A Phenotypically Variable Presentation of Albinism: A Case Report

Nancy Sorrell, OD, FAAO¹
Stephanie Schmiedecke, OD, FAAO, Dipl. Low Vision¹
Kara Tison, OD, FAAO¹

¹University of the Incarnate Word, Rosenberg School of Optometry, San Antonio, Texas

ABSTRACT

Background: Albinism refers to a group of hereditary conditions, present at birth, that are characterized by gene mutations resulting in hypopigmentation of the skin, hair, and ocular structures. There are two categories of albinism distinguished by the mode of inheritance as well as the body structures affected: Oculocutaneous Albinism and Ocular Albinism.

Case Report
A 10 year old Caucasian-Hispanic female was referred to the Low Vision Clinic with vision impairment secondary to albinism, a diagnosis confirmed by the Electrophysiology Department two years prior. Ancillary testing supporting albinism included Visual Evoked Potentials (VEPs) demonstrating abnormal optic nerve fiber decussation and optical coherence tomography (OCT) revealing foveal hypoplasia. Clinical findings consistent with albinism included strabismus with reduced stereopsis, mild but diffuse iris transillumination defects and blonde fundi. The patient had physical characteristics of fair skin, light brown hair, and had normal color vision, moderately reduced visual acuity, and absence of nystagmus, suggesting a mild phenotypic variation of albinism. At her low vision evaluation, the patient appreciated improvement in visual function with the following devices: a dome magnifier for magnification at near, a handheld telescope for magnification at distance, and a light grey tint to reduce photophobia indoors. Additional accommodations were recommended to the school system to employ while in the classroom setting.

Conclusion: Clinicians should consider the diagnosis of albinism in patients with reduced vision even when they demonstrate mostly normal skin and ocular pigmentation. Clinical cases associated with a better acuity in albinism patients include some presence of stereoacuity, mild strabismus, absence of nystagmus and near normal levels of iris pigmentation, like the patient described in the case report. Despite the level of visual impairment, the standard of care for patients with decreased vision or visual symptoms should always be a low vision evaluation in order to maximize functional vision.

INTRODUCTION
Albinism refers to a group of hereditary conditions, present at birth, that are characterized by gene mutations that can result in hypopigmentation of the skin, hair, and ocular structures. In embryonic development, the
neuroectoderm develops into the epithelium of the iris and retinal pigment layer, while the neural crest develops into the skin, hair and iris stroma. Both the neuroectoderm and the neural crest contain melanocytes which are the individual cells responsible for synthesizing melanin. Melanin then goes on to provide pigmentation to the body structures. Gene mutations related to melanin synthesis, production, or transport, can create hypopigmentation of the skin, hair, iris and retina. There are two main categories of albinism that are distinguished by the mode of inheritance as well as the body structures affected, Oculocutaneous Albinism and Ocular Albinism.

Oculocutaneous Albinism (OCA) involves gene mutations that inhibit some or all of the body’s melanocytes. This, in turn, leads to variable levels of hypopigmentation of skin, hair and ocular structures depending on which gene is affected, the patient’s ethnic pigment density, and whether the patient is a homozygous or heterozygous carrier for the involved gene. Although there are a total of 7 categories of OCA currently recognized, depending on which gene is mutated, there are four main categories of OCA that are all autosomal recessive and are considered to encompass the vast majority of OCA patients. OCA Type 1, including subtypes 1A and 1B, is considered the most severe presentation, with very little to no melanin production. These patients often have white hair with very fair skin that looks almost pink, and demonstrate the most impaired vision. OCA Type 2 and other, less common types of OCA, like type 3 and type 4, are considered milder phenotypes due to the body being able to synthesize some quantity of melanin, but still encompass a vast array of phenotypes due to some melanin synthesis. (Table 1)

In comparison, Ocular Albinism (OA) is an X-linked recessive form of albinism with 2 recognized categories, and presents with only hypopigmentation of ocular structures. Only the melanocytes in the neuroectoderm are genetically mutated, leading to hypopigmentation of the iris and retinal pigment epithelium. Melanocytes in the skin and hair are unaffected.

The spectrum of pigmentation levels seen with OCA is known to overlap those seen with OA, making the clinical detection and diagnosis of albinism possible, but the category type within the groups of albinism unknown unless genetically tested. This case report outlines a patient that demonstrated normal skin and hair pigmentation findings at the time of presentation and most, but not all, of the ocular findings known to be consistent with albinism.

