Visual search training in Occupational Therapy – an example of expert practice in community based stroke rehabilitation

Short title – Visual search training in occupational therapy

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Abstract

Introduction - Visual searching is an essential component of many everyday activities. Search training is practised as part of occupational therapy to improve performance skills both in people with hemianopia and those with spatial inattention post stroke. Evaluation of the effectiveness of such training first requires a systematic and detailed description of the intervention. To this end this study describes the practice of a Specialist Occupational Therapist.

Methods - Single sessions of intervention delivered by the Occupational Therapist to five participants with visual search disorders post-stroke were video-recorded. The recordings were analysed for content using a framework approach.

Results - The Occupational Therapist educated participants about the impact of their visual impairment on everyday activities. She used instructions, spatial cueing, placement of objects and verbal feedback to train increased amplitudes of eye and head movements, to direct attention into the blind field or neglected space and to encourage systematic searching during occupations and activities. Activities were graded by manipulating the area for attention and complexity in the environment.

Conclusion - This investigation provides a detailed description of a Specialist Occupational Therapist's community based intervention for improving visual search post stroke.

Introduction

Visual search is a critical process for many activities of daily living (ADL). For example, preparing a meal requires finding the utensils needed; crossing the road requires the search for possible hazards. This essential process can be disrupted after stroke (Mort and Kennard, 2003), which in turn affects people's ability to perform these essential everyday activities. With increasing emphasis on rehabilitation at home, the aim of this study was to describe in detail the current practice of a Specialist Occupational Therapist delivering visual search training in the community setting.

Disordered visual search after stroke is caused by three common problems: visual field loss, impaired eye movements and impaired visuo-spatial attention or neglect. Visual field loss results from disruption to the visual pathways causing part of the field of view to be lost from both eyes, so that the person is unable to see part of a scene on one side. The side and size of the visual field deficit depends on the site in the visual pathway that is interrupted by stroke (Fahle, 2003). Loss of half the field is known as homonymous hemianopia (HH).

Eye movement disorders include difficulty maintaining the position of the eyes and in coordinating their movement. As well as making it difficult to search, eye movement disorders can affect perception of depth (MacIntosh, 2003). A recent retrospective study of over 11,000 participants enrolled in stroke trials estimated the incidence of stroke related visual field deficit or eye movement disorders to be 60%; with 35% having HH (Ali et al., 2013). Recovery of field loss and eye movements occurs in the early weeks after stroke but is often partial; about 28% are left with complete HH 90 days post stroke (Ali et al., 2013).

Spatial neglect (SN) is a syndrome of behaviours characterised by a failure to attend to one side of space. Left-sided neglect is a common manifestation of right middle cerebral artery stroke because the cortical areas of the right hemisphere involved in spatial attention are extensive

(Mort et al., 2003). Estimates of the incidence of SN after stroke are based on small studies and results vary greatly according to the samples selected and measures used (Bowen et al., 1999). A good estimate of recovery rates was provided by a study of 66 consecutive patients admitted to a district general hospital with right hemisphere stroke (Cassidy et al., 1998). 40% of the sample showed signs of SN when assessed using a battery of tests in the first week; three months later this figure reduced to 9%. SN and HH often co-occur, but both can occur alone. Although the breakdown in visual search behaviour differs between the two conditions (Mort and Kennard, 2003), the domains of activities affected are similar. Stroke patients with SN or HH experience poor performance in grooming, eating, mobility, reading, shopping, money management and driving and so have reduced engagement in activities inside and outside the home, including work and leisure (Katz et al., 1999; Warren, 2009). Many people improve their performance of ADL to some degree in the early weeks after stroke either due to recovery or the adoption of compensatory strategies. However it is not uncommon for individuals to experience long-term limitations in everyday activities (Warren, 2009), and poor quality of life (Gall et al., 2010).

In the absence of severe motor impairments, communication or swallowing difficulties, many people with visual field loss are often regarded as having only minor disabilities and may be discharged from hospital within a few days of admission with little or no rehabilitation provided (Dr Philip Clatworthy, 2015, personal observations). Yet a recent research priority setting study highlighted visual impairment post stroke as a significant problem. The James Lind Alliance priority setting exercise for stroke rehabilitation research in Scotland, which consulted people with stroke, their carers' and professionals has '*What are the best ways to treat visual problems after stroke?*' at number 5 in its top 10 research questions (James Lind Alliance, 2011).

