Welcome to the new Neurological Vision Impairment Training for Orientation & Mobility Instructors. The objective of the course is to teach experienced Orientation & Mobility Instructors how to assess and train clients with neurological vision impairment (NVI).

**Specific Objectives**

- To demonstrate an understanding of the history and rationale of the program.
- To identify brain function/dysfunction relevant to training clients with NVI.
- To demonstrate assessment techniques used for clients with NVI.
- To demonstrate training procedures used with clients with NVI.
- To interpret and write reports relevant to assessment and training of clients with NVI.
- To identify and demonstrate special considerations for clients with NVI.
- To provide a practical basis and supervision for Instructors who teach clients with NVI.

**Who is the course designed for?**

This course is intended for qualified Orientation & Mobility Instructors with a minimum of two (2) years field experience. It is therefore assumed that basic O&M skills have been consolidated in a variety of settings. For this reason O&M techniques have not been documented in this training module.

The course aims to teach O&M Instructors how to teach clients with NVI following brain impairment. The topic of brain impairment is extensive. For this reason, this training program has been kept to the specific skills required by an O&M Instructor to teach clients with NVI following brain impairment without delving into the enormous area of brain dysfunction.
The training will be broken into 5 separate modules, delivered in a variety of ways, online, face to face, observation and supervision. Each module will be followed by a competency and skills assessment.

**Module 1: Introduction – online**
- Overview of the course & structure of the program
- History of the training program
- Definitions/medical terms, visual pathways and essential background reading relating to the specialised program
- Competency – online

**Module 2: Observation - practical**
Spend time with experienced O&M Instructors specialising in NVI, observing clients and understanding how the program works.
- Competency – minimum of 4 observation summaries to be submitted.

**Module 3: Visual Fields and Driving Skills – online**
An online module developed by Sue Silvera, Orthoptist.
Discusses driving issues and optical aids

**Module 4: Neuroanatomy and Neurofunctions – online**
Learn about the brain and its function, especially relating to visual processing. Understand the implications when the brain is damaged and how it may impact on the client and their NVI program.
- Competency – online

**Module 5: Assessment and Training of clients with NVI – Practical / Sydney (3 days)**
With input from experienced O&M Instructors and a neuropsychologist learn how to:
- Assess and develop a training program for people with neurological vision impairment
- Identify support agencies/organisations,
- Liaise with medical and rehabilitation staff
- Write appropriate reports
- Competency
  - online assessment
  - demonstrate assessment and training procedures

**Module 6: Practicum – under supervision**
With all of the information obtained during modules one to four, you will be then supervised by experienced O&M Instructors as you develop your assessment and training skills.
- Competency - Practicum requirements
Module 1
Introduction

The purpose of Module 1, Introduction, is to give you;

- Overview of the course & structure of the program
- History of the program
- Definitions, medical terms, overview of the visual pathways and essential background reading relating to the specialised program
- Multiple choice quiz and short answers

The online module will take approximately 8 hours to read (excluding the articles) and will be followed by a competency assessment comprising of a multiple choice quiz and short answers. The time frame to complete the assessment is COB, Monday November 16.

Definitions

Read the definitions below and click onto the links. There is some very interesting information contained. Some of the definitions will be included in the competency check.

<table>
<thead>
<tr>
<th>Stroke</th>
<th>Acute, sometimes global, neurological disturbance, lasting 24 hours or longer, due to presumed vascular disease.</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Transient Ischemic Attack (TIA)</th>
<th>Acute, sometimes global, neurological disturbance, lasting less than 24 hours, due to presumed vascular disease.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Transient ischemic attack (TIA) is a brief episode of neurologic dysfunction resulting from focal temporary cerebral ischemia not associated with cerebral infarction.</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.uptodate.com/contents/definition-of-transient-ischemic-attack">http://www.uptodate.com/contents/definition-of-transient-ischemic-attack</a></td>
</tr>
</tbody>
</table>
**Traumatic Brain Injury (TBI)**

Traumatic brain injury (TBI) is a nondegenerative, noncongenital insult to the brain from an external mechanical force, possibly leading to permanent or temporary impairment of cognitive, physical, and psychosocial functions, with an associated diminished or altered state of consciousness.


