Blind Schools

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Ophthalmic examination of a child with visual loss aims to confirm the impairment, establish the diagnosis, identify the treatment required and describe the prognosis for the disorder(s) causing visual loss. The examination by ophthalmic professionals is an important component of the broader assessment of visual function and educational needs of the child, which form the basis of the plan of management of that child and her/his family. The benefits of evaluation by a multi-disciplinary team, comprising ophthalmic and paediatric professionals together with educationalists and psychologists, are recognised.

Taking a History

It should be remembered that the mother of the child is the person who knows the child better than anyone, and if she suspects that her child may not be seeing normally then this should be taken very seriously. It is usually possible to assess the overall level of visual function through a detailed history, taken from the parents, and possibly from other relatives and teachers, as well as from the child, if appropriate. The interview also provides the first opportunity to assess the parents’ response and adaptation to their child’s visual problems and to establish a relationship between the family and the ophthalmic team.

Information on the age at onset, duration and level of visual loss should be sought. The presence or absence of specific symptoms and signs should be determined: these include eye-poking, photophobia, significant worsening of vision in dim or very bright light, or nystagmus. It is also important to enquire about any family history of ocular or systemic diseases. Questions should be asked about the mother’s pregnancy, the birth, including gestation and birth weight, and the neonatal period. It should be established whether the child’s general development is normal or whether there are concerns about hearing, speech, motor or learning abilities. Finally, as appropriate, it may be necessary to ask about specific aetiological agents, such as drugs, infections, nutritional deficiencies or trauma.

The Ophthalmic Examination

Observing the child

The clinical examination starts during the history taking, through assessment of the child’s visual alertness and behaviour: for example, her reaction to changing the lighting, or if someone unknown approaches her. The child should also be observed for any external ocular

References


Review article.

Examination of a Child with Visual Loss

To conclude, we would like to emphasize that all the children who are likely to be admitted into blind schools should be thoroughly examined by an ophthalmologist. The eye specialist should have a background of working with children and a knowledge of amblyopia and the use of low visual aids. With this approach, and if simple low visual aids are introduced early in life, the quality of education and life can be significantly improved.

Microcorneas and corneal scarring

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Examining a Child

Young infants can be examined in this way if held up to the slit lamp in the prone ‘flying baby’ position or, alternatively, by using a hand held slit-lamp. If a slit-lamp is not available, examination is possible using a magnifying loupe and appropriate light source. The organisation, symmetry and clarity of the structures of the anterior segment should be carefully evaluated. The intraocular pressure should be measured when there are specific concerns, using methods appropriate to the child’s age and level of cooperation. Pulse-air tonometry, if available, is generally more suitable for infants and young children but in older children, application tonometry is usually possible.

Examining pupillary responses
Assessment of pupil size and their response to a bright light can be difficult, especially in infants, but should be carried out. Abnormal responses are important diagnostic clues. For example, a relative afferent pupillary defect indicates asymmetrical anterior visual pathway disease and a paradoxical pupillary response may suggest retinal disease.

Assessing eye movements and strabismus
The ocular motor system should be assessed by examining the corneal light reflexes, and by the cover-uncover test to detect strabismus. The range of ocular movements should also be tested, especially when a neurological disorder is suspected. Eye movements can be tested to ascertain whether the child can follow a moving object (smooth pursuit system), and whether they can refixate on an object introduced into the field of vision (saccadic eye movements). Children are naturally interested in faces, and the examiner can use her/his own face as the object of interest.

Examining the anterior segment
Wherever possible the cornea, iris, lens, anterior chamber and anterior vireous should be examined using a slit-lamp.

