Insights into the Diagnosis and Treatment of Patients within the Autism Spectrum: A Patient's Story

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ABSTRACT

The incidence of those being diagnosed within the autism spectrum disorder (ASD) appears to be soaring. Those on the spectrum have many sensory issues which include difficulty coping with visual information. With many signs and symptoms associated with ASD, it would be easy to assume that autism itself is the problem and to overlook vision information processing as an important component that produces some of these signs and symptoms. Comprehensive eye and vision evaluations can be challenging for the doctor because of the patient's lack of ability to communicate in the traditional way of answering questions and giving verbal feedback. The individual with ASD may be fearful and display problematic behaviors. One must be attuned to how each individual communicates and discover what the behaviors may mean. Supplemental probes to traditional optometric clinical methods are needed to insure that visual needs are revealed. Lenses, yoked prisms and vision therapy can be helpful in addressing any vision information processing deficits. Treatment progress should be measured with quality of life changes as well as standard optometric assessment tools. Our patient, NT's story highlights these challenges. This paper aids the optometrist in obtaining insights into this disorder and seizing the opportunity to think creatively to help change lives for those within the autistic spectrum.

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Introduction

The statistics associated with the spectrum of autism disorders can be somewhat alarming. As many as 1 in 150 children have autism (almost 1.5 million people in the United States alone). A new case is diagnosed almost every 21 minutes, and the rate of autism is increasing 10-17% annually. Individuals on the autism spectrum have many sensory issues but vision, unfortunately is often overlooked. A person with autism may be non-verbal, bite, kick or scratch when new things are introduced and during bothersome transitions. Communication can be frustrating for all involved parties. There may be repetitive behaviors, echolalia, hyper- or hyposensitivity to light, touch and sound, or some combination of these sensory issues. It would be easy to assume that the "autism" is the problem and overlook the visual aspect. One could also assume that after a certain age, there is little hope for furthering their development not only academically but also socially.

Optometry has much to offer patients with autism. Behaviors associated with those on the autism spectrum may make a typical visual evaluation challenging. Optometrists must assess not only refractive status and eye health but become detectives, thinking creatively in order to discover what potential benefits vision therapy or lenses or both might provide a patient within the Autism Spectrum Disorder (ASD). The progress and success of a patient on the autism spectrum may need to be measured in additional ways other than our current methodologies of evaluation.

The following tells NT's story, a 16 year old with ASD. As NT's mother writes, "It took so, so many visits to a number of vision practitioners and NT lost a lot of learning time. It makes my heart ache thinking

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about how long it took. I don't think other people really believed me when I suggested he had vision problems." NT had many eye evaluations. Multiple pairs of spectacles had been prescribed but never worn. Through observation, communication, vision therapy, yoked prisms, and glasses, NT showed changes in his oculo-visual findings, as well as significant changes in daily living skills.

Visual examinations are challenging and since individuals with ASD are all different this can add to these challenges. Not every optometrist may feel comfortable working with ASD patients. Through education and clinical exposure, more optometrists can feel comfortable assessing those on the spectrum or refer to practitioners who enjoy the challenge. Through collaboration, we can all make a significant difference in many lives.

Case Review

NT, a 16 year old, Caucasian, male was referred for a visual consultation by a neurologist. He was diagnosed with PDD/NOS (Pervasive Development Delay, Not Otherwise Specified), Autism Spectrum Disorder. He had developmental delays since infancy. NT loved looking at books, being read to and could remember the stories that were read to him. He showed great interest in reading. NT verbally expressed despair over not being able to read and seemed resigned to that fate. His mother wanted to know if there were hidden vision problems that prevented him from reading.

NT was placed in a self-contained class for students with autism and was able to follow a schedule. His high school teachers did not think NT had trouble seeing. He did not really read at school although he did know a number of sight words. By giving NT enough time he could spell some words.

Therapeutic Intervention

NT started early therapeutic intervention at nine months of age. He had physical therapy from 9 months to 13 years and occupational therapy until he was 10 years old. NT received Speech, Language and Learning Services from ages 3-10 years and has been in Integrated Movement Therapy[®] for the last three years.

