AMERICAN ACADEMY OF PEDIATRICS

POLICY STATEMENT

Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of All Children

Section on Ophthalmology

Red Reflex Examination in Infants

ABSTRACT. Red reflex examination is recommended for all infants. This statement describes the indications for and the technique to perform this examination, including indications for dilation of the pupils before examination and indications for referral to an ophthalmologist.

INTRODUCTION

Current American Academy of Pediatrics policy recommends eye examinations for infants and children at specified intervals during their development, including an examination to take place sometime during the first 2 years of life, stating: "Vision screening and eye examination are vital for the detection of conditions that distort or suppress the normal visual image, which may lead to inadequate school performance or, at worst, blindness in children. Retinal abnormalities, cataracts, glaucoma, retinoblastoma, eye muscle imbalances, and systemic disease with ocular manifestations may all be identified by careful examination."[1]

The policy further recommends that an eye evaluation for infants and children from birth to 2 years of age include examination of the following:

1. Eyelids and orbits;
2. External structures of the eyes;
3. Motility;
4. Eye muscle balance;
5. Pupils; and
6. Red reflex.

The red reflex test is used to screen for abnormalities of the back of the eye (posterior segment) and opacities in the visual axis, such as a cataract or corneal opacity. An ophthalmoscope held close to the examiner's eye and focused on the pupil is used to view the eyes from 12 to 18 inches away from the subject's eyes. To be considered normal, the red reflex of the 2 eyes should be symmetrical. Dark spots in the red reflex, a blunted red reflex on 1 side, lack of a red reflex, or the presence of a white reflex (retinal reflection) are all indications for referral to an ophthalmologist.

Concern has been expressed recently that diagnosis of serious ocular conditions, including retinoblastoma and congenital cataract, in which early treatment is essential for future ocular and systemic health, often is not made sufficiently early to minimize potential consequences of those conditions. This concern has led to consideration of legislation in several states[a] mandating early pupil-dilated red reflex examinations in all neonates or very young infants.

Although in infants, pupils are easily dilated using various agents, significant complications have been sporadically reported with all commercially available dilating agents, including sympathomimetic agents like phenylephrine and anticholinergic agents like cyclopentolate hydrochloride and tropicamide. These complications include elevated blood pressure and heart rate,[2] urticaria,[3] cardiac arrhythmias,[4] and contact dermatitis.[5,6] However, pupillary dilation has been performed routinely for many years in almost all new patients seen in most pediatric ophthalmology offices, with no complications seen for years at a time, so this procedure appears to be very safe when performed in an office setting on infants older than 2 weeks. Similarly, premature infants' pupils are often dilated in the neonatal intensive care unit without significant complication, so dilation appears to be relatively safe even in very young infants.

The purpose of this policy statement is to suggest a guideline based on current knowledge and experience for examination of the eyes of young infants to minimize the risk of delay in diagnosis of serious vision-threatening or life-threatening disorders.

RECOMMENDATIONS

1. All infants should have an examination of the red reflex of the eyes performed during the first 2 months of life by a pediatrician or other primary care clinician trained in this examination technique. This examination should be performed in a darkened room on an infant with his or her eyes open, preferably voluntarily, using a direct ophthalmoscope held close to the examiner's eye and approximately an arm's length from the infant's eyes.

[a]Passed in California and under consideration in New York, Massachusetts, South Carolina, Florida, and New Jersey (at the time of publication).

2. The result of a red reflex examination is to be rated as negative or normal when the reflections of the 2 eyes are equivalent in color, intensity, and clarity and there are no opacities or white spots (leukokoria) within the area of either or both red reflexes.
3. A positive or abnormal result of a red reflex examination (inequality in color, intensity or clarity of the reflection, or the presence of opacities or white spots) should be followed, in a timely fashion, by 1 of 2 actions:
   a. A red reflex examination preceded by pupil dilation with ≤1% tropicamide or a ≤1% tropicamide/2.5% phenylephrine mixture or a 0.25% cyclopentolate/2.5% phenylephrine (eyedrop or spray), administered to each eye approximately 15 minutes before this examination.
   b. Examination by an ophthalmologist experienced in the examination and treatment of the eyes of young infants, including ocular fundus examination, using indirect ophthalmoscopy after pupil dilation.
4. Infants in high-risk categories, including relatives of patients with retinoblastoma, congenital cataract, congenital retinal dysplasia, and other congenital retinal and lenticular disorders should initially have a dilated red reflex examination or examination by an ophthalmologist experienced in the examination and treatment of the eyes of young infants, as described previously (3b).
5. Infants with a history of leukokoria (a white pupillary reflex) in 1 or both eyes noted by parents or other observers or on any physical examination, and those with absence of a red reflex should have an examination by an ophthalmologist experienced in the examination and treatment of the eyes of young infants, as described previously (3b).

Red Reflex Subcommittee
*Walter M. Fierson, MD, Chairperson
Allan M. Eisenbaum, MD
Howard L. Freedman, MD
Harold P. Koller, MD

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James B. Ruben, MD

Consultant
Michael Redmond, MD

Staff
Stephanie M. Mucha, MPH

*Lead author

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Pediatrics 2002;109;980
DOI: 10.1542/peds.109.5.980

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