**CASE REPORT**

In 2015, an eight-year-old Caucasian-Hispanic female was referred to the Electrodiagnostics clinic for further testing to confirm the suspicion of albinism, as suspected by an outside ophthalmologist due to reduced acuities and hypopigmentation of the ocular structures. The patient had complaints of longstanding decreased vision in both eyes at distance and near with her current glasses, and light sensitivity indoors and outdoors. The patient had worn glasses since the age of five and had no prior ocular trauma, surgeries, or infections. There was no pertinent family ocular history. The patient’s medical history was unremarkable with no medications and only seasonal allergies. There were no known medication allergies. The patient was in 3rd grade and her mother reported she was doing

<table>
<thead>
<tr>
<th>Type of Albinism</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCA Type 1 Including subtypes 1A and 1B</td>
<td>1/40,000 in most populations <em>rare in African-Americans</em></td>
</tr>
<tr>
<td>OCA Type 2</td>
<td>1/38,000 in most populations 1/5,000 in African populations</td>
</tr>
<tr>
<td>OCA Type 3</td>
<td>1/8,500 in African populations *rare in Caucasian and Asian populations</td>
</tr>
<tr>
<td>OCA Type 4</td>
<td>Most common in Japanese and German populations</td>
</tr>
<tr>
<td>Ocular Albinism</td>
<td>1/50,000 males</td>
</tr>
</tbody>
</table>
findings and normal pupil responses. Manifest refraction with a phoropter showed best corrected vision as 20/60-3 in the right eye with +1.00-4.50x180 and 20/50-3 with +0.50-3.00x010 in the left eye. It is important to note that because the patient was behind the phoropter, it would have been difficult for the clinician to observe for any latent nystagmus with opaque occlusion that was assumed to be used. It would have been valuable to ask the mother whether there were any situations in which the patient demonstrated nystagmus, such as when the patient was tired, sick or visually fatigued after school or homework. Performing cover test with loose lens prism, a three prism diopter base down in the left eye was found to favorably reduce vertical

![Figure 1](image)

Entering acuities at distance with her glasses (OD: +1.00-5.00x012, OS: +1.00-5.00x167) were 20/70 in the right eye with no pinhole improvement and 20/80-3 in the left eye with pinhole to 20/50. Entrance testing revealed a small angle intermittent left hypertropia with a small angle right esotropia. Extraocular muscles showed full range of motion with no nystagmus observed in free space. The patient had normal confrontation visual field
Fundus auto-fluorescence (FAF) showed no areas of degeneration. Monocular Visual Evoked Potentials (VEPs) demonstrated abnormal fiber decussation at the chiasm when monocular hemispheric responses were measured, as shown by the reverse waveform, a diagnostic finding in albinism (Figure 2).

The diagnosis of albinism was confirmed based on absence of foveal depression, response from polarity reversal VEPs, blonde fundus appearance with an undilated view, and quantitatively reduced macular pigment. It was suspected that the patient is of the OCA Type 2, 3 or 4 since she manifests ocular signs of albinism in addition to having pertinent history of white hair and pink skin at the time of birth. It can be assumed that she obtained pigmentation throughout the first years of life since she presented with light brown hair at time of examination (Figure 3). Less convincing diagnoses would include OCA Type 1, which is typically an extreme presentation with little to no ability to produce melanin, and Ocular Albinism, which only manifests ocular findings with normal skin and hair pigmentation and is most always seen in males.

The spectacle prescription was finalized and a photochromic coating was prescribed to relieve light sensitivity outdoors. It was recommended the patient be referred to the Low Vision clinic for further evaluation of visual enhancement.

The patient failed to return for a low vision evaluation that year, but returned two years later in 2017, at age ten, after being seen in the Pediatric eye clinic for her annual exam. At her pediatric eye exam, there were no significant changes to her spectacle prescription or ocular health. It was again recommended she be seen in the Low Vision clinic to evaluate and, subsequently, horizontal strabismus. Stereopsis testing revealed a positive Stereo fly test and a reduced local stereo response of 140 arc seconds with Wirt circles. It was not noted whether stereo testing was performed with or without the prism, and how the results of the stereo testing could have changed. Color vision was assessed monocularly using the computerized Cone Contrast Test, which tests the lowest red, green, and blue contrast letters that can be detected. The patient showed normal color vision response in each eye. The macular pigment optical density, which records the amount of pigment in the macula, was quantified using the Quantif-Eye MPS II. It showed reduced macular pigment density of 0.10 in both eyes, compared to normative values of 0.24-0.50, further confirming reduced ocular pigmentation that is associated with albinism.

