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Visibility

News and Research from Envision Vision Rehabilitation Center

Envision Conference 2010: Excellence in Advocacy

Sept. 22-25, 2010
Westin Riverwalk
San Antonio, TX

Excellence in Advocacy Keynote Announced

Envision announces Kara Gagnon, OD as this year's ***"Excellence in Advocacy"*** keynote speaker. Dr. Gagnon currently serves as the Director of Low Vision Optometry at the Eastern Blind Rehabilitation Center, VA Connecticut Healthcare System where she has fourteen years of

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ENVISION CONFERENCE 2010

The Link between Cardiovascular Health and Healthy Vision

A decline in cardiovascular health leading to heart disease is the number one killer of men and women in the United States. Additionally, cardiovascular disease is a major complication and the leading cause of premature death among people with diabetes. About 75 percent of people with diabetes die from heart disease or stroke. Diabetes is the leading cause of blindness in the U.S. Eye care providers should understand the importance of cardiovascular health, especially the ocular implications.[1-2]

The eye is unique because blood vessels can actually be directly visualized. This means that the eye can be the first manifestation of cardiovascular disease or other systemic diseases. Cardiovascular disease affects the major arteries in systemic circulation, clogging and stopping the flow of blood. Retinal vascular disease can be an outcome of generalized atherosclerosis, which is a thickening, hardening, and loss of elasticity of the arterial walls, resulting in impaired blood circulation. Atherosclerosis develops with aging, hypertension and diabetes, all originating from the cardiovascular

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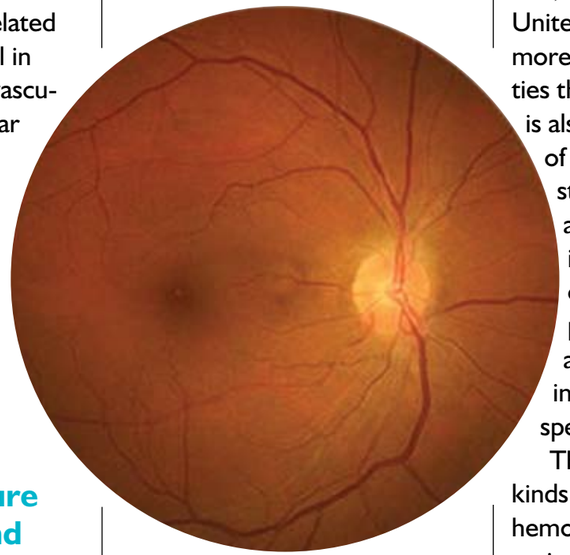
ENVISION Vision Rehabilitation

system. The fragile blood vessels in the highly vascularized retina can become damaged from atherosclerosis, hypertension and also deteriorate into vein occlusions or age-related macular degeneration, all in conjunction with cardiovascular disease. Cardiovascular complications, as well as early signs of hypertension, can be seen by ophthalmologists when examining the retina, giving them a role in the diagnosis and management of cardiovascular disease.[3-4]

High Blood Pressure (Hypertension) and Vision Loss

High blood pressure, also known as hypertension, is a cardiovascular disease that can have repercussions throughout the entire body, including the eye. Hypertension can predispose a person to having a variety of eye problems. If hypertension becomes chronic, it can affect the retinal blood vessels to the point where vision is affected through conditions known as hypertensive retinopathy, or retinal vein occlusions. Hypertension can cause retinal arteriolar changes that lead to a narrowing and compression of the veins. This causes a blockage to the portion of the circulation system that drains the retina of blood and can result in branch or central retinal vein occlusions. These types of retinal vein occlusions can be accompanied by hemorrhages, optic nerve atrophy and vision loss from ischemia or macular edema.[4]



Hypertensive retinopathy- High blood pressure can affect the vessels in the eyes. Blood vessels can narrow or thicken and harden (arteriosclerosis). This type of edema may cause distorted or decreased vision.

The damage from high blood pressure is cumulative, so the longer it goes untreated and unmanaged, the more likely that permanent damage will occur. High blood pressure is also associated as a cause of stroke, which can impair the optic nerve or damage the area of the brain responsible for processing images.[5]

Stroke and Vision Loss

One form of cardiovascular disease affecting the blood supply to the brain that affects vision is known as stroke, or cerebral vascular accident (CVA). Strokes occur in more than 780,000 people each year in the United States. Stroke causes more serious long-term disabilities than any other disease, and is also the third leading cause of death in the country. A stroke occurs when there is a disruption of blood flow in the brain. The effects of stroke depend on the part of the brain that is affected, and can include impaired body movement, speech or sensory function.

There are two different kinds of stroke: ischemic and hemorrhagic. Transient ischemic attacks (TIAs) are like a "mini-stroke" that can occur when the blood supply to the brain is briefly interrupted.[6-7]

The two most common vision loss symptoms of stroke include hemianopia and diplopia. When a stroke injures the optic nerve, which sends information from the eyes to the brain, this creates a visual field deficit known as hemianopia. Hemianopia blanks one side or one quadrant (quadrantanopia) of the visual field in each eye. With diplopia, or double vision, the two eyes fail to work together properly.[7]

Obesity and Vision Loss

Obesity is a major risk factor in the onset and progression of several health conditions that can lead to vision loss. Excess body weight predisposes a person to various systemic diseases like cardiovascular disease and diabetes that can cause vision loss. Some eye diseases, like diabetic retinopathy due to uncontrolled diabetes, are directly linked to the large number of medical conditions that can be associated with obesity. However, a majority of the public is unaware of the link between obesity and vision loss.

