

Updates in Pediatrics and Vision Therapy

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Chief of Pediatrics

University of Incarnate Word

Rosenberg School of Optometry

Objectives



Discuss techniques to improve the examination of pediatric patients



Review the most current information regarding treatment and management of amblyopia as well as innovations in vision therapy



Provide an overview of current treatments available for myopia control

Disclosures



No financial interests to disclose



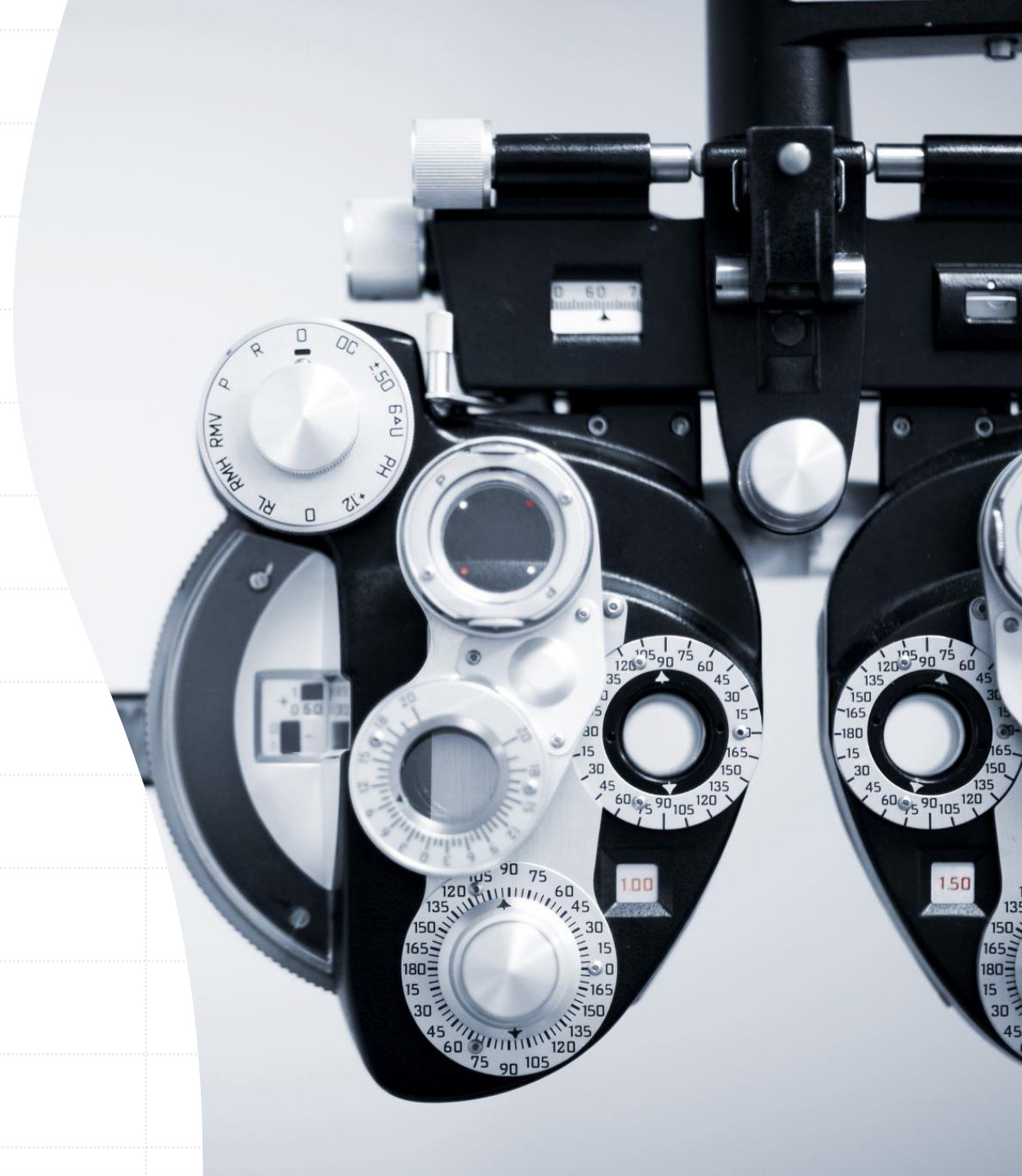
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Pediatric Eye Examination

- Case History
- Visual Acuity
- Accommodation
- Alignment/Binocular Vision
- Refraction
- Ocular Health





Case History

Developmental History

Educational History

- IEP, 504 Plan, Classroom accommodations

Symptom Surveys

Symptom Surveys

Convergence Insufficiency Symptom Survey (CISS)

Name: _____ Date: ___ / ___ / ___

Clinician/Assistant instructions: Pose the following questions exactly as written. If the patient responds with "yes" - please qualify with frequency choices. Do not give examples.

Patient instructions: Please answer the following questions about how your eyes feel when reading or doing close work.

Possible Subjective Symptoms	Frequency				
	Never (0)	Infrequently/ not very often (1)	Sometimes (2)	Fairly often (3)	Always (4)
1. Do your eyes feel tired when reading or doing close work?					
2. Do your eyes feel uncomfortable when reading or doing close work?					
3. Do you have headaches when reading or doing close work?					
4. Do you feel sleepy when reading or doing close work?					
5. Do you lose concentration when reading or doing close work?					
6. Do you have trouble remembering what you have read?					
7. Do you have double vision when reading or doing close work?					
8. Do you see the words move, jump, swim or appear to float on the page when reading or doing close work?					
9. Do you feel like you read slowly?					
10. Do your eyes ever hurt when reading or doing close work?					
11. Do your eyes ever feel sore when reading or doing close work?					
12. Do you feel a "pulling" feeling around your eyes when reading or doing close work?					
13. Do you notice the words blurring or coming in and out of focus when reading or doing close work?					
14. Do you lose your place while reading or doing close work?					
Total score _____	— x 0	— x 1	— x 2	— x 3	— x 4

For Children (< age 21) total score = **16 or higher** is suggestive of convergence insufficiency.
For Adults total score = **21 or higher** is suggestive of convergence insufficiency.

