Module: **Visual Conditions and Functional Vision: Early Intervention Issues**

Session 1: Working With Families and Eye Care Professionals

Study Questions and Answers for Recommended Reading D: Stout

1. Describe the role of parents in the pediatric eye examination.
   The parents provide the family medical history and describe the child's visual function. They assist the physician by positioning the child and easing the child's discomfort.

2. List and briefly describe four critical types of information that can be obtained during documentation of medical history in a pediatric eye examination.
   - **The documentation of the history is an important time to inconspicuously observe the child's external appearance of the eyes, posture, level of alertness, visual behaviors, and over all appearance.**
   - **It is also beneficial for the ophthalmologist to learn if the condition is congenital or acquired, and if so, at what age.**
   - **The past history should include information about prenatal and perinatal problems, birth weight, gestational age, and mode of delivery.**
   - **Questions about specific developmental milestones are asked to assess early development.**
   - **The family history is an important aspect of the medical history because young children often do not have enough history to be beneficial.**
   - **History of trauma, medications, associated medical conditions or stress are other aspects that will guide the ophthalmologist in diagnosis and treatment of the child.**

3. Throughout this chapter, the author mentioned several occasions when sedation might be necessary for a pediatric eye examination. List and briefly describe situations that might require sedation.
   - **If a child will not cooperate and further testing is critical, the ophthalmologist might sedate the child.**
   - **The PVEP often require sedation of the child to ensure good results.**
   - **Most children cannot cooperate with a slit-lamp examination because it is hard for them to sit still and follow directions. A quick peek is possible even with young children. However, sedation might be required to examine the interior of the eye.**
   - **Intraocular pressure measurement with applanation tonometry requires sedation in children younger than 3 years due to lack of cooperation.**
   - **Sedation might be necessary to get an accurate reading with the standard keratometer.**

4. What do eye specialists focus on during the external examination?
   The external examination builds on the history. Thus, a more detailed examination of neuromuscular tone, cranial nerves, head circumference, extremities, or skin might be indicated. The head is further assessed for symmetry, preauricular skin tags, ear position, and shape. The orbits are observed for ptosis, abnormalities in fissure size or shape, and orbital depth.

5. Describe three methods for assessing visual acuity in preverbal children.
   - **Optokinetic nystagmus, or OKN: Optokinetic nystagmus is an involunatary following response to moving stripes filling up most of the visual field. This enables one to receive a response from an infant whose attention to testing targets might be limited. A response to a standard OKN drum indicates that the child has vision of finger counting at 3 to 5 feet.**
   - **Forced-choice preferential looking, or FPL: The FPL uses Teller Acuity Cards to establish grating acuity. The child is presented with high-contrast gratings of various spatial frequencies paired with a blank card. Infants generally prefer patterns to solids and will look at the patterns if they are able to see them. The test takes 20 to 30 minutes to administer.**
   - **Pattern visual evoked potentials, or PVEP: PVEP assesses the response of the occipital cortex to pattern stimuli. A Snellen acuity can be established from the results. Sedation is frequently needed to ensure good results because poor fixation may give artificially low results.**

6. Why is it important to assess monocular and binocular fixation? What condition might be missed during only a monocular assessment of fixation?
   Monocular and binocular fixation are two types of fixation testing. Monocular testing establishes whether the patient fixes with the fovea and the quality of fixation. Monocular testing is important in identifying eccentric fixation as this shows that the patient's visual acuity is in the range of 20/200 or worse.

Binocular fixation testing compares the vision of one eye to the other. Thus, it can reveal fixation preference in individuals with strabismus indicating organic visual loss or amblyopia. The smallest object eliciting a fixation response should be used:

- **A 1-month-old will fixate only on a human face.**
- **2- month-old will fixate on smaller objects such as finger puppets.**
- **Targets with fine detail are appropriate for a child over 12 months of age. Children who have developed a neat pincer grasp can be encouraged to pick up small particles such as cake sprinkles.**

7. Describe three tools for assessing visual acuity in children who are verbal.
   - **Identification or matching of character shapes is assed with Allen cards, Wright figures, or Lea symbols: This tool can be used with young, pre-verbal, or shy children by having them match rather than identify. After obtaining equal acuity with single cards, one can move on to testing with linear cards. It is important to use both linear and single cards since single cards will not detect the crowding response in amplyopia. As appropriate for a child under 3 years of age, single and linear symbols test only to the level of 20/30.**
   - **The Tumbling E, or HOTV, is considered more difficult than symbol/figure cards and constitutes the next step in preliterate testing. These tests go to the 20/20 level.**
   - **Traditional Snellen letters can be used in children, age 5 to 6, who have mastered random letter identification.**

