Master Thesis in Medicine
(Second Level, 45 Credits)

Procedures and Quality of Visual Assessment of Disabled Children at Swedish Low Vision Clinics

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May 2014, Örebro, Sweden

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ABSTRACT

The amount of children with brain-related vision loss and multiple disabilities are increasing, as small premature children have a higher survival rate due to improved neonatal care. Of all children recorded at the low vision clinics in Sweden, between 50 – 80 % have multiple disabilities as well. The aim with this study was to find out how the low vision clinics in Sweden are working with children with low vision and multiple disabilities. What education the professionals at the low vision clinics have and if there are any similarities and differences in how they assess visual functions. The method used was a questionnaire consisting of 32 questions, both alternative and open questions, intended to be answered by professionals working with children. Results: There were differences and similarities between the low vision clinics and how they were assessing visual functions. Some clinics are working in stationary age related team, having good conditions to perform functional visual assessments, while other clinics are working with persons in all ages and just can have temporary teams. Some clinics do not perform visual assessments at all. Another difference is cooperation with other partners, as the habilitation for children, SPSM and special teachers in the municipality, which are well functioning in some parts of the country, but poorer in other. Some professionals have education in visual development in children, but not all. Conclusion: As children with brain-related vision loss and multiple disabilities are increasing, a national checklist may be a start for an overall understanding for visual functions. This will call for better education, resources, tools and methods at the low vision clinics. They have to be prepared to meet the new demands that will be asked on their expertise in the future.

Keywords

Brain injury, visual disability, cerebral visual impairment, children with multiple disabilities and low vision, dorsal stream, ventral stream, visual assessments in children with multiple disabilities, visual impairment in Swedish children
List of abbreviations and explanations

**VA Visual acuity**
It is described as the resolution capability of the visual system, and the ability to discriminate small details. This means that visual acuity is the spatial resolution; the ability of the visual system to discriminate two points separated from each other, and the ability to distinguish two adjacent points, and still perceive them as two. It depends on the optics of the eye, what part of the retina stimulated, and it’s condition. The capacity of visual pathways and cortex is also affecting the visual acuity. Visual acuity is measured with symbols or letters.

**CS Contrast sensitivity**
Contrast sensitivity is the ability of vision to separate small differences in light reflected from adjacent surfaces. Contrast sensitivity allows us to notice edges and show objects depths and placement in space. It is an important measurement, because it will give an idea of the image quality of a person. This examination has a great significance, because visual information for perceiving our surroundings and facial expressions in communication are both at low and intermediate contrast. (4)

**VF Visual field**
Visual field is described as the room overlooked when you are looking straight ahead, and consists of the field of both eyes together. The normal limits are about 180° horizontal and about 70° vertical down gaze and 60° up gaze. The peripheral visual field is used when moving and orientating in the surroundings. The central visual field has good resolution capability, and is used when looking at small details e.g. reading and small things. The structures examined with the visual field examination are the functions of the retina, visual pathways and visual cortex.

**CV Color vision**
It is the ability of the visual system to detect and separate light of different wavelengths. The cones are sensitive for three different wavelengths, short waved blue, middle waved green and long waved red light. At least two types of cones are needed to discover colors. Shades are combinations of all these three. The color information processes in the different layers of the cortex are very complicated, and demand an extensive communication to interpret colors.

**Stereopsis**
The image from the right and left eye are merging in visual cortex. The brain is utilizing the phenomenon to get an increased depth in the picture. Two conditions are requested for this; first,
both eyes must be aligned on the object of regard, and second, the clarity and size of the images must be compatible. (30)

Adaptation
Adaptation is the ability of the visual system, to adapt and work in different levels of light. Here cones and rods in the retina are the cells sensitive for light.

The oculo motoric functions
It is the ability of the eyes to fixate at, and follow moving objects.

Accommodation
It is the ability of the crystal lens in the eye, to focus at different distances, distance and near, and still have a sharp image at the retina. The lens is changing its form, and then the power is increasing for a sharp picture at near distance or decreasing for a sharp picture at distance.

Visual functional levels (arbitrary)

1. Subcortical functions
Consists of protective reflex, pupillary reflex, short fixations and following movements and low preferential looking values (PFL).

2. Unspecific area (blindsight)
They are reactions to peripheral movements and the simple visual field.

3. Cortical functions at primary level
They are stable fixation, eye contact, response smiling, contrast, PFL of higher values, visual acuity, stereopsis, figure/background, color vision, concrete forms, simple forms and symbols like BUST.

4. Cortical functions at secondary level
They are discrimination of symbols or letter close to each other in a row, (crowding), and complex pictures.

5. Cortical functions at higher levels
They are lokalisation and direction, orientation, moving objects, facial expression, recognizing faces and central coherence.
Visual perception/cognition
Perception is the ability of the visual system to perceive processes, interpret and merge visual impressions to a complete meaning. Cognition is the ability to handle information, as perception, memory, conceptualization, expository, problem solving and attention.

LVC low vision clinic
CVI cerebral visual impairment
ROP retinopathy of prematurity
OVI ocular visual impairment
TAC Teller acuity chart

Habilitation for Children
Habilitation for children will provide advice, support and treatment to children and young people and their families. Children who come to the habilitation may have physical impairments such as physical disability caused by brain damage, muscle or nerve diseases and deformities. It can also involve cognitive disabilities, known as developmental disability, or mental disabilities like ADHD and various forms of autism. Even children who have visual or hearing impairments may access the Habilitation, which also interacts with the local Low Vision Clinic and Hearing Center.

SPSM Specialpedagogiska skolmyndigheten. English: The National Agency for Special Needs Education and Schools. This authority is working to ensure that children, young people and adults, regardless of functional ability, have adequate conditions to fulfill their educational goals.

Professionals low vision therapists, occupational therapists, optometrists, counselors, psychologists, physiotherapists, ophthalmologists and orthoptists.

- Low vision therapists and occupational therapists are assessing visual functions and are prescribing the aids needed.
- Describing the consequences of visual impairment to parents, relatives and the network around the child.
- Optometrists and orthoptists are conducting refractions; optometrists prepare spectacles and assess visual functions.
- Counselors help the family with contact with social authorities, applications and personal counseling for parents.
➢ The psychologist conducts personal counseling.
➢ The physiotherapists are assessing motoric functions and developments.

Socialstyrelsen Health and Human Services Department
Landstingsförbundet Association of county councils
Svenska Kommunförbundet Swedish association of municipalities
BACKGROUND

In humans, the visual system is the most developed and the largest, of the senses and about half of the cerebral cortex is directly or indirectly involved in visual activity. (1, 3) Visual information is our most important way of receiving information about the world around us.