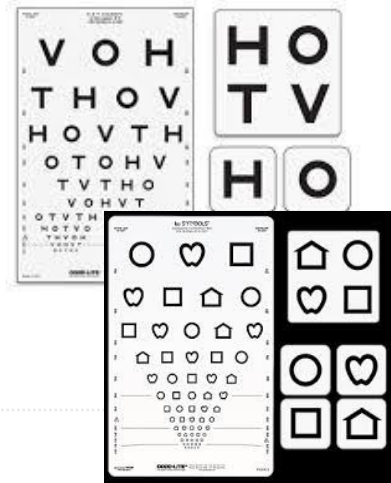
Reference: Borsting EJ, Rouse MW, Mitchell GL, et al and the CITT group. Validity and reliability of the revised convergence insufficiency symptom survey in children. Optometry and Vision Science 2003; 80(12):832-838.



Examination Techniques

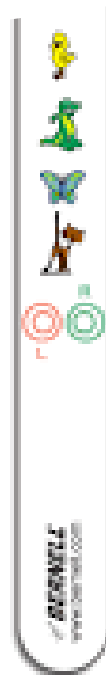
- Visual Acuity
- Accommodation
- Alignment/Binocular Vision
- Posterior Segment Evaluation

Visual Acuity



Accommodation

- Minus lens amplitude
- Push Up < Pull away
- NRA/PRA
- MEM



Alignment/Binocular Vision

- **Cover Test and NPCx3**
- Worth 4 dot
- Stereopsis



Prescribing Techniques

- Skiascopy Retinoscopy
- Trial Frame Refraction
- Autorefractometry?



Cycloplegic Refraction

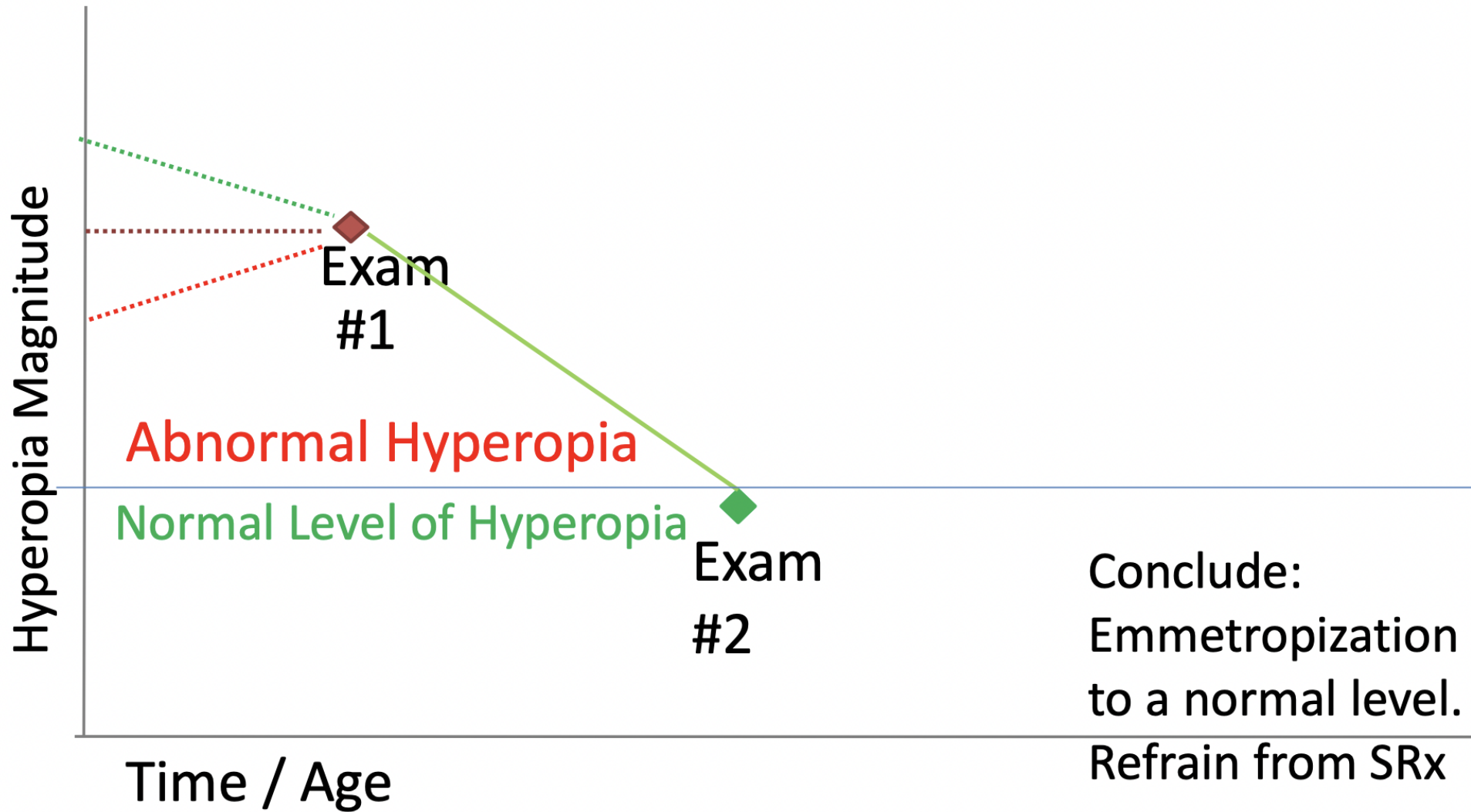
- Cyclopentolate 1% vs Tropicamide 1%
 - What does the research say?
 - What about in practice?
- Tips for drop instillation



What to Prescribe?

