Visual rehabilitation of cerebral blindness

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In our studies, subjects are training their visual functioning in the hemifield that is affected by acquired brain damage. This method focuses on restitution: improving the diminished visual functioning in the hemianopic field. Training consists of multi-trial detection threshold measurements of stimuli that are presented on fixed retinal locations. The aim of the training is to improve visual functioning in terms of enhanced peripheral detection of those stimuli.
We found that acuity, color perception and flicker fusion in the areas that were regained through training, were comparable with values in the contralateral, non-affected hemifield, the latter being a measure of pre-morbid functionality. Also, we found that the period length (number of trials) of non-detection of a stimulus is positively correlated with eccentricity and that -when a stimulus is detected- the detection threshold drops quickly. The recovery of the visual field was evaluated by periodical visual field measurements and was found to be expanding gradually during training. Finally, whenever an area has become responsive by training, this effect seems stable: follow-up measurements show that visual field enlargement is still present and cannot completely be explained in terms of eye movements.
SIGNIFICANCE: The need for rehabilitational interventions of these impairments is growing larger, because our modern society is making increasing demands on the human visual system since a growing amount of information is to be processed visually. Consequently, people who have a visual impairment, i.c. visual field defects, will more often experience such a visual impairment as a visual handicap. Therefore, it seems important to explore the possibilities of visual rehabilitation for these patients. The findings of this and other studies provide for a rehabilitational tool, that can be applied to an impairment that otherwise can only be dealt with through compensational techniques. In other words, this method addresses the impairment itself.