When children are newborn, they have no visual experiences and the pathways between eyes and brain are not fully developed. (1) Newborn children do not have any conscious vision but have a reflex pathway from the eyes to medulla oblongata for e.g. eye movements and pupil reactions, responsible for unconscious vision during first months in life. (30) When a child is between one and two months old, it starts to give eye contact and responsive smiling, close to another person. One of the first signs of conscious vision is the responsive smile, showing the primary pathway between eyes and primary visual cortex, V1, is developed. (2)

The immature visual system is vulnerable and sensitive to reduced oxygen saturation and disturbed blood flow. In about 65 % of the children born preterm, the most common cause for visual impairment was hypoxic ischemia causing small infarctions in the periventricular white matter, so called periventricular leukomalacia (PVL). The child may develop cerebral palsy, visual impairment or a combination of both. (38) In another large group of children born in term, 45 %, hypoxic ischemia at time of birth caused the visual impairment. Grönqvist et al. reported a large proportion of visually impaired children born in term with impaired mental development as well. They also noted an association between visual performance and mental ability. (39)

In 1997, Blohmé and Tornqvist (8) found that the most frequent disorders were cerebral visual impairment (CVI), non-hereditary optic atrophy, retinal dystrophy, congenital hypoplasia of the optic nerve and congenital cataract. They also found nystagmus secondary to brain disorder, albinism, congenital nystagmus, retinopathy of prematurity (ROP) and high myopia in a number of patients. The group of children with neuro-ophthalmological diseases was the greatest of them all, and in this group they found the highest proportion of additional impairments, 88 %, such as mental retardation, motoric, hearing or other impairments. This study has laid the foundation for the register “barnsynskaderegistret” in Sweden, where the eye clinics are supposed to report children with visual impairments. These findings were supported by other studies made in the Nordic countries. (36)

With improved neonatal care, very small premature children are surviving. (27) Because of the increased risk of ophthalmic disorders and cerebral dysfunctions or malfunctions, it ought to be
mandatory that these children are examined by ophthalmologists regularly, and the priority should be high. (40)

These ophthalmic disorders may prevent optimal learning, communication and optimal participating in daily living activities. (37,40,44,45) This complexity requires a number of transdiciplinary specialist teams because the assessment of visual functions in children with neurodisabilities is a very complex process. (7,31,42)

In Sweden the LVCs are responsible for habilitation/rehabilitation for individuals with visual impairments in all ages, both without and with multiple disabilities. (54) There are 34 LVCs in Sweden. The aim is to work with the patients, based on their needs, and provide for independent participating in daily life activities. To get access to their services it is necessary with a referral from an ophthalmologist. The clinics obey under the Swedish health care law, and are a part of the county councils.

Visual impairment is defined by WHO (World Health Organization) (35) and has the same classification worldwide and is divided into five categories. This categories do not take into account the visual impairments caused by a brain injury. Cerebral visual impairment (CVI) does not give the same symptoms as a visual impairment due to a defect or error in the eye, i.e. ocular visual impairment (OVI). Ocular visual impairment can coexist with cerebral visual impairment. (15,16,17,18,24,29)

Among children under 18 years with visual impairment, recent studies, (8,9) have shown that about 60 % have multiple disabilities. These children may have high refractive errors, anisometropia, strabismus and low contrast sensitivity (12,32), and a higher prevalence of higher levels of visual dysfunctions as CVI. (5,6,10,11) To discover and evaluate any visual impairment in this group may be utterly difficult. Therefore it is important to know how professionals as low vision therapist, occupational therapist, optometrists, counselors, orthoptists, psychologists, physiotherapists and other professionals at the low vision clinics are working.

Do these professions have the theoretical education enough to understand and describe the visual impairment and do they share the knowledge to medical care, parents, educational professionals, other cooperation partners, caretaker and habilitation for children? How does the cooperation with other collaboration partners look like? How are they assessing visual functions from eye to cortex?
Consequences of early catastrophes

It is important to spread the knowledge about visual functions and multiple disabilities to other caregivers so they realize the visual impairment and its consequences. (37, 46) As the Swedish health care law says that “All health care should aim to provide good health and care on equal terms for the entire population.“ (47 §2)

It is of great importance that an ophthalmologist regularly will examine these children. In children with cerebral palsy, more than 50% have accommodative dysfunctions. (26) Strabismus is frequently seen as well as disturbances of smooth pursuit eye movements, saccades, eye alignment and in fixation as a consequence of early catastrophes a like periventricular white matter injury. (21) Brain damages may also cause visual perception/cognition dysfunctions. Visual perception is a part of a cognitive process. (19,20) The children with CVI have large variations in their visual functions, with short changes from e.g. day-to-day even hour-to-hour. (4,7,11,12)

Visual assessment in children with low vision and multiple disabilities

It is difficult to make an assessment of the functional levels of vision in children with low vision and multiple disabilities. It is therefore often necessary to use unorthodox tests and behavioral methods to estimate their functional visual level. (13) These various methods are usually not in common clinical use. It is important to be familiar to the normal visual development and compare the observations with that. Children with low vision and multiple disabilities may however have disparate visual developments and behaviors than normal. (4,34) Questions of interests are:

- Can the child give responsive smile?
- Can the child give eye contact that seems normal?
- Is the child interested in using its vision?
- How far is the sphere of sight?
- Can the child fixate and follow a target, or are the fixations just short and sporadic?
- Does the child only use its hearing?
- Does the child become more tactile in some situations?
- “Is the visual behavioral typical for the age? If not, at what level of age is the visual development? Are there other functions at the same level, or are there differences between the maturation of the functions?” (34 p. 63)
No previous study has described how the 34 independent LVCs work with children with multiple disabilities and possible CVI. Therefore this study was initiated and has the following aim:

**AIM**

The aim was to find out how the professionals of LVCs in Sweden make assessments of visual functions in visual impaired children with multiple disabilities, how and if they cooperate with other authorities and how they develop their professional competence.

The questionnaire (Appendix II) was supposed to give answer to following questions:
- Are there any similarities between the low vision clinics in assessing visual functions?
- Are there any differences between the low vision clinics in assessing visual functions?
- How does the cooperation with other authorities work?
- What is the educational level of the staff and are there any wishes and/or requirements for further education in the future?

**MATERIAL AND METHOD**

A descriptive study was performed where a questionnaire (Appendix II) was developed and sent to the 34 LVCs in Sweden, together with a letter with information of the study. (Appendix I) The questionnaire was designed based on the author’s experiences as optometrist in a low vision clinic. The questionnaire consisted of 32 questions and was separated into two different parts, the first about how procedures and assessment of disabled children are made and possible cooperation with other authorities. The second part was about the present educational level the professionals have and if education was wished for and/or needed in the future. The questions were both alternative and open. One difficulty was to make a questionnaire that has good and clear questions. The formulation had to be made so the questions could be understood and interpreted by different respondents.

