

Clinical & Refractive Optometry is pleased to present this continuing education (CE) article by Dr. Madeline L. Romeu entitled **Healthy Sight Counseling and Children**. In order to obtain a 1-hour Council of Optometric Practitioner Education (COPE) approved CE credit, please refer to page 180 for complete instructions.

Healthy Sight Counseling and Children

Dr. Madeline L. Romeu

INTRODUCTION

Healthy Sight goes beyond routine vision care, integrating quality with quantity of vision and encouraging long-term ocular health. Healthy Sight Counseling provides the eyecare professional with a blueprint to achieve Healthy Sight in practice through comprehensive vision care, the appropriate selection of vision wear, and patient and practitioner education.

A major component of Healthy Sight Counseling is preventive care. For preventive care to prove effective, it must, like preventive medical care, start early in life. Attention to both quantity and quality of vision is crucial in promoting the child's optimal development from ophthalmic, educational, social, functional and psychological perspectives.

Healthy Sight is defined as the enhancement of the overall everyday quality of vision and the preservation of long-term ocular health — simply put, seeing well now and in the future.

Healthy Sight Counseling provides the eyecare professional with an integrated approach to promoting healthy sight in the everyday office or clinical practice settings. The standard medical/primary care model is adapted to expand on the refractive eye exam, incorporate quality of vision and ocular health concerns, and generate a "customized" eyeglass prescription (Fig. 1).

CHILDREN'S QUANTITY OF VISION

While Healthy Sight Counseling is a concept for all ages, certain aspects of Healthy Sight and Healthy Sight Counseling are unique to the young patient. Probably first and foremost is the need to recognize significant refractive errors and vision-threatening ocular diseases at

a young enough age, so that appropriate measures can be taken to correct — or minimize their future effects on — Healthy Sight. While there are differences of opinion on specific recommendations for vision screening in youth, one fact is indisputable: Children should be screened.

Screening for Ocular Disease

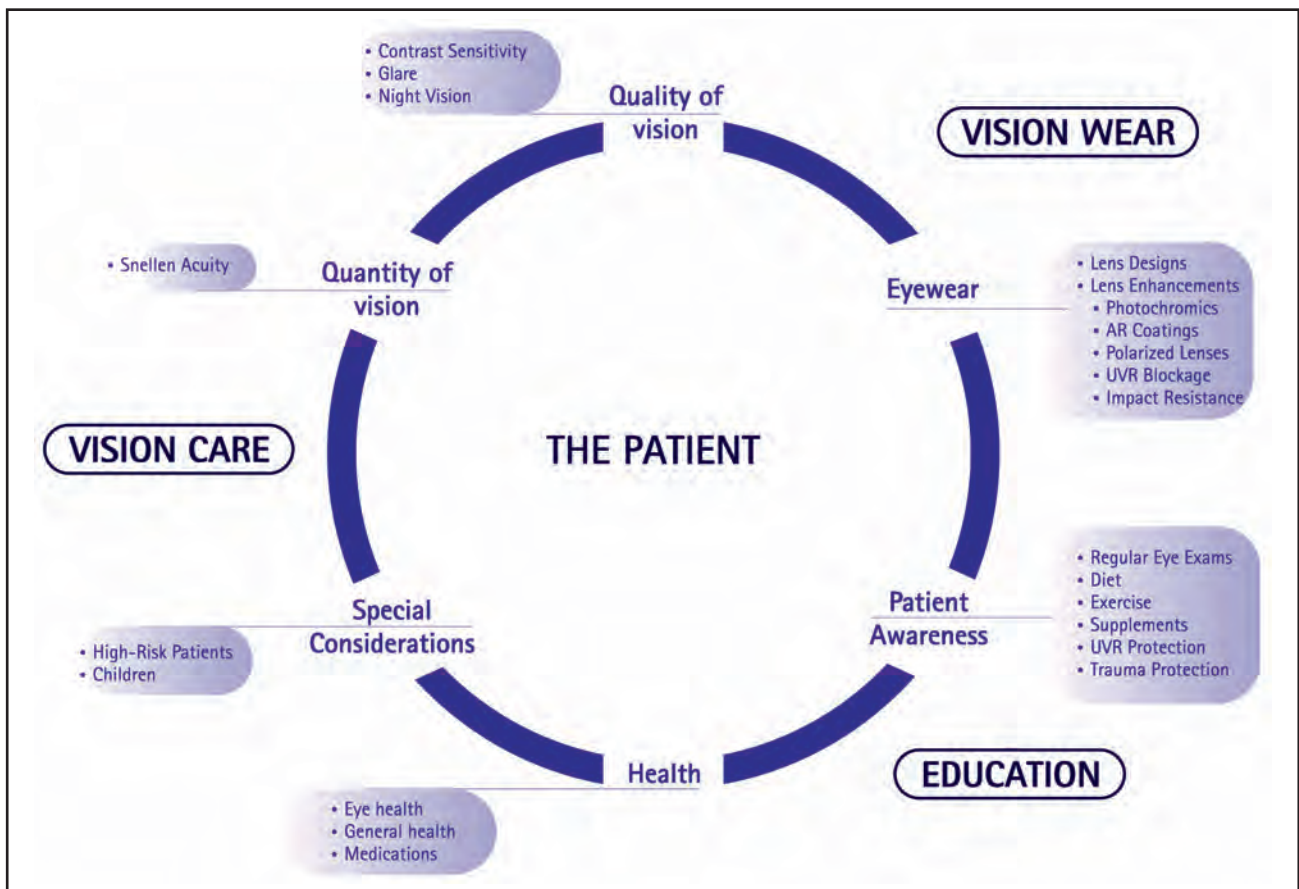
Vision screening in children aims to detect possible amblyopia, strabismus, ocular disease and refractive error. With non-refractive ocular abnormalities, in general, the earlier these are diagnosed, the better the outcome. Experimental data suggests that for optimal visual development and the successful establishment of binocularity, potential refractive and non-refractive causes for amblyopia must be detected and treated within the first few months of life. Unilateral congenital cataracts are a prime example of this, where corrective surgery and visual rehabilitation in the neonate should be undertaken as early in life as is medically feasible. With many cases of strabismus, where the misalignment of the eyes is easily recognizable, parents may be the first ones to detect that something is wrong, making early intervention the rule. Lesser degrees of strabismus (e.g. microstrabismus) or variable turns associated with uncorrected refractive errors (e.g. accommodative esotropia or unilateral high myopia) may be overlooked until the resultant visual deficit is eventually discovered when the child is screened in school. Efforts at visual recovery and rehabilitation are far less effective when undertaken at this later age rather than during early childhood.