Educational history: NT was in special education until 3 years of age. He then entered a developmental preschool until kindergarten, where he was then placed in a program for those with autism. In grades 1 and 2 he went to a special education class; in grades 3, 4 and 5 he was in an autism program; and in grades 6, 7 and 8, he was in a special education classroom. In high school he was in a self contained classroom for teens with autism.

Current pertinent history: A psychologist at the Autism Center performed an evaluation and found that NT showed mild to moderate mental retardation. The neurologist referred NT for our services. NT was taking Zoloft for anxiety.

Visual history: NT's first visual evaluation was by an ophthalmologist who reported that all findings were within normal limits of development. It was observed by his mother that the evaluation appeared challenging and she was unsure of the validity of the results obtained. NT then had a visual evaluation with an optometrist. NT noted, "I can see" with trial lenses, but refused to wear spectacles. Over the next few years, he went to a number of eye doctors. Three more pairs of spectacles were purchased. Unfortunately he would not wear any of them. NT's mother continued to think that something was visually wrong. She would see NT make odd expressions when he was looking at words on a page and he would look at things slightly sideways and rub his eyes. The family history is positive for both strabismus and amblyopia.

Vision Consultation: NT had a visual evaluation (Table 1) and presented for the consultation with symptoms of poor coordination and unusual posture. His writing was crooked or poorly spaced. He avoided near tasks. (Table 2 summarizes NT's symptoms.) NT's visual acuity was 20/25 for each eye with a prescription of: OD -2.00 sph, OS - 1.25 sph. The cover test at distance and near showed 24 prism diopters (PD) of left intermittent exotropia. Ocular motilities were full and unrestricted, but they were not smooth or accurate. He could fixate monocularly on a near target for only 1 second with his right and left eyes. When viewing a mirror through polarized glasses at a distance, he was unable to see his own right eye, indicating he was suppressing the information from that eye. On Worth Four Dot testing at distance, four lights were seen indicating fusion. With Worth Suppression Test at near, he suppressed the right eye. Using the Randot Stereopsis Test, he had 70 seconds of arc stereopsis with an intermittent suppression of the right eye. The ocular health was unremarkable. Table 3 summarizes the consultation findings.

Table 1. Examination by Previous Doctor

Unaided Visual Acuity	Distance	OD 20/200, OS 20/200
	Near	Not taken
Cover Test	Distance	24 Δ exotropia
	Near	24 Δ left exotropia
Ocular Motilities		Full, alternating
Near Point of Convergence		Could not do
Worth Four Dot	Distance	Not done
	Near	4
Randot Stereopsis		Not attempted
Distance Retinoscopy		OD -2.25 sphere OS -1.25 sphere
Subjective and Visual Acuity		OD -2.00 sphere 20/25
		OS -1.25 sphere 20/25
Phoria	Distance	Could not do
	Near	Could not do
NRA/PRA		Could not do
Near Vergence		Could not do
Positive Relative Accommoda	tion	Could not do
Negative Relative Accommod	ation	Could not do
Near Point of Convergence		Could not do
Accommodative Facility		Could not do
Visual field – confrontation: p	ass	Pass
Biomicroscopy and Ophthalm	oscopy	Unremarkable
Pupils		
AONCT IOP		OD 14 OS 14

Table 2. Visual Symptom Checklist

Does not want to look at pages of words Unusual blinking or eye rubbing Clumsiness or poor coordination Unusual posture Skips lines or loses place when reading Writes crooked or poorly spaced Difficulty tracking moving objects Poor reading comprehension Confuses or reverses letters, words or numbers Avoids near tasks	
Confuses or reverses letters, words or numbers Avoids near tasks	
Light sensitivity Confuses left and right	

Yoked Prism Evaluation: Yoked prisms were trial framed. NT appeared to be very responsive to these prisms. He wore the 15Δ base down yoked prisms. NT asked, "Movie?" and looked me straight in the eye. He looked around the room and had a huge smile. I asked, "What do the glasses feel like?" He rubbed his tummy and replied, "Magic," and continued to smile. I asked, "What's different?" After a bit, I repeated, "What's different?" He looked away. He lifted his shirt up and patted his bare belly and repeated, "Magic," as he moved his head counter clockwise gazing across the room.