**Cortical Vision Impairment (CVI)**

A temporary or permanent visual impairment caused by the disturbance of the posterior visual pathways and/or the occipital lobes of the brain. The degree of vision impairment can range from severe visual impairment to total blindness.

[http://www.tsbvi.edu/seehear/fall98/cortical.htm](http://www.tsbvi.edu/seehear/fall98/cortical.htm)

**Hemianopia/ Hemianopsia (homonymous means bilateral)**

A deficit in either half of the visual field. Also called hemianopsia.

Watch [https://www.youtube.com/watch?v=R2Tfokx_LV4](https://www.youtube.com/watch?v=R2Tfokx_LV4)
[http://www.hemianopsia.net/](http://www.hemianopsia.net/)

**Quadrantanopia**

(Superior, inferior, nasal, temporal). A deficit in any quadrant of the visual field.


**Incongruous/Congruous Hemianopia**

Refers to whether fields are bilaterally symmetrical.

Incongruous = not bilaterally symmetrical.
Congruous = bilaterally symmetrical

*(McLeod & Lance 1983)*

**Macular splitting**

Splitting of the macular area

**Macular sparing**

Preservation of the macular area

**Perceptual vision rivalry or Binocular rivalry**

A process in which a sensation disappears or becomes imperceptible when another sensation is evoked elsewhere in the sensory field.

*(Bender, 1952)*

[http://visionlab.harvard.edu/Members/Olivia/tutorialsDemos/Binocular%20Rivalry%20Tutorial.pdf](http://visionlab.harvard.edu/Members/Olivia/tutorialsDemos/Binocular%20Rivalry%20Tutorial.pdf)

**Scanning**

Use of head and eye movements to visually search for and localise a target. *(Corn & Koenig, 1996)*

**Tracking**

Visually following a moving target. *(Corn & Koenig, 1996)*

**Saccadic eye movements**

Shifting of gaze to an object, word, number etc. with rapid movements: (20-50/second) eye jumps while maintaining foveation from jump to jump (as in reading) and performed in an organised sequential manner. *(Moore, 1997)*
<table>
<thead>
<tr>
<th>Pursuit eye movements</th>
<th>Foveation (visual acuity) is maintained while tracking a moving object (saccadic movement is suppressed). <em>(Moore, 1997)</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inertia</td>
<td>Refers to visual fatigue. The person may be unable to focus or visually concentrate for periods of time.</td>
</tr>
<tr>
<td>Neglect/ inattention/</td>
<td>Refers to a deficit of attention. The person doesn’t respond normally to stimuli from the side opposite their lesions and to behave as if stimuli was not present. Different modalities can be affected.</td>
</tr>
<tr>
<td>hemi-spatial inattention/</td>
<td><a href="http://www.scholarpedia.org/article/Hemineglect">http://www.scholarpedia.org/article/Hemineglect</a></td>
</tr>
<tr>
<td>visuo-spatial neglect/</td>
<td></td>
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<tr>
<td>hemispatial agnosia/</td>
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<tr>
<td>unilateral visual neglect/</td>
<td></td>
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<tr>
<td>unilateral visual inattention</td>
<td></td>
</tr>
<tr>
<td>Resolution</td>
<td>Refers to the resolution or recovery of the visual field - may be partial or complete.</td>
</tr>
<tr>
<td>Spontaneous recovery</td>
<td>The recovery of lost neurological functions following a brain injury. Most rapid in the first few weeks and progressively slows down thereafter. <em>(Wade, Langton, Hewer, Skilbeck and David 1985)</em></td>
</tr>
<tr>
<td>Compensate scanning</td>
<td>Use of hand and eye movements directed towards the affected side to compensate for the visual field deficit.</td>
</tr>
<tr>
<td>Awareness/insight</td>
<td>Refers to an awareness of one’s own condition and its functional implications.</td>
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<tr>
<td>SEETEC</td>
<td>Sight Enhancement Education and Technology</td>
</tr>
<tr>
<td>Deficit</td>
<td>*(From deficio = to fail). The sequelae resulting from a lesion, i.e. loss of or diminished functional abilities in relation to sensations, or one’s senses and/or movement patterns and behaviours including personality i.e. what a person can’t do. <em>(Moore, 1997)</em></td>
</tr>
<tr>
<td>Neuroplasticity</td>
<td>The capacity of the nervous system to develop new neuronal connections: research on neuroplasticity of the brain after injury.</td>
</tr>
</tbody>
</table>
YouTube Videos

Here are two YouTube videos that are highly recommended to view.

