

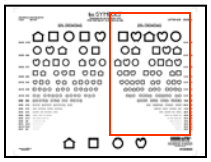


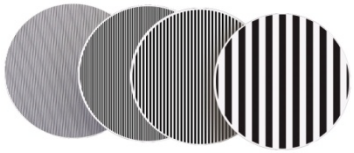
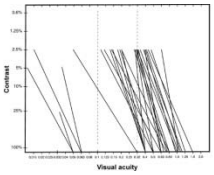
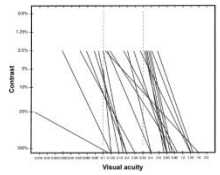


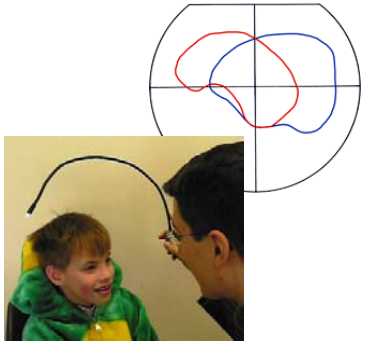

SELECTING VISION TESTS FOR CHILDREN WITH MOTOR PROBLEMS

Assessments at Schools
to support planning of special education

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International Classification of Functioning, Disability and Health

Children & Youth Version

As the Framework of Assessment of Functioning in Collaboration

between Medicine and Education

Cohort: 50 students with motor disability; **2** students had normal oculomotor functions.

1. Oculomotor Tests are important for tasks at near, especially reading:

Fixation
Saccades
Accommodation
Following
Strabismus
Nystagmus

Video

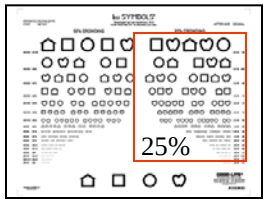
This child loses fixation and head control when pronouncing a difficult letter.
During testing, the oculomotor functions are *conscious tasks.* Therefore they need to be observed during reading and all clinical tests so that efficient learning strategies can be chosen for each student.

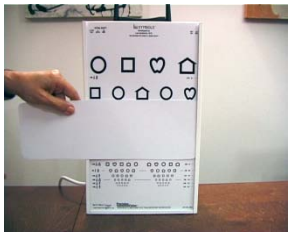
Visual ergonomics is an important question in special education.

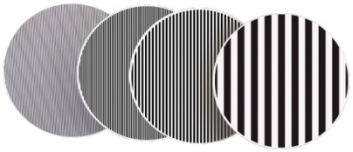
Video

This boy has conscious head and body control. If he is asked to carefully fixate and accommodate (during dynamic retinoscopy), he loses head control.

Gaze pointing in single symbol test







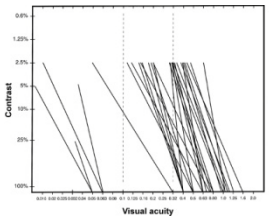
2. Sensory functions reveal the structure of the visual information entering the brain. Visual acuity was measured with LEA Symbols and LEA Numbers. Ten VA tests were used; the test with 25% spacing was closest to reading acuity.

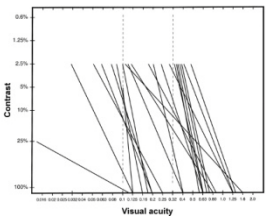
Grating acuity tests detected difficulties in the perception of high frequency gratings.

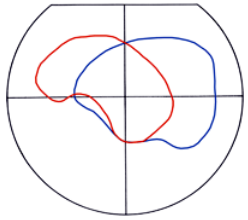
Visual acuity at 2.5% contrast defines the slope of the *contrast sensitivity* curve. *Colour vision* is robust: normal in 35, < 4 crossings in 8 out of 50 cases.

Measurement of *the size of visual field* with 10Hz flickering stimulus gives the same results as Goldmann perimetry.

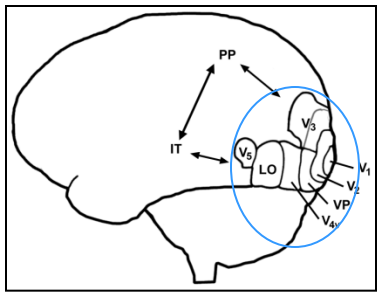
Results of *motion perception tests*, Johansson's Walking Man and the Pepi Test revealed abnormal function in 8 and 7 out of the 50 students.