With 15 Δ base up yoked prisms, NT started rocking his head up and down and side to side looking about the room. I asked him, "How are the glasses now?" He said, "Feel like" and then he paused. He continued to move his head to investigate the room and his side to side head movements began to increase in range. His mom said, "NT, you are dancing now, honey." She laughed. NT's head movement appeared to become rhythmic. I asked NT if he liked to dance. He continued to move his head as he looked about the room. His mom said, "NT, you are moving more than I have seen you move, ever, right now." He asked, "Do you?" then paused and later asked "3-D?" I told him the glasses made the world look different and I asked him, "Does the world look different?" He continued to investigate and then replied,

"Yeah." "Does it look bigger or smaller or curvier or...?" While continuing to move his head he rapidly answered, "Bigger." Then his head movement slowed down. "Do you like it better this way or the other way?" His head movement sped up side to side and he said, "Kind-of like a ride." He reached out to touch the phoroptor. His mom said, "Don't touch the equipment." He answered, "Alright," as he took his hand away from the photoptor. I asked if he was ready to have the glasses off and with a deep sigh and said "Yeah."

With 15Δ base left prisms, I asked NT, "What does this do?" NT looked up and down with a quick movement of his head and then slowed his head movement. I again asked what this did. He did not verbalize but he displayed extended eye contact with me and then slowly lifted his hands and looked at them. He dropped his hands to his lap. He proceeded to look in awe around the room as if for the first time, investigating with his eyes only, no touching and no words.

With 15Δ base right prisms, NT immediately said, "Bigger." I did not have time to even ask a question. He moved his head to the right. His head movements were very slow. I asked, "Like or not like?" He lifted his left hand up and down in front of his face and observed it intently as if observing his hand for the

first time. Then he moved his hand toward and away from his body, to and fro. I asked what his hand looked like. As he lifted his arm up and looked at his hand, he looked down at his elbow and looked surprised to see that there was a connection between his hand, arm and body. His hand and body were connected. He lifted both hands up toward his face and said, "Bigger." I asked, "Better of worse?" He clasped both hands together and then gently patted his right hand. He said, "My hands getting bigger." He asked, "You see it?" His mom said, "I don't see it different. You see it different because of the special glasses. To me it looks the same." NT seemed perplexed and asked, "Your hands look the same?" as he stretched his hands out toward his mom. He folded his hands and put them in his lap. Then he slapped his legs. His mom asked, "Do I look different to you?" He held his hands out and looked at his mom and said, "Yeah."

With the 15∆ base up yoked prisms, NT asked his mother "What I look like? Who do I, mom?" She answered that he looked like Harry Potter. His head movement was fast and suddenly became very slow, his posture changed as he slumped in the chair. I asked, "Happy or sad?", he said, "Sad feeling." I asked, "Bigger or smaller?" "Smaller." His body slouched to the right side of his chair and the evaluation was finished.

NT's mother had never seen him move as much as he did with the yoked prisms. The lenses seemed to open the door for him to explore his visual world. He appeared to see things in a totally new way, as if seeing for the first time. He wanted to know, "You see it?" He was excited and asking questions. He seemed to become surprised that his hand and arm were extensions of his own body. There was awe as he looked and patted his hand. He enjoyed the feeling he derived from the prism glasses and movement which he likened to a carnival ride. He enjoyed the evaluation but it seemed exhausting. His mother was eager for

Table 3. Consultation with Author

Unaided Visual Acuity Dis Nea	ance OD/OS could not do OU 20/200 or OD/OS could not do OU 20/200
Cover Test Dis Nea	ance Alternating exotropia r Exotropia
Fixation	OD 1 second OS 1 second
Ocular Motilities	Full range, not smooth or accurate
Near Point of Convergence	Could not do
Worth Four Dot Dis Nea	rance Not done Ir Right target suppression
Polarized glasses & mirror Dis	ance OD suppression
Randot Stereopsis	70 arc seconds Intermittent suppression of OD target
Distance Retinoscopy	Information from previous OD
Subjective Refraction	Could not do
Phoria Dis Nea	ance Could not do r Could not do
NRA/PRA	Could not do
Near Vergence	Could not do
Positive Relative Accommodation Negative Relative Accommodation	Could not do
Near Point of Convergence	Exotropia
Accommodative Facility	Briefly looked at small target with +2/-2.00
Ophthalmoscopy	Optomap in future
Yoked prism	15∆ base up ++ (fatigued) 15∆ base down ++ 15∆ base right ++ (verbal) 15∆ base left ++ (non-verbal)

more time with the yoked prisms and to investigate what doors vision therapy might open for NT.

