

AMERICAN ACADEMY OF PEDIATRICS

Committee on Practice and Ambulatory Medicine and Section on Ophthalmology

Use of Photoscreening for Children's Vision Screening

ABSTRACT. This statement asserts that all children should be screened for risk factors associated with amblyopia. Guidelines are suggested for the use of photoscreening as a technique for the detection of amblyopia and strabismus in children of various age groups. The American Academy of Pediatrics favors additional research of the efficacy and cost-effectiveness of photoscreening as a vision screening tool.

ABBREVIATION. AAP, American Academy of Pediatrics.

INTRODUCTION

The goal of all vision screening is to detect poor vision or risk factors that interfere with vision and normal visual development. It is accepted that early diagnosis and treatment yield better visual outcomes. The prevalence of amblyopia is estimated to be 1% to 4% in children¹; however, only 21% of preschool-aged children and even fewer younger children are screened for this condition.^{2,3} In the policy statement "Eye Examination and Vision Screening in Infants, Children, and Young Adults," the American Academy of Pediatrics (AAP) recommends that all newborns and children be screened for such risk factors regularly.⁴ The components of the vision screening vary by age. Despite the availability of many screening options, many children permanently lose vision each year as a result of amblyopia, media opacities, and treatable ocular disease processes.

VISION SCREENING

Performing vision screening in the pediatric population involves many difficulties. Infants and young preverbal children are unable to provide subjective responses to visual acuity testing and do not easily cooperate with testing of ocular alignment or stereoacuity. It also is difficult to screen certain older children, such as those who are nonverbal or have developmental delays. Targeted populations, particularly those in medically underserved areas, may be difficult to reach. Screening approaches must be simple and generally successful to enhance the likelihood of their use.

Other challenges involved with vision screening include false-positive and false-negative results caused by low sensitivity and specificity of certain tests. Evaluators may vary in their ability to administer and interpret test results. Regardless of the sys-

tem or approach used, it is unacceptable to fail to identify children at risk of preventable vision loss or treatable visual disability because of failure to screen or because of false-negative test results.

PHOTOSCREENING

Photoscreening is a vision screening technique used to screen for amblyogenic factors, such as strabismus, media opacities, and significant refractive errors, in 1 or both eyes in children.^{5,6} Photoscreening has the potential to increase the currently low screening rates. Using a camera or video system appropriately equipped for photoscreening, images of the pupillary reflexes (reflections) and red reflexes (Brückner test) are obtained.⁷ Other than having to fixate on the appropriate target long enough for the photoscreening, little cooperation is needed from the child. Data are then analyzed by the evaluator, reviewing center, or computer for amblyogenic factors, and positive findings are noted. Children who do not pass the test may be referred for a complete eye examination.

As a technique to screen for amblyogenic risk factors, photoscreening appears to offer certain conveniences and advantages over traditional methods of vision screening, especially in its availability to screen children who are the most difficult to screen but in whom the prevalence of amblyopia is higher than in the general pediatric population. This includes children at high risk for eye problems, such as premature infants or children with developmental delays or a family history of eye problems.

Photoscreening does not represent a single technique or piece of equipment. Different optical systems can be used for photoscreening. Interpretation of screened images may be performed onsite or off-site in a reading center or with an automated system.

Each photoscreening system may have its own advantages and disadvantages, and it appears that results published in the literature for one system are not necessarily valid for others. Studies performed by different investigators using the same photoscreening apparatus may yield a wide range of results in sensitivity, specificity, and predictive values when onsite interpretation is required.⁸⁻¹⁵ Likewise, it is not certain that data gathered about different groups of children or different settings can be extrapolated to other groups or settings.

In general, it is difficult to compare efficacies of various vision screening methods, such as stereoacuity testing, autorefraction, red reflex testing, and cover testing, and then determine if photoscreening has better positive and negative predictive values.

The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

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This is attributable in part to lack of uniformity in pass-fail criteria for significant refractive errors.

More research is needed to establish how photo-screening can be best used. Photoscreening offers hope in improving vision screening rates in infants, preverbal children, and those with developmental delays who are the most difficult to screen. Photo-screening has not been shown to be superior to other vision screening tests currently used to screen 4- to 5-year-olds. In older children, currently available vision screening techniques can be used reliably.

RECOMMENDATIONS

1. Vision screening should be performed at the earliest possible age and at regular intervals during childhood as recommended by the AAP. The goal remains to eliminate preventable blindness and treatable visual disability.
2. Photoscreening is an innovative tool that can facilitate vision screening in children, especially in children who are difficult to screen (ie, infants, toddlers, and children with developmental delays). Photoscreening systems are one option to increase the screening rate in preschool-aged children.
3. Regardless of the type of photoscreening system used, the evaluator must know how to properly apply the technology and understand the limitations of the test, such as the possible occurrence of false-positive and false-negative results as they apply to the population being tested.
4. Photoscreening needs to be studied more extensively. The AAP favors additional research of photoscreening devices and other vision screening methods in large, controlled studies to elucidate validity of results, efficacy, and cost-effectiveness for identifying amblyogenic factors in different age groups as well as subgroups of children. The goal remains to eliminate preventable childhood blindness and treatable visual disability.

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