

Mieke De Pourcq, early
intervention assistant - orthoptist

Eliane Bonamie,
coördinator home intervention
team Accent

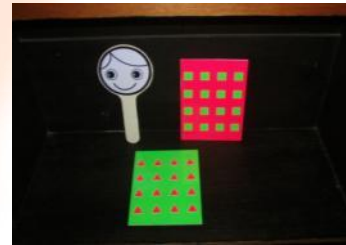
Katrien Keppens,
paediatric neurologist

De Kade, Spermalie,
Bruges, Belgium

[mieke.depourcq@mpi-
spermalie.be](mailto:mieke.depourcq@mpi-spermalie.be)

Early visual stimulation for at risk babies

a step towards better visual development and visual perception



Early visual deprivation can lead to visual dysfunction ranging from mild to severe problems.

Therefore:

- Sensitization of medical and observation teams for early signals of delayed visual development in at risk babies is needed.
- **Timely referral** to specialized early intervention teams within the sensitive period for development of selective visual attention is essential.

At risk babies: “Red flag” diagnoses (CalaciMarshO&MCVIHandout.doc – Texas School for the Blind and Visually Impaired, 2013)

Main causes:

- Prematurity
 - Periventricular Leucomalacia (PVL)
 - Intraventricular Hemorrhage (IVH)
- Cerebral Palsy
- Hydrocephalus
(! pressure on Thalamus)
- Neonatal asphyxia

Other possible causes:

- Infections of the CNS (toxoplasmosis, rubella, herpes, HIV, cytomegalovirus, encephalitis, meningitis)
- Brain tumor
- Stroke
- Asphyxia (drowning, SIDS, choking)
- Head injury
- Fetal Alcohol Syndrome
-

Sensitive periods in early development of (visual) attentional system

Basal attentional system (**subcortical**):
to **focus** selectively on a stimulus and let go again. Should be functioning from **BIRTH** on (normal gestation)

Posterior attentional system (**parietal**)

- To **orient** and **redirect selective** (visual) attention
- Develops at **0-3 MONTHS**

Anterior attentional system (**frontal**)

- For **planning** and for **divided** attention
- Functional at about **12-15 MONTHS**

Dik, M. & Geldof, C. J. A. (2007). Kinderen met Cerebral Visual Impairment. Neuropraxis,11,164-170
www.marjoleindik.com

Early pattern deprivation and visual development

(Lewis and Maurer, 2009)

- The **neural architecture**, mediating sensitivity to basic and higher level aspects of vision, must be **constructed** and **preserved by stimulating** the crude vision of the **newborn**.
 - Patterned visual input from birth on is essential to set up and refine later visual experience
 - Later start => some visual capabilities may fail to emerge, because the requisite neural architecture is no longer available.
 - Sensitive period ranges widely across different aspects of vision (a few months to 10 years, eg. global motion < 4mths)

Results

Normal visual development is sensitive to experience early in life.

⇒ Delayed development or absence of selective (visual) attention can lead to visual dysfunction ranging from mild to severe problems.

The attentional system can be stimulated (or replaced)

- by offering a specific visual **stimulation program** in severe cases or
- by simple **adaptation** of the **environment** and practical handling tips in mild cases.

Distress **signals** for delayed visual development

At **6 weeks** of age the baby should

- be staring at surroundings when awake
- show visual reaction or direct gaze on bright object or movement
- show visual attention for (edges of) caregiver's face



At **8 weeks to 28 weeks** the baby should

- visually follow moving objects or people (8-12 weeks)
- watch parent's face when being talked to / make eye contact (10-12 weeks)
- watch own hands (12-16 weeks)
- actively inspect surroundings (18-20 weeks)
- reach for objects / toys (14 –24 weeks)
- look at hands, food, bottle while sitting (18-24 weeks)
- look for or watch more distant objects (20-28 weeks)



Distress **signals** for delayed visual development (2)

At **30 weeks** to **48 weeks** the baby should

- watch activities around him for longer periods of time (30-36 weeks)
- look for dropped toys (32-38 weeks)
- visually inspect toys he can hold (38-40 weeks)
- creep after favorite toys (40-44 weeks)
- sweep eyes around room to see what's happening (44-48 weeks)
- visually respond to smiles and voices (40-48 weeks)
- visually inspect objects and persons (46-52 weeks)

At **12 months** to **18 months** the baby should

- visually steer hand activity (12-14 months)
- inspect objects very close by (14-18 months)
- point at objects or people (14-18 months)
- show interest in pictures (14-18 months)



BC Spermalie, (2012) *Ik zie het anders. Cerebrale Visuele Inperking – CVI*. Brugge: vzw De Kade.

Optometrists Network, (1995) *A Reference Guide for Preschool Children's Vision Development* – www.children-special-needs.org

Stimulation program

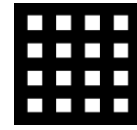
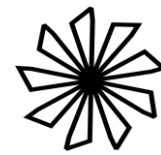
Evolving variation of patterns and faces:

- dark room/dark box (black light)
- light box
- patterns on slides/PPT/apps
- illumination
- appropriate DVD's

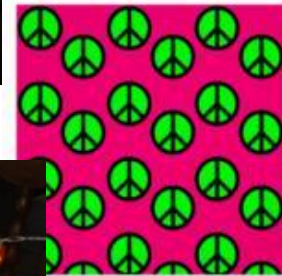
Simple adaptation of nearby surroundings:

- black & white or fluorescent patterns
- facial patterns
- attractive mobiles
- reflective materials (eg. wind chimes),...

Offering support, tips and advice to the parents at home



Sassy-rattler



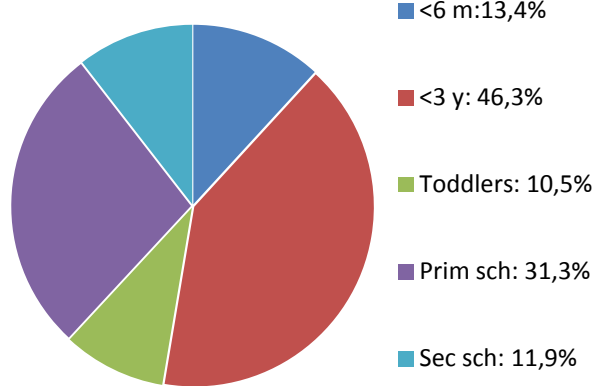
Objectives

Specific early visual stimulation could eventually

- **prevent** mild visual **dysfunctions in** children with Delayed Visual Maturation (**DVM**) or
- **decrease** the level of visual **dysfunction in** children with Cerebral Visual Impairment (**CVI**)
- subsequently sight-based **motor, social** and **cognitive** development also **benefit** from this approach
- **support** parents in their **relation** with their young child

Conclusions

AGE of NOTIFICATION to EARLY INTERVENTION TEAM for the VISUALLY IMPAIRED, ACCENT (2012)



- Referral to a specialized team after onset of symptoms is often (too) late or nonexistent
- We are convinced that increased awareness and early referral on visual dysfunction and/or delayed visual maturation can offer better support and service to the babies and their parents.