NT had myopia, intermittent exotropia, suppression, deficiency in fixations and pursuits. His reduced visual acuity was most likely influenced by both, lack of awareness and myopia. He had multiple pairs of spectacles at home that were never worn. NT appeared to have increased visual awareness with yoked prisms in each prism direction. Since there was no one position that significantly helped NT and he was unlikely to wear spectacles, glasses were not prescribed. At this time vision therapy was recommended as a first line of treatment. Yoked prisms would be prescribed when one position significantly helped more than the other directions in various tasks.

During a yoked prism evaluation, typical activities observed included: walking, throwing or catching a koosh ball, walking up and down stairs, handwriting, putting pegs in a pegboard or a pen in the cap. During the activities the yoked prisms are changed: base up, down, right and left. Observations are made as to which yoked prism position enables the person to perform significantly better at the given task. With challenging patients, one does not typically have the opportunity to trial numerous activities or prism powers. Over time we have found that 15Δ yoked prisms tend to elicit dramatic changes most often. If the patient is able to attend to more activities with the prisms, you would then trial frame additional powers from one to ten PD. The goal is to use the least amount of yoked prism that elicits a considerable change.

Since yoked prism spectacles are therapeutic by nature they may be used up to a year or so and then may no longer be necessary. This is not the case with all patients. Over time it is also possible the power or direction of the prism may need to be adjusted to continue to have desired results. Wearing time for each person may vary. It is helpful to initially associate the wearing of the prism spectacles with something positive. If the person loves watching videos, spectacles must be worn for the first two minutes of any video they watch. If they are taken off, the video is turned off. The time is incrementally increased to an hour. The hope is that the person will love the lenses so much they will forget that the spectacles are on. The problem at first is that tactile sensitivity may overpower the visual gains.

The adjustment between wearing the yoked prisms and the readjustment to the visual world with the lenses off can encourage visual attention. The lenses may be worn three to five times during the day with safe activities such as playing various games, eating, watching television, using the computer, playing with Legos, popping bubbles, and other home therapies. A progress evaluation is usually scheduled in six to eight weeks for those individuals who are prescribed prisms without initially being involved in a formal in office optometric vision therapy (OVT) program.

A program of OVT may be prescribed prior to the use of yoked prisms to help provide the opportunity to develop necessary visual abilities and if the individual can not wear spectacles because of tactile defensiveness or other sensitivities. Those sensitivities may also need to be addressed by an occupational therapist through sensory integration therapy.

NT's prognosis in vision therapy was excellent given the reaction and increase of awareness while wearing the yoked prisms. The goals of the OVT program were to improve visual processing by increasing: visual awareness, central peripheral organization, integration with other sensory systems, visual attention, and eye contact. NT's mother's goal was to see if improvement in vision skills would affect his learning and ability to read. NT was scheduled to come to the office every other week for a 45 minute OVT session. He was to do home activities, 20 minutes a day, five days a week, to reinforce the skills learned in the office.

NT attended fourteen sessions of vision therapy over a nine month period. His mother's travel schedule made it impossible to bring him to all the scheduled vision therapy sessions. (Table 4 summarizes the vision therapy activities.) Yoked prisms appeared to be an important therapeutic tool that increased his visual awareness. The lens powers used varied from 5Δ to 15Δ and changed from base up to base down, and base right to base left, while conducting various tasks. NT's mother reported that he loved to come to vision therapy. By the fifth therapy session, he started trying new things at home. During this time he was in two plays and enjoyed this activity. On the sixth visit, NT's mother noticed that when he wore the base down prisms, he was standing up tall and seemed to be much more confident. He called out for his mother to come look when he saw something out the window. This was a new behavior for him. While wearing the yoked prisms, NT walked up and down the hallway of the office very rapidly. This contrasted sharply with his typical walk, which was very slow and cautious so as not to bump into things. At this time he appeared to be becoming increasingly aware of his spatial surroundings. He stopped to look at the bench, the corners of a wall and the wall itself. He greeted strangers in the hallway with confidence. After the session, Mom noted that his awareness and confidence continued after the yoked prisms were taken off. After working with him in vision therapy, glasses with yoked prisms were prescribed for use at home and school. Due to various situations, these glasses were not purchased. NT still benefited from the use of the yoked prisms during the therapy sessions.

