Optometry's Role in the Treatment of Autism

Randy L. Schulman, MS, OD, FCOVD

Autism involves a global dysfunction in the sensory systems. A review of the characteristics of autism reveals a number of visual behaviors that warrant the optometrist's interest. A case is made for optometric intervention in the form of visual therapy and lens, prism, or filter application, and the optometrist's role as a vision care provider for the patient with autism is outlined. **Key Words:** *autism, sensory dysfunction, developmental delay, strabismus, oculomotor dysfunction, vision therapy.*

INTRODUCTION

Autism is considered to be a lifelong developmental disability that begins at birth or during the first few years of life. It is a syndrome consisting of a combination of atypical behavioral characteristics and may occur in a continuum from mild to severe. Individuals with autism demonstrate a number of behavioral abnormalities. They may be unresponsive or have obsessive interests in certain toys or mechanical objects. Often, they demonstrate an insistence on sameness, performing repetitive acts, or resisting changes in their environment. If speech and language are present, they have unusual qualities. Many individuals will exhibit markedly uneven intelligence.[1]

Individuals with autism demonstrate atypical developmental delays in motor ability, social skills, and communication ability. They may exhibit high levels of motor or learning ability in some areas and poor ability in others. Many children with autism have extraordinary skills in music, mathematics, or object manipulation but seem highly deficient in basic motor, social, or learning skills. Their ways of relating to other people, objects, and events may be inappropriate or even absent. They have immature speech patterns, limited understanding of ideas, and inappropriate use of language. They often demonstrate prosody or echolalia (atypical pitch and word mimicking) without attaching the usual meaning to words. Most important to us as clinicians are the awkward or atypical responses to sensory stimuli. The senses that may be affected include sight, hearing, touch, pain, balance, smell, taste, and proprioception.

These behavioral characteristics may be evident as early as 6 months of age, but typically symptoms of autism are not apparent until 18–36 months of age. Often these children have seemingly normal development but at 18 to 24 months the developmental progression slows or begins to regress. Often it is the inconsistency in behavior and performance that is the universal characteristic in autism.

The incidence of autism has been reported as 5 to 15 per 10,000 births depending on the criteria used for diagnosis. "Classic" autism appears in 5 of 10,000 births.[2] More recently, the incidence rate has increased due to the inclusion of individuals with autistic-like behav-

Correspondence regarding this article should be addressed to Randy L. Schulman, OD, 5 Eversley Ave., Norwalk, CT 06851.

iors. There seems to be a trend to diagnose autism in children with such behaviors so that additional services can be provided to the child. Of all developmental disabilities, autism is the fourth most prevalent disorder. It may also be associated with other disorders such as metabolic disturbances, epilepsy, and mental retardation. Autism is four to five times more common in boys than girls and has been found in families of all racial, ethnic, and social backgrounds. There seems to be a strong genetic component in some forms of autism and, although rare, multiple incidence in families has been found.[2]

The diagnosis of autism is based solely on observation of the child's behavior. Kanner was the first to define autism in terms of an atypical behavioral pattern.[3] He clustered the following characteristics: an inability to relate to and interact with people from the beginning of life, an inability to communicate with others through language, obsession with maintaining sameness and resisting change, a preoccupation with objects in favor of people, and occasional evidence of good potential for intellectual achievement. Kanner offered no etiology for the autism but did associate it with possible genetic predisposition.

In observing individuals with autism, Rimland noticed similar characteristics and felt that a chemical or structural impairment was responsible for their characteristic behaviors.[4] He argued that autism is fundamentally a difficulty in giving meaning to incoming sensory stimulation and wrote that the child with autism is "grossly impaired in a function basic to all cognition: the ability to relate new stimuli to remembered experience." Rimland felt that the child with autism is "virtually divested of the means for deriving meaning from his experience." He cited damage to a localized site in the brainstem, presumably the reticular formation in genetically predisposed infants.

Delacato further elaborated on the sensory dysfunction of autism. He stated that the sensory problem is one of an inability to deal with the stimulation coming into the brain from the outside world and postulated that brain injury resulted in one or more deficient sensory intake channels.[5] Delacato attributed many of the characteristics of autism to sensory problems. He noted tactile dysfunction in 96–100% of his patients, auditory problems in 86–90%, visual problems in almost 70%, and taste and smelling difficulties in 24–28% of his patients. The strange behaviors, he theorized, are an attempt to normalize the dysfunctional sensory channels. His hypothesis is reminiscent of Goldstein's organismic theory that "the organism selects the features of the environment to which it will react and if the organism cannot control the environment, it will try to adapt itself to it."[6] The person with autism adapts to the faulty input by withdrawing from it, suppressing it, or stimulating himself to better control it.