According to a recent review study of thousands of patients from around the world, researchers at the Goldschleger Eye Institute found strong evidence linking obesity and the occurrence of the leading eye diseases that cause vision loss. Vision loss from the major eye diseases, such as diabetic retinopathy and macular degeneration, the leading causes of adult blindness and vision loss, as well as glaucoma, are known to affect the vascular system. Obesity and excess weight are also linked to creating pulmonary problems, which can cause permanent damage to the blood vessels in the eye leading to permanent vision loss.[8]

Body Mass Index (BMI) is used by the Centers for Disease Control and Prevention (CDC) to track obesity rates in the United States. BMI is a number calculated from a person's weight and height. BMI is an indicator of body fat and is used to screen for weight categories that may lead to adverse health problems. Adults with a BMI number of 30.0 and above are considered to be obese by the CDC. Recent studies have also shown that there may also be a correlation between the BMI measure of obesity and vision loss. In these studies, people with a BMI of 30 and above were found to have a greater risk of age-related macular degeneration. In addition, they also had an increased likelihood of developing cataracts or glaucoma.[9-10]

Obesity is becoming a public health problem of epidemic proportions. Since 1980, obesity in the U.S. has doubled in adults and tripled in children and adolescents. According to the CDC, there are more than 130 million people in the U.S. that are either overweight or obese. CDC researchers estimated that in 2003, medical expenses in the U.S. related to obesity reached $75 billion.[11]

Importance of a Healthy Lifestyle

Eye disease and heart disease share a number of common risk factors. In addition to the links between age-related macular degeneration (AMD), heart disease and healthy vision overlap in many other ways. Smoking and poor diet are two risk factors that are known to adversely affect both cardiovascular and ocular health. In addition to the connections between hypertension and physical changes in the retina, cardiovascular disease and AMD have many of the same risk factors and

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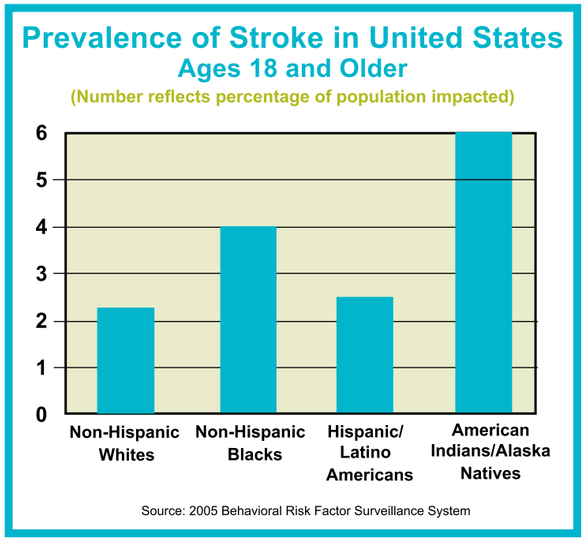
"According to the CDC, there are more than 130 million people in the U.S. that are either overweight or obese."

preventive measures. Modifying diet and stopping smoking are considered the best preventive measures.

One recent encouraging study has shown vigorous exercise may help prevent vision loss. A pair of studies at the U.S. Department of Energy's Lawrence Berkeley National Laboratory, following approximately 41,000 runners for more than seven years, strongly indicated that vigorous exercise from running reduced the risk of both cataracts and age-related macular degeneration. The research suggests the importance of a healthy lifestyle and this study is among the first to suggest that vigorous exercise may help prevent the onset of eye disease and vision loss.[12-13]

Healthy vision and optimal functioning of the microvasculature in the eye depend on receiving good dietary nutrients from the heart. A healthy diet is considered to be a diet rich in fruits, vegetables and fiber. In addition, diets that are also rich in soy have phytosterols, phytochemicals and isoflavones that are beneficial in lowering cholesterol and maintaining good blood flow through the eye vessels. Other factors influenced by diet, such as the intake of omega-3 fatty acids which are good for a healthy heart, also seem beneficial to lowering the risk of age-related macular degeneration.[4, 14]

The message that eye care providers tell their patients when they ask what they can do to keep their eyes healthy is the same as what their primary care doctors are recommending to keep their heart healthy: exercise, try to avoid obesity, don't smoke. If you have diabetes, make sure it's under control and eat a healthy, balanced diet that includes plenty of fruits, vegetables and omega-3 fatty acids.



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GUEST COLUMN

Bhavani R. Iyer, OD, FAAO

Visual Rehabilitation Following Stroke

Cerebral Vascular Accident (CVA) or stroke affects individuals in different ways, ranging from pure visual side effects (homonymous hemianopia) to hemiperesis, aphasia, cognitive impairment, memory loss and even death, in some unfortunate cases. As of 2005, it is estimated that there are 6.5 million people with stroke in the United States, with 795,000 added each year.[1] It affects women more than men and is 2/3 more common after the age 65. With 1/3 of the stroke sufferers being under 65, the impact on the working population is significant.

Stroke is the third leading cause of death in the United States, with 87% being ischemic, 10% being cerebral hemorrhages and the rest subarachnoid hemorrhages. The co-morbidities associated with a stroke depend upon the area of the brain that was affected and the duration before which treatment was provided.

With the recent advances in emergency response systems and treatment protocols, more patients are surviving strokes than ever before. It is reported that nearly a quarter of these individuals have a visual field loss that impacts their normal day to day functions.

The most common functional complaints include difficulty reading (having to re-read words, difficulty getting back to the beginning of the next line and comprehending what is read), walking, driving, bumping into things, people and doorways. The loss in independence combined with loss of job and fear of bumping into people creates social isolation and depression. Visual rehabilitation can restore some of these functions, thereby improving the individual's overall quality of life. The following case is a good example of how visual rehabilitation played a pivotal role in changing this individual's life.

TW was a cheerful 42-year-old white female who used to work for a consulting company who came to see us on 9/17/09. She was referred to the Center for Visual Rehabilitation which is associated with the Cizk Eye Clinic, University of Texas Department of Ophthalmology and Visual Science following a request for an ophthalmology evaluation by the University of Texas stroke team.

She used to travel with her family and enjoyed reading with her 7-year-old son until she suffered a hemorrhagic stroke to her left

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"As of 2005, it is estimated that there are 6.5 million people with stroke in the United States, with 795,000 added each year."[1]

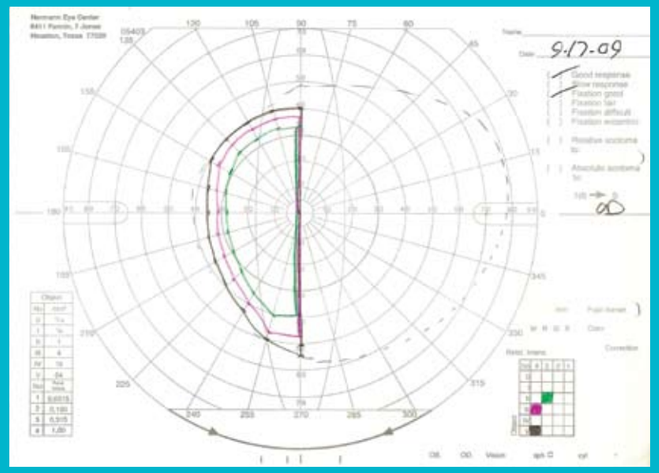
temporal lobe in May of 2009. It left her with a complete right homonymous hemianopia, mild motor aphasia, anomia (difficulty remembering names of objects, places) and memory loss. She stopped driving shortly after the stroke, per the ophthalmologist's recommendation. She had difficulty reading (which she used to enjoy) and walking, bumped into walls and was surprised by people coming at her from the right side in shopping malls and grocery stores. Her stated goals were to be able to read comfortably again and drive. Her husband was supportive and accompanied her to the evaluation. She lived in a two-story home with bedrooms upstairs.

