The British and Irish Orthoptic Society (BIOS) Position Statement for Vision Services in Stroke Practice

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Acknowledgements

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1. Introduction

This document is the second edition of the BIOS position statement for vision services in stroke practice. It provides a brief overview of Orthoptic practice for individuals who have had a stroke, their carers and health care practitioners. It has been updated using a combination of current research evidence from the medical literature and Cochrane systematic reviews, expert consensus from the Orthoptic Special Interest Group in Stroke and neuro-rehabilitation and models of best practice.

Visual problems following stroke are multifaceted, cause significant impairment and can be a barrier to rehabilitation. Since the launch of the National Stroke Strategy in 2007, there have been considerable advances in the education of healthcare professionals involved in the care of stroke survivors in addition to advances in the assessment and treatment of visual impairment due to stroke. National stroke guidelines (National Stroke Strategy 2007, SIGN 2010) state that stroke survivors with visual problems must be referred for specialist assessment and management. This has recently been endorsed in the current edition of the RCP Guidelines, 2012, that states that each stroke rehabilitation unit and service should have easy access to services providing Orthoptists (RCP 2012). The British and Irish Orthoptic Society (BIOS) provide Professional Practice Guidelines for Orthoptists working with patients who have had a stroke (BIOS 2012). These detail the specific assessment procedures and strategies for Orthoptists, to facilitate high quality and uniform care to stroke survivors who benefit from Orthoptic input.

Orthoptists have clinical expertise in the diagnosis and management of eye movement abnormality, disorders affecting binocular vision and stereovision, in visual neglect and perception and in visual field assessment. They are experienced in providing a diagnosis and management in both the early post-acute phase and long-term care for these patients. As the incidence of visual problems following stroke is 60% or more (Rowe et al 2007; McKay 2004; Clisby 1999; Freeman & Rudge, 1988, Ali et al 2013, Rowe et al 2009a), Orthoptists are therefore essential in the care and management of stroke patients by contributing their specialist knowledge and skills as part of the multi-disciplinary team (MDT). The Orthoptist has an important role to play in stroke rehabilitation and it is recommended that links between the stroke and Orthoptic departments should be established in all units (Jones & Shinton 2006)

2. Role of the Orthoptist

Orthoptists undertake specialised ocular testing procedures with provision of treatment options in the area of visual impairment following Stroke. An Orthoptic assessment can provide the patient, the medical team and carers with a clear explanation of the visual defects that have arisen following stroke and this often aids rehabilitation (Freeman 2003). Communication is often

difficult after stroke but Orthoptists can use techniques and tests that are non-verbal, making a reliable assessment possible.

Diplopia (double vision), blurred/altered vision, ocular muscle imbalance, visual field deficits and visual inattention are common visual deficits that occur following a stroke. Orthoptists can assist with many of these problems to aid rehabilitation by providing information on compensatory strategies of advice, suggesting reading aids and utilisation of an abnormal head posture, utilising prisms and occlusion for diplopia or visual disturbances such as nystagmus and advising on visual search techniques for visual field loss and inattention. This can have a positive impact on general rehabilitation as enhancing ocular abilities and making best use of residual vision can aid general balance and mobility.