Other writers have contributed to the discussion of autism as a syndrome. Frith defined autism in terms of a triad of poor communication, poor social ability, and poor imagination.[7] She attributed autism to faulty mentalizing ability and lack of coherence in central and peripheral thought-processing systems. Clara Park in her biographical book, *The Siege,* spoke of both her daughter's inability to interact with the environment and her poor mentalizing ability.[8] She summarized autism by the "overwhelming unwillingness to affect the environment and an inability to undertake exploratory behavior." She talked about "no motivation or drive, no sense of purpose and no capacity to imagine, to bring to mind and take seriously what is not, or not yet, present to immediate experience."

Despite the numerous theories on autism, the cause of autism is unknown. Autism does seem to be associated with a number of factors which may be viral, genetic, or immune in nature; psychological causes of autism, although popular in the past, are no longer accepted as etiological factors. The syndrome has been associated with frequent infections, Fragile X syndrome, maternal rubella, untreated phenylketonuria, and abnormal serotonin levels.[2] Frith aptly summarized that the cause may be "harm, havoc, or hazard," corresponding to damage to the neurological system, dysfunction of neural development, or genetic, metabolic, viral, immune, peri- or prenatal insults during development.[7] Actual structural damage is difficult to ascertain; studies of electroencephalogram and magnetic resonance imaging have been inconclusive. Biochemical imbalance and genetic predisposition are also considered to be possible causes, but no firm evidence for either has been established.[2] The most current research indicates that there is a central nervous system dysfunction. Courchesne et al[9] found a significant correlation between autism and cerebellar hypoplasia, whereas Gaffney et al,[10] found enlarged lateral ventricles and anterior horns and smaller right lenticular nuclei on magnetic resonance imaging. The most likely explanation of autism seems to be a possible genetic predisposition toward a neurochemical dysfunction with some insult early in life to the developing system.

VISUAL CHARACTERISTICS OF THE INDIVIDUAL WITH AUTISM

The numerous sensory dysfunctions of individuals with autism often manifest themselves as visual stimulatory behaviors. These stimulations include rocking, spinning, twirling, hand flapping, or other movements in front of the eyes. The individual with autism may seem particularly interested in small, moving objects, lights, shadows, mirrors, or shiny objects which are often viewed while spinning in circles. They may be fascinated with edges of objects, often placing toys or small objects at the edges of tables or chairs. These individuals can spend hours staring at tiny objects often attached to a wand or stick. They may also demonstrate spatial misperceptions or problems with depth perception, often changing their gait or seeming confused when approaching junctions in the floor or a stairway. They may be afraid of heights, stairs, or tunnels or may show no fear at walking precariously along the edges of rooftops or on balcony railings (Table 1).

TABLE 1. Signs of Visual Problems in Individuals with Autism

Squints or closes an eye
Stares at certain objects, patterns
Looks through hands
Flaps hands, flicks objects in front of eyes
Looks at objects sideways
Sensitive to light
Seems confused at a change in flooring or at stairway
Pushes or rubs an eye
Difficulty making eye contact
Looks at things in quick glances
Widens eyes or squints when asked to look
Bumps into objects
Fascinated by lights, shadows
Tends to feel his way by touching walls, tables as he moves

Nonoptometric researchers have written a great deal on visual dysfunction in autism. The lack of eye contact seems to be the most widely recognized. Rimland noted that "the strange way the autistic child stares into space has been the subject of much comment."[4] Both Kanner and Rimland talked of the pensive, vacant, unfocused gaze which seems to "look through rather than at one."[3,4] Hermelin wrote that "the child looks equally little at the file cabinet as at the psychiatrist. However, it is the psychiatrist who complains."[4] Frith noted that gaze is not used in communication.[7] Delacato was one of the first to specifically identify visual characteristics of the individual with autism and categorize them into hyper- and hyposensitive responses to visual stimulation.[5] He was particularly observant of the unusually dilated pupils, eyes turned in toward the self, and the difficulty in making eye contact.