Her medical history was positive for hypertension, diabetes, Hepatitis C, cholesterol and surgery for heart stent in May of 2009. She suffered a hemorrhagic stroke a few days after the stent surgery and underwent a left craniotomy to evacuate the hematoma. She was on medication for the hypertension, diabetes and high cholesterol. She self-reported depression and frustration at having lost her independence. She was undergoing speech and physical therapy.

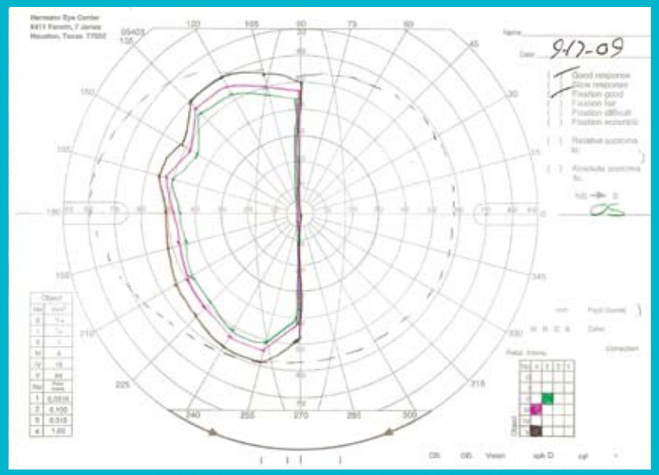
Her previous spectacle Rx, which was less than a year old, was OD: -1.25 +1.00 x 90; OS: -1.75 +1.50 x 90; ADD: +1.00DS. Her best corrected visual acuities were 20/20 OU on the ETDRS chart, with TW consistently missing the right side letters on the chart. While she was able to see up to 0.5M on the single letter chart, she was able to read only up to 3.2M on the Lighthouse continuous print chart (Children's version). She read very slowly and had to repeatedly re-read words. She became frustrated fairly quickly and said "I feel like a Cuckoo." She was able to read up to 2.0M continuous print when provided with a visual anchor for scanning. Her contrast sensitivity was not reduced and refraction remained the same.

Her writing was decipherable, but not it's best due to fine motor deficits in her right hand. The words went uphill, even with bold lined paper. Her posture was upright, and she walked independently with good cadence, but had a tendency to hold her head stiff and bump into doorways

Chart A



TW Goldman Perimeter Field Test, OD 9-17-09



TW Goldman Perimeter Field Test, OS 9-17-09

and people on the right-hand side. She demonstrated mild spatial inattention to the right, but did well with prompting. She made multiple hypometric saccades to see targets in the right field and was on the mark in the left field as expected. Her extraocular movements were full and pursuits were smooth. Goldman perimetry revealed a complete right homonymous hemianopia.

The field results were discussed with TW and her husband. She was made aware of the field requirements for driving in Texas and that she did not have adequate fields to drive. She became upset, but was reminded that she was still within the spontaneous recovery period of 6 -18 months, up to which her field could potentially improve on its own (per note in her neurology report).

At this point, prisms were introduced to improve peripheral field awareness. Several strengths were demonstrated and a 20^ base right in front of the right eye was found to be the most suitable and tolerable for TW. The pros and cons of using prisms and the mechanism were explained to TW and she clearly communicated a willingness to try them if it could help her avoid bumping into things and people. She was educated that this was not intended as a means for her to drive.

She was referred to the center's occupational therapist (OT) to work on scanning and saccades training. A follow-up was scheduled to paste the Fresnel prisms after a couple sessions of scanning training to ensure adequate scanning into the defective field. A 20^ base right was dry mounted to the right temporal half of her right spectacle lens. She was oriented to the prisms and shift in image location and returned twice a week to work with the OT on scanning, center-periphery awareness including training with the Dynavision training board, adaptive reading, writing strategies, and mobility within a community (hospital, elevators, escalator, shopping).

Lind Stevens, OTR/L

Upon an occupational therapy evaluation, several areas of deficit were identified in functional areas like reading, independent mobility, maintaining finances and possible return to driving. The goal of therapy was to increase her ability to read comfortably so she could once again enjoy reading. In order to accomplish this, she had to scan the word fully, accurately, and in less time. On the Pepper Visual Skills Reading Test (VSRT), which is a non-contextual reading test, she was reading 18 words per minute (WPM) with 93% accuracy. Errors were seen at the end of the words. She also had a language deficit that slowed word recognition.

TW also reported errors with bill paying at home. In the area of functional mobility, she reported that she occasionally bumped into things on the right at home. Her greatest area of difficulty, however, was walking in dynamic environments such as the mall or the grocery store. Observation of the patient in public areas showed that she tended to keep her head fixed in a forward position. When questioned about this, she said that she was afraid of "running into things". The goal of therapy was to improve scanning skills so she was able to navigate these complex environments safely and independently.

Intervention for reading included the use of an anchor to help her track across the line. Graded reading materials were used that provided interest and the 'just right' challenge to enable her to work on visual skills. She was encouraged to spell difficult words, which allowed her to recognize them. TW read out loud for a portion of each therapy time so that the OT could provide feedback for continuous text reading. Intervention also included number copying, letter and word scanning drills, with and without use of anchor, and self-checking for accuracy. A home program to reinforce the above skills was regularly carried out.