The reason for both alternative and open questions was the possibility for the clinics to give their own comments and describe how they work. The goal with this study was to describe and interpret the procedures and quality of visual assessment, at the LVCs in Sweden. This method is a hermeneutic approach to the study and was analyzed by content analyzes. (41) Qualitative methods suits well when this type of dynamic processes are studied and to learn more about experiences, thoughts, expectations and attitudes among individuals. (48)
A group of professionals were supposed to answer the questionnaire. It was expected that there could be differences from one low vision clinic to another depending on the amount of professionals employed, and what different professions that participate in assessing children with multiple disabilities.

As the researcher has knowledge of the studied subject, preunderstanding can both be a weakness and strength. The aim was that the preunderstanding would have minimal influence at interpreting and analyzing the results. The questionnaires were sent to the low vision clinics and time for answering was three weeks. A majority was returned in time.

As the questionnaire was supposed to be answered by a number of professionals, no single person was supposed to be pointed out. This could be a strength but also a weakness. The strengths are several professions and maybe several in the same profession were answering the questionnaire, with different points of view. This could perhaps open for discussions about the procedures used in their team. The weakness could be that only one person answered the questionnaire and not all voices were heard. As the questionnaires were numbered by chance, there was no possibility to know from which LVC the answers came, and they were handled with confidentiality and stored in a locked drawer until the analyses were supposed to be done.

Once the questionnaires were transcribed, they were read several times. A content analysis was made of the answers, and notes were made during the various issues, what respondents expressed as important and significant.

**Ethical considerations**

All low vision clinics were informed with the aim of this study, see appendix 1. They were informed that the participation was voluntary, and could be discontinued when so desired, without any consequences. As the questionnaire was meant to be answered by a group of professionals, no low vision clinic or person personally will be recognized in the final report.

The questionnaires were numbered by chance. The answers were handled with confidentiality and stored in a locked drawer so unauthorized persons could not ascertain the content until analyzes were made. This study has been taken ethical considerations to those involved under the applicable rules and guidelines for research. (25)
RESULTS

General information
In Sweden there are 21 counties, and out of these 21, there are seven counties having more than one low vision clinic. The questionnaire was sent to all 34 low vision clinics. The response rate was very good, 76%.

All clinics are accepting referrals of children with cerebral visual impairment (CVI). The differences varied between 50-80% of children with visual impairment and multiple disabilities recorded at the various LVC.

Working procedures
All low vision clinics are working in teams. In some counties there are permanent age-related teams that only work with children and adolescents. The teams include all professionals as optometrists, low vision therapists/occupational therapists, counselors, psychologists, physiotherapists, and if required computer pedagogues/technicians. In other low vision clinics they work with patients of all ages and the teams are more temporary. Lacking some professionals the teams can vary in constellations and professions from time to time, composed based on needs for the moment. (table 1) In some cases children with multiple disabilities have their contact with the counselor at the Habilitation for children, and not at the low vision clinic.

The most commonly constellation is low vision therapist/occupational therapist and optometrist that perform functional visual assessments together or separately. Other constellations are low vision therapist/special teacher and ophthalmologist/orthoptist.

A functional visual assessment is performed several times and varies depending on the degree of visual impairment, individual purpose and need. They can be made less than once a year, or more often, but are performed more frequent in younger children, perhaps 3-5 times a year.

Reasons for performing visual assessment are when a new referral arrives, before communication investigation, before school starts, changing school stages and after parents' requests.

In the cases where the low vision clinics are making the visual assessments, 38% always are performed at the clinics. The rest of LVCs are flexible, sometimes it is made at the clinic, and if necessary, it sometimes can be performed at preschool/school or at home. It can be performed at the Habilitation for children, when the collaboration between habilitation and low vision clinic is close. Otherwise it is performed at the eye clinic.
Cooperation

**Cooperation with Habilitation for children**
- Making common visits performing visual assessments at the low vision clinic or habilitation for children, pre/schools and homes.
- Participate in network meetings and synergy meetings, discussing individual children.
- Common habilitation plans.
- Habilitation for children can have the main responsibility for these children, and reserving common visits
- Cooperation can be before, under or after the visual assessment.
- Bad cooperation, “Earlier there were cooperation, but it has decreased, and could be much better.”

**Cooperation with special teachers in the municipality**
Low vision clinics and special teacher in the municipality have different assignments. LVC are working with the child and family, the special teacher with pedagogical support against teachers in pre/schools.

- Common visits at pre/schools and schools for learning disabilities
- Network meetings for information transfer to e.g. teachers and for planning
- When required
- Shared training initiatives for teachers in the municipality

**Cooperation with SPSM**
The schools are engaging SPSM after the initiative of low vision clinics

- Network meetings
- Common visits at pre/schools and schools for learning disabilities
- Feedback to teachers at pre/schools and schools for learning disabilities
- Shared training for teachers
- Telephone contact
- When needed

In some parts of Sweden there is not much contact, but in other parts there is good regional cooperation.

**Cooperation with external collaboration partners**
There are a lot of external collaboration partners. Most of them are illustrated in figure 1. The collaboration is depending on the need of the child and family and can vary for shorter or longer
periods. Depending on what authority the low vision clinic need to be in contact with, it can depend in what profession involved.

**Cooperation with other collaboration partners with deeper vision investigations on occasions when low vision clinics own skills are not enough**

The most important are the SPSM specialist centers in Stockholm and Örebro. Then there are ophthalmologists and optometrist at the eye clinic, pediatric neurologists and psychologists, when visual perception assessments are supposed to be made. Some children need to be sent for objective examinations as VEP (visual evoked potential) and/or ERG (electroretinogram).

**Procedures of Visual assessment**

The methods used were depending on what developmental level of the children. See fig 2.