Almost every book I have read written by the mother of an individual with autism speaks of her child's difficulty in making eye contact. In *Let Me Hear Your Voice,* Catherine Maurice, the mother of two children with autism, wrote of the absence of appropriate eye gaze.[11] She also gave an apt description of the most disturbing visual characteristics of the child with autism: intent gazing at a single object to the exclusion of anything else, toe walking, hand flapping, head shaking, body tensing, holding objects up to extreme corners of the eye, and looking at things upside down. She included an absence of imaginary play as a disturbing visual behavior.

OPTOMETRIC FINDINGS OF INDIVIDUALS WITH AUTISM

Scharre and Creedon's article "Assessment of Visual Function in Autistic Children" gave a very complete description of the visual evaluation of individuals with autism.[12] They evaluated 34 individuals with autism aged 2 to 11 years for ocular alignment, refractive error, visual acuity, oculomotor skills, and stereopsis. None of the children had ocular disease, known seizure disorders, or dysmorphic features. The findings revealed refractive errors ranging from -4.25 to $+3.25$ with a median of Plano. A 21% rate of strabismus using the cover test at near and far was found, and 14 of 17 of the children exhibited 550-sec arc on Lang stereopsis testing. Although all the children exhibited saccadic eye movements, 31 children had atypical optokinetic nystagmus and only 5 children demonstrated voluntary pursuit movements.

In private practice, I have observed 32 patients in whom autism was previously diagnosed. The patients ranged in age from 2 to 36 years. Of the 32 patients, six reported having had a diagnosis of pervasive developmental delay in addition to autism. Twenty-four patients were male and eight were female. Scharre and Creedon made several interesting observations in their discussion which are supported by my clinical experience. The researchers made an observation that the aversion to occlusion prevented assessment of amblyopia. This resistance to occlusion is very typical of the child with autism. In my observations of the individuals with autism, many resisted initial occlusion, oftentimes one eye more than the other.

Another observation that the researchers made was a high incidence of refractive error. In clinical practice, I have found very few with high refractive errors. In fact, the majority seemed to be emmetropic or mildly farsighted on either near or static retinoscopy techniques. Of the 27 tested, 4 did not have reliable fixation, 12 revealed emmetropia, and 8 revealed hyperopia between +0.50 and +1.00 D. One patient revealed greater than 2.00 D of myopia on initial testing but on subsequent evaluation revealed 0.50 D of hyperopia. Two other patients revealed myopia and astigmatism of up to 6.00 D sphere and more than 1.5 D cylinder which had been prescribed prior to my examination. Near retinoscopy was tested reliably on 10 patients. Of those tested, 3 revealed the normal lag of +0.50 D, whereas 5 demonstrated lags of +1.00 or more (Table 2).

Scharre and Creedon also noted that most of the subjects revealed intermittent exotropia. This fact correlates highly with my observations. The one different finding is the numbers. The researchers report an incidence of 21%, a finding consistent with the developmentally delayed population. In my observations of patients with autism, 27 (84%) of those patients revealed a strabismus. Only 5 patients (16%) demonstrated minor misalignments or no eye turn. The minor misalignments included asymmetric vergence eye movements during refixation. Of those individuals with autism who exhibited an eye turn, no fewer than 9 patients (28%) exhibited both an intermittent exotropia and an intermittent esotropia at varying times. Only 6 (19%) of the 32 patients evaluated were solely esotropic and 12 (44%) exhibited only intermittent exotropia (Fig 1). Sometimes the observation of a paradoxical strabismus was made at subsequent visits. Almost all the patients with autism demonstrated numerous misalignments during my examination. Although I have found a high incidence of strabismus in practice, it seems to be intermittent in nature. Stereopsis findings were obtainable and a number of my patients demonstrated depth perception. Of the 25 individuals tested, 60% responded positively to the stereofly on initial testing. Of the 15 patients who responded to the stereofly, 11 (73%) were able to correctly identify two or three of the animals on stereopsis testing (Fig 2). My findings are similar to those obtained by the researchers.