On the eighth session, NT made eye contact with people in the reception area. He continued to walk around with more confidence and at a faster pace both with and without the yoked prism glasses. He continued to become more visually aware. During the ninth session, when working with the Quoits Vectogram, NT was able to appreciate stereopsis, with both base-in and base-out vergence demand. He localized accurately. NT asked, "Is it scary?"

After the ninth session, NT had a progress evaluation; the findings are in Table 5. Six months prior, NT wasn't interested in playing games or reading out loud. Now he was doing both. He was

Visual Thinking Through Eye Movement	Visual Thinking Through Accommodation	Visual Thinking Through Eye Teaming	Visual Thinking Through Visual Motor	Visual Thinking and Logic	Visual Thinking Through Directionality
Rotating pegboard monocular (w varied yoked ∆) Pegs in and out Cups/cubes Blink Carl's Card Marble Roll Marsden ball Dotting Large O's Star saccades Feather catch Bubbles Feather catch Ann Arbor Letter Tracking© Space Fixator Wayne Saccadic Fixator® AcuVision® Mazes (+/-)	Wayne Saccadic Fixator® (near/far) Mazes with accommodative rock (monocular) +/- eye movement visual thinking logic activities	Pencil push ups Stick in straw Brock string Window anaglyphs Vectograms VTS 3	Yoked prism (power & direction varied) Line walk E/H coord. Bubbles Tootie toss/cans Feather catch Reflexes Angels in snow w/ metronome Jumping jacks Balance sequence	What's the Difference?® Which Way Please?® Dominoes Bingo: Near Point of Convergence Think Track® Parquetry Hierarchy Parquetry Workbook© Attributes Hierarchy Visual figure ground Pass The Bag®	Directionality probe Wayne Saccadic Fixator® AcuVision®

Table 4. NT's Vision Therapy Activities

also interested in music as well as playing basketball. During the tenth session, working on the AcuVision 1000 Eye Hand Coordinator, NT showed extreme head movement and total body movement as he stepped side to side to be in front of the light each time the light moved. His mother helped give directions and he was able to stand still and reach out with his hand to touch the lights. He started to use both hands. By the end of the therapy, NT learned to stand still and use his eyes to guide his hands.

During the fourteenth therapy session, he was asked to work with the Brock String. When asked to hold the string to his nose, he asked, "Are you kidding?" After the session, NT said that beads aren't appropriate for his age. NT's teacher had been trying to teach age appropriateness and had been stressing what things are and are not age appropriate. NT was then given options of different activities in vision therapy so that it would be deemed age appropriate. At this time unfortunately, he was not willing to continue vision therapy and could

Table 5. Optometric Progress Examination

Unaided Visual Acuity	Distance Near	OD/OS could not do OU 20/40 OD/OS could not do OU 20/30		
Cover Test	Distance Near	Not recorded Exotropia		
Ocular Motilities		Full range, smoother, frequent loss of fixation		
Randot Stereopsis		70 arc seconds Intermittent suppression of OD target		
Polarized glasses & mirror	Distance	Not attempted		
Worth Four Dot	Distance Near	4 4		
4Δ base in and out at near:	4Δ base in and out at near:			
Phoria	Distance Near	Could not do Could not do		
NRA/PRA		Could not do		
Near Vergence Positive Relative Accommodation Negative Relative Accommodation Near Point of Convergence Accommodative Facility Fusional Facility		Could not do		
		Could not do		
		Could not do		
		+2 exo increased, -2 "sharper"		
		Variable response		
Yoked prism		15∆ base up 15∆ base down ++ 15∆ base right √ 15∆ base down √		

not be persuaded otherwise. After discussion with NT's mother, it was decided that NT would discontinue in office.

