

Routine observations in vision screening, the 1st year

1. Observations on **red reflex** and **the structure of the anterior, front part of the eyes** at birth and when the infant is seen for the first time for vaccination as well as during each visit later. Infant's **eyes should be moving symmetrically** and **constant strabismus** of an eye is a reason for referral already at this age.
2. Observations on **normal eye contact and interaction at 6-8 weeks of age**. Eye contact is a prerequisite for more complex visual interaction and therefore emotionally very important function. If normal eye contact is not present at the age of 6 weeks, the parents are advised to hold the infant close to their face and talk to the infant while the other parent may bring the little hands to feel the face. This multimodal contact may make the infant aware of the presence of the parent. If the eye contact does not develop during the following two weeks, the infant needs to be examined by an ophthalmologist without delay. If the ophthalmologist finds the eyes structurally normal with age typical refraction, the infant needs to be assessed by a paediatric neurologist to answer "why the brain does not use the visual information that seems to be available?"
3. Observations on **alignment of the eyes** starting at the age of three months.
4. After the age of six months **squint, strabismus**, especially inward squint, should not occur more than briefly when the child is tired, or the outward squint when the child is thinking on something, not looking at anything and the eyes turn in their sleep position (s.c. Bell's phenomenon, eyes turning out and up during sleep, which prevents corneas from drying if the lids are slightly open). The tests used at this and during each later visit are the Hirschberg test or light reflex test using a weak penlight and cover test. The instruments, **penlight, fixation stick** with pictures that entice the infant to accommodate and **translucent cover** should be available.
5. **Glaucoma** is a rare condition in infants. It needs to be detected early, before it has caused irreversible damage to the optic nerve. Eyes that grow unequally or more than normally, are the suspected ones. Since treatment is difficult, these cases are usually taken care of by one university hospital in each country, except in large countries where several university hospitals cover all rare disorders. Similarly rare condition that needs to be remembered is **retinoblastoma** that may be present at birth but usually starts to grow in infancy. Since it is life threatening, referral and treatment should be with no delay. **Ptoxis** is a more common condition requiring surgical treatment in some cases and therefore evaluation by an ophthalmologist trained for lid surgery.
6. Since refractive errors and amblyopia and strabismus are more common in some families than in the population in general, **infants in those families are at greater risk** than other infants and should be followed up with greater scrutiny and referred to examination. Their families usually know about amblyopia and its treatment and have a high motivation in following the advice on prevention or treatment of amblyopia by bringing the infant to the office of their ophthalmologist if there is any worry about development of vision.

7. All infants with problems in development in the other areas, motor, cognitive or hearing, should have **their eyes and vision assessed at the time of the first diagnostic investigations and have vision included in their early intervention.** If the diagnosis is possible at birth, as it is in several syndromes, like Down Syndrome, the referral to the ophthalmologist should be during the first diagnostic investigations or *at the age of 12-14 weeks at the latest* when responses to gratings in preferential-looking test situation, contrast sensitivity (with Hiding Heidi test), accommodation and refractive errors can be examined. Insufficient **accommodation** is common in infants with Down Syndrome and other hypotonic infants and should be treated with **spectacles**, *near correction* in the first spectacles at the age of a few weeks and, when the infants learns to sit, *bifocals* with undercorrected high minus refraction and equal overcorrection of plus to fit the limited visual sphere of these infants during the first year.
8. **General delay of motor functions** is common in severely visually impaired infants. Lack of visual information decreases the drive to explore. *Delay in motor development is a secondary impairment caused by poor visual information.* Therefore infants with visual impairment should have physiotherapy even if they have normal motor functions during the first few weeks. It is important that the infant can *watch other normally moving infants of the same age* to copy the hand movements and communication.
9. **Recognition of family members' faces** develops between 7 to 11 months of age and should be discussed with the parents during the follow-up visit at 8 months-of-age. If the infant responds to voices but not to facial features, the infant needs to be examined by an ophthalmologist first. If the eyes and refraction are normal, a paediatric neurologist needs to assess whether the delay is related to weak cortical function of face recognition. Early intervention with communication training needs to be started without delay and people related to care of the infant should get thorough explanation on face blindness because it is a poorly known loss of brain function and hard to believe to be true. *These infants are nearly always experienced "autistic" and met with negative attitudes.* This should be prevented.

In all screening and thus also **in vision screening, referral to examination and treatment need to be organized before screening is started.** Screening without treatment and early intervention rightfully causes bitterness and anxiety in the families that are told that their child has a problem but the child is not examined or treated because of shortage of manpower or organizational restrictions in referral services. The referring service workers should see to that the infant has been examined by the consulting specialist doctor who has sent a report to the referring service.