Screening for Refractive Error

Vision screening in the school age group is primarily geared toward the recognition of ocular disease and the detection of ametropias that might hinder or impair the education of the child. The World Health Organization has estimated that 5% to 15% of children worldwide have refractive errors. Failure to address the quantity of vision issue may impact adversely on school performance, acquisition of hand-eye mediated motor coordination skills and psychosocial development.

While ideally all vision screenings would be performed by eye care professionals, the simple fact is that routine screening is more likely to be the task of the

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pediatrician, the school nurse or specially-trained vision screeners. Children who are found to have possible abnormalities are then referred for the appropriate evaluation and management.

Particularly when dealing with the possibility of ocular disease and asymmetrical refractive errors or strabismus that could lead to amblyopia, it is crucial that initial screening be performed early — ideally within the first year of life. This early screening is typically performed by the pediatrician as part of routine baby care, where examination with a pen light or direct ophthalmoscope can detect such potentially vision-threatening disorders as congenital ptosis, cataract, corneal opacity, strabismus and asymmetrical refractive error — all of which require prompt referral to specialists for early therapeutic intervention (Table I). While there is general agreement that follow-up is necessary during childhood, specific recommendations for subsequent screening and for formal eye exams after infancy vary; and it is suggested that guidelines provided by professional societies be followed.

Most children undergo routine vision screening upon entry to school either in kindergarten or first grade. While

significant refractive changes in adult life, aside from presbyopia, are not common in the absence of ocular disease, the situation can be quite different in the younger patient. The child's eye is a developing eye, and growth spurts can affect the health and refractive status of the visual system as well as the rest of the body. Periodic re-evaluation of the child's vision is necessary from early infancy through adolescence. This is particularly true in children with recognized refractive errors.

CHILDREN'S QUALITY OF VISION

In the pediatric population, even in those children whose refractive errors are detected and corrected, it is interesting to note that quality of vision issues, so important in spectacle-wearing adults (and an integral component of Healthy Sight Counseling), remain largely neglected. Consider the frequency of the prescription of spectacle lens enhancements — such as fixed-tint sunglasses and photochromic lenses — in spectacle-wearing adults versus children. While an estimated 52% of adults who wear prescription eyeglasses also wear prescription sunglasses (34%) or photochromics (18%),

Table I Vision-threatening ocular disorders

Children are commonly screened for vision-threatening ocular disorders. Early detection can lead to successful intervention.