The first one, “Hemianopia explained and simulated using an eye-tracker” explains the above diagram plus demonstrates a functional effect of hemianopia using an eye tracker.

In the second video, “Visual Pathways - UBC Flexible Learning” Dr. Claudia Krebs describes the visual pathways by drawing on a board as well as using a real brain to highlight the structures and pathways.

1. **Hemianopia explained and simulated using an eye-tracker**
   
   https://www.youtube.com/watch?v=UoNDclXOW5s

2. **Visual Pathways - UBC Flexible Learning**

   https://www.youtube.com/watch?v=TbDFrbXiz2s

   “How do images get from the world, through the eye, into our understanding? Dr Claudia Krebs traces the topsy turvy visual pathways that make up the optic nerves.”
Retinal and optic nerve fibers on the right side of each eye see the left side of the world (the left part of the visual field), while fibers on the left side of each eye see the right side of the world (the right part of the visual field).

Similarly, superior retinal and optic nerve fibers on the upper part of each eye see the lower part of the world (the bottom part of the visual field), while the inferior retinal and optic fibers on the lower part of each eye see the upper part of the world (the top part of the visual field).

After the optic nerve exits the eyeball from the back of each eye, it travels a short distance before the nasal fibers (the optic nerve fibers on the side of the eye closer to the nose) from each eye cross over to the opposite side (make an “X”) as they continue traveling toward the brain. Here is what happens in the eye and brain when we look at an object:

In the right eye, the nasal fibers (shown in orange in the diagram above), which see the far right part of the visual field, cross over to the left side of the brain, while the temporal fibers (those on the side of the eye closer to the temple) which see the far left part of the visual field, do not cross over (in purple).

In the left eye, the nasal fibers (in purple), which see the far left part of the visual field, cross over to the right side of the brain, while the temporal fibers (those on the side of the eye closer to the temple) which see the far right part of the visual field, do not cross over (in orange).

Therefore a stroke, lesion, or injury at the point where the nasal fibers from each eye cross (where the fibers make an “X”, called the optic chiasm), would cause loss of the right visual field in the right eye and loss of the left visual field in the left eye.

Further back along the visual pathway (after the fibers have already crossed at the optic chiasm and made an “X”), a stroke, lesion, or injury to the right side of the brain would cause loss of the left visual field of each eye, and an injury to the left side of the brain would cause loss of the right visual field of each eye.

Depending on precisely where in the brain these strokes, lesions, or injuries occur, the effect can involve a smaller or larger area of the visual field and can affect either central (or straight-ahead) vision, peripheral (or side) vision, or both. Multiple strokes or lesions can cause multiple patterns of visual field loss.
Homonymous Hemianopia

Based on a paper written by Lorraine Sands/Baskett 1992

Homonymous hemianopia refers to the loss of half of the visual field. The incidence of homonymous hemianopia is perhaps more common than what most people think. Georg Kerkhoff, (2000), reported, “About 20 - 30% of all patients in neurological rehabilitation centres have homonymous visual field disorders”, (p695).

Pambakian, (2005), also commented, “Homonymous visual field disorders (HVFDs) are among the most common disorders that occur in brain damage, particularly after stroke”. He further stated that in the field of rehabilitation, “there are no uniformly accepted treatments for HVFDs, and surprisingly little systemic, evidence-based research in this area” (p136).

The Orientation and Mobility training program offered by Guide Dogs NSW/ACT is designed to assess and train people with neurological visual field deficits to help clients (and family and/or carers) understand their vision impairment, encourage scanning skills into the deficit visual field and to teach strategies to encourage safe and independent mobility, taking into account a person’s cognitive and physical abilities.