Typically, home activities are done to reinforce what is learned during in-office therapy. NT's mother said,

> "One thing that providers may not realize is how chaotic and or difficult the life of a family who has a child with autism may be. It is exhausting, and sometimes hard to accomplish all of the things that one needs to do in a given time, because the child isn't able to do those things, or won't, or has "lost it" - and so parents may feel... they aren't meeting the expectations of the provider. For example, sometimes I couldn't get NT to do the vision therapy work, and other times I could. When I couldn't. I always felt bad, even though I knew I shouldn't. I'd have to just tell myself to swallow my pride and go ahead and take him to vision therapy anyway, even though I'd have to tell the therapist we hadn't done the homework that time! Fortunately, he seemed to love going to his vision therapy appointments and would usually rally." 5

Conclusion

NT had vision therapy over a nine month period with a progress evaluation after his ninth vision therapy session approximately six months after he started therapy. This showed that NT had an increase in stereopsis and was able to achieve Worth Four Dot distance and near (Table 5). He had a vision examination (Table 6) two months after vision therapy was discontinued. He continued to be intermittently exotropic at distance/near and myopia with some astigmatism as well. His unaided visual acuity at near had greatly improved. NT's pursuits had improved but were still not completely smooth and accurate. He tended to respond best with base down yoked prisms. NT noted that while conducting accommodative rock therapy, -2.00 lenses made the target sharper. A

Table 6. Visual Evaluation after Vision Therapy was Discontinued

Unaided Visual Acuity	Distance	OD 20/400 OS 20/200		
	Near	OD 20/30 OS 20/30		
Cover Test	Distance	30∆ right exotropia		
	Near	Right exotropia		
Ocular Motilities		Full range, not smootl	n and accurate	
Near Point of Convergence	e	Exotropia		
Worth Four Dot	Distance	Not attempted		
	Near	Not attempted		
Visual Field - Humphrey		Could not do		
Biomicroscopy		Unremarkable		
IOP		OD not able OS not able		
Ophthalmoscopy		Optomap because of sensory issues		
Ophthalmoscopy		Optomap because of s	sensory issues	
Ophthalmoscopy Distance Retinoscopy		Optomap because of s OD - 2.25 –1.25 x 005	sensory issues OS -2.00 – 1.75 x 00	
 Ophthalmoscopy Distance Retinoscopy Subjective Refraction		Optomap because of s OD - 2.25 –1.25 x 005 OD - 2.00 – 1.25 x 005	sensory issues OS -2.00 – 1.75 x 00 OS-2.00 – 1.25 x 180	
Ophthalmoscopy Distance Retinoscopy Subjective Refraction Phoria	Distance Near	Optomap because of s OD - 2.25 –1.25 x 005 OD - 2.00 – 1.25 x 005 Could not do	ensory issues OS -2.00 – 1.75 x 00 OS-2.00 – 1.25 x 180	
 Ophthalmoscopy Distance Retinoscopy Subjective Refraction Phoria Near Vergence	Distance Near	Optomap because of s OD - 2.25 - 1.25 x 005 OD - 2.00 - 1.25 x 005 Could not do Could not do	sensory issues OS -2.00 – 1.75 x 00 OS-2.00 – 1.25 x 180	
Ophthalmoscopy Distance Retinoscopy Subjective Refraction Phoria Near Vergence Positive Relative Accommon Negative Relative Accommon	Distance Near odation nodation	Optomap because of s OD - 2.25 – 1.25 x 005 OD - 2.00 – 1.25 x 005 Could not do Could not do Could not do Could not do	ensory issues OS -2.00 – 1.75 x 00 OS-2.00 – 1.25 x 180	
Ophthalmoscopy Distance Retinoscopy Subjective Refraction Phoria Near Vergence Positive Relative Accommon Negative Relative Accommon Accommodative Facility	Distance Near odation nodation	Optomap because of s OD - 2.25 –1.25 x 005 OD - 2.00 – 1.25 x 005 Could not do Could not do Could not do Not attempted	sensory issues OS -2.00 – 1.75 x 00 OS-2.00 – 1.25 x 180	
Ophthalmoscopy Distance Retinoscopy Subjective Refraction Phoria Near Vergence Positive Relative Accomm Negative Relative Accomm Accommodative Facility Yoked prism	Distance Near odation nodation	Optomap because of s OD - 2.25 -1.25 x 005 OD - 2.00 - 1.25 x 005 Could not do Could not do Could not do Could not do Not attempted 15Δ base up $$	sensory issues OS -2.00 – 1.75 x 00 OS-2.00 – 1.25 x 180	
 Ophthalmoscopy Distance Retinoscopy Subjective Refraction Phoria Near Vergence Positive Relative Accomm Negative Relative Accomm Accommodative Facility Yoked prism	Distance Near odation nodation	Optomap because of s OD - 2.25 -1.25 x 005 OD - 2.00 - 1.25 x 005 Could not do Could not do Could not do Could not do Not attempted 15Δ base up $$ 15Δ base down +	sensory issues OS -2.00 – 1.75 x 00 OS-2.00 – 1.25 x 180	