- Orthoptists use their specialist knowledge of the visual system, the brain and its associated pathologies to formulate strategies to assess the patient.
- By using quantitative and qualitative tests to investigate further the visual status of the patient, they can determine:
    - Presence of an ocular condition
    - Diagnosis of the type of ocular condition
    - Whether the ocular defects are due to the recent stroke or pre-existing pathology
    - The possible prognosis for ocular improvement and recovery
- Advise, in the presence of ocular motility disorders and in particular gaze palsies, on how to utilise residual visual functions including compensatory head postures/movements, prisms and positioning of objects.
- Help to alleviate symptoms of diplopia using prisms, occlusion or advice on the use of a compensatory head posture and positioning as appropriate, and monitor accordingly.
- Provide an explanation, advice and treatment options regarding the presence of nystagmus as appropriate, regarding the use of a compensatory head posture or positioning, and or use of other strategies such as occlusion to lessen symptoms of oscillopsia, vertigo or blurring.
- Advise on the strategies available to cope with visual field loss such as positioning, scanning, prisms and exaggerated head movements.
- Arrange formal visual field assessment (if not already performed) where visual field loss is detected by confrontation testing and recovery is not evident by 3-4 months post stroke**.** Zhang et al (2006) recommends visual field testing should be systematically performed in all stroke patients. This is also particularly important for driving standards.
- Provide the patients with the option of referral to Ophthalmology for consideration of certification for vision impairment where applicable
- Identify visual inattention, because it has implications for the patient's safety and mobility as it impacts on activities of daily living, and provide advice and strategies for rehabilitation.

- As part of the stroke MDT, designs and implements treatment plans with the patient's involvement and consent.
    - Considers all treatment options in liaison with the stroke team and patient taking into account prognostic indicators, available resources, any adverse side effects and level of patient involvement that will be required.
    - In conjunction with the stroke team advises and structures the specific treatment with respect to the general condition of the patient.
    - Provides details of verbal or written instructions/information regarding Orthoptic, optical and, if required, ophthalmic procedures and care given to the patient and/or carer.
    - Provides written/verbal information to the MDT on the ocular status of the patient such as:
        - Identifying the patient's glasses that are required for reading and distance tasks
        - Identifying if the patient has vision within expected norms or if this is reduced
        - Identifying if the patient has diplopia, visual field loss or inattention
        - Identifying if the patient has any difficulty with their vision that may affect balance, judging distances and mobility
- Informs the patient and the stroke team at an appropriate time when the presence of a visual defect such as double vision, visual field loss, visual inattention or reduced vision will affect the patient's driving eligibility.
- Provide a cost-effective service by screening for stroke-associated visual defects and thus save on unnecessary referrals to Ophthalmology

The positive effect that reassurance and explanation to the patient can have when their visual problems after stroke are fully defined to them by knowledgeable professionals should not be underestimated.

3. Evidence

The impact of visual impairment can be wide ranging. Impact on functional performance can include general mobility, self-care, ability to judge distances due to diplopia or impaired stereo vision, reading impairment due to cortical or ocular dysfunction, impaired colour perception and visual hallucinations. Impact to quality of life is also an issue with changes to independent living, ability to drive, social functioning, dependency, loss of confidence and links to anxiety and depression (Jones & Shinton 2006, Bois-Wollner & Diamond 1976, Chen et al 2009, Fisk et al 2002, Langelaan et al 2007, Papageorgiou et al 2007). Eye movement disorders impact on the effectiveness of rehabilitation therapy in regaining mobility and activities of daily living (SIGN stroke guideline 2010)

3.1. Incidence

There has been one systematic study of the presence and extent of visual deficits following stroke (Rowe 2013). However a true incidence of visual impairment could not be ascertained. Visual deficits arising after stroke are multi-faceted and frequent with a prevalence reported as up to 92% in a sub population of stroke survivors referred with already suspected visual difficulty and up to 60% in an overall stroke population (Rowe et al 2007, MacIntosh 2003, Ali et al 2013, Freeman and Rudge 1988, Rowe et al 2009a). The visual sequelae of stroke are many but broadly relate to low vision, visual field loss, ocular motility deficits and visual perception difficulties (Jones & Shinton 2006, MacIntosh 2003, Freeman & Rudge 1988).

Low vision has been reported in up to 29% of stroke survivors and can relate to associated vascular pathology or to other co-existent ocular abnormalities such as glaucoma, cataract and refractive error (Lotery et al 2000, Rowe et al 2009a).

