The effect of visual training for patients with visual field defects due to brain damage: a systematic review

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CRD summary
The authors concluded that scanning compensatory therapy was recommended for patients with homonymous visual field defects until visual restoration therapy was evaluated adequately. The review was generally well-conducted, but evidence from the small number of generally poor quality studies was limited and the results should be interpreted with caution.

Authors' objectives
To evaluate the effects of systematic visual training in patients with homonymous visual field defects (HVFDs).

Searching
MEDLINE, EMBASE, CINAHL and Cochrane Controlled Trials Register were searched for studies published between 1966 and 2005/07 for studies reported in English, German or Dutch. Search terms were reported. Reference lists of conference reports, relevant studies and related articles were screened.

Study selection
Randomised controlled trials (RCTs), controlled clinical trials, retrospective studies and studies of repeated measures design were eligible if they assessed the effects of visual restoration therapy (VRT) or scanning compensatory therapy (SCT) in patients with homonymous visual field defects due to post-chiasmic lesions of the visual system after brain injury documented by CT/MRI scans. Studies of patients with left or right visual field defects with and without macular sparing were eligible. Studies measured visual field size, visual search field, reading time, reading error or subjective measures using questionnaires.

The included studies most frequently evaluated compensation training and visual restoration therapy and most commonly assessed outcomes using ophthalmoscopy and perimetry techniques. The age of patients, where reported, ranged from 13 to 77 years. The time from onset of homonymous visual field defects ranged from two weeks to 240 months.

Two reviewers independently selected studies and resolved disagreements on inclusions by discussion with the aid of a third reviewer if required.

Assessment of study quality
Two reviewers independently assessed the validity using 13 criteria for RCTs and 11 criteria for repeated-measures design studies; criteria were based on study specifications, adequacy of measurement and blinding. Details were given in either the text or supplementary tables (see URL For Original Research). Each criterion was scored as good, moderate or poor. Disagreements were resolved by discussion with the aid of a third reviewer if required.

Data extraction
For each study, appropriate outcome data were presented in tables. The authors stated neither how data were extracted for the review nor how many reviewers performed the data extraction.

Methods of synthesis
The studies were grouped by study design and intervention and combined in a narrative synthesis. Differences between studies were discussed, particularly with respect to validity.

Results of the review
The authors stated that two RCTs (n=70) and 12 repeated-measures design studies (n=350) were included. One RCT followed up 22 of 48 from the other RCT.
Visual restoration therapy: (one RCT plus follow-up RCT and five repeated-measures design studies)

The original RCT evaluated visual restoration therapy and had good internal and external validity. The follow-up study had poor internal validity. Two of the five repeated measures design studies that evaluated visual restoration therapy had good internal validity, one had moderate and two had moderate to poor internal validity. Five studies (counting the RCT with follow-up as two studies) reported a significant effect of visual restoration therapy. Two studies reported no treatment effect.

Scanning compensatory therapy: (seven repeated measures design studies)

One study (indicated by two reference numbers in the text) had good internal validity, one had moderate to good, three had moderate, and one had poor internal validity.

All studies reported significant improvements associated with scanning compensatory therapy. Improvements were reported in the visual search field, reading speed and reading errors. The studies used different methods to measure the visual search field.

Authors’ conclusions

Scanning compensatory therapy was recommended for patients with homonymous visual field defects until visual restoration therapy was evaluated adequately.

CRD commentary

The review question and inclusion criteria were clearly stated. Several relevant sources were searched and some attempts were made to minimise publication bias. Language restrictions meant that other relevant studies may have been missed. Appropriate methods were used to minimise reviewer error and bias during study selection and validity assessment, but methods used to extract data were not described. In view of the differences between studies, a narrative synthesis was appropriate. Study validity was assessed and results were reported and incorporated into the synthesis. The review was generally well-conducted, but evidence from the small number of generally poor quality studies was limited and the results should be interpreted with caution.

Implications of the review for practice and research

Practice: The authors stated that scanning compensatory therapy was recommended for patients with homonymous visual field defects until visual restoration therapy was evaluated adequately.

Research: The authors stated that there was a need for further research using validated instruments to measure outcomes that included the effects of treatments on activities of daily living. In addition, restorative therapy required further research of residual vision. Outcome assessors should be blinded in future studies.

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