- **Subcortical functions A-D:** The methods used; black/white faces- colorful faces at different sizes and distances, Lea faces, bubble blowers, toys, torches, balls and material from the “synväskan”. Common PFL method used; the Teller acuity chart, TAC, followed by Lea gratings and Cardiff.
- **Unspecific area E:** Common methods are balls on a stick in different sizes, toys, Christmas balls, Lea flicker wand, and torches. Donders confrontation method and Rarebit.
- **Cortical functions at primary level F-L:** Methods used for CS are Hiding Heidi, Mr. Happy, sprinkles on light/dark backgrounds, Pelli Robson, low contrast flip chart and KM contrast. VA methods when children have difficulties in participating, or cannot participate, TAC, Cardiff and Lea gratings. If the child could point equal to equal with hand or eye, and participate, single numbers, symbols, or letter charts were used, like BUST, LH symbols, HVOT and digital charts. For VA near, small things like paperclips, sprinkles, candy like nonstop and small toys on different backgrounds, e.g. black/white/motley, was used. When they were able to point equal to equal, single charts for near distance was used as BUST, LH symbols, and HVOT letters. If the child was able to read, LVI text charts were used. For stereopsis, the most used tests were Lang, TNO and Titmus. For color the tests used; made easy, PV16, Keeler, HRR, Ischihara, LH color puzzle and matching basic colors.
- **Cortical functions at secondary level M-N:** The methods used; LH symbols, and KM letters, both single and in a row. The playground picture from a book of Borrman, “Nu
läser vi” and other pictures. The answers stated clearly that the children had to be able to participate, and have conditions for that. This was used when suspicion of visual interpretation difficulties occurred.

- Cortical functions at higher levels O-S: Methods used were interview, observation, mailbox by Lea, Lea facial expressions, pictures with different facial expressions and showing the child a picture of someone they know. The playground and complicated pictures in a book were used. For perceiving moving objects, the methods used were observation of the child when objects like balls or cars were moving.

- Other senses T: By listening or feeling with their hands on a surface. It was observed when the children were reacting on different stimuli.

**Access to ophthalmologists**

One LVC have an ophthalmologist employed, other LVC are a part of the eye clinic, and have access to their services, and five LVC have access to ophthalmologists as consultants; the frequency varies from a day every second month, one day every month to every second week, where the ophthalmologist is coming to the clinic, fig 3. The investigation frequencies can vary, depending on special reasons. Some LVC don´t know how often the children are examined.

**Spectacles**

It was in most cases the medical diagnoses and the need that made it possible to do the ordination. In some counties the ordination never was a problem, but in other there were strict medical rules for ordination.

**National checklist for visual assessments**

There was a great interest for a national checklist, see fig 4. The argument was the need of quality assurance of these assessments.

**Education/further training**

The most common way of learning was studying literature of their own, or to learn from more experienced colleagues. See table 2. Not all professionals have attended formal education in visual development in children. There are possibilities for using working hours for studying. See fig 5.
Own suggestions on what type of formal education (university) that is desired/needed in the future when it comes to children and visual development in children

- Formal qualifications, as professional degree in the fields habilitation/rehabilitation/medical/optical/special education
- A formal education for low vision therapists.
- Basic education in visual development in children 1 and 2
- Practical training in how to perform functional visual assessments

Own suggestions on what type of formal education (university) that are desirable/necessary in the future in low vision clinics

- A formal education for low vision therapists
- Basic education in visual development in children 1 and 2
- Education at second level with a masters degree
- Extended training in practicing functional visual assessments

DISCUSSION

All clinics are accepting referrals of children with CVI, and as we know this number is increasing due to increased survival rate among premature children. (7,8,14)

Some low vision clinics are already working in multidisciplinary age related-teams. They are in minority, and most clinics work with people in all ages but have the possibility to form temporary teams, depending on the needs. Some low vision clinics do not perform visual assessments at all, but at the eye clinics. This difference may affect the outcome of the work with these children since the understanding of the difficulties may be missed. In most of the cases the examinations of visual functions are limited to be performed at the LVCs or the eye clinics, but flexibility with the places has to exist. The child may perform better in a familiar environment e.g. pre/school or at home, than at the LVC. It gives a good opportunity to observe the behavior in their own environment, and parents and caregivers can be present so the visual functions can be discussed and better understood. (43,46,51)

All clinics that perform functional visual assessments are flexible with the amount of the examinations, depending on individual needs and purposes. To be receptive to this is a security for these children since the visual development is continuous until eight to ten years of age, or longer.
Granberg and Olsson claim, that closer cooperation between employees with various professions (teams) can reduce patient visits or hospitalization, and may give a more holistic perspective in persons who are the subject of interventions. (55) A holistic perspective is in our point of view an advantage for the individual child, so the interventions are coordinated and in right time. Working together in teams will also give synergic effects where the sum of the outcome is higher than the number of members in the group. (23)

The advantages with working in age-related teams are the possibility to perform visual assessments with two or more professionals together, mostly low vision therapists/occupational therapists and optometrists. It is also possible to judge their results based on their different professions and afterwards summarize the outcome of the results together. Another advantage is that one profession can observe the behavior of the child when the other profession is assessing visual functions. The disadvantages in examine visual functions alone, is that the possibility to assess and observe at the same time is decreased. It is possible to overlook any reaction or behavior, so the summary may be less good than it could be and you have no one to summarize and discuss the results with.

It was interesting to find that usually at least two professions were performing the visual functions together. The optimal would probably be opportunities to work in stationary age-related teams and together perform the visual assessments. Limitations may be lack of professionals for stationary teams and economic conditions for new recruitments in the county councils.

Cooperation

A natural contact to cooperate with should be the Habilitation for children. Most of these children are registered here as well. Both the low vision clinics and the Habilitations for children are responsible for the child and family. The contacts with the Habilitation for children are varying between different parts of Sweden. Some counties have good cooperation and others have poor contact. The most common way of cooperation was network meetings and common habilitation plans, which they must set up as Health and human services department states. (22) According to the complexity in brain-related vision loss, there ought to be more cooperation between these two. A more overall view of the children, will give possibilities to take advantage of the capabilities they are possessing. Sandfeld Nielsen et al. and Pararajasegaram (40,44) argues that unawareness of these ophthalmic disorders and their consequences at the Habilitation for children may prevent optimal learning conditions at all levels and participation in everyday
life. There need to be visual competence added to the Habilitations for children. One way of learning about this could be that they are more involved in participation in functional visual assessments together with the LVCs and built on common developed plans for cooperation.

A good cooperation should exist between LVC and special teachers in the municipalities and SPSM. They have a pedagogical responsibility against teachers in pre/schools and schools for children with learning disabilities. To provide proper educational support they need to have knowledge about children's visual abilities. Then they can help teachers to find individual strategies of learning. (4,7) To achieve this is to participate in visual assessments and/or or to visit the child and observing its behavior. Unfortunately, this cooperation varies a lot both with SPSM and special teachers in the municipality. SPSM in Örebro and Stockholm also have specialist functions when deeper investigations in vision are needed when the LVCs skills not are enough. They may also need access to psychologists when visual perception assessments have been made. Better and more various ways of cooperation are needed, and also do exist in some places, but a good working relationship can sometimes be prevented because of confidentiality between authorities.