One explanation for the difference in the rate of strabismus found was the difficulty in obtaining reliable fixation on the cover test. I found that 31% were very resistant to the

TABLE 2. Retinoscopy Findings

Distance Retinoscopy (n = 27)	
Unreliable fixation	4
Emmetropia	12
Hyperopia ≤1.00 D	8
Myopia/astigmatism	2
Near Retinoscopy (n = 10)	
Normal lag	3
Lag ≥1.00 D	5
No lag	2

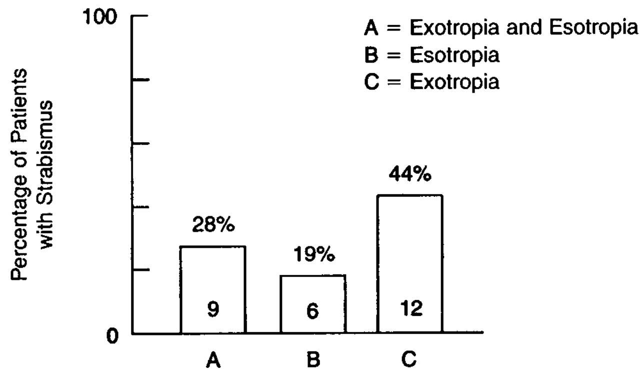

Fig 1. Strabismus findings (n = 27).

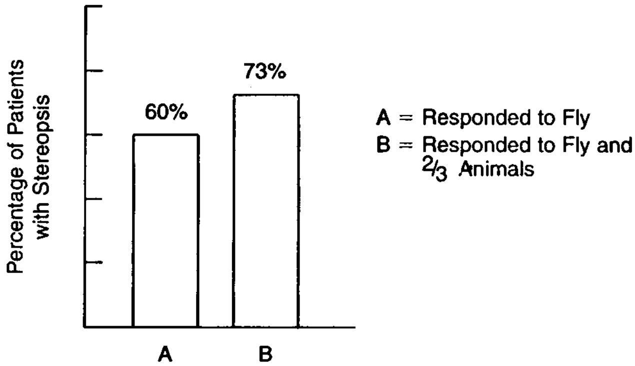

Fig 2. Stereopsis findings ($n = 20$).

cover on initial testing of 25 patients. In practice I have the opportunity to perform the cover test numerous times during my initial evaluation and make observations on other occasions during progress evaluations and during therapy. I can also attribute the higher incidence of strabismus found in practice to the fact that patients are referred because of the high number of visual characteristics of their condition.

One final observation made by the researchers is the atypical eye movements and the possible relationship to recent evidence suggesting a cerebellar and/or brainstem abnormality. The patients whom I have seen do have ocular motor dysfunctions and most have difficulty with fixations and pursuits. In observing these individuals in the examination and therapy rooms during less structured activities, I have found their eye movements to be saccadic in nature and not necessarily accurate; the saccades tend to be hypometric, and at times there is no compensatory movement. Seventy-eight percent of my patients demonstrated frequent loss of fixation or no fixation at all on initial evaluation. Only one patient demonstrated good grasp, release, and regrasp of fixation, whereas the remainder had fair fixation ability with some loss of fixation. Pursuit eye movements were very poor or absent in 50% of my patients. The remainder were fair (28%), as demonstrated by 50% accuracy with frequent saccadic intrusions or good (22%) as evidenced by 60% or better accuracy on initial testing (Table 3).

The fact that an impaired ocular motor system is often found in cerebellar pathways and that those pathways link it to the brainstem may be an important link to the etiology of autism. Rimland cited the reticular system

TABLE 3. Fixation and Pursuit Findings ($n = 32$)

	No. of Patients Exhibiting Findings	
	Fixations	Pursuits
Poor	25	16
Fair	6	9
Good	1	7

and an attention/arousal dysfunction, but he felt that he was not committed to the reticular formation as being the site of dysfunction. He strongly believed that the damage was local, in fact, given the patients' normal appearance and areas of superior development; they excelled in some areas and were very deficient in others.[4]

THE CASE FOR OPTOMETRIC INTERVENTION

We understand that a child's visual abilities require an emergent process of development through a variety of experiences across an extended period. At any point during the process, there may be roadblocks to hinder, change, or halt this development. These blocks to visual development include injury, illness, physical, or emotional trauma, and inadequate or inappropriate stimulation. In the case of the individual with autism there may be more than one deterring factor not limited to external insults but possibly due to internal genetic or biochemical dysfunction. We now have a picture of the child with autism who is getting distorted visual inputs, and we have identified some areas of faulty visual functioning. The unusual visual characteristics may result from their misperceptions of their world; the behaviors may be, as Delacato suggested, the attempt of the child with autism to neutralize the input or simply manage despite the fragmented, unreliable visual information.[5]

Many theories have been proposed to explain the nature of the sensory dysfunction and the purpose behind the unique characteristics of autism. From the optometric perspective, it is very interesting to listen to the language the researchers use. The next few paragraphs will further explore some of the thinking on autism and then the case for optometric intervention will be made.