Homonymous hemianopia results when the visual pathway is interrupted posterior to the optic chiasm. It is characterised as the loss of vision in the temporal field of one eye and the nasal field of the other. If the lesion is in the right hemisphere of the brain, the person will have a loss of vision in the nasal half of the right eye and the temporal half of the left eye, resulting in the loss of the visual field on the left side. If the lesion is in the left hemisphere of the brain, the result will be a right homonymous hemianopia. Homonymous hemianopia can result from cerebrovascular accidents, tumours, or any trauma to the occipital lobe posterior to the optic chiasm.

Homonymous hemianopia, with lesions completely inside the occipital lobe can be demonstrated to functionally recover: although the hemianopia exists, the person rapidly learns to compensate in a functional sense (Hill, 1988). However, fixed homonymous hemianopias produce a condition in which the person, despite normal vision in one field, is unable to shift their gaze to see whole objects or to scan a whole scene when moving in space. No compensation, through eye or head movements is sought, and the person is left with half an image of everything. No attempt is made to turn their head to complete the image, and they often only eat half the food of their plates, bump into objects on the affected side, and have problems when reading. Ganell and Williams (1963) reported patients complaining of a feeling of uncertainty particularly in crowds, and of bumping into objects on side.

Visual neglect and homonymous hemianopia

Visual neglect can be defined as a failure to notice visual features to one side in the immediate environment, resulting in everyday problems like walking through doorways (Sunderland, Wade and Langton Hewer, 1987). Visual neglect has profound effects on both the recovery and rehabilitation prospects of the client. Many terms are used, often interchangeably, to describe this phenomenon, and they include “hemispatial neglect: visuospatial neglect, hemi spatial agnosia; hemi-inattention and unilateral visual neglect” (Willanger, Dainelson and Ankerhus, 1981).

The presence of homonymous hemianopia is often mistaken for neglect, especially in the early stages of recovery (Kinsella and Ford, 1985). Neglect is correlated with the presence of homonymous hemianopia, but is not synonymous with it e.g. - Diller and Weinberg, 1977; Weinstein and Friedland, 1977. The fact that neglect mostly lasts a few weeks, though hemianopia and other sensory/motor defects remain, indicates that they are not solely responsible for the neglect (Weinstein and Friedland, 1977). It has been hypothesised that the neglect syndrome is a disorder of attention for one half of the body and space, and for purely anatomical reasons, it is associated with homonymous hemianopia - as neglect is mainly due to organic damage in the parietal area of the brain, adjoining the occipital lobe e.g. Hill, 1988: Meienberg, Harrer and Wehren, 1986.
Perceptual rivalry

It is the homonymous hemianopia that is responsible for searching difficulties. Searching loses speed and efficiency, particularly when the image being search for is located in the hemianopic side. The gaze is naturally directed first toward the only side form which the visual information is arriving (Chedru, Leblanc and Lhermitte, 1973). Objects on the affected side are ignored as they are not seen. It is therefore important to overcome this problem, which is termed “perceptual rivalry”, if the person is to functionally recover from homonymous hemianopia. Simply stated, the intact field so strongly draws the attention, the person fixates only on that side (Hill, 1988).

The term “perceptual rivalry” was used by Bender and Furlow (1945) and they wrote that one stimulus (on the affected side) may be felt to be less intense than the stimuli on the non-affected side, if they were presented simultaneously in the two visual fields. This can be demonstrated through the method of double simultaneous stimulation (DSS), where the examiner presents an object (eg: - hand, torchlight) simultaneously in each visual field, and the client is asked to state what they see. Cohn (1972) described the consistent deviation to the unaffected side as a “magnetic quality”. Poppelreuter (1917, in Weinstein and Friedland, 1977) demonstrated homonymous visual defects as elicitable on double simultaneous stimulation, referring to it as a “hemianopic weakness of attention”.

This phenomenon may even be apparent when both stimuli are placed in the client’s good visual field - with the stimulus closest to the affected side being ignored or seen as dimmer than the stimuli further away from the affected side. For functional compensation of a homonymous hemianopia, the client needs to suppress the “pull” to the good side and raise their attention to the affected side.