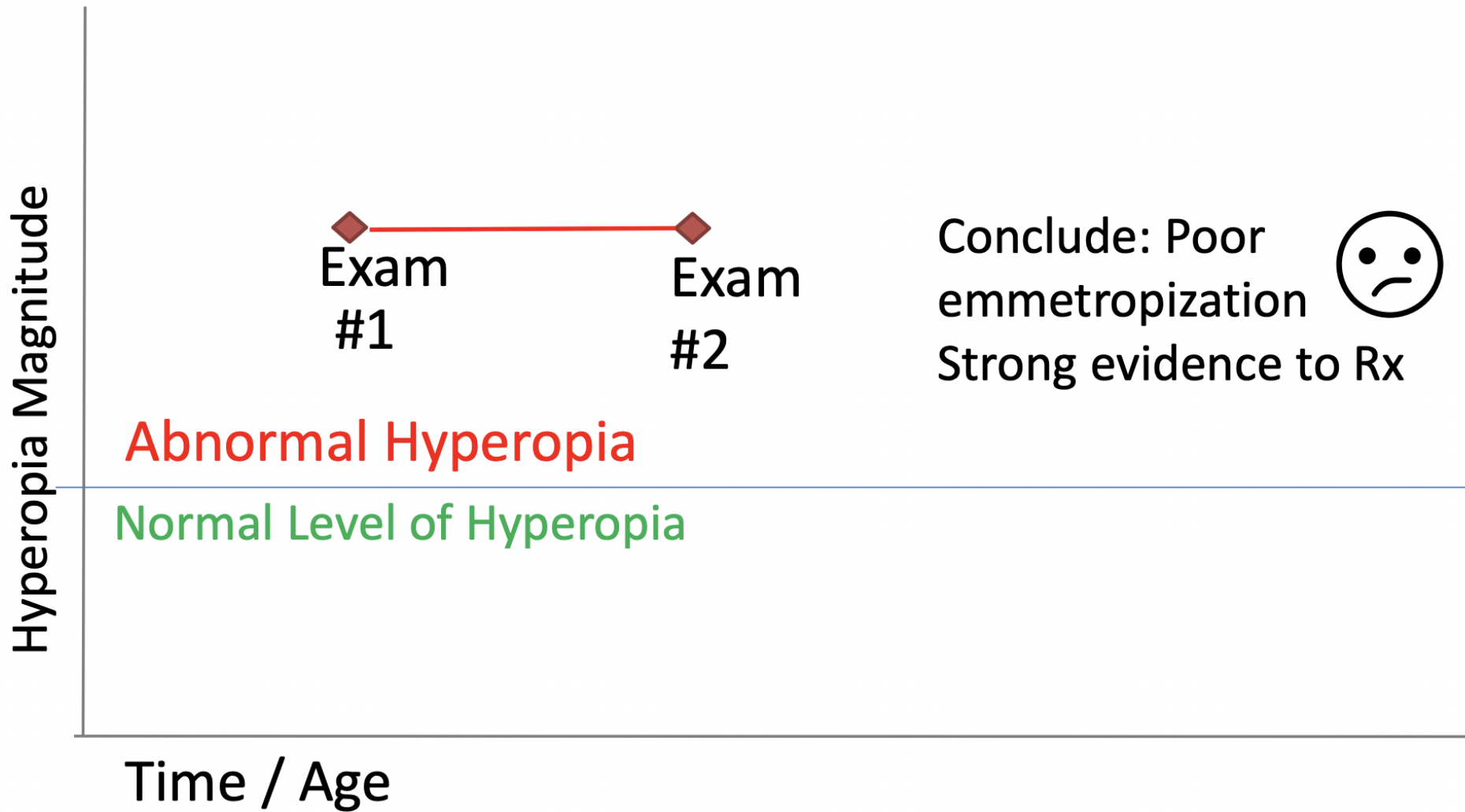
- Most plus to BVA?
- Keep the cyl cut the sphere