Cooperation with the eye clinic is important and some of the assessments are performed here. An information transfer between these two clinics is of great importance in order to help these children. Some LVCs have no information about eye examinations and visual assessments taking place at the eye clinic, while others being a part of the eye clinic have access to the latest information. This collaboration is the foundation for an overall medical, pedagogical and social framework for these children. A regularly examination by an ophthalmologist is necessary as well as functional visual assessments at the LVCs. (40)

These children often have large refractive errors, and may need to change their lenses in the spectacles quite often. (27,28,33) Depending on diagnoses, age and individual needs the possibilities to get spectacles are generous from all LVC and they are supporting this. To be able to be generous is an advantage, it is important to support the optimal visual development. If not, the visual development will be poorer than necessary.

Functional visual assessment

Children with low vision and multiple disabilities are difficult to understand, examine and habilitate. They are a heterogeneous group with various skills and difficulties. Their behavior can differ from day to day. (4,7) Some assessments are easier than other to perform and sometimes proper methods are lacking for the assessment. Then you have to use unorthodox tests that not
are in common clinical use, suited to the children's developmental level and if they can participate or not. Most LVCs are familiar to these tests and how they are used. The functional visual assessment is discussed according to the results in fig 3.

The behavioral parts are examined at all LVCs that perform assessments and are quite easy to observe and perform as they don’t need much participation from the child, which the results showed. The challenge is to tempt the children with interesting objects with good contrast, with or without glitter at different distances in order to get their attention. The LVCs seems confident with these assessments.

The most common tests performed at the LVCs are visual acuity, at distance and near. These tests are always performed. The results show that PFL are not used as often as expected, however, if the child can participate or point equal to equal in tests with symbols or letters, they will be used instead. PFL, detection acuity, cannot be compared with symbols or letter charts, resolution acuity, which is a pure cortical function. (4,7,13)

Another function often measured is reaction to peripheral movements and simple visual field. This is difficult to perform alone. That it is not always assessed and the explanation could be that only one person performs the visual assessment.

Contrast sensitivity, is also an important measurement, because reduced CS affects the interaction with others and in communication situations. (4) CS is examined quite often, but not as often as visual acuity, which it should be. It could have been changed even if the VA has not.

Other cortical functions as stereopsis, color vision and figure/background are not assessed as often. These tests need some kind of participation from the child. Stereopsis is a test often assessed by the orthoptist at the eye clinic, and may be an explanation to why 1/3 of the clinics don’t assess the test themselves. Color vision is more frequent measured than stereopsis and figure/background is examined nearly as often as color vision. Observations can be made to the differences in detecting the objects with different backgrounds, and could be nonverbal.

Higher cortical functions are single symbols/letters vs. in a row (crowding) and looking at complex pictures (4). The LVCs stated clearly that participation from the children is necessary to perform these tests, if not; they are excluded from these tests. Crowding was mostly assessed when suspicions of visual interpretation difficulties occurred and the same for complex pictures. These functions have to be examined in every child possible to assess, in order to exclude visual interpretation difficulties. They may not have to be examined at each assessment point.
Other cortical functions of higher levels are location in the room and recognize direction, perceiving moving objects, recognizing facial expressions, recognizing faces and central coherence, important for everyday functioning and an important part in social interaction. (4, 6) These functions must be examined in every child possible to assess, and are made quite often at the LVCs. For location and direction, and facial expressions there are test material present. Surprisingly few tested for objects moving, when it is easy to use e.g. a ball. An explanation is that this question has been misunderstood. Qualitative methods as observation and interview of the parents and caregivers are often used in assessing these functions. They are quite difficult and time-consuming to examine as the examinations may take place at pre/schools, home or in schools for children with learning disabilities in order to observe and understand the child in its familiar environment.

Cortical visual functions except VA and perhaps CS are difficult to examine and assess. There may be some uncertainty in assessing some of these functions, and are left to optometrists at the eye clinic to perform, or they are not made at all. These functions are perhaps impossible to examine at the same time, as they are tiresome and it is difficult to keep the child’s attention for a long time. Some of these visual functions are asked to the parents or caregiver. If it isn’t possible to examine these functions, interviewing persons close to the child is a better way than not doing anything at all. It must however be emphasized that parents and teachers often misjudges the child’s visual abilities and interpret them as being better than they are!

Using other senses but the visual, as hearing or tactile manners may be a strategy used when the visual functions are not enough. This is very often observed in the meeting with the child.

It could be difficult to have a national checklist for all these visual functions, but a checklist is better than none at all. Functions possible to assess and observe should be done. This makes it easier to interpret what brain functions measured and a better overall visual understanding. (7) This checklist will give a chance to get a profile of the children’s visual functions, their abilities and their weak sides. Together with their other functions; motoric, attention and executive, that also must be accounted for, the best individual planning for education and learning can be made. This knowledge is valuable for the LVCs and all cooperation partners. This can avoid the children from being misunderstood and get the chance to utilize their capabilities and have a chance to participate in society on their own terms. (30)

Education
This profound assessment requires a good knowledge of all professionals working at the LVCs. This involves children’s normal general development, visual development and normal visual functions. Their dysfunctions and consequences must be known. (48,49,50)

All the professionals at the low vision clinics have professional degrees, but not all have studied visual functions. A common way of getting knowledge of functional visual assessment is reading current literature, learning from more experienced colleagues at the LVC, or from other LVCs. There was little or no time for studying current research, so this will not be enough. While education still existed in the University courses Visual development in children 1 and 2, some professionals, but not all were able to attend them. These educations gave a good theoretical platform for visual functions and visual understanding in children with multiple disabilities.

Today there is neither any education for low vision therapists, nor in visual development in children. This is a problem, and the lack of formal education at university level makes it more vulnerable for the LVCs in times for retirements and sickness absence, when competence can suddenly disappear. Formal education in visual development in children is suitable for all categories of professionals, even if they are working with adults or elderly. To be familiar with brain functions and brain damage related vision loss, will make it easier to understand difficulties in everyday life, both in children and adults. (52,53)

A growing awareness among the low vision clinics about this has raised thoughts of the present working methods, educational level and if they need to be changed. Some clinics have already started. It is important that the information to cooperation partners, parents, pre/schools, schools for children with learning disabilities must be adequate and up to date. To work together in multidisciplinary teams may be a good start to find new methods, because of the complexity in the visual assessment in children with neurodisabilities. (42)