Ocular motility disorders can be divided into cortical deficits of strabismus, saccadic or smooth pursuit eye movements and brain stem defects including cranial nerve palsies, nystagmus, gaze palsies and skew deviations. The prevalence of ocular alignment and/or ocular motility deficits is estimated at up to 64% (Rowe et al 2007, Fowler et al 1996, Rowe et al 2009a, Rowe et al 2011a,b, Rowe et al 2013a,c, Ciuffreda et al 2007).

Perceptual problems encompass agnosia, simultanagnosia, prosopagnosia, alexia and achromatopsia amongst others (Rowe et al 2009b). Visual inattention (VI) is a frequent perceptual sequelae of right-hemisphere damage (Mort, 2004) although it has also been reported in left hemisphere damage (Cherney, 2001; Stone,1993). The reported prevalence varies but has been documented to be as high as 85% with some degree of neglect (Beis, 2004; Stone et al 1993; Sunderland et al 1987). Recovery of VI frequently occurs in the early post-acute stage, however persistent neglect has been documented to be as high as 31.5% (Cassidy, 1998).

Homonymous visual field defects are among the most common disorders that occur after stroke and not the only type of visual field loss that can occur. The prevalence of post-stroke homonymous visual field loss is relatively high and frequently underestimated by confrontational testing with stroke patients often unaware of their field loss (Townend et al. 2007).

Estimates of incidence of stroke-associated visual field loss vary considerably, depending on the method of testing used or what stage post stroke testing was performed with ranges from 20% (Beis et al 1994) to 63% (Gray et al 1989). They lead to considerable disabilities, particularly with reading, visual exploration, mobility and are associated with a higher risk of falls and also associated with reduced prognosis for successful rehabilitation (Pambakian, 2005) and frequently preclude driving (Zhang et al 2006). Visual field loss, like low vision, is associated with a higher risk of falls and thus it is important to

obtain the diagnosis of visual field impairment for this group of already compromised patients (Jones & Shinton 2006, Rowe et al 2013b).

3.2. Early intervention

National guidelines (NSF for Older People 2001, RCP national stroke guidelines 2012, NICE stroke rehabilitation guidelines 2013, SIGN stroke guidelines 2010) recommend that best care starts with a proper assessment and continues in a specific stroke unit with active management. An assessment of visual deficits in the immediate post-acute phase is the optimum time for Orthoptic input. At this stage the Orthoptist can provide essential information to the MDT on the ocular status of the patient so that other professionals can consider and use this knowledge when planning and carrying out heir own rehabilitation plans.

The neglect syndrome rather than overall stroke severity is an important predictor of poor functional recovery (Jehkonen, 2000; Buxbaum 2004) and therefore, therapy treatment for neglect remains a high priority. Treatment targeted at visual neglect has been shown to improve outcome and reduce pressure on resources (Kalra, 1997). However it is generally recognised that more research is needed to better define which treatment techniques are the most beneficial (Riggs, 2007). Treatment options have included prism adaptation (Berberovic et al), visual imagery techniques (Niemeier 2001; Niemeier 1998), and visual scanning training (Luauté, 2006). A recent Cochrane systematic review considers the many interventions for visual inattention (Bowen et al 2013).

There is evidence to support visuospatial rehabilitation for deficits associated with visual neglect after right hemisphere stroke (Cicerone, 2006; Jutai, 2003). Spacio-motor cueing and early emphasis on function can improve outcome and reduce resource use in patients with visual neglect (Kalra, 1997). Motor and functional recovery of stroke patients with neglect seems to be significantly improved by the simultaneous presence of a treatment specifically focussed on neglect (Peli 2000; Rossetti et al 1998; Paolucci 1996). Results from systematic reviews for interventions for visuo-spatial neglect have not found sufficient evidence to reach conclusions relating to the effectiveness of interventions. However, of the potentially promising interventions visual scanning training appears to be the intervention with the most supporting evidence (SIGN stroke guidelines)

There is a limited literature addressing possible rehabilitation options for patients with homonymous hemianopias and this has been reported clearly by Pollock et al (2011). Treatment typically involves expanding the visual field in lateral gaze using sector prisms. Patients, particularly those who are younger or motivated, report improvement in functioning and obstacle avoidance (Peli 2000). However it appears that although patients may show adaptation to the field defect there is little objective alteration of the visual field boundaries (Reinhard et al 2005). Despite uncertainty as to the long-term efficacy of this treatment due to lack of large scale systematic trials, advocates promote the

increased speed of adaptation to visual field loss and the benefit of this to rehabilitation. Most importantly, it is a low-cost treatment that generalises across a wide range of tasks for many weeks afterwards.