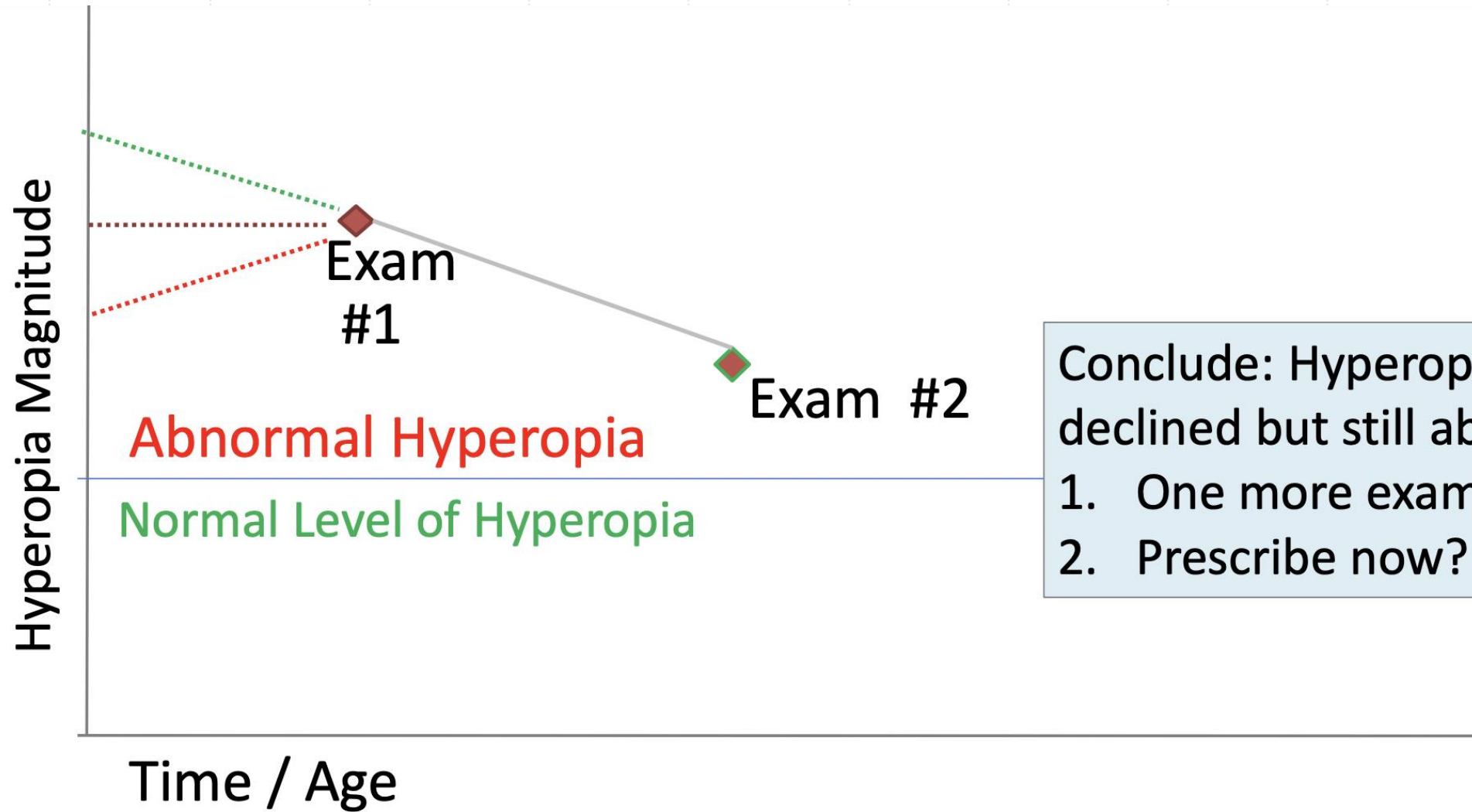




Conclude:
Emmetropization
to a normal level.
Refrain from SRx







Conclude: Hyperopia declined but still abnormal.

1. One more exam?
2. Prescribe now?



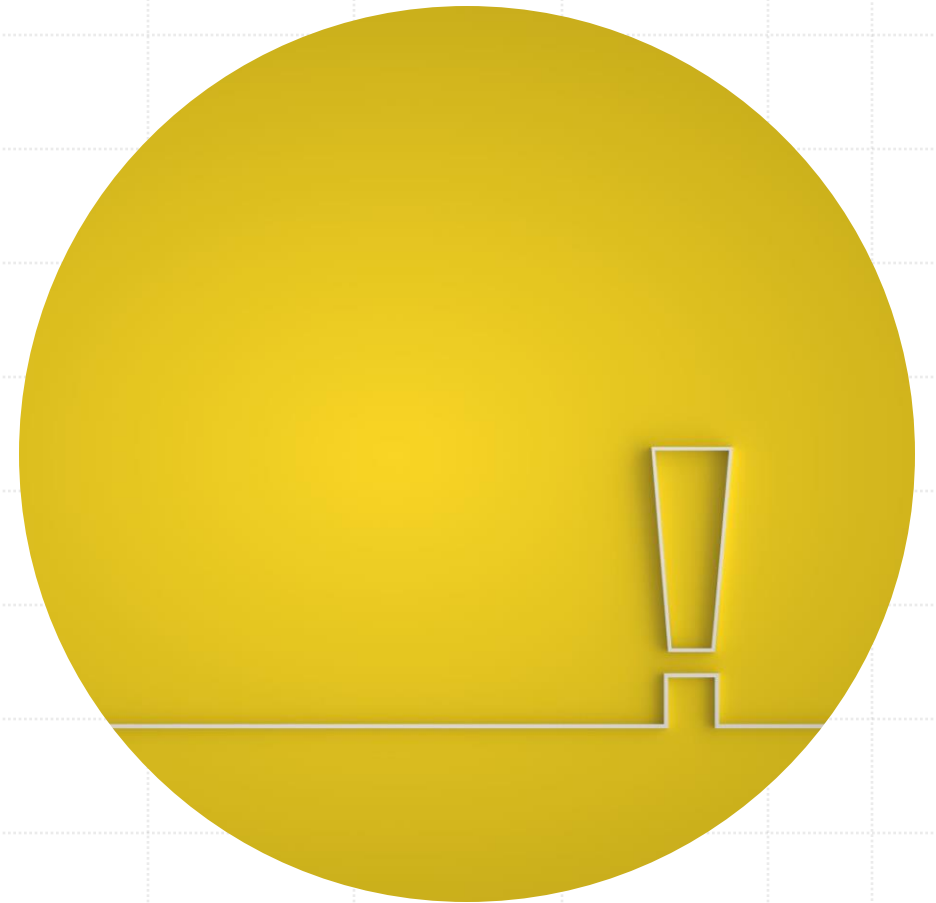
Myopia Control in 2024

Treatment Options

- Spectacles
 - Progressive Lenses
 - ~~Under Correction of Single Vision~~
 - Traditional Bifocals?
- Contact Lenses
 - ~~Gas Permeable~~
 - ~~Soft Spherical CL~~
 - **Multifocal - MiSight, NaturalVue, Biofinity Center Distance**
 - **Orthokeratology – Acuvue abiliti**
- **Anti-Muscarinic - Atropine**
- Acupuncture?
- Vision Therapy?