A 120 point Humphrey Visual Field showed a reliable field with a few areas of scattered peripheral loss in the right eye and near normal field in the left eye, with only two far peripheral points missed. Because the left eye was tested second, the difference between the eyes was attributed to a learning effect due to the patient’s age and being a first time test taker. It was suspected that the right eye’s field could have improved if re-tested. A spectral-domain OCT (SD-OCT) of the macula revealed an absent foveal depression in each eye (Figure 1).
magnification devices and filters to better enhance her visual function.

The patient presented to the Low Vision Clinic one week later. Her visual goals included seeing the board easier at school, reporting that, even though she has preferential seating at the front of the classroom, she often has to walk closer to copy from the board. She also wanted to address her photophobia by reducing indoor and outdoor light sensitivity. She reports the photochromic coating on her lenses did not get dark enough outside to completely relieve her light sensitivity. She reported no trouble seeing the font size of her homework, but naturally leans close to the reading material.

Entering acuities at distance with current glasses in the right eye were 20/70 without pinhole improvement and 20/70+1 in the left eye without pinhole improvement. Single letter near acuities were 0.8M at 15cm in the right eye and left eye, with both eyes reading threshold continuous text size of 0.4M at 15cm. Accommodation tested with monocular estimated method (MEM) showed a borderline lag of +0.75D in each eye. Trial frame refraction was performed and the right eye was correctable to 20/70 with +1.00-4.75x178 and the left eye was correctable to 20/50-2 with +0.25-3.50x002 and 3 prism diopters base down. With both eyes, the patient was able to read 20/60 at distance and 0.4M at 15cm continuous text at near. Contrast sensitivity testing with the Pelli-Robson contrast sensitivity chart was normal with 1.95 log in each eye.

To address her distance goal of seeing the board at school easier, a hand-held spotting telescope was introduced. As a consensus, it is widely accepted that the goal acuity at distance for visually impaired patients be 20/40, as this level of acuity is considered to be functional in the “real world,” while still maximizing the field of view that’s often limited with higher power telescopes. We recognize this may be different in patients with different or more specific visual demands. Considering our patient’s complaint at distance, and the fact that she has not previously had experience with magnification devices, we used 20/40 as our initial goal. To determine the appropriate magnification, the Snellen denominator of the better seeing eye is divided by the Snellen denominator of the goal size acuity. With the acuity in her left eye at 20/50 and goal acuity of 20/40, a 1.25x telescope would be most appropriate to begin with. However, the lowest power of telescope available in the clinic at the time of evaluation was a 2.8x. When evaluated over the left eye, the patient obtained distance acuity of 20/20, as expected with this telescope power. She responded favorably to the magnification and was able to focus the device and localize letters across the room well. To be most precise, it would be preferred that the device be trialed in the exact setting in which it is to be used, to ensure the magnification adequately meets the visual demand. Since we were not able to trial this at her school, it was advised to have a teacher, specialized in working with visually impaired students, practice with this device in her classroom setting.

To address her indoor photophobia, a filter evaluation was performed using various colors and transmittance levels. A light grey filter with 58% light transmittance was found to subjectively provide her with the most comfortable vision in indoor fluorescent lighting, without reducing visual acuity. Her spectacle prescription was finalized with the 58% grey filter. Next, fit-over sunglasses for outdoor wear were evaluated in colors of dark grey, amber and plum, but the patient found the frame styles unfavorable. A hat was recommended for outdoor wear as an alternative to fit-over sunglasses to accommodate for her discomfort. Another alternative would be to prescribe a separate pair of prescription sunglasses for when she is outside.