Essential to improved commissioning of community rehabilitation services is the objective evaluations of which interventions are beneficial. Guidelines for the treatment of HH and SN are vague and are based on consensus and very limited evidence (Royal College of Physicians, 2012; National Institute for Health and Care Excellence, 2013). Recent Cochrane reviews of rehabilitation interventions for both SN and HH have concluded that there are insufficient high quality studies to determine the effectiveness of treatments for improving independence in ADL, but that training patients to use compensatory visual search strategies seems to help improve performance on impairment level tests such as cancellation tasks and reading (Pollock et al., 2011a; Bowen et al., 2013).

Much of the research into visual search training has used computer based interventions (e.g. Mannan et al., 2010; Ong et al., 2014). While this approach is effective for improving performance on screen based search tasks, these training methods are often not in context with the individuals' goals for rehabilitation and therefore may not be optimal for translation of visual search learning to activities in everyday life. Neuroscience has shown that the brain is organised for function and it therefore follows that task specific training practiced in the context of daily living tasks should lead to adaptation of the wide neural networks involved in the task (Carey and Seitz 2007). Specificity of computerised visual training has been demonstrated for visual exploration and reading tasks (Schuett et al., 2012). Based on this theory of task dependence, if it can be delivered intensively, visual search training embedded within occupations is arguably more likely to be effective for improving performance in everyday living than training using computer screens or light displays.

There is also recognition that the occupational therapy profession should be more active in vision rehabilitation (Warren, 2011). A recent survey of current occupational therapy practice for visual problems in inpatient stroke services in Scotland found that out of 55 occupational

therapy inpatient stroke services 45 (82%) deliver treatment to patients with SN and 38 (69%) report treating HH; suggesting that a striking 31% do not. The most common treatments reported for both disorders were ADL training and scanning training (Pollock et al., 2011b). The respondents also reported providing information and environmental modifications. Barriers to the management of visual problems after stroke included: lack of protocols (33/55, 60%), lack of awareness of best practice treatment options (25/55; 45%) and lack of specialist training (27/55, 49%). The picture is likely to be similar throughout the UK.

A priority for clinical research is that interventions should be well described (Hoffman et al., 2014). There is no established best way to do search training within Occupational Therapy. Warren (1993 a,b) described a hierarchical model for evaluation and treatment of visual perceptual dysfunction in adult acquired brain injury. However this is a model to apply rather than a detailed description of intervention. Taylor et al. (2011) have reported the content of a systematic treatment schedule of table top activities delivered by an Occupational Therapist that showed promise for improving participants' psychological adjustment to living with visual field loss. In this study we wished to describe current practice occupational therapy for improving visual search for people with stroke, living at home. Our aim was to provide a detailed single case description of 'real-life' implementation of visual search training within occupational therapy in the community setting. Single-case descriptions are valuable at the exploratory stage for developing and evaluating interventions (Baxter and Jack, 2008). They are a first step in the process of formulating a detailed framework for an intervention, that can be reliably implemented and replicated in a future effectiveness study and in evidence based clinical practice (Hoffman et al., 2014).

The study focussed on service users with HH and SN for three reasons:

1. HH and SN impact occupational performance similarly and Occupational Therapists use similar assessments to screen for HH and SN (Pollock et al., 2011b). It was anticipated that that there would be similarities in the training of compensatory strategies that Occupational Therapists use with patients with HH and SN to help them learn to visually search.
2. HH and SN commonly co-exist and it is not always easy to distinguish between the conditions using clinical tests, including perimetry (Robertson and Halligan, 1999).
3. It is recognised that the ability to learn compensatory search strategies is dependent on attention (Warren, 1993b; Mort and Kennard, 2003) and people with HH may experience difficulties in everyday tasks because of limited attentional resources, even if they do not have SN. They are likely to benefit from training to help them use compensatory strategies more automatically in complex tasks or distracting environments that demand greater attention.

Methods

Occupational therapy delivered by a Specialist Occupational Therapist in Stroke, working in a community service, was recorded on video and analysed to provide a detailed description of her search training intervention. Approval for the study was obtained from South West Frenchay NHS Research Ethics Committee (ref. no. 11/SW/0306). Consent for participation was obtained from stroke participants and also from other adults in the household as the video recordings were undertaken in participants' homes.