Atropine

- 0.025% - Best effectivity with least side effects
 - Start low and ramp up (either percentage or dual tx)
- Baseline Visit:
 - VAs
 - MRx
 - Pupil size AND reaction
 - Accommodative Amplitude
 - Topo/Tomography if available
 - IOP?
- Off label use
 - OSRx
 - Not covered by insurance



Patient Information

*First Name: [REDACTED]
 Middle Name: [REDACTED]
 *Last Name: [REDACTED]
 *Date of Birth: [REDACTED]
 Gender: Female Male Animal Unknown
 Identification Type: [REDACTED]
 Other: [REDACTED]

Address 1: [REDACTED]
 Address 2: [REDACTED]
 City: San Antonio
 State: TEXAS
 Zip: [REDACTED]

Phone: [REDACTED]
 Cell Phone: [REDACTED]
 Fax: [REDACTED]
 Email: [REDACTED]

Delivery/Shipping Information

Copy Patient Information | Copy Doctor Information | Patient Shipping Preferences

Recipient Type: [REDACTED]
 Company Name: [REDACTED]
 Last Name: [REDACTED]
 Address: [REDACTED]
 Country: United States
 State: ALASKA
 Delivery Service: [REDACTED]
 Residential Address Indicator: [REDACTED]
 Save Shipping Preference:

First Name: [REDACTED]
 Address (cont.): [REDACTED]
 Country: United States
 State: [REDACTED]
 Shipping/Pick up Date: [REDACTED]
 Shipment Insurance Amount: [REDACTED]

Phone: [REDACTED]
 Address (cont.): [REDACTED]
 Country: United States
 State: [REDACTED]
 Shipping/Pick up Date: [REDACTED]
 Shipment Insurance Amount: [REDACTED]

Allergies - Diagnosis/Problems Information

Check here if there are no allergies:
 Allergies (Name/Code): NO KNOWN ALLERGIES
 Check here if there are no diagnosis:
 Diagnosis/Problems (Name/Code): Myopia, bilateral HS2.13

Payment Information

Payor: [REDACTED]
 Credit Card Type: [REDACTED]
 Company Name: [REDACTED]
 Cardholder Last Name: [REDACTED]
 Credit Card Address: [REDACTED]
 Credit Card City: [REDACTED]
 Exp. Month: [REDACTED] Exp. Year: [REDACTED]

Credit Card Number: [REDACTED]
 Cardholder M.I.: [REDACTED]
 Email: [REDACTED]
 Credit Card State: [REDACTED]
 HSA/FSA Card:

Cardholder First Name: [REDACTED]
 Credit Card Zip: [REDACTED]

Order Information

Home | Logout | Help

Ashleigh Yates
 ozenberg School of Optometry

Control Panel
 Quick Menu
 Recent Patients
 ez-eRx
 List Pending eRx
 Script Scan
 Order Status
 Secure Mail
 Multi Order Mgmt
 Patient Actions
 Document Management
 My Profile
 Reports
 EPSC Responsibilities
 Terms of Use | Privacy Policy


Search Medication

Medication List: [REDACTED]
 Patient Medication History: [REDACTED]
 My RxList | Patient Medication History

Patient Medication History

OSRX 5011 ATROPINE+ 0.025% SULFATE MONOHYDRATE, Oph Soln [REDACTED]
 Strength: 0.025% Bx #2427655
 Quantity (MLS): 3.5 (three point five) (1.00 Bottle(5)) Other: [REDACTED]
 Refills: 11 8 4 Other: [REDACTED]
 Days Supply: 30 Other: [REDACTED]
 Directions: Instill 1 drop into each eye at bedtime
 Add. other: [REDACTED]
 Instructions: Clinical Difference Other: [REDACTED]
 Statement: [REDACTED]
 Dispensation: Therapeutically equivalent generic drug may be substituted

Prescribing Information:



Rosenberg School of Optometry

9725 Datapoint Dr. San Antonio, TX 78229
 Phone: (210) 683-1190, Fax:
 Date: Feb/05/2024 03:53:51 PM (CST)

Lic. #TX

Ashleigh Yates
 Ashleigh Yates

Electronic Prescription Order

Name: [REDACTED]	Last Name: [REDACTED]	Middle Name: [REDACTED]
Phone: [REDACTED]	Cell Phone: [REDACTED]	DOB: [REDACTED]
Address: [REDACTED]	Address (Cont): [REDACTED]	Email: [REDACTED]
City: [REDACTED]	State: TX	Zip: [REDACTED]
Gender: [REDACTED]	Pay Type: [REDACTED]	Ins. Name: [REDACTED]
Group Name: [REDACTED]	Ins. Phone: [REDACTED]	Member ID: [REDACTED]
Ins. Control Number: [REDACTED]	Ins. BIN: [REDACTED]	Delivery Type: [REDACTED]
Driver's License Number: [REDACTED]	Driver's License State: [REDACTED]	

#1 OSRX 5011 ATROPINE+ 0.025% SULFATE MONOHYDRATE Oph Soln
 Strength: 0.025%====
 Quantity: 3.5 MLS (three point five)====
 Refills: 11====
 Directions: Instill 1 drop into each eye at bedtime====
 Dispensation: Therapeutically equivalent generic drug may be substituted====
 Days Supply: 30====
 Special Instructions: ====
 Date Written: 02/05/2024 (Feb 05, 2024)====

Special Instructions: - Allergies: NO KNOWN ALLERGIES; - Diagnosis: Myopia, bilateral.
 The compounded medications listed are made at the request of the prescribing practitioner whose signature appears above due to the medical need of a specific patient and the preparation is prescribed because the prescriber has determined that the preparation will produce a clinically significant therapeutic response compared to a commercially available product.

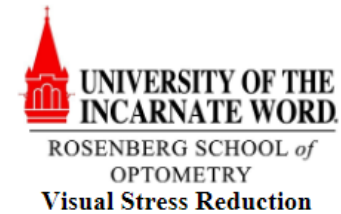
Submitted by: Ashleigh Yates Date: Feb/05/2024 03:53:51 PM (CST)
 Signed electronically by: Ashleigh Yates

OSRX, Inc.
 1120 Kensington Avenue Suite E, Missoula, MT, 59901
 Phone: 406-541-6121, Fax: 406-541-6267
 LIFE FILE Pharmacy System

Environmental Modifications

- Ergonomic adjustments
- Improved lighting
- Additional rest
- Increased periods of physical activity

DECREASE SCREEN TIME!



Making changes to the workspace can reduce visual stress and other types of physical stress. Reducing visual and physical stress provides more efficient and effective work.