Intervention for functional mobility included the use of the Dynavision training board and mobility training in the public

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areas in which the clinic was located. Initial Dynavision training included self-paced and device driven tasks with eyes leading the search to prepare for use of prisms. The complexity of the Dynavision tasks was increased with the addition of two or more digit recognition presented in the center of the board. As the patient improved, the tasks were made more challenging. After a few scanning sessions, when prisms were introduced to TW, these were incorporated into the Dynavision training and tasks to increase peripheral awareness were added. Mobility training included instruction of scanning skills in a real world setting. This was completed before and after introduction of prism to the lateral side of right lens. TW was trained in correct use of the prism. She incorporated the above skills into trips to the grocery store and to the mall, outside of therapy.

After 3 months of occupational therapy, twice a week, TW was reading 24 WPM with 95% accuracy on the VSRT (Pretreatment speed was 18 WPM). Though statistically this does not appear to be a big difference, the biggest improvement was noticed on a timed contextual reading test, taken once a month. Her reading speed improved from 33 WPM pretreatment to 50.5 WPM using text with similar level of complexity in 3 months. At this time, TW was also paying her bills accurately. In addition, she felt confident enough to begin tackling the files at home that had been accumulating since her stroke. She had also completed two simplified, abridged classic novels, as part of her home program, and was working on a third. As an avid reader, this was important to her.

TW's functional mobility and scanning skills had also improved. She demonstrated improved Dynavision scores. As one example, her initial response time on the 60-second self-paced task increased from 38 hits at the start of care to 58 hits after three months of care. She initially did not like the prism but soon became accustomed to it and found that her skills to detect objects in her lower right field were heightened, especially in dynamic, complex environments. TW reported that her ability to navigate the mall had greatly improved. Her head movements had also become more natural.

Due to her active involvement in therapy and her home program, TW knows how to continue working on her visual scanning, reading, writing and mobility skills. TW hopes to return to work after the first of the year, but is not sure what her job description will be as she is still not functioning at the level she was at prior to the stroke, largely due to the language difficulties that remain. A work site evaluation may prove useful.

Follow up: She returned on 11/3/09 for a follow up at the OT's prompting after she reported that things were looking double when she looked through the prism, while they hadn't before. She also said she could see things quicker than before.

Her visual acuities remained at 20/20 OU through her correction. A repeat Goldman revealed this picture: *(see Chart B)*

Not only had her field expanded within her seeing area, it had actually crossed over the midline into her deficit area. She was ecstatic at the improvement and felt encouraged to continue her treatment plan. Since the field had obviously improved, and the prisms were causing diplopia even with a slight right gaze, it was cut back a few segments. After walking around the medical center to assess her adaptation to the new position, it was cut back even more leaving only a quadrant.

She was advised to continue to work with the OT on the scanning and center periphery awareness tasks. She was asked to return for a 1-month follow up.

Discharge (12/09/09):

At discharge, her visual acuities remained at 20/20 OU. Her fields looked like this: *(see Chart C)*

Her fields continue to improve, though not as dramatically as we saw at the 2-month follow up after rehabilitation training was started. She was ecstatic at her improvement and reported that she no longer bumps into objects and people. Her reading has improved, and when asked if we could remove the small wedge of prism in the lower right quadrant, she became upset as she still uses it when walking in malls and

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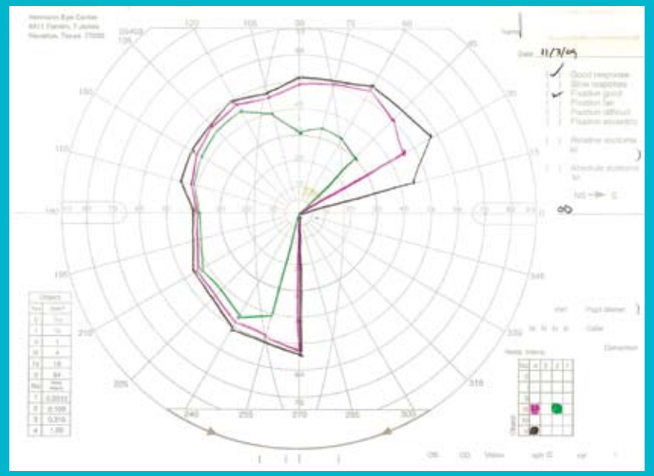
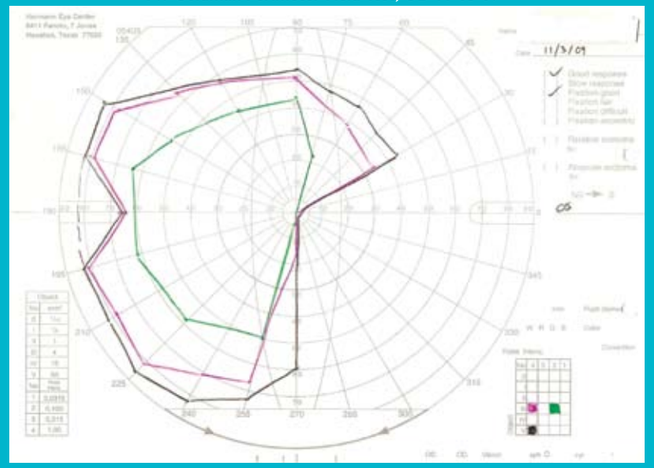
Chart B

