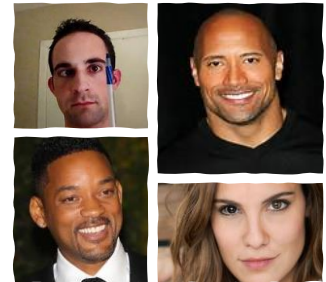
- 1. Learn about the core deficits in ASD and their link to behaviors
- 2. Prepare your staff and practice in advance
- 3. Incorporate modifications and strategies into your eye-testing protocol
- Autism spectrum disorder (ASD) is a developmental disability that affects 1 out of every 50 children. Patients with ASD are hypersensitive to bright lights and touch. Instillation of drops, tonometry, and binocular indirect ophthalmoscopy are particularly difficult. But you can successfully examine these patients by learning about the core deficits, preparing your staff and practice, and modifying your eye testing protocol.



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SPECIAL THINGS TO LOOK FOR

- Duane's Syndrome - eye won't abduct
- Brown's Syndrome - SO defect
- Terry Syndrome - ROP
- Aniridia - no iris
- Neuroblastoma - black eyes
- Cataracts
- Amblyopia
- Strabismus



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BIRTH DEFECTS



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RECENT 2023 ARTICLE

- 'Medics said my baby had eczema. Then she had her eye removed'
- When Katherine O'Neill noticed her 12 week old daughter's eye was red, medics suggested treating her for eczema. But at six months old, baby Amelia was diagnosed with retinoblastoma – a rare eye cancer.
- After six rounds of chemotherapy, she had surgery to remove her eye. Now, after going through so much at such a young age, her mum described Amelia as a 'superstar'.
- Katherine, 42, noticed that Amelia, who is a twin sister to Jake, had been rubbing her eye ever since she was born in September 2020.
- Katherine, a full-time mum, from Winsford, said: 'She had passed her newborn sight check and I was advised the redness could be eczema.'



'Medics said my baby had eczema. Then she had her eye removed' (bbc.com)

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FOR PARENTS

- Tear Production around 3 months
- Tear drainage issues common
- Eyes wandering first few months, learning eye control
- Children won't know what good vision is, parents must be on the look out anomalies

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REPORTING SUSPECTED ABUSE

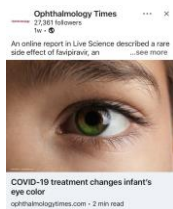
- Know your State requirements
- Bullying case
- Don't feel bad, this shouldn't happen
- Shaken Baby Syndrome

[100 Child Abuse or Neglect Reporting Guidelines](#)

80

RECENT ARTICLE SEPTEMBER 2023

- An online report in *Live Science* described a rare side effect of favipiravir, an antiviral drug used to treat COVID-19.¹ The 6-month-old boy's dark brown eyes turned deep blue after he was treated for COVID with favipiravir.
- The baby, who lives in Thailand, had been treated with favipiravir for 3 days and the treatment helped improve the COVID symptoms. However, the physician ordered the treatment stopped because of the change in color of the eyes, which returned to their original brown color 5 days after favipiravir was stopped.
- [COVID-19 treatment changes infant's eye color | ophthalmologytimes.com](#)



81

FOR TEACHERS

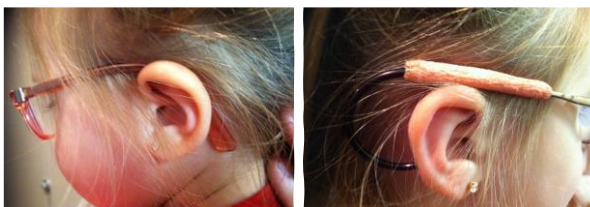
A vision disorder is not always visible when looking at a child

Vision disorders don't normally cause pain

A child may not realize that they are not seeing better



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FITTING CHILDREN GLASSES

83



CHILDREN'S EYE WEAR

- Brad Sultan, CEO and Founder
- Kids Bright Eyes 443.6395907

84



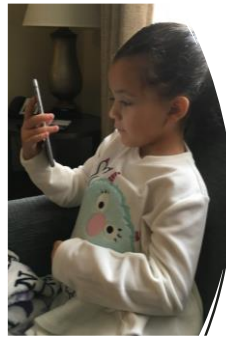
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A SPECIAL THANKS TO MY GRANDCHILDREN FOR BEING AMAZING MODELS

THANK YOU

martralyn@msn.com