Visual search training may also be implemented for those with visual field loss and is shown to have benefit for stroke survivors with hemianopia (Pollock et al 2011). It has been reported that up to 70% of patients with homonymous field defects show disorganised visual search strategy, which can be markedly improved with systematic training of saccadic eye movements, and visual search strategies (Kerkhoff 2000). Visual field rehabilitation strategies should be initiated early after injury (Zhang et al 2006)

It is important that low vision is identified in older patients (Rowe et al 2009a). In many cases it is treatable, e.g. spectacles for uncorrected refractive errors or surgical extraction of cataract. However undiagnosed low vision or untreated low vision is a risk factor for falls and is also linked with depression and reduced activity of daily living performance (Jones & Shinton 2006). Importantly low vision can also impact on the rehabilitation of stroke (Johansen et al 2003).

Patients with disorders of eye movement should receive appropriate advice or interventions from appropriately trained specialists. (SIGN stroke guideline 118). It is important to recognise that improvement can be noted with ocular motility treatment (Kapoor et al 2004). Patients may be treated in a variety of ways dependent on their symptoms (Rowe et al 2013a). Those with diplopia can be given Fresnel prisms to join the double images and where it is not possible to achieve this with prisms, occlusion – either total or sector – can be utilised. Exercises are advocated in many cases of convergence weakness and compensatory head postures are advised to aid gaze disorders. In addition, advice may be given in relation to scanning and tracking strategies and use of a typoscope to aid reading (Rowe et al 2011a).

3.3. Long-term Follow up

In cases of visual field loss, most improvement occurs by 3-6 months (Zhang et al 2006, Rowe et al 2013b). In cases of diplopia, most recovery is expected by 6 months. By 6 months post-stroke, the Orthoptist will have either determined the next stage of intervention such as prism incorporation, referral to Ophthalmology for sight-impaired registration, botulinum toxin or surgery as appropriate OR assessed the patient as fit for discharge. It seems reasonable therefore to anticipate an average follow-up time of 6 months in most cases, based on current evidence.

However, as '*the impact of stroke varies hugely, support in the long-term needs to be tailored to meet the individual's needs'* (DoH, 2007). Follow-up can be arranged in an out-patient setting as long as is required to support long-term rehabilitation as appropriate and reflects the stated required staffing levels to support such long-term care.

Throughout the process of initial and follow-up assessments, it is important that patients and carers are provided with appropriate information that explains the potential visual problems in an appropriate manner (Rowe 2013). Early provision of visual information is reported as beneficial by stroke survivors as is post-discharge information about local support services.

4. Staffing Recommendations

Orthoptists accept direct referrals from in-patient stroke units, TIA clinics, ophthalmology out-patient clinics and community follow-up referrals. Allowance has to be made for multidisciplinary working and provision of education sessions for other professionals working with stroke patients. The National Stroke Strategy stated that staffing levels are currently inadequate (DoH, 2007). A survey in 2010 stated that staffing levels had not changed significantly and that stroke units with access to orthoptists were recorded as 78% (National sentinel stroke Audit, 2010). To comply with current national stroke guidelines this needs to be addressed.

The recommended staffing input from Orthoptists providing stroke care is 0.1wte Orthoptists per 10 bedded acute stroke unit. In addition, a minimum of one session per week for provision of follow up care is recommended. This is the **minimum** requirement to provide adequate services for stroke patients. The numbers provided may vary in areas where hyperacute / acute stroke care occurs out of area.

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