

AMERICAN ACADEMY
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Incorporating Vision Therapy into Amblyopia Treatment

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Disclosure Statement

- Nothing to disclose

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Goals of this lecture

- Set a common ground on definition of functional amblyopia
- Briefly discuss initial therapy plans
- Discuss one vision therapy plan that is utilized
 - It is not the only plan that can be used

Setting the Scene

Functional Amblyopia

A monocular, (sometimes binocular), reduction of visual acuity to 20/30 or less that is not correctable with refractive means alone.

- Typically two lines of visual acuity difference seen between the eyes
- It is a cortical issue not a retinal issue
- It leads to decrease in visual function

Setting the Scene

Causes of Functional Amblyopia

Refractive error-patient may have uncorrected refractive error that needs to be given before additional treatment started

- Anisometropia
- Isometropia
- Meridional

Setting the Scene

Causes of Functional Amblyopia

Strabismus-typically unilateral, constant strabismus, seen more with esotropia than exotropia

Mixed Mechanism-Patient can have both significant refractive error and strabismus which decreases visual acuity

Setting the Scene

Decrease in Visual Function

- Visual acuity
- Accommodation
- Contrast sensitivity
- Fixation
- Eye movements
- Binocular function
- Motion detection
- Vernier acuity

Setting the Scene

Standard...Traditional...Treatment Plan

1. Correct refractive error (whole different lecture series on how to prescribe)
2. Wear spectacles until vision stabilizes
 - I usually see patients every 6 to 8 weeks to measure visual acuity
 - Stability is improvement of one line or less
3. Start Part Time Patching or Atropine therapy

Scene is set, now add Vision Therapy?

- Things to consider before adding vision therapy to part time patching
 - Level of acuity
 - Patient will need to be able to see the targets we present
 - Around 20/100 is when I start vision therapy
 - Presence of stereoacuity
 - The presence or absence of stereoacuity will result in different therapy plans
 - Compliance with PTP
 - If they were non-compliant with PTP will they be compliant with additional therapy?

What Vision Therapy Activities to Augment PTP?

- There is much variety on what is considered vision therapy and what to add to amblyopia treatment
- The following plan is what I and others use when treating patients with amblyopia
- It was developed by surveying members of AAO, AOA and COVD who engage in vision therapy and activities modified from CITT

Core components of the In-Office Vision Therapy Plan

- Three main areas
 - Accommodation
 - Suppression
 - Vergence
- Goal is to be able to move in a methodical manner utilizing techniques that are known and endpoints which show improvement

Accommodation

Treatment Category	Phase 1	Phase 2	Phase 3
Accommodation			
	Letter Chart Accommodative Facility	Letter Chart Accommodative Facility	Binocular Accommodative Facility with word search ± 2.50
	Loose Lens Bi-ocular Facility -4.00	Loose Lens Bi-ocular Facility -6.50	Binocular Accommodative Facility with word rock cards ± 2.50
	Accommodative Push-ups		

Suppression

Treatment Category	Phase 1	Phase 2	Phase 3
Suppression	Physiological Diplopia Awareness (Brock String)	Bar Reader	Vis-à-vis
	Red Crayon Activities	Anaglyphic Letter Tracking	Anaglyphic Letter Tracking
	Red Line Coloring Book		Number Find
	Face Form 1	Face Form 2	String Reading
	Line Tracing 1	Line Tracing 2	

Vergences

Treatment Category	Phase 1	Phase 2	Phase 3
Vergences	Barrel Card	Brock String with Prism (15 BI and 25 BO)	Eccentric Circles
	Vectogram—SILO/Localization	Vectogram—Ranges and Recoveries (L and 30)	Vectogram Jumps (L and 30)
	Computer Vergences (15 BI and 25 BO)	Computer Jump Ductions (15 BI and 25 BO)	Aperture Rule (Card 8 BO and Card 4 BI)
		Mini-Tranaglyph—Ranges and recoveries (12 BO and 8 BI)	Mini-Tranaglyph—Ranges and recoveries (25 BO and 15 BI)

Full Therapy Plan

- The complete Vision Therapy plan can be found at:

<http://pedig.jaeb.org/Studies.aspx?RecID=35>

Patient example

AA 9 year-old male

History

- Here for comprehensive eye examination
- Clinical history—PTP and episodes of Atropine 1% for last 18 months, currently on PTP 4 hrs qD.
- Vision stabilized
- Currently wearing glasses
- No Headaches
- Does well in school
- No medications, no major medical conditions
- Normal birth, no complications

Examination Data Acuity—Preliminary tests

Dist. VA cc	Near VA cc	Dist CT	Near CT	NPC
20/20 OD 20/63 OS (ss Snellen)	20/15 OD 20/63 OS	Ortho	Ortho	BON
Pupils	Thorington	Stereo	Versions	VF
-APD	Ortho	200" arc	OD, OS full and smooth	Full OD, OS

Examination Data Preliminary

NPA	MEM	Accommodative Facility	NRA
5 cm OD 10 cm OS 5 cm OU	+0.50 OD +2.50 OS	10cpm OD 4 cpm OS 6 cpm OU	+1.25
PRA	Color Vision	Vergence (Dist & Near)	Worth-dot
-1.50	12/12 OD, OS	Poor cooperation	Fusion at all distances L&D