Rehabilitation of deficit & past studies

For those people with homonymous hemianopia and associated neglect, who aren’t aware of their visual field defect, and who don’t compensate for it, the question of rehabilitation is raised. Can such a person be made aware of their deficit and therefore learn to functionally compensate for it?

The loss of visual function following a cerebrovascular accident (C.V.A.) or other neurological incident, has until recently been a somewhat neglected area of the rehabilitation field. Most C.V.A. and head injured patient’s show a considerable recovery of function, particularly over the first few weeks post incident (Wade, Wood and Langton Hewer,1984), and it is therefore not unreasonable to ask whether recovery of function would have taken place anyway, without rehabilitation. Even if this is true, it has been noted that recovery from visual neglect and homonymous hemianopia may exert a slowing influence on rehabilitation, and therefore intervention aimed at accelerating recovery may be useful (Sunderland, Wade and Langton Hewer, 1987). As already mentioned, it is difficult to predict which people will and which people won’t compensate for their homonymous hemianopia, but any attempt to speed up or improve this adaptation process should be made.
There have been numerous studies investigating the rehabilitation of different functions following some neurological impairment, though literature available on rehabilitation techniques for people with homonymous hemianopia and visual neglect is not highly prevalent.

Johnson and Cryan (1979) noted that visual scanning exercises are helpful in improving compensation for visual field defects, and that reinforcement and encouragement are very important factors in teaching people to compensate for homonymous hemianopia. They felt that this would better equip the person to cope with their environment.

It has been found clinically that merely telling a person to look left (for a left homonymous hemianopia), or to attend to the left visual field is ineffective in remediating faulty scanning habits (Gordon, Hibbard, Egelko, Diller, Shaver, Lieberman and Ragnarsson, 1985). Gordon et al. also claimed that improved scanning habits could be affected by systematically presenting people with a sufficiently compelling task that causes head turning to the affected side, so that a target could be sighted in the non-affected visual field, and to overcome the person’s consistent gaze to space on their unaffected side.

Diller and Weinberg (1977) completed one of the first studies which recorded the behavioural techniques in treating people with left homonymous hemianopia and left sided hemi-inattention. Their study involved teaching a slow and systematic left to right search, to scan a specifically designed tracking machine (which consisted of two rows of different coloured lights on a board), and then training the person to transfer these scanning techniques to more functional and relevant behaviours e.g. reading and writing. The rationale behind their program was to make the subjects aware of their deficits, and force them to view the stimuli systematically, and to repeat the exercises frequently so that scanning became automatic. Their study indicated that basic scanning training improved left to right scanning behaviours over a range of situations. They found it was preferable to provide consistent training stimuli, so the person could be allowed to focus on the functions being trained, rather than adjusting to new and possibly confusing changes in stimuli. Other studies have demonstrated that consistent practice is a necessary condition for automatic process development of a function (e.g. Schneider and Fisk, 1982).

Webster, Jones, Blanton, Gross, Beissel and Wofford (1984) examined the efficacy of the training program devised by Diller and Weinberg, and the degree to which scanning generalises to performances in mobility (where wheelchair navigation was used to measure mobility). Their study demonstrated the feasibility of behaviour in training to reduce the impact of homonymous hemianopia and hemi-inattention: and concluded that visual scanning training generalises to other activities requiring visual scanning.

Some problems with past studies

These and other rehabilitation studies all indicate some improvement in the level of skill functioning of the client, following intervention. In fact, it has been noted that most cognitive rehabilitation studies have reported improvement on outcome measures, though it isn't known whether behavioural changes were maintained over time or generalised in a “natural environment” e.g. Gummow, Miller and Dustame, 1983.