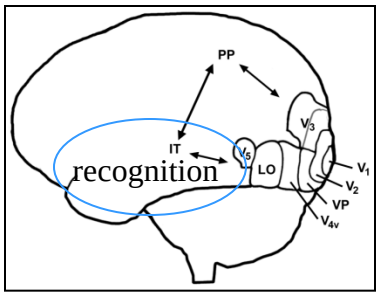


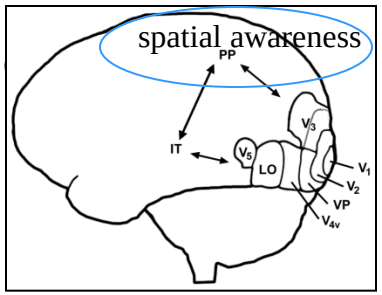




Pepi-test

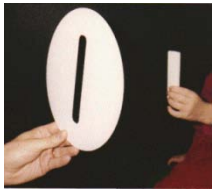
A. 

B. 

C. 

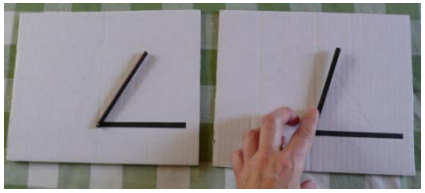
3. <u>Visual Processing Disorders</u> were assessed by the schools' rehab teams based on the observations of parents, teachers and therapists. Ophthalmologists, paediatric neurologists and paediatricians contributed to the differential diagnosis:

A. The quality of the incoming visual information (Slide 3) and *perception of orientation* (Figures D to G) *and length of lines* (H and I) were assessed.

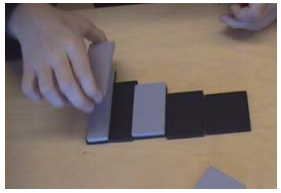
D. 

E. 

F. 

G. 

H. 

I. 

B. Of the numerous *recognition functions*, face recognition and recognition of facial expressions are the socially most important functions; often undiagnosed.

C. *Spatial awareness, orientation in space and abstract mathematical space* are common problem areas and require new teaching strategies.

Slide 5 lists the most important visual functions to be assessed at school age.

VISUAL PROCESSING FUNCTIONS

VENTRAL STREAM

Perception and recognition

Length of lines, Orientation of lines, Figure-ground, Visual closure,
Details in pictures, Pictures of concrete objects, Noticing errors, Noticing missing details, Comparison with pictures in memory, ‘Reading’ series of pictures, Visual problems in copying pictures
Recognition of Faces, Facial expressions, Body language, Concrete objects, Landmarks
Numbers, Letters, Words, Crowding effect, Scanning lines of text

DORSAL STREAM

Spatial awareness and orientation in space

Perception of near and far space, Orientation in space
Memorising routes, Perception of textures and surface qualities

Motion perception

Motion perception and moving
Motion perception and communication

Depth perception

Simultan perception and simultanagnosia

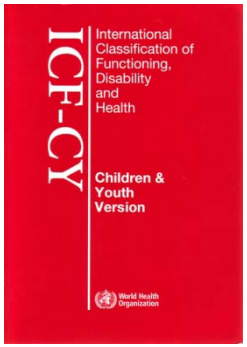
Eye-hand coordination

Grasping and throwing objects, Drawing, free hand,
Copying from near/ from blackboard

Mathematical space

Integration of sensory information

Visual, auditory, tactual overload



Summary

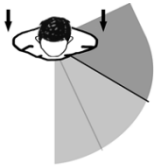
For the **assessment of visual functioning** important test situations are:

1.**Oculomotor functions** and strabismus. *Special spectacles*, devices for compensation of loss of e.g. vertical movements (below), optical magnification, and CCTV are needed.

2. Clinical sensory tests: **visual acuity**, **grating acuity**, **visual field**, **contrast sensitivity**, **colour vision** and **motion perception** tests. Testing required *new spectacles* in 20% cases. Further testing with Vernier and Interferometric Resolution Acuity would add to understanding of the nature of vision loss.

3. Tests of **perception of direction** and **length of lines** were useful.

Schools need a summary based on the 9 domains of the **ICF-CY** (WHO 2007) or the 4 core domains of the **Management of Low Vision in Children** (WHO1993).



Hemianopia and exotropia, altern.