... when the perception is upside down

Cerebral Visual Impairment – CVI

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Graz - Austria
Insides from Graz
Personally Background

• Working in the educational field
• An increasing number of children have other symptoms than sensory visual impairment and blindness
• We felt a need to learn more about this topic
• We decided to attend the in-service course about CVI at the University of Dortmund, Germany.
Working Background

- Experts for CVI in Austria, but just on the first mountain
- Decision to start a research project
- Supportive collaboration of Lea Hyvärinen, Fi and Marjolein Dik, NL – thanks a lot!
Society Background

- Assessment of visual impairment in children in Austria quite good
- Satisfactory cooperation of ophthalmologists and the educators
Problem: limited time of ophthalmologists
- Especially the assessment of children with CVI takes interdisciplinary experts and a lot of time with parents and teachers.
What is CVI?

Cerebral Visual Impairment (CVI) is a condition where some of the special 'vision' parts of the brain and its connections are damaged. This causes visual impairment even though the eyes are normal. Often children with CVI actually have good visual acuity but can not 'make sense' of what they see.

http://www.ssc.education.ed.ac.uk/resources/vi&multi/eyeconds/cereVI.html,
Descriptions of visual processing problems (ICF b2102) also called Cerebral Visual Impairment (CVI) differ surprisingly much from each other. (Hyvärinen, 2011)
CVI-Research project

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INTERNATIONAL EXPERTS & COOPERATIONS:
Prof. Dr. Lea Hyvärinen
Drs. Marjolein Dik
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Research Questions

• “How can children with cerebral visual impairment see?”

• “How can we create better learning strategies for these children?”
Phase 1: 2010/2011

Assessment of Functional Vision for Educational Purposes with Dr. Hyvärinen

Sample: 21 children
Age: 5 - 15 years
Assessment of Functional Vision by Prof. Dr. Lea Hyvärinen
Results Phase 1

- Children all over Austria 9 boys, 12 girls
- Not the optimal visual correction: 7 ch.
- Problems in accommodation: a few
- Problems in face recognition: 5
  - in shape recognition: 3
  - grating acuity: some
  - in space & maths perception: many

Discussion about mobility training and processing route-based or map-based.
Phase 2: 2011/2012
Interdisciplinary period

Drs. Dik Neuropsychological Assessment

Precondition: IQ Test

• 2\textsuperscript{nd} Assessment of Functional Vision

Dr. Hyvärinen

• Educators and Parents

Sample: 13 children

Age: 6 – 15 years
Neuropsychological Assessment

- Developmental Test of Visual Perception I + II
- Tea-CH Test of Every day attention of children
- Test Of Memory And Learning
- Beery
- Big Books
Our neurospychological tests
In-service Training
Setting up a Local Network of experts

• Neuropsychologist
• Ophthalmologist
• Orthoptist

• Occupational-therapist
• Educators

Getting to know each others professions
Discussing the specific terms like:
- visual field or attention field
- case discussion
Phase 3: 2012 - 2014

“How can we create better learning strategies for these children?”
Finding out daily needs & sharing strategies
Results

Normal Visual Acuity: in 4 children (but glasses have to be improved)

Visual Impairment: in 4 children

Visual Processing Problems: in 2 children

Subnormal Vision: in 7 children with specific field losses and visual processing problems
Data about intelligence

7 out of 13 had lower Verbal IQs;
5 had mental retardation and
2 functioned below average
This was a surprise for some of the children’s teachers!
Explained a lot about participants’ visual behaviour
(simply on a younger developmental level)

The opposite happened as well: one young man with low vision and motor disability showed a nearly normal intelligence!
Physical Impairments

Motor control and ergonomic adjustments are preconditions for seeing well. No wheelchair and/or not well adjusted supportive devices → no visual task behaviour. Talk with occupational therapist.

Visual-motor-integration is impossible for the majority of this group: the functions can only be used in sequences: first look, make a plan, than move! “Driving” is usually without visual control (head down).
Physical Impairments

In 2 of 7 children with cerebral palsy we found visual-motor-integration problems like Optic Ataxia.
1 in 13 had visual perception problems compared their cognitive functions.