1. **CHAIR-** The chair should provide proper back support and allow you to sit in a balanced posture. Feet should be flat on the floor.
2. **WORKING SURFACE-** A sloping surface that is tilted between 20 and 25 degrees from the horizontal can reduce neck and eyes. A slant board can help achieve this.
3. **POSTURE-** Good posture should be achieved with feet flat on the floor. The posture of the neck and shoulders should be maintained. This posture should be used for all near point activities such as reading, writing, and computer work. The working distance from the center of the middle knuckle to the tip of the nose should be maintained.
5. **LIGHTING-** Fluorescent light should be avoided if possible. Fluorescent lights flick at 100-120 Hz and have been linked to headaches and visual fatigue, particularly for patients with acquired brain injury. Adequate room lighting should be provided as well as direct lighting and all near work. No glare or shadows should interfere.
6. **NEAR POINT LENSES-** If near point lenses were prescribed, they should be worn for all close work including reading, writing, schoolwork, video games, and smart phone/tablet use. These lenses are not for clarity, but for reducing visual stress and for putting the eyes into better balance for near tasks. These lenses enhance the relationship between posture, working distance, and the sloping work surface.
7. **BREAKS-** Breaks should be taken for every 20 min. on the computer, smart phone, or tablet. When reading, place a bookmark 2 pages ahead then stop, look up, and focus on a distant target. Timers should be set for visual breaks when working on the computer.
8. **TV/SMARTPHONES/VIDEOGAMES-** Limit total TV time, game time and phone time to two hours per day, preferably less. Use good working distance (arm's length) and take breaks every 20 minutes.
9. **SPORTS/OUTDOOR PLAY-** Encourage outdoor play or sports that require large muscle movements and seeing beyond arm's length.

Visual Efficiency

NPC

Worth 4 Dot

Accommodation

Pursuits and Saccades



Visual Efficiency

- Pencil Pushups/Brock String
- Near point lenses for visual stress
- Remember ADD for accom ET
- When to refer?
 - Prism for CI?



VISION CONDITIONS – listed by ICD-10-CM code number

<u>ICD-10-CM#</u>	<u>CONDITION</u>	<u># HOURS OF THERAPY</u>
H52.523/.533	Accommodative Dysfunction	16
H52.531/.532/.533	Accommodative Excess	16-24
H53.031/.032.033	Strabismic Amblyopia	60
H53.011/.012/.013	Deprivation Amblyopia	30
H53.021/.022/.023	Refractive Amblyopia	12-56
H53.06/R48.3	Psychophysical Disturbances/Visual Agnosia	30
H53.30	General Binocular Vision Dysfunction	24
H53.34	Suppression of Binocular Vision	8-20
H53.33	Simultaneous Vision without Fusion	32-52
H53.32	Fusion with Defective Stereopsis	12
H53.31	Anomalous (Retinal) Correspondence	25
H50.011/.012	Monocular Comitant Esotropia	60
H50.05	Alternating Comitant Esotropia	60
H50.111/.112	Monocular Comitant Exotropia	45
H50.15	Alternating Comitant Exotropia	45
H50.311/.312	Intermittent Esotropia	40
H50.32	Intermittent Alternating Esotropia	40
H50.331/.332	Intermittent Exotropia	30
H50.34	Intermittent Alternating Exotropia	30
H50.21/.22	Hypertropia	36-48
H50.21/.22	Hypotropia	36-48
H50.411/.412	Cyclotropia	36-48
H50.40	Microtropia (Unspecified heterotropia)	30
H50.43	Accommodative Esotropia	40
H50.51	Basic Esophoria	30
H50.52	Basic Exophoria	30
H50.53	Vertical Heterophoria	30
H50.54	Cyclophoria	30
H50.55	Dissociated Vertical Deviation	40-60
H49.00/.01/.02/.03	Third Cranial Nerve Palsies, partial	30-40
H49.00	Third Cranial Nerve Palsies, total	60-80
H49.10/.11/.12/.13	Fourth Cranial Nerve Palsies	60-80
H49.20/.21/.22/.23	Sixth Cranial Nerve Palsies	30-40
H49.40/.41/.42/.43	External Ophthalmoplegia	32-40
H49.30/.31/.32/.33	Total Ophthalmoplegia	32-40
H50.611	Brown's Tendon Sheath Syndrome	32-40
H50.69	Limited Ductions	12-16
H50.811/.812	Duane's Syndrome	24-32
H50.89	Chronic Progressive Ophthalmoplegia	32-40
H51.11	Convergence Insufficiency	24
H51.12	Convergence Excess	24
H51.8	Divergence Insufficiency	35
H55.01	Congenital Nystagmus	24-36
H55.02	Latent Nystagmus	30-50
H55.03	Visual Deprivation Nystagmus	28-40
H55.81	Ocular Motor Dysfunction Deficiencies of Saccadic Eye Movement	12
H55.89	Ocular Motor Dysfunction Deficiencies of Pursuit Eye Movement	12
R94.113	Ocular Motor Dysfunction Abnormal Oculomotor Studies	12

These facts sheets were produced by Dr.
 Gabby Marshall, FCOVD
 And her team for the College of Optometrists
 in Vision Development (COVD).
 COVD certifies professional competency in
 vision therapy, serves as an informational
 And educational resource, and advances
 research and clinical care in
 Vision development and therapy. For
 additional information, see our website,
www.covd.org.

Amblyopia Updates





Refractive Amblyopia Parameters

- **Isometropic** Amblyopia
 - Hyperopia - >5.00 Diopters
 - Myopia - >8.00 Diopters
 - Astigmatism - >2.50 Diopters
- **Anisometropic** Amblyopia
 - Hyperopia - >1.00 Diopter difference
 - Myopia - >3.00 Diopter difference
 - Astigmatism - >1.50 Diopter difference

ATS Occlusion Summary Moderate Amblyopia

Study	Age	Severity of amblyopia	Results
ATS 1	3-7	Moderate	6hrs/day patching = Daily Atropine
ATS 2B	3-7	Moderate	2hrs/day patching = 6hrs/day patching
ATS 4	3-7	Moderate	Weekend Atropine = Daily Atropine
ATS 10	3 to <10	Moderate	Bangerter Foils = 2hrs/day patching

Optimal efficacy for occlusion therapy:



ATS Occlusion Summary Severe Amblyopia

Study	Age	Severity of Amblyopia	Results
ATS 2A	3-7	Severe	6hrs/day patching = Full time patching

6hr/day Patching

Remember... this is patching only. VT in conjunction decreases the amount of necessary patching time.