- Corneal abnormalities
- Congenital/juvenile cataracts
- Congenital/juvenile glaucoma
- Neoplasms
- Ptosis
- Pathological high myopia
- Retinal dystrophies
- Uveitis

only 11% of children who wear prescription eyeglasses wear any type of prescription sunwear (7% prescription sunglasses and 4% photochromic lenses).

While it can be suspected that children would be less likely to be aware of or complain about quality of vision issues compared to adults, it is also suspected that they could be more susceptible to them. This is largely due to the lifestyle of the average child: typically an indoors-outdoors lifestyle with extended periods of time spent in bright sunlight, working on computers or playing video games. In all, these are circumstances where quality of vision issues such as light sensitivity and glare become important — probably even more important than in adults.

Of interest are two preliminary studies assessing children's preferences between clear and photochromic lenses with regard to visual comfort, visual convenience and acceptance of spectacle wear. First is a study performed at Clinical Vision Research Australia at the University of Melbourne.¹ Fifty children, ages 10 to 15 years, with no ocular disease and spherical refractive errors ranging from +/- 1.50 to -6.00 with 2.00 D or less of astigmatic error were studied. After completing a 30-day trial period wearing photochromic lenses, and a 30 day trial with clear lenses, the children completed the Pediatric Quality of Vision Survey, a questionnaire instrument designed to assess their experiences wearing their lenses in different situations such as outdoor and indoor use or when watching television, using computers or adjusting to lighting changes. They were also queried regarding personal peer acceptance of their eyeglasses.

Results demonstrated that 30/50 children (60%) preferred photochromic lenses over clear lenses, with 43/50 (88%) choosing to continue wearing the photochromic lenses over the clear lenses at the conclusion of the study. In addition, 88% of parents rated their child's overall experience with photochromic lenses as favorable or very favorable. With regard to performance, photochromic lenses were rated equally with the clear lenses for all indoor activities — and better in several categories outdoors, including seeing well in bright sunlight and playing sports.

These results were consistent with findings from an earlier study² conducted in the U.S., where upon completing the photochromic and clear lens trials, the children were given the option of keeping either the clear or the photochromic lenses. Almost 90% chose the photochromics. In addition, 98% of the participants' parents expressed a strong preference for the photochromic lenses over the clear lenses for their children.

Both of these studies convincingly demonstrate that children can, and do, appreciate the benefits of quality of vision spectacle lens enhancements like photochromic lenses; and, when given the opportunity, they appear to prefer photochromics over clear spectacle lenses.

Ocular Protection

Healthy Sight is all about seeing well now and into the future. The latter consideration makes preventive eye care in children of paramount importance in the concept of Healthy Sight Counseling. A crucial element of preventive eye care is ocular protection from those factors that might impact adversely on a lifetime of Healthy Sight. When considering Healthy Sight Counseling, preventive eye care and ocular protection in children, two factors deserve special consideration: impact and ultraviolet radiation (UVR) protection.

Impact Protection

Children live and prosper in an active, rough-and-tumble world and, all too often, children — and specifically children's eyes — pay the price for living in this kind of world.

Approximately 40,000 sports-related ocular injuries occur in the U.S. each year. Of these, 43% occur in children under 15 years of age. It has been estimated that 90% of these ocular injuries could be avoided with the use of appropriate sports-protective eye wear, but only about 15% of children use eye protection for sports. This is why impact-resistant lenses — especially polycarbonate lenses — should be used routinely in spectacles prescribed for children, and impact-resistant sports goggles or safety glasses recommended for children engaged in sports, particularly ball sports.

With these statistics in mind, the risk of impact-related ocular injuries in children must be taken seriously. Parents should be counseled on the absolute necessity for the regular use of protective eyewear in all children engaged in contact sports — even those who do not require prescription eyeglasses for vision correction. It would be hoped that recommendations for the routine use of protective eyewear will be mandated, as is currently the case for the use of protective helmets for bicycling and seat belts in automobiles. Eyecare professionals should consider taking the lead in campaigning for such regulation in children.

Ultraviolet Radiation (UVR) Protection

There is considerable laboratory and epidemiological evidence linking ultraviolet radiation to ocular disease. In the concept of Healthy Sight Counseling, awareness of the need for UVR protection should be an important aspect of the preventive eye care. Intense, short-term UVR exposure can produce sunburn of the eyelids, solar keratopathy and retinopathy. Cumulative, long-term exposure has been associated with neoplasms of the eyelids, pterygium, Labrador keratopathy, cataract and age-related macular degeneration (AMD).