Although there were no specific near complaints at this exam, we decided to evaluate a dome magnifier to demonstrate the ability of magnifying reading material while providing the patient with a longer working distance. In the
future, as the patient begins to have prolonged periods of near work with school, a dome magnifier can prevent the patient from having to bend down so close to her reading material. Dome magnifiers are helpful for making prolonged periods of near work comfortable, such as when a student is doing homework. The goal size acuity at near for school age children is at least their grade level font size. The patient was in 5th grade, and needed the ability to comfortably read 1.25M size print, or about a 10 point font size. Most dome magnifiers range in power from 2x-4x. A 4x dome magnifier was available in the clinic for evaluation. She was able to achieve 0.25M print. Since the patient responded well to the magnification as anticipated, a more appropriate power dome magnifier of 2x may be best to successfully achieve goal size acuity while providing a larger field of view, a longer working distance, and therefore reducing accommodative demand. This may be more appropriate to consider in the future as her school work font size decreases in successive grade levels.

Slit lamp examination revealed normal anterior segment structures except for very mild diffuse iris transillumination defects in both eyes when observed carefully in a dark room (Figure 4). Intraocular pressures were measured with the iCare tonometer as 20 mmHg in both eyes. Upon dilation exam with one drop of 1% tropicamide in each eye, the posterior segment showed normal optic nerves, vessels and periphery but with an overall blonde fundus appearance and no foveal light reflex (Figure 5).

The spectacle prescription was finalized with 58% transmittance in a light grey tint. A letter was written to the school district
recommending the following accommodations in the classroom: preferential seating in the front of the classroom away from windows, the option to wear a hat indoors to decrease light exposure, additional time with testing, if needed, and use of a darker writing utensil such as a #1 pencil. The recommendation for a 1.25x-2x hand-held telescope was also recommended through the school district. To help supply devices for home use, the patient was referred for a state sponsored program.

Due to the non-progressive nature of albinism, the patient was educated to return in one year for her annual exam or sooner if the patient has new visual goals.

DISCUSSION

There are an estimated 17,000 people in the United States with some form of albinism and the prevalence of OCA is different across racial origins.\(^5\)

Because there is vast phenotypic overlap not only amongst each type of OCA but also with OA, the exact type of albinism is only able to be confirmed with genetic testing. The goal of genetic testing is to determine which gene is affected and whether that gene is of the OCA types or OA types. This information aids in determining the mode of inheritance, whether it be autosomal recessive or X-linked recessive. Patients should be counseled regarding the likelihood of future offspring being affected. Another advantage of genetic testing would be to determine if the patient has a syndromic form of albinism. Some genetic phenotypes have been found that are linked to not only albinism, but also syndromes that can lead to potentially severe systemic complications such as Hermansky-Pudlak syndrome or Chediak-Higashi syndrome. These can involve bleeding and bruising problems due to platelet deficiency, or repeated infections, respectively.

The diagnosis of albinism can be made with clinical findings. One of several ocular finding consistent in all types of albinism is foveal hypoplasia manifesting as a lack of foveal pit. This anatomical anomaly can easily be confirmed by performing an OCT of the macula. In contrast to the idea that albinism patients have complete lack of foveal development, one study concluded that some albinism patients may have rudimentary foveal development that is associated with better visual acuity than those albinism patients that show no foveal development.\(^9\) Clinically, this will appear fundoscopically as an annular reflex best viewed with binocular indirect ophthalmoscopy. Although no foveal light reflex was observed in my patient, there was also no presence of an annular reflex noted upon dilated fundus exam.

A direct consequence of inadequate foveal development is a resultant nystagmus. It has been clinically observed that the nystagmus typically present in albinism is identical to the nystagmus waveform in idiopathic infantile nystagmus syndrome.\(^6\) Even though the patient described in the case had a complete absence of a foveal pit, she did not present with a nystagmus, which is considered uncommon for albinism. It is important to note that the clinician may overlook a subtle nystagmus, and that evaluating for these involuntary eye movements behind the magnification of a slit lamp can be a valuable tool. The patient’s normal head posture should be noted, to determine whether the patient could be holding their eyes in a gaze that elicits their null point. There are studies, however, that have demonstrated that nystagmus is not a consistent finding in OCA and may not be a criterion for diagnosis of albinism as once thought.\(^10\)