Delacato aptly noted that sensation is necessary for the development of the nervous system and requires an essential sequence of experiences. He wrote that "since there is no control of the sensory system, he chooses to control the inputs going into the sensory system. He allows *in* those that he alone controls; the others are rejected as chaos."[5] Delacato also suggested that space is *not constant* and crowds them so they are incapable of functioning. He felt that treatment should aim to normalize the input. He gave recommendations on changing the lighting or contrast, using colored lights or filtered glasses. He even suggested varying the visual activities and talked of varying distance and direction. He mentioned penlight pursuits and encouraged the use of a mirror to visually stimulate these children.

Rimland believed that there are two principles to the dysfunction which are important to recognize: first, that they cannot understand relationships or think in terms of concepts, symbols, analogies, or abstractions and, second, that they cannot integrate sensations into a comprehensible whole.[4] Rimland cited the reticular formation as the locus of integration and modulation of the receptor system. Specifically, he felt that its vital role was in the initiation of attention and in the maintenance of alertness. He stated that what is most crucial in autism is the inability to "perceive and attach meaning to the input from the distance receptors" (sight and hearing). He believed in the necessity of having " flexibility and a readily adaptable capacity for attending and for changing the focus of attention." With this attention or alertness, Rimland hypothesized, comes a certain indistractability or concentration.

Frith also thought that the control of attention was dysfunctional and postulated that "they may focus too much attention and too much detail and thus cannot see the wood for the trees." She attributed the deficiency to a lack of central coherence; they did not see the need to generalize and thus did not comprehend the whole picture. She further believed that the attention mechanism was intact because individuals with autism are able to concentrate on things that would not interest others and they can concentrate longer than others. Thus, they may be engrossed in a peripheral task as intently as if it were central (so much so it becomes central). In her book, *Somebody Somewhere,* Donna Williams wrote "I was sick to death of my attention wandering onto the reflection of every element of light and color, the tracing of every patterned shape."[13]

Frith made an important comparison between mentalizing ability and self-awareness. She believed that "the ability to make sense of other people is also the ability to make sense of oneself." Furthermore, Frith wrote that "the culmination of mentalizing ability is self-consciousness."[7] Rimland defined self-awareness as the "ability to perceive one's self as an entity" requiring abstracting "a certain essence from one's experiences."[4] He wrote that the individual with autism cannot integrate sensations and views events as unrelated. For these individuals, the "building of an organized, unitary ego would seem impossible." The incapacity for self-awareness may then account for the savant behaviors of the child with autism. They do not think about the process, but just do it. Their attention is fixed only on the one task at the suppression of all other stimuli.

In addition to their thoughts on development, arousal, awareness, and attention, the clinicians had some observations regarding central and peripheral processing. Rimland felt that the "fundamental impairment" is the difficulty in coping with figure-ground relationships.[4] Frith spoke of a fragmented world full of confusion and terror which is unpredictable and strange.[7] The fragmented sensations and actions are a result of a lack of coherence. To her, it is not a lack of control, but a lack of knowing when and where to apply the control. She wrote of central thought which interprets, compares, stores, draws inferences, reinterprets, and initiates action, and peripheral thought which comprised pieces of uninterpreted information. She related the autistic behaviors to theories of the mind. Frith felt that the impaired social relations resulted from the inability to realize the thoughts and actions of the mind, that we think, know, believe differently from others.

These researchers and clinicians all speak in terms with which we should be familiar. They talk of development, space dimensions, attention, awareness, gestalt perceptions, and central and peripheral processing. In thinking about the sensory dysfunction in autism, there are several key elements that come to mind. One may be the process of development itself. The critical period seems to be between 10 months and 3 years of age. This period is familiar to optometrists as a crucial period of visual development. It is at this stage in development when the child begins to move from near space out to far space. It is when self-awareness begins and is explored. The child begins to show increasing visual-motor manipulation and interaction with the environment. The child also expands his periphery and begins to socialize with others through eye contact.[14] Perhaps, it is at this stage of development where something goes awry and the crucial process of awareness and expansion into the world is interrupted.