Participants

The Specialist Occupational Therapist; (JA) has extensive knowledge and experience of visual rehabilitation for stroke. She has completed a three day intensive course on evaluation and intervention for visual impairment from acquired brain injury in the adult (http://www.visabilities.com) and contributed to the recent Cochrane review of Interventions for visual field defects in patients with stroke (Pollock et al., 2011).

Service User participants

Consecutive service users fitting the eligibility criteria were identified by the health care professionals in hospital stroke services (Occupational Therapists in hospital and Early Supported Discharge Team and Stroke Care Coordinator). JA did not identify people for the study.

Inclusion criteria:

- Diagnosis of stroke, by physician's judgement
- Discharged to home
- Limited ADL due to visual search problems judged by Occupational Therapists in acute care or Early Supported Discharge services for stroke who were independent of the study.
- Ability to participate in the research processes and intervention
- Consent to participation.
- Reduced visual field and/or SN.

Exclusion criteria:

- Previous history of severe sight impairment
- Previous history of disability affecting performance of personal care tasks; determined as modified Rankin score 4 or more (van Swieten et al., 1988).
- Under 18 years old

Visual field loss was assessed using a confrontation test (Pattern, 1996), in which the patient's visual field is assessed in comparison to the examiner's own field. The confrontation test for assessing visual fields was chosen since it is an accepted screening test for visual fields in clinical practice (Chest Heart and Stroke Scotland, Stoke Training and Awareness Resources (STARs), Advancing Module: Vision). SN was assessed using conventional paper and pencil star cancellation task and line bisection tests from the Behavioural Inattention Test (Wilson et al., 1987). Scores below the cut off score for normal performance were used to determine SN. The tests are reliable, and quick and easy to administer (Wilson et al., 1987). These screening assessments were carried out by health professionals who were independent of the study.

Procedure

Demographic characteristics of the participants were collected: age, gender, side of stroke, lesion site, time since stroke and results of vision examination, including perimetry testing by an orthoptist.

JA visited the participants on two occasions. On the first visit JA checked the participant still fitted the eligibility criteria. If they did she interviewed the participant about the functional impact of their visual impairment to identify goals and decide the activities to be video recorded on the second visit. At the intervention visit JA set a video camera in an optimal position to capture the intervention from the perspective of viewing the therapist and the patient. During an outdoor activity, an assistant held the camera. Video files were labelled using an anonymised ID code for each participant and taken away for independent analysis (JA was not involved in the analysis).

Analysis

Video recordings were analysed using a framework developed by occupational therapy researchers. Framework analysis allows complex cross sectional descriptive data to be managed and analysed systematically and transparently (Pope et al., 2000). The method can be used deductively as well as inductively. Framework analysis comprises four main stages: familiarisation with the data, identification of thematic framework, indexing and charting, mapping and interpretation. The framework was informed by consideration of visual search, motor learning and occupational therapy literature and by viewing the first video. Initial framework headings developed from the literature were 'Environment', 'Structure of Task', 'Scanning and Search', 'Techniques and Approaches', 'Education and Advice' and 'Other Points'. These headings were considered to provide coverage of aspects of Occupational Therapy intervention specific to visual scanning training, learning theory approaches and other person-centred considerations which may have influenced the therapist's actions. The columns in the framework beneath each heading allowed the researchers to make annotations about the therapist's actions observed on the video recordings.

Each video was viewed through from beginning to end without making notes initially to familiarise the researchers with the data. Indexing and charting the data was carried out by reviewing the videos and using the stop start player functions to enable all significant interactions and vision-specific techniques relevant to the content of the intervention to be identified and noted down, and then categorised and entered into the framework grid. This process was carried out by two observers who discussed and agreed the categorisation of observations.

The framework categories and entries (i.e. the coded events and observations) were later re-examined, clarified, re-interpreted and remapped into four themes: 1. Activities; 2. Education; 3.

Environment and space; 4. Instructions, cues and prompts to scan and search and feedback during activities. The video recordings were reviewed once again to check that the themes captured the content of the intervention.

The researchers' interpretation of the therapist's actions was checked with JA, in a Skype interview, using open questions that were carefully worded to avoid influencing her responses.