A problem in research and remediation is that much of it is restricted to the laboratory setting, with the question of whether it generalises to the natural environment seeming to be a secondary concern. It has been questioned (e.g.- Diller and Gordon, 1981) as to whether it is merely enough to teach a skill or whether the goal is to improve daily functioning in some way. Wagner and Danse (1987) claim that it isn’t enough to teach a client a technique in a rehabilitation setting and hope it generalises, as factors outside the rehabilitation setting can undo significant treatment gains e.g. social factors. This is a widely held view in the literature, and it has been mentioned several times that rehabilitation must focus on ways of training or retraining clients in skills necessary for everyday living and re-entry to independent life in the community e.g. Miller, 1980; Gordon et al, 1985; Gouvier and Warner, 1987. The Webster et al (1984) study did attempt to measure an everyday function (independent mobility), but the setting used had no real relation to daily situations, as wheelchair navigation is not analogous to independent mobility. Along with this, wheelchair manoeuvring requires far more skills than mere scanning ability.
According to Kertesz (1979), there is a tendency to attribute recovery to treatment, whereby underestimating the extent of spontaneous recovery. This is a particularly important point when dealing with a neurologically impaired population. The mechanisms underlying spontaneous recovery of function aren’t completely understood, but it is generally agreed that the spontaneous recovery of behavioural deficits following a cerebrovascular accident, is most rapid in the first few weeks post trauma and slows down thereafter, but can continue over a period of months or even years (Skilbeck, Wade, Langton, Hewer and Wood, 1983). As nearly all surviving clients show some degree of recovery of function, it’s important to show that the therapy improves this natural recovery by either speeding up and/or increasing its extent.

Scanning training

Generally, forced usage of an impaired behaviour is the most straightforward way to approach rehabilitation (Gummow, Miller and Dustman, 1983). One of the simplest ways to broaden the visual field would therefore be scanning - instructing clients to turn their heads towards the side of the deficit. It has however, as previously noted, been shown that merely telling a person to look to the affected side is ineffective in remediating faulty scanning habits. Systematic improvement is needed (Weinberg, Diller, Gordon, Gerstman, Lieberman, Laken, Hodges and Ezrachi, 1977). The Johnson and Cryan (1979) study, mentioned earlier in this paper, noted that scanning exercises are helpful in improving compensation, but only if reinforcement is constant.

Consistency is the prevalent theme for any cognitive retraining task. Schneider and Fisk (1982) stated that human performance in almost any cognitive skill improves with practice, but the degree of improvement increases noticeably when the subject is able to deal with the task consistently. Results of their study indicate that learning is not a function of executions, but a function of consistent executions. Consistency is therefore very important when devising a training program. If a skill is to be mastered, it is suggested that it must be practised in exactly the same way, many times over, for optimum effect. Johnston (1988) further added that rehabilitation efforts must be designed in a way that minimises the complexity of the training for the client, particularly if their judgement or self-monitoring skills are also impaired.

Most of the documented attempts to improve visual scanning and attentional problems have come from Diller and his colleagues at the New York University Medical Centre e.g. Diller and Weinberg, 1977; Weinberg, Diller et al, 1977, with the emphasis being on providing tasks of compelling interest to encourage eye and head turning towards the affected side.
Training program for people with homonymous hemianopia

This article outlines the history behind the program and the work conducted by Betty Hill, Speech Therapist, founder of the program with Mr Don Verlander (Royal Guide Dogs Associations of Australia).

The Guide Dogs Associations of Australia (RDGAA) is a voluntary agency providing mobility-based rehabilitation services to blind and vision-impaired clients in all states of Australia. Hill (1988) elaborated and trialled the training procedures described by Diller and Weinberg (1977). This resulted in the training program currently used by RDGAA. Fixed homonymous hemianopia have been found to respond well to these techniques, to enable all but the severest cases to seek compensation for their deficit (Verlander and Stott, 1983).

These techniques are based on two principles. Firstly, perceptual rivalry must be overcome. This is achieved by teaching the client to suppress attention to the non-affected side, and raise attention to the affected side. RDGAA received permission from Leonard Diller and Joseph Weinberg of the New York University Medical Centre, to develop a scanning machine based on the one designed for their 1977 study. The machine consists of two rows of brightly coloured lights set in a matt background. The lights are controlled by the instructor. The client is seated in from of the machine and taught to scan and name the lights on their affected side, until they are able to do so without being cued by the instructor. Practice is intensive and verbally monitored by the instructor, so that any tendency not to look to the affected side first, is immediately corrected. On the scanning machine, clients often don't move their heads far enough to the affected side and the instructor needs to define the correct perimeters - to the last lights on the left and right of the scanning machine.