Amblyopia Treatment

- MFBF vs Patching
- ATS 22 – spec wear alone v. spec wear & patching initially
- ATS 23 – MFBF vs patching – coming soon!








Amblyopia Prognosis

- Patient compliance
- Monocular Fixation Status – eccentric fixation ↓
- Initial Visual Acuity
- Age of patient when treatment is initiated
 - Older patients may require LONGER treatment, but treatment is possible (even in adults)
- Type of treatment
- Motivation



Vision Therapy Updates



 Add user
  Users
  Booking
  Apps
  Sessions
  Progress
  Video Library
  Print lab

MY APPS

A-Z ▾ Search



Single-select



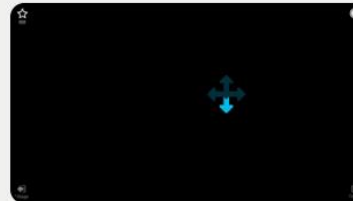
All Binocular fov Concentration Coordination Decoding Eye movements Field of view Reading
 Senses Test Visualization



Arrow

Decode, overview, concentration, reaction.

A colored arrow indicates a direction. This direction should be selected as soon as possible. It is about achieving as many points as possible at a given time with a limited number of errors.



Bells

Saccade, sense of direction, coordination, reaction, field of vision.