While ocular UVR protection is necessary for everyone, UVR protection for children becomes a priority for several reasons.

- First, since it is cumulative exposure that has been linked to such vision-threatening diseases as cataract and AMD, UVR protection must start early in life to be effective. It has been estimated that the average child receives three times the annual UVR exposure as an adult.
- Second, children's eyes are more susceptible than older eyes to potential UVR-related damage. The clear crystalline lens of the child under age 10 transmits more than 75% of incident UVR, compared to only 10% at age 30.
- Finally, while spectacles represent the most convenient and effective modality to protect the eyes from UVR, only 16% of children (under age 18) wear prescription eyeglasses (compared to approximately 57% of adults). This means that the segment of the population most susceptible to ocular damage from UVR is less likely to be protected from it.

SYSTEMIC DISEASE AND CHILDREN'S EYES: ADAPTING THE MEDICAL MODEL FOR HEALTHY SIGHT COUNSELING

Integral to the implementation of Healthy Sight Counseling is the adaptation of the standard medical model for vision and eye care. A careful history exploring both ocular and systemic factors that might impact on Healthy Sight precedes the comprehensive ophthalmic examination. Both diseases and medications used to treat those diseases must be considered.

Diseases Impacting on Healthy Sight

In children, as in adults, a number of systemic diseases can impact Healthy Sight, with immediate and long-term effects on quantity or quality of vision. One important example is juvenile diabetes. The WHO has estimated the current incidence of juvenile diabetes Type I as 440,000 cases worldwide, with more than one quarter of affected children living in Southeast Asia and more than one fifth in Europe. This incidence is increasing at a rate of 5% per year. While Type II diabetes has been traditionally

considered to be a disease of adults, it is now affecting children in near-epidemic proportions.

In the U.S., Type II represents 45% of all newly diagnosed cases of juvenile diabetes. In Japan the incidence of Type II diabetes in children has doubled over the last two decades, and is now more common than Type I. Prevalence rates for Type II diabetes in native and aboriginal children in North America and Australia are as high as 5.3%.

In juvenile diabetes, broad swings in blood sugar levels can produce short-term fluctuations in the child's refractive state. More important long-term is the risk for the development of diabetic retinopathy, where the resulting retinal damage can seriously impair vision for a lifetime.

Another example is seen in juvenile rheumatoid arthritis (JRA), where the iritis associated with the disease and the steroids used to treat the JRA can cause fluctuations in vision, and, in the long term, lead to ocular complications such as glaucoma and cataract. Other examples include posterior subcapsular cataracts in chronic atopy, a variety of neuro-ophthalmic abnormalities in multiple sclerosis and childhood brain tumors, and ocular metastatic disease in juvenile neoplasia. While in most cases the systemic disease is well established by the time vision or ocular health has been affected, occasionally the alert eye care professional will be the first to suspect systemic disease based on the comprehensive medical model of Healthy Sight Counseling for ocular evaluation.

Medications and Children's Eyes

The increasing availability and use of a large variety of topical and systemic, prescription and non-prescription (over-the-counter or OTC) drugs is not confined to the adult segment of the population. Children are also being treated with a wide variety of medications and are therefore susceptible to the same benefits and potential ocular complications as their older counterparts.

According to a Center for Disease Control survey, approximately 13% of children in the United States had a health condition for which prescription medication had been taken regularly for at least 3 months.³

From the viewpoint of Healthy Sight Counseling, ocular side effects of medications can be divided into those affecting the quantity of vision, those impairing quality of vision and those associated with ocular disease. Not all medications in current clinical use are recommended for use in children 12 years or less. Important agents commonly used in children and their possible ocular side effects are listed in Table II.