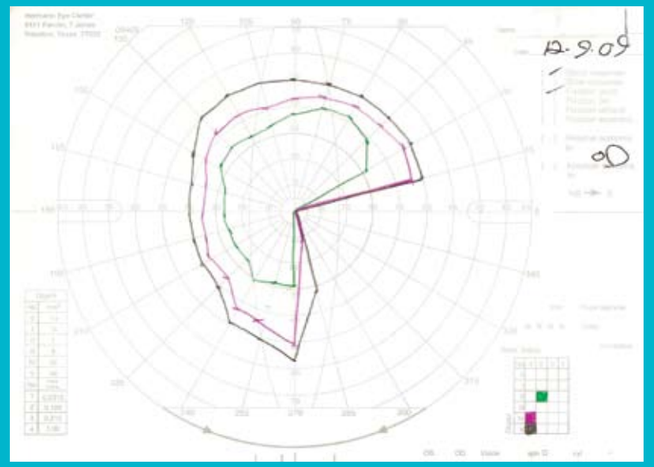


TW Goldman Perimeter Field Test, OD 11-03-09

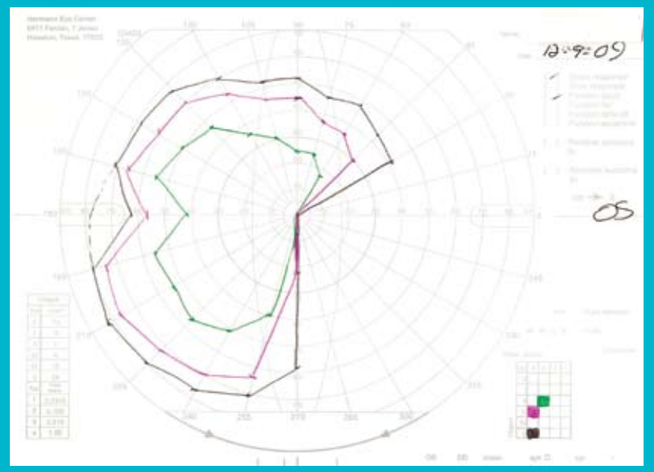


TW Goldman Perimeter Field Test, OS 11-03-09

Chart C



TW Goldman Perimeter Field Test, OD 12-09-09



TW Goldman Perimeter Field Test, OS 12-09-09

A 20^ base right dry mounted Fresnel prism

grocery stores and would prefer to leave it there. She will continue to work on her home training program as instructed by the OT. In addition, as a result of TW's progress with scanning, prism use, and Dynavision scores[2], a formal driving evaluation in the near future may be appropriate.

Discussion:

With an increase in survival rates following a stroke, we are increasingly likely to see individuals like TW who have to live with a visual field deficit. Since the rehabilitation intervention occurred within the 6-month period, which most experts agree as the window for possible spontaneous recovery, it is unclear as to whether the improvement in the visual field was a result of the rehabilitation or spontaneous recovery. If it is indeed spontaneous recovery, one might argue that we kick-started it with rehabilitation since TW had had no change in the first 4 months after her stroke. If this is indeed a direct result of the rehabilitation training, as vision rehabilitation specialists, we have great potential for changing the lives of as many as 1.62 million people.

Functionally, TW has gone from being told that she will never be able to drive again, to having a second chance at keeping her independence.

Improvement in reading speed has given her confidence that she could some day return to work. Until then, she is enjoying reading to her son. A multi-specialty approach to the rehabilitation plan is often required in these patients to ensure a positive outcome.

We are in the process of a full-fledged IRB approved study to evaluate the outcomes of scanning training in stroke patients.

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GUEST COLUMN

William L. Park, OD, FAAO

Contact Lenses for Infants With High Refractive Error: A Life Changing Endeavor and the Sooner, the Better!

William Park, OD, FAAO and Joanne Park, COA

Contact lenses should be an important consideration for best-corrected visual acuity for high refractive errors and/or anatomical ocular disease manifestations such as aniridia (prosthetic iris contact lens). They can be critical as a component of short and long-term BCVA considerations for infants due to nystagmus and their high refractive error.[1] Contact lenses may also be instrumental in enhancing daily visual function for persons with retinal dystrophies.

PROBABLE IMPLICATIONS FOR CONTACT LENSES

Albinism	High refractive error	Ocular Trauma
Aniridia	High RX/ Nystagmus	Pediatric Aphakia
Anisometropia	Hyperopia > 4.00D	ROP
Coloboma	Microphthalmia	
Cone Dystrophy	Myopia > 4.00D	

Previously, Park and Sunness[1-4] and others[5-7] reported the use of red contact lenses to alleviate aversion to light during normal illumination (photopic conditions) in patients with cone disorders that were present at birth. Dramatic improvement in visual function in all patients (determined by observation of the patient and by a patient retrospective interventional case series) was achieved.

Various rationale expressed by the children (retrospectively) for their argument for contact lenses ranged from their perceived perception of how others saw them with contact lenses vs. glasses, having to remove their glasses to participate in activities (sports/recreational) resulting in even poorer vision and performance, or simply not wearing their glasses because of having to explain their vision to their peers.

In the following case, contact lenses are paramount for maximum alignment of the visual axis with the prescriptive correction, due to the large optical zone of the contact lenses (generally 6^{+}-8^{+}mm) vs. the pinpoint optical center of glasses. For obvious reasons, this is extremely important in patients *continued on page 13*

William L. Park, OD, FAAO

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"Contact lenses should be an important consideration for best-corrected visual acuity for high refractive errors and/or anatomical ocular disease manifestations."

Case Study: ROP with significant systemic implications

KW and her twin CW were born in Kansas at approximately 23 weeks, at a birth weight of 1 lb. 4 ounces and subsequently placed in NICU.

The course of early intervention was eventful, beginning with referral to a ROP retina specialist in suburban Detroit following initial laser treatment in Kansas. To date, a total of four MEDEVAC flights for examination under anesthesia (EUA) and consideration of retinal surgical intervention were necessary due to health issues.

Post contact - fitting, KW held her head more vertically and experienced improved tracking, pursuits and saccadic response to stimuli.

Over a course of time and as a result of ocular and systemic implications, KW developed stage 4 and 5 retinopathy of prematurity resulting in multiple procedures, including a bilateral lensectomy (removal of the crystalline lens) and multiple bilateral vitrectomies. CW's subsequent vision surgeries, although considered a success, ultimately left him with no viable vision.

The following is a synopsis of KW's care: 7 EUAs, 5 vitrectomies, 6 laser surgeries, and bilateral lensectomies and iridectomies performed to both eyes. The resultant aftermath included an extremely high refractive error necessitating immediate optical resolution for maximal development of macular function.

This was further complicated by a myriad of systemic issues that affected overall general well being and included respiratory distress: nasal cannula and O_2, G tube replacement, paralysis of the left vocal cord, resection of the intestine and appendix, and fractures of the hip, ribs and right upper arm due to Rickets.

Ocularly, the immediate action is to achieve best-corrected visual acuity with correction, which was measured over 6 visits to be 20/200 in the right eye and light perception in the left eye due to complications of the retinopathy of prematurity in spite of surgical intervention. Both mom and nurse noted a change in the way KW held her head with the contact lens wear. It was now more vertical with improved tracking, pursuits and saccadic response to multiple stimuli in all fields of gaze. Contact tolerance and comfort with uncomplicated wear has been achieved per observation and parental feedback for nine months.