CONCLUSIONS AND SIGNIFICANCE OF THE STUDY

In this study we wanted to know more about the procedures and quality of visual assessment at low vision clinics in Sweden, and the educational level of the professionals. There are 34 clinics, and therefore a descriptive and a qualitative method with a questionnaire was chosen in order to explore this subject. This type of method is useful in purpose to study clinical procedures and experiences from habilitation/rehabilitation and implementation of procedures in health care.
- Children born preterm is an increasing group due to higher survival. One of the most frequent disorders is cerebral visual impairment (CVI). All low vision clinics are accepting referrals with the diagnose CVI from ophthalmologists.
- It is important for all caregivers to know what consequences CVI will have in everyday life.
- There is knowledge about methods of functional visual assessments, but there are differences and there are similarities between the LVCs in performing them.
- Many LVCs have good cooperation with eye clinics; habilitation for children, SPSM, special teachers in the municipality and others. In other parts of Sweden there is little or no cooperation at all. The cooperation has to improve so the holistic perspective will be better.
- There is an in increased need for relevant education for all professionals, not only in the low vision clinics, which are meeting children with visual impairment and multiple disabilities.
- There is an increased need for cooperation in multidisciplinary teams.
- The low vision clinics need to have more resources in order to improve the habilitation process and functional visual assessments, and a national checklist for visual functioning. They need to prepare for the future.
- The challenges for the future will be to improve the understanding of the children with brain damage related visual loss and multiple disabilities among all caregivers; medicine, habilitation, schools, other caregivers and the rest of our society. With that understanding, it is possible to help the children with new strategies to live their life as independently as possible.
- As these children are growing up, better cooperation between the low vision clinics and Habilitation for adults is needed.

Hopefully this study has contributed to some new knowledge about LVCs, their work and importance and can contribute to new ideas and approaches in working with children with low vision and multiple disabilities.
ACKNOWLEDGEMENTS

I want to thank all low vision clinics that have participated in this study and made it possible. A special thanks to the former head of the low vision clinic in Uppsala, Viveca Frändberg that encouraged me to start my studies and to present head, Michael Wennman that let me continue. Anders Sjöström, thank you for being my supervisor.
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FIGURES AND LEGENDS

Figur 1
Figur 2

Figur 3
Figur 4

Figur 5
Figur 1. Cooperation with external collaboration partners

Figur 2. Functional visual assessments

1. A-D Subcortical functions are protective reflex, pupillary reflex, short fixations and following movements and low preferential looking values (PFL) 2. E Unspecific area is reactions to peripheral movements and the simple visual field.
3. F-L Cortical functions at primary level are stable fixation, eye contact, response smiling, contrast, PFL of higher values, visual acuity, stereopsis, figure/background, color vision, concrete forms, simple forms and symbols like BUST.
4. M-N Cortical functions at secondary level are discrimination of symbols or letter close to each other in a row, (crowding), and complex pictures. 5. O-S Cortical functions at higher levels are localisation and direction, orientation, moving objects, facial expression, recognizing faces and central coherence. 6. T Using other senses like e.g. hearing/touching.

Figur 3. Access to ophthalmologists

Figur 4. Interest for a national checklist in performing functional visual assessment

Figur 5. Possibilities to A: attend regular education/training for all professionals, B: educate/train during paid working hours, C: use work time for own studying, D: attend formal education (university) during working hours, E: need for formal training/continuing education regarding visual development in children and F: future need for formal training/continuing education.
Table 1. Professionals employed at the low vision clinics. All clinics also have administrative staff, managers, secretaries and assistants

<table>
<thead>
<tr>
<th>Low vision therapist and/or occupational therapist</th>
<th>Optometrist</th>
<th>Counselor</th>
<th>Psychologist</th>
<th>Physiotherapist</th>
<th>Computer teacher</th>
<th>Computer /aid technician</th>
<th>Special teacher vision/hearing</th>
<th>Ophthalmologist</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 %</td>
<td>100 %</td>
<td>96 %</td>
<td>20 %</td>
<td>28 %</td>
<td>28 %</td>
<td>48 %</td>
<td>8 %</td>
<td>4 %</td>
</tr>
<tr>
<td>One vacant</td>
<td>4 % have access</td>
<td>4 % have access</td>
<td>4 % have access</td>
<td>4 % have access</td>
<td>17 % have access as consultants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Possibilities</td>
<td>Yes</td>
<td>No</td>
<td>No answer</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>------------------------------------------------------------------------------</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Study literature of their own in the actual subject.</td>
<td>88 %</td>
<td>12 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learn from experienced colleagues at the low vision clinic</td>
<td>81 %</td>
<td>4 %</td>
<td>15 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learn from experienced colleagues at other low vision clinics</td>
<td>81 %</td>
<td>19 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal education at university level learning procedures of visual assessment</td>
<td>73 %</td>
<td>8 %</td>
<td>19 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal continuing education at university level learning procedures of visual assessment</td>
<td>62 %</td>
<td>23 %</td>
<td>15 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common days for low vision clinics in learning procedures of visual assessments</td>
<td>58 %</td>
<td>15 %</td>
<td>27 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX I

Uppsala den 2014-01-30

Till alla chefer på Syncentralerna i Sverige


Jag ska nu skriva min masteruppsats och har valt att skriva om hur syncentralerna i olika delar av Sverige arbetar med, och gör synbedömningar på barn med flerfunktionshinder. Jag är intresserad av att få veta hur andra syncentraler i landet arbetar med dessa barn. Därför har jag sammanställt en enkät med frågor, som kommer att skickas till alla syncentraler i hela landet. På slutet finns även frågor som rör utbildning av de yrkeskategorier som arbetar med barn med flerfunktionshinder.

Jag hoppas därför att ni som arbetar med barn med flerfunktionshinder som är inskrivna på er syncentral, vill hjälpa mig genom att besvara enkäten. Om ni är flera på er syncentral som arbetar med barnen, är det bra om ni besvarar enkäten gemensamt. Skicka den tillbaka till mig i bifogat svarskuvert snarast möjligt, men senast 2014-02-21


Tack på förhand!

Kontaktuppgifter:    Handledare:
Berit Bolin Björklund    Anders Sjöström, MD, PhD
Mail: berit.bolin.bjorklund@lul.se    School of Health and Medical Sciences
Telefon: 018-611 67 28    Örebro Universitet, anders.sjostrom@oft.gu.se
APPENDIX II

Enkät till Syncentralerna i Sverige.

Synbedömning av barn med flerfunktionshinder.

1. Hur många invånare finns i ert upptagningsområde/län?
   ………………. Stycken

2. Hur stor yta har ert upptagningsområde/län?
   ……………… km²

3. Hur många anställda finns på er syncentral?
   ……… stycken

4. Vilka yrkeskategorier och hur många, arbetar på er syncentral?
   ………………………………………………………………………………………………..
   ………………………………………………………………………………………………..
   ………………………………………………………………………………………………..