Another consequence of foveal hypoplasia is the misrouting of optic nerve fibers at the chiasm. Normally, only nasal fibers carrying visual information from the retina cross at the chiasm on their way to the occipital cortex. In albinism patients, it has been found that there is also crossing of some temporal fibers at the chiasm. One study concluded that the misrouting of fibers occurs due to the slowed retinal
ganglion cell development in the macula. This slow development causes the visual pathway at the chiasm to not fully develop before gene expression ceases. The misrouting of temporal retinal fibers can be confirmed clinically by measuring the post-chiasmatic fibers at the occipital cortex with monocular VEPs. To do so, the active electrode is initially placed over the right hemisphere of the occipital cortex and the reference electrode over the left hemisphere while recordings from each eye are obtained. The active and reference electrode can then be switched to the opposite hemispheres, and recordings from each eye obtained again. The abnormal fiber crossing in albinism results in a VEP with a reverse polarity waveform as opposed to a normally flat line waveform seen in normally routed optic nerve fibers. In normal populations that have a balanced amount of chiasmal fiber crossing, the signal between the hemispheres cancel each other out and manifest a flat waveform, but since there is abnormal crossing of temporal fibers to the hemispheres in albinism patients, the waveform displays a signal as each hemisphere is compared to each other. Although the VEP can give confirmation to the abnormal fiber crossing, a VEP may not be necessary to prove the misrouting since the misrouting of optic nerve fibers manifests as strabismus and reduced stereopsis in the clinical setting. However, if the clinician suspected albinism in a patient without a strabismus, a VEP would be able to confirm the abnormal fiber crossing and help confirm the diagnosis of albinism.

Another finding consistent with albinism is lack of ocular pigment seen clinically as iris transillumination defects and blonde fundi. Transillumination defects are defects of the iris due to hypopigmentation of the pigment epithelial layer. Albinism patients also lack adequate pigment in the RPE cells of the retina, manifesting as a very blonde fundus with a prominent view of the choroidal vessel layer. Although clinically measurable to some degree, the density of macular pigment remains very low in people with albinism, ranging from 0.05 to 0.24, according to one study, as opposed to the normal measurable levels of 0.24-0.45 in normal populations. It is speculated that the lack of ocular pigment in both the iris and retina explains the inability to absorb incoming light, creating light scatter and therefore symptoms of glare and light sensitivity which can further reduce vision.

In addition to quantifying ocular pigment, there have been measurements in foveal cone packing demonstrating that there can be normal density of cones in the fovea even though there is no presence of a foveal pit. Because of this, color vision typically remains intact. Although not specifically tested, it could be reasonably concluded that the patient described in the case report demonstrated some normalcy in cone density, as her color vision was normal.

Basic visual treatment strategies include correcting refractive error, which often shows high amounts of with-the-rule astigmatism, and can easily be accounted for with optical correction. The high amounts of astigmatism typically present as an amblyogenic factor. Therefore, it is imperative these patients be seen as early as 6 months of age to be assessed for appropriate spectacle correction. It should be expected that the majority of albinism patients will not correct to 20/20 vision due to the anomalous fovea anatomy, however, spectacle correction may improve acuity since refractive amblyogenic factors may be present. Impact resistant polycarbonate or Trivex spectacles offer protection and the clinician also has the option to incorporate photochromic coatings or tints to minimize indoor and outdoor light sensitivity. A filter assessment can determine which tints relieve not only light sensitivity but glare in the indoor and outdoor setting. Tinted colored contact lenses are also an option to help reduce light sensitivity and glare by covering iris transillumination defects and making the iris more opaque to prevent unnecessary light scatter within the eyes.
Furthermore, a low vision evaluation is crucial in order to maximize the patient’s functional vision. Due to its congenital nature, albinism is most commonly diagnosed in early childhood. Magnification devices should be introduced at an early age in order to aid in academic performance and to create confidence and normalcy for a potential lifetime of device use. A dome magnifier is an example of an optical device that is easy for children to handle. In a recent study, it was concluded that dome magnifiers were easier to control compared to stand-shaped magnifiers in visually impaired children. Another low vision device that can benefit children with albinism is a hand-held monocular telescope. These devices magnify distant objects and are used to spot see objects far away, such as words on the school board. Minimal training is often required when introducing telescopes to the pediatric population. With practice, the patient can learn how to use this device in their daily life for many distance related tasks, including seeing street signs or seeing aisle signs at the grocery store. As the patients become older, a bioptic telescope could be a hands-free option and provide eligibility for a restricted driver’s license. Currently in the United States, approximately half of the states allow for bioptic driving. If nystagmus is present, the eye care professional should provide the patient with the most appropriate spectacle prescription, as this is arguably the most therapeutic intervention one can do for a patient with a high refractive error and nystagmus. Subsequently, a prism lens can be utilized to reduce the postural and visual effects of nystagmus, if present. A child may demonstrate an excessive head turn or abnormal neck posture in order to view in their null point, which is the position of gaze where nystagmus is most minimized. This abnormal head, neck or posture position can create skeletomuscular deficits in the growing body. The prism allows the eyes to view in a more natural location, alleviating abnormal body positions. If the patient does not demonstrate a specific null point, base out prism in each eye may be added to dampen the nystagmus by stimulating convergence in patients with a normal binocular system. It will be important to test accommodation and eye alignment in these patients to ensure the convergence demand evoked by the prism is tolerable. In cases of strabismus, surgery can be performed for cosmesis to better align the eyes with the chance to obtain better binocularity if corrected at an early age. Vision therapy may also be warranted in order to gain binocularity.

