



Abstracts book of Vision 2008

the 9th International Conference on Low vision
Research and Rehabilitation partnerships -
Proceedings of the 9th International Conference on Low vision

64 MOBILITY & NAVIGATION - Cognitive Abilities

[View Full Paper](#)

64.1 - An orientation and mobility program for people with neurological vision loss - A case study

Brown M.¹

¹Royal Society for the Blind of South Australia, Community Services, Adelaide, Australia

Neurological vision loss has been described as the "third wave" of vision loss; with the first being blindness and the second low vision. The main causes of neurological vision loss are an acquired brain injury (ABI) or a stroke. It is estimated that each year 1.5 million Americans sustain an acquired brain injury (ABI) and of these between 30 - 35 % have an associated vision deficit. Unfortunately vision loss due to an ABI is often not diagnosed and there is no standard intervention or agency that provides rehabilitation. Community based rehabilitation agencies do not have the specialised skills, equipment and knowledge to deal with the vision loss and blindness agencies are ambivalent about providing rehabilitation to people with ABIs who are not necessarily "blind".

The Royal Society for the Blind (RSB) has partnered with Neurovision Technologies to conduct a research project to determine whether the Neurovision package is more effective than a traditional approach to mobility training for people with an ABI. The training is delivered by a combination of an Occupational Therapist and an Orientation and Mobility Instructor, beginning with static scanning and moving on to dynamic scanning used in mobility. The research results will be compared with other studies done by the US Department of Veterans Affairs and the Fife Society for the Blind.

Prior to commencing the research, a pilot study was conducted with a small group of young women. This presentation will describe the progress of the women through training and their outcomes. Based on the results of this small group, the package is good at demonstrating and explaining what the visual deficits are to the individual and their family. This meant that the women were less fearful and more confident at the commencement of their mobility training, thus reducing the time required. Also carers became actively involved in training and re-enforced strategies. Some of the group met their mobility goals, others did not but intervention improved mobility skills.



An orientation and mobility program with neurological vision loss: A case study

Margaret Brown^{*}

Royal Society for the Blind, South Australia

Abstract. Neurological vision loss has been described as the “third wave” of vision loss; with the first being blindness and the second low vision. The main causes of neurological vision loss are an acquired brain injury (ABI) or a stroke. It is estimated that each year 1.5 million Americans sustain an acquired brain injury (ABI) and of these between 30 - 35 % have an associated vision deficit. Unfortunately vision loss due to an ABI is often not diagnosed and there is no standard intervention or agency that provides rehabilitation. Community based rehabilitation agencies do not have the specialised skills, equipment and knowledge to deal with the vision loss and blindness agencies are ambivalent about providing rehabilitation to people with ABIs who are not necessarily “blind”. The Royal Society for the Blind (RSB) has partnered with Neurovision Technologies to conduct a research project to determine whether the Neurovision package is more effective than a traditional approach to mobility training for people with an ABI. The training is delivered by a combination of an Occupational Therapist and an Orientation and Mobility Instructor, beginning with static scanning and moving on to dynamic scanning used in mobility. The research results will be compared with other studies done by the US Department of Veterans Affairs and the Fife Society for the Blind. Prior to commencing the research, a pilot study was conducted with a small group of young women. This presentation will describe the progress of the women through training and their outcomes. Based on the results of this small group, the package is good at demonstrating and explaining what the visual deficits are to the individual and their family. This meant that the woman were less fearful and more confident at the commencement of their mobility training, thus reducing the time required. Also carers became actively involved in training and re-enforced strategies. Some of the group met their mobility goals, others did not but intervention improved mobility skills.

Keywords: Neurological vision loss, Rehabilitation, Scanning training, Orientation and mobility program.

1. Introduction

Neurological vision loss has been described as the “third wave” of vision loss; with the first being blindness and the second low vision. The main causes of neurological vision loss are an acquired brain injury (ABI) or a stroke. It is estimated that each year 1.5 million Americans sustain an acquired brain injury (ABI) and of these between 30 - 35% have an associated vision deficit. Unfortunately vision loss due to an ABI is often not diagnosed and there is no standard intervention or agency that provides rehabilitation. Community based rehabilitation agencies do not have the specialized skills, equipment and knowledge to deal with the vision loss, and blindness agencies are ambivalent about providing rehabilitation to people with ABIs who are not necessarily “blind”.

Over the past 40 years several research groups have set out to determine whether patients with hemianopia have the ability to compensate for their field deficit using eye movements, head movements, and extrastriate vision. Scanning eye movements are normal in only a minority of hemianopic patients (Chedru, Leblanc, & Lhermitte, 1973; Gassel & Williams, 1963; Ishiai, Furukawa, & Tsukgoshi, 1987). Their search times are usually longer owing to the repetition of search saccades and fixations, resulting in longer, unsystematic scan paths. In addition, they dwell on their intact hemifield and their saccades are less regular, less accurate, and too small to allow rapid, organised scanning or reading. Consequently, objects or relevant parts of a scene located in the affected side are omitted (Zihl, 1995).

In 2007 the Royal Society for the Blind (RSB) accepted an offer from Neuro Vision Technology to participate in a research project along with the U.S. Department of Veterans Affairs and Fife Association for the Blind in the U.K. The aim of the research is to ascertain whether the scanning training technology developed by Neuro Vision Technology is effective in developing consistent scanning strategies which assist with daily living and mobility tasks.

^{*} Corresponding author: e-mail address: mbrown@rsb.org.au

The research is a double blind randomised trial and is listed on the Australian New Zealand Clinical Trials Registry and has received grant money from the Australian Government's National Eye Health Demonstration Grants Program.