Table 7. Spectacle Prescriptions

Spectacle Prescription	Power	Outcome	
Previous optometrist	OD -2.00 sphere OS -1.25 sphere	Purchased NT would not wear	
Yoked prism RX	OD Plano sphere 7Δ BD OS Plano sphere 7Δ BD	Not purchased - Because of finances –	
RX After VT discontinued	OD -2.00 – 1.25 x 005 OS -2.00 – 1.25 x 180	Wears all the time	

spectacles prescription of OD -2.00 -1.25 x 005, OS -2.00 -1.25 x 180 was given. Table 7 summarizes the spectacle prescription.

When NT put on the glasses for the first time he noted, "I don't have to daydream anymore." His mom said her heart soared and also broke a little when he said that. No prisms were in his spectacles but NT was finally willing to wear spectacles for the very first time. This willingness to wear glasses occurred over the course of therapy. Yoked prisms were one of the key tools that helped NT become connected to the world around him. His mother noted that NT became more engaged than usual in physical activities (including running) when he had yoked prisms on and that this effect lasted for quite a while after he removed the prisms. In the near future we may prescribe yoked prisms for use during certain activities (i.e. sports). If success were measured purely by the amount of the strabismus present, then NT would not be considered a successful vision therapy patient because the strabismus though improved could still be elicited on an intermittent basis. NT did make significant gains in stereopsis, fusion, fixations and pursuits.

If the quality of life changes are taken into consideration however, then NT's success is monumental. Optometric vision therapy created the opportunity for NT to build visual awareness, learn where his body was in space, and improve his ability to localize and integrate his vision with his other senses, as well as to read at an enhanced level. With these new skills, he was able to appreciate the superior visual acuity his spectacles helped him acheive. Prior to vision therapy, NT had numerous pairs of spectacles but was not able to wear the glasses. His mother reports that, "Since the vision therapy and his new prescription, NT sees so much better. He doesn't have to daydream anymore. He loves his glasses. He wears them from the moment he gets up until he gets in bed. He's much happier; he's reading new words, trying new things and is becoming more competent and independent as a result. He is in Transition Academy at a Community College. He is an avid music lover, and thrilled that he can get on the computer and listen to (and read!) all sorts of music from a range of genres. He loves Enya, Loreena McKennitt, and other Irish musicians, the Beatles, Beach Boys, World Music, and

much more. He is also interested in photography and travel." He is working with his mother on a book: Traveling with NT: A Journey to Ireland. He recently took a self advocacy class and is working on making a presentation about his experiences as well as starting a job at the library.

As NT often asks, "You see it?" I hope more optometrists will be able to see through NT's eyes and collaborate with other optometric colleagues, to appropriately evaluate and treat patients with autism.

Can you imagine the success you will discover by measuring quality of life changes, as well as by using vision examination findings? Do you see how the detective work needed and the ability to think creatively is applied to patients with autism? Do you see yourself being part of changing lives for those on the autism spectrum? I hope so.

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- Externship Manual
- Externship Sites List
- Externship Director List
- Residency Opportunity
- Practice Opportunities
- Research & White Papers

- Speakers Bureau
- Student Liaison PowerPoint Presentation
- Tour de Optometry

COVD Publications:

- Optometry & Vision Development, the COVD journal
- VISIONS, the official COVD newsletter
- Email News Brief Archives

If you haven't looked lately, log in today and check it out! From the members homepage, click on the "Students & Residents" link in the left navigation bar.