Three categories of medications warrant special mention. First are steroidal agents, administered for a wide variety of therapeutic indications in children. The escalating use of steroid-containing inhaler units and

Table II Commonly used medications and their ocular side effects in children

Drug Class	Sample Medications	Adverse Effects
Antibiotics	Amoxicillin Cefaclor, Cefadroxil, Cefixime Cephalexin, Cephadrine Penicillin Erythromycin Clarithromycin Loracarbef Trimethoprim-sulfa (TMP-SMZ)	Ocular allergic reactions, edema, photosensitivity, photophobia, glare phenomenon, ptosis, diplopia, superinfections
Antihistamines (Sedating)	Brompheniramine, Carbinoxamine, Chlorpheniramine, Clemastine, Diphenhydramine, Phenindamine	Mydriasis, photosensitivity, decreased light reaction, decreased lacrimation, ocular pain, ocular burning sensation, decreased vision, anisocoria, diplopia, decreased accommodation, urticaria visual hallucinations, headache
Antihistamines (Nonsedating)	Cetirizine, Fexofenadine, Loratadine	Decreased lacrimatation
Analgesics	Acetaminophen Ibuprofen Codeinea	Allergic reactions, decreased vision, urticaria, visual hallucinations Decreased vision, diplopia, photophobia, photosensitivity, toxic amblyopia Pinpoint pupils, myopia, decreased vision, urticaria, visual hallucinations
CNS Stimulants	Dexedrine, Methylphenidate	Mydriasis, photophobia, blepharoclonus, itching, headaches, subconjunctival hemorrhages, visual hallucinations
Tricyclic Antidepressants	Nortriptyline, Desipramine, Amitriptyline	Mydriasis, photophobia, photosensitivity, blurred vision, decreased accommodation, visual hallucinations
SSRIs Antidepressants	Fluoxetine, Fluvoxamine, Sertaline, Paroxetine	Mydriasis, photophobia, blurred vision, diplopia, ptosis, dry eyes, allergy, urticaria
Corticosteroids (Oral)	Dexamethasone Prednisone Prednisolone	Cataracts, elevation of IOP, decreased vision, mydriasis, ptosis, toxic amblyopia, decreased resistance to infection, visual hallucinations, visual field defects
Corticosteroids (Inhaled, nasal)	Beclomethasone, Budesonide, Flunisolide, Fluticasone, Triamcinalone	Cataracts, elevation of IOP

spray formulations in the treatment of the current near-epidemic of juvenile asthma raises serious concerns about long-term ocular sequelae in the form of steroid-related cataract and glaucoma. Second are anti-histaminics, useful for the relief of symptoms of seasonal and perennial allergies and for respiratory conditions such as the common cold. Antihistamines can induce alterations in refractive status, impair accommodative amplitude, lead to mydriasis and photosensitivity, and produce ocular surface drying, resulting in dry eyes and contact lens intolerance. Third, and of increasing significance, are medications used to treat attention-deficit hyperactivity disorder (ADHD).

According to statistics from the National Institute of Mental Health:

- ADHD affects as many as 3 to 5 percent of school-age children
- An estimated 2.2 million children received stimulant medication, such as Ritalin, in 2002⁴
- Ocular side effects of Ritalin include mydriasis, photosensitivity, blurred vision, and decreased vision

HEALTHY SIGHT COUNSELING IN ACTION FOR CHILDREN

The preventive medicine aspects of Healthy Sight Counseling requires the recognition of ocular disease risk factors and their appropriate management by the eyecare professional. With children, this must be done in partnership with the pediatrician, with careful analysis of specific ocular and medical disorders, a collaborative approach to dealing with potential ocular complications of systemic disease or its treatment, and a concerted effort to prevent or at least minimize potential side effects. Additional partnering with parents and school personnel is also necessary, making Healthy Sight Counseling in children a true team endeavor, especially in the younger child.

The most effective way to address quantity and quality of vision issues as they impact on Healthy Sight

and Healthy Sight Counseling is through a careful medical and drug history, refractive examination and a customized spectacle prescription. This means prescribing the appropriate corrective measures to achieve the best possible quantitative vision and recommending specific spectacle lens enhancements — such as impact-resistant lenses, anti-reflective coatings, fixed tint and photochromic lenses and polarizing lenses — to specifically address quality of vision concerns.

HEALTHY SIGHT COUNSELING AND EDUCATION

Practitioner education and involvement and dedication to patient education are crucial to the successful implementation of Healthy Sight Counseling. While adult patients are expected to partner with their health and eyecare professionals to achieve Healthy Sight, the situation becomes more complex in children who are dependent on the adults in their lives to look out for their health and visual well-being. In children, therefore, educational efforts must extend beyond the traditional doctor-patient relationship to include the entire network of individuals involved in the health and safety of the child. This means that the message of Healthy Sight Counseling must be spread to pediatricians, school nurses, athletic coaches, camp counselors and anyone else responsible for assisting the child in achieving good sight and long-term ocular well-being. When it comes to Healthy Sight in children, everyone in the child's life has an important role to play.

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