The Neuro Vision Technology system involves the use of a lightboard linked to software which measures field loss and tracking abilities of the individual. Prior to participating in the project, the person is assessed thoroughly by a neuro-ophthalmologist, and undergoes other tests such as the Rivermead Behavioural Inattention Test, quality of life tests (NEI VFQ-25 and the Mayo Portland Adaptability Inventory). They also undergo a mobility walk. These tests are conducted again at the end of the program to measure any changes.

RSB staff members involved in the project are Occupational Therapists who are responsible for the static component, and Orientation and Mobility Instructors who look after the dynamic component.

In preparing staff for the research phase of the project, we worked with four young women who had experienced strokes. All four were single mothers and so had huge responsibilities and a strong motivation to resume independent lives.

This paper will describe the progress of two of the women.

2. Case Study 1 – Lynda

Lynda is a 34-year-old single parent who had a stroke after the birth of her second child, which resulted in a left hemianopia. She was discharged when she was medically stable, with no referrals to an ophthalmologist or an agency for vision rehabilitation.

Lynda contacted the RSB to seek assistance as she was having considerable difficulties with mobility. She was walking into things on her left side that she couldn't see, was unsafe crossing roads and could not use public transport. Thus, she could not go out alone to do the shopping or take her oldest child to school. Her parents were helping with transport but they could not cope with her ongoing transport needs. As part of the assessment, it was found that she also had a loss of sensation on her left side. Lynda had not noticed this previously and therefore had not been testing the water safely when bathing her baby.

After a period of static scanning training, with the light board and table top activities, Lynda developed an efficient scanning pattern which enabled her to begin learning strategies to move safely around the community. This commenced with an indoor mobility walk where she was required to locate targets which were placed at various heights. These were simply coloured cardboard stars. With the aim being the application of the scanning systems learnt with the light board in a safe familiar environment. Initially she was encouraged to walk slowly as accuracy in spotting the targets was the most important factor and walking speed was gradually increased. Once she could locate all the targets the program moved outdoors.

Initially the outdoor program involved a block walk in a familiar area spotting items such as house numbers, number of windows in houses, items on the other side of the road, the number of parked cars and street signage. At the same time she was required to avoid obstacles and pedestrians.

As her skills and confidence increased she tackled shopping centres. This involved negotiating car parks, locating shops and then specific items in the shop shelves. Additionally she was required to reverse the process, for example putting the items back in the correct position on the shelves.

The program then moved to a very complex environment, Adelaide Central Markets. This could be described as a chaotic environment with low lighting, lots of noise and low-level obstacles.

She is now able to bathe her baby safely, shop independently, scan the supermarket shelves and select wanted items. She now no longer walks into people or other obstacles and is able to catch public transport and cross roads safely. This means she can safely take her baby to childcare, walk her eldest daughter to school and resume her volunteer work at the school canteen. One of the important outcomes of the program was that her parents were relieved of the responsibility of her considerable transport needs.

3. Case Study 2 - Tracey

Tracey is a 35-year-old mother of three who had a stroke three years ago, which resulted in a right hemianopia. She was discharged from hospital after five days and returned home to a small town of 150 people with no rehabilitation services available.

At the time of referral Tracey's confidence was so low that she became totally reliant on her partner who was her official caregiver. Her attempts to go to the supermarket would overwhelm her and she would just walk out. She was bumping into objects but the final straw was when she attempted an independent walk and ran into a power pole near her home. Her confidence was so low she did not undertake any outdoor travel and she was being treated for severe depression.

As with Lynda, she received static scanning training using the light board and the dynamic mobility program. Due to her low confidence the training took place in her own home rather than the RSB centre.

Tracey's motivation levels lifted because she learned about her vision loss and why she was missing vital information from her environment and what she must do to maximize her remaining vision. Being able to complete the scanning training in her own home prior to going outdoors lifted her confidence levels significantly.

She had the confidence to move to a busy town with her three children. She is able to walk everywhere she needs to go and is slimmer and fitter. She is able to manage road crossings safely and complete her supermarket shopping independently. She is no longer on antidepressants. The strategy developed with the Instructor to overcome her memory loss issues was to utilize the reminder system of her mobile phone and she is now a proficient user of this.

4. Conclusion

Preliminary evidence from staff indicates that the scanning device and other assessments assist in demonstrating to the client and the family the exact nature of the visual deficit. It is very common for people with neurological field loss to believe they have one "bad eye" and one "good eye" rather than a severe field deficit in both eyes. This belief often leads to inadequate and unsafe compensatory strategies. Family members' clearer understanding of the vision deficit meant that they could comprehend the rationale behind the rehabilitation and were motivated to assist with reinforcing strategies.

Additionally, staff members are reporting reduced time required for the Orientation and Mobility programs. Scanning skills are established in a safe environment and clients are therefore able to apply them immediately the work in the outdoor environment begins, increasing safety and confidence.

References

- Chedru, F., Leblanc, M., & Lhermitte, F. (1973). Visual searching in normal and brain-damaged subjects. *Cortex*, 9: 94-111.
- Gassel, M.M., & Williams, D. (1963). Visual function in patients with homonymous hemianopia. Part II. Oculomotor mechanisms. *Brain*, 86: 1-36.
- Ishiai, S., Furukawa, T., & Tsukgoshi, H. (1987). Eye-fixation patterns in homonymous hemianopia and unilateral spatial neglect. *Neuropsychologia*, 25: 675-679.
- Zihl, J. (1995). Visual scanning behaviour in patients with Homonymous hemianopia. *Neuropsychology*, 33; 287-303.