"If it looks like chaos..." Involving the parents with the multi-disciplinary team is essential for maximum outcomes.

with nystagmus (involuntary eye movement) present at birth, as fixation through the optical center in glasses would be miniscule and sporadic.[8-9]

Retinopathy of prematurity (ROP) is also known as Retrolental Fibroplasia. Blood vessels grow to the edges of the retina until the time of birth. When a baby is born prematurely, this normal vessel growth stops and new abnormal vessels begin to grow. ROP is a potentially blinding eye disorder that primarily affects premature infants weighing around 2 lbs 12 ounces or less, that are born before 31 weeks gestation. Neonatal care and oxygen provided to sustain life are potential causes for new abnormal blood vessel growth in the back of the eye leading to ROP.

ROP remains one of the most prevalent co-morbidities among extremely premature infant survivors, who are otherwise experiencing great gains in survival and in pulmonary and neurologic sequelae.[10]

A tribute to Arnall Patz, MD - After World War II, Arnall Partz, MD served at the Walter Reed Army Medical Center and trained at D.C. General Hospital. It was there, beginning in 1950, that Dr. Patz noticed an association between incubators and retinopathy of prematurity (known then as retrolental fibroplasia), a leading cause of infant blindness. In one of the first clinical trials in all of medicine, he followed premature babies who were routinely given high concentrations of oxygen and others who were given lower doses. Rebuffed by a funding agency which thought the proposal unscientific and possibly dangerous, he conducted the clinical trial without federal funding.

For this discovery and the subsequent saving of vision in thousands of premature infants he was given the Albert Lasker Medical Research Award, one of the most prestigious honors in American medicine. Helen Keller presented him with the award in 1956. In 1979, he became the Director of the Wilmer Eye Institute. As Director, he enlarged the clinical and research facilities and programs in his typical visionary fashion. His colleagues at Hopkins praise him for serving as mentor for more than five decades to scores of today's leading eye specialists.

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William L. Park, OD, FAAO is in private practice in Wichita, KS. Dr. Park is committed to outreach efforts to address the epidemic of diabetes. He works exclusively with patients referred for low vision evaluation, low vision rehabilitation and neurological vision loss. He is a past Director of Low Vision Services, Lions Research & Rehabilitation Center, Wilmer Eye Institute-Johns Hopkins University. Dr. Park can be reached at William L. Park, OD, LLC, **www.parklowvision.com**, 610 N. Main, Suite 201 Wichita, KS 67203, **(316) 440-1690** or **drpark@parklowvision.com**.

Joanne Park, COA is a Certified Ophthalmic Assistant at Envision Vision Rehabilitation Center. Joanne has more than 20 years of experience in the optometry and ophthalmology fields. She has been a facilitator of low vision support groups, educator on diabetic eye conditions for diabetic education, refractive surgical technician and study coordinator for NIH/NEI refractive and drug company research. As Optometric Assistant, Joanne coordinates the contact lens program for children.

RESEARCH Highlights

Michael D. Crossland, PhD, MCOptom, FAAO

Implantable Telescopes: The future of low vision rehabilitation?

Michael D. Crossland, PhD, MCOptom, FAAO

Specialist Optometrist, Moorfields Eye Hospital, London, UK

Research Fellow, UCL Institute of Ophthalmology, London, UK

"If low vision practitioners did not prescribe telescopes, thousands of people would be unable to watch sports, visit the theater, navigate airports, or enjoy art galleries."

Telescopes are a mainstay of low vision rehabilitation. If low vision practitioners did not prescribe telescopes, thousands of people would be unable to watch sports, visit the theater, navigate airports, or enjoy art galleries.

While undoubtedly useful, hand-held telescopes have considerable limitations: they are often heavy and cumbersome to use, and they have a limited field of view. Spectacle-mounted telescopes can be less cumbersome, but can only be used for spotting or tracking tasks and require considerable training to be used effectively. Both hand-held and spectacle-mounted telescopes draw attention to the user and neither can be used when walking due to induced problems with balance and coordination.

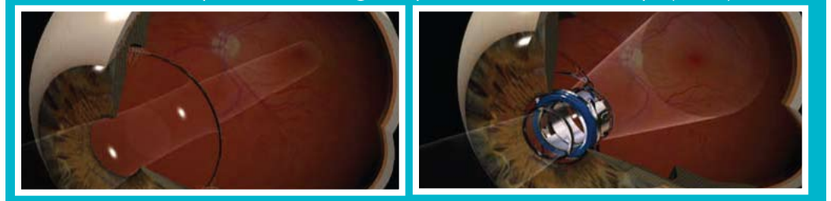
In contrast, if a telescope can be implanted within the eye, it cannot be seen by others, can be used all of the time, and leaves both hands free to use. Because the position of an implanted telescope is so close to the nodal point of the eye, it will not have the same disruptive effect on the vestibular-ocular reflex as a hand-held or spectacle-mounted telescope. Although these systems have been described for several years, there has been a recent surge in research publications for two intraocular telescope systems: the implantable miniature telescope (IMT) and the IOL-Vip.[1-2]

The IMT (VisionCare, Saratoga, CA) is a Galilean telescope which, when implanted, has a magnification of either 2.2x or 3.0x. The IOL-Vip (LenSpecial, Milan, Italy) is also a Galilean telescope but has a lower effective power of 1.3x.[3]

Both systems are implanted following cataract surgery. The IMT replaces the crystalline lens with a sealed unit containing both lenses of the telescope. In contrast, the IOL-Vip consists of two lenses, a negative lens placed within the capsular bag and a positive lens which sits in the anterior chamber, just anterior to the iris. A further difference to conventional cataract surgery is that a peripheral iridotomy is performed at the same time as the lens implantation, due to a rise in intraocular pressure in some of the earliest subjects who had the procedure performed.[4, 3]

To date, the biggest study to evaluate the IMT describes one-year follow-up data for 217 people, and two-year data for 174 people. The major study of the IOL-Vip describes 40 eyes of 35 patients.[5-6, 3]

VisionCare Opthalmic Technologies Implantable Minature Telescope (IMT™)

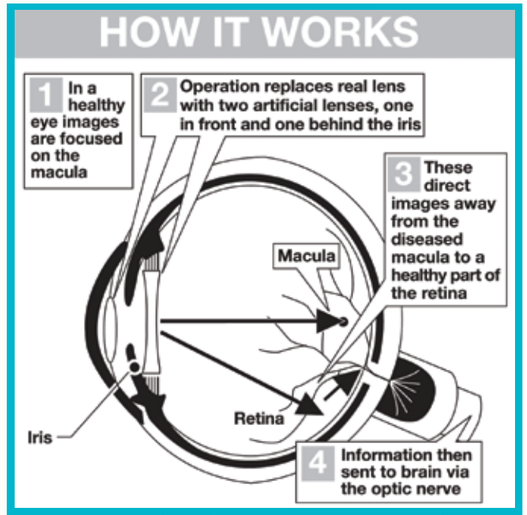


Normal Eye
Central vision is focused on diseased macula.