Avoidance of prolonged sunlight exposure without protective measures like sunglasses, sunscreen, hats or protective clothing should be discussed. Patients with albinism are at an increased risk for skin cancers such as basal cell carcinoma and squamous cell carcinoma. According to the National Organization for Albinism and Hypopigmentation (NOAH), a sunscreen with sun protection factor (SPF) of 30 or greater every two hours on sun exposed skin offers adequate protection from harmful ultraviolet light.

In those patients suspected of syndromic albinism types, referral to an internist or hematologist for further investigation is warranted. In addition, genetic testing may be offered to determine which gene is affected and could be useful for future gene therapy interventions. To date, there is no gene therapy as treatment for OCA or OA.

CONCLUSION

Clinicians should consider albinism as a differential diagnosis in patients with reduced vision even when they demonstrate seemingly normal skin and ocular pigmentation. In patients with ocular findings consistent with albinism and adequate skin and hair pigmentation, it may be worth asking specific history questions since a patient can be born with white hair and little cutaneous melanin production but accumulate pigmentation over time, such as the patient described. This can often help
distinguish more between a suspected OCA or OA type of albinism. There are some clinical cases that are associated with a better acuity in albinism patients, including some presence of stereoaucity, mild strabismus, absence of nystagmus and near normal levels of iris pigmentation, like the patient described in the case report. Despite the level of visual acuity, the standard of care for patients with decreased vision or symptoms of visual impairment should always be a low vision evaluation in order to perform vision rehabilitation and maximize functional vision. Resources are available for patients to help them learn and understand more about their condition. The NOAH website offers valuable information for albinism patients and their families, including support groups, advocacy and awareness.

REFERENCES


4. “Near Vision Test Chart,” by the Low Vision Clinic, NC Memorial Hospital Dept. of Ophthalmology. University of North Carolina Medical School of Medicine, Chapel Hill, NC.


CORRESPONDING AUTHOR

BIOGRAPHY:

Nancy Sorrell, OD, FAAO
Granbury Eye Clinic, Granbury, Texas

Dr. Sorrell is a 2017 graduate of the University of Houston College of Optometry. She went on to complete a residency in Low Vision Rehabilitation at University of Incarnate Word, Rosenberg School of Optometry. She is a Fellow in the American Academy of Optometry and an active member in the American Optometric Association and Texas Optometric Association. She currently practices in Granbury, Texas at Granbury Eye Clinic.
Consulting services customized to your specific needs:

Practice Growth
- Professional Referrals
- Patient Communications
- Customized Brochures
- Practice Newsletters
- VT Marketing Systems
- Easy-to-Present CE
- Social Media Strategies
- In-Office Digital Advertising

Case Presentation
- Increase Case Acceptance
- Effectively Explain the Diagnosis
- Empower Your Patients to Get the Care They Need

Practice Management
- Practice Growth Strategies
- Solutions to Staff Challenges
- Management Tools to Create the Practice You’ve Always Wanted

Schedule your Free Initial Consultation with Toni Bristol to learn how we can help you achieve your goals.

Call 877.248.3823 or email tonibristol@expansionconsultants.com

You improve vision.
We improve your practice.

Improve efficiency office-wide with Nu Squared Vision Therapy EMR.

www.NuSquared.com