GUIDES

Select guide ▾

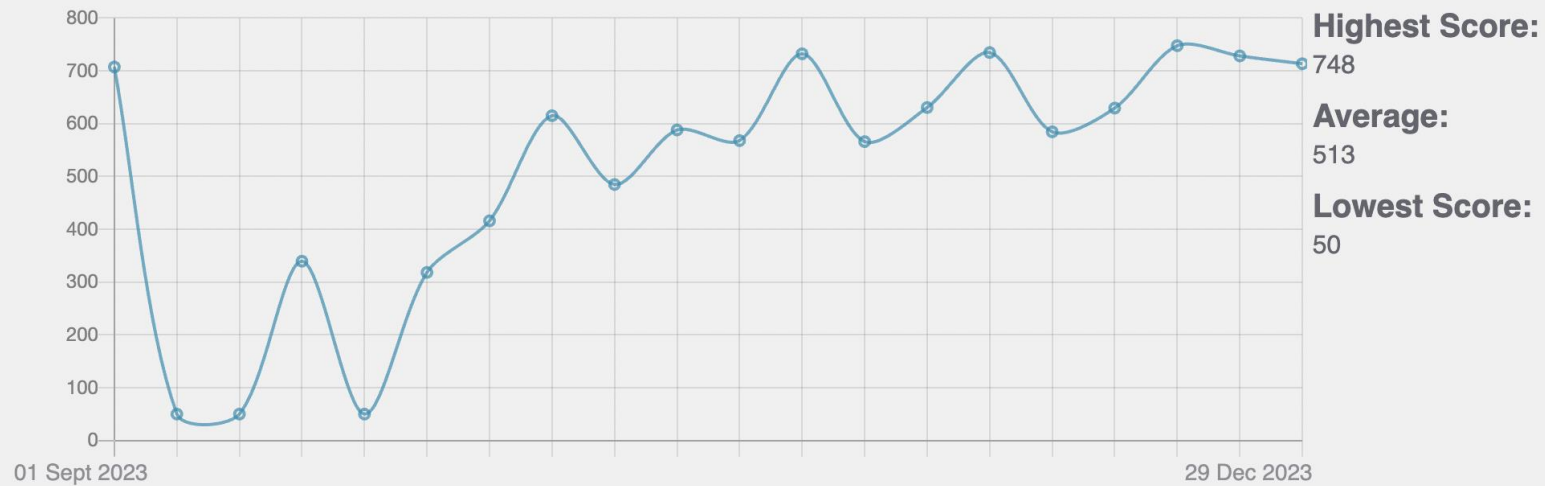
FEEDBACK

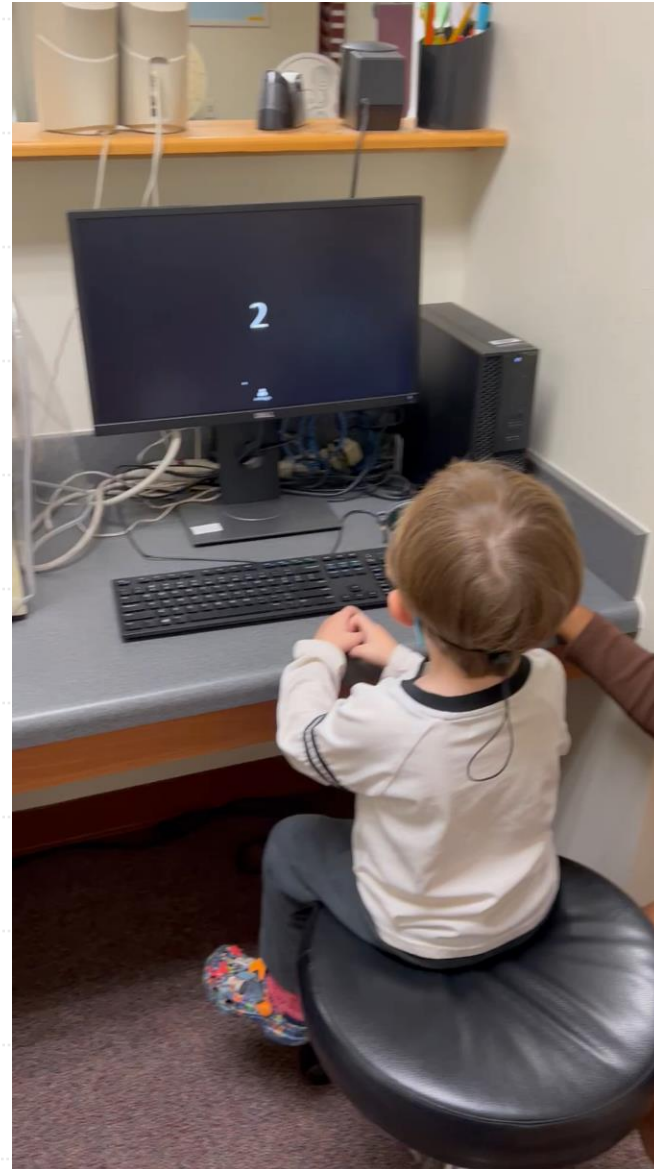
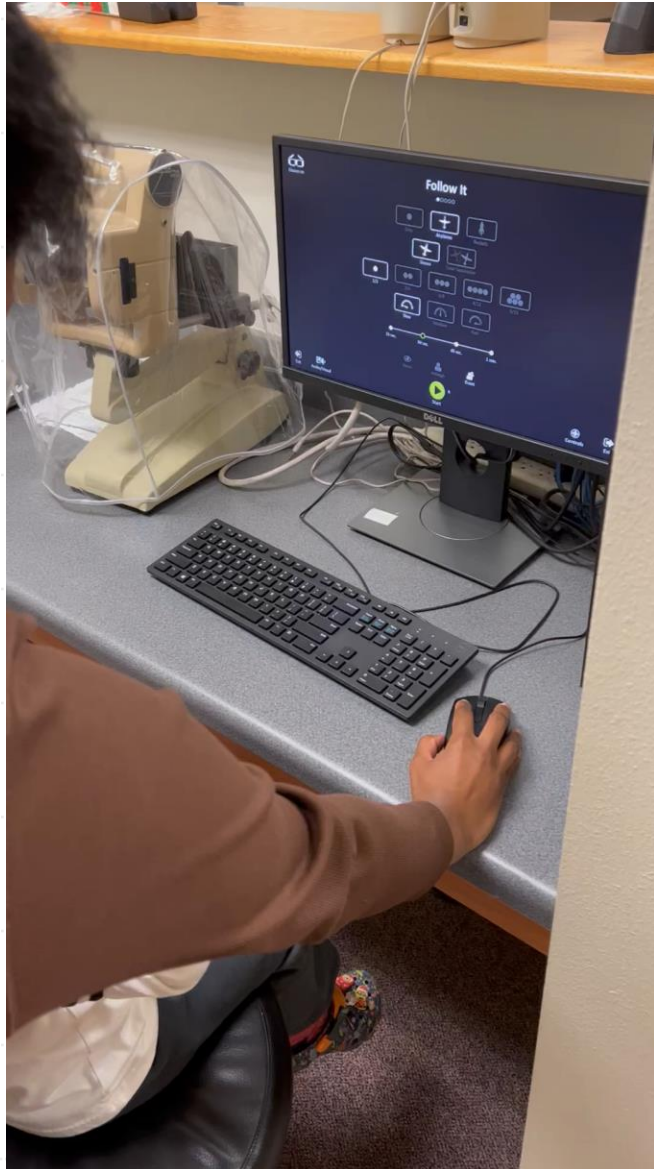
We appreciate feedback, so if you have any input or ideas on how we can improve our apps or the platform, feel free to send us an email on feedback@eyebab.com

Last login	Time used	Sessions	Apps	Edit	Stats	Reset	Status
25-01-2024 15:44			11	⚙️	☰ 📄	🔑	●
25-01-2024 10:21			58	⚙️	☰ 📄	🔑	●
25-01-2024 08:04			5	⚙️	☰ 📄	🔑	●
24-01-2024 12:22			9	⚙️	☰ 📄	🔑	●
23-01-2024 22:13			4	⚙️	☰ 📄	🔑	●

ne pial
bov su
k bače

Jump Read





Combo:
in office +
home

VIVID VISION

- Virtual Reality
- MFBF
- Prism
- Visual Information Processing Applications



MINI CASE: BM

BM is a 13 year old WM with a history patching OS and bilateral XT surgery in 2014. OD still turning out post surgery.

Pertinent findings:

Cover Test: 15 IRXT at distance, 20 IRXT' at near (high frequency)

NPC: Suppression

Worth 4 Dot: 4 dots to 4 ft, 3 dots 4-10ft, 4 dots at distance

Stereopsis: 240" at distance, 400" at near

Plan: 35 hours of office-based vision therapy with home support (including home VR)

BM'S VISION THERAPY

	In Office	At Home
Sessions 1-10	Monocular Accommodation Brock String VTS4 Vivid Vision VR	Vivid Vision (All games at angle of deviation) VR – A/S games, stereopsis games Dichoptic R/G TV trainer
Sessions 11-20	Prism Flippers Binocular Accommodation	Vivid Vision VR (Reduced BI prism) – Added step/jump vergence, barnyard bounce
Sessions 21-30	Free space fusion activities, BIM/BOP	Vivid Vision VR - (No BI prism) – Removed A/S games Eccentric Circles
Final 5	Tighten up binocular accommodation, sports vision training	Vivid Vision VR

BM'S FINAL RESULTS

Cover Test: 6XP at distance, 8XP' at near

NPC: To the nose

Worth 4 dot: 4 all distances

Stereopsis: 60" at distance, 16" at near

REFERENCES

Vision Therapy and Virtual Reality Applications
(Fortenbacher, Bartolini et al)

Sensorimotor Training in Virtual Reality (Adamovich et al)

Comprehensive review of amblyopia: Types and management. (Kaur S et al)

Effect of monocular fixation in binocular field (MFBF) on amblyopia - a pilot study comparing it with patching. (Jayakumar M et al)

Effectiveness of myopia control interventions: A systematic review of 12 randomized control trials published between 2019 and 2021 (Lanca C et al)