Implanted Eye
Central vision is rendered on central and peripheral retina.

Visual acuity improves in all cases: by a mean of 0.36 logMAR for patients with the 3x IMT; 0.28 logMAR for those with the 2.2x IMT; and 0.5 logMAR for the IOL-Vip. The larger than expected acuity increase in the IOL-Vip may be due to the fact that some of the patients assessed had pre-operative cataract, or due to further magnification caused by a residual spectacle correction worn over the telescope.[6, 3]

While this sounds encouraging, this of course comes at the expense of a restricted visual field. The field of view of the IMT is 9.2° with the 2.2x and 6.6° with the 3.0x telescope. The IOL-Vip field of view is theoretically 80° which, while impressive, is still reduced from the normal monocular visual field of approximately 170° horizontally and 120° vertically. While the IMT is designed to be implanted monocularly, the IOL-Vip has been used binocularly.[1, 7]



The Veni Vidi IOL VIP system, developed by LenSpecial

The effect of the IMT on quality of life has been assessed using a visual function questionnaire. The surgery was shown to reduce self-reported difficulty on many tasks, including near and distance visual tasks, as well as social functioning. However, there was a small reduction in self-reported peripheral vision.[5]

A further problem with implanting a telescope, rather than a conventional intraocular lens within the eye, is that less light reaches the retina. It is very disappointing that the effect of intraocular telescope implantation on contrast sensitivity has not been assessed. Contrast sensitivity is known to be a very important factor in visual performance in people with low vision, and reduced retinal illuminance through a telescope would presumably reduce contrast sensitivity further. Both the IOL-Vip and IMT groups report some data on reading acuity and magnification needs, although the gold standard measure of reading speed has not been reported.

It is important to note that in all of the studies to date, the improvements reported have been measured after a very intensive rehabilitation program which includes eccentric viewing training and careful instruction in the use of these telescopes. Of course, low vision training can significantly improve visual function even without a surgically implanted telescope. For example, the 2003 study *Patients with AMD and a large absolute central scotoma can be trained successfully to use eccentric viewing, as demonstrated in a scanning laser ophthalmoscope* by Nilsson, Frennesson & Nilsson depicts this finding.[8]

To date, no studies have been published which show the improvement in visual function without the implanted

continued on next page

telescope, but with the rehabilitation program used in the IMT and IOL-Vip studies. A randomized controlled trial of this training on two groups of subjects, one of whom receives conventional cataract surgery and one of whom receives an intraocular telescope, would be the best way to assess this. Of course, it would be difficult to maintain masking in a study of this design as both the rehabilitation worker and patient would be aware of having a magnified view through one eye.

Finally, it is worth noting that having an intraocular telescope implanted, like any surgical procedure, is not risk-free. Two of the subjects in the safety trial of the IMT (1%) required a corneal transplant for post-operative corneal edema. There are also serious risks of retinal detachment and endophthalmitis from any surgical procedure on the eye, although no cases of these poor outcomes have been described for people having a telescope implantation.[6]

So, is the intraocular telescope the future of low vision rehabilitation? My personal (and skeptical) answer would be "it's too soon to tell." While some of the early data is very encouraging, I think it would be premature to make a real judgment about this technique before more data is published. In particular, I would like to see a published paper which details the effect of the training on a control group, and data on some different measures of visual function in people who have received this surgery. However, this is a relatively new and fast-moving field and I understand some of these trials are already in progress. The future of the intraocular telescope is exciting and something which we - and our patients - should follow closely.

Acknowledgement: I have no commercial interest in the IMT, IOL-Vip or any competing devices. Decisions regarding an intraocular telescope should be made by the person receiving the device after careful discussion with their ophthalmologist, low vision practitioner and physician.

Michael Crossland, PhD, MCOptom, FAAO is a Research Fellow in Visual Neuroscience at the UCL Institute of Ophthalmology and a Specialist Optometrist at Moorfields Eye Hospital NHS Foundation Trust, London, UK. Dr. Crossland also spends one day per week working as an optometrist in a busy hospital-based low vision clinic. Dr. Crossland's major research interest is in the assessment and rehabilitation of people with central vision loss caused by macular disease. His research focuses on the development and use of the preferred retinal locus.

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Envision Conference 2010: Excellence in Advocacy *cont. from page 1*

service. In her role serving as Chair for National Low Vision Veterans Affairs Optometric Workgroup and the Chair of the Veterans Affairs Traumatic Brain Injury Optometric Workgroup, Dr. Gagnon is known for her advocacy efforts on behalf of veterans to receive low vision services, especially veterans impacted by traumatic brain injury. She has been recognized for this work with numerous commendations from the Department of Veterans Affairs, an award from the National Blinded Veterans Association and an award presented by the former Secretary of Health of the Department of Veterans Affairs, Dr. James Peake. Her other respected professional activities and appointments include Executive Council Member of the Vision Rehabilitation Section of the American Optometric Association and Chair of the Brain Injury Committee of the Vision Rehabilitation Section of the American Optometric Association. Dr. Gagnon also holds Adjunct Faculty positions with New England College of Optometry, Illinois College of Optometry, State University of New York College of Optometry and Pennsylvania College of Optometry. We welcome Dr. Gagnon's participation at Envision Conference 2010.

Online Registration for Envision Conference 2010 is Now Open

Make plans to attend the multidisciplinary low vision rehabilitation and research conference dedicated to improving the quality of low vision care through professional collaboration, advocacy, research and education.

Each year, hundreds of low vision professionals come together at the Envision Conference to advance the state-of-the-art in low vision rehabilitation.

Register by July 9, 2010 to receive the early bird rate of $425. Registration received after July 9, 2010 will be $525.

Envision Conference 2010 Program Submissions are Now Being Accepted

Submissions for clinical education, research presentations and research posters are being accepted now through March 29, 2010.