The second main area of remediation is teaching the client to consciously scan systematically across the lights - suppressing any tendency to skip over the lights. The exercises are graded and presented from simple to complex. Speed of scanning can also be increased with sufficient practice.

Following work on the scanning machine, a mobility assessment is given, to see if the client is able to walk around safely, without bumping into obstacles, becoming disoriented or missing important landmarks or clues, such as street signs, house numbers or shop names. The scanning skills taught to the client in a static situation (on the scanning machine) are transferred to a dynamic environment. Training is graded appropriately, according to the client’s skill levels and the objectives they may have set for themselves. These may range from walking safely around a nursing home to catching public transport into the city. Regular follow-ups are also provided.

Hill (1988) summarised the results of 350 clients who had undergone the RGDA training program and the following was observed. Those clients with:-

(1) Right homonymous hemianopia (left occipital lobe lesion only) had a good prognosis for full recovery.

(2) Left homonymous hemianopia (right occipital lobe lesion only) had a prognosis of 80% chance for independent travel.

(3) Right homonymous hemianopia (left occipitoparietal lobe lesions) had an excellent prognosis, with only 5% of the clients showing any residual deficit.

(4) Left homonymous hemianopia (right occipitoparietal lobe lesion) had the following prognosis:-
   a. 10% capable of full independent travel.
   b. 50% capable of restricted travel.
   c. 40% unable to travel independently.

The greater rate of functional improvement for right homonymous hemianopia is possibly due to non-damage of the spatial side of the brain.

These results are extremely promising and have resulted in the expansion of this particular service provided by RGDA. The service seems to achieve excellent results, and is attracting large numbers of referrals.
Guide Dogs NSW/ACT has been using the scanning machine for more than 20 years within the Neurological Vision Impairment programs. Neurological Vision Impairment programs are provided to people with acquired brain injury (such as through a stroke or trauma) and as a result, have an associated neurological vision impairment.

It has been estimated that 30-40% of people with a cerebrovascular infarction who attend a rehabilitation centre have homonymous visual field detects (Kerkhoff, Munssinger, Meier, 1994).

The Neurological Vision Services program provided at Guide Dogs NSW/ACT use a “top down” approach. Scanning training using the residual vision is undertaken to improve awareness and naturally direct attention to the area with the deficit. The next step in this approach, if needed, is to introduce a mobility aid such as a white cane and/or Miniguide. The third step is to refer to an orthoptist for optical aids, such as prisms to be trialled to direct attention to the deficit side.

Replacement of the original scanning machine

For several decades Guide Dogs NSW/ACT used the same type of portable scanning machine. This equipment had been used as an assessment tool to help inform an Orientation & Mobility Instructor how a person was using their residual vision, if systematic scanning was occurring and whether there were any difficulties with visual processing and visual memory. It was often used to help people gain an awareness of a person’s visual field deficit.

Unfortunately as the years passed, the scanning machines began to wear and tear and maintenance became a real issue.

The new scanning device

In 2014, the scanning machine was replaced by a software program operating on a Windows based computer system (originally designed for iOS devices (Apple). Rather than having a fixed panel of lights, the new device presents a sequence of lights on a portable screen via a projector and a software program using a computer and a remote keyboard. This new equipment helps to represent awareness of a client’s position in, and awareness of, their surrounding space.

The overall equipment consists of:

- A portable lightweight and compact unit.
- Cordless projector which gives the same effect on the screen as the short throw projector
- Portable, wide and adjustable screen
- Software program easy to use and the lights can be manually and automatically sequenced
- Affordable, low cost

New neurological O&M assessment procedures

At the same time, Guide Dogs NSW/ACT also modified the assessment procedures and moved to more ‘evidence based’ practices. Two quick screening tools were introduced to complete before scanning as well as a functional assessment. The screening tools used are: Self –Reported Cognitive Dysfunction and Problems in Every Day Living (to assess functional impact of visual neglect).

Also introduced were standardised selected tests from the Behavioural Inattention Test (BIT) to assist with screening (conventional sub-tests and behaviour sub-tests). The results can be used to reliably assess type, severity and functional impact of a person’s visual condition. The results also help identify factors that may consequently impact the person’s O&M program.