5. Hur stor andel av inskrivna barn på er syncentral har ytterligare funktionshinder?
   …………………………………………………………………………………………………

6. Tar ni emot barn med CVI?
   Ja …… Nej ……

7. Arbetar ni i team?
   Ja …… Ja, ibland …… Nej aldrig ……

   Egna kommentarer:
   ………………………………………………………………………………………………..
   ………………………………………………………………………………………………..
   ………………………………………………………………………………………………..
8. Vilken/vilka yrkeskategorier arbetar med barn med flerfunktionshinder?

………………………………………………………………………………………………
………………………………………………………………………………………………
…………………………………………………………………………………………

9. Gör ni synbedömningar på barn med flerfunktionshinder?
   Ja ……             Ja, ibland ……             Nej aldrig ……
   Egna kommentarer:
………………………………………………………………………………………………
………………………………………………………………………………………………
…………………………………………………………………………………………

10. Hur ofta görs synbedömningar på barn med flerfunktionshinder?
    mindre än 1 gång/år ……   1 gång/år ……   2 gånger/år ……   3 gånger/år……
    4 gånger/år……   5 eller fler gånger/år ……
    Egna kommentarer:
………………………………………………………………………………………………
………………………………………………………………………………………………
…………………………………………………………………………………………

11. Vilken/vilka yrkeskategorier utför synbedömningen?
………………………………………………………………………………………………
………………………………………………………………………………………………
…………………………………………………………………………………………

12. Om det är flera yrkeskategorier, gör de synbedömningen gemensamt?
   Ja, alltid ……             Ja, ibland ……             Nej aldrig ……
   Egna kommentarer:
………………………………………………………………………………………………
………………………………………………………………………………………………
…………………………………………………………………………………………
13. Var utförs synbedömningarna?

<table>
<thead>
<tr>
<th></th>
<th>Ja, alltid ......</th>
<th>Ja, ibland ......</th>
<th>Nej, aldrig ......</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syncentralen:</td>
<td>Ja, alltid ......</td>
<td>Ja, ibland ......</td>
<td>Nej, aldrig ......</td>
</tr>
<tr>
<td>Förskola/skola:</td>
<td>Ja, alltid ......</td>
<td>Ja, ibland ......</td>
<td>Nej, aldrig ......</td>
</tr>
<tr>
<td>Hemma:</td>
<td>Ja, alltid ......</td>
<td>Ja, ibland ......</td>
<td>Nej, aldrig ......</td>
</tr>
<tr>
<td>Annan plats:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Egna kommentarer:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14. Har ni samarbete med barnhabiliteringen, när det gäller barn med flerfunktionshinder inskrivna på syncentralen?

<table>
<thead>
<tr>
<th></th>
<th>Ja, alltid ......</th>
<th>Ja ibland ......</th>
<th>Nej, aldrig ......</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ja, alltid ......</td>
<td>Ja ibland ......</td>
<td>Nej, aldrig ......</td>
<td></td>
</tr>
</tbody>
</table>

Om ja, beskriv hur samarbetet ser ut.

15. Har ni samarbete med kommunens specialpedagoger?

<table>
<thead>
<tr>
<th></th>
<th>Ja, alltid ......</th>
<th>Ja ibland ......</th>
<th>Nej, aldrig ......</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ja, alltid ......</td>
<td>Ja ibland ......</td>
<td>Nej, aldrig ......</td>
<td></td>
</tr>
</tbody>
</table>

Om ja, beskriv hur samarbetet ser ut.
16. Har ni samarbete med SPSM?
   Ja, alltid ……..  Ja ibland ……..  Nej, aldrig ……..
   Om ja, beskriv hur samarbetet ser ut.
   ………………………………………………………………………………………………………
   ………………………………………………………………………………………………………
   ………………………………………………………………………………………………………
   ………………………………………………………………………………………………………
   ………………………………………………………………………………………………………
   ………………………………………………………………………………………………………

17. Har ni samarbete med andra samarbetspartners när det gäller barn med flerfunktionshinder inskrivna på syncentralen?
   Ja, alltid ……..  Ja ibland ……..  Nej, aldrig ……..
   Om ja, beskriv hur samarbetet ser ut.
   ………………………………………………………………………………………………………
   ………………………………………………………………………………………………………
   ………………………………………………………………………………………………………
   ………………………………………………………………………………………………………
   ………………………………………………………………………………………………………
   ………………………………………………………………………………………………………

18. Finns det någon samarbetspartner att vända sig till för rådfrågning med fördjupade synutredningar vid tillfällen när syncentralens egen kompetens inte räcker till?
   Ja, alltid ……..  Ja ibland ……..  Nej, aldrig ……..
   Vänligen beskriv:
   ………………………………………………………………………………………………………
   ………………………………………………………………………………………………………
   ………………………………………………………………………………………………………
   ………………………………………………………………………………………………………
   ………………………………………………………………………………………………………
   ………………………………………………………………………………………………………
19. Har ni samarbete med, eller har er syncentral egen ögonläkare som undersöker barn med flerfunktionshinder?
   Ja …….       Nej …….       Nej, de undersöks på ögonkliniken …….  
   Egna kommentarer:
   ……………………………………………………………………………………………………
   ……………………………………………………………………………………………………
   ………………………………………………………………………………………………………

20. Hur ofta blir barn med flerfunktionshinder undersökta av ögonläkare?
   mindre än 1 gång/år ……  1 gång/år …….  2 gånger/år ……  3 gånger/år……  
   4 gånger/år ……  5 eller fler gånger/år ……
   Egna kommentarer:
   ……………………………………………………………………………………………………
   ……………………………………………………………………………………………………
   ……………………………………………………………………………………………………

Synbedömning

21. Synbedömning av barn med flerfunktionshinder:

   A: Tittar ni på hur barnet fixerar?
   Ja, alltid …….       Ja ibland …….       Nej, aldrig ……
   Om ja, vilken/vilka metoder används?
   ……………………………………………………………………………………………………
   ……………………………………………………………………………………………………
   ……………………………………………………………………………………………………

   B: Tittar ni på hur barnet kan följa ett föremål?
   Ja, alltid …….       Ja ibland …….       Nej, aldrig ……
   Om ja, vilken/vilka metoder används?
   ……………………………………………………………………………………………………
   ……………………………………………………………………………………………………
   ……………………………………………………………………………………………………
C: Tittar ni på hur barnet kan röra sina ögon (motilitet)?
Ja, alltid ……       Ja ibland ……       Nej, aldrig ……
Om ja, vilken/vilka metoder används?

D: Använder ni någon form av PFL-metod? (randmönster)
Ja, alltid ……       Ja ibland ……       Nej, aldrig ……
Om ja, vilken/vilka metoder används?

E: Tittar ni på hur barnet uppfattar perifera rörelser? Enkelt synfält?
Ja, alltid ……       Ja ibland ……       Nej, aldrig ……
Om ja, vilken/vilka metoder används?