More than any other sensory system, it is vision that is most responsible for gathering information from our environment, deriving meaning from that information, and directing our activities. Vision includes the interpretation of one's world and other people's worlds. Vision requires a general awareness of the world which includes the ability to have foresight, insight, intuition, creativity, and imagination. It is all these areas in which the individual with autism is deficient. As John Streff has said, "when vision is working, it guides and leads, if not it interferes."[15] Now, if the visual system is interfering in such a way as to create a lack of awareness, inattention, or fragmented view of the world, we have the knowledge to help organize perceptions. We further understand that structure and function are not mutually exclusive. Function can affect structure. Given that there is a sensory dysfunction of some sort in autism, it is our role as vision care providers to identify what the visual dysfunction is and offer the means to optimize the functioning in the patient's life.

Not only do we have a comprehensive understanding of the visual system, we also hold the tools for enhancing and retuning it. By changing the sensory input through the use of lenses, prisms, occlusion, and filters we can affect overall processing. Lenses and prisms intentionally change space dimensions, encouraging the patient to negotiate distance and space variables in a different manner. In the case of the individual with autism, the lenses and prisms may break the dependence on an inflexible structure based on misperceptions. Plus lenses may expand the visual field in such a way that they are now able to process more information without becoming so absorbed in one thing. Similarly, yoked prisms bend the light energy causing an effective expansion or compression in a given field. Occluders and tinted lenses may also create a change in the incoming stimuli.[15,16] The resultant change may be the organizing principle necessary for a more global view of the world.

As explained by Forkiotis, lenses result in a "change in physiology of the individual" inducing "an awakening and stimulation . . . of the conscious awareness of all sensory-motor levels."[16] Forkiotis calls lenses "the most powerful and effective tool in affording a change in perception." The result is a change in physiology toward improved function and performance. For the patient with autism it may be the missing ingredient to establishing a better, bigger, brighter world with a more accurate understanding of self in time and space. The lenses just may break down the perceptual inflexibility that suppresses and distorts the stimuli coming in, and allow for more accurate simultaneous processing in an expanded field.

For Donna Williams, glasses with a tint was the crucial factor.[17] She stated that, on putting on the glasses for the first time, "the room didn't seem so crowded, overwhelming or bombarding. The background noise I had always heard before was not even apparent." She gave the example of the messy room she "had never seen." It "had always been bits of different mess in parts of a room." With her glasses she was able to observe the gestalt and take in directly, without any overload, what had been viewed before only peripherally.

Vision therapy affords the opportunity to relearn or learn anew how to interpret the visual input in the safe environment of the therapy room. It is a process of guiding the development of the visual system so that it functions with optimal efficiency. By using many different lenses, prisms, and forms of occlusion, we create numerous opportunities for change. We can help the individual to increase awareness by directing attention in a different manner. Thus, the misperceptions as evidenced by the visual dysfunction come to conscious awareness and the patient can establish a more organized view of the world. They will abandon the visual behaviors that represent the distortion in sensory perception in favor of an improved pattern and appropriate responses to stimuli.

One of the most important things that can be gained in a visual therapy program is self-awareness. Body movement activities are an appropriate place to begin developing this awareness. The incapacity for self-awareness is aptly put by Donna Williams when she tells of her inability to feel both her leg and her hand upon it.[13] There was no cohesiveness, just a hand or a leg but no simultaneous perception of the whole body. In vision therapy, feedback is encouraged and self-awareness and attention are developed in all areas of perception. In therapy we guide the individual to establish a more global view. We do not emphasize central versus peripheral but rather a total field. This unified model of vision comprising total vision may afford the "glue" necessary to piece together the fragmented world of the individual with autism.

It is also important to recognize that vision does not operate in isolation. Rather, vision is closely related to balance, movement, posture, and to some extent speech and language ability. We are reminded of Skeffington's four circles which demonstrate the inclusiveness of the visual system. Skeffington's model of vision included identification, centering, speech-audition, and antigravity. It was the most comprehensive model of the interrelatedness of the sensory systems in terms of meaningful information. Dr. Shankman has taken Skeffington's model and expanded it in his Perspective on Behavioral Optometry.[18] He equated antigravity with self-awareness and the ability to be more balanced physically and emotionally. He felt that centering required concentration, or the ability to center the mind on a desired point and not be distracted by peripheral stimuli, yet remaining aware of their presence. Identification was viewed as knowing or thinking and related to the ability to see or think clearly. Skeffington's speech-audition circle corresponded to listening and the ability to communicate.