8. Describe the procedure for assessing visual fields in very young children.
   - **Informal assessment of the visual field can be done as soon as the child can maintain steady fixation on an object. An interesting, developmentally appropriate object is activated centrally, while, simultaneously, a second object is introduced from the periphery in all four quadrants. The examiner will watch to see if the child shifts gaze from the central toy to orient to the toy in the periphery.**
   - **Formal assessment is possible with preschool children. Goldman perimetry will more precisely determine the child's visual field loss.**

9. At what age can children reliably be assessed for color vision? What tools would be most useful for young children?
   A child's color vision can be assessed formally at age 3 or 4 years using various tests:
   - **The Ishihara Pseudoisochromatic Color Plates work on the principle of color confusion. The plates have geometric shapes that can be traced with the finger. The plates are sensitive for red-green defects, but do not detect blue-yellow range defects.**

- **The Richmond Pseudoisochromatic Plates, also named American Optical Hardy-Rand-Rittler, are based on the principle of color saturation. It does not come in an illiterate format, but will detect both red-green and blue-yellow defects.**
- **The City University Color Vision Test (TCU test) comes in a book format, so that the manipulation of the color discs is eliminated. Unfortunately, the test fails to detect 20% of color defects.**

10. At what age can children reliably be assessed for contrast sensitivity? What procedure can be used?
    Children's contrast sensitivity can be formally measured at age 4 years using the Vistech wall chart. The chart is comprised of 8 levels of contrast sensitivity (horizontal) for each 5 levels of spatial frequency (vertical). The child imitates grating orientation with his hand. A record of the child's minimum contrast detectable at each spatial frequency is maintained and used to plot a contrast sensitivity function curve.

11. What information do eye specialists obtain from an assessment of the red reflex? How do they assess the red reflex?
    The specialist will evaluate the red reflex to determine the presence of an opacity (including size), amblyopia, and deviations as in strabismus. In dim illumination, the red reflex is assed by illuminating both pupils with the same direct ophthalmoscope beam. The intensity and quality of the reflexes in both eyes is compared. The child's attention should be focused at a distance to eliminate a near response.

12. Why do eye specialists examine the pupils? What visual condition may be associated with abnormal pupillary responses?
    The pupils are examined to determine overall eye health, nervous system integrity, and functional use of vision. Afferent pupillary defect is associated with abnormal pupillary responses.

13. Describe three challenges in securing accurate measures of intraocular pressure in very young children. How might eye specialists secure truly accurate measures of intraocular pressure in very young children?
    - **The child must be supine. Hand-held instruments are too large for the infant's eye.**
    - **If the child is upset (crying and struggling), the intraocular pressure might vary.**
    - **Certain tonometers require corneal contact, which is difficult to obtain in a young child.**
    - **Seadation may be necessary to secure a truly accurate reading.**

14. What is keratometry and when might young children need this assessment?
    Keratometry is the assessment of the corneal shape and the axis of astigmatism. The measurements of a keratometer are important in fitting a child with contact lenses.

15. Stout discusses dilatation and cycloplegia. Using a medical dictionary or the Internet, define these terms. Why are they important in the examination of young children?
    - **Dilatation: The act of expanding an aperture; the dilation of the pupil of the eye**
    - **Cycloplegia: Paralysis of the intraocular muscles**

    These methods are important in accurately determining the refractive error in children by eliminating accommodation.

16. Using a medical dictionary or the Internet, define *fundus* and then describe Stout's suggestions for examining the fundus in young children.
    The fundus is defined as the back or deep part of the eye, including the retina. If the examiner needs a quick look, an indirect light can be used to view the the posterior pole (optic nerve and macula). The optic nerve can be examined further with the direct ophthalmoscope. While the child is watching a distant target (video), the examiner will be able to observe the optic nerve. Sedation of the child might be necessary to obtain more details, particularly to the periphery of the fundus. Children under the age of 2 years can be held by a parent; older children that will not cooperate may need sedation.

Stout, A.U. (2003). Pediatric eye examination. In K.W. Wright & P.H. Spiegel (Eds.), *Pediatric ophthalmology and strabismus* (2nd ed., pp. 57-67). New York: Springer.