

## Early Visual Development

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## Part Two of Two



### *Preparing Kids for Future Adult Performance*

By Rhoda P. Erhardt

*Editor's note: this is the second installment in a two-part series on visual development.*

Someone whose general development has been delayed or compromised by damage to the central nervous system may demonstrate fairly obvious mobility deficits, hand dysfunction, and/or cortical visual impairment (CVI). But other visual impairments may be subtle and difficult to identify. We need comprehensive evaluations to analyze exactly how visual developmental processes are disrupted and the effects of that disruption on children's ability to play, perform self-care and achieve in school.

When writing goals and objectives, we also need to be aware of what children need for future occupational performance, so that intervention plans include vital visual components.

I learned a great deal about visual pathology from a child named Joseph who I followed as a consulting therapist for more than 20 years. He was born 10 weeks prematurely and had a severe intraventricular hemorrhage (IVH) that resulted in a massive left parietal/occipital porencephalic cyst. His hydrocephalus was managed with a ventriculoperitoneal shunt that needed many revisions. His diagnoses also included retinopathy of prematurity (ROP), a seizure disorder, and cerebral palsy (spastic quadriplegia, right side more involved than left). Within a few years Joseph's ophthalmologist prescribed lenses for astigmatism and myopia (nearsightedness), and recommended surgery for strabismus.

As Joseph grew older, a right hemianopsia (field deficit in the right half of each eye) and a growing cataract in his right eye left him with vision only in the left half of his left eye.

Was Joseph legally blind? Yes. Did he have any functional vision? Definitely yes.

At one year the boy did not roll over, sit alone or crawl, and did not use his right hand. When Joseph was 18 months old, the Easter Seal Mobile Therapy Program began weekly visits to train his mother and a home health aide. For almost 10 years, home and school occupational therapy concentrated on his most obvious impairments--delays in gross- and fine-motor skills. Visual stimulation was limited to simple tracking games such as following and poking soap bubbles. During that time, Joseph's diagnosis improved from quadriplegia to hemiplegia to diplegia.

It was not until Joseph was 11 years old that I evaluated the motor components of his vision with my then-new Erhardt Developmental Vision Assessment (EDVA), a product of extensive literature review, videotaped research studies and clinical observations. The evaluation included involuntary or reflexive visual patterns of pupillary reactions, doll's eye responses and eyelid reflexes, and voluntary, cognitively-directed eye movements of localization (visual approach), fixation (visual grasp), ocular pursuits (visual manipulation), and gaze shifts (visual release).

The management programs I used for Joseph were derived from a model that links visual activities to functional goals and objectives and integrates them into regular life routines in the context of occupational roles. Visual procedures are based on developmental

theory combined with realistic functional needs. Developmentally targeted interventions are recommended when potential for dynamic process and change is evident. Functionally appropriate adaptations are recommended for static visual and postural conditions due to irreversible pathology or physiological structural limitations.

Joseph's future adult independence depended on our ability to introduce and adapt functional activities in his therapy program that provided practice in learning skills both essential and meaningful to him.

At age 11, Joseph's educational program was based in a classroom for trainable students with mental handicaps at a regular junior high school, with mainstreaming into selected regular classes and activities such as music, library, lunch, and recess. The following examples show how the model for management helped individualize Joseph's existing IEP and integrate visual procedures into functional activities within his school and home environments.

### **Goal: To improve money management skills**

*Objective:* Joseph will purchase a snack from a vending machine and verify the correct change. *Assessment of visual components:* Localization skills are delayed in his right peripheral visual field. **Visual procedures:** *Functionally appropriate adaptations--*during classroom instruction, coins should be placed in Joseph's left visual field for optimal performance in localizing and discriminating correct amounts. *Developmentally targeted interventions--*in one-to-one sessions with his teacher, coins should be placed across a wide area, requiring Joseph to scan his entire visual field with eyes and head together. (Figures 1 and 2)

### **Goal: To improve writing skills**

*Objective:* Joseph will write his full name, address, and telephone number on the top of his school papers. *Assessment of visual components:* Ocular pursuits are jerky and irregular during writing. Joseph's body is totally flexed to gain maximum stability as he moves eyes and head together to follow his writing hand. Nearsightedness requires his eyes to be close to the paper. **Visual procedures:** *Functionally appropriate adaptations--*Joseph's new chair promotes spinal extension and still brings his eyes within the necessary 12-inch focal length. The inclined surface suggested by his occupational therapist improves neck extension and brings his face parallel to the paper for better visual function (Figure 3). *Developmentally targeted interventions--*When playing pool, standing supported by the table (Figure 4), Joseph can follow the path of each ball, approaching and retreating (convergence and divergence), as well as moving horizontally (tracking).

Today, at age 23, Joseph is a high school graduate, ambulates independently with underarm crutches and functions well at work and at home, where he helps with laundry and cooking, and can operate the microwave independently. He loves his job--working part-time at a department store unpacking shoes--and he is an avid basketball fan.

Joseph now uses his writing and money management skills when he writes phone messages, prepares a grocery list of foods he likes, and purchases those foods or snacks at the grocery store, at work and at basketball games. His favorite activity is driving his three-wheeler with a grass-cutting attachment.

Last year, after severe floods in eastern North Dakota, Joseph used the tricycle with a custom-built aluminum dumper cart to help his family clean up destroyed trees and other debris on the family farm.

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