Examining the posterior segment
Examination of the fundus can be difficult and dilation of the pupils is essential. It is very important to examine the fundus of all children who have reduced vision, as loss of vision may be due to life threatening conditions, such as retinoblastoma. In young infants examination can be made easier if the child is held and fed by a parent while being examined. For older children it may be necessary to wrap the child in a blanket, and have an assistant hold the child’s head steady during the examination, after explaining to the parents that the examination is not painful in any way. Wherever possible, direct and indirect ophthalmoscopes should be used. Indirect ophthalmoscopy, if possible using a 28+ or 30+ dioptre lens, provides a good view of the entire fundus whilst direct ophthalmoscopy allows more detailed examination of structures such as the optic disc and fovea.

Refration
As part of their initial ophthalmic examination, all children should be assessed by cycloplegic refraction for the presence of a refractive error, as this may be the cause of the visual impairment, as well as providing diagnostic clues.

Examining the family
Ophthalmic examination of the parents, siblings and other family members is important whenever the disorder causing visual loss is suspected to be hereditary, even if there is no previously established family history.

Measuring Visual Functions
Measuring visual functions in children is not straightforward. The visual system is relatively immature at birth and development, particularly rapid in the first year of life, continues into late childhood. Therefore, it can be difficult to predict final visual outcome in infants and very young children, including some of those with apparently very poor vision. Acuity is the most frequently measured visual function but others, such as visual fields and binocularity, may be particularly relevant to the overall functional assessment of the child.

Acuity
Despite the development of methods appropriate to different ages, measuring acuity remains difficult in infants, preschool children and those with other disabilities. In addition, many techniques require special equipment and conditions, making them unsuitable for some settings. Whichever method is used to measure a child’s vision, it is important to assess vision corrected for any refractive errors, and to assess the eyes separately as well as together whenever possible.

Children of infants may be measured using forced choice preferential looking methods using Teller or Cardiff acuity cards, and by electro-physiological tests of visual evoked potentials. Both techniques are time-consuming, require special equipment and trained personnel, and are costly. Until recently these methods were generally only used in specialised paediatric ophthalmology units. In co-operative children, aged 18–24 months, it is possible to use picture optotype tests (such as Keys pictures) at very short distances. Standard optotype tests, such as the Snellen E chart, can generally only be used in children aged 3 years or above. It is important that testing is carried out at the appropriate distance, and, if possible, using linear optotype systems to ensure the effect of crowding is not overlooked in children with amblyopia.
Examining a Child

With some younger children and those unable to read, a matching test, involving matching letters on the distance chart with those on a card held at near, can be used.

Visual fields

Formal visual field testing is generally only possible in older children. However, useful information about significant visual field defects, such as hemianopia, can be obtained by testing visual fields using simple confrontation methods.3

Binocular vision

Assessment of the level of binocular vision is primarily important in children with strabismus. However, it can be a useful test in the assessment of a child suspected of having serious loss, as the presence of binocular vision implies good acuity in each eye. There are various clinical stereo-acuity tests, some of which can be used with young children.4

The Child with Very Poor Vision

When assessing a child thought to have very poor vision, methods which can detect very basic levels of visual function should be used. Examples include assessing whether a child responds in any way to a bright light; or if they respond to a visual threat, such as waving a hand fast in front of the face. In infants a useful test is the spinning test. In this test the child is held at arm's length facing the examiner, who spins the child round several times. If, after stopping spinning, the eyes have prolonged nystagmus, this suggests that the child has very poor vision (or cerebellar disease).

All these tests need to be interpreted cautiously, as a normal response depends on motor function as well as visual function. If these tests of basic visual function are abnormal, electro-diagnostic tests (such as electro-retinograms or visual evoked responses) can be used to confirm whether an abnormality is present or not. If these facilities are not available it is advisable to say to the parents that you need to examine the child again in a few months' time, when the tests can be repeated.

What to Tell the Parents of a Child Thought to be Blind

It is advisable to be cautious about giving a definite visual prognosis to parents of young children who appear to be blind. As it is difficult to predict the final visual outcome in young children, it is important to avoid judging the child's visual function too early in life. Whilst it is essential that parents are not given unrealistic expectations of their child's future vision, it is important to remember that some children with serious ocular disorders and apparently very poor vision, can achieve better than expected overall visual ability.

References