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Major review

Spontaneous recovery and treatment effects in patients with homonymous visual field defects: a meta-analysis of existing literature in terms of the ICF framework

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ABSTRACT

Homonymous visual field defects (HVFDs) are a common consequence of posterior brain injury. Most patients do not recover spontaneously and require rehabilitation. To determine whether a certain intervention may help an individual patient, it is necessary to predict the patient's level of functioning and the effect of specific training. We provide an overview of both the existing literature on HVFDs in terms of the International Classification of Functioning, Disability, and Health (ICF) components and the variables predicting the functioning of HVFD patients or the effect of treatment. We systematically analyzed 221 publications on HVFD. All variables included in these articles were classified according to the ICF, as developed by the World Health Organization, and checked for their predictive value. We found that ICF helps to clarify the scope of the existing literature and provides a framework for designing future studies, which should consider including more outcome measures related to Activities and Participation. Although several factors have been described that predict HVFD patients' level of functioning or the effects of training, additional research is necessary to identify more.

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1. Introduction

Among the most common consequences of postchiasmatic stroke are homonymous visual field defects (HVFDs), such as hemianopia. These often have a negative impact on the patients' level of functioning. There is an increasing amount

of attention to the possibilities of treatment, which is either aimed at restoration of the visual field or at compensation for the field defect. Although there are analyses of the factors that predict the level of functioning for patients with HVFDs or the effect of an intervention, to our knowledge there has been no large-scale review. Furthermore, most studies on HVFDs make

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use of a myriad of parameters, and consistency in measurements among the different studies is lacking. To create an accessible overview of the information in the available literature, all individual parameters described in 221 articles on HVFD were classified and examined for their predictive effect on other parameters.

We use the International Classification of Functioning, Disability, and Health (ICF). The ICF, as developed by the World Health Organization in 2001, has the purpose of establishing a common language for describing health and health-related states in order to improve communication among users such as health care workers, researchers, policy-makers and the public, including people with disabilities.²¹⁹ The ICF framework (Fig. 1) consists of two parts outlining the situation for a patient with a given health condition. The first describes Functioning and Disability and distinguishes the components *Body Functions and Structures* and *Activities and Participation*. The second part, the Contextual Factors, consists of the components *Environmental Factors* and *Personal Factors*. The Body Functions not only include physiological, but also psychological, functions, whereas the Body Structures describe anatomical body parts. The ICF defines an Activity as “execution of a task or action by an individual” which represents “the individual perspective of functioning.” Participation is defined as “a person’s involvement in a life situation,” which represents “the societal perspective of functioning.” Functioning and Disability can be influenced by external Environmental Factors, such as the physical and social environment of an individual, as well as by internal Personal Factors, the characteristics of the individual. The components are further structured in domains and categories, resulting in unique codes for individual parameters.

The ICF as widely used in rehabilitation settings helps the clinician decide which levels of functioning should be assessed. For example, in case of a patient with post-chiasmatic brain damage (Health Condition), the visual field (Body Functions) could be assessed, as well as the degree of bumping into objects (Activities) and the difficulty traveling to work (Participation). Furthermore, the impact of Environmental Factors, such as social support from family and friends, as well as Personal Factors, such as the patient’s experience with walking the route to work, are worth being

assessed, because they can have a large influence on the functioning of the patient (see Fig. 1).

The wide application of the ICF in rehabilitation settings makes the ICF a suitable framework for examining how the components of interest for clinical rehabilitation are examined and described by the existing research literature. We apply the ICF to gain more insight into the HVFD, which refers to blindness for part of the visual field caused by post-chiasmatic brain damage. Because of the location of the injury, the visual field defect is identical for both eyes and therefore is called *homonymous*. HVFD is a negative predictor for recovery after stroke. When stroke patients also have HVFD, they require longer rehabilitations in hospitals, are less independent in their mobility, have a lower rate of independence in self-care function, and are more impaired in their activities of daily life.^{39,41,56,145,160}

Only in a minority of cases does the visual field completely recover spontaneously, although the literature is ambiguous about the exact numbers.²²⁹ For patients with persistent field defects, several training methods are available. One approach is restorative training, which is aimed at regaining visual functions at the border of or within the field defect, and therefore its focus is on the ICF component Body Functions and Structures. Another approach is compensatory training, aimed at learning how to deal with the field defect. Compensatory training usually focuses on making systematic eye movements, although there is a large variance in training protocols used (for an overview see Bouwmeester, Heutink, and Lucas¹¹). Whereas some protocols teach patients to make systematic eye movements during exploration tasks, others focus on specific eye movements during reading. We include the use of prism glasses in our discussion of compensatory treatment. For compensatory training, the outcome can also be on a Body Function, but often improvement on Activities and Participation, such as improvement in the mobility domain, is the aim of compensatory treatment. There has been a substantial amount of discussion on whether the restorative training truly restores the visual field or if the effects could be confounded by unsteady fixation during perimetry assessment.^{11,156,161}

From a rehabilitation perspective, it is important to be able to assess prognosis and to choose the right intervention for

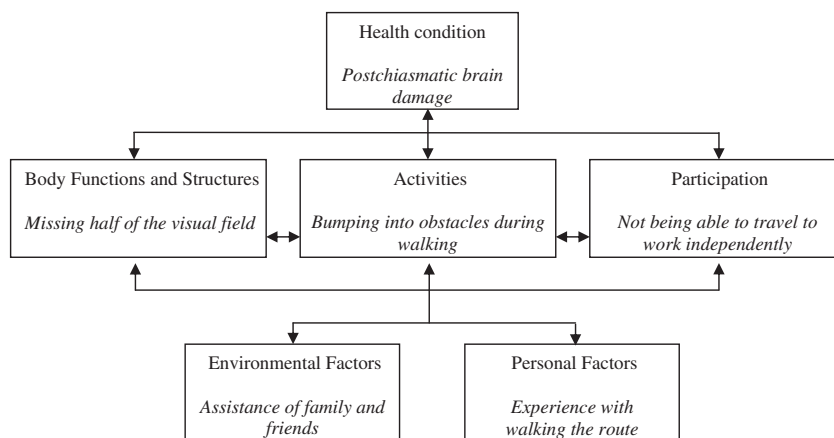


Fig. 1 – An illustrative example of the ICF scheme²¹⁹ in case of homonymous hemianopia, a common form of HVFD.

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