Findings

Six stroke participants were recruited to the study, one withdrew before being recorded. None of the participants were on JA's case load at the time of their recruitment to the study; although she knew two of them having previously helped to plan their discharge from a community hospital. She had not carried out any visual rehabilitation with them at that time. Five participants had their Occupational Therapy recorded. Table 1 shows the characteristics of these five and their goals. Table 2 lists the activities recorded on video for each participant. Duration of occupational therapy captured on video ranged from 17 to 53 minutes. Sessions focused on one or two goals.

[Table 1 and 2 near here]

Table 3 shows the content of the intervention for each participant and summary descriptions are given under theme headings.

[Table 3 near here, but is large maybe supplementary material or appendix?]

Activities

Participants (P1-5) practised visual search within the context of their goal occupations in four of the videos (P1 preparing a meal, P2 golf, P4 and P5 reading). However the opportunity to practise within one or more goal tasks was not available in all cases. P3's goals were to

improve her mobility outside the home, return to cycling and shop confidently in supermarket. Constraints on filming in busy public places prevented recording these activities for this study. One of P4's goals was to be independent in driving a powered wheelchair. However at the time of the study he did not have a powered wheelchair. In these two cases (P3 and P4) the Occupational Therapist used search activities in their living rooms: scanning for objects while walking in the room (P3); and using a letter search task on large white board to encourage scanning to the blind side of the area in front of the wheelchair (P4). These activities lasted 24 minutes for P3 and 11 minutes for P4. Within this time the JA changed the search tasks slightly giving variable practice rather than massed practice (many repetitions of the exactly the same task). When asked about her choice of activities in the interview JA reasoned that these preparatory activities allowed participants to practise scanning and search strategies in safety before applying them in their desired occupations.

Education

JA consistently began sessions with an explanation of the nature and impact of the individual's visual impairment and the need for adopting compensatory strategies to improve performance. Explanations of field loss from each eye were enhanced with visual materials; demonstration goggles with part of each eye piece masked with tape (P4) and diagrams of the visual fields from each eye (P5).

(To P4) "This shaded out area is the bit you don't see, which is why you need to turn your head far enough round to make sure this seeing bit sees what the non-seeing bit can't."

JA related the visual impairment to occupations that participants wanted to do. An example was seen with P2 when she was preparing him to find that the HH and SN would affect his golf

performance. The therapist highlighted how golf may be familiar but the participant's performance was likely to be altered.

"You may find it more difficult to track the ball after you have hit it, and then to locate it."

Another example was her explanation to P3 that her loss of vision in the left lower quandrant would cause problems when walking.

"*Your particular problem is that you can't see to the lower left quadrant which makes moving around difficult particularly outside*"

She explained that the purpose of the intervention was to enable the participant to do their desired occupations by helping them to learn to use strategies to compensate for their loss of visual field. The main strategies were: increasing the amplitude of head and eye movements to the affected side when looking for things and to search the space in a systematic manner starting in the blind or neglected area of space. She listed the strategies during the education and also reminded participants of them at the beginning of activities.

Reading, being focussed on a relatively narrow area of space, required different compensatory strategies and changes in behaviour than activities in wider spaces. Before their strokes P4 and P5 had used hand held magnifying glasses for reading or doing crosswords. JA explained to each of them how the frame of the magnifying glass would prevent sight of the whole text and so would now hinder recognition of the beginning and ends of lines.

(To P5) "The difficulty is because you don't see so well on that one side this [the magnifying glass] could make it even more difficult. For you being further away and having a bigger picture is working better than being close up to it. What this [the magnifying glass] does is to narrow it down, cutting out a lot of information that might orient you to where things end."

She suggested that these participants use alternative large print media or make an optician's appointment to see if they needed new prescription glasses to correct their acuity in near vision.

The education included helping participants to understand that recovery was a learning process. For example in explaining to P3 how conscious effort must be made to scan to the blind side she said *"The brain finds it difficult to do that initially because it finds it easy to orientate itself to the side it can see. We have to re-educate it to looking more to the side you can't see."*
JA gave participants printed advice about field loss and strategies aimed at improving performance in wide field search and reading.