F: Tittar ni på om barnet ger ögonkontakt och svarsleende?
Ja, alltid ……       Ja ibland ……       Nej, aldrig ……
Egna kommentarer:
G: Tittar ni på barnets kontrastseende?

Ja, alltid ……       Ja ibland …….            Nej, aldrig ……

Om ja, vilken/vilka metoder används?

H: Vilka metoder används för att bedöma/kontrollera barnets synskärpa på avstånd?

I: Vilka metoder används för att bedöma/kontrollera barnets synskärpa på nära håll?

J: Tittar ni på barnets stereoseende?

Ja, alltid ……       Ja ibland …….            Nej, aldrig ……

Om ja, vilken/vilka metoder används?
K: Tittar ni på om barnet kan urskilja en figur mot bakgrund?
Ja, alltid ……  
Ja ibland ……  
Nej, aldrig ……  
Om ja, vilken/vilka metoder används?
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
………………………………………………………………………………………………

L: Kontrolleras barnets färgseende?
Ja, alltid ……  
Ja ibland ……  
Nej, aldrig ……  
Om ja, vilken/vilka metoder används?
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
………………………………………………………………………………………………

M: Tittar ni på om det är skillnad i att uppfatta symboler på rad med enstaka symboler?
Ja, alltid ……  
Ja ibland ……  
Nej, aldrig ……  
Om ja, vilken/vilka metoder används?
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
………………………………………………………………………………………………

N: Tittar ni på om barnet kan uppfatta komplexa bilder?
Ja, alltid ……  
Ja ibland ……  
Nej, aldrig ……  
Om ja, vilken/vilka metoder används?
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
………………………………………………………………………………………………
O: Tittar ni på om barnet kan lokalisera sig i rummet och veta i vilken riktning saker finns?
Ja, alltid ……       Ja ibland …….            Nej, aldrig …….
Om ja, vilken/vilka metoder används?
........................................................................................................
........................................................................................................
........................................................................................................
........................................................................................................

P: Tittar ni på om barnet kan se former i rörelse?
Ja, alltid ……       Ja ibland …….            Nej, aldrig ……
Om ja, vilken/vilka metoder används?
........................................................................................................
........................................................................................................
........................................................................................................
........................................................................................................

Q: Tittar ni på om barnet kan urskilja ansiktsuttryck?
Ja, alltid ……       Ja ibland …….            Nej, aldrig ……
Om ja, vilken/vilka metoder används?
........................................................................................................
........................................................................................................
........................................................................................................
........................................................................................................

R: Tittar ni på om barnet kan känna igen ansikten?
Ja, alltid ……       Ja ibland …….            Nej, aldrig ……
Om ja, vilken/vilka metoder används?
........................................................................................................
........................................................................................................
........................................................................................................
........................................................................................................
S: Tittar ni på om barnet kan förstå och dra slutsatser om vad som händer i en komplicerad bild (central coherens)?

Ja, alltid ……       Ja ibland ……       Nej, aldrig ……

Om ja, vilken/vilka metoder används?

………………………………………………………………………………………………………………
………………………………………………………………………………………………………………
………………………………………………………………………………………………………………
………………………………………………………………………………………………………………

T: Tittar ni på om barnet använder andra sinnen, t.ex. hörsel/känsel?

Ja, alltid ……       Ja ibland ……       Nej, aldrig ……

Om ja, vilken/vilka metoder används?

………………………………………………………………………………………………………………
………………………………………………………………………………………………………………
………………………………………………………………………………………………………………
………………………………………………………………………………………………………………
22. Har barnen möjlighet att erhålla glasögon som hjälpmedel?

<table>
<thead>
<tr>
<th>Typ av glasögon</th>
<th>Ja</th>
<th>Nej</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avståndsglasögon utan filter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avståndsglasögon med filter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avståndsglasögon, solfilter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Närglasögon utan filter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Närglasögon med filter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Närglasögon med solfilter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dubbelslipade/progressiva utan filter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dubbelslipade/progressiva med filter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dubbelslipade/progressiva med solfilter</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Egna kommentarer till tabellen:

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23. Finns det intresse för en nationell standard, ”checklista” för synbedömningar på barn med flerfunktionshinder?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ja</td>
<td></td>
</tr>
<tr>
<td>Nej</td>
<td></td>
</tr>
</tbody>
</table>

Egna kommentarer:

……………………………………………………………………………………………………
Frågor om utbildning/fortbildning:

24. Hur har de yrkeskategorier som arbetar med barn, erhållit kunskap om synbedömningar av barn med flerfunktionshinder?

<table>
<thead>
<tr>
<th>Inlärningsmetod</th>
<th>Ja</th>
<th>Nej</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genom egen inläsning av böcker skrivna i ämnet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genom att lära av andra kollegor på den egna Syncentralen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genom att lära av andra kollegor på andra Syncentraler</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genom formell utbildning på högskolenivå</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genom formell fortbildning på högskolenivå</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genom deltagande på Syncentralsgemensamma barndagar på olika ställen i landet</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

kommentarer till tabellen:

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Egn a
25. Har alla yrkeskategorier på er Syncentral som arbetar med barn med flerfunktionshinder haft möjlighet att gå på regelbunden fortbildning om barns syn?

Ja ……    Nej ……

Om nej, vilka yrkeskategorier har fått gå, respektive inte fått gå:
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…………………………………………………………………………………………………
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26. Om ja, har ni möjlighet att fortbilda er på betald arbetstid?

Ja ……    Nej ……

Egna kommentarer:
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27. Har ni på er Syncentral möjlighet att avsätta arbetstid till egen inläsning och att följa aktuell forskning i ämnet?

Ja ……    Nej ……

Egna kommentarer:
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28. Har ni på er Syncentral möjlighet att gå en formell utbildning(universitet) på betald arbetstid?

Ja ……    Nej ……
29. Finns det behov av formell utbildning/fortbildning (universitet) när det gäller barns syn och synutveckling på er Syncentral?

Ja ..... Nej ..... 

Egna kommentarer:

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30. Kommer det i framtiden finnas behov av formell utbildning/fortbildning (universitet) när det gäller barns syn och synutveckling på er Syncentral?

Ja ...... Nej ......

Egna kommentarer:

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31. Har ni egna förslag på vilken typ av formell utbildning (universitet) som är önskvärd/nödvändig i framtiden när det gäller barn och barns synutveckling?

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32. Har ni egna förslag på vilken typ av formell utbildning (universitet) som är önskvärd/nödvändig i framtiden på Syncentralerna?

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………………………………………………………………………………………………
………………………………………………………………………………………………
Tack för att ni tagit er tid att besvara denna enkät!