Following intervention, the BIT assessment tests are again conducted 3 months post training as part of the follow up procedure. At this time, the person’s functional mobility skills are also reviewed.
You will find as part of Module 1, Introduction, ‘Pre-reading articles’ in the second document Part B which contains the nine essential articles for this training course. This is mandatory reading and it is recommended that you print each article and use as references, as most papers will have an assessment question attached to it – (see competency section). Below is an overview of each article.


This paper describes the loss of visual function following neurological incident. Mention is made of visual asthenia and visual agnosias, particularly during the acute stages of recovery, but the emphasis is on teaching compensatory techniques for people with homonymous hemianopia. Remediation techniques focus on the following:

1. Overcoming perceptual rivalry - the person must learn to consciously suppress their attention to the non-affected side and raise attention to the affected side.
2. Placing objects/stimuli on the person’s affected side, and reinforcing head turning towards this side.

**Training revolves around:**

- Use of specially designed tracking machine.
- Mobility training - simple to more complex, depending on client needs and level of functioning.


This article looked at Homonymous Hemianopia from the clinical point of view. It discusses the effect on everyday life of the person and the importance of various therapies in the rehabilitation of patients with Homonymous Hemianopia. Both optical and vision therapy can help to improve the ability to navigate safely within the environment, and may enhance the capability of enjoying activities such as reading and driving.


This study looks at all rehabilitation strategies currently available for treatment of visual field deficits. It describes spontaneous recovery, neglect and main treatment approaches for Hemianopia:

- Passive strategies
- Compensatory scanning therapy
- Optical devices
- Visual restitution therapy

**Article 4:** Hayes, A; Chen, C.S.; Clarke, G. & Thompson, A. (2012).

Functional improvements following the use of the NVT Vision Rehabilitation program for patients with hemianopia following stroke. NeuroRehabilitation 31 19–30. IOS Press.

This article explains the Neuro Vision Technology (NVT) System to teach compensatory scanning for neurological vision loss. This treatment was offered as part of the Comprehensive Neurological Vision Rehabilitation Program. The article presents a case study of a person with a strong left neglect and his progress undertaking a compensatory visual scanning program.

**Article 5:** Rowe, F; Brand, D; Jackson, Carole A; Price, Alison; Walker, L; Harrison, S; Eccleston, C; Scott, C; Akerman, N; Dodridge, C; Howard, C; Shipman, T; Sperring, U; MacDiarmid, S; Freeman, C. (2008). Visual Impairment following stroke: do stroke patients require vision assessment? Age and Ageing, 1 – 6. Oxford University Press.

This paper discusses different types of vision impairment occurring following stroke. It also stresses the need for vision assessment in patients.
following stroke due to the high incidence reported in the study.


This article discusses the incidence of homonymous visual field defects following brain injury and the general principles underlying visual rehabilitation. The article discusses use of Optical aids (including prisms) and visual training (also discussing reading).


This article examines the issue of a person’s awareness of their visual field deficit. Patients who were unaware of their vision impairment tended to have lesions extending beyond the occipital lobe (particularly into the parietal lobe). Awareness of a visual field deficit is associated primarily with lesions confined to the occipital lobe.

**Article 8:** The Royal Society for the Blind (2009). Neurological Vision Loss: A guide for people who have a Homonymous Hemianopia.

This booklet is designed to provide information about vision loss associated with acquired brain injury and resulting vision impairment. It explains symptoms, diagnosis and treatment as well as support available to individuals and families.


This paper outlines the new clock-face methods into the NVI training program. It focuses on O&M skills of the person and builds awareness of their vision field by tracking, scanning and tracing objects (coloured cones) at various distances. Further research using controlled and uncontrolled groups is required to validate this interesting method.

**Readings/References**

The following references are considered very useful to assist with acquiring further knowledge in the field of neurological vision impairment and are mentioned in various sections of Module 1. We have also included historical references and useful books.

**Current recommended reading - articles**


Hayes, A., Chen, C.S., Clarke, G., & Thompson, A. (2012). Functional improvements following the use of the NVT Vision Rehabilitation program


**Books**


**Historical References**