Environment and space

The parts of space used in preparatory activities were congruent with the goal occupation. For example practice for outdoor mobility with P3, who had lower left quadrantanopia and complained she missed kerbs, was done using a search activity while walking with target objects that were positioned on the floor to the left and right throughout the length of the living room. For P4 a large board for practising search placed in front of his wheelchair, corresponded to space he would need to attend to if driving the chair in the room.
The environment was used to grade the difficulty of the search activity by reducing or increasing the number of distractor items in searches (P3, P4), and reducing or increasing the size of the area to search in the task. For example reading was made easier by using a blank piece of paper to provide an anchor below the line being read and to mask lines underneath it on the page (P3, P5). Placing cards closer to the front edge of the table and on the left side helped P3, who had lower left quandrantanopia to concentrate on practicing making bigger eye movements into the blind quadrant.

Instructions, cues and prompts to scan and search during activities

During activities the therapist used instructions, verbal and visual cues and prompts.

(To P1) "Think about making wide head turns towards the affected side."

"Try making your head and eye movements quicker".

"Look to this side [therapist moved her hands and head in a deliberate fashion to the left] and then scan to the right ", [she completed her demonstration movement to the right side].

Sometimes continuous visual prompts were used and they were sustained after fading the verbal prompts. For example a picture of an eye with the written message 'Turn your head to the left', was put on the kitchen wall in a prominent position for P1. In another example P4 was encouraged to place his affected hand on the table by the side of his reading material to form the visual anchor point for its left edge.

Some directions were very specific to the task. An example was seen on the golf course: P2 was directed to look to the left towards the next hole when hitting the ball. JA stood alongside P2 (on his unaffected side); she turned to her right as if getting ready to hit the ball and then looked clearly to her left. She verbally instructed: *"You need to look"'*, whilst physically demonstrating the action. She reminded him of the strategies he would need to locate the ball: *"Follow the trajectory of the ball so that when you go to find it you're able to locate it easier".*

JA encouraged participants to recognise the results of their learning; known in the motor learning literature as 'knowledge of performance' (KP) and 'knowledge of results' (KR) (Schmidt and Wrisberg, 2008). Examples of KP were observed after P2 had practiced attending to the golf swing and direction of the shot. JA asked him to consider his performance: *"can you see how it has improved now?"*

(To P4) "You are turning your head really well"

KR was used when training P3 to make bigger eye movements in a table top task: *"Just try and move your eyes over to the left...What can you see now?"*

"Initially you said I can't see it, but when you moved your eyes a little bit more you could see a bit more of the whole picture"

Discussion

Using systematic analysis of video recordings of the Specialist Occupational Therapist's intervention we have acquired a detailed description of her Occupational Therapy for training visual search in people with HH and SN post stroke. This case study has provided a framework for describing search training in community based Occupational Therapy and provides an important foundation for future research with a larger sample of therapists.

In keeping with the ethos of Occupational Therapy, the intervention was client centred and designed to improve participants' performance in their goal activities of daily living (AOTA, 2014). The intervention followed an adaptive compensatory or functional approach (Ivey and Mew, 2010) with repetition of specific functional tasks and or activities to enable the person to learn how to compensate for visual impairments. The approach assumes that performance can improve despite the persistence of neurological deficits. For compensation to occur it is essential that the person understands their visual impairment and the impact that it can have on occupational performance. Thus education was an important part of the intervention.

JA's intervention was influenced by her years of clinical experience, awareness of the vision rehabilitation literature (e.g. Pollock et al., 2011a) and knowledge gained from the training course she attended. Elements such as stressing the importance of using the seeing portion of the visual field to search both left and right sides of the scene, the use of preparatory activities for practising systematic search strategies starting on the affected side and real practice of everyday tasks in real environments are advised by Warren (1993b; 2011b).

The intervention reflected principal components of training that are prevalent in the neuropsychology vision rehabilitation literature:

- Most importantly visual search training in occupational therapy is task specific. A recent study has demonstrated that training-related improvements in reading and visual exploration are highly task-dependent (Schuett et al., 2012). Occupational therapy either uses real tasks or the next best option, a preparatory activity selected to support the development of performance skills and performance patterns to enhance occupational engagement (AOTA, 2014). The greatest advantage that occupational therapy has over other interventions, which are mostly computer based, maybe that the activities are designed so that they are practiced within a similar area of space relative to the individual (i.e. peripersonal or far space) and using the same posture and mobility needed in the real task. Furthermore by their design preparatory activities used in Occupational Therapy allow safe preparation for the goal task.
- Zihl (2003) stresses the need to train patients with HH to increase amplitudes of saccades to the affected side. JA was observed to do this using table top activities in which P3 was asked to keep the head still and to find target cards using large eye movements. However some activities require larger gaze shifts including head movements; in these cases JA specifically prompted participants to make head movements. She used instructions and placement of objects in the environment to train increased amplitudes of eye and head movements into the blind field or neglected space.
- Intensive practice with hundreds of repetitions is a feature of computer based visual search training (Mannan et al., 2010; Ong et al., 2014). The use of preparatory activities in Occupational Therapy allows more practice of search strategies than would be possible in more complex ADLs, however the number of repetitions delivered in occupational therapy