Clinical education submissions should incorporate information low vision practitioners and educators need to succeed professionally, and should encourage discussion of professional concerns and views. Submissions are reviewed for meeting continuing education criteria for AOTA, COPE, ACVREP, ACCME, CRCC and TPTA.

Research presentations may be submitted by anyone who is involved in the area of low vision research, including the professional and academic vision research communities, applied psychology, nursing, low vision therapy, occupational therapy and practicing ophthalmologists and optometrists.

continued on next page

"By the time something is published in a journal, it's a year or even two years old. By coming to a conference like this, you can get very current information."

- David Lewerenz, OD, FAAO
Assistant Professor of Optometry, Northeastern State University Oklahoma College of Optometry

David Lewerenz, OD, FAAO presenting at Envision Conference 09 in San Antonio, Texas.

Contact Michael Epp, Director of Outreach and Continuing Education at **michael.epp@envisionus.com** or **(316) 440-1515** with any questions about clinical education or research submissions.

Important Dates:

- **March 29, 2010** - Deadline for clinical education and research submissions and edits
- **April 30, 2010** - Clinical education and research presentation selection notification
- **July 9, 2010** - Deadline for presentation media and handouts
- **September 22-25, 2010** Envision Conference 2010 at the Westin Riverwalk Hotel, San Antonio, Texas

Visit **www.envisionconference.org** to learn more about submission guidelines and presenter remuneration.

Continuing Education Certificates Still Available

Envision Conference 09 held 48 clinical education sessions, 10 research sessions, and eight workshops, providing 111 hours of low vision rehabilitation and research education. Those certified through professional organizations were able to collect 29 hours of continuing education. Envision Conference 09 continuing education certificates are still available online. You can download your certificate by visiting the Envision Conference website. To retrieve your certificate for continuing education credits earned at Envision Conference, you will need to provide the following information as specified in the conference registration: your name and registration number or your badge number. You can also download certificates from any previous Envision Conference. If you have any questions about retrieving your CEU certificate, contact Michael Epp at **michael.epp@envisionus.com** or **(316) 440-1515.**

To submit and to register for Envision Conference 2010, visit the Envision Conference website, **www.envisionconference.org.**

Conference attendees check out the latest in low vision products and services in the Exhibit Hall.

Attendees focus during an Envision Conference 2009 session.

ENVISION Vision Rehabilitation UPDATE

Envision Vision Rehabilitation Center Gains CORF Status

The Envision Vision Rehabilitation Center recently received its status from the Centers for Medicare & Medicaid Services (CMS) as a Certified Outpatient Rehabilitation Facility (CORF).

A CORF, a nonresidential facility certified under Medicare Part A, provides coordinated outpatient diagnostic, therapeutic and restorative services at a single location to patients. Facility physicians provide consultation with and medical supervision of non-physician staff, establishment and review of the plan of treatment and other medical and facility administrative activities. Congress authorized CORF certification in 1980 to ensure that Medicare beneficiaries have access to a variety of rehabilitation services at one location, on an out-patient basis. Under CORF status, Envision Vision Rehabilitation Center has a Medicare number, allowing some low vision services to be billed to Medicare. The Envision Vision Rehabilitation Center continues to provide the same high quality, multi-disciplinary low vision care it has in the past, but CORF status allows Envision to expand its vision rehabilitation model to include occupational therapy, orientation & mobility, physical therapy and social services.

To obtain CORF status, Envision Vision Rehabilitation Center had to apply and undergo a site evaluation by the Kansas Department of Health and Environment (KDHE). The preparation for CORF application required an intensive review by the clinical and administrative staff of policies, procedures and patient service at Envision.

"The CORF process made us take a very organized approach to ensuring we are meeting the health and safety regulations of KDHE and that we are meeting the standards of CORF under CMS," said Jennifer Barclay, Manager, Envision Vision Rehabilitation Center.

If you have questions about Envision's CORF status, please contact Jennifer Barclay, Manager, Envision Vision Rehabilitation Center at (316) 440-1617 or email jennifer.barclay@envisionus.com.

Envision Expands Art Program

In addition to Saturday workshops, the Envision Art Program is now offering after-school arts for school-age children. Currently, the art room features 49 works of art created by young people who are blind or low vision.

For more information about the Envision Art Program and/or to schedule a tour, contact the Envision Vision Rehabilitation Center at (316) 440-1600.

Matt works on a caterpillar made in the "Very Hungry Caterpillar" workshop.

ENVISION® Vision Rehabilitation

Visibility is a quarterly publication of Envision Vision Rehabilitation Center.

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To submit an article or case study to be considered for publication in Visibility, please contact Michael Epp, Director of Outreach & Continuing Education, (316) 440-1515 or michael.epp@envisionus.com.

Envision CEO Elected to ACVREP Board of Directors

Envision is proud to announce that Linda K. Merrill-Parman, Envision, Inc. CEO, was recently elected to the Academy for Certification of Vision Rehabilitation & Education Professionals (ACVREP) Board of Directors. The mission of ACVREP is to advance professional competency in vision rehabilitation and education to promote service quality.

Established in 1999, ACVREP is a not-for-profit organization dedicated to meeting the needs of the vision services field and providing high-quality professional certification in the disciplines of low vision therapy, orientation and mobility, and vision rehabilitation therapy.

"I'm looking forward to working closely with ACVREP to advance the field of low vision rehabilitation," said Linda K. Merrill-Parman.

Merrill-Parman will serve a three-year term and will be eligible for re-election at that time.

About Envision Vision Rehabilitation

The Envision Vision Rehabilitation Center provides comprehensive, multi-disciplinary low vision rehabilitation and services for people with vision loss. The center's goal is to help patients maximize their independence and realize their best functional vision. The center achieves this by offering a comprehensive low vision rehabilitation program unique to the needs of each patient. Envision provides low vision rehabilitation regardless of ability to pay. Call to find out about the availability of financial assistance.

REQUEST COPIES OF VISIBILITY

If you would like to share Visibility with a colleague, please request a copy from Michael Epp, Director of Outreach & Continuing Education at **michael.epp@envisionus.com** or call **(316) 440-1515**.
Visiblity is also available online at **www.envisionus.com/Visibility**.

The viewpoints expressed by the guest authors of *Visibility* do not necessarily reflect the viewpoints of Envision or its staff.