When we think about autism in terms of this expanded model, we truly have a more global view of the disorder. More important or more critical in the treatment of the patient with autism is the fact that we have the tools and ability to create a change in the model through optometric intervention. Because most of our information about the world comes in through the visual system, it can and, in fact, does affect the processing and functioning of other sensory-motor systems. Through the visual system we can make changes in self-consciousness, attention, thought processes, and communication ability.

DISCUSSION

In this article, the visual behaviors of the patient with autism have been presented and a case for optometric intervention has been made. Clinical and research optometric findings have documented disorders of the visual system which we can diagnose and treat. The case for optometric intervention has been given, calling for prescribing vision therapy and lenses and/or prisms to create positive changes. Therefore, I strongly believe that the treatment of the child with autism should include optometric intervention, especially the child demonstrating unusual visual characteristics. The therapy should include individualized in-office vision therapy with a supportive home program. The training should also include lens, prism, and filter application. Emphasis should be placed on motor activities with feedback using visual, auditory, and proprioceptive stimuli to develop awareness of the body and the visual system.

In my practice, alone, the results of such treatment are very promising. Although I have not quantified the success of my patients with autism, I have qualified success in terms of decrease in visual or other self-stimulation, increased visual awareness, and improved visual skills. I have also studied the overall development of the individual, including socialization and communication ability as observed by me, the parents, and other therapists or teachers. Of the cases in which I had the opportunity to do vision therapy, I have graded each case as making slow, fair, or very good progress. Of the 20 patients who were able to do therapy on a bimonthly or monthly basis, 25% made slow progress, 30% made fair progress and 45% made very good progress. There were no cases in which no improvement was made (Fig 3).

With such high rates of success it should be evident that our intervention is important and should be part of a multidisciplinary approach to the treatment of the individual with autism. In practice, it was the patients who also had the opportunity for other interventions who made the most progress. The professional evaluations and interventions which, in my opinion, seem to be the most important are body wellness, sensory integration, and, in most cases, auditory integration testing. Body wellness investigation should not be limited to the physical examination by the pediatrician but should include the utilization of other professionals. These include nutritional practitioners, allergists, chiropractors, and other professionals specializing in such areas as applied kinesthiology, cranial-sacral manipulation, and homeopathy. In addition, the proper educational setting is necessary for the most learning to take place. I have found that behavioral modification techniques are extremely useful in the younger patients and employ some of the applications to sponsor lens, prism, or therapy acceptance. As clinicians, we must work together with the other professionals. It is our responsibility to educate others and make suggestions to other professionals regarding vision. We may also make recommendations to the educator as to optimal lighting, postural and seating requirements, and modifications to school work.

Thus, in treating the individual with autism, we must be willing to become members of a team who are still learning the best way to treat these individuals. We must remember that, because we are not always afforded the opportunity to perform our standard optometric battery, we must be creative and become good observers. We must look at posture, behavior, and the visual stimulations and determine where the dysfunction lies and what treatment can make a change in each area. Many of these patients are nonverbal so we must look very closely at the behaviors and the changes in behavior patterns with different lenses, prisms, or light filters. With our tools for change, we can make some differences in the overall functioning of these patients.

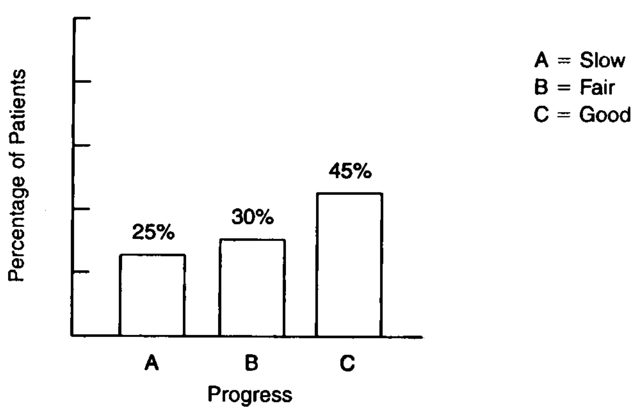

Fig 3. Progress in vision therapy (n = 20).

SUMMARY

Optometric intervention in the treatment of autism is important. Autism is primarily a sensory disorder and the individual with autism has many signs of disturbances of the visual system. The unusual visual characteristics of autism are evident very early in development and thus affect development in other areas. As optometrists cognizant of behavioral characteristics of visual dysfunctions, we are in a position both to evaluate and treat these individuals. Through the judicious use of lenses and prisms and a program of vision therapy, we can provide the opportunity for change the individual with autism needs to function better in a very much visual world.

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