treatment sessions was far less than the massed practice of hundreds of trials that can be achieved with automated computer based systems.

- Task difficulty was graded by the demands of the activity in allocating attention to an area of space. The boundaries of space to be searched were controlled and so was the complexity of the environment, particularly in the activities which are easy to manipulate. In real everyday activities the therapist was observed to increase task difficulty by adding clutter in environment. Conversely reading was made less challenging by reducing the text visible on the page using a mask to occlude lines of text. This strategy for grading by increasing or decreasing distractor items is commonly used in computerised training programmes (Mort and Kennard, 2003)
- The therapist gave knowledge of performance and knowledge of results, which is a valuable coaching technique for improving motor learning (Schmidt and Wrisberg, 2008).
- The therapist encouraged spatial anchoring using the participant's arm to mark the boundary for reading and for a table top search activity; though kinaesthetic cueing by encouraging the participant to move the limb on the affected side was not observed. This 'limb activation' technique depends on the person having voluntary movement in the affected limb. Later questioning revealed that JA uses the technique with people with SN as their predominant problem, who are able to move the affected arm. Robertson and North (1992) showed limb activation on the neglected side to be helpful for improving performance of pencil and paper search tasks in SN.

Limitations of the study

The description of the intervention was based on therapy delivered by a single community based Specialist Occupational Therapist (JA). In addition to being the subject of this study JA

helped to conceive and plan this research. This dual role could be considered a threat to the ecological validity of the study; for example it has the potential to influence who was recruited, JA's behaviour in carrying out her intervention and the interpretation made of the content of the occupational therapy. Concerns about impartiality in recruitment may be assuaged because this was done by other clinicians and at the time of recruitment to the study, none of the participants were on JA's case load. She had had a role earlier in the care pathway of participants 1 and 2, when she had helped to plan their discharge from a community hospital. However she had not carried out any visual rehabilitation with them and did not identify or recruit them to the study.

It is possible that video recording her own intervention may have changed JA's behaviour; however this is a disadvantage inherent in being conscious of video-recording no matter who is the subject. The activities used in the study were restricted by the data collection method. Video recordings were limited to quiet locations away from other people and so we were unable to capture the therapist training participants when navigating in streets or in shops. Nevertheless we consider that a more systematic and detailed description of treatment resulted from video analysis than would have occurred using alternative means of data collection, for example, by interview.

Most important in maintaining impartiality in the findings of this study is that JA did not have any role in analysing the video recording. The researchers responsible for the video analysis were very careful to avoid influencing JA's responses in their follow up interview with her in order to maintain neutrality. This study can be considered to have been carried out with cognisance of threats to its credibility and measures taken to allay them. Nevertheless the resulting description of the content of visual search training in occupational therapy is from a single Specialist Occupational Therapist and further work will be necessary to determine whether the practice of others for training visual search is carried out in a similar way.

A second limitation was the small sample size of stroke participants. The five participants were typical of JA's case load, (though, as already pointed out, not actually on her case load). They all had visual field loss and sometimes, in addition, SN. The sample ranged from being immobile within the home to being ambulant and wanting to engage with activities outside. The search strategies being trained were common between participants and so although the range of activities may not have been exhaustive it is felt that the training strategies used were probably captured near to saturation. The sample did not include anyone considered to have SN without visual field loss therefore differences in training strategies between the two conditions were not identified from the data.

Conclusion

A detailed description of the practice of a community based Specialist Occupational Therapist's intervention for training visual search in her clients with visual problems after stroke has been achieved. This is an important first step on the way to defining an Occupational Therapy intervention for evaluation.

Key findings

i) Occupational therapy provides strategies for improving visual search in goal activities.

What the study has added

ii) A detailed single case description of occupational therapy for training visual search in people with stroke.

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