2 in 13 had problems with visual attention.
All children with cerebral palsy had visual-motor-integration problems and 2 with Optic Ataxia.
Our Research findings

• Austrian assessment has to be improved
• Local interdisciplinary networks for assessment and support have to be built
• Improving teaching methods according to the findings that the “label” is not important and relates to IQ and developmental age according to the ICF
• Concept „CVI“ has lost it’s mystic touch
My discrepancy working model

1. Ophthalmologist/Optometrist
   - b210 Seeing functions: Sensory functions; visual acuity functions; visual field functions; quality of vision; functions of sensing light and colour, visual acuity of distant and near vision, monocular and binocular vision, etc.
   - b215 Functions of structures adjoining the eye (movement aspect)

Team: Can acuity and participation problems be explained by developmental level and these data?

2. Yes: standard approach for sensory impairments
   - No:
     - Neuropsychologist chooses test material taking into account all available diagnoses - also brain structure information (s110) from neurologist - to formulate hypotheses

3. Find information about, measure and compare the following functions:
   - b110 consciousness/b130 energy and drive functions
   - b117 (verbal) intellectual functions
   - b122 Global psychosocial functions
   - b7.. Movement related functions
   - b144 non visual memory functions
   - b140 non visual attentional functions
   - B164 executive (higher cognitive) functions

4. Team: Validate each visual problem: mild, moderate, severe, complete impairment

5. Team: Help is indicated by one complete/severe, moderate and mild (taking other diagnoses into account as well)
F.

Premature born
in the 26. gestational week
1000 Gr. Hydrocephalus,
Cerebral hemorrhage
Visual acuity: 0,25
Refuses glasses +6
Age: 13
F.s health condition
Disease / Disorder

Body function / structure (Impairment)
Mental retardation
Optic Ataxia left sided
Language processing and memory are weak.

Activities (Limitation)
Motoric restrictions.
Planning of complex Activities (ADL)
Likes walking by herself and playing with smaller children.

Participation (Restriction)
Needs very long time to reply, restricted self-initiative.
Very uncertain in new situations

Environmental factors
Teachers and peers have problems to wait for her Activities.

Personal factors
One parent family
M.

Premature born – twin in the 31. gestational week; 1.238 Gramm, PVL
Central Apnoesyndrom Cerebral Palsy
Hypermetropia levis
Near visual acuity : 0,03
Age: 16
**M. s Health condition**

**Disease / Disorder**

**Body function / structure** (Impairment)
- Nearly normal understanding (verbal IQ)
- Learning disabilities (dyslexia, dyscalculia)
- Problems in motor functions and visual-motor-integration.

**Activities** (Limitation)
- Very limited mobility in his wheelchair.
- Strength: Listening to people and retell stories

**Participation** (Restriction)
- School has not the right computer adjustments for his learning possibilities

**Environmental factors**
- No fitting devices!
- Misses fitting computer!

**Personal factors**
- Very supportive family
S.

Hydrocephalus, subnormal vision field loss, small vision field especially in the lower part.
Intelligence level average (K-ABC), behavior problems
Age: 8
• S. s visual processing is on age level and relates to intelligence.
• S. s behaviour is influenced especially by his retardation in social-emotional areas. Therapy and play development support is needed in this area.
S. s Health condition
Disease / Disorder

Body function / structure (Impairment)
Cognitive level average
Psycho-social below Average.
Visual perception problems (CVI)

Activities (Limitation)
Impatient (out-bursting)
Needs quiet lay out and sometimes enlargement.

Participation (Restriction)
He is sometimes unable to cope with the main stream class because of behavior

Environmental factors
Follows local psycho-therapy with peers

Personal factors
Overprotection by his parents


DUTTON, Gordon N. / BAX, Martin [Hrsg.]: Visual Impairment in Children Due to Damage to the Brain. London 2010.


Literature
HYVÄRINEN, Lea / JACOB, Namita: WHAT and HOW Does This Child See? Helsinki 2011.


VBS Conference 2016

Servus in Graz

Jaritz & Schloffer
ICEVI Europe 2013 - Istanbul