Examination Data

Refractive–Ocular Health

Dry OD	Dry OS	Wet OD Ret	Wet OS Ret
+1.25	+5.00	+2.00 20/20 bva	+6.50 20/63 bva
Ant. Seg OD	Ant. Seg OS	Posterior OD	Posterior OS
Normal	Normal	Normal	Normal

Assessment and Plan

Extensive patient/parent ed. Decided to start VT, RTC 1 week to begin therapy. Continue PTP 4 hours qD

Initial Vision Therapy Session

Accommodation

- Letter Chart Accommodative Facility
 - Distance from large chart 7 feet
 - Near target distance 10 cm
 - Cycles/minute 7 cpm
- Accommodative push-up
 - Closest near target distance 10 cm

Initial Vision Therapy Session

Anti-Suppression

- Brock String (Diplopia Awareness)
 - Accurate fixation No (exo posture)
 - Suppression <10% yes
- Face Form
 - Form level 1
 - Time 55 secs
 - Suppression <10% yes

Initial Vision Therapy Session

Vergence

- Barrel card
 - Fusion held 10 sec at middle barrel No
 - Fusion held 10 sec at distance barrel Yes
 - Suppression <10% Yes
- Vectogram-Phase 1
 - SILO and Localization present Yes
 - Suppression <10% Yes

Key Elements to In-Office Therapy

Principles of Sequencing Training Procedures

1. Start with larger targets and work toward finer, more detailed targets.
2. Begin with brief periods of time on a given task and frequent breaks and work toward more sustained effort

Principles of Sequencing Training Procedures

3. Start with complete concentration on the visual task and work toward ability to achieve the desired level of performance in the presence of distractions.
4. Begin with plenty of emphasis on visual and other feedback cues and work toward being able to perform maximally in the absence of feedback.

Principles of Sequencing Training Procedures

5. Start with emphasizing the direction of difficulty of vergence and/or accommodation and later work on improving ability in both directions.
6. Emphasize amplitude (Stamina) first and later work on improving facility.

Follow-Up

- Patient underwent 16 weeks of In-Office vision therapy
- Patient also performed home therapy
- Made weekly visits 90% of the time

Scheduling and Time Commitment Issues

- It is important that your in-office visits be as organized as possible. You should plan what you will be doing in advance of the patient's visit.
- The in-office visit may include a few tests to check progress, five to ten minutes on each of three to five training procedures, and check on how the patient is doing the home training procedures

Final Vision Therapy Session

Accommodation

1. Binocular accommodative facility w/word search
 - Lens power ± 2.50
 - Cycles per minute 12 cpm

Final Vision Therapy Session

Suppression

2. Anaglyphic letter tracking
 - Font size (# of paragraphs per page) 6
 - Suppression <10% Yes
3. String Reading
 - Worksheet level 3
 - Time 120 secs
 - Suppression <10% yes

Final Vision Therapy Session

Vergence

4. Computer Vergences
 - Highest level BO 40
 - Highest level BI 12
5. Aperture Rule
 - Highest card on BO 8
 - Highest card on BI 4
 - Targets clear Yes
 - Requires pointer to fuse, initially

Wait what about the home therapy

There are computer activities that can be prescribed for home use, you can augment these activities with more traditional equipment based therapies as well.

Typically, I prescribe home therapy to be performed at least 5 days a week while under treatment.

Wait what about the home therapy

Benefits of computer based therapy is that you can connect to their server and monitor the patients' activities remotely

It will automatically change target size as the patient improves upon the activity

Home therapy is also a way to augment what the patient is doing in the office

Prescribed home therapy

- Patient was prescribed amblyopia i-Net to be used in the beginning
- Additional activities were prescribed based upon areas of difficulties with the in-office based therapy

Examination Data Post VT

Acuity-Preliminary tests

Dist. VA cc	Near VA cc	Dist CT	Near CT	NPC
20/20 OD 20/25+ OS (ss Snellen)	20/15 OD 20/25+ OS	Ortho	BON	BON
Pupils	Thorington	Stereo	Versions	VF
-APD	Ortho	100" arc	OD, OS full and smooth	Full OD, OS

Examination Data Post VT

Preliminary

NPA	MEM	Accom Facility	Worth-dot
5 cm OD 6 cm OS 5 cm OU	+0.50 OD +1.00 OS	10 cpm OD 10 cpm OS 8 cpm OU	Fusion at all distances L&D

Long term Follow-up

- Patient has been seen for 2 additional comprehensive annual exams
- Clinical data is steady
 - Va in OS measures between 20/20- and 20/25+
 - No additional issues

Typically therapy time-line

1. Perform an eye exam and diagnosis amblyopia
2. Prescribe spectacles if needed
3. Monitor visual acuity every 6 to 8 weeks until vision stabilizes
4. Based upon level of acuity, stereoacuity, ability can start vision therapy in conjunction with PTP

Typically therapy time-line

5. Weekly, bi-weekly, in-office vision therapy sessions until patient meets all endpoints and/or vision is significantly improved
6. Once vision therapy is completed can switch to maintenance therapy, once a week monitor every two months, continue PTP if needed

Typically therapy time-line

7. Once vision therapy and PTP completed monitor once a quarter for regression of acuity
8. Restart if acuity decreases by two lines or more from "final" acuity

Final Thoughts

Amblyopia affects much more than visual acuity, so why only treat that?

Vision therapy can be used to augment patching therapy

There is no one vision therapy plan

Well controlled research is needed for this area